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A taxonomic revision of Palaearctic *Chionodes* (Lepidoptera: Gelechiidae)

With 198 figures

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Abstract

The Palaearctic species of the genus *Chionodes* HÜBNER, [1825], are revised; 28 species are recognized as valid; 6 species are newly described; 8 new synonyms and one new combination are established and lectotypes are designated for 26 nominal species. Separate keys to the males and females are provided, based on genitalia and wing characters. Data on the biology of the species are summarized. The adults and the male and female genitalia are illustrated.

Zusammenfassung

Die paläarktischen Arten der Gattung *Chionodes* HÜBNER, [1825], werden revidiert; es werden 28 Arten als gültig anerkannt, 6 Arten neu beschrieben, 8 neue Synonyme sowie eine neue Kombination festgestellt und Lectotypen von 26 nominalen Arten festgelegt. Getrennte Bestimmungsschlüssel für die Männchen und Weibchen, basierend auf Genitalstrukturen und Flügelzeichnung werden erstellt und Informationen über Ökologie und Biologie zusammengefaßt. Imagines aller Arten und die Genitalien beider Geschlechter werden abgebildet.

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Introduction

The gelechiid genus *Chionodes* HÜBNER, [1825], is distributed through most of the Palaearctic, Nearctic and the more temperate parts of the Neotropical region. Over half of the about 120 described (about 165 nominal) species currently recognized as valid occur in the Nearctic region (72 species - HODGES, 1983: 22) where there exists an even larger number of as yet undescribed species. With 28 species known to-date (22 previously described and 6 added in this paper) we consider it unlikely that the total number of Palaearctic *Chionodes* will rise to more than 40, whilst the Neotropical fauna with 12 species (BECKER, 1984: 45) is grossly under-recorded.

The Palaearctic species of *Chionodes* cannot easily be recognized as members of that genus by their wing pattern, venation or labial palpi. Most species are drab, uniformly grey or brown, with minimal markings including the often indistinct discal, discocellular and plical spots and the similarly faint light costal and tornal spots which sometimes merge to form an indistinct transverse band. However, at least one species (*electella*) is predominantly white with dark markings whilst several species are black with more or less conspicuous white transverse bands. The labial palpi with a moderate brush of erect scales beneath the second segment do not differ from those of many other gelechiine genera. Consequently, prior to 1960, almost all Palaearctic *Chionodes* were described in *Gelechia* s.l. and in that large collective genus associated with a variety of more or less unrelated taxa. In contrast to the lack of superficial generic characters in the wing or head structure, the males are readily recognized as *Chionodes* by the distinctive apex of their abdomen. Posteriorly, the very broad sternite VIII is obliquely truncate and its hind margin bears a broad fringe of long, densely set scales which are often white or at least distinctly lighter than the preceding segments. As a result of the sternite's large size its lateral margins almost meet dorsally where they are capped by the narrow tergite. Although the genitalia are completely withdrawn into segment VIII there often remains between the tergite and sternite of dried specimens a gap wide enough for an inspection of the typically hood-shaped uncus. Beyond recognition of the genus it is also possible in several instances to distinguish individuals of externally similar species by differences in the uncus (e.g. *distinctella* and *fumatella*).

Material and methods

Our study is based primarily on the collections of the BMNH and TLMF, supplemented with particularly valuable material collected by KASZAB in Mongolia (TM) and by MIKKOLA and his associates in various parts of the Russian Federation (ZMUH). Further material was received from other institutions and private individuals as listed below. We have examined over 1200 specimens and about 120 male and 60 female genitalia preparations. As it is the purpose of this paper to clarify the taxonomic status of all currently known Palaearctic *Chionodes* species a particular effort was made to trace their type-material. The current location of most historic collections relevant to this study was recorded by HORN & KAHLE (1935-37) and is widely known. In many instances the type-material has

remained in the collection of the describer, who had usually collected it himself; however, specimens may be insufficiently documented because the type-concept is of relatively recent origin, and most authors did not routinely designate and label holotypes and paratypes until well into this century. Moreover, specimens in historic collections frequently lack determination labels and adequate data labels so that the type-status of such material is even more difficult to ascertain. We assume in such instances that identified specimens in the collection of the describing author are syntypic unless there is evidence to the contrary. If a species was originally described from an unspecified number of specimens and there exists now only one example, this is considered as forming part of a hypothetical syntype-series; it is designated as the lectotype rather than assumed to be the holotype.

Types of species described by HEINEMANN (1870) can be found in a number of places. The quantity of types and voucher material in his own collection (NL) is rather limited because he based many of his descriptions on specimens received on loan from contemporary lepidopterists into whose collections they reverted after study: FREY (BMNH), O. HOFMANN (BMNH), RÖSSLER (MW), STAUDINGER (ZMHU), WOCKE (ZIAN), ZELLER (BMNH) and others. Unfortunately, the information in his work is usually too scant to permit identifying the source of his material, and some types therefore may never be located. However, in a few instances it is possible to deduce the collector from the locality recorded by HEINEMANN; for example, 'Regensburg' is a strong indication that the specimen(s) originated from O. HOFMANN, Regensburg, in whose collection one should search for them. Specimens loaned to HEINEMANN by ZELLER usually bear a small white label 'Hnm. vidit' in ZELLER's handwriting.

HERRICH-SCHÄFFER maintained his own research collection but from time to time also sold specimens. At least one lot was purchased by BMNH from STANTON acting on behalf of HERRICH-SCHÄFFER (registration no. B.M. 65.22). Many of HERRICH-SCHÄFFER's specimens are preserved in the collection of O. HOFMANN (BMNH). They are identified by a tiny square blue label uppermost on the pin, probably attached by O. HOFMANN, and a white printed label 'H-S. Coll., Hfm. Coll., Wlsm. 1910-427'. A significant part of HERRICH-SCHÄFFER's Microlepidoptera was acquired by STAUDINGER and amalgamated with his own collection. Most of those specimens bear a white printed label 'H.-Sch.' and, if they were considered to be of type-status, a pink printed label 'Origin.', both supplied by STAUDINGER. In addition to specimens from his own collection, HERRICH-SCHÄFFER occasionally used loan material from several contemporary lepidopterists, although this is not always obvious from his descriptions (see *praeclearella*).

STAUDINGER, who maintained one of the most important Lepidoptera collections of his time, was also an entomological dealer who sold or exchanged much syntypic material which is now found in several museums, including BMNH; lectotypes should nevertheless be selected from amongst the specimens in his own collection (ZMHU).

TEICH's collection in Riga was destroyed in the 1939-45 war and the types of *tristella* and *brunnea* may no longer exist; however, as a syntype of *Gelechia tenebrosella* TEICH was found in coll. STAUDINGER (ZMHU), there is still a slim chance that representatives of other TEICH species may have survived elsewhere.

ZELLER's collection was acquired after his death by Lord WALSINGHAM and is now preserved in BMNH. Many of ZELLER's early specimens, including those recorded in his paper in Isis, Leipzig (ZELLER, 1839), were not labelled at all. Only a few specimens bear a small label with the date of capture that can be correlated with ZELLER's very detailed diaries (Entomology Library, BMNH). Later specimens, in particular those collected on his journeys to Sicily and various parts of the Swiss, Austrian, Italian and Slovenian Alps, are mostly documented adequately, sometimes on coloured paper, for example, blue (Raibl and Preth, 1867), yellow (Bergün, 1871), orange (Bergün, 1873). See also *luctuella*, Remarks on the type-material of *G. sauteriella*.

We were able to locate the types of 45 of the 54 previously described species-group taxa and personally examined 40 of them; information on the types of another five species was received from reliable sources. The identity of five taxa with missing types is not in doubt because their original descriptions are accompanied by unambiguous illustrations (*luctificella*, *leucomella* and *luctiferella*)

or there exists material that is authentic albeit not of type-status (*reuttiella* and *syrticola*). The identity of *striolatella*, *tristella* and *brunnea* remains doubtful and our interpretation follows the principle of the first revisor.

The type-material of each nominal species is discussed in detail, and the status of all type-specimens examined by us is clearly documented by labelling them appropriately as lectotype, paralectotype etc. unless they were already unambiguously labelled. Type-information in this paper is given as completely as possible; it is supplemented from the original description and sometimes secondary sources when label data alone are inadequate. Major discrepancies between published information and that on specimen labels is discussed as necessary.

The measurements accompanying the descriptions of the adults are those of the fore wing lengths of the smallest and largest specimen measured in millimeters from the base of the wing to its apex. As sometimes only inadequate material was available many measurements are necessarily approximate and the range in the size of some species may be greater than indicated.

The preparation of the genitalia follows the standard technique. It is recommended to descale the abdomen carefully and open it on one side by using a pair of fine scissors to cut along the spiracular line. Spreading the denuded abdomen makes important characters of the abdominal base, abdominal sclerites and segment VIII of the male more clearly visible than they would be otherwise. The male genitalia are best displayed by using the 'unrolling' technique (PITKIN, 1984, HUEMER, 1987) that has proved its worth in other Gelechiidae such as *Mirificarma* GOZMÁNY, 1955, *Caryocolum* GREGOR & POVOLNÝ, 1954, and *Sattleria* POVOLNÝ, 1965. In *Chionodes*, 'unrolling' after severing the membranous connection between the vinculum and the pedunculus on the right-hand side (ventral view) makes important previously disregarded characters such as the pedunculi accessible for study. In preparing the female genitalia staining with mercurochrome or chlorazol black is recommended to make the delicate bursa copulatrix more clearly visible. Great care should be taken not to tear or distort the bursa copulatrix because its shape and the position of the signum may provide useful taxonomic characters. Although the virgin bursa copulatrix is greatly inflated when the spermatophore is inserted following copulation, this does not usually affect its overall shape.

The terminology of the genitalia is based on KLOTS (1970). All termini used in our paper are explained, and the reference points to the measurements of various parts of the genitalia (for example, length and width of uncus) marked, in Fig. 49 (♂) and Fig. 50 (♀). Measurements of the male genitalia were almost exclusively taken from the 'unrolled' armature. In the descriptions of the signa the anterior transverse ridge is nearer the fundus bursae, the posterior ridge nearer the antrum; the photographic illustrations are arranged with the posterior ridge to the left.

Biological data and the descriptions of the early stages were taken mostly from the literature. As far as possible we have relied upon papers recording original observations and we have attempted a critical evaluation of such published information; in each case our source is indicated.

Under 'Distribution' we usually list only the countries; however, if a species is restricted to a limited area or is only known from one locality, this is usually expressed, for example, 'Spain (Castile, Sierra de Gredos)'. All distribution records, except those backed by a literature reference are based on specimens examined by us. Dubious or incorrect distribution records found in the literature are discussed. The use and spelling of geographical names follow as far as possible the Times Atlas of the World (Comprehensive edn 9, revised), 1993, but in this world of rapidly changing boundaries and country names it is quite impossible to be entirely up to date. 'Russia' in this paper means the Russian Federation as defined in the Times Atlas. If a current name differs significantly from that in the entomological literature or on specimen labels, the alternative spelling is additionally cited in parentheses and inverted commas, for example, 'Hövgöl Nuur ('lac. Chubsugul')'.

For abbreviations of the Fennoscandian biological provinces see the inside front and back covers of any volume of the series Fauna ent. scand. The localities of KASZAB's Mongolia expeditions are meticulously documented in his published itineraries (KASZAB, 1965a, 1965b, 1966, 1968) in which each collecting site is identified by a number that is cross-referenced on the specimen labels. These numbers are recorded in our paper under 'Material examined' and follow the collector's name, for

example, '(KASZAB, no. 716)'.

All altitudes are uniformly given in meters above sea level; those originally recorded in feet are converted to the nearest 100 m followed by the non-metric data in parentheses, for example, '1800 m ('6000 feet')'.

The literature on *Chionodes* was considered as completely as possible and was critically evaluated, but in view of the existence of numerous faunistic papers of regional rather than global importance no full bibliography is given. All abbreviations of journal titles follow the World List of Scientific Periodicals (edn 4) 1963-1965. The full titles may be found in the World List or in the List of Serial Publications in the British Museum (Natural History) Library (edn 3), 1980. Books and other non-serial publications are abbreviated in accordance with the principles of the World List.

The illustrations of the adults normally depict the left-hand wings. In a few instances the better preserved right-hand wings were photographed and the image reversed for uniformity; this is appropriately indicated in the legends. All genitalia illustrations are cross-referenced by the genitalia slide numbers to 'Material examined' so that the full data of the respective specimen can be obtained.

Abbreviations of Museums, Institutions and private Collections

ANS	Academy of Natural Sciences, Philadelphia, U.S.A.
BMNH	British Museum (Natural History), London, U.K.
BURM	coll. BURMANN, Innsbruck, Austria
CISK	Centre for Insect Systematics, Kangweon National University, Chuncheon, South Korea
HABE	coll. HABELER, Graz, Austria
IECAS	Institute of Entomology, Czech Academy of Sciences, České Budějovice, Czech Republic
ISEA	Institute of Systematics & Evolution of Animals, Polish Academy of Sciences, Kraków, Poland
JAKS	coll. JAKŠIĆ, Pristina, Yugoslavia.
LN	Landessammlungen für Naturkunde, Karlsruhe, Germany
MCZ	Museum of Comparative Zoology, Cambridge, Mass., U.S.A.
MINGA	Muzeul de Istorie Naturala 'Grigore Antipa', Bucharest, Rumania
MW	Museum Wiesbaden, Wiesbaden, Germany
NL	Niedersächsisches Landesmuseum, Hannover, Germany
NM	Naturhistorisches Museum, Vienna, Austria
NMP	Národní Muzeum, Prague, Czech Republic
TLMF	Tiroler Landesmuseum Ferdinandeum, Innsbruck, Austria
TM	Természettudományi Múzeum, Budapest, Hungary
USNM	U.S. National Museum of Natural History, Washington, U.S.A.
ZI	Zoologiska Institutionen, Lund, Sweden
ZIAN	Zoological Institute, Academy of Sciences, St Petersburg, Russia
ZM	Zoologisk Museum, Copenhagen, Denmark
ZMHU	Zoologisches Museum der Humboldt-Universität, Berlin, Germany
ZMUH	Zoological Museum, University of Helsinki, Helsinki, Finland
ZMUO	Zoological Museum, University of Oslo, Oslo, Norway
ZSBS	Zoologische Sammlung des Bayerischen Staates, Munich, Germany

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Check-list of Palaearctic *Chionodes*

Chionodes HÜBNER, 1825

lugubrella-group

lugubrella (FABRICIUS, 1794)

luctificella HÜBNER, [1813]

lunatella ZETTERSTEDT, 1839

tragicella-group

tragicella (HEYDEN, 1865)

libidinosa STAUDINGER, 1871

soella sp. n.

luctuella-group

luctuella (HÜBNER, 1793)

sauteriella ZELLER, 1868

aprilella sp. n.

holosericella-group

violacea (TENGSTRÖM, 1848)

mongolica PISKUNOV, 1979 [June 26]

ukrainica PISKUNOV, 1979 [June 27],

syn. n.

holosericella (HERRICH-SCHÄFFER, 1854)

cognatella HEINEMANN, 1870

norvegiae STRAND, 1903

dovrella GRONLIEN, 1925

meesi BARCA, 1932 syn. n.

danieli OSTHELDER, 1951

praeclarella (HERRICH-SCHÄFFER, 1854)

pergrandella REBEL, 1917

tannuoella (REBEL, 1917)

flavipalpella sp. n.

caucasicella sp. n.

distinctella-group

nubilella (ZETTERSTEDT, 1839)

tarandella WOCKE, 1864

continuella (ZELLER, 1839)

trimaculella PACKARD, 1867

albomaculella CHAMBERS, 1875

perpetuella (HERRICH-SCHÄFFER, 1854)

apolectella (WALSINGHAM, 1900)

distinctella (ZELLER, 1839)

striolatella HEINEMANN, 1870

tristella TEICH, 1889

indistinctella REBEL, 1901, syn. n.

latiorella AMSEL, 1939, syn. n.

unicolor TOLL, 1948, syn. n.

deserticola PISKUNOV, 1979, syn. n.

hayreddini KOÇAK, 1986

ochripalpella FREY, 1880, nom. praeocc.

hinnella (REBEL, 1935)

bastuliella (REBEL, 1931)

frigidella sp. n.

fumatella-group

sp. (incertae sedis)

electella (ZELLER, 1839)

viduella (FABRICIUS, 1794)

leucomella QUENZEL, 1802

luctiferella HERRICH-SCHÄFFER, 1859

labradoriella CLEMENS, 1863

nebulosella (HEINEMANN, 1870)

fumatella (DOUGLAS, 1850)

celerella STANTON, 1861

oppletella HERRICH-SCHÄFFER, 1854

reuttiella HEINEMANN, 1870

nigricans HEINEMANN, 1870

syrticola STAUDINGER, 1871

brunnea TEICH, 1901, syn. n.

carpella PISKUNOV, 1971, syn. n.

sagayica (KOÇAK, 1986) comb. n.

tantella sp. n.

ignorantella (HERRICH-SCHÄFFER, 1854)

ochrisignella NOLCKEN, 1871

Taxa excluded from *Chionodes*

Anarsia decolorella ZELLER, 1839 - The name *decolorella*, frequently attributed to HEINEMANN, was incorrectly applied to the species referred to in this paper as *Chionodes praeclarella* (HERRICH-SCHÄFFER) until its status was clarified by an examination of the holotype (SATTLER, 1986: 256).

Current status: *Stenodes decolorella* (ZELLER) (Tortricidae).

Gelechia albifaciella HEINEMANN, 1870 - The name *albifaciella* was incorrectly applied by several authors to a colour form of *Chionodes distinctella* (ZELLER) until its status was clarified by an examination of the holotype (SATTLER, 1964b: 156). Current status: *Caryocolum albifaciella* (HEINEMANN) (Gelechiidae).

Gelechia distinctella var. (or valid sp.?) *tenebrosella* TEICH, 1886 - The name *tenebrosella* was variously applied to a colour form or treated as a synonym of *Chionodes distinctella* (ZELLER) until its status was clarified by the designation of a lectotype (SATTLER, 1992: 109). Current status: *Bryotropha terrella* (DENIS & SCHIFFERMÜLLER) (syn.: *tenebrosella* TEICH) (Gelechiidae).

The systematic position of *Chionodes*

Lacking convincing external generic characters, most *Chionodes* species, in common with many other Gelechiinae, were originally described in the vast dumping-ground genus *Gelechia* s.l. Although the genus *Chionodes* was proposed by HÜBNER as early as 1825, it was not recognized as valid until BUSCK (1939) successfully initiated the break-up of *Gelechia* s.l. by reference to the male and female genitalia which ever since have proved invaluable in defining gelechiine genera. BUSCK's study identified over 50 North American species as belonging to *Chionodes*; some 20 European species were subsequently added by SATTLER (1960).

The Palaearctic *Chionodes*, together with some of the Nearctic species, constitute a relatively uniform monophyletic subgroup of this large and morphologically diverse genus. Without an intimate knowledge of all Nearctic species it is currently not possible for us to identify autapomorphies for the genus as a whole (except perhaps the long thin coecum penis in the male genitalia), but we are able to suggest an autapomorphy for the Palaearctic subgroup: the highly specialized structure of abdominal segment VIII in the male. This is composed of a long narrow tergite and a very large sternite with a characteristic broad anterior apophysis (Figs 53-58). Amongst the Nearctic species other forms of segment VIII occur, for example the sternite with paired anterior apophyses (SATTLER, 1967: fig. 34) or tergite and sternite of similar size and shape, without anterior apophysis, representing the plesiomorphic state.

It is generally accepted that the family Gelechiidae in its current restricted sense, i.e. excluding the Lecithoceridae and Symmocidae, is established as monophyletic by at least one autapomorphy: the subradial retinaculum on the underside of the female fore wing. There is, however, as yet no consensus on the suprageneric categories (subfamilies and tribes) within that family, and authors' views differ widely. For example, HODGES (1986: 7), an author with broad knowledge of the gelechiid world fauna, recognized only three subfamilies, Gelechiinae, Pexicopiinae and Dichomeridinae, distinguished primarily by the structure of the abdominal base in the adults. At the other end of the spectrum, SINEV (1992: 156; 1993: 22) lists no fewer than nine subfamilies.

We believe that the subfamily Gelechiinae can clearly be defined by the structure of abdominal segment VIII in the male. This is a more restricted concept than that of HODGES, though not as narrow as that of SINEV. In the groundplan of the Gelechiidae the abdominal segment VIII of the male is an entire closed ring into which the genitalia are partially or completely withdrawn. This condition is found in most Gelechiidae, including all Pexicopiinae and Dichomeridinae sensu HODGES. However, in a group of at least 80 genera the abdominal segment VIII is horizontally divided into separate dorsal and ventral flaps which permit a wider opening of that segment for the extrusion or withdrawal of the genitalia during mating. This specialized structure of segment VIII we believe to be an autapomorphy of the subfamily Gelechiinae s.str. and thus evidence for its monophyly.

Within the Gelechiinae s.str. three tribes have been recognized: Gelechiini, Teleiodini and Gnorimoschemini. The first two comprise 35+ genera of mostly Palaearctic, Nearctic and Afrotropical distribution which are united by a strong synapomorphy in the female genitalia: a specialized signum bursae composed of a frequently rhombic, hexagonal or octagonal base plate with serrated edges and

a pair of distinct transverse ridges (BUSCK, 1939: figs 34, 40-43, 55; JANSE, 1949-1963, numerous examples; SATTLER, 1960: figs 84-96; PITKIN, 1988: figs 81-90). The Teleiodini form a monophyletic subordinate clade, definable by several characters: fore wing with small patches of raised scales; anterior margin of abdominal S II medially with secondary group of sensilla trichodea (SATTLER, 1964a: 90, fig.3); aedeagus fused with anellus/vinculum complex in male genitalia, very long apophyses anteriores in female genitalia. However, none of these characters is universal throughout this tribe, and several of the constituent genera are identifiable as Teleiodini only by various character combinations. The tribe Gelechiini s.str. is as yet definable only by the absence of Teleiodini characters, and it is therefore questionable whether such division into two is sensible; the recognition of two separate subfamilies, Gelechiinae and Teleiodinae (SINEV, 1992: 156: 1993: 22), is certainly unjustified.

In *Chionodes* abdominal segment VIII of the male clearly shows the separation of tergite and sternite characteristic of Gelechiinae s.str. whilst the signum bursae in the female is of the specialized Gelechiini + Teleiodini type (CLARKE, 1947: figs 14, 17), as contrasted with the hook-like signum of Gnorimoschemini. Even when the signum is strongly reduced, as in many Palaearctic species, traces of the transverse ridges are usually still recognizable. As *Chionodes* lacks all the characters of Teleiodini it must be assigned to Gelechiini s.str. This tribe is poorly defined and may be paraphyletic. It is represented by genera such as the Holarctic *Gelechia* HÜBNER, [1825], and western Palaearctic *Mirificarma* GOZMÁNY, 1955, but also comprises a residue of Gelechiinae genera left here merely because they cannot be associated unambiguously with the better defined Teleiodini and Gnorimoschemini. *Chionodes* is neither close to *Gelechia* and *Mirificarma* nor to any other Palaearctic genus and it is more likely that its sister-group will be found in the Nearctic fauna. *Euchionodes* CLARKE, 1950, from Argentina, described as close to *Chionodes* but differing in the venation and vestiture of the labial-palpus (CLARKE, 1950: 285), will probably be absorbed into *Chionodes* when the Neotropical members of that genus are better known.

Revision of Palaearctic *Chionodes*

Chionodes HÜBNER, [1825]

Chionodes HÜBNER, [1825], Verz. bekannter Schmett. : 420. Type-species: *Tinea luctificella* HÜBNER, [1813], Samml. eur. Schmett. 8: pl. 45, fig. 312, by subsequent designation: MEYRICK, 1925: 73.

= *Chionoda* HÜBNER, [1826], Anz. Verz. bekannter Schmett. : 67. Incorrect subsequent spelling of *Chionodes* HÜBNER, [1825].

Diagnosis. Head evenly convex, without frontal processes or modifications. Ocellus distinct, rarely much reduced (*electella*) or absent (*nebulosella*). Proboscis well developed, usually longer than labial palpus, basal half squamose. Maxillary palpus with four segments, folded over base of proboscis. Pilifer strong, usually concealed beneath maxillary palpus. Labial palpus with three segments, recurved, segment 1 short, 2 about as long as 3, with moderate brush of elongate scales beneath, 3 acute. Antenna about two-thirds length of fore wing, scape without pecten. Wingspan 12.0-23.0 mm. Fore wing colour mostly drab, grey or brown, rarely white with grey markings; several species black with white transverse bands. Wings with normal gelechiid complement of veins. In fore wing common stalk of R4+5 long, M1 approximated to base of R4+5, M3 at base close to CuA1. In hind wing R1 present, anastomosed with Sc near base of wing; M1 free, connate or stalked with Rs, M3 connate with CuA1. Female with frenulum of three setae and subradial retinaculum. Pregenital abdomen ♂ (Figs 51-58). Parallel-sided, for most part weakly sclerotized (except in *viduella*). T I with frame of narrow posteriorly diverging sclerites, rigidly fused with T II but segmental boundary clearly marked. S II moderately sclerotized, with distinctive pair of sternal

apodemes and venulae; venulae straight, posteriorly curved (except in *viduella*), converging towards group of sensory setae (sensilla trichodea) at posterior third of S II. Number of sensilla trichodea variable, between 15 and 50. S III-VII with pair of widely spaced sensilla trichodea at about anterior quarter. T VIII as long as or shorter than S VIII, narrow, tongue-shaped, more or less evenly tapered, with deep, broadly arched anterior emargination. S VIII broad, about five times width of T VIII, with roughly parallel margins, medially concave posterior margin and distinctive median anterior apophysis. S VIII moderately sclerotized, more membranous posterior third densely covered with fringe of long hair-like scales (area recognizable in descaled preparations by densely arranged scale sockets). Base of T VIII firmly connected to S VIII by thin, strongly sclerotized brace.

Pregenital abdomen ♀. More or less spindle-shaped, widest at about level of segments III or IV, posteriorly tapered; structure of basal segments (venulae and sensilla trichodea) and sclerotization similar to those of male. Segment VII up to twice length of preceding segment. T VII sub-triangular, posteriorly narrowed in such manner that in extreme cases (for example *fumatella*) sides of S VII almost meet dorsally.

Genitalia ♂ (Fig. 49). Symmetrical; concealed in specialized abdominal segment VIII. Uncus clearly differentiated from tegumen, large, hook-shaped, sometimes with apical tooth or thorn. Gnathos strongly curved hook (weaker in *fumatella*-group), base without culcitula. Tegumen broad, anteriorly with weak to moderate emargination; pedunculi variable, structure characteristic of groups within genus. Vinculum with broad, moderately long saccus. Valva divided into long, strongly sclerotized, needle-like costa and shorter, weakly sclerotized, sparsely setose, digitate sacculus; rarely valva strongly reduced (*lugubrella*). Aedeagus slim with long thin coecum, apex with more or less complex arms for extrusion of vesica. Cornuti usually absent; present in *lugubrella*. Ductus ejaculatorius short, without sclerotized lamina.

Genitalia ♀ (Fig. 50). Papilla analis of normal gelechiid structure, sub-ovate, set with sensory setae; apophysis posterior rod-like, two-thirds to almost full length of abdomen. T VIII evenly sclerotized, S VIII membranous; apophysis anterior very variable, rod-like to broadly rounded or distally truncate. Sclerotized antrum short, tubular, to long funnel-shaped. Ductus seminalis arising from apex bursae, immediately anterior to antrum; colliculum absent. Bursa copulatrix of variable shape, undifferentiated, pyriform, to distinctly differentiated into ductus bursae and corpus bursae. Signum bursae usually in middle of corpus bursae, rarely in fundus, of gelechiine type but mostly more or less strongly reduced, rarely absent.

Remarks. Colour differences between the sexes are slight or non-existent except in *viduella*, in which the male has a black, the female a white head and thorax. However, there is some tendency towards sexual dimorphism in the wing shape. In the male the costal and dorsal margins of the fore wing usually diverge distally so that the wing is distinctly wider at two-thirds than it is at one-third. In the female both margins are almost parallel and the wing is not wider at two-thirds. The hind wing of the female in some species (for example *praeclarella* and *perpetuella*) has a more distinct apex and oblique termen than that of the male. Such dimorphism has been interpreted as a trend towards wing reduction and flightlessness (SATTLER, 1988: 258-259; 1991: 245-246, as *pergrandella*). There are as yet no observations to confirm that the females of any *Chionodes* are flightless.

In the male genitalia the anterior edge of the tegumen between the pedunculi is usually strengthened by a narrow sclerotization with, in some instances, medially a short posterior extension. This sclerotization is best noticeable in the *holosericeella*-group where it has the shape of an inverted Y. In the *distinctella*-group it is more complex on the pedunculi and does not always follow the edge of the tegumen; its posterior extension is weak or absent. The function of the sclerotization is probably, at least in part, that of a muscle attachment area. No appropriate study of *Chionodes* is available, but a comparison with the situation in *Gelechia turpella* (DENIS & SCHIFFERMÜLLER) (KUZNETSOV & STEKOLNIKOV, 1978: 98, fig. 10) suggests that it is the anterior attachment of the uncus depressor (m1) with its median extension the dorsal attachment of the tergal extensors of the valvae (m2). In conjunction with the pedunculi the sclerotization can provide a useful aid in distinguishing species-groups.

Reduction of the signum in Palaearctic *Chionodes* progresses differentially, from anterior towards posterior. Thus, the anterior transverse ridge, i.e. the one nearer the fundus bursae, is lost before the posterior ridge, i.e. the one nearer the antrum.

It should be noted that the generic description in this paper is valid only for Palaearctic species. Many New World *Chionodes* differ more or less strongly in various aspects of their morphology such as asymmetrical genitalia and the structure of abdominal segment VIII in the male and apophyses anteriores which are strongly reduced and fused with the greatly enlarged antrum in the female.

Biology. The adults of most species are nocturnal and are usually attracted to the light but can be flushed out of concealment in the daytime. Several species appear to be active at dawn (e.g. *praeclarella*, *apolectella*) or dusk (*bastuliella*), and at least one species (*viduella*) is crepuscular but also diurnal and flies in the sunshine.

Observations on the early stages are scarce. We have not seen any descriptions of the ovum or the method of oviposition, although it is likely that the ova are deposited singly or in small clusters onto the host-plant of the larva. Host-plant records are inadequate and only nine of the 28 species recognized by us were ever reared, none of them from the egg. In many instances our present knowledge is based on no more than one or two observations, and it is indicative of the paucity of observations that, for example, there is still considerable uncertainty over the host-plant of *distinctella*, one of the commonest and most widespread Gelechiidae in the European fauna.

In contrast to many other Gelechiidae the genus *Chionodes* is not narrowly specialized on only one or a few closely related plant genera. The confirmed host-plants of the Palaearctic species include Lichenes (1 species), Bryophyta (2 species), Pinaceae (3 species), Papilionaceae (1 species), Betulaceae (1 species) and Rosaceae (1 species); additional probable or possible host-plant families are Polygonaceae (1 species), Ericaceae (1 species) and Compositae (1 species). Further host-plant families are recorded for Nearctic species, for example, Salicaceae (*Salix*), Fagaceae (*Quercus*), Aceraceae (*Acer*), and Malvaceae (*Hibiscus*).

More or less detailed descriptions of larvae and pupae exist for several species; they were standardized as far as possible and are recorded in the appropriate places together with observations on the larval habits. Most species probably overwinter in the larval stage; this is confirmed for six species. *C. ignorantella* overwinters as a young larva, *tragicella* and *viduella* as mature larvae, pupating in spring without further feeding; no detail is available for *lugubrella*, *luctuella* and *electella*. There is no evidence for overwintering as a pupa and there is as yet no record of a Palaearctic *Chionodes* overwintering in the adult stage. Overwintering as an adult is exceedingly rare in the Gelechiidae; it is recorded in the European *Teleiodes decorella* (HAWORTH), *Gelechia asinella* (HÜBNER), *Caryocolum junctella* (DOUGLAS), *Pogochaetia solitaria* STAUDINGER, *Cosmardia moritzella* (TREITSCHKE), *Platyedra subcinerea* (HAWORTH) and *Helcystogramma arulensis* (REBEL) and North American *Dichomeris vacciniella* BUSCK. *Psoricoptera gibbosella* (ZELLER) apparently overwinters as an adult in North Africa (ARAHOU et al., 1991: 65) but probably not in central Europe.

It is likely that most species produce only one generation a year; however, as some unusually long flight periods are recorded, for example ten weeks for *luctuella* and over three months for *distinctella*, the possibility of a second generation in certain species cannot be ruled out.

Distribution. The genus *Chionodes* is found in most parts of the Palaearctic region, including the Arctic (Ostrov Vrangelya, 71°30'N 180°), higher elevations of the Alps and other mountain ranges, North Africa and the Middle East, but appears to be absent from Iceland, the Azores, Madeira and the Canaries. In Asia the genus occurs in Russia, Afghanistan, Mongolia, Tibet, Kyrgyzstan, Tajikistan, China, Korea and Japan; there are no records from the Himalayas.

Keys to the species of Palaearctic *Chionodes*

The genus *Chionodes* comprises several complexes and pairs of loosely related species with very similar genitalia. Reliable identification may further be complicated by variation in the structure of

the pregenital abdomen, shape of the uncus and anterior margin of the tegumen, length of the valva, shape of the saccus, length of the antrum in relation to the apophyses anteriores etc. The keys should therefore not be used in isolation and full reference should be made to the illustrations and accompanying text, including information on the distribution and biology as far as known. It helps greatly if perfect specimens and good genitalia preparations are available.

Key to the males

1. Costa short, apex at most level with base of gnathos, rarely valva vestigial 2
- Costa long, distinctly exceeding base of gnathos (Figs 73, 74, 103-114) 20
2. Costa and sacculus strongly reduced, vestigial; aedoeagus with cornuti
(fore wing black with white fasciae) (Figs 1, 66-72) *lugubrella* (p. 17)
- Costa and sacculus distinct; aedeagus without cornuti 3
3. Costa robust, very short, sickle-shaped (Figs 75, 76) 4
- Costa less robust, not exceptionally short, usually bent at base
(rarely at apex), but never sickle-shaped 5
4. Costa with basal hump (Fig. 75)
(fore wing black with white fasciae) *luctuella* (p. 22)
- Costa without basal hump (Fig. 76)
(fore wing uniformly grey) *aprilcella* (p. 24)
5. Costa strongly bent at distal third (Fig. 95) *apoelectella* (p. 41)
- Costa at most evenly curved distally 6
6. Uncus distinctly longer than wide (Figs 77-81) 7
- Uncus at most as long as wide 10
7. Gnathos hook very large; sacculus less than one-half length of costa (Figs 81, 82) 8
- Gnathos hook weaker; sacculus less than one-half length of costa 9
8. Uncus sub-oval; sacculus one-half length of costa (Fig. 81)
(fore wing uniformly grey) *holosericeella* (p. 28)
- Uncus sub-trapezoid; sacculus about three-quarters length of costa (Fig. 82)
(fore wing brown with distinctly darker veins) *praeclarella* (p. 30)
9. Smaller species, fore wing under 8 mm, shiny dark brown, often with purple sheen
. *violacea* (p. 25)
- Larger species, fore wing above 9 mm, dull loamy brown, without sheen
. *mongolica* (p. 26)
10. Uncus sub-quadrangular, apex faintly notched (Figs 83-86) 11
- Uncus sub-triangular, rounded or oval, apex even, not notched (Figs 87-102) 13
11. Sacculus at most one-half length of costa (Fig. 86) *caucasicella* (p. 34)
- Sacculus about two-thirds length of costa (Figs 83-85) 12
12. Coecum thin, almost one-half overall length of aedeagus (Fig. 125) *tannuoella* (p. 32)
- Coecum more robust, about one-third overall length of aedeagus (Fig. 126)

.....	<i>flavipalpella</i> (p. 33)
13. Fore wing with white markings (Figs 21-23)	14
- Fore wing without white markings	15
14. Head cream; sacculus about three-quarters length of costa (Fig. 21, 22, 93)	
.....	<i>continuella</i> (p. 37)
- Head greyish brown; sacculus about one-half length of costa (Fig. 23, 94)	
.....	<i>perpetuella</i> (p. 39)
15. Coecum about one-half overall length of very thin aedeagus (Fig. 102) . . .	<i>frigidella</i> (p. 50)
- Coecum less than one-half overall length of usually more robust aedeagus	16
16. Fore wing grey	17
- Fore wing brown	18
17. Adult broad-winged (Fig. 19) (northern Europe - Siberia)	<i>nubilella</i> (p. 35)
- Adult narrow-winged (Fig. 32) (Spain, Sierra Nevada only)	<i>bastuliella</i> (p. 49)
18. Fore wing loamy brown with black veins (Fig. 31)	
(Spain, Sierra de Gredos only)	<i>hinnella</i> (p. 48)
- Fore wing light brown to dark brown, veins never conspicuously darker	19
19. Labial palpus various shades of brown	<i>distinctella</i> (p. 42)
- At least second segment of labial palpus ochre	<i>hayreddini</i> (p. 46)
20. Sacculus more than one-half length of costa (Figs 107, 108, 111-113)	21
- Sacculus less than one-half length of costa (Figs 73, 74, 104)	23
21. Uncus broad, with long apical thorn (Fig. 112, 113)	<i>tantella</i> (p. 64)
- Uncus sub-oval or sub-triangular, apical thorn short (Figs 107-111)	22
22. Gnathos hook weak (Fig. 107)	<i>fumatella</i> (p. 59)
- Gnathos hook strong (Fig. 108, 111)	<i>sagayica</i> (p. 63)
23. Costa exceeding uncus (Figs 73, 74, 104)	24
- Costa not reaching end of uncus (Figs 103, 105, 106, 114)	26
24. Distal margin of uncus even, without median thorn (Fig. 104)	<i>electella</i> (p. 52)
- Distal margin of uncus with small median thorn (Figs 73, 74)	25
25. Sacculus one-third length of costa (Fig. 73)	<i>tragicella</i> (p. 19)
- Sacculus much less than one-third length of costa (Fig. 74)	<i>soella</i> (p. 21)
26. Distal margin of uncus with small median thorn (Figs 105, 106, 114)	27
- Distal margin of uncus even, without thorn (Fig. 103)	
(Ostrov Vrangelya)	species indet. (p. 51)
27. Sacculus reduced, vestigial (Fig. 106)	<i>nebulosella</i> (p. 58)
- Sacculus about one-third length of costa	28

28. Uncus sub-quadrangular (Fig. 105) *viduella* (p. 54)
 - Uncus sub-rectangular (Fig. 114) *ignorantella* (p. 65)

Key to the females

(The females of *aprilella* sp. n., *tannuoella*, *flavipalpella* sp. n., *caucasicella* sp. n. and *frigidella* sp. n. are unknown.)

1. Apophyses anteriores broadly rounded distally (Figs 163-168) 2
 - Apophyses anteriores distally rod-like, evenly tapered or pointed
 (Figs 145-162, 169-171) 6
2. Apophyses anteriores very long, strongly constricted at level of antrum, evenly
 rounded distally (Fig. 163) *electella* (p. 52)
 - Apophyses anteriores usually shorter, at most moderately constricted at
 level of antrum, irregularly rounded distally (Figs 164-168) 3
3. Apophyses anteriores medially fused at base only (Figs 164, 165) 4
 - Apophyses anteriores medially fused to distal third (Figs 166-168) 5
4. Apophyses anteriores splayed, anterior emargination broadly
 V-shaped (Fig. 164) (fore wing black with discrete white fasciae) *viduella* (p. 54)
 - Apophyses anteriores more or less parallel, anterior emargination narrow,
 U-shaped (Fig. 165) (fore wing with diffuse white markings) *nebulosella* (p. 58)
5. Apophyses anteriores distally splayed, anterior emargination broad, antrum broad
 (Fig. 167) *sagayica* (p. 63)
 - Apophyses anteriores more or less parallel, anterior emargination narrow,
 antrum narrow (Figs 166, 168) *fumatella* (p. 59)
6. Antrum broadly sub-triangular, at base almost equalling width of segment VIII
 (Fig. 145) *lugubrella* (p. 17)
 - Antrum narrower, almost tubular, at least in distal part 7
7. Apophyses anteriores broad, medially fused in basal half, abruptly tapered to short
 point (Figs 169-171) 8
 - Apophyses anteriores rod-like or more or less evenly tapered 9
8. Antrum short, funnel-shaped; apophyses anteriores constricted at level of antrum
 (Fig. 171) *ignorantella* (p. 65)
 - Antrum longer, tubular; apophyses anteriores not constricted
 (Figs 169, 170) *tantella* (p. 64)
9. Apophyses anteriores rod-like or pointed 13
 - Apophyses anteriores blunter, not rod-like, distally rounded (Figs 157-162) 10
10. Adult brown, relatively broad-winged (Figs 26-31) 11
 - Adult grey, relatively narrow-winged (Spain, Sierra Nevada only) *bastuliella* (p. 49)
11. Fore wing loamy brown with black veins (Fig. 31)
 (Spain, Sierra de Gredos only) *hinnella* (p. 48)

- Fore wing light brown to dark brown, veins never conspicuously darker 12
- 12. Labial palpus various shades of brown *distinctella* (p. 42)
- At least second segment of labial palpus ochre *hayreddini* (p. 46)
- 13. Apophyses anteriores abruptly tapered, distal half to three-quarters rod-like 18
- Apophyses anteriores more or less evenly tapered, at most distal fifth rod-like 14
- 14. Antrum broad, robust, distally rounded; apophyses anteriores acute (Fig. 148)
 *luctuella* (p. 22)
- Antrum slimmer, distally truncate, not rounded 15
- 15. Apophyses anteriores broadly triangular, inner margin curved (Figs 153, 154) 16
- Apophyses anteriores slim, inner margin straight (Figs 155, 156) 17
- 16. Head grey, fore wing uniformly grey (Fig. 19, 20) *nubilella* (p. 35)
- Head cream, fore wing with white markings (Fig. 21, 22) *continuella* (p. 37)
- 17. Head greyish brown, fore wing blackish brown with white markings (Fig. 24)
 (Alps only) *perpetuella* (p. 39)
- Head cream, fore wing rust brown with cream markings (Fig. 25)
 (Corsica and Sardinia only) *apolectella* (p. 41)
- 18. Bases of apophyses anteriores medially fused, tergite VIII anteriorly constricted
 and/or anterior margin with conspicuous sclerotization (Figs 149-151) 19
- Tergite VIII not constricted anteriorly, margin without conspicuous sclerotization 21
- 19. Constricted part of tergite VIII distinctly extended anteriorly (Figs 149, 150) 20
- Constricted part of tergite VIII barely extended anteriorly, anterior sclerotization
 broadly rounded (Fig. 151) *holosericella* (p. 28)
- 20. Fore wing dull loamy brown; anterior sclerotization of tergite VIII broad, posteriorly
 concave (Fig. 9, 10, 150) *mongolica* (p. 26)
- Fore wing shiny dark brown, often with purple sheen; tergite VIII without anterior
 sclerotization (Figs 7, 149) *violacea* (p. 25)
- 21. Apophyses posteriores long (about 4 mm), about four times length of antrum
 *tragicella* (p. 19)
- Apophyses posteriores shorter (about 2 - 2.6 mm), about three times length
 of antrum 22
- 22. Fore wing uniformly grey, with black spots (Fig. 4) *soella* (p. 21)
- Fore wing brown with distinctly darker veins (Figs 13, 14) *praeclarella* (p. 30)

The *lugubrella*-group

Fore wing black with white fasciae.

Genitalia ♂. Uncus broadly rounded, distal margin weakly dentate. Tegumen strongly tapered from base of gnathos towards uncus, anterior margin broadly triangular, without broadly sclerotized edge, pedunculi long, simple. Valva strongly reduced, vestigial. Aedeagus relatively thick, with long thin

coecum, strongly sclerotized subapical arm and two bundles of small cornuti.

Genitalia ♀. Apophyses anteriores thin, rod-like, antrum very broad, funnel-shaped, bursa copulatrix with scobinate patch at merger of ductus and apex bursae. Signum strong, surface dentate, with pair of transverse ridges.

***Chionodes lugubrella* (FABRICIUS, 1794)**

(Figs 1, 2, 59, 67-72, 115, 145, 172)

Tinea lugubrella FABRICIUS, 1794, Ent. syst. 3(2): 299. Lectotype [sex uncertain], Sweden: Lappmark (PAYKULL) (ZM), here designated [not examined].

Tinea luctificella HÜBNER, [1813], Samml. eur. Schmett. 8: pl. 45, fig. 312. Syntypes [number and sex not stated], Europe [not traced]. [Synonymized by ZELLER, 1839: 200.]

Lita lunatella ZETTERSTEDT, 1839, Insecta lappon.: 1005. Lectotype ♀, Norway: Finmark, Alta-Kautokeino, 12.VIII.1832 (ZETTERSTEDT) (ZI), here designated [examined]. [Synonymized by TENGSTRÖM, 1848: 131.]

Adult (Figs 1, 2). ♂, 7.3-8.6 mm; ♀, 6.8-7.1 mm. Head dark grey-brown, frons cream. Second segment of labial palpus cream, outer surface slightly mottled dark brown; third segment cream, more or less intensely mottled with dark brown. Thorax and tegula blackish brown. Fore wing blackish brown with two white fasciae: oblique incomplete fascia extending from one-fifth of costa towards first quarter of dorsum, but ending just beyond fold; costal and tornal spots at three-quarters usually confluent, forming distally concave fascia; fringe blackish brown, distal part grey at apex and tornus, white on termen. Hind wing dark grey-brown.

Pregenital abdomen ♂ (n=15). Tergite VIII about length of sternite, narrow, gently tapered, distally rounded, anterior emargination broad, depth about one-third overall length of tergite. Sternite VIII with posterior margin weakly to distinctly concave, lateral margins more or less parallel, straight to weakly concave, anterior apophysis short, distally truncate.

Genitalia ♂ (Figs 59, 67-72, 115) (n=15). Overall length 1.6-2.0 mm. Uncus (0.36-0.42 x 0.38-0.50 mm) large, clearly differentiated from posteriorly tapered tegumen, greatest width near base, lateral margin convex, distal margin with three minute teeth separated by shallow emarginations. Gnathos hook robust, strongly curved. Costa reduced, variable, sometimes absent; when present short, thin, digitate, with long terminal seta. Sacculus (0.16-0.20 mm) extremely short, broad, with setose margin. Saccus (0.57-0.65 mm) broad at base, basal quarter evenly tapered, distal part with parallel margins. Aedeagus (1.29-1.54 mm) short, stout, almost straight, apex with strong hook and two groups of small cornuti; coecum (0.56-0.66 mm) about one-half overall length of aedeagus.

Genitalia ♀ (Figs 145, 172) (n=2). Apophyses posteriores 2.6-2.7 mm. Anterior margin of tergite VIII distinct, broadly arched between widely spaced apophyses anteriores. Apophyses anteriores (0.53-0.55 mm) about length of segment VIII, base slightly dilated, distal four-fifths rod-like. Antrum (0.40-0.42 mm) very broad, sub-triangular, at base almost equalling width of segment VIII, shorter than apophysis anterior. Ductus bursae short but distinct, laterally merged with apex bursae; dense patch of scobinations at merger of corpus, apex and ductus bursae. Corpus bursae large, oval. Signum at posterior quarter; strongly sclerotized, oval, with pair of distinct transverse ridges, margin strongly dentate.

Remarks. In Palaearctic *Chionodes lugubrella* is unique in the almost complete reduction of the

valvae in the male. There is considerable individual variation in the length of the costa. In our sample of 15 genitalia slides (including specimens from Canada, Ontario, and U.S.A., Arizona, Colorado, Pennsylvania, Utah and Washington) the costa is present in 10 specimens; it is absent in 4 specimens whilst it is present on one side but absent on the other in 1 specimen. Although this rather delicate structure may occasionally get detached by accident, a careful examination of our slides indicates that in some instances it was never developed. The form with a costa was illustrated by BUSCK (1939, pl. 59, fig. 6) and SATTLER (1960, pl. 8, fig. 42 b).

C. lugubrella is easily recognized by the two white fasciae of the fore wing and by its genitalia. Nearctic specimens are smaller on average and the third segment of the labial palpus is darker than in those from the Palaearctic region.

T. lugubrella was described from an unspecified number of specimens (sex not stated) from 'Lapponia Dom. de PAYKULL'. A single specimen in FABRICIUS's Kiel collection (now on indefinite loan to ZM) with a label '*lugubrella*' in FABRICIUS's handwriting has been selected as the lectotype by KARSHOLT and is here formally designated as such. It is in good condition but lacks the abdomen and is unset so that its sex could not be established (KARSHOLT, pers. comm.).

T. luctificella was originally illustrated without accompanying text and was based on one or more specimens (sex unknown) which must now be considered lost with HÜBNER's collection. The type-locality was not indicated and could not be ascertained from indirect evidence; however, the identity of *luctificella* is not in doubt because the name was made available in conjunction with a recognizable illustration.

L. lunatella was described from an unspecified number of females from Norway, Finnmark, between Alta and Kautokeino, 12.VIII.1832, leg. ZETTERSTEDT, and Sweden, Lycksele Lappmark, Umeå, 23.IV.1832, leg. ZETTERSTEDT. According to BENANDER (1940: 59) there are three specimens in ZETTERSTEDT's collection (ZI) labelled '*L. lunatella* ZETT. ♀ Alten', 'Lycks.' and 'Stensele 4 JI.' respectively. The first specimen, bearing ZETTERSTEDT's label with the name of the species, is here designated as the lectotype; the third specimen was not mentioned in the original description and was identified by BENANDER as *Teleiopsis diffinis* (HAWORTH).

Biology. Host-plants: *Trifolium repens* L., *Lotus corniculatus* L., *Vicia cracca* L. (BENANDER, 1929: 142); *Dorycnium* (MILLIÈRE, 1876: 327); *Dorycnium pentaphyllum* SCOP. ('*D. suffruticosum*') (CHRÉTIEN, 1908: 68) (Papilionaceae).

Larva whitish green with red markings around pinacula; D1 and D2 in broad red line that is interrupted at segmental borders; SD1 and spiracle in even broader line; L1 and L2 in small round spot and L3 in a line. Red spots around pinacula on meso- and metathorax confluent, forming transverse band. Head of youngest larva black, later green, finally yellow with black stemmatal spot and black spot behind it. Prothoracic shield greenish yellow with brown lower corners; anal shield with green tinge. Pinacula large, glossy dark brown.

The ovum is unknown. The larva was observed from late VII onwards and was still feeding as late as IX; it overwinters. It was found in the company of the larva of *Ancylis badiana* (DENIS & SCHIFFERMÜLLER) (= *A. lundana* F.) (Tortricidae) living in the same manner between spun leaves (BENANDER, 1929: 142).

The adult occurs in late VI - early VIII. It was observed flying around birch shrub and trees (ZELLER, 1878: 136; SCHÜTZE, 1902: 17) and is attracted to the light (pers. obs., K.S.). Vertical distribution: in the Alps observed between 580 m and 1300 m.

Distribution. Holarctic. Norway, Sweden, Finland, Switzerland, Austria, Italy, Poland, Russia, Canada, USA. Also recorded from Spain (VIVES, 1985: 8); France (Alpes-Maritimes) (MILLIÈRE, 1876: 327; LHOMME, [1948]: 587); Germany (Berlin) (KARSHOLT, pers. comm.); Czech Republic (southern Bohemia, Šumava Mountains) (ELSNER et al., 1988: 74); Ukraine (Kiev area) (SOVINSKIJ, 1938: 62).

Material examined (including 15 ♂, 2 ♀ genitalia preparations)

Norway: lectotype of *lunatella* as above; 3 ♂, STi, Kongsvoll, 900-1100 m, 20-28.VII.1983

(KARSHOLT & MICHELSEN) (TLMF); 1 ♂, Dovre, 17.VII.1862 (WOCKE) (ZIAN); 4 ♂, On, Vinstra, 20.VI.1981, 27-28.VI.1985 (KARSHOLT; TUCK) (ZM; BMNH); 2 ♂, 1 ♀ (STAUDINGER) (BMNH); 1 ♂, 1 ♀, without data (NMP). **Sweden:** 2 ♂, Lappmark, Abisko, 14-15.VII.1990 (KRAMPL) (NMP); 1 ♂, Torne Lappmark, Abisko, Torne Träsk, 25.VII.1920 (WETTSTEIN) (genitalia slide no. 14.324; NM); 1 ♂, Lappland, 1890 (NM); 1 ♀, Norbotten, Kaunisvara, 1.VII.1976 (JOHANSSON) (ZM). **Finland:** 1 ♂, Kuusamo (ZM); 1 ♂, 1 ♀ (NYLANDER) (BMNH). **Switzerland:** 1 ♂, Ticino, Maggia, 28.VII.-7.VIII.1959 (LAUBE); 1 ♂, Graubünden, Engadin (FREY); 1 ♂, Graubünden, Bergün, 15.VII.1873 (ZELLER); 1 ♂, Valais, Saas Fee, 14.VII.1959 (JACOBS) (BMNH); 1 ♂, Valais, Brig, 700 m, 7.VII.1961 (BURMANN) (TLMF). **Austria:** 1 ♂, Nordtirol, Umhausen, 8.VII.1951 (BURMANN). **Italy:** 1 ♀, Piemont, Alagna, Alpe Mond, 27.VII.1906 (NM); 1 ♀, Piemont, Alagna, Sesia-Au, 7.VIII.1906 (genitalia slide no. GEL 308; TLMF); 1 ♂, Südtirol, Bozen (TLMF); 1 ♂, Prov. Belluno, Madonna di Campiglio, VII.1897 (REBEL) (genitalia slide no. 14.325; NM). **Poland:** 3 ♂, Wroclaw, 10.VII.1864, VII.1866, 24.VII.1870 (WOCKE); 1 ♂, Silesia (ZELLER) (BMNH; ZIAN). **Russia:** 8 ♂, St. Petersburg (BMNH; ZIAN); 1 ♀, Irkutsk, 10.VI.1917 (MYLNIKOFF); 1 ♂, Kamchatka, 29.VII.1913 (ZIAN); 1 ♂, Altayskiy Kray, 10 km W of Katanda, Katun valley, 1200 m, 6-8.VII.1983 (MIKKOLA, HIPPA & JALAVA) (ZMUH). **Canada:** 12 ♂, 1 ♀, Ontario, Black Sturgeon Lake, 18-26.VI.1965 (SATTLER) (genitalia slide no. GEL 85; TLMF) (BMNH; TLMF); 4 ♀, Ontario, Bell's Corners near Ottawa, 5-22.VII.1965 (SATTLER); 1 ♂, Ontario, Maskoka, VI.1921; 1 ♀, Manitoba, Awame, 7.VI.1906 (BMNH).

The *tragicella*-group

Fore wing grey with usually distinct discal, discocellular and plical spots.

Genitalia ♂. Uncus broad, sub-quadrate to sub-rectangular, with small median thorn. Anterior margin of tegumen broadly triangular, edge with narrow sclerotization, pedunculi long simple. Costa long, exceeding uncus, strongly curved distally, apex sharply pointed. Saccus at most one-third length of costa. Saccus V-shaped. Aedeagus very long, thin.

Genitalia ♀. Apophyses anteriores thin, rod-like. Antrum narrowly funnel-shaped, distally level with or exceeding apophyses anteriores. Bursa copulatrix pyriform or drop-shaped, not differentiated into ductus and corpus bursae. Signum in anterior half of bursa.

Chionodes tragicella (HEYDEN, 1865)

(Figs 3, 53, 73, 116, 146, 173)

Oecophora tragicella HEYDEN, 1865, Stettin. ent. Ztg 26: 380. Holotype ♀, Switzerland: Ober Engadin, St. Moritz, late VII. (HEYDEN) (ZFMS) [examined].

Gelechia libidinosa STAUDINGER, 1871, Berl. ent. Z. 14: 299. Lectotype ♂, Italy: Piemonte, Alps (GHILIANI) (ZMHU, Berlin), here designated [examined]. [Synonymized by WOCKE, 1871:289.]

Adult (Fig. 3). ♂, 9.0-9.8 mm; ♀, 8.0-10.2 mm. Head grey, frons sometimes lighter, mixed with white. Labial palpus grey, second segment sparsely mixed with whitish scales. Thorax and tegula grey mixed with whitish. Fore wing grey, more or less strongly mixed with white scales; discal, discocellular and plical spots black-grey, indistinct, plical usually streak-like, discocellular sometimes likewise, occasionally discal and discocellular confluent; veins in apical part of wing sometimes lined with dark scales; termen with or without indistinct dark marginal spots; fringe greyish white with darker medial line. Hind wing dark grey.

Pregenital abdomen ♂ (Fig. 53) (n=3). Tergite VIII short, about one-half length of sternite, anterior emargination deep, about two-fifths to one-half overall length of tergite. Sternite VIII sub-rectangular, posterior margin truncate to weakly concave, lateral margins parallel, anterior apophyses long, narrow.

Genitalia ♂ (Figs 73, 116) (n=3). Overall length 3.0 mm. Uncus (0.46-0.50 x 0.55-0.63 mm) large, clearly differentiated from tegumen, sub-rectangular, greatest width near base, lateral margin slightly convex, distal margin with small median tooth. Gnathos hook well developed, bent basally, distal part evenly curved. Costa (1.90-2.12 mm) extremely long, exceeding uncus, evenly curved, apex sharply pointed. Sacculus (0.72-0.87 mm) short, straight, slimmer than costa. Saccus (1.05-1.16 mm) broad, evenly tapered, lateral margin almost straight. Aedeagus (2.85-3.24 mm) very long, slender, straight, apex with large rounded and smaller hook-like sclerite, coecum (1.1-1.2 mm) slender.

Genitalia ♀ (Figs 146, 173) (n=3). Apophyses posteriores 4.2 mm. Anterior margin of tergite VIII broadly emarginated. Apophyses anteriores (0.80-0.99 mm) about length of segment VIII, base slightly dilated, distal four-fifths narrow, rod-like. Antrum (1.11-1.20 mm) broad, at base almost one-half width of segment VIII, almost tubular, distal part slightly tapered, at least level with, sometimes greatly exceeding apophysis anterior. Bursa copulatrix slim, pyriform, not clearly differentiated into ductus and corpus bursae, merged with antrum near apex bursae; signum anteriorly, in widest part of bursa. Signum large, sub-oval, posterior part trapezoid with serrate margin; posterior transverse ridge distinct, anterior ridge greatly reduced.

Remarks. *G. libidinosa* was described from one male and one female from the Alps of Piemonte, received by STAUDINGER from GHILIANI. Both specimens are in coll. STAUDINGER; the male is here designated as the lectotype.

Biology. Host-plant: *Larix* (Pinaceae) (SCHÜTZE, 1897: 302-307; PATOCKA, 1987: 457).

The ovum is unknown. The larva is found in summer and autumn. It lives in a silken tube under scales of bark on old larch trees and, from that shelter, searches out nearby leaves on which it feeds. The entrance to its tunnel is often betrayed by the presence of a few dead needles. The mature larva overwinters in a dense cocoon under flakes of bark and pupates in spring. Its cocoon is best found in winter on felled trees at the base of branches, in particular those on which tufts of needles extend most of the way to the trunk. Cocoons can be found on all parts of the tree including the crown. Heavy predation of the cocoons by the larvae of *Raphidia* (Insecta: Raphidioptera) has been observed (SCHÜTZE, 1897: 302-307; 1931: 38).

The adult occurs in VI-VII; it rests by day on the trunks of its host-tree and was observed in the early hours of the morning, soon after sunrise, flying high up in the trees (SCHÜTZE, 1896: 23-26). Vertical distribution: from the lowlands to about 1900 m.

Distribution. Mostly local in Denmark, Germany, Switzerland, Austria, Italy, Slovenija. Also recorded from The Netherlands (KUCHLEIN, 1993: 485), France (Hautes-Alpes) (LHOMME, [1948]: 598), Latvia (ŠULCS & ŠULCS, 1981: 96) and Slovakia (PATOCKA, 1987: 457).

Material examined (including 3 ♂, 3 ♀ genitalia preparations)

Denmark: 1 ♂, LFM, Boto, pupa 7.VI.1980 (*Larix*) (KARSHOLT); 1 ♀, NWZ, Asnæs, Forskov, 26.VI.1986 (KARSHOLT) (ZM). **Germany:** 2 ♂, Sachsen, Rachlau, e.l. VII.1898 (HOFMANN; SCHÜTZE) (ZSBS); 1 ♂, Sachsen, Rachlau, early VI (SCHÜTZE) (genitalia slide no. 27.657; BMNH); 2 ♀, Sachsen (STAUDINGER); 1 ♂, 1 ♀, Brandenburg, Marienberg, 15.VI.1958 (EVERS); 2 ♂, 3 ♀, Württemberg, Kirchberg/Murr, 6, 13.V.1961 (SÜSSNER) (genitalia slide no. GEL 297 + GEL 298; TLMF). **Switzerland:** holotype of *tragicella* as above; 1 ♀, Graubünden, Bergün, 2.VII.1871 (ZELLER); 1 ♀, Graubünden, Sils-Maria (FREY) (BMNH). **Austria:** 1 ♀, Steiermark, Dachstein, Brandriedl, 1700 m, 19.VI.1937 (ORTNER); 1 ♀, Osttirol, Lavant, 650 m, 10.VI.1989 (DEUTSCH); 1 ♀, Osttirol, Lavanter Alm, 1200 m, 24.VI.1991 (DEUTSCH); 1 ♂, 1 ♀, Nordtirol, Mieming,

Fronhausen, 20.VI.1970 (HERNEGGER); 1 ♀, Nordtirol, Obsteig, 18.VI.1972 (HERNEGGER) (TLMF). **Italy:** lectotype of *libidinosa* as above; 1 ♂, Südtirol, Ritten, Obergrünwald, 1750 m, 15.VII.1993 (HUEMER); 1 ♀, Südtirol, Schnalstal, 900 m, E.VI.1984 (PAVLAS) (TLMF). **Slovenija:** 1 ♂, Kamniske Alpe, Krvavec, Veli zwoh, 1950 m, 20.VII.1992 (HABELER) (HABE).

Chionodes soella sp. n.

(Figs 4, 54, 74, 117, 147, 174)

Adult (Fig. 4). ♂, 9.5 mm; ♀, 9.0 mm. Head grey mixed with white, particularly frons. Labial palpus grey, second segment mixed with some white. Thorax and tegula grey mixed with white. Fore wing grey, intensely mixed with white scales; discal, discocellular and plical spots dark grey, indistinct to distinct; termen with indistinct black spots; fringe greyish white with darker medial line. Hind wing dark grey.

Pregenital abdomen ♂ (Fig. 54) (n=1). Tergite VIII nearly length of sternite, evenly tapered posteriorly, pointed, anterior emargination broad, depth about one-third overall length of tergite. Sternite VIII broad, posterior margin with wide V-shaped emargination, lateral margins parallel, anterior apophysis short, sub-triangular.

Genitalia ♂ (Figs 74, 117) (n=1). Overall length 2.5 mm. Uncus (0.48 x 0.61 mm) very large, clearly differentiated from tegumen, sub-rectangular, greatest width near base, lateral margin straight, distal margin with small medial tooth. Gnathos hook well developed, bent at about basal third, distal part gently curved. Costa (1.64 mm) extremely long, exceeding uncus, curved, bent near apex, sharply pointed. Sacculus (0.30 mm) very short, less than one-fifth length of costa, straight. Saccus (0.75 mm) broad, evenly tapered, lateral margin weakly concave. Aedeagus (2.20 mm) very long, slender, slightly curved, apex with large rounded and smaller hook-like sclerite, coecum (0.65 mm) slender, slightly curved, distally swollen.

Genitalia ♀ (Figs 147, 174) (n=1). Apophyses posteriores 2.2 mm. Anterior margin of tergite VIII broadly concave. Apophyses anteriores (0.48 mm) about length of segment VIII, base slightly dilated, distal four-fifths narrow, rod-like. Antrum (0.60 mm) long, very broad, at base about one-half width of segment VIII, distally narrower, rounded, about level with apex of apophyses anteriores. Bursa copulatrix slim, drop-shaped, not differentiated into ductus and corpus bursae, widest at anterior two-fifths (level of signum). Signum distinct, of irregular shape, posterior part trapezoid with serrate margin and transverse ridge; anterior ridge absent.

Remarks. *C. soella* sp. n. is closest to *tragicella* but is clearly separated by the genitalia of both sexes. The adults are slightly smaller and darker grey than typical *tragicella*. In the male, *soella* sp. n. is distinguished by the longer abdominal tergite VIII, short anterior apophysis of sternite VIII, apically bent costa and very short sacculus and, in the female, by the short antrum, that barely exceeds the apophyses anteriores, and the more posterior position of the signum. In *tragicella* the abdominal tergite VIII of the male is only about one-half the length of the sternite, the anterior apophysis of sternite VIII is very long and narrow, the costa is evenly curved all the way and the sacculus is over one-third the length of the costa; in the female the long antrum exceeds the apophyses anteriores by about one-third and the signum is situated in the anterior fifth of the bursa copulatrix.

Biology. Host-plant and early stages unknown; the close relationship with *tragicella* suggests that the larva may likewise feed on *Larix* (Pinaceae). The five adults known to date have been collected in late VI - early VII. Vertical distribution: only known from 1200 m.

Distribution. Russia (Altayskiy Kray).

Material examined (including 1 ♂, 1 ♀ genitalia preparations)

Holotype ♂, **Russia**: SW-Altai, Katun valley, 10 km W of Katanda, 1200 m, 29.VI-5.VII.1983 (MIKKOLA, HIPPA & JALAVA) (genitalia slide no. 92/358, HUEMER; ZMUH).

Paratypes. **Russia**: 1 ♂, 3 ♀, as holotype but 22-27.VI., 6-8.VII.1983 (genitalia slide no. 92/362, HUEMER; TLMF; ZMUH).

The *luctuella*-group

Fore wing black with white fasciae or uniformly grey with dark discal, discocellular and plical spots.

Genitalia ♂. Uncus broadly rounded. Anterior margin of tegumen broadly concave, sclerotized edge narrow. Costa very short, sickle-shaped, sacculus short, straight.

Genitalia ♀. Apophyses anteriores broad at base, strongly tapered, acute. Antrum robust, distally rounded, level with apex of apophyses anteriores.

Chionodes luctuella (HÜBNER, 1793)

(Figs 5, 75, 118, 148, 175, 176)

Phalaena Tinea luctuella HÜBNER, 1793, Samml. auserles. Vögel Schmett.: 5, pl. 5. Syntypes [number and sex not stated], [Germany: Bavaria, Augsburg (HÜBNER)] [not traced].

Gelechia sauteriella ZELLER, 1868, Verh. zool.-bot. Ges. Wien 18: 612. Lectotype ♀, Latvia: south-east of Riga ('Bielsteinhof'), V. (LIENIG) (genitalia slide no. 7118; BMNH), here designated [examined]. [Synonymized by WOCKE, 1871: 291.]

Adult (Fig. 5). ♂, 6.5-7.1 mm; ♀, 6.4-6.7 mm. Head cream. Labial palpus cream, base of second and third segment mottled dark brown on outer surface. Thorax and tegula blackish brown, mixed with white at mesoscutellum. Fore wing blackish brown, mottled greyish white, particularly along dorsum; three fascia-like white markings developed: narrow oblique fascia extending from one-fifth of costa towards first quarter of dorsum, but ending just beyond fold; comma-shaped costal mark at one-half, slightly constricted medially; costal and tornal spots at four-fifths forming broad, complete (particularly in ♀) or narrow, usually incomplete (♂) straight fascia; fringe blackish brown, distal part grey-brown. Hind wing dark grey-brown.

Pregenital abdomen ♂ (n=2). Tergite VIII about length of sternite, moderately to distinctly tapered posteriorly, depth of anterior emargination about one-quarter to one-third overall length of tergite. Sternite VIII with posterior margin broadly V-shaped, lateral margins slightly converging posteriorly, anterior apophysis short, broad, distally truncate to weakly concave.

Genitalia ♂ (Figs 75, 118) (n=2). Overall length 1.9 mm. Uncus (0.33-0.34 x 0.44 mm) short, clearly differentiated from tegumen, broadly rounded, greatest width near base. Gnathos hook strong, relatively short, strongly curved at basal third. Costa (0.45-0.50 mm) very short, sickle-shaped, with distinct basal hump. Sacculus (0.28-0.37 mm) short, straight, broad, digitate. Saccus (0.73-0.75 mm) broad at base, evenly tapered towards middle, distal half constricted, with parallel margins, apex broadly rounded. Aedeagus (1.98-2.14 mm) long, slender, slightly curved, evenly tapered towards thin, distally swollen coecum (0.65 mm), apex with two hook-like sclerites.

Genitalia ♀ (Figs 148, 175, 176) (n=2). Apophyses posteriores 2.4-2.6 mm. Anterior margin of

tergite VIII broadly emarginated. Apophyses anteriores (0.62-0.65 mm) slightly exceeding length of segment VIII, broad at base, strongly tapered towards rod-like apex. Antrum (0.62-0.65 mm) long, broad, at base about two-fifths width of segment VIII, almost tubular, anterior end broadly rounded, about level with apex of apophyses anteriores. Bursa copulatrix about length of segment VIII (including apophyses anteriores), differentiated into short ductus and large corpus bursae. Signum at about middle of corpus bursae, distinct, large, rounded, edge irregularly dentate, posterior transverse ridge present.

Remarks. *C. luctuella* is easily recognized by its small size, the cream head and labial palpus and the distinct white fasciae of the fore wing. The male genitalia differ from those of all other *Chionodes*, except *aprilella* sp. n., in the short, sickle-shaped costa whilst the female genitalia are characterised by the broad, robust antrum with almost parallel margins and the comparatively large signum.

P.T. luctuella was originally illustrated without accompanying text and was based on one or more specimens (sex unknown) which must now be considered lost with HÜBNER's collection. No type-locality was indicated, but there is indirect evidence that *luctuella* was collected in the vicinity of Augsburg (HÜBNER, 1796: 66; 1822: 73). The identity of the species is not in doubt because the name was made available in conjunction with a recognizable colour illustration.

G. sauteriella was described from five females from Russia, Kaliningradskaya Oblast, Kaliningrad (formerly Germany, Ostpreussen, Königsberg), collected by SAUTER, and one female from Latvia (Livonia, Bielsteinhof near Riga), collected by LIENIG. Detail of the type-material is here extracted from two earlier papers (LIENIG & ZELLER, 1846: 289; ZELLER 1868a: 147, footnote) referred to by ZELLER in the original description. A female in BMNH, here designated as the lectotype, bears two conflicting labels in ZELLER's handwriting: a small yellow label 'Livon.' and a larger faded blue label 'Luctuella H., Sauteriella Z. ZV. 68, 612, Königsb. SAUT. 56'. Such blue labels were apparently ZELLER's collection labels and were not originally attached to any specimen. They bear the name of the species, one or more of its synonyms, the original reference and sometimes further references to important literature and/or ZELLER's correspondence. Subsequently those labels were pinned under one of the specimens in ZELLER's series, either after Walsingham acquired the collection following ZELLER's death in 1883, or after the Walsingham collection was incorporated in the BMNH. It is therefore assumed that the lectotype originated from Livonia, not Königsberg. Another female (coll. STANTON, BMNH) bears ZELLER's blue label 'Luctuella H. Königsb. SAUT. 56' and has now been labelled as paralectotype. No further type-material was traced.

Biology. Host-plant: conifers. HÜBNER (1796: 66) observed the adult around Augsburg in deciduous forests; however, most subsequent authors recorded it in association with conifers such as *Picea abies* (L.) Karsten, *Abies alba* MILL. and, in higher regions of the Alps, *Pinus mugo pumilio* (HAENKE) FRANCO. In the vicinity of Munich, OSTHELDER (1951: 143) repeatedly swept the brown larva in V from *Picea abies* and reared the adult; he also swept the adult from young spruce trees and occasionally spruce hedges in suburban gardens in Munich and once collected a specimen in a pure stand of *Pinus* ('Kiefer').

In Latvia, LIENIG once found a pupa, from which the adult had freshly emerged, in mid-V on *Picea abies* ('Fichte') (LIENIG & ZELLER, 1846: 289). BURMANN (1977: 139), who swept the adult from strongly lichen-covered coniferous trees, incorrectly suspected the larva to feed on lichen. According to the same author the adult is nocturnal and is readily attracted to the light.

The adult occurs in mid-V - late VII, probably in a single generation. Vertical distribution: in the Alps up to about 1900 m.

Distribution. Boreo-montane. In the north in Fennoscandia, the Baltic states and Russia (former German Ostpreussen); in the south in the Alps and foothills, as far north as the river Danube. Sweden, Finland, Latvia, Russia; Germany, Switzerland, Austria, Italy. Also recorded from Norway (GUSTAFSSON, 1987: 92) and Denmark (BUHL et al., 1990: 38).

Material examined (including 2 ♂, 2 ♀ genitalia preparations)

Sweden: 1 ♂, Sm, Högsby, 8.VII.1971 (JOHANSSON) (ZM). **Finland:** 1 ♂, U. Sluntle, 18-31.VII.1982 (KARSHOLT). **Germany:** 1♂, Bayern, Regensburg (HERRICH-SCHÄFFER) (genitalia slide no. 27.320; BMNH); 2 ♂, Bayern, Grünsink, 600 m, E.VI.1973 (ZÜRNBAUER); 1 ♂, Bayern, Pasing, 520 m, M.VI.1977 (ZÜRNBAUER); 2 ♂, Bayern, Nymphenburg, 520 m, E.VI.1970 (ZÜRNBAUER); 1 ♂, Bayern, Schluifelderwald, 600 m, A.VII.1965 (ZÜRNBAUER); 1 ♂, Bayern, Mörlbach, 670 m, A.VII.1965 (ZÜRNBAUER); 2 ♂, Bayern, Leutstetten, 590 m, A.VII.1972 (ZÜRNBAUER); 1 ♀, Bayern, Lechauen, 570 m, A.VII.1973 (ZÜRNBAUER) (genitalia slide no. GEL 306) (TLMF); 1 ♂, Württemberg (BMNH). **Switzerland:** 3 ♂, St. Gallen, Uzwil, 23.VI.1960 (MALICKY) (TLMF); 1 ♂, Zürich (FREY) (BMNH). **Austria:** 1 ♂, Oberösterreich, Linz, Koglerau, 28.VI.1909; 1 ♀, Nordtirol, Wörgl, 20.VI.1974; 3 ♂, Nordtirol, Pinegg, 850 m, A.VII.1972 (ZÜRNBAUER); 1 ♂, Ampass, Taxerhof, 5.VII.1970 (HERNEGGER); 1 ♀, Nordtirol, Innsbruck, 16.VII.1969 (HERNEGGER); 1 ♂, Nordtirol, Rißtal, Hagelhütten, 1050 m, 30.VI.1993 (CERNY); 2 ♂, Nordtirol, Pillersattel, 1500 m, 30.VII.1984 (BURMANN); 1 ♂, Nordtirol, Lechaschau, 11.VII.1988 (KAHLEN); 1 ♂, Nordtirol, Stanzach, Blockau, 920 m, 5.VII.1989 (HUEMER); 1 ♂, Vorarlberg, Feldkirch, 450 m, 25.VI.1982 (HUEMER) (TLMF). **Italy:** 1 ♂, Prov. Trentino, Sella-Gruppe, Piz Ciavazes S-Wand, 2150 m, 7.VIII.1981 (HUEMER). **Latvia:** lectotype of *sauteriella* as above. **Russia:** 1 ♀ (*sauteriella* paralectotype), Kaliningradsкая Oblast, Kaliningrad ('Königsberg'), 1856 (SAUTER); 1 ♀, Kaliningradsкая Oblast, Kaliningrad (BMNH).

Chionodes aprilella sp. n.

(Figs 6, 76, 119)

Adult (Fig. 6). ♂, 7.5 -8.0 mm. Head grey, mixed with white, particularly frons. Labial palpus grey, second and third segment mixed with white. Thorax and tegula grey mixed with white. Fore wing grey, mixed with lighter scales; discal, discocellular and plical spots black grey, indistinct; fringe greyish white with darker medial line. Hind wing grey.

Pregenital abdomen ♂ (n=1). Tergite VIII almost length of sternite, evenly tapered, anterior emargination about one-quarter to one-half overall length of tergite. Sternite VIII with posterior margin weakly concave, lateral margins parallel, anterior apophysis moderately long, weakly tapered, distally truncate.

Genitalia ♂ (Figs 76, 119) (n=1). Overall length 1.7 mm. Uncus (0.30 x 0.43 mm) short, clearly differentiated from tegumen, broadly rounded, greatest width near base, posterior margin with pair of weak humps. Gnathos hook strong, bent at basal quarter, median part almost straight, apical quarter upturned. Costa (0.50 mm) very short, sickle-shaped, without basal hump. Sacculus (0.35 mm) very short, straight, digitate. Saccus (0.70 mm) broad at base, evenly tapered. Aedeagus (1.70 mm) long, slender, straight, abruptly narrowed to thin, distally swollen coecum (0.70 mm), apex with two hook-like sclerites.

Genitalia ♀. Unknown.

Remarks. *C. aprilella* sp. n. superficially resembles *tragicella* and *soella* sp. n. but the genitalia indicate that it is closely related to *luctuella*. Externally *aprilella* sp. n. is immediately distinguished by its uniformly grey fore wing from the conspicuous black-and-white pattern of *luctuella*. The male genitalia strongly resemble those of *luctuella* but differ in the presence of a pair of weak humps on the posterior margin of the uncus, the medially straighter gnathos hook, absence of a basal hump on the costa and shorter, more robust aedeagus. The short, sickle-shaped costa distinguishes *aprilella*

sp. n. from all other *Chionodes* except *luctuella*.

Biology. Host-plant and early stages unknown. The adults have been collected in late VI - early VII. Vertical distribution: only known from 1200 m.

Distribution. Russia (Altayskiy Kray).

Material examined (including 1 ♂ genitalia preparation)

Holotype ♂, **Russia**: SW-Altai, Katun valley 10 km of W Katanda, 1200 m, 28.VI-5.VII.1983 (MIKKOLA, HIPPA & JALAVA) (genitalia slide no. 92/363, HUEMER; ZMUH).

Paratypes. **Russia**: 2 ♂, as holotype but 22-27.VI.1983 (TLMF; ZMUH).

The *holosericella*-group

Fore wing drab, various shades of brown, rarely with purple sheen, with or without dark discal, discocellular and plical spots. Basal part of hind wing shaggy, with semi-erect, elongate scales in male of some species (*holosericella*, *praeclarella*, *tannuoella* and North American *fluvialella*) (shaggy scaling not to be confused with brush of long hairs regularly present along vein A2 in hind wing of both sexes).

Genitalia ♂. Uncus large, usually longer than wide. Tegumen with parallel lateral margins; anterior margin broadly triangular, sclerotized edge broad, inverted Y-shaped; pedunculi broadly rounded, linked to vinculum by long, straight, strongly sclerotized arm. Gnathos hook very strong, acute. Costa of moderate length, apex about level with base of gnathos; sacculus shorter, straight.

Genitalia ♀. Apophyses anteriores rod-like. In some species anterior margin of tergite VIII between bases of apophyses anteriores with characteristic sclerotization (*violacea*, *mongolica* and *holosericella*). Antrum long, narrow, funnel-shaped. Signum reduced, posterior transverse ridge present, anterior ridge vestigial.

Chionodes violacea (TENGSTRÖM, 1848)

(Figs 7, 60, 77, 120, 149, 177)

Gelechia violacea TENGSTRÖM, 1848, Notis. Sällsk. Fauna Flora fenn. Förh. 1: 125. Lectotype ♂, Finland: Österbotten, Oulu ('Uleåborg') late VI (NYLANDER) (genitalia mounted on card, without serial number; ZMUH), here designated [examined].

Adult (Fig. 7). ♂, 7.1-7.8 mm; ♀, 7.5-7.7 mm. Head shiny dark brown. Labial palpus dark brown, mixed with some lighter scales. Thorax and tegula shiny dark brown. Fore wing shiny dark brown, in fresh specimens with purple sheen, almost unicolorous, rarely with very indistinct black discal, discocellular and plical spots; fringe dark brown, distal part lighter grey-brown. Hind wing grey-brown.

Pregenital abdomen ♂ (n=3). Tergite VIII distinctly shorter than sternite, tongue-shaped, depth of anterior emargination almost one-half overall length of tergite. Sternite VIII broad, posterior margin broadly V-shaped, lateral margins parallel to very weakly convergent, anterior apophysis broad with parallel lateral margins, distally truncate.

Genitalia ♂ (Figs 60, 77, 120) (n=3). Overall length 2.2 mm. Uncus (0.52-0.55 x 0.45-0.52 mm) sub-oval, variable. Gnathos hook strong, evenly curved. Costa (0.83-0.88 mm) distinctly bent near

base, distal part evenly curved, apex about level with base of gnathos. Sacculus (0.38-0.43 mm) short, almost straight, apical part slightly dilated. Saccus (0.78-0.91 mm) broad at base, evenly tapered. Aedeagus (2.10-2.38 mm) long, slender, apex with two sclerites, coecum (0.80-0.85 mm) straight to weakly curved.

Genitalia ♀ (Figs 149, 177) (n=2). Apophyses posteriores 3.9 mm. Anterior third of tergite VIII constricted, anterior margin between bases of apophyses anteriores concave, with narrow, distinctly sclerotized edge. Apophyses anteriores (0.93-1.00 mm) thin, rod-like. Antrum (1.20 mm) very long, distinctly exceeding apophyses anteriores, narrow, weakly funnel-shaped. Bursa copulatrix oval, not differentiated into ductus and corpus bursae, much shorter than antrum. Signum at anterior third of bursa, sub-oval, with irregular margin and moderate posterior and very weak anterior transverse ridge.

Remarks. *C. violacea* is very close to *C. mongolica*; for a discussion of the differences see the latter.

C. violacea was described from an unspecified number of specimens (sex not stated) from Finland, northern Österbotten (Ostrobothnia borealis), Gamla Carleby ('G:la Carleby'), 30.VII.1845 (HELLSTRÖM) and Oulu ('Uleåborg'), late VI. (NYLANDER). A male and female from Oulu are preserved in ZMUH; the male is here designated as the lectotype.

Biology. Host-plant and early stages unknown. The adult occurs in mid-VI to mid-VII. Vertical distribution: up to 2400 m (Mongolia).

Distribution. Sweden, Finland, Russia, Mongolia. Not yet recorded from Norway (OPHEIM, 1978).

Material examined (including 3 ♂, 2 ♀ genitalia preparations)

Sweden: 5 ♂, 2 ♀, Norrbotten, Båtskärnäs, 29.VI.1976 (JOHANSSON) (genitalia slide no. GEL 307; TLMF), 30.VI.1978 (SVENSSON); 2 ♂, Norrbotten, Boden, 23.VI.1964, 6.VII.1965 (JOHANSSON) (BMNH; TLMF; ZM). **Finland:** lectotype as above; 1 ♀ (paralectotype), Österbotten, Oulu (NYLANDER) (ZMUH); 3 ♂, Oulu, 27-28.VI.1971, 20.VI.1972 (KYRKI) (BMNH); 2 ♂, 1 ♀, Kuusamo, 15.VII.1935 (KROGERUS) (genitalia slide no. 91/311 + 91/312, HUEMER; ZM). **Mongolia:** 3 ♂, Gobi Altaj aimak, Chasat chajrchan ul mountains, ca. 20 km S of Somon Zargalan, 2400 m, 15.VII.1966 (KASZAB, no. 695) (genitalia slide no. 90/085, HUEMER; TM) (TLMF; TM). **Russia:** 2 ♂, Magadanskaya Oblast, upper Kolyma river, nr. Vetrennyi, 20.VII.1987 (MIKKOLA) (ZMUH).

Chionodes mongolica PISKUNOV, 1979

(Figs 9, 10, 79, 80, 122, 150, 178)

Chionodes mongolica PISKUNOV, 1979 (June 26), Nasekom. Mongol. 6: 395, fig. 1. Holotype ♂, Mongolia: Hövsgöl, Hövsgöl Nuur ('lac. Chubsugul'), 1-5.VIII.1976 (ORLOW) (genitalia slide no. 14760=91/289, HUEMER; ZIAN) [examined].

Chionodes ukrainica PISKUNOV, 1979 (June 27), Ent. Obozr. 58: 371, fig. 6. Holotype ♂, Ukraine: ('Ukraina or., parc nation. Kam. mogily'), 16.VII.1971 (KOSAKEWITSCH) (genitalia slide no. 14766=91/292, HUEMER; ZIAN) [examined]. **Syn. n.**

Adult (Figs 9, 10). ♂, 8.9-9.1 mm; ♀, 8.2 mm. Head loamy brown. Labial palpus loamy brown, mixed with some lighter scales. Thorax and tegula loamy brown. Fore wing loamy brown, almost unicolorous or more or less mottled dark brown, with or without indistinct black discal, discocellular and plical spots; veins occasionally dark brown distally; fringe loamy brown, distal part light brown. Hind wing brownish grey.

Pregenital abdomen ♂ (n=4). Tergite VIII distinctly shorter than sternite, tongue-shaped, depth of anterior emargination less than one-half overall length of tergite. Sternite VIII broad, posterior margin broadly V-shaped, lateral margins parallel to slightly convex, anterior apophysis broad, lateral margins more or less parallel, distally truncate to weakly concave.

Genitalia ♂ (Figs 79, 80, 122) (n=4). Overall length 2.8 mm. Uncus (0.62-0.67 x 0.50-0.59 mm) sub-oval, lateral margins parallel or slightly converging posteriorly. Gnathos hook strong, evenly curved. Costa (1.06-1.11 mm) distinctly bent near base, distal part evenly curved, apex about level with base of gnathos. Sacculus (0.43-0.49 mm) short, almost straight. Saccus (1.07-1.20 mm) broad at base, evenly tapered. Aedeagus (2.65-2.84 mm) long, slender, apex with two sclerites, coecum (0.95-1.05 mm) straight to weakly curved.

Genitalia ♀ (Figs 150, 178) (n=1). Apophyses posteriores 4.8 mm. Anterior third of tergite VIII constricted, anterior margin between bases of apophyses anteriores concave, medially with conspicuous broad, posteriorly concave, sclerotization. Apophyses anteriores (1.32-1.37 mm) long, broader basally, distal three-quarters narrow, rod-like. Antrum (1.44 mm) long, distally level with apex of apophyses anteriores, narrow, weakly funnel-shaped. Bursa copulatrix oval, not differentiated into ductus and corpus bursae, distinctly shorter than antrum. Signum almost in fundus bursae, sub-oval, with irregular margin and moderate posterior and faintest trace of anterior transverse ridge.

Remarks. *C. mongolica* is very close to *violacea* but, for the time being, is retained as a valid species although its taxonomic status must be reassessed when further material is available. Externally *mongolica* differs from typical *violacea* in the larger size and loamy brown fore wing without the purplish sheen characteristic of the latter. Differences in the male genitalia are so slight that they may fall within the normal range of variation or may even be accounted for by minor variation in the way individual armatures are mounted on slides. Apart from the overall larger size of the genitalia (corresponding to the size difference of the adults) *mongolica* is distinguished in the male by the sacculus that is not inflated in its distal portion (slightly inflated in *violacea*). Apparent differences in the shape of the uncus should be disregarded because that structure is rather variable in both species. A better difference is found in the female genitalia, in which both species share the anteriorly constricted tergite VIII; however, whilst its concave anterior margin between the apophyses anteriores is lined with a narrow sclerotized edge in *violacea*, it bears a conspicuous broad sclerotization with concave posterior demarcation in *mongolica*. Moreover, in *violacea*, the signum is situated near the middle of the bursa copulatrix whilst in *mongolica* it is found more anteriorly, almost in the fundus bursae. The apparent difference in the length of the antrum that distally exceeds the apophyses anteriores in *violacea* but is level with them in *mongolica*, may be the result of individual variation as found in other *Chionodes* species such as *distinctella*. In assessing the value of these differences it should also be borne in mind that only one female of each could be examined. Five specimens from Mongolia are very close to *mongolica* and *violacea*. The adults (Fig. 8) are larger than either and differ in the grey-brown (rather than shiny dark brown or loamy brown) distinctly marked fore wings and light grey hind wings. The male genitalia (Fig. 78, 121) (female unknown) are almost identical to those of *violacea* and *mongolica* and differ only in the linear measurements, in particular the length of the sacculus.

Biology. Host-plant and early stages unknown. The few adults known to date have been collected from late VI - early VIII. Vertical distribution: inadequate data.

Distribution. Ukraine, Russia, Mongolia.

Material examined (including 3 ♂, 1 ♀ genitalia preparations)

Ukraine: holotype of *ukrainica* as above. **Russia:** 2 ♂, 1 ♀, Orenburgskaya Oblast, Guberlya ('Guberli'), 19-22.VI.1892 (CHRISTOPH) (genitalia slide no. 90/181 + 90/196, HUEMER; ZIAN).

Mongolia: holotype of *mongolica* as above.

Identity uncertain (see Remarks). **Mongolia:** 5 ♂, Bajan-Ölgij aimak, NE edge of lake Tolbo nuur, 2100 m, 1.VII.1968 (KASZAB, no. 1051) (genitalia slide no. 90/079, HUEMER; TM) (BMNH; TLMF; TM).

Chionodes holosericeella (HERRICH-SCHÄFFER, 1854)

(Figs 11, 12, 81, 123, 151, 179)

Gelechia holosericeella HERRICH-SCHÄFFER, 1854, Syst. Bearb. Schmett. Eur. 5: 176. Holotype ♂, Switzerland: Ober-Engadin, Samedan ('Samaden'), second half VII. (FREY) (BMNH) [examined].

Gelechia cognatella HEINEMANN, 1870, Schmett. Dtl. Schweiz (2)2(1): 218. Lectotype ♂, Switzerland: Ober-Engadin, VII., around *Pinus larix* (HEINEMANN) (BMNH), here designated [examined]. [Synonymized by FREY, 1880: 364, as *holosericeella*, incorrect subsequent spelling.]

Gelechia norvegiae STRAND, 1903, Berl. ent. Z. 47: 155. Holotype ♂, Norway: Norland, Saltdal, 7.VIII.1881 (SCHØYEN) (ZMUO) [examined]. [Synonymized by SATTLER, 1958: 219.]

Gelechia dovrella GRONLIEN, 1925, Norsk ent. Tidsskr. 2: 52. Holotype ♀ [not ♂ as stated], Norway: Opland, Dovre, Kongsvold, 8.VII.1921 [not 10.VII. as stated] (GRONLIEN) (genitalia slide no. 179 d, SATTLER; ZMUO) [examined]. [Synonymized by SATTLER, 1960: 35.]

Gelechia norvegiae var. *meesi* BARCA, 1932, Ent. Tidskr. 53: 32. Lectotype ♂, Norway: Opland, Dovre, Kongsvold, 25.VII.1922 (BARCA) (ZMUO), here designated [examined]. **Syn. n.**

Gelechia danieli OSTHELDER, 1951, Mitt. münch. ent. Ges. 41 (Beilage: Schmett. Südbayerns): 137, fig. 1. Lectotype ♂, Germany: Bayern, Ammerwald, Frieder, 1700-2000 m, 23-30.VII.1948 (DANIEL) (ZSBS), here designated [examined]. [Synonymized by SATTLER, 1960: 35.]

Adult (Figs 11, 12). ♂, 7.7-9.0 [6.7-7.5, eastern Asia] mm; ♀, 6.9-7.3 mm. Head light brown, particularly frons. Labial palpus light brown, second segment speckled with dark brown on outer surface, third segment speckled with dark brown. Thorax and tegula mid-brown. Fore wing mid-brown, evenly mottled light brown; discal, discocellular and plical spots indistinct dark brown, discal dash-like; indistinct light brown costal and tornal spots at four-fifths, separate; fringe mid-brown, distal half light brown. Hind wing light grey-brown.

Pregenital abdomen ♂ (n=6). Tergite VIII slightly longer than sternite, narrow, depth of anterior margination at least one-third overall length of tergite. Sternite VIII with posterior margin deeply concave medially, anterior apophysis very broad, distally truncate.

Genitalia ♂ (Figs 81, 123) (n=6). Overall length 2.4 mm. Uncus (0.63-0.67 x 0.50-0.53 mm) large, sub-oval with broad base, lateral margins slightly converging posteriorly, apex evenly rounded. Gnathos hook very large, strongly curved. Costa (0.72-0.78 mm) strongly bent near base, distal part slightly curved, apex not reaching base of gnathos. Sacculus (0.46-0.48 mm) rather short, almost straight, about same width as costa. Saccus (0.80-0.83 mm) broad at base, more or less evenly tapered, apex rounded or almost pointed. Aedeagus (1.98-2.07 mm) rather short, slender, straight, apex with two hook-like sclerites, coecum (0.70-0.78 mm) straight or very gently curved, distally swollen.

Genitalia ♀ (Figs 151, 179) (n=2). Apophyses posteriores 2.6 mm. Tergite VIII relatively short, anterior margin broadly arched between bases of apophyses anteriores, with large, posteriorly convex sclerotization. Apophyses anteriores (0.72 mm) long, broader basally, distal three-quarters rod-like. Antrum (0.65 mm) slightly shorter than apophyses anteriores, broad at ostium, funnel-shaped. Bursa copulatrix about length of antrum, oval, not differentiated into ductus and corpus bursae; signum in

middle of bursa, sub-oval, with distinct posterior and short weak anterior transverse ridge.

Remarks. *C. holosericella* differs in the male genitalia from all related species in the large gnathos; amongst the central European species it is easily distinguished by the very large sub-oval uncus that is usually exposed sufficiently in dried specimens to be visible without descaling. The female is characterised by the broad median sclerotization of the anterior margin of tergite VIII. A homologous structure is found in *mongolica* and *violacea* but both species differ from *holosericella* in the long, anteriorly constricted tergite VIII.

Males from eastern Asia (Magadanskaya Oblast) are distinctly smaller on average (6.7-7.5 mm) than those from Europe to central Asia (7.7-9.0 mm) and their fore wing ground colour is darker but we were unable to find any differences in the genitalia.

G. holosericella was described from a single male from Switzerland that HERRICH-SCHÄFFER had received from FREY. Subsequently, FREY (1856: 116) stated that he had collected this specimen in Ober-Engadin, Samedan ('Samaden'), in the second half of VII. It is further stated that head and palpi of that specimen were somewhat rubbed. A male matching HERRICH-SCHÄFFER's description and FREY's subsequent comments exists in BMNH and bears FREY's label '*G. holosericeella* [sic!] H-S. (Original). Engadin.'. There can be no doubt that it represents the holotype. Consequently the designation of a lectotype (SATTLER, 1960: 35) is invalid and is here withdrawn.

Based on specimens he had collected in Ober-Engadin in VII. (year unknown), HEINEMANN included this species twice in the same work. Some of his material was identified by HERRICH-SCHÄFFER as *Gelechia holosericella* (HEINEMANN, 1870: 202) whereas for another part, considered to represent a separate species closely related to *Bryotropha boreella* (DOUGLAS), the name *Gelechia cognatella* was proposed (HEINEMANN, 1870: 218). The latter was described from several specimens (number and sex not stated) collected around '*Pinus larix*'. A syntype male in coll. ZELLER (BMNH) bears the labels 'Ober-Engadin. 7' [blue label, HEINEMANN's handwriting]; '*Cognatella*' and '*Als Boreella?*, von HNM 1/67' [both ZELLER's handwriting]; '*Boreella?* Dgl., 44.' [unidentified handwriting]; it is here designated as the lectotype. Another male and female in coll. HEINEMANN (NL) should now be labelled as paralectotypes. The synonymy of *holosericella* and *cognatella* was first discussed by ZELLER (1878: 134) who, however, preferred to use the junior name.

G. norvegiae var. *meesi* was described from eleven males from Dovre as '...a very characteristic race with light grey, slightly brownish, coarsely irrorated fore wings...' [translated from German]. An examination of three syntypes has shown them not to differ significantly from typical *holosericella*. A specimen in coll. BARCA labelled '*Meesi* type' is here designated as the lectotype.

Biology. Host-plant and early stages unknown. In the Alps the adults have been observed around *Pinus mugo pumilio* (HAENKE) FRANCO and, according to HEINEMANN (1870: 218), *Larix* ('*Pinus larix*'). In eastern Asia they were collected in *Larix*-bogs and around *Populus tremula* L. and *Betula* L. (information on specimen-labels). The adult occurs in late VI - late VIII. Vertical distribution: 900 m (rarely lower) to about 2600 m.

Distribution. Arcto-alpine. Norway, Sweden, Finland, between about 60° N and 67° N. Alps of Switzerland (Graubünden), Germany, Austria, Italy; Croatia, Asiatic Russia (Altayskiy Kray, Irkutskaya Oblast, Magadanskaya Oblast), South Korea.

Erroneous records. A record from France (BURRAS et al., 1933: 105; LHOMME, [1948]: 602; LERAUT, 1980: 77) was based on a misidentified male of *Aroga aristotelis* (MILLIÈRE) (SATTLER, 1984: 63). A male in NM with data 'Bohemia, 1835' is considered as mislabelled; there is as yet no evidence that *holosericella* occurs in the Czech Republic.

Material examined (including 6 ♂, 2 ♀ genitalia preparations)

Norway: holotype of *norvegiae* as above; holotype of *dovrella* as above; lectotype of *meesi* as above; 2 ♂ (*meesi* paralectotypes), Dovre, Kongsvold, 10.VII.1921, 19.VII.1932 (BARCA) (ZMUO); 4 ♂, 1 ♀, STi, Kongsvoll, 900-1100 m, 9.VII.1921 (genitalia slide no. 15.213; NM), 26.VI, 11.VII.1982, 20-28.VII.1983, 28.VI.1985 (RIBBE; LARSEN; KARSHOLT & MICHELSEN; TUCK) (BMNH);

NM; TLMF); 3 ♂, Vågå, 7.VII.1961 (NIELSEN) (BMNH). Sweden: 1 ♂, Vb. Vännäs, Hällfors, 13.VII.1950 (SVENSSON) (BMNH). Germany: lectotype of *danieli* as above; 1 ♂, 1 ♀ (*danieli* paralectotypes), Bayern, Ammerwald, Frieder, 1700-2000 m, 22-30.VII.1948 (DANIEL) (ZSBS). Switzerland: holotype of *holosericella* as above; lectotype of *cognatella* as above; 1 ♂, 1 ♀ (*cognatella* paralectotypes), Graubünden, Ober-Engadin, VII. (HEINEMANN) (NL); 17 ♂, 3 ♀, Graubünden, Bergün, 12-26.VII.1871, 3-24.VII.1875 (ZELLER) (BMNH); 2 ♂, 1 ♀, Graubünden, Umbrail, 23.VII.1977, 5.VIII.1977, 22.VIII.1987 (BURMANN) (BURM; TLMF). Austria: 1 ♂, Kärnten, Nockgebiet, Zunderwand, 1780 m, 20.VII.1988 (WIESER); 1 ♂, Osttirol, Glocknergruppe, Kals, Lucknerhaus, 1950 m, 24.VII.1977 (HABELER); 4 ♂, Osttirol, Rieserfernergruppe, Patschertal, 15.VIII.1989 (TARMANN); 1 ♂, Osttirol, Venedigergruppe, Virental, Hinterbichl, Dorfertal, 1600 m, 10.VIII.1993 (HUEMER); 1 ♂, Osttirol, Venedigergruppe, Virgental, Hinterbichl, 1530 m, 9.VII.1993 (HUEMER); 7 ♂, Osttirol, Venedigergruppe, Virgental, Sajathütte SW, 2550-2600 m, 29.VII.1993 (RYRHOLM); 1 ♂, Osttirol, Venedigergruppe, Virgental, Sajathütte W, 2600 m, 2.VIII.1993 (RYRHOLM); 11 ♂, Osttirol, Venedigergruppe, Virgental, Sajathütte W, 2500 m, 4.VIII.1993 (RYRHOLM); 4 ♂, Osttirol, Venedigergruppe, Virgental, Sajatmähder E, 2300-2400 m, 1.VIII.1993 (RYRHOLM); 1 ♂, 1 ♀, Osttirol, Venedigergruppe, Virgental, Sajatmähder E, 2400-2500 m, 6.VIII.1993 (RYRHOLM); 1 ♂, Nordtirol, Pinnegg, 1000 m, E.VII.1971 (ZÜRNBAUER); 1 ♂, Nordtirol, Rofan, 1700 m, E.VII.1968 (ZÜRNBAUER); 1 ♀, Nordtirol, Finstermünz, 1200 m, 30.VII.1982 (BURMANN); 1 ♂, Nordtirol, Weißenbach, Feldele, 910 m, 5.VII.1989 (HUEMER) (TLMF); 1 ♂, Nordtirol, Vennatal, 1600 m (SCHOLZ); 2 ♂, Nordtirol, Vennatal, 2000 m, 9.VII.1950 (BURMANN) (BURM); 2 ♂, Vorarlberg, Schattenlagant, 1460 m, 13.VII.1985 (HUEMER) (genitalia slide no. GEL 304; TLMF); 1 ♂, Vorarlberg, Zürs, 25.VII.1931 (GRADL) (NM). Italy: 1 ♂, Südtirol, Trafoi, 29.VII.1969 (ZIAN); 1 ♂, Südtirol, Sella-Joch, VII (REBEL) (NM); 4 ♂, Prov. Trentino, Sella-Gruppe, Piz Ciavazes S-Wand, 2150 m, 7.VIII.1981 (HUEMER) 4 ♂, Prov. Bormio, Ortler, Val Fraële, 21-31.VII.1960 (HARTIG); 1 ♂, Prov. Udine, Raibl, 4.VII.1867 (ZELLER) (BMNH). Croatia: 3 ♂, Rijeka ('Fiume'), VI.1849 (MANN) (ZIAN). Russia: 4 ♂, Altayskiy Kray, 15 km S of Katanda, Kuragan valley, 1200 m, 23-25.VII.1983 (MIKKOLA, HIPPA & JALAVA); 1 ♂, Irkutskaya Oblast, 70 km E of Sljudjanka, Sneznaja reka, 31.VII-1.VIII.1984 (MIKKOLA & VIITASAARI); 4 ♂, Irkutskaya Oblast, 50 km E of Sljudjanka, river Hara-Murin, 8-11.VII.1984 (MIKKOLA & VIITISAARI); 8 ♂, Magadanskaya Oblast, upper Kolyma river, 440-500 m, 28.VII-1.VIII.1987 (MIKKOLA) (ZMUH). South Korea: 1 ♂, 1 ♀, Mt. Paektusan, lake shore, 18.VII.1977 (DELY & DRASKOVITS) (CISK).

Chionodes praeclarella (HERRICH-SCHÄFFER, 1854)

(Figs 13, 14, 82, 124, 152, 180)

Gelechia praeclarella HERRICH-SCHÄFFER, 1854, Syst. Bearb. Schmett. Eur. 5: 177. Holotype ♂, Switzerland, Engadin, 1800 m ('6000 feet') (FREY) (BMNH) [examined].

Gelechia pergrandella REBEL, 1917, Dt. ent. Z. Iris 30: 193. Lectotype ♂, Russia: Tuviniskaya Respublika, eastern Tannu Ola mountains, 'Schawyr', VI.1914 (collector unknown) (genitalia slide no. 14.318; NM), designated by SATTLER (1986: 257) [examined]. [Synonymized by HUEMER & TARMANN, 1993: 56, 144.]

Adult (Figs 13, 14). ♂, 9.6-10.8 mm; ♀, 7.9-8.8 mm. Head greyish brown. Labial palpus light brown, second segment mottled dark brown on outer surface. Thorax and tegula loamy brown. Fore wing loamy brown to greyish brown, darker brown along veins, particularly in distal two-thirds, otherwise without markings; fringe loamy brown, distal half light brown. Hind wing light grey-brown.

Pregenital abdomen ♂ (n=6). Tergite VIII distally level with sternite VIII or slightly longer, apex pointed or rounded, depth of anterior emargination less than one-half overall length of tergite. Sternite VIII widest at posterior quarter, posterior margin laterally convex, medially concave, anterior apophysis broad, lateral margins concave, distally truncate.

Genitalia ♂ (Figs 82, 124) (n=6). Overall length 2.6-2.8 mm. Uncus (0.62-0.68 x 0.60-0.65 mm) more or less trapezoid, broadest near base, lateral margins straight to weakly convex, weakly rounded posteriorly. Gnathos hook very large, evenly curved. Costa (0.93-1.01 mm) strongly bent basally, distal part weakly curved, apex almost level with base of gnathos. Saccus (0.64-0.76 mm) rather long, almost straight, slightly dilated apically, about same width as costa. Saccus (0.90-1.0 mm) broad at base, evenly tapered, lateral margin straight to weakly concave. Aedeagus (2.20-2.33 mm) rather long, slender, apex with two hook-like sclerites, coecum (0.70-0.80 mm) short, weakly curved.

Genitalia ♀ (Figs 152, 180) (n=2). Apophyses posteriores 2.3- 2.6 mm. Anterior margin of tergite VIII broadly arched, without median sclerotization. Apophyses anteriores (0.50-0.60 mm) short, about length of segment VIII, basal half broadly triangular, distal part narrow rod-like. Antrum (0.85-0.90 mm) very long, broad, funnel-shaped, over one-half width of segment VIII basally, distal part weakly tapered, distinctly exceeding apophysis anterior. Bursa copulatrix pyriform to oval, ductus bursae short or absent. Signum at middle of corpus bursae, irregularly rounded, with distinct posterior transverse ridge; anterior ridge at most very weak.

Remarks. *C. praeclarella* is one of the largest Palaearctic *Chionodes* species and is characterized by the dark veins in the distal portion of the fore wing. Specimens from the Alps are distinctly loamy brown, those from central Asia grey-brown. The superficially similar *frigidella* sp. n. is smaller and has a narrower, unicolorous fore wing without darker veins.

In the past the name *praeclarella* has been attributed to both HERRICH-SCHÄFFER and HEINEMANN; consequently it is listed in two separate places in the catalogues of REBEL (1901: 143), MEYRICK (1925: 82) and GAEDE (1937: 158, 204). Following FREY (1880: 357), *praeclarella* HERRICH-SCHÄFFER was placed as the senior name of the species currently known as *Agonochaetia terrestrella* (ZELLER). In contrast, '*praeclarella* HEINEMANN' (more accurately: *praeclarella* HERRICH-SCHÄFFER sensu HEINEMANN) is conspecific with *Chionodes distinctella* (ZELLER). We are now able to demonstrate that *praeclarella* HERRICH-SCHÄFFER is the species hitherto known as *Chionodes pergrandella* (REBEL) (= *decolorella* ZELLER sensu HEINEMANN, 1870).

G. praeclarella was described from the Swiss Alps, Engadin, 6000 feet, from material supplied to HERRICH-SCHÄFFER by FREY. Although the number of specimens (or their sex) was not indicated in the original description, there is subsequent evidence that HERRICH-SCHÄFFER had only a single specimen: a male collected by FREY in Ober Engadin, between Samedan and Celerina, at 6000 feet, in the last days of VII.1853 (FREY, 1856: 117-118). This specimen, which HERRICH-SCHÄFFER returned to its owner after having examined it, is still preserved in coll. FREY (BMNH) and bears a label in FREY's handwriting '*G. Praeclarella* H.S., Original., Engadin.'; it is conspecific with *G. pergrandella* REBEL (= *decolorella* sensu HEINEMANN, 1870). The previous lectotype designation (SÄTTLER, 1960: 37) is here withdrawn as invalid.

It complicates matters that HERRICH-SCHÄFFER later misinterpreted his own species and applied the name *praeclarella* to certain specimens of *distinctella*. Several *distinctella* from Ober Engadin, incorrectly identified as *praeclarella* by HERRICH-SCHÄFFER, are now preserved in coll. STAUDINGER (ZMHU), amongst them a male designated invalidly as the lectotype (SÄTTLER, 1960: 37). It is possible that HEINEMANN had seen one of those specimens and that this resulted in his incorrect interpretation of *praeclarella*. As a consequence of these complications all literature references to *praeclarella*, except those by FREY (1856: 117; 1880: 357), apply to other species, notably *distinctella* and *Agonochaetia terrestrella* (ZELLER).

G. pergrandella was described from an unspecified number of males; the single syntype in NM was designated as the lectotype by SATTLER (1986: 257). The type-material was collected, together with that of the following *tannuoellella*, in the eastern Tannu Ola mountains 'near Schawyr, between the rivers Agyr and Termis, in June 1914, at an altitude of about 2500 m above sea level' [translated from German]. The collector is unknown; REBEL received the specimen(s) from the entomological dealer O. BANG-HAAS (REBEL 1917: 186). The type-locality 'Schawyr' lies somewhere on the border between the Tuvinskaya Respublika and Mongolia (about 49°55'N and 97°40'E). We were unable to ascertain its current name and establish on which side of today's border it is situated. However it is attached to Russia in this paper.

Biology. Host-plant and early stages unknown; larva probably on Polygonaceae. The adult has been observed in early VII - late VIII in the Alps and mid-VI - mid-VII in Mongolia. In the Alps it can be flushed out of larger stands of *Rumex scutatus* L. and *Oxyria digyna* (L.) HILL (Polygonaceae), the most likely host-plants of the larva. The male is readily attracted to the light whilst the female usually remains well hidden and is rarely encountered; it was once found under a stone. KARSHOLT (pers. com.) swet one female in the evening. The preferred habitats are the edges of streams and gravel channels with profuse plant growth (BURMANN, 1977: 139, as *decolorella*; P. H., pers. obs.). Vertical distribution: 1600-2800 m.

Distribution. Alps (Switzerland, Austria, Italy), Russia (Tuvinskaya Respublika), Mongolia.

Material examined (including 6 ♂, 2 ♀ genitalia preparations)

Switzerland: holotype of *praeclarella* as above; 1 ♂, Graubünden, Umbrail, 2100 m, 31.VIII.1987 (BURMANN, HUEMER & TARMANN); 1 ♂, Graubünden, Umbrail, 2200 m, 3-9.VIII.1975 (BURMANN) (TLMF); 1 ♂, Graubünden, Flüelapass, 1.VII.1925 (OSTHELDER) (ZSBS); 1 ♀, Valais, Simplon (ANDEREGG) (BMNH). **Austria:** 2 ♂, Großglockner, VII.1848 (MANN) (ZIAN); 2 ♂, Großglockner (KRONE; MANN) (BMNH; TLMF); 1 ♂, Osttirol, Schobergruppe, Alkuser Scharte, 2630 m, 8.VIII.1988 (TARMANN); 2 ♂, Osttirol, Kartitsch, 1600 m, 9.VII.1964 (SÜSSNER); 4 ♂, Osttirol, Rieserfernergruppe, Patschertal, 2080 m (TARMANN); 1 ♂, Osttirol, Venedigergruppe, Virgental, Sajatmähder E, 2300- 2400 m, 1.VIII.1993 (RYRHOLM) (TLMF); 1 ♀, Stubai Alpen, Franz Sennhütte, 2800 m, 14.VIII.1950 (BURMANN) (BURM); 1 ♂, Nordtirol, Sölden, Kleblaralm, 1800 m, 3.VIII.1956 (SÜSSNER); 1 ♂, Nordtirol, St. Anton, Capall, 2000 m, 17.VII.1959 (SÜSSNER) (TLMF). **Italy:** 1 ♂, Südtirol, Schluderbach, 1876 (MANN) (NM); 1 ♀, Südtirol, Schnalstal, 1800 m, 23.VII.1983 (SKULE & SKOU) (ZM); 1 ♂, Südtirol, Trafoi, 6.VIII. (ZMHU); 1 ♂, Südtirol, Passiria, Platt, 1100 m, 7.VIII.1961 (HARTIG). **Russia:** lectotype of *pergrandella* as above. **Mongolia:** 5 ♂, Archangaj aimak, Changaj mts., Somon Ichtamir - Somon Culut, 20 km W of Ichtamir, 2150 m, 19.VII.1966 (KASZAB, no. 716); 3 ♂, 1 ♀, Central aimak, 11 km S Zosijn das, 90 km S of Ulan-Baator, 1650 m, 15.VI.1967, 15-16.VII.1967 (KASZAB, no. 922) (genitalia slide no. 756, SATTLER; TM); 3 ♂ Chövsgöl aimak, 8 km N of Somon Alagerdene, Egijn gol, 1600 m, 17.VII. 1968 (KASZAB, no. 1121); 8 ♂, Chövsgöl aimak, Somon Cecerleg - Somon Bajan-ul, 65 km W of Cecerleg, 1700 m, 22.VI.1968 (KASZAB, no. 1003); 1 ♂, Chövsgöl aimak, 4 km NW of Mörön, 1500 m, 19.VII.1968 (KASZAB, no. 1128); 1 ♂, Chövsgöl aimak, N of Somon Chatgal, Chövsgöl nuur SW, 1650 m, 18.VII.1968 (KASZAB, no. 1124); 3 ♂, Chövsgöl aimak, Tunamal nuur, 26 km SW of Somon Scharag, 1950 m, 15.VII.1968 (KASZAB, no. 1112) (BMNH; TLMF; TM).

Chionodes tannuoellella (REBEL, 1917)

(Figs 15, 83, 125)

Gelechia tannuoellella REBEL, 1917, Dt. ent. Z. Iris 30: 193. Lectotype ♂, Russia: Tuvinskaya Respublika, eastern Tannu Ola mountains ('Schawyr'), 2500 m, VI.1914 (collector unknown)

(genitalia slide no. 3209; NM), here designated [examined].

Adult (Fig. 15). ♂, 7.2-8.8 mm. Head light brown. Labial palpus light brown, inner surface of second segment whitish brown. Thorax and tegula light brown. Fore wing shiny light brown, more or less strongly mottled mid-brown, particularly in apical part; with indistinct mid-brown discal, plical and discocellular spots, the last comma-shaped; fringe light brown, basally mixed with mid-brown. Hind wing light grey.

Pregenital abdomen ♂ (n=4). Tergite VIII of moderate width, apex level with or slightly exceeding sternite, depth of anterior emargination about 1/3 overall length of tergite. Sternite VIII with posterior margin moderately concave to broadly V-shaped, lateral margins very weakly convex, almost parallel; anterior apophysis long, distally truncate to moderately concave, lateral margins more or less parallel.

Genitalia ♂ (Figs 83, 125) (n=4). Overall length 2.6-2.7 mm. Uncus (0.51-0.56 x 0.55-0.60 mm) large, sub-quadrangular, lateral margins slightly convex, apex rounded with small medial incision. Gnathos hook moderate to strong, long, strongly curved. Costa (0.81-0.92 mm), apex not reaching base of gnathos, strongly bent basally, distal part slightly curved. Saccus (0.56-0.75 mm) rather long, straight, about same width as costa. Saccus (1.12-1.19 mm) long, strongly tapered basally, slightly tapered, lateral margin straight, sometimes weakly concave in basal third. Aedeagus (2.50-3.00 mm) long, slender, apex with large rounded and hook-like sclerites, coecum (1.06-1.22 mm) very long, thin, straight to weakly curved.

Genitalia ♀. Unknown.

Remarks. *C. tannuoella* is difficult to recognize by external characters, although the unusual light grey colour of the hind wings is distinctive. The male genitalia differ from those of related taxa by the sub-quadrangular uncus, the very long saccus and the long, thin coecum of the aedeagus.

G. tannuoella was described from an unspecified number of males from Schawyr; two syntypes are preserved in NM and were available for study and lectotype designation. For a discussion of the type-material and type-locality see *C. praeclarella (pergrandella)*.

Biology. Host-plant and early stages unknown. The adult occurs in early VI - late VII. Vertical distribution: 1600-2600 m.

Distribution. Russia (Tuvinskaya Respublika), Mongolia.

Material examined (including 4 ♂ genitalia preparations)

Russia: lectotype as above; 1 ♂ (paralectotype), Tuvinskaya Respublika, eastern Tannu Ola, Schawyr, 2500 m, 1914 (collector unknown) (NM). **Mongolia:** 1 ♂, Bajanchongor aimak, Changaj mts., 120 km W of Somon Zag, 2280 m, 21.VI.1966 (KASZAB, no. 556); 6 ♂, Central aimak, 11 km S of Zosijn davaa, 90 km S of Ulan-Baator, 1650 m, 7.VI.1967 (KASZAB, no. 770) (genitalia slide no. 90/084, Huemer; TM) (BMNH; TM; TLMF).

Chionodes flavipalpella sp. n.

(Figs 16, 55, 85, 126)

Adult (Fig. 16). ♂, 8.0-8.9 mm. Head light greyish brown. Labial palpus cream. Thorax and tegula mid greyish brown. Fore wing greyish brown without distinct markings; indistinct discocellular spot; fringe greyish brown, distally lighter. Hind wing greyish brown.

Pregenital abdomen ♂ (Fig. 55) (n=2). Tergite VIII about length of sternite, of moderate width; anterior emargination regularly arched, depth about two-fifths overall length of tergite. Sternite VIII with posterior margin moderately concave, lateral margins more or less parallel; anterior apophysis long, distally truncate, lateral margins straight, parallel.

Genitalia ♂ (Figs 85, 126) (n=2). Overall length 2.4 mm. Uncus (0.50 x 0.55 mm) large, almost circular, apex with minute medial incision. Gnathos hook strong, long, strongly curved. Costa (0.85 mm), apex almost level with base of gnathos, bent basally, distal part slightly curved. Sacculus (0.60 mm) rather long, straight, about same width as costa, slightly dilated apex. Saccus (0.88 mm), broad, almost evenly tapered. Aedeagus (1.94 mm) stout, straight, apex with large rounded and smaller hook-like sclerite, coecum (0.76 mm) slender, slightly swollen apically.

Genitalia ♀. Unknown.

Remarks. *C. flavipalpella* sp. n. is easily recognized by the yellowish cream labial palpi which are similar to those of *hayreddini*. Two specimens from Mongolia (Figs 17, 84) are extremely similar to *flavipalpella* sp. n. in genitalia but differ by the dark labial palpus, a character that shows little variation in Palaearctic *Chionodes* and usually separates species. The less than perfect condition of the specimens does not permit a decision on their taxonomic status.

Biology. Host-plant and early stages unknown. The adult occurs in mid-VII to late VII. Vertical distribution: 500-700 m.

Distribution. Russia (Magadanskaya Oblast).

Material examined (including 2 ♂ genitalia preparations)

Holotype ♂, **Russia:** Magadanskaya Oblast, Upper Kolyma river, 62°N 149°40'E, 700 m, scree slope, 15.VII.1987 (MIKKOLA) (genitalia slide no. 92/371, HUEMER; ZMUH).

Paratype. **Russia:** 1 ♂, as holotype but 500 m, 31.VII.1987 (*Larix* bog) (genitalia slide no. 92/361, HUEMER; ZMUH).

Identity uncertain (see Remarks). **Mongolia:** 2 ♂, Chövsgöl aimak, lake Tunamal nuur, 26 km SW of Somon Scharga, 1950 m, 21.VI.1968 (KASZAB, no. 997) (genitalia slide no. 91/307, HUEMER; TM).

Chionodes caucasicella sp. n.

(Figs 18, 56, 86, 127)

Adult (Fig. 18). ♂, 8.4 mm. Head dark grey-brown. Labial palpus dark brown, second segment mixed with yellowish green. Thorax and tegula dark grey-brown. Fore wing dark grey-brown, mottled with tinge of yellowish green at one-quarter, one-half and three-quarters, the last forming transverse fascia; indistinct black discal, discocellular and plical spots; fringe greyish, basally darker. Hind wing dark grey-brown.

Pregenital abdomen ♂ (Fig. 56) (n=1). Tergite VIII shorter than sternite, broadly acute, anterior emargination broad, depth about one-third overall length of tergite. Sternite VIII broad, posterior margin broadly concave medially; anterior apophysis short, broad, distally concave, lateral margin weakly concave in basal half, convex distally.

Genitalia ♂ (Figs 86, 127) (n=1). Overall length 2.0 mm. Uncus (0.50 x 0.52 mm) large, almost square, lateral margin slightly convex, apex rounded, with small medial incision. Gnathos hook strong, rather short, distinctly curved. Costa (0.80 mm), apex almost level with base of gnathos,

strongly bent basally, distal part slightly curved. Sacculus (0.40 mm) short, straight, about same width as costa. Saccus (0.70 mm) short, broad, strongly tapered, lateral margin slightly concave. Aedeagus (2.00 mm) long, stout, apex with large rounded and narrow hook-like sclerites, short coecum (0.78 mm) slightly curved.

Genitalia ♀. Unknown.

Remarks. *C. caucasicella* sp. n. differs from related species such as *tannuoella* and *flavipalpella* sp.n. by the shorter sacculus and saccus; it is easily distinguished from other *Chionodes* by the yellowish green tinge of the fore wing markings.

Biology. Host-plant and early stages unknown. The holotype has been collected in late VII in an alpine meadow. Vertical distribution: only known from 2600 m.

Distribution. Russia (Kabardino-Balkarskaya Respublika).

Material examined (including 1 ♂ genitalia preparation)

Holotype ♂, **Russia:** C.Caucasus, Kabardino-Balkarskij nature reserve, 35 km SE of mt. Elbrus, 43°N 43°E, 2600 m, alpine meadow, 20.VII.1990 (JALAVA) (genitalia slide no. 92/367, Huemer; ZMUH).

The *distinctella*-group

Fore wing mostly drab, grey or brown with dark discal, discocellular and plical spots, rarely with white markings.

Genitalia ♂. Uncus short, broadly oval or inverted heart-shaped. Tegumen with parallel lateral margins, anterior margin shallowly to moderately concave; narrow anterior sclerotization either directly following edge of tegumen or leaving edge and running as straight line to about middle of broadly rounded pedunculi to join X- or H-shaped sclerotizations. Costa short, not exceeding base of gnathos, more or less curved; sacculus shorter, straight.

Genitalia ♀. Apophyses anteriores broad at base, more or less strongly tapered, distally pointed or rounded, never rod-like. Antrum tubular to weakly funnel-shaped, long, level with or distally exceeding apophyses anteriores. Signum strongly reduced, sometimes absent.

Chionodes nubilella (ZETTERSTEDT, 1839)

(Figs 19, 20, 91, 92, 128, 153, 182)

Haemylis nubilella ZETTERSTEDT, 1839, Insecta lappon.:998. Lectotype ♂, Sweden: Lappland (FRIGELIUS) (genitalia mounted on cardboard, without serial number; ZI), here designated [examined].

Gelechia tarandella WOCKE, 1864, Stettin. ent. Ztg 25: 212. Lectotype ♂, Norway: Dovre, Blaahoe, 26.VI.1862 (WOCKE) (genitalia slide no. 91/221 HUEMER; ZIAN), here designated [examined]. [Synonymized by BENANDER, 1946: 38, 78.]

Adult (Figs 19, 20). ♂, 8.3-8.9 mm; ♀, 6.7-7.5 mm. Head mid to dark grey. Labial palpus dark grey, second segment more or less intensely mottled whitish grey, particularly on inner surface. Thorax and tegula mid to dark grey. Fore wing dark grey, occasionally intensely mottled whitish grey across wing: costad of fold at one-quarter and one-half, in apical area; whitish grey costal and

tornal spots at four-fifths well developed, separate; distinct black discal, discocellular and plical spots; fringe light grey-brown, basally mixed with dark grey. Hind wing light grey.

Pregenital abdomen ♂. As in *continuella*.

Genitalia ♂ (Figs 91, 92, 128) (n=6). Overall length 1.9 mm. Uncus (0.39-0.45 x 0.46-0.55 mm) broad, rounded at base, distal part sub-triangular. Gnathos hook rather long, strong, distinctly curved. Costa (0.74-0.78 mm), apex almost level with gnathos base, slightly curved basally, distal part straight. Sacculus (0.65-0.68 mm) almost reaching length of costa, weakly curved, about same width as costa. Saccus (0.60-0.73 mm) short, broad, evenly tapered, lateral margin slightly concave. Aedeagus (1.64-1.88 mm) rather short, stout, almost straight, apex with large rounded sclerite, end of coecum (0.70-0.75 mm) slightly swollen.

Genitalia ♀ (Figs 153, 182) (n=3). Apophyses posteriores 2.4-3.0 mm. Apophyses anteriores (0.44-0.65 mm) short, about length of segment VIII, sub-triangular, basally broad, distal part evenly tapered. Antrum (0.60-0.70 mm) long, broad, weakly funnel-shaped, about one-third width of segment VIII basally, about width of apophysis anterior basally, distal part tapered, about level with or slightly exceeding apophysis anterior. Bursa copulatrix pyriform, with very short, scobinate ductus bursae. Signum near middle of corpus bursae, large, irregularly rounded, with distinct posterior transverse ridge and weaker anterior transverse ridge.

Remarks. *C. nubilella* is extremely similar to *continuella* in the genitalia; however, the adults differ in the grey colour of the head and the lack of white markings on the fore wings.

H. nubilella was described from an unspecified number of males from Swedish Lappland 'Stensele and Brattiksfjell (Lapponia Umensis meridionalis), 3-30.VII. (ZETTERSTEDT); Nordland, Bjoerkvik; Lapponia Tornensis and borealis (FRIGELIUS)'. The material in ZETTERSTEDT's collection was discussed by BENANDER (1940: 58) who, at the same time, incorrectly synonymized *nubilella* with *distinctella* (ZELLER) but later (BENANDER, 1946: 38, 78) recalled it from synonymy and established it as a senior subjective synonym of *G. tarandella* WOCKE. The specimen dissected and discussed by BENANDER is here designated as the lectotype.

G. tarandella was described from an unspecified number of specimens collected in Norway. We have examined 12 syntypes in coll. WOCKE; a male is here designated as the lectotype.

Biology. Host-plant and early stages unknown. Moths have been collected at light in *Larix* bogs, on scree slopes and in mountain tundra. The adult occurs in mid-VI - early VII. Vertical distribution: from about 500 m to 1500 m.

Distribution. Northern Europe: Norway; Sweden; Finland. Russia (Magadanskaya Oblast).

Material examined (including 6 ♂, 4 ♀ genitalia preparations)

Norway: lectotype of *tarandella* as above; 10 ♂, 1 ♀ (*tarandella* paralectotypes), Dovre, Blaahoe, 14-28.VI.1862 (WOCKE) (ZIAN); 1 ♂, Dovre (LARSEN) (ZM); 1 ♂, Dovre (STAUDINGER); 1 ♂, Altenfjnd, VII.1903 (HAMPSON) (BMNH); 1 ♂, STi., Kongsvoll, 20-28.VII.1983 (KARSHOLT & MICHELSEN); 3 ♂, 1 ♀, TRI., Paras, 28.VI.1972 (KARSHOLT); 1 ♀, Grönnessan, 2.VII.1972 (KARSHOLT) (ZM). **Sweden:** lectotype of *nubilella* as above; 1 ♂ (*nubilella* paralectotype) [label illegible] (ZI); 2 ♂, Torne lappmark, Björkliden, 6 + 8.VII.1958 (SVENSSON) (genitalia slide no. 91/297, HUEMER; LN) (BMNH; LN); 3 ♂, 2 ♀, Torne lappmark, Snurtii, 11 + 15.VII.1973 (JOHANSSON) (genitalia slide no. 91/298, HUEMER; ZM) (ZM; TLMF); 1 ♂, Torne lappmark, Nuolja, 25.VII.1958 (SVENSSON) (LN). **Finland:** 1 ♂, Salla (KANGAS); 1 ♂, Kuusamo, 4.VII.1937 (WINTER) (BMNH); 3 ♂, Enontekiö Le, Kilpisjärvi, 14-18.VII.1929 (KARVONEN) (genitalia slide no. 91/301, HUEMER; LN). **Russia:** 9 ♂, 1 ♀, Magadanskaya Oblast, upper Kolyma river, 1250 m, 9-24.VII.1987 (MIKKOLA); 1 ♂, same locality but 1500 m, 26.VII.1987; 2 ♂, same locality but 500

m, 2-5.VIII.1987; 1 ♂, same locality but 600 m, 16.VII.1987; 1 ♂, 1 ♀, same locality but 1200-1800 m, 6.VII.1990 (KULLBERG, KUUSAARI & NIEMINEN); 3 ♂, Magadanskaya Oblast, Anadyr, 6.VII.1991 (MIKKOLA) (ZMUH).

Chionodes continuella (ZELLER, 1839)

(Figs 21, 22, 57, 87-90, 93, 129, 154, 183)

Gelechia continuella ZELLER, 1839, Isis, Leipzig 1839: 198. Lectotype ♂, Germany: Brandenburg, Frankfurt (Oder) (ZELLER) (genitalia slide no. 7163; BMNH), here designated [examined].

Gelechia trimaculella PACKARD, 1867, Proc. Boston nat. Hist. Soc. 11: 61. Syntypes 2 ♂, Canada: Labrador, Strawberry Harbor, late VII. (PACKARD) (MCZ) [not examined]. [Synonymized by BUSCK, 1903: 859.]

Gelechia albomaculella CHAMBERS, 1875, Can. Ent. 7: 209. Holotype ♂, Canada: [?Quebec] (BELANGER) (USNM) [not examined]. [Synonymized by BUSCK, 1903: 859.]

Adult (Figs 21, 22). ♂, 7.9-9.7 mm; ♀, 6.5-7.1 mm. Head cream. Second segment of labial palpus cream, mottled dark brown on outer surface, third segment blackish brown with some white scales. Thorax and tegula blackish brown. Fore wing blackish brown with or without some white mottling; white markings well developed: medial patches at one-fifth and one-half, the latter with a separate spot in fold, separated costal and tornal spots at four-quarters; white markings occasionally considerably extended across wing and almost merging along dorsum; blackish discal, dicellular and plical spots indistinct; termen with or without white dots; fringe dark brown basally, distal part light brown. Hind wing light grey.

Pregenital abdomen ♂ (Fig. 57) (n=9). Tergite VIII slightly shorter than sternite, more or less evenly tapered posteriorly, pointed, anterior emargination broad, depth about two-fifths overall length of tergite. Sternite VIII broad, posterior margin shallowly to moderately concave medially; lateral margin distinctly convex; anterior apophysis broad, distally truncate to concave, lateral to distinctly concave.

Genitalia ♂ (Figs 87-90, 93, 129) (n=9). Overall length 1.8-2.1 mm. Uncus (0.37-0.44 x 0.49-0.56 mm) broad, rounded at base, distal part weakly triangular. Gnathos hook rather long, strong, distinctly curved. Costa (0.66-0.76 mm), apex almost about level with gnathos base, slightly bent basally, distal part straight. Sacculus (0.52-0.57 mm) distinctly shorter than costa, weakly curved, about same width as costa. Saccus (0.68-0.85 mm) short, broad, evenly tapered, lateral margin slightly concave. Aedeagus (1.72-2.06 mm) rather short, stout, almost straight, apex with large rounded sclerite, coecum (0.73-0.87 mm) slightly swollen distally.

Genitalia ♀ (Figs 154, 183) (n=4). Apophyses posteriores 2.6-3.1 mm. Apophyses anteriores (0.44-0.65 mm) short, about length of segment VIII, sub-triangular, basally broad, distal part evenly tapered. Antrum (0.55-0.60 mm) long, broad, weakly funnel-shaped, about one-third width of segment VIII basally, about basal width of apophysis anterior, distal part tapered, about level with or slightly exceeding apophysis anterior. Bursa copulatrix more or less pyriform, without distinct ductus bursae. Signum near middle of corpus bursae, distinct, irregularly rounded, with weak posterior transverse ridge; anterior ridge absent.

Remarks. *C. continuella* is extremely similar to *nubilella* in the genitalia but can easily be separated by its cream head and the white markings of the fore wing. Specimens from parts of Denmark (Fig. 22) differ from typical *continuella* in the distinctly extended white markings of the fore wing;

however, some specimens show intermediate character.

G. continuella was described from one male and one female from Frankfurt an der Oder (present German/Polish border region). Most of ZELLER's early specimens, in particular those referred to in his paper of 1839 in Isis, Leipzig, do not bear original data labels. Certain specimens, usually no more than one of each species, were subsequently given by ZELLER a label bearing the name of the species, sometimes also a synonym, the original reference, sometimes one or more further references and, if applicable, the initials of a correspondent and date of the correspondence. Amongst ZELLER's *continuella* there is a male bearing his label '*Gelechia continuella* Z., Is. 39, 198., HS. f. 512 p. 180'. This specimen had been marked by a BMNH 'Type' label and is here designated as the lectotype. An associated unlabelled female is probably the one referred to in the original description and has now been labelled as paralectotype; all other *continuella* in ZELLER's collection bear data labels that exclude them from the type-material.

G. trimaculella was described from two males from Labrador, Strawberry Harbor, 'the last of July'. Both specimens are preserved in MCZ (MILLER & HODGES, 1990: 66); no lectotype has yet been designated.

Biology. Host-plants: lichens (*Cladonia*).

Larva 14 mm, initially brown, later red-brown, after final moult red, ventrally paler.

First three segments with weakly developed, light, longitudinal dorsal line. Head light brown; thoracic shield brown, finely divided. Anal shield large, dark brown to almost black. Thoracic legs black; abdominal prolegs strongly developed, light, with two brown sclerotized rings, the basal one open, the middle one complete. Anal claspers with brown sclerotized plate on outer surface. Pinacula brown, bearing long setae. Pupa pale yellow.

The ovum is unknown. The larva was observed in V - VI on dry heathland in long silken tunnel amongst lichen. When disturbed it retreats into a hollow *Cladonia* stem. The mature larva is found on the ground under lichen, where pupation takes place in a loosely spun cocoon that is covered in lichen fragments (SCHÜTZE, 1905: 199; 1931: 10). The larva of *continuella* was probably observed only by SCHÜTZE; all subsequent literature records appear to be based on his papers.

The adult occurs in mid-VI-end of IX. Vertical distribution: from sea-level to above 2000 m.

Distribution. Norway, Sweden Finland, Denmark, France, Germany, Austria, Poland, Latvia, Russia, Canada, USA. Also recorded from The Netherlands (LEMPKE, 1976: 26; KUCHLEIN, 1993: 486), Belgium (DE PRINS, 1983: 14) and Rumania (POPESCU-GORJ, 1984: 128).

Based on a record of *nebulosella* in the Alpes-Maritimes (MILLIÈRE, 1886: 155), LHOMME ([1948]: 590) introduced the name *continuella* to the French list because, at that time, the former was considered to be merely a form of the latter. Although LHOMME had stated simultaneously that the French form was, in fact, *nebulosella* whilst typical *continuella* did not occur in France (but see *nebulosella*!). LERAUT (1980: 77) incorrectly recorded the latter without accounting for *nebulosella*. We are now able to demonstrate that *continuella* does indeed occur in the extreme north of France (see Material examined).

Material examined (including 9 ♂, 4 ♀ genitalia preparations)

Norway: 1 ♂, On, Fokstumyrin, 1000 m, 22.VII.1983 (KARSHOLT & MICHELSSEN); 2 ♂, Fi, Grönnessan, 2.VII.1972 (KARSHOLT); 1 ♂, STi, Kongsvoll, 24.VI.1981 (KARSHOLT) (genitalia slide no. 91/316, HUEMER; ZM) (ZM); 3 ♂, STi, Kongsvoll, 900-1100 m, 20-28.VII.1983 (KARSHOLT & MICHELSSEN) (TLMF; ZM); 2 ♂, Bossekop, 29.VI.1860 (STAUDINGER); 1 ♂, Lille-Blodal, 22.IX.1885; 1 ♂, 1 ♀, Finnmark (BMNH). **Sweden:** 1 ♂, Öl, Seberneby, 29.VII.1975 (KARSHOLT); 1 ♂, Norbotten, Kaunisvara, 1.VII.1976 (JOHANSSON); 1 ♂, Torne lappmark, Tuipal, 17.VII.1964 (JOHANSSON); 1 ♂, Torne lappmark, Kiruna, 7.VII.1976 (JOHANSSON); 1 ♀, Torne lappmark, Abisko, 19.VII.1975; 1 ♂, Sm, Bäckebo, 30.V.1981 (KARSHOLT); 1 ♂, Ög., Ödeshög, 17.VII.1972 (KARSHOLT) (ZM); 5 ♂, Lappland (BMNH). **Finland:** 1 ♂, Li, Inari, Kattajärvi, 13.VII.1975 (LAASONEN); 1 ♂, U., Ekenäs, 19-24.VII.1982 (MIKKOLA) (ZM). **Denmark:** 2 ♂, Jylland, Blåvand 2.VIII.1973 (NIELSEN) (genitalia slide no. GEL 21; TLMF); 2 ♂, EJ, Anholt, 7.VIII.1976,

17-18.VII.1979 (KARSHOLT; NIELSEN) (TLMF); 5 ♂, 1 ♀, NEJ, Læsø, Nordmarken, 27.VII.1980, 7-10.VIII.1980 (Genitalia slide no. 91/315, HUEMER), 5.VII.1983, 22.VII-4.VIII.1984 (KARSHOLT); 1 ♂, 1 ♀, NEJ, Læsø, Østerby, 1, 4.VIII.1979 (KARSHOLT) (ZM). **France:** 1 ♂, 1 ♀, Dep. Nord, Douai, 14.VIII.1872 (FOUCART) (BMNH). **Germany:** lectotype of *continuella* as above; 1 ♀ (*continuella* paralectotype); 3 ♂, Sachsen, Niesky, 19.VIII.1853, 5.IX.1857 (CHRISTOPH); 1 ♂, Bayern, Nürnberg, 21.VIII (HOFMANN); 1 ♂, 1892 (BMNH); 1 ♂, Niedersachsen, Dannenberg, Pevestorf, 5- 8.VIII.1957 (DE LATTIN). **Austria:** 1 ♂, Nordtirol, Umhausen, 25.VI.1951 (BURMANN) (genitalia slide no. GEL 20; TLMF). **Poland:** Silesia, 'Gnadenfeld', 19.VIII.1851 (CHRISTOPH); 3 ♂, 1 ♀, Szczecin ('Stettin'), 1891 (genitalia slide no. 15.212; NM); 2 ♂, Szczecin ('Altdamm'), 17 + 28.VII.1890 (BMNH; NM). **Latvia:** 1 ♀, Riga (TEICH) (BMNH); 1 ♂, Skaune, 8.VIII.1972 (ŠULCS) (coll. ŠULCS, Riga). **Russia:** 7 ♂, 1 ♀, Yukanski, Murmansk, Kola, 12.VII-5.VIII.1917 (COCKAYNE) (BMNH); 1 ♂, Irkutskaya Oblast, Hamar-Daban, Pik Tsherskogo, 2000 m, 23.VII.1984 (MIKKOLA & VIITASAARI); 2 ♂, Altayskiy Kray, 15 km s Katanda, Bert-Kum, 2000-2500 m, 9-14.VII.1987 (MIKKOLA, HIPPA & JALAVA); 3 ♂, Magadanskaya Oblast, upper Kolyma river, 500 m, 7- 9.VII.1990 (KULLBERG, KUUSAARI & NIEMINEN) (ZMUH). **Canada:** 1 ♂, 6 ♀, Ontario, Bell's Corners near Ottawa, 16.VII-12.VIII.1965 (SATTTLER); 1 ♂, Ontario, Charlton, VIII.1932 (BMNH); 1 ♂, Yukon T., 20 km SE of Whitehorse, 16.VII.1985 (MIKKOLA) (ZMUH). **USA:** 1 ♂, New Hampshire, Mt. Washington, 1850 m, 3.VIII.1985 (MIKKOLA) (ZMUH).

Chionodes perpetuella (HERRICH-SCHÄFFER, 1854)

(Figs 23, 24, 94, 130, 155, 184)

Gelechia perpetuella HERRICH-SCHÄFFER, 1854, Syst. Bearb. Schmett. Eur. 5: 162 [key], 180; 1853, ibidem, 5: pl. 69, fig. 511 [non-binominal]. Lectotype ♂, Switzerland (genitalia slide no. 261a, SATTTLER; ZMHU), designated by SATTTLER (1960: 39) [examined].

Adult (Figs 23, 24). ♂, 8.3-10.0 mm; ♀, 7.5-7.7 mm. Head greyish brown. Second segment of labial palpus cream, mottled dark brown on outer surface, third segment blackish brown with some white scales. Thorax and tegula blackish brown. Fore wing blackish brown, mottled with lighter scales; white markings well developed: patch from fold to subcosta at one-fifth, medial patch at one-half, small dot at about middle of fold, separated costal and tornal spots at four-fifths; discal, discocellular and plical spots indistinct; termen with white dots; fringe blackish brown basally, distal part light brown. Hind wing light grey.

Pregenital abdomen ♂ (n=5). Tergite VIII at most length of sternite, broadly lanceolate to evenly tapered, apex pointed or rounded; anterior emargination broadly arched or inverted U- shaped, depth about one-third overall length of tergite. Sternite VIII with posterior margin moderately concave; lateral margins straight, parallel or slightly diverging posteriorly; anterior apophysis short, weakly to distinctly constricted near base, distally concave.

Genitalia ♂ (Figs 94, 130) (n=5). Overall length 1.7-1.8 mm. Uncus (0.32-0.34 x 0.37-0.39 mm) short, rather small, rounded, sub-triangular. Gnathos hook weak, distinctly curved distally. Costa (0.68-0.76 mm) bent basally, distal part straight, apex almost level with gnathos base. Sacculus (0.40-0.55 mm) distinctly shorter than costa, almost straight, about same width as costa. Saccus (0.65-0.70 mm) short, broad, strongly tapered basally, distal quarter with parallel margins. Aedeagus (1.70-1.98 mm) slender, almost straight, apex with large rounded sclerite, coecum (0.62-0.68 mm) slightly curved.

Genitalia ♀ (Figs 155, 184) (n=1). Apophyses posteriores 3.3 mm. Apophyses anteriores (0.68-0.70

mm) about length of segment VIII, sub-triangular, basally broad, distal part evenly tapered to narrow, rod-like distal quarter. Antrum (0.67 mm) long, broad, tubular, about one-third width of segment VIII basally, about width of apophysis anterior basally, slightly shorter than apophysis anterior. Bursa copulatrix pyriform to barrel-shaped, not differentiated into ductus and corpus bursae. Signum at anterior quarter of bursa copulatrix, strongly reduced.

Remarks. *C. perpetuella* is very similar to *continuella* and *nebulosella* externally but can easily be distinguished by the greyish brown rather than cream head. The genitalia differ from those of the closely related *continuella* by the shorter sacculus, slimmer aedeagus and much narrower apophyses anteriores.

G. perpetuella was described from two specimens (sex not stated) from Switzerland. In coll. STAUDINGER (ZMHU) there are two males originating from HERRICH-SCHÄFFER, neither with locality information; however, it is assumed that they are the syntypes. Whilst the lectotype agrees with the general concept of *perpetuella* the paralectotype (genitalia slide no. 153 c, SATTTLER) represents *nebulosella* (HEINEMANN).

Gelechia perpetuella ZELLER (1839: 198, under *continuella*) is a nomen nudum and thus unavailable.

Biology. Host-plant and early stages unknown. BURMANN (1977: 141) flushed the adults from rocks covered in mosses and lichens, the host-substrates of *continuella*, *fumatella* and *ignorantella*; the larva of *perpetuella* may inhabit one of these substrates. The males are attracted to the light. The adult occurs in early VI - late IX, mostly mid-VII - mid-VIII, apparently in a single long drawn-out generation. Vertical distribution: 1100-2700 m (BURMANN, 1977: 141), exceptionally as low as 400 m (Slovenija).

Distribution. Alps (France, Germany, Switzerland, Austria, Italy, Slovenija).

Also recorded from the lower *Pinus mugo pumilio* zone, about 1500-1700 m, of the Tatry mountains (Polish/Slovak border region) (NOWICKI, 1865: 187; 1868: (121)). The occurrence of *perpetuella* in the Tatry mountains is not impossible; however, corroboration is required because all subsequent authors (e.g. ZEBRAWSKI, 1867: [157], and STACH, 1936: 189, 212) merely refer to NOWICKI and we were unable to trace authentic material. A record from the Czech Republic (Böhmerwald) (SOFFNER, 1930:129) likewise requires confirmation.

Dubious record. An isolated record from Latvia (TEICH, 1889: 109) is almost certainly incorrect.

Material examined (including 4 ♂, 1 ♀ genitalia preparations)

France: 2 ♂, Dep. Alpes-Maritimes, Marguareis, Navela, 2100-2200 m, 21.-23.VII.1990 (HUEMER & TARMANN); 1 ♂, Dep. Alpes-Maritimes, Cime Seneca, 2450 m, 20.VII.1991 (HUEMER & TARMANN) (genitalia slide no. GEL 282; TLMF); 6 ♂, Dep. Alpes-du-Haute-Provence, SW. Castel du Restfond, St. de Caire Brun N., 2420 m, 25.VII.1990 (HUEMER & TARMANN) (TLMF); 1 ♂, Dep. Al pes-du-Haute-Provence, Maurin, 18.VIII.1932 (FASSNIDGE); 1 ♂, Dep. Hautes-Alpes, Nevache, 26.VIII.1938 (FASSNIDGE) (BMNH); 2 ♂, Dep. Hautes-Alpes, Pelvoux, 1850 m, E.VIII.1973 (ZÜRNBAUER); 1 ♂, Dep. Hautes-Alpes, Col de Galibier, 2400 m, E.VIII.1973 (ZÜRNBAUER) (TLMF). **Switzerland:** lectotype as above; 1 ♂, Meyenwand (BOLL); 3 ♂, Graubünden, Engadin (FREY; STAUDINGER); 2 ♂, Graubünden, Pontresina, 28.VII.1870; 1 ♂, Graubünden, Bergün, 25.VII.1871 (ZELLER) (BMNH); 8 ♂, Graubünden, Umbrail, 2100 m, 22., 31.VIII.1987 (BURMANN, HUEMER & TARMANN); 1 ♂, Graubünden, Stavelchod, 27.VII.1931 (THOMANN); 1 ♂, Graubünden, A. Muranza, 2400 m, 19.VII.1936 (THOMANN) (TLMF); 1 ♂, Valais, Simplon, VII.1892; 1 ♂, Valais, 10.VIII.1906 (NM); 1 ♂, Valais, Bourg St. Pierre, 3-4.VII.1993 (HOARE); 3 ♂, Valais, Saas Fee, 1700-2100 m ('5500-7000 feet'), 18., 22.VIII.1900, 14.VII.1959 (JACOBS), 14.VII.1961; 3 ♂, Valais, Arolla, 2000 m ('6500 feet'), VII.1900 (TUTT), 17-29.VIII.1925 (FLETCHER); 1 ♂, Valais, Berisal, 1500 m ('5000 feet'), 21.VII.1926 (FLETCHER) (BMNH). **Austria:** 2 ♂, Osttirol, Schobergruppe, Schleinitz, Stanis Alm, 2000 m, 25.VII.1985, 28.VIII.1991 (TARMANN); 1 ♂, Osttirol, Schobergruppe, Oberwaldsteig bei Lottknöpfen, 2240 m, 9.VIII.1988 (TARMANN); 1 ♂, Osttirol, Schobergruppe, E of Alte Thurner Alm, 31.VIII.1991 (TARMANN); 3 ♂,

Osttirol, Venedigergruppe, Virgental, Hinterbichl, 1530 m, 9.VII.1993 (HUEMER); 2 ♂, Osttirol, Venedigergruppe, Virgental, Essen-Rostocker-Hütte, 2200 m, 2.VIII.1993 (RAKOSY); 5 ♂, Osttirol, Venedigergruppe, Virgental, Essen-Rostocker-Hütte, 2240 m, 6.VIII.1993 (RAKOSY); 1 ♂, Osttirol, Venedigergruppe, Virgental, Essen-Rostocker-Hütte, 2050 m, 9.VIII.1993 (RAKOSY); 1 ♂, 3 ♀, Osttirol, Venedigergruppe, Virgental, Malhambach, 2230 m, 7-8.VIII.1993 (RAKOSY); 1 ♀, Osttirol, Venedigergruppe, Virgental, Malhambach, 2350-2450 m, 3.VIII.1993 (RAKOSY); 1 ♀, Nordtirol, Vennatal, 1400 m, 7.VII.1968 (HERNEGGER) (genitalia slide no. GEL 313; TLMF); 1 ♂, Nordtirol, Obergurgl, 1950 m, 22.VIII.1987 (HUEMER); 1 ♂, Nordtirol, Sölden, Gaislachalm, 2000 m, 23.VII.1956 (SÜSSNER); 13 ♂, Nordtirol, Rettenbachtal, 2600 m, 10., 14., 21.IX.1987, 6.VIII.1988 (BURMANN & HUEMER) (TLMF). **Slovenija:** 1 ♂, Nanos, 29.IX.1983 (DEUTSCH) (TLMF). **Italy:** 1 ♂, Südtirol, Stelvio (FREY) (BMNH); 1 ♂, Südtirol, Schluderbach, 1876 (MANN) (NM); 1 ♂, Adamello, Rif. Mandron, 2500 m, M.VIII.1958 (BURMANN); 1 ♂, Piemonte, Colle di Sestrières, 2100-2700 m, 1-6.VIII.1937 (ZERNY); 1 ♂, Piemonte, Val d'Aosta, Valsavaranche, 1500 m, VIII.1927 (DELLA-BEFFA) (TLMF); 1 ♀, Piemonte, Alpi Cozie, Sestriere, 20.VII.1952 (PROLA) (BNMH).

Chionodes apolectella (WALSINGHAM, 1900)

(Figs 25, 95, 96, 131, 156, 185)

Gelechia apolectella WALSINGHAM, 1900, Entomologist's mon. Mag. 36: 216. Holotype ♂, France: Corsica, Vizzavona, 11.VI.1899 (WALSINGHAM) (genitalia slide no. 5048; BMNH) [examined].

Adult (Fig. 25). ♂, 6.3-8.0 mm; ♀, 6.3 mm. Head cream. Second segment of labial palpus cream, third segment brown with some cream scales. Thorax and tegula rust-brown. Fore wing rust-brown, more or less intensely mottled cream, distal third mottled dark brown; cream markings irregularly extended, well developed: broad patch from fold to subcosta at one-fifth, medial patch at one-half, separated costal and tornal spots at four-fifths; light markings more or less mottled rust-brown; distinct dark brown markings: basal spots, patch from fold to costa at one-quarter, small spot at about two-fifths in cell, larger spot at three-fifths medially; fringe light brown with darker central line. Hind wing light grey.

Pregenital abdomen ♂ (n=3). Tergite VIII shorter than sternite, narrow, gently tapered, apex rounded; anterior emargination regularly arched, depth about one-third overall length of tergite. Sternite VIII with posterior margin weakly concave, lateral margins gently curved; anterior apophysis broad, distally truncate, slightly constricted medially.

Genitalia ♂ (Figs 95, 96, 131) (n=2). Overall length 1.6 mm. Uncus (0.22 x 0.29-0.33 mm) short, greatest width near base, distal part sub-triangular. Gnathos hook weak, slightly bent apically. Costa (0.64-0.66 mm) straight basally, strongly bent at distal third, apex about level with tip of gnathos, straight basally, strongly bent at distal third. Sacculus (0.54-0.58 mm) straight, about same width as costa. Saccus (0.54-0.58 mm) broad, gently tapered, lateral margin slightly irregular. Aedeagus (1.74-1.90 mm) long, slender, straight, apex with large rounded sclerite, end of coecum (0.55-0.64 mm) slightly swollen.

Genitalia ♀ (Figs 156, 185) (n=1). Apophyses posteriores 2.8 mm. Anterior margin of tergite VIII broadly emarginated. Apophyses anteriores (0.65 mm) slightly longer than segment VIII, separated by broad membranous zone, basally broad, evenly tapered to rod-like distal part, outer margin slightly concave, inner margin almost straight. Antrum (0.70 mm) long, broad, weakly

funnel-shaped, near base about 1.5 times width of apophysis anterior at same level, distally about level with apex of apophysis anterior. Bursa copulatrix broadly pyriform, with short ductus bursae. Signum in fundus bursae, narrow, sub-rectangular; anterior transverse ridge indistinct, posterior ridge absent.

Remarks. *C. apolectella* is easily recognized by the colour of the head, labial palpus and particularly the fore wing; it was compared by WALSINGHAM with *electella* which it somewhat resembles externally. SCHAWERDA (1936: 80) described the only known Sardinian specimen as darker than those from Corsica.

Biology. Host-plant and early stages unknown. The type-specimens (15 males) were flying early in the morning above *Juniperus sabina* L. (Cupressaceae). Vertical distribution: inadequate data.

Distribution. Corsica. Also recorded from Sardinia (SCHAWERDA, 1936: 80).

Material examined (including 3 ♂, 1 ♀ genitalia preparations)

France: holotype as above; 11 ♂ (paratypes), Vizzavona, 11.VI.1899 (WALSINGHAM); 22 ♂, Vizzavona, 12.VI.1899 (WALSINGHAM) (BMNH); 1 ♂ (paratype), Corsica, 11.VI.1889 (WALSINGHAM) (genitalia slide no. 15.211; NM); 1 ♂, Corsica, 1886 (CONSTANT) (genitalia slide no. 15.210; NM); 1 ♀, Corsica, Ascotal, 250 m, M.VI.1972 (ZÜRNBAUER) (genitalia slide no. GEL 114; TLMF).

Chionodes distinctella (ZELLER, 1839)

(Figs 26-29, 61, 97, 98, 132, 157-159, 186-188)

Gelechia distinctella ZELLER, 1839, Isis, Leipzig 1839: 199. Lectotype ♂, Poland: Zielona Góra, Głogów ('Glogau'), VI. (ZELLER) (genitalia slide no. 4926; BMNH), here designated [examined].

Gelechia striolatella HEINEMANN, 1870, Schmett. Dtl. Schweiz (2)2: 204. Syntype ♂, [Germany: Niedersachsen, Braunschweig] (HEINEMANN) [not examined]. [Synonymized by REBEL, 1901: 143, with '?'; Meyrick, 1925: 82.]

Gelechia tristella TEICH, 1889, Arb. NatForschVer. Riga (N.F.) 6: 108. Syntypes (2, sex not stated), Latvia: near Riga ('Kurtenhof'), 24.V. (TEICH) [not traced, probably destroyed]. [Synonymized by REBEL, 1901: 143.]

[*Gelechia decolorella* ab. *colorella* CARADJA, 1920, Dt. ent. Z. Iris 34: 98. Holotype ♂, Tajikistan/Kyrgyzstan: Alayskiy Khrebet ('Alaigebirge'), 3000 m, [1903] (KORB) (genitalia slide no. 91/220, HUEMER; MINGA). Unavailable (infrasubspecific) name. Misidentification].

Gelechia distinctella var. *indistinctella* REBEL, 1901, in STAUDINGER & REBEL, Cat. Lepid. palaeart. Faunengebieten 2: 143. Lectotype ♂, Algeria: Tenied el Had (ZMHU), here designated [examined]. **Syn. n.**

Gelechia distinctella subsp. *latiorella* AMSEL, 1939, in HARTIG & AMSEL, Mem. Soc. ent. ital. 17: 71. Lectotype ♂, Italy: Sardinia, Aritzo, 27.VII.1936 (AMSEL) (genitalia slide no. 91/299 HUEMER; LN), here designated [examined]. **Syn. n.**

Gelechia distinctella subsp. *unicolor* TOLL, 1948, Z. wien. ent. Ges. (32. Jg) 58: 113, pl. 4, fig. 21. Lectotype ♂, Iran: Khorasan, Kuh-i-Mirabi, 2000 m, VII-VIII.1938 (KOTZSCH) (genitalia slide no. 1296, TOLL; ISEA), here designated [examined]. **Syn. n.**

Chionodes deserticola PISKUNOV, 1979, Nasekom. Mongol. 6: 396, fig. 2. Holotype ♀, Mongolia: Uvs, Uvs Nuur aimak, 50 km E of Ulaangom, 5.VIII.1970 (KERZHNER) (genitalia preparation no. 14761=91/293, HUEMER; ZIAN) [examined]. **Syn. n.**

Adult (Figs 26-29). ♂, 7.3-8.7 mm; ♀, 7.5-9.8 mm. Head light to dark brown, frons lighter. Second

segment of labial palpus light to mid-brown, speckled with dark brown on outer surface, inner surface whitish brown; third segment intensely speckled with dark brown. Thorax and tegula light to dark brown, frequently mottled orange-brown. Fore wing from almost unicolorous light to dark brown, frequently mottled orange-brown, particularly dorsum; discal, discocellular and plical spots indistinct, dark brown, occasionally reduced, sometimes lined with white scales; costal and tornal spots at four-fifths orange-brown to white, indistinct, separated, occasionally reduced; fringe mid-brown, with dark brown scales basally, distal half light brown. Hind wing light grey to grey-brown.

Pregenital abdomen ♂ (n=9). Tergite VIII as long as sternite, more or less evenly tapered; anterior emargination broadly arched, depth about one-third to one-half overall length of tergite. Sternite VIII with posterior margin moderately concave medially; lateral margins convex, sternite widest at middle. Anterior apophysis slightly to distinctly constricted near base, distally truncate to weakly convex.

Genitalia ♂ (Figs 61, 97, 98, 132) (n=9). Overall length 2.1-2.4 mm. Uncus (0.32-0.38 x 0.42-0.57 mm) short, broad, sub-triangular to oval. Gnathos hook short, weak, distinctly bent. Costa (0.65-0.76 mm), apex about level with tip of gnathos, slightly bent at basal third, distally straight. Saccus (0.48-0.61 mm) straight to slightly curved, about same width as costa. Saccus (0.70-0.86 mm) gently tapered. Aedeagus (1.91-2.29 mm) long and slender, straight, apex with large rounded sclerite, coecum 0.60-0.75 mm.

Genitalia ♀ (Figs 157-159, 186-188) (n=10). Apophyses posteriores 3.5-4.3 mm. Anterior margin of tergite VIII slightly emarginated, weakly sclerotized. Apophyses anteriores (0.66-0.74 mm) long, broad, sub-triangular, slightly longer than segment VIII, broad basally, evenly tapered distally, outer and inner margin slightly convex to straight. Antrum (0.74-1.00 mm) long and broad, tubular, near base about width of apophysis anterior at same level, slightly to distinctly longer than apophysis anterior. Bursa copulatrix not differentiated into ductus and corpus bursae, long narrow, widest in anterior quarter. Signum indistinct, variable, reduced to very small, moderately dentate plate, sometimes absent.

Remarks. *C. distinctella* is a rather variable species; MEES (1910: 361) used the names *striolatella* HEINEMANN, *praeclarella* (sensu) HEINEMANN and *tenebrosella* TEICH to denote various colour forms. Specimens from Iran and Afghanistan are usually characterized by their light grey-brown rather than brown head, thorax and fore wings with reduced wing markings. This form has been described as *distinctella unicolor* by TOLL (1948: 113); however, a comparison of a long series from that area with specimens from central Europe has shown that intermediates occur in both areas. Thus we do not consider it justified to retain *unicolor*, or the strongly marked forms of the Mediterranean area (*latiorella* and *indistinctella*) as subspecies.

Two slightly rubbed females from south-eastern Tibet differ from European *distinctella* in the much broader apophyses anteriores and the complete absence of a signum. Their antrum distinctly exceeds the apophyses anteriores, in one specimen even more so than in the other, but in neither more than in some European specimens.

G. distinctella was described from an unspecified number of specimens (sex not stated) from Glogau, where ZELLER observed the adults in VI commonly on trunks of pine trees. A male bearing a faded green label '*distinctella* Z.' in ZELLER's handwriting is undoubtedly one of ZELLER's oldest specimens. It was previously labelled as 'Type' in BMNH and is here formally designated as the lectotype; no further likely syntypes were traced.

G. striolatella was described from an unspecified number of specimens from Braunschweig. A single specimen, probably a male, in HEINEMANN's collection (NL) bears the labels 'Brschw' and '*striolatella*'; it was seen by K.S. and on superficial inspection appeared to be *distinctella*.

Confirmation by detailed examination is still required.

G. tristella was described from two specimens (sex not stated) collected in the evening on 24.V. in a bog at Kurtenhof, Latvia. No authentic material was traced; TEICH's collection, originally preserved in Riga, was destroyed in the 1939-45 war. REBEL (1901: 143), as the first revisor, placed *tristella* with '?' in synonymy under *distinctella*; this interpretation is here accepted with some reservation, because the date of capture is too early for *distinctella*.

G. distinctella latiorella was described from 13 specimens (sex not stated) collected in Sardinia by AMSEL. We have examined three syntypes; a male labelled 'Typus' by AMSEL is here designated as the lectotype.

G. distinctella unicolor was described from 4 specimens (sex not stated) collected in Iran by KOTZSCH. From the two syntypes which have been examined, the male is here designated as the lectotype.

C. deserticola was described from a single Mongolian female. The main difference to *distinctella* was supposed to be the unusual length of the antrum (PISKUNOV, 1979: 376); however, an examination of a longer series from Asia indicates that this character is quite variable within a single population and does not justify the separation of such forms from *distinctella*.

Biology. There are no reliable recent observations on the biology of *distinctella*. Most literature records are based on isolated observations made about 100 years ago, and all recorded host-plants require confirmation. Were the larva polyphagous, as the range of host-plants below appears to indicate, it would surely have been observed with some regularity. The lack of observations suggests that it occupies a niche rarely explored by microlepidopterists, for example grass roots.

Moss. Larva in spring in a silken tube amongst moss, particularly where it grows on rocks in dry places (RAGONOT, 1875: 145; RÖSSLER, 1882: 291; STANGE, 1899: 23).

Genista (Papilionaceae). Larva in V, VI between spun leaves (HARTMANN, 1880: 15, *G. tinctoria*) or in a silken tube on the ground (DISQUÉ, 1908: 79).

Artemisia campestris L. (Compositae). Larva in III-V amongst the shoots (DISQUÉ, 1907: 67; 1908: 45); in III-IV in spun tube on the lowest leaves (MEESS, 1910: 361); in IV-VI in spun tube under the plant (BENANDER, 1928: 68).

Thymus (Labiatae). Larva suspected by RÖSSLER ([1867]: 342) to feed on this plant; later dropped (RÖSSLER, 1882: 291) but repeated by REUTTI (1898: 244).

Larva off white with many light brown longitudinal lines and delicate black spots; head, prothoracic and anal shields black (MEESS, 1910: 361). - Larva brownish red with whitish dorsal, subdorsal, supraspiracular and subspiracular lines; head, prothoracic and anal shields, thoracic legs and pinacula black (BENANDER, 1928: 68). The ovum is unknown and the pupa is undescribed. The adult occurs in VI - early X, probably in a single generation. Both sexes are attracted to the light and adults were also observed commonly feeding in the flowers of *Chrysanthemum vulgare* (L.) BERNH. (Compositae) in the daytime (STANGE, 1899: 23). Vertical distribution: from sea-level to 3600 m (Afghanistan).

Distribution. Common throughout Europe but absent from Iceland and arctic Fennoscandia. North Africa (Morocco, ?Mauritania, Algeria), Asia (Turkey, Syria, Iran, Afghanistan, Russia, Tajikistan/Kyrgyzstan, Mongolia).

Material examined (including 9 ♂, 10 ♀ genitalia preparations)

Britain (England): 1 ♂, 8 ♀, Norfolk, Merton, 19.VII.1886, 3 + 29.VII.1897, 18.VII.1891 (Walsingham); 1 ♂, 1 ♀, Kent, Deal, 15.VI + 20.VII.1875 (BMNH). **Denmark:** 1 ♀, WJ, Dejbjerg Hede, 22.VIII.1987 (KARSHOLT); 1 ♂, SZ, Skibinge, 29.VI.1974 (KARSHOLT); 1 ♂, LFM, Ulfshale, 19-22.VII.1987 (KARSHOLT) (ZM). **Spain:** 1 ♂, Prov. Granada, Marbella, El Mirador, 17.V.1969 (TRAUGOTT-OLSEN) (ZM); 1 ♂, 3 ♀, Prov. Granada, Sierra Nevada, Road to Veleta, 2000-2300 m, 19-23.VII.1962 (SATTTLER); 1 ♂, Prov. Granada, Sierra Nevada, Puerto de la Ragua, 1000 m, 25.VI.1968 (SATTTLER & CARTER); 1 ♂, Prov. Granada, Sierra de Alfacar, 1500 m, 9.VII.1962 (SATTTLER); 1 ♂, 1 ♀, Prov. Granada, Valley of Rio Fardes, W of Diezma, 1250 m, 14.VII.1962

(SATTLER) (BMNH); 1 ♂, 2 ♀, San Ildefonso, 20.VI-6.VII (MNHU). **France:** 1 ♂, Pyrénées, Val d'Ossoue, 1500 m, 12.VII.1961 (BURMANN) (BURM); 3 ♂, Pyrénées, Puymorens, VII.1955 (JACOBS); 1 ♂, Dep. Alpes-Maritimes, Authion, 1800 m ('6000 feet'), 15.VIII.1911 (WALSINGHAM); 1 ♀, Dep. Alpes-Maritimes, Col St. Michael, 29.VII.1913 (WALSINGHAM) (BMNH); 4 ♂, Dep. Alpes-Maritimes, Thiery, 4.VIII.1975 (DUJARDIN); 1 ♂, Dep. Alpes-Maritimes, Col de la Cayolle, 2300 m, 22-23.VIII.1953 (DUJARDIN); 1 ♂, 4 ♀, Dep. Hautes-Alpes, Prelles, 1200 m, VIII.1973 (ZÜRNBAUER) (TLMF); 2 ♀, Alpes-de-Haute-Provence, Uvernet, 4 + 6.VIII.1937 (FASSNIDGE); 3 ♂, 1 ♀, Dep. Alpes-de-Haute-Provence, Maurin, 3-18.VIII.1932 (FASSNIDGE); 1 ♀, Dep. Isère, Bourg d'Oisans, VIII.1896 (TUTT); 1 ♀, Dep. Savoie, Lanslebourg, VIII.1897 (TUTT); 2 ♂, Dep. Dauphiné, La Grave, VIII.1896 (TUTT); 1 ♂, Paris (RAGONOT) (BMNH). **The Netherlands:** 1 ♂, 1 ♀, Zandvoort, 22.VI.1936, 7.VII.1937 (BENTINCK) (BMNH). **Germany:** 1 ♂, Frankfurt; 1 ♂, Regensburg, 1889 (BMNH); 3 ♂, Württemberg, Alb, Härtsfeld, Großkuchen, 10.VII.1955 (SÜSSNER) (TLMF). **Switzerland:** 1 ♀, Graubünden, Landquart, 6.VIII.1917 (THOMANN); 1 ♀, Sta. Maria/Münstertal, 26.VII.1936 (THOMANN) (TLMF); 1 ♂, Graubünden, Engadin (FREY); 2 ♂, 2 ♀, Graubünden, Samedan, 25.VII.1876; 4 ♂, 2 ♀, Graubünden, Bergün, 28.VI + 19.VII.1871, 18.VII.1873 (ZELLER); 1 ♂, 1 ♀, Valais, Saas Fee, 1800-2100 m ('6000-7000 feet'), 12 + 18.VIII.1900; 1 ♀, Valais, Villar, VIII.1899 (TUTT) (BMNH). **Austria:** 1 ♂, 1 ♀, Burgenland, Breitenbrunn, 150 m, A.VI.1977 (ZÜRNBAUER) (TLMF); 1 ♀, Burgenland, W of Wallern, 6.VI.1954 (KASY) (NM); 1 ♀, Apetlon, 4.VIII.1955 (GLASER) (BURM); 7 ♂, 7 ♀, Burgenland, Zurndorfer Heide, 20.VII.1963 (GLASER); Niederösterreich, Kreuzstetten Neubau, 9.VIII.1952 (REISSER) (BMNH); 3 ♂, 1 ♀, Niederösterreich, Theresienfeld, 26.VII.1957 (genitalia slide no. GEL 86; TLMF); 27.VI.1963 (MALICKY); 1 ♀, Niederösterreich, Oberweiden, Marchegg, 21.VI.1903 (PREISSECKER); 2 ♀, Oberösterreich, Wegscheid, 16.VI + 11.VII.1921 (KNITSCHKE); 1 ♂, Oberösterreich, Gaumberg, 29.VII.1923 (KNITSCHKE); 1 ♂, 1 ♀, Kärnten, Gmünd, 600 m, 12.VII.1962, 12.VII.1963 (SÜSSNER); 3 ♂, Osttirol, Venedigergruppe, Virgental, Virgen-Obermauern, 1410 m, 8.VII.1993 (TARMANN); 10 ♂, 2 ♀, Osttirol, Venedigergruppe, Virgental, Virgen-Obermauern, 1400 m, 11-12.VIII.1993 (RAKOSY); 2 ♂, Osttirol, Venedigergruppe, Virgental, Virgen-Obermauern, 1400 m, 18.VIII.1993 (HUEMER); 1 ♂, Osttirol, Venedigergruppe, Virgental, Prägraten-Bichl, N- Fröbäch, 1580 m, 20.VIII.1993 (HUEMER); 1 ♂, Innsbruck, Ampass, 5.VII.1967 (HERNEGGER); 1 ♂, 1 ♀, Nordtirol, Serfaus, 1400 m, 16.VII.1958, 20.VII.1963 (SÜSSNER); 2 ♂, Nordtirol, Fließ, 7.VII.1975 (BURMANN); 4 ♂, 2 ♀, Nordtirol, St.Anton am Arlberg, 1400 m, 11-17.VII.1950 (SÜSSNER) (TLMF); 1 ♂, Nordtirol, Larstig Alm, 1600 m, 3.VII.1949 (KAPPELLER) (BMNH); 1 ♂, Nordtirol, Innsbruck, 28.VI.1941 (BURMANN); 2 ♂, Nordtirol, Umhausen, 16.VII.1945, 6.VII.1947 (BURMANN); 1 ♂, Nordtirol, Rofen, 2000 m, 4.VIII.1951 (BURMANN); 1 ♂, Vorarlberg, Zürs, 1800 m, 29.VI.1939 (BURMANN) (BURM; TLMF). **Italy:** lectotype of *latiorella* as above; 1 ♀, Piemont, Colle di Sestrières, 1800-2100 m, 23-31.VII.1937 (ZERNY) (TLMF); 1 ♂, Torino VIII.1888 (GIANELLI) (NM); 1 ♂, 1 ♀, Piemont, Courmayeur, 5.VIII.1917 (WALSINGHAM); 1 ♂, 1 ♀, Piemont, Au Pra, 2400 m ('8000 feet'), VIII.1901 (TUTT); 2 ♂, Südtirol, Trafoi (FREY); 1 ♂, 1 ♀, Südtirol, Mendel Pass, VIII.1895 (TUTT); 2 ♀, Südtirol, Passiria, Platt, 1100 m, 7.VIII.1963 (HARTIG); 1 ♂, Südtirol, Passiria, Septfluß, 1700 m, 18.VIII.1965 (HARTIG) (BMNH); 2 ♂, 1 ♀, Südtirol, Truden, 1000-1200 m, 10.VII.1961 (SÜSSNER); 3 ♂, Südtirol, Schnalstal, 800 m, VII.1967, early X.1968 (ZÜRNBAUER) (TLMF); 1 ♀, Südtirol, Auer, 200 m, 29.VIII.1990 (HUEMER & KARSHOLT); 1 ♂, 1 ♀, Prov. Verona, Mt. Baldo, above Prada, 1200 m, 22.VII.1989 (KARSHOLT) (ZM); 1 ♀, Mt. Baldo, 1800 m, late V.1966 (ZÜRNBAUER) (TLMF); 1 ♂, Abruzzi, 1908 (SOHN) (NM); 1 ♀, Lazio, Terminillo, 1800 m, 7.VII.1964 (HARTIG); 1 ♀, Sardinia, Belvi, Istiddi, 700 m, 14.VIII.1975 (HARTIG) (BMNH); 1 ♂, 1 ♀ (*d. latiorella* paralectotypes), Sardinia, Aritzo, Sacasa, 21+24.VII.1936 (AMSEL) (genitalia slide no. 91/299 + 91/300, HUEMER; LN). **Croatia:** 1 ♂, Senj ('Zengg'), 1-7.VII.1913 (DOBIASCH) (BMNH). **Bosna i Hercegovina:** 1 ♀, Bjelasnica, 11.VII.1898 (REBEL); 1 ♂, Prenj, 17.VII.1898; 2 ♂, 2 ♀, Vuclja bara, VII.1909 (WAGNER) (genitalia slide no. 14.337; NM). **Montenegro:** 1 ♂, Cetinje, VII.1908 (REBEL) (NM). **Albania:** 1 ♂, Bize b. Shengjergji, 1400-1500 m, 10-15.VII.1961; 3 ♀, Thethi,

Shalabach-valley, 900-1200 m, 1-4.VIII.1961 (DEI); 1 ♂, Monastir; 1 ♂, Korab, 23-31.VII.1916; 1 ♂, Gjalica Ljums, 17- 26.VI.1918; 1 ♀, Kiruma, 4.VII.1918 (NM). **Hungary:** 1 ♂, Retyezáth, 400-600 m ('1200-1800 feet'), 6-7.VII.1937 (LIPTHAY) (BMNH). **Rumania:** 1 ♀, Periprava, Pád. Letea, 22.VI.1966 (POPESCU-GORJ); 1 ♂, 1 ♀, Agigea, 23.VI.1964, 13.VI.1965 (POPESCU-GORJ); 1 ♀, Carmen-Sylva, 20.VII.1931 (POPESCU-GORJ); 1 ♂, Timisoara, Casa verde, 31.VII.1944 (OSTROGOVICH) (MINGA). **Bulgaria:** 1 ♂, 1 ♀, Nessebar, 23.VIII-4.IX.1962, 17-31.VII.1963 (SOFFNER); 1 ♂, Nessebar, 12-13.VI.1969 (COGAN & VANE-WRIGHT); 2 ♀, Samokor, VII.1911 (BMNH). **Greece:** 1 ♀, Drama, Mt. Phalakron, above Volas, 6.VII.1986 (FIBIGER); 4 ♂, 1 ♀, Ioannina, Katara Pass, 1600 m, 11.VII.1985 (FIBIGER) (ZM). **Poland:** lectotype of *distinctella* as above; 1 ♂, Szezcin, Torney, 16.VI.1890 (HERING) (ISEA); 2 ♂, 1 ♀, Silesia (STAUDINGER) (BMNH). **Latvia:** 1 ♂, Riga (TEICH); 1 ♂ (BMNH). **Belorussia:** 1 ♂, Minsk, 15.VII-15.VIII.1941 (LN). **Russia:** 4 ♂, 7 ♀, Krasnoarmeysk ('Sarepta') [40 km S of Volgograd], 6.VII.1861, 6.VI.1864, 9.VI.1868, 9.VIII.1871 (CHRISTOPH), without data (BMNH; ZM); 1 ♀, Siberia, Talmenka (Barnaul), 8-9.VII.1967 (ZOUHAR) (ZM). **Turkey:** 1 ♂, Nemrut Dagı, 2100-2450 m, 30.VII-1.VIII.1988 (VAN OORSCHOT et al.) (BMNH); 1 ♂, Prov. Ankara, 20 km NW of Kizilcaha-mam, 1200 m, 24.VII.1986 (FIBIGER); 1 ♂, 15 km S of Erzurum, 3000 m, 20.VII.1989 (FIBIGER & ESSER); 1 ♂, Erzincan, Kizildag, 2100 m, 18.VII.1989 (FIBIGER & ESSER); 17 ♂, 2 ♀, Prov. Kayseri, 5 km NW of Ercios Dagı, 2000 m, 22.VII.1986 (FIBIGER) (ZM). **Syria:** 3 ♀, [Haleb,] Shar Deresy ('Shar Devesy') (BMNH). **Iran:** lectotype of *unicolor* as above; 1 ♀ (*d. unicolor* paralectotype), Khorasan, Kuh-i Mirabi, 2000 m, VII-VIII.1938 (KOTZSCH) (ISEA). **Afghanistan:** 8 ♂, 2 ♀, Badakhshan, Sarekand, 3500-3600 m, 23-26.VII.1953 (KLAPPERICH) (BMNH; LN); 1 ♂, 1 ♀, SE of Kabul, Khurd-Kabul, 1900 m, 18.VI.1965 (KASY & VARTIAN); 3 ♂, Band-i-Amir, 3000 m, 30.VII.1963 (KASY & VARTIAN) (NM); 1 ♂, Band-i-Amir, 2900 m, 24-26.VII.1966 (AMSEL); 2 ♂, Koh-i-Baba, Shah-tu-Pass, 3000 m, 17-19.VII.1966 (AMSEL) (genitalia slide no. 91/227, HUEMER; LN); 4 ♂, 1 ♀, Khinjan, Salang Pass, 2100 m, 5-11.VII.1966 (AMSEL) (LN). **Tajiki-stan/Kyrgyzstan:** holotype of *colorella* as above. **Mongolia:** holotype of *deserticola* as above; 3 ♂, 1 ♀, Central aimak, 11 km S of pass Zosijn davaa, 90 km S of Ulan-Batoor, 1650 m, 15.VI.1967 (KASZAB, no. 923); 2 ♂, 2 ♀, Central aimak, 26 km E of Somon Lun, 1180 m, 3.VII.1964 (KASZAB, no. 260); 1 ♂, Central aimak, 25 km E of Somon Lun, 1200 m, 25.VII.1968 (KASZAB, no. 1148); 1 ♂, Central aimak, Ulaan chodag, 16 km S of Somon Öndörschireet, 1500 m, 23.VII.1966 (KASZAB, no. 737); 2 ♂, Bulgan aimak, 9 km E of Somon Abzaga, 1300 m, 22.VII.1966 (KASZAB, no. 730); 1 ♂, Bulgan aimak, 5 km W of Somon Daschintschilen, 1140 m, 2.VII.1964 (KASZAB, no. 253); 1 ♂, Bulgan aimak, 11 km W of Somon Bajanuur, lake Bajan nuur, 1000 m, 24.VII.1968 (KASZAB, no. 1144); 9 ♂, Zavchan aimak, Choit church, 26 km ENE of lake Telmen nuur, 2150 m, 13.VII.1968 (KASZAB, no. 1103); 1 ♂, Uvs aimak, 6 km SW of Somon Baruuntuurun, river Chagilcagijn, 1350 m, 24.VI.1968 (KASZAB, no. 1011); 4 ♂, 1 ♀, Chövsgöl aimak, 4 km NW of Mördön, 1500 m, 19.VII.1968 (KASZAB, no. 1128); 1 ♂, Chövsgöl aimak, Alag Mort, 42 km NE of pass Chaldzan Sogotyń, river Tesijn gol, 1900 m, 14.VII.1968 (KASZAB, no. 1109); 1 ♂, Bajanchongor aimak, 90 km NE of Caganbulag, Echin gol, 950 m, 27-29.VI.1967 (KASZAB, no. 857) (BMNH; TM). **Morocco:** 1 ♂, Moyen Atlas, Bin-el-Quidane, 3-4.VII.1972 (FRIEDEL) (BURM). **?Mauritania:** 3 ♂ (STAUDINGER) (genitalia slide no. 14.334; NM) (BMNH; NM). **Algeria:** lectotype of *indistinctella* as above; 1 ♀, Région de Géryville, VI.1910 (POWELL); 2 ♂, Prov. Oran, Aflou, VI.1911 (POWELL) (BMNH); 1 ♀, Prov. Oran (ZM). Identity uncertain (see Remarks). **SE Tibet:** 2 ♀, Tsangpo valley, Tumbatse, 3400 m ('11000 feet'), 8.VIII.1924 (KINGDON WARD) (BMNH).

Chionodes hayreddini KOÇAK, 1986

(Figs 30, 62, 99, 133, 160, 189)

Chionodes hayreddini KOÇAK, 1986, Priamus 4: 57. (Objective replacement name for *Gelechia ochripalpella* FREY, 1880, nom. praeocc.). Type-information as for *G. ochripalpella*.

Gelechia ochripalpella FREY, 1880, Lepid. Schweiz :358. Lectotype ♂, Italy: Südtirol, above Trafoi, road to Stelvio, 1500 m ('etwa 5000') late VII/early VIII. (FREY) (BMNH), here designated [examined]. (Junior primary homonym of *Gelechia (Trichotaphe) ochripalpella* ZELLER, 1873 (Lepidoptera: Gelechiidae)).

Adult (Fig. 30). ♂, 8.8-9.4 mm; ♀, 7.2-8.5 mm. Head brown mixed with cream, frons cream. Second segment of labial palpus ochre, some brown scales dorsally; third segment brown with some ochre. Thorax and tegula mid-brown. Fore wing mid-brown, scales basally lighter; discal, discocellular and plical spots indistinct; ochre costal and tornal spots at four-fifths and one-half; ochre costal and tornal spots at four-fifths separate, occasionally almost confluent; fringe mid-brown, distally light brown. Hind wing brownish grey.

Pregenital abdomen ♂ (n=3). Tergite VIII shorter than sternite, variable, evenly tapered to broadly tongue-shaped, apex pointed to broadly rounded; anterior emargination regularly arched, depth about one-third to two-fifths overall length of tergite. Sternite VIII with posterior margin moderately concave, lateral margins variable, gently curved, straight or slightly concave at distal third; anterior apophysis broad, distally truncate to concave, medially constricted.

Genitalia ♂ (Figs 62, 99, 133) (n=3). Overall length 2.0 mm. Uncus (0.33-0.35 x 0.47-0.52 mm) short, broad, distal part sub-triangular with indistinct apical projection. Gnathos hook short, weak, distinctly bent. Costa (0.78-0.83 mm) strongly bent at basal third, distally straight, apex about level with tip of gnathos, strongly bent at basal third, distally straight. Sacculus (0.50 mm) short, straight, slimmer than costa. Saccus (0.65-0.79 mm) gently tapered, lateral margin almost straight. Aedeagus (1.85-2.05 mm) long and slender, apex with large rounded sclerite, coecum (0.55-0.65 mm) slightly curved.

Genitalia ♀ (Figs 160, 189) (n=1). Apophyses posteriores 3.3 mm. Anterior margin of tergite VIII slightly emarginated, weakly sclerotized. Apophyses anteriores (0.70-0.76 mm) long, rather broad, sub-triangular, slightly longer than segment VIII, broader basally, evenly tapered distally, outer and inner margin nearly straight. Antrum (0.67 mm) long, broad, tubular, near base reaching width of apophysis anterior at same level, distally almost level with apex of apophysis anterior. Bursa copulatrix not differentiated into ductus and corpus bursae, narrow, medially somewhat constricted. Signum at anterior quarter of corpus bursae, reduced to small irregularly shaped plate without transverse ridges.

Remarks. *C. hayreddini* can superficially be confused with several species, particularly *distinctella*, but it differs from all known Palaearctic *Chionodes*, except *flavipalpella* sp. n., by the ochre second segment of the labial palpus. The genitalia are very similar to those of *distinctella* and related species but can be distinguished by the shape of the uncus, the shorter costa, the broad base of the sacculus and the gradually tapered apophyses anteriores.

The abdominal segment VIII of the male is similar to that of *distinctella* but the tergite is slightly shorter and broader whilst the lateral margins of the sternite are more or less parallel and medially not so distinctly bulging. The anterior apophysis tends to be distally concave rather than convex as in *distinctella*. There is also a difference in the sclerotization of the pedunculi and anterior margin of the tegumen. In *hayreddini* the narrow anterior sclerotization closely follows the margin of the tegumen. In contrast, in *distinctella* the homologous sclerotization touches the anterior margin of the tegumen dorsally but then leaves it and runs in a straight line to about the middle of the pedunculi, thus delimiting on the anterior margin of the tegumen/pedunculi a triangle of lesser sclerotization that is not present in *hayreddini* (Figs 61, 62).

G. ochripalpella was described from two syntypes (sex not stated); both are males and are preserved in coll. FREY (BMNH); the specimen bearing FREY's label '*G. ochripalpella*. FREY. (ZELL. vid.) Trafoi.' is here designated as the lectotype. A doubtfully included specimen from Valais (leg. ANDEREGG) could not be traced.

Biology. Host-plant and early stages unknown. In the daytime the adult remains well hidden on vegetated rocks; rarely the male is flushed out of its concealment. Occasionally individuals are attracted to a light in their immediate habitat. The adult occurs in early-VI - early VIII. Vertical distribution: 1200-2200 m (BURMANN, 1977: 140).

Distribution. Alps (Austria, Italy), also Switzerland (Valais) (FREY, 1880: 358). The record from Rumania, Muntii Retezatului, Cioca, 1400 m (DIÓSZEGHY, 1930: 285) is unconfirmed.

Erroneous records. The record from Norway (GRØNLIEN, 1937: 29) has remained unconfirmed; this species is unknown in northern Europe and the name has been omitted from the current Norwegian list (OPHEIM, 1978). The specimen recorded from Turkey, Amasia (CARADJA, 1920: 97), has been examined; it is a male of *Aroga aristotelis* (MILLIÈRE).

Material examined (including 3 ♂, 1 ♀ genitalia preparations)

Austria: 1 ♀, Niederösterreich, Schneeberg, 21.VII.1914 (NEUSTETTER) (NM); 1 ♂, Niederösterreich, Payerbach, Grafenschlag, 3.VI.1935 (TLMF); 1 ♀, Steiermark, Eisenerz, 16.VII.1910 (ZERNY) (NM); 2 ♂, Kärnten, Heiligenblut Umg., 15-21.VI.1951, 18.VII-9.VIII.1954 (DE LATTIN); 1 ♂, Osttirol, Kals, Lesacher Riegel, 2000 m, 13.VII.1960 (SÜSSNER); 1 ♀, Osttirol, Kartitsch, 1600 m, 9.VII.1964 (SÜSSNER); 3 ♂, Osttirol, Venedigergruppe, Virgental, Maurertal, 1550 m, 22.VI.1993 (HUEMER); 1 ♂, Osttirol, Venedigergruppe, Virgental, Hinterbichl, 1530 m, 9.VII.1993 (HUEMER); 1 ♂, Osttirol, Venedigergruppe, Virgental, Prägraten-Bichl, 1550 m, 9.VI.1993 (HUEMER); 1 ♂, Nordtirol, Vennatal, 1400 m, 12.VII.1985 (BURMANN); 1 ♂, Nordtirol, Umhausen, Narrenkogel, 2100 m, 26.VI.1945 (BURMANN) (genitalia slide no. GEL 302; TLMF); 1 ♀, Nordtirol, Umhausen, 15.VI.1945 (Burmann) (genitalia slide no. GEL 303; TLMF); 1 ♂, Nordtirol, Pillermoor, 1500 m, 6.VII.1987 (BURMANN, HUEMER & TARMANN) (TLMF). **Italy:** lectotype of *ochripalpella* as above; 1 ♂ (*ochripalpella* paralectotype), [Südtirol, above Trafoi] (FREY) (BMNH); 1 ♂, 2 ♀, Südtirol, Stelvio, 15-16.VII.1875, 27.VII.1876 (WOCKE) (ZIAN); 2 ♂, Prov. Trentino, Sella-Gruppe, Piz Ciavazes S-Wand, 2150 m, 7.VIII.1991 (HUEMER) (TLMF).

Chionodes hinnella (REBEL, 1935)

(Figs 31, 63, 100, 134, 161, 190)

Gelechia hinnella REBEL, 1935, Z. öst. EntVer. 20: 12. Lectotype ♂, Spain: Avila, Sierra de Gredos, Garganta de las Pozas, 1900 m, 16.VII.1934 (REISSER) (genitalia slide no. 3022a; NM), designated by SATTLER (1960: 38) [examined].

Adult (Fig. 31). ♂, 7.5-8.5 mm; ♀, 7.3-7.8 mm. Head loamy brown, vertex grey. Labial palpus cream, mottled dark brown, particularly outer surface of second segment and third segment. Thorax and tegula loamy brown, thorax with grey longitudinal line. Fore wing loamy brown with or without weak greyish brown mottling; veins intensely covered with black scales, particularly R1-R5 and A1+2; fringe light greyish brown with dark cilia line. Hind wing light grey.

Pregenital abdomen ♂ (n=3). Tergite VIII shorter than sternite, more or less evenly tapered; anterior emargination broadly arched, depth about two-fifths overall length of tergite. Sternite VIII with posterior margin moderately concave to very broadly V-shaped, lateral margins slightly curved to straight, almost parallel; anterior apophysis broad, distally concave, medially constricted.

Genitalia ♂ (Figs 63, 100, 134) (n=3). Overall length 2.0 mm. Uncus (0.30-0.32 x 0.42-0.43 mm) short, broad, distal part sub-triangular with convex outer margin. Gnathos hook short, weak, distinctly bent. Costa (0.68-0.75 mm) slightly bent at basal third, distally straight, apex about level with tip of gnathos. Sacculus (0.39-0.45 mm) straight to slightly curved, about same width as costa. Saccus (0.63-0.70 mm) gently tapered. Aedeagus (1.80-2.00 mm) long, slender, straight, apex with large rounded sclerite, coecum (0.70 mm).

Genitalia ♀ (Figs 161, 190) (n=4). Apophyses posteriores 3.6 mm. Anterior margin of tergite VIII slightly emarginated, weakly sclerotized. Apophyses anteriores (0.72 mm) long, rather broad, sub-triangular, slightly longer than segment VIII, broader basally, evenly tapered distally, outer and inner margin nearly straight. Antrum (0.75 mm) long and broad, tubular, near base about width of apophysis anterior at same level, distally about level with apex of apophysis anterior. Bursa copulatrix not differentiated into ductus and corpus bursae, long, narrow, fundus slightly inflated. Signum absent; if present tiny, at anterior third of bursa.

Remarks. *C. hinnella* is easily recognized by the brown fore wings with characteristic black veins. The genitalia are almost indistinguishable from those of *distinctella* and related species.

Biology. Host-plant and early stages unknown. The adults are common in VII on slopes covered mostly by shrubby Genisteae; both sexes are attracted to the light (K.S., pers. obs.). Vertical distribution: 1800-2350 m.

Distribution. Spain (Castile, Sierra de Gredos).

Material examined (including 3 ♂, 2 ♀ genitalia preparations)

Spain: lectotype as above; 46 ♂, 27 ♀, Prov. Avila, Sierra de Gredos, Garganta de las Pozas, 1800 m, 11-19.VII.1970 (SATTLER & KIRBY) (genitalia slide no. GEL 310 + GEL 118; TLMF); 2 ♂, Prov. Avila, Sierra de Gredos, Risco Moreno, 2350 m, 24.VII.1970 (SATTLER & KIRBY) (BMNH; TLMF).

Chionodes bastuliella (REBEL, 1931)

(Figs 32, 64, 101, 135, 162, 191)

Gelechia bastuliella REBEL, 1931, Z. öst. Ent Ver. 16: 57. Lectotype ♀, Spain: Andalucia, Sierra Nevada, Puerto del Lobo, 2180 m, 18.VII.1930 (REISSER) (genitalia slide no. 3023; NM), designated by SATTLER (1960: 38) [examined].

Adult (Fig. 32). ♂, 6.2-6.5 mm; ♀, 6.2 mm. Head grey, frons whitish grey. Second segment of labial palpus white on inner surface, mottled mid-brown on outer surface, third segment dark brown with some lighter scales. Thorax and tegula greyish brown. Fore wing narrow, greyish brown, mottled with darker and lighter scales; with indistinct discal, discocellular and plical spots, the last dash-like; indistinct pale costal and tornal spots at four-fifths separate, the latter sometimes reduced; fringe light grey-brown with dark brown cilia-line. Hind wing light grey.

Pregenital abdomen ♂ (n=2). Tergite VIII shorter than sternite, narrow, evenly tapered; anterior emargination regularly arched, depth about one-third overall length of tergite. Sternite VIII with posterior margin moderately concave, lateral margins gently curved to straight, parallel; anterior apophysis long, distally truncate to weakly concave, slightly constricted medially.

Genitalia ♂ (Figs 64, 101, 135) (n=2). Overall length 1.7-1.8 mm. Uncus (0.26 x 0.35-0.36 mm) short, broad, distal part sub-triangular. Gnathos hook short, weak, distinctly bent. Costa (0.63-0.66

mm) slightly bent at basal third, distally straight, apex about level with tip of gnathos. Sacculus (0.42-0.47 mm) straight, thinner than costa. Saccus (0.75 mm) gently tapered, lateral margin slightly irregular. Aedeagus (1.72-1.80 mm) long, slender, straight, apex with large rounded sclerite, coecum (0.55-0.58 mm).

Genitalia ♀ (Figs 162, 191) (n=2). Apophyses posteriores 3.2 mm. Anterior margin of tergite VIII slightly emarginated, weakly sclerotized. Apophyses anteriores (0.58-0.67 mm) long and rather broad, sub-triangular, slightly longer than segment VIII, broader basally, evenly tapered distally, outer and inner margin nearly straight. Antrum (0.70-0.80 mm) long and broad, tubular, near base slightly broader than apophysis anterior at same level, distally slightly above level with apex of apophysis anterior. Bursa copulatrix not clearly visible in only available preparation, probably similar to that of preceding species, signum tiny.

Remarks. *C. bastuliella* is easily recognized by its small size and narrow fore wing. The genitalia are extremely similar to those of *distinctella* and related taxa.

The type-locality is close to a once much-used mule track that started in the village of Lacalahorra on the northern slopes of the Sierra Nevada and crossed the mountains somewhere west of the better known pass Puerto de la Ragua; the track is now disused and the name Puerto del Lobo forgotten, although the nearby peak that gave it its name is still known as Collado del Lobo. After unsuccessful attempts in 1960, 1962 and 1968 to find *bastuliella* in other parts of the Sierra Nevada, K.S. finally visited the type-locality in 1969. He followed instructions received from the original collector, the late H. REISSER of Vienna, but was shown the exact spot by Dr F. FERNANDEZ-RUBIO, Madrid, who in turn had been taken there a few years previously by the mule driver (recently deceased by the time of K.S.'s visit in 1969) who had guided REISSER in 1930. After several days' fruitless search, the species was finally discovered amongst a conspicuous outcrop of rocks, where REISSER used to shelter in a shallow cave during bad weather. Although *bastuliella* ought to be more widespread in the Sierra Nevada, it has not been found anywhere else except for a single male on the road to Veleta (2600 m).

Biology. Host-plant and early stages unknown. The adult occurs in VII. The small number of specimens known where netted at dusk or attracted to the light. The sparse field observations do not allow any speculation as to what the host-plant might be. Vertical distribution: about 2200-2600 m.

Distribution. Spain (Andalucia, Sierra Nevada).

Material examined (including 2 ♂, 2 ♀ genitalia preparations)

Spain: Lectotype as above; 16 ♂, 1 ♀, Prov. Granada, Sierra Nevada, Collado del Lobo North Side, 2300 m, 13-15.VII.1969 (SATTLER & CARTER) (genitalia slide no. 26.518; BMNH; genitalia slide no. GEL 309; TLMF); 1 ♂, Prov. Granada, Sierra Nevada, Road to Veleta, 2600 m, 11.VII.1969 (SATTLER & CARTER) (BMNH; TLMF).

Chionodes frigidella sp. n.

(Figs 33, 65, 102, 136)

Adult (Fig. 33). ♂, 9.6-10.8 mm. Head loamy brown. Labial palpus loamy brown to light brown, mottled darker brown on outer surface. Thorax and tegula loamy brown. Fore wing unicolourous loamy brown, without markings; fringe light brown, basally darker. Hind wing light grey-brown.

Pregenital abdomen ♂ (n=3). Tergite VIII shorter than sternite, evenly tapered, distally rounded; anterior emargination slightly pointed arch, depth about one-third overall length of tegumen. Sternite VIII with posterior margin shallowly concave, lateral margins very gently curved to almost straight,

parallel; anterior apophysis broad, distally truncate, very slightly constricted near base.

Genitalia ♂ (Figs 65, 102, 136) (n=3). Overall length 2.1-2.3 mm. Uncus (0.32-0.35 x 0.43-0.49 mm) short, greatest width near base, distal part sub-triangular with convex outer margin. Gnathos hook short, weak, distinctly bent. Costa (0.80-0.85 mm) strongly bent at basal third, distally straight, apex almost level with base of gnathos. Sacculus (0.58-0.65 mm) straight, slightly broader than costa. Saccus (0.78-0.85 mm) gently tapered, slightly irregular lateral margin. Aedeagus (2.16-2.26 mm) long, very thin, apex with large rounded sclerite, coecum (1.00-1.05 mm) very long, slightly curved.

Genitalia ♀. Unknown.

Remarks. *C. frigidella* sp. n. is somewhat similar to *praeclarella* externally but differs by the slightly smaller size, distinctly narrower fore wing and uniform ground colour.

Biology. Host-plant and early stages unknown. No information except the locality is given on the specimen labels. Vertical distribution: only known from about 3000 m.

Distribution. Mountains of Central Asia: (Tien Shan, Alayskiy Khrebet).

Material examined (including 3 ♂ genitalia preparations)

Holotype ♂, **Kyrgyzstan/China:** [Tien Shan,] 'Juldus' '*Gelechia decolorella* Hein.' (ZSBS).

Paratypes. **Kyrgyzstan/China:** 1 ♂, Tien Shan, Juldus (ZM). **Tajikistan/Kyrgyzstan:** 2 ♂, Alayskiy Khrebet ('Alai Tau') (genitalia slide no. 91/314, HUEMER; ZM) (NM; ZM).

The *fumatella*-group

Fore wing usually drab, dark grey, sometimes black with white fasciae or white with dark grey markings.

Genitalia ♂. Uncus oval, longer than wide, rarely sub-rectangular or sub-quadrate, with more or less prominent apical thorn. Tegumen rarely with parallel lateral margins, often anteriorly splayed, anterior margin broadly triangular, sclerotized edge narrow; pedunculi more or less angular or long, narrow. Gnathos hook weak, blunt, rarely strong, acute. Costa long, exceeding base of gnathos, sacculus reduced or very long, reaching base of gnathos. Aedeagus relatively short.

Genitalia ♀. Apophyses anteriores very broad, basal part fused medially, distally rounded or truncate, rarely tapered to short point. Antrum much shorter than apophyses anteriores. Signum reduced but usually at least posterior transverse ridge present.

Remarks. Whilst the uncus in most Palearctic *Chionodes* is a ventrally flat pad, that of most species in the *fumatella*-group has more or less strongly downwards-turned sides which have to be flattened during dissection. Our descriptions of the overall shape are based on the flattened uncus where applicable.

Chionodes species (incertae sedis)

(Figs 48, 103, 137)

Adult (Fig. 48). ♂, 9.2 mm; ♀, 6.3-6.7 mm. Head greyish brown. Fore wing greyish brown with dark discal, discocellular and plical spots, discocellular spot prominent. Hind wing greyish brown.

Pregenital abdomen ♂ (n=1). Tergite VIII as long as sternite, evenly tapered; anterior emargination broadly arched, depth about one-third overall length of tergite. Sternite VIII with posterior margin broadly concave, lateral margins strongly curved; anterior apophysis short, moderately broad, distally asymmetrical in only examined specimen.

Genitalia ♂ (Figs 103, 137) (n=1). Overall length 2.4 mm. Uncus (0.55 x 0.62 mm) large, long, broad, evenly rounded, clearly differentiated from tegumen. Gnathos hook strong. Costa (1.45 mm) very long, extremely strong, apex about level with middle of uncus, evenly curved. Sacculus (0.71 mm) short, straight, about half width of costa. Saccus (0.77 mm) broad, almost evenly tapered. Aedeagus (2.02 mm) moderately short, slightly dilated medially, almost straight, apex with elongated hook-like sclerite, coecum (0.65 mm) stout.

Genitalia ♀. Unknown.

Remarks. The only specimen of this possibly undescribed species is in a very poor condition and further material is needed to clarify its taxonomic status. Although this species is distinguished from all known Palearctic *Chionodes* we refrain for several reasons from naming it. Our experience has shown that external characters may be vital in distinguishing closely related *Chionodes*; a description of a new species based on a single specimen devoid of almost all scales would therefore be irresponsible. Moreover, without knowledge of the female we are currently unable to assign the species to a particular species-group and, before contemplating the description of a new species from a locality such as Ostrov Vrangelya, it should be ascertained that it is not an already named Nearctic species.

We place this species provisionally in the *fumatella*-group because it closely agrees with *nebulosella* in the shape of the pedunculi which have an unusually long sclerotized distal arm that connects the tegumen to the vinculum. Both species also share the long, strong costa but whilst the sacculus is rudimentary in *nebulosella* it is about one-half the length of the costa in the species from Ostrov Vrangelya. Placement in the *fumatella*-group is also provisional because the long slim aedeagus is usually characteristic of other species groups.

Biology. Host-plant and early stages unknown. The only adult known was collected in early July. Vertical distribution: inadequate data.

Distribution. Russia (Ostrov Vrangelya 71°30'N 180°).

Material examined (including 1 ♂ genitalia preparation)

Russia: 1 ♂, Ostrov Vrangelya, Ushakovskiy, 7-8.VII.1983 (BERMANN) (genitalia slide no. 90/185, HUEMER; ZIAN).

Chionodes electella (ZELLER, 1839)

(Figs 34, 104, 138, 163, 192)

Gelechia (*Gelechia*) *electella* ZELLER, 1839, Isis, Leipzig 1839: 198. Lectotype ♂, Poland: Silesia ('Salzbrunn'), 18.VI.1834 (ZELLER) (BMNH), here designated [examined].

Adult (Fig. 34). ♂, 5.1-7.0 mm; ♀, 5.4-6.2 mm. Head white. Second segment of labial palpus white, mottled dark brown on outer surface; third segment black with white apex. Thorax and tegula white more or less mottled brown. Fore wing ground colour white, mottled grey basally, at about one-quarter and in distal half; discal, discocellular and plical spots prominent, black; distinct white costal and tornal spots at four-fifths, almost confluent; fringe white with dark cilia-line. Hind wing light grey.

Pregenital abdomen ♂ (n=3). Tergite VIII distally exceeded slightly by sternite, narrow, lateral margins more or less parallel, distally tapered, apex rounded to pointed; anterior emargination broadly arched, depth about one-third overall length of tergite. Sternite VIII broad, posterior margin laterally rounded, deeply concave medially; lateral margins weakly convex, almost parallel; anterior apophysis of moderate width, lateral margins parallel to weakly concave, distal margin rounded to truncate.

Genitalia ♂ (Figs 104, 138) (n=3). Overall length 1.6 mm. Uncus (0.43 x 0.42 mm) large, clearly differentiated from tegumen, sub-rectangular, lateral margin convex, distal margin straight with minute medial projection. Gnathos hook weak, strongly bent. Costa (1.42 mm) extremely long, apex about level with tip of uncus, slightly curved. Saccus (0.50 mm) short, about same width as costa. Saccus (0.58 mm) evenly tapered, with slightly concave margin. Aedeagus (1.02 mm) short, thick, almost straight, apex with hook-like sclerite, coecum (0.32 mm) short.

Genitalia ♀ (Figs 163, 192) (n=2). Apophyses posteriores 2.0 mm. Segment VIII short. Apophyses anteriores (1.25-1.30 mm) extremely long and broad, basal half fused medially, distal half broadened, oval, outer margin of apophysis anterior weakly concave in basal half, distally convex. Antrum (0.20 mm) very short, with broad lateral sclerotizations, about half width of fused apophyses anteriores basally. Bursa copulatrix long; corpus bursae wide, imperceptibly tapered to long thin ductus bursae. Signum at anterior sixth of bursa copulatrix, large, sub-oval with distinct posterior and weaker anterior transverse ridge.

Remarks. *C. electella* is easily recognized by its small size and the white ground colour of the fore wing.

G. electella was described from an unspecified number of specimens (sex not stated) collected by ZELLER near Salzbrunn on the trunks of spruce trees ('Tannen'). Although it is stated that the species occurs in VII, the VI specimen here designated as the lectotype is recorded as *electella* in ZELLER's field diary and was clearly part of the syntype series. It was chosen because it is the best-preserved of the surviving specimens. The type-locality 'Salzbrunn' (current Polish name ?Swiebodzice) is situated 15-20 km west of Swidnica (former German name Schweidnitz) in the former German province of Schlesien (Silesia).

Biology. Host-plant: *Picea abies* (L.) KARST. (= *Abies excelsa* D.-C.) (Pinaceae). Confirmation is required that the larva also feeds on *Juniperus communis* L. (Cupressaceae) as sometimes claimed (LHOMME, [1948]: 591).

Larva light brownish-red to chocolate brown; head, prothoracic shield and tarsal claws black, anal shield brown, anal comb strong, with crossed medial prongs. The presence of a strong anal comb distinguishes *electella* from the superficially similar larva of *Batrachedra pinicolella* (ZELLER) (Batrachedridae). (LIENIG & ZELLER, 1846: 286; SCHÜTZE, 1931: 5; PATOCKA, 1960: 134, fig. 207).

Pupa 6.0 x 1.6 mm, light brown; exuviae pale brownish yellow, last abdominal rings darker, rather shiny, surface delicately sculptured. Head and pronotum distinctly wrinkled, fronto-clypeal suture evenly curved. Wing case, antenna and hind leg extended to middle of abdominal segment V, fore leg little shorter than middle leg and proboscis. Labium small, triangular; maxillary palpus distinct. Tip of abdomen blunt, without cremaster, with group of hooked bristles. (PATOCKA, 1960: 134, fig. 212; 1987: 457, figs 21, 22).

G. electella inhabits coniferous forests, in particular their edges, and occasionally reaches pest status on *Picea abies*. The ovum is unknown. The larva occurs from VIII, overwintering, till V or VI. It produces a shallow serpentine groove in the bark and lines it with silk that it covers densely with small particles of bark and lichen so that it is extremely well concealed. Emerging from this shelter it mines the older needles; it can be obtained by beating. The notion that the larva lives in woody nodes on the twigs of *Picea* and *Juniperus* (HARTMANN, 1880: 17; SORHAGEN, 1886: 188) has been

refuted (JOANNIS, 1922: 121; ESCHERICH, 1931: 207; SCHÜTZE, 1931: 35). Pupation takes place in V- VI in a firm white cocoon on the ground; the pupal period lasts about five weeks. The adult occurs in late V - early VIII. HARTMANN (1880: 17) assumed the existence of two generations with larvae in VIII - IX (adults in following V) and VI - VII (Adults in VII - VIII); however, this is unconfirmed and other evidence points towards a single extended generation. (LIENIG & ZELLER, 1846: 286; DISQUÉ, 1908: 101; SCHÜTZE, 1902: 16; 1931: 35; HERING, 1957: 774; PATOCKA, 1960: 133). Vertical distribution: sea-level to about 2000 m.

Distribution. Denmark, Germany, Switzerland, Austria, Italy, Hungary, Rumania, Poland, Latvia. Also recorded from The Netherlands (LEMPKE, 1976: 25; KUCHLEIN, 1993: 485), Belgium (DE PRINS, 1983: 14), France (Isère, Savoie, Haute-Savoie) (LHOMME, [1948]: 591) and Greece (GOZMÁNY, 1990: 252).

Material examined (including 2 ♂, 2 ♀ genitalia preparations)

Denmark: 1 ♂, LFM, Ulfshale, 7.VII.1987 (KARSHOLT); 1 ♀, SZ, Vemmetofte, 31.VII.1974 (KARSHOLT) (ZM). **Germany:** 2 ♂, Stassfurt, 19.VI.1950, 13.VII.1951 (SOFFNER); 2 ♂, Niesky, 27.VI.1855, 21.VI.1857 (CHRISTOPH); 2 ♂, 3 ♀, Bayern, Augsburg, 30.VII.1871 (BMNH); 1 ♂, Pfalz, Geilweilerhof, 12.VI.1948 (DE LATTIN); 1 ♀, Bayern, Königsdorfer-Filz, 600 m, E.VII.1971 (ZÜRNBAUER); 1 ♀, Bayern, Langwied, 490 m, E.VII.1977 (ZÜRNBAUER); 1 ♂, Bayern, Pasing, 520 m, A.VII.1977 (ZÜRNBAUER); 1 ♂, Bayern, Jedlinger Moor, 680 m, A.VIII.1966 (ZÜRNBAUER); 1 ♂, 1 ♀, Württemberg, Kirchberg/Murr, 7.VII.1951 (SÜSSNER); 1 ♂, Württemberg, Burgstall/Murr, 12.VI.1960 (SÜSSNER); 2 ♂, 2 ♀, Württemberg, Marbach/Neckar, 30.VI.1958, 3.VII.1973, 3.VII.1977 (SÜSSNER); 2 ♂, Württemberg, Schwarzwald, Buchenberg, 4.VII.1952, 5.VIII.1954 (AMSEL) (TLMF). **Switzerland:** 1 ♀, Zürich; 1 ♀, Zürich, Bremgarten (BMNH). **Austria:** 1 ♀, Burgenland, 15.VII.1964 (ISSEKUTZ); 1 ♂, Oberösterreich, Waldburg, 26.VI.1920 (KNITSCHKE); 1 ♂, Osttirol, Lienzer Dolomiten, Lavanter Almtal, 1200 m, 8.VIII.1993 (HUEMER); 1 ♂, Osttirol, Venedigergruppe, Virgental, Virgen-Obermauern, 1400 m, 14.VIII.1993 (RAKOSY); 1 ♂, Nordtirol, Kufstein-Endach, 5.VII.1988 (HUEMER); 2 ♀, Nordtirol, Pinnegg, 1000 m, E.VII.1971 (ZÜRNBAUER); 1 ♀, Nordtirol, Vennatal, 1600 m, 6.VIII.1966 (HERNEGGER) (genitalia slide no. GEL 300; TLMF); 1 ♀, Nordtirol, Sistranser Wiese, 21.VII.1961 (HERNEGGER); 1 ♂, Nordtirol, Köfels 22.VII.1945 (BURMANN); 1 ♂, 1 ♀, Nordtirol, Ampass, 5.VII.1970 (HERNEGGER) (genitalia slide no. GEL 301; TLMF); 1 ♂, Nordtirol, Rißtal, Weitgriesalm, 900 m, 29.VI.1993 (HUEMER); 1 ♀, Nordtirol, Zams, Steinseehüttenweg, 850 m, 13.VIII.1988 (BURMANN & HUEMER); 1 ♀, Nordtirol, Pillermoor, 1500 m, 8.VIII.1986 (BURMANN); 1 ♂, Nordtirol, Ehrwald, 31.VIII.1968 (HERNEGGER) (TLMF); 1 ♂, Nordtirol, Karer See, 1800 m ('6000 feet'), 13.VIII.1902 (BMNH); 1 ♂, Vorarlberg, Feldkirch-Gisingen, 450 m, 10.VII.1982 (HUEMER) (TLMF). **Italy:** 1 ♂, Südtirol, Val Popena, 1876 (MANN) (NM); 3 ♂, 1 ♀, Prov. Udine, Raibl, 9-27.VII.1867 (ZELLER) (BMNH). **Hungary:** 1 ♂, Simontornya 29.VI.1919 (NM). **Rumania:** 2 ♀, Cluj, 19.VI.1934 (OSTROGOVICH), 24.VI.1935; 1 ♂, Sibiu ('Hermannstadt') (PRALL) (MINGA). **Poland:** lectotype as above; 2 ♂, 2 ♀ (paralectotypes), Silesia, 'Salzbrunn', 3-21.VII.1838 ('on trunks of *Pinus abies*') (ZELLER); 1 ♀ (paralectotype), Silesia, 'Fürstst.', 24.VII.1838 (ZELLER); 1 ♂, 1 ♀, Silesia (STAUDINGER) (BMNH); 1 ♂, Pieniny mts., Cisowiec, 25.VI.1957 (ZUKOWSKI). **Latvia:** 1 ♀, 'Livonia' (BMNH).

Chionodes viduella (FABRICIUS, 1794)

(Figs 35, 36, 52, 58, 105, 139, 164, 193)

Tinea viduella FABRICIUS, 1794, Ent. syst. 3(2): 299. Lectotype ♀, Sweden: Lule Lappmark (PAYKULL) (ZM), here designated [not examined].

Tinea leucomella QUENZEL, 1802, in ACERBI, Travels through Sweden, Finland Lapland North Cape

2: 254, pl. 3, fig. 3. Syntypes [number and sex not stated], Fennoscandia (QUENZEL) [not traced]. [Synonymized by REBEL, 1901: 145.]

Gelechia luctiferella HERRICH-SCHÄFFER, 1856, Neue Schmett. Eur. angrenzenden Ländern :6, pl. [7], fig. 42. Syntypes [number and sex not stated], Switzerland: Engadin (PFAFFENZELLER) [not traced]. [Synonymized by WOCKE, 1871: 291.]

Gelechia labradoriella CLEMENS, 1863, Proc. ent. Soc. Phila. 2: 12. Holotype ♀, Canada: Labrador (PACKARD) (genitalia slide no. 2953, HODGES; ANS) [not examined]. [Synonymized by BUSCK, 1903: 936.]

Adult (Figs 35, 36). ♀, 6.5-8.0 mm; ♂, 6.0-7.0 mm. Head dark grey-brown, frons mixed with white (female head white). Second segment of labial palpus cream; third segment white, mixed with brown externally. Thorax and tegula blackish brown (♀ thorax white). Fore wing blackish brown with white markings: narrow oblique fascia extending from first fifth of costa towards first quarter of dorsum, ending just beyond fold; comma-shaped costal mark at one-half; costal and tornal spots at four-fifths fused to broad, complete (♀) or narrow, usually incomplete (♂), fascia, parallel to termen; fringe white, apex and tornus black. Hind wing dark grey-brown.

Pregenital abdomen ♂ (Figs 52, 58) (n=3). All segments with strongly sclerotized almost black plates: tergite I with narrow plate in posterior half; tergites II-V plates progressively increasing in size from one-half to four-fifths; tergites VI and VII completely sclerotized. Anterior two-thirds of sternite II weakly sclerotized venulae straight, posteriorly diverging slightly, terminating on lateral margin of strongly sclerotized posterior third of sternite. Sternites III-VII completely sclerotized. Tergite VIII distally level with or slightly shorter than sternite, narrow, tapered, apex rounded; anterior emargination broadly rounded, depth slightly less than one-half overall length of tergite. Sternite VIII broad, posterior margin more or less straight, weakly concave medially, lateral margins parallel to gently convex. Anterior apophysis broad, lateral margins more or less parallel, distal margin concave.

Pregenital abdomen ♀ (n=3). Distinctly constricted between segments V and VI. Sclerotization strong as in male and sclerites similarly arranged, but dorsally most extended on tergite II, decreasing towards end of abdomen, on VI and VII confined to narrow longitudinal patch; ventrally on V and VI much narrower than on preceding sternites, on VII broadly U- shaped. Venulae on sternite II as in male.

Genitalia ♂ (Figs 105, 139) (n=3). Overall length 2.3 mm. Uncus (0.46 x 0.50 mm) large, sub-rectangular, distal margin with minute medial tooth. Gnathos hook long, thick, distinctly curved. Costa (1.35 mm) almost straight basally, distal part evenly curved, apex exceeding gnathos base. Sacculus (0.70 mm) slightly curved, half width of costa. Saccus (0.80 mm) broad, evenly tapered, lateral margin straight. Aedeagus (1.80 mm) short, thick, slightly curved medially, apex with two sclerites, coecum (0.66 mm) stout.

Genitalia ♀ (Figs 164, 193) (n=3). Apophyses posteriores 2.7 mm. Segment VIII short. Apophyses anteriores (0.95 mm) long, extremely broad, twice as long as segment VIII, slightly fused basally with convex connection, sub-rectangular with rounded edges, slightly dilated distally, outer margin irregular. Antrum (0.40 mm) short, very broad, funnel-shaped, distally narrow with irregular sclerotization. Bursa copulatrix differentiated into moderately long, broad ductus bursae and oval corpus bursae. Signum in about middle of corpus bursae, large, sub-oval, with finely dentate edge and distinct posterior transverse ridge; anterior ridge vestigial.

Remarks. *T. viduella* was described from an unspecified number of specimens (sex not stated). In FABRICIUS's Kiel collection (now on indefinite loan to ZM) there are three specimens under the name

viduella. A female, unfortunately in bad condition (only head, thorax and left fore wing preserved) agrees with the current concept of *viduella* and has been selected by KARSHOLT as the lectotype; it is here formally designated as such. Two further unlabelled specimens are not conspecific with the lectotype; they represent *Denisia* (?) *albimaculea* (Haworth) (Oecophoridae).

T. leucomella was described from an unspecified number of specimens (sex not stated) collected in 'Lapland'. QUENZEL's specimens 'were soon scattered over Germany, and all countries where these objects are esteemed and collected' (ACERBI, 1802: 245) and we were unable to trace any type-material. However, the identity of *leucomella* is not in doubt because the original description is accompanied by a good colour illustration depicting a female (white thorax!) in its natural pose.

G. luctiferella was described from an unspecified number of specimens (sex not stated) from Engadin. The type-material was collected by PFAFFENZELLER, whose collection was later dispersed (HORN & KAHLE, 1936: 207). We were unable to trace any type-specimen in BMNH or ZMHU, but the identity of *luctiferella* is not in doubt because the original description is accompanied by a good colour illustration depicting a male (black thorax!).

The holotype of *G. labradoriella* was examined by BUSCK (1903: 936), who established the synonymy with *viduella*, and HODGES (pers. comm.), who confirmed it.

Biology. Host-plants: *Betula nana* L., *B. pendula* ROTH. ('*B. alba*') (Betulaceae), *Rubus chamaemorus* L. (Rosaceae) (BENANDER, 1929: 143). Possibly also on other plants such as *Vaccinium* (Ericaceae) (see below).

Larva brownish red with violet tinge and bluish white markings: dorsal line, elongate spot around D1 and D2, line through SD1 enlarged around spiracle, and broad line through L1 and L2. Pinacula large, brown, with black setal papillae. Spiracles black. Head yellow with black stemmatal spot; prothoracic and anal shields yellow with brown setal papillae. Thoracic legs yellow.

In Sweden the final instar larva was found in VIII feeding inside a folded leaf of *Betula nana*. In early IX it spun up for hibernation amongst wilted leaves, where it pupated in early spring. Identical larvae were observed on *B. pendula* and *Rubus chamaemorus*; they completed their final moult in early VIII but were not reared to the imago (BENANDER, 1929: 143).

Larvae believed to be those of *viduella* were discovered by PETRY in bogs of the Harz mountains in VII between two leaves of *Vaccinium uliginosum* L. They resembled the larva of *Scrobipalpa atriplicella* (FISCHER VON ROESLERSTAMM) but were bigger, greyish brown above, dorsum with tinge of red and with light dorsal and lateral lines, each segment left and right of the dorsal line with characteristically arranged dark pinacula: two behind each other and outwardly another two side by side (RAPP, 1936: 24).

In the Alps *viduella* is widespread throughout the alpine dwarf-shrub zone from 1600-2500 m and in some places as low as 1000 m. On overcast days the adults can be disturbed from sparse stands of *Juniperus sibirica* BURGSD. and *Vaccinium uliginosum* L. Sunny hillsides with light cover of *Rhododendron ferrugineum* L. are also favourite habitats. Occasionally the males fly in the sunshine around *Vaccinium* flowers. After sunset the mating flight of the males commences; the females then move from their hiding places amongst low-growing vegetation to more exposed sites where they attract the males (BURMANN, 1977: 138). In central Europe *viduella* often occurs at much lower elevations outside the Alps and is mostly restricted to bogs (RAPP, 1936: 24; ELSNER et al., 1981: 77). The adults were observed in Norway in dry places with *Vaccinium myrtillus* L., and in the Silesian mountains (now Poland) also around *Vaccinium* (WOCKE, 1862: 238; 1874: 62). In Switzerland they were recorded as very lively in hot sunshine in VI when they flew rather low around *Vaccinium uliginosum* L. (ZELLER, 1878: 136); they were also observed around *Juniperus* (MÜLLER-RUTZ, 1914: 488; VORBRODT, 1931: 135). BURMANN (1977: 138) believes that the larva are polyphagous and in the Alps may have host-plants different from those recorded in Sweden. The adult occurs in late-V-VII. Vertical distribution: in the Alps up to about 2500 m.

Distribution. Boreo-montane. Widespread in northern Europe (most provinces of Norway, Sweden and Finland; U.S.S.R., Latvia) and the Alps (France, Switzerland, Germany, Austria, Italy). Local, and mostly confined to bogs, in the French Massif Central (Puy-de-Dôme, Mont Dore; Cantal, Le

Lioran), Vosges (La Bresse) (LHOMME, [1948]: 587); Germany (Niedersachsen/Sachsen-Anhalt, Harz mountains (RAPP, 1936: 24); Baden Württemberg, Schwarzwald, Hinterzarten (REUTTI, 1898: 246)); Czech Republic (southern Bohemia, Sumava mountains (ELSNER et al., 1981: 77); summits of Silesian mountains, 'Riesengebirge', 1600 m, and 'Glatzer Schneeberg' 1420 m (Polish /Czech border region), Praded ('Altvatergebirge'), 1490 m (Czech Republic) (WOCKE, 1874: 62)). Probably distributed throughout northern Asia. Western Mongolia (Bulgan aimak); Russia (Yevreskaya Avt. Oblast, Amurskaya Oblast; also Khabarovsk, Kazakevicha (CARADJA, 1920: 100)); North Korea; north-eastern China (Heilungjiang, Mu-tan-chiang); Japan (HODGES, pers. comm.). Widespread in northern America. Canada (Labrador, Quebec, New Brunswick, Ontario, Manitoba, Alberta, Northwest Territories); U.S.A. (Alaska, Maine, New Hampshire) (CLEMENS, 1863: 12; BROWER, 1984: 8; HODGES, pers. comm.). The records from the French Pyrénées (Ariège, Ax-les-Thermes) (LHOMME, [1948]: 587) and Spain (VIVES, 1985: 8) require confirmation.

Erroneous record. A single specimen from Portugal, Algarve, Monchique, Foia, 700 m ('2150 feet'), 21.V.1880 (EATON) was recorded by STANTON (1881: 247) as *Gelechia* sp. 'allied to *G. viduella*'; this record was repeated by ZERKOWITZ (1946: 134) with '?' under *G. viduella*. An examination of the specimen concerned in coll. STANTON (BMNH) has shown it to be a female of an undescribed *Aroga* species.

Material examined (including 3 ♂, 3 ♀ genitalia preparations)

Norway: 1 ♂, Fv, Kviby, Alta, 1.VII.1982 (LARSEN) (NM); 1 ♂, STi, Kongsvoll, 24.VI.1981 (KARSHOLT); 4 ♂, 1 ♀, Kongsvoll, 26 + 29.VI.1963 (NIELSEN); 1 ♂, Buskerud n., Gol, 10.VII.1962 (NIELSEN); 1 ♀, Bv, Gol, 900-1000 m, 2.-7.VII.1984 (KARSHOLT) (ZM); 1 ♂, Bossekop (STAUDINGER); 2 ♂, Finnmark (STAUDINGER); 2 ♂, 2 ♀ (STAUDINGER) (BMNH). **Sweden:** 2 ♂, Torne-Träsk, Nissontjokko, 9.VII.1920 (WETTSTEIN) (NM); 1 ♂, Lappland (STAUDINGER); 1 ♂, Lappland, Alten (BMNH). **Finland:** 1 ♀, Li, Utsjoki, 10.VII.1956 (VON SCHANTZ). **Germany:** 1 ♀, 'Braunschweig' [incorrect locality] (HEINEMANN); 1 ♀, Harz, 1892; 1 ♂ (BMNH). **Switzerland:** 1 ♀, Graubünden, Engadin, 27.VI.1863; 1 ♀, Graubünden, Engadin, Sta. Maria (FREY); 1 ♂, 1 ♀, Graubünden, Bergün, 14.VI.1875 (ZELLER); 1 ♂, Valais, Andermatt, VII.1953 (JACOBS) (BMNH). **Austria:** 1 ♂, Niederösterreich, Karlstift, 12.VI.1905 (PREISSECKER) (NM); 1 ♂, Oberösterreich, Warscheneck, 1500 m, 18.VII.1943 (KLIMESCH) (BMNH); 1 ♂, Steiermark, Koralpe, 25.V.1890 (NM); 2 ♂, Steiermark, Zirbitzkogel, 1600 m, 4.VI.1949 (PINKER) (TLMF); 1 ♂, Kärnten, 'Trielbn.', 1871 (BMNH); 6 ♂, Osttirol, Lasörlinggruppe, Schwarzachtal, In der Weisse, 2450 m, 14.VIII.1989 (TARMANN); 1 ♂, Osttirol, Kals, Matreier Törl, 2200 m, 14.VII.1960 (SÜSSNER); 1 ♀, Osttirol, Kals, Dorfer See, 1900 m, 18.VII.1960 (SÜSSNER); 2 ♂, Nordtirol, Vennatal, Ochsenalm, 2000 m, 5.VII.1969 (HERNEGGER); 3 ♀, Nordtirol, Patscherkofel, 2000 m, 15.VII.1956, 18.VII.1960 (HERNEGGER); 1 ♀, Nordtirol, Padaunerkogel, 2000 m, 11.VII.1960 (HERNEGGER); 1 ♂, Nordtirol, Sölden, Hochsölden, 2000 m, 28.VII.1956 (SÜSSNER); 2 ♀, Nordtirol, Sölden, Zwieselstein, 1600 m, 27.VII.1956 (SÜSSNER); 1 ♂, Nordtirol, Hochgurgl, 2100 m, 5.VII.1993 (HUEMER); 1 ♀, Nordtirol, St. Anton, Galzig, 2000 m, 3.VII.1959 (SÜSSNER); 1 ♂, 1 ♀, Vorarlberg, Brandnertal, Böser Tritt, 1600-1800 m, 2.VII.1983, 18.VII.1984 (HUEMER) (genitalia slide no. GEL 312; TLMF); 1 ♀, Vorarlberg, Brandnertal, Schattenlagant, 1500 m, 9.VIII.1984 (TLMF). **Italy:** 2 ♀, Südtirol, Kurzas, 2100 m, A.VII.1967 (ZURNBAUER) (TLMF); 1 ♂, Südtirol, Trafoi (BMNH). **Czech Republic:** 1 ♂, 1 ♀, Praded ('Altvater') (WOCKE) (ZIAN). **Mongolia:** 1 ♀, Bulgan aimak, 23 km NNE of Somon Chischig-Öndör, 1390 m, 15.VI.1968 (KASZAB, no. 963) (genitalia slide no. 90/089, HUEMER; TM). **North Korea:** 1 ♂, 1 ♀, Ryanggang Prov., Paektusan mts, Paektusan Mt., 1800 m, 13.VII.1987, 26.VI.1988 (JAROŠ); 2 ♂, 1 ♀ Samjiyon, 1400-1500 m, 15-22.VI.1988 (JAROŠ); 2 ♂, 1 ♀, Kanwon Prov., Kumgangsán Mts, Manmulsang, 700 m, 25., 26.V.1988 (JAROŠ) (BMNH). **Russia:** 1 ♀, Yevreskaya Avt. Oblast, Radde ('Raddefka'), 1876 (CHRISTOPH) (BMNH); 1 ♂, 2 ♀, Amurskaya Oblast, [ca. 100 km W of Magdagachi,] Albasin (ZIAN).

Chionodes nebulosella (HEINEMANN, 1870)

(Figs 37, 38, 106, 140, 165, 194)

Gelechia nebulosella HEINEMANN, 1870, Schmett. Dtl. Schweiz (2)2: 218. Lectotype ♂, Slovenija: Julijske Alpe, Mangrt (genitalia slide no. 148 a, SATTLER; ZMHU), designated by SATTLER, 1960: 32) [examined].

Adult (Figs 37, 38). ♂, 9.6-10.5 mm; ♀, 9.3-9.5 mm. Head white. Second segment of labial palpus white, mottled dark brown on outer surface, third segment blackish brown with some white scales. Thorax and tegula blackish brown with white mottling. Fore wing blackish brown, intensely mottled with white scales; white markings well developed: irregular oblique fascia from first fifth of costa to first third of fold, medial patch at one-half, separate costal and tornal spots at four-fifths; indistinct black discal, discocellular and plical spots, the second comma-shaped; termen with white dots; fringe basally dark greyish brown, distally light grey. Hind wing light grey.

Pregenital abdomen ♂ (n=3). Tergite VIII variable, usually shorter than sternite, narrow to moderately broad, distally rounded; anterior emargination broadly arched to sub-triangular, depth about two-fifths overall length of tergite. Sternite VIII with posterior margin very broadly V-shaped, lateral margins more or less straight, parallel; anterior apophysis exceptionally short, almost obsolete, distally weakly convex to weakly concave.

Genitalia ♂ (Figs 106, 140) (n=3). Overall length 2.3-2.4 mm. Uncus (0.42-0.47 x 0.48-0.56 mm) large, sub-rectangular, greatest width at distal third, distal margin slightly concave with small medial tooth. Gnathos hook long and rather thick, distinctly bent. Costa (1.14-1.23 mm) long, strongly bent at basal third, distally slightly curved, apex about level with middle of uncus. Saccus (0.19-0.21 mm) reduced, digitate distal part minute. Saccus (0.76-0.85 mm) broad, gently tapered, particularly in basal half. Aedeagus (1.45-1.68 mm) short, stout, almost straight, coecum (0.45-0.55 mm) short.

Genitalia ♀ (Figs 165, 194) (n=2). Apophyses posteriores 1.8 mm, short. Segment VIII short, broad. Apophyses anteriores (0.85-0.90 mm) long, extremely broad, almost twice as long as segment VIII, slightly fused basally with convex connection, sub-rectangular with broadly rounded edges, lateral margin strongly concave. Antrum (0.35 mm) short, broad, tubular, distally with irregular lateral sclerotization. Bursa copulatrix variable, short, not clearly differentiated into ductus and corpus bursae, to long, oval with moderately long, narrow ductus bursae. Signum in middle or anterior half of corpus bursae, of irregular shape; posterior transverse ridge vestigial, anterior ridge absent.

Remarks. *C. nebulosella* is externally similar to *continuella* and was treated as a form of the latter by several authors. It differs from *continuella* by the larger size, white rather than cream head and white mottling of the fore wing. The genitalia of both sexes indicate that there is no close relationship between the two species. The greatly reduced anterior apophysis of abdominal sternite VIII distinguishes *nebulosella* from all other Palearctic *Chionodes*.

G. nebulosella was described from an unspecified number of specimens (sex not stated) from Mangrt (collector not stated). A specimen 'aus hiesiger Gegend', ('from this vicinity', meaning the area around the city of Braunschweig) or from the Harz mountains was doubtfully included. It is a male labelled 'Brschw.' and '*Nebulosella* m.i.l., 27.', now preserved in coll. HEINEMANN (NL), and is correctly identified; however, it must have been mislabelled because *nebulosella* does not occur around Braunschweig and its occurrence in the Harz mountains is unlikely.

Biology. Host-plant and early stages unknown. In the Alps *nebulosella* is mostly found on limestone whilst the localities in the Czech Republic are montane peat bogs. In the alpine dwarf-shrub zone the adults can be beaten from old stands of *Pinus mugo pumilio* (HAENKE) FRANCO; the males are

occasionally attracted to the light (BURMANN, 1977: 137). The adult occurs in early VI - early VIII. Vertical distribution: 600-2200 m.

Distribution. Alps (Germany, Switzerland, Austria, Italy, Slovenija), Bosna i Hercegovina, Montenegro. Also recorded from the Czech Republic (southern Bohemia, Šumava Mountains) ELSNER et al., 1981: 77, text-fig. 5, pl. 2, fig. 5) and France (Alpes- Maritimes) (MILLIÈRE, 1886: 155; LHOMME, [1948]: 590, as *continuella* f. *nebulosella*); however, the latter record is unconfirmed and dubious because *nebulosella* is otherwise not known from the western Alps.

Material examined (including 3 ♂, 2 ♀ genitalia preparations)

Germany: 1 ♂, Bayern, Miesbach ('Alpen'), 9.VI.1862 (HOFMANN) (BMNH); 1 ♂, Bayern, Karwendel, Wendelstein, 1600 m, A.VII.1973 (ZÜRNBAUER); 1 ♀, Bayern, Dammkar, 1600 m, M.VIII.1972 (ZÜRNBAUER) (genitalia slide no. GEL 316; TLMF) (TLMF). **Switzerland:** 1 ♂, Graubünden, Bergün, 28.VI.1871 (ZELLER) (BMNH). **Austria:** 1 ♂, Niederösterreich, Waxriegel, VII.1844 (MANN) (ZIAN); 1 ♂, Niederösterreich, Schneeberg, Saugraben, 4.VII.1927; 1 ♂, Oberösterreich, Neustift bei Liebenau, 12.VI.1932 (KLIMESCH) (TLMF); 1 ♀, Steiermark, Radstätter Tauern, 16.VII.1877 (NM); 1 ♂, Steiermark, Hochthor, 9.VIII.1910 (ZERNY) (TLMF); 1 ♂, Großglockner, 27.VII.1848 (MANN) (ZIAN); 4 ♂, 2 ♀, Kärnten, Karawanken, Vertatscha, 1700 m, VII.1952 (PINKER); 2 ♂, 1 ♀, Osttirol, Daberkamm, 1580-1740 m, 10, 26.VII.1988 (TARMANN); 2 ♀, Osttirol, Venedigergruppe, Virgental, Virgen-Zedlach, Hinteregg W, 1630-1750 m, 7.VII.1993 (TARMANN); 1 ♀, Nordtirol, Patscherkofl, 2000 m, 26.VII.1941 (BURMANN); 1 ♀, Nordtirol, Halltal, 1000 m, 19.VII.1972 (HERNEGGER); 1 ♀, Nordtirol, Pillersattel, 1500 m, 18.VII.1985 (BURMANN); 1 ♂, Nordtirol, Hahntennjoch, 1800 m, 26.VII.1979 (BURMANN & TARMANN); 1 ♀, Vorarlberg, Lech, Schafalpe, 1700 m, 26.VII.1954 SÜSSNER); 1 ♂, Vorarlberg, Schattenlagant, 1460 m, 13.VII.1985 (HUEMER) (genitalia slide no. GEL 315; TLMF) (TLMF). **Italy:** 1 ♂, Südtirol, Schludersbach, 1876 (MANN) (NM); 19 ♂, Südtirol, Sextener Dolomiten, Schludersbach, Cimabanche, 1530 m, 2.VII.1991 (HUEMER); 3 ♂, Südtirol, Sella-Gruppe, SE of Grödnerjoch, 2050 m, 11.VIII.1991 (HUEMER); 1 ♂, 1 ♀, Prov. Trentino, Sella-Gruppe, Piz Ciavazes S-Wand, 2150 m, 7.VIII.1991 (HUEMER); 1 ♂, Prov. Verona, Monte Baldo, Noveza, 1300-1600 m, M.VI.1965 (BURMANN); 1 ♂, Prov. Udine, Monte Sernio-Massiv, Rif. Grauzaria, 1250 m, 16.VII.1988 (HUEMER) (TLMF); 2 ♂, 2 ♀, Prov. Udine, Raibl, 19.VI-22.VII.1867 (ZELLER) (BMNH). **Slovenija:** lectotype as above; 1 ♂, Ovtšchewa, 15.VII.1942 (ZERNY) (NM); 1 ♂, Kamniska Biotrica, 600 m, 13.VII.1968 (HARTIG) (BMNH). **Bosna i Hercegovina:** 1 ♂, Hercegovina, Prenj, 29.VII.1901 (REBEL) (genitalia slide no. 14.322; NM); 1 ♀, Bjelasnica, 13.-24.VII.1895 (NM). **Montenegro:** 1 ♂, Durmitor, Velika Kalica, 1900 m, 26.VII.1985 (JAKŠIĆ); 1 ♂, Durmitor, Sedlo, 1900 m, 25.VII.1984 (JAKŠIĆ) (JAKS).

Chionodes fumatella (DOUGLAS, 1850)

(Figs 39-41, 66, 107, 141, 166, 168, 195)

Gelechia fumatella DOUGLAS, 1850, Trans. ent. Soc. Lond. (N.S.) 1: 67. Lectotype ♂, Britain: Cheshire, New Brighton (GREGSON) [abdomen missing] (BMNH), here designated [examined].

Gelechia celerella STAINTON, 1851, Suppl. Cat. Tineidae & Pterophoridae :5. Lectotype ♀, Britain: Cheshire, Liscard near New Brighton, IX. (GREGSON) (genitalia slide no. 4868; BMNH), here designated [examined]. [Synonymized by MEYRICK, 1928: 626.]

Gelechia oppletella HERRICH-SCHÄFFER, 1854, Syst. Bearb. Schmett. Eur. 5: 162 [key], 180, pl. 77, fig. 582. Lectotype ♀, Germany: Bayern, Regensburg (HERRICH-SCHÄFFER) [abdomen missing] (ZMHU), here designated [examined]. [Synonymized by SNELLEN, 1882: 632.]

Gelechia reuttiella HEINEMANN, 1870, Schmett. Dtl. Schweiz (2)2: 196. Syntypes, Germany: Baden-Württemberg, Lahr district, islands in river Rhein near Wittenweiler (REUTTI) [not

- traced]. [Synonymized by SATTLER, 1960: 33.]
- Gelechia nigricans* HEINEMANN, 1870, Schmiett. Dtl. Schweiz (2)2: 205. Lectotype ♂, Germany: Niedersachsen, Braunschweig, emerged 10.VII.1869 (HEINEMANN) (ZMHU), here designated [examined]. [Synonymized by HERING, 1893: 94.]
- Gelechia syrticola* STAUDINGER, 1871, Berl. ent. Z. 14: 304. Syntypes (1 ♂, 1 ♀), Germany: Baden-Württemberg, Lahr district, islands in river Rhein near Wittenweiler, 7.VI.1857 (REUTTI) (ZMHU), [not traced]. [Synonymized with *reuttiella* by WOCKE, 1871: 289.]
- Gelechia nigricans* var. *brunnea* TEICH, 1901, Korresp Bl. NaturfVer. Riga 44: 13. Holotype (sex not stated), Latvia: Baldone ('Baldohn') [not traced, probably lost]. **Syn. n.**
- Chionodes carpella* PISKUNOV, 1971, Zool. Zh. 50: 1107, figs 2 a, 2 b. Holotype ♂, Belorussia: Vitebsk, 23.VIII.1969 (PISKUNOV) (genitalia preparation no. 11760=91/290, HUEMER; ZIAN) [examined]. **Syn. n.**

Adult (Figs 39-41). ♂, 6.5-8.8 mm; ♀, 6.5-7.8 mm. Head grey to greyish brown, frons whitish grey. Second segment of labial palpus whitish grey, speckled with dark grey-brown, particularly on outer surface; third segment dark grey-brown with some white scales. Thorax and tegula light to dark greyish brown, frequently mottled orange-brown. Fore wing mid to dark greyish brown, frequently variegated with orange-brown and blackish brown mottling; discal, discocellular and plical spots fairly distinct, blackish brown, rarely reduced, usually lined with white; orange-brown to whitish costal and tornal spots at four-fifths, indistinct, separated; fringe greyish brown, with dark brown cilia-line. Hind wing light grey.

Pregenital abdomen ♂ (n=6). Tergite VIII variable, slightly shorter than sternite (in holotype of *carpella* much shorter), more or less evenly tapered, distally rounded; anterior emargination broadly arched, depth about one-third overall length of tergite. Sternite VIII with posterior margin deeply concave medially, lateral margins conex, sometimes slightly constricted behind middle; anterior apophysis moderately long, broad at base, strongly tapered to about middle, distal half weakly tapered or with parallel margins, distally truncate or very gently rounded.

Genitalia ♂ (Figs 66, 107, 141) (n=6). Overall length 1.7-1.9 mm. Uncus (0.39-0.43 mm x 0.24-0.27 mm) sub-oval, distally with distinct medial thorn. Gnathos hook weak, slender, straight basally, curved distal part. Costa (1.25-1.40 mm) extremely long, apex level with or slightly exceeding tip of uncus, strongly curved basally, distal part slightly curved. Sacculus (0.86-0.94 mm) very long, two-thirds to about four-fifths length of costa, almost evenly curved, about half width of costa. Saccus (0.55-0.61 mm) broad at base, evenly tapered, distal half sub-rectangular. Aedeagus (1.16-1.28 mm) short, stout, slightly dilated medially, almost straight, apex with hook-like sclerite, short coecum (0.30-0.35 mm) stout.

Genitalia ♀ (Figs 166, 168, 195) (n=3). Apophyses posteriores 2.8-2.9 mm. Segment VIII short, broad. Apophyses anteriores (0.90-0.99 mm) about 2.5 times length of segment VIII, extremely broad, somewhat constricted at level of antrum, distally diverging slightly, basal two-thirds fused medially, distal third sub-rectangular with broadly rounded corners, gap between apophyses relatively narrow. Antrum (0.22-0.30 mm) short, narrow, tubular, about one sixth width of fused apophyses anteriores basally, distally with irregular lateral sclerotization. Bursa copulatrix clearly differentiated into long, narrow ductus bursae and large, oval corpus bursae. Signum near middle of corpus bursae, small, rhomboid, edges not dentate; posterior transverse ridge distinct, anterior ridge absent.

Remarks. In the previous century several authors did not distinguish *fumatella* from *distinctella* (MEYRICK, 1895: 601) or had strong doubts about their status as separate species (ZELLER, 1878: 132, as *oppletella*; SNELLEN, 1882: 632, 633). *C. fumatella* resembles *distinctella* externally but differs in the narrower fore wing (less obvious in the female). Moreover, the ground colour of the

frequently variegated fore wing is greyish brown, rather than brown, and the blackish brown discal, discocellular and plical spots are lined with white scales. The male can easily be recognized by the apical thorn of the uncus (thorn absent in *distinctella*) which is usually visible under low magnification, even without denuding the tip of the abdomen. *C. fumatella* is distinguished from the closely related *sagayica* by the weaker gnathos hook and usually shorter sacculus. It differs from *tantella* sp. n. in the weaker thorn of the uncus, distinctly shorter sacculus and the broadly rounded rather than pointed apophyses anteriores.

G. fumatella was described from several specimens (sex not stated): three from New Brighton collected by GREGSON and an unspecified number from Devon collected by JORDAN. One of the specimen from New Brighton, originally presented by the collector to DOUGLAS, in whose collection (BMNH) it is still preserved, is here designated as the lectotype; no further syntypes were traced.

The name *celerella* originated from DOUGLAS but was inadvertently made nomenclaturally available by STANTON. *G. celerella* was described from an unspecified number of specimens (sex not stated) found on sand hills at Liscard near New Brighton in IX. A female from the DOUGLAS collection, previously labelled as 'type' in BMNH, is here designated as the lectotype. The collector, not recorded by STANTON, was GREGSON (DOUGLAS, 1852: 243) and it is surprising that the synonymy of *celerella* with *fumatella*, a species discovered by the same collector in the same locality, was not instantly recognized.

G. oppletella was described from an unspecified number of specimens (sex not stated) from Frankfurt am Main and Regensburg. In coll. STAUDINGER (ZMHU) there are two females originating from HERRICH-SCHÄFFER but without locality labels. The specimen with the label '*oppletella* m.' is here designated as the lectotype and the type-locality is restricted to Regensburg. The lectotype lacks the original abdomen but had the abdomen of a *Bryotropha* male wrongly attached. Although 'May', the date of capture originally recorded, is rather too early for *fumatella*, the syntypes fit HERRICH-SCHÄFFER's description well, and there is no doubt about the identity of *oppletella*.

G. reuttiella was described from an unspecified number of specimens (sex not stated) collected on islands in the river Rhine ('Rheininseln') in June. No collector was mentioned in the original description but the choice of name, together with external evidence (REUTTI, 1898: 243), indicates that the material was collected by REUTTI, who gives further detail on the type-locality. There are no specimens of *reuttiella* in coll. HEINEMANN (NL) but see *syrticola*.

G. nigricans was described from an unspecified number of specimens (sex not stated) collected by HEINEMANN in VII in the attic of his house in Braunschweig together with *Bryotropha basaltinella* (ZELLER); once also reared from moss. This last specimen is preserved in coll. STAUDINGER, together with two further males from Braunschweig, and is here designated as the lectotype.

G. syrticola was described from one male and one female collected by REUTTI in Baden, on islands in the river Rhine ('Rheininseln') on 7.VI.1857 and STAUDINGER attributed the name *syrticola* to 'REUTTI in litt.'. In coll. STAUDINGER (ZMHU) there are under this name three males: 1) '7.6.57'; '*reuttiella* m., Rheininseln'; '*reuttiella* m., Rheininseln, 274.' [large, rectangular, black-edged label, possibly HERRICH-SCHÄFFER's handwriting; however, this specimen lacks a printed label 'H.-Sch.' that usually identifies specimens STAUDINGER acquired with HERRICH-SCHÄFFER's collection (see numbers 2 and 3)]. The tip of the abdomen was cut off this specimen, presumably for an examination of the genitalia, although no slide number is registered and no preparation was found. 2) 'Rheininseln', '7.6.57'; 'H.-Sch.' [printed label]. 3) '7.6.57'; 'H.-Sch.' [printed label]; 'Genitalia K. SATTLER 148 d'.

Although with the correct data and undoubtedly originating from REUTTI, none of the specimens is labelled '*syrticola*' or bears the characteristic pink label 'Origin.' that identifies STAUDINGER's type-material. Moreover, the female referred to in the original description of *syrticola* is missing. However, as HEINEMANN attributed the name *reuttiella* to HERRICH-SCHÄFFER, he may have received his material via the latter and his types may be unidentifiable amongst STAUDINGER's three males.

G. nigricans var. *brunnea* was described from a single specimen that must be considered lost in the 1939-45 war with TEICH's collection. GAEDE (1937: 196) as the first and only revisor placed

brunnea as a subspecies of *G. oppletella* (= *fumatella*). We accept this concept but place *brunnea* as a synonym because there is no evidence of subspeciation in European *fumatella*.

C. carpella was described from a single male with highly unusual genitalia that lack, for example, the valva (PISKUNOV, 1971: 1107). An examination of the holotype has shown it to be a freak *fumatella* with strongly deformed genitalia (Figs 109-110). Whilst parts of the valva are fused with the tegumen, other structures, such as the uncus, are still recognizable as typical of *fumatella*. Further specimens from the type-locality agree with the holotype of *carpella* externally but have normal *fumatella* genitalia.

Biology. Host-plant: unspecified mosses on roofs or rocks (HEINEMANN, 1870: 205, as *nigricans*; STANGE, 1899: 23).

Dubious host-plant: *Lotus corniculatus* L. (Papilionaceae). In Britain (North Wales) a single specimen was once reared from a sample of this plant but its larva was not observed actually feeding on it (MICHAELIS, 1977: 220).

Larva off white with black pinacula set in yellowish brown squares; head, prothoracic and anal shields black (BENANDER, 1928: 68).

The ovum is unknown. The mature larva was observed in V - mid-VI. No information is available on the pupa; the adult occurs in VI - late IX, probably in a drawn-out single generation. In Germany the adults were observed at times commonly on attic windows of old houses (HEINEMANN, 1870: 205, as *nigricans*; STANGE, 1899: 23). In Britain *fumatella* was formerly restricted mainly to sandy coasts but in recent years is also found increasingly on chalk, clay and other substrates inland (BRADFORD & SOKOLOFF, 1988: 131). Vertical distribution: from sea-level up to 2000 m.

Distribution. Britain, Denmark, France, Belgium, Germany, Switzerland, Austria, Italy, Rumania, Greece, Poland, Czech Republic, Latvia, Belorussia, Russia. Also recorded from Sweden and Finland (GUSTAFSSON, 1987: 92), The Netherlands (KUCHLEIN, 1993: 485), Norway (OPHEIM, 1978: [10], 27), Hungary (GOZMÁNY, 1958: 232) and Ukraine (Kiev area) (SOVINSKIY, 1938: 61). The presence in Mongolia is unconfirmed because Mongolian specimens of the *fumatella*-group examined by us are *sagayica* and *tantella* sp. n. except for a single female that agrees with European *fumatella* in the genitalia and is provisionally placed here (see also Remarks under *sagayica*).

Material examined (including 6 ♂, 3 ♀ genitalia preparations)

Britain (England): lectotype of *fumatella* as above; lectotype of *celerella* as above; 1 ♂, Essex, Rainham, VII.1978 (ROBINSON); 1 ♀, Dorset, Studland, 2.VIII.1894 (BMNH). **Denmark:** 1 ♂, LFM, Gedesby, 3.VIII.1974 (KARSHOLT); 1 ♀, NEJ, Læsø, 16.VII.1982 (KARSHOLT) (ZM); 3 ♂, Sjælland, Asserbo, 7.VIII.1979 (ROBINSON) (BMNH). **France:** 1 ♂, Dep. Haut-Rhin, Sennheim, 6.VIII.1959 (WENCK); 1 ♀, Dep. Alpes-de-Haute-Provence, Uvernet, 1.VIII.1937 (FASSNIDGE); 1 ♂, 4 ♀, Dep. Hautes-Alpes, Nevache, 29.VII-27.VIII.1938 (FASSNIDGE) (BMNH); 2 ♂, 1 ♀, Dep. Hautes-Alpes, Prelles, 1200 m, A.VIII.1974 (ZÜRNBAUER) (genitalia slide no. GEL 311; TLMF); 1 ♂, Dep. Alpes-Maritimes, Col de La Lombarde, 2300 m, 7.VIII.1981 (DUJARDIN) (genitalia slide no. 88/216, HUEMER; TLMF) (TLMF). **Belgium:** 1 ♂, Prov. Limburg, La Campine, Anversois (FOLOGNE) (BMNH). **Germany:** lectotype of *oppletella* as above; lectotype of *nigricans* as above; 1 ♂, Bremen, Grambke, 4.VIII.1937 (AMSEL) (LN); 1 ♂, Braunschweig; 1 ♂, Mecklenburg, 8.VII.1906 (NM); 4 ♂, 4 ♀, Neubrandenburg, Friedland (STANGE); 3 ♂, (STAUDINGER) (BMNH); 1 ♂, Usedom, Loddin, 4.VIII.1984 (SUTTER) (ZM); 1 ♂, Thüringen, Querfurt (WOLTER) (BURM); 1 ♂, Kyffhäuser, 8.VII.1961 (MÜLLER); 1 ♂, Bayern, Langwied, 490 m, E.VII.1977 (ZÜRNBAUER) (TLMF). **Switzerland:** 1 ♂, Bern, Delemont, 1.VIII.1961 (MALICKY); 1 ♂, Valais, Brig, 7.VII.1961 (BURMANN) (TLMF); 1 ♂, Valais (ANDEREGG); 1 ♂, Vaud, Montreux, 10.VII.1926 (BMNH). **Austria:** 1 ♂, Burgenland, Hacklsberg, 19.VII.1964 (GLASER) (LN); 1 ♀, Burgenland, Seewinkel, E of Apetlon, 9.VIII.1962 (KASY); 1 ♀, Wien, Lobau, 25.VII.1916; 3 ♂, Niederösterreich, Hundsheimer Berg S, Porta hungarica, 3, 17.VII.1977, 27.VII.1978 (KASY) (NM); 1 ♀, Wien, 11.VII.1898 (PREISSECKER); 1 ♂, Oberösterreich, Linz, 16.VII.1923 (KNITSCHKE) (TLMF); 1 ♂, 1 ♀, Oberösterreich, Linz, 21.VII.1918, 28.VII.1919 (HAUDER) (NM); 1 ♂, Salzburg, Rauris,

VI.1962 (BURMANN) (BURM); 1 ♂, Kärnten, 18.VII-9.VIII.1954 (DE LATTIN); 5 ♂, Osttirol, Venedigergruppe, Virgental, Virgen-Obermauern, 1400 m, 14. 18.VIII.1993 (HUEMER, RAKOSY); 1 ♂, Osttirol, Venedigergruppe, Virgental, Sajtmähder (Zopat), 1850-900 m, 19.VIII.1993 (HUEMER); 1 ♂, Osttirol, Venedigergruppe, Virgental, Hinterbichl, 1530 m, 9.VII.1993 (HUEMER); 1 ♂, Nordtirol, Innsbruck, 10.VII.1944 (KAPPELLER) (BMNH); 2 ♂, 1 ♀, Nordtirol, Innsbruck, 24.VI, 1, 5.VII.1957 (BURMANN); 1 ♂, 2 ♀, Nordtirol, Umhausen, 23.VII, 6.VIII.1944 (BURMANN) (TLMF); 2 ♂, Nordtirol, Oetz, 13.VIII.1889 (BMNH); 1 ♂, Nordtirol, Landeck, 850 m, 14.VII.1963 (BURMANN); 5 ♂, Nordtirol, Forchach, Lechau, 30.VII.1988 (EGGER & KAHLEN); 3 ♂, 1 ♀, Nordtirol, Stanzach, Blockau, 920 m, 5.+16.VII.1989 (HUEMER); 1 ♂, Nordtirol, Weißenbach, Feldele, 910 m, 5.VII.1989 (HUEMER) (TLMF). **Italy:** 1 ♂, Südtirol, Passiria, Platt, 1100 m, 20 + 23.VIII.1962 (HARTIG); 1 ♂, 2 ♀, Südtirol, Passiria, Stuls, 1300 m, 27.VIII.1959, 10.VII.1961 (HARTIG); 3 ♂, Südtirol, Schnalstal, 800-1000 m, E.VIII.1974, E.IX.1970 (ZÜRNBAUER); 1 ♂, Südtirol, Naturns, 550 m, 18.VII.1960 (BURMANN); 11 ♂, 4 ♀, Südtirol, Prad, Praderfeld, 900 m, 5, 28.VIII.1991 (HUEMER); 1 ♂, Prov. Udine, V. Rio d. Lago, 1000 m, 8.VIII.1987 (HUEMER) (TLMF). **Rumania:** 1 ♂, Cluj, 11.VII.1933; 1 ♂, Sibiu, 8.VII.1917 (PRALL) (MINGA). **Greece:** 2 ♂, Florina, 5 km NW of Pisodarion, 2000 m, 21.VII.1990 (FIBIGER); 1 ♂, Katara pass, 1800 m, 27.VII.1990 (FIBIGER) (ZM). **Poland:** 2 ♂, 2 ♀, Szczecin ('Altdamm'), 18.VII, 8.VIII, 17.VII.1890 (HOFMANN) (BMNH); 1 ♂, Pieniny mts., Czorszytyn, Zamek, 5.VIII.1955 (ZUKOWSKI). **Czech Republic:** 1 ♂, Bohemia, Tetschen, 19.VII.1931 (ZIMMERMANN) (NM). **Latvia:** 1 ♂, Riga (TEICH) (BMNH); 1 ♂, 1892 (TEICH) (NM); 1 ♂, Verbaznic ciema, 13.VIII.1969 (ŠULCS) (coll. ŠULCS, Riga). **Belorussia:** lectotype of *carpella* as above; 1 ♂, 1 ♀, Minsk, 15.VII-15.VIII.1941 (LN). **Russia:** 1 ♂, C. Caucasus, Kabardino-Balkarskij nature reserve, 35 km SE of mt. Elbrus, 2300 m, 13.VII.1990 (JALAVA); 1 ♂, SW-Altai, Katun valley, 10 km W of Katanda, 1200 m 15-19.VII.1983 (MIKKOLA, HIPPA & JALAVA) (ZMUH). Identity uncertain (see Remarks). **Mongolia:** 1 ♀, Bulgan aimak, 9 km E of Somon Abzaga, 1300 m, 23.VII.1966 (KASZAB, no. 730) (genitalia slide no. 776, SATTLER; TM).

Chionodes sagayica (KOÇAK, 1986) comb. n.

(Figs 42-44, 108, 111, 142, 167, 196)

Gelechia sagayica KOÇAK, 1986, Priamus 4: 58. Holotype ♀, Russia: Vostochnyy Sayan, Gora Munku-Sardyk (collector unknown) (genitalia slide 477 FILIPJEV; ZIAN) [examined].

Adult (Figs 42-44). ♂, 7.5-8.7 mm; ♀, 7.0-7.5 mm. Head brownish grey, frons lighter. Second segment of labial palpus whitish grey, speckled with dark brown, particularly on outer surface; third segment dark brown with some lighter scales. Thorax and tegula brownish grey. Fore wing brownish grey, speckled with some orange-brown, particularly near apex; discal, discocellular and plical spots indistinct, blackish brown; light costal and tornal spots absent; fringe greyish brown, distal part lighter. Hind wing light greyish brown.

Pregenital abdomen ♂ (n=4). Tergite VIII shorter than (rarely as long as) sternite, evenly tapered, distally rounded; anterior emargination broadly arched, depth about one-third overall length of tegumen. Sternite VIII with posterior margin moderately concave medially, lateral margins more or less straight, parallel; anterior apophysis short, broad, variable, evenly or stepwise tapered, distally truncate to moderately concave.

Genitalia ♂ (Figs 108, 111, 142) (n=4). Overall length 1.9-2.0 mm. Uncus (0.47-0.48 x 0.27-0.32 mm) sub-triangular, distally with distinct medial thorn. Gnathos hook rather strong, slender, strongly curved, distally slightly dilated. Costa (1.23-1.37 mm) strongly curved basally, distal part slightly

curved extremely long, apex level with tip of uncus. Sacculus (1.00-1.03 mm) very long, almost evenly curved, about one-half width of costa. Saccus (0.68-0.73 mm) broad at base, evenly tapered, distal half sub-rectangular. Aedeagus (1.35-1.51 mm) short, stout, slightly dilated medially, almost straight, apex with hook-like sclerite, coecum (0.50 mm) short, stout.

Genitalia ♀ (Figs 167, 196) (n=2). Apophyses posteriores 2.8 mm. Segment VIII short, broad. Apophyses anteriores (0.75-0.92 mm) about 3 times length of segment VIII, extremely broad, distally splayed, basal three-fifths fused medially, distal two-fifths sub-rectangular with broadly rounded corners, gap between apophyses broadly rounded. Antrum (0.38 mm) relatively broad, slightly funnel-shaped, about one-fifth to one-quarter basal width of fused apophyses anteriores. Bursa copulatrix long [shape not determinable, distorted in preparation]. Signum at anterior quarter of bursa copulatrix; anterior transverse ridge vestigial, posterior ridge slightly stronger.

Remarks. *C. sagayica* is very closely related to *fumatella* and its taxonomic status is still uncertain. The holotype female resembles *fumatella* externally; the ovipositor and apophyses posteriores are shorter than in European *fumatella*, the apophyses anteriores are distally splayed and the antrum is broader. The type-locality of *sagayica*, Gora Munku Sardyk, is situated on the border of the Buryatskaya Respublika with Mongolia. We consider it likely that four males and one female from the Mongolian Bulgan province represent this species. The only female in the series is damaged and lacks the bursa copulatrix; however, it agrees reasonably well with the holotype of *sagayica* in the distally splayed apophyses anteriores and the broad antrum. The male genitalia are very similar to those of *fumatella* and differ primarily in the much stronger gnathos hook. A further female, collected together with the specimens from Bulgan province, is much smaller and agrees with *fumatella* in the genitalia (Fig. 168) (see *fumatella*).

G. sagayica was originally proposed as an objective replacement name for '*Gelechia tenebrosella* FILIPJEV (1930: 9, pl. 1, fig. 8, pl. 2, fig. 6)', considered by KOÇAK to be a junior primary homonym of *Gelechia tenebrosella* TEICH, 1886. However, *tenebrosella* sensu FILIPJEV is clearly a misidentification of *tenebrosella* TEICH, and *sagayica* is therefore a 'sp. n.' rather than 'nom. n.'. The type-material of *sagayica* thus is the single female recorded by FILIPJEV as *tenebrosella* TEICH (see above). It should be noted that *Gelechia distinctella* var. *tenebrosella* TEICH, 1886, is itself a junior primary homonym of *Gelechia (Brachmia) tenebrosella* ZELLER, 1839 [= *Monochroa tenebrella* (HÜBNER)], and a junior subjective synonym of *Bryotropha terrella* (DENIS & SCHIFFER-MÜLLER, 1775) (SATTLER, 1992: 109).

Biology. Host-plant and early stages unknown. The adult occurs in late VII. Vertical distribution: insufficiently known, only record from about 1300 m.

Distribution. Russia (Vostochnyy Sayan, Irkutskaja Oblast), Mongolia (Archangaj aimak, Bulgan aimak).

Material examined (including 4 ♂, 2 ♀ genitalia preparations)

Russia: holotype as above; 1 ♂, Vostochnyy Sayan, Arasagun-gol (genitalia slide no. 90/125, HUEMER; ZM); 1 ♂, Irkutskaja Oblast, Hamar-Daban, meteorological station, 1450 m, 14-28.VII. 1984 (MIKKOLA & VIITASARI) (ZMUH). **Mongolia:** 1 ♂, Archangaj aimak, Changaj mts, 8 km W of Somon Urdtamiir, 1620 m, 21.VII.1966 (KASZAB, no. 725); 4 ♂, 1 ♀, Bulgan aimak, 9 km E of Somon Abzaga, 1300 m, 22-23.VII.1966 (KASZAB, no. 729 + 730) (genitalia slide no 91/310, HUEMER; TM) (TM).

Chionodes tantella sp. n.

(Figs 45, 46, 112, 113, 143, 169, 170, 197)

Adult (Figs 45, 46). ♂, 7.1-8.1 mm; ♀, 6.0-7.7 mm. Head greyish brown to orange-brown, frons

whitish grey. Second segment of labial palpus cream, speckled with mid-brown and orange-brown, particularly on outer surface; third segment mid-brown. Thorax and tegula greyish brown, frequently mottled orange-brown. Fore wing greyish brown, mottled orange-brown and blackish brown, dorsum usually light brown; discal, discocellular and plical spots indistinct blackish brown, usually lined with white scales; orange-brown to white costal and tornal spots at four-fifths, indistinct not fused; termen with blackish brown and white dots; fringe grey basally, distal part orange-brown. Hind wing light greyish brown.

Pregenital abdomen ♂ (n=3). Tergite VIII shorter than sternite, evenly tapered, apex rounded; anterior emargination broadly arched, depth about one-third overall length of tergite. Sternite VIII with posterior margin moderately concave to broadly V-shaped, lateral margins straight, parallel; anterior apophysis short, broad, distally truncate to weakly concave.

Genitalia ♂ (Figs 112, 113, 143) (n=3). Overall length 2.1 mm. Uncus (0.40-0.43 x 0.43 mm) broadly oval, distally with strong medial thorn. Gnathos hook weak, long, slender, straight basally, curved distal part. Costa (1.34-1.36 mm) extremely long, strongly curved basally, distal part slightly curved apex nearly level with tip of uncus. Sacculus (1.10-1.14 mm) extremely long, strongly curved basally, distal part slightly curved, about one-half width of costa. Saccus (0.65-0.69 mm) broad at base, evenly tapered basally, distal third sub-rectangular. Aedeagus (1.70 mm) rather short, stout, slightly dilated medially, straight, apex with hook-like sclerite, short coecum (0.45 mm) stout.

Genitalia ♀ (Figs 169, 170, 197) (n=2). Apophyses posteriores 3.3-4.1 mm. Segment VIII short. Apophyses anteriores (0.98-1.03 mm) long, extremely broad, basal half to three-fifths fused medially, abruptly tapered to short tip, free distal parts separated by broadly V-shaped gap; segment not constricted at level of antrum. Antrum (0.43-0.57 mm) short, narrow, tubular, about one-quarter basal width of fused apophyses anteriores. Bursa copulatrix with short ductus bursae imperceptibly widened into large drop-shaped or oval corpus bursae. Signum in anterior half of corpus bursae, reduced, shape variable, with short but distinct posterior transverse ridge.

Remarks. *C. tantella* sp. n. is very similar to *fumatella* and *sagayica* externally but can be separated by the usually light dorsum of the fore wing. The male genitalia differ from those of both taxa by the distinctly longer sacculus and stronger medial thorn of the uncus; the gnathos hook resembles that of *fumatella* and is weaker than in *sagayica*. The female genitalia are easily distinguished from those of *fumatella* by the pointed rather than rounded apophyses anteriores which resemble those of *ignorantella*, but whilst in the latter the fused portion of the apophyses is clearly constricted at the level of the antrum, it has parallel margins in *tantella* sp.n.

Biology. Host-plant and early stages unknown. The adult occurs in mid- to late VIII. Vertical distribution: 600 m to about 1300 m.

Distribution. Mongolia (Central aimak, Cojbalsan aimak).

Material examined (including 3 ♂, 3 ♀ genitalia preparations)

Holotype ♂, **Mongolia:** Central aimak, Kerulen, 45 km E of Somon Bajandelger, 1340 m, 24.VIII.1965 (KASZAB, no. 478) (TM).

Paratypes. **Mongolia:** 46 ♂, 2 ♀, as holotype but 26.VII., 24.VIII.1965 (genitalia slide no. 90/086 + 90/087 + 91/305, HUEMER; 775, SATTLER; TM); 1 ♀, Cojbalsan aimak, Somon Chalchingol, 600 m, 13.VIII.1965 (KASZAB, no. 409) (BMNH; TLMF; TM).

Chionodes ignorantella (HERRICH-SCHÄFFER, 1854)

(Figs 47, 114, 144, 171, 198)

Gelechia ignorantella HERRICH-SCHÄFFER, 1854, Syst. Bearb. Schmett. Eur. 5: 162 [key], 180

(1854); pl. 68, fig. 510 (1853, non-binominal). Lectotype ♀, Germany: Mecklenburg (MUSSEHL) (genitalia slide no. 1962 B, SVENSSON [micro-slide on pin with moth]; ZMHU), here designated [examined].

Gelechia ochrisignella NOLCKEN, 1871, Lepid. Fauna Estland, Livland & Kurland (2): 548. Holotype ♂, Latvia: Riga (TEICH) (abdomen missing; BMNH) [examined]. [Synonymized by HERING, 1893: 96.]

Adult (Fig. 47). ♂, 6.9-7.4 mm; ♀, 6.3-6.7 mm. Head dark greyish brown to orange-brown, frons lighter. Second segment of labial palpus yellowish white, speckled with dark brown, particularly on outer surface; third segment dark brown with some yellowish white scales. Thorax and tegula dark brown, mottled grey. Fore wing dark brown, mottled grey, particularly dorsally; discal, discocellular and plical spots very faint blackish brown; small pale yellow costal and tornal spots at four-fifths, separated; fringe dark greyish brown basally, distal part light grey. Hind wing fairly dark, greyish brown.

Pregenital abdomen ♂ (n=2). Tergite VIII narrow, weakly tapered, distally rounded, shorter than sternite; anterior emargination broadly arched, depth about two-fifths overall length of tergite. Sternite VIII with posterior margin broadly concave, lateral margin weakly curved; anterior apophysis short, broad, trapezoidal, distally truncate to weakly concave.

Genitalia ♂ (Figs 114, 144) (n=2). Overall length 1.9 mm. Uncus (0.45 x 0.25 mm) sub-rectangular, distally with distinct medial thorn. Gnathos hook weak, slender, slightly curved apically. Costa (1.03 mm) extremely long, strongly curved basally, distal part almost straight, apex almost level with tip of uncus. Sacculus (0.50 mm) short, straight, about width of costa. Saccus (0.75 mm) broad at base, with evenly tapered basal and sub-rectangular distal part. Aedeagus (1.48 mm) short, slightly dilated medially, almost straight, apex with hook-like sclerite, coecum (0.50 mm) stout.

Genitalia ♀ (Figs 171, 198) (n=1). Apophyses posteriores 3.0 mm. Segment VIII short. Apophyses anteriores (0.98-1.03 mm) long, extremely broad, basal three-fifths fused medially, abruptly tapered to short tip, free distal parts separated by broadly V-shaped gap; segment distinctly constricted at level of antrum. Antrum (0.40 mm) short, slightly funnel-shaped, narrow, about one-third basal width of fused apophyses anteriores. Bursa copulatrix very long, ductus bursae short, gradually widened to narrow posterior section of corpus bursae; anterior section wider, oval. Signum at about middle of corpus bursae, sub-oval, posterior transverse ridge long, distinct; anterior ridge vestigial or absent.

Remarks. *C. ignorantella* is easily recognized by its small size and the pale yellow costal and tornal spots of the fore wing. The genitalia differ from those of related *Chionodes* by characters such as the short sacculus and shape of the apophyses anteriores.

G. ignorantella was described from two specimens (sex not stated) from Mecklenburg, leg. H. MUSSEHL, in FISCHER VON ROESLERSTAMM's collection. Both are females and are now preserved in coll. STAUDINGER (ZMHU). A lectotype was selected (but not formally designated) by SVENSSON in 1962; it bears the labels 'v. MUSSEHL' and '*Ignorantella*, FR'.

In the original description of *G. ochrisignella* the type-locality was erroneously cited as 'Dorpat', but this was corrected by ZELLER (in STANGE, 1880: 116).

Biology. Host-plant: unspecified mosses.

The ovum is unknown. The undescribed larva overwinters young and feeds till V, VI. It lives, sometimes in company with those of *Dipleurina lacustrata* (PANZER) and *Eudonia truncicolella* (STANTON) in a silken tube amongst mosses on garden fences and roadside trees such as willows and poplars (STANGE, 1880: 116; 1899: 23, as *Scoparia crataegella* and *S. truncicolella*). The adult occurs in VII. According to JAROŠ & SPITZER (1987: 10) the species is a characteristic stenotopic

element of wet *Alnus*-forests. Vertical distribution: only known from low altitudes.

Distribution. Usually very local. Sweden, Germany, 'Tirol' (Austria or Italy), Poland, Czech Republic, Latvia. Also recorded from Denmark (most districts) (KARSHOLT, 1985: 64), Norway (Vest-Agder) (OPHEIM, 1978: [10]), Finland (JALAVA, 1977: 14), Russia (Karelskaya Respublika, Petrozavodsk (HERING, 1893: 97), Ukraine (Kiev area) (SOVINSKI, 1938: 61) and Hungary (GOZMÁNY & SZABÓKY, 1986: 267).

Dubious records. France (Gironde) (LHOMME, [1948]: 596). The occurrence of *ignorantella* in the French Département Gironde, far away from its main area of distribution in northern and central Europe, is rather unlikely. Mongolia (PISKUNOV, 1979: 396; EMEL'YANOV, 1982: 376). As we have not found any *ignorantella* in the extensive material available to us from Mongolia and other parts of central Asia, confusion with another species of the *fumatella*-group such as *tantella* sp. n. cannot be ruled out.

Material examined (including 2 ♂, 2 ♀ genitalia preparations)

Sweden: 1 ♀, Öl, Seberneby, 23.VII.1975 (KARSHOLT) (ZM). **Germany:** lectotype of *ignorantella* as above; 1 ♀ (*ignorantella* paralectotype), Mecklenburg (MUSSEHL) (ZMUH); 1 ♂, 2 ♀, Neubrandenburg, Friedland, 14.VII.1880, 5.VII.1898 (moss) (STANGE) (BMNH; ZSBS). **Austria/Italy:** 1 ♀, Tirol, 3.VIII.1899 (moss) (STANGE) (ZSBS). **Poland:** 1 ♂, 1 ♀, Wrocław ('Breslau'), 14.VII.1857 (WOCKE) (genitalia slide no. 90/182 + 91/284, HUEMER; ZIAN). **Czech Republic:** 10 ♂, 1 ♀, České Budějovice, Cernis, 20.VII-6.VIII.1984, 29.VII + 16.VIII.1985, 7.VII-4.VIII.1986 (JAROŠ) (CSAV; TLMF). **Latvia:** holotype of *ochrisignella* as above.

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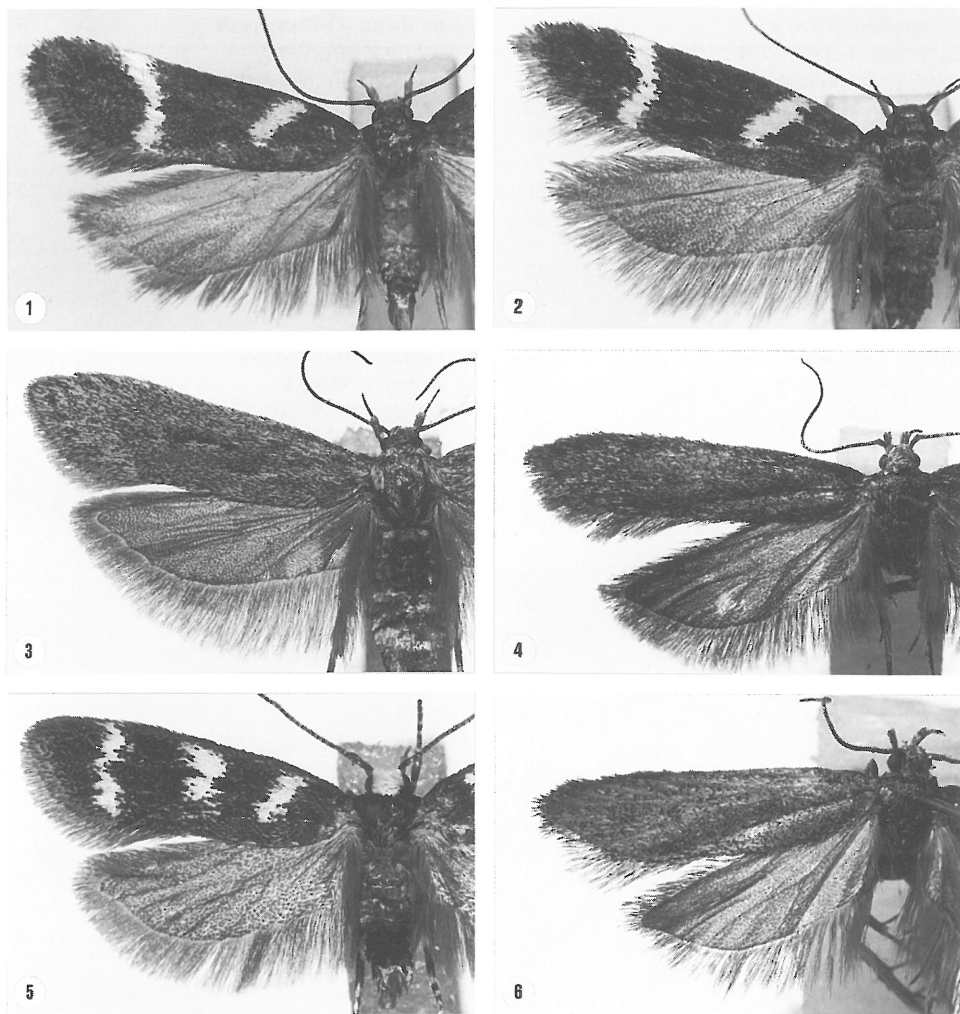
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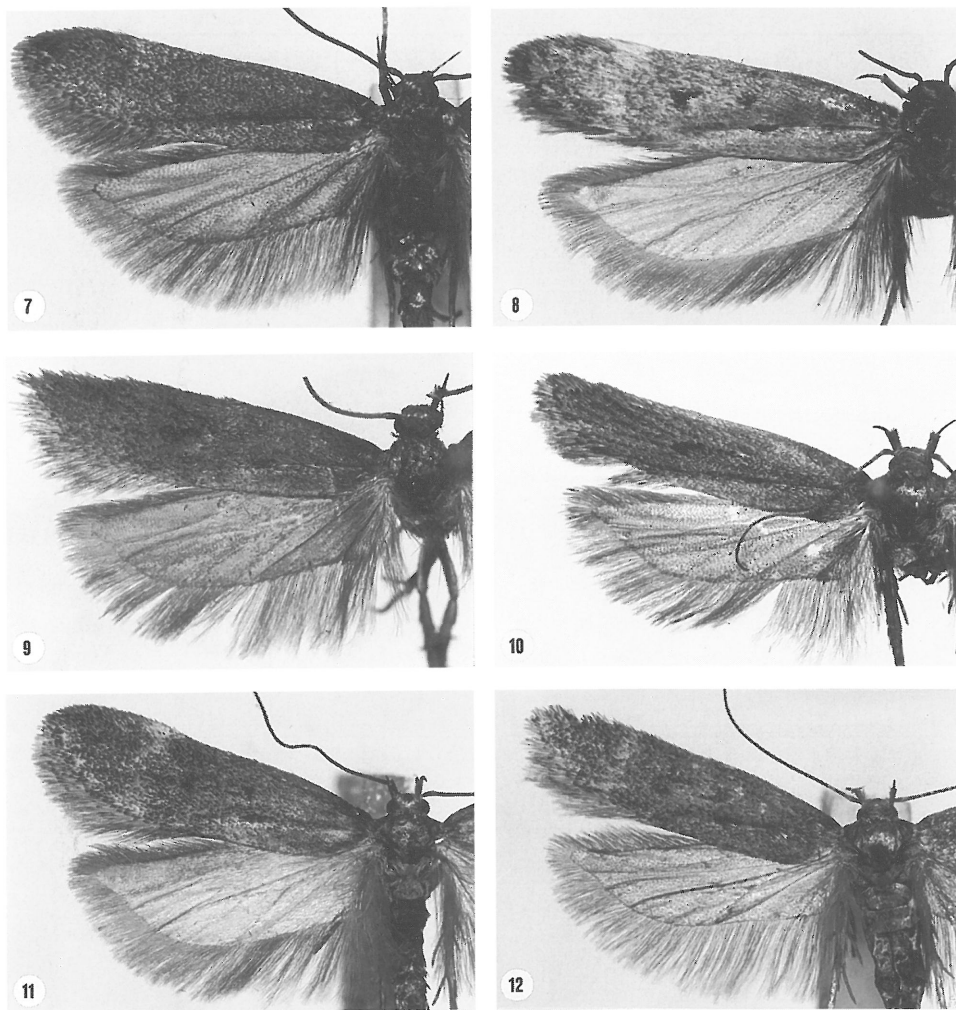
Invalid names are in *italics*, principal entries in **bold**. Names of species other than those currently in *Chionodes* are followed by their genus.

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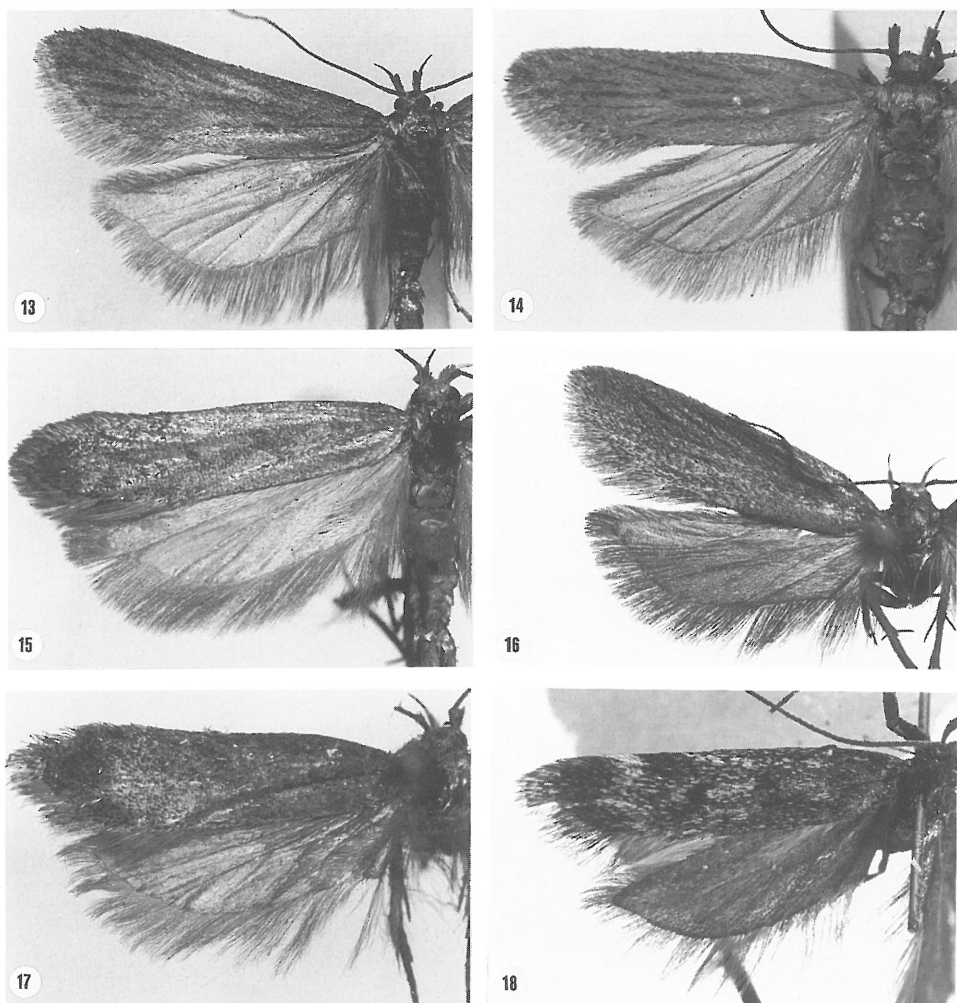
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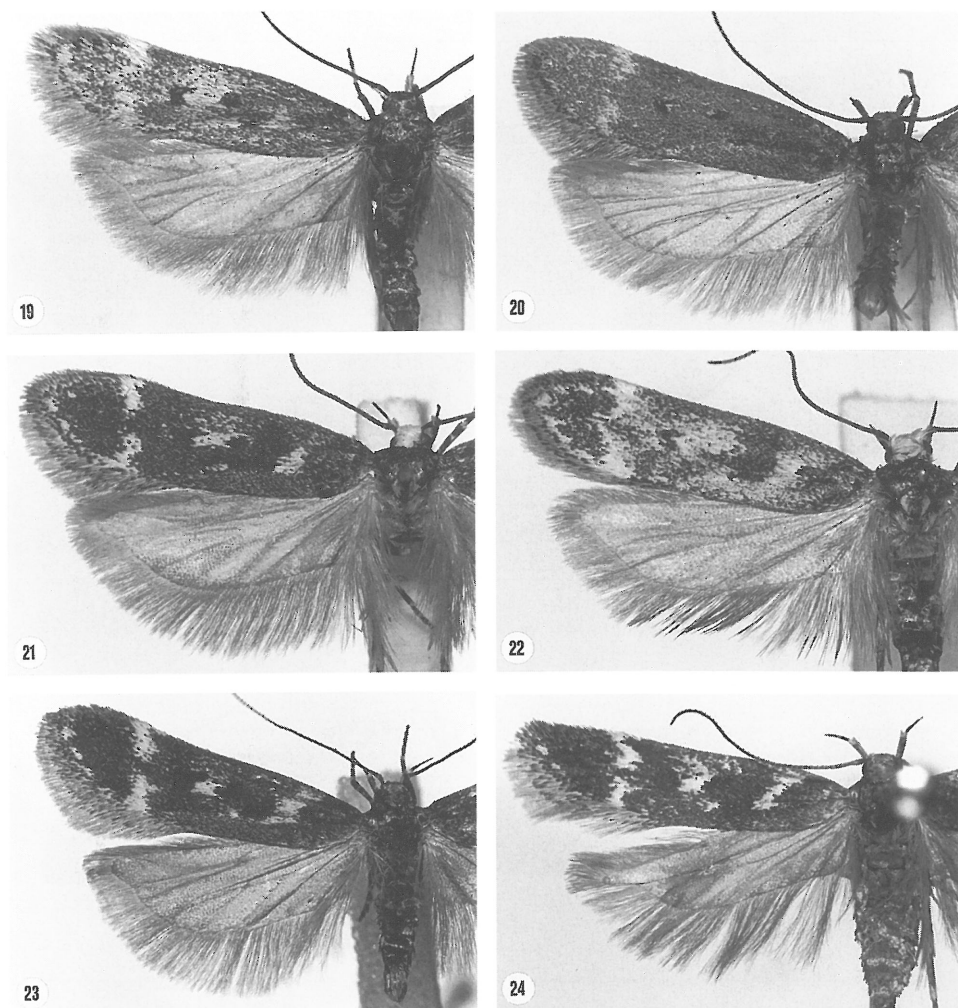
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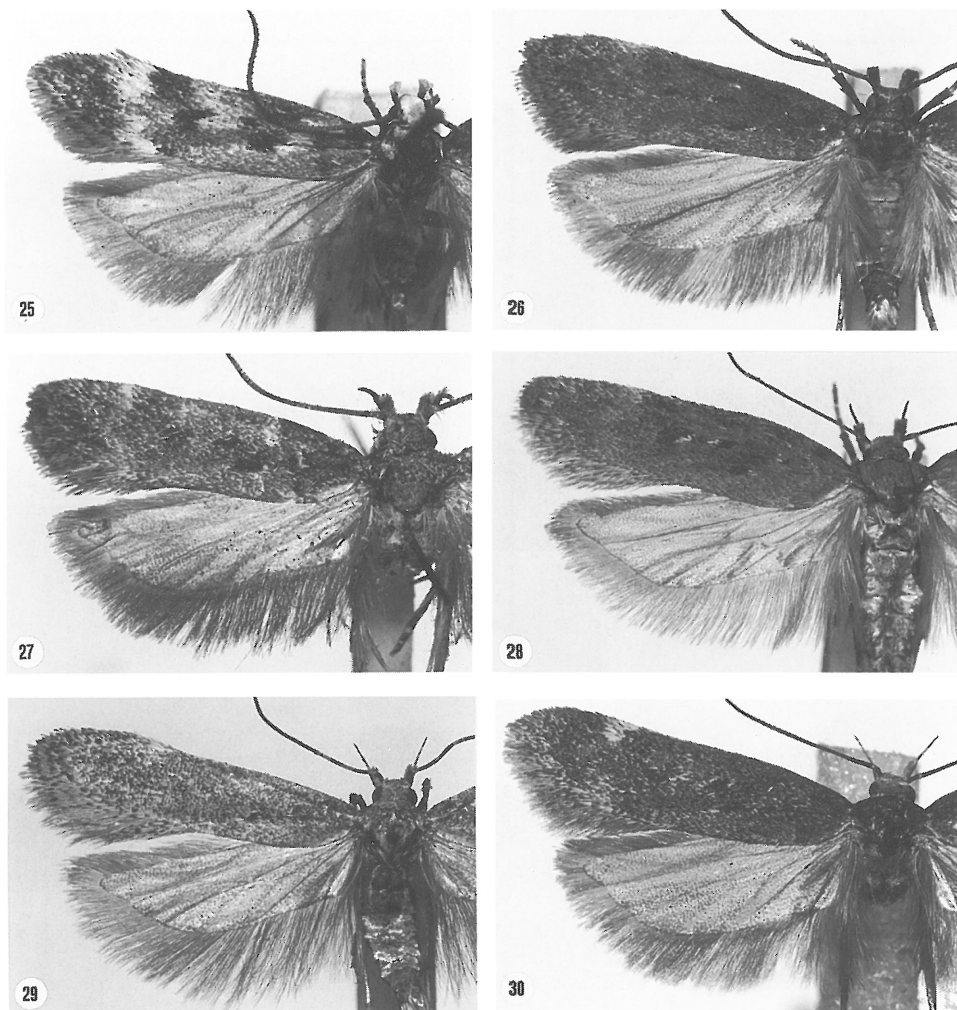
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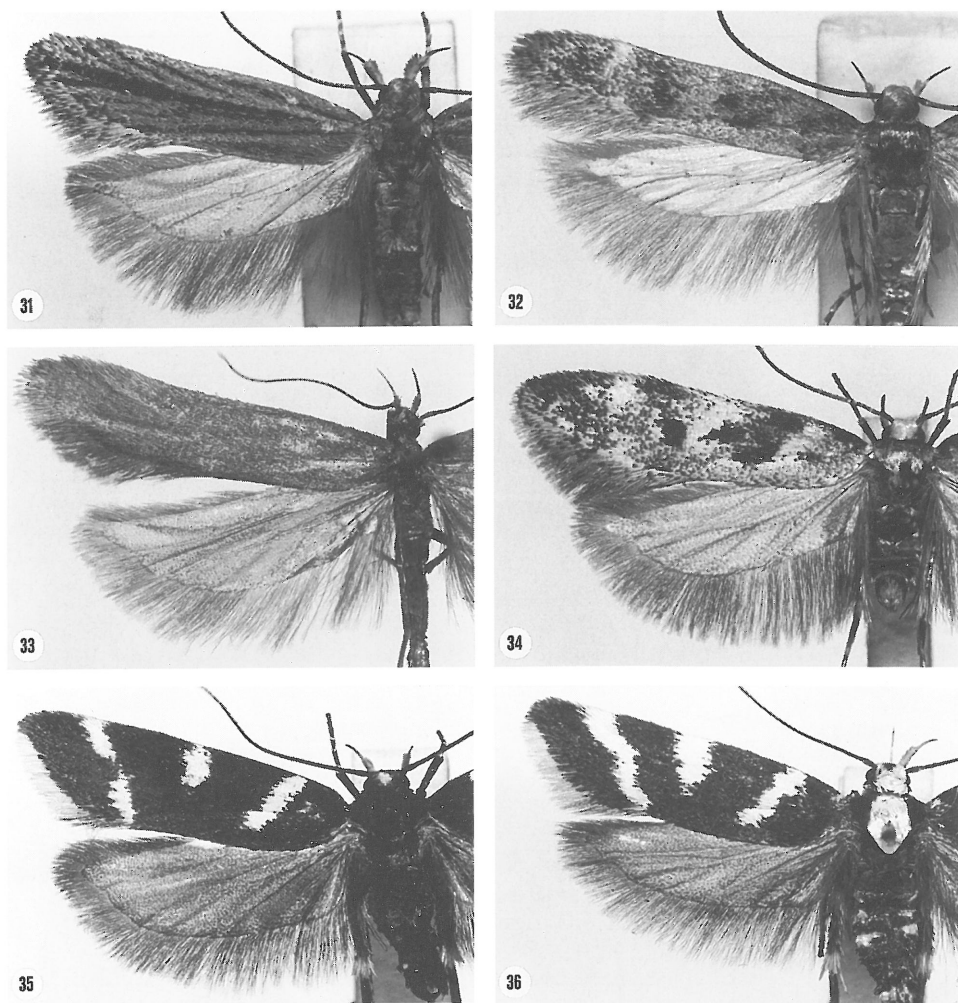
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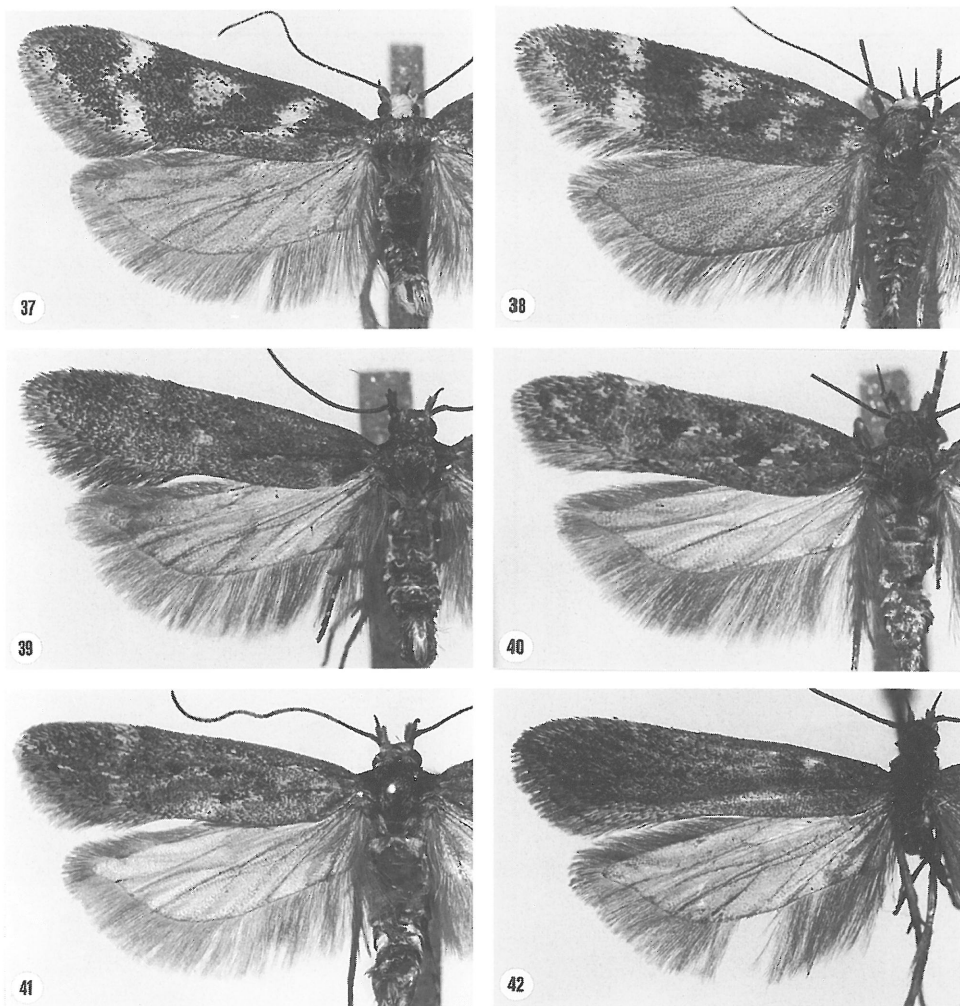
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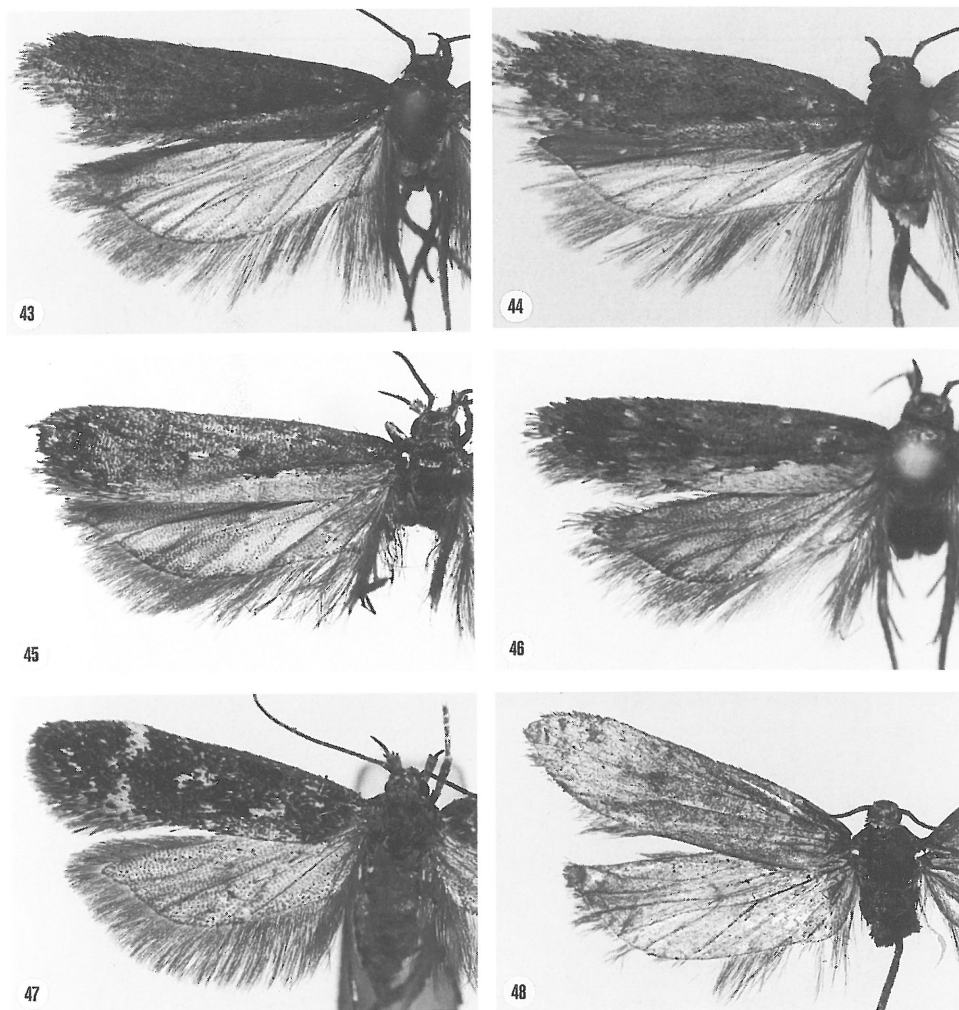
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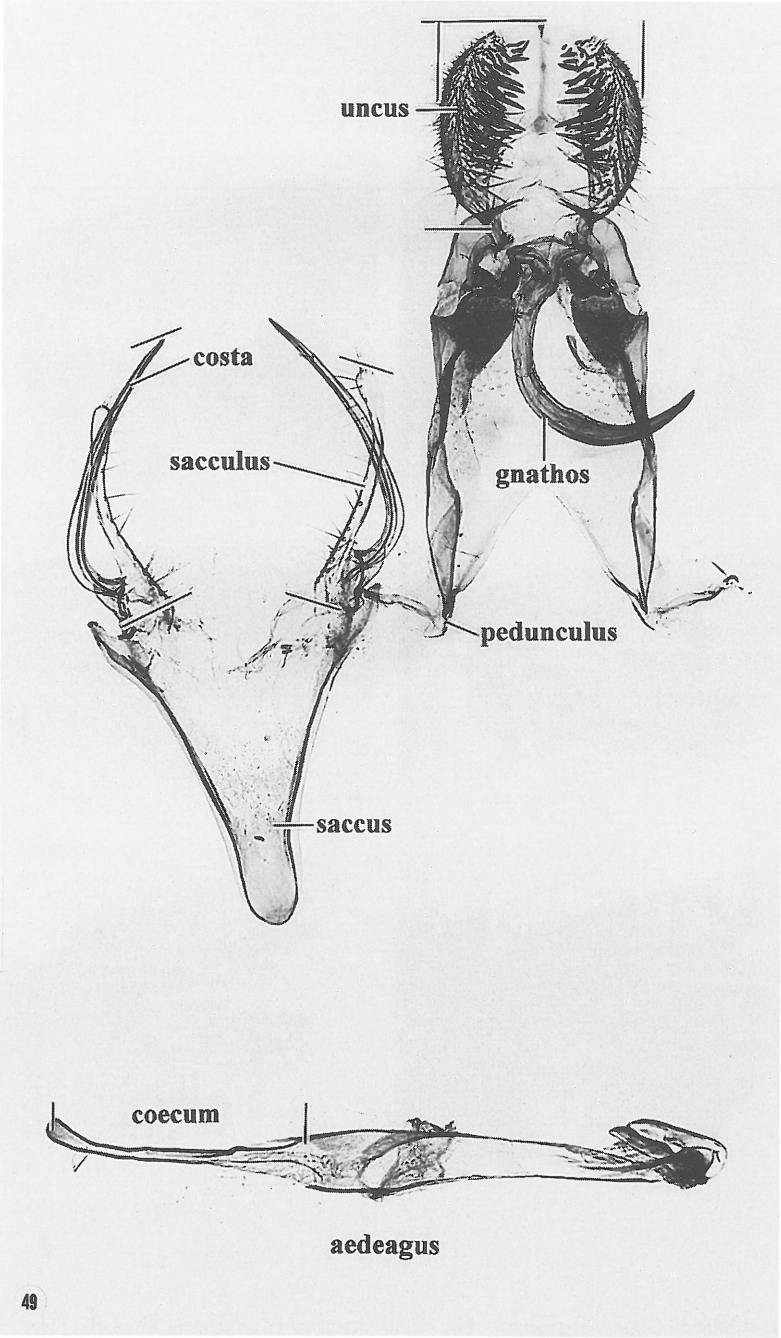


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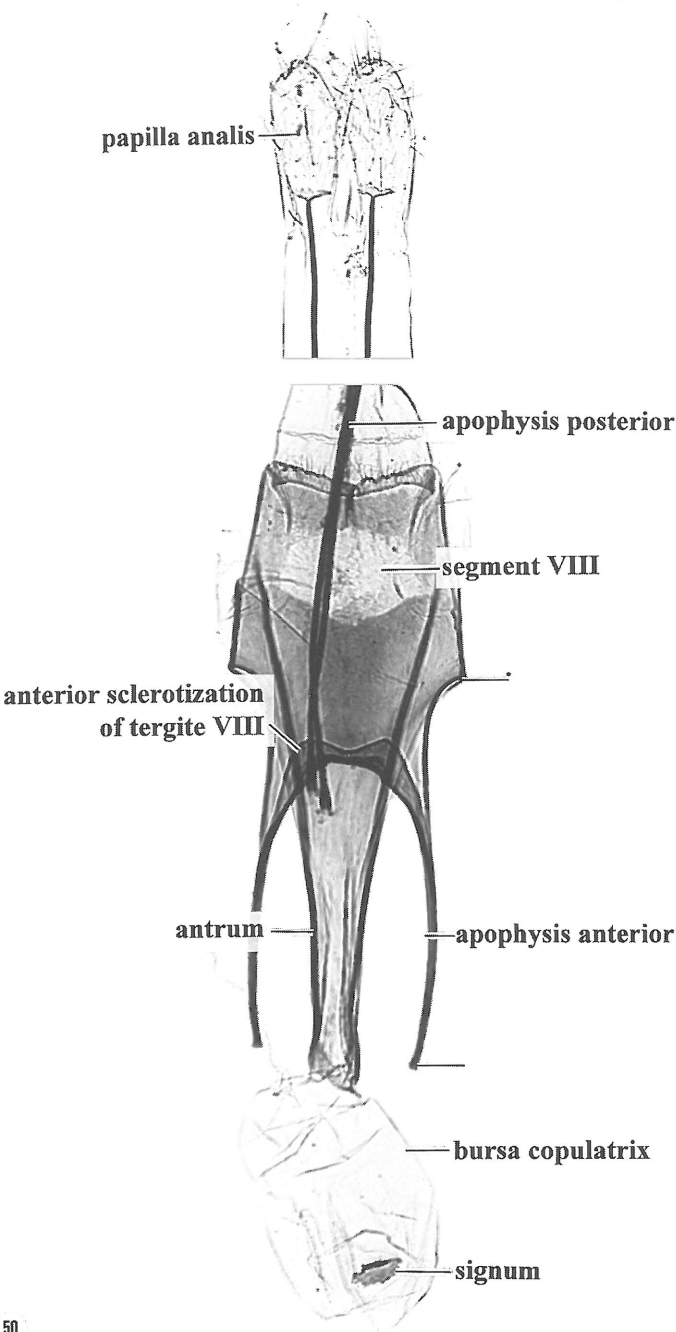
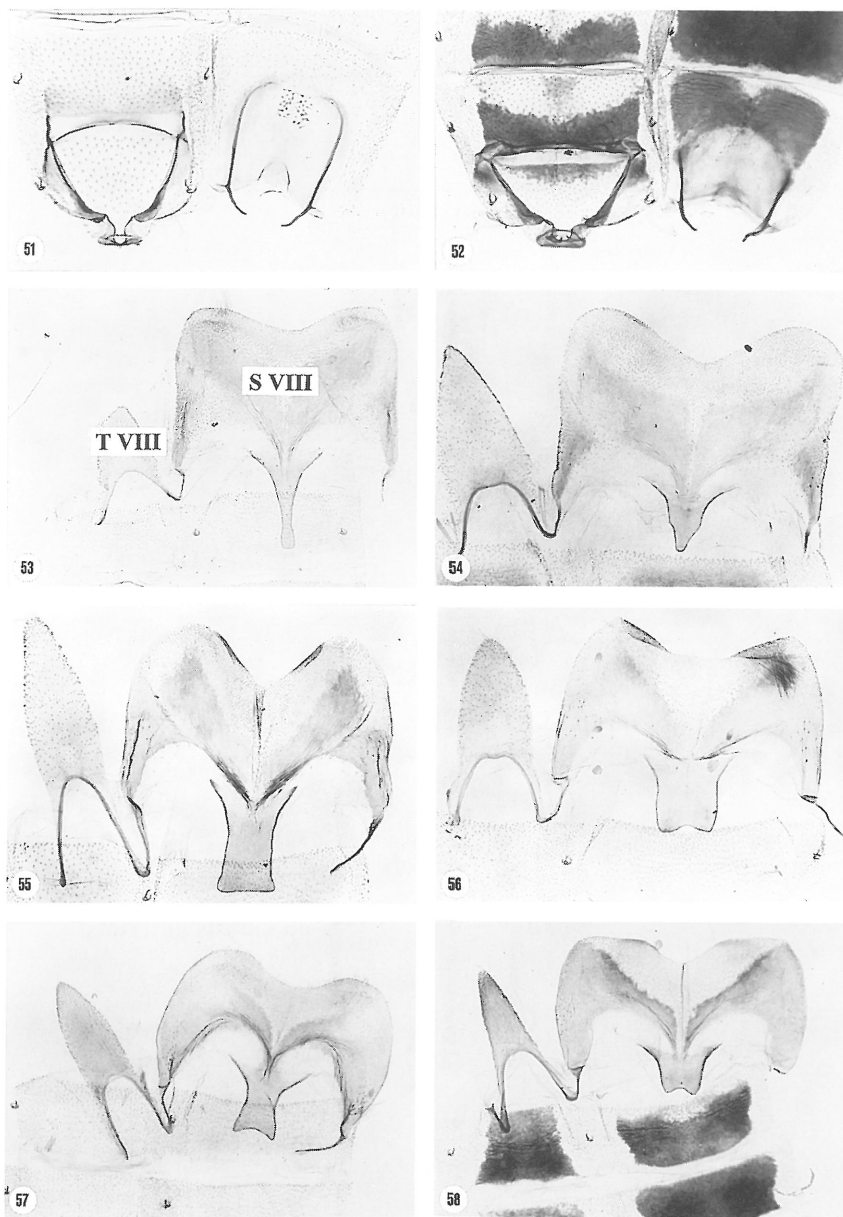
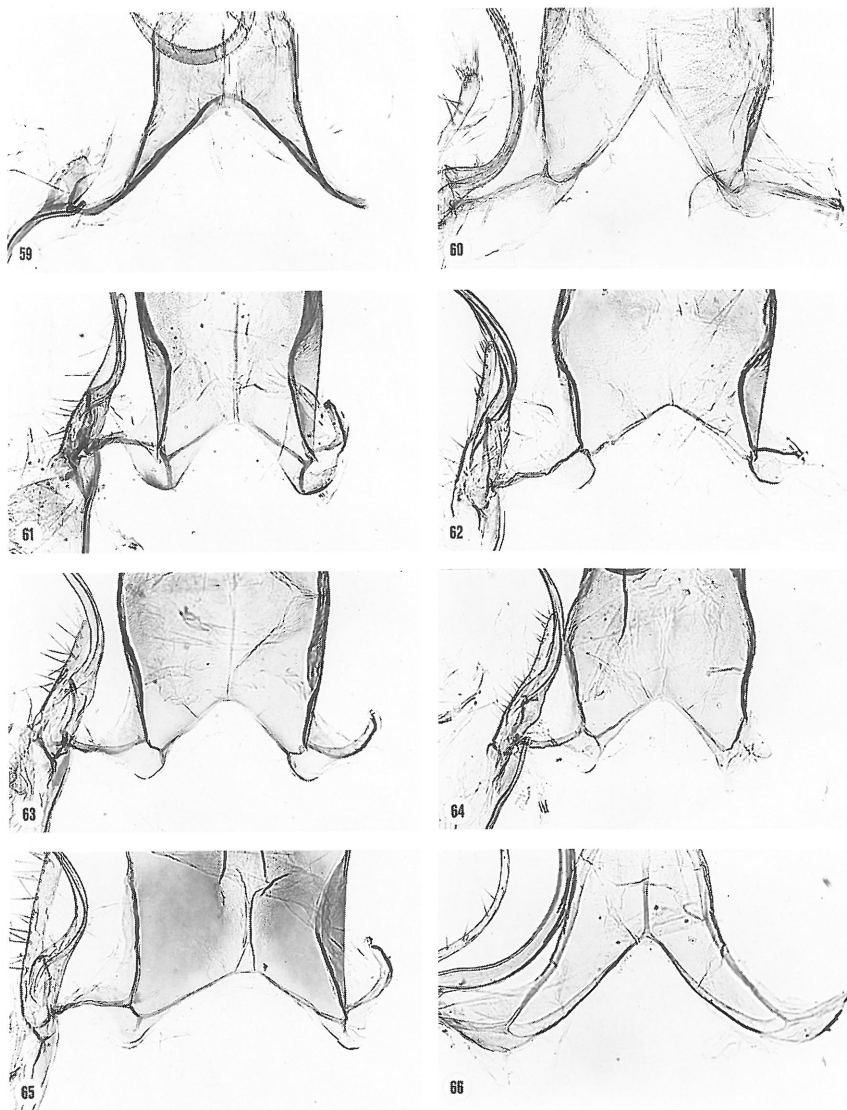


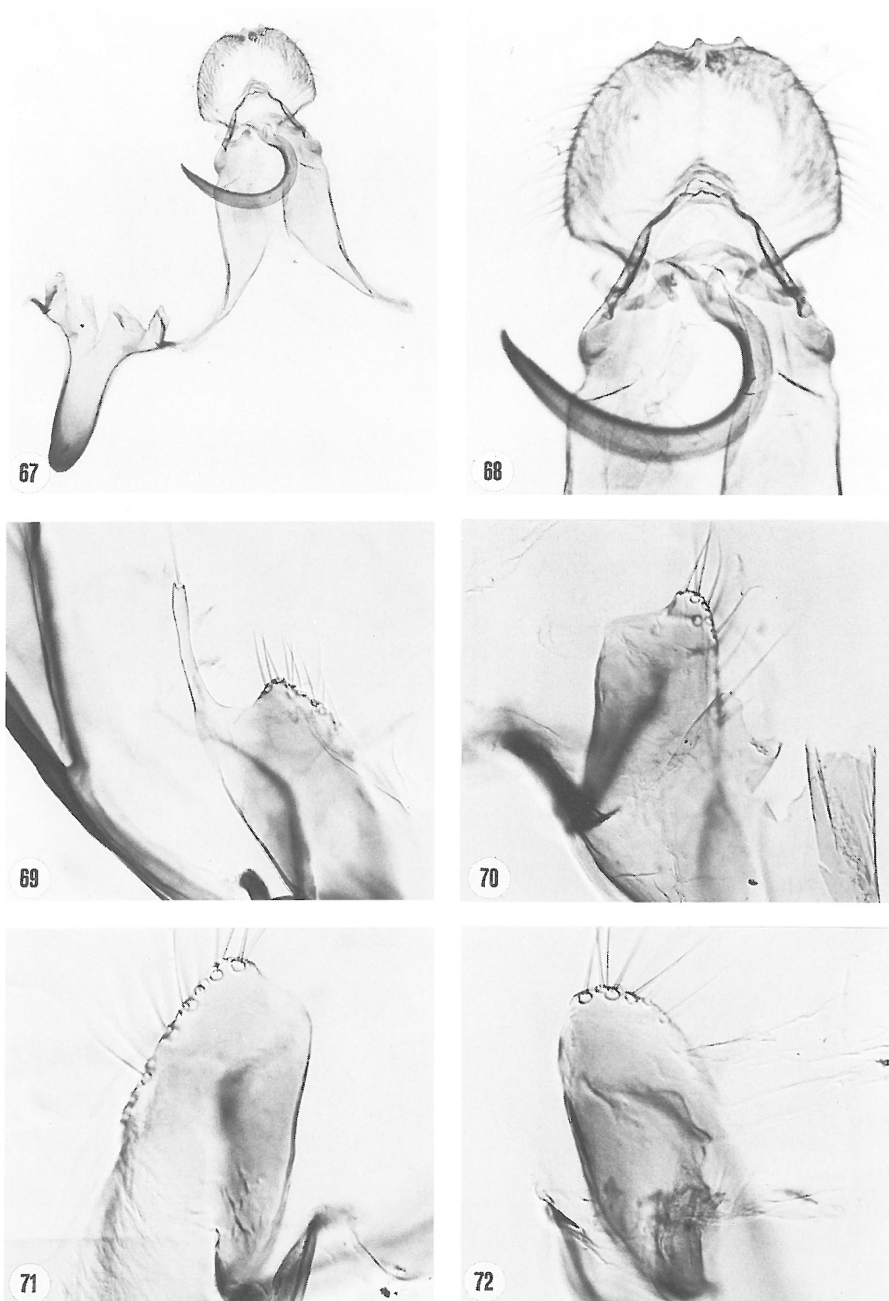
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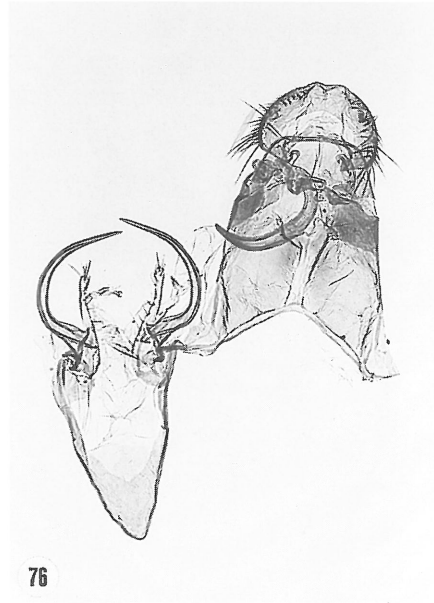
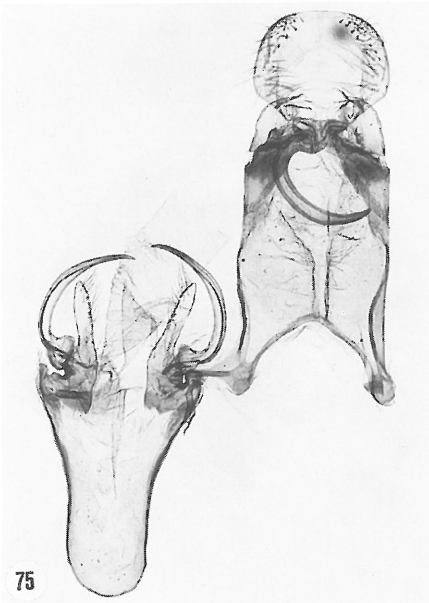
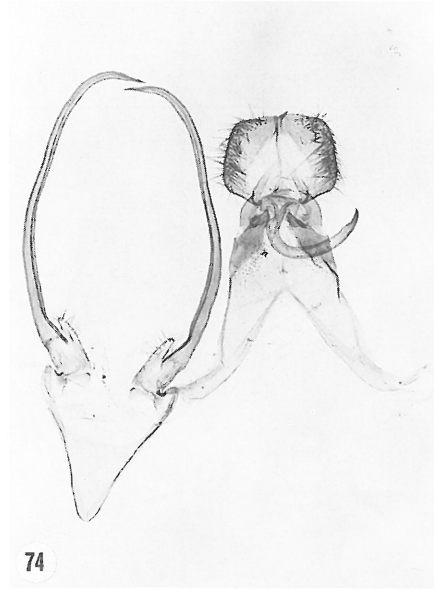
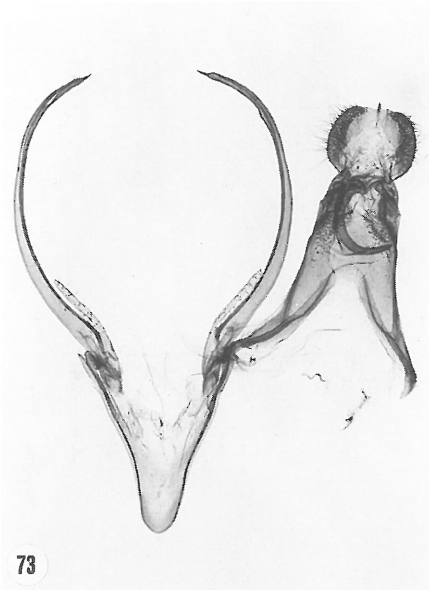
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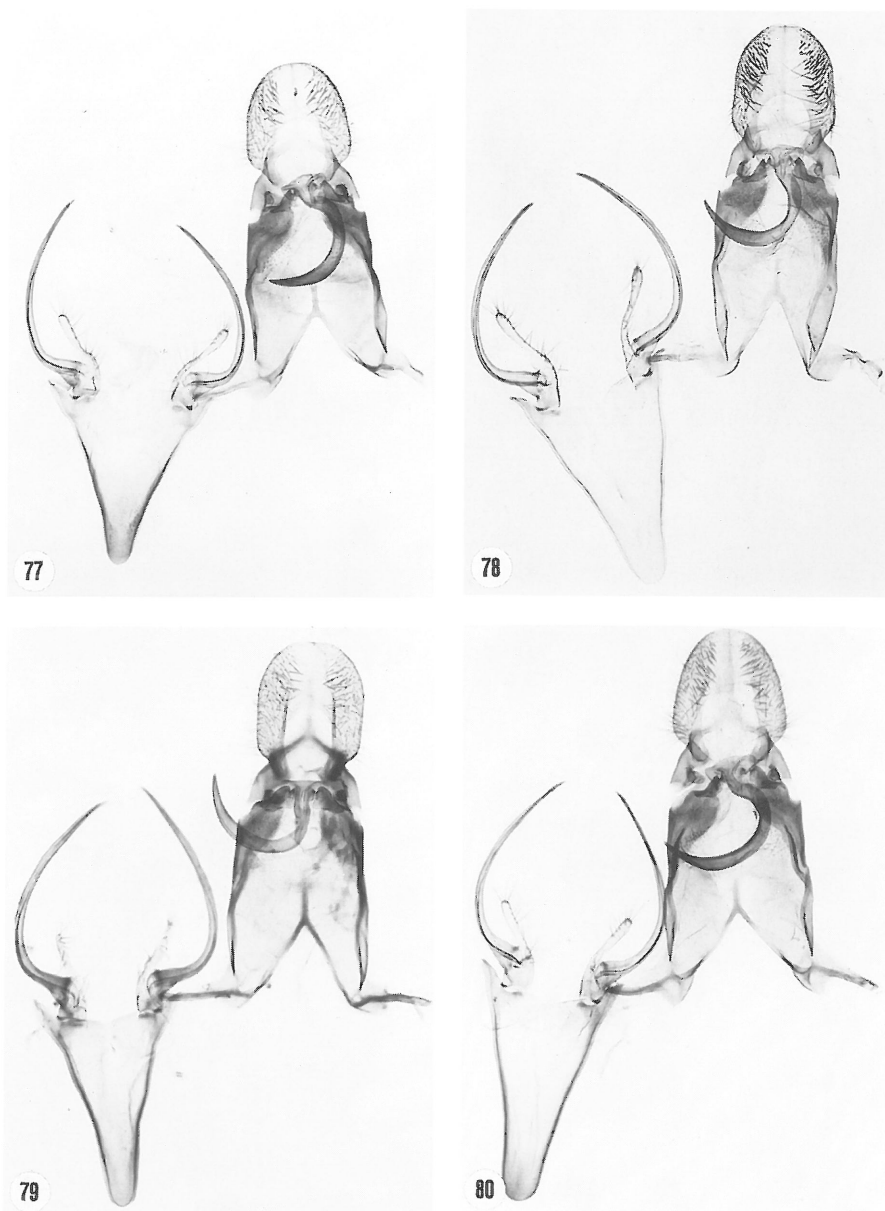
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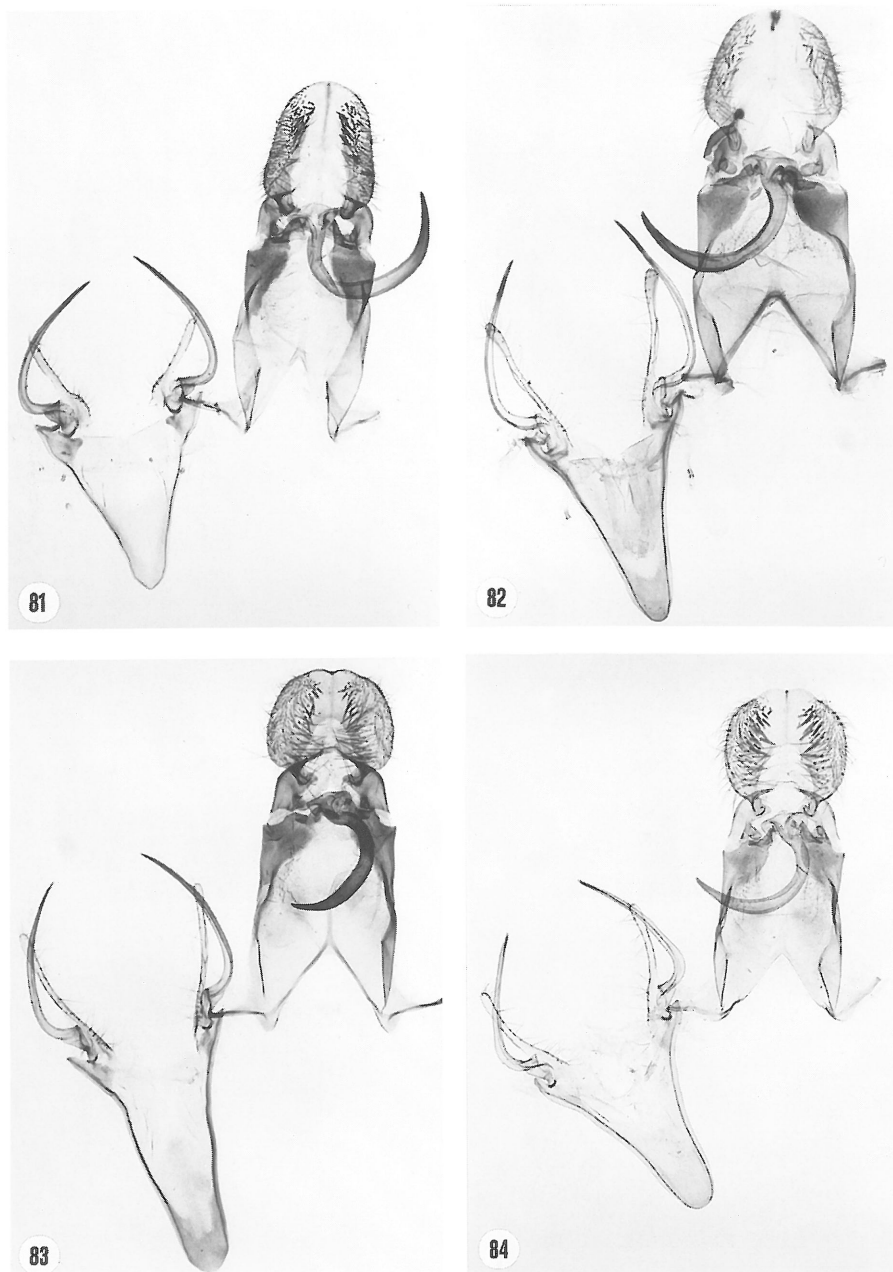
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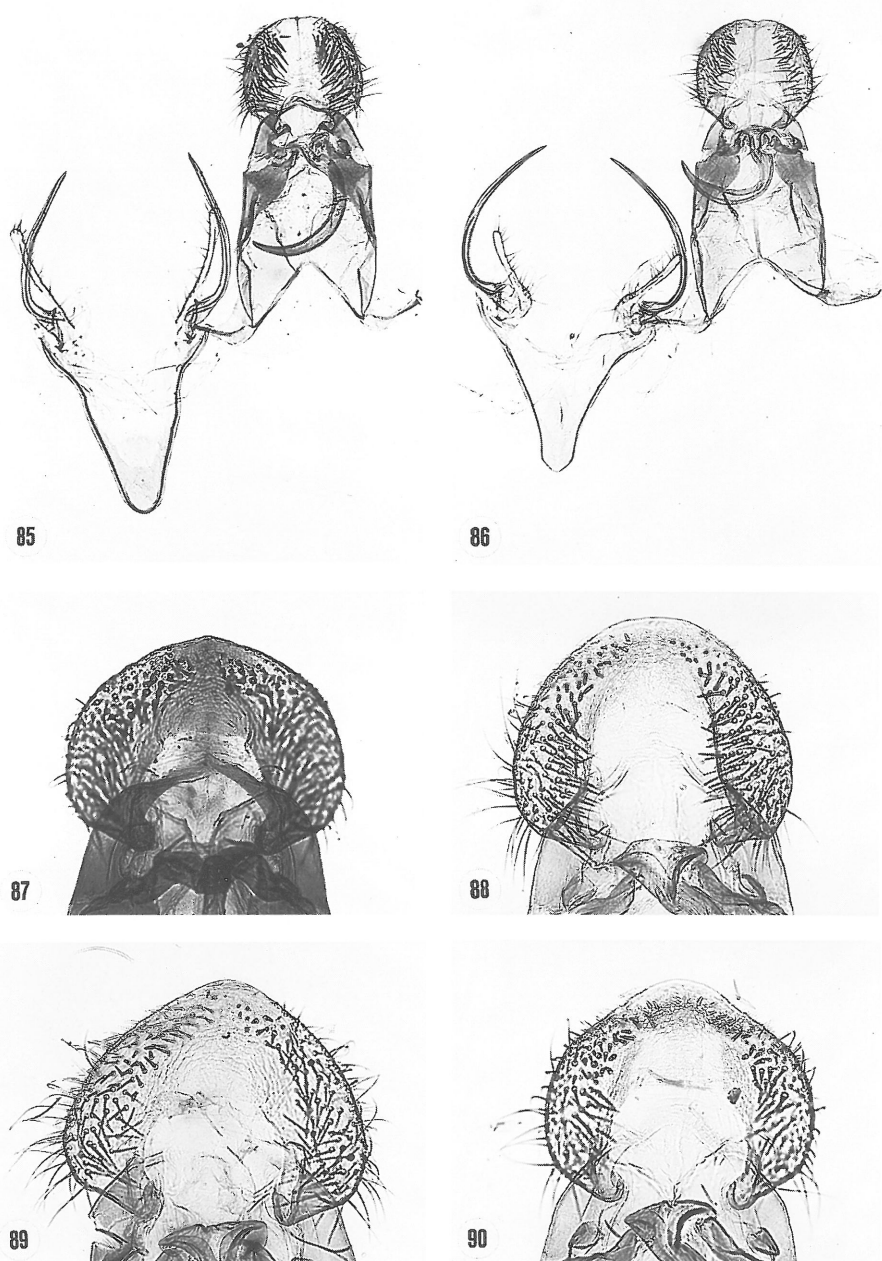
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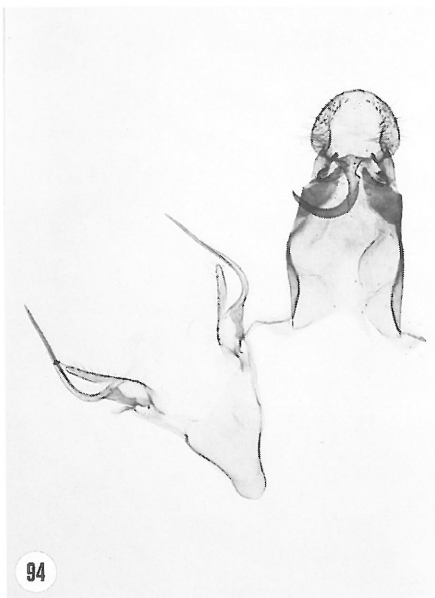
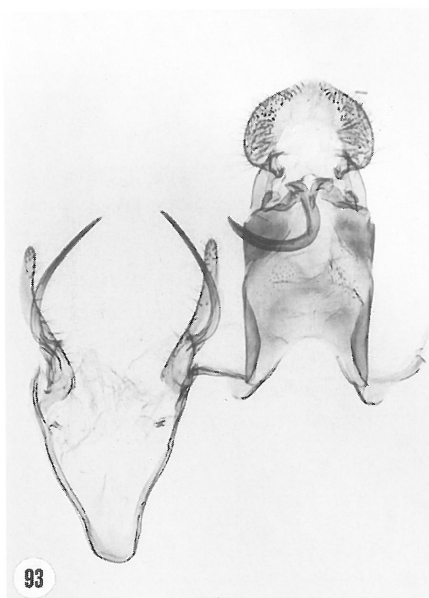
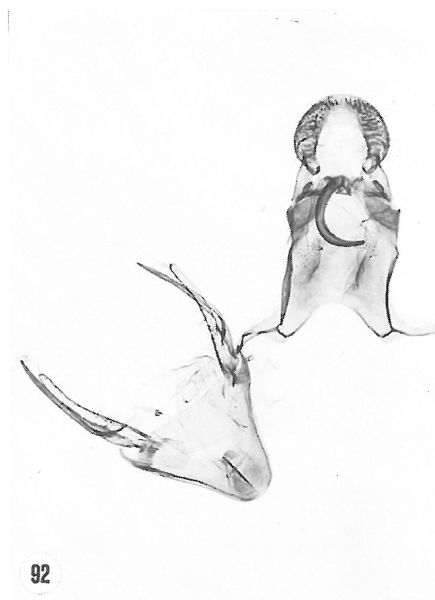
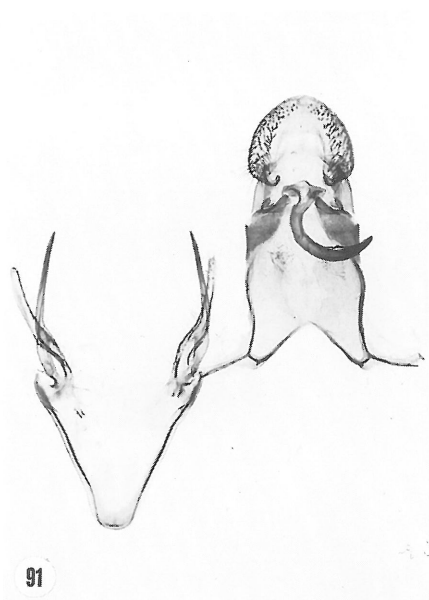
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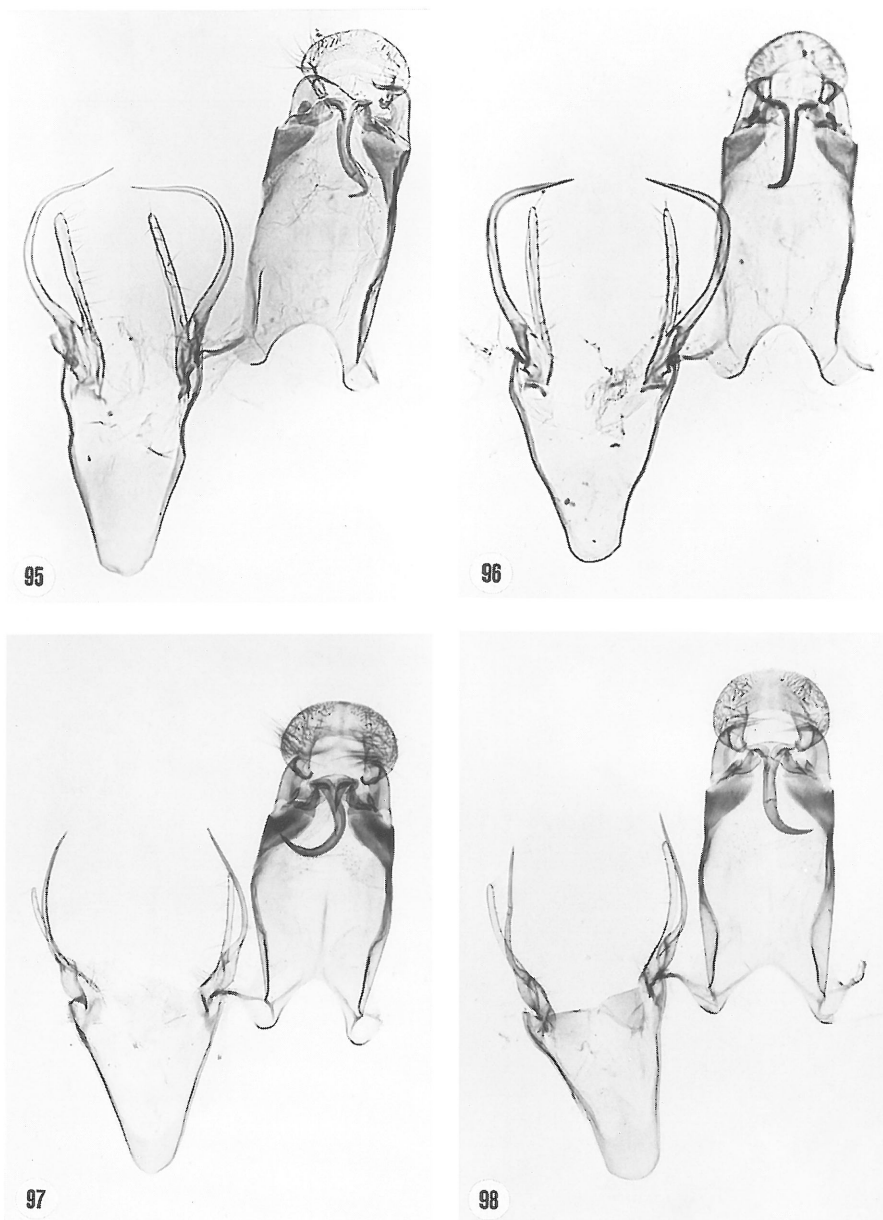
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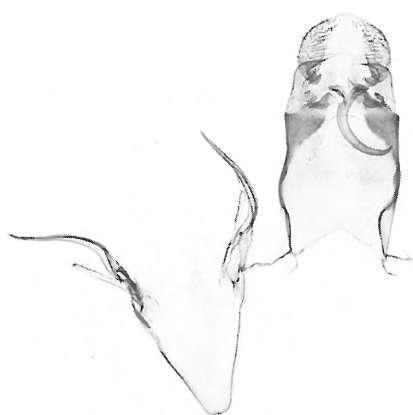
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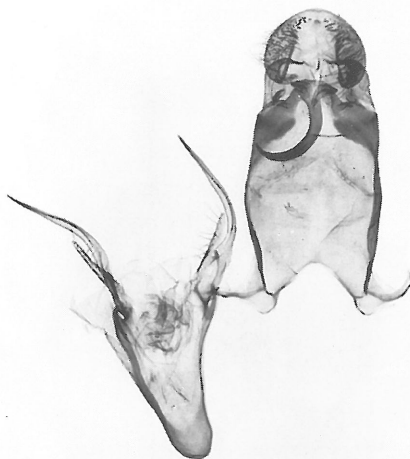
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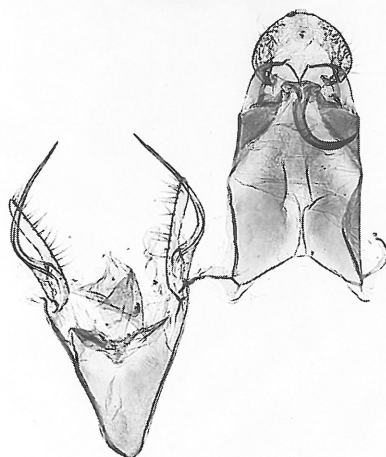
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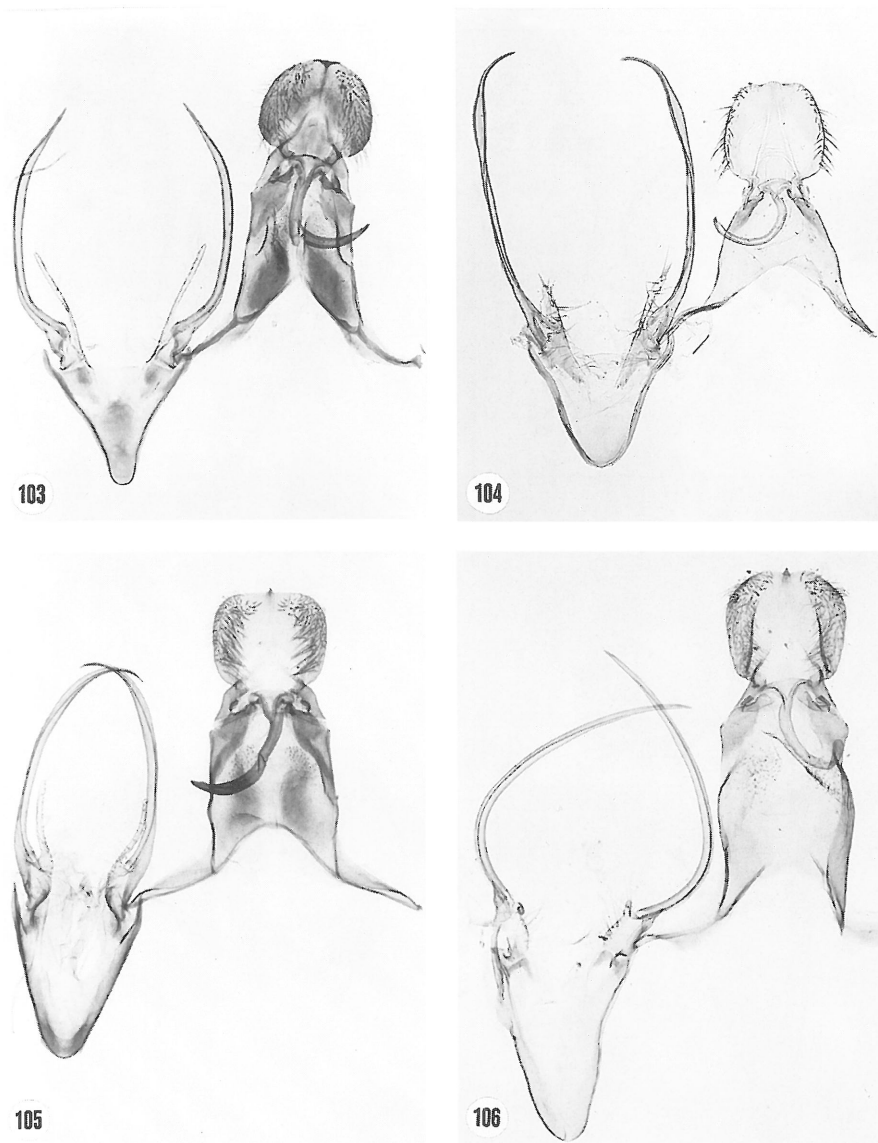


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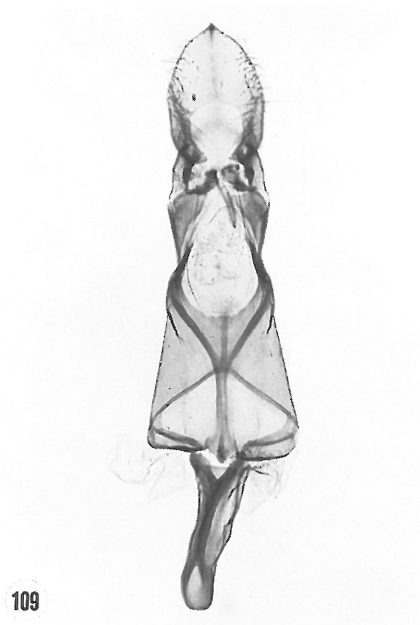


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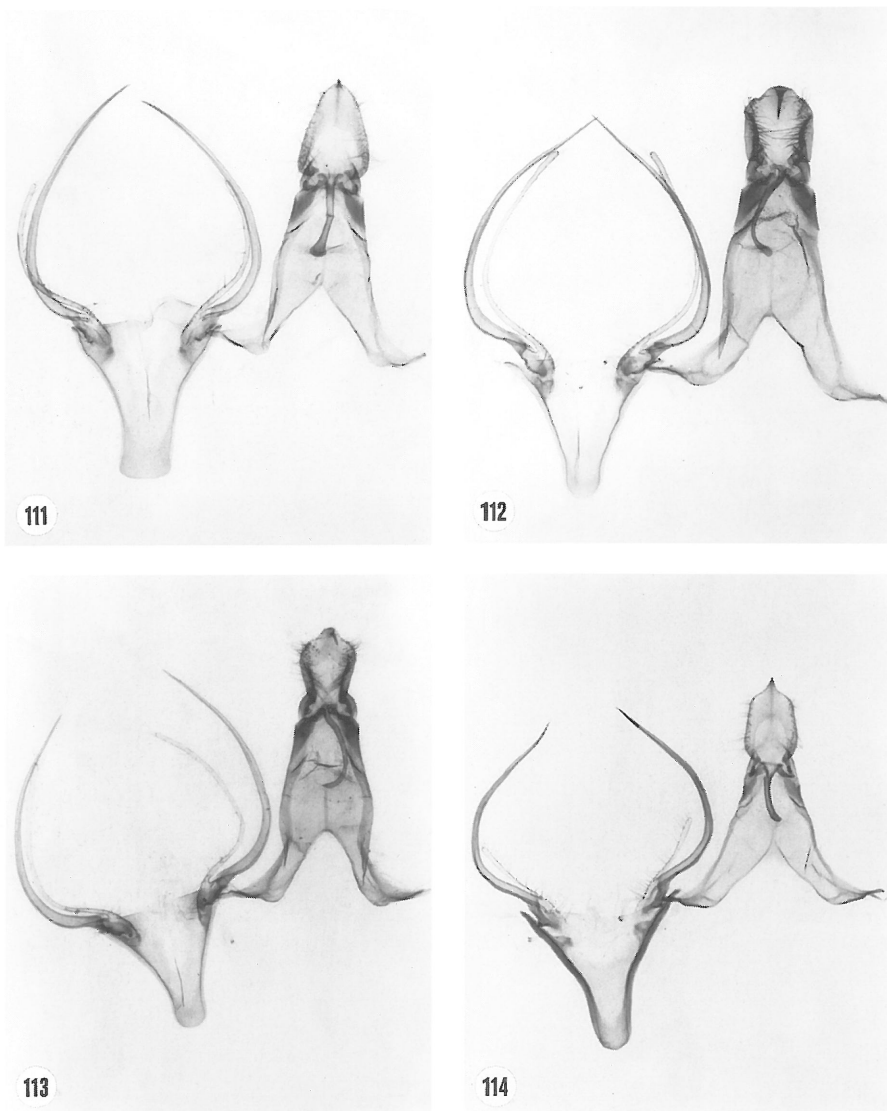
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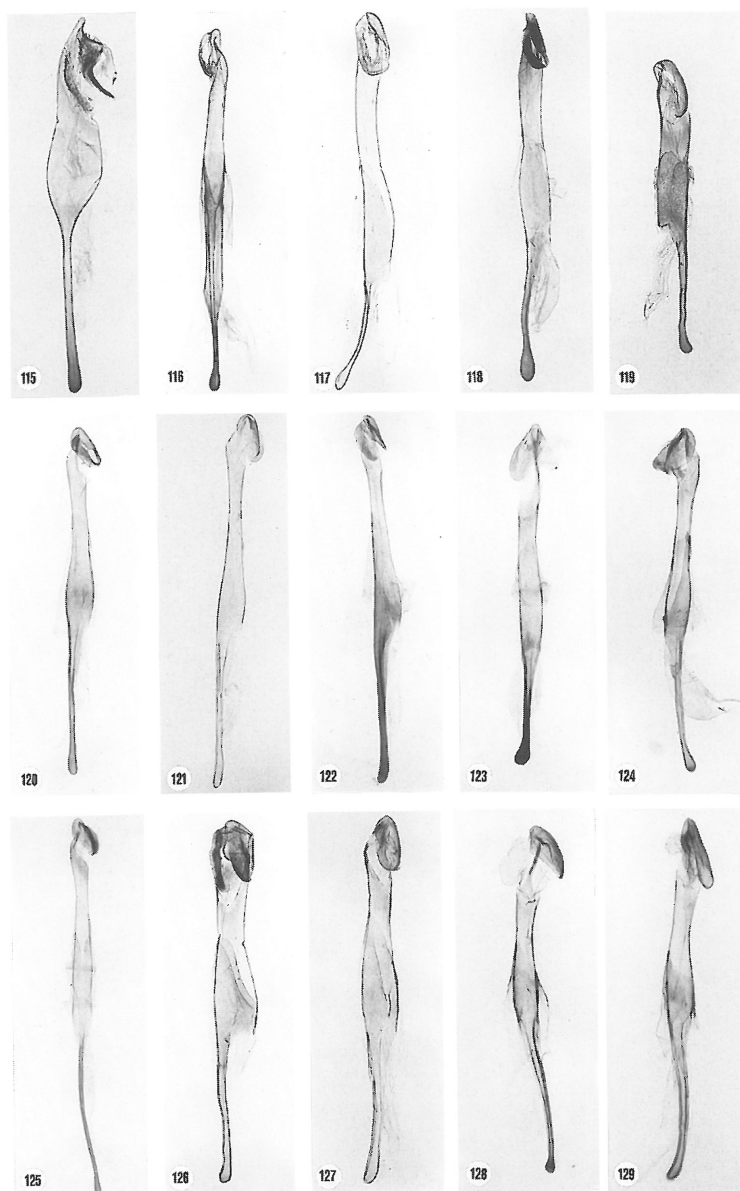
Figs 103-106: Genitalia of *Chionodes* ♂ - Fig. 103, *C. sp.* (incertae sedis), Russia (90/185, HUEMER; ZIAN). Fig. 104, *C. electella*, Austria (GEL 301; TLMF). Fig. 105, *C. viduella*, Austria (GEL 312; TLMF). Fig. 106, *C. nebulosella*, Austria (GEL 315; TLMF).



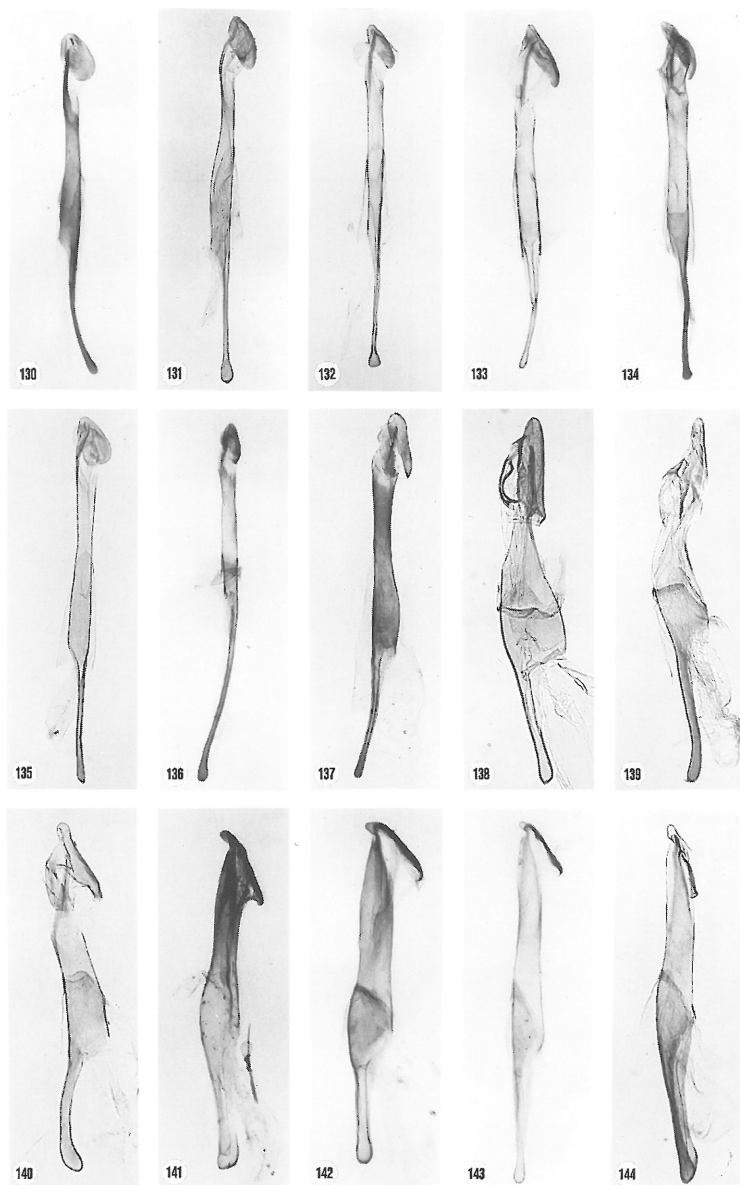
Figs 107-110: Genitalia of *Chionodes* ♂. - Fig. 107, *C. fumatella*, France (88/216, HUEMER; TLMF). Fig. 108, *C. sagayica*, Mongolia (91/310, HUEMER; TM). Figs 109-110, *C. fumatella*, carpella holotype, Belorussiya (11.760; ZIAN).



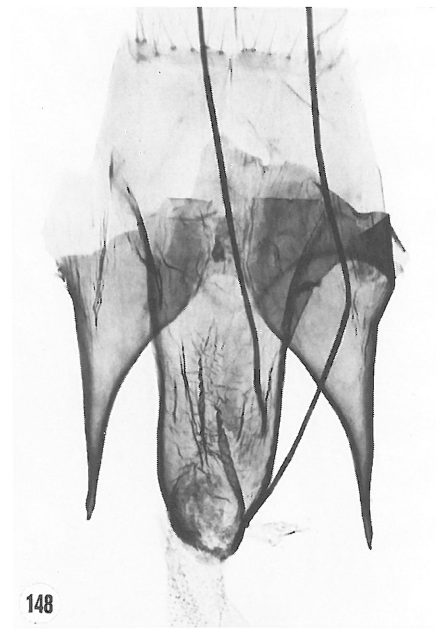
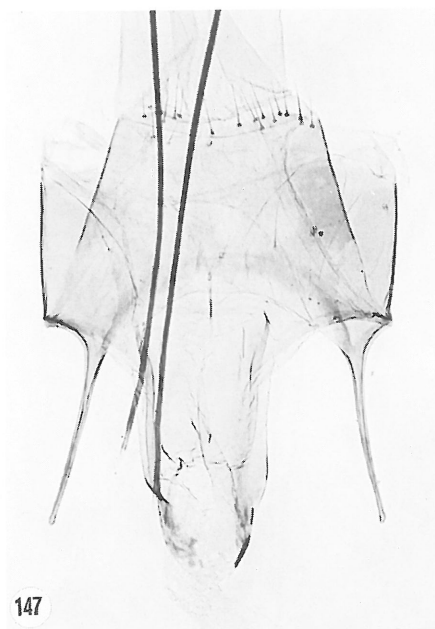
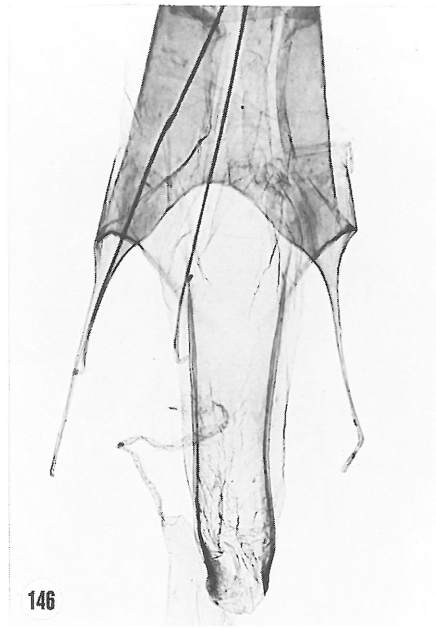
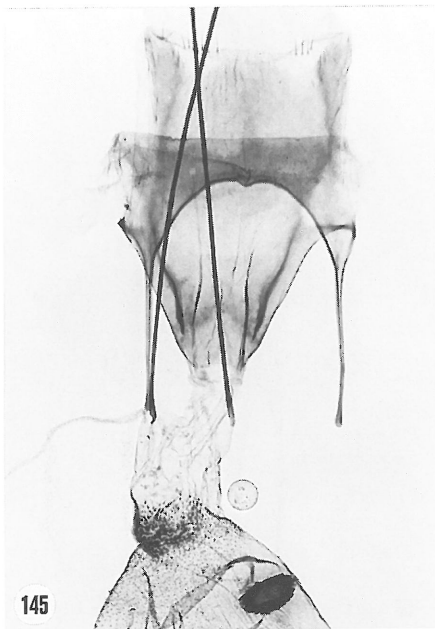
Figs 111-114: Genitalia of *Chionodes* ♂. - Fig. 111, *C. sagayica*, Russia (90/125, HUEMER; ZM). Fig. 112, *C. tantella*, paratype, Mongolia (90/086, HUEMER; TM). Fig. 113, *C. tantella*, paratype, Mongolia (91/305, HUEMER; TM). Fig. 114, *C. ignorantella*, Poland (90/182, HUEMER; ZIAN).



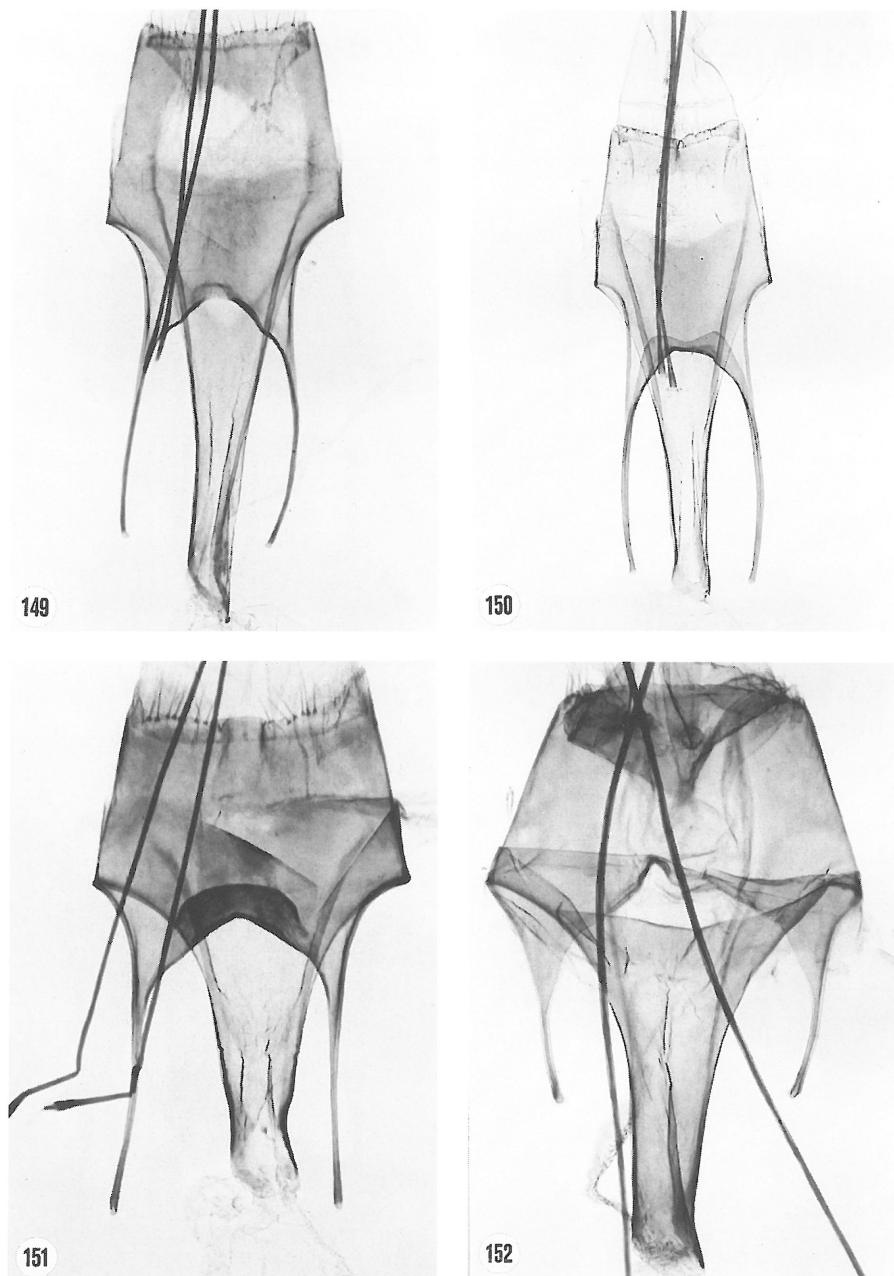
Figs 115-129: Aedeagus of *Chionodes*. - Fig. 115, *C. lugubrella* (14.325; NM). Fig. 116, *C. tragicella* (27.657; BMNH). Fig. 117, *C. soella* (92/358, HUEMER; ZMUH). Fig. 118, *C. luctuella* (27.320; BMNH). Fig. 119, *C. aprilella* (92/363, HUEMER; ZMUH). Fig. 120, *C. violacea* (90/085, HUEMER; TM). Fig. 121, *C. cf. mongolica* (90/079, HUEMER; TM). Fig. 122, *C. mongolica* (90/181, HUEMER; ZIAN). Fig. 123, *C. holosericea* (GEL 304; TLMF). Fig. 124, *C. praeclarella* (14.318; NM). Fig. 125, *C. tannuoella* (90/084, HUEMER; TM). Fig. 126, *C. flavipalpella* (92/361, HUEMER; ZMUH). Fig. 127, *C. caucasicella* (92/367, HUEMER; ZMUH). Fig. 128, *C. nubilella* (91/297, HUEMER; LN). Fig. 129, *C. continuella* (91/315, HUEMER; ZM).



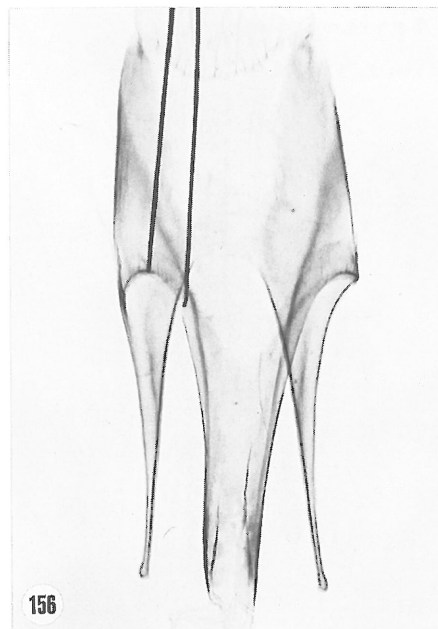
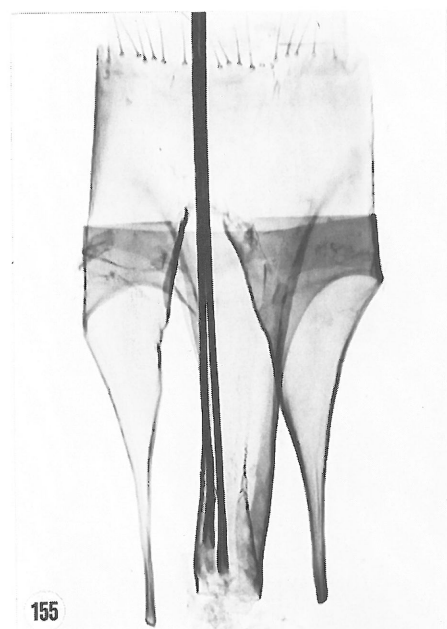
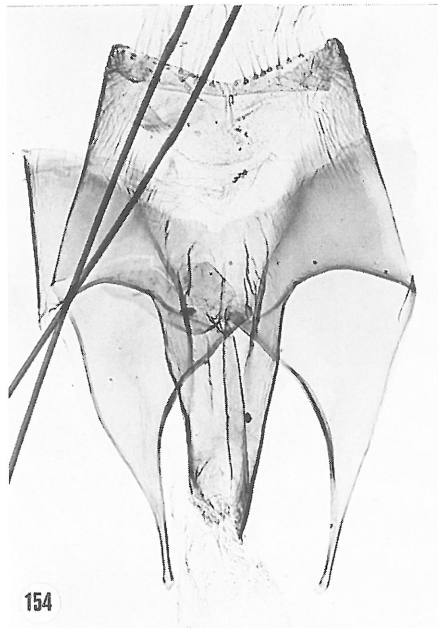
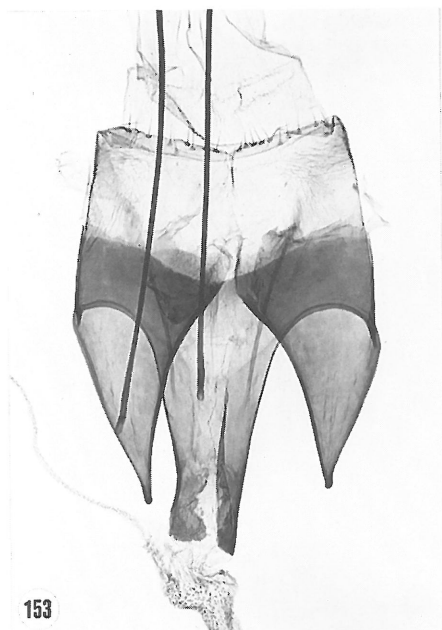
Figs 130-144: Aedeagus of *Chionodes*. - **Fig. 130**, *C. perpetuella* (GEL 282; TLMF). **Fig. 131**, *C. apolectella* (GEL 114; TLMF). **Fig. 132**, *C. distinctella* (91/227, HUEMER; LN). **Fig. 133**, *C. hayreddini* (GEL 302; TLMF). **Fig. 134**, *C. hinnella* (GEL 310; TLMF). **Fig. 135**, *C. bastuliella* (GEL 309; TLMF). **Fig. 136**, *C. frigidella* (91/314, HUEMER; ZM). **Fig. 137**, *C. sp.* (incertae sedis) (90/185, HUEMER; ZIAN). **Fig. 138**, *C. electella* (ZELLER) (GEL 301; TLMF). **Fig. 139**, *C. viduella* (GEL 312; TLMF). **Fig. 140**, *C. nebulosella* (14.322; NM). **Fig. 141**, *C. fumatella* (88/216, HUEMER; TLMF). **Fig. 142**, *C. sagayica* (91/310, HUEMER; TM). **Fig. 143**, *C. tantella* (91/305, HUEMER; TM). **Fig. 144**, *C. ignorantella* (90/182, HUEMER; ZIAN).



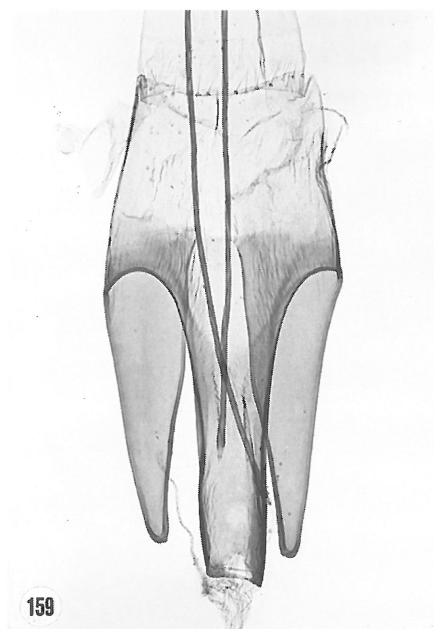
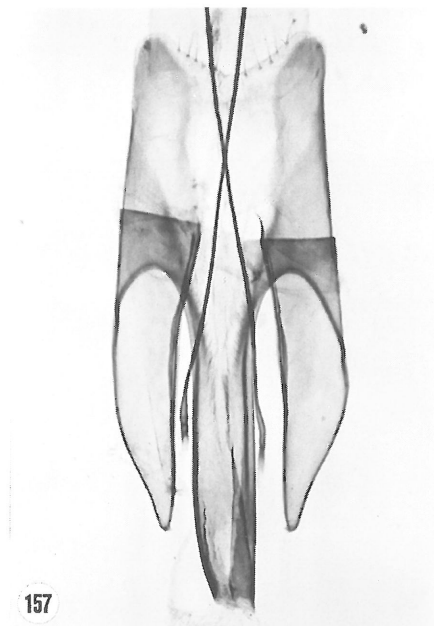
Figs 145-148: Genitalia of *Chionodes* ♀. - Fig. 145, *C. lugubrella*, Italy (GEL 308; TLMF). Fig. 146, *C. tragicella*, Germany (GEL 298; TLMF). Fig. 147, *C. soella*, paratype, Russia (92/362, HUEMER; ZMUH). Fig. 148, *C. luctuella*, Germany (GEL 306; TLMF).



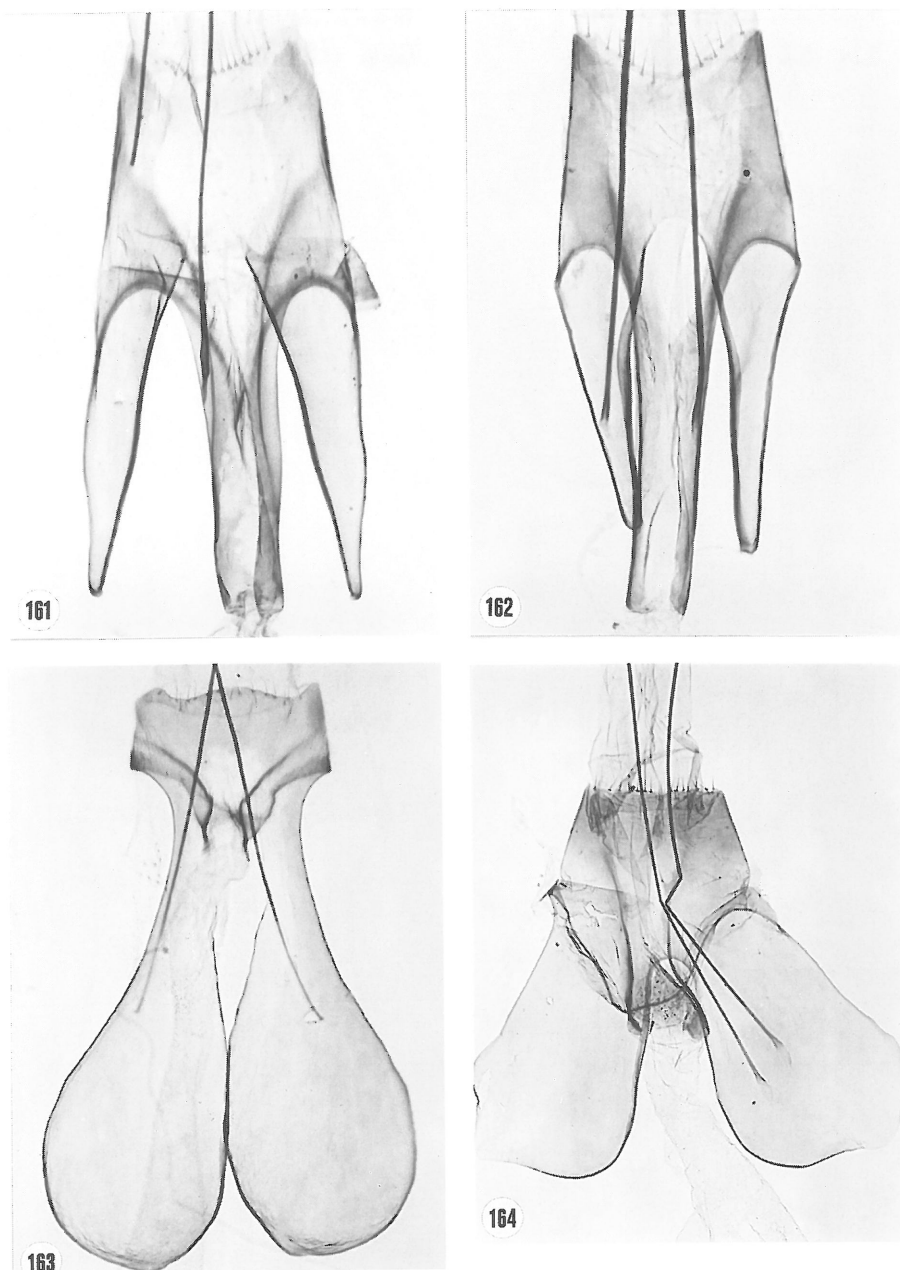
Figs 149-152: Genitalia of *Chionodes* ♀. - Fig. 149, *C. violacea*, Finland (91/312, HUEMER; ZM). Fig. 150, *C. mongolica*, Russia (90/196, HUEMER; ZIAN). Fig. 151, *C. holosericella*, (15.213; NM). Fig. 152, *C. praeclarella*, Mongolia (756, SATTLER; TM).



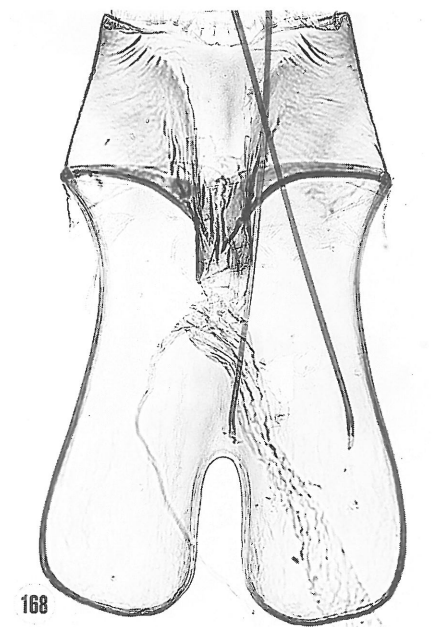
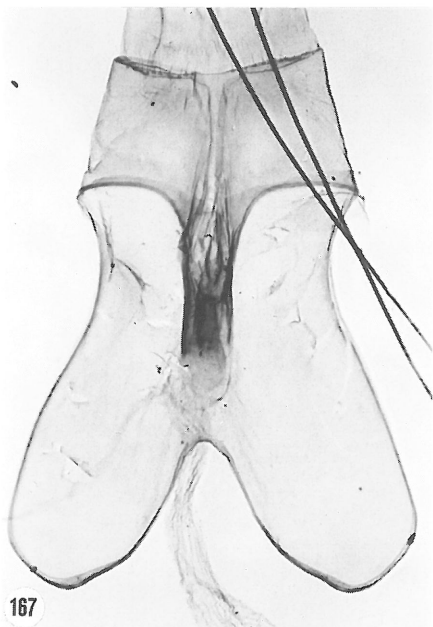
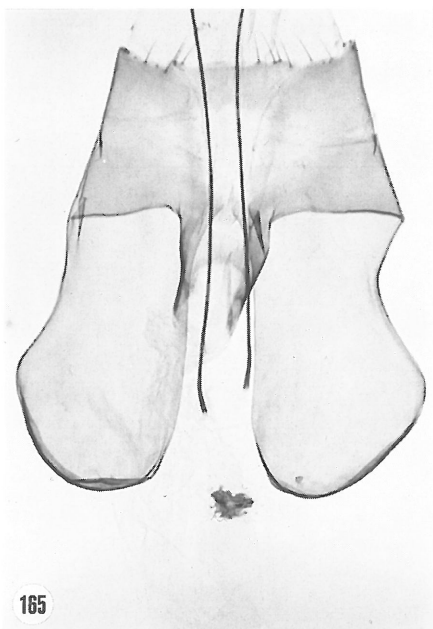
Figs 153-156: Genitalia of *Chionodes* ♀. - Fig. 153, *C. nubilella*, Sweden (91/298, HUEMER; ZM). Fig. 154, *C. continuella*, Poland (15.212; NM). Fig. 155, *C. perpetuella*, Austria (GEL 313; TLMF). Fig. 156, *C. apolectella*, France (15.210; NM).



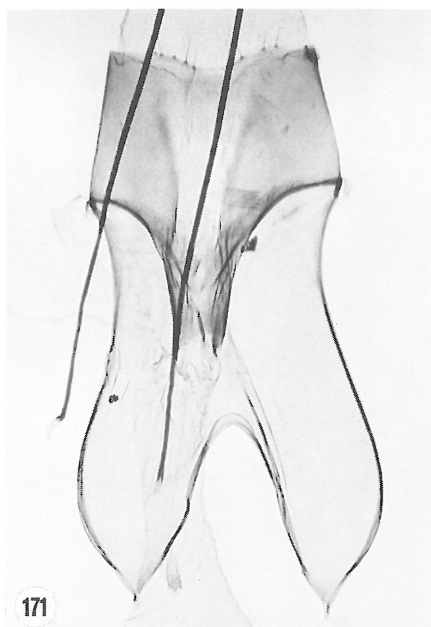
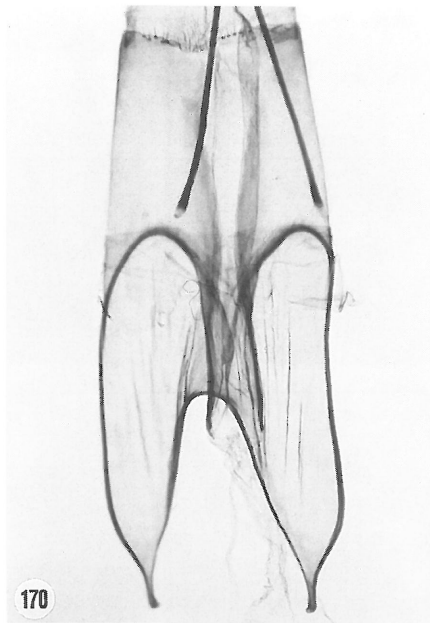
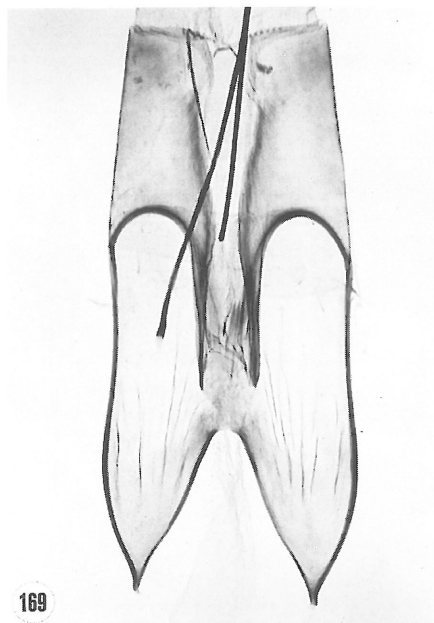
Figs 157-160: Genitalia of *Chionodes* ♀. - Fig. 157, *C. distinctella*, Bosna i Hercegovina (14.337; NM). Fig. 158, *C. distinctella*, Austria (GEL 86; TLMF). Fig. 159, *C. distinctella latiorella* paralectotype, Italy (91/300; LN). Fig. 160, *C. hayreddini*, Austria (GEL 303; TLMF).



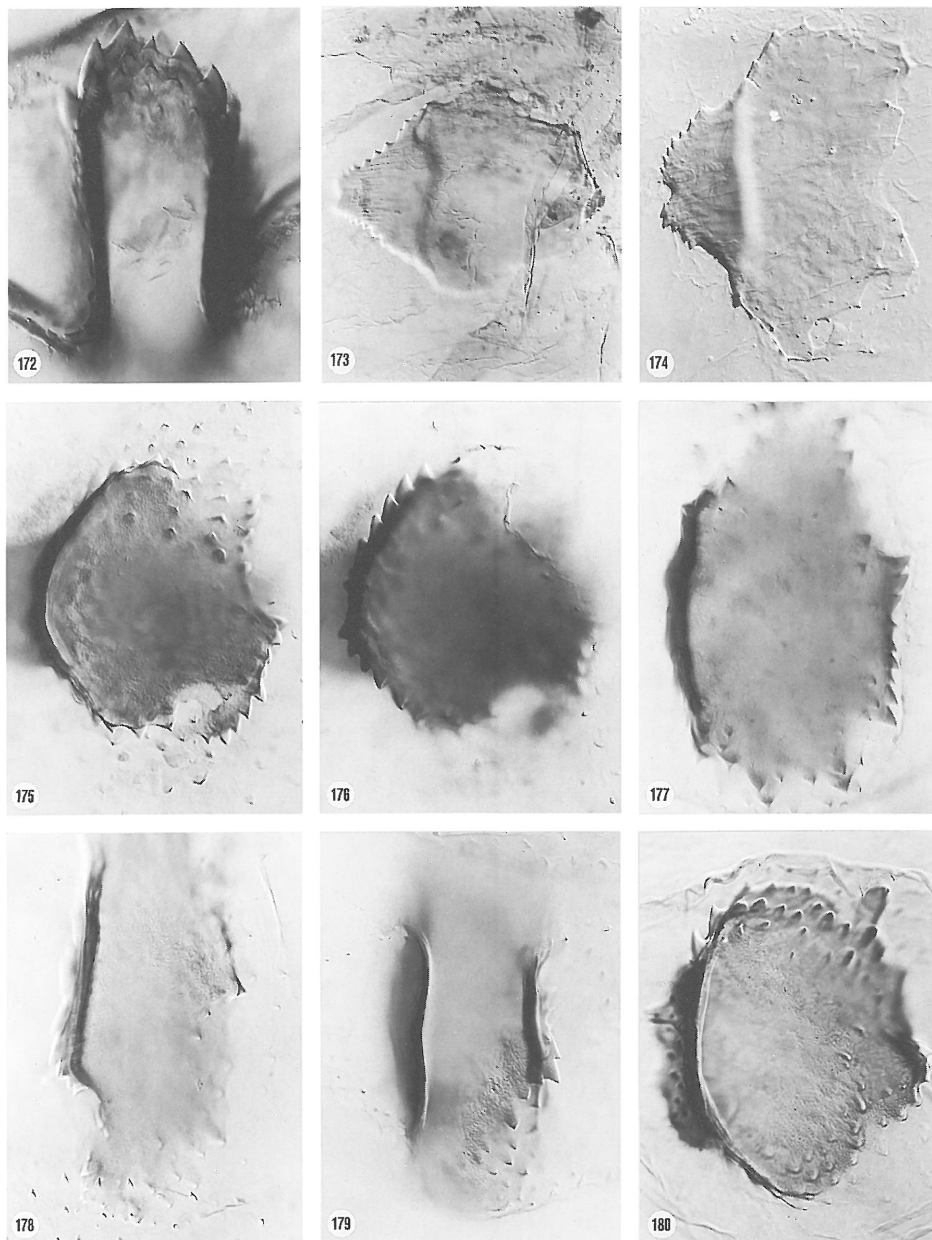
Figs 161-164: Genitalia of *Chionodes* ♀. - Fig. 161, *C. hinnella*, Spain (GEL 118; TLMF). Fig. 162, *C. bastuliella*, Spain (26.518; BMNH). Fig. 163, *C. electella*, Austria (GEL 300; TLMF). Fig. 164, *C. viduella*, Mongolia (90/089; TM).



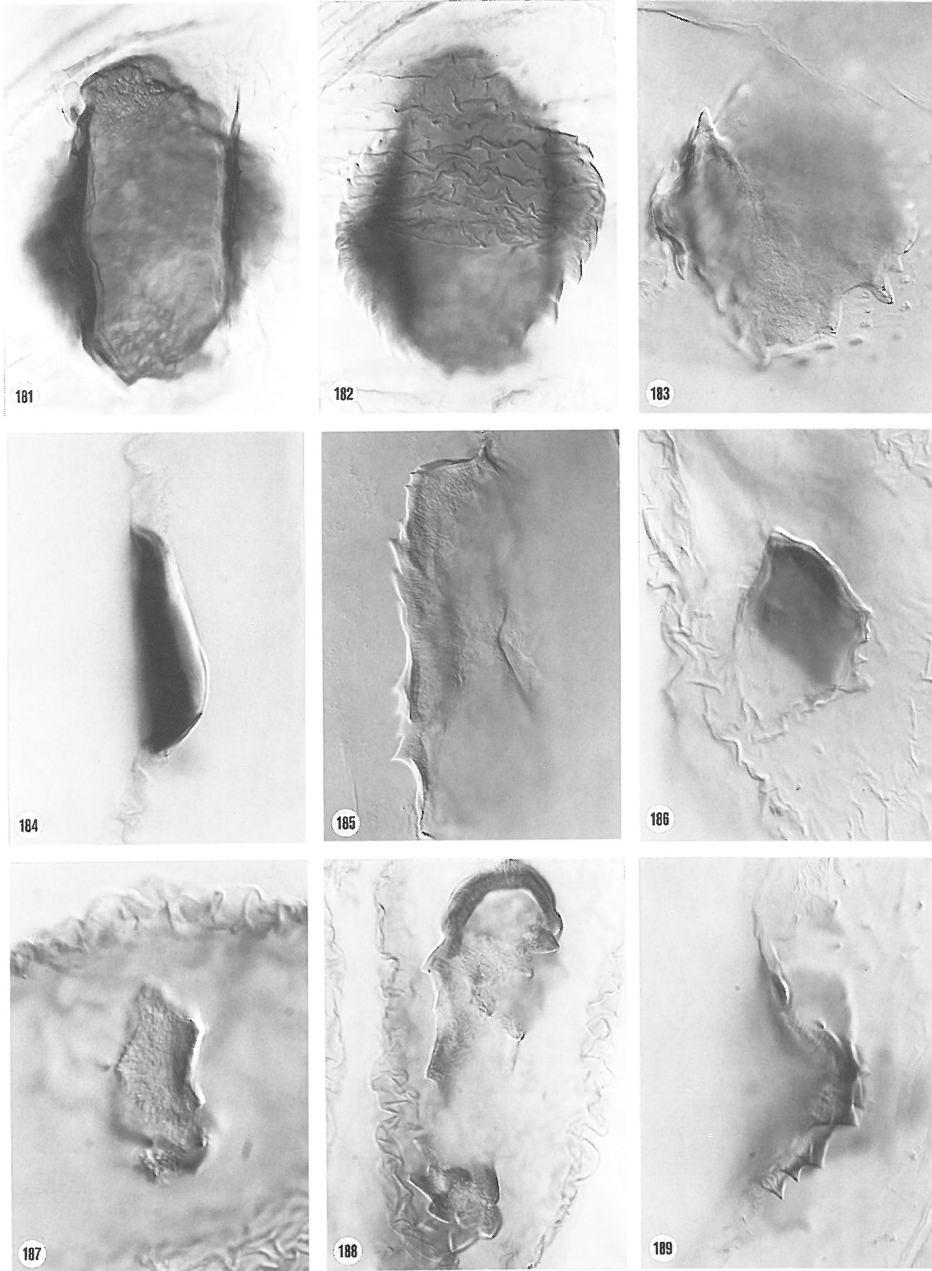
Figs 165-168: Genitalia of *Chionodes* ♀. - Fig. 165, *C. nebulosella*, Germany (GEL 316; TLMF). Fig. 166, *C. fumatella*, France (GEL 311; TLMF). Fig. 167, *C. sagayica*, holotype, Russia (477, FILIPJEV; ZIAN). Fig. 168, *C. fumatella*, Mongolia (776, SATTLER; TM).



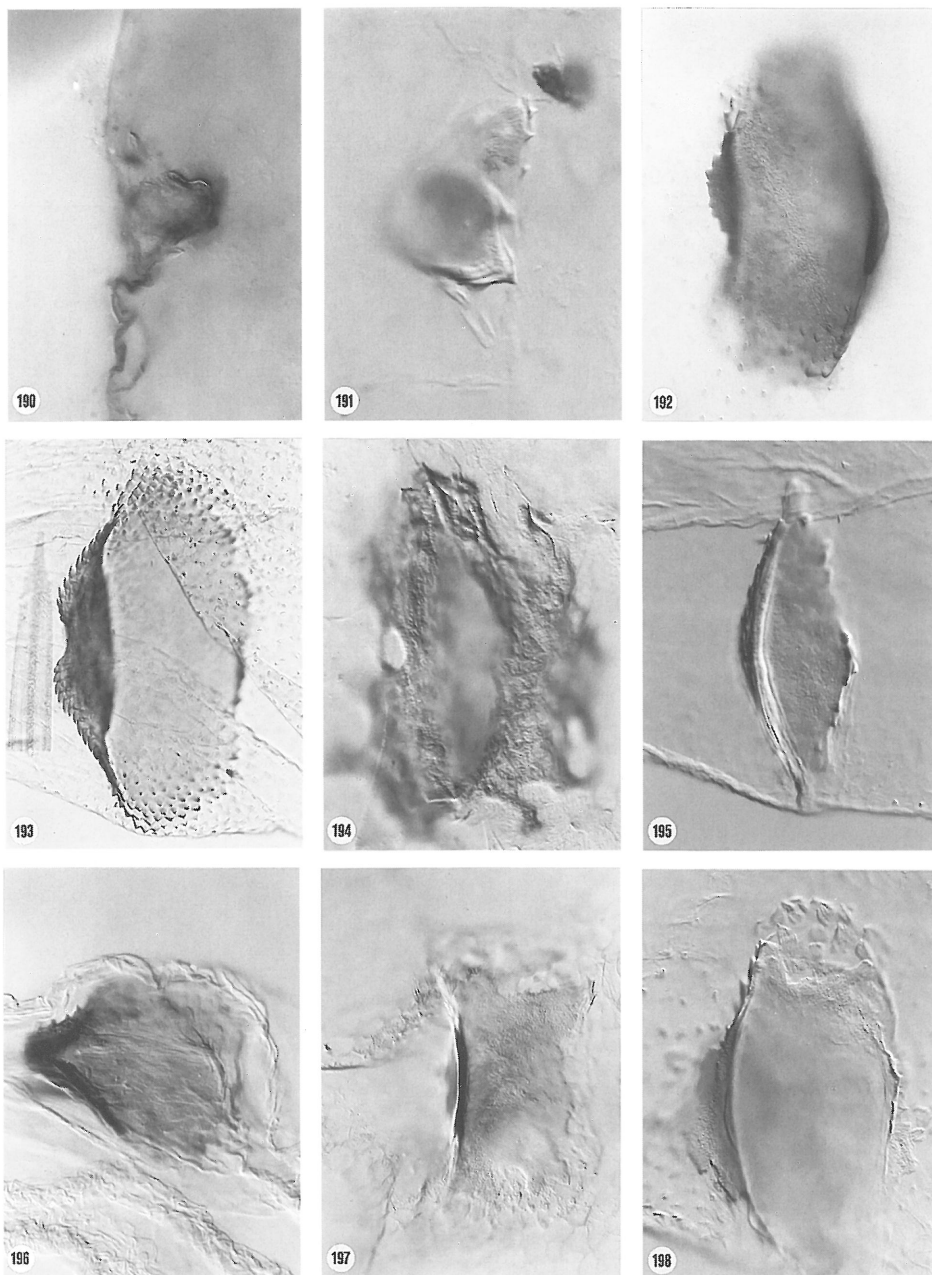
Figs 169-171: Genitalia of *Chionodes* ♀. - **Fig. 169,** *C. tantella*, paratype, Mongolia (90/087, HUEMER; TM). **Fig. 170,** *C. tantella*, paratype, Mongolia (775, SATTLER; TM). **Fig. 171,** *C. ignorantella*, Poland (91/284, HUEMER; ZIAN).



Figs 172-180: Female genitalia (signum) of *Chionodes*. - Fig. 172, *C. lugubrella* (GEL 308; TLMF). Fig. 173, *C. tragicella* (GEL 298; TLMF). Fig. 174, *C. soella* (92/362, HUEMER; ZMUH). Fig. 175, *C. luctuella* (GEL 306; TLMF). Fig. 176, *C. luctuella* (GEL 306; TLMF). Fig. 177, *C. violacea* (91/312, HUEMER; ZM). Fig. 178, *C. mongolica* (90/196, HUEMER; ZIAN). Fig. 179, *C. holosericella* (15.213; NM). Fig. 180, *C. praeclarella* (756, SATTLER; TM).



Figs 181-189: Female genitalia (signum) of *Chionodes*. - Fig. 181, *C. nubilella* (91/298, HUEMER; ZM). Fig. 182, *C. nubilella* (91/298, HUEMER; ZM). Fig. 183, *C. continuella* (15.212; NM). Fig. 184, *C. perpetuella* (GEL 313; TLMF). Fig. 185, *C. apolectella* (15.210; NM). Fig. 186, *C. distinctella* (14.761; NM). Fig. 187, *C. distinctella* (GEL 86; TLMF). Fig. 188, *C. distinctella* (91/300, HUEMER; LN). Fig. 189, *C. hayreddini* (GEL 303; TLMF).



Figs 190-198: Female genitalia (signum) of *Chionodes*. - Fig. 190, *C. hinnella* (GEL 118; TLMF). Fig. 191, *C. bastuliella* (26.518; BMNH). Fig. 192, *C. electella* (GEL 300; TLMF). Fig. 193, *C. viduella* (90/089, HUEMER; TM). Fig. 194, *C. nebulosella* (GEL 316; TLMF). Fig. 195, *C. fumatella* (GEL 311; TLMF). Fig. 196, *C. sagayica* (477, FILIPIEV; ZIAN). Fig. 197, *C. tantella* (775, SATTLER; TM). Fig. 198, *C. ignorantella* (91/284, HUEMER; ZIAN).