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The Alysiinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera)

III. The parasites of *Paraphytomyza* ENDERLEIN, *Phytagromyza* HENDEL and *Phytomyza* FALLÉN[2]

With textfigures 78—147

Contents

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[2] Part I in Beitr. Ent., **14**, 823—914; 1964. — Part II in Beitr. Ent., **16**, 551—605; 1966.

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Introduction

The first part of this paper (GRIFFITHS, 1964b) dealt with general questions of the taxonomy, biology and evolution of the Alysiinae, with particular reference to the species of the tribe Dacnusini which are parasites of the Agromyzidae. The second part (GRIFFITHS, 1966) dealt with the Alysiinae parasites of *Agromyza*. This third part deals with the Alysiinae parasites of two small genera, *Paraphytomyza* ENDERLEIN and *Phytagromyza* HENDEL, and a large assemblage of species which, for want of a better classification, I have all included for the time being in *Phytomyza* FALLÉN. The material studied has been very extensive and the only important species-group for whose European parasite fauna there is almost no information is the group of *Galium*-feeding species of *Paraphytomyza*. But there are still many individual host species from which I received no material, and doubtless many additional species of parasites remain to be discovered.

I have followed NOWAKOWSKI (1962) in dividing the previously accepted concept of *Phytagromyza*, retaining that name only for the species whose larvae mine Salicaceae and *Fraxinus*. Most of the remaining species, including all those associated with Rubiaceae and Caprifoliaceae, have been included in *Paraphytomyza* (see the note in NOWAKOWSKI, 1964). I have ascribed to *Phytomyza* not only the species normally included in this genus but also all leaf-mining species formerly ascribed to *Napomyza*. NOWAKOWSKI (1962) demonstrated that many of these species are very closely related to species included in *Phytomyza* and that the distinction of two "genera" *Napomyza* and *Phytomyza* according to the presence or absence of the lower cross-vein is entirely misleading. The generic name *Napomyza* should be applied only to those stem-boring species related to the genotype *lateralis* FALLÉN (whose parasites are not treated in this paper). For the time being I have included the leaf-mining species in *Phytomyza*, reverting to their previous nomenclature. It is evident that the very wide concept of *Phytomyza* used in this paper includes a number of divergent groups and may not be monophyletic. But until genitalia studies have been made on a large number of species it would be premature to attempt to break it down into smaller genera. The existing uncertainty about the relationships between the species included in *Phytomyza* has made it difficult to evaluate the significance of many of the host ranges shown by their parasites.

The abbreviations used in this paper have already been explained in the introduction to Part II (GRIFFITHS, 1966).

Acknowledgements to those who have helped me with the loan or gift of material have already been given in Part I (GRIFFITHS, 1964b). In addition to those mentioned there I would like to add an acknowledgement to Dr. habil. H. BUHR of Mühlhausen, Thuringia, who has gone to considerable trouble to obtain material for me to include in this paper. I would also like to express my thanks to Miss GERALDINE ROCHE of the National Museum of Ireland for her kindness in sending me material from the HALIDAY collection.

Some comment should perhaps be made here on the host identifications of the Danish material from the SCHLICK collection recorded in this paper. This material has not previously been named, but SCHLICK gave all his species of

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Agromyzidae numbers. The hosts of the parasites were established by comparing the puparia mounted with the parasites with those from which flies had emerged; and in most cases the association was further confirmed by the species-numbers on the labels. SCHLICK clearly specialised in collecting from marsh plants and he obtained several species whose life-history is not otherwise known. Unfortunately he did not state the host-plants on his labels, so that the life-history of these species must await rediscovery. I am therefore in the curious position of having established what are the parasites of *Phytomyza tenella* MEIGEN and *P. dasyops* HENDEL, although the life-history of these hosts is unknown.

Previous Records

As in the previous part of this paper I have prepared a table below explaining the discrepancies between my list of host records and the list of records given in FULMEK (1962), whose list includes virtually all records for Europe before the present decade. The comments exclude changes in the generic nomenclature, which affect most parasite names and a number of host names. Comments on some of the rejected records are also included under the descriptions of the species concerned. A few records have been rejected without explanation as not being based on any good authority, although I have not seen the material on which they were based. It must be appreciated that before NIXON's work relatively few species of Dacnusini had been described and most earlier identifications cannot be accepted without subsequent confirmation or reexamination of the material concerned.

Table 9

Earlier Records of Alysiinae parasites of host species included in this paper in *Phytomyza*, *Paraphytomyza* and *Phytagromyza* (after FULMEK, 1962) with comments thereon

Host	Parasite	Comments
Agromyza + *Phytomyza* (sensu antiquo)	*Alysia* sp.	not accepted (parasites of Calliphoridae)
	Dacnusa sp.	record too imprecise to be of value
Napomyza glechomae KALTENBACH	*Rhizarcha areolaris* NEES	refers to *Dacnusa confinis* RUTHE
	Rhizarcha laevipectus THOMSON	accepted
Napomyza spp.	*Dacnusa* sp. vic. *aphanta* NIXON	This seems to be a confused version of the record in GRIFFITHS (1956) of *"Dacnusa* sp. nr. *aphanta* MARSHALL" having been bred from *"Napomyza" xylostei* KALTENBACH. The parasite is described as *Chorebus sylvestris* sp. nov. in this paper and the host referred to *Phytomyza*.
	Rhizarcha laevipectus THOMSON	I have seen material of *Dacnusa laevipectus* THOMSON bred from several leaf-mining species formerly included in *Napomyza* which are referred to *Phytomyza* in this paper (not from the true *Napomyza* spp.).

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Host	Parasite	Comments
Napomyza xylostei KALTENBACH	*Aphaereta minuta* NEES	not accepted (I have never received any *Aphaereta* sp. bred from Agromyzidae)
	Dacnusa aphanta NIXON	refers to *Chorebus sylvestris* sp. nov.
	Orthostigma pumilum NEES	not accepted (probably parasite of Tachinidae)
Phytagromyza langei HERING	*Dacnusa incidens* THOMSON	not accepted (THOMSON's name has been synonymised with *Dacnusa abdita* (HALIDAY), a parasite of *Agromyza*)
Phytagromyza populi KALTENBACH	*Dacnusa albipes* HALIDAY	accepted
	Dacnusa lateralis HALIDAY	not accepted (parasite of *Agromyza*)
Phytagromyza tremulae HERING	*Dacnusa albipes* HALIDAY	accepted
Phytagromyza tridentata LOEW	*Dacnusa albipes* HALIDAY	accepted
	Dacnusa dirempta HALIDAY	not accepted
Phytagromyza xylostei ROBINEAU-DESVOIDY	*Dacnusa dirempta* HALIDAY	not accepted
	Dacnusa flavipes GOUREAU	not accepted, see Appendix VIII
Phytomyza abdominalis ZETTERSTEDT	*Dacnusa ovalis* MARSHALL	not accepted
Phytomyza aconiti HENDEL	*Pachysema aquilegiae* MARSHALL	refers to *Dacnusa delphinii* sp. nov.
Phytomyza actaeae HENDEL	*Rhizarcha stramineipes* HALIDAY	not accepted (*Dacnusa stramineipes* (HALIDAY) has a long ovipositor and can hardly be a parasite of a leaf-miner.)
Phytomyza adjuncta HERING	*Rhizarcha laevipectus* THOMSON	accepted
	Toxelea umbellina NIXON	accepted
Phytomyza affinis FALLÉN	*Orthostigma flavipes* RATZEBURG *Orthostigma pumilum* NEES	not accepted (probably parasite of Tachinidae) — the two specific names are synonymous, see KÖNIGSMANN (1964).
Phytomyza albiceps MEIGEN	*Dacnusa ovalis* MARSHALL	refers to *Chorebus alecto* (MORLEY)
	Dacnusa rufipes NEES	NEES' name is a nomen dubium (type destroyed)
	Dacnusa sp.	not sufficiently precise
	Pachysema temula HALIDAY	not accepted (parasite of *Scaptomyza*)
	Pachysema turissa NIXON	accepted as referring to *Chorebus alecto* (MORLEY) (= *Dacnusa turissa* NIXON) — the species has never been included in *Pachysema*
	Rhizarcha areolaris NEES	not accepted: I consider that the host was *P. atricornis* MEIGEN
	Rhizarcha maculipes THOMSON	accepted
	Rhizarcha senilis NEES	not accepted (parasite of *Melanagromyza*)
	Toxelea bellina NIXON	refers to *Dacnusa ocyroe* NIXON (mislabelled specimen)
Phytomyza anemones HERING	*Pachysema* sp.	refers to *Dacnusa brevistigma* (TOBIAS) (in Italy — not in Britain)
Phytomyza angelicae KALTENBACH	*Dacnusa angelicae* NIXON	accepted
	Rhizarcha areolaris THOMSON	not accepted (I have not been able to trace the material on which HAVILAND's (1922) study of "*Dacnusa areolaris*" is based)
	Rhizarcha laevipectus THOMSON	accepted
Phytomyza angelicastri HERING	*Toxelea bellina* NIXON	accepted (this record refers to the intermediate series between *Exotela cyclogaster cyclogaster* FÖRSTER and *E. c. umbellina* (NIXON))
Phytomyza anthrisci HENDEL	*Toxelea umbellina* NIXON	accepted
Phytomyza aquilegiae ROBINEAU-DESVOIDY	*Dacnusa chereas* GOUREAU	see Appendix VIII (host was *P. minuscula* GOUREAU, not *P. aquilegiae* HARDY)

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Host	Parasite	Comments
	Pachysema aquilegiae MARSHALL	accepted
Phytomyza atricornis MEIGEN	*Antrusa melanocera* THOMSON	not accepted
	Dacnusa leptogaster HALIDAY	not accepted (parasite of *Ophiomyia pulicaria* group)
	Dacnusa maculata GOUREAU	not accepted (see Appendix VIII)
	Dacnusa semirugosa HALIDAY	not accepted (parasite of *Amaurosoma*)
	Dacnusa sonchi FÖRSTER	nomen nudum (never described)
	Dacnusa sp.	record insufficiently precise
	Pachysema turissa NIXON	not accepted: I consider the host was *P. albiceps* MEIGEN (*Dacnusa turissa* NIXON is a synonym of *Chorebus alecto* (MORLEY) and has never been included in *Pachysema*)
	Rhizarcha areolaris NEES	accepted
	Rhizarcha laevipectus THOMSON	accepted
	Rhizarcha maculipes THOMSON	accepted
	Rhizarcha pubescens CURTIS	accepted
Phytomyza bellidina HERING	*Pachysema turissa* NIXON	accepted (parasite now called *Chorebus alecto* (MORLEY) — never was included in *Pachysema*)
Phytomyza chaerophylli KALTENBACH	*Rhizarcha areolaris* NEES	not accepted
	Rhizarcha laevipectus THOMSON	HAMM's records have been referred to *P. anthrisci* HENDEL
	Toxelea bellina NIXON	refers to *Exotela cyclogaster umbellina* (NIXON)
	Toxelea umbellina NIXON	accepted
Phytomyza cicutae HENDEL	*Rhizarcha areolaris* NEES	not accepted
Phytomyza cineracea HENDEL	*Pentapleura angustula* HALIDAY	not accepted (I have only seen an *Opius* sp. bred from this host)
Phytomyza cinerea MEIGEN	*Dacnusa incerta* GOUREAU	not accepted (described from a *Liriomyza* host, see Appendix VIII)
Phytomyza cirsii HENDEL	*Toxelea spinifer* NIXON	accepted
Phytomyza conopodii HERING	*Toxelea umbellina* NIXON	accepted
Phytomyza continua HENDEL	*Dacnusa leptogaster* HALIDAY	host identification not accepted (*leptogaster* is a parasite of the *Ophiomyia pulicaria* group): there are no puparia with the series on which this record is based.
Phytomyza conyzae HENDEL	*Dacnusa ovalis* MARSHALL	refers to *Chorebus alecto* (MORLEY)
	Pachysema ocyrae NIXON	accepted (but spelling should be *ocyroe*)
	Rhizarcha maculipes THOMSON	accepted
	Rhizarcha pubescens CURTIS	not accepted
Phytomyza corvimontana HERING	*Pachysema melicerta* NIXON	accepted
Phytomyza crassiseta ZETTERSTEDT	*Dacnusa amasis* NIXON	not accepted
	Dacnusa lugens HALIDAY	not accepted (probably parasites of Tachinidae)
	Orthostigma sp.	accepted
	Pachysema turissa NIXON	The record of *turissa* in NIXON (1937) referred to *Chorebus amasis* (NIXON). *Chorebus alecto* (MORLEY) (= *Dacnusa turissa* NIXON) is recorded from *crassiseta* for the first time in this paper. (*Dacnusa turissa* has never been included in *Pachysema*.)
	Rhizarcha maculipes THOMSON	accepted
Phytomyza fulgens HENDEL	*Rhizarcha laevipectus* THOMSON	accepted

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Host	Parasite	Comments
Phytomyza gentianae HENDEL	*Dacnusa dagda* NIXON	accepted
Phytomyza heliosciadii KALTENBACH	*Dacnusa heliosciadii* FÖRSTER	nomen nudum (never described): the host name is a nomen dubium as no Agromyzid has subsequently been found on the stated host-plant, *Apium nodiflorum*.
Phytomyza ilicis CURTIS	*Dacnusa chereas* GOUREAU	described from *P. minuscula* GOUREAU, not recorded from *ilicis*
	Dacnusa maculata GOUREAU	nomen dubium, see Appendix VIII
Phytomyza lappina GOUREAU	*Dacnusa rufipes* NEES	NEES' name is a nomen dubium (type destroyed)
	Pachysema ocyrae NIXON	accepted (but spelling should be *ocyroe*)
	Rhizarcha maculipes THOMSON	accepted
Phytomyza laserpitii HENDEL	*Dacnusa tarsalis* THOMSON	not accepted (parasite of *P. autumnalis* GRIFFITHS and *P. farfarae* HENDEL)
Phytomyza melana HENDEL	*Dacnusa credne* NIXON	refers to *Chorebus abaris* (NIXON) bred from *P. tetrasticha* HENDEL
	Dacnusa resa NIXON	also refers to *Chorebus abaris* (NIXON) bred from *P. tetrasticha* HENDEL
	Toxelea umbellina NIXON	accepted
Phytomyza milii KALTENBACH	*Dacnusa aphanta* MARSHALL	accepted
	Rhizarcha areolaris NEES	confirmation required (HAMM confused *P. milii* KALTENBACH and *P. nigra* MEIGEN)
Phytomyza minuscula GOUREAU	*Dacnusa tessula* FALLÉN	not accepted (the name seems to be a confused version of *Dacnusa temula* (HALIDAY), a parasite of *Scaptomyza*)
	Pachysema aquilegiae MARSHALL	not accepted
	Rhizarcha areolaris NEES	not accepted
Phytomyza nigra MEIGEN	*Dacnusa aphanta* MARSHALL	accepted
	Rhizarcha areolaris NEES	accepted
	Rhizarcha maculipes THOMSON	accepted
Phytomyza obscura HENDEL	*Dacnusa nana* NIXON	the host was *P. origani* HERING, but the species is also associated with *obscura* (first recorded by NOWAKOWSKI, 1959)
Phytomyza obscurella FALLÉN	*Coelinius festus* GOUREAU	GOUREAU's name is a nomen dubium, see Appendix VIII (*Coelinius* spp. are parasites of Chloropidae)
	Dacnusa incerta GOUREAU	not accepted (described from a *Liriomyza* sp. on *Euphorbia*)
	Rhizarcha areolaris NEES	refers to *Dacnusa laevipectus* THOMSON
	Rhizarcha laevipectus THOMSON	accepted
	Toxelea bellina NIXON	refers to *Exotela cyclogaster umbellina* (NIXON)
	Toxelea umbellina NIXON	accepted
Phytomyza pastinacae HENDEL	*Toxelea bellina* NIXON	accepted (now called *Exotela cyclogaster cyclogaster* FÖRSTER)
Phytomyza periclymeni DE MEIJERE	*Dacnusa lateralis* HALIDAY	not accepted (parasite of *Agromyza*)
	Rhizarcha maculipes THOMSON	host was *P. xylostei* KALTENBACH (misidentified by HAMM)
Phytomyza petövi HERING	*Rhizarcha maculipes* THOMSON	accepted
Phytomyza pimpinellae HENDEL	*Rhizarcha laevipectus* THOMSON	accepted
Phytomyza plantaginis ROBINEAU-DESVOIDY	*Dacnusa dirempta* HALIDAY	not accepted
	Pachysema discolor FÖRSTER	refers to *Dacnusa plantaginis* sp. nov.
	Rhizarcha areolaris NEES	not accepted
	Rhizarcha maculipes THOMSON	accepted

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Host	Parasite	Comments
	Rhizarcha stramineipes HALIDAY	not accepted (*Dacnusa stramineipes* (HALIDAY) has a long ovipositor and can hardly be a parasite of a leaf-miner)
Phytomyza primulae ROBINEAU-DESVOIDY	*Antrusa melanocera* THOMSON	not accepted
	Coelinius festus GOUREAU	nomen dubium, see Appendix VIII
	Dacnusa incerta GOUREAU	not accepted, see Appendix VIII
	Pachysema discolor MARSHALL	accepted (but author should be FÖRSTER)
	Pachysema cercides NIXON	synonym of *Dacnusa discolor* (FÖRSTER)
	Rhizarcha maculipes THOMSON	accepted
Phytomyza ramosa HENDEL	*Dacnusa tanis* NIXON	the host was *Phytomyza* sp. on *Dipsacus*, but the species is also recorded in this paper from the true *ramosa*
	Pachysema metula NIXON	host was *Phytomyza* sp. on *Dipsacus*
	Rhizarcha areolaris NEES	confirmation required
	Rhizarcha pubescens CURTIS	host was *Phytomyza* sp. on *Dipsacus*
	Toxelea spinifer NIXON	not accepted
Phytomyza ranunculi SCHRANK	*Pachysema melicerta* NIXON	refers to *Dacnusa macrospila* (HALIDAY)
	Rhizarcha areolaris NEES	not accepted
	Rhizarcha gilvipes HALIDAY	confirmed (but I do not know whether the records on which the entries in FULMEK's list are based were correct)
	Rhizarcha laevipectus THOMSON	accepted
	Rhizarcha maculipes THOMSON	accepted
Phytomyza ranunculivora HERING	*Pachysema melicerta* NIXON	refers to *Dacnusa macrospila* (HALIDAY) bred from *P. ranunculi* SCHRANK
Phytomyza rufipes MEIGEN	*Chorebus affinis* NEES	not accepteds
	Dacnusa mucronata TELENGA	significance not known to me (the identity of TELENGA's species requires clarification)
	Dacnusa thusa NIXON	confirmed
	Rhizarcha areolaris NEES	not accepted
	Rhizarcha pubescens CURTIS	accepted
	Rhizarcha stramineipes HALIDAY	not accepted (I suspect this record is based on confusion with *D. pubescens* (CURTIS))
Phytomyza scabiosae HENDEL	*Dacnusa* sp.	refers to *Chorebus scabiosae* sp. nov.
Phytomyza scolopendri ROBINEAU-DESVOIDY	*Dacnusa punctum* GOUREAU	accepted
Phytomyza senecionis KALTENBACH	Dacnusini sp.	record insufficiently precise
	Rhizarcha areolaris NEES	not accepted
	Rhizarcha gilvipes HALIDAY	not accepted
Phytomyza silai HERING	*Priapsis dice* NIXON	accepted
Phytomyza smyrnii SPENCER	*Toxelea umbellina* NIXON	confirmation required
Phytomyza sonchi ROBINEAU-DESVOIDY	*Dacnusa flavipes* GOUREAU	not accepted, see Appendix VIII
	Toxelea bellina NIXON	refers to *Exotela cyclogaster sonchina* ssp. nov.
Phytomyza söndérupi HERING	*Rhizarcha stramineipes* HALIDAY	not accepted
Phytomyza spp.	*Alysia* spp.	not accepted (parasites of Calliphoridae)
	Orthostigma pumilum NEES	not accepted (probably a parasite of Tachinidae)
	Rhizarcha areolaris NEES	parasite of *P. atricornis* MEIGEN, *P. asteris* HENDEL and *P. nigra* MEIGEN
	Rhizarcha laevipectus THOMSON	oligophagous parasite of many *Phytomyza* spp.
Phytomyza spondylii ROBINEAU-DESVOIDY	*Rhizarcha laevipectus* THOMSON	accepted

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Host	Parasite	Comments
	Toxelea bellina NIXON	accepted (now called *Exotela cyclogaster cyclogaster* FORSTER)
Phytomyza symphyti HENDEL	*Dacnusa nana* NIXON	host was an unidentified *Phytomyza* sp. (? *pulmonariae* NOWAKOWSKI), but the species is also recorded in this paper from the true *symphyti*
	Dacnusa sp.	this specimen has been accepted as *Chorebus nana* (NIXON) in this paper: the host was *P. myosotica* NOWAKOWSKI
	Rhizarcha maculipes THOMSON	host was *P. myosotica* NOWAKOWSKI
Phytomyza tetrasticha HENDEL	*Dacnusa dirempta* HALIDAY	not accepted
Phytomyza thalictricola HENDEL	*Pachysema* sp. vic. *turissa* NIXON	refers to *Chorebus oreoselini* sp. nov. bred from *P. pauliloewii* HENDEL (misidentified as *thalictricola* in GRIFFITHS, 1956)
Phytomyza veronicicola HERING	*Dacnusa lateralis* HALIDAY	not accepted (parasite of *Agromyza*)
Phytomyza vitalbae KALTENBACH	*Rhizarcha laevipectus* THOMSON	accepted

Dapsilarthra FÖRSTER

For information on identifying the species of *Dapsilarthra* see KÖNIGSMANN (1959) and Part II of this paper (GRIFFITHS, 1966). The following are records for the host genera treated in this part.

Dapsilarthra rufiventris (NEES)

KÖNIGSMANN (1959) recorded this species from the following species of *Phytomyza*: *P. autumnalis* GRIFFITHS (as "*Ph.* nov. spec. GRIFFITHS"), *P. calthivora* HENDEL, *P. gentianae* HENDEL, *P. phellandrii* HERING, *P. primulae* ROBINEAU-DESVOIDY, *P. sedicola* HERING and *P. swertiae* HERING. I have examined additional material from the following hosts.

Phytomyza atricornis MEIGEN — 1 ex. from *Cirsium arvense*, Beaconsfield, Bucks., England (BM).

P. autumnalis GRIFFITHS — 7 ex. from *Cirsium palustre*, Mühlhausen, Thuringia, Germany, leg. BUHR no. 2688 (GCDG).

P. biseta GROSCHKE — 1 ex. from *Chaerophyllum hirsutum*, Wolfersdorf, Thuringia, Germany, leg. BUHR, HERING no. 1988 (GCDG).

P. crassiseta ZETTERSTEDT — 1 ex. from *Veronica montana*, Rostrevor Wood, Down, Ireland (GCDG): 1 ex., Hausach, Schwarzwald, Germany, leg. SPENCER (GCDG): 3 ex., Bolt Head, Devon, England, leg. SPENCER (GCDG).

P. glechomae KALTENBACH — 1 ex. from *Glechoma hederacea*, Darenth, Kent, England (BM).

P. lonicerella HENDEL — 1 ex. from *Lonicera periclymenum*, Derwent Water, Cumberland, England (GCDG): 1 ex., Lizard, Cornwall, England, leg. SPENCER (GCDG).

P. plantaginis ROBINEAU-DESVOIDY — 3 ex. from *Plantago major*, Mühlhausen, Thuringia. Germany, leg. BUHR no. 2533 (GCDG).

P. primulae ROBINEAU-DESVOIDY — 1 ex., Lenggries, Oberbayern, Germany, leg. GROSCHKE (STGT): 1 ex. from *Primula vulgaris*, Oxford, England, leg. HAMM (HD) (mounted with *Dacnusa discolor* (FÖRSTER)).

Other host genera are *Amauromyza* (KÖNIGSMANN, 1959), *Trilobomyza* (KÖNIGSMANN, 1959) and *Liriomyza* (material in my collection).

Dapsilarthra sylvia (HALIDAY)

KÖNIGSMANN (1959) recorded this species from *Phytomyza astrantiae* HENDEL and *P. swertiae* HERING. I have received additional material from the following hosts.

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Phytomyza obscurella FALLÉN — ♂♀ from larvae 3. x. 64 on *Aegopodium podagraria*, Stadtwald, Mühlhausen, Thuringia, Germany, em. iii. 65, leg. BUHR no. 2314a (GCDG).
P. ranunculi SCHRANK — ♀ from larva 29. v. 65 on *Ranunculus repens*, Stadtwald, Mühlhausen, Thuringia, Germany, em. 30. vi. 65, leg. BUHR no. 2378 (GCDG).

I have previously also recorded this species from *Agromyza oycoviensis* BEIGER (GRIFFITHS, 1966).

Dapsilarthra balteata (THOMSON)

Recorded by KÖNIGSMANN (1959) from *Phytomyza fallaciesa* BRISCKKE and *P. phellandrii* HERING.

Dapsilarthra nowakowskii KÖNIGSMANN

KÖNIGSMANN (1959) described this species from a series bred by Dr. NOWAKOWSKI from *Phytomyza minuscula* GOUREAU in the Tatry mountains, Poland.

Dapsilarthra gahani (BAUME-PLUVINIEL)

DE LA BAUME-PLUVINIEL (1914) described this species from material bred from a *Phytomyza* species on *Aquilegia* (presumably either *P. aquilegiae* HARDY or *P. minuscula* GOUREAU) from the shores of Lake Lucerne, Switzerland. KÖNIGSMANN (1959) could not trace his material and was unable to interpret the name from the description (which omits certain relevant characters). It seems advisable to wait until further material from the type locality can be obtained before offering any firm opinion on the application of the name.

Pseudopezomachus MANTERO

This genus contains four described species from the mediterranean region. For their identification reference should be made to NIXON (1940).

All the species are flightless, with the wings either highly modified to form oar-shaped appendages (*P. masii* NIXON ♂) or completely lost (other species and *P. masii* NIXON ♀). The structure of the thorax has also been considerably modified, and in particular the postscutellum has been completely lost. This latter apomorph character serves to distinguish *Pseudopezomachus* from the other genera of apterous or brachypterous Alysiinae (for the literature on these see the catalogue in HEDQVIST (1962)).

In addition to the records for *Pseudopezomachus* there is an old record (included in FULMEK, 1962) of another apterous species, *Chasmodon apterus* (NEES), having been bred from an unidentified Agromyzid in Germany. But there are also old records of *Chasmodon* from hosts other than Agromyzidae, and it seems unwise to attempt to evaluate these records until further information is available.

The following are the breeding records of *Pseudopezomachus* from the host genera treated in this paper.

Pseudopezomachus cursitans (FERRIÈRE)

2 ex. from larvae of *Phytomyza ferulae* HERING on *Scaligeria cretica*, Hvar Island, Yugoslavia, em. 4 and 19. ix. 63, leg. HERING no. 7007 (GCDG and Mr. K.-J. HEDQVIST's collection). 1 ♀ from larva of *Phytomyza obscura* HENDEL on *Calamintha clinopodium*, Jelsa, Hvar Island, em. 7. ix. 65, leg. HERING no. 7334 (GCDG).

This species was previously known only from the female holotype taken on Corfu (Greece). The Hvar material includes a male which like the females is

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completely wingless. The number of antennal segments in the Hvar specimens in my possession is: ♂, 21 (2 ex.); ♀, 19, 20. According to FERRIÈRE (1930) the holotype ♀ has 21 antennal segments. The species was also bred from *Liriomyza congesta* BECKER on Hvar and is probably oligophagous.

Pseudopezomachus bituberculatus (MARSHALL)

2 ♀♀ from larvae of *Phytomyza bellidina* HERING on *Bellis silvestris*, Jelsa, Hvar Island, Yugoslavia, em. 1—2. xi. 65, leg. HERING no. 7332 (GCDG).

This species was also bred from a dipterous leaf-miner on *Lepidium* at Hyères in France (first recorded in NIXON, 1940). These specimens are in the British Museum but, as the puparia were not retained, the identity of the host cannot be established.

Dacnusini

Tables of biometric data have again been prepared to include characters which admit of simple numerical expression and thereby reduce the length of the verbal descriptions. Notes on the bases of the measurements and ratios included have been given in Part I (GRIFFITHS, 1964b, page 904). Since a high proportion of the species treated in this paper are described as new and substantial revisionary work has been necessary, I have thought it advisable to describe all species on a comparable basis, irrespective of whether or not adequate previous descriptions are available. When no reference is made to the length of the ovipositor (♀) in any description, it should be assumed that this is short, not projecting beyond the apical tergite in the retracted position.

Exotela FÖRSTER

Exotela aconiti sp. nov.

Colour. Palpi dull yellow, slightly tinged with brown. Labrum and clypeus deep yellow. Centre of mandibles pale yellow. Basal antennal segments yellow-brown as far as about the second flagellar segment (this colour merging gradually into the black colour of most of the flagellum). Legs largely deep yellow, almost yellow-brown, with the tarsi (especially segments 5) and the apex of the hind tibiae infuscated: the hind coxae are also slightly infuscated posteriorly at their extreme base. Gaster entirely dark.

Morphology. Ocelli forming a triangle whose base is slightly longer than its sides: immediately behind the ocellar triangle the vertex is traversed by a short longitudinal groove. Face with punctate sculpture, covered with dense pubescence which is directed upwards except along the eye-margins. Vertex and temples with about 4 rows of fine hairs. Antennal segments: ♂, 29 (holotype); ♀, 27: the first flagellar segment is relatively long (compare *cyclogaster*), but the more apical segments are short, only about 1.5 times as long as wide. Mandibles 3-toothed, only slightly expanded towards their apex.

Mesoscutum with slightly roughened surface (especially anteriorly), densely pubescent over its entire surface: notaulices weak, indicated anteriorly only. Precoxal suture of mesepisternum obliquely placed, small and narrow, but well-defined and clearly rugose-costate. Metapleuron with sparse fine pubescence directed towards the hind coxa (the plesiomorph condition). Propodeum strongly shining with a few erect hairs mainly at its sides. Petiole with fine pubescence

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distributed over most of its surface. Tergite 3 bearing similar fine pubescence in the holotype (but not in the other specimen).

Wing with *1m—cu* interstitial or narrowly received into cell R_s: pterostigma and cell $2R_1$ elongate (compare *cyclogaster*, fig. 78): vein Cu_{1b} weak or almost absent.

Host — *Phytomyza aconitella* HENDEL

Holotype ♂ from larva 12. ix. 60 on *Aconitum callibotrys*, Kraków Ravine, Tatry, Poland, pupated 16. ix, em. 5. v. 61, leg. NOWAKOWSKI (PAN). Paratype ♀ from larva 1. ix. 60 on *Aconitum callibotrys*, Miedziane, Tatry, pupated 2. ix, em. 8. v. 61, leg. NOWAKOWSKI (PAN).

This is not a very distinctive species and careful comparison will be needed to prevent confusion of caught specimens with *E. hera* (NIXON) or *E. cyclogaster* FÖRSTER. An important character to notice is the extensive mesoscutal pubescence, entirely covering the lateral lobes. The petiole is also more pubescent than in the two species mentioned.

Exotela gilvipes (HALIDAY)

Alysia (*Dacnusa*) *gilvipes* HALIDAY, 1839 (in part)
Dacnusa gilvipes (HALIDAY), MARSHALL, 1891, 1895 and 1897, NIXON, 1937 (nec sensu FÖRSTER, 1862)
Dacnusa (*Dacnusa*) *albilabris* THOMSON, 1895
Toxelea gilvipes (HALIDAY), NIXON, 1954
Exotela gilvipes (HALIDAY), GRIFFITHS, 1964b and 1966

Colour. Palpi, labrum, mandibles and basal antennal segments (up to at least the second flagellar segment) clear yellow. Clypeus yellow or yellow-brown. Legs almost entirely yellow, only tarsal segments 5 and occasionally the apex of the hind tibiae somewhat darker.

Morphology. Antennal segments: ♂, 27—31; ♀, 27—29. A short longitudinal groove runs from the middle of the ocellar triangle across the vertex (as in *sulcata*). Mesoscutum roughened anteriorly, with short pubescence covering most of its surface: notaulices weak or absent. Precoxal suture broad and coarsely rugose. Metapleuron bearing long hairs directed towards the hind coxa. Propodeum with a few long hairs similar to those of the metapleuron at its sides, bare centrally. Petiole only sparsely pubescent, often with a distinct central keel. Tergite 3 with a few hairs scattered over its surface. Ovipositor (♀) long and downcurved, projecting beyond the apical tergite in the retracted position by at least half the length of the petiole. Legs unusually slender, especially the tarsi (hind tarsus about as long as the hind tibia).

Wing (fig. 80) with *1m—cu* received into cell R_s: pterostigma elongate: Cu_{1b} retained.

Breeding records

Host — *Phytomyza ranunculi* SCHRANK

Denmark: 5 ex., Randers, Jutland; 2 ex., Damhusmose, Sealand; and 2 ex., Køge, Sealand: leg. SCHLICK (KB and GCDG). 1 ♂ from puparium vi. 21 on *Ranunculus* sp., Oxford, England, em. 24. vi. 21, leg. HAMM (HD).

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This is the only species of *Exotela* with a projecting ovipositor (fig. 335 in NIXON, 1954, shows this in an extruded position). The slender tarsi (about equal in length to the tibiae) are also characteristic.

The series in the Irish National Museum believed to represent HALIDAY's *gilvipes* includes three males of *E. cyclogaster sonchina* ssp. nov., one female of *Dacnusa evadne* NIXON and two females of the species described above. The original description says "terebra exerta gracili", which can only refer to females of the species described above. But HALIDAY's statement that the legs were more slender in the female than in the male clearly implies that he thought that the males of *cyclogaster sonchina* represented the same species (this subspecies having similar bright coloration to *gilvipes*). A lectotype ♀ has therefore been selected to confirm the accepted interpretation of this species. A male of *sonchina* was labelled as "Type" by STELFOX in 1932 before he appreciated that two species were involved, but in the interests of nomenclatorial stability I have not chosen this specimen as the lectotype (see also in Appendix XI).

Exotela sulcata (TOBIAS), **comb. nov.**

Pachysema sulcata TOBIAS, 1962

Colour. Palpi dark brown. Clypeus brown or dark brown; labrum dull yellow or brown. Mandibles yellow-brown centrally. Antennae entirely dark. Legs ochreous or yellow-brown, with all tarsi and the apices of the tibiae more strongly infuscated. The whole insect has a dull appearance, in contrast with the metallic sheen of most species.

Morphology. Head strongly transverse (see the table of biometric data) with the clypeus somewhat projecting in lateral view. Ocelli forming a triangle whose base is slightly longer than its sides: a short longitudinal groove runs from the middle of the triangle across the vertex. Face only weakly shining, covered with punctate sculpture and dense pubescence which is directed upwards except along the eye-margins: clypeus similarly sculptured to the face. Vertex and temples bearing 3—4 rows of short hairs, which are also found on the ocellar triangle and the upper part of the frons. Antennal segments: ♂, 23 (1 ex.)—24—27; ♀, 23—25—26 (1 ex.). Mandibles 3-toothed, not expanded.

Mesoscutum shallowly sculptured anteriorly, bearing short adpressed pubescence distributed over most of its surface (length of hairs about 0.05 mm.): notaulices weakly indicated anteriorly only or absent. Precoxal suture of mesepisternum broad and coarsely rugose-costate: epicnemial suture rugose-costate along the anterior edge of the mesepisternum. Metapleuron shallowly sculptured, only weakly shining, with sparse pubescence directed towards the hind coxa (but the hairs are distinctly shorter than in most *Exotela* spp.). Propodeum with inconspicuous erect short hairs sparsely distributed over most of its surface. Petiole bearing only very few hairs. Tergite 3 without any basal hairs.

Wing (fig. 79) with vein *1m—cu* narrowly received into cell R_s or interstitial (in a few of the Danish specimens): cell $2R_1$ narrower than in other *Exotela* spp.: cell *2Cu* short, closed by vein Cu_{1b} at its lower distal corner in the English specimen but this vein is weak or lost in the Danish series.

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Breeding records

Host 1 — *Phytomyza calthivora* HENDEL

1 ♂ from larva on *Caltha palustris*, Corsham, Wilts , England, em 13 IV 55, leg SPENCER (GCDG) 37 ex , Randers, Jutland, Denmark, leg SCHLICK (KB and GCDG)

Host 2 — *Phytomyza calthophila Hering*

47 ex , Randers, Jutland, Denmark, leg SCHLICK (KB) 4 ♂♂, 2 ♀♀ from larvae 12 VI 65 on *Caltha palustris*, Mullagh More, Clare, Ireland, em 21—24 III 66 (GCDG)

This is a very well characterised species Apart from the dark coloration the broad coarse precoxal suture and short dense mesoscutal pubescence are distinctive TOBIAS (1962) originally described the species in *Pachysema*, but the pterostigma is not sexually dimorphic the wing venation leaves me in no doubt that it is correctly placed in *Exotela*

It is surprising that the Irish series did not emerge until the following spring from host larvae collected in early June The host has two or more generations a year in Ireland, as elsewhere

***Exotela lonicerae* sp. nov.**

Colour Palpi yellow Mandibles orange or brown centrally with dark teeth Labrum dull yellow, but clypeus brown or reddish Antennae largely dark, only the scape, annellus and sometimes the first flagellar segment yellow-brown Legs largely dull yellow, with the apical tarsal segments of legs 1 and 2, and the hind tibiae (at least apically) and entire hind tarsi somewhat infuscated Tergite 3 brown or yellow-brown at least basally

Morphology Ocelli forming a triangle whose base is clearly longer than its sides Face shining, almost smooth, with fine pubescence, directed upwards at its centre but downwards at its sides Vertex and temples with 3 to 4 rows of fine hairs Antennal segments ♂, 24 (3 ex), 26, ♀, 23—26 Mandibles a little expanded, with 3 strong teeth, of which tooth 2 is rather strongly pointed

Mesoscutum pubescent over its central lobe and anterior face, but the lateral lobes are largely bare notaulices absent Precoxal suture of mesepisternum absent, or at most represented by a smooth impression epicnemial suture also smooth for most of its length Metapleural pubescence sparse and long, directed towards the hind coxa Propodeum strongly shining with sparse erect hairs similar to those of the metapleuron mainly at its sides Petiole with only sparse inconspicuous pubescence Tergite 3 with hairs near its base, as well as an apical row

Wing (fig 84) with the pterostigma shorter and broader than in the *E cyclogaster* group *1m—cu* interstitial or very narrowly received into cell R_1 Cu_{1b} retained, so that cell *2Cu* is closed at its lower distal corner

Host — *Paraphytomyza hendeliana* HERING

Holotype ♀, 1 ♂, 9 ♀♀ paratypes from larvae 17 VII 62 on *Lonicera periclymenum*, Scratch Wood, London, em 12—19 IV 63 (GCDG) 1 paratype from larva on *Lonicera periclymenum*, Hampstead, London, em 26 IV 54, leg SPENCER (GCDG) 3 ♂♂, 1 ♀ paratypes

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from larvae 11. vi. 64 on *Lonicera periclymenum* in my garden at Barnet, London, em. 13—20. iv. 65 (GCDG).

This species has, like its host, only a single generation a year. It is closely related to *E. minuscula* sp. nov., but that species has fewer antennal segments and a shorter cell $2R_1$.

Exotela minuscula sp. nov.

To be compared with *E. lonicerae* sp. nov. as follows.

Colour. Antennae paler, with the basal segments as far as about the third flagellar segment obscurely yellow-brown (this colour merging gradually into the dark colour of the rest of the flagellum). Legs almost entirely deep yellow, only the fifth tarsal segments slightly infuscated. Tergite 3 pale ochreous in the holotype and Polish specimen, but dark in the Mühlhausen specimen.

Morphology. 20—21 antennal segments (♀). Mandibles small, not expanded. Petiole shorter and broader (see the table of biometric data), almost bare.

Wing (fig. 81) with cell $2R_1$ very short, ending far before the apex of the wing: Cu_{1b} absent, so that cell $2Cu$ is open at its lower distal corner.

Host — *Paraphytomyza xylostei* ROBINEAU-DESVOIDY

Holotype ♀ from larva 2. viii. 64 on *Lonicera caprifolium*, Novigrad, Istria, Yugoslavia, em. 28. viii. 64 (GCDG). Paratype ♀ from larva 7. vi. 64 on *Lonicera tatarica*, Żbików near Pruszków, Poland, em. 22. vi. 64, leg. BIELAWSKI (PAN). Paratype ♀ from larva 14. vii. 65 on *Lonicera tatarica*, Rieseningen, Muhlhausen, Thuringia, Germany, em. viii. 65, leg. BUHR no. 2467 (GCDG).

This species differs from its sister-species *lonicerae* mainly in its very small size, fewer antennal segments and contraction of cell $2R_1$. These features are all clearly the result of adaption to a very small host species. Like its host it has a number of generations each year (in contrast with the single-brooded *lonicerae*).

The *Exotela cyclogaster* group

The *Phytomyza albiceps* and *obscurella* groups s.l. (leaf-miners on various Umbelliferae and Compositae) are very commonly attacked by what may be termed the *Exotela cyclogaster* group. The proper status of some of the forms within this group is somewhat problematical, and breeding experiments would be desirable to supplement the morphological information. Four species can be accepted as distinct on firm morphological evidence. These are *E. spinifer* (NIXON), *E. obscura* sp. nov., *E. tatrica* sp. nov. and *E. senecionis* sp. nov. The remaining forms I have included in the single species *cyclogaster*. They exhibit variation mainly in colour and in the number of antennal segments.

This variation is partly correlated with host association, which suggests that ecological speciation has occurred or is occurring. A particularly clear corres-

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pondance of colour variation with host association is shown by the form with bright yellow basal flagellar segments which has been bred many times from *Phytomyza marginella* FALLÉN, but only in central and eastern Europe from other hosts NIXON (1954) divided my concept of *cyclogaster* into two species — *Toxelea bellina* (NIXON) and *T umbellina* NIXON — which he tried to distinguish on the number of antennal segments and colour But in both characters he recognised some degree of overlap Study of the rather numerous bred material available has convinced me that there is no constant colour difference between specimens with more or fewer antennal segments, and although there is substantial correlation between the number of antennal segments and host association, one intermediate series has come to light In view of these difficulties NIXON's concepts of *bellina* and *umbellina* have been reduced to subspecific rank (*cyclogaster* being considered a senior synonym of *bellina*) The form associated mainly with *P marginella* FALLÉN, which was included by NIXON under *bellina*, has been proposed as a third subspecies The series which appears to be intermediate between subspecies *cyclogaster* and *umbellina* was bred from *Phytomyza angelicastri* HERING In addition there are a few specimens for the time being not classified to subspecies, because the material available from their hosts is inadequate

Three of the five species here recognised — *spinifer*, *obscura* and *tatrica* — have an obviously shorter first flagellar segment than the other two (*cyclogaster* and *senecionis*) It is important that this character should be properly appreciated when identifying material of this group

Exotela cyclogaster FORSTER

Morphology 21—28 antennal segments first flagellar segment 1 3—1 5 times as long as the second, and more than one fifth of the length of the thorax (see the table of biometric data) Mesoscutum largely smooth and shining, slightly roughened on its anterior face, with long sparse pubescence over its central lobe and the anterior part of the lateral lobes notaulices weak Postscutellum (fig 147) visible in lateral view as a short blunt tooth, not strongly projecting as in *E spinifer* (NIXON) Precoxal suture obliquely placed, short and fairly narrow, but distinctly rugose Metapleuron bearing long hairs directed towards the hind coxa Propodeum with a few erect hairs similar to those of the metapleuron at its sides Petiole bearing a few long hairs, or almost bare in small specimens (especially subspecies *umbellina*) Tergite 3 with only an apical row of hairs

Wing (fig 78) with vein *1m—cu* clearly received into cell R_s vein R_s strongly sinuate Cu_{1b} weak, so that cell *2Cu* is more or less open at its lower distal corner

In view of the importance of the range of variation in the number of antennal segments for the division of this species into subspecies, the full breakdown of the data by hosts is now given

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	♂♂	♀♀
Subspecies *sonchina* ssp. nov.		
ex *P. marginella* FALLÉN	25 (2 ex.), 26 (2 ex.), 28 (5 ex.)	25 (6 ex.), 26 (4 ex.)
ex *P. senecionis* KALTENBACH	27 (2 ex.)	25 (1 ex.), 26 (1 ex.)
ex *P. obscurella* FALLÉN	26 (1 ex.)	
ex *P. thysselini* HENDEL	26 (1 ex.)	
Subspecies *cyclogaster* FÖRSTER		
ex *P. aegopodii* HERING		26 (1 ex.)
ex *P. heracleana* HERING	26 (1 ex.), 28 (2 ex.)	25 (1 ex.), 26 (2 ex.), 27 (2 ex.)
ex *P. pastinacae* HENDEL	27 (1 ex.)	25 (1 ex.)
ex *P. spondylii* ROBINEAU-DESVOIDY	25 (1 ex.), 26 (2 ex.), 27 (1 ex.)	24 (2 ex.), 25 (1 ex.)
ex *P. sphondyliivora* SPENCER		26 (4 ex.), 27 (1 ex.)
ex *P.* ? *simmi* BEIGER	26 (1 ex.)	
ex *P. virgaureae* HERING	27 (1 ex.)	
Subspecies *umbellina* (NIXON)		
ex *P. adjuncta* HERING	23 (1 ex.), 24 (1 ex.)	21 (1 ex.), 22 (6 ex.), 23 (3 ex.), 24 (1 ex.)
ex *P. anthrisci* HENDEL	22 (2 ex.), 23 (2 ex.), 24 (1 ex.)	21 (2 ex.), 22 (2 ex.), 23 (2 ex.), 24 (1 ex.), 25 (1 ex.)
ex *P. aurei* HERING		24 (1 ex.)
ex *P. chaerophylli* KALTENBACH		21 (1 ex.), 22 (1 ex.), 23 (2 ex.), 24 (2 ex.)
ex *P. conii* HERING		22 (1 ex.)
ex *P. conopodii* HERING		22 (1 ex.)
ex *P. ferulae* HERING	23 (2 ex.)	22 (1 ex.)
ex *P. melana* HENDEL		20 (1 ex.)
ex *P. obscurella* FALLÉN		21 (1 ex.), 22 (2 ex.)
Intermediate between subspecies *cyclogaster* and *umbellina*		
ex *P. angelicastri* HERING	24 (2 ex.), 25 (3 ex.), 26 (2 ex.)	23 (2 ex.), 24 (2 ex.), 25 (1 ex.), 26 (1 ex.)
Not classified to subspecies (inadequate material)		
ex *P. brunnipes* BRISCHKE		25 (1 ex.)
ex *P.* sp. (*Peucedanum palustre*)		25 (1 ex.)

Three subspecies are recognised, mainly on the basis of variation in the number of antennal segments and colour, as follows.

Exotela cyclogaster sonchina ssp. nov.

Alysia (*Dacnusa*) *gilvipes* sensu HALIDAY, 1839 (in part)
Dacnusa bellina sensu NIXON, 1937 (in part)
Toxelea bellina (NIXON) sensu NIXON, 1954 (in part)

Colour. Palpi, mandibles, clypeus and labrum all yellow. Antennae with scape, pedicel and at least the basal two flagellar segments bright yellow, contrasting strongly in dorsal view with the black succeeding flagellar segments. Legs largely yellow, only the tarsi and the apex of the hind tibiae infuscated (hind coxae always entirely yellow).

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Antennal segments: ♂, 25—28; ♀, 25—26. Thorax distinctly longer than high.

Breeding records

Host 1 — *Phytomyza marginella* FALLÉN (= *sonchi* ROBINEAU-DESVOIDY)

ENGLAND. 2 ex., Darenth, Kent, em. 1 and 4. v. 54, leg. SPENCER (GCDG). 3 ex. from puparia 12. vii. 19 on *Lactuca* sp., Oxford, em. 8. viii. 19, leg. HAMM (HD). 4 ex. from puparia vii. 19 on *Lapsana communis*, Oxford, em. 30. vii—8. viii. 19, leg. HAMM (HD and BM). 2 ex. from puparia x. 18 on *Lapsana communis*, Oxford, em. 15. v. 19, leg. HAMM (HD and BM). 2 ex. from puparia on *Taraxacum* sp., Oxford, em. 12 and 17. v. 19, leg. HAMM (BM). 1 ex. from larva 18. x. 53 on *Lapsana communis*, Mickleham, Surrey, em. 16. v. 54 (BM). 1 ex. from puparium 12. ix. 54 on *Taraxacum* sp., Boxhill, Surrey, em. 9. x. 54 (BM). 1 ♀ from larva 12. vii. 53, Hampstead, London, em. 5. ix. 53, leg. SPENCER (BM). — SCOTLAND. 1 ex., Inverness, em. ix. 54, leg. SPENCER (GCDG). — GERMANY. Holotype ♂ from larva on *Hieracium lachenalii*, Berlin Botanical Gardens, em. 22. iii. 52, leg. HERING no. 5805 (GCDG). 1 ex., Stuttgart-Batnang, em. 21. v. 55, leg. GROSCHKE (STGT). 1 ♀ from larva 4. vii. 65 on *Lapsana communis*, Stadtwald, Mühlhausen, Thuringia, em. viii. 65, leg. BUHR no. 2449 (GCDG). 1 ♂ from larva 29. vi. 65, same plant and locality, em. viii. 65, leg. BUHR no. 2431 (GCDG). 1 ex. from larva 11. ix. 64, same plant and locality, em. 11. iv. 65, leg. BUHR no. 2258 (GCDG). — SWEDEN. 1 ex., Hälsingborg, Skåne, em. 23. viii. 52, leg. RYDÉN (LUND). — POLAND. 2 ♂♂ from larvae 23. viii. 57 on *Prenanthes purpurea*, Roztoki Valley, Tatry, pupated 29. viii, em. 30. iii and 18. iv. 58, leg. NOWAKOWSKI (PAN). 1 ♀ from larva 5. ix. 60 on *Prenanthes purpurea*, Spadowiec Valley, Tatry, pupated 13. ix, em. 24. iv. 61, leg. NOWAKOWSKI (PAN).

Host 2 — *Phytomyza senecionis* KALTENBACH

3 ex. from larvae 23. viii. 63 on *Senecio nemorensis*, near Como, Italy, em. 22—25. ix. 63 (GCDG). 1 ♂ from larva 25. ix. 60 on *Senecio fluviatilis*, Mątowski Las reservation, Piekło near Sztum, Poland, pupated 29. ix, em. 2. v. 61, leg. NOWAKOWSKI (PAN). 2 ♀♀ from larvae 13. vi. 57 on *Senecio fluviatilis*, Młociny, Warszawa, Poland, pupated 16. vi, em. 3 and 12. vii. 57, leg. NOWAKOWSKI (PAN).

Host 3 — *Phytomyza obscurella* FALLÉN

1 ♂ from larva 1. ix. 57 on *Aegopodium podagraria*, Zakopane near Tatry, Poland, pupated 3. ix, em. 28. ix. 57, leg. NOWAKOWSKI (PAN). 1 ♂ from larva 25. ix. 60 on *Aegopodium podagraria*, Mątowski Las reservation, Piekło near Sztum, Poland, pupated 27. ix, em. 25. iv. 61, leg. NOWAKOWSKI (PAN).

Host 4 — *Phytomyza thysselini* HENDEL

1 ♂ from larva 21. ix. 54 on *Peucedanum palustre*, Sierakow, Kampinoska Forest, Poland, pupated 22. ix, em. 8. v. 55, leg. NOWAKOWSKI (PAN).

All the above specimens except the holotype are designated paratypes. In Britain this subspecies seems confined to *P. marginella* FALLÉN, but the specimens obtained from other hosts in Poland and the Alps seem to be identical.

Exotela cyclogaster cyclogaster FÖRSTER, **stat. nov.**

Exotela cyclogaster FÖRSTER, 1862, GRIFFITHS, 1964b and 1966
Dacnusa bellina NIXON, 1937 (in part)
Toxelea bellina (NIXON), NIXON, 1954 (in part)

Colour. Palpi and mandibles yellow or yellow-brown. Clypeus and labrum usually deep yellow, but conspicuously pale in some of the specimens bred from

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Phytomyza heracleana HERING and dark brown in the Portuguese specimens. Antennae with the pedicel, scape and first flagellar segment often yellow-brown, but this colour merges gradually into the darker colour of the succeeding flagellar segments without a marked contrast in colour in dorsal view: occasionally the flagellum is completely dark. Legs largely dull yellow: the hind coxae are often darkened posteriorly at their extreme base: the tarsi and the apex of the hind tibiae are strongly infuscated.

Antennal segments: ♂, 25—28; ♀, 24—27. Thorax distinctly longer than high.

Breeding records

Host 1 — *Phytomyza heracleana* HERING

8 ex. from larvae 28. vi. 63 on *Heracleum sphondylium*, near Budapest, Hungary, em. 22. vii. 63 (2 ex.) and 13. ix. 63 (6 ex.), leg. SPENCER (GCDG). 1 ex. from larva on *Heracleum sphondylium*, Killin, Perthshire, Scotland, em. 10. x. 55, leg. SPENCER (GCDG).

Host 2 — *Phytomyza pastinacae* HENDEL

2 ex. from larvae 1. viii. 53 on *Pastinaca sativa*, Headington, Wilts., England, em. 5. ix. 53, leg. SPENCER (BM).

Host 3 — *Phytomyza spondylii* ROBINEAU-DESVOIDY

3 ex. from larvae on *Heracleum sphondylium*, Sintra, Portugal, em. 19. xi. 53, 4. xii. 53 and 4. iv. 54, leg. SPENCER (GCDG). 2 ex. from puparia 4. x. 24 on *Heracleum sphondylium*, Oxford, England, em. 29. iv and 4. v. 25, leg. HAMM (HD). 4 ex. from larvae 31. vii. 54 on *Heracleum sphondylium*, Chilworth, Surrey, England, em. 5—29. ix. 54 (BM).

Host 4 — *Phytomyza sphondyliivora* SPENCER

4 ex. from larvae 20. vi. 54 on *Heracleum sphondylium*, Betchworth, Surrey, England, em. 12—26. viii. 54 (GCDG). 1 ex. from larva 7. vi. 63 on *Heracleum sphondylium*, Portland, Dorset, England, em. 6. vii. 63, leg. SPENCER (GCDG).

Host 5 — *Phytomyza aegopodii* HENDEL

1 ex. from larva 15. viii. 35 on *Aegopodium podagraria*, Warsow, Mecklenburg, Germany, em. 16. ix. 35, leg. BUHR (GCDG).

Host 6 — *Phytomyza ?simmi* BEIGER

2 ex. from larvae 7. ix. 55 on *Bellis perennis*, Afon Mellte, Brecon, Wales, em. 2—3. x. 55 (GCDG).

Host 7 — *Phytomyza virgaureae* HERING

1 ex. from larva 17. vii. 55 on *Solidago virgaurea*, Holmbury—St. Mary, Surrey, England, em. 23. x. 55 (GCDG).

The holotype of *cyclogaster* (unfortunately with broken antennae) is an individual with completely yellow coxae: but its antennae are only obscurely yellowish at their base without any clear contrast of colour as in ssp. *sonchina*. The holo-

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type of *bellina* (Trawallua, Sligo, Ireland, 24—29. vii. 35) is an individual whose hind coxae are infuscated at their base, and whose scape, pedicel and first flagellar segment are pale, agreeing well with many of the specimens bred from *Phytomyza* spp. on *Heracleum*.

It is possible that subspecies *cyclogaster* as here defined is still composite, as the host range is distinctly disjunct. The first four hosts are all associated with *Heracleum* and the closely related *Pastinaca* (Umbelliferae), while the last two hosts (which are probably very closely related) are associated with *Bellis* and *Solidago* (Compositae).[3] More material is needed to clarify this question.

Exotela cyclogaster umbellina (NIXON), **stat. nov.**

Dacnusa bellina sensu NIXON, 1937 (in part)
Toxelea umbellina NIXON, 1954
Exotela umbellina (NIXON), GRIFFITHS, 1966

Colour. Labrum and palpi yellow or yellow-brown: clypeus and mandibles varying from orange-yellow to black. The basal antennal segments do not contrast strongly in colour with the more apical segments, at most the scape, pedicel and first flagellar segment are yellow-brown. Hind coxae usually darkened at least at their base, but sometimes entirely yellow: legs largely yellow in most specimens, but sometimes yellow-brown.

Antennal segments: 20 (1 ♀)—21—24—25 (1 ♀). Thorax usually only about as long as high (see the table of biometric data)[4]. Petiole almost bare.

Breeding records

Host 1 — *Phytomyza adjuncta* HERING

1 ex. from larva on *Pimpinella major*, Scratch Wood, London, em. viii. 38, leg. SPENCER (GCDG). 1 ex. from larva 17. viii. 54 on *Pimpinella major*, Mill Hill, London, em. 29. iv. 55 (GCDG). 1 ex. from larva 19. ix. 53 on *Pimpinella saxifraga*, Chorleywood, Herts., England, em. 24. x. 53 (BM). 1 ex. from larva 20. vi. 54 on *Pimpinella saxifraga*, Betchworth, Surrey, England, em. 1. vii. 54 (BM). 4 ex. from larvae 27. viii. 54, Weinheim, Germany, em. ix. 54 and iii. 55, leg. SPENCER (GCDG). 4 ex. from larvae 20. vi. 61 on *Pimpinella saxifraga*, Warszawa, Poland, pupated 23. vi, em. 15—30. viii. 61, leg. NOWAKOWSKI (PAN). 2 ex. from larvae 9. vii. 55 on *Pimpinella saxifraga*, Granica reservation, Kampinoska Forest, Poland, pupated 11. vii, em. 6—8. viii. 55, leg. NOWAKOWSKI (PAN). 1 ex. from puparium 8. vii. 54 on *Pimpinella saxifraga*, Rozłoka reservation, Kampinoska Forest, em. ix. 54, leg. NOWAKOWSKI (PAN). 1 ex. from larva 1. ix. 62 on *Pimpinella saxifraga*, Sokolica, Pieniny, Poland, pupated 3. ix, em. 28. ix. 62, leg. NOWAKOWSKI (PAN).

[3] It may be noted here that the record of *Toxelea bellina* being bred from *P. albiceps* MEIGEN, another leaf-miner on Compositae, given in GRIFFITHS (1956) was based on a mislabelled specimen which is in fact a female of *Dacnusa ocyroe* (NIXON).

[4] It is emphasised that statements about the relative length, height etc. of the thorax are based on the conventions explained in the notes on the first table of biometric data (Beitr. Ent., **14**, 904; 1964).

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Host 2 — *Phytomyza anthrisci* HENDEL

2 ex. from larvae on *Anthriscus sylvestris*, Brookman's Park, Herts., England, em. 9. iv. 54, leg. SPENCER (GCDG). 3 ex. from larvae 8. xi. 53, same plant and locality, em. 21. xii. 53, 18. iv and 25. v. 54 (BM). 2 ex. from larvae on *Anthriscus sylvestris*, Selsdon, Surrey, England, em. iii. 55, leg. SPENCER (GCDG). 3 ex. from larvae on *Anthriscus sylvestris*, Lewes, Sussex, England, em. 4—30. x. 52, leg. SPENCER (GCDG). 7 ex. from puparia 12. vi. 22 on *Anthriscus* sp., Oxford, England, em. 2—7. x. 22, leg. HAMM (HD). 1 ex. from larva 9. v. 54 on *Anthriscus sylvestris*, Darenth, Kent, England, em. 14. xi. 54 (BM). 5 ex. from larvae on *Anthriscus cerefolium*, Rostock Botanical Gardens, Germany, em. 23. ix. 36, leg. BUHR (GCDG). 1 ex. from larva on *Anthriscus sylvestris*, Hedlandet, Södermanland, Sweden, em. 30. viii. 43, leg. LUNDQVIST (LUND). 1 ex. from larva 20. vii. 65 on *Anthriscus sylvestris*, Felchtaer Bach, Mühlhausen, Thuringia, Germany, em. 1. x. 65, leg. BUHR no. 2492/1 (GCDG).

Host 3 — *Phytomyza aurei* HERING

1 ex. from larva on *Chaerophyllum aureum*, Mühlhausen, Thuringia, Germany, em. 3. iii. 62, leg. BUHR, HERING no. 1723 (GCDG).

Host 4 — *Phytomyza chaerophylli* KALTENBACH

2 ex. from larvae on *Chaerophyllum temulum*, England (? locality) (GCDG). 4 ex. from larvae 27. vi. 54 on *Chaerophyllum temulum*, Faversham, Kent, England, em. 22. vii. 54 (2 ex.) and 14—17. x. 54 (2 ex.) (BM).

Host 5 — *Phytomyza conii* HERING

1 ex. from larva 21. vi. 61 on *Conium maculatum*, Woodwalton Fen, Hunts., England, em. 22. vii. 61 (GCDG).

Host 6 — *Phytomyza conopodii* HERING

1 ex. from larva 15. v. 54 on *Conopodium majus*, Mill Hill, London, em. 11. x. 54 (BM).

Host 7 — *Phytomyza ferulae* HERING

3 ex. from larvae on *Scaligeria cretica*, Hvar Island, Yugoslavia, em. 30. xi. 63, HERING no. 7007 (GCDG).

Host 8 — *Phytomyza melana* HENDEL

1 ex. from larva 9. viii. 53 on *Pimpinella saxifraga*, Egham, Surrey, England, em. ix. 53, leg. SPENCER (BM).

Host 9 — *Phytomyza obscurella* FALLÉN

1 ex. from larva on *Aegopodium podagraria*, Hampstead, London, em. 25. ii. 52, leg. SPENCER (GCDG). 2 ex. from puparia 3. ix. 22 on *Aegopodium podagraria*, Oxford, England, em. 5. x. 22, leg. HAMM (HD).

In addition I have received 8 ex. bred from an unidentified *Phytomyza* sp. on *Pimpinella sexifraga*, Hedlandet, Södermanland, Sweden, em. vii—viii. 42/43 and iii. 44 (1 ex.), leg. LUNDQVIST (LUND).

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The record for *Phytomyza smyrnii* SPENCER in Portugal (in GRIFFITHS, 1956) has been omitted pending confirmation as the specimen concerned is now headless. The identifications of the host species mining *Pimpinella* have been revised since some of the records were first published (in GRIFFITHS, 1956).

The series bred from the mediterranean host *P. ferulae* HERING are among the darkest specimens (with black clypei and the hind tibiae largely infuscated).

Specimens of *Exotela cyclogaster* FÖRSTER not referred to a subspecies

Host — *Phytomyza angelicastri* HERING

16 ex. from larvae 4. x. 53 on *Angelica sylvestris*, Brookman's Park, Herts., England, em. 9. xi—5. xii. 53 (4 ex.) and 18. iv—25. v. 54 (BM).

This series is intermediate between subspecies *cyclogaster* and *umbellina* in respect of the number of antennal segments. Their coloration shows no unusual features: the legs are largely deep yellow with the hind coxae infuscated basally: the basal antennal segments as far as the first flagellar segment are yellow-brown.

Host — *Phytomyza brunnipes* BRISCHKE

1 ex. from larva 12. vi. 64 on *Sanicula europaea*, Boxhill, Surrey, England, em. ix. 64, leg. SPENCER (GCDG).

More material from this host is needed before an opinion on the subspecies can be given.

Host — *Phytomyza* sp.

3 ex. from larvae 23. ix. 60 on *Peucedanum palustre*, Łeba, Pomerania, Poland, pupated 28. ix, em. 6—25. v. 61, leg. NOWAKOWSKI (PAN).

Only one of these specimens has its antennae unbroken. More material from the same host is needed before an opinion on the subspecies can be given.

I have also examined a single female with 22 antennal segments, probably referable to *cyclogaster*, with the following data: from larva 7. x. 55 of *Phytomyza tanaceti* HENDEL on *Chrysanthemum vulgare*, Kazuń, Kampinoska Forest, Poland, pupated 11. x, em. 3. xi. 55, leg. NOWAKOWSKI (PAN). This specimen is unusual in having only a weakly developed precoxal suture. More material from the same host is needed to clarify its specific identity.

***Exotela obscura* sp. nov.**

To be compared with *E. cyclogaster* FÖRSTER as follows.

Colour. Antennae with entirely dark flagellum, the first segment showing no tendency to be paler: scape and annellus yellow-brown. Palpi and labrum deep yellow; clypeus yellow-brown or reddish. Front and middle legs largely ochreous or brownish yellow with the coxae and tarsi more or less infuscated: hind legs with the tarsi and usually the entire coxae infuscated (but in some of the Polish series bred from *P. angelicae* KALTENBACH the hind coxae are only infuscated

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on about their basal half); in some specimens the hind tibiae are also infuscated, so that only the hind femora remain ochreous. Tergites 3 and 4 deep red-brown, the following tergites black.

Morphology. 23—26 antennal segments (both sexes): the flagellar segments are relatively shorter and broader than in *cyclogaster* (first flagellar segment about 1.2 times as long as the second and less than one fifth of the thorax length). Notaulices distinct to about the middle of the mesoscutum. Postscutellum visible in lateral view only as a short blunt tooth (contrast *spinifer*). Hind coxa not sculptured (contrast *senecionis*). Tergite 3 with pubescence over most of its surface.

Host 1 — *Phytomyza aegopodii* HENDEL

1 ♂ paratype, Hälsingborg, Skåne, Sweden, em. 10. ii. 50, leg. RYDÉN (LUND).

Host 2 — *Phytomyza angelicae* KALTENBACH

14 ♂♂, 17 ♀♀ paratypes from larvae 29. vii. 57 on *Angelica sylvestris*, Grabina, Kampinoska Forest, Poland, pupated 30. vii—2. viii, em. 15. viii—1. ix. 57, leg. NOWAKOWSKI (PAN). 1 ♀ paratype from larva 5. vi. 54 on *Angelica sylvestris*, Warszawa-Młociny, pupated 16. vi, em. 2. v. 55, leg. NOWAKOWSKI (PAN). 1 ♀ paratype from larva 29. vii. 56 on *Angelica sylvestris*, Cybulice, Kampinoska Forest, pupated 1. viii, em. 19. iv. 57, leg. NOWAKOWSKI (PAN).

Host 3 — *Phytomyza laserpitii* HENDEL

3 ♂♂, 1 ♀ paratypes from larvae on *Laserpitium latifolium*, Fridingen, Württemberg, Germany, em. 6. viii. 54, leg. GROSCHKE (STGT and GCDG). Holotype ♀, 1 ♂, 3 ♀♀ paratypes from larvae on *Laserpitium latifolium*, Neuffen, Württemberg, em. 23. viii. 55, leg. GROSCHKE (STGT and GCDG). 14 ♂♂, 12 ♀♀ paratypes from larvae on *Laserpitium latifolium*, Högklint, Gotland, Sweden, em. 6—25. iii. 51, leg. RYDÉN (LUND and GCDG).

Host 4 — *Phytomyza pubicornis* HENDEL

2 ♂♂, 3 ♀♀ paratypes, Hälsingborg, Skåne, Sweden, em. 9—19. ii. 50, leg. RYDÉN (LUND). 1 ♂, 3 ♀♀ paratypes, Ulricehamn, Västergötland, Sweden, em. 17. ii. 47, leg. RYDÉN (LUND). ♂♀ paratypes, Örkelljunga, Skåne, em. 13. iii. 30, leg. RYDÉN (LUND). ♂♀ paratypes from larvae 28. v. 57 on *Aegopodium podagraria*, Białowieski National Park, Poland, pupated 10. v, em. 20—21. ii. 58, leg. NOWAKOWSKI (PAN).

Important characters for recognising this species are the short, entirely dark basal flagellar segments and the infuscated hind coxae. The coloration of *senecionis* is similar, but that species has an obviously longer, pale first flagellar segment and the hind coxae conspicuously sculptured.

I am also provisionally referring to this species two specimens bred from larvae of two *Phytomyza* spp. taken at Sils, Switzerland, at about 1850 metres, on 30. vii. 64, leg. SPENCER (GCDG): a male was bred in the following spring from *P. laserpitii* HENDEL on *Laserpitium latifolium*, and a female from *P.* ? *heracleana* HERING on *Peucedanum ostruthium*. This pair agree with *obscura* morphologically but are much darker, with their labrum, palpi and legs entirely infuscated. It

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is possible that they represent a dark alpine subspecies of *obscura*, but I am making no nomenclatorial proposal until more evidence is available. (These insects are not to be confused with *E. tatrica* sp. nov. which has different wing venation.)

***Exotela senecionis* sp. nov.**

To be compared with *Exotela cyclogaster* FÖRSTER as follows.

Colour. Labrum, clypeus, the centre of the mandibles and usually the palpi clear yellow (but occasionally the apical segments of the maxillary palpi are slightly infuscated). Base of antennae yellow-brown as far as the first flagellar segment or the base of the second, the rest of the flagellum black. Legs 1 and 2 deep yellow with the tarsi infuscated: hind legs darker, with at least the basal half of the coxae black and the tarsi and about the apical third of the tibiae strongly infuscated. Gaster entirely dark.

Morphology. Antennal segments: ♂, 26—29, 31 (1 ex.); ♀, 26—28: first flagellar segment elongate (compare *cyclogaster*), 1.4—1.5 times as long as the second and more than one fifth of the thorax length: the more apical flagellar segments are short (only about 1.5 times as long as wide). Precoxal suture broad, strongly rugose-costate. Metapleuron with conspicuous reticulate sculpture (similar to that of the propodeum) extending over most of its surface and over about the basal half of the hind coxa. Pubescence of metapleuron, propodeum and petiole slightly denser than in *cyclogaster*. Tergite 3 usually with a few fine hairs distributed over its surface.

Host 1 — *Phytomyza senecionis* KALTENBACH

Holotype ♂, 1 ♂ paratype from larvae 1. ix. 60 on *Senecio subalpinus*, Świstówka, Tatry, Poland, pupated 5. ix, em. 2—6. v. 61, leg. NOWAKOWSKI (PAN). 1 ♀ paratype from larva 28. viii. 57 on *Senecio subalpinus*, Kraków Ravine, Tatry, pupated 31. viii, em. 19. iii. 58, leg. NOWAKOWSKI (PAN). 10 paratypes (3 ♂♂, 5 ♀♀, 2 sex unknown) from larvae 5. ix. 60 on *Senecio subalpinus*, Spadowiec Valley, Tatry, pupated 13. ix, em. x. 60 (2 ex.) and 17. iv—18. v. 61, leg. NOWAKOWSKI (PAN and GCDG). 1 ♂ paratype from larva 1. ix. 60 on *Senecio fuchsii*, Miedziane near Morskie Oko, Tatry, pupated 2. ix, em. 3. v. 61, leg. NOWAKOWSKI (PAN).

Host 2 — *Phytomyza alpina* GROSCHKE

Paratype ♀ from larva on *Senecio alpinus*, Brauneck near Lenggries, Oberbayern, Germany, 1200 metres, em. 1. ii. 53, leg. GROSCHKE (STGT).

Host 3 — *Phytomyza homogyneae* HENDEL

1 ♂ paratype from larva 1. ix. 60 on *Homogyne alpina*, Świstówka, Tatry, Poland, pupated 3. ix, em. 2. v. 61, leg. NOWAKOWSKI (PAN).

This species agrees with *cyclogaster* in having a long first flagellar segment, but it can easily be distinguished by its darker hind coxae which are conspicuously sculptured on about their basal half. This sculpturation is not shown by *obscura* and *tatrica*, the two other relatively dark-legged species associated with the

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Phytomyza albiceps group s. l. The other important difference between this species and *obscura* lies in the form of the antennae: in *obscura* and *tatrica* the flagellum is entirely dark and the first flagellar segment much shorter.

Exotela spinifer (NIXON)

Toxelea spinifer NIXON, 1954
Exotela spinifer (NIXON), GRIFFITHS, 1966

To be compared with *E. cyclogaster* FÖRSTER as follows.

Colour. Antennae with scape, pedicel and first flagellar segment obscurely brown, not contrasting with the rest of the flagellum. Legs yellow with the tarsi and the apex of the hind tibiae infuscated.

Morphology. Antennal segments: ♂, 25; ♀, 23—27: the first flagellar segment is relatively short (as in *obscura* sp. nov.). Mesoscutal pubescence extending over the entire surface of the lateral lobes. Postscutellum developed into a conspicuous pointed spine (fig. 146). Precoxal suture with its upper margin ill defined, almost smooth with only feeble rugosity along its sharply delimited lower edge. Petiole very elongate (see the table of biometric data).

Breeding records

Host 1 — *Phytomyza cirsii* HENDEL

2 ex. from larvae 11. x. 53 on *Carduus nutans*, Boxhill, Surrey, England, em. 16. xii. 53 (BM). 4 ex. from larvae 17. ix. 54 on *Cirsium arvense*, Rickmansworth, Herts., England, em. 11. x. 54 and 17—31. v. 55 (BM).

Host 2 — *Phytomyza lappina* GOUREAU

1 ♀ from larva 11. ix. 64 on *Arctium lappa*, Stadtwald, Mühlhausen, Thuringia, Germany, em. 18. v. 65, leg. BUHR no. 2263 (GCDG).

Host 3 — *Phytomyza alpina* GROSCHKE

6 ♀♀ from larvae on *Senecio jacobaea*, Kinlochewe, Ross, Scotland, em. viii. 53, leg. RICHARDS[5].

In addition there is a single specimen (recorded in GRIFFITHS, 1956) which is labelled as bred from *Phytomyza ramosa* HENDEL, Reigate, Surrey, em. 15. vii. 53, leg. SPENCER (BM). This host is not closely related to the three established hosts and, as no further material has been bred from it, I am inclined to suspect a confusion in the data. The host puparium was unfortunately not preserved. I am therefore not accepting the record without confirmation.

This species will be easily recognised by its long pointed postscutellum, a feature shown by no other species.

***Exotela tatrica* sp. nov.**

To be compared with *E. cyclogaster* FÖRSTER as follows.

[5] Record after NIXON (1954) the specimens have not been reexamined.

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Colour. Palpi, clypeus, labrum and antennae (except annellus) more or less black. Centre of mandibles dark brown. Legs largely brown with the coxae almost black. Gaster with tergites 3 and 4 dark brown, the following tergites black.

Morphology. 26 antennal segments (both specimens): first flagellar segment relatively short (compare *obscura*), 1.2—1.3 times as long as the second, and less than one fifth of the thorax length (see the table of biometric data). Mesoscutum roughened anteriorly, with rather short pubescence distributed over almost its entire surface: notaulices indicated anteriorly only. Precoxal suture poorly developed, weakly rugose-costate anteriorly, but smooth along much of its length. Hind coxa not sculptured (contrast *senecionis*). Petiole with fine pubescence distributed over its entire surface. Tergite 3 with a few basal hairs.

Wing (fig. 83) with the pterostigma shorter and broader than in *cyclogaster*: cell $2R_1$ shorter: Cu_{1b} retained.

Host — *Phytomyza aronici* NOWAKOWSKI

Holotype ♂ from larva 23. viii. 57 on *Doronicum clusii*, Zawrat, Tatry, Poland, 2150 metres, pupated 26. viii, em. 19. iii. 58, leg. NOWAKOWSKI (PAN). Paratype ♀ from larva 2. ix. 56 on *Doronicum clusii*, Opalone, Tatry, 1700 metres, em. 2. v. 57, leg. NOWAKOWSKI (PAN).

This species is referred to the *cyclogaster* group with the other species of *Exotela* associated with *Phytomyza* spp. on Umbelliferae and Compositae, but it is very distinct by reason of its very dark coloration (darker than *senecionis* and *obscura* in that even the palpi and labrum are almost black), the weakly developed precoxal suture and short cell $2R_1$. The host is confined to high altitudes in the mountains of central Europe and Spain.

Priapsis NIXON

Only a single species of this small genus is known as a parasite of the host genera treated in this paper. Others are known to me as parasites of *Liriomyza* and *Pseudonapomyza*.

Priapsis dice NIXON

Priapsis dice NIXON, 1943 and 1954

Colour. Entirely black (including the legs).

Morphology. Antennal segments: ♂, 16—19; ♀, 16—18. Mandibles 3-toothed, not expanded. Palpi very short (see the table of biometric data).

Pronotum with conspicuous medial pit. Mesoscutum with its dorsal surface shining and bare, except for a few hairs along the former course of the notaulices (which are completely absent): there are also patches of hairs on the anterior edge of the lateral lobes, but the central part of the anterior face is bare. Mesepisternal sutures absent. Metapleural pubescence fairly sparse, directed mainly towards the hind coxa. Propodeum almost smooth, with pubescence similar to that of the metapleuron at its sides but only very fine pubescence over its centre,

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which is conspicuously shining. Petiole subtriangular, with pubescence at its sides but bare along its central line.

Wing (fig. 82) with vein R_s hardly sinuate, *1m—cu* rejected from cell R_s (but not very widely so) and Cu_{1b} absent.

Breeding records

Host 1 — *Phytomyza silai* HERING

4 ♂♂, Runnymede, Berks., England, em. viii. 53, leg. BROWN (BM). 3 ♂♂ from larvae 15. viii. 53 on *Silaum silaus*, Bookham, Surrey, England, em. 7—11. ix. 53 (BM). 1 ex. from larva 13. x. 54 on *Silaum silaus*, Scratch Wood, London, em. iii. 55, leg. SPENCER (GCDG). 1 ex. from larva 17. viii. 57, same plant and locality, leg. SPENCER (GCDG).

Host 2 — *Phytomyza angelicivora* HERING

1 ♂ from larva on *Angelica palustris*, Pasewalk, Mecklenburg, Germany, em. 22. vi. 53, leg. BUHR no. 505 (BM).

Dacnusa HALIDAY

Dacnusa metula (NIXON), **comb. nov.**

Pachysema metula NIXON, 1954

Colour. Palpi and labrum dull yellow. Clypeus black. Centre of mandibles orange-yellow. Antennae dark except for the yellow-brown annellus and ventral surface of the scape. Legs largely dull orange-yellow, with only the fifth tarsal segments and sometimes the extreme base of the hind coxae somewhat infuscated. Gaster beyond petiole brown.

Morphology. Antennal segments: ♂, 27—28; ♀, 26—28. Ocelli forming a small about equilateral triangle. Mandibles 3-toothed, not expanded. Face smooth and shining, its pubescence rather sparse. Thorax very elongate (see the table of biometric data). Mesoscutum roughened anteriorly, with pubescence covering its central and most of its lateral lobes: notaulices well-developed as V-shaped rugose furrows uniting, or almost so, with the posterior fovea. Subalar callus and surrounding area rugose: precoxal suture developed as a long narrow but distinctly rugose furrow. Metapleuron with much of its surface coarsely rugose like the propodeum: its pubescence rather sparse. Propodeal pubescence fine, in no way concealing the coarsely rugose surface beneath. Petiole elongate, more or less parallel-sided, almost bare. Tergite 3 bare. Ovipositor (♀) stout, projecting shortly (by less than half the length of the petiole) beyond the apical tergite in the retracted position.

Wing (fig. 99) with sexually dimorphic pterostigma, broader and blackened in the male: metacarp relatively short: vein *2r* unusually remote from the base of the pterostigma: *1m—cu* rejected from cell R_s.

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Breeding records

Host 1 — *Phytomyza* sp. *ramosa* auctt.

Holotype ♀ from puparium on *Dipsacus fullonum sylvester*, Abbotsbury, Dorset, England, em. vii. 52, leg. SPENCER (BM). 3 ex. from puparia 28. vi. 53 on *Dipsacus fullonum sylvester*, Scratch Wood, London, em. 20. vii and 3. viii. 53, leg. SPENCER (BM). 1 ♂, same plant and locality, em. iii. 55, leg. SPENCER (GCDG). 2 ♀♀, Morkorgl, Småland, Sweden, em. 2—3. viii. 39, leg. RYDÉN (LUND).

Host 2 — *Phytomyza succisae* HERING

1 ♂, 3 ♀♀ from larvae 12. vi. 65 on *Succisa pratensis*, Poulavallan, Clare, Ireland, em. 5—12. vii. 65 (GCDG).

This species is easily recognisable by its elongate thorax, rugose precoxal suture and wing venation.

Dacnusa prisca sp. nov.

Colour. Palpi and labrum yellow. Clypeus red-brown. Mandibles yellow-brown. Antennae with scape and annellus yellow-brown, but flagellum entirely dark. Legs entirely yellow. Gaster with tergite 3 yellow-brown, the following tergites darker.

Morphology. 31 antennal segments (♂). Ocelli forming an almost equilateral triangle. Mandibles 3-toothed, not expanded. Facial pubescence fairly sparse, in no way concealing the smooth shining surface beneath, directed mainly upwards at its centre but downwards at its sides.

Thorax 1.2 times as long as high. Mesoscutum with pubescence over its entire surface: notaulices distinct, although shallow, reaching beyond the middle of the mesoscutum. Precoxal suture of mesepisternum represented by a short, obliquely placed, rugose furrow (similar to that of *hospita*). Metapleural pubescence sparse, directed towards the hind coxa (the plesiomorph condition). Propodeal pubescence sparse and inconspicuous, in no way concealing the shining rugose surface beneath. Petiole very sparsely pubescent, of shining appearance, with only shallow longitudinal sculpture. Tergite 3 bearing a few basal hairs, but these are very fine and inconspicuous.

Wing (♂) (fig. 105) with very large pterostigma, broad at its base but strongly tapering apically: metacarp shorter than the pterostigma: *2r* short: *1m—cu* rejected from cell R_s.

Holotype ♂, Hälsingborg, Skåne, Sweden, em. 27. ii. 29, leg. RYDÉN (LUND), labelled as bred from *Phytomyza albiceps* MEIGEN.

The host label on this specimen is not in RYDÉN's hand and presumably indicates only that the specimen formerly stood in his collection with or near *P. albiceps* MEIGEN. It is probable that this association is erroneous. Although based on a single specimen with doubtful host data, this species is so well characterised that I do not hesitate to describe it. It will easily be recognised by its wing venation in association with its retention of a rugose precoxal suture; in

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the latter respect the species is plesiomorph in comparison with most other species of *Dacnusa*.

Dacnusa laeta (NIXON)

Pachysema laeta NIXON, 1954
Dacnusa laeta (NIXON), GRIFFITHS, 1966

Since recording this species as a parasite of *Agromyza spiraeae* KALTENBACH and *A. arunci* HERING I have obtained further material bred from two *Phytomyza* spp. at the same locality, as follows.

Host 3 — *Phytomyza calthophila* HERING

1 ♂ from larva 13. vi. 65 on *Caltha palustris*, Lough Goller, Clare, Ireland, em. 7. vii. 65 (GCDG).

Host 4 — *Phytomyza ranunculi* SCHRANK

18 ex. from larvae 13. vi. 65 on *Ranunculus acer*, Lough Goller, Clare, Ireland, em. 8—12. vii. 65 (GCDG).

In addition I have received a female labelled as bred from *Phytomyza cineracea* HENDEL (whose larvae feed in stems of *Ranunculus*), Liden, Medelpad, Sweden, em. 16. ii. 52, leg. RYDÉN (LUND), but perhaps this record requires confirmation as there is some confusion in the literature about the larval characters of the host.

The widely disjunct host association of this species is remarkable. Probably the association with *Phytomyza* is prior to that with *Agromyza* (which seems to have received its few species of *Dacnusa* parasites as a result of transference from *Phytomyza*).

Dacnusa hospita (FÖRSTER)

Aphanta hospita FÖRSTER, 1862, NIXON, 1954
Dacnusa hospita (FÖRSTER), GRIFFITHS, 1964b

Colour. Palpi dull orange-yellow. Antennae largely dark, with only the scape and annellus brown. Legs largely yellow-brown, with the tarsi, hind coxae and apex of the hind tibiae slightly darker. Gaster dark.

Morphology. Antennal segments: ♂, 21—22; ♀, 22—23. Mesoscutum with its central lobe strongly sculptured anteriorly, with pubescence over its whole surface except part of the posterior half of the lateral lobes: notaulices weak and difficult to distinguish from the secondary sculpturation. Mesepisternum with a short but distinct, rugose precoxal suture. Metapleuron with long white, somewhat dense, adpressed pubescence, which completely conceals its lower half. Propodeum with similar long white pubescence at its sides, giving way to much finer hairs over its centre, which do not completely obscure the reticulate sculpture of the surface beneath in posterior view. Petiole strongly broadened towards its apex, almost bare; its sculpture largely longitudinal. Ovipositor (♀) projecting slightly beyond the apical tergite in the retracted position.

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Wing (figs. 100 and 101) remarkable for the complete loss of veins R_s+M and Cu_{1a}: pterostigma short, strongly sexually dimorphic, much broader and blackened in the male; metacarp about equal in length to the pterostigma.

Breeding records

Host — *Phytomyza* sp. near *ranunculi* SCHRANK (? *stolonigena* HERING)

1 ♀, München-Freimann, Germany, em. 13. vii. 53, leg. GROSCHKE (STGT). 1 ♂, Randers, Jutland, Denmark, leg. SCHLICK (KB).

There are six specimens of this species (agreeing with NIXON's, 1954, interpretation) in the FÖRSTER collection. One, a male without locality label but probably from Aachen, has been designated lectotype. There were also some specimens of other species with them in the collection, but these clearly do not fit FÖRSTER's description.

The puparium with GROSCHKE's specimen is not of the true *ranunculi*, but agrees with HERING's (1949) description of the puparium of "subspecies *stolonigena*" (which being morphologically distinct I consider must be a full species). The Danish specimen is on a mount with puparia both of the true *ranunculi* and of the same type as the host of GROSCHKE's specimen.

Dacnusa macrospila (HALIDAY)

Alysia (*Dacnusa*) *macrospila* HALIDAY, 1839
(nec *Dacnusa macrospila* (HALIDAY) sensu NIXON, 1937)
(nec *Pachysema macrospila* (HALIDAY) sensu NIXON, 1954)

Colour. Palpi and labrum dull ochreous yellow. Clypeus red-black. Centre of mandibles brown or yellow-brown. Antennae almost entirely dark, only the annellus and ventral surface of the scape brown or yellow-brown. Legs largely ochreous, with only the fifth tarsal segments and occasionally the extreme base of the hind coxae obviously darker. Gaster beyond petiole largely brown.

Morphology. Antennal segments: ♂, 24 (1 ex.)—25—27; ♀, 26. Ocelli forming an almost equilateral triangle. Mandibles 3-toothed, not expanded. Face almost smooth, with short downwardly directed white pubescence at its sides giving way to finer inwardly directed pubescence at its centre.

Mesoscutum shining, evenly covered with pubescence over its entire surface: notaulices absent. Precoxal suture absent. Metapleuron with rather dense, coarse white pubescence, concealing much of the surface beneath. Propodeum densely covered with similar coarse pubescence, its surface largely concealed. Petiole short, densely covered with whitish pubescence: the following tergites with only apical rows of hairs.

Wing (figs. 110 and 111) with a short pterostigma, extremely broad and blackened in the male (similar to that of *D. ergeteles* (NIXON)), but cell $2R_1$ much shorter than in that species, the metacarp being only slightly longer than the pterostigma: vein *2r* shorter than the width of the pterostigma in the male: *1m—cu* rejected from cell R_s.

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Breeding records

Host 1 — *Phytomyza ranunculi* SCHRANK

1 ♂ from larva 25. viii. 53 on *Ranunculus* sp., Mill Hill, London, em. 19. ix. 53 (BM). 1 ♀ from larva 20. xii. 53 on *Ranunculus* sp., Hausach, Schwarzwald, Germany, em. 2. iv. 54, leg. SPENCER (GCDG). 12 ♂♂, 2 ♀♀, Denmark, leg. SCHLICK, localities Randers and Aalborg (Jutland), Køge, Damhusmose and Utterslevmose (Sealand) (KB and GCDG): three of the puparia with this series are clearly different from the rest and agree with HERING's (1949) description of the puparia of *stolonigena*, but this host association requires confirmation as the puparia do not seem to have been segregated by SCHLICK during breeding.

Most of HALIDAY's material of *macrospila* has proved on examination to belong to this species, which differs very obviously from the two species to which NIXON (1937 and 1954) has applied the name in having a shorter cell $2R_1$. A lectotype is designated by Mr. A. W. STELFOX in Appendix XI. There are also two specimens in the collection with very long cell $2R_1$, but these are clearly HALIDAY's variety "abdominis segmento 1° rufescente". I consider that they belong to *D. ergeteles* (NIXON) (= *Dacnusa macrospila* (HALIDAY) sensu NIXON, 1937).

Although the male of *macrospila* is readily identifiable by its wing venation, care should be taken not to confuse the female with *D. melicerta* (NIXON). In *macrospila*, unlike that species, the metacarp is distinctly longer than the pterostigma.

Dacnusa melicerta (NIXON), **comb. nov.**

Pachysema melicerta NIXON, 1954

Colour. Palpi and labrum yellow. Clypeus reddish black. Centre of mandibles orange-brown. Antennae dark except that the annellus and ventral surface of the scape and pedicel are obscurely yellow-brown. Legs deep yellow except for tarsal segments 5 which are contrastingly black. Gaster entirely dark.

Morphology. Antennal segments: ♂, 25; ♀, 25—26. Ocelli forming a triangle whose base is slightly longer than its sides. Mandibles small, 3-toothed. Face shining, only feebly sculptured, with rather dense pubescence directed downwards at its sides, but inwards at its centre.

Pronotum with medial pit. Mesoscutum sculptured anteriorly, only weakly shining, with dense coarse pubescence over its entire surface: notaulices absent. Precoxal suture absent. Metapleural and propodeal pubescence coarse, dull whitish, rather dense and obscuring the surface beneath (except for a small bare part of the propodeum immediately above the petiole). Petiole short (about 1.2 times as long as wide), with evenly distributed conspicuous dense pubescence. Tergite 3 bare.

Wing (figs. 112 and 113) with strongly sexually dimorphic pterostigma, broader and blackened in the male; metacarp shorter than the pterostigma (contrast *macrospila*): vein R_s only weakly sinuate: *1m—cu* rejected from cell R_s.

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Breeding records

Host 1 — *Phytomyza achilleae* HERING

1 ♀ from larva 17. vi. 62 on *Achillea millefolium*, Scratch Wood, London, em. 12. vii. 62 (GCDG).

Host 2 — *Phytomyza corvimontana* HERING

1 ♂ from larva 3. x. 54 on *Achillea ptarmica*, Scratch Wood, London, em. 26. x. 54 (BM).

Host 3 — *Phytomyza matricariae* HENDEL

2 ♀♀ from larvae on *Matricaria maritima*, Hedlandet, Södermanland, Sweden, em. 12. viii. 43, leg. LUNDQVIST (LUND).

I have also received a female bred from an unidentified *Phytomyza* sp. on *Achillea ligustica*, Rostock Botanical Gardens, Germany, em. 10. viii. 36, leg. BUHR (GCDG).

NIXON (1954) alsc accepted as this species a small male of *macrospila* and a female of *veronicae*, which are both very similar species. Another species which might easily be confused with *melicerta* is *D. centaureae* sp. nov., but this has more numerous antennal segments.

I am not completely satisfied that I am correct in applying the name *melicerta* to this species as NIXON's holotype ♀ has a distinctly longer thorax than the bred specimens (in which the thorax is conspicuously short, no longer than high). The point should be reexamined when more evidence is available.

***Dacnusa centaureae* sp. nov.**

Colour. Palpi and labrum yellow. Clypeus brown or red-black. Centre of mandibles orange-yellow. Antennae largely dark, but yellow-brown basally as far as the base of the first flagellar segment. Legs yellow except for tarsal segments 5 which are contrastingly dark. Gaster with tergites 3 and 4 yellow-brown, otherwise black.

Morphology. Antennal segments: ♂, 28, 30; ♀, 30, 32. Ocelli forming a triangle whose base is slightly longer than its sides. Mandibles 3-toothed, not expanded. Face shining, only weakly sculptured, with its centre line bare, but otherwise with pubescence directed downwards at its sides but inwards nearer its centre.

Thorax clearly longer than high. Pronotum with conspicuous medial pit. Mesoscutum distinctly roughened at least anteriorly, but nevertheless shining, with dense coarse white pubescence over its entire surface: notaulices virtually absent. Precoxal suture of mesepisternum represented by a smooth groove or completely absent. Metapleural pubescence somewhat dense, obscuring at least the lower half of the metapleuron. Propodeal pubescence similar to that of the metapleuron, whitish and somewhat dense, but not completely obscuring the finely rugose surface beneath. Petiole about 1.5 times as long as apically wide, evenly covered with conspicuous rather dense pubescence. Tergite 3 bare except in one male in which it bears some basal hairs.

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Wing (fig. 119) with broad tapering pterostigma in both sexes, but larger and blackened in the male: metacarp a little shorter than the pterostigma: *1m—cu* widely rejected from cell R_s.

Host — *Phytomyza montana* GROSCHKE

Holotype ♂, ♂♀ paratypes from larvae on *Centaurea montana*, Stuttgart-Rohr, Germany, em. 27—29. viii. 55, leg. GROSCHKE (STGT and GCDG). ♀ paratype from larva on *Centaurea montana*, Stuttgart-Echterdingen, em. 11. iv. 54, leg. GROSCHKE (STGT). ♂ paratype from larva on *Centaurea montana*, Wolfratshausen, Oberbayern, Germany, em. 28. v. 53, leg. GROSCHKE (STGT).

This species is very similar to *melicerta*, but has more numerous antennal segments and a longer petiole.

***Dacnusa soldanellae* sp. nov.**

Colour. Palpi deep yellow. Labrum orange-yellow. Clypeus red-brown to black. Centre of mandibles reddish yellow. Antennae brown or black, with the ventral surface of the scape golden brown. Legs largely deep golden yellow, with tarsal segments 5 and the base of the hind coxae somewhat darker. Gaster with tergites 3 and 4 red-brown, becoming darker towards its apex.

Morphology. Antennal segments: ♂, 28—30; ♀, 27—31. Ocelli forming a triangle whose base is slightly longer than its sides, in the centre of which lies a short longitudinal groove. Mandibles 3-toothed, not expanded. Face strongly shining, only feebly sculptured, with longer downwardly directed pubescence at its sides and fine inconspicuous inwardly directed pubescence at its centre.

Pronotum with a small medial pit. Mesoscutum with dense pubescence distributed over its entire surface except the posterior half of the lateral lobes, and with the anterior part of its central lobe roughened: notaulices usually distinct anteriorly only. Precoxal suture represented by a shallow smooth impression. Metapleural pubescence long and white, somewhat dense, almost obscuring the surface beneath (compare *melicerta* and *centaureae*). Propodeum with long white pubescence, similar to that of the metapleuron, at its sides, but its centre bears only extremely fine pubescence (visible only at high magnification), which in no way obscures the shining rugose surface beneath in posterior view. Petiole with conspicuous long white hairs distributed over its entire surface. Tergite 3 bare.

Wing (compare fig. 114) with sexually dimorphic pterostigma, broader and blackened in the male, almost parallel-sided in both sexes (compare *alpestris* and *ocyroe*): metacarp shorter than the pterostigma: vein *2r* longer than the width of the pterostigma: *1m—cu* rejected from cell R_s.

Host — *Phytomyza soldanellae* STARÝ

Holotype ♂; 5 ♂♂, 11 ♀♀ paratypes from larvae on *Soldanella* sp., Brauneck near Lenggries, Oberbayern, Germany, 1500 metres, em. 19—27. vi. 53, leg. GROSCHKE (STGT and GCDG). Paratype ♂ from larva on *Soldanella* sp., Saas-Fee, Switzerland, em. 1. viii. 59, leg. SPENCER (GCDG).

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This species has a parallel-sided pterostigma like *ocyroe* and *alpestris*, but its shorter, more pubescent petiole and denser metapleural pubescence should prevent confusion.

***Dacnusa alpestris* sp. nov.**

Colour. Maxillary palpi deep yellow with the apical segment sometimes somewhat infuscated. Labrum orange-yellow. Clypeus dark brown or black. Centre of mandibles golden brown. Antennae black except that the annellus and underside of the scape are red-brown or yellow-brown. Legs largely deep golden yellow, but the tarsi, especially segments 5, and the apex of the hind tibiae are infuscated. Gaster entirely dark.

Morphology. Antennal segments: ♂, 24, 27 (2 ex.) (♀ broken). Ocelli forming a triangle whose base is slightly longer than its sides. Mandibles 3-toothed, not expanded. Face almost smooth, its pubescence rather sparse, directed downwards at its sides but inwards or upwards at its centre.

Mesoscutum roughened anteriorly, with dense white pubescence distributed over its entire surface: notaulices only very feebly indicated anteriorly in the two males, but showing as distinct V-shaped grooves in the two females. Precoxal suture absent. Metapleuron with its surface partly rugose; its pubescence very fine, a little denser than in *ocyroe*. Propodeal pubescence sparse, in no way concealing the shining rugose surface beneath. Petiole elongate and almost bare (with no more than 3 or 4 pairs of hairs on its dorsal surface), similar to that of *ocyroe*. Tergite 3 bare.

Wing (fig. 114) similar to that of *ocyroe*, with the pterostigma parallel-sided in both sexes: *1m—cu* fairly narrowly rejected from cell R_s.

Host 1 — *Phytomyza alpina* GROSCHKE

Holotype ♂, 2 ♀♀ paratypes from larvae on *Senecio alpinus*, Lenggries, Oberbayern, Germany, 1500 metres, em. 27. viii—10. ix. 53, leg. GROSCHKE (STGT and GCDG).

Host 2 — *Phytomyza senecionis* KALTENBACH

Paratype ♂ from larva 12. ix. 56 on *Senecio nemorensis*, Kraków Ravine, Tatry, Poland, pupated 2. ix, em. 10. x. 56, leg. NOWAKOWSKI (PAN).

Host 3 — *Phytomyza tussilaginis* HENDEL

Paratype ♂ from larva 18. viii. 64 on *Tussilago farfara*, Mösern, Tirol, Austria, 1250 metres em. 13. ix. 64 (GCDG). Paratype ♀ from larva 1. ix. 56 on *Tussilago farfara*, Ścieżka pod Reglami, Tatry, Poland, pupated 2. ix, em. 10. x. 56, leg. NOWAKOWSKI (PAN).

This species very closely resembles *D. ocyroe* NIXON, but clearly differs in its more extensive mesoscutal pubescence. It is perhaps an alpine vicariant of that species. The specimen bred from *Phytomyza senecionis* KALTENBACH is very small (with 24 antennal segments) but I think it belongs to this speci s.

I have also obtained a large British male which differs from the continental material of *alpestris* in having 31 antennal segments and the mandibles strongly

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expanded towards their apex. The data are as follows: from larva 5. ix. 64 of *Phytomyza rydeniana* HERING on *Cirsium heterophyllum*, Ingleborough, Yorks., England, em. 2. v. 65 (GCDG). I suspect that this represents a distinct species but do not intend to describe it until more material is available. The host is a boreo-alpine species, not occurring in southern England.

Dacnusa ocyroe NIXON

Dacnusa ocyroe NIXON, 1937
Pachysema ocyroe (NIXON), NIXON, 1954

Colour. Palpi and labrum yellow. Clypeus brown or almost black. Centre of mandibles orange-yellow or yellow-brown. Antennae brown or yellow-brown basally with largely dark flagellum, its basal segments slightly paler but not contrastingly so. Legs largely yellow, but tarsal segments 5 of the front and middle legs, and the entire hind tarsi and the apex of the hind tibiae infuscated. Gaster with tergite 3 brown, otherwise black.

Morphology. Antennal segments: ♂, 24—28; ♀, 23—27. Face shining, almost smooth, with pubescence directed downwards at its sides, but mostly inwards at its centre.

Mesoscutum with its anterior face and central lobe pubescent, but its lateral lobes almost bare: notaulices distinct anteriorly only or virtually lost. Precoxal suture absent. Metapleuron largely smooth and shining, with sparse downwardly directed pubescence (the plesiomorph condition). Propodeum strongly shining, deeply rugose, with only very sparse fine pubescence. Petiole elongate, its dorsal surface almost bare (usually with only an apical pair of hairs). Tergite 3 without basal hairs.

Wing (compare fig. 114) with sexually dimorphic pterostigma, broader and blackened in the male, almost parallel-sided in both sexes: metacarp shorter than the pterostigma: vein R_s strongly sinuate: *1m—cu* rejected from cell R_s.

Breeding records

Host 1 — *Phytomyza albiceps* MEIGEN

♂ from puparium 30. ix. 22 on *Artemisia vulgaris*, Oxford, England, em. 29. iv. 23, leg. HAMM (HD). 1 ♀ from larva 27. vi. 54 on *Artemisia vulgaris*, Faversham, Kent, England, em. 16. vii. 54 (BM). 2 ♂♂, 1 ♀ from larvae 10. vi. 54 on *Artemisia vulgaris*, Łomianki, Kampinoska Forest, Poland, pupated 12. vi, em. vii. 54, leg. NOWAKOWSKI (PAN).

Host 2 — *Phytomyza alpina* GROSCHKE

♂, 2 ♀♀ from larvae on *Senecio alpinus*, Partnachklamm, Germany, em. 5. xii. 49, leg. GROSCHKE (STGT).

Host 3 — *Phytomyza conyzae* HENDEL

♂, 2 ♀♀ from larvae on *Inula conyza*, Blackgang, Isle of Wight, England, em. 6—12. x. 55, leg. SPENCER (GCDG). ♂ from larva 14. viii. 55 on *Inula helenium*, Betchworth, Surrey, England, em. 17. ix. 55 (GCDG). 2 ♂♂ from larvae 30. vii. 62 on *Inula conyza*, near Settle,

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Yorks., England, em. 12 and 20. viii. 62 (GCDG). 3 ♂♂, 1 ♀ from larvae on *Inula conyza*, Bagley Wood, Oxford, England, em. 31. vii. 31 and 29. vii. 32, leg. HAMM (HD). 1 ♂, 3 ♀♀ from larvae 6. vii. 31 on *Inula conyza*, Oxstead, Surrey, England, leg. ROBBINS (BM).

Host 4 — *Phytomyza farfarae* HENDEL

♀ from larva on *Tussilago farfara*, Garmisch, Bayern, Germany, em. 20. ix. 55, leg. SPENCER (GCDG). ♀ from larva on *Tussilago farfara*, Lenggries, Oberbayern, Germany, em. 10. ix. 53, leg. GROSCHKE (STGT).

Host 5 — *Phytomyza lappina* GOUREAU

♂ from puparium 27. ix. 53 on *Arctium* sp., Darenth, Kent, England, em. 25. x. 53 (BM). ♀ from puparium 29. viii. 53 on *Acrtium* sp., Boxhill, Surrey, England, em. 11. ix. 53 (BM).

Host 6 — *Phytomyza leucanthemi* HERING

1 ♀ from larva 15. ix. 60 on *Chrysanthemum leucanthemum*, Nosal, Tatry, Poland, pupated 18. ix, em. 18. x. 60, leg. NOWAKOWSKI (PAN).

Host 7 — *Phytomyza senecionis* KALTENBACH

1 ♀ from larva 9. ix. 60 on *Senecio nemorensis*, Spadowiec Valley, Tatry, Poland, pupated 18. ix, em. 15. iv. 61, leg. NOWAKOWSKI (PAN). 1 ♀ from larva 9. ix. 60 on *Senecio fuchsii*, same locality, pupated 14. ix, em. x. 60, leg. NOWAKOWSKI (PAN).

Host 8 — *Phytomyza solidaginis* HENDEL

♀, Sweden (? locality), 14. vii. 52, leg. RYDÉN (LUND).

Host 9 — *Phytomyza marginella* FALLÉN (= *sonchi* ROBINEAU-DESVOIDY)

♂♀ from larvae 15. ix. 61 on *Mycelis muralis*, Penrice, Gower, Wales, em. 5 and 9. x. 61 (GCDG).

The inclusion of *P. farfarae* HENDEL in the host range of this species is surprising, as that species does not belong to the *albiceps* group s. l., as do the other hosts.

This species and its sister-species *D. alpestris* sp. nov. are well characterised by their elongate, almost bare petiole and parallel-sided pterostigma. The latter feature is also shown by *soldanellae* sp. nov., but that species has a shorter, more pubescent petiole.

***Dacnusa angelicina* sp. nov.**

Colour. Palpi yellow. Labrum yellow-brown: clypeus dark brown or black. Centre of mandibles red-brown. Antennae almost entirely dark (only the annellus and ventral surface of the scape yellow-brown). Legs deep yellow, with the tarsi, apex of the hind tibiae and sometimes the posterior edge of the hind coxa slightly darker, more or less brown. Petiole and tergite 3 brown, the following tergites dark.

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Morphology. Head strongly transverse. Antennal segments: ♂, 28 (holotype); ♀, 31 (2 ex.). Ocelli forming a triangle whose base is slightly longer than its sides. Mandibles 3-toothed, hardly expanded. Face smooth and shining with only the downwardly directed hairs at its sides conspicuous: a large part of its central area appears bare.

Pronotum with a small medial pit. Mesoscutum slightly roughened anteriorly, pubescent over almost its entire surface: notaulices faintly visible as shallow V-shaped smooth grooves. Precoxal suture absent. Metapleuron largely smooth and shining with plesiomorph pubescence (sparse long hairs directed towards the hind coxa). Propodeum strongly sculptured, with only sparse, very fine pubescence (visible only at high magnification). Petiole short and widened towards its apex, bearing only a few hairs at its sides and near its apex. Tergite 3 bare.

Wing (fig. 107) with elongate pterostigma (broader and blackened in the male), which tapers strongly towards its apex: cell $2R_1$ extremely long, almost reaching the apex of the wing, the metacarp being slightly longer than the pterostigma: vein R_s sinuate: *1m-cu* rejected from cell R_s.

Host 1 — *Phytomyza angelicae* KALTENBACH

Holotype ♂, Wurzacher Ried, Württemberg, Germany, em. 9. vii. 55, leg. GROSCHKE (STGT).

Host 2 — *Phytomyza aegopodii* HENDEL

1 ♂ paratype from larva 11. ix. 64 on *Aegopodium podagraria*, Stadtwald, Mühlhausen, Thuringia, Germany, em. 17. iv. 65, leg. BUHR no. 2256 (GCDG). 3 ♀♀ paratypes from larvae 3. x. 64, same plant and locality, em. 12—20. iv. 65, leg. BUHR nos. 2307 and 2340 (GCDG).

This species and *D. lithospermi* sp. nov. have similar wing venation (but this may perhaps represent symplesiomorphy). The clearest difference between the two species I consider to lie in the metapleural and propodeal pubescence.

***Dacnusa lithospermi* sp. nov.**

Colour. Palpi and labrum pale yellow. Clypeus red-brown. Centre of mandibles orange-yellow. Antennae dark with the scape and annellus contrastingly yellow. Legs entirely pale yellow. Gaster with tergites 3 and 4 yellow, the following tergites dark.

Morphology. Head strongly transverse. 30 antennal segments (♂). Ocelli forming a triangle whose base is slightly longer than its sides, in the centre of which lies a short longitudinal groove. Mandibles 3-toothed, not expanded. Face smooth and shining, with pubescence directed downwards at its sides and inwards at its centre.

Pronotum with a small medial pit. Mesoscutum shining, only feebly punctate, with short dense pubescence over its entire surface: notaulices very weak. Precoxal suture absent. Metapleuron largely shining on its upper half, but rather densely pubescent on its lower half. Propodeum with longer pubescence similar

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to that of the metapleuron at its sides, giving way over its centre to very fine pubescence which although dense does not obscure in posterior view the finely rugose surface beneath. Petiole bare centrally, with sparse pubescence along its sides and towards its apex. Tergite 3 without basal hairs.

Wing (fig. 108) with large blackened strongly tapering pterostigma: cell $2R_1$ very long, the metacarp about as long as the pterostigma: vein R_s strongly sinuate: *1m—cu* rejected from cell R_s.

Host — *Phytomyza lithospermi* NOWAKOWSKI

Holotype ♂ from larva on *Lithospermum officinale*, München-Freimann, Germany, em. 26. vii. 53, leg. GROSCHKE (STGT).

The wing venation of this species is similar to that of *D. angelicina* sp. nov., but its metapleural and propodeal pubescence is denser. The host was originally identified as *P. symphyti* HENDEL by GROSCHKE (before the description of *P. lithospermi* NOWAKOWSKI).

Dacnusa ergeteles (NIXON), **comb. nov.**

Dacnusa macrospila (HALIDAY) sensu NIXON, 1937 (nec *Alysia* (*Dacnusa*) *macrospila* HALIDAY, 1839)
Pachysema ergeteles NIXON, 1954

Colour. Palpi yellow. Antennae dark, with the annellus and ventral surface of the scape yellow-brown. Legs deep yellow with only tarsal segments 5 distinctly infuscated. Petiole red or red-black: tergites 3 and 4 orange-yellow, the following tergites dark.

Morphology. Antennal segments: ♂, 28, 29, 31 (bred specimen) (broken in the holotype). Mesoscutum fairly densely pubescent over most of its surface: notaulices absent. Precoxal suture absent. Metapleuron with somewhat dense pubescence, especially over its lower half. Propodeum with similar, fairly dense pubescence which tends to be adpressed and to obscure part of the rugose surface beneath in posterior view. Petiole only sparsely pubescent. Tergite 3 bare.

Wing (fig. 106) with very short and broad blackened pterostigma which is much shorter than the metacarp: cell $2R_1$ elongate, with vein R_s obviously sinuate: *1m—cu* rejected from cell R_s. (♀ unknown).

Breeding records

Host — *Phytomyza* sp.

1 ♂, Randers, Jutland, Denmark, leg. SCHLICK (KB).

In addition to the Irish holotype I refer to this species two specimens placed by HALIDAY (1839) as a variety of *macrospila*. The species can be recognised by the combination of dense metapleural and propodeal pubescence with a short broad pterostigma but very long cell $2R_1$.

The host of the bred specimen is a black species of *Phytomyza* of which there is one male in the SCHLICK collection (SCHLICK's *Phytomyza* no. 15). I have made a preparation of its genitalia, but unfortunately the species concerned is not

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otherwise known to me or to Dr. J. T. NOWAKOWSKI, who was kind enough to give me his comments. He suggests that the species belongs to the group of black-frons miners of Ranunculaceae which includes *P. abdominalis* ZETTERSTEDT, *P. campanariae* NOWAKOWSKI, *P. calthophila* HERING etc. (see NOWAKOWSKI, 1962, p. 103).

Dacnusa brevistigma (TOBIAS), **comb. n ov.**

Pachysema brevistigma TOBIAS, 1962

Colour. Palpi yellow. Antennae dark with scape and annellus yellow-brown. Legs entirely yellow in some specimens; at most tarsal segments 5 of the front and middle legs, and the tarsi and apex of the tibiae of the hind legs are yellow-brown or red-brown. Tergites 3 and 4 yellow or red-brown: often the petiole too is red-brown.

Morphology. Antennal segments: ♂, 23 (1 ex.)—24—27; ♀, 26—28—(29). Mesoscutum with its central lobe pubescent, but the lateral lobes largely bare: notaulices absent. Precoxal suture absent. Metapleuron with sparse pubescence directed towards the hind coxa (the plesiomorph condition). Propodeal pubescence sparse and fine, in no way obscuring the shining surface beneath, which is weakly sculptured or almost smooth. Petiole and tergite 3 almost bare.

Wing (fig. 117) with strongly dimorphic pterostigma, broader and strongly blackened in the male; metacarp 1.0—1.3 times as long as the pterostigma; *1m—cu* rejected from cell R_s; cell $2R_1$ elongate.

Breeding records

Host 1 — *Phytomyza anemones* HERING

9 ♂♂ from larvae on *Anemone hortensis*, Hvar, Yugoslavia, em. 11—13. v. 63, leg. HERING no. 7010 (GCDG). 3 ♂♂, 5 ♀♀ from larvae 12. iv. 54 on *Anemone* sp., Capri, Italy, em. 10—12. v. 54 (BM) (recorded as "*Pachysema* sp." in GRIFFITHS, 1956).

Host 2 — *Phytomyza hellebori* KALTENBACH

4 ♂♂ from larvae 23. viii. 63 on *Helleborus* sp., near Como, Italy, em. 3—17. ix. 63 (GCDG). 1 ♂, 8 ♀♀ from puparia 31. viii. 65 on *Helleborus lividus corsicus*, Vizzavona, Corsica, 1000 metres, em. 9. ix—1. x. 65 (GCDG).

Host 3 — *Phytomyza auricomi* HERING

3 ♀♀ from larvae 18. viii. 65 on *Ranunculus auricomus*, Stadtwald, Mühlhausen, Thuringia, Germany, em. 8. ix. 65, 7. ii and 8. iii. 66, leg. BUHR no. 2612 (GCDG). ♂♀ from larvae 19. ix. 65 on *Ranunculus auricomus*, Lobdeburg, Jena, Thuringia, em. 7—8. iii. 66. leg. BUHR no. 2667 (GCDG).

The holotype ♀ of *brevistigma* has an entirely red-yellow gaster and cell $2R_1$ slightly shorter than in the bred material described and figured in this paper. It is possible that it does not represent the same species, and Mr. V. I. TOBIAS (personal communication) is of this view. But I do not feel justified in proposing a new name for the bred material until further evidence is available and am provisionally ascribing it to *brevistigma*.

The British material misidentified as *macrospila* by NIXON (1954) is very similar to this species, but differs in having a shorter pterostigma (the metacarp being

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1.3—1.6 times as long as the pterostigma). Probably a different species is concerned which will require a new name. I have deferred proposing one until its life-history can be established.

Dacnusa lissos (NIXON)

Pachysema lissos NIXON, 1954
Dacnusa lissos (NIXON), GRIFFITHS, 1966

Colour. Palpi and labrum yellow. Clypeus red-brown. Centre of mandibles orange-yellow. Antennae with dark flagellum, but scape, pedicel and annellus yellow-brown, usually somewhat contrasting. Legs largely yellow, with tarsal segments 5 of the front and middle legs and the hind tarsi and apex of the hind tibiae somewhat infuscated. Gaster with tergites 3 and 4 orange-yellow.

Morphology. Antennal segments: ♂, 33 (4 ex.), 34 (2 ex.), 36 (2 ex.), 37 (1 ex.); ♀, 34 (holotype), 35 (2 ex.). Ocelli forming a more or less equilateral triangle. Mandibles 3-toothed, not expanded. Face with long fine pubescence over its entire surface, directed inwards at its centre but downwards at its sides; the surface beneath is strongly shining and in no way obscured.

Mesoscutum densely pubescent over its entire surface, with its central lobe somewhat roughened anteriorly: notaulices absent. Precoxal suture represented by a smooth impression or absent. Metapleural pubescence long, white, evenly distributed and moderately dense, but not completely obscuring the surface beneath. Propodeum with similar long, white hairs at its sides, giving way to fine inconspicuous hairs over its centre, beneath which its rugose surface is clearly visible in posterior view. Petiole with sparse evenly distributed pubescence. Tergites 3 and 4 with fine scattered pubescence in most specimens.

Wing (fig. 118) with sexually dimorphic pterostigma, broader and blackened in the male: metacarp a little shorter than the pterostigma: vein R_s strongly sinuate: *1m—cu* rejected from cell R_s.

Breeding records

Host 1 — *Phytomyza abdominalis* ZETTERSTEDT

♂, Neubronn near Aalen, Württemberg, Germany, em. 21. v. 55, leg. GROSCHKE (STGT). ♂, München Botanical Gardens, Germany, em. 1. viii. 55, leg. GROSCHKE (STGT). ♂, Hälsingborg, Skåne, Sweden, em. 10. vii. 39, leg. RYDÉN (LUND). ♂, same locality, em. 4. ix. 29, leg. RYDÉN (LUND). 2 ♂♂, 4 ♀♀ from larvae 29. iv. 63 on *Hepatica nobilis*, Białowieski National Park, Poland, pupated 10. v, em. 23. v—15. vi. 63, leg. MIKOŁAJCZYK (PAN and GCDG). 3 ♂♂ from larvae 14. x. 55 on *Hepatica nobilis*, Sieraków, Kampinoska Forest, Poland, pupated 17—20. x, em. iv—5. v. 56, leg. NOWAKOWSKI (PAN).

Host 2 — *Phytomyza aconitophila* HENDEL

2 ♂♂, Hälsingborg, Skåne, Sweden, em. 13. viii. 29, leg. RYDÉN (LUND).

I am also provisionally referring to this species a single male with broken antennae bred from *Phytomyza* sp. (HERING, 1957, no. 358) on *Anemone sylvestris*, Leutra-Tal, Jena, Thuringia, Germany, em. 17. vii. 63, leg. BUHR, HERING

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no. 1975 (GCDG). Details of this specimen have been included in the table of biometric data. Additional material from this host is needed for further study.

The most characteristic features of this species are its large number of antennal segments and the wing venation (particularly the form of the pterostigma and the length of cell $2R_1$) and the moderately dense metapleural and propodeal pubescence.

Dacnusa clematidis sp. nov.

Colour. Palpi and labrum yellow. Clypeus and face red-brown. Antennae with the scape, pedicel and annellus yellow or yellow-brown and the basal flagellar segments obscurely ochreous or brown, this colour merging gradually into the dark colour of most of the flagellum. Centre of mandibles reddish yellow. Legs almost entirely pale yellow, only tarsal segments 5 weakly infuscated. Petiole reddish: the rest of the gaster largely yellow-brown, becoming darker towards its apex.

Morphology. Antennal segments: ♂, 26 (2 ex.), 28; ♀, 25 (3 ex.). Palpi very long (see the table of biometric data). Ocelli forming a triangle whose base is obviously longer than its sides. Mandibles 3-toothed, not expanded. Face almost smooth, with fine pubescence (directed downwards at its sides but inwards over its centre) which does not obscure the surface beneath.

Pronotum with medial pit. Mesoscutum with its anterior face roughened but otherwise almost smooth, strongly shining, with pubescence distributed over almost its entire surface: notaulices absent. Precoxal suture absent. Metapleuron with sparse pubescence directed towards the hind coxa. Propodeum covered with sparse fine pubescence which does not conceal the rugose surface beneath. Petiole with a distinct central keel, almost bare (with no more than 4 pairs of hairs on its dorsal surface). Tergite 3 without basal hairs.

Wing (fig. 109) with strongly tapering, sexually dimorphic pterostigma (broader and blackened in the male); metacarp distinctly shorter than the pterostigma in most specimens (but almost as long in the largest male): *1m—cu* widely rejected from cell R_s.

Host — *Phytomyza kaltenbachi atragenis* HERING

Holotype ♂; 2 ♂♂, 3 ♀♀ paratypes from larvae 15. ix. 60 on *Clematis alpina*, Nosal, Tatry, Poland, pupated 18. ix, em. 2. v—27. vi. 61, leg. NOWAKOWSKI (PAN and GCDG).

This species is very similar to several others associated with blotch-miners on Ranunculaceae, particularly *D. brevistigma* (TOBIAS). The differences are given in the key below.

Dacnusa campanariae sp. nov.

Colour. Labrum dark brown: clypeus black. Palpi and antennae virtually black Centre of mandibles yellow-brown. Legs brown with the tarsi and coxae virtually black. Gaster with the sides of the petiole reddish and tergites 3 and 4 yellow, contrasting with the darker apical segments.

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Morphology. 24 antennal segments (♀). Ocelli forming a triangle whose base is slightly longer than its sides. Mandibles 3-toothed, not expanded. Face with fine pubescence, directed inwards at its centre but downwards along the eye-margins, not obscuring the smooth shining surface beneath.

Mesoscutum largely smooth and shining, its central lobe and anterior face pubescent but the lateral lobes largely bare: notaulices shortly indicated anteriorly only. Metapleural pubescence moderately dense, but not obscuring most of the surface beneath. Propodeum with similar fairly dense pubescence, especially at its sides, but this is not sufficiently dense to obscure the rugose surface beneath in posterior view. Petiole almost bare, shining, with a distinct central keel and shallow, partly longitudinal sculpture. Tergite 3 bare. Ovipositor (♀) not projecting beyond the apical tergite in the retracted position.

Wing with a broad tapering pterostigma, about 1.3 times as long as the metacarp: cell $2R_1$ short, ending well before the apex of the wing: *1m—cu* widely rejected from cell R_s.

Host — *Phytomyza campanariae* NOWAKOWSKI

Holotype ♀ from larva 27. ix. 64 on *Pulsatilla pratensis*, Góra Zelejowa reservation near Chęciny, Poland, pupated 5. x, em. 29. x. 64, leg. NOWAKOWSKI (PAN).

This small species is very distinctive by reason of its dark coloration and almost bare petiole. *D. terminalis* (TOBIAS) differs according to the description (TOBIAS, 1962) in having yellow palpi and 28 antennal segments.

Dacnusa aquilegiae MARSHALL

Dacnusa aquilegiae MARSHALL, 1891, 1895 and 1897, NIXON, 1937 (in part)
Pachysema aquilegiae (MARSHALL), NIXON, 1954 (in part)

Colour. Palpi yellow or golden yellow. Labrum yellow; clypeus yellow-brown or red-brown. Centre of mandibles orange or yellow-brown. Antennae dark: the scape and annellus are yellow-brown, but not strongly contrasting in colour with the flagellum. Legs entirely golden yellow except for the fifth tarsal segments in many specimens: but in others the hind tarsi and apex of the hind tibiae are red-brown, and the hind coxae slightly infuscated at their extreme base. Gaster with tergite 3 yellow-brown or reddish: sometimes also the petiole is red-brown.

Morphology. Antennal segments: ♂, 25—30; ♀, 26—30. Mandibles 3-toothed, not expanded. Facial pubescence rather sparse, not concealing the surface beneath.

Mesoscutum with pubescence over almost its entire surface: notaulices almost absent. Precoxal suture absent. Metapleural pubescence long and fine, not obscuring the surface beneath. Propodeum largely covered with fine pubescence, but this is not sufficiently dense to obscure the surface beneath, which is usually shallowly rugose (not extensively smooth as in *D. delphinii* sp. nov.). Petiole with pubescence evenly distributed over its surface. Tergite 3 with scattered hairs at least basally.

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Wing (fig. 115) with strongly dimorphic pterostigma, larger, wedge-shaped and strongly blackened in the male, but narrower and more parallel-sided in the female: *1m—cu* interstitial in both sexes; R_s strongly sinuate; R_s+M usually weak.

Breeding records

Host 1 — *Phytomyza aquilegiae* HARDY

4 ex. from larvae 17. ix. 54 on *Aquilegia* sp., Bolt Head, Devon, England, em. iv.—v. 55, leg. SPENCER (GCDG). 5 ex. from larvae 30. vii. 53 on *Aquilegia* sp., Hampstead, London, em. 30. viii—10. ix. 53, leg. SPENCER (BM). 34 ex. from *Aquilegia* sp., Oxford, England (7 ex. from puparia vi. 18, em. 13—22. viii. 18; 1 ex. from puparium ix. 18, em. 13. v. 19; 18 ex. from puparia ix. 19, em. 20. iv—17. v. 20; 4 ex. from puparia 10. vi. 21, em. 1—9. vii. 21; 4 ex. from puparia 6. ix. 22, em. 14—30. v. 23), leg. HAMM (HD). 2 ex. from puparia 11. x. 25 on *Aquilegia* sp., Milton and Guildford, Surrey, England, em. 16—22. v. 26, leg. HAMM (HD). 3 ex., München-Freimann, em. 3. vi. 54, leg. GROSCHKE (STGT). 4 ex., Liden, Medelpad, Sweden, em. 26. ii—16. iii. 52, leg. RYDÉN (LUND). 4 ex., Hälsingborg, Skåne, Sweden, em. 11—12. iii. 52, leg. RYDÉN (LUND). 2 ex. from larvae 22. vii. 55 on *Thalictrum minus*, Zamczysko, Kampinoska Forest, Poland, pupated 28. vi, em. 22. v. 56, leg. NOWAKOWSKI (PAN). 1 ex. from larva 29. vii. 57, same plant and locality, pupated 30. vii, em. 24. iii. 58, leg. NOWAKOWSKI (PAN). 1 ♀ from larva on *Aquilegia chrysantha*, Rostock Botanical Gardens, Germany, em. 2. viii. 35, leg. BUHR no. 914 (GCDG). 6 ex. from larvae 12. viii. 64 on *Aquilegia vulgaris*, Mühlhausen, Thuringia, Germany, em. iv. 65, leg. BUHR no. 2160 (GCDG). 25 ex. from larvae 25. vi. 65, same plant and locality, em. 14—23. vii. 65 and 21. iii. 66 (1 ♂), leg. BUHR no. 2398 (GCDG).
MARSHALL's holotype ♀ (now apparently lost) was bred from a miner on *Aquilegia vulgaris*, doubtless this same host.

Host 2 — *Phytomyza actaeae* HENDEL

4 ♀♀ from larvae on *Actaea spicata*, Hedlandet, Södermanland, Sweden, em. 7—8. ix. 42, leg. LUNDQVIST (LUND). 1 ♀ from larva 20. vii. 59 on *Actaea spicata*, Igman, near Sarajevo, Bosnia, Yugoslavia, pupated 23. vii, em. 15. viii. 59, leg. NOWAKOWSKI (PAN).

Host 3 — *Phytomyza albimargo* HERING

4 ♂♂ from larvae on *Anemone nemorosa*, Kunnersdorf, near Görlitz, Germany, em. 15. ii. 55, leg. HERING no. 5983 (GCDG). 1 ♂, 3 ♀♀, Örkelljunga, Skåne, Sweden, em. 27. ii. 31, leg. RYDÉN (LUND). 1 ♂, 2 ♀♀ from larvae on *Anemone nemorosa*, Hedlandet, Södermanland, Sweden, em. 27. ii—1. iii. 44, leg. LUNDQVIST (LUND).

Host 4 — *Phytomyza rydeni* HERING

3 ♂♂, Ulricehamn, Västergötland, Sweden, em. 10. iii. 35, leg. RYDÉN (LUND).

Host 5 — *Phytomyza thalictricola* HENDEL

2 ex., Pevestorf, Holstein, Germany, em. 20. viii. 53 and 5. iv. 54, leg. GROSCHKE (STGT).

Host 6 — *Phytomyza heracleana* HERING

1 ♂, Lund, Skåne, Sweden, em. 12. iii. 52, leg. RYDÉN (LUND).

Host 7 — *Phytomyza symphyti* HENDEL

♂♀ from larvae 25. ix. 60 on *Symphytum officinale*, Mątowski Las reservation, Piekło near Sztum, Pomerania, Poland, pupated 1. x, em. 25—27. iv. 61, leg. NOWAKOWSKI (PAN).

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All the recorded hosts produce blotch-mines on Ranunculaceae with the exception of *P. heracleana* HERING and *P. symphyti* HENDEL. Since this species has been bred from each of those hosts on a single occasion only, it is possible that its attacking them was abnormal. In this connection it is interesting to note that the closely related *D. fuscipes* sp. nov. has also been bred from hosts producing blotch-mines on both Umbelliferae and Ranunculaceae.

I have also received two specimens (♂♀) bred from *Phytomyza kaltenbachi atragenis* HERING (from larvae 15. ix. 60 on *Clematis alpina*, Nosal, Tatry, Poland, pupated 18. ix, em. 14 and 27. v. 61, leg. NOWAKOWSKI (PAN)) which agree substantially with *aquilegiae* but have unusually long antennae (number of segments: ♂, 28; ♀, 32). More material from this host is needed for further study.

NIXON (1937 and 1954) had little material of this species and his treatment of *aquilegiae* is mainly based on the larger species with more numerous antennal segments described as *D. delphinii* sp. nov.

Dacnusa delphinii sp. nov.

Dacnusa aquilegiae MARSHALL sensu NIXON, 1937 (in part) (nec *Dacnusa aquilegiae* MARSHALL, 1891)

Pachysema aquilegiae (MARSHALL) sensu NIXON, 1954 (in part) (nec *Dacnusa aquilegiae* MARSHALL, 1891)

Very similar to *D. aquilegiae* MARSHALL, with which it may be compared as follows.

Colour. Palpi and labrum yellow. Clypeus yellow-brown. Antennae with scape and annellus often contrastingly yellow-brown. Tergite 3 red or yellow-brown.

Morphology. Antennal segments: ♂, 32—36; ♀, 31—36 (except two abnormally small individuals with only 29). Propodeum with much of its surface almost smooth. (Gaster as NIXON, 1954, fig. 323.)

Wing with *1m—cu* usually very narrowly rejected from cell R_s, rarely fully interstitial: R_s+M stronger.

Breeding records

Host 1 — *Phytomyza aconiti* HENDEL

Holotype ♂ from larva 29. vii. 55 on *Delphinium* sp., Finchley, London, em. 22. viii. 55 (GCDG). 9 paratypes from larvae 20. viii. 54, same plant and locality, em. 16. viii—10. ix. 54 (BM). 6 paratypes from larvae on *Delphinium* sp., Hendon, London, em. vii. 32, leg. BLAIR (BM). 3 ♂♂, 2 ♀♀ paratypes from larvae on *Delphinium* sp., Wye, Kent, England, 1954, leg. MILES (BM).

Host 2 — *Phytomyza aconitophila* HENDEL

3 ♀♀ paratypes from larvae on *Aconitum* sp., Silesia, 19th century, leg. SCHOLTZ (PAN). 1 ♀ paratype from larva 2. ix. 56 on *Aconitum callibotryon*, Jaworzynka Valley, Tatry, Poland, pupated 5. ix, em. 2. v. 57, leg. NOWAKOWSKI (PAN). 34 paratypes from larvae on *Aconitum pyrenaicum*, *Delphinium elatum*, *D. nudicaule* and other cultivated forms of *Delphinium*, Rostock Botanical Gardens, Germany, em. vii. 35 (32 ex.), 24. iii. 36 and 6. iv. 36, leg. BUHR (GCDG). 1 ♀ paratype from larva on *Delphinium elatum*, Berlin Botanical Gardens, Germany, em. 6. x. 65, leg. HERING no. 7483 (GCDG).

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Other material

2 ♂♂, 1 ♀ paratypes taken on leaves of *Delphinium*, Weybridge, Surrey, England, 6. viii. 40, leg. NIXON (BM).

This species was not distinguished from *D. aquilegiae* MARSHALL by NIXON (1937 and 1954). But it differs in its more numerous antennal segments and usually larger size. Caught specimens could easily be confused with the *Agromyza*-parasite *D. abdita* (HALIDAY), which has the same range of antennal segments. The differences which I have been able to find between that species and *delphinii* are given in couplet 30 of the key below. Care should also be taken not to confuse the darker species described below as *D. fuscipes* sp. nov., which has also been bred from *Phytomyza aconiti* HENDEL.

***Dacnusa fuscipes* sp. nov.**

Colour. Palpi yellow-brown, distinctly infuscated. Labrum brown or yellow-brown; clypeus shining black. Centre of mandibles red-brown. Antennae entirely black except for the yellow-brown annellus. Front and middle legs largely deep yellow or ochreous with infuscated tarsi: hind legs with coxae black or dark brown at their base, but usually becoming paler apically; trochanters, femora and tibiae largely deep yellow; and the tarsi and apex of the femora strongly infuscated. Gaster with tergite 3 brown, otherwise black.

Morphology. Antennal segments: ♂, 29—30; ♀, 27 (1 ex.), 29—30, 32 (1 ex.). Ocelli forming an almost equilateral triangle. Mandibles 3-toothed, not or only slightly expanded towards their apex. Face with white hairs directed inwards at its centre but downwards at its sides, rather sparsely distributed and not obscuring the almost smooth surface beneath.

Mesoscutum with short hairs distributed over almost its entire surface, more or less smooth apart from its anterior face: notaulices almost or complete absent. Precoxal suture absent. Metapleuron largely smooth and shining, with plesiomorph pubescence consisting of sparse long hairs directed towards the hind coxa. Propodeum shining, largely rugose, with only fine inconspicuous pubescence. Petiole with obvious pubescence evenly distributed over its surface. Tergite 3 with 2 or 3 rows of basal hairs.

Wing (compare fig. 115) with sexually dimorphic pterostigma, larger, blackened and tapering towards its apex in the male, but narrower and paler in the female: metacarp relatively short: vein R_s strongly sinuate: *1m—cu* interstitial or virtually received into cell R_s.

Host 1 — *Phytomyza laserpitii* HENDEL

Holotype ♂; 1 ♂, 2 ♀♀ paratypes from larvae 25. vii. 55 on *Laserpitium latifolium*, Névache, Hautes Alpes, France, em. iv—v. 56, leg. SPENCER (GCDG).

Host 2 — *Phytomyza aconiti* HENDEL

♂♀ paratypes from larvae 30. viii. 57 on *Delphinium oxysepalum*, Kraków Ravine, Tatry, Poland, pupated 3. ix, em. 1. x. 57 and 24. iii. 58, leg. NOWAKOWSKI (PAN). 4 ♂♂, 6 ♀♀

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paratypes from larvae 12. ix. 60, same plant and locality, pupated 18. ix, em. 2—14. v. 61, leg. NOWAKOWSKI (PAN and GCDG). 3 ♀♀ paratypes from larvae 24. vii. 61, same plant and locality, pupated 31. vii, em. 28. viii—31. x. 61, leg. NOWAKOWSKI (PAN).

This species very closely resembles *D. aquilegiae* MARSHALL and *D. delphinii* sp. nov. but has obviously darker coloration. Its range of antennal segments is intermediate between those two species. Since all series of *fuscipes* were obtained from high altitudes it is possible that it is an alpine vicariant of the two species mentioned. The disjunct known host association is unexpected, but has a clear parallel in RYDÉN's breeding of *aquilegiae* from *Phytomyza heracleana* HERING, although the normal hosts of that species are blotch-miners on Ranunculaceae.

Dacnusa lonicerella sp. nov.

Colour. Palpi and labrum yellow-brown. Clypeus red-black. Centre of mandibles orange-yellow. Antennae entirely dark. Legs largely ochreous, with the hind coxae, hind tarsi and the apical half of the hind tibiae infuscated. Gaster beyond petiole brown.

Morphology. Antennae 25-segmented (♂), relatively short, their apical segments only twice as long as wide. Ocelli forming a triangle whose base is longer than its sides. Maxillary palpi rather short (see the table of biometric data). Mandibles small, 3-toothed. Face almost smooth, covered with fine pubescence which is directed inwards except at its sides, but this does not obscure the shining surface beneath. Vertex and temples with 3—4 rows of white hairs.

Mesoscutum roughened on the anterior part of its central lobe, with dense pubescence over its anterior face and central lobe, but the lateral lobes partly bare: notaulices absent. Precoxal suture absent. Metapleuron largely smooth and shining, with only sparse pubescence directed towards the hind coxa. Propodeum with fine pubescence at its sides but bare centrally, smooth and shining on its dorsal surface but sculptured above the petiole. Petiole shining, only shallowly sculptured, evenly covered with long conspicuous somewhat dense pubescence. Gaster beyond petiole more densely pubescent than in any other *Dacnusa* sp.: tergites 3 and 4 are evenly covered with hairs and tergites 5 and 6 each bear two rows of hairs.

Wing (♂) (fig. 116) with broad blackened parallel-sided pterostigma and short metacarp: *1m–cu* virtually received into cell R_s.

Host — *Paraphytomyza lonicerae* ROBINEAU-DESVOIDY

Holotype ♂ from larva on *Lonicera xylosteum*, Badra-Kelbra, Thuringia, Germany, em. 25. ii. 62, leg. BUHR, HERING no. 1705 (GCDG).

This specimen clearly represents a distinct species, well characterised by the extensive pubescence of its gaster, the wing venation and its dark hind coxae.

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Dacnusa monticola (FÖRSTER)

Brachystropha monticola FÖRSTER, 1862
Rhizarcha mutia NIXON, 1948
Dacnusa (*Rhizarcha* ?) *coracina* STELFOX, 1954
Pachysema coracina (STELFOX), NIXON, 1954
Pachysema mutia (NIXON), STELFOX, 1957
Dacnusa monticola (FÖRSTER), GRIFFITHS, 1964b

Colour. Palpi, labrum, clypeus and antennae dark. Centre of mandibles yellow-brown. Legs largely brown or red-brown, with all coxae infuscated.

Morphology. Number of antennal segments strongly sexually dimorphic: ♂, 25—27; ♀, 23—25. Ocelli forming a small equilateral triangle. Mandibles small, 3-toothed. Face somewhat roughened towards its sides, with fairly dense pubescence at its sides but becoming almost bare centrally.

Mesoscutum largely smooth and shining, its pubescence confined mainly to the former course of the notaulices: notaulices impressed for a short distance anteriorly only. Precoxal suture absent. Metapleuron with sparse pubescence directed towards the hind coxa. Propodeum rugose, with only sparse pubescence mainly at its sides. Petiole about as long as wide, with a distinct central keel, its sculpture tending to be longitudinally striate; its surface is evenly covered with very short inconspicuous pubescence. Extreme base of tergite 3 usually with a row of similar very short hairs. Ovipositor (♀) extraordinarily long, projecting far beyond the apex of the gaster and bent upwards towards its apex.

Wing (fig. 102) with pterostigma darker in the male, but not very strongly sexually dimorphic: cell $2R_1$ very short, with vein R_s evenly curved: *1m-cu* rejected from cell R_s, but not very widely so.

Breeding records

Host — *Phytomyza tenella* MEIGEN

Denmark. 6 ♂♂, 6 ♀♀ Præstevangen, Sealand; 6 ♂♂, 4 ♀♀ Randers, Jutland: leg. SCHLICK (KB and GCDG).

In addition there are single specimens in the SCHLICK collection from each of the above two localities mounted with puparia of *Phytomyza diversicornis* HENDEL, but I suspect that a confusion has occurred.

Since writing my comments in Part I of this paper (GRIFFITHS, 1964b) it has been brought to my attention that the type locality of this species, Celerina, is a village in the Upper Engadine district of Switzerland near St. Moritz. This species attacks the same host as *D. nigrella* sp. nov. from which it differs in having a much longer ovipositor and bare mesoscutum.

The host species is the true *P. tenella* MEIGEN, whose genitalia I have previously figured (GRIFFITHS, 1964a, fig. 9). The genitalia of a male of this species in the SCHLICK collection agrees closely with that figure of the holotype. I had provisionally considered a species feeding in seeds of *Euphrasia* to represent the same species (since the differences in the genitalia are not very great). But the puparia in the SCHLICK collection are clearly different from those of the *Euphrasia-*

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feeding species, having much larger, strongly projecting hind spiracles. This new evidence shows conclusively that two species are involved. According to recent research by Mr. K. A. SPENCER the name *Phytomyza affinis* FALLÉN should properly be applied to the *Euphrasia*-feeder. The life-history of the true *tenella* is not known, but it may be expected to be a seed-feeder on some species of Scrophulariaceae. I think it possible that SCHLICK collected his material from *Pedicularis palustris*, since he also collected *P. diversicornis* HENDEL (a known stem-miner on that host) at the same localities; but this will of course require confirmation.

***Dacnusa nigrella* sp. nov.**

Colour. Very dark species. Palpi, labrum, clypeus and antennae entirely black. Centre of mandibles ochreous or brown. Legs almost entirely dark brown or black (only the extreme base of the tibiae distinctly paler).

Morphology. Antennae short, the more apical segments only about 1—1½ times as long as broad; number of segments strongly sexually dimorphic: ♂, 24 (1 ex.)—25—27; ♀, 22—24. Ocelli forming an equilateral triangle. Mandibles 3-toothed, not or hardly expanded. Facial pubescence dense.

Thorax somewhat elongate (see the table of biometric data). Mesoscutum densely pubescent over most of its surface (except part of the posterior half of its lateral lobes): notaulices weak or almost absent. Precoxal suture absent. Metapleural pubescence somewhat dense, directed towards the hind coxa. Propodeum with similar somewhat dense pubescence, although its shining rugose surface is clearly visible in posterior view. Petiole about as long as wide, broadened towards its apex, its sculpture tending to be longitudinally striate, with a central keel and short dense pubescence over its entire surface. Tergite 3 without any basal hairs. Ovipositor (♀) very stout, shortly projecting (by about half the length of the petiole) beyond the apical tergite in the retracted position.

Wing (fig. 104) with pterostigma darker in the male, but not very strongly sexually dimorphic: cell $2R_1$ short: *1m—cu* rejected from cell R_s, but not very widely so.

Host — *Phytomyza tenella* MEIGEN

Denmark. Holotype ♂; 15 ♂♂, 15 ♀♀ paratypes, Randers, Jutland: 6 ♂♂, 4 ♀♀ paratypes, Præstevangen, Sealand: 1 ♂ paratype, Copenhagen: leg. SCHLICK (KB and GCDG).

This species is very close to *D. nigropygmaea* STELFOX but differs in having shorter antennae (in *nigropygmaea* the number of antennal segments is: ♂, 27—29; ♀, 24—26), almost black legs (largely brown in *nigropygmaea*), a slightly shorter cell $2R_1$, and *1m—cu* more closely approximated to cell R_s. For comment on the identity of the host see under *D. monticola* (FÖRSTER).

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Dacnusa fasciata STELFOX

Dacnusa (*Pachysema*) *fasciata* STELFOX, 1954
Pachysema fasciata (STELFOX), NIXON, 1954

Colour. Palpi and labrum yellow. Clypeus reddish yellow. Centre of mandibles yellow. Base of antennae (as far as about the first flagellar segment) yellow or yellow-brown. Legs yellow or reddish yellow except that the tarsal segments are progressively darkened. Tergite 3 and about half of tergite 4 orange or reddish, contrasting with the dark apex of the gaster.

Morphology. Antennal segments: ♂, 30—33; ♀, 28—30. Ocelli forming a triangle whose base is longer than its sides. Mandibles 3-toothed, not expanded.

Mesoscutum with deeply impressed V-shaped notaulices; its pubescence fine, distributed over most of its surface; central lobe roughened. Precoxal suture absent. Metapleuron with sparse pubescence directed towards the hind coxa. Propodeum rugose and shining with only sparse inconspicuous pubescence. Petiole rugose, subtriangular, with a distinct central keel, almost bare (with only a few apical pairs of hairs on its dorsal surface). Tergite 3 bare. Ovipositor (♀) very stout, projecting in the retracted position beyond the apical tergite by the length of the petiole or a little more, almost straight.

Wing (fig. 103) with pterostigma darker in the male, but not very strongly sexually dimorphic; vein R_s sinuate; *1m—cu* rejected from cell R_s: vein Cu_{1b} very short.

Breeding records

Host — *Phytomyza dasyops* HENDEL

5 ♂♂, 2 ♀♀ Damhusmose and 1 ♂ Randers, Sealand, Denmark, leg. SCHLICK (KB and GCDG).

The host-plant of *P. dasyops* HENDEL is unknown. As SCHLICK did not give this information on his labels the secret died with him.

This species is probably related to *monticola*, *nigrella* and *nigropygmaea* (having like them a projecting ovipositor and strong sexual dimorphism in the number of antennal segments).

Dacnusa sibirica TELENGA

Morphology. Antennal segments: ♂, 22—24; ♀, 22—24. Ocelli forming an almost equilateral triangle. Mandibles 3-toothed, not expanded. Palpi short (see the table of biometric data). Face smooth, with only sparse pubescence directed downwards at its sides but inwards at its centre.

Mesoscutum largely smooth, with very short pubescence distributed over most of its surface (except part of the lateral lobes): notaulices distinct anteriorly only or absent. Precoxal suture represented by a smooth impression or absent. Metapleuron shining, only sparsely pubescent at its centre, but with short denser pubescence ventrally. Propodeum with a few long hairs at its sides but its centre bears finer pubescence, which does not conceal in posterior view the shining, deeply rugose surface beneath. Petiole almost bare, longitudinally striate and strongly shining. Tergite 3 bare.

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Wing (figs. 91 and 92) with strongly sexually dimorphic, tapering pterostigma, largely blackened but paler near its apex in the male (approaching the condition found in *discolor* and *plantaginis*): *Im—cu* rejected from cell R_s.

The male of this species will be readily recognised by the form of the pterostigma. Other characteristic features (of both sexes) are the almost bare, longitudinally striate petiole and the low number of antennal segments. Although I have generally not interpreted species described by TELENGA (1935) in this paper, the use of the name *sibirica* for this species seems virtually certain in view of the unique pterostigma.

Two geographical subspecies are recognised on the basis of colour differences, as follows.

***Dacnusa sibirica sibirica* TELENGA, stat. nov.**

Dacnusa sibirica TELENGA, 1935

Colour. Palpi and labrum yellow. Clypeus red-black. Centre of mandibles orange-yellow. Antennae almost entirely dark except that the ventral surface of the scape is sometimes yellow-brown. Legs yellow except that the tarsal segments are progressively darkened. Gaster with tergite 3 brown, the following tergites darker.

Breeding records

Host 1 — *Phytomyza asteris* HENDEL

1 ♀ from puparium 10. vi. 62 on *Aster tripolium*, Pagham, Sussex, England, em. 22. vi. 62 (GCDG). 3 ♂♂, 1 ♀ from puparia 12. ix. 61 on *Aster tripolium*, Llanrhidian, Gower, Wales, em. 23. ix—10. x. 61 (GCDG and BM).

Host 2 — *Phytomyza autumnalis* GRIFFITHS (= *affinis* FALLÉN sensu HENDEL and HERING)

13 ♂♂, 14 ♀♀, Vesterfælled, Copenhagen, Denmark, leg. SCHLICK (KB).

Host 3 — *Phytomyza plantaginis* ROBINEAU-DESVOIDY

1 ♂ from puparium on *Plantago major*, Hälsingborg, Skåne, Sweden, em. 13. viii. 23, leg. RYDÉN (LUND).

Host 4 — *Phytomyza ranunculi* SCHRANK

1 ♂ from larva 2. vi. 58 on *Ranunculus sceleratus*, Kampinos, Poland, pupated 2. vi, em 20. vi. 58, leg. NOWAKOWSKI (PAN).

TELENGA's original material was taken at Irkutsk and Nikolsk-Ussurijsk in Siberia.

***Dacnusa sibirica comis* (NIXON), stat. et comb. nov.**

Pachysema comis NIXON, 1954

Colour. Palpi and labrum varying from yellow-brown to almost black. Clypeus black. Centre of mandibles brown or testaceous. Antennae entirely dark. Legs

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never yellow, varying from light brown or testaceous to dark red-brown, with the tarsi and hind coxae somewhat infuscated (sometimes almost black). Gaster entirely dark.

Breeding records

Host — *Phytomyza asteris* HENDEL

3 ♂♂, 1 ♀ from puparia 19. ix. 54 on *Aster tripolium*, Carlingford Lough, Co. Down, Ireland, em. 24. ix. 64 and 30. iv—13. v. 65 (GCDG).

Mr. A. W. STELFOX has taken this subspecies at two localities in Ireland, the one already stated and the type locality (North Bull near Dublin). Both are salt marshes and it seems clear that this subspecies is restricted to such localities (as is the host *P. asteris* HENDEL in Britain). Since material bred from the same host in England and Wales belongs to the typical yellow-legged form of *sibirica*, it appears that comis is a geographical vicariant of *sibirica*, and I have therefore accorded it only subspecific rank.

Dacnusa discolor (FÖRSTER)

Liposcia discolor FÖRSTER, 1862, MARSHALL, 1891, 1895 and 1897
Dacnusa discolor (FÖRSTER), TELENGA, 1935, NIXON, 1937 (in part)
Pachysema cercides NIXON, 1954, **syn. nov.**
(nec *Pachysema discolor* (FÖRSTER) sensu NIXON, 1954)

Colour. Palpi and labrum yellow. Clypeus dark. Centre of mandibles red-brown. Antennae with its basal segments brown or yellow-brown, this colour merging gradually into the dark colour of most of the flagellum. Legs yellow except for the infuscated fifth tarsal segments. Tergite 3 usually yellow-brown.

Morphology. Antennal segments: ♂, 24—27; ♀, 25—27: the more apical flagellar segments are 2½—3 times as long as broad. Ocelli forming an about equilateral triangle. Mandibles small, 3-toothed. Palpi longer than in *plantaginis* (see the table of biometric data). Face shallowly sculptured, with fine pubescence, directed inwards except at its sides, which does not conceal the surface beneath.

Pronotum with a medial pit. Mesoscutum, mesepisternum, metapleuron and propodeum as described for *plantaginis* sp. nov. (see below). Petiole rugose and densely pubescent, as in *plantaginis*, but more elongate than in that species (see the table of biometric data). Tergite 3 with few or no basal hairs. Ovipositor (♀) very slightly projecting beyond the apical tergite in the retracted position. Hind tarsus shorter than the tibia (contrast *plantaginis*).

Wing (figs. 93 and 94) with elongate sexually dimorphic pterostigma which is broadened and blackened at its base but becoming contrastingly paler towards its apex in the male: cell $2R_1$ reaching to near the apex of the wing: *1m-cu* rejected from cell R_s.

Breeding records

Host 1 — *Phytomyza primulae* ROBINEAU-DESVOIDY

1 ♀ from larva 30. vii. 62 on *Primula vulgaris*, near Settle, Yorks., England, em. 16. viii. 62 (GCDG). 1 ♀, Lairg, Sutherland, Scotland, em. vii. 54, leg. SPENCER (GCDG). 4 ex. from

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larvae 30. v. 54 on *Primula vulgaris*, Chailey, Sussex, England, em. 20—24. iv. 55 (GCDG). 1 ♀, Mickleham, Surrey, England, em. 20. vi. 52, leg. SPENCER (GCDG). 3 ♂♂, 1 ♀ from puparia 19. vi. 27 on *Primula vulgaris*, Oxford, England, em. 24. vii—viii. 27, leg. HAMM (HD). 3 ♂♂, 2 ♀♀ from puparia 9. vi. 33, same plant and locality, em. 18. vi (4 ex.) and vii. 33, leg. HAMM (HD). 3 ♂♂, 5 ♀♀ from puparia vi—vii. 19, same plant and locality, em. 8—28. vii. 19, leg. HAMM (HD and BM). 2 ♂♂, 3 ♀♀ from larvae 10. vi. 65 on *Primula vulgaris*, Mullagh More, Clare, Ireland, em. 27. vi—7. vii. 65 (GCDG). 1 ♀ from larva 10. viii. 59 on *Primula* sp., Zagreb Botanical Gardens, Yugoslavia, pupated 11. viii, em. 24. viii. 59, leg. NOWAKOWSKI (PAN).

Host 2 — *Phytomyza sedicola* HERING

1 ♀ from larva 13. vii. 53 on *Sedum telephium*, Vågåmo, Norrbotten, Norway, leg. RYDÉN (LUND).

The identification of the specimen bred from *P. sedicola* HERING will require confirmation, as it is based on a single female with broken antennae.

NIXON (1954) rightly separated this species (as *cercides*) from *plantaginis* sp. nov. (as *discolor*). But it appears from examination of FÖRSTER's material that the name *discolor* should properly be applied to this species, which NIXON called *cercides*. The six males in FÖRSTER's collection agree well with specimens bred from *P. primulae* ROBINEAU-DESVOIDY in having fairly long yellow palpi, yellow legs and the wing clearly longer than the body. Their antennae are unfortunately all broken. A lectotype has been selected (locality Aachen).

Records of *discolor* as a parasite of *Hydrellia* spp. (Ephydridae) are doubtless erroneous.

***Dacnusa plantaginis* sp. nov.**

Pachysema discolor (FÖRSTER) sensu NIXON, 1954 (nec *Liposcia discolor* FÖRSTER, 1862), **syn. nov.**

Colour. Palpi and labrum yellow-brown or brown. Clypeus brown or black. Centre of mandibles red-brown. Antennae dark, sometimes slightly paler at their base. Legs almost unicolorous yellow-brown except for the black fifth tarsal segments. Gaster beyond petiole brown.

Morphology. Antennal segments: ♂, 22—24; ♀, 21—24: the more apical flagellar segments are not more than twice as long as wide. Ocelli forming a small equilateral triangle. Mandibles small, 3-toothed. Palpi short (see the table of biometric data). Face smooth, covered with fine pubescence, directed inwards except at its sides, which does not conceal the surface beneath.

Pronotum with a small medial pit. Mesoscutum roughened anteriorly, with pubescence distributed over all its surface except part of the posterior half of the lateral lobes: notaulices almost absent. Precoxal suture represented by a smooth impression. Metapleural pubescence dense, whitish, concealing much of the surface beneath. Propodeum covered by similar conspicuous white pubescence, which partly conceals the surface beneath in posterior view. Petiole rugose, evenly covered with rather dense pubescence. Tergite 3 with few or no basal hairs. Ovipositor (♀) slightly projecting beyond the apical tergite in the retracted position. Hind tarsus as long as or longer than the tibia.

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Wing (figs. 95 and 96) not longer than the body (see the table of biometric data): pterostigma elongate, sexually dimorphic, broadened and blackened at its base but becoming contrastingly paler towards its apex in the male (as in *discolor*): cell $2R_1$ narrow and elongate: *Im—cu* rejected from cell R_s.

Breeding records

Host 1 — *Phytomyza plantaginis* ROBINEAU-DESVOIDY

Holotype ♂; 2 ♂♂, 5 ♀♀ paratypes from larvae 19—21. ix. 62 on *Plantago coronopus*, Burry Holms, Gower, Wales, em. 24. ix—27. xi. 62 (GCDG). ♀ paratype from larva 21. ix. 62 on *Plantago maritima*, same locality, em. 5. xi. 62 (GCDG). 1 ♂, 2 ♀♀ paratypes, Slough, Bucks., England (1 ♂ from larva 14. vi. 38, em. 25. vi.; 1 ♀ from larva 28. vi. 38, em. ix.; 1 ♀ from larva 15. viii. 38, em. ix. 38), leg. RICHARDS (BM). 3 ♀♀ paratypes, Nymphburg, München, Germany, em. 20. viii—5. ix. 53, leg. GROSCHKE (STGT). 5 ♀♀ paratypes from puparia 17. vi. 64 on *Plantago lanceolata*, Warszawa—Pyry, Lasy Kabackie, Poland, em. 25. vi—13. vii. 64, leg. NOWAKOWSKI (PAN).

Host 2 — *Phytomyza griffithsi* SPENCER

1 ♀ paratype from larva 24. vi. 62 on *Plantago media*, Boxhill, Surrey, England, em. 23. vii. 62 (GCDG).

NIXON (1954) described this species as *discolor*, but a new name is needed (see the comments under *discolor* above).

Dacnusa veronicae sp. nov.

This species is very similar to *D. plantaginis* sp. nov., with which it may be compared as follows.

Morphology. Antennal segments: ♂, 22; ♀, 22—24. Mesoscutum roughened over its entire surface. Hind tarsus shorter than the tibia. Wing with a much shorter pterostigma (figs. 97 and 98), only slightly longer than the metacarp: vein *2r* shorter than the width of the pterostigma in the male. Wing length exceeding the body length (see the table of biometric data).

Host — *Phytomyza crassiseta* ZETTERSTEDT

Holotype ♂, 1 ♀ paratype from larvae 17. x. 54 on *Veronica* sp., Mickleham, Surrey, England, em. 30. xi. 54 and 12. iv. 55 (BM and GCDG). 1 ♀ paratype from puparium 23. v. 54 on *Veronica* sp., Bookham, Surrey, em. 4. vi. 54 (BM). 1 ♀ paratype from puparium 17. xii. 22, Forest Hill, Kent, England, em. 26. iv. 23, leg. HAMM (BM). 1 ♀ paratype from puparium 10. xii. 22 on *Veronica officinalis*, Bagley, Oxford, em. 25. iv. 23, leg. HAMM (BM).

The female of this species, lacking the characteristically elongate pterostigma of *discolor* and *plantaginis*, could easily be confused with *melicerta* (and was identified as such by NIXON, 1954), but I think there is a clear difference in the shape of the wing (compare figs. 97 and 112) and thorax (see ratio F in the table of biometric data).

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THOMSON's (1895) holotype of *Dacnusa* (*Dacnusa*) *liopleuris* is a very similar insect but does not represent the same species. Further details will be given in Part V. In the meantime I have omitted *liopleuris* from the key to *Dacnusa*, but included particulars of the holotype in table 14 of biometric data.

Dacnusa heringi sp. nov.

Colour. Palpi ochreous or dull yellow. Labrum and clypeus dark brown or black. Centre of mandibles orange or red-brown. Antennae largely black, but the more basal segments brown. Legs uniformly ochreous yellow, except the darkened fifth tarsal segments; the extreme base of the hind coxae is also somewhat infuscated in the two males. Gaster with tergite 3 brown, the following tergites more or less black.

Morphology. Head somewhat quadrate (see the table of biometric data). Antennal segments: ♂, 23, 24; ♀, 21, 22 (5 ex.): the more apical flagellar segments about 2½ times as long as wide. Ocelli forming a small equilateral triangle. Face smooth and shining, with short adpressed pubescence over its centre and downwardly directed hairs at its sides. Mandibles small, 3-toothed.

Mesoscutum smooth, with short sparse pubescence situated mainly on its anterior face, the front part of the lateral lobes and in two or three rows along the former course of the notaulices: its centre line and the posterior half of the lateral lobes are characteristically bare and shining: notaulices absent. Subalar callus densely pubescent: precoxal suture represented by a smooth impression or absent. Metapleuron, propodeum and petiole covered with long dense pubescence (similar to that of the *areolaris* group): the surface of the propodeum and petiole appears only shallowly sculptured and can be seen as a distinct subshine beneath the pubescence at certain angles of light. Petiole subtriangular (as commonly in the *areolaris* group). Tergite 3 with at most a few short basal hairs. Ovipositor and sheaths (♀) upcurved, projecting shortly (by about half the length of the petiole) beyond the apical tergite in the retracted position (distinctly longer than in *D. plantaginis* sp. nov. which has been bred from the same host).

Wing (fig. 120) strongly sexually dimorphic: pterostigma elongate but tapered towards its apex in both sexes, but broader and heavily blackened over its entire length in the male: metacarp very short: vein R_s more or less evenly curved, especially in the male: *1m—cu* rejected from cell R_s:Cu_{1a} weak or absent.

Host — *Phytomyza griffithsi* SPENCER

Holotype ♂; 1 ♂, 6 ♀♀ paratypes from larvae on *Plantago media*, Mühlhausen, Thuringia, Germany, em. 10—17. ii. 63, leg. BUHR, HERING no. 1927 (GCDG).

The form of the petiole and its pubescence in this species is as in the *areolaris* group. I consider that the species belongs to *Dacnusa* s. s. (= *Rhizarcha*), but it is relatively plesiomorph in its retention of a broad pterostigma (fig. 120) (although approaching the elongate form of most other species). It can be readily distinguished from *D. plantaginis* sp. nov., which attacks the same host, by the

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wing venation, the form of the petiole and its pubescence, the sparser mesoscutal pubescence and longer ovipositor in the female.

This species is named in honour of Professor Dr. E. M. HERING in recognition of his valuable help in providing material for this paper.

Dacnusa tarsalis THOMSON

Dacnusa (*Dacnusa*) *tarsalis* THOMSON, 1895
Rhizarcha nitetis NIXON, 1948, **syn. nov.**

Colour. Palpi brown or deep yellow. Labrum brown. Clypeus black. Centre of mandibles yellow-brown. Antennae dark. Legs largely deep yellow, paler than in *D. maculipes* THOMSON and *D. areolaris* (NEES), but the hind coxae and fifth tarsal segments darkened.

Morphology. Antennal segments: ♂, 24—26; ♀, 22—26. Mandibles small, 3-toothed. Mesoscutum densely pubescent over its entire surface. Precoxal suture almost or completely absent. Metapleuron, propodeum and petiole densely pubescent (as in the *areolaris* group): extreme base of tergite 3 with a few rows of similar pubescence. Ovipositor (♀) slightly projecting beyond the apical tergite in the retracted position.

Wing (fig. 125) with *2r* not so closely approximated to the base of the pterostigma as in the *areolaris* group: pterostigma more or less parallel-sided, blackened in the male.

Breeding records

Host 1 — *Phytomyza autumnalis* GRIFFITHS (= *affinis* FALLÉN sensu HENDEL and HERING)

1 ex. from puparium 23. v. 54 on *Centaurea nigra*, Bookham, Surrey, England, em. 11. vi. 53 (BM). 3 ex. from larvae x. 54 on *Centaurea nigra*, Scratch Wood, London, em. 4. xi. 54, iii and 10. vi. 55 (GCDG). 1 ex., Schongau, Oberbayern, Germany, em. 4. iii. 54, leg. GROSCHKE (STGT).

Host 2 — *Phytomyza farfarae* HENDEL

2 ex. from puparia 19. viii. 64 on *Tussilago farfara*, Mösern, Tirol, Austria, 1250 metres, em. 30. viii. 64 (GCDG).

The male of this species can easily be confused with that of *D. pubescens* (CURTIS), but there is a clear difference in the shape of the mandibles. The female of *pubescens* has a much stouter and more projecting ovipositor.

After reexamination of the lectotype of THOMSON's species (by my 1964 designation) I am satisfied that it represents this species. — The records of "*tarsalis*" as a parasite of *Liriomyza pusio* MEIGEN, *Ophiomyia proboscidea* STROBL and *Phytomyza laserpitii* HENDEL (see FULMEK, 1962) doubtless do not refer to this species.

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Dacnusa pubescens (CURTIS)

Alysia pubescens CURTIS, 1826
Alysia (*Dacnusa*) *pubescens* CURTIS, HALIDAY, 1833
Alysia exserens NEES, 1834, **syn. nov.**
Alysia (*Dacnusa*) *areolaris* (NEES) var. *β*, HALIDAY, 1839
Dacnusa pubescens (CURTIS), NIXON, 1937
Rhizarcha pubescens (CURTIS), NIXON, 1948

Colour. Palpi and labrum yellow or yellow-brown. Clypeus dark. Antennae almost entirely dark, at most the annellus and ventral surface of the scape yellow-brown. Centre of mandibles orange-yellow. Legs largely yellow, with the base of the hind coxae and tarsal segments 5 infuscated.

Morphology. Antennal segments: ♂, 23—27; ♀, 23—26. Palpi long (see table of biometric data). Mandibles (fig. 140) with tooth 3 indented, so that they appear weakly 4-toothed. Mesoscutum covered with dense pubescence usually over its entire surface: notaulices weak or absent. Precoxal suture absent. Metapleuron, propodeum and petiole very densely clothed with pubescence, beneath which their largely smooth surfaces are visible as a strong subshine. Base of tergite 3 with a few rows of similar pubescence. Petiole subtriangular. Ovipositor (♀) stout, shortly projecting beyond the apical tergite in the retracted position.

Wing (fig. 128) with long, parallel-sided pterostigma, blackened in the male: vein *2r* not so closely approximated to the base of the pterostigma as in the *areolaris* group: cell *2Cu* somewhat elongate.

Breeding records

Host 1 — *Phytomyza atricornis* MEIGEN

2 ♂♂, 1 ♀ from puparia 27. vi. 23 on *Lapsana communis*, Oxford, England, em. vii. 23, leg. HAMM (HD). 1 ♀ from puparium 5. xii. 21 on *Senecio cruentes* ("*Cineraria*"), Headington, Oxford, England, em. 20. i. 21, leg. HAMM (HD).

Host 2 — *Phytomyza* sp. *ramosa* auctt.

1 ex. from puparium 20. vi. 53, Scratch Wood, London, em. 2. viii. 53, leg. SPENCER (BM). 1 ex. from puparium 29. viii. 54 on *Dipsacus fullonum sylvester*, Mickleham, Surrey, England, em. 16. ix. 54 (BM).

Host 3 — *Phytomyza rufipes* MEIGEN

1 ♀ from larva 22. viii. 61 on *Brassica napus* (cultivated Swede), Longniddry, East Lothian, Scotland, em. 11. ix. 61, leg. BASDEN (GCDG). A very long series bred from leaf-stalks of turnip (*Brassica rapa*), Lögdö, Sundsbruk, Medelpad, Sweden, em. vi. 30, leg. LUNDBLAD (labelled as bred from *Hylemyia* sp., but this is doubtless in error) (BM).

Host 4 — *Phytomyza taraxacocecis* HERING

1 ♀ from puparium 5. v. 63 on *Taraxacum* sp. on the lawn in my garden at Barnet, London, em. 9. vi. 63 (GCDG).

HAMM's specimens bred from the leaf miner *P. atricornis* MEIGEN are unusually small. Probably this is not a normal host as the stout projecting ovipositor of

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pubescens is clearly an adaption to reach larvae in tougher tissue, such as stems or the midrib of the leaf. The other three hosts all have this type of biology.

CURTIS' (1826) original description of this species is very brief, but HALIDAY had access to his material. The traditional interpretation of CURTIS' name here accepted is based on the description in HALIDAY (1839).

NEES' (1834) description of *Alysia exserens* seems appropriate to this species, and the synonymy of that name is therefore proposed.

Dacnusa merope (NIXON), **comb. nov.**

Rhizarcha merope NIXON, 1948

Colour. Palpi and labrum yellow. Clypeus red-black. Antennae usually becoming reddish towards their base (especially ventrally), but sometimes almost entirely dark. Legs largely deep yellow with tarsal segments 5 and sometimes the extreme base of the hind coxae infuscated. (The bred series have the face and sides of the head black, not reddish as in some of NIXON's original specimens. I suspect that this was a fading effect.)

Morphology. Antennal segments: ♂, 24 (1 ex.)—25—27, 29 (1 ex.); ♀, 26—28—29 (1 ex.) (bred specimens only). Palpi long (see the table of biometric data). Mandibles 3-toothed, with tooth 3 broad, but not indented. Thorax elongate. Mesoscutum with pubescence over all its surface except part of the posterior half of the lateral lobes: notaulices weakly indicated anteriorly only or almost absent. Precoxal suture absent. Metapleuron, propodeum and petiole very densely clothed with pubescence; the surface of the propodeum and petiole bears distinct granulate sculpture, not producing such a strong subshine as in *D. pubescens* (CURTIS). Tergite 3 with little or no basal pubescence. Petiole small, subtriangular. Ovipositor (♀) much longer than in *D. pubescens* (CURTIS), projecting beyond the apical tergite by much more than the length of the petiole.

Wing (fig. 121) with cell $2R_1$ very long, reaching almost the apex of the wing; pterostigma extremely elongate in both sexes, blackened in the male: vein *2r* not so closely approximated to the base of the pterostigma as in the *areolaris* group.

Breeding records

Host — *Phytomyza* sp. (HERING, 1957, no. 3604a)

1 ♂, 3 ♀♀ from puparia in leaf-stalks of *Petasites albus*, Mühlhausen, Thuringia, Germany, em. viii. 64, leg. BUHR, HERING no. 2142 (GCDG). 23 ex. from puparia 3 and 5. viii. 65, same plant and locality, em. 13—2. ix. 65, leg. BUHR nos. 2532 and 2580 (GCDG).

The same or a related species of *Phytomyza* occurs in Britain in leaf-stalks of *Tussilago farfara*.

***Dacnusa helvetica* sp. nov.**

Similar to *D. maculipes* THOMSON, with which it may be compared as follows.

Colour. Very dark species, with the palpi, labrum and clypeus virtually black: legs dark brown with all coxae black.

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Morphology. Antennal segments: ♀, 21 (2 ex.). Thorax about 1.4 times as long as high. Mesoscutum smooth and shining, with its dorsal surface bare except for a few hairs along the former course of the notaulices (which are absent): there is some pubescence on the anterior edge of the lateral lobes, but the central part of the anterior face is broadly bare (contrast *gentianae*). Precoxal suture short but well defined and distinctly rugose-costate. Ovipositor (♀) stout, upcurved and shortly projecting beyond the apical tergite in the retracted position.

Wing (♀) closely resembling that of *confinis* and *gentianae* (compare figs. 122 and 126), with the pterostigma very elongate, slightly widened towards its apex but not so strongly so as in *maculipes*, and the metacarp very short: vein R_s more or less evenly curved.

Host — *Phytomyza ramosa* HENDEL

Holotype ♀ and paratype ♀ from puparia 21. vii. 64 on *Knautia arvensis*, Great St. Bernard pass, Switzerland, em. 11 and 14. viii. 64, leg. SPENCER (GCDG).

Although having a distinctly projecting ovipositor this species clearly belongs to the *areolaris* group, not the *stramineipes* group (in which the precoxal suture is absent and *2r* more remote from the base of the pterostigma). It is very close to *gentianae* and *confinis*, but clearly differs in having a longer ovipositor and less mesoscutal pubescence.

***Dacnusa gentianae* sp. nov.**

Similar to *D. maculipes* THOMSON, with which it may be compared as follows.

Colour as in dark specimens of *areolaris* and *maculipes* (legs brown with all coxae infuscated: palpi brown: clypeus, labrum and antennae black).

Morphology. Thorax rather elongate (1.2—1.4 times as long as high). Mesoscutum with most of its dorsal surface shining, completely smooth and bare except for a few hairs along the former course of the notaulices: its pubescence is largely confined to its anterior face (which is almost entirely pubescent, unlike that of *D. helvetica* sp. nov.) and posterior margin (where there is a pair of rather dense tufts of hair). Precoxal suture visible as a deep groove, conspicuously rugose in the Polish pair but only feebly rugose in the other specimens. Ovipositor (♀) upcurved (compare *helvetica*), but hardly projecting beyond the apical tergite in the retracted position. Wing (fig. 122) with cell $2R_1$ short, as in *maculipes*, *confinis* and *helvetica*; pterostigma not noticeably broadened towards its apex; metacarp extremely short: vein R_s strongly curved, not at all sinuate.

Host 1 — *Phytomyza vernalis* GROSCHKE

Holotype ♂ and paratype ♂ from larvae on *Gentiana verna*, Brauneck, near Lenggries, Oberbayern, Germany, 1500 metres, em. 9—10. vi. 53, leg. GROSCHKE (STGT).

Host 2 — *Phytomyza gentianae* HENDEL

Paratype ♂ from puparium 19. viii. 64 on *Gentiana asclepiadea*, Mösern, Tirol, Austria, 1200 metres, em. 23. viii. 64 (GCDG).

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Host 3 — *Phytomyza swertiae* HERING

Paratype ♂ from larva 15. ix. 60 on *Sweertia perennis*, Kraków Ravine, Tatry, Poland, pupated 20. ix, em. 17. iv. 61, leg. NOWAKOWSKI (PAN). Paratype ♀ from larva 21. viii. 57 on *Sweertia perennis*, Białego Valley, Tatry, Poland, pupated 7. ix, em. 8. iv. 58, leg. NOWAKOWSKI (PAN).

The extensively bare mesoscutum of this species seems to be secondary (since there is rather dense pubescence along its posterior margin and the notaulices are absent), not to be considered as a plesiomorph character. Another very similar species, but with a distincly projecting ovipositor and even part of the anterior face of the mesoscutum bare, is described above as *D. helvetica* sp. nov. These species seem very closely related to *maculipes* and *confinis*.

Dacnusa confinis RUTHE

Dacnusa confinis RUTHE, 1859
Rhizarcha confinis (RUTHE), NIXON, 1948

Similar to *D. maculipes* THOMSON, with which it may be compared as follows.
Colour. Somewhat paler: palpi yellow or yellow-brown: dominant colour of legs deep yellow, but hind coxae always infuscated.
Morphology. Palpi longer (see the table of biometric data). Antennal segments: ♂, 23—25; ♀, 22—24. Thorax 1.1—1.2 times as long as high (as in *laevipectus*). Narrow precoxal suture present, smooth or weakly rugose.
Wing (fig. 126) with a very long more or less parallel-sided pterostigma (blackened in the male), but very short metacarp: vein R_s almost evenly curved.

Breeding records

Host 1 — *Phytomyza ranunculi* SCHRANK

Denmark: 10 ex., Køge, Sealand, 4 ex., Utterslevmose, Sealand, and 7 ex., Randers, Jutland, leg. SCHLICK (KB and GCDG).

Host 2 — *Phytomyza glechomae* KALTENBACH

1 ex. from larva 17. v. 53, Mickleham, Surrey, England, em. 11. ix. 53, leg. SPENCER (BM).

This species closely resembles *D. maculipes* THOMSON, but can be distinguished by its paler coloration and differences in the wing venation. That species has a shorter cell $2R_1$, slightly longer metacarp and the pterostigma conspicuously widened towards its apex. Two other species with wing venation almost identical with that of *confinis* are described above as *D. gentianae* sp. nov. and *D. helvetica* sp. nov. These are darker legged species with less mesoscutal pubescence.

Dacnusa maculipes THOMSON

Dacnusa (*Dacnusa*) *maculipes* THOMSON, 1895
Dacnusa maculipes THOMSON, NIXON, 1937, GRIFFITHS, 1966
Rhizarcha maculipes (THOMSON), NIXON, 1948

Very similar to *D. areolaris* (NEES) with which it may be compared as follows.

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Morphology. Antennal segments: ♂, 20—24; ♀, 19—25 (usually 21—23). Thorax 1.1—1.3 times as long as high. Mesoscutum usually not so densely pubescent, the posterior half of the lateral lobes often bare in small specimens: notaulices sometimes shortly indicated anteriorly. Precoxal suture represented by a narrow furrow, usually weakly rugose but sometimes smooth.

Wing (fig. 123) with the pterostigma distinctly widened towards its apex, darkened in the male: metacarp and cell $2R_1$ shorter, vein R_s being more strongly curved, especially in the male.

Breeding records

Host 2[6] — *Phytomyza albiceps* MEIGEN

2 ex. from puparia 30. ix. 22 on *Artemisia* sp., Lye Hill, Oxford, England, em. 9 and 24. iv. 23, leg. HAMM (HD).

Host 3 — *Phytomyza alpina* GROSCHKE

8 ex. from larvae 30. vii. 62 on *Senecio jacobaea*, Ingleborough, Yorks., England, em. 23. viii—12. ix. 62 and 2—12. iv. 63 (GCDG). 1 ex. from larva 1. viii. 64 on *Senecio alpinus*, Maloja, Switzerland, em. spring 65, leg. SPENCER (GCDG).

Host 4 — *Phytomyza anemones* HERING

1 ex. from larva 30. v. 54 on *Anemone nemorosa*, Chailey, Sussex, England, em. 24. viii. 54 (GCDG).

Host 5 — *Phytomyza astrantiae* HENDEL

1 ex. from larva 17. viii. 64 on *Astrantia major*, Mösern, Tirol, Austria, 1250 metres, em. 14. ix. 64 (GCDG).

Host 6 — *Phytomyza atricornis* MEIGEN

1 ex. from puparium 30. vii. 64 on *Chrysanthemum leucanthemum*, Pontresina, Switzerland, em. 1. viii. 64, leg. SPENCER (GCDG). 2 ex. from larvae 22. viii. 62 on *Sonchus arvensis*, Beachy Head, Sussex, England, em. 8—10. ix. 62 (GCDG). 1 ex. from puparium 8. vii. 54, Chippenham Fen, Cambs., England, em. vii. 54, leg. SPENCER (GCDG). 2 ex. from puparia viii. 19 on *Sisymbrium* sp., Oxford, England, em. viii. 19, leg. HAMM (HD). 2 ex. from puparia vii. 19 on *Sonchus* sp., Oxford, em. 24—28. vii. 19, leg. HAMM (HD). 3 ex. from puparia vii. 26 on *Linaria* sp., Oxford, em. viii. 26, leg. HAMM (HD). 2 ex. from puparia 10. vii. 53, Finchley, London, em. 25. vii. 53 (BM). 1 ex. from larva 9. viii. 53 on *Sonchus oleraceus*, Pangbourne, Berks., England, em. 11. ix. 53 (BM). 1 ex. from larva on *Taraxacum* sp., Hedlandet, Södermanland, Sweden, em. 17. viii. 42, leg. LUNDQVIST (LUND). 1 ex. from larva on *Sonchus oleraceus*, same locality, em. 27. vii. 43, leg. LUNDQVIST (LUND). 4 ex. from puparia 25. vii. 57 on *Linaria vulgaris*, Leszno, near Warszawa, Poland, em. 10—12. viii. 57, leg. NOWAKOWSKI (PAN). 3 ex. from puparia 5. vii. 57 on *Sonchus arvensis*, Kiełpin, near Warszawa, Poland, em. 15. vii (2 ex.) and 12. viii. 57, leg. NOWAKOWSKI (PAN). 1 ex. from puparium 5. vii. 51 on *Salvia splendens*, Poznań-Podolany, Poland, em. 7. vii. 51, leg. NOWAKOWSKI (PAN). 1 ex. from puparium 4. vii. 51 on *Raphanus raphanistrum*, Poznań-Dębina, em. 5. vii. 51, leg. NOWAKOWSKI (PAN). 1 ex. from larva 24. vii. 65 on *Pisum sativum arvense*, Katzentreppen, Mühlhausen, Thuringia, Germany, em. 12. viii. 65, leg. BUHR no. 2509a (GCDG).

[6] Host 1 was *Agromyza abiens* ZETTERSTEDT, see Part II (GRIFFITHS, 1966).

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Host 7 — *Phytomyza autumnalis* GRIFFITHS (= *affinis* auctt.)

7 ex. from puparia 10. vii. 57 on *Cirsium palustre*, Warszawa-Młociny, Poland, em. 18—21. vii. 57, leg. NOWAKOWSKI (PAN). 1 ex. from larva 20. vii. 65 on *Carduus acanthoides*, Felchtaer Bach, Mühlhausen, Thuringia, Germany, em. 29. ix. 65, leg. BUHR no. 2501c (GCDG).

Host 8 — *Phytomyza campanulae* HENDEL

1 ex., 6. viii. 34, Ulricehamn, Västergötland, Sweden, leg. RYDÉN (LUND).

Host 9 — *Phytomyza cinerea* HENDEL

1 ex., Bauerloch, Neuffen, Württemberg, Germany, em. 9. ix. 54, leg. GROSCHKE (STGT).

Host 10 — *Phytomyza cirsii* HENDEL

1 ex., Wedel, Holstein, Germany, em. 10. ix. 53, leg. GROSCHKE (STGT).

Host 11 — *Phytomyza conopodii* HERING

1 ex. from larva 21. vi. 54 on *Conopodium majus*, Hampstead, London, em. 1. vii. 54, leg. SPENCER (GCDG).

Host 12 — *Phytomyza conyzae* HENDEL

2 ex. from larvae 23. ix. 63 on *Pulicaria dysenterica*, Llangennydd, Gower, Wales, em. 22—23. iv. 63 (GCDG). 1 ex. from puparium 15. x. 22 on *Pulicaria dysenterica*, Headington, Oxford, England, em. 23. iv. 23, leg. HAMM (HD). 1 ex. from puparium 11. viii. 31 on *Inula conyza*, Bagley Wood, Oxford, em. ix. 31, leg. HAMM (HD).

Host 13 — *Phytomyza corvimontana* HERING

4 ex. from larvae 3. x. 54 on *Achillea ptarmica*, Scratch Wood, London, em. iv—v. 55 (GCDG).

Host 14 — *Phytomyza crassiseta* ZETTERSTEDT

1 ex. from puparium 17. xii. 22 on *Veronica* sp., Forest Hill, Kent, England, em. 16. iv. 23, leg. HAMM (HD).

Host 15 — *Phytomyza fuscula* ZETTERSTEDT

3 ex. from puparia 26. v. 61 on *Alopecurus pratensis*, Warszawa-Młociny, Poland, em. 5—7. vi. 61, leg. NOWAKOWSKI (PAN).

Host 16 — *Phytomyza gentianae* HENDEL

1 ex. from puparium 18. ix. 24 on *Centaurium minus*, Tubney, Berks., England. em. 1. x. 24, leg. HAMM (HD).

Host 17 — *Phytomyza glechomae* KALTENBACH

1 ex. from puparium 20. xi. 22 on *Glechoma hederaceum*, Southfield Farm, Oxford, England, em. 20. iv. 23, leg. HAMM (HD).

Host 18 — *Phytomyza griffithsi* SPENCER

1 ex. from larva on *Plantago media*, Mühlhausen, Thuringia, Germany, em. 1. ii. 63, leg. BUHR, HERING no. 1927 (GCDG).

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Host 19 — *Phytomyza heracleana* HERING

7 ex. from larvae 21. vi. 61 on *Heracleum sphondylium*, Lasy Kabackie, Warszawa, Poland, em. 25. vii—28. viii. 61, leg. NOWAKOWSKI (PAN).

Host 20 — *Phytomyza hoppi* HERING

1 ex. from larva 12. ix. 60 on *Aster bellidiastrum*, Kraków Ravine, Tatry, Poland, em. 5. v. 61, leg. NOWAKOWSKI (PAN).

Host 21 — *Phytomyza lappina* GOUREAU

1 ex. from larva 21. viii. 53 on *Arctium* sp., Woodside Park, London, em. 31. ix. 53 (BM). 4 ex. from larvae 3. ix. 53, same plant and locality, em. 6—25. x. 53 (BM). 5 ex. from larvae 7. x. 55 on *Arctium lappa*, Kazuń, Kampinoska Forest, Poland, pupated 11. x, em. 30. x. 55, 6. xi. 55 and 29. iv—2. v. 56, leg. NOWAKOWSKI (PAN).

Host 22 — *Phytomyza milii* KALTENBACH

1 ex. from puparium 26. v. 61 on *Poa trivialis*, Warszawa-Młociny, Poland, em. 7. vi. 61, leg. NOWAKOWSKI (PAN).

Host 23 — *Phytomyza myosotica* NOWAKOWSKI

1 ex. from larva 22. viii. 60 on *Myosotis palustris*, Woodwalton Fen, Hunts., England, em. 12. ix. 60 (GCDG). 1 ex. from larva 31. vii. 53 on *Myosotis* sp., Finchley, London, em. 27. viii. 53 (BM). 1 ex. from puparium 13. xi. 64 on *Myosotis* sp. in my garden at Barnet, London, em. 6. iv. 65 (GCDG).

Host 24 — *Phytomyza nigra* MEIGEN

2 ex. from puparia 21. vi. 61 on *Poa trivialis*, Woodwalton Fen, Hunts., England, em. 7. vii. 61 (GCDG). 2 ex. from puparia 2. v. 25 on Gramineae sp., Stoke Row, Oxford, England, em. 14. v. 25, leg. HAMM (HD). 1 ex. from puparium 24. v. 23 on Gramineae sp., Oxford, em. 13. vi. 23, leg. HAMM (HD).

SIMM's (1925) figure of "*Dacnusa areolaris*", bred by him from host material from *Lolium italicum* and rye (*Secale cereale*) at Cieszin and neighbouring localities (Poland) and Górna Sucha (Czechoslovakia), appears to refer to *D. maculipes* THOMSON.

Host 25 — *Phytomyza petoei* HERING

2 ex. from larvae 22. v. 61 on *Mentha spicata*, Cambridge, England, em. 12—13. vi. 61 (GCDG). 2 ex. from larvae 5. viii. 62 on *Mentha spicata* in my garden at Barnet, London, em. 24. viii. 62 (GCDG). 1 ex. from larva 23. vii. 53, Kew, London, em. 11. viii. 53, leg. SPENCER (BM).

Host 26 — *Phytomyza plantaginis* ROBINEAU-DESVOIDY

9 ex., München, Nymphburg, Germany, em. 20. viii—28. ix. 53, leg. GROSCHKE (STGT). 2 ex., Stuttgart, Germany, em. 1. xi. 55, leg. GROSCHKE (STGT). 1 ex. from larva on *Plantago lanceolata*, Godesberg, Rheinland, Germany, em. 1. ii. 63, leg. GORHOLT (GCDG). 4 ex. from larvae on *Plantago* spp., Hope, Devon, England, em. x. 54, leg. SPENCER (GCDG). 1 ex. from larva 15. viii. 54 on *Plantago lanceolata*, Ash Vale, Surrey, England, em. ix. 54, leg. SPENCER (GCDG).

Host 27 — *Phytomyza primulae* ROBINEAU-DESVOIDY

1 ex. from puparium vii. 19 on *Primula* sp., Oxford, England, em. 28. vii. 19, leg. HAMM (HD).

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Host 28 — *Phytomyza ranunculi* SCHRANK

1 ex., Eglharting, near München, Germany, em. 6. xi. 48, leg. GROSCHKE (STGT). 2 ex. from puparia 7. vi. 22 on *Ranunculus* sp., Oxford, England, em. 20—26. vi. 22, leg. HAMM (HD). 1 ex., same plant and locality, em. 24. vi. 20, leg. HAMM (HD). 2 ex. from larvae 6. ix. 53 on *Ranunculus* sp., Beaconsfield, Bucks., England, em. 30. ix and 9. x. 53 (BM).

Host 29 — *Phytomyza ranunculi caulinaris* HERING

2 ex. from larvae on *Ranunculus platanifolius*, Oberwiesenthal, Erzgebirge, Germany, em. 26—29. ii. 62, leg. BUHR, HERING no. 1757 (GCDG).

Host 30 — *Phytomyza rydeniana* HERING

1 ex. from larva 25. vii. 28 on *Cirsium heterophyllum*, Andåken, Jämtland, Sweden, em. 23. ii. 29, leg. RYDÉN (LUND) (host identified as *P. cirsicola* HENDEL by RYDÉN).

Host 31 — *Phytomyza salviae* HERING

3 ex., München-Freimann, Germany, em. 7—17. vii and 28. ix. 53, leg. GROSCHKE (STGT).

Host 32 —*Phytomyza marginella* FALLÉN (=*sonchi* ROBINEAU-DESVOIDY)

20 ex. from puparia 22. vi. 23 on *Lapsana communis*, Oxford, England, em. viii—ix. 23, leg. HAMM (HD). 5 ex. from puparia vi—vii. 19 on *Lapsana communis*, Oxford, em. 29. vii—8. viii. 19, leg. HAMM (HD).

Host 33 — *Phytomyza succisae* HERING

1 ex. from larva on *Succisa pratensis*, Scratch Wood, London, em. 1. ix. 55, leg. SPENCER (GCDG).

Host 34 — *Phytomyza xylostei* KALTENBACH

1 ex. from larva on *Lonicera periclymenum*, Golspie, Sutherland, Scotland, em. vii. r54 leg. SPENCER (GCDG). 11 ex. from puparia 6. vii. 25 on *Symphoricarpos albus*, Oxford, England, em. 13. vii. 25, leg. HAMM (HD).

Host 35 — *Paraphytomyza buhri* DE MEIJERE

1 ex. from larva on *Galium mollugo*, Lizard, Cornwall, England, em. 7. ix. 57, leg. SPENCER (GCDG).

Host 36 — *Phytagromyza populi* KALTENBACH

1 ex. from puparium 7. x. 23 on *Populus nigra*, Shotover, Oxford, England, em. 24. iv. 24, leg. HAMM (HD). 1 ex. from puparium 10. viii. 24 on *Populus nigra*, Cobham, Surrey, England, em. 2. ix. 24, leg. HAMM (HD).

The host records given above refer only to the host genera treated in this paper This species also attacks many other leaf-mining Phytomyzinae, but only rarely Agromyzinae.

A lectotype (♂) has been selected from THOMSON's original series (Örtofta, Sweden) in agreement with NIXON's (1948) interpretation of this species.

The venational differences between this species and other members of the *areolaris* group are well marked in the male, but less so in the female. The

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precoxal suture is distinct in nearly all specimens of *maculipes* (whereas it is always absent in *areolaris*), but is often short and inconspicuous, requiring careful examination to be appreciated.

Dacnusa areolaris (NEES)

Bracon areolaris NEES, 1811 (in part)
Alysia (*Dacnusa*) *areolaris* (NEES), HALIDAY, 1833 and 1839
Alysia areolaris (NEES), NEES, 1834 (in part)
Dacnusa lysias GOUREAU, 1851 and 1869
Rhizarcha areolaris (NEES), FORSTER, 1862, NIXON, 1948
Dacnusa areolaris (NEES), MARSHALL, 1891, 1895 and 1897, NIXON, 1937
(nec *Dacnusa* (*Dacnusa*) *areolaris* (NEES) sensu THOMSON, 1895)

Colour. Palpi brown or blackish. Labrum dark brown or black. Clypeus and antennae (except the annellus) black. Centre of mandibles brown or yellow-brown. Legs largely yellow-brown or brown, with the hind coxae strongly infuscated.

Morphology. 20—22 antennal segments (both sexes). Palpi short (see the table of biometric data). Mandibles small, 3-toothed. Thorax elongate, about 1.4 times as long as high (see the table of biometric data and NIXON, 1948, fig. 250). Mesoscutum densely pubescent over usually its entire surface: notaulices absent. Precoxal suture completely absent. Metapleuron, propodeum and petiole very densely covered with pubescence, beneath which their largely smooth surface may be seen as a subshine. Base of tergite 3 with a few rows of similar pubescence. Petiole subtriangular. Ovipositor (♀) not projecting beyond the apical tergite in the retracted position.

Wing (fig. 124) with *2r* very closely approximated to the base of the pterostigma, which is more or less parallel-sided (contrast *maculipes*), blackened in the male: metacarp and cell $2R_1$ longer than in *maculipes*.

Breeding records

Host 1 — *Phytomyza atricornis* MEIGEN

ENGLAND. 1 ex. from puparium 14. vii. 62 on *Aster* sp. in my garden at Barnet, London, em. 30. vii. 62 (GCDG). 1 ex., Boxhill, Surrey, em. 4. v. 52, leg. SPENCER (GCDG). 1 ex. from puparium on *Sonchus oleraceus*, Hampstead, London, em. 15. iii. 52, leg. SPENCER (GCDG). 4 ex., Hampstead, London, em. 21. v and 20. vi. 52, leg. SPENCER (GCDG). 1 ex. from puparium 26. vii. 53 on *Sonchus oleraceus*, Boxhill, Surrey, em. 7. viii. 53 (BM). 1 ex. from puparium 26. vi. 53 on *Chrysanthemum morifolium*, Finchley, London, em. 14. vii. 53 (BM). 1 ex. from puparium 15. ix. 53 on *Helichrysum* sp., Kew Botanical Gardens. London, em. 8. x. 53 (BM). About 30 ex. from puparia on *Senecio*, *Taraxacum*, *Sonchus*, *Cirsium*, *Hieracium* and *Linaria* from localities in south-east England, leg. HAMM (HD). —

IRELAND. 45 ex. from larvae and puparia 10. vi. 65 on *Sonchus arvensis* (42 ex.) and *Eupatorium cannabinum* (3 ex.), Poulsallagh, Clare, em. 19—27. vi. 65 (GCDG). —

WALES. 2 ex. from puparia 21. ix. 62 on *Inula crithmoides*, Burry Holms, Gower, em. 11 and 18. x. 62 (GCDG). 2 ex. from puparia 22. ix. 62 on *Matricaria maritima inodora* var. *salina*, Worms Head, Gower, em. 12—13. x. 62 (GCDG). —

FRANCE. 1 ex. from larva 24. vii. 64 on *Cirsium spinosissimum*, Col St. Bernard, em. 2. viii. 64, leg. SPENCER (GCDG). —

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SWITZERLAND. 3 ex. from larvae 27. vii. 64 on *Cirsium spinosissimum*, Furka Pass, em. 10—16. viii. 64, leg. SPENCER (GCDG). 1 ex. from larva on *Chrysanthemum leucanthemum*, Pontresina, em. 14. viii. 64, leg. SPENCER (GCDG). —
SWEDEN. 1 ex. from larva on *Artemisia vulgaris*, Hälsingborg, Skåne, em. 13. viii. 23, leg. RYDÉN (LUND). 8 ex. from larvae on *Vicia faba* and *Sisymbrium officinale*, same locality, em. vii. 26, leg. RYDÉN (LUND). —
GERMANY. 4 ex. from puparia 24. vii. 36 on *Phlox drummondii*, Rostock Botanical Gardens, em. 3—6. viii. 36, leg. BUHR (GCDG). 1 ex. from larva 27. iv. 36 on *Lophospermum scandens*, same locality, em. 10. viii. 36, leg. BUHR (GCDG). —
YUGOSLAVIA. 1 ex. from larva on *Cirsium creticum*, Jelsa, Hvar, em. 26. v. 65, leg. HERING no. 7399 (GCDG).

Host 2 — *Phytomyza asteris* HENDEL

1 ex. from puparium 10. vi. 62 on *Aster tripolium*, Pagham, Sussex, England, em. 23. vi. 62 (GCDG). 2 ex. from puparia 12. ix. 61 on *Aster tripolium*, Llanrhidian, Gower, Wales, em. 25. ix. 61 (GCDG).

Host 3 — *Phytomyza nigra* MEIGEN

1 ex. from puparium 8. v. 55 on *Deschampsia caespitosa*, Buxted, Sussex, England, em. 24. v. 55 (GCDG). 6 ex. from puparia 21. vi. 61 on *Poa trivialis*, Woodwalton Fen, Hunts., England, em. 27—29. vi. 61 (GCDG). 4 ex. from puparia 3. vii. 55 on *Holcus lanatus*, Bookham, Surrey, England, em. 11—13. vii. 55 (GCDG). 5 ex., spring '52, Hampstead, London, em. 23—26. vi. 52, leg. SPENCER (GCDG). 1 ex. from puparium 5. vi. 52 on *Triticum* sp., Primrose Hill, London, em. 16. vi. 52, leg. SPENCER (GCDG). About 15 ex. from puparia on Gramineae spp. from localities in south-east England, leg. HAMM (HD).

In GRIFFITHS (1956) this species was also recorded from *Ophiomyia beckeri* HENDEL, *Phytomyza glechomae* KALTENBACH and *P. ramosa* HENDEL. I have thought it wise not to accept the first of these records without confirmation, as puparia of *O. beckeri* HENDEL and *Phytomyza atricornis* MEIGEN can often both be collected on the same food-plants. I therefore suspect a confusion in the host association. The specimen bred from *P. glechomae* KALTENBACH was misidentified and is now referred to *D. confinis* RUTHE. I have not been able to find the specimen bred from *P. ramosa* HENDEL and regard the record as subject to confirmation. There are three species of *Dacnusa* s. s. (= *Rhizarcha*) which I have accepted as bred from *Phytomyza* spp. on Dipsacaceae: these are *D. maculipes* THOMSON, *D. pubescens* (CURTIS) and *D. helvetica* sp. nov.

The species attacking *Phytomyza angelicae* KALTENBACH whose biology was described by HAVILAND (1922) was doubtless not *Dacnusa areolaris* (NEES) in the sense accepted here. Unfortunately I have not been able to trace her specimens. Possibly the question of the identity of her species will be clarified when comparative studies of larval morphology have been made.

MELIS (1935) studied the biology of *Phytomyza atricornis* MEIGEN at Firenze and Versilia in Italy (mainly in connection with infestations of *Pisum sativum*) and recorded *Dacnusa areolaris* (NEES) as the sole Dacnusini parasite. However he does not describe this parasite and, in view of the inadequate state of the taxonomy of the group at that time, the identification, although plausible enough, should not be accepted as reliable unless the material can be reexamined.

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There are many other records in addition to those just mentioned of "*areolaris*" having been bred from a wide variety of hosts (not all Agromyzidae) in the literature (see FULMEK, 1962). Obviously the name has been applied in the past to many different insects. The species here accepted as *areolaris* was not properly defined and distinguished from other members of the *areolaris*-group until the work of NIXON (1937), and no earler records can be accepted without reexamination of the material concerned.

CAMERON (1903) included a "*Dacnusa sonchivorus* CAMERON" (a nomen nudum since no description is given) in his list of New Zealand Hymenoptera. His material (in the British Museum) bred from a leaf-miner on *Sonchus oleraceus* appears identical with European *areolaris*. Studies of *areolaris* as a parasite of *Phytomyza atricornis* MEIGEN in New Zealand were made by KELSEY (1937). It seems likely that both host and parasite have been introduced there.

Dacnusa laevipectus THOMSON

Dacnusa (*Dacnusa*) *laevipectus* THOMSON, 1895 (in part)
Rhizarcha nox MORLEY, 1924
Dacnusa laevipectus THOMSON, NIXON, 1937
Rhizarcha laevipectus (THOMSON), NIXON, 1948

Similar to *D. areolaris* (NEES) with which it may be compared as follows. Colour. Somewhat variable, but usually paler than in *areolaris*. Palpi yellow or yellow-brown. Dominant colour of legs usually yellow, less commonly yellow-brown: the hind coxae are usually infuscated at least at their base (but completely yellow in a few specimens in the series from München Botanical Gardens). Morphology. Antennal segments: ♂, 22—26; ♀, 21—25 (usually 22—24 in both sexes). Palpi longer (see the table of biometric data). Thorax very short and deep (1.1—1.2 times as long as high) with a strongly arched mesoscutum (see NIXON, 1948, fig. 254 and the table of biometric data).

Wing (fig. 127) with very long parallel-sided pterostigma, but short metacarp: vein R_s more strongly curved (approaching the condition of *maculipes*, but that species has a shorter pterostigma which is distinctly broadened towards its apex).

Breeding records

Host 1 — *Phytomyza adjuncta* HERING

1 ex. from larva 7. x. 53 on *Pimpinella major*, Mill Hill, London, em. 13. xi. 53 (BM).

Host 2 — *Phytomyza albifrons* GROSCHKE

5 ex. from larvae on *Thalictrum aquilegifolium*, Schongau, Oberbayern, Germany, em. 20. iii—1. iv. 54, leg. GROSCHKE (STGT).

Host 3 — *Phytomyza angelicae* KALTENBACH

1 ex. from larva 8. xi. 53 on *Angelica sylvestris*, Brookman's Park, Herts., England, em. 12. xii. 53 (BM).

Host 4 — *Phytomyza anthrisci* HENDEL

1 ex. from larva on *Anthriscus sylvestris*, Brookman's Park, Herts., England, em. 25. ii. 54, leg. SPENCER (GCDG). 1 ex. from larva on *Anthriscus sylvestris*, Hampstead, London,

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em. 5. vi. 52, leg. SPENCER (GCDG). 4 ex. from puparia 2. xii. 24 on *Anthriscus* sp., Oxford, England, em. 3. iii—2. iv. 25, leg. HAMM (HD).

Host 5 — *Phytomyza astrantiae* HENDEL

10 ex. from larvae 9. ix. 56 on *Astrantia major*, Spadowiec Valley, Tatry, Poland, pupated 9—11. x, em. 17—27. iv. 57, leg. NOWAKOWSKI (PAN).

Host 6 — *Phytomyza atricornis* MEIGEN

1 ex. from puparium xii. 20 on *Chrysanthemum* sp., Oxford, England, em. 7. ii. 21, leg. HAMM (HD).

Host 7 — *Phytomyza brunnipes* BRISCHKE

1 ex. from larva on *Sanicula europaea*, Northaw Wood, Herts., England, em. 27. iii. 54, leg. SPENCER (GCDG).

Host 8 — *Phytomyza campanulae* HENDEL

1 ex. from larva 12. ix. 60 on *Phyteuma orbiculare*, Kraków Ravine, Tatry, Poland, em. 18. x. 60, leg. NOWAKOWSKI (PAN).

Host 9 — *Phytomyza fulgens* HENDEL

1 ex. from larva 17. x. 54 on *Clematis vitalba*, Mickleham, Surrey, England, em. 25. xi. 54 (BM).

Host 10 — *Phytomyza glechomae* KALTENBACH

4 ex. from puparia 20. xi. 22 on *Glechoma hederaceum*, Southfield, Oxford, England, em. 2—27. iii. 23 and 7. viii. 23 (1 ex.), leg. HAMM (HD). 5 ex. from puparia 29. xi. 24 on *Glechoma hederaceum*, Oxford, em. 28. i—10. ii. 25, leg. HAMM (HD). 2 ex., 20. vii. 27, Flyinge, Skåne, Sweden, leg. RYDÉN, (LUND). 1 ex. from larva 14. vi. 65 on *Glechoma hederaceum*, Poulavallan, Clare, Ireland, em. 4. vii. 65 (GCDG).

Host 11 — *Phytomyza notata* MEIGEN

2 ex., München (Englische Garten), Germany, em. 30. x. 48, leg. GROSCHKE (STGT). 1 ex, from larva 18. x. 64 on *Ranunculus* sp., Milan, Italy, em. 28. xi. 63, leg. SPENCER (GCDG).

Host 12 — *Phytomyza obscurella* FALLÉN

1 ex. from puparium 3. ix. 22 on *Aegopodium podagraria*, Oxford, England, em. 4. x. 22. leg. HAMM (HD). 1 ex. from puparium xi. 21 on *Aegopodium podagraria*, Oxford, em. iv. 22, leg. HAMM (HD).

Host 13 — *Phytomyza pimpinellae* HENDEL

2 ex. from larvae 3. x. 54 on *Pimpinella major*, Arkley, London, em. 27. x and 5. xi. 54 (BM and GCDG).

Host 14 — *Phytomyza ranunculi* SCHRANK

16 ex., München (Englische Garten), Germany, em. xi. 48, leg. GROSCHKE (STGT). 13 ex., München Botanical Gardens, em. 2—29. xii. 49, leg. GROSCHKE (STGT). 1 ex., Wolfratshausen, Oberbayern, Germany, em. 8. xii. 49, leg. GROSCHKE (STGT). 3 ex. from larvae 20. xii. 53 on *Ranunculus repens*, Hausach, Schwarzwald, Germany, em. 15. iii. 54, leg. SPENCER (GCDG). 1 ex. from larva 29. x. 61 on *Ranunculus* sp., Cambridge, England,

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em. 19. ii. 62 (GCDG). 8 ex. from larvae on *Ranunculus* sp., Hampstead, London, em. 28. v—8. vi. 52, leg. SPENCER (GCDG). 36 ex. from puparia on *Ranunculus* spp. from localities in south-east England, leg. HAMM (HD). 16 ex. from larvae 9. v. 54 on *Ranunculus ficaria*, Darenth, Kent, England, em. 31. v—5. vi. 54 (BM). 5 ex. from larvae 10. vi. 65 on *Ranunculus flammula*, Mullagh More, Clare, Ireland, em. 2—5. vii. 65 (GCDG). 1 ex., 13. vii 52, Sweden (? locality), leg. RYDÉN (LUND). 2 ex. from larvae 26. v. 61 on *Ranunculus repens*, Warszawa-Młociny, Poland, pupated 29. v, em. 11 and 17. vi. 61, leg. NOWAKOWSKI (PAN).

Host 15 — *Phytomyza sii* HERING

9 ex. from larvae 4. vii. 26 on *Sium latifolium*, Övedskloster, Skåne, Sweden, em. 25. vii. 26, leg. RYDÉN (LUND).

Host 16 — *Phytomyza soldanellae* STARÝ

4 ex. from larvae on *Soldanella* sp., Brauneck, near Lenggries, Oberbayern, Germany 1500 metres, em. 15—18. vi. 53, leg. GROSCHKE (STGT).

Host 17 — *Phytomyza spondylii* ROBINEAU-DESVOIDY

2 ex. from larvae on *Heracleum sphondylium*, Hampstead, London, em. 16. vi. 52, leg. SPENCER (GCDG). 3 ex. from puparia 24. viii. 24 and 4. x. 24 on *Heracleum sphondylium*, Oxford, England, em. 22. ix (2 ex.) and 21. xi. 24, leg. HAMM (HD). 3 ex. from larvae 29. vii. 53 on *Heracleum sphondylium*, Woodside Park, London, em. 20. viii—3. ix. 53 BM).

Host 18 — *Phytomyza vitalbae* KALTENBACH

3 ex. from larvae 15. ix. 61 on *Clematis vitalba*, Penrice, Gower, Wales, em. 5—6. x. 61 (GCDG). 2 ex. from puparia ix. 20 on *Clematis* sp., Oxford, England, em. 29. ix and 6. x. 20, leg. HAMM (HD). 1 ex. from larva 10. ix. 53 on *Clematis vitalba*, Rickmansworth, Herts., England, em. 30. ix. 53 (BM). 1 ex. from larva 15. ix. 53 on *Clematis* sp., Kew Gardens, London, em. 9. x. 53 (BM).

This species may be distinguished from *areolaris* and *maculipes* by its longer yellow palpi and deep thorax whose mesepisternum is evenly convex, without any trace of a precoxal suture. Two other similar species (*mara* and *marica*) have been described, but their life-history has not been established (the differences are given in the key below).

One of THOMSON's two specimens from the type locality (Pålsjö, Skåne, Sweden) is hereby designated lectotype to confirm NIXON's (1948) interpretation of this species. The other specimen belongs to the species here accepted as *D. areolaris* (NEES). THOMSON's interpretation of the latter name was clearly different, as he stated that the species had a distinct precoxal suture ("sternaulis distinctis").

Chorebus HALIDAY

All species treated in this paper except *Chorebus thusa* (NIXON) belong to what I have termed the *lateralis/ovalis* complex. The following characters may be assumed whenever nothing to the contrary is stated in the descriptions.

Mandibles 4-toothed, not or only slightly expanded. Face with shallow punctate sculpture, covered with fairly dense fine pubescence, directed mostly

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inwards over its centre but downwards along the eye-margins. Clypeus black like the face. Mesepisternum with a well-defined rugose-costate precoxal suture. Metapleural pubescence dense, forming a rosette around a raised swelling: propodeum covered with similar dense pubescence. Wing venation rather uniform in most species (compare figs. 87 and 88), with the pterostigma longer than the metacarp, *1m—cu* clearly rejected from cell R_s, and vein Cu_{1b} weak or absent, so that cell *2Cu* is more or less open at its lower distal corner. Ovipositor (♀) not projecting beyond the apical tergite in the retracted position.

Chorebus aphantus (MARSHALL)

Dacnusa aphanta MARSHALL, 1891, 1895 and 1897, NIXON, 1937, 1943 and 1946
Chorebus aphantus (MARSHALL), GRIFFITHS, 1966

Colour. Palpi and labrum deep yellow, sometimes tinged with brown. Centre of mandibles orange or red-brown. Antennae entirely dark, or the basal flagellar segments more or less brown. Legs yellow or yellow-brown with the tarsi and hind coxae somewhat infuscated (varying from brown to almost black): often the upper edge of the hind femora is distinctly infuscated. Gaster sometimes with tergite 3 red-brown, sometimes entirely dark.

Morphology. Antennal segments: ♂, 26—29; ♀, 23—27 (bred specimens only). Palpi long (see the table of biometric data). Mandibles (fig. 129) not expanded, with tooth 3 appearing as a projection from the base of tooth 2.

Thorax about 1.2—1.3 times as long as high. Mesoscutum with its middle lobe slightly roughened anteriorly, with pubescence covering its central lobe and about the anterior half of the lateral lobes: notaulices reaching to about the middle of the mesoscutum. Metapleural swelling deeply rugose-punctate, like the propodeum and petiole. Petiole rather long and almost parallel-sided, covered with dense, evenly distributed pubescence (but no apical tufts). Tergite 3 with some basal hairs, mainly near its sides.

Wing (fig. 87) with vein R_s clearly sinuate.

Breeding records

Host 1 — *Phytomyza nigra* MEIGEN

1 ex. from puparium 6. ix. 64 on *Nardus stricta*, Malham Tarn, Yorks., England, em. 13. ix. 64 (GCDG). · 1 ex. from puparium 21. vi. 61 on *Poa trivialis*, Woodwalton Fen, Hunts., England, em. 27. vi. 61 (GCDG). 2 ex. from puparia 3. vii. 55 on *Holcus lanatus*, Bookham, Surrey, England, em. 10—13. vii. 55 (GCDG). 1 ex. from puparium 7. v. 25 on Gramineae sp., Oxford, England, em. 3. vi. 25, leg. HAMM (HD). 1 ex. from puparium 25. vii. 54 on *Holcus lanatus*, Scratch Wood, London, em. 6. viii. 54 (BM).

The species identified doubtfully as "*Dacnusa rufipes* NEES" by SIMM (1925), bred from host material on *Lolium italicum* and rye (*Secale cereale*) at Cieszyn and neighbouring localities (Poland) and Górna Sucha (Czechoslovakia), was probably *aphantus*: but SIMM's figure is of a teneral specimen whose wing venation is not developed.

Host 2 — *Phytomyza milii* KALTENBACH

1 ex., Stuttgart—Wildpark, em. 4. v. 54, leg. GROSCHKE (STGT). 9 ex., Køge, Sealand; 3 ex., Damhusmose, Sealand; 1 ex., Aarhus, Jutland; 2 ex., Randers, Jutland; Denmark, leg. SCHLICK (KB). 6 ex. from puparia 23. xi. 24 on Gramineae sp., Cothill, Berks., England, em. 14. ii—29. iv. 25, leg. HAMM (HD and BM).

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My interpretation of this species agrees with that of NIXON and has been confirmed by examination of the holotype (in the British Museum). Some confusion in the literature has been caused by MARSHALL's statement that vein R_s+M was subobsolete and his suggestion that his species might represent *Aphanta* FÖRSTER (see for instance the remarks in FISCHER, 1962). The wings of the holotype appear slightly teneral and the veins at the centre of the wing are weak: but nevertheless the normal venation is clearly present. MARSHALL was wrong in suggesting that this species might represent *Aphanta hospita* FÖRSTER (treated in this paper under the genus *Dacnusa*), which was presumably unknown to him. It should also be noted that MARSHALL's description and keys were inaccurate in stating that this species lacks the precoxal suture. This same error occurs elsewhere in his work, possibly because his manner of mounting made it difficult to examine the side of the thorax. I have no doubt that the female labelled as type must be accepted as such. It is labelled "Gavilon", a locality in Monmouthshire, and MARSHALL gives "South Wales" as a locality.

A few specimens of this species (e. g. those from Bookham) approach the coloration of the very similar *C. sylvestris* sp. nov., although most have obviously darker legs. That species has a lower, although overlapping, range of antennal segments.

The elongate, evenly pubescent petiole is an important feature for recognising this species. In this respect it resembles many of the *Agromyza*-parasites included in the *lateralis* group, but these have more numerous antennal segments (except occasionally in *C. bres* (NIXON)). Other species of *Phytomyza*-parasites which have an evenly pubescent petiole are listed under D(iii) in the "Notes on the Identification of *Chorebus* spp." below. Their descriptions should be carefully compared when determining caught material.

Chorebus sylvestris sp. nov.

Very similar to *aphantus*, with which it may be compared as follows.
Colour paler. Palpi and labrum always clear yellow. Antennae usually with their basal segments as far as about the third flagellar segment deep yellow or yellow-brown, this colour merging gradually into the dark colour of the apical flagellar segments; but the flagellum is entirely dark in a few specimens. Legs entirely yellow, or at most the hind coxae tinged with brown at their base. Tergite 3 yellow-brown or reddish.

Morphology. Antennal segments: ♂, 23 (1 ex.)—24—27; ♀, 22—25. Notaulices weaker, usually not distinct on the dorsal surface of the mesoscutum. Petiole slightly more widened towards its apex.

Host 1 — *Phytomyza lonicerella* HENDEL

1 ♂ paratype from larva 28. vii. 62 on *Lonicera periclymenum*, Derwent Water, Cumberland, England, em. 6. iv. 63 (GCDG). 1 ♀ paratype from puparium 17. vi. 52 on *Lonicera periclymenum*, The Lizard, Cornwall, England, em. 27. vi. 52, leg. SPENCER (GCDG).

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Host 2 — *Phytomyza xylostei* KALTENBACH

Holotype ♀ from puparium 8. vii. 54 on *Lonicera periclymenum*, Golspie, Sutherland. Scotland, em. viii. 54, leg. SPENCER (GCDG). 1 ♀ paratype from puparium 18. vii. 54 on *Lonicera periclymenum*, Stokenchurch, Bucks., England, em. viii. 54, leg. SPENCER (GCDG). 2 ♂♂ paratypes, Hälsingborg, Skåne, Sweden, em. 10. vii. 24, leg. RYDÉN (LUND). 2 ♀♀ paratypes from puparia vi. 19 on *Lonicera* sp., Oxford, England, em. viii. 19, leg. HAMM (HD). 4 ♀♀ paratypes from larvae and puparia 25. vii. 54 on *Lonicera periclymenum*, Scratch Wood, London, em. 5—7. viii. 54 (BM). 2 ♀♀ paratypes from puparia 6. viii. 54 on *Lonicera periclymenum*, Northaw, Herts., England, em. 12. viii. 54 (BM). 5 ♀♀ paratypes from puparia 6. xi. 27 on *Lonicera periclymenum*, Bagley Wood, Oxford, England, em. 27—30. iv. 28, leg. HAMM (BM) (host misidentified by HAMM as *Phytomyza periclymeni* DE MEIJERE). 1 ♀ paratype from puparium 14. vii. 65 on *Lonicera orientalis*, Rieseninger. Mühlhausen, Thuringia, Germany, em. 17—22. vii. 65, leg. BUHR no. 2485 (GCDG). 3 ♂♂, 3 ♀♀ paratypes from puparia on *Symphoricarpos albus*, same locality, em. 25. vii—5. viii. 65. leg. BUHR no. 2486 (GCDG).

Host 3 — *Phytomyza alpigenae* HENDEL

2 ♂♂, 7 ♀♀ paratypes from larvae on *Lonicera* sp., Lenggries, Oberbayern, Germany, em. 1—8. iv. 54, leg. GROSCHKE (STGT).

See the remarks under *aphantus*. Material bred from the above hosts has consistently pale legs and a lower range of antennal segments. I am satisfied that it represents a distinct species, although little differentiated from *aphantus* morphologically. A few of the records of this species were given in GRIFFITHS (1956) as referring to "*Dacnusa* sp. near *aphanta* MARSH.".

***Chorebus xylostellus* sp. nov.**

Similar to *aphantus* and *sylvestris*, with which it may be compared as follows. Colour pale. Palpi and labrum yellow. Centre of mandibles orange-yellow. Antennae with its basal segments yellow or orange-yellow (at least as far as the third flagellar segment, often as far as the fifth). Legs entirely pale yellow. Tergite 3 orange or reddish.

Morphology. Antennal segments: ♂, 22 (1 ex.)—23—25—26 (1 ex.); ♀, 19 (2 ex.)—20—21. In the Swedish series the centre line of the mesoscutum is distinctly impressed, forming a longitudinal groove, but this is not well marked in the other series: notaulices weak or absent in the Swedish and Polish specimens, but distinct to about the middle of the mesoscutum in many of the German specimens. Petiole not so densely pubescent as in *aphantus* and *sylvestris*, almost parallel-sided: tergite 3 with few or no basal hairs. Wing with *1m—cu* not so widely rejected from cell R_3, almost interstitial in some specimens.

Host — *Phytomyza periclymeni* DE MEIJERE

Holotype ♀; 8 ♂♂, 12 ♀♀ paratypes from puparia 21—27. x. 55 on *Lonicera xylosteum*, Borga, Borgholm, Öland, Sweden, leg. JOHANSSON (LUND and GCDG). 1 ♂ paratype from puparium 12. x. 58, same plant and locality, leg. JOHANSSON (LUND). 9 paratypes (4 ♂♂, 4 ♀♀, 1 sex unknown) from larvae on *Lonicera xylosteum*, Hedlandet, Södermanland, Sweden, em. 6—19. ii. 43, leg. LUNDQVIST (LUND). 4 ♀♀ paratypes from larvae on *Lonicera xylosteum*, Borgeby, Skåne, Sweden, em. 3. iii. 23, leg. RYDÉN (LUND). 3 ♂♂, 1 ♀ para-

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types from larvae 3. x. 64 on *Lonicera xylosteum*, Stadtwald, Mühlhausen, Thuringia, Germany, em. 13. iii–8. iv. 65, leg. BUHR no. 2333 (GCDG). 7 ♂♂, 9 ♀♀ paratypes from larvae 4. x. 64, same plant and locality, em. 23–30. x. 65 and 4–16. viii. 66, leg. BUHR no. 2698 (GCDG). 2 ♂♂ paratypes from larvae on *Lonicera xylosteum*, Berlin Botanical Gardens, Germany, em. 26. ii. 53, leg. HERING no. 59121 (BM). 5 ♀♀ paratypes, Stuttgart-Echterdingen, Germany, em. 29. iii–1. iv. 54, leg. GROSCHKE (STGT). 1 ♀ paratype from larva 3. vii. 56 on *Lonicera xylosteum*, Warszawa-Młociny, Poland, pupated 8. vii, em. 22. vii. 56, leg. NOWAKOWSKI (PAN).

This species seems to be a vicariant of *sylvestris* (the host species on *Lonicera* are monophyletic and their inclusion in different genera, *Napomyza* and *Phytomyza*, under the until recently accepted generic classification of the Agromyzidae was entirely misleading — see NOWAKOWSKI, 1962). It differs from *sylvestris* in its lower number of antennal segments and conspicuously pale antennae. The latter character is reminiscent of *C. albipes* (HALIDAY), but that species has a largely bare mesoscutum.

***Chorebus luzulae* sp. nov.**

Similar to *aphantus*, with which it may be compared as follows.

Colour. Legs yellow-brown, almost unicolorous, with the hind coxae infuscated at least at their base. Tergite 3 reddish.

Morphology. Size larger (see the table of biometric data). Antennal segments: ♂, 33; ♀, 29, 30 (2 ex.). Mesoscutum extensively roughened (at least over its anterior face and entire central lobe), with pubescence extending over nearly all its surface: notaulices distinct anteriorly only, although a very faint indication of their course can be seen as far as the posterior fovea. Petiole widened towards its apex, with dense pubescence covering its entire surface: this tends to be denser at the apical corners, sometimes forming weak apical tufts. Tergite 3 pubescent at least at its base, with its extreme base (adjacent to the petiole) distinctly sculptured.

Host — *Phytomyza luzulae* HERING

Holotype ♂; 1 ♂, 2 ♀♀ paratypes from puparia on *Luzula* sp., Feuerbach Tal, Stuttgart, Germany, em. 2. iv (1 ex.) and 7. v. 54, leg. GROSCHKE (STGT and GCDG).

This species I consider to be a vicariant of *aphantus*, from which it differs mainly in its larger size, more numerous antennal segments and somewhat different pubescence of the petiole (tending to become denser at the apical corners). It is not a very distinctive species. Caught material believed to belong to it should also be compared carefully with *C. armida* (NIXON). Another species resembling *aphantus* and with a similar range of antennal segments to *luzulae* is *C. prosper* (NIXON), whose life-history is still unknown: but this is a much smaller insect with yellow coxae and shorter maxillary palpi.

***Chorebus buhri* sp. nov.**

Colour. Palpi and labrum ochreous or yellow-brown. Centre of mandibles yellow-brown. Antennae entirely dark. Legs largely ochreous or brown with the hind coxae darker (more or less dark brown). Gaster with tergite 3 yellow-brown, the following tergites dark.

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Morphology. Head rather large, not very strongly transverse (see the table of biometric data). Antennal segments: ♂, 26, 27 (2 ex.); ♀, 22, 23. Palpi shorter than in *aphantus* (see the table of biometric data). Mandibles slightly expanded, with tooth 2 long and pointed (fig. 130) (but tooth 3 is not reduced as in *dagda* and *gentianellus*).

Thorax rather elongate (about 1.3 times as long as high). Mesoscutum with its anterior face and central lobe densely pubescent but the lateral lobes bare: notaulices almost absent. Precoxal suture narrow, rather weakly developed. Metapleural swelling rugose-punctate, like the propodeum and petiole, surrounded by a very dense rosette of pubescence: base of hind coxa also rather densely pubescent. Propodeal pubescence very dense. Petiole elongate, not much widened towards its apex, entirely covered with dense pubescence which shows a slight tendency to be denser at the apical corners. Tergite 3 without basal hairs.

Wing with vein R_s weakly sinuate.

Host — *Phytomyza griffithsi* SPENCER

Holotype ♂; 2 ♂♂, 1 ♀ paratypes from larvae on *Plantago media*, Mühlhausen, Thuringia, Germany, em. 6—7. ii. 63, leg. BUHR, HERING no. 1927 (GCDG). 1 ♀ paratype from puparium 28. viii. 65, same plant and locality, em. 31. viii—2. ix. 65, leg. BUHR no. 2633 (GCDG).

The form of the head and mandibles are important for recognising this species. Otherwise it is not very distinctive.

I am pleased to name this species in honour of Dr. habil. H. BUHR whose help in obtaining material for this paper has been most valuable.

Chorebus dagda (NIXON), **comb. nov.**

Dacnusa dagda NIXON, 1943 and 1946

Colour. Palpi and labrum ochreous or yellow-brown. Centre of mandibles red-black. Antennae more or less entirely dark. Legs largely yellow-brown or brown with the hind coxae darker, more or less dark brown. Gaster entirely dark, at most tergites 3 and 4 reddish.

Morphology. Antennal segments: ♂, 26 (1 ex.); ♀, 24—25. Maxillary palp fairly short (see the table of biometric data). Mandibles with tooth 2 long and pointed, but tooth 3 only weakly developed (fig. 135).

Thorax somewhat elongate (1.3—1.4 times as long as broad). Mesoscutum with its central lobe roughened anteriorly, but most of its surface smooth and very shining, its anterior face and central lobe pubescent but the lateral lobes largely bare: notaulices distinct usually to about the middle of the mesoscutum. Metapleural swelling strongly rugose-punctate, with a distinct fringe of pubescence at least ventrally (not forming such a distinct rosette as in most species of *Chorebus*). Propodeal pubescence short and adpressed, but not so dense as in most species of *Chorebus* associated with *Phytomyza*; in posterior view much of the rugose surface beneath is clearly visible. Petiole (fig. 141) not or only slightly

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widened towards its apex, with sparse pubescence distributed over most of its surface. Tergite 3 without basal hairs.

Wing with vein R_s weakly sinuate.

Breeding records

Host — *Phytomyza gentianae* HENDEL

1 ♂, 7 ♀♀ from larvae and puparia 23. viii. 63 on *Gentiana asclepiadea*, near Como, Italy, em. 4—21. ix. 63 (GCDG). 5 ex. from larvae and puparia 8. viii. 54 on *Centaurium minus*, Boxhill, Surrey, England, em. 11—31. viii. 54 (BM). 1 ♀ from larva 28. viii. 65 on *Centaurium umbellatum*, Mühlhausen, Thuringia, Germany, em. 9. ix. 65, leg. BUHR no. 2642b (GCDG).

The important feature for recognising this species is the shape of the mandibles (clearly an apomorph character). In other respects it is very similar to such species as *aphantus*, *buhri* and *scabiosae*, although the pubescence of its metapleuron, propodeum and petiole is less dense. NIXON (1946) compared this species with *Laotris striatula* (HALIDAY). As far as the similarity of the mandibles is concerned, I must point out that the weak third tooth in *dagda* is situated after tooth 2, whereas the long tooth in *Laotris striatula* is the third tooth, i.e. the additional small tooth arises before the original tooth 2 (which has as a result become the third tooth). Clearly the elongation of (the original) tooth 2 in these species does not represent synapomorphy, and there is no very close relationship between them. Although the metapleural pubescence of *dagda* does not form a very well defined rosette, its sister-species *gentianellus* (synapomorph in respect of the mandibles) is typical of the genus in this respect.

***Chorebus gentianellus* sp. nov.**

Colour. Palpi ochreous, with the apical segments of the maxillary palpi infuscated in the two females. Labrum ochreous or brown. Centre of mandibles reddish. Antennae entirely dark. Legs brown with the hind femora dark-brown and all coxae almost black. Gaster entirely dark or with tergite 3 reddish.

Morphology. Antennal segments: ♂, 27; ♀, 26 (2 ex.): flagellar segments short, mostly about 1½ times as long as wide in the female (slightly longer in the male). Maxillary palpi short (see the table of biometric data). Mandibles with tooth 2 long and pointed, but tooth 3 weak (compare fig. 135).

Thorax elongate (1.3—1.4 times as long as high). Mesoscutum with its central lobe slightly roughened anteriorly, with pubescence over all its surface except the posterior half of the lateral lobes: notaulices distinct to about a third or a half of the length of the mesoscutum. Precoxal suture of mesepisternum long and very deeply impressed, anteriorly almost joining the epicnemial suture. Metapleural swelling rugose-punctate, surrounded by a complete rosette of dense pubescence. Propodeal pubescence very dense. Petiole (fig. 142) slightly widened towards its apex, with dense pubescence covering its entire surface and tending to form apical tufts (although these are not very well defined). Tergite 3 bearing a few fine hairs immediately adjacent to the petiole.

Wing with vein R_s strongly curved, only weakly sinuate.

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Host 1 — *Phytomyza gentianella* HENDEL

Holotype ♀ from larva on *Gentiana* sp., Puppling, near Wolfratshausen, Oberbayern, Germany, em. 1. v. 53, leg. GROSCHKE (STGT).

Host 2 — *Phytomyza vernalis* GROSCHKE

1 ♂, 1 ♀ paratypes from larvae on *Gentiana verna*, Brauneck, near Lenggries, Oberbayern, Germany, 1500 metres, em. 12 and 16. vi. 53, leg. GROSCHKE (STGT and GCDG).

This species has short palpi and mandibles resembling those of *dagda* (which is also associated with a host feeding on Gentianaceae), but its propodeum and petiole are much more pubescent. The well developed precoxal suture is also a characteristic feature.

Chorebus punctus (GOUREAU), **comb. nov.**

Dacnusa punctum GOUREAU, 1851 (typographical error for *puncta*)

Colour. Palpi and labrum yellow or ochreous yellow. Centre of mandibles yellow-brown. Antennae more or less entirely dark (at most obscurely brownish at their base). Legs uniformly deep yellow or yellow-brown, sometimes with the hind coxae, hind tarsi and apex of the hind tibiae slightly darker, more or less brown. Gaster with tergite 3 yellow-brown or red-brown, the following tergites dark.

Morphology. Antennal segments: ♂, 26 (2 ex.), 27 (5 ex.), 28; ♀, 25 (2 ex.), 26 (2 ex.), 27 (2 ex.), 28 (note the absence of any marked sexual dimorphism). Maxillary palpi moderately long, but the two apical segments are shorter (in relation to the size of the insect) than in *aphantus*. Mandibles not expanded, with tooth 2 large but tooth 3 appearing only as a weak projection from its base.

Thorax elongate, 1.4—1.6 times as long as high. Mesoscutum with most of its surface slightly roughened, almost entirely covered with fairly dense pubescence: notaulices virtually absent or weakly impressed to about the middle of the mesoscutum. Precoxal suture very narrow, usually clearly rugose-costate but virtually smooth in two specimens. Metapleural swelling shining, usually rather shallowly sculptured. Metapleural and propodeal pubescence dense. Petiole almost parallel-sided, with fairly dense pubescence evenly distributed over its surface, without any tendency to form apical tufts. Tergite 3 with a few basal hairs.

Wing with vein R_s distinctly sinuate.

Host 1 — *Phytomyza scolopendrii* ROBINEAU-DESVOIDY

♂♀ from puparia 12. ix. 54 on *Phyllitis scolopendrium*, Hope, Devon, England, em. 14.ix.54, leg. SPENCER (GCDG). 1 ♂, near Neuffen, Württemberg, Germany, em. 6. viii. 54, leg. GROSCHKE (STGT). 8 ex. from puparia on *Asplenium ruta-muraria*, Kunitz, Jena, Thuringia, Germany, em. 18—21. vii. 63, leg. BUHR, HERING no. 1969 (GCDG). ♂♀ from larvae 1. ix. 62 on *Phyllitis scolopendrium*, Czertezik, Pieniny, Poland, pupated 25. ix, em. 2. v. 63, leg. NOWAKOWSKI (PAN).

GOUREAU's (1851) original material was bred from this host on *Phyllitis scolopendrium* in France.

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Host 2 — *Phytomyza dorsata* HENDEL

6 ex. from larvae on *Ceterach officinarum*, Hvar, Yugoslavia, em. 27–28. iv. 63, leg. HERING no. 7003 (GCDG).

Host 3 — *Phytomyza sedicola* HERING

5 ex. from puparia 18. viii. 56 on *Sedum maximum*, Żukowo, Szwajcaria Kaszubska, Poland, em. 20—24. viii. 56 (3 ex.) and 27. iv. 57 (2 ex.), leg. NOWAKOWSKI (PAN).

This is not a very distinctive species and might easily be confused with for instance *aphantus*. The inclusion of *P. sedicola* HERING in the host range is surprising. The above description is based on the specimens bred from *P. scolopendrii* ROBINEAU-DESVOIDY and *P. dorsata* HENDEL. The series bred from *sedicola* have uniformly golden yellow legs and the petiole slightly widened towards its apex. But I can find no substantial difference between them and paler specimens of *punctus*. Their antennal segments number 28 (2♀♀) and 29 (1♀) (broken in the males).

***Chorebus scabiosae* sp. nov.**

Colour. Palpi and labrum dull yellow or ochreous. Centre of mandibles red-brown. Antennae more or less entirely dark. Legs varying from deep yellow to light brown, unicolorous or with the hind coxae somewhat infuscated. Tergites 3 and 4 dull yellow-brown, slightly paler than the following tergites.

Morphology. Antennal segments: ♂, 22—24; ♀, 21—23. Maxillary palpi fairly short (see the table of biometric data).

Thorax 1.3--1.5 times as long as high. Mesoscutum with its central lobe roughened, its anterior face and central lobe densely pubescent but the lateral lobes largely bare: notaulices weak, sometimes virtually absent. Metapleural swelling rugose-punctate, like the propodeum and petiole. Pubescence of propodeum and petiole dense and whitish. Petiole parallel-sided or slightly widened towards its apex, rather densely pubescent near its base but more sparsely so towards its apex (sometimes bare centrally on its apical half): there is no trace of apical tufts. Tergite 3 usually without basal hairs. Ovipositor (♀) not projecting in the retracted position.

Wing with vein R_s only weakly sinuate.

Host — *Phytomyza scabiosae* HENDEL

Holotype ♀; 1 ♂, 7 ♀♀ paratypes, Karkstein, Bopfingen, Württemberg, Germany, em. 21—22. vii. 55, leg. GROSCHKE (STGT). 2 ♀♀ paratypes from puparia 14. viii. 55 on *Scabiosa columbaria*, Betchworth, Surrey, England, em. 19—20. viii. 55 (GCDG). 2 ♀♀ paratypes from puparia 29. viii. 54 on *Scabiosa columbaria*, Mickleham, Surrey, em. 10 and 15. ix. 54 (BM). 5 ♂♂, 3 ♀♀ paratypes from puparia 24. vii. 55 on *Scabiosa columbaria*, Boxhill, Surrey, em. 30. vii—4. viii. 55 (BM).

This species is not very distinctive and could easily be confused with *aphantus* or *sylvestris*. However it has obviously shorter palpi and longer tarsi.

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Chorebus tanis (NIXON), **comb. nov.**

Dacnusa tanis NIXON, 1945

Colour. Palpi varying from ochreous to almost black. Labrum brown. Centre of mandibles red-brown. Antennae entirely dark. Legs yellow-brown or red-brown with the hind coxae darker, almost black in most specimens (and in many specimens the entire hind femora and apex of the hind tibiae are also strongly infuscated). Tergite 3 usually reddish.

Morphology. Antennal segments: ♂, 23—29; ♀, 20—28. Palpi fairly short (see the table of biometric data). Mandibles not expanded.

Thorax elongate, about 1.4 times as long as high. Mesoscutum roughened anteriorly, with pubescence over all its surface except the posterior half of the lateral lobes: notaulices weak or absent (in a few specimens the central line of the mesoscutum is impressed to form a longitudinal groove, but usually this feature is absent). Metapleural swelling rugose-punctate, like the propodeum and petiole. Pubescence of metapleuron and propodeum dense and whitish. Petiole usually slightly widened towards its apex, with short pubescence covering most of its surface (but tending to be sparse centrally on its posterior half) and forming distinct apical tufts. Tergite 3 with few or no basal hairs. Ovipositor (♀) stout, slightly upcurved, projecting beyond the apical tergite in the retracted position by nearly the length of the petiole.

Breeding records

Host 1 — *Phytomyza* sp. *ramosa* auctt.

6 ex. from puparia on *Dipsacus fullonum sylvester*, Abbotsbury, Dorset, England, em. 27. vi—2. vii. 52, leg. SPENCER (BM and GCDG). 2 ex. from puparia 3. x. 54 on *Dipsacus fullonum sylvester*, Scratch Wood, London, em. 18. x. 54 and iii. 55 (BM and GCDG). 2 ♀♀, Stuttgart-Fellbach, Germany, em. 10. xi. 55, leg. GROSCHKE (STGT). 2 ex. from larvae 20. vi. 54 on *Dipsacus fullonum sylvester*, Betchworth, Surrey, England, em. 20. vii. 54 (BM). 1 ex. from puparium 29. viii. 54 on *Dipsacus fullonum sylvester*, Mickleham, Surrey, em. 15. ix. 54 (BM).

Host 2 — *Phytomyza ramosa* HENDEL (= *olgae* HERING)

1 ♂, 4 ♀♀, Stuttgart-Kaltental, Germany, em. 9—25. vii. 54, leg. GROSCHKE (STGT). 1 ♀, Stuttgart-Rohr, em. 11. vii. 55, leg. GROSCHKE (STGT). 1 ♂ from puparium 5. vii. 57 on *Knautia arvensis*, Kiełpin, near Warszawa, Poland, em. 21. vii. 57, leg. NOWAKOWSKI (PAN). 1 ♀ from puparium on *Scabiosa columbaria*, Jelsa, Hvar, Yugoslavia, em. 26. v. 65, leg. HERING no. 7429 (GCDG).

Host 3 — *Phytomyza succisae* HERING

3 ♂♂, 4 ♀♀, Neuffen, Württemberg, Germany, em. 4—20. ix. 54, leg. SPENCER and GROSCHKE (GCDG and STGT).

Host 4 — *Phytomyza scabiosarum* HERING

11 ♂♂, 12 ♀♀ from larvae 10. iv. 64 on *Scabiosa columbaria*, Sicily, 20 km. South of Catania, em. about 10. iv. 64, leg. SPENCER (GCDG). 2 ♀♀ from puparia 18. iv. 58, Castelldefels, Barcelona, Spain, em. 1—5. v. 58, leg. SPENCER (BM).

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In addition I have received a Swedish specimen (Småland, em. 3. viii. 39, leg. RYDÉN (LUND)), which is labelled as bred from *P. ramosa* HENDEL, but I do not know which of the two species to which the name has been applied is concerned.

The ovipositor is slightly shorter (projecting by about half the length of the petiole) in the Sicilian and Spanish series: but otherwise the insects agree well with specimens from North and Central Europe and I do not doubt that they are conspecific. The range of antennal segments is unusually wide in this species and is correlated with size differences between the host species and perhaps also geographical distribution. The full breakdown of the data is as follows:

	♂♂	♀♀
ex *P.* sp. on *Dipsacus*	29	24, 25, 26 (2 ex.), 28
ex *P. ramosa* HENDEL	25	21, 22, 24
ex *P. succisae* HERING	25, 27	23, 24 (2 ex.), 26 (2 ex.)
ex *P. scabiosarum* HERING	23, 24 (4 ex.), 25 (6 ex.)	20 (4 ex.), 21 (6 ex.), 22 (2 ex.)

This species is well characterised by its projecting ovipositor, dark coloration and long tarsi (see the table of biometric data).

Chorebus merion (NIXON), **comb. nov.**

Dacnusa merion NIXON, 1945

Colour. Palpi ochreous yellow with segments 3 and 6 of the maxillary palpi conspicuously infuscated. Labrum, mandibles and antennae virtually black. Legs dark brown with all coxae and tarsi almost black. Gaster entirely dark.
Morphology. Antennal segments: ♂, 33 (2 bred ex.); ♀, 33 (holotype). Ocelli forming an equilateral triangle. Maxillary palpi short (see the table of biometric data). Mandibles somewhat expanded towards their apex, with all four teeth well developed. Facial pubescence very dense.

Thorax elongate (about 1.4 times as long as high). Mesoscutum with dense pubescence over its anterior face, extending on to the sides of the lateral lobes, but its dorsal surface is very strongly shining with its pubescence largely consisting of three to four rows of hairs along the course of the notaulices; the central part of the central lobe bears only a few scattered hairs: notaulices weak. Metapleural swelling rugose, surrounded by a dense rosette of whitish pubescence. Propodeal pubescence very dense. Petiole almost parallel-sided, with rugose-punctate sculpture like the propodeum, its entire surface covered with dense pubescence which shows a tendency to become denser apically, but no well-defined tufts are formed. Tergite 3 almost bare.

Wing with *2r* rather remote from the base of the pterostigma: vein R_s sinuate.

Breeding records

Host — *Phytomyza taraxacocecis* HERING

2 ♂♂ from puparia 5. v. 63 from leaf-bases of *Taraxacum* sp. on the lawn in my garden at Barnet, London, England, em. 31. v and 15. vi. 63 (GCDG).

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The elongate thorax, sparse mesoscutal pubescence and dark coloration (including almost black mandibles) are characteristic features of this species. As no bred female was available the identification of the species as NIXON's *merion* (described from the female) requires confirmation.

Chorebus ergias (NIXON), **comb. nov.**

Dacnusa ergias NIXON, 1945

Colour. Palpi and labrum deep yellow. In the female the antennae are distinctly brown or yellow-brown for about their basal half, but the antennae of the males are darker, the flagellum being no more than obscurely brownish at its base. Centre of mandibles yellow-brown. Legs largely deep yellow with only the base of the hind coxae and tarsal segments 5 infuscated. Gaster entirely dark.

Morphology. Antennal segments: ♂, 34—35; ♀, 30—32. Maxillary palpi fairly short (see the table of biometric data). Mandibles not expanded, with tooth 3 appearing as a projection from tooth 2 (fig. 131). Facial pubescence very dense.

Thorax very elongate (1.4—1.5 times as long as high). Mesoscutum largely smooth and shining but with the anterior edge of the lateral lobes (and the lateral extensions of the notaulices) usually roughened; its pubescence is rather long, covering all its surface except the posterior half of the lateral lobes: notaulices well developed, usually converging on the posterior fovea. Precoxal suture long, usually extending almost to the posterior margin of the mesepisternum: the central part of the mesepisternum bears some fine pubescence, similar to that of the subalar callus. Metapleural and propodeal pubescence dense: the base of the hind coxa is also clothed with dense pubescence, often with a tendency to form tufts: the metapleural swelling, propodeum and petiole, and to some extent the base of the hind coxae are rugose-punctate. Pubescence of petiole dense, rather long, tending to form apical tufts (although these are not so well defined as in *alecto* and similar species). Tergite 3 with few or no basal hairs. Ovipositor (♀) stout, but not or only slightly projecting beyond the apical tergite in the retracted position. Legs very long, with the hind tarsi as long as or longer than the hind tibiae (see the table of biometric data).

Wing with vein R_s strongly sinuate: Cu_{1b} almost lost (contrast the *senilis* and *leptogaster* groups, with which this species might be confused because of its elongate form).

Breeding records

Host — *Phytomyza araciocecis* HERING

2 ♂♂, 9 ♀♀ from puparia 8. vi. 65 in *Crepis paludosa*, Stadtwald, Mühlhausen, Thuringia, Germany, em. 9—16. vi. 65, leg. BUHR no. 2388 (GCDG).

An important feature for recognising this species is its slender legs. It has a similar elongate appearance to *C. merion* (NIXON), but this is a darker insect with sparser mesoscutal pubescence. *C. fallax* (NIXON) differs in having a longer, projecting ovipositor and tooth 2 of its mandibles unusually long and pointed (fig. 136).

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Chorebus fallax (NIXON), **comb. nov.**

Dacnusa fallax NIXON, 1937, 1944 and 1945

Colour. Palpi and labrum deep yellow. Antennae more or less entirely dark or with their basal segments brown. Centre of mandibles orange-yellow. Legs deep yellow or reddish yellow with the base of the hind coxae and tarsal segments 5 infuscated: sometimes the hind femora and other hind tarsal segments are also somewhat infuscated. Gaster with tergites 3 and 4 brown, the following tergites almost black.

Morphology. Head very large (see the table of biometric data). Antennal segments: ♂, 34—35; ♀, 32—35. Palpi long. Mandibles not expanded, with tooth 2 unusually long and curved outwards, but teeth 3 and 4 relatively small (fig. 136).

Thorax elongate, about 1.5 times as long as high. Mesoscutum with its anterior face and central lobe roughened, with rather long pubescence covering most of its surface (except part of the posterior half of the lateral lobes): notaulices represented by lines of rugosity as far as about the middle of the mesoscutum. Precoxal suture broad: the central part of the mesepisternum bears some fine pubescence similar to that of the subalar callus. Metapleural and propodeal pubescence very dense: the base of the hind coxa is also clothed with similar dense pubescence, which tends to form tufts. Metapleural swelling finely rugose-punctate. Petiole elongate, almost parallel-sided, entirely covered with dense, rather long pubescence which tends to become denser towards the apical corners (although not forming well defined tufts). Tergite 3 with a few hairs on each side near its base. Ovipositor (♀) stout, shortly projecting beyond the apical tergite in the retracted position. Legs very long, with the hind tarsi as long as the hind tibiae (see the table of biometric data).

Wing with vein R_s weakly sinuate: Cu_{1b} almost or completely lost (contrast the *senilis* and *leptogaster* groups).

Breeding records

Host — *Phytomyza cardui* HERING

1 ♀ from puparium 3. x. 64 from stem of *Cirsium arvense*, Mühlhausen, Thuringia, Germany, em. spring '65, leg. BUHR no. 2322 (GCDG).

This species is readily recognisable by the form of its mandibles and projecting ovipositor. Its affinities clearly lie with *ergias*, also a parasite of the *Phytomyza robustella* group, not with the *senilis*-group in which it was tentatively placed by NIXON (1944). These species differ from the *senilis*-group in having vein Cu_{1b} virtually absent. This feature associates them with the *ovalis/lateralis* complex (to which nearly all the *Chorebus* parasites of *Phytomyza* belong). Their resemblance to the *senilis*-group (mostly parasites of *Melanagromyza*) in respect of their elongate form and somewhat densely pubescent hind coxa I consider to represent convergence.

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***Chorebus canariensis* sp. nov.**

Colour. Palpi dark brown. Labrum deep yellow or brown. Centre of mandibles orange or reddish. Antennae entirely black except for the yellow-brown annellus. Legs largely yellow-brown or brown, with the tarsi and apex of the hind tibiae dark brown: also the hind coxae are dark brown in two out of the four specimens. Tergite 3 reddish.

Morphology. Antennal segments: ♂, 21, 22; ♀, 19 (2 ex.). Maxillary palpi extremely short (see the table of biometric data). Mandibles slightly expanded towards their apex, with all four teeth well developed.

Thorax 1.2—1.3 times as long as high. Mesoscutum smooth, with very short pubescence covering all its surface except the posterior half of the lateral lobes: notaulices completely absent. Mesepisternum with short pubescence extending from the subalar callus over its centre. Metapleural swelling shining, only weakly sculptured, with long hairs radiating from its centre and an almost complete rosette of pubescence. Propodeal pubescence short and adpressed but not so dense as in most species of *Chorebus* associated with *Phytomyza*. Petiole (fig. 143) not or only slightly widened towards its apex, almost flat (i.e. hardly raised along its centre as in many species), strongly shining, its shallow sculpture having a distinct longitudinal element, bare centrally but with a few hairs near its sides and apical corners. Tergite 3 without basal hairs.

Wing (fig. 85) with vein R_s strongly curved, not sinuate: metacarp very short.

Host — *Phytomyza atricornis* MEIGEN

Holotype ♂; 1 ♂, 2 ♀♀ paratypes from puparia 13. ii. 62 on an unidentified host-plant, Los Arucas, Gran Canaria, Canary Islands, em. 24—26. ii. 63, leg. SPENCER (GCDG).

This species is considered to be a geographical vicariant of *C. sativi* (NIXON). See the remarks below under that species.

***Chorebus sativi* (NIXON), comb. nov.**

Dacnusa sativi NIXON, 1943 and 1946

Similar to *C. canariensis* sp. nov., with which it may be compared as follows.

Colour. Legs darker, largely dark brown.

Morphology. Antennal segments: ♂, 21; ♀, 18—19. Mesoscutum with very short pubescence over almost its entire surface. Metapleural swelling finely punctate. Petiole not so flat, rather coarsely rugose, not strongly shining, with short hairs rather densely distributed over almost its entire surface.

Host — *Phytomyza atricornis* MEIGEN

Holotype ♂, ♂♀ from puparia 17. ii. 32 on *Pisum sativum*, Rabat, Morocco, em. 5. iii. 32, leg. KOZLOVSKY (BM).

This species and *canariensis* are clearly synapomorph in respect of their very short mesoscutal pubescence, the absence of notaulices, the low number of antennal segments and the wing venation. Probably they are geographical vicariants.

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No *Chorebus* sp. has to my knowledge been bred from *Phytomyza atricornis* MEIGEN in Europe proper apart from an isolated case of xenophagy by *C. misellus* (MARSHALL) (see Part V).

***Chorebus thalictri* sp. nov.**

Colour. Palpi ochreous brown. Labrum and centre of mandibles yellow-brown. Antennae entirely dark. Legs largely ochreous brown with the coxae somewhat darker. Gaster entirely dark.

Morphology. 24 antennal segments (♂). Palpi somewhat short (see the table of biometric data). Mandibles hardly expanded, with all four teeth well developed.

Thorax about 1.3 times as long as high. Mesoscutum roughened anteriorly, with dense pubescence distributed over almost its entire surface: notaulices not extending longitudinally on the dorsal surface of the mesoscutum. Metapleural swelling finely rugose-punctate. Metapleural and propodeal pubescence dense: the base of the hind coxa is also somewhat densely pubescent, but no distinct tufts are formed. Petiole slightly widened towards its apex, evenly covered with dense but fine pubescence, which shows no tendency to form apical tufts: the base of tergite 3 is also rather densely pubescent.

Wing with vein R_s sinuate.

Host — *Phytomyza aquilegiae* HARDY

Holotype ♂ from larva 30. viii. 57 on *Thalictrum aquilegifolium*, Kraków Ravine, Tatry, Poland, pupated 5. ix, em. 11. iii. 58, leg. NOWAKOWSKI (PAN).

This insect is very similar to *angelicae* but has its mesoscutum and petiole more densely pubescent and fewer antennal segments.

***Chorebus angelicae* (NIXON), comb. nov.**

Dacnusa angelicae NIXON, 1945

Colour. Palpi and labrum yellow-brown or ochreous. Antennae entirely dark. Centre of mandibles brown or orange-brown. Legs largely deep yellow-brown or testaceous with the coxae (especially the hind coxae) and the apical tarsal segments infuscated: sometimes the hind femora are also somewhat infuscated. Gaster beyond petiole entirely more or less reddish black.

Morphology. Antennal segments: ♂, 25—27; ♀, 23 (1 ex.), 25—26. Maxillary palpi fairly short (see the table of biometric data). Mandible small, but with tooth 1 slightly expanded: all four teeth well developed.

Thorax short, about 1.1 times as long as high. Mesoscutum largely smooth and shining, with pubescence over its anterior face and central lobe (at least anteriorly), but the lateral lobes are largely bare: notaulices reaching about the middle of the mesoscutum. Metapleuron densely pubescent, its swelling strongly rugose-punctate (like the propodeum). Propodeal pubescence not so dense as in most species of *Chorebus* associated with *Phytomyza*; in posterior view much of the surface beneath can be seen. Petiole somewhat widened towards its apex, strongly shining, its pubescence sparse and inconspicuous (not forming apical tufts). Tergite 3 without basal hairs.

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Wing with vein R_s sinuate.

Breeding records

Host — *Phytomyza angelicae* KALTENBACH

1 ex. from larva 29. vii. 57 on *Angelica sylvestris*, Grabina, Kampinoska Forest, Poland, em. 17. viii. 57, leg. NOWAKOWSKI (PAN). 2 ex. from larvae 29. vii. 56 on *Angelica sylvestris*, Ordona, Kampinoska Forest, em. 22 and 27. viii. 56, leg. NOWAKOWSKI (PAN). 1 ex. from larva on *Angelica sylvestris*, Hedlandet, Södermanland, Sweden, em. 12. viii. 43, leg. LUNDQVIST (LUND). 4 ex. from larvae on *Angelica sylvestris*, Hogley, Oxford, England, em. 15—19. viii. 18, leg. HAMM (HD and BM). 2 ex. from larvae 21. vii. 53 on *Angelica sylvestris*, Wicken Fen, Cambs., England, em. viii. 53, leg. SPENCER (BM). 3 ex. from larvae on *Angelica* sp., Northern Etchells, Cheshire, England, em. vii—viii. 22, leg. BRITTEN (BM). 3 ex. from larvae on *Angelica sylvestris*, Manchester, Lancs., England, em. 30. iv. 35, leg. COHEN (BM). 1 ex. from *Angelica sylvestris*, Platt Fields, Manchester, em. 24. iv. 23, leg. BRITTEN (BM). Holotype ♀; 1 ♂, 3 ♀♀ from puparia 24. ix. 22 on *Angelica sylvestris*, Hogley, Oxford, England, em. 27. xi. 22 (2 ♀♀), 2. v. 23, 31. v. 23 (holotype ♀) and 5. vi. 23 (♂), leg. HAMM (BM and HD).

The sparse pubescence of the mesoscutum and petiole distinguish this species from all other *Chorebus* spp. which have been bred from *Phytomyza* spp. on Compositae and Umbelliferae: but there is a possibility of caught material being confused with some of the species associated with Ranunculaceae-feeding hosts, such as *tamiris* and *thalictri*.

***Chorebus fallaciosae* sp. nov.**

Colour somewhat variable. Palpi and labrum varying from deep yellow to ochreous or brown. Antennae usually entirely dark, but sometimes obscurely yellow at their base. Centre of mandibles orange or brown. Legs almost unicolorous deep yellow in some specimens, but more commonly ochreous tinged, often with the hind coxae somewhat darker (more or less brown): in a few specimens the legs are entirely light brown or testaceous. Gaster with tergite 3 red or yellow-brown, the following tergites darker.

Morphology. Antennal segments: ♂, 27 (1 ex.)—28—31; ♀, 26—28—29 (1 ex.). Palpi moderately long (see the table of biometric data). Mandibles not or only slightly expanded, with all four teeth well developed.

Thorax 1.2—1.3 times as long as high. Mesoscutum largely smooth and shining, with its pubescence almost confined to the course of the notaulices and the anterior edge of the lateral lobes (the central part of its anterior face is, like the central lobe, bare and shining): notaulices usually distinct, converging on the posterior fovea. Metapleural swelling rugose-punctate, its fringe of pubescence well developed at least ventrally. Propodeal pubescence not so dense as in most species of *Chorebus* associated with *Phytomyza*; in posterior view much of the rugose surface beneath can be seen. Petiole somewhat widened towards its apex, largely bare, but with scattered hairs at its base, along its sides and towards its apex (not forming apical tufts). Tergite 3 without basal hairs.

Wing with vein R_s sinuate.

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Host 1 — *Phytomyza fallaciosa* BRISCHKE (= *pseudohellebori* HENDEL)

Holotype ♀; 2 ♂♂, 5 ♀♀ paratypes from larvae 7. x. 55 on *Ranunculus repens*, Kazuń, Kampinoska Forest, Poland, pupated 11. x, em. 30. x—3. xi. 55 and 22. v. 56 (1 ♂), leg. NOWAKOWSKI (PAN and GCDG). 1 ♀ paratype from larva 7. x. 55 on *Ranunculus acer*, same locality, pupated 9. x. em. 3. xi. 55, leg. NOWAKOWSKI (PAN). 1 ♀ paratype from puparium 13. ix. 55 on *Ranunculus repens*, Sieraków reservation, Kampinoska Forest, em. 15. ix. 55, leg. NOWAKOWSKI (PAN). 1 ♀ paratype from puparium 21. x. 55 on *Ranunculus repens*, Warszawa-Młociny, em. 5. v. 56, leg. NOWAKOWSKI (PAN). 1 ♀ paratype from puparium 18. viii. 56 on *Ranunculus lanuginosus*, Żukowo, Szwajcaria Kaszubska, Poland, em. 28. viii. 56, leg. NOWAKOWSKI (PAN). 5 ♂♂, 4 ♀♀ paratypes, Denmark (1 ♀, Randers, Jutland; 3 ♂♂, 3 ♀♀, Køge, Sealand; 2 ♂♂, Damhusmose, Sealand), leg. SCHLICK (KB). 2 ♀♀ paratypes from larvae 30. v. 54 on *Ranunculus bulbosus*, Chailey, Sussex, England, em. 18. vi. 54 (BM). 1 ♂ paratype from larva 4. x. 53 on *Ranunculus* sp., Brookman's Park, Herts., England, em. 18. iv. 54 (BM). 2 paratypes (1 ♂, 1 sex unknown) from larvae 18. x. 53 on *Ranunculus* sp., Mickleham, Surrey, England, em. 13 and 18. xi. 53 (BM).

Host 2 — *Phytomyza rydeni* HERING

1 ♂ paratype from larva 28. vi. 56 on *Ranunculus auricomus*, Sieraków, Kampinoska Forest, Poland, pupated 30. vi, em. 13. vii. 56, leg. NOWAKOWSKI (PAN).

This species resembles the *Agromyza*-parasites *C. lugubris* (NIXON) and *C. hilaris* GRIFFITHS, but has fewer antennal segments. It was recorded as *lugubris* in GRIFFITHS (1956). Important features to note in comparing it with other species associated with *Phytomyza* are the completely bare centre-line of the mesoscutum and partly bare petiole.

***Chorebus calthae* sp. nov.**

Colour. Palpi and labrum yellow-brown or ochreous (sometimes the apical segment of the maxillary palpi is infuscated). Antennae entirely dark. Centre of mandibles red-brown. Legs dull yellow or light brown with the coxae and tarsi somewhat darker (brown or dark brown). Gaster entirely dark or at most tergite 3 reddish.

Morphology. Antennal segments: ♂, 28—30; ♀, 24—27. Palpi fairly long. Mandibles not expanded, with all four teeth well developed: tooth 2 is somewhat blunt and not projecting much beyond tooth 3.

Thorax short, about 1.1 times as long as high. Mesoscutum slightly roughened anteriorly, with fine dense pubescence distributed over almost its entire surface (except in the two Polish females in which the lateral lobes are largely bare): notaulices weak, hardly extending longitudinally on the dorsal surface of the mesoscutum. Metapleural swelling punctate, but small and barely visible beneath the extremely dense pubescence (forming a rosette as normally in *Chorebus*): the base of the hind coxa also bears similar dense pubescence which tends to form tufts. Propodeal pubescence extremely dense. Petiole strongly widened towards its apex, covered with short dense pubescence which becomes denser towards its apical corners. Tergite 3 with a few basal hairs.

Wing (fig. 89) with the pterostigma and cell $2R_1$ unusually elongate: vein R_s strongly sinuate.

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Host — *Phytomyza calthivora* HENDEL

Holotype ♀, 1 ♀ paratype from larvae on *Caltha palustris*, Corsham, Wilts., England, em. 24. vi. 54, leg. SPENCER (GCDG). 6 ♂♂, 8 ♀♀ paratypes, Randers, Jutland, Denmark, leg. SCHLICK (KB and GCDG). 2 ♀♀ paratypes from larvae 3. vii. 57 on *Caltha palustris*, Warszawa-Młociny, Poland, pupated 5—8. vii, em. 27. vii. 57 and 27. ii. 58, leg. NOWAKOWSKI (PAN).

This species has an elongate cell $2R_1$ like *C. bensoni* (NIXON) and *C. tamiris* (NIXON), the two other species associated with *Phytomyza* spp. on *Caltha*. Possibly the three species are monophyletic. The densely pubescent petiole of *calthae* will readily distinguish it from the other two species.

Chorebus tamiris (NIXON), **comb. nov.**

Dacnusa tamiris NIXON, 1943 and 1946

Colour. Palpi and labrum yellow (the apical segment of the maxillary palpi rarely slightly infuscated). Centre of mandibles yellow-brown or red-brown. Antennae sometimes more or less entirely dark, but often obscurely brown or yellow-brown at their base as far as about the first flagellar segment. Legs largely deep yellow, often somewhat ochreous, with only tarsal segments 5 distinctly infuscated: sometimes the hind coxae are brown (as in the holotype). Gaster dark with at most tergite 3 red-brown.

Morphology. Antennal segments: ♂, 28—32—33 (1 ex.); ♀, 27—31—32 (1 ex.). Palpi fairly long (see the table of biometric data). Mandibles not expanded, with all four teeth well developed.

Thorax short, not more than 1.1 times as long as high. Mesoscutum largely smooth and shining, with fine pubescence covering its anterior face and central lobe (at least anteriorly), but the lateral lobes are largely bare: notaulices usually reaching at least the middle of the mesoscutum. Precoxal suture well defined, obliquely placed. Metapleural swelling rugose-punctate. Metapleural and propodeal pubescence moderately dense: the base of the hind coxa also bears similar dense pubescence which tends to form tufts. Petiole somewhat widened towards its apex, strongly shining, with long sparse inconspicuous pubescence distributed over most of its surface (but often tending to be absent from the centre-line). Tergite 3 without basal hairs. In the female the apex of the gaster has a pointed appearance, as the apical tergites project somewhat to cover the upcurved ovipositor (which although rather long does not project beyond the apical tergite in the retracted position).

Wing with cell $2R_1$ somewhat elongate; vein R_s weakly sinuate.

Breeding records

Host — *Phytomyza calthophila* HERING

33 ex., Randers, Jutland, Denmark, leg. SCHLICK (KB and GCDG). 1 ♂ from larva 4. vii. 56 on *Caltha palustris*, Sieraków reservation, Kampinoska Forest, Poland, pupated 5. vii, em. 17. iv. 57, leg. NOWAKOWSKI (PAN). 1 ♀ from larva 19. vi. 57 on *Caltha palustris*, Warszawa-Młociny, pupated 20—21. vi, em. 2. iii. 58, leg. NOWAKOWSKI (PAN). 4 ex.

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from larvae 3. vii. 55 on *Caltha palustris*, Granica, Kampinoska Forest, pupated 5. vii, em. 23. vii. 55 (1 ex.) and 5—7. v. 56, leg. NOWAKOWSKI (PAN). 3 ♂♂, 1 ♀ from larvae 4. ix. 56 on *Caltha laeta*, Spadowiec Valley, Tatry, Poland, em. 26. ix. 56 (2 ex.) and 15—17. iv. 57, leg. NOWAKOWSKI (PAN and GCDG). 2 ex. from larvae on *Caltha palustris*, Hedlandet, Södermanland, Sweden, em. 6—9. viii. 42, leg. LUNDQVIST (LUND). 2 ex., same plant and locality, em. 14. vii. 43, leg. LUNDQVIST (LUND). 1 ♀ from larva on *Caltha palustris*, Courmayeur, Val Ferret, Italy, em. spring '65, leg. SPENCER (GCDG).

I have also received a single male of a similar insect bred from larva of *Phytomyza trolliivora* HERING on *Trollius europaeus*, Orterer Alm, Kochel, Germany, em. 2. vii. 53, leg. GROSCHKE (STGT). This has light brown legs with the coxae infuscated (more or less dark brown), 29 antennal segments and the notaulices absent from the dorsal surface of the mesoscutum. Probably it represents an undescribed species, but I prefer to wait for more material before describing it.

C. tamiris (NIXON) is not a very distinctive species and when comparing it careful attention stroud be paid to the pubescence of the petiole and mesoscutum and the upcurved ovipositor.

Chorebus bensoni (NIXON), **comb. nov.**

Dacnusa bensoni NIXON, 1943 and 1946

Colour. Palpi and labrum yellow. Antennae brownish, becoming yellow-brown (especially ventrally) for about their basal half in the female (but not in the three males seen). Legs yellow except that tarsal segments 5 are contrastingly infuscated. Gaster beyond petiole more or less entirely brown, tergite 3 only slightly paler than the following tergites.

Morphology. Antennal segments: ♂, 33, 35 (2 ex.); ♀, 30—33. Palpi rather short. Mandibles not expanded, with all four teeth well developed.

Thorax short, about 1.1 times as long as high. Mesoscutum largely bare and shining, with fine pubescence covering its anterior face and central lobe, but the lateral lobes are almost bare: notaulices usually extending to about the middle of the mesoscutum. Metapleural swelling rugose-punctate. Metapleural and propodeal pubescence moderately dense. Petiole widened towards its apex, broadly bare along its centre line but with fine inconspicuous pubescence along its sides. Tergite 3 almost bare. Ovipositor (♀) stout and extremely long, projecting beyond the apical tergite in the retracted position by almost half of the gastral length, its sheaths almost as long as the hind tibia.

Wing with cell $2R_1$ rather elongate; vein R_s distinctly sinuate.

Breeding records

Host — *Phytomyza soenderupi* HERING

Denmark: 3 ♂♂, 1 ♀, Randers, Jutland, and 1 ♀, Damhusmose, Sealand, leg. SCHLICK (KB and GCDG).

The most characteristic features of this species are the very long ovipositor and short, almost bare petiole. The larvae of the host are known to feed in leaf-stalks of *Caltha*.

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***Chorebus albimarginis* sp. nov.**

Colour. Palpi dull yellow. Labrum orange-yellow. Antennae obscurely brown at their base, otherwise dark. Centre of mandibles reddish. Legs yellow-brown with the coxae and tarsi slightly darker, more or less brown. Gaster with tergites 3 and 4 yellow-brown, the following tergites darker.

Morphology. 32 antennal segments (♀). Palpi short (see the table of biometric data). Mandibles not expanded, with all four teeth clearly developed.

Thorax about 1.3 times as long as high. Mesoscutum largely smooth and shining, with pubescence over its anterior face, along the course of the notaulices and in about two rows along its central line; the lateral lobes are almost completely bare: notaulices distinct to about the middle of the mesoscutum. Metapleural swelling shining, only weakly rugose-punctate. Metapleural and propodeal pubescence moderately dense: the base of the hind coxa also bears a small tuft of pubescence. Petiole parallel-sided, strongly shining and almost bare (apart from a few hairs near its base there are only two pairs of hairs on its dorsal surface). Tergite 3 bare.

Wing with vein R_s strongly curved, hardly sinuate.

The middle and hind legs of the holotype are remarkable in possessing only four tarsal segments: such a reduction is shown by no other species of Dacnusini known to me, but since I have only one specimen available for study I cannot tell whether the feature is constant or teratological.

Host — *Phytomyza albimargo* HERING

Holotype ♀, Gernsch. Wald, Hessen, Germany, em. 2. vii. 53, leg. GROSCHKE (STGT).

This species is similar to *tamiris*, but is slightly more darkly coloured and has an almost bare petiole.

***Chorebus kama* (NIXON), comb. nov.**

Dacnusa kama NIXON, 1945

Colour. Palpi and labrum dull yellow. Centre of mandibles yellow-brown. Antennae entirely dark. Legs dull yellow or yellow-brown with the hind coxae somewhat infuscated, at least at their base. Gaster with tergite 3 brown, the following tergites darker.

Morphology. Antennal segments: ♂, 28—32; ♀, 27—31. Palpi moderately long. Mandibles not expanded, with all four teeth well developed.

Thorax 1.2—1.3 times as long as high. Mesoscutum with its anterior face and central lobe roughened, with fine, rather long pubescence distributed usually over its entire surface (but sometimes the posterior half of the lateral lobes is bare): notaulices well developed, extending at least to the middle of the mesoscutum and often to the posterior fovea. Precoxal suture broad. Metapleural swelling rugose-punctate (like the propodeum and petiole). Metapleural and propodeal pubescence dense. Petiole covered with dense, rather long pubescence which tends to become denser towards the apical corners. Tergite 3 sometimes with some basal

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hairs. Ovipositor (♀) and sheaths shortly projecting (by less than half of the length of the petiole) beyond the apical tergite in the retracted position: when extruded the ovipositor itself (but not its sheaths) can be seen to be strongly downcurved (see NIXON, 1945, fig. 193).

Wing with vein R_s sinuate.

Breeding records

Host — *Phytomyza ranunculi* SCHRANK

53 ex., Køge, Rudehegn, Damhusmose and Utterslevmose (Sealand), and Randers (Jutland), Denmark, leg. SCHLICK (KB and GCDG).

The female of this species may be readily recognised by the form of the ovipositor, in conjunction with the densely pubescent petiole and mesoscutum. The male could easily be confused with for instance *C. armida* (NIXON), but has longer tarsi.

***Chorebus tenellae* sp. nov.**

Colour. Palpi deep yellow. Labrum and centre of mandibles orange or yellow-brown. Antennae entirely dark, or at most the basal segments obscurely brownish. Legs golden yellow or occasionally yellow-brown with tarsal segments 5 contrastingly infuscated. Gaster with tergites 3 and 4 reddish, the following tergites virtually black.

Morphology. Head somewhat quadrate (1.7—1.8 times as long as wide). Antennal segments: ♂, 28—31; ♀, 25 (1 ex.)—26—28. Maxillary palpi fairly short. Mandibles (fig. 137) not expanded, with four distinct teeth of which tooth 4 is unusually close to their base.

Thorax about 1.3 times as long as high. Dorsal surface of mesoscutum largely smooth (at most the central lobe roughened anteriorly), bare and shining, with pubescence confined to the anterior part of the central lobe and along the course of the notaulices: notaulices well developed as rugose furrows, reaching at least the middle of the mesoscutum. Metapleural swelling rugose-punctate. Metapleural and propodeal pubescence moderately dense. Petiole widened towards its apex, largely bare but with some fine pubescence along its sides and at its apical corners (although not forming distinct tufts). Tergite 3 without basal hairs. Ovipositor (♀) short, stout and upcurved, only slightly projecting beyond the apical tergite in the retracted position.

Wing with vein R_s only weakly sinuate.

Host — *Phytomyza tenella* MEIGEN

Holotype ♀; 8 ♂♂, 11 ♀♀ paratypes, Randers, Jutland, Denmark, leg. SCHLICK (KB and GCDG). 3 ♂♂, 6 ♀♀ paratypes, Præstevangen, Sealand, Denmark, leg. SCHLICK (KB).

In addition there is a single female from Randers mounted with a puparium of *Phytomyza diversicornis* HENDEL, but this I suspect is the result of a confusion.

For recognising this species careful attention should be paid to the shape of the mandible (fig. 137): in other respects it might easily be confused with several

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other species (e.g. *tamiris*, *thalictri* and *angelicae*). For comment on the identity of the host, see the remarks under *Dacnusa monticola* (FÖRSTER).

***Chorebus gnaphalii* sp. nov.**

Colour. Palpi and labrum dark brown. Antennae entirely dark. Centre of mandibles red-black. Legs dark brown with the coxae and hind tarsi virtually black. Gaster entirely shining black.

Morphology. 29 antennal segments (♀). Palpi fairly short (see the table of biometric data). Mandibles not expanded, with tooth 2 rather long and pointed but tooth 3 only weakly developed.

Thorax rather elongate (about 1.3 times as long as high). Mesoscutum with its anterior face and central lobe punctate, with dense pubescence over all its surface except the posterior half of the lateral lobes: notaulices appearing as a somewhat irregular line of rugosity to about the middle of the mesoscutum. Mesepisternum with some fine hairs across its centre: precoxal suture long, anteriorly almost joining the epicnemial suture. Metapleural swelling and propodeum finely rugose-punctate. Metapleural and propodeal pubescence extremely dense. Petiole very elongate, virtually parallel-sided, largely bare and shining with some fine pubescence at its base and a few long hairs along its sides. Tergite 3 with a few short hairs on either side at its base.

Wing with vein R_s distinctly sinuate: *1m—cu* very widely rejected from cell R_s.

Host — *Phytomyza gnaphalii* HERING

Holotype ♀ from larva on *Gnaphalium silvaticum*, Mühlhausen, Thuringia, Germany, em. 16. ix. 64, leg. BUHR, HERING no. 2190 (GCDG).

The most characteristic features of this species are the very elongate petiole and very dark coloration.

***Chorebus thusa* (NIXON), comb. nov.**

Dacnusa thusa NIXON, 1937, 1943 and 1946

Colour. Palpi and labrum brown. Antennae entirely dark. Centre of mandibles red-brown. Legs largely dark brown. Gaster with tergite 3 brown or reddish.

Morphology. Head large with swollen temples: maxillary palpi relatively short: mandibles (fig. 139) expanded towards their apex, with four strong teeth. Antennae short with 20—23 segments (♀).

Thorax 1.2—1.4 times as long as high. Mesoscutum largely smooth and shining, with short pubescence covering its anterior face, central lobe and extending onto the anterior part of the lateral lobes: but the lateral lobes are largely bare: notaulices not extending longitudinally on the dorsal surface of the mesoscutum. Precoxal suture narrow. Metapleural swelling poorly defined, only weakly rugose: the pubescence on the lower half of the metapleuron is rather evenly distributed, with only a weak tendency towards differentiation in the direction of the hairs. Propodeal pubescence dense (but not so dense as in most species of

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Chorebus associated with *Phytomyza*), but fine, hardly obscuring the surface beneath in posterior view. Petiole strongly widened towards its apex, covered with dense, evenly distributed pubescence. Tergite 3 also bears some fine pubescence at its base.

Wing (fig. 86) with broad pterostigma: vein R_s weakly sinuate.

Breeding records

Host — *Phytomyza rufipes* MEIGEN

2 ♀♀ from puparia 24. vii. 58 on *Brassica napus* (Swede), Trawscoed, Cardigan, Wales, em. viii. 58, leg. MILES (BM).

The series which includes the holotype was swept off *Brassica* and was considered by Prof. O. W. RICHARDS to be attacking *P. rufipes* MG. LUNDBLAD's (in NIXON, 1946) record of the host as *Delia* sp. (Anthomyiinae) was doubtless erroneous.

This species stands well apart from the other *Chorebus* spp. treated in this paper by reason of its large mandibles (fig. 139) and poorly differentiated metapleural pubescence. It should be compared with such species as *C. anita* (NIXON), *C. acco* (NIXON) and *C. myles* (NIXON) (see NIXON, 1943 and 1946), all of which are of unknown life-history.

Chorebus albipes (HALIDAY), **comb. nov.**

Alysia (*Dacnusa*) *albipes* HALIDAY, 1839
Dacnusa albipes (HALIDAY), MARSHALL, 1891, 1895 and 1897, NIXON, 1937, 1943 and 1946

Colour. Palpi and labrum pale yellow. Clypeus orange or brown. Centre of mandibles orange-yellow. Basal antennal segments contrastingly yellow at least as far as the third flagellar segment (often as far as about the sixth flagellar segment). Legs yellow except that tarsal segments 5 are slightly infuscated. Gaster with tergite 3 brown or yellow-brown, the following tergites darker.

Morphology. Antennal segments: ♂, 21 (1 ex.)—22—24; ♀, 18 (1 ex.)—19—22. Palpi short (see the table of biometric data). Mandibles slightly expanded towards their apex, with all four teeth well developed.

Thorax somewhat elongate, 1.2—1.4 times as long as high. Mesoscutum largely smooth and shining, with its pubescence mainly confined to the sides of its anterior face and the former course of the notaulices; its centre line is usually bare (even on the anterior face): notaulices not or only shortly extending longitudinally on the dorsal surface of the mesoscutum. Metapleural pubescence somewhat sparse, but tending to form a fringe around at least the lower half of the rather poorly defined rugose-punctate swelling. Propodeal pubescence short and adpressed (as in most other *Chorebus* spp. associated with *Phytomyza*), but unusually sparse, not obscuring the rugose surface beneath. Petiole not or only slightly widened towards its apex, largely bare and shining but with a few hairs along its sides. Tergite 3 without basal hairs.

Wing with vein R_s weakly sinuate: *1m—cu* somewhat closely approximated to cell R_s, sometimes virtually interstitial.

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Breeding records

Host 1 — *Phytagromyza populi* KALTENBACH

6 ex. from puparia on *Populus* × *berolinensis*, Rostock Botanical Gardens, Mecklenburg, Germany, em. 10. ii. 64, leg. BUHR no. 624 (GCDG). 4 ex. from puparia on *Populus* sp., Hampstead, London, em. v. 55, leg. SPENCER (GCDG). 1 ex. from puparium on *Populus nigra*, Hendon, London, em. 30. x. 54, leg. SPENCER (GCDG). 5 ex. from puparia 14. x. 22 on *Populus* sp., Shotover, Oxford, England, em. 13. vi—3. vii. 23, leg. HAMM (HD). 5 ex. from puparia x. 23 on *Populus nigra*, same locality, em. vi. 24, leg. HAMM (HD). 2 ex. from larvae and puparia 7. x. 55 on *Populus nigra*, Kazuń, Kampinoska Forest, Poland, em. vii. 56, leg. NOWAKOWSKI (PAN). 1 ex. from larva 7. x. 55 on *Populus nigra*, Warszawa-Bielany, Poland, em. 30. vii. 56, leg. NOWAKOWSKI (PAN). 1 ex., Hälsingborg, Skåne, Sweden, em. 15. ii. 28, leg. RYDÉN (LUND).

Host 2 — *Phytagromyza tremulae* HERING

4 ex. from larvae on *Populus tremula*, Hampstead, London, em. 2. viii. 53, 12—13. v. 54 (2 ex.) and ix. 54, leg. SPENCER (GCDG and BM). 1 ex. from larva 27. ix. 61 on *Populus tremula*, Bookham, Surrey, England, em. 19. v. 62 (GCDG). 2 ex. from larvae on *Populus tremula*, Rostock, Mecklenburg, Germany, em. 3. vii. 53, leg. HERING no. 530 (BM).

Host 3 — *Phytagromyza tridentata* LOEW

2 ex. from puparia 4. x. 53 and 10. x. 54 on *Salix* sp., Brookman's Park, Herts., England, em. 5. vi. 54 and 6. v. 55 (BM and GCDG). 2 ex. from larvae and puparia 18. vii. 54 on *Salix* sp., Slade Green, Kent, England, em. 4 and 14. viii. 54 (BM). 7 ex. from puparia 13. x. 24 and 29. x. 25 on *Salix* sp., Oxford, England, em. 20. v. 25 (4 ex.) and v. 26 (3 ex.), leg. HAMM (HD and BM). 22 ex., Damhusmose (18 ex.), Utterslevmose (1 ex.) and Køge (2 ex.) (Sealand), and Tranekær hestehave, Langeland (1 ex.), Denmark, leg. SCHLICK (KB). 3 ex. from larvae 4. vii. 53 on *Salix alba*, Berlin-Dahlem, Germany, em. 30. vi—10. vii. 53, leg. HERING no. 5941 (BM). 1 ex. from puparium 27. x. 57 on *Salix fragilis*, Warszawa-Młociny, Poland, em. 17. iii. 58, leg. NOWAKOWSKI (PAN). 1 ex. from larva 7. x. 55 on *Salix fragilis*, Kazuń, Kampinoska Forest, pupated 10. x, em. 10. v. 56, leg. NOWAKOWSKI (PAN).

The Hampstead series bred from *P. tremulae* HERING differ from the description given above in having the hind coxae brown. The Bookham and German specimens bred from the same host have yellow coxae but are unusual in having the front half of the central lobe of the mesoscutum distinctly pubescent.

This species is readily identifiable by its brightly coloured antennae, low number of antennal segments and usually bare mesoscutum. Two other small species with pale basal antennal segments are *endymion* and *xylostellus*, but these both have a much more pubescent mesoscutum.

Chorebus endymion sp. nov.

Colour. Palpi and labrum yellow. Clypeus reddish. Basal antennal segments dull yellow as far as the second flagellar segment. Centre of mandibles yellow. Legs pale yellow with only tarsal segments 5 weakly infuscated. Petiole reddish: tergites 3 and 4 orange-yellow, contrasting with the dark following tergites.

Morphology. 23 antennal segments (♀). Palpi long (see the table of biometric data). Mandibles not expanded, with all four teeth distinct.

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Thorax 1.2 times as long as high. Mesoscutum smooth and shining with pubescence over its anterior face and central lobe, but the lateral lobes are bare: notaulices very weak, only visible as faint smooth impressions on the dorsal surface of the mesoscutum. Precoxal suture rather short and narrow, but distinctly rugose-costate. Metapleural and propodeal pubescence moderately dense. Petiole widened towards its apex, largely bare but with some short pubescence near its base and a few scattered hairs along its sides. Tergite 3 without basal hairs.

Wing with vein R_s sinuate.

Host — *Paraphytomyza xylostei* ROBINEAU-DESVOIDY

Holotype ♀ from larva 10. viii. 54 on *Symphoricarpos albus*, Berlin-Dahlem, Germany, em. 22. vii. 55, leg. SPENCER (BM).

This species should be recognised by its almost bare petiole, long palpi and low number of antennal segments. The two *Chorebus* spp. (*sylvestris* and *xylostellus*) attacking *Phytomyza* spp. on *Lonicera* and *Symphoricarpos* have a different form of petiole (parallel-sided and evenly pubescent).

Chorebus thecla (NIXON), **comb. nov.**

Dacnusa thecla NIXON, 1943 and 1946

Colour. Palpi and labrum yellow. Antennae with scape and pedicel yellow-brown, but the flagellum entirely dark or only obscurely paler towards its base. Centre of mandibles orange-brown. Legs deep yellow, sometimes slightly ochreous tinged, with tarsal segments 5 slightly infuscated. Gaster with tergite 3 yellow-brown or red-brown, the following tergites darker.

Morphology. Antennal segments: ♂, 28—31; ♀, 25—27. Palpi long (see the table of biometric data). Mandibles not expanded, with all four teeth well developed.

Thorax about 1.2 times as long as high. Mesoscutum with its anterior face and central lobe slightly roughened, with pubescence distributed over all its surface except the posterior half of the lateral lobes: notaulices weak, usually not extending longitudinally on the dorsal surface of the mesoscutum. Metapleural swelling rugose-punctate. Metapleural and propodeal pubescence whitish and extremely dense: the base of the hind coxa also bears a distinct tuft of whitish hairs (as in *nana*). Petiole (fig. 145) widened towards its apex, not so elongate as in *nana* and *abaris*, densely pubescent on its basal half but more sparsely pubescent towards its apex — in many specimens there are small groups of short hairs at the apical corners, but these are not always present. Tergite 3 without basal hairs.

Wing with vein R_s distinctly sinuate.

Breeding records

Host — *Phytomyza lithospermi* NOWAKOWSKI

23 ex. from larvae on *Lithospermum officinale*, München-Freimann, Germany, em. 14. vii—10. viii. 53, leg. GROSCHKE (STGT and GCDG).

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The host was originally determined by GROSCHKE as *P. symphyti* HENDEL (before the description of *lithospermi*).

This species is similar to *nana* but differs in having a wider, less pubescent petiole and fewer antennal segments in the female.

Chorebus abaris (NIXON), **comb. nov.**

Dacnusa abaris NIXON, 1943 and 1946

Colour. Palpi and labrum yellow. Centre of mandibles orange-brown. Antennae with their basal segments dull yellow or yellow-brown (as far as at least the third or fourth flagellar segments), this colour merging gradually into the dark colour of most of the flagellum. Legs entirely yellow except that the fifth tarsal segments are slightly infuscated. Gaster with tergite 3 yellow-brown, the following tergites darker.

Morphology. Antennal segments: ♂, 34 (2 ex.); ♀, 30 (2 ex.), 32 (3 ex.), 33 (1 ex.). Palpi long. Mandibles hardly expanded, with all four teeth well developed.

Thorax not more than 1.2 times as long as high. Mesoscutum with its anterior face and central lobe roughened, with pubescence distributed over all its surface except about the posterior half of the lateral lobes: notaulices usually well developed, reaching at least the middle of the mesoscutum (but weak in a few specimens). Precoxal suture strongly developed, anteriorly almost joining the epicnemial suture. Metapleural swelling rugose-punctate, strongly shining. Metapleural and propodeal pubescence whitish and extremely dense: the white pubescence at the base of the hind coxa tends to form a distinct tuft (as in *nana*). Petiole elongate, usually only slightly widened towards its apex, its dorsal surface largely bare but with some fine pubescence at its base and a few long hairs along its sides and near its apex. Tergite 3 without basal hairs.

Wing with vein R_s strongly sinuate.

Breeding records

Host 1 — *Phytomyza lycopi* NOWAKOWSKI

♂♀ from puparia 23—27. ix. 55 on *Lycopus europaeus*, Sieraków reservation, Kampinoska Forest, Poland, em. 14. x and 3. xi. 55, leg. NOWAKOWSKI (PAN). 1 ♀ from puparium 4. vii. 56, same plant and locality, em. 15. vii. 56, leg. NOWAKOWSKI (PAN). 1 ♀ from larva 29. vi. 57, same plant and locality, pupated 1. vii, em. 16. vii. 57, leg. NOWAKOWSKI (PAN). ♂♀ from larvae 23. vi. 54 on *Lycopus europaeus*, Dziekanów Leśny, Kampinoska Forest, pupated 26. vi, em. 3 and 13. vii. 54, leg. NOWAKOWSKI (PAN).

Host 2 — *Phytomyza symphyti* HENDEL

2 ♀♀ from larvae 16. viii. 60 on *Symphytum officinale*, Woodwalton Fen, Hunts., England, em. 27—30. iii. 61 (GCDG). 1 ♂, 2 ♀♀ from puparia 14. vi. 57 on *Symphytum officinale*, Warszawa-Młociny, Poland, em. 1. vii (2 ex.) and 23. ix. 57, leg. NOWAKOWSKI (PAN). 1 ♂ from larva 25. ix. 60 on *Symphytum officinale*, Mątowski Las reservation, Piekło near Sztum, Pomerania, Poland, pupated 1. x, em. 25. iv. 61, leg. NOWAKOWSKI (PAN).

Host 3 — *Phytomyza tetrasticha* HENDEL

4 ex. from puparia on *Mentha* sp., Cothill, Berks., England, em. vi—vii. 28, leg. HAMM (BM). 1 ex. from puparium 2. x. 27 on *Mentha aquatica*, Royal Common, Surrey, England,

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em. 1928, leg. HAMM (HD). 1 ♂, Utterslevmose, Sealand, Denmark, leg. SCHLICK (KB). 1 ♀ from larva 23. x. 57 on *Mentha aquatica*, Granica, Kampinoska Forest, Poland, pupated 26. x, em. 19. iii. 58, leg. NOWAKOWSKI (PAN). 1 ♂ *from puparium* 31. vii. 55, same plant and locality, em. 12. viii. 55, leg. NOWAKOWSKI (PAN). 1 ♂ from puparium 3. vii. 57 on *Mentha aquatica*, Warszawa-Młociny, em. 15. vii. 57, leg. NOWAKOWSKI (PAN).

NIXON (1944) had difficulty in interpreting HAMM's carded specimens of this species and identified them doubtfully as *C. credne* (NIXON) and *C. resa* (NIXON). Many of the Polish records have already been published under "*Dacnusa ?nana* NIXON" by NOWAKOWSKI (1959). I have also previously published the record for Woodwalton Fen as referring to *C. nana* (NIXON) (GRIFFITHS, 1963).

This species, *nana* and *thecla* consider to form a monophyletic superspecies. All possess a rather distinct tuft of pubescence on the hind coxa and are associated with the *Phytomyza obscura* group of miners on Labiatae and Boraginaceae. The main differences between them lie in the form and pubescence of the petiole.

Chorebus nana (NIXON), **comb. nov.**

Dacnusa nana NIXON, 1943 and 1946

Colour. Palpi and labrum yellow. Antennae usually yellow-brown at their base (clearly so as far as about the first flagellar segment), this colour merging gradually into the dark colour of most of the flagellum. Centre of mandibles orange-brown. Legs entirely yellow except that the fifth tarsal segments are slightly infuscated. Gaster with tergite 3 deep yellow, the following tergites becoming progressively darker.

Morphology. Antennal segments: ♂, 28 (1 ex.)—29—32; ♀, 25 (1 ex.), 27—32. Palpi long (see the table of biometric data). Mandibles hardly expanded, with all four teeth well developed.

Thorax not more than 1.2 times as long as high. Mesoscutum roughened anteriorly, with pubescence distributed over almost its entire surface: notaulices weak, hardly extending longitudinally on the dorsal surface of the mesoscutum. Metapleural swelling shining, weakly rugose-punctate. Metapleural and propodeal pubescence whitish and extremely dense: the base of the hind coxa also bears a distinct tuft of white hairs. Petiole elongate, more or less parallel-sided, with dense whitish pubescence (similar to that of the petiole) distributed over its entire surface and tending to form apical tufts, although these are not well defined. Tergite 3 usually with some basal hairs on either side.

Wing with vein R_s strongly sinuate.

Breeding records

Host 1 — *Phytomyza myosotica* NOWAKOWSKI

6 ex. from puparia 4—8. vii. 56 on *Myosotis palustris*, Sieraków reservation, Kampinoska Forest, Poland, em. 15—27. vii. 56, leg. NOWAKOWSKI (PAN). 2 ex. from puparia 29. vi. 57, same plant and locality, em. 6—10. vii. 57, leg. NOWAKOWSKI (PAN). ♂♀ from larvae 20. vi. 57 on *Myosotis palustris*, Warszawa-Młociny, pupated 23. vi, em. 5. vii. 57, leg. NOWAKOWSKI (PAN). 1 ♀ from puparium 12. viii. 56 on *Myosotis silvatica*, Żukowo, Szwajcaria Kaszubska, Poland, em. 10. iv. 57, leg. NOWAKOWSKI (PAN). 1 ex. from larva

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27. v. 54 on *Myosotis* sp., Finchley, London, em. 21. vi. 54 (BM) (recorded as "*Dacnusa* sp." in GRIFFITHS, 1956).

Host 2 — *Phytomyza obscura* HENDEL

1 ♂ from puparium 22. vii. 55 on *Calamintha clinopodium*, Zamczysko, Kampinoska Forest, Poland, em. 6. viii. 55, leg. NOWAKOWSKI (PAN). 1 ♂ from puparium 19. vii. 57 on *Calamintha clinopodium*, Cybulice, Kampinoska Forest, em. 2. viii. 57, leg. NOWAKOWSKI (PAN). 1 ♂ from puparium 8. vii. 56 on *Calamintha clinopodium*, Sieraków reservation, Kampinoska Forest, em. 24. vii. 56, leg. NOWAKOWSKI (PAN). 1 ♂, 2 ♀♀ from larvae on *Calamintha clinopodium*, Pitve, Hvar, Yugoslavia, em. 5—7. vi. 65, leg. HERING no. 7390 (GCDG).

Host 3 — *Phytomyza origani* HERING

2 ♀♀ from larvae on *Origanum* sp., Ilrica Falls, Sibenija, Yugoslavia, em. 22. vi. 62, leg. SPENCER (GCDG). 1 ex. from larva on *Origanum vulgare*, Otford, Kent, England, em. 22. viii. 58, leg. SPENCER (BM). 1 ex. from larva 18. x. 53 on *Origanum vulgare*, Mickleham, Surrey, England, em. 26. iv. 54 (BM). 1 ex. from puparium 20. vi. 54 on *Origanum vulgare*, Betchworth, Surrey, em. 10. vii. 54 (BM).

Host 4 — *Phytomyza* sp. ? *pulmonariae* NOWAKOWSKI

2 ex. from larvae 18. x. 53 on *Symphytum officinale*, Mickleham, Surrey, England, em. 23. xi. 53 and 19. v. 54 (BM).

Host 5 — *Phytomyza symphyti* HENDEL

2 ♂♂, 1 ♀ from larvae on *Symphytum tuberosum*, Gusen, near Mauthausen, Upper Austria, em. 20. ix. 62 and 5—6. ii. 63, leg. HERING no. 6807 (GCDG).

Host 6 — *Phytomyza petoei* HERING

2 ♂♂, 2 ♀♀, Wolfratshausen, Oberbayern, Germany, em. 27. vi—2. vii. 53, leg. GROSCHKE (STGT).

Some of the records ascribed to this species by NOWAKOWSKI (1959) and the record in GRIFFITHS (1963) refer to *C. abaris* (NIXON).

This species has a much more densely pubescent petiole than *abaris* and *thecla*.

Chorebus mitra (NIXON), **comb. nov.**

Dacnusa mitra NIXON, 1945

Colour. Palpi and labrum brown to virtually black. Antennae entirely dark. Mandibles red-black or black. Legs dark brown with the coxae, tarsi and apex of the hind tibiae black. Gaster largely or completely dark.

Morphology. Antennal segments: ♂, 30—31; ♀, 26 (1 ex.)—27–30—31 (1 ex.) (bred specimens only). Mandibles hardly expanded, with all four teeth clearly developed. Palpi fairly short (see the table of biometric data).

Thorax not more than 1.2 times as long as high. Mesoscutum with its dorsal surface largely smooth (only the central lobe slightly roughened anteriorly), with pubescence distributed over all its surface except part of the posterior half of the lateral lobes: notaulices weakly indicated usually to about the middle of the mesoscutum, sometimes almost absent. Metapleural swelling shining, weakly

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rugose-punctate. Metapleural and propodeal pubescence dense and whitish: the base of the hind coxa also bears dense pubescence which tends to form tufts (but these are not very distinct). Petiole elongate, not much widened towards its apex, with long dense pubescence distributed over its entire surface and becoming denser towards its apical corners (although not forming very well defined tufts). Tergite 3 usually with a few short hairs on either side at its base.

Wing with vein R_s strongly sinuate.

Breeding records

Host — *Phytomyza campanulae* HENDEL

1 ♀ from larva 8. viii. 54 on *Campanula glomerata*, Boxhill, Surrey, England, em. 16. iv. 55 (GCDG). 5 ♂♂, 12 ♀♀ from larvae 11. vi. 65 on *Campanula rotundifolia*, Black Head, Clare, Ireland, em. 2—10. vii. 65 (15 ex.) and 9—11. iv. 66 (2 ex.) (GCDG).

The above description is based on the Irish series. The Boxhill specimen and NIXON's holotype are slightly paler coloured, with red-brown mandibles and largely brown legs, with only the coxae more or less black.

The most characteristic features of this species are its dark legs and long dense pubescence of the petiole.

***Chorebus oreoselini* sp. nov.**

Colour. Palpi and labrum varying from dull yellow to brown. Antennae entirely dark. Centre of mandibles red-brown. Legs deep yellow or yellow-brown with the hind coxae and hind tarsi slightly darker, more or less brown. Gaster dark or at most with tergite 3 reddish.

Morphology. Antennal segments: ♂, 26 (2 ex.); ♀, 25—26. Palpi rather short (see the table of biometric data). Mandibles slightly expanded, with four strong teeth.

Thorax 1.2—1.3 times as long as high. Mesoscutum roughened anteriorly, with pubescence distributed over most of its surface, but usually absent from the posterior half of the lateral lobes: notaulices distinct to about the middle of the mesoscutum. Metapleural swelling rugose-punctate. Metapleural and propodeal pubescence moderately dense. Petiole rugose-punctate, usually somewhat widened towards its apex, with fine dense pubescence covering its entire surface and becoming denser towards the apical corners (sometimes forming weak tufts). Tergite 3 with a few basal hairs adjacent to the petiole.

Wing as in *alecto* (fig. 88), with vein R_s distinctly sinuate.

Host — *Phytomyza pauliloewi* HENDEL

Holotype ♀; 1 ♂, 3 ♀♀ paratypes from larvae 13. iv. 54 on *Peucedanum oreoselinum*, Amalfi, Campania, Italy, em. 13—14. v. 54 (BM and GCDG). 1 ♂ paratype from larva 20. ix. 54 on *Peucedanum oreoselinum*, Sieraków, Kampinoska Forest, Poland, pupated 21. ix, em. x. 54, leg. NOWAKOWSKI (PAN). 1 ♀ paratype from larva 25. ix. 54 on *Peucedanum oreoselinum*, Łuże, Kampinoska Forest, pupated 30. ix, em. 4. v. 55, leg. NOWAKOWSKI (PAN). 1 ♀ paratype from larva 31. vii. 55 on *Peucedanum oreoselinum*, Granica, Kampinoska Forest, pupated 2. viii, em. 15. viii. 55, leg. NOWAKOWSKI (PAN).

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Owing to confusion of the foodplant I had previously misidentified the host of the Amalfi series as *P. thalictricola* HENDEL and recorded it as such in GRIFFITHS (1956), where the parasite is listed as "*Dacnusa* sp. near *turissa* NIXON".

This species is poorly characterised and might easily be confused with *C. alecto* (MORLEY). The differences are that the pubescence of the petiole is finer, at most forming weak apical tufts, the maxillary palpi slightly shorter and the notaulices better developed.

***Chorebus pimpinellae* sp. nov.**

Colour. Palpi almost black. Labrum yellow-brown. Centre of mandibles red-brown. Antennae entirely black except the yellow-brown annellus. Legs dark brown with the coxae black. Gaster entirely dark.

Morphology. 26 antennal segments (♀). Palpi rather short (see the table of biometric data). Mandibles slightly expanded, with four strong teeth (compare *alecto*, fig. 132).

Thorax about as long as high. Mesoscutum roughened anteriorly, with pubescence distributed over almost its entire surface: notaulices not extending longitudinally on the dorsal surface of the mesoscutum. Metapleural swelling rugose-punctate. Metapleural and propodeal pubescence dense. Petiole strongly widened towards its apex (only 1.4 times as long as wide), with dense pubescence over its entire surface and distinct apical tufts. Tergite 3 with some fine pubescence at its extreme base (adjacent to the petiole).

Wing as in *alecto* (fig. 88), with vein R_s distinctly sinuate.

Host — *Phytomyza melana* HENDEL

Holotype ♀ from larva 6. ix. 64 on *Pimpinella saxifraga*, Gorsdale Scar, Yorks., England, em. 12. x. 64 (GCDG).

This specimen is similar to *alecto* but differs in its very dark coloration, broader petiole and shorter palpi.

***Chorebus alecto* (MORLEY), comb. nov.**

Rhizarcha alecto MORLEY, 1924
Dacnusa turissa NIXON, 1937 (in part) and 1945

Colour. Palpi and labrum usually ochreous or yellow-brown, but sometimes deep yellow. Centre of mandibles red-brown. Antennae entirely dark or at most obscurely brownish at their base. Legs varying from deep yellow to yellow-brown, with about the basal half of the hind coxae infuscated. Gaster with tergite 3 red-brown, the following tergites black.

Morphology. Antennal segments: ♂, (25)—26—28; ♀, (23)—24—26—(27). Palpi fairly long (see the table of biometric data). Mandible (fig. 132) slightly expanded towards its apex, with four strong teeth.

Thorax short, not more than 1.2 times as long as high. Mesoscutum with all or most of its surface roughened (more or less punctate) and covered with dense pubescence (but in a few specimens the posterior half of the lateral lobes is smooth and

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almost bare): notaulices not distinct on the dorsal surface of the mesoscutum. Metapleural swelling strongly rugose-punctate. Metapleural and propodeal pubescence extremely dense and whitish. Petiole (fig. 144) somewhat widened towards its apex, with dense pubescence covering almost its entire surface and forming distinct apical tufts. Tergite 3 with few or no basal hairs.

Wing (fig. 88) with vein R_s distinctly sinuate.

Breeding records

Host 1 — *Phytomyza albiceps* Meigen

1 ex. from larva 21. viii. 53, Miller's Dale, Derby, England, em. 16. ix. 53, leg. Spencer (BM). 1 ex. from larva 27. vi. 53, Hampstead, London, em. 15. vii. 53, leg. Spencer (BM). 3 ex. from larvae 27. vi. 54 on *Artemisia vulgaris*, Faversham, Kent, England, em. 15—18. vii. 54 (BM). 1 ex. from larva 18. vii. 54 on *Artemisia vulgaris*, Slade Green, Kent, em. 4. viii. 54 (BM). 20 ex. from larvae 6. viii. 62 on *Artemisia vulgaris*, Scratch Wood, London, em. 24—30. viii. 62 (GCDG). 1 ♀ (*holotype of turissa* Nixon) from puparium 4. x. 24 on *Artemisia vulgaris*, Shotover, Oxford, England, em. 16. v. 25, leg. Hamm (BM). 6 ex. from puparia 30. ix. 22 on *Artemisia vulgaris*, Oxford, England, em. 30. iv—3. v. 23, leg. Hamm (HD). 5 ex. from puparia 27. vi. 31 on *Artemisia vulgaris*, Oxford, em. 11. vii. 31, leg. Hamm (HD). 2 ex. from larvae 10. vi. 54 on *Artemisia vulgaris*, Łomianki, Kampinoska Forest, Poland, pupated 12. vi, em. 2. viii. 54 and 7. v. 55, leg. Nowakowski (PAN).

Host 2 — *Phytomyza bellidina* Hering

2 ex. from larvae 16. iii. 53 on *Bellis sylvestris*, Sintra, Portugal, em. 13. v. 53, leg. Spencer (BM).

Host 3 — *Phytomyza conyzae* Hendel

8 ex. from puparia 14. viii. 55 on *Inula conyza*, Betchworth, Surrey, England, em. 31. viii to 12. ix. 55 (GCDG). 1 ex. from larva 6. vii. 31 on *Inula conyza*, Oxstead, Surrey, leg. Robbins (BM). 1 ♀ from puparium 15. x. 22 on *Pulicaria dysenterica*, Headington, Oxford, England, em. 4. v. 23, leg. Hamm (HD). 4 ex., Michalsberg, Württemberg, Germany, em. 7. vi. 55, leg. Groschke (STGT). 4 ex. from larvae 12. vi. 53, Genoa, Italy, em. x. 53, leg. Spencer (BM).

Host 4 — *Phytomyza corvimontana* Hering

1 ♂ from larva on *Achillea ptarmica*, Hedlandet, Södermanland, Sweden, em. 27. viii. 43, leg. Lundqvist (LUND).

Host 5 — *Phytomyza klimeschi* Hering

1 ♂ from larva 19. vii. 57 on *Achillea millefolium*, Cybulice, Kampinoska Forest, Poland, em. 7. viii. 57, leg. Nowakowski (PAN). 1 ♀ from larva 21. vii. 55 on *Achillea millefolium*, Cisowe, Kampinoska Forest, pupated 24. vii, em. 9. viii. 55, leg. Nowakowski (PAN).

Host 6 — *Phytomyza kyffhusana* Hering

1 ♀, Wolfratshausen, Oberbayern, Germany, em. vii. 54, leg. Groschke (STGT).

Host 7 — *Phytomyza matricariae* Hendel

5 ex. from larvae on *Matricaria maritima*, Hedlandet, Södermanland, Sweden, em. 5—12. viii. 43, leg. Lundqvist (LUND). 1 ex. from larva on *Achillea millefolium*, same locality, em. 27. vii. 43, leg. Lundqvist (LUND).

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Host 8 — *Phytomyza tanaceti* HENDEL

2 ♀♀ from larvae on *Chrysanthemum vulgare*, Dissen, Germany, em. 20. viii. 55, leg. SPENCER (GCDG).

Host 9 — *Phytomyza crassiseta* ZETTERSTEDT

1 ♂ from larva 17. x. 54 on *Veronica* sp., Mickleham, Surrey, England, em. 24. iv. 55 (GCDG). 2 ♀♀ from puparia 31. vii. 27 on *Veronica officinalis*, Hälsingborg, Skåne, Sweden, em. 13. viii. 27, leg. RYDÉN (LUND). 1 ex. from puparium 10. vi. 54 on *Veronica officinalis*, Dziekanów Leśny, Kampinoska Forest, Poland, leg. NOWAKOWSKI (PAN). ♂♀ from larvae and puparia 6. viii. 53 on *Veronica officinalis* and *V. chamaedrys*, same locality, leg. NOWAKOWSKI (PAN).

The specimens bred from *Phytomyza crassiseta* ZETTERSTEDT lack the extensive roughening of the mesoscutum shown by most other specimens and, since this host association is obviously disjunct from the rest of the host range, perhaps represent a sibling (all with intact antennae have 25 antennal segments (1 ♂, 3 ♀♀)). They are not to be confused with *C. amasis* (NIXON) which attacks the same host: that species has fewer antennal segments and a very broad petiole.

The identification of the very small specimen bred from *P. kyffhusana* HERING requires confirmation. The insect has much less pubescence on its mesoscutum and petiole than normally in *alecto*; but I have observed such a reduction in dwarf individuals of several species and have therefore provisionally identified the specimen as *alecto*.

NIXON (1945) also gives some records of this species as bred from *Phytomyza atricornis* MEIGEN (= *syngenesiae* HARDY) on *Artemisia* and *Chrysanthemum* in England, but I strongly suspect that these were based on misidentifications of the host (whose puparia have not been preserved). Three specimens bred from *P. albiceps* MEIGEN and *P. conyzae* HENDEL were identified by NIXON (in GRIFFITHS, 1956) as *C. ovalis* (MARSHALL), but I am satisfied that they belong to the present species. The life-history of *ovalis* has not been established.

This species belongs to a small group associated (subject to the comment on *P. crassiseta* ZETTERSTEDT above) with the *albiceps* and *obscurella* groups, miners of Umbelliferae, Compositae and *Campanula*. I have recognised five species in this paper — *alecto*, *armida*, *mitra*, *oreoselini* and *pimpinellae*. They are characterised by the dense pubescence of the petiole (forming distinct apical tufts, fig. 144) and relatively short thorax. I think that *amasis*, a parasite of *P. crassiseta* ZETTERSTEDT, is also probably referable to this same group.

Chorebus armida (NIXON), **comb. nov.**

Dacnusa armida NIXON, 1945

This species agrees with *C. alecto* (MORLEY) in all the characters used in the description except that the antennal segments are more numerous (♂, 27 (1 ex.) —28—31; ♀, 26 (1 ex.)—27—31 in the bred series) and the maxillary palpi slightly longer (see the table of biometric data): also it reaches a larger size than *alecto*. Most of the continental series have the palpi and legs clear yellow, with the hind coxae weakly infuscated at its base only (or in a few specimens entirely

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yellow): but some specimens are darker, in particular the British series bred from *P. angelicastri* HERING which have yellow-brown legs and palpi with the hind coxae largely infuscated (i.e. not clearly differing from *alecto* in colour).

Breeding records

Host 1 — *Phytomyza angelicae* KALTENBACH

1 ♂, Stuttgart-Echterdingen, Germany, em. 1. iv. 54, leg. GROSCHKE (STGT).

Host 2 — *Phytomyza angelicastri* HERING

2 ♂♂, 2 ♀♀ from larvae on *Angelica sylvestris*, Hampstead, London, em. viii. 52, leg. SPENCER (GCDG). 3 ex. from larvae 15 and 25. ix. 55 on *Angelica sylvestris* Warszawa-Młociny, Poland, em. 17—19. x. 55 and 13. v. 56, leg. NOWAKOWSKI (PAN). 1 ex. from larva 15. vii. 55 on *Angelica sylvestris*, Zamczysko, Kampinoska Forest, Poland, pupated 17. vii, em. 9. viii. 55, leg. NOWAKOWSKI (PAN). 1 ex. from larva 9. vii. 55 on *Angelica sylvestris*, Granica, Kampinoska Forest, pupated 11. vii, em. 10. viii. 55, leg. NOWAKOWSKI (PAN). ♂♀ from larvae 13. vi. 54 on *Angelica sylvestris*, Warszawa-Młociny, Poland, pupated 14. vi, em. 1. viii. 54, leg. NOWAKOWSKI (PAN). 3 ex. from larvae on *Angelica sylvestris*, Hedlandet, Södermanland, Sweden, em. 2. ix. 42, 7. iii. 44 and 2. iv. 44, leg. LUNDQVIST (LUND). 5 ex. from larvae 29. vi. 65 on *Angelica sylvestris*, Stadtwald, Mühlhausen, Thuringia, Germany, em. 19. vii—18. viii. 65, leg. BUHR no. 2409 (GCDG). 1 ♀ from larva 4. vii. 65, same plant and locality, em. 17. viii. 65, leg. BUHR no. 2451 (GCDG). 1 ♀ from larva 3. viii. 65, same plant and locality, em. 29. viii. 65, leg. BUHR no. 2547 (GCDG). 28 ex. from larvae 4. x. 65, same plant and locality, em. x—xii. 65, leg. BUHR no. 2692 (GCDG).

Host 3 — *Phytomyza angelicivora* HERING

2 ♀♀, München-Freimann, Germany, em. 30. viii and 10. ix. 53, leg. GROSCHKE (STGT). 1 ♀, Hohenpeissenbg., Oberbayern, Germany, em. 27. viii. 53, leg. GROSCHKE (STGT).

Host 4 — *Phytomyza aegopodii* HENDEL

2 ♂♂, Hälsingborg, Skåne, Sweden, em. 21. ii. 50, leg. RYDÉN (LUND).

Host 5 — *Phytomyza eupatorii* HENDEL

1 ♀ from larva 9. ix. 54 on *Eupatorium cannabinum*, Sieraków reservation, Kampinoska Forest, Poland, pupated 11. ix, em. 16. v. 55, leg. NOWAKOWSKI (PAN).

Host 6 — *Phytomyza lappina* GOUREAU

2 ♂♂, 2 ♀♀, Stuttgart, Germany, em. 27. iii and 20. iv (3 ex.). 54, leg. GROSCHKE (STGT) 1 ♀, München, Germany, em. 2. xi. 49, leg. GROSCHKE (STGT). ♂♀ from larvae 10. xi. 61 on *Arctium* sp., Colle-sur-Loup, Côte d'Azur, France, pupated 14. xi, em. 20. i and iii. 62, leg. NOWAKOWSKI (PAN).

Host 7 — *Phytomyza laserpitii* HENDEL

11 ex. from larvae on *Laserpitium latifolium*, Hedlandet, Södermanland, Sweden, em. 10—31. iii. 44, leg. LUNDQVIST (LUND).

Host 8 — *Phytomyza obscurella* FALLÉN

2 ♂♂ from larvae on *Aegopodium podagraria*, Berlin Botanical Gardens, Germany, em. 15. iii. 52, leg. HERING no. 5828 (GCDG). 3 ♀♀ from larvae 3. x. 64 on *Aegopodium podagraria*, Stadtwald, Mühlhausen, Thuringia, Germany, em. iii. 65, leg. BUHR no. 2314a

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(GCDG). 1 ♀ from larva 4. vii. 65, same plant and locality, em. 18. viii. 65, leg. BUHR no. 2445 (GCDG).

A single female with 26 antennal segments bred from *Phytomyza chaerophylliana* HERING (from larva 4. vii. 54 on *Chaerophyllum temulum*, Warszawa—Młociny, Poland, pupated 7. vii, em. 20. v. 55, leg. NOWAKOWSKI (PAN)) is also provisionally referred to this species. A firm identification is not possible without more material.

The host range established above appears disjunctive: for instance only one member of the *obscurella* group (*P. obscurella* FALLÉN) and only two species mining Compositae are represented. Although GROSCHKE obtained a specimen of *armida* from *P. angelicae* KALTENBACH at Stuttgart, BUHR failed to obtain it from a very large sample of this host in Thuringia although he bred it in numbers from *P. angelicastri* HERING collected on the same day (5. x. 65). I suspect that the species as here conceived is composite and contains a number of sibling species or host races.

Chorebus amasis (NIXON), comb. nov.

Dacnusa amasis NIXON, 1945

Colour. Palpi dull yellow, in one female with the apical segment of the maxillary palpi infuscated. Labrum yellow. Antennae entirely dark (except the annellus). Centre of mandibles red-brown. Legs largely deep yellow (almost unicolorous) with the hind coxae sometimes brown basally. Gaster beyond petiole red-black. Morphology. Antennal segments: ♂, 20—23; ♀, 20—23. Palpi short (see the table of biometric data). Mandible small but slightly widened towards its apex, with all four teeth well developed.

Thorax about 1.2 times as long as high. Entire surface of mesoscutum punctate and covered with dense pubescence: notaulices absent. Metapleural swelling rugose-punctate, like the propodeum and petiole. Pubescence of metapleuron and propodeum very dense and whitish. Petiole strongly widened towards its apex, only about 1.3 times as long as wide, with dense pubescence covering its entire surface and tending to form apical tufts. Tergite 3 with few or no basal hairs.

Wing with vein R_s strongly curved, hardly sinuate.

reeding records

Host — *Phytomyza crassiseta* ZETTERSTEDT

Holotype ♀, 3 ♂♂ from puparia 10. xii. 22 on *Veronica officinalis*, Bagley Wood, Berks., England, em. 24. iv—2. v. 23, leg. HAMM (BM) (recorded in NIXON (1937) under "*Dacnusa turissa*"). 2 ♀♀ from puparia 6. ii. 55 on *Veronica* sp., Scratch Wood, London, em. 9—11. iv. 55 (GCDG).

This small species is well characterised by its broad petiole, entirely punctate mesoscutum and low number of antennal segments. It appears closely related to *C. alecto* (MORLEY), which has also been bred from *P. crassiseta* ZETTERSTEDT (see the remarks under *alecto*).

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Chorebus crassipes (STELFOX), **comb. nov.**

Dacnusa crassipes STELFOX, 1954

Colour. Palpi and labrum deep yellow. Centre of mandibles orange or red-brown. Antennae entirely dark. Legs deep yellow or occasionally light brown, with the hind coxae more or less brown and tarsal segments 5 slightly infuscated. Gaster with tergite 3 reddish, the following tergites dark.

Morphology. Head large, with the width of the temples about equal to the eye-width in lateral view. Ocelli forming an equilateral triangle. Antennal segments: ♂, 30—34; ♀, 27—31. Mandibles (fig. 134) not or only slightly expanded, with tooth 4 reduced, obviously smaller than the large tooth 3 (as in *C. cybele* (NIXON)). Palpi fairly short.

Thorax very long and narrow (at least twice as long as wide). Mesoscutum largely smooth and shining with fine, somewhat sparse pubescence distributed over all its surface except the posterior half of the lateral lobes[7]: notaulices weak, indicated anteriorly only. Rugose precoxal suture well developed. Metapleuron, propodeum and petiole coarsely rugose-punctate. Metapleural pubescence moderately dense, tending to form a rosette around the poorly defined swelling. Propodeum with short dense pubescence covering its entire surface. Petiole short, strongly widened towards its apex, almost bare along its centre line, but much of its surface is clothed with short, adpressed, fairly dense pubescence: this pubescence is slightly denser at the apical corners but no distinct tufts are formed. Tergite 3 with a few inconspicuous basal hairs. Ovipositor (♀) extraordinarily long, upcurved, projecting beyond the apical tergite by about half the gastral length in the retracted position, its sheaths about equal in length to the hind tibia.

Wing (fig. 90) with cell $2R_1$ somewhat narrow; vein R_s only weakly sinuate; and cell *2Cu* somewhat elongate, more or less open at its lower distal corner (vein Cu_{1b} weak).

Breeding records

Host — *Phytomyza diversicornis* HENDEL

20 ♂♂, 25 ♀♀, Randers, Jutland, Denmark, leg. SCHLICK (KB, GCDG and Mr. A. W. STELFOX's collection).

The only other species of *Chorebus* known to me as possessing an ovipositor approaching the length of that of *crassipes* is *C. bensoni* (NIXON), but that species has a short thorax and differently shaped mandibles. *C. crassipes* (STELFOX) is similar to *C. cybele* (NIXON), a parasite of *Melanagromyza* spp., in respect of its elongate form and the shape of the mandibles, but I consider this resemblance to be due to convergence (both being associated with stem-boring hosts). The metapleural rosette is well developed in *crassipes* (as in other species of the *ovalis/lateralis* complex), but this is not the case in the *cybele* group.

[7] The pubescence which can be seen is much less extensive in many of the specimens, but I suspect that they have been rubbed.

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Coloneura FÖRSTER

My redefinition of the genus *Coloneura*, with a key to species, will be given in part V of this paper.

Coloneura major sp. nov.

Colour. Palpi and labrum yellow. Centre of mandibles orange or red-brown. Antennae with the scape and pedicel yellow-brown, but the flagellum entirely dark. Legs entirely yellow except that tarsal segments 5 are weakly infuscated. Gaster with tergites 3 and 4 reddish, the following tergites dark.

Morphology. Antennal segments: ♂, 30—31; ♀, 27—29. Ocelli forming a more or less equilateral triangle. Palpi short (see the table of biometric data). Mandibles (fig. 138) 3-toothed.

Pronotum with a medial pit: its sides are largely bare, with only some fine inconspicuous pubescence along the oblique suture. Mesoscutum largely smooth and shining, with fine pubescence over its anterior face and central lobe (at least anteriorly), but the lateral lobes are largely bare: notaulices well developed, almost reaching the posterior fovea. Rugose-costate precoxal suture present. Metapleuron rugose-punctate, like the propodeum; its pubescence is fairly dense and tends to be parted along its centre (but not forming a rosette as in most *Chorebus* spp. associated with *Phytomyza*). Propodeum covered with similar fine, adpressed pubescence, but this is not sufficiently dense to obscure the surface beneath. Petiole subtriangular, largely bare but with some short fine hairs along its sides and at its apical corners. Tergite 3 without basal hairs. Ovipositor (♀) slightly upcurved, shortly projecting beyond the apical tergite in the retracted position.

Wing with vein R_s strongly curved, hardly sinuate; *1m—cu* rejected from cell R_s; and Cu_{1b} almost or completely absent.

Host — *Phytomyza dasyops* HENDEL

Holotype ♀; 5 ♂♂, 8 ♀♀ paratypes, Damhusmose, Sealand, Denmark, leg. SCHLICK (KB and GCDG).

The host-plant of *P. dasyops* HENDEL is unknown (see also under *Dacnusa fasciata* STELFOX).

Further Revision of the Key of *Exotela* FÖRSTER

A key for *Exotela* was given in Part II of this paper (GRIFFITHS, 1966). Further revision of couplets 7 onwards is now necessary to incorporate additional species and to take account of my reappraisal of *E. cyclogaster* FÖRSTER. I have also reconsidered my previous association of *E. phryne* (NIXON) and *E. spinifer* (NIXON) in the same couplet, in order to compare the latter species more directly with other species of the *cyclogaster* group.

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7 Precoxal suture showing as a long, very narrow groove which is smooth or only feebly rugose. 26—28 antennal segments. Mesoscutal pubescence lying mainly in two or three rows along the former course of the notaulices. (Postscutellum not developed into a pointed spine.) . . . . . *E. phryne* (NIXON)

Host: *Agromyza alnibetulae* HENDEL

— Precoxal suture showing as a short smooth impression or completely absent . . . 8
— Rugose precoxal suture retained (in *spinifer*, in which the precoxal suture is only weakly rugose along its lower edge, the postscutellum is developed into a pointed spine (fig. 146)) 12

8 Face and clypeus bright yellow. 24 antennal segments (♂), the scape, pedicel and first two flagellar segments being bright yellow, in contrast with the rest of the flagellum. Mesoscutum extensively pubescent with notaulices distinct anteriorly only . . . . . *E. facialis* (THOMSON)
— Face dark. 9

9 20—21 antennal segments. Cell $2R_1$ very short (fig. 81) . . ***E. minuscula* sp. nov.**

Host: *Paraphytomyza xylostei* ROBINEAU-DESVOIDY

— At least 23 antennal segments. Cell $2R_1$ longer 10

10 Basal flagellar segments contrastingly pale. Clypeus dark. Petiole about 1.5 times as long as wide. 24—27 antennal segments . . . . . *E. arunci* GRIFFITHS

Hosts: *Agromyza arunci* HERING and *A. spiraeoidearum* HERING

— Basal flagellar segments not contrastingly pale. Petiole 1.7—1.9 times as long as wide 11

11 Clypeus yellow. 26—29 antennal segments. Pterostigma more elongate (fig. 45). Mesoscutum and petiole more pubescent (fig. 77) . . . . . *E. nowakowskii* GRIFFITHS

Host: *Agromyza spiraeae* KALTENBACH

— Clypeus brown or reddish. 23—26 antennal segments. Pterostigma shorter and broader (fig. 84) . . . . . ***E. loniceraе* sp. nov.**

Host: *Paraphytomyza hendeliana* HERING

12 Palpi dark brown or black. Legs extensively infuscated. Clypeus brown or black . 13
— Palpi usually clear yellow, sometimes slightly tinged with brown. Legs largely yellow except in *senecionis* and *obscura* 14

13 Precoxal suture broad and coarsely rugose-costate. Petiole bearing only very few hairs. Wing as fig. 79 . . . . . *E. sulcata* (TOBIAS)

Hosts: *Phytomyza calthivora* HERING and *P. calthophila* HERING

— Precoxal suture poorly developed, weakly rugose-costate anteriorly, but smooth along much of its length. Petiole with fine pubescence distributed over its entire surface. Wing as fig. 83. . . . . ***E. tatrica* sp. nov.**

Host: *Phytomyza aronici* NOWAKOWSKI

Note: see also the remarks under the description of *E. obscura* sp. nov. on a dark alpine form referred to that species.

14 At least the basal half of the hind coxae infuscated 15
— Hind coxae entirely yellow or yellow-brown, or at most infuscated posteriorly at their extreme base 16

15 Hind coxae not sculptured. Flagellum entirely dark: its basal segments relatively short and broad (first flagellar segment 1.2 times as long as the second; ratio of first flagellar segment to the thorax length 5.7—6.0). 23—26 antennal segments . . . . . ***E. obscura* sp. nov.**

Hosts: *Phytomyza aegopodii* HENDEL, *P. angelicae* KALTENBACH, *P. laserpitii* HENDEL and *P. pubicornis* ZETTERSTEDT

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— Basal half of hind coxae conspicuously sculptured. First and sometimes the base of the second flagellar segment yellow-brown, contrasting with the black colour of the rest of the flagellum: first flagellar segment long (1.4—1.5 times as long as the second; ratio of first flagellar segment to the thorax length 3.8—4.5). 26—31 antennal segments . . . . . ***E. senecionis* sp. nov.**

Hosts: *Phytomyza senecionis* KALTENBACH, *P. alpina* GROSCHKE and *P. homogyneae* HENDEL

16 28—32 antennal segments. Precoxal suture broad and conspicuous. Lateral lobes of mesoscutum bare. First flagellar segment less than one fifth of the thorax length . . . . . *E. hera* (NIXON)

Hosts: *Agromyza* spp. on *Urtica*

— Fewer antennal segments; or, if 28 or more, the lateral lobes of the mesoscutum are densely pubescent (*aconiti*) or the first flagellar segment relatively longer (*cyclogaster*) 17

17 Head large and less transverse, swollen behind the eyes; mandible large, widened towards its apex (see Table 6 of biometric data in Part II). Pterostigma not so elongate (fig. 46 and NIXON, 1954, fig. 314) . . . . . *E. dives* (NIXON)

— Head usually strongly transverse (over 1.9 times as wide as long except sometimes in *cyclogaster umbellina*): mandibles smaller. Pterostigma more elongate (fig. 78) 18

18 Postscutellum developed into a pointed spine (fig. 146). Precoxal suture with only feeble rugosity along its sharply delimited lower edge. Basal flagellar segments short (as in *obscura*) . . . . . *E. spinifer* (NIXON)

Hosts: *Phytomyza alpina* GROSCHKE and *P. cirsii* HENDEL

— Postscutellum visible as no more than a short blunt tooth in lateral view (fig. 147). Basal flagellar segments longer (first flagellar segment 1.3—1.5 times as long as the second) 19

19 Entire surface of mesoscutum densely pubescent. Petiole with fine pubescence over most of its surface. 27—29 antennal segments . . . . . ***E. aconiti* sp. nov.**

Host: *Phytomyza aconitella* HENDEL

— Lateral lobes of mesoscutum partly bare. Petiole less pubescent . . . . . *E. cyclogaster* FÖRSTER 20

20 At least the two basal flagellar segments bright yellow, contrasting strongly in dorsal view with the black succeeding segments. Hind coxae always entirely yellow. 25—28 antennal segments . . . . ***E. cyclogaster sonchina* ssp. nov.**

Hosts: *Phytomyza marginella* FALLÉN, *P. senecionis* KALTENBACH, *P. obscurella* FALLÉN and *P. thysselini* HENDEL

— Flagellum without such a strong colour contrast in dorsal view, usually no more than the first flagellar segment being obviously yellow or yellow-brown. Hind coxae often infuscated posteriorly at their base 21

21 24—28 antennal segments. Thorax distinctly longer than high . . . . . *E. cyclogaster cyclogaster* FÖRSTER

Hosts: *Phytomyza* spp. on *Heracleum* and *Pastinaca*, *P. virgaureae* HERING and *P.* ? *simmi* BEIGER

— 21—24 antennal segments. Thorax usually not longer than high . . . . . *E. cyclogaster umbellina* (NIXON)

Hosts: *Phytomyza* spp. on Umbelliferae, mainly the *obscurella* group

Note: An apparently intermediate series has been bred from *Phytomyza angelicastri* HERING

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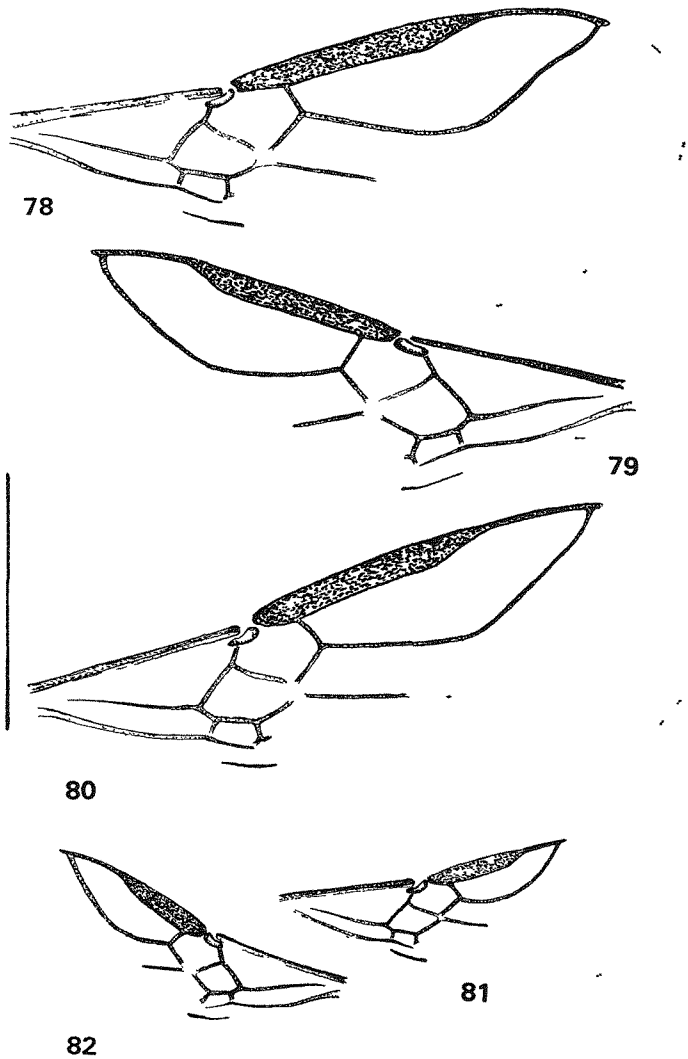

Figs 78—82 Wings of 78, *Exotela cyclogaster cyclogaster* FORSTER ♀, 79, *Exotela sulcata* (TOBIAS) ♀, 80, *Exotela gilvipes* (HALIDAY) ♀, 81, *Exotela minuscula* sp nov ♀, 82, *Priapsis dice* NIXON ♂ (Scale 1 mm)

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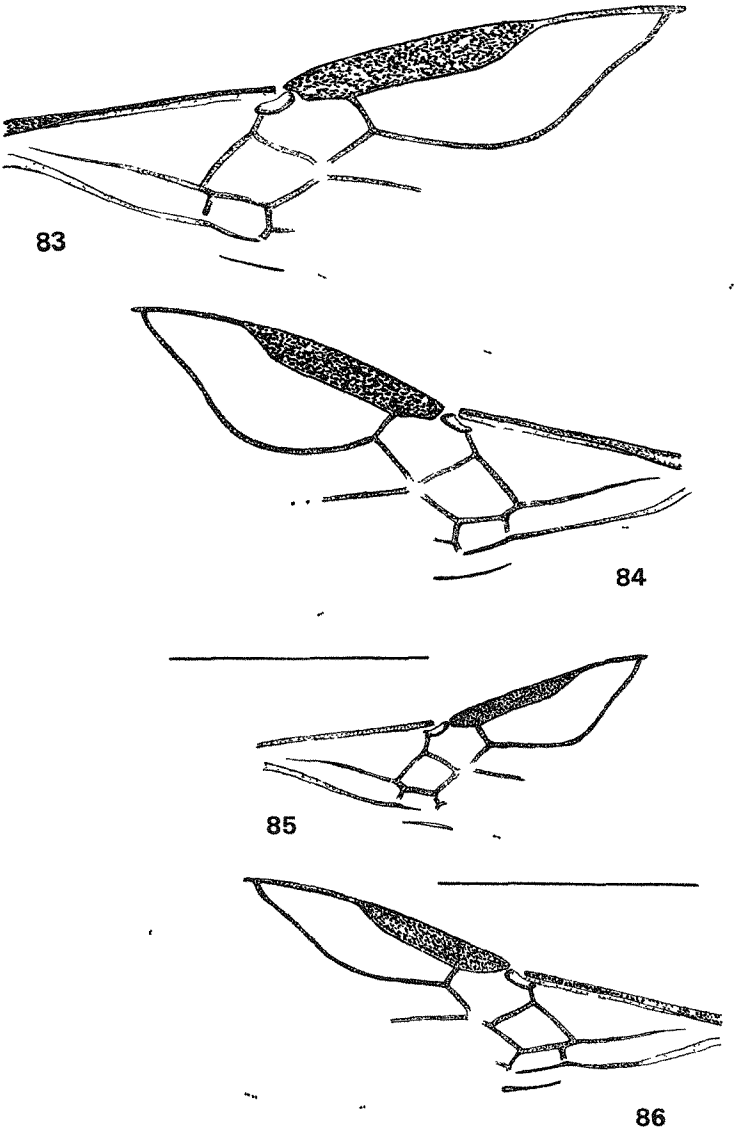

Figs 83—86 Wings (♀♀) of 83, *Exotela tatrica* sp nov , 84, *Exotela loniceraе* sp nov 85, *Chorebus canariensis* sp nov , 86, *Chorebus thusa* (NIXON) (Scale 1 mm)

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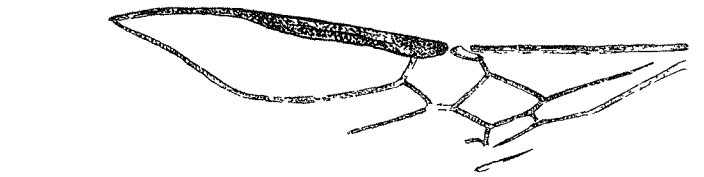

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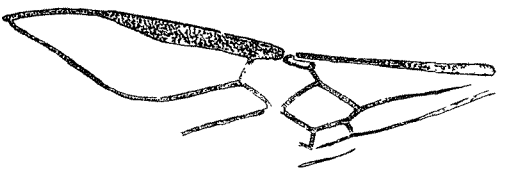

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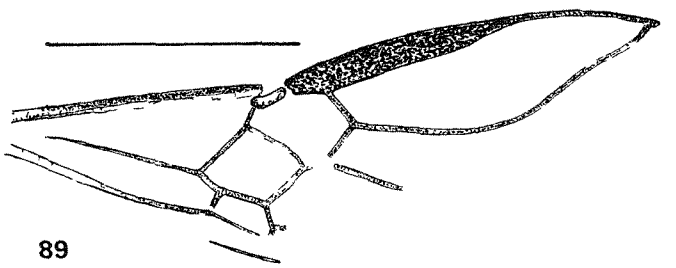

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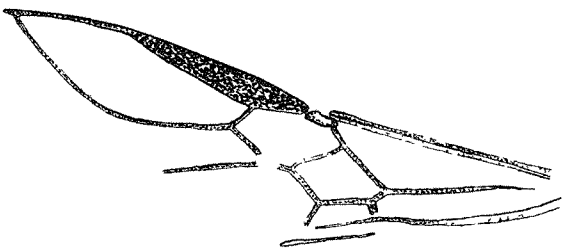

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Figs 87—90 Wings of *Chorebus* spp . 87, *C aphantus* (MARSHALL) ♂; 88, *C alecto* (MORLEY) ♀, 89, *C. calthae* sp nov ♀; 90, *C. crassipes* (STELFOX) ♀ (Scale 1 mm)

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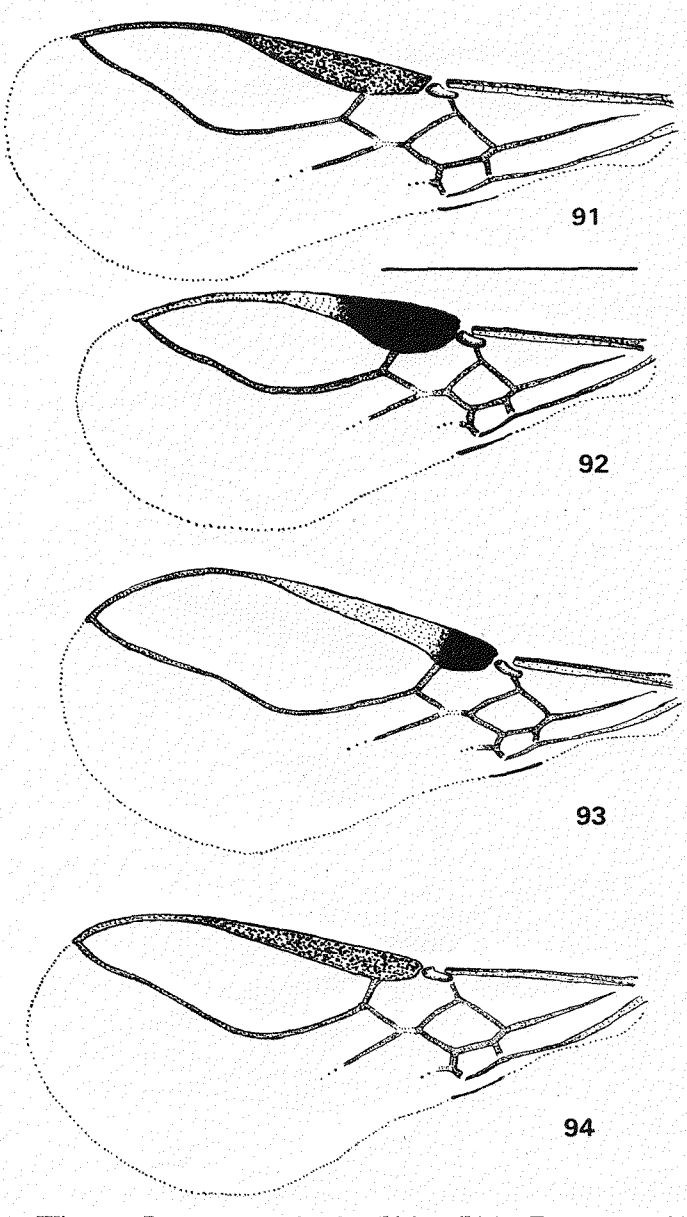

Figs. 91—94. Wings of *Dacnusa* spp.: 91, *D. sibirica sibirica* TELENGA ♀; 92, *D. sibirica sibirica* TELENGA ♂; 93, *D. discolor* (FÖRSTER) ♂; 94, *D. discolor* (FÖRSTER) ♀. (Scale 1 mm.)

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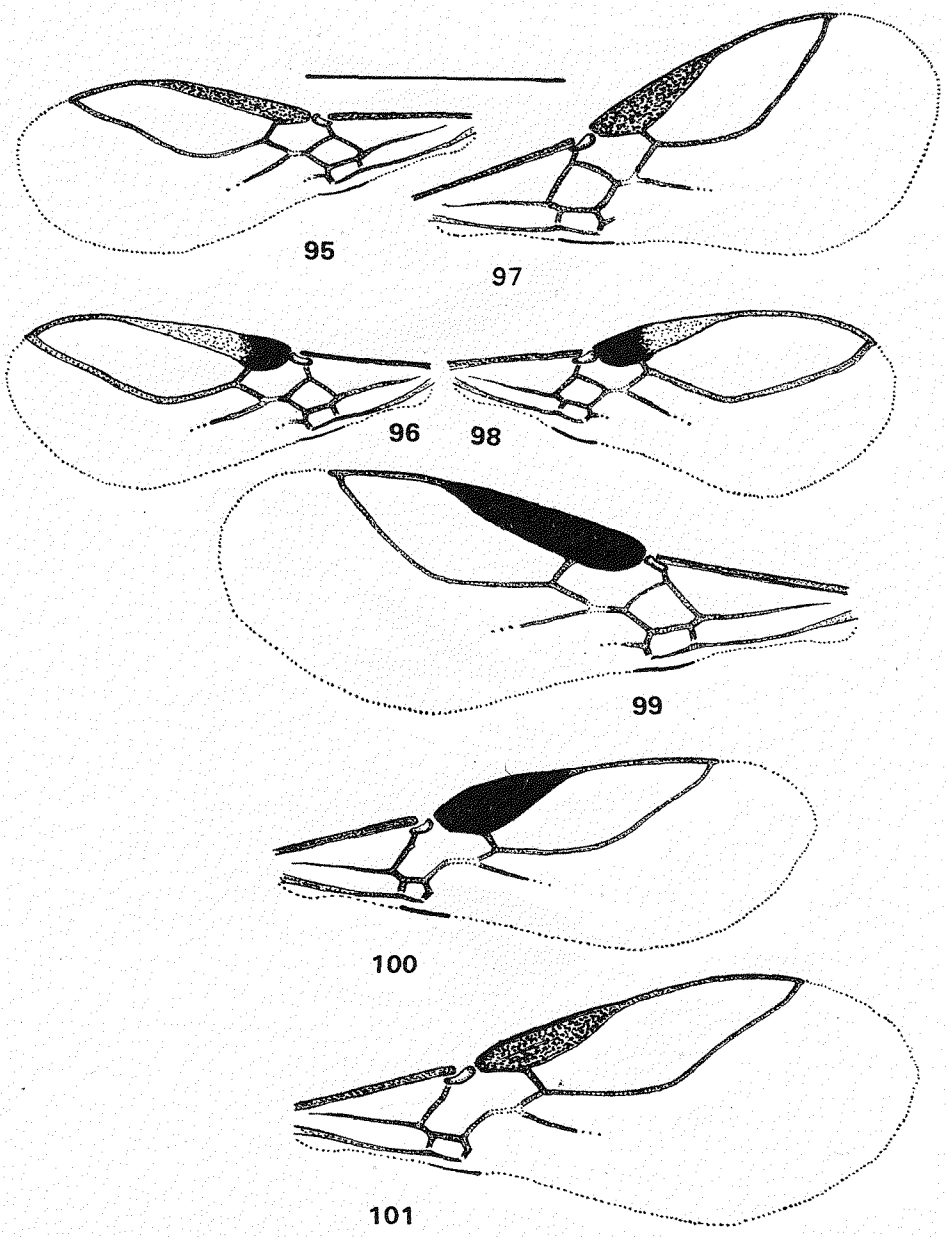

Figs. 95—101. Wings of *Dacnusa* spp.: 95, *D. plantaginis* sp. nov. ♀; 96, *D. plantaginis* sp. nov. ♂; 97, *D. veronicae* sp. nov. ♀; 98, *D. veronicae* sp. nov. ♂; 99, *D. metula* (NIXON) ♂; 100, *D. hospita* (FÖRSTER) ♂; 101, *D. hospita* (FÖRSTER) ♀. (Scale 1 mm.)

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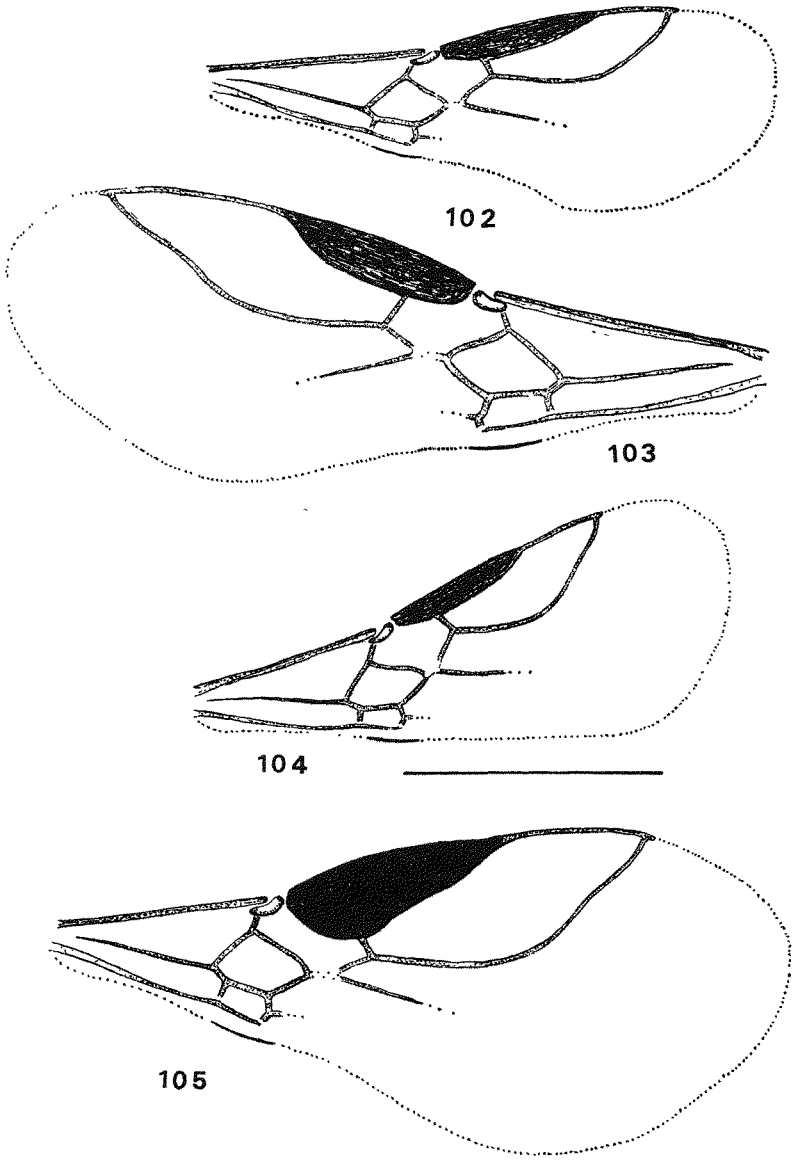

Figs. 102—105. Wings of *Dacnusa* spp. ♂♂: 102, *D. monticola* (FÖRSTER); 103, *D. fasciata* STELFOX; 104, *D. nigrella* sp. nov.; 105, *D. prisca* sp. nov. (Scale 1 mm.)

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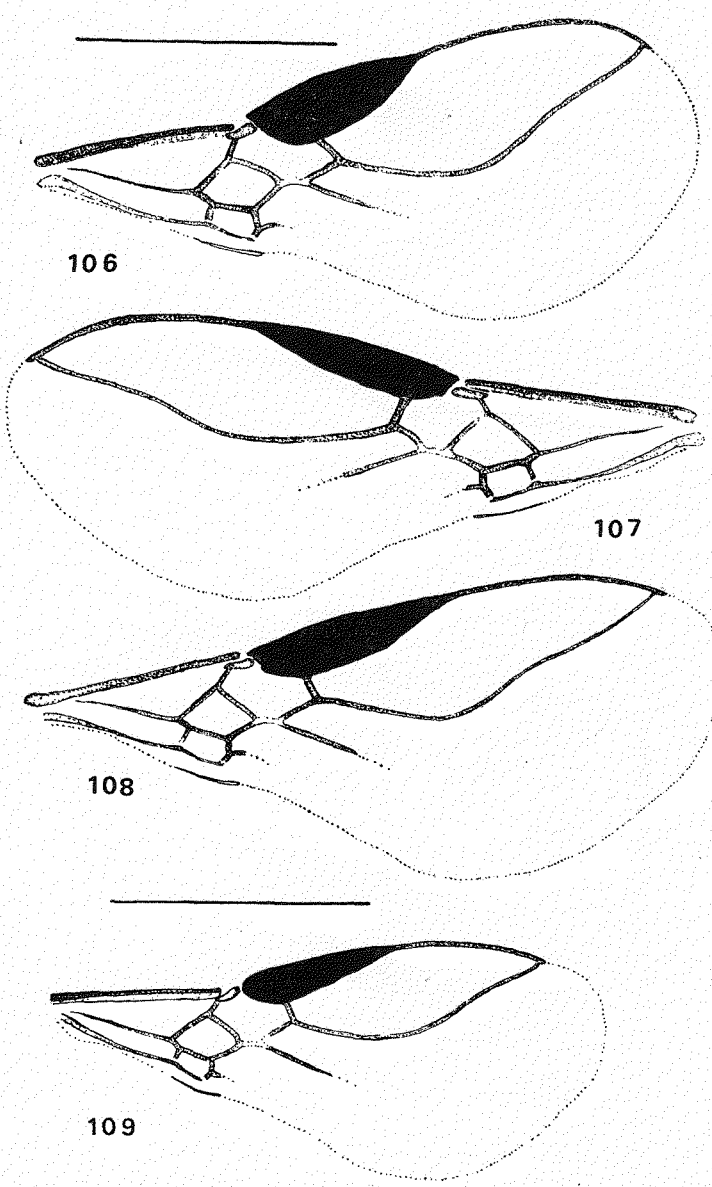

Figs. 106–109. Wings of *Dacnusa* spp. ♂♂: 106, *D. ergeteles* (Nixon); 107, *D. angelicina* sp. nov.; 108, *D. lithospermi* sp. nov.; 109, *D. clematidis* sp. nov. (Scale 1 mm.)

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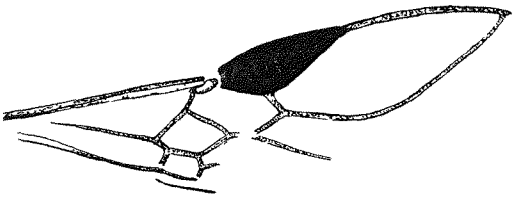

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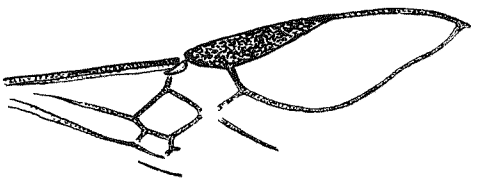

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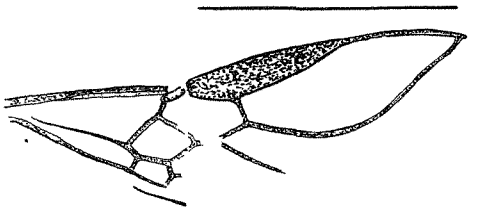

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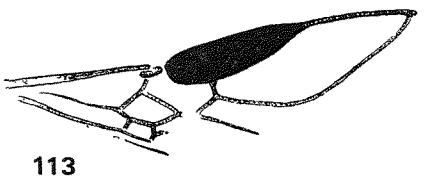

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Figs. 110—113. Wings of *Dacnusa* spp.: 110, *D. macrospila* (HALIDAY) ♂; 111, *D. macrospila* (HALIDAY) ♀; 112, *D. melicerta* (NIXON) ♀; 113, *D. melicerta* (NIXON) ♂. (Scale 1 mm.)

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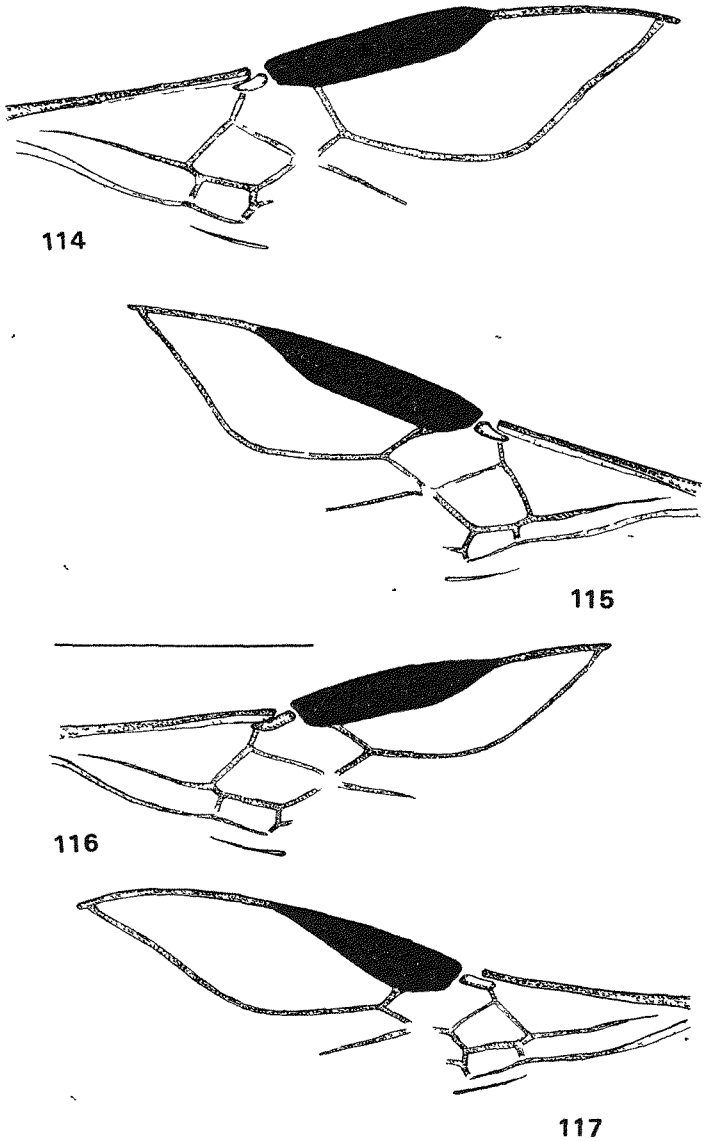

Figs. 114—117. Wings of *Dacnusa* spp. ♂♂: 114, *D. alpestris* sp. nov.; 115, *D. aquilegiae* MARSHALL; 116, *D lonicerella* sp. nov ; 117, *D brevistigma* (TOBIAS). (Scale 1 mm.)

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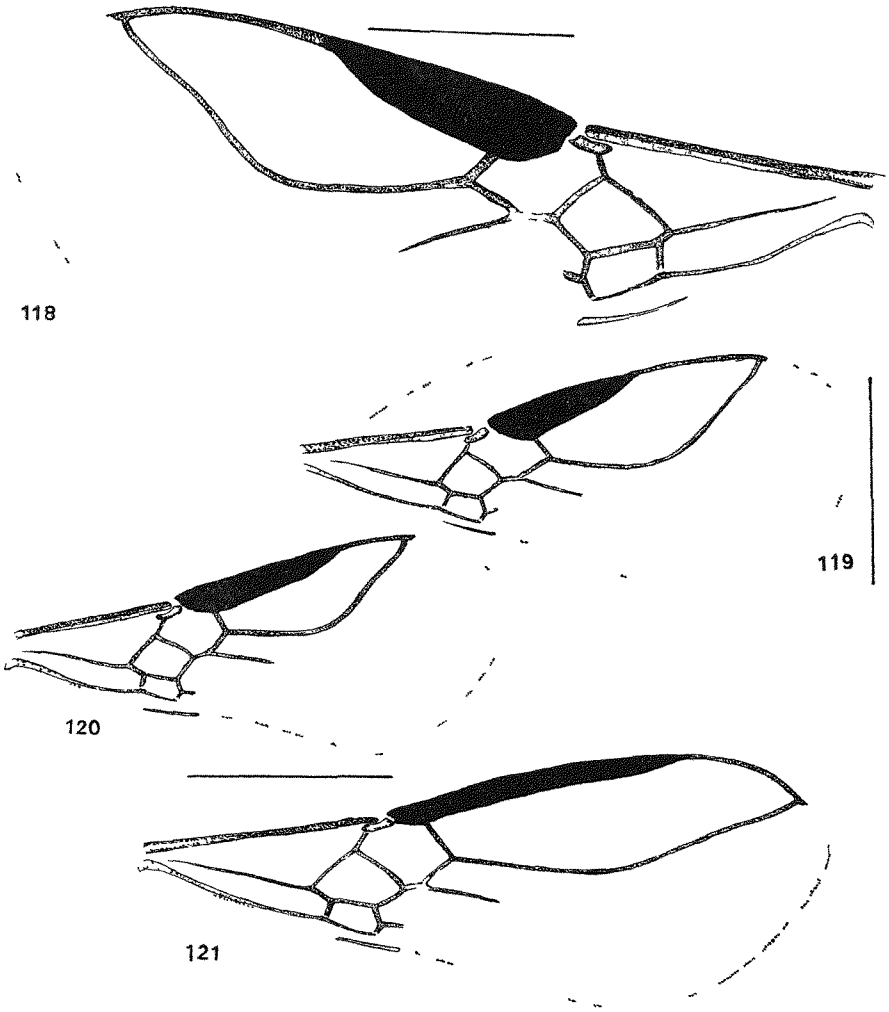

Figs 118—121 Wings of *Dacnusa* spp ♂♂ 118, *D lissos* (NIXON), 119, *D centaureae* sp nov , 120, *D heringi* sp nov , 121, *D merope* (NIXON) (Scale 1 mm)

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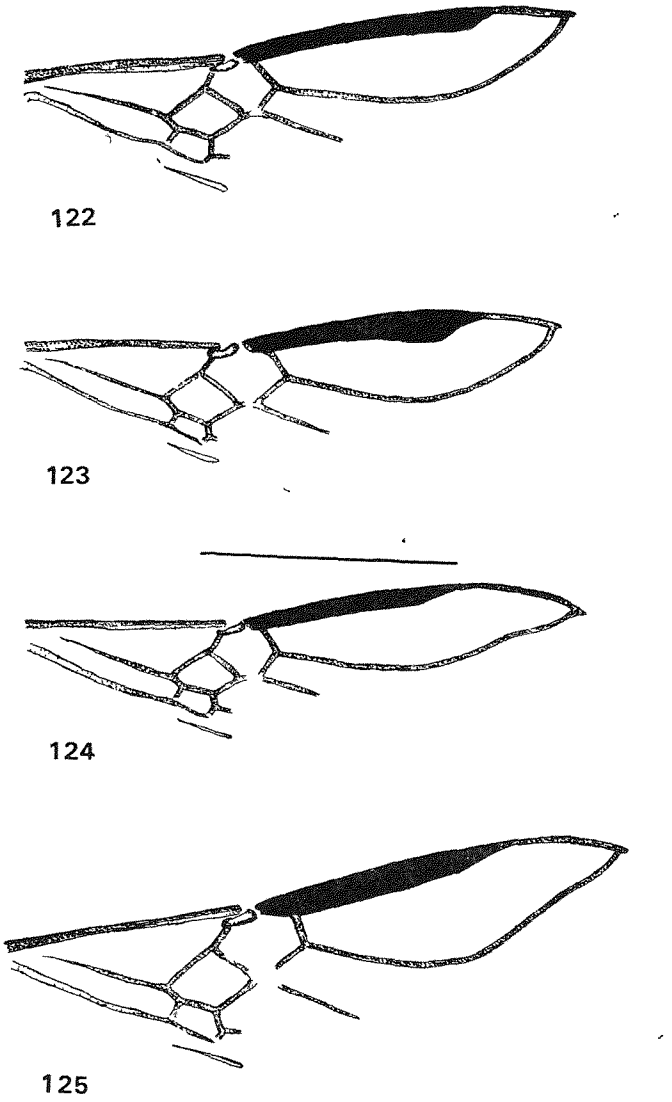

Figs 122—125 Wings of *Dacnusa* spp ♂♂ 122, *D gentianae* sp nov , 123, *D maculipes* THOMSON, 124, *D areolaris* (NEES), 125, *D tarsalis* THOMSON (Scale 1 mm)

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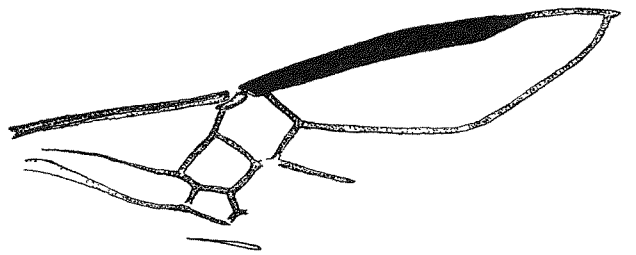

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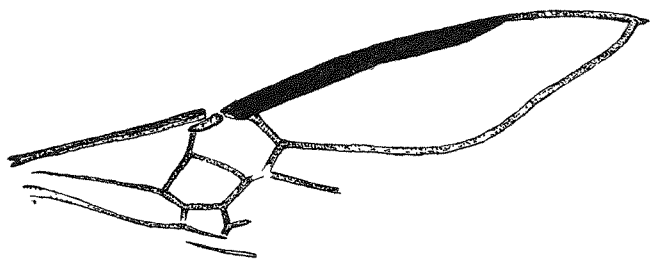

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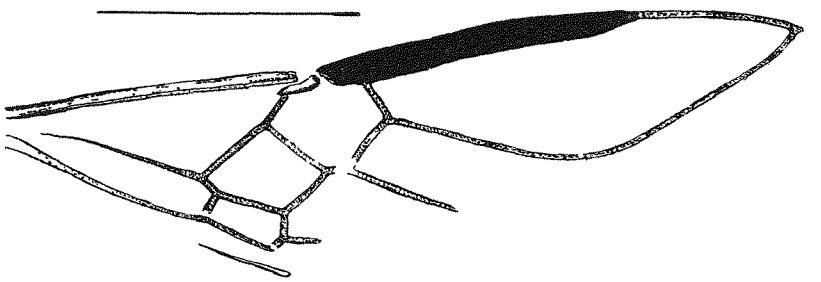

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Figs 126—128 Wings of *Dacnusa* spp ♂♂ 126, *D confinis* RUTHE, 127, *D. laevipectus* THOMSON, 128, *D pubescens* (CURTIS) (Scale 1 mm)

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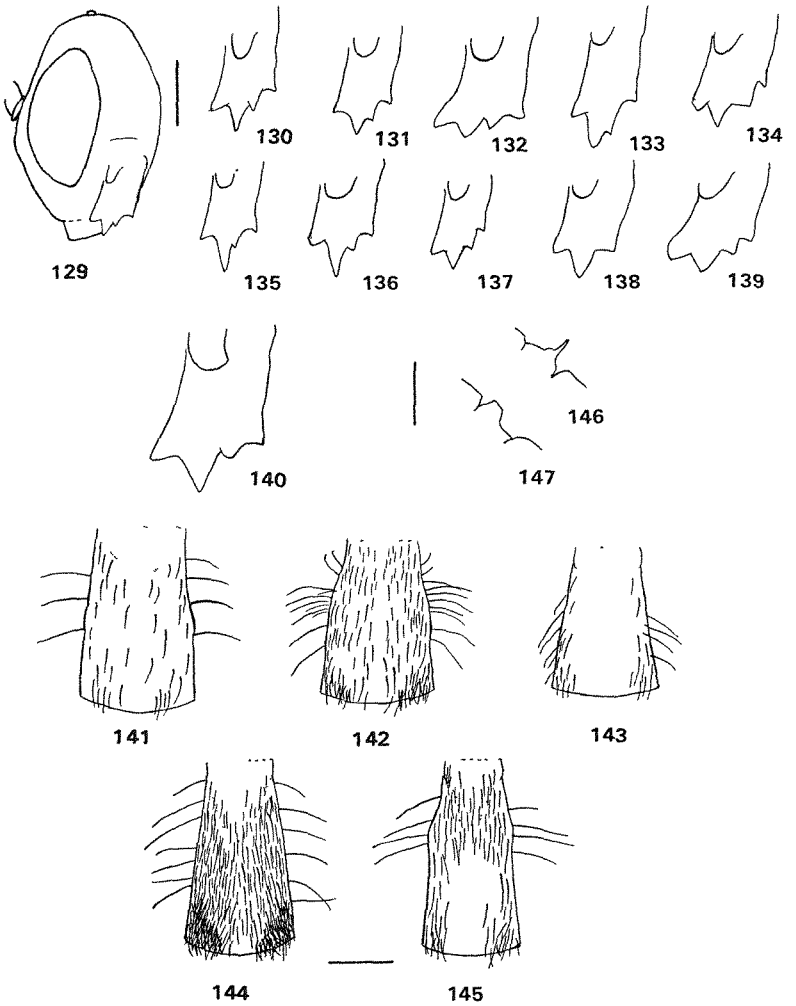

Fig. 129. Head and mandibles in lateral view of *Chorebus aphantus* (MARSHALL)

Figs. 130—140. Mandibles of: 130, *Chorebus buhri* sp. nov.; 131, *Chorebus ergias* (NIXON); 132, *Chorebus alecto* (MORLEY); 133, *Chorebus calthae* sp. nov.; 134, *Chorebus crassipes* (STELFOX); 135, *Chorebus dagda* (NIXON); 136, *Chorebus fallax* (NIXON); 137, *Chorebus tenellae* sp. nov.; 138, *Coloneura major* sp. nov.; 139, *Chorebus thusa* (NIXON); 140, *Dacnusa pubescens* (CURTIS)

Figs. 141—145. Petioles of *Chorebus* spp.: 141, *C. dagda* (NIXON); 142, *C. gentianellus* sp. nov.; 143, *C. canariensis* sp. nov.; 144, *C. alecto* (MORLEY); 145, *C. thecla* (NIXON)

Figs. 146—147. Postscutellum in lateral view of *Exotela* spp.: 146, *E. spinifer* (NIXON); 147, *E. cyclogaster cyclogaster* FÖRSTER (Scale 0.1 mm.)

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Revised Key of *Dacnusa* HALIDAY

The existing keys of *Dacnusa* (in NIXON, 1948 and 1954, under the generic names *Rhizarcha* and *Pachysema*) have been revised below. NIXON's (1948) treatment of *Dacnusa* s. s. (= *Rhizarcha*) seems to me wholly admirable. The part of the key referring to this group (couplets 2—16) is largely based on his key, with the addition of three new species and the removal of *mutia* NIXON (a synonym of *monticola* FÖRSTER which is treated in couplet 22). Some changes in the arrangement of this part of the key have also been made with the aim of separating *tarsalis* and *faeroeensis* from the *areolaris* group, as I conceive it. No revision of the key to the *stramineipes* group has been offerred (see couplet 16), since little additional material of this group was available to me. The remainder of the key (couplets 17 onwards), referring mainly to species which would be included in *Pachysema* as defined by NIXON (1954), has required to be largely rewritten because of the high proportion of new species and now bears little resemblance to NIXON's original "*Pachysema*" keys. All species included in the key have been seen by me except *terminalis*, which is included on the basis of its description.

1 Pubescence of metapleuron, propodeum and petiole very dense and usually long. Petiole widened towards its apex, at most $1^1/_2$ times as long as its apical width, often not much longer than wide and with a virtually smooth surface. Pterostigma very narrow and elongate in most species (figs. 121—128), but never becoming paler towards its apex as in males of the *discolor* group (rather shorter or broader pterostigmata are shown by *lugens* (see NIXON, 1948, fig. 242) and *heringi* (fig. 120)). Hind tarsus 0.9—1.1 times the length of the tibia. . . . . *Dacnusa* s. s. (= *Rhizarcha* FÖRSTER sensu NIXON, 1948) 2

— Metapleural and propodeal pubescence rarely approaching this density. Petiole always sculptured. Pterostigma very variable, but rarely so elongate. (Hind tarsus less than 0.9 times the length of the tibia in many species) 17

Note: the forms most likely to be confused with those under the first alternative are the females of *discolor* and *plantaginis*, but these species have a rugose, more or less parallel-sided petiole.

2 Pterostigma relatively short, with vein *2r* arising remote from its base (NIXON, 1948, fig. 242); the part of the pterostigma beyond the origin of *2r* is only about twice as long as that before. Legs virtually black throughout. 22—24 antennal segments. Tergite 3 almost entirely covered with fine pubescence . . *D. lugens* (HALIDAY)

— Pterostigma longer, the part beyond the origin of vein *2r* being well over three times as long as that before 3

3 Pterostigma broader at its base, obviously tapered towards its apex, rather strongly sexually dimorphic (fig. 120): *2r* not so closely approximated to the base of the pterostigma as in the *areolaris* group. Mesoscutal pubescence short and sparse, situated mainly on its anterior face, the front part of the lateral lobes and in two or three rows along the former course of the notaulices: central line and posterior half of lateral lobes bare and shining. Legs largely ochreous yellow. 21—24 antennal segments . . . . . ***D. heringi* sp. nov.**

Host: *Phytomyza griffithsi* SPENCER

— Pterostigma narrower (figs. 121—128), not broadened at its base except in *marica* (see NIXON, 1948, fig. 245), a species in which *2r* arises from the extreme base of the pterostigma 4

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4 Vein *2r* arising extremely close to the base of the pterostigma, so that this vein is longer than the distance from its origin to the base of the pterostigma (figs. 122—124, 126 and 127). Ovipositor (♀) not projecting beyond the apical tergite in the retracted position except in *helvetica*, which has a distinct rugose precoxal suture. 21—26 antennal segments. (*D. faeroeensis* (ROMAN) in which the origin of *2r* is a little less closely approximated to the base of the pterostigma than in the other species also has a conspicuous rugose precoxal suture) 5

— *2r* arising further from the base of the pterostigma, so that it is not longer than the distance from its origin to the base of the pterostigma (figs. 121, 125 and 128). Precoxal suture almost or completely absent 16

5 Mesepisternum with broad, distinctly rugose precoxal suture. Pterostigma parallel-sided, shorter than in the *areolaris* group, with the origin of *2r* not so closely approximated to its base (see NIXON, 1948, fig. 268). Petiole distinctly rugose. Legs largely yellow or reddish yellow with the hind coxae infuscated . . . . . *D. faeroeensis* (ROMAN)[8]
(= *lestes* NIXON)

Host: *Scaptomyza graminum* FALLÉN (Drosophilidae)

— Precoxal suture, if present, narrow, smooth or only weakly rugose. Vein *2r* arising extremely close to the base of the pterostigma (figs. 122—124, 126 and 127) . . . . . *D. areolaris* group. 6

6 Precoxal suture of mesepisternum visible at least as a short groove, which may be smooth or weakly rugose 7

— Mesepisternum without any indication of a precoxal suture 12

7 Mesoscutum with much of its dorsal surface, including the central lobe, bare and shining 8

— Mesoscutum more densely pubescent, at most the posterior half of the lateral lobes bare 10

8 Head large with strongly swollen temples and large mandibles (see the table of biometric data in Part II). Wing with pterostigma distinctly broadened towards its apex and vein R_s sinuate (fig. 53). Legs (including coxae) yellow or yellow-brown . . . . . *D. dryas* (NIXON)

Host: *Agromyza frontella* RONDANI

— Head and mandibles not unusually large. Wing (fig. 122) with pterostigma only slightly widened towards its apex; vein R_s evenly curved, so that the metacarp is extremely short (similar to *maculipes*). Legs brown with all coxae infuscated . . . 9

9 Ovipositor (♀)distinctly projecting beyond the apical tergite in the retracted position. Anterior face of mesoscutum broadly bare centrally . . . . . ***D. helveticae* sp. nov.**

Host: *Phytomyza ramosa* HENDEL

— Ovipositor (♀) hardly projecting beyond the apical tergite in the retracted position. Anterior face of mesoscutum almost entirely pubescent . . . ***D. gentianae* sp. nov.**

Hosts: *Phytomyza* spp. on Gentianaceae

10 Wing (fig. 123) with the pterostigma conspicuously widened towards its apex, the metacarp very short and vein R_s strongly curved, not or only weakly sinuate (so that cell $2R_1$ is unusually short). Legs largely brown with the hind coxae infuscated . . . . . *D. maculipes* THOMSON

Hosts: many leaf-mining Agromyzidae

[8] PETERSEN (1956) established that ROMAN's (1917) type of *Dacnusa confinis* var. *faeroeensis* was conspecific with *Dacnusa lestes* NIXON. According to the 1961 International Code of Zoological Nomenclature a name originally proposed for a "variety", if published before 1960, is available as a name for a species. Therefore the name *faeroeensis* must take priority over *lestes*. HAMM's record of the host as "*Cerodonta* sp. on *Stellaria*", first published by NIXON (1937) and uncritically repeated by other authors, was based on a misidentification of *Scaptomyza*.

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— Pterostigma not or only slightly widened towards its apex: cell $2R_1$ longer. Legs not so dark 11

11 Wing (fig. 126) with very short metacarp and vein R_s strongly curved, so that cell $2R_1$ ends far short of the apex of the wing. Mesepisternum without hairs over its medial surface. Legs largely deep yellow with the hind coxae infuscated . . . . . *D. confinis* RUTHE

Hosts: *Phytomyza ranunculi* SCHRANK and *P. glechomae* KALTENBACH

— Wing with very long cell $2R_1$ almost reaching its apex (see NIXON, 1948, fig. 264). Mesepisternum with fine hairs scattered sparsely over its medial surface. Legs almost entirely yellow . . . . . *D. soma* (NIXON), **comb. nov.**

12 Cell $2R_1$ extremely long, reaching almost to the apex of the wing (see NIXON, 1948, figs. 263 and 265). Thorax as in *areolaris*, but legs largely yellow . . . . . *D. longiradialis* NIXON

— Cell $2R_1$ shorter or, if approaching the length of that of *longiradialis*, the thorax is short and deep (1.1—1.2 times as long as high) 13

13[9] Thorax not very deep, about 1.4 times as long as high. Maxillary palpi short (see the table of biometric data) and infuscated. Legs largely brown or yellow-brown. Wing as fig. 124 . . . . . *D. areolaris* (NEES)

Hosts: *Phytomyza atricornis* MEIGEN, *P. asteris* HENDEL and *P. nigra* MEIGEN

— Thorax very deep, about 1.1—1.2 times as long as high 14

14 Pterostigma only about twice as long as the metacarp (see NIXON, 1948, fig. 245). Legs and palpi dark brown . . . . . *D. marica* (NIXON), **comb. nov.**

— Pterostigma at least 2½ times as long as the metacarp. Palpi yellow. Legs paler, usually largely yellow 15

15 Wing as fig. 127 with vein R_s only weakly sinuate in the male. Legs deep yellow with the hind coxae usually infuscated at least at their base . . . *D. laevipectus* THOMSON

Hosts: various leaf-mining *Phytomyza* spp.

— Wing with longer cell $2R_1$ and strongly sinuate vein R_s (see NIXON, 1948, fig. 246). Legs (including coxae) pale yellow . . . . . *D. mara* (NIXON), **comb. nov.**

16 Ovipositor (♀) small, not or only slightly projecting beyond the apical tergite in the retracted position. 22—26 antennal segments. Mandibles 3-toothed. Legs deep yellow with the hind coxae infuscated. (The male is very similar to that of *pubescens* except that tooth 3 of the mandibles is not indented) . . . . . *D. tarsalis* THOMSON

Hosts: *Phytomyza autumnalis* GRIFFITHS and *P. farfarae* HENDEL

— Ovipositor (♀) stout, distinctly projecting beyond the apical tergite . . . . . *D. stramineipes* group

See the keys in NIXON (1948), couplets 2—6(♀♀) and 12—15(♂♂), where six species are recognised. The hosts of only two (*pubescens* and *merope*) are known.[10]

[9] The measurements on which all proportions in this paper are based have been made according to the conventions given in the notes on the first table of biometric data (Beitr. Ent., **14**, 904; 1964).

[10] Note on the *stramineipes* group. After further study of FÖRSTER's type I am now satisfied that *Tanystropha baemorrhoa* FÖRSTER should be synonymised with *Alysia* (*Dacnusa*) *stramineipes* HALIDAY, 1839, as interpreted by NIXON (1948). The synonymy reads as follows.

Dacnusa stramineipes (HALIDAY)

Alysia (*Dacnusa*) *stramineipes* HALIDAY, 1839
Tanystropha haemorrhoa FÖRSTER, 1862, **syn. nov.**
Dacnusa stramineipes (HALIDAY), NIXON, 1937 (nec sensu MARSHALL, 1891, 1895 and 1897)
Rhizarcha stramineipes (HALIDAY), NIXON, 1948

The application of one name — *Dacnusa* (*Dacnusa*) *longicauda* THOMSON, 1895 — remains to be clarified. TOBIAS' (1962) *Rhizarcha longithorax*, described from the male only, is also likely in my opinion to belong to this group.

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17 Mesepisternum with a distinctly rugose precoxal suture 18
— Precoxal suture represented by a smooth impression or absent 21
18 Vein R_s+M completely lost (figs. 100 and 101). Pterostigma short and broad. Metapleuron densely pubescent, but petiole almost bare. Precoxal suture short. Ovipositor (♀) projecting slightly beyond the apical tergite in the retracted position . . . . . *D. hospita* (FÖRSTER)

Host: *Phytomyza* sp. near *ranunculi* SCHRANK (? *stolonigena* HERING)

— R_s+M present 19
19 Notaulices weak, visible anteriorly only. Precoxal suture represented by a broad more or less oblong area of rugosity. Basal two flagellar segments contrastingly bright yellow. 22—25 antennal segments . . . . . *D. laeta* (NIXON)

Hosts: *Agromyza arunci* HERING, *A. spiraeae* KALTENBACH, *Phytomyza calthophila* HERING and *P. ranunculi* SCHRANK

— Notaulices better developed. Antennal segments more numerous: basal flagellar segments not contrastingly yellow 20
20 Thorax elongate, 1.4—1.5 times as long as high. Precoxal suture long and narrow. Vein *2r* very remote from the base of the pterostigma (fig. 99). Ovipositor (♀) projecting beyond the apical tergite . . . . . *D. metula* (NIXON)

Hosts: *Phytomyza* sp. on *Dipsacus* and *P. succisae* HENDEL

— Thorax less elongate, about 1.2 times as long as high. Precoxal suture short, obliquely placed. Vein *2r* nearer the base of the pterostigma (fig. 105). (♀ unknown) . . . . . ***D. prisca* sp. nov.**
21 Dorsal surface of mesoscutum bare and shining, with hairs only along the former course of the notaulices 22
— At least the central lobe of the mesoscutum pubescent 23
22 Ovipositor (♀) not projecting beyond the apical tergite. Cell $2R_1$ longer, the metacarp approaching the length of the pterostigma (see NIXON, 1954, fig. 309). Petiole almost bare. Legs largely yellow . . . . . *D. temula* (HALIDAY)

Host: *Scaptomyza apicalis* HALIDAY (= *flaveola* MEIGEN) (Drosophilidae)[11]

— Ovipositor (♀) projecting far beyond the apex of the gaster, bent upwards towards its apex. Cell $2R_1$ very short (fig. 102), the metacarp being much shorter than the pterostigma. Petiole covered with short inconspicuous pubescence. Legs largely brown or red-brown with all coxae infuscated . . . . . *D. monticola* (FÖRSTER)

Host: *Phytomyza tenella* MEIGEN

23 Vein *2r* eliminated: the distal section of R_s is bent at its base and fused with (♂) or contiguous with (♀) the pterostigma (see NIXON, 1943, fig. 5 and 1954, fig. 308) . . . . . *D. adducta* (HALIDAY)

Host: *Liriomyza flaveola* FALLÉN

— *2r* present 24
24 *1m—cu* interstitial or almost so (figs. 47—50, 115 and 116) 25
— *1m—cu* clearly rejected from cell R_s 31
25 Dark legged species with very short antennae and palpi (17 antennal segments in the lectotype) . . . . . *D. aterrima* THOMSON
— At least 25 antennal segments. Legs largely ochreous (*lonicerella*) or yellow 26

[11] The record first given in NIXON (1937) of this species having been bred by O. LUNDBLAD in Sweden from *Hylemyia* (Muscidae) on *Brassica* is doubtless erroneous. A long series of *Dacnusa pubescens* (CURTIS), a parasite of *Phytomyza rufipes* MEIGEN, was bred at the same time and also labelled as bred from *Hylemyia*. The obvious conclusion is that different kinds of dipterous larvae were not distinguished during breeding.

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26 Hind coxae infuscated. Palpi yellow-brown 27
— Hind coxae yellow or infuscated only at their extreme base (*evadne*). Palpi yellow 28
27 Gaster with unusually extensive pubescence, tergites 3 and 4 being evenly covered with hairs and tergites 5 and 6 each with two rows of hairs. 25 antennal segments. Pterostigma (fig. 116) more or less parallel-sided. (♀ unknown) ***D. lonicerella* sp. nov.**
Host: *Paraphytomyza lonicerae* ROBINEAU-DESVOIDY

— Tergite 3 with two or three rows of basal hairs, but the following tergites bearing only an apical row of hairs. 27—32 antennal segments. Male pterostigma (compare fig. 115) tapering towards its apex . . . . . ***D. fuscipes* sp. nov.**
Hosts: *Phytomyza aconiti* HENDEL and *P. laserpitii* HENDEL

28 Petiole with only very few hairs on its dorsal surface. Hind tibiae not infuscated apically. Pterostigma more or less parallel-sided (figs. 49—50). Lateral lobes of mesoscutum largely bare. 27—33 antennal segments . . . . . *D. evadne* NIXON
Host: *Agromyza spiraeae* KALTENBACH

— Petiole more pubescent. Hind tibiae often infuscated apically. Pterostigma distinctly tapered towards its apex, at least in the male (figs. 47—48 and 115). Mesoscutum pubescent over most of its surface 29
29[12] 25—30 antennal segments. *1m—cu* fully interstitial. Metacarp short (fig. 115), about half the length of the pterostigma . . . . . *D. aquilegiae* MARSHALL
Hosts: blotch-mining *Phytomyza* spp., usually on Ranunculaceae

— 30 or more antennal segments 30
30 31—36 antennal segments. Metacarp short (compare fig. 115), about half the length of the pterostigma: in the female the pterostigma is slightly narrower than in the *abdita* female: *1m—cu* slightly rejected from cell R_s (contrast *aquilegiae*). First flagellar segment not so long in proportion to the second: mandibles small (see ratios D and E in the table of biometric data). Tergite 3 with scattered hairs over its surface, but tergite 4 usually with only an apical row of hairs (see NIXON, 1954, fig. 323) . . . . . ***D. delphinii* sp. nov.**
Hosts: *Phytomyza aconiti* HENDEL and *P. aconitophila* HENDEL

— 30—36 antennal segments. Metacarp usually slightly longer, more than half the length of the pterostigma: in the female the pterostigma is slightly broader (fig. 48). First flagellar segment usually longer in proportion to the second: mandibles relatively larger (see ratios D and E in the table of biometric data in Part II). Both tergites 3 and 4 with scattered hairs over most of their surface (see NIXON, 1954, fig. 322) . . . . . *D. abdita* (HALIDAY)
Hosts: *Agromyza* spp. on *Urtica* and Boraginaceae

— 38—42 antennal segments. Otherwise as for *abdita* . . . . . *D. maxima* (FISCHER)
Host: *Agromyza abiens* ZETTERSTEDT

31 Legs entirely brown or black. Petiole not or only slightly longer than wide 32
— Legs largely yellow, at most the tarsi and the apex of the hind tibiae infuscated (except in the Irish subspecies of *sibirica*, see couplet 39) 35
32 Petiole almost bare 33
— Petiole rather densely pubescent although the hairs may be short and inconspicuous. Ovipositor (♀) projecting beyond the apical tergite 34
33 28 antennal segments (♂). Palpi pale yellow. Tergite 3 dark. (♀ unknown) . . . . . *D. terminalis* (TOBIAS), **comb. nov.**

[12] It may not always be possible to identify isolated caught specimens of the species in couplets 29 and 30 without careful comparison with confirmed material.

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– 24 antennal segments (♀). Palpi almost black. Tergite 3 yellow. (♂ unknown) . . . . . ***D. campanariae* sp. nov.**

Host: *Phytomyza campanariae* NOWAKOWSKI

34 Antennal segments: ♂, 24–27; ♀, 22–24. Wing with cell $2R_1$ very short and *1m–cu* somewhat approximated to cell R_s (fig. 104). Legs almost black ***D. nigrella* sp. nov.**

Host: *Phytomyza tenella* MEIGEN

– Antennal segments: ♂, 27–29; ♀, 24–26. Cell $2R_1$ longer: *1m–cu* further rejected from cell R_s (see NIXON, 1954, fig. 320). Legs largely brown . . *D. nigropygmaea* STELFOX

35 Ovipositor (♀) projecting beyond the apical tergite. Mesoscutum with deeply impressed V-shaped notaulices. Petiole no longer than wide, almost bare. 28–33 antennal segments . . . . . *D. fasciata* STELFOX

Host: *Phytomyza dasyops* HENDEL

– Ovipositor (♀) not projecting beyond the apical tergite in the retracted position. Petiole more elongate or, if not, densely pubescent 36

36 Pterostigma strongly tapering and merging gradually into the metacarp, blackened in the male at its base only, contrastingly paler over most of its length (figs. 94, 96 and 98). Metapleuron, propodeum and petiole rather densely pubescent. Precoxal suture represented by a smooth impression. The females of two species, *discolor* and *plantaginis*, may be recognised by their elongate pterostigmata (figs. 93 and 95), but the female of *veronicae* should be carefully compared with those of *macrospila* and *melicerta* (see couplet 44) 37

– Pterostigma broader (figs. 91 and 92), becoming paler in the male only near its apex. Metapleural and propodeal pubescence sparse. Petiole almost bare, longitudinally striate, 1.4–1.5 times as long as wide. 22–24 antennal segments . . . . . *D. sibirica* TELENGA 39

– Male pterostigma unicolorous. Petiole clearly pubescent (though often only sparsely so) or, if almost bare (*austriaca*, *ocyroe* and *alpestris*), more elongate . . . 40

37 Pterostigma not much longer than the metacarp (figs. 97 and 98): vein *2r* shorter than the width of the pterostigma in the male. 22–24 antennal segments . . . . . ***D. veronicae* sp. nov.**

Host: *Phytomyza crassiseta* ZETTERSTEDT

– Pterostigma much longer than the metacarp (figs. 93–96) 38

38 21–24 antennal segments: the more apical flagellar segments not more than twice as long as wide. Palpi shorter (see table of biometric data). Compare ratios A, B, H, I and L in the table of biometric data . . . . . ***D. plantaginis* sp. nov.**

Hosts: *Phytomyza plantaginis* ROBINEAU-DESVOIDY and *P. griffithsi* SPENCER

– 24–27 antennal segments: the more apical flagellar segments 2½–3 times as long as broad. Compare the palpi length and the above ratios in the table of biometric data . . . . . *D. discolor* (FÖRSTER)

Hosts: *Phytomyza primulae* ROBINEAU-DESVOIDY and *P. sedicola* HERING

39 Legs yellow except that the tarsal segments are progressively darkened . . . . . *D. sibirica sibirica* TELENGA

Hosts: *Phytomyza asteris* HENDEL, *P. autumnalis* GRIFFITHS, *P. plantaginis* ROBINEAU-DESVOIDY and *P. ranunculi* SCHRANK

– Legs varying from light brown or testaceous to dark red-brown with the tarsi and hind coxae somewhat infuscated (sometimes almost black). (Ireland) . . . . . *D. sibirica comis* (NIXON)

Host: *Phytomyza asteris* HENDEL

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40 Pterostigma very narrow in both sexes (see NIXON, 1954, fig. 317). Notaulices distinct to about the middle of the mesoscutum. 27—30 antennal segments. Petiole subtriangular, densely clothed with short hairs . . . . . *D. obesa* STELFOX
Host: *Liriomyza virgo* ZETTERSTEDT

— Pterostigma not so narrow. Notaulices weak or absent. Petiole normally more elongate (at least 1.2 times as long as wide) 41

41[13] Pterostigma parallel-sided (fig. 114) 42

— Pterostigma clearly tapering towards its apex 44

42 Petiole 1.5—1.6 times as long as wide, with conspicuous pubescence distributed over its entire surface. 27—31 antennal segments . . . . ***D. soldanellae* sp. nov.**
Host: *Phytomyza soldanellae* STARÝ

— Petiole more elongate, 1.8—2.0 times as long as wide, almost bare (with no more than 3 or 4 pairs of hairs on its dorsal surface). 24—28 antennal segments . . . 43

43 Lateral lobes of mesoscutum almost bare . . . . . *D. ocyroe* NIXON
Hosts: *Phytomyza* spp. on Compositae, mainly the *albiceps* group s.l.

— Entire surface of mesoscutum densely pubescent . . . . . ***D. alpestris* sp. nov.**
Hosts: *Phytomyza alpina* GROSCHKE, *P. senecionis* KALTENBACH and *P. tussilaginis* HENDEL

44 33—37 antennal segments. Tergites 3 and 4 yellow. Wing as fig. 118 with cell $2R_1$ reaching almost to its apex. Metapleural and propodeal pubescence moderately dense . . . . . *D. lissos* (NIXON)
Hosts: *Phytomyza abdominalis* ZETTERSTEDT and *P. aconitophila* HENDEL

— At most 32 antennal segments 45

45 Cell $2R_1$ relatively short (figs. 97, 112, 113 and 119) with the metacarp not longer than the pterostigma. Metapleuron, propodeum and petiole densely pubescent 46

— Metapleuron and propodeum sparsely pubescent: or, if rather densely pubescent (*macrospila, ergeteles* and *lithospermi*), cell $2R_1$ is very long, reaching almost the apex of the wing (*ergeteles* and *lithospermi*) and/or the metacarp is distinctly longer than the pterostigma (*macrospila* and *ergeteles*) 48
Note: care should be taken not to confuse *macrospila* and *melicerta* at this couplet; the metacarp is distinctly shorter than the pterostigma in *melicerta*.

46 Wing short and broad with the pterostigma not much longer than the metacarp (fig. 97). 23 antennal segments . . . . . ***D. veronicae* sp. nov.** (see couplet 37)

— Wing not so short and broad (figs. 112, 113 and 119). Antennal segments more numerous 47

47 25—26 antennal segments . . . . . *D. melicerta* (NIXON)
Hosts: *Phytomyza achilleae* HERING, *P. corvimontana* HERING and *P. matricariae* HENDEL

— 28—32 antennal segments . . . . . ***D. centaureae* sp. nov.**
Host: *Phytomyza montana* GROSCHKE

48 Cell $2R_1$ not so elongate: metacarp clearly shorter than the pterostigma. Metapleuron and propodeum only sparsely pubescent. Petiole almost or completely bare. Lateral lobes of mesoscutum pubescent 49

— Cell $2R_1$ very elongate, reaching almost the apex of the wing: pterostigma as long as or almost as long as the metacarp (figs. 107 and 108) 50

[13] The characters of the shape of the pterostigma used from this couplet onwards are best appreciated in males. In females the relative proportions of the pterostigma and metacarp are the same, but differences in the shape of the pterostigma are less pronounced.

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— Cell $2R_1$ very elongate, reaching almost the apex of the wing: pterostigma shorter than the metacarp (figs. 106 and 117) 51

— Pterostigma very short (as in *ergeteles*), but cell $2R_1$ much shorter than in that species (figs. 110 and 111). Metapleuron and propodeum densely pubescent. 24—27 antennal segments . . . . . *D. macrospila* (HALIDAY)

Host: *Phytomyza ranunculi* SCHRANK
Note: a few individuals of *clematidis* and *brevistigma* have the pterostigma and metacarp of almost equal length and may cause difficulty between the first and third alternatives in this couplet.

49 21—24 antennal segments. Wing as FISCHER (1961), figs. 1 and 2 . . . . . *D. austriaca* (FISCHER), **comb. nov.**

— 25—28 antennal segments. Wing as fig. 109 . . . . . ***D. clematidis* sp. nov.**

Host: *Phytomyza kaltenbachi atragenis* HERING

50 28—31 antennal segments. Metapleuron with only sparse pubescence (compare fig. 16). Legs deep yellow with the tarsi and apex of the hind tibiae brown . . . . . ***D. angelicina* sp. nov.**

Hosts: *Phytomyza angelicae* KALTENBACH and *P. aegopodii* HENDEL

— 30 antennal segments (♂). Metapleuron more densely pubescent. Legs entirely pale yellow . . . . . ***D. lithospermi* sp. nov.**

Host: *Phytomyzae lithospermi* NOWAKOWSKI

51 Metapleuron and propodeum rather densely pubescent, their surface partly concealed. 29—31 antennal segments. Pterostigma (♂) very short and broad (fig. 106). Lateral lobes of mesoscutum largely pubescent . . . . . *D. ergeteles* (NIXON)

Host: *Phytomyza* spec.

— Metapleural and propodeal pubescence sparse. 23—28 antennal segments. Lateral lobes of mesoscutum largely bare 52

52 Metacarp 1.3—1.6 times as long as the pterostigma, which is very short and broad . . . . . *D.* spec. (*macrospila* (HALIDAY) sensu NIXON, 1954)

— Metacarp only 1.0—1.3 times as long as the more elongate pterostigma (fig. 117) . . . . . *D. brevistigma* (TOBIAS)

Hosts: *Phytomyza anemones* HERING, *P. auricomi* HERING and *P. hellebori* KALTENBACH

Notes on the Identification of *Chorebus* spp.

The new species of *Chorebus* described in this paper could not all be incorporated in the existing keys without substantially revising them, but I think that it would be premature for me to attempt to do this at this time because the genus contains a large number of species associated with the remaining genera of Agromyzidae whose parasites I have not yet studied in detail. Nevertheless I have prepared some notes below which are intended to narrow the field of search for anyone who wishes to check caught material against my descriptions. These notes refer solely to the species treated in this paper and should of course be used in conjunction with the existing keys of the groups concerned (in NIXON, 1943—46).

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A. Antennae

(i) Number of segments 23 or less:

always or usually — *canariensis, sativi, amasis, albipes*; *xylostellus* ♀, *buhri* ♀, *scabiosae* ♀, *endymion* ♀, *thusa* ♀;

[14]sometimes — *xylostellus* ♂ (the information on the males of the four other species listed above is inadequate, but some may fall into this category); *aphantus* ♀, *sylvestris* ♀, *tanis* ♀.

(ii) Number of segments 30 or more:

always or usually — *ergias, fallax, merion, abaris, albimarginis, bensoni*; *crassipes* ♂, *luzulae* ♂;

sometimes — *crassipes* ♀, *luzulae* ♀; *armida, kama, mitra, nana, tamiris*; *thecla* ♂, *calthae* ♂, *tenellae* ♂, *fallaciosae* ♂.

(iii) Basal segments contrastingly yellow at least as far as the second flagellar segment — *albipes, xylostellus, abaris, nana*; less markedly so in *sylvestris, endymion, ergias* and *bensoni*.

B. Mandibles

(i) Tooth 2 very long and pointed, but tooth 3 very weakly developed: as fig. 135 — *dagda, gentianellus*; as fig. 136 — *fallax*.

(ii) Tooth 2 fairly long and pointed, but not so markedly so: tooth 3 more distinct (fig. 130) — *buhri, gnaphalii*.

(iii) Tooth 4 unusually small and arising close to the base of the mandible (figs. 134 and 137) — *tenellae, crassipes*.

(iv) Mandibles strongly expanded (fig. 139) — *thusa*.

C. Mesoscutal Pubescence[15]

(i) Dorsal surface of mesoscutum entirely bare except for a few hairs along the course of the notaulices — *albipes, fallaciosae*.

(ii) Dorsal surface of mesoscutum largely bare, but with three or four rows of hairs on its central lobe or along the course of the notaulices — *merion, albimarginis*, see also the comments under the description of *albipes*.

(iii) Central lobe of mesoscutum more or less densely pubescent (at least anteriorly), but the lateral lobes largely bare — *buhri, scabiosae, dagda, bensoni, tamiris, endymion, angelicae, tenellae*, [*thusa*].

(iv) Mesoscutum extensively pubescent (at most the posterior half of the lateral lobes bare) — [*thusa*], *aphantus, sylvestris, xylostellus, tanis, gentianellus, luzulae, punctus, canariensis, sativi, alecto, amasis, armida, mitra, oreoselini, pimpinellae, kama, gnaphalii, abaris, nana, thecla, calthae, thalictri, ergias, fallax, crassipes*.

D. Pubescence of Petiole[15]

(i) Petiole almost bare, with only some inconspicuous basal pubescence and a few isolated hairs on its dorsal surface — *gnaphalii, abaris, albimarginis, endymion*; [*albipes*].

[14] Only species whose normal range of antennal segments reaches as few as 23 are listed here: there are a few other species of which I have seen exceptionally small individuals with as few as 23 segments, but this is outside their normal range of variation.

[15] Where a species has been included under two alternatives because its characters are intermediate, its name is given in square brackets.

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(ii) Petiole with pubescence at its base, along its sides and towards its apex, but becoming bare centrally — [*albipes*]; *canariensis* (fig. 143), *thecla* (fig. 145), *bensoni*, *tenellae*, *fallaciosae*; [*scabiosae*], [*dagda* (fig. 141)], [*tamiris*], [*angelicae*].

(iii) Petiole with fairly dense pubescence evenly distributed over its entire surface, but not becoming noticeably denser at its apical corners — [*scabiosae*], [*dagda* (fig. 141)], [*tamiris*], [*angelicae*]; *aphantus*, *sylvestris*, *xylostellus*, *sativi*, *punctus*, *thusa*, *thalictri*; [*buhri*], [*crassipes*].

(iv) Petiole with dense pubescence covering its entire surface and becoming denser towards its apical corners, sometimes forming distinct tufts — [*crassipes*], [*buhri*]; *ergias*, *fallax*, *merion*, *tanis*, *gentianellus* (fig. 142), *alecto* (fig. 144), *amasis*, *armida*, *mitra*, *oreoselini*, *pimpinellae*, *kama*, *nana*, *calthae*, *luzulae*.

E. Ovipositor (♀)

(i) Very long, projecting beyond the apical tergite by almost half the gastral length — *bensoni*, *crassipes*.

(ii) Projecting (in the retracted position) beyond the apical tergite by nearly the length of the petiole — *tanis*.

(iii) More shortly projecting — *kama*, *fallax*, *tenellae* (only slightly projecting).

(iv) Not projecting beyond the apical tergite in the retracted position — *aphantus*, *sylvestris*, *xylostellus*, *buhri*, *scabiosae*, *dagda*, *gentianellus*, *canariensis*, *sativi*, *luzulae*, *punctus*, *ergias*, *merion*, *alecto*, *amasis*, *armida*, *mitra*, *oreoselini*, *pimpinellae*, *gnaphalii*, *abaris*, *nana*, *thecla*, *albimarginis*, *calthae*, *tamiris*, *albipes*, *endymion*, *thusa*, *angelicae*, *fallaciosae*.

Keys to the Dacnusini Parasites of particular Host-Groups

Since the affinities of many of the species of *Phytomyza* have not yet been sufficiently clarified to allow the genus to be broken down into smaller groups in accordance with the principles of phylogenetic classification, I have made a rough and ready breakdown mainly in accordance with host-plants for the purposes of this section. The result is that some of the keys, particularly that referring to *Phytomyza* spp. on Ranunculaceae, deal with a number of disjunct groups of hosts. The following host species are not included in any of the keys: *Phytomyza dasyops* HENDEL, *P. diversicornis* HENDEL, *P. dorsata* HENDEL, *P. primulae* ROBINEAU-DESVOIDY, *P. rufipes* MEIGEN, *P. scolopendrii* ROBINEAU-DESVOIDY, *P. sedicola* HERING, *P. soldanellae* STARÝ, *Paraphytomyza buhri* DEMEIJERE and *Phytagromyza* spp. I have recorded from these hosts only one or two species of Dacnusini parasites, whose names can be found in Table 11.

1. *Phytomyza* spp. on Ranunculaceae

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare figs. 129, 132 and 133). Metapleural pubescence forming a rosette of radiating hairs (compare fig. 22) 2

— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa 8

2 Mesoscutum with both central and lateral lobes bare. Petiole largely bare, but with scattered hairs at its base, along its sides and towards its apex. Antennal segments: ♂, 28—31; ♀, 26—28 . . . . . ***Chorebus fallaciosae* sp. nov.**

Hosts: *P. fallaciosa* BRISCHKE and *P. rydeni* HERING

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— At least the central lobe of the mesoscutum pubescent (although only sparsely so in *Chorebus albimarginis* sp. nov.) 3

3 Petiole covered with dense pubescence which becomes denser towards its apical corners 4

— Pubescence of petiole sparse or, if fairly dense, not becoming denser towards the apical corners 5

4 Ovipositor (♀) shortly projecting beyond the apical tergite in the retracted position. Petiole rather elongate (1.6—1.8 times as long as wide) with characteristically long pubescence. Notaulices well developed. Central lobe of mesoscutum roughened. Antennal segments: ♂, 28—32; ♀, 27—31 . . . . . *Chorebus kama* (NIXON)

Host: *P. ranunculi* SCHRANK

— Ovipositor (♀) not projecting beyond the apical tergite in the retracted position. Petiole shorter (1.3—1.5 times as long as wide) with short pubescence. Notaulices weak. Mesoscutum distinctly roughened only on its anterior face. Antennal segments: ♂, 28—30; ♀, 24—27 . . . . . ***Chorebus calthae* sp. nov.**

Host: *P. calthivora* HENDEL

5 Ovipositor (♀) extremely long, projecting beyond the apical tergite in the retracted position by almost half the gastral length. Petiole short (about 1.2 times as long as wide), broadly bare along its central line but with fine inconspicuous pubescence along its sides. Antennal segments: ♂, 33—35; ♀, 30—33 . . *Chorebus bensoni* (NIXON)

Host: *P. soenderupi* HERING

— Ovipositor (♀) short, not projecting beyond the apical tergite in the retracted position. Petiole longer 6

6 Petiole about twice as long as wide, parallel-sided and almost bare. Mesoscutal pubescence sparse (only about two rows of hairs on the central lobe). 32 antennal segments (♀) . . . . . ***Chorebus albimarginis* sp. nov.**

Host: *P. albimargo* HERING

— Petiole shorter (1.3—1.7 times as long as wide), with pubescence distributed over most of its surface (at most absent from the centre-line). Central lobe of mesoscutum more densely pubescent 7

7 24 antennal segments (♂). Lateral lobes of mesoscutum pubescent. Legs ochreous brown . . . . . ***Chorebus thalictri* sp. nov.**

Host: *P. aquilegiae* HARDY

— Antennal segments: ♂, 28—32; ♀, 27—31. Lateral lobes of mesoscutum largely bare. Legs deep yellow, sometimes ochreous tinged . . . . *Chorebus tamiris* (NIXON)

Host: *P. calthophila* HERING

Note: A similar insect has been bred from *P. trolliivora* HERING (see the comment under the description of *tamiris*).

8 Pubescence of metapleuron, propodeum and petiole very long and dense, concealing the surface beneath. Pterostigma very elongate (figs. 123, 126 and 127) with vein *2r* branching from its extreme base 9

— Pubescence of metapleuron, propodeum and petiole sparse, except in *Dacnusa macrospila* (HALIDAY) and *D. ergeteles* (NIXON). Pterostigma with vein *2r* not branching so closely to its base 11

9 Mesepisternum without any indication of a precoxal suture. Wing as fig. 127. Legs largely deep yellow . . . . . *Dacnusa laevipectus* THOMSON

(oligophagous species)

— Precoxal suture visible at least as a short groove, which is usually rugose . . . 10

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10 Pterostigma conspicuously widened towards its apex (fig. 123). Legs largely brown . . . . . *Dacnusa maculipes* THOMSON
(oligophagous species)

— Pterostigma not or only slightly widened towards its apex (fig. 126). Legs largely deep yellow . . . . . *Dacnusa confinis* RUTHE
Hosts: *P. ranunculi* SCHRANK and *P. glechomae* KALTENBACH

11 Rugose precoxal suture present 12
— Precoxal suture represented by a smooth impression or absent. Pterostigma sexually dimorphic, broader and darker in the male 16
12 R_s+M completely lost (figs. 100 and 101): pterostigma short and broad, sexually dimorphic. Metapleuron densely pubescent, but petiole almost bare. Precoxal suture short . . . . . *Dacnusa hospita* (FÖRSTER)
Host: *P.* sp. near *ranunculi* SCHRANK (? *stolonigena* HERING)

— R_s+M present. Metapleural pubescence sparse 13
13 Pterostigma sexually dimorphic (figs. 51 and 52). Precoxal suture represented by a broad area of rugosity. First three antennal segments and base of fourth contrastingly bright yellow. 22—25 antennal segments . . . . . *Dacnusa laeta* (NIXON)
Hosts: *P. calthophila* HERING and *P. ranunculi* SCHRANK (also bred from two *Agromyza* spp.)

— Pterostigma narrow, not sexually dimorphic: *1m—cu* interstitial or received into cell R_s (figs. 79 and 80) 14
14 Legs extensively infuscated. Palpi dark brown . . . . . *Exotela sulcata* (TOBIAS)
Hosts: *P. calthivora* HENDEL and *P. calthophila* HERING

— Legs largely yellow. Palpi yellow 15
15 Ovipositor (♀) long and downcurved, projecting beyond the apical tergite in the retracted position by at least half the length of the petiole. Legs unusually slender with the hind tarsi about as long as the hind tibiae . . . . *Exotela gilvipes* (HALIDAY)
Host: *P. ranunculi* SCHRANK

— Ovipositor (♀) not projecting beyond the apical tergite in the retracted position. Hind tarsus shorter than the hind tibia . . . . . ***Exotela aconiti* sp. nov.**
Host: *P. aconitella* HENDEL

16 *1m—cu* interstitial or almost so (fig. 115): metacarp much shorter than the pterostigma 17
— *1m—cu* clearly rejected from cell R_s 19
17 Palpi yellow-brown. Hind coxae infuscated. 27—32 antennal segments . . . . . ***Dacnusa fuscipes* sp. nov.**
Hosts: *P. aconiti* HENDEL and *P. laserpitii* HENDEL

— Palpi and hind coxae yellow 18
18 25—30 antennal segments. Smaller species (wing length less than 3 mm.) . . . . . *Dacnusa aquilegiae* MARSHALL
Hosts: *P. aquilegiae* HARDY, *P. actaeae* HENDEL, *P. albimargo* HERING, *P. rydeni* HERING, *P. thalictricola* HENDEL, *P. heracleana* HERING and *P. symphyti* HENDEL
Note: see also the remarks under the description of *aquilegiae* on specimens bred from *P. kaltenbachi atragenis* HERING

— 31—36 antennal segments. Larger species (wing length usually in excess of 3 mm.) . . . . . ***Dacnusa delphinii* sp. nov.**
Hosts: *P. aconiti* HENDEL and *P. aconitophila* HENDEL

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19 Pterostigma becoming paler near its apex in the male (fig. 92). Petiole almost bare, longitudinally striate. 22—24 antennal segments. Legs yellow . . . . . *Dacnusa sibirica sibirica* TELENGA

Once bred from *P. ranunculi* SCHRANK (other hosts are *P. asteris* HENDEL, *P. autumnalis* GRIFFITHS and *P. plantaginis* ROBINEAU-DESVOIDY)

— Pterostigma unicolorous in both sexes. Petiole clearly pubescent, although often only sparsely so 20

20 Legs brown with the coxae virtually black. 24 antennal segments (♀) . . . . . ***Dacnusa campanariae* sp. nov.**

HOST: *P. campanariae* NOWAKOWSKI

— Legs yellow 21

21 Large species (wing length up to 4 mm.) with 33—37 antennal segments. Wing as fig. 118. Metapleural and propodeal pubescence moderately dense . . . . . *Dacnusa lissos* (NIXON)

HOSTS: *P. abdominalis* ZETTERSTEDT and *P. aconitophila* HENDEL

— Smaller species with fewer antennal segments 22

22 Metapleuron and propodeum rather densely pubescent. Pterostigma very short (figs. 106, 110 and 111) 23

— Metapleural and propodeal pubescence sparse (compare fig. 16). Pterostigma longer (figs. 109 and 117) 24

23 Cell $2R_1$ very elongate, reaching almost the apex of the wing (fig. 106). 29—31 antennal segments . . . . . *Dacnusa ergeteles* (NIXON)

HOST: see the note under the description of *ergeteles*

— Cell $2R_1$ much shorter (figs. 110 and 111). 24—27 antennal segments . . . . . *Dacnusa macrospila* (HALIDAY)

HOST: *P. ranunculi* SCHRANK

24 Wing (fig. 109) with the pterostigma usually longer than the metacarp. Lateral lobes of mesoscutum pubescent . . . . . ***Dacnusa clematidis* sp. nov.**

HOST: *P. kaltenbachi atriagenis* HERING

— Wing (fig. 117) with the pterostigma usually shorter than the metacarp. Lateral lobes of mesoscutum largely bare . . . . . *Dacnusa brevistigma* (TOBIAS)

HOSTS: *P. anemones* HERING, *P. auricomi* HERING and *P. helleborı* KALTENBACH

2. *Phytomyza* spp. on Umbelliferae

(mainly belonging to the *albiceps* and *obscurella* groups)

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 132). Metapleural pubescence forming a rosette of radiating hairs (compare fig. 22) 2

— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa 5

2 Pubescence of petiole sparse and inconspicuous, not forming apical tufts. 25—27 antennal segments. Legs deep yellow-brown or testaceous with the coxae infuscated . . . . . *Chorebus angelicae* (NIXON)

HOST: *P. angelicae* KALTENBACH

— Pubescence of petiole dense, becoming denser towards the apical corners, often forming distinct tufts (compare fig. 144) 3

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3 Legs dark brown with the coxae black. Palpi almost black. 26 antennal segments (♀) . . . . . ***Chorebus pimpinellae* sp. nov.**

Host *P melana* HENDEL

— Legs and palpi yellow or yellow-brown 4

4 25—26 antennal segments. Notaulices distinct to about the middle of the mesoscutum . . . . . ***Chorebus oreoselini* sp. nov.**

Host *P pauliloewi* HENDEL

– 27—31 antennal segments. Notaulices not distinct on the dorsal surface of the mesoscutum . . . . . *Chorebus armida* (NIXON)

Hosts *P angelicae* KALTENBACH, *P. angelicastri* HERING, *P angelicivora* HERING, *P aegopodii* HENDEL, *P eupatorii* HENDEL, *P lappina* GOUREAU, *P laserpitii* HENDEL and *P obscurella* FALLÉN (? also *P chaerophylliana* HERING)

5 Pubescence of propodeum, metapleuron and petiole very long and dense, concealing the surface beneath. Pterostigma very elongate (figs. 123 and 127) with vein *2r* branching from its extreme base 6

— Pubescence of metapleuron, propodeum and petiole sparse (compare fig. 16). Pterostigma with vein *2r* not branching so closely to its base 7

6 Mesepisternum without any indication of a precoxal suture. Pterostigma not widened towards its apex (fig. 127). Legs largely deep yellow. . . . . *Dacnusa laevipectus* THOMSON

(oligophagous species)

— Precoxal suture visible as a short groove which is usually rugose. Pterostigma conspicuously widened towards its apex (fig. 123). Legs largely brown . . . . . *Dacnusa maculipes* THOMSON

(oligophagous species)

7 Rugose precoxal suture present. *1m—cu* received into cell R_s (fig. 78). Pterostigma not sexually dimorphic 8

— Precoxal suture represented by a smooth impression or absent 11

8 Flagellum entirely dark: its basal segments relatively short and broad (first flagellar segment 1.2 times as long as the second). Hind coxae infuscated . . . . . ***Exotela obscura* sp. nov.**

Hosts *P aegopodii* HENDEL, *P angelicae* KALTENBACH, *P laserpitii* HENDEL and *P pubicornis* ZETTERSTEDT

— Basal flagellar segments often yellow or yellow-brown: first flagellar segment elongate, 1.3—1.5 times as long as the second. Hind coxae at most infuscated posteriorly at their extreme base. . . . *Exotela cyclogaster* FORSTER 9

9 At least the basal flagellar segments bright yellow, contrasting strongly in dorsal view with the black succeeding segments. Hind coxae always entirely yellow. 25—28 antennal segments . . . . . ***E. cyclogaster sonchina* ssp. nov.**

Hosts: *P marginella* FALLÉN, *P senecionis* KALTENBACH, *P obscurella* FALLÉN and *P thysselini* HENDEL

— Flagellum without such a strong colour contrast in dorsal view, usually no more than the first flagellar segment being obviously yellow or yellow-brown. Hind coxae often infuscated posteriorly at their base 10

10 24—28 antennal segments. Thorax distinctly longer than high . . . . . *E. cyclogaster cyclogaster* FORSTER

Hosts *P aegopodii* HENDEL, *P heracleana* HERING, *P pastinacae* HENDEL, *P spondylii* ROBINEAU-DESVOIDY, *P sphondylivora* SPENCER, *P ? simmi* BEIGER and *P virgaureae* HERING

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— 20—24 antennal segments. Thorax usually not longer than high . . . . . *E. cyclogaster umbellina* (NIXON)

Hosts: the *P. obscurella* group, *P. conii* HERING and *P. ferulae* HERING
Note: an apparently intermediate series has been bred from *P. angelicastri* HERING.

11 Very small (wing length less than 2 mm.) entirely black species with 16—19 antennal segments. Cell *2Cu* open at its lower distal corner (fig. 82). Pterostigma not sexually dimorphic . . . . . *Priapsis dice* NIXON

Hosts: *P. silai* HERING and *P. angelicivora* HERING

— At least 25 antennal segments. Cell *2Cu* closed by Cu_{1b} at its lower distal corner. Pterostigma sexually dimorphic, broader and darker in the male 12

12 Cell $2R_1$ extremely elongate, reaching almost the apex of the wing (fig. 107): *1m—cu* rejected from cell R_s. 28—31 antennal segments . . . . . ***Dacnusa angelicina* sp. nov.**

Hosts: *P. angelicae* KALTENBACH and *P. aegopodii* HENDEL

— Cell $2R_1$ much shorter: *1m—cu* interstitial or almost so (fig. 115) 13

13 Palpi yellow-brown. Hind coxae infuscated. 27—32 antennal segments . . . . . ***Dacnusa fuscipes* sp. nov.**

Hosts: *P. aconiti* HENDEL and *P. laserpitii* HENDEL

— Palpi and hind coxae yellow. 25—30 antennal segments . *Dacnusa aquilegiae* MARSHALL

Once bred from *P. heracleana* HERING (normally associated with blotch-mining species on Ranunculaceae)

3. The *Phytomyza albiceps* group s. l. on Compositae

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 132). Metapleural pubescence forming a rosette of radiating hairs (compare fig. 22) 2

— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa 4

2 Petiole very elongate (over twice as long as wide), largely bare with only some fine pubescence at its base and a few long hairs along its sides. Legs dark brown with the coxae virtually black . . . . . ***Chorebus gnaphalii* sp. nov.**

Host: *P. gnaphalii* HERING

— Petiole not so elongate, covered with dense pubescence which forms distinct apical tufts. Legs largely yellow or yellow-brown 3

3 Normal range of antennal segments: ♂, 26—28; ♀, 24—26 . . *Chorebus alecto* (MORLEY)

Hosts: *P. albiceps* MEIGEN, *P. bellidina* HERING, *P. conyzae* HENDEL, *P. corvimontana* HERING, *P. klimeschi* HERING, *P. kyffhusana* HERING, *P. matricariae* HENDEL, *P. tanaceti* HENDEL and *P. crassiseta* ZETTERSTEDT

— Normal range of antennal segments: ♂, 28—31; ♀, 27—31 . . *Chorebus armida* (NIXON)

Hosts: *P. eupatorii* HENDEL, *P. lappina* GOUREAU and several species on Umbelliferae

4 Pubescence of metapleuron, propodeum and petiole very long and dense, concealing the surface beneath. Pterostigma elongate, broadened towards its apex (fig. 123), with vein *2r* branching from its extreme base. Precoxal suture visible as a short groove which is usually rugose. Legs largely brown . . . . *Dacnusa maculipes* THOMSON (oligophagous species)

— Pubescence of metapleuron, propodeum and petiole sparse except in *Dacnusa melicerta* (NIXON) and *D. centaureae* sp. nov. Pterostigma with vein *2r* not branching so closely to its base 5

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5 Rugose precoxal suture present (but somewhat weak in *Exotela spinifer* (NIXON) and *E. tatrica* sp. nov.). *1m—cu* received into cell R_s (figs. 78 and 83). Pterostigma not sexually dimorphic 6

— Precoxal suture represented by a smooth impression or absent. *1m—cu* rejected from cell R_s. Pterostigma sexually dimorphic, larger and darker in the male . . 10

6 At least the basal half of the hind coxae infuscated 7

— Hind coxae yellow or at most infuscated posteriorly at their extreme base . . . 8

7 Legs largely infuscated. Palpi dark brown or black. Antennae entirely dark. Precoxal suture poorly developed, weakly rugose-costate anteriorly, but smooth along much of its length. Wing as fig. 83. Hind coxa not sculptured . . . . . ***Exotela tatrica* sp. nov.**

Host: *P. aronici* NOWAKOWSKI

— Legs 1 and 2 largely deep yellow: hind legs with at least the femora and most of the tibiae deep yellow. Palpi yellow. First and sometimes the base of the second flagellar segment yellow-brown. Precoxal suture broad, strongly rugose-costate. Wing similar to that of *E. cyclogaster* FÖRSTER (fig. 78). Basal half of hind coxa conspicuously sculptured . . . . . ***Exotela senecionis* sp. nov.**

Hosts: *P. senecionis* KALTENBACH, *P. alpina* GROSCHKE and *P. homogyneae* HENDEL

8 Postscutellum developed into a pointed spine (fig. 146). Precoxal suture with only feeble rugosity along its sharply delimited lower edge. First flagellar segment short, about 1.2 times as long as the second . . . . . *Exotela spinifer* (NIXON)

Hosts: *P. alpina* GROSCHKE, *P. cirsii* HENDEL and *P. lappina* GOUREAU

— Postscutellum visible as no more than a short blunt tooth in lateral view (fig. 147). First flagellar segment longer, 1.3—1.5 times as long as the second . . . . . *Exotela cyclogaster* FÖRSTER 9

9 At least the two basal flagellar segments bright yellow, contrasting strongly in dorsal view with the black succeeding segments . . . . . ***E. cyclogaster sonchina* ssp. nov.**

Hosts: *P. marginella* FALLÉN, *P. senecionis* KALTENBACH, *P. obscurella* FALLÉN and *P. thysselini* HENDEL

— Flagellum without such a strong colour contrast in dorsal view, usually no more than the first flagellar segment being obviously yellow. *E. cyclogaster cyclogaster* FÖRSTER

Hosts: *P. virgaureae* HERING, *P.* ? *simmi* BEIGER and several species on Umbelliferae

10 Pterostigma parallel-sided (fig. 114). Petiole elongate, 1.8—2.0 times as long as wide, almost bare. Metapleural and propodeal pubescence sparse 11

— Pterostigma clearly tapering towards its apex (figs. 112, 113 and 119). Metapleuron, propodeum and petiole densely pubescent. Petiole not so elongate 12

11 Lateral lobes of mesoscutum almost bare . . . . . *Dacnusa ocyroe* NIXON

Hosts: *P. albiceps* MEIGEN, *P. alpina* GROSCHKE, *P. conyzae* HENDEL, *P. farfarae* HENDEL, *P. lappina* GOUREAU, *P. leucanthemi* HERING, *P. senecionis* KALTENBACH, *P. solidaginis* HENDEL and *P. marginella* FALLÉN

— Entire surface of mesoscutum densely pubescent . . . ***Dacnusa alpestris* sp. nov.**

Hosts: *P. alpina* GROSCHKE, *P. senecionis* KALTENBACH and *P. tussilaginis* HENDEL

Note: see also the comments under the description of *alpestris* on a similar insect bred from *P. rydeniana* HERING.

12 25—26 antennal segments . . . . . *Dacnusa melicerta* (NIXON)

Hosts: *P. achilleae* HERING, *P. corvimontana* HERING and *P. matricariae* HENDEL

— 28—32 antennal segments . . . . . ***Dacnusa centaureae* sp. nov.**

Host: *P. montana* GROSCHKE

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4. *Phytomyza atricornis* MEIGEN and some related species on Compositae

(species with the front spiracles of their puparia projecting ventrally through the epidermis of the host-plant)

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 132). Metapleural pubescence forming a rosette of radiating hairs. 18—22 antennal segments. Wing as fig. 85 (pterostigma not sexually dimorphic) 2

— Mandibles 3-toothed except in *Dacnusa pubescens* (CURTIS) (fig. 140). Metapleural pubescence directed mainly downwards towards the hind coxa. Pterostigma blackened in the male 3

2 Petiole raised centrally, rather coarsely rugose, not strongly shining, with short hairs rather densely distributed over almost its entire surface. . *Chorebus sativi* (NIXON)

Host: *P. atricornis* MEIGEN

— Petiole almost flat, strongly shining, its shallow sculpture having a distinct longitudinal element, bare centrally but with a few hairs near its sides and apical corners (fig. 143). (Canary Islands) . . . . . ***Chorebus canariensis* sp. nov.**

Host: *P. atricornis* MEIGEN

3 Metapleuron, propodeum and petiole only sparsely pubescent. Pterostigma not unusually elongate 4

— Pubescence of metapleuron, propodeum and petiole very long and dense, concealing the surface beneath. Pterostigma very elongate (figs. 121—128) 6

4 Pterostigma parallel-sided (compare fig. 114). Petiole elongate, 1.8—2.0 times as long as wide. 23—28 antennal segments . . . . . *Dacnusa ocyroe* NIXON

Hosts: *P. farfarae* HENDEL and several members of the *albiceps* group

— Pterostigma tapered, becoming paler near its apex in the male (figs. 91 and 92). Petiole 1.4—1.5 times as long as wide. 22—24 antennal segments . . . . . *Dacnusa sibirica* TELENGA 5

5 Legs yellow except that the tarsal segments are progressively darkened . . . . . *D. sibirica sibirica* TELENGA

Hosts: *P. asteris* HENDEL, *P. autumnalis* GRIFFITHS, *P. plantaginis* ROBINEAU-DESVOIDY and *P. ranunculi* SCHRANK

— Legs varying from light brown or testaceous to dark red-brown with the tarsi and hind coxae somewhat infuscated (sometimes almost black). (Ireland) . . . . . *D. sibirica comis* (NIXON)

Host: *P. asteris* HENDEL

6 Vein *2r* arising extremely close to the base of the pterostigma (figs. 123, 124 and 127). Ovipositor (♀) not projecting beyond the apical tergite in the retracted position 7

— Vein *2r* arising further from the base of the pterostigma (figs. 121, 125 and 128) . . 9

7 Precoxal suture visible as a short groove which is usually rugose. Pterostigma conspicuously widened towards its apex (fig. 123). Legs largely brown . . . . . *Dacnusa maculipes* THOMSON

(oligophagous species)

— Mesepisternum without any indication of a precoxal suture. Pterostigma not widened towards its apex (figs. 124 and 127) 8

8 Thorax not very deep, about 1.4 times as long as high. Maxillary palpi short (see the table of biometric data) and infuscated. Legs largely brown or yellow-brown. Wing (fig. 124) with vein R_s clearly sinuate . . . . . *Dacnusa areolaris* (NEES)

Hosts: *P. atricornis* MEIGEN, *P. asteris* HENDEL and *P. nigra* MEIGEN

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— Thorax very deep, 1.1—1.2 times as long as high. Maxillary palpi longer and yellow. Legs largely deep yellow. Wing (fig. 127) with vein R_s more curved, only weakly sinuate . . . . . *Dacnusa laevipectus* THOMSON

oligophagous species, once bred from *P. atricornis* MEIGEN

9 Mandibles (fig. 140) with tooth 3 indented, so that they appear weakly 4-toothed. Ovipositor (♀) stout, shortly projecting beyond the apical tergite in the retracted position . . . . . *Dacnusa pubescens* (CURTIS)

HOSTS: *P. atricornis* MEIGEN (rarely), *P.* sp. on *Dipsacus*, *P. rufipes* MEIGEN and *P. taraxacocecis* HERING

— Mandibles 3-toothed (tooth 3 not indented) 10

10 Ovipositor (♀) small, not or only slightly projecting beyond the apical tergite in the retracted position. Cell $2R_1$ not unusually long (fig. 125) . . . . . *Dacnusa tarsalis* THOMSON

HOSTS: *P. autumnalis* GRIFFITHS and *P. farfarae* HENDEL

— Ovipositor (♀) very long, projecting beyond the apical tergite by much more than the length of the petiole. Wing (fig. 121) with cell $2R_1$ very long, reaching almost the apex of the wing . . . . . *Dacnusa merope* (NIXON)

HOST: *Phytomyza* sp. on *Petasites* (HERING, 1957, no. 3604a)

5. The *Phytomyza robustella* group (on Compositae)

1 Metapleural pubescence long and dense, directed mainly downwards towards the hind coxa. Pterostigma very elongate (fig. 128), blackened in the male. Precoxal suture absent. Ovipositor (♀) stout, shortly projecting beyond the apical tergite in the retracted position . . . . . *Dacnusa pubescens* (CURTIS)

HOSTS: *P. taraxacocecis* HERING, *P. atricornis* MEIGEN, *P.* sp. on *Dipsacus* and *P. rufipes* MEIGEN

— Metapleural pubescence dense, forming a rosette of radiating hairs (compare fig. 22). Pterostigma not so elongate, not sexually dimorphic. Rugose precoxal suture present 2

2 Mandibles with tooth 2 very long and curved outwards (fig. 136). Ovipositor (♀) shortly projecting beyond the apical tergite in the retracted position. Legs largely deep yellow or reddish yellow . . . . . *Chorebus fallax* (NIXON)

HOST: *P. cardui* HERING

— Mandibles (fig. 131) with tooth 2 not unusually long. Ovipositor (♀) not or only very slightly projecting beyond the apical tergite in the retracted position . . . 3

3 Legs largely deep yellow. Mesoscutum with pubescence covering all its surface except the posterior half of the lateral lobes . . . . . *Chorebus ergias* (NIXON)

HOST: *P. araciocecis* HERING

— Legs dark brown with all coxae and tarsi almost black. Dorsal surface of mesoscutum with only about three or four rows of hairs along the course of the notaulices . . . . . *Chorebus merion* (NIXON)

HOST: *P. taraxacocecis* HERING

6. *Phytomyza* spp. on Gentianaceae

1 Mandibles 4-toothed, with tooth 2 long and pointed but tooth 3 only weakly developed (fig. 135). Metapleural pubescence tending to form a rosette of radiating hairs (although this is somewhat weak in *Chorebus dagda* (NIXON)). Wing with

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shorter pterostigma, not sexually dimorphic, with vein *2r* not branching so closely to its base (figs. 122 and 123) 2

— Mandibles 3-toothed. Metapleural pubescence dense, directed mainly downwards towards the hind coxa. Pterostigma elongate, blackened in the male: vein *2r* arising extremely close to the base of the pterostigma 3

2 Mesoscutum with its central lobe pubescent but lateral lobes largely bare. Petiole with only sparse pubescence (fig. 141) . . . . . *Chorebus dagda* (NIXON)

HOST: *P. gentianae* HENDEL

— Mesoscutum with pubescence over all its surface except the posterior half of the lateral lobes. Petiole (fig. 142) with dense pubescence covering its entire surface and tending to form apical tufts . . . . . ***Chorebus gentianellus* sp. nov.**

HOSTS: *P. gentianella* HENDEL and *P. vernalis* GROSCHKE

3 Dorsal surface of mesoscutum bare except for a few hairs along the former course of the notaulices. Pterostigma hardly widened towards its apex (fig. 122) . . . . . ***Dacnusa gentianae* sp. nov.**

HOSTS: *P. gentianae* HENDEL, *P. swertiae* HERING and *P. vernalis* GROSCHKE

— Mesoscutum largely pubescent. Pterostigma conspicuously widened towards its apex (fig. 123) . . . . . *Dacnusa maculipes* THOMSON

(oligophagous species)

7. *Phytomyza* spp. on *Plantago*

1 Mandibles 4-toothed (fig. 130). Metapleural pubescence forming a rosette of radiating hairs. Petiole entirely covered with dense pubescence which shows a slight tendency to become denser at its apical corners. Pterostigma not sexually dimorphic . . . . . ***Chorebus buhri* sp. nov.**

HOST: *P. griffithsi* SPENCER

— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa. Pterostigma sexually dimorphic 2

2 Metapleuron and propodeum only sparsely pubescent. Petiole almost bare, longitudinally striate. Pterostigma as figs. 91 and 92, becoming paler near its apex in the male. Legs yellow . . . . . *Dacnusa sibirica sibirica* TELENGA

Once bred from *P. plantaginis* ROBINEAU-DESVOIDY (other hosts are *P. asteris* HENDEL, *P. autumnalis* GRIFFITHS and *P. ranunculi* SCHRANK)

— Metapleuron, propodeum and petiole densely pubescent 3

3 Petiole rugose, more or less parallel-sided. Male pterostigma (fig. 96) blackened at its base only, becoming contrastingly paler towards its apex . . . . . ***Dacnusa plantaginis* sp. nov.**

HOSTS: *P. plantaginis* ROBINEAU-DESVOIDY and *P. griffithsi* SPENCER

— Petiole subtriangular, with its largely smooth surface visible as a subshine beneath its very dense pubescence. Male pterostigma blackened throughout its length . 4

4 Pterostigma broader at its base, obviously tapered towards its apex (fig. 120): vein *2r* less closely approximated to the base of the pterostigma. Precoxal suture represented by a smooth impression or absent. Mesoscutal pubescence sparse (not extending onto the lateral lobes). Legs largely ochreous yellow. . . . . ***Dacnusa heringi* sp. nov.**

HOST: *P. griffithsi* SPENCER

— Pterostigma conspicuously widened towards its apex (fig. 123): vein *2r* arising extremely close to the base of the pterostigma. Precoxal suture visible as a short

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groove which is usually rugose. Mesoscutum largely pubescent. Legs largely brown . . . . . *Dacnusa maculipes* THOMSON
(oligophagous species)

8. *Phytomyza* spp. on Dipsacaceae

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 129). Metapleural pubescence forming a rosette of radiating hairs. Pterostigma not sexually dimorphic 2
— Mandibles 3-toothed except in *Dacnusa pubescens* (CURTIS) (fig. 140). Metapleural pubescence directed mainly downwards towards the hind coxa. Pterostigma blackened in the male 3
2 Ovipositor (♀) projecting beyond the apical tergite in the retracted position by nearly the length of the petiole. Pubescence of petiole forming distinct apical tufts . . . . . *Chorebus tanis* (NIXON)
Hosts: *P.* sp. on *Dipsacus*, *P. ramosa* HENDEL, *P. succisae* HENDEL and *P. scabiosarum* HERING

— Ovipositor (♀) not projecting beyond the apical tergite in the retracted position. Petiole rather densely pubescent near its base but more sparsely so towards its apex (sometimes bare centrally on its apical half), without any trace of apical tufts . . . . . ***Chorebus scabiosae* sp. nov.**
Host: *P. scabiosae* HENDEL

3 Wing with large broad pterostigma (fig. 99): vein *2r* unusually remote from the base of the pterostigma. Petiole elongate, more or less parallel-sided, almost bare. Precoxal suture visible as a long, narrow, but distinctly rugose furrow. Metapleural and propodeal pubescence sparse . . . . . *Dacnusa metula* (NIXON)
Hosts: *P.* sp. on *Dipsacus* and *P. succisae* HENDEL

— Wing with elongate pterostigma (figs. 122, 123 and 128). Petiole subtriangular: metapleuron, propodeum and petiole very densely pubescent 4
4 Vein *2r* arising further from the base of the pterostigma (fig. 128). Mandibles (fig. 140) with tooth 3 indented, so that they appear weakly 4-toothed. Mesoscutum densely pubescent. Precoxal suture absent. Ovipositor (♀) stout, shortly projecting beyond the apical tergite in the retracted position. *Dacnusa pubescens* (CURTIS)
Hosts: *P.* sp. on *Dipsacus*, *P. atricornis* MEIGEN, *P. rufipes* MEIGEN and *P. taraxacocecis* HERING

— Vein *2r* arising extremely close to the base of the pterostigma (figs. 122 and 123). Mandibles 3-toothed. Precoxal suture visible at least as a short groove which is usually rugose 5
5 Mesoscutum almost entirely bare. Pterostigma hardly widened towards its apex (compare fig. 122). Ovipositor (♀) stout, upcurved, shortly projecting beyond the apical tergite in the retracted position . . . . . ***Dacnusa helvetica* sp. nov.**
Host: *P. ramosa* HENDEL

— Mesoscutum largely pubescent. Pterostigma conspicuously widened towards its apex (fig. 123). Ovipositor (♀) not projecting beyond the apical tergite in the retracted position . . . . . *Dacnusa maculipes* THOMSON
(oligophagous species)

9. *Phytomyza* spp. on Gramineae and *Luzula*

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (fig. 129). Metapleural pubescence forming a rosette of radiating hairs. Pterostigma not sexually dimorphic; vein *2r* not branching so close to its base (fig. 87) 2

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— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa. Pterostigma elongate, blackened in the male: vein *2r* arising extremely close to the base of the pterostigma (figs. 123 and 124) 3

2 Antennal segments: ♂, 26—29; ♀, 23—27. Petiole almost parallel-sided, covered with dense, evenly distributed pubescence. Wing length up to 2.5 mm. . . . . *Chorebus aphantus* (MARSHALL)

Hosts: *P. nigra* MEIGEN and *P. milii* KALTENBACH

— Antennal segments: ♂, 33; ♀, 29—30. Petiole widened towards its apex, covered with dense pubescence which tends to become denser at its apical corners. Wing length up to 3 mm . . . . . ***Chorebus luzulae* sp. nov.**

Host: *P. luzulae* HERING

3 Precoxal suture visible as a short groove which is usually rugose. Pterostigma conspicuously widened towards its apex (fig. 123) . . . . *Dacnusa maculipes* THOMSON

(oligophagous species)

— Precoxal suture absent. Pterostigma not widened towards its apex (fig. 124) . . . . . *Dacnusa areolaris* (NEES)

Hosts: *P. nigra* MEIGEN, *P. atricornis* MEIGEN and *P. asteris* HENDEL

10. *Phytomyza* spp. on *Lonicera* and *Symphoricarpos*

1 Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa. Pterostigma elongate, widened towards its apex, blackened in the male (fig. 123): vein *2r* arising extremely close to the base of the pterostigma. Legs largely brown . . . . . *Dacnusa maculipes* THOMSON

(oligophagous species)

— Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 129). Metapleural pubescence forming a rosette of radiating hairs. Pterostigma parallel-sided, not sexually dimorphic, with vein *2r* not arising so close to its base. Legs largely yellow 2

2 Antennal segments: ♂, 23—25; ♀, 19—21: basal segments conspicuously yellow or orange-yellow at least as far as the third flagellar segment, often as far as the fifth . . . . . ***Chorebus xylostellus* sp. nov.**

Host: *P. periclymeni* DE MEIJERE

— Antennal segments: ♂, 24—27; ♀, 22—25: basal segments as far as about the third flagellar segment sometimes deep yellow or yellow-brown, but not so markedly contrasting in colour as in *xylostellus*. . . . . ***Chorebus sylvestris* sp. nov.**

Hosts: *P. lonicerella* HENDEL, *P. xylostei* KALTENBACH and *P. alpigenae* HENDEL

11. *Phytomyza* spp. on Labiatae and Boraginaceae

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 132). Metapleural pubescence forming a rosette of radiating hairs. Pterostigma not sexually dimorphic 2

— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa. Pterostigma blackened in the male 4

2 Petiole elongate, more or less parallel-sided, with dense whitish pubescence distributed over its entire surface and tending to form apical tufts. Antennal segments:

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♂, 29—32; ♀, 27—32: basal segments usually yellow-brown (clearly so as far as about the first flagellar segment) . . . . . *Chorebus nana* (NIXON)

Hosts: *P. obscura* HENDEL, *P. origani* HERING, *P. petoei* HERING, *P. myosotica* NOWAKOWSKI and *P. symphyti* HENDEL

— Petiole not so densely pubescent 3

3 Petiole (fig. 145) widened towards its apex, densely pubescent on its basal half but more sparsely pubescent towards its apex. Antennal segments: ♂, 28—31; ♀, 25—27: flagellum entirely dark or only obscurely paler towards its base . . . . . *Chorebus thecla* (NIXON)

Host: *P. lithospermi* NOWAKOWSKI

— Petiole elongate, usually only slightly widened towards its apex, its dorsal surface largely bare. Antennal segments: ♂, 34; ♀, 30—33: basal flagellar segments dull yellow or yellow-brown . . . . . *Chorebus abaris* (NIXON)

Hosts: *P. lycopi* NOWAKOWSKI, *P. symphyti* HENDEL and *P. tetrasticha* HENDEL

4 Petiole only sparsely pubescent. Pterostigma broader, not so elongate (figs. 108 and 115), with vein *2r* arising further from its base 5

— Petiole very densely pubescent. Pterostigma very elongate (figs. 123, 126 and 127), with vein *2r* arising extremely close to its base 6

5 Cell $2R_1$ very elongate, reaching almost the apex of the wing (fig. 108): *1m—cu* rejected from cell R_s . . . . . ***Dacnusa lithospermi* sp. nov.**

Host: *P. lithospermi* NOWAKOWSKI

— Cell $2R_1$ shorter: *1m—cu* interstitial or almost so (fig. 115) . . . . . *Dacnusa aquilegiae* MARSHALL

Once bred from *P. symphyti* HENDEL (normally associated with blotch-mining species on Ranunculaceae)

6 Mesepisternum without any indication of a precoxal suture. Wing as fig. 127. Legs largely deep yellow . . . . . *Dacnusa laevipectus* THOMSON

(oligophagous species)

— Precoxal suture visible at least as a short groove, which is usually rugose . . . 7

7 Pterostigma conspicuously widened towards its apex (fig. 123). Legs largely brown . . . . . *Dacnusa maculipes* THOMSON

(oligophagous species)

— Pterostigma not or only slightly widened towards its apex (fig. 126). Legs largely deep yellow . . . . . *Dacnusa confinis* RUTHE

Hosts: *P. glechomae* KALTENBACH and *P. ranunculi* SCHRANK

12. *Phytomyza crassiseta* ZETTERSTEDT (on *Veronica*)

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 132). Metapleural pubescence forming a rosette of radiating hairs (compare fig. 22). Pubescence of petiole dense, tending to form apical tufts (fig. 144). Pterostigma not sexually dimorphic 2

— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa. Pterostigma sexually dimorphic 3

2 20—23 antennal segments. Petiole strongly widened towards its apex, only about 1.3 times as long as wide . . . . . *Chorebus amasis* (NIXON)

— Antennal segments more numerous (25 in all available specimens bred from *crassiseta*). Petiole more elongate . . . . . *Chorebus alecto* (MORLEY)

(also associated with species of the *Phytomyza albiceps* group on Compositae)

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3 Pterostigma not much longer than the metacarp, in the male blackened at its base only, becoming contrastingly paler towards its apex (figs. 97 and 98): vein *2r* not branching so closely to the base of the pterostigma. Petiole rugose, more or less parallel-sided . . . . . ***Dacnusa veronicae* sp. nov.**

— Pterostigma elongate, conspicuously widened towards its apex, blackened throughout its length in the male (fig. 123): vein *2r* arising extremely close to the base of the pterostigma. Petiole subtriangular, with its largely smooth surface visible as a subshine beneath its very dense pubescence . . . . *Dacnusa maculipes* THOMSON (oligophagous species)

13. *Phytomyza campanulae* HENDEL (on *Campanula*)

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 132). Metapleural pubescence forming a rosette of radiating hairs (compare fig. 22). Pterostigma not sexually dimorphic, with vein *2r* not arising so close to its base (compare fig. 88). Petiole elongate, its pubescence becoming denser towards its apical corners. 27—31 antennal segments. Legs dark . . . . . *Chorebus mitra* (NIXON)

— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa. Pterostigma elongate, blackened in the male, with vein *2r* arising extremely close to its base (figs. 123 and 127). Petiole subtriangular, evenly covered with very dense pubescence 2

2 Mesepisternum without any indication of a precoxal suture. Pterostigma not widened towards its apex (fig. 127). Legs largely deep yellow . . . . . *Dacnusa laevipectus* THOMSON (oligophagous species)

— Precoxal suture visible as a short groove which is usually rugose. Pterostigma conspicuously widened towards its apex (fig. 123). Legs largely brown . . . . . *Dacnusa maculipes* THOMSON (oligophagous species)

14. *Phytomyza tenella* MEIGEN[16]

1 Mandibles 4-toothed (fig. 137). Metapleural pubescence dense, forming a rosette of radiating hairs. Antennal segments: ♂, 28—31; ♀, 26—28. Petiole largely bare but with some fine pubescence along its sides and at its apical corners. Ovipositor (♀) short and upcurved, only slightly projecting beyond the apical tergite in the retracted position. Legs golden yellow or occasionally yellow-brown . . . . . ***Chorebus tenellae* sp. nov.**

— Mandibles 3-toothed. Metapleural pubescence directed mainly downwards towards the hind coxa. Fewer antennal segments. Petiole with short inconspicuous pubescence evenly distributed over its entire surface. Legs dark 2

2 Dorsal surface of mesoscutum with its pubescence confined mainly to the former course of the notaulices. Ovipositor (♀) extraordinarily long, projecting far beyond the apex of the gaster and bent upwards towards its apex. *Dacnusa monticola* (FÖRSTER)

— Mesoscutum largely pubescent. Ovipositor (♀) shorter, very stout, projecting beyond the apical tergite in the retracted position only by about half the length of the petiole . . . . . ***Dacnusa nigrella* sp. nov.**

[16] For comment on the application of this name see the remarks under the description of *Dacnusa monticola* (FÖRSTER).

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15. *Paraphytomyza* spp. on *Lonicera* and *Symphoricarpos*

1 Mandibles 4-toothed, the additional tooth situated between the original teeth 2 and 3 (compare fig. 129). Metapleural pubescence dense, forming a rosette of radiating hairs (compare fig. 22). Rugose precoxal suture present. *1m—cu* rejected from cell R_s. Palpi long. 23 antennal segments (♀). Legs pale yellow . . . . . ***Chorebus endymion* sp. nov.**

Host: *P. xylostei* ROBINEAU-DESVOIDY

— Mandibles 3-toothed. Metapleural pubescence sparse, directed mainly downwards towards the hind coxa (compare fig. 16). Precoxal suture absent. *1m—cu* interstitial or received into cell R_s 2

2 Pterostigma blackened in the male (fig. 116). Legs largely ochreous with the hind coxae, hind tarsi and apical half of the hind tibiae infuscated. Gaster unusually densely pubescent, with tergites 3 and 4 evenly covered with hairs and tergites 5 and 6 each bearing two rows of hairs . . . . . ***Dacnusa lonicerella* sp. nov.**

Host: *P. lonicerae* ROBINEAU-DESVOIDY

— Pterostigma not blackened in the male. Legs largely deep yellow (including the coxae). Gaster not so densely pubescent 3

3 20—21 antennal segments. Cell $2R_1$ very short (fig. 81) . . . . . ***Exotela minuscula* sp. nov.**

Host: *P. xylostei* ROBINEAU-DESVOIDY

— 23—26 antennal segments. Cell $2R_1$ not so short (fig. 84) . . . . . ***Exotela lonicerae* sp. nov.**

Host: *P. hendeliana* HERING

Host Specificity

The host ranges of the species of Alysiinae treated in this paper are given in Table 10. The definitions of the terms used in the classification were explained in Part I of this paper (GRIFFITHS, 1964b).

Table 10

Classification of host ranges of Alysiinae parasites of *Paraphytomyza*, *Phytagromyza* and *Phytomyza*

Tribe Dacnusini	
Exotela	
aconiti sp. nov.	Monophagy, 1st degree
gilvipes (HALIDAY)	Monophagy, 1st degree
sulcata (TOBIAS)	Monophagy, 2nd degree
lonicerae sp. nov.	Monophagy, 1st degree
minuscula sp. nov.	Monophagy, 1st degree
cyclogaster sonchina ssp. nov.	Disjunctive Monophagy
cyclogaster cyclogaster (FÖRSTER)	Monophagy, 2nd degree (? disjunctive)
cyclogaster umbellina (NIXON)	Monophagy, 2nd or 3rd degree
obscura sp. nov.	Monophagy, 2nd degree
senecionis sp. nov.	Monophagy, 2nd degree
spinifer (NIXON)	Monophagy, 2nd degree
tatrica sp. nov.	Monophagy, 1st degree
Priapsis dice NIXON	Monophagy, 2nd degree
Coloneura major sp. nov.	Monophagy, 1st degree
Dacnusa	
metula (NIXON)	Monophagy, 2nd degree
laeta (NIXON)	Disjunctive Monophagy
hospita (FÖRSTER)	Monophagy, 1st degree
macrospila (HALIDAY)	Monophagy, 1st degree
melicerta (NIXON)	Monophagy, 2nd degree
centaureae sp. nov.	Monophagy, 1st degree

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soldanellae sp. nov.	Monophagy, 1st degree
alpestris sp. nov.	Monophagy, 2nd degree
ocyroe NIXON	Disjunctive Monophagy
angelicina sp. nov.	Monophagy, 2nd degree
lithospermi sp. nov.	Monophagy, 1st degree
ergeteles (NIXON)	Monophagy, 1st degree
brevistigma (TOBIAS)	Monophagy, 2nd degree
lissos (NIXON)	Monophagy, 2nd degree
clematidis sp. nov.	Monophagy, 1st degree
campanariae sp.nov.	Monophagy, 1st degree
aquilegiae MARSHALL	Disjunctive Monophagy
delphinii sp. nov.	Monophagy, 2nd degree
fuscipes sp. nov.	Disjunctive Monophagy
lonicerella sp. nov.	Monophagy, 1st degree
nigrella sp. nov.	Monophagy, 1st degree
monticola (FÖRSTER)	Monophagy, 1st degree
fasciata STELFOX	Monophagy, 1st degree
sibirica sibirica TELENGA	Disjunctive Monophagy
sibirica comis (NIXON)	Monophagy, 1st degree
discolor (FÖRSTER)	Monophagy, 1st or 2nd degree
plantaginis sp. nov.	Monophagy, 2nd degree
veronicae sp. nov.	Monophagy, 1st degree
heringi sp. nov.	Monophagy, 1st degree
tarsalis THOMSON	Monophagy, 2nd degree
pubescens (CURTIS)	Disjunctive Monophagy
merope (NIXON)	Monophagy, 1st degree
helvetica sp. nov.	Monophagy, 1st degree
gentianae sp. nov.	Monophagy, 2nd degree
confinis RUTHE	? Disjunctive Monophagy
maculipes THOMSON	Oligophagy, 1st degree
areolaris (NEES)	Monophagy, 2nd degree or possibly disjunctive
laevipectus THOMSON	Oligophagy, 1st degree
Chorebus	
aphantus (MARSHALL)	Monophagy, 2nd degree
sylvestris sp. nov.	Monophagy, 2nd degree
xylostellus sp. nov.	Monophagy, 1st degree
luzulae sp. nov.	Monophagy, 1st degree
buhri sp. nov.	Monophagy, 1st degree
dagda (NIXON)	Monophagy, 1st degree
gentianellus sp. nov.	Monophagy, 2nd degree
punctus (GOUREAU)	? Disjunctive Monophagy
scabiosae sp. nov.	Monophagy, 1st degree
tanis (NIXON)	Monophagy, 2nd degree
merion (NIXON)	Monophagy, 1st degree
ergias (NIXON)	Monophagy, 1st degree
fallax (NIXON)	Monophagy, 1st degree
canariensis sp. nov.	Monophagy, 1st degree
sativi (NIXON)	Monophagy, 1st degree
thalictri sp. nov.	Monophagy, 1st degree
angelicae (NIXON)	Monophagy, 1st degree
fallaciosae sp. nov.	Disjunctive Monophagy
calthae sp. nov.	Monophagy, 1st degree
tamiris (NIXON)	Monophagy, 1st degree
bensoni (NIXON)	Monophagy, 1st degree
albimarginis sp. nov.	Monophagy, 1st degree
kama (NIXON)	Monophagy, 1st degree
tenellae sp. nov.	Monophagy, 1st degree
gnaphalii sp. nov.	Monophagy, 1st degree
thusa (NIXON)	Monophagy, 1st degree
albipes (HALIDAY)	Monophagy, 3rd degree
endymion sp. nov.	Monophagy, 1st degree
thecla (NIXON)	Monophagy, 1st degree
abaris (NIXON)	Disjunctive Monophagy
nana (NIXON)	Disjunctive Monophagy
mitra (NIXON)	Monophagy, 1st degree
oreoselini sp. nov.	Monophagy, 1st degree
pimpinellae sp. nov.	Monophagy, 1st degree
alecto (MORLEY)	Disjunctive Monophagy
armida (NIXON)	Disjunctive Monophagy
amasis (NIXON)	Monophagy, 1st degree
crassipes (STELFOX)	Monophagy, 1st degree

Other Alysiinae

Dapsilarthra	
rufiventris (NEES)	Oligophagy, 1st degree
sylvia (HALIDAY)	Oligophagy, 1st degree
balteata (THOMSON)	Oligophagy, 1st degree
nowakowskii KÖNIGSMANN	? Monophagy
Pseudopezomachus	
cursitans (FERRIÈRE)	Oligophagy, 1st degree
bituberculatus (MARSHALL)	? Oligophagy

It will be readily apparent from Table 10 above that the great majority of the Dacnusini treated in this paper exhibit monophagy of the first or second degree, as has previously been demonstrated for the Dacnusini parasites of *Agromyza* in Part II of this paper (GRIFFITHS, 1966). If the number of species of each genus in Tables 10 and 4 (in Part II) are totalled, it will be seen that the

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proportion of species classified as monophagous to the first degree is higher in *Chorebus* (about two-thirds of all species) than in *Exotela* and *Dacnusa* (about a half of all species). In view of the considerable amount of material studied I consider this difference to be statistically significant. Some species now known from only one host may of course be subsequently reclassified as monophagous to the second degree, but this will apply just as much to the other genera as to *Chorebus*. I have no information at present on what factors may be responsible for this tendency to a higher degree of host specificity in *Chorebus*.

There are two oligophagous species included in *Dacnusa*. *Dacnusa laevipectus* THOMSON appears confined to hosts now included in *Phytomyza*, but these belong to diverse groups whose species will doubtless be placed in separate genera when their classification is revised. Hence I have classed the host-range as oligophagy, rather than generic monophagy. The second species, *D. maculipes* THOMSON, also attacks other Phytomyzinae leaf-miners, especially *Liriomyza* and *Trilobomyza*, and has once been bred from *Agromyza abiens* ZETTERSTEDT (see Part II). This is the widest host-range shown by any species of Dacnusini. But this oligophagy I consider to be secondary. The closest relatives of these species (excluding species of unknown life-history) are *D. confinis* RUTHE, *D. gentianae* sp. nov., *D. helvetica* sp. nov. and *D. areolaris* (NEES), all of which are monophagous.

Apart from *Dacnusa maculipes* THOMSON the only other species of Dacnusini treated in this paper which attacks any other genus of Agromyzidae is *D. laeta* (NIXON). The known host-range of this insect is remarkably disjunct, consisting of two *Agromyza* spp. (bred in Poland) and two *Phytomyza* spp. (bred in Ireland). The other cases of disjunctive monophagy listed above all refer to hosts belonging to different species-groups now included in *Phytomyza*. In the present inadequate state of our knowledge of the phylogeny of the groups included in *Phytomyza*, it does not seem profitable to comment further on the possible significance of these host distributions.

Evolution of Hosts and Parasites

The known host associations are given in Table 11. Since it is not possible at this time to break down *Phytomyza* into monophyletic groups with any confidence, I have merely divided the species for ease of reference according to their host-plants.

Table 11
List of Records of Dacnusini Parasites of *Paraphytomyza*, *Phytagromyza* and *Phytomyza*

Hosts	*Dacnusa* s. s. (= *Rhizarcha*)	Other *Dacnusa* spp.	*Exotela*, *Coloneura major* and *Priapsis dice*	*Chorebus*
I. *Phytomyza* spp. on Ranunculaceae[17]				
ranunculi	*confinis*, *laevipectus*, *maculipes*	*laeta*, *macrospila*, *sibirica sibirica* (once)	*gilvipes*	*kama*
ranunculi caulinaris	*maculipes*			
? *stolonigena*		*hospita*		

[17] Excluding *P. minuscula* GOUREAU, since the generic position of its recorded parasite "*Dacnusa Chereas* GOUREAU" is not known.

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Table 11 (continued)

Hosts	*Dacnusa* s. s. (= *Rhizarcha*)	Other *Dacnusa* spp.	*Exotela*, *Coloneura major* and *Priapsis dice*	*Chorebus*
notata	*laevipectus*			
vitalbae	*laevipectus*			
calthivora			*sulcata*	*calthae*
calthophila		*laeta*	*sulcata*	*tamiris*
soenderupi				*bensoni*
trolliivora				spec. (near *tamiris*)
aconitella			*aconiti*	
fulgens	*laevipectus*			
albifrons	*laevipectus*			
abdominalis		*lissos*		
spec. (HERING, 1957, no. 358)		? *lissos*		
anemones	*maculipes*	*brevistigma*		
hellebori		*brevistigma*		
auricomi		*brevistigma*		
fallaciosa				*fallaciosae*
actaeae		*aquilegiae*		
aquilegiae		*aquilegiae*		*thalictri*
thalictricola		*aquilegiae*		
albimargo		*aquilegiae*		*albimarginis*
rydeni		*aquilegiae*		*fallaciosae*
aconitophila		*delphinii*, *lissos*		
aconiti		*delphinii*, *fuscipes*		
kaltenbachi atragenis		*clematidis*, ? *aquilegiae*		
campanariae		*campanariae*		
II. *Phytomyza* spp. on Umbelliferae				
aegopodii		*angelicina*	*cyclogaster cyclogaster*, *obscura*	*armida*
angelicae	*laevipectus*	*angelicina*	*obscura*	*armida* (once), *angelicae*
angelicastri			*cyclogaster* ? subsp.	*armida*
chaerophylliana				? *armida*
laserpitii		*fuscipes*	*obscura*[18]	*armida*
pauliloewi				*oreoselini*
pimpinellae	*laevipectus*			
conii			*cyclogaster umbellina*	
heracleana[18]	*maculipes*	*aquilegiae* (once)	*cyclogaster cyclogaster*, ? *obscura*	
pastinacae			*cyclogaster cyclogaster*	
spondylii	*laevipectus*		*cyclogaster cyclogaster*	
sphondyliivora			*cyclogaster cyclogaster*	
sii	*laevipectus*			
angelicivora			*Priapsis dice*	*armida*
silai			*Priapsis dice*	
ferulae			*cyclogaster umbellina*	
smyrnii			? *cyclogaster umbellina*	
astrantiae	*laevipectus*, *maculipes*			
anthrisci	*laevipectus*		*cyclogaster umbellina*	
chaerophylli			*cyclogaster umbellina*	

[18] See also the comments under the description of *Exotela obscura* sp. nov.

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Table 11 (continued)

Hosts	*Dacnusa* s. s. (= *Rhizarcha*)	Other *Dacnusa* spp.	*Exotela*, *Coloneura major* and *Priapsis dice*	*Chorebus*
conopodii	*maculipes*		*cyclogaster umbellina*	
aurei			*cyclogaster umbellina*	
adjuncta	*laevipectus*		*cyclogaster umbellina*	
melana			*cyclogaster umbellina*	*pimpinellae*
obscurella	*laevipectus*		*cyclogaster sonchina*, *cyclogaster umbellina*	*armida*
thysselini			*cyclogaster sonchina*	
brunnipes	*laevipectus*		*cyclogaster* ? subsp.	
pubicornis			*obscura*	
III. *Phytomyza* spp. on Compositae				
(a) *albiceps* group s.l. (usually leaving the host-plant to pupate)				
achilleae		*melicerta*		
albiceps	*maculipes*	*ocyroe*		*alecto*
bellidina				*alecto*
conyzae	*maculipes*	*ocyroe*		*alecto*
corvimontana	*maculipes*	*melicerta*		*alecto*
hoppi	*maculipes*			
klimeschi				*alecto*
kyffhusana				*alecto*
leucanthemi		*ocyroe*		
matricariae		*melicerta*		*alecto*
tanaceti			? *cyclogaster*	*alecto*
gnaphalii				*gnaphalii*
montana		*centaureae*		
eupatorii				*armida*
lappina	*maculipes*	*ocyroe*	*spinifer*	*armida*
marginella	*maculipes*	*ocyroe*	*cyclogaster sonchina*	
senecionis		*alpestris*, *ocyroe*	*cyclogaster sonchina*, *senecionis*	
alpina	*maculipes*	*alpestris*, *ocyroe*	*senecionis*, *spinifer*	
tussilaginis		*alpestris*		
homogyneae			*senecionis*	
cirsii	*maculipes*		*spinifer*	
rydeniana	*maculipes*	? *alpestris*		
? *simmi*			*cyclogaster cyclogaster*	
solidaginis		*ocyroe*		
virgaureae			*cyclogaster cyclogaster*	
aronici			*tatrica*	
(b) Species whose puparia remain in the host-plant with their front spiracles projecting ventrally through the epidermis				
atricornis[19]	*areolaris*, *maculipes*, *laevipectus* (rarely), *pubescens* (rarely)			*canariensis*, *sativi*, *misellus* (once—see Part V)
autumnalis	*maculipes*, *tarsalis*	*sibirica sibirica*		
asteris	*areolaris*	*sibirica comis*, *sibirica sibirica*		
farfarae	*tarsalis*	*ocyroe*		
sp. (HERING, 1957, no. 3604a)	*merope*			
cardui				*fallax*
taraxacocecis	*pubescens*			*merion*
araciocecis				*ergias*
cinerea	*maculipes*			

[19] Also on host-plants other than Compositae.

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Table 11 (continued)

Hosts	*Dacnusa* s. s. (= *Rhizarcha*)	Other *Dacnusa* spp.	*Exotela*, *Coloneura major* and *Priapsis dice*	*Chorebus*
IV. *Phytomyza* spp. on Gentianaceae				
gentianae	*gentianae, maculipes*			*dagda*
vernalis	*gentianae*			*gentianellus*
gentianella				*gentianellus*
swertiae	*gentianae*			
V. *Phytomyza* spp. on *Plantago*				
plantaginis	*maculipes*	*plantaginis, sibirica*		
		sibirica (once)		
griffithsi	*heringi, maculipes*	*plantaginis*		*buhri*
VI. *Phytomyza* spp. on Dipsacaceae				
ramosa	*helvetica*			*tanis*
spec. on *Dipsacus* (*ramosa* auctt.)	*pubescens*	*metula*		*tanis*
succisae	*maculipes*	*metula*		*tanis*
scabiosarum				*tanis*
scabiosae				*scabiosae*
VII. *Phytomyza* spp. on Gramineae and *Luzula*				
nigra	*areolaris, maculipes*			*aphantus*
fuscula	*maculipes*			
milii	*maculipes*			*aphantus*
luzulae				*luzulae*
VIII. *Phytomyza* spp. on *Lonicera* and *Symphoricarpos*				
xylostei	*maculipes*			*sylvestris*
lonicerella				*sylvestris*
alpigenae				*sylvestris*
periclymeni				*xylostellus*
IX. *Phytomyza* spp. on Labiatae and Boraginaceae				
obscura				*nana*
origani				*nana*
tetrasticha				*abaris*
lycopi				*abaris*
lithospermi		*lithospermi*		*thecla*
? *pulmonariae*				*nana*
myosotica	*maculipes*			*nana*
symphyti		*aquilegiae* (once)		*abaris, nana*
petoei	*maculipes*			*nana*
glechomae	*confinis, laevipectus, maculipes*			
salviae	*maculipes*			
X. *Phytomyza* spp. on Scrophulariaceae				
crassiseta	*maculipes*	*veronicae*		*alecto, amasis*
tenella		*monticola, nigrella*		*tenellae*
diversicornis				*crassipes*
XI. *Phytomyza* spp. on Filicopsida				
scolopendrii				*punctus*
dorsata				*punctus*

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Table 11 (continued)

Hosts	*Dacnusa* s. s. (=*Rhizarcha*)	Other *Dacnusa* spp.	*Exotela*, *Coloneura major* and *Priapsis dice*	*Chorebus*
XII. Other *Phytomyza* spp.				
dasyops		*fasciata*	*Coloneura major*	
primulae	*maculipes*	*discolor*		
sedicola		*discolor*		*punctus*
soldanellae	*laeripectus*	*soldanellae*		
rufipes	*pubescens*			*thusa*
campanulae	*maculipes*, *laeripectus*			*mitra*
XIII. *Phytagromyza*				
populi	*maculipes*			*albipes*
tridentata				*albipes*
tremulae				*albipes*
XIV. *Paraphytomyza*				
buhri	*maculipes*			
lonicerae		*lonicerella*		
hendeliana			*lonicerae*	
xylostei			*minuscula*	*endymion*

Exotela FÖRSTER

Some further suggestions may now be made on the relationships between the species of *Exotela* in which vein *1m—cu* is received into cell R_s (described as "Apomorph *Exotela* spp." in my introductory account of the connection between phylogeny and host association in Part I (GRIFFITHS, 1964b). It seems probable that the ancestor of this group was a yellow-legged insect with a well defined rugose precoxal suture, similar to such species as *hera* (NIXON), *cyclogaster* FÖRSTER and *aconiti* sp. nov. The separation of the ancestral species may have been associated with transference from a Gramineae-feeding host (see the discussion in Part I) to a host mining some dicotyledon. Whether this host or hosts was an *Agromyza* or *Phytomyza* species is not clear.

The absence of the precoxal suture in the two species associated with *Paraphytomyza* described in this paper appears to represent synapomorphy with two species associated with the *Agromyza rubi* group, *E. arunci* GRIFFITHS and *E. nowakowskii* GRIFFITHS, and one species of unkown life-history, *E. facialis* (THOMSON). If I am right in thinking that *E. phryne* (NIXON), whose precoxal suture is reduced but not eliminated, is the sister-species of these five species, it follows that, if the loss of the precoxal suture represents synapomorphy, the association of two species with *Paraphytomyza* has arisen by transference from the *Agromyza rubi* group.

Exotela parasites of *Phytomyza* are associated only with the *albiceps* group (on Compositae and Umbelliferae) and certain species mining Ranunculaceae. The species associated with the *albiceps* group are very homogeneous morphologically and probably monophyletic, although I can see no clear-cut apomorph character

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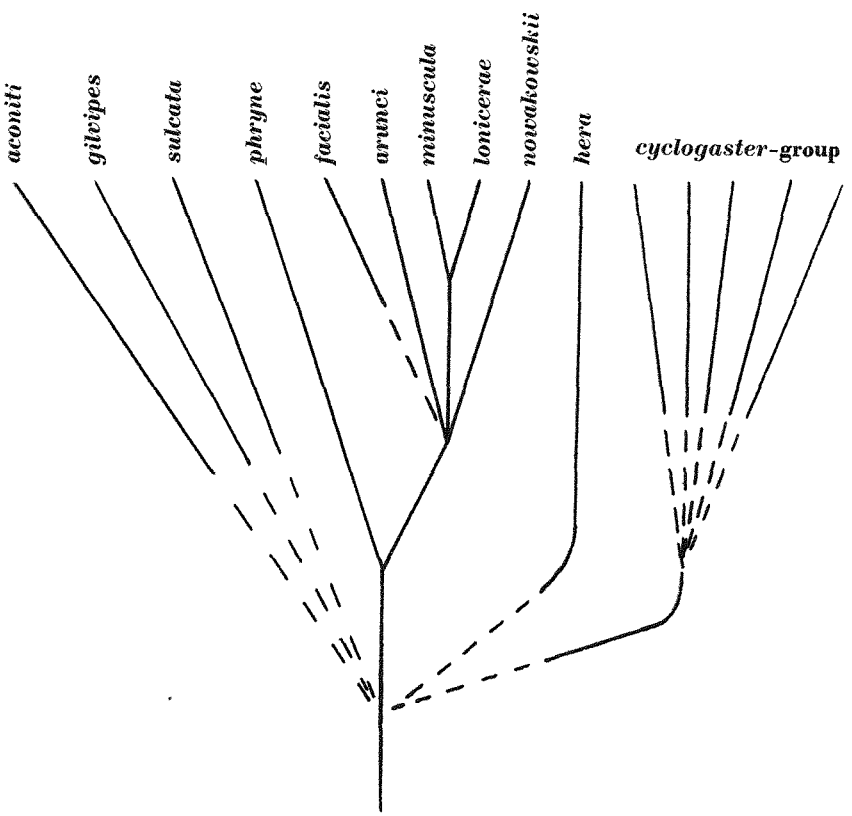
to support this view: the wing venation for instance is virtually identical in all species except *E. tatrica* sp. nov., which is apomorph in respect of its broader pterostigma and shorter cell $2R_1$. I have referred to these species as the *cyclogaster* group in this paper. But the species known from Ranunculaceae-feeding hosts are more strongly divergent morphologically and there is no reason to think that they are monophyletic. According to the principle explained in Part I (GRIFFITHS, 1964b, page 870) it therefore seems to me probable that an association with Ranunculaceae-feeding hosts is prior to that with the *albiceps* group. Whether or not this association antedates an association with *Agromyza* is not yet clear. Possibly further light will be thrown on this when the species associated with *Agromyza* spp. on Papilionaceae are available for study.

Expressing the ideas just outlined in the form of a phylogeny tree gives the following result:



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Dacnusa HALIDAY

The great majority of *Dacnusa* species are parasites of *Phytomyza*. The few species associated with *Agromyza* are clearly derived from ancestors associated with *Phytomyza* (see particularly the remarks on the *abdita* group below). In association with the other genera of Agromyzidae there remain as far as I am aware only a few species of *Liriomyza*-parasites, which will be dealt with in a later part of this paper. Within the genus I think that the following major monophyletic groups can be distinguished: (i) *Dacnusa* s. s. (=*Rhizarcha* FÖRSTER, (ii) the *discolor* group, (iii) a large group whose limits are not entirely clear, mainly associated with blotch-miners on Ranunculaceae, and (iv) the *monticola* group.

Dacnusa s. s. is well characterised as a monophyletic group by its possession of characteristically long and dense pubescence covering the metapleuron, propodeum and petiole: in shape the petiole appears plesiomorph, being short and subtriangular. The majority of species of this group have a characteristically long pterostigma, but two species, *lugens* (HALIDAY) and *heringi* sp. nov., retain a broader, relatively plesiomorph pterostigma, more comparable with the condition found in other groups of *Dacnusa*. Among the remaining species two groups can be defined — the *stramineipes* group consisting of species with a long projecting ovipositor, and the *areolaris* group containing species in which vein *2r* is exceptionally closely approximated to the base of the pterostigma. The latter feature is unique to this group among the Dacnusini and I think that it must indicate monophyly. The *areolaris* group contains several species which retain the precoxal suture, so that its elimination in such species as *areolaris* (NEES) and *laevipectus* THOMSON cannot, if the *areolaris* group is monophyletic, represent synapomorphy with *tarsalis* THOMSON and the *stramineipes* group. There are two other species with elongate pterostigmata which I have not included in these two groups — *faeroeensis* (ROMAN) and *tarsalis* THOMSON. The former species retains a broad precoxal suture (plesiomorph) and vein *2r* is not so closely approximated to the base of the pterostigma as in the *areolaris* group. *D. tarsalis* THOMSON is similar to species of the *stramineipes* group in respect of the absence of the precoxal suture (apomorph) and the position of vein *2r* (plesiomorph) and may represent the sister-species of that group.[20] Within the *areolaris* group five of the species which retain the precoxal suture — *maculipes* THOMSON, *dryas* (NIXON), *confinis* RUTHE, *gentianae* sp. nov. and *helvetica* sp. nov. — may be considered synapomorph in respect of their short cell $2R_1$. The five species which have lost the precoxal suture may be considered synapomorph in this respect. These suggestions on the evolution of *Dacnusa* s. s. may be expressed in the form of a phylogeny tree as follows:

[20] The suggestion that *D. tarsalis* THOMSON might be an ecological vicariant of species of the *discolor* group made in Part I (GRIFFITHS, 1964b, page 853) is now withdrawn, since it is now clear that *tarsalis* is not monophyletic with that group.

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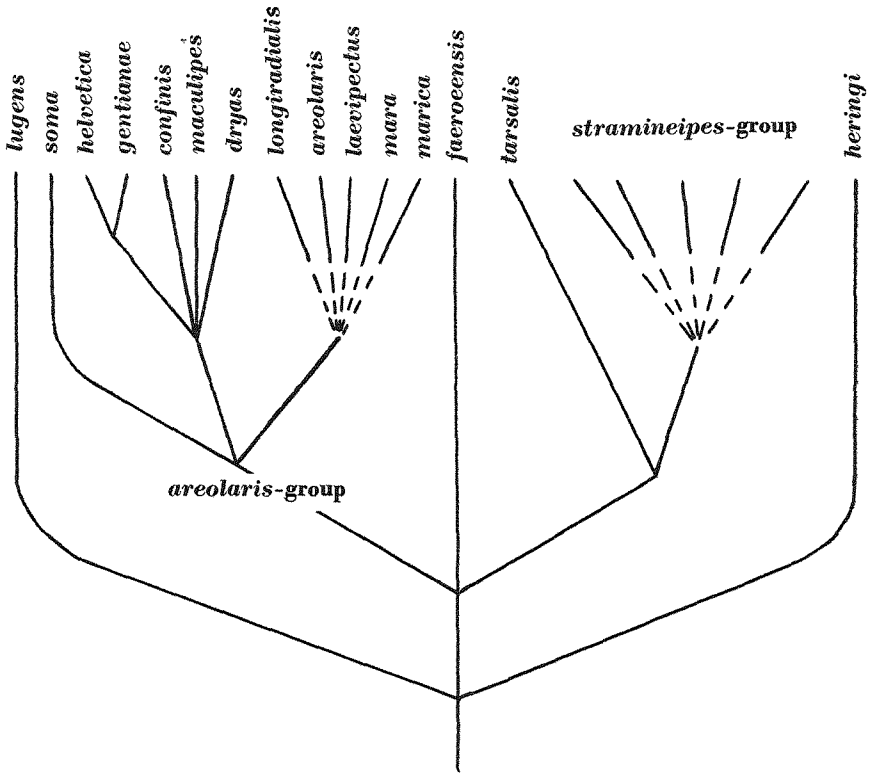

All species of *Dacnusa* s. s. whose life-histories are known are parasites of *Phytomyza* with the exception of *dryas* (NIXON), a parasite of *Agromyza frontella* RONDANI, and *faeroeensis* (ROMAN), a parasite of *Scaptomyza* (Drosophilidae). The oligophagous species *maculipes* THOMSON is also associated with other genera of Phytomyzinae as well as *Phytomyza*, but I consider this to represent a secondary expansion of host range. Most of the monophagous species (excluding the two just mentioned and *confinis* RUTHE whose host range is inadequately known) are associated with species of *Phytomyza* whose puparia remain in the host plant with the front spiracles projecting ventrally through the epidermis. The hosts of *heringi* sp. nov., *merope* (NIXON), *tarsalis* THOMSON, *areolaris* (NEES), *gentianae* sp. nov. and *helvetica* sp. nov. all have puparia of this type. It is evident that the association of the ancestral species of *Dacnusa* s. s. was with a host or hosts of this group.

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The *discolor* group (= *Liposcia* FÖRSTER) includes the five species *discolor* (FÖRSTER), *plantaginis* sp. nov., *veronicae* sp. nov., *liopleuris* THOMSON (see Part V) and *sibirica* TELENGA. They are characterised by the male pterostigma becoming contrastingly paler towards its apex. The first three species are clearly monophyletic, having the metapleuron, propodeum and petiole rather densely pubescent and the blackening of the male pterostigma more restricted. *D. sibirica* TELENGA is plesiomorph in having only sparse metapleural and propodeal pubescence, and an almost bare petiole. All species of the *discolor* group except *liopleuris* THOMSON are associated with species of *Phytomyza* whose puparia remain in the host plant with the front spiracles projecting ventrally through the epidermis. It thus seems that the host or hosts of the ancestor of the *discolor* group belonged to the same group as the host of the ancestor of *Dacnusa* s. s. This leads me to suspect that the two groups may derive from a common ancestor, although there is no clear morphological evidence for this.

There are numerous *Dacnusa* spp. associated with *Phytomyza* spp. on Ranunculaceae, especially blotch-mining species (see Table 11). Except for *D. laeta* (NIXON) and *D. hospita* (FÖRSTER) these are very homogeneous in facies, having broad sexually dimorphic pterostigmata and no precoxal suture. Unfortunately I am not able to define this group (= *Pachysema* FÖRSTER sensu NIXON, in part) with any precision, since a broad tapering pterostigma is probably plesiomorph for *Dacnusa* (being shown by such species outside this group as *heringi*, *temula*, *metula*, *prisca* and *laeta*), and it is difficult to have confidence in the other character as indicating monophyly, as it has clearly evolved independently several times within the genus *Dacnusa* (being shown by the *discolor* group, the *monticola* group, and within *Dacnusa* s. s. by the *stramineipes* group and certain species only of the *areolaris* group). The species associated with hosts in the *Phytomyza albiceps* group (on Compositae and Umbelliferae), *D. lithospermi* sp. nov. and *D. soldanellae* sp. nov. are also of very similar facies and can probably be attributed to this same wide group. Within this wide group a smaller monophyletic group called the *abdita* group can be defined on apomorph characters of the wing venation (vein *1m—cu* interstitial and cell $2R_1$ rather short). The six species of this group — *abdita* (HALIDAY), *evadne* NIXON, *maxima* (FÖRSTER), *aquilegiae* MARSHALL, *fuscipes* sp. nov. and *delphinii* sp. nov. — are difficult to distinguish and probably of recent separation. The first three species are parasites of *Agromyza* (following a transference), while the last three have remained associated with *Phytomyza* spp. on Ranunculaceae, although not exclusively so in the case of *aquilegiae* and *fuscipes* whose host ranges appear to be disjunct. *D. lonicerella* sp. nov., a parasite of *Paraphytomyza*, may also belong to the *abdita* group, if its venational characters represent synapomorphy rather than convergence. The *Phytomyza* spp. on Ranunculaceae belong to a number of disjunct groups, but the delimitation and affinities of these have not yet been clarified sufficiently to throw light on the likely priorities of host association of their *Dacnusa* parasites. Further information is also needed on the relationship between the *albiceps*

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group and the groups mining Ranunculaceae before any comment can be made on the evolution of the species of *Dacnusa* associated with them.

In the *monticola* group (= *Brachystropha* FÖRSTER) I include *D. monticola* (FÖRSTER), *D. nigrella* sp. nov., *D. nigropygmaea* STELFOX and, tentatively, *D. fasciata* STELFOX. All these species have a projecting ovipositor (apomorph), strong sexual dimorphism in the number of antennal segments (? apomorph), but only weak dimorphism of the pterostigma (? plesiomorph). The first three of these species appear monophyletic, all being dark-legged insects with similar short, inconspicuous, but rather dense pubescence of the petiole. Two are parasites of *P. tenella* MEIGEN (whose larvae are doubtless seed-feeders), while the life-history of the third, *nigropygmaea*, is still unknown. *D. fasciata* STELFOX is a more plesiomorph species, with a bare petiole and well developed notaulices, but I think it can also be included in this group as it agrees in the three characters stated above.

Apart from the four main groups just mentioned there remain three species associated with *Phytomyza* which are plesiomorph in retaining a rugose precoxal suture. These are *D. metula* (NIXON), *D. laeta* (NIXON) and *D. hospita* (FÖRSTER). The host association of the first species suggests that it may be the sister-species either of *Dacnusa* s. s. and/or the *discolor* group. Morphologically it is very isolated and I have not found any apomorph characters which link it with any other species or species-group. The two other species, *laeta* and *hospita*, are both associated with Ranunculaceae-feeding hosts and, when the affinities of these hosts are better understood, the occurence of these two plesiomorph parasite species may throw some light on the evolution of the large group of *Dacnusa* spp. discussed above which is mainly associated with these hosts.

D. temula (HALIDAY), a parasite of *Scaptomyza* (Drosophilidae), is a plesiomorph species. Only it and *D. monticola* (FÖRSTER) have retained a virtually bare mesoscutum (this feature is also found in certain species of the *areolaris* group, but seems there to be secondary (pseudoplesiomorph)). The species is apomorph in respect of its loss of the precoxal suture, but as this change has occurred several times within *Dacnusa* it is difficult to know with what group *temula* should be linked.

I am not commenting for the time being on the possible affinities of the few species of *Dacnusa* associated with *Liriomyza* hosts, or the two remaining species of unknown life-history, *D. prisca* sp. nov. and *D. aterrima* THOMSON.

Chorebus HALIDAY

All species of *Chorebus* recorded in this paper are referred to the *lateralis/ovalis* complex, as broadly defined in Part I (GRIFFITHS, 1964b, page 850) with the exception of *Chorebus thusa* (NIXON). Species of the *lateralis/ovalis* complex are found in association with a wide range of *Phytomyza* spp., and single species are associated with *Phytagromyza* and *Paraphytomyza* (see Table 11). No significant pattern is discernible which suggests any priorities in host association. One obvious feature of the recorded host associations is the rarity of the occur-

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rence of more than one species on the same host. Only four instances are recorded for *Phytomyza* and one of these represents geographical vicariance. This suggests that secondary expansion of the host range has only occurred rarely. A very large proportion of the species seem restricted to a single host (see above under "Host Specificity"). It seems likely that hosts and parasites have evolved in parallel in many cases, but in the present inadequate state of our knowledge of the phylogeny of the species included in *Phytomyza*, only a few instances at a very low taxonomic level can be given with any confidence, as follows.

(i) *C. dagda* (NIXON) and *C. gentianellus* sp. nov. are monophyletic vicariants (undoubtedly synapomorph in the form of their mandibles) on different species of *Phytomyza* mining Gentianaceae.

(ii) *C. sylvestris* sp. nov. and *C. xylostellus* sp. nov. are monophyletic vicariants on different species of *Phytomyza* mining *Lonicera*.

(iii) *C. nana* (NIXON), *C. abaris* (NIXON) and *C. thecla* (NIXON), all associated with *Phytomyza* spp. on Boraginaceae and Labiatae, appear synapomorph in having a distinct tuft of hairs on the hind coxa. Their host association is largely vicariant, but two species are recorded from *P. symphyti* HENDEL.

(iv) Five species associated with the *Phytomyza albiceps* and *obscurella* groups probably form a monophyletic group as they all have similar pubescence of the petiole (dense and tending to form apical tufts). Probably *C. amasis* (NIXON) belongs to this same group. See under the description of *C. alecto* (MORLEY).

(v) The three *Phytomyza* spp. on *Caltha* have vicariant *Chorebus* parasites, *C. tamiris* (NIXON), *C. calthae* sp. nov. and *C. bensoni* (NIXON). In view of the very close relationship of the host species this vicariance suggests that the parasites are monophyletic, although clear morphological support for this is lacking.

Appendix VIII — Notes on GOUREAU's species of Alysiinae

The identity of GOUREAU's bred species of Alysiinae has long remained a mystery as his descriptions were very inadequate, referring to little except colour. The host ranges of the Alysiinae parasites of Agromyzidae have not been hitherto well enough known to be of help in interpreting GOUREAU's species, but in view of the considerable information on host association now available I think it profitable for me to try to interpret them. The types of GOUREAU's species of Hymenoptera must be presumed lost. Mr. C. GRANGER of the Paris Museum informs me that he has long searched for them without success. Mr. J. E. COLLIN of Newmarket, Suffolk, is in possession of GOUREAU's Agromyzidae (as part of the BIGOT collection) but has no knowledge of the location of the Hymenopterous parasites.

In an early work GOUREAU (1846) refers to the breeding of various parasites from Agromyzidae, but names no Dacnusini to species. The only species referred to a genus was bred from puparia taken on leaves of *Phragmites communis*. GOUREAU attributed the parasite to *Œnone*, doubtless erroneously as the species of that genus (now called *Symphya*) are parasites of *Phytobia* spp., whose larvae bore in the cambium of trees. GOUREAU's description suggests that the species before him was *Chorebus coxator* (THOMSON), a parasite of *Agromyza* spp. on *Phragmites*.

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GOUREAU's most important work on leaf-mining Diptera (GOUREAU, 1851) includes brief descriptions of numerous parasites. Figures are also given, but these are unfortunately very inaccurate. My interpretation of his species of Alysiinae bred from Agromyzidae included in that paper is as follows.

Alysia truncator NEES

The host, which GOUREAU called *Agromyza Macquarti* ROBINEAU-DESVOIDY, is now known as *Trilobomyza verbasci* BOUCHÉ. GOUREAU's species of parasite cannot have been the species now accepted as *Alysia truncator* NEES, which is a parasite of Calliphoridae. The only Alysiinae likely to have been bred from that host are species of *Dapsilarthra*: the only other suggestion I can make is that GOUREAU may have confused an *Opius* sp. with *Alysia*. His description is too brief for any definite interpretation to be given.

Dacnusa flavipes GOUREAU

This species was bred from *Cerodontha* (*Dizygomyza*) *iraeos* ROBINEAU-DESVOIDY. The description is very brief, as follows.

"Long. 2 mill. Noir luisant; les trois premiers articles des antennes et les pattes jaunâtres; les crochets des tarses noirs; ailes hyalines, à nervures brunes."

Virtually the only useful information here is that the species was completely yellow-legged, but as there is only one such species known from this host — the species later described as *Dacnusa raissa* NIXON — it is reasonable to suppose that this was GOUREAU's species. The following synonymy is therefore proposed.

Chorebus flavipes (GOUREAU), **comb. nov.**

Dacnusa flavipes GOUREAU, 1851
Dacnusa raissa NIXON, 1937 and 1945, **syn. nov.**

The parasites of *Paraphytomyza xylostei* ROBINEAU-DESVOIDY and *Phytomyza marginella* FALLÉN (= *sonchi* ROBINEAU-DESVOIDY) which GOUREAU also referred provisionally to *flavipes* doubtless belonged to different species.

Dacnusa incerta GOUREAU

This was bred from what GOUREAU called *Agromyza pusilla* MEIGEN mining *Euphorbia cyparissias*. But his figure is of a broad-leaved *Euphorbia* which cannot have been *cyparissias*. I propose to follow HENDEL (1931—1936) in considering that GOUREAU's species was the species now accepted as *Liriomyza pascuum* MEIGEN, a widespread miner on *Euphorbia amygdaloides*. A *Chorebus* sp. attacks this host and may be accepted as GOUREAU's *incerta*. I propose to redescribe it in a later part of this paper.

The parasites of *Phytomyza ranunculi* SCHRANK and *P. primulae* ROBINEAU-DESVOIDY which GOUREAU compared with *incerta* were doubtless of different species (no descriptions are given).

Dacnusa punctum GOUREAU

A *Chorebus* spec. bred from *Phytomyza scolopendrii* ROBINEAU-DESVOIDY and fitting GOUREAU's description has been redescribed as *Chorebus punctus* (GOUREAU)

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in this paper. I regard the form "*punctum*" as a typographical error for *puncta*. Apart from this curious form GOUREAU's latinity is always correct (apart from obvious typographical errors), and he cannot have intended to qualify the generic name *Dacnusa* with the neuter form of the adjective.

Dacnusa maculata GOUREAU

GOUREAU states that this species, which he bred from *Phytomyza ilicis* CURTIS (called by him *P. Aquifolii* GOUREAU), was very similar to *Dacnusa puncta* GOUREAU. He describes it as follows.

"Long. $2^1/_3$ mill. Noire; antennes noires en dessus, à premier article jaune en dessous, les autres bruns; face braunâtre; bouche et pattes jaunâtres; dos du deuxième segment de l'abdomen de la même couleur; ailes hyalines."

The species has never been found since (although GOUREAU's record has been repeated on numerous occasions). CAMERON (1939) made extensive studies of the parasites of *P. ilicis* CURTIS in England, but failed to obtain any Dacnusini. In the circumstances I can only suspect that GOUREAU's species did not belong to the Dacnusini, or that there was a confusion in the host association. The name must be regarded as a nomen dubium.

Dacnusa lysias GOUREAU

This species was bred from *Phytomyza atricornis* MEIGEN, which GOUREAU called *P. horticola* GOUREAU. A further more detailed description is given in a later work (GOUREAU, 1869), where the same host is called *P. geniculata* MACQUART. The parasite concerned is clearly one of the *Dacnusa areolaris* group, but it is not possible to judge whether it was *D. areolaris* (NEES) or *D. maculipes* THOMSON (or perhaps both). To avoid nomenclatorial complications I propose to regard *lysias* as a synonym of *areolaris*, the already established synonymy.

Coelinius festus GOUREAU

GOUREAU placed this species, which he says he bred from *Phytomyza primulae* ROBINEAU-DESVOIDY, in *Coelinius* on account of its short pterostigma. The description given is as follows.

". . . il a le stigma court, la cellule radiale large et longue, se rétrécissant en pointe arrondie vers le bout de l'aile, et deux cellules cubitales . . ."

"Long. $2^1/_2$ mill. Noir luisant; antennes noires à premier article jaunâtre en dessous; dos du deuxième segment de l'abdomen et pattes jaunâtres; ailes hyalines."

The reference to a short pterostigma is not appropriate to any species of Dacnusini known to me as a parasite of *P. primulae* ROBINEAU-DESVOIDY and leads me to suspect some error either in the host association or the attribution of the parasite to the Dacnusini. GOUREAU's ascription of the species to *Coelinius* carries little weight, as there is no reason to think that he was acquainted with that genus (which contains parasites of Chloropidae). In the circumstances I see no alternative to discarding his name as a nomen dubium.

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Dacnusa chereas GOUREAU

GOUREAU compared this species, which he bred from *Phytomyza minuscula* GOUREAU, with *D. flavipes* GOUREAU (spelt "*pallipes*" on page 155 through a typographical error). The description is as follows.

"Long. 1¼ mill. Noir, antennes noires, les deux ou trois premiers articles des antennes pales en dessous; pattes testacées, à crochets des tarses bruns; ailes hyalines."

I have not seen any Dacnusini bred from this host and therefore cannot offer an opinion on the identity of GOUREAU's species at the present time.

Appendix IX — ROMAN's (1917) new Dacnusini

ROMAN (1917) described one new species and one new variety of Dacnusini from the Faroe Islands.

Gyrocampa thomsoni ROMAN

Mr. P. I. PERSSON of the Naturhistoriska Riksmuseet, Stockholm, kindly sent me three males of the type series for examination. They were misplaced in *Gyrocampa* and represent the species accepted as *Chaenusa conjungens* (NEES).

Dacnusa confinis RUTHE **var.** ***faeroeënsis*** ROMAN

This is now accepted as a good species. See the note under the key to *Dacnusa*.

Appendix X — WALKER's (1860) Ceylonese genera ascribed to the Dacnusini

I recently examined the types of WALKER's (1860) two supposed Ceylonese genera of Dacnusini, which are in the British Museum (Natural History). Both genera were misplaced. *Heratremis filosa* is a species of Alysiinae which retains the cross-vein *2r–m* (although this is poorly sclerotised): it is not referable to the tribe Dacnusini. *Nebartha macropodides* is not even an Alysiine, but in the opinion of Mr. G. E. J. NIXON a species of *Rogas*.

Appendix XI. Some Notes on the Dacnusini in HALIDAY's Collection

The present arrangement of the Dacnusini in the HALIDAY collection in the National Museum of Ireland, Dublin, is the result of the work of Mr. A. W. STELFOX in 1932. At that time he prepared a handwritten report entitled "Report on the Dacnusides contained in the HALIDAY collection (not including the *Coelinius* group)" of which there are three copies, one in the National Museum of Ireland, one in his own possession and one in mine. The following is an extract from the introduction to the report explaining the need for rearranging the collection.

"The secimens dealt with are referable to the genera *Oenone, Epimicta, Dacnusa, Gyrocampa, Chorebus* and *Chaenusa* and have been transferred to two boxes, mainly from boxes 10 and 11, where the contents were in a chaotic state as if deliberately mixed by some maniac. Only in a few cases were the specimens of one species found more or less grouped together. Who is responsible for this chaos it is now impossible to say and in what state this part of the collection was found by KANE when he "overhauled" the collection about 1883 — a year after the collection was transferred to the National Museum — is quite uncertain."

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The specimens bear no locality labels, but only numbers, concerning which STELFOX continues as follows.

"Some of the numbers, especially the pencil numbers on the cards of the carded specimens, refer to the position they formerly held in WALKER's two boxes (HALIDAY received material from Mr. WALKER, Prof. WESTWOOD, Mr. RUDD, Mr. DALE and others). As is well known the practice of the day was to keep a record of the provenance of specimens in a note book, with serial numbers to attach to each specimen or group of specimens of the same origin. In the case of the HALIDAY collection this M. S. catalogue never reached the National Museum (formerly known as the Museum of Science and Art) and is supposed to be lost. Besides these numbers on the cards, there appear to be several series of numbers on little squares of white or green paper, and the pins bear paper labels of various shapes and colours. I have discovered that a small pink diamond-shaped label signifies "Scotland". The numbered labels may in some cases be specific labels or merely refer to some other serial M. S. lists. . . . One thing is certain and that is that if these numbers are specific they correspond with some M. S. list in which the specific names were not placed in the same order as in HALIDAY's "Hymenoptera Brittanica: *Alysia*. Fasciculus Alter."

In the course of this work STELFOX selected specimens which seemed to him to be the most suitable for fixing the identity of HALIDAY's species and, after consultation with Mr. G. E. J. NIXON to whom he sent much of the material for comment, these were labelled as the "types". STELFOX comments in his report as follows.

"In the task of identifying the specimens and selecting the types I have received very great help from Mr. G. E. J. NIXON of the British Museum and I have taken no step forward until I was able to satisfy him that I was right. The absence of specific names on or in connexion with the specimens has made it necessary to re-identify all and select as types those specimens that fit HALIDAY's diagnosis most closely. It may seem that this would be a hopeless task and I at first thought so myself: but the fact that HALIDAY's health began to fail shortly after the publication of the "Fasciculus Alter" and that in consequence no or very little new material seems to have been added to the collection after that date, has made the sorting out of the species a comparatively easy task and the specimens chosen as types seem quite certainly to have belonged to the series from which HALIDAY drew up his descriptions of the species."

I recently had the opportunity of seeing the HALIDAY collection at Dublin and it seems to me that STELFOX and NIXON did valuable and reliable work in resorting it. But the labelling of the "types" has yet no formal validity according to the International Code of Zoological Nomenclature, since the designations have not been published. To remedy this omission Mr. STELFOX now makes the following statement.

"I hereby designate as lectotypes in accordance with the Code the specimens of the following species in the HALIDAY collection labelled by me as "Type" in 1932. All were described by HALIDAY in his "Hymenoptera Britannica: *Alysia*. Fasciculus Alter" published in 1839.

Alysia (*Œnone*) *ringens* HALIDAY
Alysia (*Dacnusa*) *marginalis* HALIDAY
Alysia (*Dacnusa*) *semirugosa* HALIDAY
Alysia (*Dacnusa*) *striatula* HALIDAY
Alysia (*Dacnusa*) *talaris* HALIDAY
Alysia (*Dacnusa*) *lateralis* HALIDAY
Alysia (*Dacnusa*) *albipes* HALIDAY
Alysia (*Dacnusa*) *adducta* HALIDAY
Alysia (*Dacnusa*) *temula* HALIDAY
Alysia (*Dacnusa*) *macrospila* HALIDAY
Alysia (*Dacnusa*) *stramineipes* HALIDAY
Alysia (*Dacnusa*) *foveola* HALIDAY
Alysia (*Dacnusa*) *uliginosa* HALIDAY
Alysia (*Chorebus*) *naiadum* HALIDAY

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I also labelled as "Type" the specimens which I believe to be the holotypes of *Alysia* (*Dacnusa*) *lugens* HALIDAY, *Alysia* (*Dacnusa*) *postica* HALIDAY, *Alysia* (*Dacnusa*) *clandestina* HALIDAY and *Alysia* (*Chorebus*) *lymphata* HALIDAY, which species were described from single specimens. I also labelled specimens which I believed to belong to the original series of *Alysia* (*Dacnusa*) *abdita* HALIDAY, *Alysia* (*Dacnusa*) *leptogaster* HALIDAY and *Alysia* (*Chorebus*) *nereidum* HALIDAY, but did not choose a "Type". I could not find any specimen answering the description of *Alysia* (*Dacnusa*) *cincta* HALIDAY in the collection. The male holotype of *Alysia* (*Dacnusa*) *phaenicrura* HALIDAY also was not found, but there was another specimen presumably taken after the publication of the description."

Only in the case of *Alysia* (*Dacnusa*) *gilvipes* HALIDAY have I thought it desirable to designate as lectotype a specimen other than that labelled as "Type" by STELFOX in 1932. This action has been taken and reasons for it given under my account of the species concerned (now included in *Exotela*).

In revising the collection STELFOX also found the material of the species for which HALIDAY used NEES' names. This material should be consulted in cases where there is doubt about the application of any of NEES' names (since all NEES' types have been lost). Although we do not know whether HALIDAY saw NEES' material and cannot be certain that he has interpreted all NEES' species correctly, he was a contemporary of NEES and thus in a far better position to make enquiries than we are today. That there was contact of some kind between the two workers seems most probable in view of HALIDAY's confident use of many of NEES' names.

Summary

1. This paper, the third of a series, deals with the Alysiinae parasites in Europe of *Paraphytomyza* ENDERLEIN, *Phytagromyza* HENDEL and *Phytomyza* FALLÉN. These belong to five genera of Dacnusini (*Exotela*, *Priapsis*, *Coloneura*, *Dacnusa* and *Chorebus*) and two non-Dacnusine genera, *Dapsilarthra* FÖRSTER and *Pseudopezomachus* MANTERO. The concept of *Phytomyza* used in this paper includes leaf-mining species formerly included in *Napomyza* HALIDAY. The parasites of true *Napomyza* spp. are not treated. —

2. The Dacnusini parasites nearly all exhibit a high degree of host specificity. This is especially marked in *Chorebus*, the majority of whose species have only been obtained from a single host. Two species of *Dacnusa* (*D. maculipes* THOMSON and *D. laevipectus* THOMSON) exhibit secondary oligophagy. The non-Dacnusine species are also oligophagous. —

3. Revised keys are given for *Exotela* and *Dacnusa*. Keys are also given for the parasites of particular host-groups, to facilitate the identification of bred material. —

4. In the course of a discussion on the evolution of the parasites in relation to their hosts, priorities in the host association of *Exotela* and *Dacnusa* are suggested and instances of vicariance at a low taxonomic level given for *Chorebus*. —

5. Complete host/parasite lists have again been prepared, intended to supersede previously published lists for Europe. —

6. Forty new species are described, six in *Exotela*, one in *Coloneura*, seventeen in *Dacnusa* and sexteen in *Chorebus*; and one new subspecies in *Exotela*.

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Zusammenfassung

1. Dieser Artikel ist der dritte einer Serie und behandelt die europäischen Alysiinae-Parasiten von *Paraphytomyza* ENDERLEIN, *Phytagromyza* HENDEL und *Phytomyza* FALLÉN. Sie gehören zu fünf Dacnusini-Gattungen (*Exotela, Priapsis, Coloneura, Dacnusa* und *Chorebus*) und zu zwei Gattungen außerhalb der Dacnusini, nämlich *Dapsilarthra* FÖRSTER und *Pseudopezomachus* MANTERO. Der Begriff *Phytomyza* wird in diesem Artikel unter Einschluß der früher zu *Napomyza* HALIDAY gerechneten blattminierenden Arten gebraucht. Die Parasiten der echten *Napomyza* spp. werden nicht behandelt. —

2. Die Dacnusini-Parasiten zeigen fast alle einen hohen Grad von Wirtsspezifik. Das ist besonders ausgeprägt bei *Chorebus*, von der die meisten Arten nur auf einem einzigen Wirt gefunden wurden. Zwei *Dacnusa*-Arten (*D. maculipes* THOMSON und *D. laevipectus* THOMSON) zeigen sekundäre Oligophagie. Die Arten außerhalb der Dacnusini sind ebenfalls oligophag. —

3. Es werden verbesserte Bestimmungstabellen für *Exotela* und *Dacnusa* mitgeteilt. Ferner werden Bestimmungstabellen für die Parasiten einzelner Wirtsgruppen angegeben, um die Determination gezüchteten Materials zu erleichtern. —

4. Bei der Besprechung der Entwicklung der Parasiten im Verhältnis zu ihren Wirten wird festzustellen versucht, mit welchen Wirtsgruppen *Exotela* und *Dacnusa* fruher verbunden waren. Für *Chorebus* werden Beispiele von Vikarianz auf niedriger taxonomischer Ebene erwähnt. —

5. Es wurden neue vollständige Listen von Wirten und Parasiten zusammengestellt, die die früher für Europa veröffentlichten Listen ersetzen sollen. —

6. Es werden 40 neue Arten beschrieben, 6 bei *Exotela*, eine bei *Coloneura*, 17 bei *Dacnusa* und 16 bei *Chorebus*, sowie eine neue Unterart bei *Exotela*.

Резюме

1. Эта статья, третяя одной серии, обрабатывает европейские паразиты-Alysiinae от *Paraphytomyza* ENDERLEIN, *Phytagromyza* HENDEL и *Phytomyza* FALLÉN. Паразиты стоят в пяти родах Dacnusini (*Exotela, Priapsis, Coloneura, Dacnusa* и *Chorebus*) и в двух вне Dacnusini: *Dapsilarthra* FÖRSTER и *Pseudopezomachus* MANTERO. *Phytomyza* применяется в этой статье с включением тех листеминирующих видов, которые раньше относились к *Napomyza* HALIDAY. Паразитами настоящих видов *Napomyza* не занимались. —

2. Почти все паразиты-Dacnusini показывают высокую степень хозяинной специфики. Это особенно выявленно у *Chorebus*, где большинство видов находились только на одном хозяйне. Два вида *Dacnusa* (*D. maculipes* THOMSON и *D. laevipectus* THOMSON) показывают вторичную олигофагию. Виды вне Dacnusini тоже олигофагны. —

3. Даются улучшенные определительные таблицы для *Exotela* и *Dacnusa*. Кроме того даются определительные таблицы для отдельных групп хозяинов, чтобы облехчать детерминацию выращенного материала. —

4. При обсуждении развития паразитов в отношении к их хозяинам делается попытка установить, с какими группами хозяинов *Exotela* и *Dacnusa* были раньше связанны. Для *Chorebus* отмечаются примеры викариации на низком таксономическом уровне. —

5. Даются новые совершённые списки хозяинов и паразитов, которые должны заменить списки, которые опубликовались раньше для Европы. —

6. Описываются 40 новых видов, 6 у *Exotela*, 1 у *Coloneura*, 17 у *Dacnusa* и 16 у *Chorebus*, также один новый подвид у *Exotela*.

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Tables of Biometric Data

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Table 12
Biometric Data

		Absolute Measurements (1 = 0.01 mm.)																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head			Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height					3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
1	♀	63	32	43	18	34	19	12	20	15	13	13	15	11	11	83	46	69	63	85	72	28	15	11	7	11
2	♂	58	28	43	14	30	17	11	18	13	12	11	14	10	11	74	41	63	54	74	63	24	13	10	7	10
3	♂	61	30	46	13	34	21	13	19	13	12	10	13	11	12	78	44	72	67	91	74	30	15	11	7	10
4	♀	59	28	43	15	32	19	12	17	13	12	—	13	10	10	76	39	61	61	80	67	26	14	9	7	10
5	♂	41	20	31	10	23	13	7	12	10	9	6	7	5	5	46	32	46	35	48	39	15	7	6	4	7
6	♀	50	30	39	15	30	17	11	17	13	12	10	12	7	7	65	41	65	54	72	61	24	13	9	7	9
7	♀	68	32	50	15	36	22	13	21	15	13	12	17	12	12	91	44	71	74	87	76	30	16	11	9	11
8	♂	58	28	41	14	32	21	12	19	12	11	11	14	11	12	71	39	60	59	80	67	26	13	10	7	11
9	♂	58	28	46	13	32	22	13	14	12	10	9	11	7	9	80	43	74	63	85	71	27	14	10	8	11
10	♀	63	34	46	16	35	22	13	17	13	11	—	—	—	—	91	48	74	69	96	74	28	15	12	9	11
11	♂	56	26	43	13	32	19	10	13	11	10	9	11	7	9	74	43	61	50	72	58	22	12	9	6	10
12	♀	59	26	43	12	32	19	12	13	10	10	10	11	9	10	78	44	67	58	76	63	24	11	10	7	10
13	♀	59	32	43	18	30	19	11	13	12	11	9	13	9	11	76	46	69	59	74	59	21	12	11	6	9
14	♂	69	35	50	21	37	22	13	21	14	13	13	17	12	13	95	52	80	71	93	73	27	15	11	7	11
15	♀	67	32	48	17	35	23	13	19	13	12	11	16	12	13	93	48	78	71	98	79	30	17	12	8	12
16	♂	59	34	45	17	31	21	11	18	14	13	12	14	10	10	81	41	67	63	85	81	32	15	13	9	13
17	♀	56	34	44	17	31	19	11	18	14	13	—	—	—	—	81	42	65	61	81	83	34	17	13	9	11
18	♂	65	32	46	17	35	24	12	19	14	12	9	13	8	7	80	46	74	59	80	69	26	13	11	7	11
19	♀	63	32	44	14	35	21	12	17	13	10	9	12	9	9	83	44	65	61	81	67	26	13	9	7	11
20	♂	58	30	41	19	30	19	11	16	13	12	11	13	7	9	78	43	61	54	72	58	21	12	9	7	9
21	♀	56	28	41	16	32	18	13	17	13	11	9	13	7	10	72	37	61	53	71	56	19	12	9	7	9
22	♀	46	24	35	12	23	17	8	11	9	9	6	8	6	7	58	34	46	37	54	44	17	9	7	4	7

Nos. 1—2. *Exotela cyclogaster sonchina* ssp. nov. ex *Phytomyza marginella* FALLÉN: 1, Inverness, Scotland; 2, holotype, Germany.
Nos. 3—4. *Exotela cyclogaster cyclogaster* FÖRSTER: 3, ex *Phytomyza heracleana* HERING, Budapest, Hungary; 4, ex *P. sphondyliivora* SPENCER, Surrey, England.
Nos. 5—6. *Exotela cyclogaster umbellina* (NIXON): 5, ex *Phytomyza adjuncta* HERING, London; 6, ex *P. anthrisci* HENDEL, Selsdon, Surrey, England.
Nos. 7—8. *Exotela senecionis* sp. nov. ex *Phytomyza senecionis* KALTENBACH, Poland: 7, Kraków Ravine; 8, Spadowiec Valley.
Nos. 9—10. *Exotela tatrica* sp. nov. ex *Phytomyza aronici* NOWAKOWSKI, Poland (9 the holotype).

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Hind Coxa				Petiole			Ratios																				
26	27	28	29	30	31	32	A	B	C	D	E			F	G	H	J	J					K	L
Width	Length	Wing Length	Gaster Length	Width	Length	Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus	Width of Mandibles/ Length of Head	Antennal Segments			Height/Length of Thorax	Thorax/Head Width	Wing Length/Body Length	Hind Tibia/Tarsus	Hind Tarsal Segments					Lengths of Petiole/ Gaster	Width/Length of Petiole
											3	4	5					1	2	3	4	5		
17	28	281	102	24	39	200	2 0	1 4	1 9 1 0 6	2 7	1 3	1	0 9	1 2	1 4	0 7	0 8	1 9	1	0 8	0 5	0 8	2 6	1 6
14	26	238	85	17	32	176	2 1	1 5	1 9 1 0 6	2 5	1 4	1	0 9	1 2	1 4	0 7	0 8	1 9	1	0 8	0 6	0 8	2 7	1 9
15	26	262	113	24	37	214	2 1	1 6	1 8 1 0 6	2 3	1 5	1	0 9	1 1	1 4	0 8	0 8	2 0	1	0 7	0 5	0 7	3 0	1 5
13	25	262	89	20	35	186	2 1	1 5	1 9 1 0 6	2 3	1 3	1	0 9	1 2	1 5	0 7	0 8	1 9	1	0 7	0 5	0 7	2 5	1 8
9	15	162	65	17	24	128	2 1	1 6	1 8 1 0 6	2 9	1 3	1	0 9	1 0	1 3	0 8	0 8	2 0	1	0 8	0 6	0 9	2 7	1 4
14	22	257	78	19	32	167	1 7	1 3	1 7 1 0 6	2 7	1 3	1	0 9	1 0	1 2	0 8	0 8	1 9	1	0 7	0 5	0 7	2 5	1 6
17	28	300	113	19	41	248	2 1	1 6	1 9 1 0 6	2 4	1 4	1	0 9	1 3	1 5	0 8	0 9	1 9	1	0 7	0 6	0 7	2 7	2 2
15	26	267	98	17	36	200	2 1	1 5	1 8 1 0 6	2 3	1 5	1	0 9	1 2	1 5	0 7	0 8	2 0	1	0 8	0 6	0 9	2 7	2 2
13	26	281	106	21	39	224	2 1	1 7	1 8 1 0 7	2 1	1 2	1	0 9	1 1	1 3	0 8	0 8	1 9	1	0 7	0 6	0 8	2 7	1 9
15	28	305	93	21	39	214	1 9	1 4	1 8 1 0 6	2 6	1 3	1	0 9	1 2	1 3	0 7	0 8	1 9	1	0 8	0 6	0 8	2 4	1 8
12	22	228	85	19	32	181	2 2	1 6	1 8 1 0 6	2 6	1 2	1	0 9	1 2	1 3	0 8	0 8	1 9	1	0 7	0 5	0 8	2 7	1 7
13	22	243	87	22	35	200	2 3	1 6	1 9 1 0 6	2 2	1 2	1	0 9	1 2	1 3	0 8	0 8	2 2	1	0 9	0 7	0 9	2 5	1 6
15	24	233	93	18	39	195	1 9	1 4	2 0 1 0 6	2 8	1 1	1	0 9	1 1	1 3	0 8	0 8	1 7	1	0 9	0 5	0 8	2 4	2 2
15	28	310	120	25	37	238	1 9	1 4	1 9 1 0 6	2 7	1 4	1	0 9	1 2	1 3	0 8	0 8	1 8	1	0 7	0 5	0 7	3 2	1 5
17	30	314	117	27	39	233	2 1	1 5	1 9 1 0 7	2 4	1 4	1	0 9	1 2	1 4	0 7	0 8	1 8	1	0 7	0 5	0 7	3 0	1 5
15	26	276	115	22	37	238	1 8	1 4	1 9 1 0 7	3 0	1 3	1	0 9	1 2	1 5	0 9	1 0	2 1	1	0 9	0 6	0 9	3 1	1 7
13	28	276	93	22	34	209	1 7	1 3	1 8 1 0 6	3 0	1 2	1	0 9	1 3	1 3	0 8	1 0	2 0	1	0 8	0 5	0 7	2 8	1 5
14	26	276	96	26	35	209	2 1	1 5	1 8 1 0 7	2 6	1 4	1	0 9	1 1	1 4	0 8	0 9	2 0	1	0 9	0 6	0 9	2 7	1 4
15	28	271	93	22	37	209	2 0	1 4	1 8 1 0 6	2 7	1 3	1	0 8	1 3	1 4	0 8	0 8	2 0	1	0 7	0 6	0 9	2 5	1 7
13	26	248	93	16	30	186	1 9	1 4	1 9 1 0 6	2 7	1 2	1	0 9	1 3	1 3	0 7	0 8	1 7	1	0 8	0 6	0 8	3 1	1 9
14	26	243	72	17	28	157	2 0	1 5	1 8 1 0 6	2 1	1 3	1	0 9	1 2	1 5	0 6	0 8	1 6	1	0 7	0 6	0 7	2 6	1 7
9	17	167	65	18	24	143	1 9	1 5	2 0 1 0 7	3 0	1 2	1	0 9	1 2	1 4	0 9	0 8	1 9	1	0 9	0 4	0 9	2 7	1 4

Nos 11—12 *Exotela obscura* sp nov ex *Phytomyza laserpitii* HENDEL 11, Wurttemberg Germany, 12 Gotland, Sweden
No 13 *Exotela spinifer* (NIXON) ex *Phytomyza cirsii* HENDEL, Herts, England
Nos 14—15 *Exotela aconiti* sp nov Poland (14 the holotype)
Nos 16- 17 *Exotela gilvipes* (HALIDAY) ex *Phytomyza ranunculi* SCHRANK, Denmark
Nos 18—19 *Exotela sulcata* (TOBIAS) ex *Phytomyza calthivora* HENDEL 18, Wilts England 19 Randers Denmark
Nos 20—21 *Exotela loniceraе* sp nov, Scratch Wood, London
No 22 *Exotela minuscula* sp nov, holotype

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Table 13
Biometric Data

		Absolute Measurements (1 = 0.01 mm.)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head			Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height					3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
1	♂	46	22	35	10	24	14	9	12	10	9	6	6	5	5	58	32	44	40	54	48	19	9	7	6	8
2	♀	43	24	34	10	23	14	9	10	9	8	—	6	5	5	48	28	44	36	48	44	17	9	6	5	7
3	♂	66	34	50	16	35	25	12	17	15	13	9	12	9	8	89	46	74	59	83	80	29	17	12	9	14
4	♀	60	34	44	15	34	—	12	14	13	11	—	—	—	—	78	44	71	58	78	77	30	15	11	8	13

Nos. 1—2 *Priapsis dice* NIXON: 1, ex *Phytomyza angelicivora* HERING, Germany; 2, ex *P. silai* HERING, London, England.

Table 14
Biometric Data

		Absolute Measurements (1 = 0.01 mm.)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head			Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height					3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
1	♂	52	34	44	17	—	17	12	15	15	14	—	11	8	8	78	37	54	54	78	78	30	16	12	9	12
2	♀	52	26	41	14	26	17	9	15	15	13	9	12	7	8	76	37	52	56	80	74	30	14	11	9	11
3	♂	61	30	43	16	34	21	13	16	15	13	12	14	11	12	83	46	72	61	80	63	24	11	9	7	11
4	♀	52	26	37	14	28	21	11	17	15	14	7	9	7	7	69	35	56	54	76	69	24	15	11	8	10
5	♀	50	26	37	13	30	—	9	16	13	12	8	9	7	7	61	35	56	46	67	58	21	12	9	7	9
6	♂	41	22	33	12	26	13	9	15	13	11	7	9	6	7	58	28	44	41	58	54	21	10	9	6	7
7	♂	48	24	36	12	26	19	9	14	12	11	7	9	7	7	55	35	52	45	59	48	17	9	7	5	9
8	♀	50	22	37	11	28	18	10	17	13	12	9	11	8	9	59	35	58	50	67	55	21	11	9	7	10
9	♀	61	32	43	16	34	22	13	21	17	15	12	15	9	10	81	44	65	63	81	67	25	15	9	8	9
10	♂	56	30	41	17	32	22	11	21	17	15	10	13	11	11	74	43	65	61	81	63	24	12	9	7	9
11	♂	63	34	48	17	35	22	12	21	17	16	11	15	12	14	93	46	74	69	96	76	30	17	12	7	11
12	♀	63	30	46	15	32	22	11	18	15	13	11	14	9	13	87	46	69	63	93	74	30	15	11	7	11
13	♂	58	26	43	13	32	22	13	19	15	13	13	17	14	12	78	43	65	65	85	71	28	12	11	7	11
14	♀	58	26	43	14	30	21	10	17	14	13	—	15	11	10	78	41	61	58	80	63	24	11	9	7	10

Nos. 1—2. *Dacnusa metula* (NIXON) ex *Phytomyza* sp. on *Dipsacus*: 1, London, England; 2, Småland, Sweden.
No. 3. *Dacnusa prisca* sp. nov. holotype.
No. 4. *Dacnusa hospita* (FÖRSTER) ex *Phytomyza* sp. ? *stolonigena* HERING, Munchen, Germany.
Nos. 5—6. *Dacnusa macrospila* (HALIDAY) ex *Phytomyza ranunculi* SCHRANK: 5, Schwarzwald, Germany; 6, London, England.
Nos. 7—8. *Dacnusa melicerta* (NIXON), London, England: 7, ex *Phytomyza corvimontana* HERING; 8, ex *P. achilleae* HERING.

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26	27	28	29	30	31	32	Ratios A	B	C	D	E			F	G	H	I	J					K	L
Hind Coxa				Petiole							Antennal Segments							Hind Tarsal Segments						
Width	Length	Wing Length	Gaster Length	Width	Length	Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus	Width of Mandibles/ Length of Head	3	4	5	Height/Length of Thorax	Thorax/Head Width	Wing Length/Body Length	Hind Tibia/Tarsus	1	2	3	4	5	Lengths of Petiole/ Gaster	Width/Length of Petiole
11	18	172	69	21	23	153	21	16	19106	26	12	1	09	13	15	09	09	22	1	08	06	09	29	11
10	18	162	59	21	21	133	18	14	18106	28	11	1	09	11	15	08	09	18	1	07	05	08	29	10
16	27	267	124	31	39	248	20	15	19107	28	11	1	09	12	14	09	10	16	1	07	05	08	32	13
15	25	248	111	29	35	219	18	13	181 —	28	11	1	09	11	14	09	10	20	1	08	05	09	32	12

Nos 3—4 *Coloneura major* sp nov , Denmark (3 the holotype)

26	27	28	29	30	31	32	Ratios A	B	C	D	E			F	G	H	I	J					K	L
Hind Coxa				Petiole							Antennal Segments							Hind Tarsal Segments						
Width	Length	Wing Length	Gaster Length	Width	Length	Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus	Width of Mandibles/ Length of Head	3	4	5	Height/Length of Thorax	Thorax/Head Width	Wing Length/Body Length	Hind Tibia/Tarsus	1	2	3	4	5	Lengths of Petiole/ Gaster	Width/Length of Petiole
15	26	238	113	18	30	228	16	13	—	28	10	1	09	14	14	10	10	19	1	08	05	07	38	17
15	28	238	93	16	32	200	20	16	20107	28	10	1	09	15	14	08	09	22	1	08	06	08	29	20
15	32	291	120	24	34	243	21	14	18106	23	10	1	09	12	13	08	08	22	1	08	07	10	36	14
13	22	219	80	26	30	186	20	14	19107	23	11	1	10	12	15	08	09	16	1	07	05	07	27	11
12	26	205	81	24	28	167	19	14	171 —	28	12	1	09	11	14	08	09	17	1	08	06	08	29	12
12	21	190	78	17	22	162	18	15	16105	26	11	1	09	13	15	08	09	20	1	09	05	07	35	13
11	22	200	67	18	25	150	20	15	19107	26	12	1	09	11	14	07	08	20	1	08	06	09	27	14
12	22	214	72	21	24	153	22	17	18106	22	12	1	09	10	14	07	08	18	1	08	07	09	30	12
14	30	257	89	21	32	219	19	14	18107	24	12	1	09	13	14	09	08	17	1	06	05	06	28	15
14	28	262	76	21	30	181	19	14	18107	27	12	1	09	11	13	07	08	20	1	08	06	08	26	15
17	32	305	126	23	37	248	19	14	18106	29	12	1	09	12	14	08	08	18	1	07	04	07	34	16
14	30	291	106	23	35	224	21	16	20107	27	12	1	09	13	14	08	08	20	1	07	05	07	30	15
14	26	286	104	20	38	214	22	16	18107	20	12	1	09	12	13	07	08	23	1	09	06	09	27	19
12	26	257	98	18	35	195	22	16	19107	26	12	1	09	13	14	08	08	22	1	08	07	09	28	20

Nos 9—10 *Dacnusa centaureae* sp nov , Germany

Nos 11—12 *Dacnusa soldanellae* sp nov , Oberbayern, Germany (11 the holotype)

Nos 13—14 *Dacnusa alpestris* sp nov 13, ex *Phytomyza tussilaginis* HENDEL Austria, 14 ex *P alpina* GROSCHKE, Oberbayern Germany

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Table 14 (cont)

		Absolute Measurements (1 = 0.01 mm.)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head			Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height					3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
15	♂	48	26	35	13	30	19	9	16	13	13	10	14	9	14	63	32	54	48	67	58	21	12	9	7	9
16	♀	56	28	41	15	30	21	11	19	15	14	12	17	11	15	78	39	61	59	77	67	26	13	9	7	11
17	♂	56	24	41	12	32	19	10	14	13	12	10	12	9	10	69	41	59	52	71	56	21	11	7	6	12
18	♀	58	28	41	15	31	19	11	16	13	12	11	13	10	10	76	43	59	57	72	56	22	11	7	6	10
19	♂	50	22	35	13	26	21	9	19	14	14	12	14	11	15	65	34	54	50	69	50	21	9	7	6	8
20	♂	63	28	44	14	35	—	13	19	16	13	—	—	—	—	76	42	71	59	78	58	21	11	9	7	9
21	♂	61	32	43	15	33	21	12	21	17	15	12	15	11	13	83	43	61	53	80	71	26	14	10	9	12
22	♂	59	32	43	17	32	21	11	19	17	15	10	14	9	13	81	43	63	58	83	71	26	15	11	7	11
23	♂	74	32	52	19	39	28	15	25	19	18	17	22	17	21	111	61	102	87	109	83	32	15	13	9	14
24	♂	59	26	43	15	32	21	12	21	17	15	14	19	13	17	87	44	65	67	87	63	24	11	9	7	11
25	♂	50	26	35	15	26	18	11	17	15	13	10	13	11	13	69	35	56	48	67	50	19	9	7	6	8
26	♂	54	27	39	15	31	17	9	18	16	15	12	17	11	15	76	39	59	53	81	68	26	13	11	7	11
27	♀	49	28	36	17	25	17	9	16	14	13	10	14	9	12	65	34	52	47	71	58	22	12	9	6	10
28	♀	39	21	28	11	21	14	8	11	10	9	6	7	6	6	44	25	39	34	50	43	15	9	7	4	8
29	♀	60	31	41	17	34	21	11	15	13	12	11	12	10	11	76	44	66	58	81	59	21	12	9	7	9
30	♂	61	30	44	16	34	22	13	17	14	13	11	13	9	12	83	48	69	72	87	67	23	13	11	8	11
31	♂	67	34	43	19	37	22	13	17	15	14	13	16	11	15	91	48	85	71	91	74	24	17	11	9	13
32	♀	76	36	50	19	44	26	13	17	14	14	13	17	11	15	98	54	91	71	95	80	28	17	13	9	13
33	♂	56	31	41	14	32	21	12	16	13	12	11	13	9	9	78	43	63	59	81	63	22	13	9	7	10
34	♀	59	32	43	17	32	19	12	17	14	13	10	15	9	12	78	43	69	63	87	71	27	13	11	7	12
35	♂	59	26	41	13	35	19	9	12	10	10	9	9	6	7	74	44	69	50	71	56	21	10	8	7	9
36	♂	48	28	43	11	26	17	11	11	9	9	7	7	5	6	74	39	52	43	63	59	22	13	9	6	9
37	♀	56	28	43	11	26	—	14	9	8	7	7	7	4	5	69	46	59	44	63	54	21	10	8	6	10
38	♀	48	30	41	11	26	—	9	11	10	9	—	7	6	6	67	37	61	46	67	61	24	13	9	6	9
39	♂	52	32	44	14	28	—	9	13	11	10	—	9	—	—	76	37	58	50	74	67	24	14	10	7	11

Nos. 15—16. *Dacnusa ocyroe* (NIXON): 15, ex *Phytomyza conyzae* HENDEL, Yorks., England; 16, ex *P. alpina* GROSCHKE, Germany.

Nos. 17—18. *Dacnusa angelicina* sp. nov., Germany: 17, holotype ex *Phytomyza angelicae* KALTENBACH, Wurttemberg; 18, ex *P. aegopodii* HERING, Thuringia.

No. 19. *Dacnusa lithospermi* sp. nov. holotype.

No. 20. *Dacnusa ergeteles* (NIXON), Denmark.

Nos. 21—22. *Dacnusa brevistigma* (TOBIAS): 21, ex *Phytomyza hellebori* KALTENBACH, Como, Italy; 22, ex *P. anemones* HERING, Yugoslavia.

Nos. 23—24. *Dacnusa lissos* (NIXON): 23, ex *Phytomyza abdominalis* ZETTERSTEDT, Württemberg, Germany; 24, ex *P. aconitophila* HENDEL, Sweden.

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26	27	28	29	30	31	32	A	B	C	D	E			F	G	H	I	J					K	L
							Ratios																	
Hind Coxa		Wing Length	Gaster Length	Petiole		Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus	Width of Mandibles/ Length of Head	Antennal Segments			Height/Length of Thorax	Thorax Width/ Head Width	Wing Length/ Body Length	Hind Tibia/Tarsus	Hind Tarsal Segments					Lengths of Petiole/ Gaster	Width/Length of Petiole
Width	Length			Width	Length						3	4	5					1	2	3	4	5		
13	22	224	91	15	29	181	19	14	16 1 06	30	12	1	10	12	15	08	09	17	1	08	06	08	32	19
14	26	276	93	19	34	200	20	15	19 1 07	25	12	1	10	13	14	07	09	20	1	07	06	09	27	18
15	26	238	81	20	30	190	23	17	18 1 06	24	11	1	09	12	14	08	08	18	1	07	05	11	28	15
13	26	257	96	19	30	195	21	15	19 1 06	25	12	1	09	13	14	08	08	20	1	07	05	09	32	15
15	26	238	74	17	26	162	22	16	19 1 08	24	12	1	10	12	15	07	07	22	1	08	06	09	29	16
17	28	238	87	21	32	190	23	16	18 1 —	21	12	1	08	11	15	08	07	18	1	08	07	08	28	15
16	26	276	109	23	30	228	19	14	18 1 06	27	12	1	09	14	14	08	09	19	1	08	07	09	37	13
15	28	281	106	24	29	224	19	14	18 1 07	28	11	1	09	13	14	08	08	18	1	07	05	07	37	12
22	43	381	145	31	44	286	24	16	19 1 07	21	13	1	10	11	12	07	08	21	1	09	06	10	32	15
17	32	281	98	19	34	209	23	16	19 1 06	21	12	1	09	12	13	07	07	22	1	08	07	10	29	18
15	26	224	91	18	26	186	19	13	19 1 07	23	11	1	09	12	14	08	08	20	1	08	06	09	35	15
17	26	271	100	24	30	209	19	14	17 1 05	29	11	1	10	13	14	08	08	20	1	09	06	09	34	12
13	25	257	74	19	26	172	18	13	20 1 07	32	11	1	09	13	15	07	08	19	1	08	05:	08	29	13
11	17	172	56	17	21	119	19	14	18 1 06	25	1.1	1	09	11	16	07	09	17	1	07	05	09	27	12
13	22	252	89	19	32	172	20	13	18 1 06	27	11	1	09	12	14	07	07	17	1	08	06	08	28	17
15	26	271	100	21	34	209	21	15	18 1 07	23	12	1	09	12	13	08	08	18	1	09	06	09	30	16
17	35	300	128	28	37	257	20	13	18 1 06	26	12	1	10	11	14	09	08	14	1	07	06	08	34	13
19	37	333	111	26	39	243	21	15	17 1 06	28	12	1	10	11	14	07	08	17	1	08	06	08	29	15
14	26	257	98	17	28	200	18	14	18 1 07	26	12	1	09	12	13	08	08	17	1	07	06	08	35	17
11	28	286	89	22	28	195	19	14	19 1 06	26	12	1	09	11	14	07	08	21	1	09	06	09	32	13
13	28	238	104	21	26	214	23	16	17 1 05	30	12	1	10	11	13	09	08	20	1	08	06	09	40	13
13	22	209	91	24	26	190	17	15	19 1 06	25	12	1	10	14	12	09	09	17	1	07	05	07	35	11
14	24	200	104	30	30	195	20	15	21 1 —	20	11	1	08	12	12	10	09	20	1	08	05	10	35	10
12	24	219	76	24	25	176	16	14	19 1 —	35	11	1	09	11	13	08	09	19	1	07	04	07	31	10
11	24	224	91	27	28	195	16	14	19 1 —	34	12	1	09	13	14	09	09	17	1	07	05	08	33	10

No 25 *Dacnusa ? lissos* (NIXON) ex *Phytomyza* sp (HERING, 1957, no 358) Thuringia, Germany

Nos 26–27 *Dacnusa clematidis* sp nov, Poland (26 the holotype)

No 28 *Dacnusa campanariae* sp nov holotype

Nos 29–30 *Dacnusa aquilegiae* MARSHALL ex *Phytomyza aquilegiae* HARDY 29 Devon, England, 30, Munchen Germany

Nos 31–32 *Dacnusa delphinii* sp nov ex *Phytomyza aconiti* HENDEL, London, England (31 the holotype)

Nos 33–34 *Dacnusa fuscipes* sp nov ex *Phytomyza laserpitii* HENDEL, Nevache, France

No 35 *Dacnusa lonicerella* sp nov holotype

Nos 36–37 *Dacnusa nigrella* sp nov, Randers, Denmark

Nos 38–39 *Dacnusa monticola* (FORSTER) ex *Phytomyza tenella* MEIGEN, Denmark

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Table 14 (continued)

		Absolute Measurements (1 = 0.01 mm.)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head							Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height	Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
40	♀	69	35	50	15	39	21	12	17	15	13	—	13	7	9	95	52	80	63	89	83	32	17	12	7	15
41	♂	69	32	50	12	38	23	13	19	16	13	—	13	7	10	98	54	80	67	89	91	35	17	13	9	16
42	♂	48	26	35	12	28	19	10	16	15	13	7	7	4	6	61	35	50	44	65	56	21	11	9	6	9
43	♀	54	26	41	12	30	21	11	17	14	14	—	9	6	7	69	39	56	52	76	67	26	14	12	6	10
44	♂	48	26	35	16	27	17	9	15	13	—	9	10	7	7	63	34	54	48	61	—	21	—	—	—	—
45	♀	54	28	39	17	27	19	11	17	16	13	11	11	9	11	65	35	56	52	72	65	24	13	11	7	9
46	♀	50	32	41	18	28	19	11	15	13	11	7	7	6	6	65	35	54	46	67	71	28	15	11	7	9
47	♂	44	24	35	13	27	19	9	15	13	12	6	7	5	4	59	32	46	43	58	58	21	12	9	6	9
48	♂	41	21	32	11	24	17	9	15	13	12	6	7	6	6	52	28	44	41	56	52	17	11	7	6	9
49	♀	50	28	39	15	—	—	9	17	12	12	6	7	6	6	67	37	52	50	69	58	21	12	9	7	9
50	♀	54	26	41	14	30	19	11	17	14	12	7	11	7	8	67	39	62	52	71	54	19	12	7	7	9
51	♂	59	37	43	13	35	21	8	17	16	14	9	13	7	10	76	43	56	50	76	76	28	16	11	8	13
52	♀	56	32	42	15	30	18	11	15	13	12	7	11	6	9	71	39	52	50	74	74	29	15	11	8	11
53	♂	59	34	44	16	34	19	13	18	15	14	9	12	9	11	83	46	59	56	80	76	30	15	12	8	11
54	♀	52	26	41	14	26	18	11	15	14	13	9	13	8	10	67	37	46	46	69	63	24	13	10	8	9
55	♀	72	37	54	17	39	26	17	24	23	17	10	17	12	13	102	54	72	72	106	106	43	22	15	11	16
56	♂	74	44	48	21	41	24	18	22	22	17	—	17	11	13	91	48	72	67	96	98	39	21	15	9	15
57	♀	67	35	48	17	36	22	16	19	18	17	13	16	11	15	91	48	63	59	89	95	37	21	15	9	13
58	♀	48	25	37	11	26	18	10	15	13	11	7	9	6	6	63	32	46	43	65	65	26	13	10	7	9
59	♂	49	28	35	12	29	19	11	15	15	13	7	9	6	7	67	35	48	44	69	69	26	13	10	7	11
60	♂	67	34	46	15	37	22	16	19	15	—	9	11	8	9	83	44	63	58	83	81	22	17	13	9	12
61	♀	65	32	45	11	37	—	13	19	15	14	—	13	9	10	85	48	76	60	87	81	32	16	12	9	13
62	♂	59	32	44	12	35	—	13	21	15	15	—	—	—	—	78	43	67	56	78	81	30	17	13	8	13
63	♀	54	30	37	13	30	19	13	17	15	13	7	9	7	7	69	37	56	50	72	65	26	13	9	7	9
64	♂	50	25	37	10	26	19	13	15	11	11	7	9	6	7	56	38	50	43	59	54	19	11	8	6	9

Nos. 40—41. *Dacnusa fasciata* STELFOX ex *Phytomyza dasyops* HENDEL, Denmark.

Nos. 42—43. *Dacnusa sibirica* TELENGA ex *Phytomyza asteris* HENDEL: 42, Down, Ireland (subsp. *comis*); 43, Gower, Wales (subsp. *sibirica*).

Nos. 44—45. *Dacnusa discolor* (FÖRSTER): 44, lectotype, Aachen, Germany; 45, ex *Phytomyza primulae* ROBINEAU-DESVOIDY, Yorks., England.

Nos. 46—47. *Dacnusa plantaginis* sp. nov. ex *Phytomyza plantaginis* ROBINEAU-DESVOIDY, Gower, Wales (47 the holotype).

Nos. 48—49. *Dacnusa veronicae* sp. nov. ex *Phytomyza crassiseta* ZETTERSTEDT, England: 48, Surrey (holotype); 49, Oxford.

No. 50. *Dacnusa liopleuris* THOMSON holotype, Sweden.

Nos. 51—52. *Dacnusa heringi* sp. nov. (51 the holotype).

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Ratios																																
26	27	28	29	30	31	32	A	B	C			D	E			F	G	H	I	J					K	L						
Hind Coxa		Wing Length	Gaster Length	Petiole		Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus			Width of Mandibles/ Length of Head	Antennal Segments			Height/ Length of Thorax	Thorax/ Head Width	Wing Length/ Body Length	Hind Tibia/ Tarsus	Hind Tarsal Segments					Lengths of Petiole/ Gaster	Width/ Length of Petiole						
Width	Length			Width	Length							3	4	5					1	2	3	4	5									
17	34	310	126	39	34	257	1	9	1	4	1	8 1 0 5	2	9	1	1	0	9	1	2	1	3	0	8	0	9	1	9	1	0	7	0	4	0	9	3	8	0	9
21	35	305	148	35	35	286	2	2	1	6	1	8 1 0 6	2	4	1	2	1	3	0	8	1	2	0	9	1	0	2	1	1	0	8	0	6	1	0	4	2	1	0
11	21	205	85	17	24	176	1	9	1	4	1	7 1 0 7	2	6	1	0	1	9	1	2	1	4	0	9	0	9	1	8	1	0	8	0	5	0	8	3	5	1	4
16	26	238	91	20	30	190	2	1	1	6	1	8 1 0 7	2	3	1	2	1	1	0	1	2	1	4	0	8	0	9	1	9	1	0	9	0	4	0	7	3	1	1	5
11	21	200	81	14	24	167	1	9	1	4	1	8 1 0 6	2	8	1	1	—		1	2	1	4	0	8	—						—					3	4	1	7
12	24	233	81	16	26	186	1	9	1	4	2	0 1 0 7	2	5	1	1	0	9	1	2	1	5	0	8	0	9	1	9	1	0	9	0	6	0	7	3	1	1	7
14	24	195	93	19	26	190	1	6	1	3	1	8 1 0 7	2	8	1	1	0	9	1	2	1	4	1	0	1	1	1	9	1	0	7	0	5	0	6	3	6	1	4
12	21	167	89	19	26	176	1	8	1	5	1	7 1 0 7	2	6	1	1	0	9	1	3	1	4	1	1	1	0	1	7	1	0	7	0	5	0	7	3	4	1	4
11	19	176	72	15	21	148	2	0	1	5	1	7 1 0 7	2	4	1	1	0	9	1	2	1	5	0	8	0	9	1	6	1	0	7	0	6	0	8	3	4	1	4
14	21	200	74	18	24	167	1	8	1	4	—		3	0	1	3	1	1	0	1	3	1	4	0	8	0	8	1	7	1	0	7	0	6	0	7	3	1	1	3
14	26	228	87	19	30	167	2	1	1	6	1	8 1 0 6	2	3	1	2	1	0	0	9	1	1	1	4	0	7	0	8	1	5	1	0	6	0	5	0	8	2	9	1	6
12	27	238	106	24	30	209	1	6	1	2	1	7 1 0 6	2	9	1	1	0	9	1	4	1	4	0	9	1	0	1	8	1	0	7	0	5	0	8	3	6	1	2
13	24	226	102	22	25	205	1	8	1	3	1	9 1 0 6	2	8	1	1	0	9	1	4	1	4	0	9	1	0	1	9	1	0	7	0	5	0	7	4	1	1	1
15	28	252	104	24	22	214	1	8	1	3	1	8 1 0 6	2	6	1	2	1	0	1	4	1	3	0	8	1	0	2	0	1	0	8	0	5	0	7	4	7	0	9
11	23	228	80	19	24	162	2	0	1	6	2	0 1 0 7	2	3	1	1	0	9	1	4	1	4	0	7	0	9	1	9	1	0	8	0	6	0	7	3	3	1	3
15	32	371	167	32	34	300	1	9	1	4	1	9 1 0 7	2	2	1	1	0	7	1	4	1	3	0	8	1	0	1	9	1	0	7	0	5	0	7	5	0	1	1
15	30	314	130	26	32	252	1	7	1	1	1	8 1 0 6	2	5	1	1	0	8	1	3	1	5	0	8	1	0	1	9	1	0	7	0	5	0	7	4	1	1	2
17	30	310	108	34	32	228	1	9	1	4	1	9 1 0 6	2	3	1	1	0	9	1	4	1	4	0	7	1	1	1	8	1	0	7	0	4	0	6	3	4	0	9
13	22	214	67	19	21	162	1	9	1	5	1	9 1 0 7	2	4	1	1	0	9	1	4	1	5	0	8	1	0	2	0	1	0	8	0	5	0	7	3	2	1	1
12	22	238	83	19	22	181	1	7	1	3	1	7 1 0 6	2	5	1	1	0	9	1	4	1	4	0	8	1	0	2	0	1	0	8	0	6	0	9	3	7	1	2
17	27	291	117	30	34	248	2	0	1	4	1	8 1 0 6	2	2	1	2	1	—	1	3	1	5	0	9	1	0	1	8	1	0	7	0	5	0	7	3	3	1	1
15	28	276	108	32	29	228	2	1	1	4	1	7 1 —	2	4	1	3	1	1	0	1	1	1	3	0	8	0	9	2	0	1	0	8	0	6	0	8	3	8	0	9
14	26	271	102	26	26	214	1	9	1	4	1	7 1 —	2	4	1	4	1	1	0	1	2	1	1	0	8	1	0	1	8	1	0	8	0	5	0	8	3	9	1	0
12	23	233	87	24	26	181	1	8	1	3	1	8 1 0 6	2	3	1	1	0	9	1	2	1	4	0	8	0	9	2	0	1	0	7	0	6	0	7	3	4	1	1
12	19	195	76	22	23	157	2	0	1	5	1	9 1 0 7	1	9	1	3	1	1	0	1	1	1	3	0	8	0	9	1	7	1	0	7	0	6	0	8	3	3	1	1

Nos 53—54 *Dacnusa tarsalis* THOMSON ex *Phytomyza autumnalis* GRIFFITHS, London, England

Nos 55—56 *Dacnusa pubescens* (CURTIS) ex *Phytomyza rufipes* MEIGEN, Medelpad, Sweden

No 57 *Dacnusa merope* (NIXON) ex *Phytomyza* sp on *Petasites*, Thuringia, Germany

No 58 *Dacnusa helvetica* sp nov holotype

Nos 59—60 *Dacnusa gentianae* sp nov 59, holotype ex *Phytomyza vernalis* GROSCHKE, Germany, 60, ex *P swertiae* HERING, Poland

Nos 61—62 *Dacnusa confinis* RUTHE ex *Phytomyza ranunculi* SCHRANK, Denmark

Nos 63—64 *Dacnusa maculipes* THOMSON 63, ex *Phytomyza alpina* GROSCHKE, Yorks, England, 64, ex *P astrantiae* HENDEL, Austria

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Table 14 (continued)

		Absolute Measurements (1 = 0.01 mm.)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head			Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height					3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
65	♀	59	32	44	13	33	22	13	19	17	15	7	12	7	7	85	48	63	54	81	80	33	16	11	8	12
66	♂	43	24	35	12	26	16	9	14	13	12	—	7	6	6	59	32	41	41	67	62	26	13	8	7	9
67	♂	59	29	44	15	34	22	12	17	16	13	12	15	8	14	80	48	72	59	87	81	30	17	13	9	13
68	♀	48	22	39	11	26	19	10	15	13	12	9	12	9	11	67	39	56	50	69	67	26	13	10	7	11

Nos. 65—66. *Dacnusa areolaris* (NEES): 65, ex *Phytomyza atricornis* MEIGEN (*Matricaria*), Gower, Wales; 66, ex *P. nigra* MEIGEN, Woodwalton Fen, England.

Table 15
Biometric Data

		Absolute Measurements (1 = 0.01 mm.)																							
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head			Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height					3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
1	♂	43	24	35	11	22	18	7	13	11	10	8	11	8	9	59	31	46	41	63	52	21	10	7	6	7
2	♀	51	30	41	13	24	19	9	13	11	11	9	12	9	11	71	38	58	52	73	65	25	13	10	7	9
3	♀	51	28	39	17	24	19	9	15	11	12	11	12	9	11	67	41	56	46	67	58	22	12	9	7	9
4	♂	50	26	39	14	26	19	9	17	12	11	9	13	8	10	69	41	54	48	69	60	22	12	10	7	10
5	♂	54	30	41	15	24	17	9	16	13	12	9	12	9	10	74	39	56	46	65	59	21	13	9	7	10
6	♀	50	26	39	14	22	17	9	15	12	11	9	12	9	10	69	37	52	44	63	56	20	11	10	7	9
7	♂	59	30	44	14	30	21	11	15	13	12	9	14	10	11	83	44	65	61	87	74	30	15	11	7	10
8	♀	61	32	48	17	29	21	12	17	14	13	10	13	10	11	89	44	71	63	87	76	32	15	11	8	11
9	♀	50	28	41	13	26	20	11	13	11	11	7	9	6	8	65	34	48	44	63	65	24	14	11	8	9
10	♂	49	28	37	15	26	18	11	13	11	10	6	9	6	8	65	34	48	43	62	58	22	13	11	6	8
11	♀	56	28	39	16	30	21	9	14	12	11	7	10	7	7	76	41	54	48	71	65	23	12	10	7	11
12	♂	54	28	41	14	32	21	9	15	13	11	7	10	6	7	72	40	54	43	69	63	23	13	9	7	10
13	♀	55	31	41	14	26	21	9	12	10	9	7	9	6	8	76	41	56	52	74	64	24	13	9	7	10
14	♂	47	26	37	12	26	18	10	13	11	9	6	9	6	7	65	34	50	46	67	63	24	13	9	7	9

Nos. 1—2. *Chorebus aphantus* (MARSHALL): 1, ex *Phytomyza nigra* MEIGEN, Woodwalton Fen, England; 2, ex *P. milii* KALTENBACH, Stuttgart, Germany.

Nos. 3—4. *Chorebus sylvestris* sp. nov.: 3, holotype ex *Phytomyza xylostei* KALTENBACH, Scotland; 4, ex *P. lonicerella* HENDEL, Cumberland, England.

Nos. 5—6. *Chorebus xylostellus* sp. nov.: 5, Borgholm, Sweden; 6, Stuttgart, Germany.

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26	27	28	29	30	31	32	Ratios A	B	C	D	E			F	G	H	I	J					K	L
Hind Coxa				Petiole							Antennal Segments							Hind Tarsal Segments						
Width	Length	Wing Length	Gaster Length	Width	Length	Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus	Width of /Length Mandibles/ of Head	3	4	5	Height/Length of Thorax	Thorax /Head Width	Wing Length/ /Body Length	Hind Tibia/Tarsus	1	2	3	4	5	Lengths of Petiole/ Gaster	Width/Length of Petiole
15	28	267	102	26	30	214	1 9	1 4	1 8 1 0 7	2 4	1 2	1	0 9	1 4	1 2	0 8	1 0	2 0	1	0 7	0 5	0 7	3 4	1 1
11	19	200	80	17	21	162	1 8	1 5	1 6 1 0 6	2 8	1 1	1	0 9	1 4	1 4	0 8	0 9	2 0	1	0 6	0 5	0 7	3 9	1 2
15	28	286	113	27	32	219	2 1	1 5	1 8 1 0 7	2 4	1 1	1	0 8	1 1	1 2	0 8	0 9	1 8	1	0 8	0 6	0 8	3 6	1 2
12	22	252	89	22	26	172	2 2	1 7	1 9 1 0 7	2 2	1 1	1	0 9	1 2	1 2	0 7	1 0	2 0	1	0 8	0 6	0 9	3 0	1 2

Nos 67—68 *Dacnusa laevipectus* THOMSON 67, ex *Phytomyza ranunculi* SCHRANK, Cambridge, England, 68 ex *P vitalbae* KALTENBACH, Gower, Wales

26	27	28	29	30	31	32	Ratios A	B	C	D	E			F	G	H	I	J					K	L
Hind Coxa				Petiole							Antennal Segments							Hind Tarsal Segments						
Width	Length	Wing Length	Gaster Length	Width	Length	Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus	Width of /Length Mandibles/ of Head	3	4	5	Height/Length of Thorax	Thorax /Head Width	Wing /Body Length	Hind Tibia/Tarsus	1	2	3	4	5	Lengths of Petiole/ Gaster	Width/Length of Petiole
12	19	209	81	13	26	162	1 8	1 5	2 0 1 0 8	3 2	1 2	1	0 9	1 3	1 4	0 8	0 8	2 0	1	0 7	0 5	0 7	3 1	2 0
15	22	243	96	19	34	205	1 7	1 4	2 1 1 0 8	3 4	1 2	1	1 0	1 2	1 3	0 8	0 9	1 9	1	0 8	0 6	0 7	2 9	1 8
14	21	209	80	19	28	181	1 8	1 4	2 1 1 0 8	3 0	1 3	1	1 1	1 2	1 2	0 9	0 9	1 9	1	0 7	0 6	0 8	2 9	1 5
13	22	219	87	19	28	167	1 9	1 5	1 9 1 0 7	2 8	1 4	1	0 9	1 3	1 2	0 8	0 9	1 9	1	0 8	0 6	0 8	3 1	1 5
12	19	219	81	17	30	172	1 8	1 4	2 2 1 0 7	3 2	1 2	1	0 9	1 3	1 4	0 8	0 9	1 6	1	0 7	0 6	0 8	2 7	1 8
12	20	209	74	19	29	172	1 9	1 5	2 2 1 0 7	2 8	1 3	1	0 9	1 3	1 4	0 8	0 9	1 8	1	0 9	0 7	0 8	2 6	1 6
17	26	267	109	19	34	228	2 0	1 5	2 0 1 0 7	2 7	1 1	1	0 9	1 3	1 3	0 9	0 9	2 0	1	0 8	0 5	0 7	3 3	1 7
17	28	291	102	26	39	233	1 9	1 5	2 1 1 0 7	2 6	1 2	1	0 9	1 3	1 4	0 8	0 9	2 1	1	0 7	0 5	0 7	2 6	1 5
14	19	190	102	17	32	200	1 8	1 5	1 9 1 0 8	2 5	1 2	1	1 0	1 3	1 5	1 0	1 0	1 7	1	0 8	0 6	0 7	3 2	1 9
13	21	190	95	17	28	181	1 8	1 3	1 9 1 0 7	2 5	1 2	1	0 9	1 3	1 5	1 0	0 9	1 7	1	0 9	0 4	0 6	3 4	1 7
14	22	219	74	19	30	176	2 0	1 4	1 9 1 0 7	3 0	1 2	1	0 9	1 4	1 3	0 8	0 9	1 9	1	0 8	0 6	0 9	2 5	1 5
15	22	224	89	17	29	190	1 9	1 5	1 7 1 0 7	3 2	1 1	1	0 9	1 3	1 4	0 9	0 9	1 8	1	0 7	0 6	0 8	3 1	1 7
15	21	214	96	25	34	214	1 8	1 3	2 1 1 0 8	3 3	1 1	1	0 9	1 4	1 3	1 0	0 9	1 9	1	0 7	0 5	0 8	2 9	1 3
15	22	195	81	17	26	172	1 8	1 4	1 8 1 0 7	2 6	1 2	1	0 8	1 3	1 4	0 9	0 9	1 9	1	0 7	0 5	0 7	3 1	1 5

Nos 7—8 *Chorebus luzulae* sp nov, Germany (8 the holotype)

Nos 9—10 *Chorebus buhri* sp nov, Germany

Nos 11—12 *Chorebus dagda* (NIXON) ex *Phytomyza gentianae* HENDEL Como, Italy

Nos 13—14 *Chorebus gentianellus* sp nov, Germany 13, holotype ex *Phytomyza gentianella* HENDEL, 14 ex *P vernalis* GROSCHKE

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Table 15 (continued)

		Absolute Measurements (1 = 0.01 mm.)																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head							Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height	Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
15	♂	58	32	44	16	30	19	11	14	13	12	9	14	8	8	91	40	58	48	74	72	26	14	12	9	11
16	♀	61	32	48	17	32	21	13	17	13	13	9	14	8	9	95	45	67	63	87	80	30	17	12	9	11
17	♀	58	32	43	15	31	19	14	13	12	11	8	13	6	7	74	41	58	52	71	65	24	13	9	7	10
18	♀	40	22	32	12	21	15	7	12	11	10	7	9	5	6	58	31	39	37	52	51	19	11	7	6	9
19	♀	41	24	32	14	21	17	8	13	12	11	7	9	5	6	56	35	44	39	54	52	19	11	7	6	9
20	♀	58	28	44	15	31	20	12	13	13	12	7	10	6	9	81	44	59	50	76	85	32	19	13	9	12
21	♂	50	30	39	14	27	21	10	13	11	11	7	10	6	6	69	37	50	44	65	71	25	15	11	7	12
22	♂	65	34	50	15	34	22	15	16	13	11	10	12	8	9	95	50	67	63	91	89	32	19	14	11	13
23	♀	58	35	46	18	31	21	11	17	14	12	9	13	9	10	89	43	59	61	91	95	35	22	15	9	13
24	♂	59	37	48	19	32	22	12	17	15	13	9	13	7	9	87	41	61	61	93	93	34	21	15	11	12
25	♀	64	35	48	17	32	21	11	19	15	14	11	13	11	13	85	43	58	59	91	96	37	22	15	10	12
26	♂	50	24	37	11	27	17	10	12	12	10	6	7	4	4	67	43	50	43	61	56	22	12	7	6	9
27	♀	50	25	37	13	26	17	11	12	11	10	6	6	4	5	59	39	50	43	61	56	22	12	7	6	9
28	♂	52	27	39	12	29	17	13	14	12	11	—	—	—	—	67	39	56	43	65	56	21	13	7	6	9
29	♂	49	28	38	12	28	19	11	16	13	12	7	10	6	7	69	35	56	52	71	56	21	12	8	6	10
30	♀	54	31	39	17	28	19	12	13	11	11	—	9	6	8	67	42	61	48	63	58	21	11	9	7	10
31	♂	48	26	37	13	25	18	9	12	10	9	7	9	6	8	63	37	56	46	59	52	17	10	8	7	9
32	♂	59	32	41	13	31	21	13	15	13	11	8	11	7	9	74	42	61	52	72	71	26	13	11	9	11
33	♀	56	32	43	16	29	21	12	15	13	12	9	13	7	9	71	39	56	52	72	72	26	15	11	9	11
34	♀	65	32	46	15	34	22	11	17	15	13	10	15	9	10	85	50	78	67	87	69	26	14	10	7	12
35	♀	54	28	40	15	26	22	10	14	11	10	7	11	6	8	67	41	58	52	71	56	22	11	7	6	9
36	♂	58	28	44	13	31	21	11	16	14	12	9	12	7	10	67	43	59	56	76	65	27	13	9	7	10
37	♀	62	32	44	16	32	21	15	15	12	11	9	12	8	10	71	44	71	58	76	63	25	11	9	7	10
38	♀	60	32	46	16	28	—	13	15	12	11	9	13	8	8	74	43	68	59	80	80	31	16	13	9	13
39	♀	48	28	38	13	26	19	9	11	10	9	7	9	6	8	63	35	50	44	65	46	21	10	9	7	None
40	♂	61	32	41	12	35	—	12	17	13	12	9	12	8	9	76	43	65	58	76	72	26	16	13	8	9
41	♀	60	35	44	17	35	21	13	17	14	13	9	13	9	9	76	41	59	58	76	76	28	16	12	9	10
42	♀	54	33	44	17	30	21	12	16	12	11	7	11	6	6	76	41	59	52	74	65	26	13	9	7	9
43	♂	58	32	44	14	32	—	—	15	13	11	—	11	6	7	78	39	59	50	74	68	26	13	10	7	12

Nos. 15—17. *Chorebus punctus* (GOUREAU): 15, ex *Phytomyza scolopendrii* ROBINEAU-DESVOIDY, Devon, England; 16, ex *P. dorsata* HENDEL, Yugoslavia; 17, ex *P. sedicola* HERING, Poland.

Nos. 18—19. *Chorebus scabiosae* sp. nov.: 18, Württemberg, Germany; 19, Surrey, England.

Nos. 20—21. *Chorebus tanis* (NIXON): 2♀, ex *Phytomyza* sp. on *Dipsacus*, Stuttgart, Germany; 21, ex *P. scabiosarum* HERING, Sicily.

No. 22. *Chorebus merion* (NIXON) ex *Phytomyza taraxacocecis* HERING, England.

Nos. 23—24. *Chorebus ergias* (NIXON) ex *Phytomyza araciocecis* HERING, Germany.

No. 25. *Chorebus fallax* (NIXON) ex *Phytomyza cardui* HERING, Germany.

Nos. 26—27. *Chorebus canariensis* sp. nov., Canary Islands (26 the holotype).

No. 28. *Chorebus sativi* (NIXON) ex *Phytomyza atricornis* MEIGEN, Morocco.

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							Ratios																		
26	27	28	29	30	31	32	A	B	C	D	E			F	G	H	I	J					K	L
Hind Coxa		Wing Length	Gaster Length	Petiole		Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus	Width of Mandibles/ Length of Head	Antennal Segments			Height/Length of Thorax	Thorax /Head Width	Wing /Body Length/	Hind Tibia/Tarsus	Hind Tarsal Segments					Lengths of Petiole/ Gaster	Width/Length of Petiole
Width	Length			Width	Length						3	4	5					1	2	3	4	5		
13	24	252	111	18	30	233	1.8	1.4	1.9:1:0.6	2.8	1.1	: 1 :	0.9	1.6	1.4	0.9	1.0	1.8	: 1 :	0.8	: 0.6 :	0.8	3.5	1.7
17	26	267	106	22	36	224	1.9	1.5	1.9:1:0.6	2.4	1.3	: 1 :	1.0	1.4	1.4	0.8	0.9	1.8	: 1 :	0.7	: 0.6 :	0.7	2.9	1.7
15	22	224	98	19	32	195	1.8	1.3	1.9:1:0.6	2.6	1.1	: 1 :	0.9	1.3	1.4	0.9	0.9	1.9	: 1 :	0.7	: 0.6 :	0.8	3.1	1.7
10	19	162	69	15	26	162	1.8	1.4	1.9:1:0.7	3.0	1.1	: 1 :	0.9	1.5	1.3	1.0	1.0	1.7	: 1 :	0.7	: 0.5 :	0.8	2.6	1.7
10	17	164	56	14	23	143	1.7	1.3	2.0:1:0.8	3.0	1.1	: 1 :	0.9	1.3	1.2	0.9	1.0	1.7	: 1 :	0.7	: 0.5 :	0.8	2.4	1.7
15	26	238	100	23	35	214	2.1	1.6	1.9:1:0.7	2.3	1.0	: 1 :	0.9	1.4	1.3	0.9	1.1	1.7	: 1 :	0.7	: 0.5 :	0.7	2.8	1.5
14	21	205	89	16	27	176	1.7	1.3	1.8:1:0.8	2.8	1.2	: 1 :	1.0	1.4	1.3	0.9	1.1	1.7	: 1 :	0.7	: 0.5 :	0.8	3.3	1.8
16	30	262	126	24	35	262	1.9	1.5	1.9:1:0.7	2.3	1.2	: 1 :	0.9	1.4	1.3	1.0	1.0	1.7	: 1 :	0.8	: 0.6 :	0.7	3.6	1.5
17	28	267	109	17	34	224	1.6	1.3	1.9:1:0.7	3.2	1.2	: 1 :	0.9	1.5	1.3	0.8	1.0	1.6	: 1 :	0.7	: 0.4 :	0.6	3.3	1.9
18	27	271	117	19	35	248	1.6	1.3	1.9:1:0.7	3.0	1.1	: 1 :	0.9	1.4	1.5	0.9	1.0	1.6	: 1 :	0.7	: 0.5 :	0.6	3.3	1.9
15	28	281	135	18	37	267	1.8	1.4	2.0:1:0.7	3.2	1.2	: 1 :	0.9	1.5	1.5	0.9	1.1	1.7	: 1 :	0.7	: 0.5 :	0.6	3.6	2.1
13	21	195	65	16	24	167	2.1	1.5	1.9:1:0.6	2.3	1.0	: 1 :	0.9	1.3	1.2	0.9	0.9	1.9	: 1 :	0.6	: 0.5 :	0.8	2.7	1.5
12	19	181	71	17	24	159	2.0	1.5	1.9:1:0.6	2.2	1.1	: 1 :	0.9	1.2	1.3	0.9	0.9	1.8	: 1 :	0.6	: 0.5 :	0.8	2.9	1.4
13	21	195	93	17	24	181	1.9	1.4	1.8:1:0.6	2.1	1.1	: 1 :	0.9	1.2	1.3	0.9	0.9	1.6	: 1 :	0.6	: 0.5 :	0.7	3.8	1.4
13	22	228	91	20	32	176	1.8	1.4	1.8:1:0.7	2.5	1.2	: 1 :	0.9	1.3	1.4	0.8	0.8	1.7	: 1 :	0.7	: 0.5 :	0.8	2.8	1.6
11	21	209	89	21	34	176	1.8	1.3	2.0:1:0.7	2.6	1.2	: 1 :	1.0	1.1	1.3	0.8	0.9	1.8	: 1 :	0.8	: 0.7 :	0.9	2.7	1.6
12	21	190	81	19	29	176	1.9	1.4	1.9:1:0.7	2.8	1.2	: 1 :	0.9	1.1	1.3	0.9	0.9	1.7	: 1 :	0.8	: 0.7 :	0.9	2.9	1.5
13	22	228	93	17	35	200	1.9	1.3	1.9:1:0.7	2.4	1.1	: 1 :	0.9	1.2	1.4	0.9	1.0	2.0	: 1 :	0.9	: 0.7 :	0.9	2.6	2.1
15	22	224	89	19	34	190	1.8	1.4	1.9:1:0.7	2.7	1.1	: 1 :	0.9	1.3	1.4	0.9	1.0	1.8	: 1 :	0.8	: 0.6 :	0.8	2.7	1.8
15	26	291	98	28	36	224	2.1	1.5	1.9:1:0.7	2.8	1.2	: 1 :	0.9	1.1	1.3	0.8	0.8	1.9	: 1 :	0.7	: 0.5 :	0.9	2.7	1.3
14	21	228	78	19	28	176	1.9	1.4	2.1:1:0.8	2.8	1.2	: 1 :	0.9	1.1	1.3	0.8	0.8	2.0	: 1 :	0.6	: 0.5 :	0.8	2.8	1.5
16	24	238	96	21	34	207	2.1	1.6	1.9:1:0.7	2.5	1.1	: 1 :	0.9	1.1	1.3	0.9	0.9	2.1	: 1 :	0.7	: 0.6 :	0.8	2.8	1.7
14	25	248	81	25	34	214	2.0	1.4	1.9:1:0.7	2.1	1.2	: 1 :	0.9	1.0	1.4	0.9	0.8	1.9	: 1 :	0.8	: 0.6 :	0.9	2.4	1.3
16	24	262	130	26	32	233	1.9	1.4	2.2:1:—	2.5	1.3	: 1 :	0.9	1.1	1.4	0.9	1.0	1.9	: 1 :	0.8	: 0.5 :	0.8	4.1	1.2
11	26	186	83	16	32	186	1.7	1.4	1.9:1:0.7	3.2	1.1	: 1 :	0.9	1.3	1.4	1.0	0.7	2.0	: 1 :	0.8	: 0.7		2.6	2.0
13	24	238	111	21	34	224	1.9	1.3	1.7:1:—	2.6	1.3	: 1 :	0.9	1.2	1.4	0.9	1.0	1.6	: 1 :	0.8	: 0.5 :	0.6	3.3	1.6
13	26	243	106	21	38	224	1.7	1.3	1.7:1:0.6	2.7	1.2	: 1 :	0.9	1.3	1.5	0.9	1.0	1.8	: 1 :	0.8	: 0.6 :	0.6	2.8	1.8
15	22	226	89	26	34	209	1.7	1.4	1.8:1:0.7	2.8	1.3	: 1 :	0.9	1.3	1.3	0.9	0.9	2.0	: 1 :	0.7	: 0.6 :	0.7	2.7	1.3
14	25	219	108	19	32	226	1.8	1.4	1.8:1:—	—	1.1	: 1 :	0.9	1.3	1.5	1.0	0.9	2.0	: 1 :	0.8	: 0.6 :	0.9	3.4	1.7

No. 29. *Chorebus thalictri* sp. nov. holotype.

Nos. 30—31. *Chorebus angelicae* (NIXON) ex *Phytomyza angelicae* KALTENBACH: 30, Ordona, Poland; 31, Södermanland, Sweden.

Nos. 32—33. *Chorebus fallaciosae* sp. nov. ex *Phytomyza fallaciosa* BRISCHKE: 32, Herts., England; 33, Kazuń, Poland.

Nos. 34—35. *Chorebus calthae* sp. nov.: 34, holotype, Wilts., England; 35, Poland.

Nos. 36—37. *Chorebus tamiris* (NIXON) ex *Phytomyza calthophila* HERING, Poland: 36, Sieraków; 37, Granica.

No. 38. *Chorebus bensoni* (NIXON) ex *Phytomyza soenderupi* HERING, Randers, Denmark.

No. 39. *Chorebus albimarginis* sp. nov. holotype.

Nos. 40—41. *Chorebus kama* (NIXON) ex *Phytomyza ranunculi* SCHRANK, Denmark.

Nos. 42—43. *Chorebus tenellae* sp. nov., Denmark.

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Table 15 (continued)

		Absolute Measurements (1 = 0.01 mm.)																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
		Head							Antennal Segments			Maxillary Palpus Segments				Thorax			Hind Leg			Hind Tarsal Segments				
		Width	Length	Height	Eye-width (lateral)	Distance between Eyes	Clypeus Width	Mandibles Width	3	4	5	3	4	5	6	Length	Width	Height	Femur	Tibia	Tarsus	1	2	3	4	5
44	♀	52	28	41	15	27	19	9	13	12	11	9	9	7	7	72	41	54	48	63	61	23	13	9	7	9
45	♀	54	30	43	12	32	17	14	12	11	11	8	9	6	7	74	41	58	48	72	71	26	16	11	7	10
46	♂	44	24	34	13	22	17	12	12	11	10	7	9	6	7	61	34	44	43	56	50	19	9	7	6	9
47	♀	46	26	35	13	23	16	9	13	11	10	7	7	5	6	58	33	48	44	55	44	17	9	7	6	7
48	♀	44	25	35	16	23	17	8	15	13	11	10	12	8	10	58	34	48	44	59	51	19	11	7	6	8
49	♀	53	25	39	13	27	18	11	13	11	10	9	11	7	9	67	39	56	46	61	54	21	11	8	6	9
50	♂	56	27	41	14	30	19	10	14	11	11	8	12	7	9	71	43	59	53	69	59	22	12	9	6	9
51	♀	61	28	46	17	34	21	13	17	15	14	8	—	—	—	74	43	61	65	76	71	24	15	12	8	10
52	♂	58	32	44	17	30	19	13	17	13	12	9	13	9	11	71	41	65	58	76	63	22	13	10	7	10
53	♂	51	26	38	15	26	17	11	15	13	12	9	12	9	10	63	34	55	48	61	58	22	12	9	6	9
54	♀	46	22	35	12	23	15	10	14	12	11	—	11	7	8	59	34	48	46	61	52	19	10	7	6	9
55	♀	52	23	37	12	29	18	11	14	11	10	8	11	7	7	63	39	57	51	67	58	22	11	9	7	10
56	♂	50	25	40	12	29	18	11	14	11	10	6	9	7	7	65	37	53	50	71	56	22	12	8	6	9
57	♀	54	26	41	11	30	19	13	14	12	10	7	9	7	8	68	40	56	52	69	54	19	11	9	7	10
58	♂	52	27	39	14	28	17	11	13	11	10	7	9	6	8	63	34	48	44	59	47	17	10	8	6	8
59	♀	56	26	44	11	30	21	13	15	12	11	7	10	7	8	65	40	63	54	72	54	19	11	9	6	9
60	♀	56	32	43	15	30	22	14	15	13	12	9	11	9	12	65	44	61	54	70	59	22	13	10	6	9
61	♂	54	27	39	14	29	19	12	16	13	12	9	9	7	10	65	43	58	52	69	59	22	12	9	6	9
62	♂	44	22	35	11	24	17	9	13	11	11	8	9	6	—	58	30	48	41	59	54	21	10	7	6	9
63	♀	61	30	43	17	33	23	13	17	15	13	10	13	10	12	80	48	65	63	80	67	23	14	10	7	11
64	♂	48	26	34	15	26	—	9	12	10	10	—	11	7	9	59	37	50	46	61	46	17	9	7	6	8
65	♀	50	27	37	12	28	19	11	13	12	11	6	7	5	6	61	35	52	43	59	55	22	10	8	6	9
66	♀	54	35	45	17	30	19	12	15	12	11	8	10	7	8	80	40	62	52	78	74	27	17	12	7	11
67	♂	58	37	50	18	30	21	13	15	12	11	9	11	9	9	104	44	67	61	85	86	32	19	13	9	13

No. 44. *Chorebus gnaphalii* sp. nov. holotype.

No. 45. *Chorebus thusa* (NIXON) ex *Phytomyza rufipes* MEIGEN, Wales.

Nos. 46—47. *Chorebus albipes* (HALIDAY), England: 46, ex *Phytagromyza tridentata* LOEW, Herts.; 47, ex *P. tremulae* HERING, Surrey.

No. 48. *Chorebus endymion* sp. nov. holotype.

Nos. 49—50. *Chorebus thecla* (NIXON) ex *Phytomyza lithospermi* NOWAKOWSKI, Germany.

Nos. 51—52. *Chorebus abaris* (NIXON): 51, ex *Phytomyza symphyti* HENDEL, Woodwalton, England; 52, ex *P. lycopi* NOWAKOWSKI, Sieraków, Poland.

Nos. 53—54. *Chorebus nana* (NIXON): 53, ex *Phytomyza myosotica* NOWAKOWSKI, Sieraków, Poland; 54, ex *P. obscura* HENDEL, Hvar, Yugoslavia.

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Ratios																										
26	27	28	29	30	31	32	A	B	C	D	E			F	G	H	I	J					K	L
Hind Coxa				Petiole							Antennal Segments							Hind Tarsal Segments						
Width	Length	Wing Length	Gaster Length	Width	Length	Total Body Length	Length/ Width of Head	Length/ Height of Head	Width of Head/ Distance between Eyes/ Width of Clypeus	Width of Mandibles/ Length of Head	3	4	5	Height/Length of Thorax	Thorax Width/Head Width	Wing Length/Body Length	Hind Tibia/Tarsus	1	2	3	4	5	Lengths of Petiole/ Gaster	Width/Length of Petiole
16	21	190	98	17	36	219	1.9	1.5	1.9:1:0.7	3.0	1.1	1	0.9	1.3	1.3	1.1	1.0	1.9	1	0.7	0.6	0.7	2.7	2.2
12	21	214	89	22	30	186	1.8	1.4	1.7:1:0.6	2.1	1.1	1	1.0	1.3	1.3	0.9	1.0	1.7	1	0.7	0.5	0.6	3.0	1.4
9	17	200	63	16	26	148	1.8	1.4	2.1:1:0.8	2.1	1.1	1	0.9	1.4	1.3	0.7	0.9	2.2	1	0.9	0.6	1.1	2.4	1.6
10	19	186	69	13	27	148	1.8	1.4	2.0:1:0.7	2.8	1.2	1	0.9	1.2	1.4	0.8	0.8	1.9	1	0.8	0.6	0.9	2.6	2.1
11	19	186	63	17	25	133	1.8	1.4	1.9:1:0.7	3.1	1.1	1	0.9	1.2	1.3	0.7	0.9	1.7	1	0.7	0.5	0.7	2.5	1.5
13	21	195	74	17	33	176	2.1	1.5	2.0:1:0.7	2.3	1.2	1	0.9	1.2	1.3	0.9	0.9	1.9	1	0.7	0.5	0.8	2.3	2.0
14	22	214	76	21	34	172	2.1	1.5	1.9:1:0.6	2.5	1.3	1	1.0	1.2	1.3	0.8	0.9	1.9	1	0.8	0.5	0.8	2.3	1.6
12	24	238	93	18	36	200	2.2	1.6	1.8:1:0.6	2.1	1.2	1	0.9	1.2	1.4	0.8	0.9	1.6	1	0.8	0.5	0.7	2.5	2.0
15	22	227	98	17	37	209	1.8	1.4	1.9:1:0.6	2.4	1.3	1	0.9	1.1	1.4	0.9	0.8	1.7	1	0.8	0.6	0.8	2.6	2.2
14	21	205	80	15	30	167	2.0	1.5	2.0:1:0.7	2.3	1.1	1	0.9	1.1	1.5	0.8	0.9	1.8	1	0.7	0.5	0.8	2.7	2.0
11	21	190	69	14	27	153	2.1	1.8	2.0:1:0.6	2.2	1.1	1	0.9	1.2	1.4	0.8	0.8	1.8	1	0.7	0.6	0.8	2.5	2.0
13	22	205	74	17	34	167	2.2	1.6	1.8:1:0.6	2.1	1.2	1	0.9	1.1	1.3	0.8	0.9	2.0	1	0.8	0.6	0.9	2.2	2.0
13	21	214	78	17	30	162	2.0	1.6	1.8:1:0.6	2.2	1.3	1	0.9	1.2	1.3	0.8	0.8	1.9	1	0.7	0.5	0.7	2.6	1.8
13	22	224	78	17	31	162	2.1	1.6	1.8:1:0.6	2.0	1.2	1	0.9	1.2	1.4	0.7	0.8	1.7	1	0.8	0.6	0.9	2.5	1.8
12	19	205	91	17	29	176	1.9	1.4	1.9:1:0.6	2.4	1.2	1	0.9	1.3	1.5	0.9	0.8	1.7	1	0.8	0.6	0.8	3.2	1.7
14	22	233	80	26	37	172	2.1	1.7	1.9:1:0.7	2.0	1.2	1	0.9	1.0	1.4	0.7	0.8	1.7	1	0.8	0.5	0.8	2.2	1.4
15	22	228	83	23	37	172	1.8	1.4	1.9:1:0.7	2.3	1.1	1	0.9	1.1	1.3	0.8	0.8	1.7	1	0.8	0.5	0.7	2.3	1.6
13	21	214	89	16	34	190	2.0	1.5	1.9:1:0.7	2.3	1.2	1	0.9	1.1	1.3	0.9	0.9	1.8	1	0.8	0.5	0.8	2.6	2.1
10	19	198	68	13	26	148	2.0	1.6	1.8:1:0.7	2.4	1.2	1	1.0	1.2	1.5	0.7	0.9	2.0	1	0.8	0.6	0.9	2.6	2.0
16	26	252	130	24	43	233	2.1	1.4	1.9:1:0.7	2.3	1.2	1	0.9	1.2	1.3	0.9	0.8	1.7	1	0.8	0.5	0.8	3.0	1.8
11	17	190	78	17	24	157	1.9	1.3	1.9:1:—	2.8	1.2	1	1.0	1.2	1.3	0.8	0.8	1.9	1	0.8	0.6	0.9	3.2	1.4
11	21	186	78	22	28	162	1.8	1.4	1.8:1:0.7	2.4	1.1	1	0.9	1.2	1.4	0.9	0.9	2.1	1	0.8	0.5	0.8	2.8	1.3
15	27	238	115	28	30	238	1.5	1.3	1.8:1:0.6	3.0	1.3	1	0.9	1.3	1.4	1.0	0.9	1.6	1	0.7	0.4	0.7	3.9	1.1
15	29	291	150	29	40	300	1.5	1.3	1.9:1:0.7	2.9	1.3	1	0.9	1.6	1.3	1.0	1.0	1.7	1	0.7	0.5	0.7	3.8	1.4

Nos. 55—56. *Chorebus mitra* (NIXON) ex *Phytomyza campanulae* HENDEL, Ireland.

Nos. 57—58. *Chorebus oreoselini* sp. nov.: 57, Campania, Italy; 58, Kampinoska Forest, Poland.

No. 59. *Chorebus pimpinellae* sp. nov. holotype.

Nos. 60—62. *Chorebus alecto* (MORLEY): 60, ex *Phytomyza albiceps* MEIGEN, London; 61, ex *P. conyzae* HENDEL, Württemberg, Germany; 62, ex *P. crassiseta* ZETTERSTEDT, Surrey, England.

Nos. 63—64. *Chorebus armida* (NIXON): 63, ex *Phytomyza obscurella* FALLÉN, Mühlhausen, Germany; 64, ex *P. angelicastri* HERING, London.

No. 65. *Chorebus amasis* (NIXON) ex *Phytomyza crassiseta* ZETTERSTEDT, London.

Nos. 66—67. *Chorebus crassipes* (STELFOX) ex *Phytomyza diversicornis* HENDEL, Denmark.

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