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Revision of the genus *Mniophila* Stephens, 1831

(Coleoptera: Chrysomelidae)

With 7 figures and 3 maps

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Summary

A revision of the genus *Mniophila* Stephens, 1831 is provided. Redescriptions of the genus and species, differential diagnoses, and distribution are given. New data on biology are presented. Three new species: *Mniophila caucasica* sp. n. from Caucasus (Russia, Abkhazia, Georgia, Azerbaijan), *Mniophila transcaucasica* sp. n. from Armenia and Georgia, and *Mniophila taurica* sp. n. from Crimea are described. The species level status of *Mniophila bosnica* Apfelbeck, 1914 is confirmed. The status of *Mniophila muscorum turcica* L. Medvedev, 1970 is elevated to a species level. The generic position of *Mniophila exulans* Samuelson, 1973 is discussed.

Keywords

Coleoptera, Chrysomelidae, Alticini, *Mniophila*, revision, description, distribution, new species.

New species

Mniophila caucasica sp. n., *Mniophila transcaucasica* sp. n., *Mniophila taurica* sp. n.

Zusammenfassung

Mit der vorliegenden Arbeit wird die Gattung *Mniophila* Stephens, 1831 revidiert. Es erfolgt eine Neubeschreibungen der Gattung und der Arten mit Differenzialdiagnosen und Angaben zur Verbreitung. Neue Daten bezüglich der Biologie werden ebenfalls vorgestellt. Drei neue Arten: *Mniophila caucasica* sp. n. aus dem Kaukasus (Russland, Abchasien, Georgien, Azerbaijan), *Mniophila transcaucasica* sp. n. aus Armenien und Georgia und *Mniophila taurica* sp. n. von der Krim werden beschrieben. Die Status der Art *Mniophila bosnica* Apfelbeck, 1914 bleibt erhalten. *Mniophila muscorum turcica* L. Medvedev, 1970 wird hingegen in den Status einer Art erhoben. Die Zuordnung zur Gattung von *Mniophila exulans* Samuelson, 1973 wird diskutiert.

Introduction

A flea beetle genus *Mniophila* was established by Stephens in 1831 for *Haltica muscorum* Koch, 1803. Recently 4 species, 1 subspecies and 2 forms were described under this generic name. These are *Mniophila muscorum* (Koch, 1803), *Mniophila wroblewskii* Wańkowicz, 1880, *Mniophila bosnica* Apfelbeck, 1914, *Mniophila exulans* Samuelson, 1973, *Mniophila muscorum turcica* L. Medvedev, 1970, *Mniophila muscorum* fa. *seriatopunctata* Roubal, 1932, and *Mniophila muscorum* fa. *fortepunctata* Horion, 1939. *Mniophila ruficollis* Motschulsky, 1866 from Sri Lanka was erroneously described under this generic name and later was transferred to the genus *Ancycloscelis* Ogloblin, 1930 (Ogloblin 1930) that subsequently was placed in synonymy with

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Ivalia Jacoby, 1887 by Scherer (1969). There is no common opinion on the status and rank of these taxa and forms. In regards to the recent data (Gruev & Döberl 1997) the genus *Mniophila* includes 2 species and 1 subspecies in the Palaearctic Region. The other authors (Konstantinov & Vandenberg 1996) recognized the existance of a single species in Palaearctic and one questionable species in Oceania (Fiji). The number of subspecies varies with authors (Mohr 1966; Medvedev 1970; Gruev & Döberl 1997). Currently the rank of *Mniophila bosnica* and *Mniophila wroblewskii* is under question and remains unclear (Mohr 1966; Medvedev 1970; Strejček 1993; Doguet 1994; Gruev & Döberl 1997).

The generic position of *Mniophila exulans* Samuelson requires particular study because attributing this species to *Mniophila* was done with some reservations.

Three new species belonging to this genus were discovered in the course of this study. This required a revision of *Mniophila* including reconsideration of statuses and ranks of all taxa and forms, study of morphological variability, distribution, and supplemented with biological data.

Abbreviations

The specimens treated in this paper are deposited in the following collections:

NHML	Natural History Museum, London
IRSNB	Institute Royal des Sciences Naturelles, Brusseles
HNHM	Hungarian Natural History Museum, Budapest
ZMUA	Zoölogisch Museum Universiteit van Amsterdam
DEI	Senckenberg Deutsches Entomologisches Institut, Müncheberg
SMF	Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt-am-Main
MTD	Museum für Tierkunde, Dresden
NHMW	Naturhistorisches Museum, Wien
ZMUC	Zoologisk Museum, Universitets København
MNCN	Museo Nacional de Ciencias Naturales, Madrid
MZUF	Museo Zoologico de “La Specola”, Firenze
ZMMU	Zoological Museum of Moscow State University
DEMU	Department of Entomology, Moscow State University
BMPU	Department of Biology, Moscow State Pedagogic University
ZIN	Zoological Institute, Saint-Petersburg
KUMN	Kharkov University, Museum of Nature
SIZK	Schmalhausen Institute of Zoology, Kiev
ZMKU	Zoological Museum, Kiev
LM	L. Medvedev collection (Moscow)
NC	K. Nadein collection (Kiev)

Methods

All observations, preparations and figures were made using a dissecting microscope MBS-10. The figures of the male genitalia were made from glycerin preparations. Measurements were made using an ocular-micrometer. The terminology for spermathecal structure follows Döberl (1986) and species’ distribution follows Gruev & Döberl (1997).

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Systematics

Genus *Mniophila* Stephens, 1831

Mniophila Stephens, 1831: 330. – Heikertinger 1930: 1346 (catalogue). – Heikertinger & Csiki 1940: 520–522 (world catalogue). – Kaszab 1962: 349 (key, description). – Mohr 1966: 206, 261, fig 70: 1 (key). – Gruev & Tomov 1986: 312–314, figs 358, 359a, b (key, description). – Doguet 1994: 549–552, figs 208, 209 (key, description). – Konstantinov & Vandenberg 1996: 271, 307, fig. 48 (key, description). – Cox 1997: 277–279, figs 1–6 (egg, larva). – Gruev & Döberl 1997: 240–241 (distribution, bibliography). – Warchałowski 2000: 25–28, figs 35–40 (key, description, distribution).

Type species: *Haltica muscorum* Koch, 1803, by monotypy.

Distribution:

Range of distribution of the genus *Mniophila* embraces Western and Central Europe, Balkans, Crimea, Caucasus, and Turkey (Figs 8-10). *Mniophila muscorum* has the widest range (Fig. 8), from Pyrenees (Spain) to Carpathians (Ukraine). The northern boundary of this species is in Dania, Norway, and Sweden. The rest of the species have ranges smaller than *Mniophila muscorum*. It is worthy to mention the high level of endemism among the species of *Mniophila*. The only ranges of *M. muscorum* and *M. bosnica,* and probably, *M. caucasica* sp. n. and *M. transcaucasica* sp. n. are partly overlapping (Figs 8-10).

Redescription:

Body dark, brown to black, shining, with greenish or bronzy metallic luster or without one; sometimes in brown individuals pronotum and elytra with light margin; sometimes partly coloured individuals occur; legs and antennae light to dark brown. Body elliptical and moderately convex to clearly rounded and rather convex (Figs 1A-E; 3A-C; 4A; 5A, B; 6A-D; 7A); head not or barely visible from above. Head (Figs 1F; 4H; 5C; 7E) large; vertex large, wide, its surface covered with weakly developed smooth shagrination coarse, well developed, grainy shagrination. Ocular sulci not developed. Frontal calli triangular or rhomboidal, small, its surface smoother than that of the vertex and frons; separated from vertex by thin supracallinal sulci. Frontal ridge distinct, convex, triangular and flattened basally. Anterofrontal ridge weakly convex, straight. Antennal grooves large and deep, covered with large and coarse shagrination. Frontal part of head moderately short to long. Antennal sockets situated closely to each other, separated from eye margin by impressed interval in length is almost equal to socket. Eyes small, elliptical, flattened to convex, widely spaced. Antennae (Figs 1M, 3D; 4G; 5E; 6K; 7D) short; three apical segments distinctly widened; remaining segments thinner; eighth antennomere thinner and smaller than seventh; first and second antennomeres clearly longer and thicker than following five segments. Labrum small, with deep frontal notch situated medially.

Pronotum (Figs 1G; 3E, 4B; F; 6E; 7B) large, widely transverse. Apical and basal edges with rather thin margins; lateral margin wider. Anterofrontal callosity large, thickened, not forming acute denticle; posterolateral callosity smaller, poorly developed. Basal edge of pronotum curved in sides, distinctly rounded medially or widely rounded. Pronotal surface covered with visible, large shagrination. Punctation usually present, not coarse, sparse, and shallow, poorly visible on pronotal microsculpture, rarely impunctate.

Elytra slightly elongate with elongate elytral apices to clearly rounded, without elongate apices. Punctation variable: impunctate to punctured densely; usually punctures arranged in regular or partly confused striae, depth and frequency, and size of punctures variable; secondary punctation

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from undeveloped to well developed, often as large as punctures in striae and dense. Elytral interstices smooth. Hind wings completely reduced.

Pro-, meso-, and metathorax strongly shortened; mesothorax shorter than pro- and metathorax. Procoxal cavities open.

Legs (1I-L; 3F-I; 4C-F; 5G-J; 6F, G, I, J; 7F-I) not long, usually thick, rarely thinner; first protarsomere of male larger and thicker than in female; hind tibiae and often that of middle and foreleg curved, sometimes fore and middle tibiae straight; hind femora usually wide (Fig. 1H), rarely thin (Fig. 5D).

Aedeagus (Figs 2, 3J, K; 4I, J; 5K-M; 6L-N; 7J, K) rather large, curved basally, apical 2/3 almost straight to distinctly curved; apex shape variable: rounded, widened, elongated and narrowing, with or without apical denticle. Spermatheca small, collo large, thick, straight, nodulus comparatively narrow, not very long, duct short, moderately curved, not forming loops, ramus globose, globular.

Body length: 1.1-1.6 mm, width – 0.8-1.2 mm.

Preimaginal stages. Egg and first instar larva have been described by Cox (1997).

Discussion:

The species of the genus *Mniophila* inhabit primary mountain territories and foothills of Europe, Caucasus and Asia Minor and occur in deciduous and mixed forests of the nemoral origin one of indicators of which is *Fagus*. Ecological and morphological features of the genus *Mniophila* determine its distribution to a significant extent. First, a cryptic way of life with all life stages and trophic relations connected to moss in mesophilic or mesohygrophilic biotopes. Second, a rather small body size (1.1-1.6 mm), and reduced hind wings limit their dispersal ability. These features apparently determined the recent distribution of the genus *Mniophila*. Another important factor was the distribution of plant formations favourable to the distribution of this genus. Some paleobotanical data can be used to correlate the modern range of *Mniophila*. Recent mountain and foothill nemoral forests in Europe, Caucasus and Asia Minor are significantly fractionated. The forests in Western and Central Europe are more homogenous and continuous than those in Eastern Europe, Caucasus, and Asia Minor that are often restricted to large territories (Shelyag-Sosonko 1980; Didukh 1992). This is partly connected with a landscape because mountain territories usually are nemoral forest refugia. Thus, the range of *Mniophila* is continuous in Western and Central Europe while significantly split up in its eastern and southeastern parts, such as, Crimea, Caucasus, and Asia Minor. Straits, large rivers, and valleys separate mountain territories with nemoral forests in these regions. Obviously, in the past when the range of nemoral forests was more continuous and embraced larger territories in Europe, Caucasus, and Asia Minor (Shelyag-Sosonko et. al. 1987; Kleopov 1990; Didukh 1992) the conditions were more favourable for range expansion of *Mniophila*. When territories with nemoral forests were limited, barriers arose between them and interchange of flora and fauna diminished, and they became valuable refugia. So, exchange between these territories was significantly limited. The disjunctions of ranges of the species of *Mniophila* apparently are caused by these reasons. Recently, for the above-mentioned reasons, the exchange between populations of Crimea and Balkans, or Caucasus, was probably, impossible. These are some of the reasons why these populations are recognized as good species.

Another criterion is morphological. The population's morphological variability was studied and allowed me to reveal some stable characters, such as body shape, head structure, antennae, prothorax, legs, and male genitalia. These characters are stable at the level of population. The character states of these characters can be used to distinguish species from each other. It is

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worthwhile to emphasize that stable complex of characters confirms the chosen species concept in *Mniophila*. In other words, e.g. *Mniophila taurica* sp. n. differs from *Mniophila caucasica* sp. n. in the same features as from *Mniophila bosnica*.

Thus, the problem of a choice between subspecific or specific status in the present case, in my opinion, should be solved in favour of specific status for the following reasons. First, as mentioned above geographical distribution with restricted or impossible exchange between populations in most cases. Second, apparently sympatric distribution of some species (it can be supposed for *Mniophila bosnica* and *Mniophila muscorum*; *Mniophila transcaucasica* sp. n. and *Mniophila caucasica* sp. n.) and absence of intermediate forms. Third, there is a stable complex of morphological characters with equal differences between the species. Additionally, it can be mentioned that the degree of morphological differences between these species, in my opinion, is sufficient for recognizing them as good species and have the same level of difference as in many other genera of Alticini.

The morphological uniformity of species of *Mniophila* does not provide a basis for establishing subgenera or species groups. This uniformity did not allow the production of a workable key for all species. There is only the affinity of *M. taurica* sp. n., *M. caucasica* sp. n., *M. transcaucasica* sp. n., and *M. turcica* on one side and *M. muscorum* and *M. bosnica* on the other side. The most reliable character for determination is the structure of aedeagus. The distribution of the species can also be used. For the help in identification keys to European and Caucasian species of genus are given.

The genus *Mniophila* included a single species for a long time. *M. bosnica* was regarded only as a variation or subspecies until the paper of Gruev (1979). *Mniophila exulans* Samuelson, 1973 was then described from Fiji (Samuelson 1973). The new species was attributed to the genus *Mniophila* with some reservations. This author mentioned some characters that are not shared with the genus *Mniophila*: "because it has upper frons and vertex strongly delimited instead of weakly and antennal segment 8 of normal size instead of reduced" (Samuelson 1973: 61). He also mentioned the genera *Taizonia* Chen, 1934, *Amphimeloides* Jacoby, 1887 and *Kamala* Maulik, 1926 that can be compared or related to this species. In my opinion attributing *M. exulans* to *Mniophila* has no sufficient bases. As mentioned above morphological characters possibly can be used against this generic assignmenet. The spermatheca figured by Samuelson (1973: fig. 27j) can also be applied to this argument. The range of distribution of *M. exulans* causes objections as well. As mentioned above the species of genus *Mniophila* are distributed in mountains and foothills of Europe and Asia Minor and connected with nemoral forests of mountain systems of Alpine folding. Primarily European genera *Aeschrocnemis* Weise, 1888, *Apteropeda* Chevrolat, 1839, *Minota* Kutschera, 1859, and *Orestia* Germar, 1845 have similar distributions. In the present time Nepalese species of *Orestia*, and Himalayan, Chinese, and Japanese species of *Minota* were described but their generic position requires confirmation. Nonetheless, such disjunctions of ranges can be explained from the genesis of Palaearctic flora and fauna point of view. In the same time the origin and composition of Fijian flora and fauna have another history. Therefore, it is unlikely that a genus of the European fauna (with limited dispersal ability) has its own representative in the fauna of Oceania.

My opinion has also been confirmed by A. Samuelson (pers. comm.) that *Mniophila exulans* represents a separate and undescribed genus.

The generic position of *Mniophila* is unclear. The group Mniophilites was established in the alticine classification developed by Chapuis (1875). The rank of this group can be regarded as subtribe. After Chapuis this group was mentioned in the catalogues of Horn (1889 – Mniophilae) and Leng (1920 – Mniophilini). Undoubtedly, *Mniophila* differs in many characters from most

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Alticini. Such features like living in moss, very small size and globose shape of a body, reduced hind wings along with other characters usually rarely present together among other alticines. These are specialized features for a cryptic way of life. Similar characters are presented in some other alticine genera like *Mniophilosoma* Wollaston, 1854, *Apteropeda*, *Minota*, *Clavicornaltica* Scherer, 1974, *Kiskeya* Konstantinov et Chamorro-Lacayo, 2006, and some others genera. Comparison between these genera reveals that adaptations for a cryptic way of life and corresponding morphological characters apparently originated independently but in similar ways and resulted in their similarity. Significant morphological specialization raises difficulties in revealing of relations of *Mniophila* and other genera with the present state of knowledge. At the same time establishing of a separate high-level taxon (tribe or subtribe) for each genus will not clear up the situation but will result in fractionation of the classification. The only genus that can be compared with *Mniophila* is *Mniophilosoma*. The features shared by both genera are size and globose shape of a body and its proportions, shape of antennae and labrum, structure of thorax, male and female genitalia. *Mniophila* differs from *Mniophilosoma* in the structure of a head, particularly shallow and curved ocular sulci, long and narrow frontal ridge, frontal calli larger, pronotal lateral sides rounded, eighth antennomere smaller than seventh and ninth, elytra shorter. The question about the relationship of these genera cannot be resolved unambiguously because of probability of convergent similarity.

Biological remarks:

The genus *Mniophila* belongs to "minotoid" morpho-ecological group (Nadein 2005). The other genera belonging to this group are *Mniophilosoma*, *Minota*, *Apteropeda*, *Orestia*, *Clavicornaltica*, *Kiskeya*, some species of *Psylliodes* Latreille, 1825. This morpho-ecological group is characterized by the following characters: small or very small size, 1-3 mm; colour dark, usually black, sometimes with metallic lustre; body compact, rounded, subspherical or elliptic-cylindrical, very convex; head drawn into prothorax, almost invisible from above; antennae and legs short, often swollen, legs fit into depressions on ventral side of body, and antennae into deep grooves lateral to frontal ridge. The winglessness is typical for the "minotoid" form as well as for many beetles that inhabit mountains.

The trophic relations of *Mniophila* have been insufficiently studied. The host plants of *Mniophila* were recorded for the first time by Kaltenbach (1874). This author recorded *Digitalis*, *Plantago* (Plantaginaceae) and *Teucrium* (Lamiaceae) as host plants of leaf-mining larva. In that time the host plants of adults were not recorded and habitation in moss was the only indirect record for their trophic relations. After Kaltenbach (1874) these host plants were mentioned in the works of Kaszab (1962), Mohr (1966), Medvedev & Roginskaya (1988), Gruev & Tomov (1986), Jolivet & Hawkeswood (1995), and Doguet (1994), etc. Actually such trophic selection raises some doubts. It is a fact that adults of *Mniophila* can only be collected in moss. It means that beetles never transfer to other plants. This could be reliable confirmation that their host plants are mosses. This would confirm the opinion of Cox (1997) that the larvae are not leaf miner of dicots and all stages of their life cycle are spent in moss. The observations on the first instar larva in Great Britain presented by this author revealed that it is most likely an external feeder on mosses. According to Cox (1997) the adults of *Mniophila muscorum* have been collected on several moss species: *Rhytidiadelphus loreus* (Hedw.) Warnst., *Rhytidiadelphus triquetrus* (Hedw.) Warnst. (Hypnaceae), and *Eurhynchium striatum* (Hedw.) Schimp. (Brachytheciaceae). Samples of mosses from several localities and biotopes of Abkhazia and Crimea were collected during author's collecting trips in 2007 and 2008. The adults of *Mniophila caucasica* sp. n. from Abkhazia have been collected on following moss genera and species: *Ctenidium molluscum* (Hedw.) Mitt., *Hypnum cupressiforme* Hedw. (Hypnaceae); *Thamnobryum alopecurum* (Hedw.) Nieuwl.,

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Neckera crispa Hedw. (Neckeraceae); *Metzgeria conjugata* Lindb. (Metzgeriaceae); *Anomodon attenuatus* (Hedw.) Hüb., *A. rugelii* (Müll.) Keisl. (Anomodontaceae); *Brachythecium populeum* (Hedw.) B. S. G., *Brachythecium* sp. (Brachytheciaceae); *Fissidens* sp. (Fissidentaceae). The adults of *Mniophila taurica* sp. n. have been collected on following moss genera and species in Crimea: *Brachythecium glareosum* (Bruch ex Spruce) Schimp., *Homalothecium philippeanum* (Spruce) Schimp. (Brachytheciaceae), and *Plagiomnium rostratum* (Schrad.) T. Kop. (Mniaceae).

Medvedev (1997) pointed out that adults of *Mniophila* are detritophagous and confirmed it experimentally. It is likely also that adults are assumed to be phytophags or phytosaprophags.

Field observations of adults of *Mniophila* in June of 2003 and 2008 in Ukraine (Crimea) and in June-July of 2007 in Abkhazia (Georgia) demonstrate some interesting results on the behavior, biotope preference, and life cycle of beetles.

The copulation of beetle in Abkhazia was recorded from 23 June to 8 July. The larvae, apparently, finish their development and are ready to pupate at the end of summer or beginning of autumn while imagoes emerge in spring. This supposition is based on collecting of adults in the first half of May in Crimea. Cox (1997) mentioned that adults in Great Britain occur in moss throughout the year.

Adults of *Mniophila* usually occur in moss at the trunk base and prominent roots of trees, fallen trees, stones and rocks of various sizes, soil, logs, and tree branches. Beetles prefer the mosses usually with a middle length of stems and not very dense growing on a stone and at the base of tree (usually deciduous, sometimes conifers). As a rule the beetles can be found in fresh, not dry or wet moss. Usually adults occur on moss and sometimes inside of moss' bed. The most preferable substrates are oriented horizontally or sloping. More rarely beetles occur on completely vertical substrate. Beetles that occur in mosses on trees prefer large stands of *Fagus* or *Carpinus* with thick base and with projecting trunks. Trees or stones favourable for *Mniophila* are usually situate in more or less shaded conditions. But sometimes adults occur in well lighted biotopes like stony slopes at glades. Beetles usually do not occur at high altitude above ground, the maximal recorded height was 1.5 meters above ground.

Activity of adults has usually been recorded during the day but their activity in evening was recorded also. Adults moving up the trunk of *Fagus* was recorded in evening. At the altitude of 1300 m beetles were collected in the evening while the air temperature was 12-13 °C; at the altitude ca. 2000 m the temperature recorded was 7-10 °C at the same time.

Beetles occur singularly or in small groups up to 2-5 individuals on a unit of substrate. Such groups occur sporadically and do not form mass accumulations. Usually beetles are not rare in favourable biotopes.

Correspondence between the kind of substrate and the altitude is recorded. At an altitude of 200-500 m beetles usually were in the moss at trees base. Then with gradual increase in altitude a preferable substrate is moss on stones. In Abkhazia at the altitude of ca. 1300 m the beetles were collected exclusively in the moss on stony slope under *Rhododendron* bushes hanging down.

Observation on the behavior of the species of *Mniophila* demonstrates that individuals inhabiting moss on stones usually occur on the moss motionlessly or crawl from site to site. The individuals inhabiting moss on trees bases and trunks usually occur in deeper moss. When threatened adults exhibit an escape response (thanatosis) where they fall downward. Observations show that beetles usually jump reluctantly and at small distance. Probably, inhabiting in hidden conditions and small size promoted development of another tactics of behavior when jumping activity has secondary value.

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Key to the European species of *Mniophila* Stephens, 1831

1. Aedeagus ventrally with apical third short, straight margins and nearly straight apex with denticle to elongated, narrow, with narrow apex without denticle (Fig. 2); eyes convex, body usually slightly elongated (Fig. 1F); male first metatarsomere short and narrow (Fig. 1K), colouration black usually with greenish metallic lustre; pronotum long with base narrowly rounded (Fig. 1G); elytral puncation denser, often confused, secondary punctation larger. ..... *M. muscorum*

– Aedeagus ventrally with apical third short with rounded margins and rounded apex without distinct denticle, apex never elongated (Fig. 3J, K); eyes flattened; body clearly rounded (Fig. 3A-C); male first metatarsomere long and wide (Fig. 3F); colouration usually light to dark brown; pronotum short with widely rounded base (Fig. 3E); elytral puncation sparser, usually more regular, secondary punctation usually smaller. ..... *M. bosnica*

Mniophila muscorum (Koch, 1803)

(Figs 1, 2, 8)

Haltica muscorum Koch, 1803: 48.

Mniophila muscorum (Koch, 1803) – Stephens 1831: 330. – Heikertinger & Csiki 1940: 520–522 (world catalogue). – Kaszab 1962: 349 (key, distribution). – Mohr 1966: 261, fig. 70: 1 (key). – Gruev & Tomov 1986: 312–314, figs 358, 359a, b (description, distribution). – Medvedev & Roginskaya 1988: 141 (host plants). – Doguet 1994: 549–552, figs 208, 209 (key, distribution). – Konstantinov & Vandenberg 1996: 271, 307, fig. 48 (key, description). – Gruev & Döberl 1997: 240, 241 (distribution, bibliography). – Cox 1997: 277–279, figs 1–6 (larva). – Warchałowski 2000: 25–28, figs 35–40 (key, description, distribution).

Altica monticola Grimmer, 1841: 48. – Weise 1876: 178 (synonymized).

Mniophila wroblewskii Wańkowicz, 1880: 118.

Mniophila muscorum var. *wroblewskii* Wańkowicz. – Weise, 1883: 252.

Mniophila muscorum fa. *seriatopunctata* Roubal, 1932: 130. – Heikertinger & Csiki 1940: 521 (world catalogue).

Mniophila muscorum fa. *fortepunctata* Horion, 1939: 142. – Heikertinger & Csiki 1940: 522 (world catalogue).

Mniophila muscorum wroblewskii Wańkowicz. – Strejček, 1993: 131.

Type material:

Type material is lost according to Doguet (1994). To prevent confusion of this taxon I here designate a neotype of *Mniophila muscorum* in order to have a unique bearer of this name and the standard for its application. A neotype specimen, male, from Bulgaria with labels: 1. BG: Stara Planina, Botev-Massiv, N-Seite, Kar an der Pobita Glava, 1775 m; 2. unter Juniperus, Moss 42°43'36''N 24°53'38''O 27.V.2000 leg. Zerche. A neotype is deposited in DEI.

Type locality: Stara Planina Mountain Range: Botev-Massiv (Bulgaria).

Other material examined:

Great Britain: UK: W. Sussex Rewell Hill. 16.ix.2003 P. G. Booth, 4 specimens (NHML). – Oxford Kent 26.3.70 / in moss, 4 specimens (NHML). – Westerham 27.V.1923 CET., 18 specimens (NHML). – H. Donisthorpe B. M. 1934-4, 2 specimens (NHML). – Chatham Distr. J. J. W., 5 specimens (NHML). – Barcombe 4.-24, 1 specimen (NHML). – Chatham Kent J. J. W., 6 specimens (NHML). – Westmorland Ambleside ix.1969 / in moss, 3 specimens (NHML). – Tavertham Kent J. J. W., 2 specimens (NHML).

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France: Tours Desbroch., 3 specimens (DEI). – France: Htes Pyr. 1856–1875 Coll. L. Pandellé, 5 specimens (IRSNB). – France: Htes Pyr. H. Pyrénée 1856–1875 Coll. L. Pandellé, 5 specimens (IRSNB). – Tarbes, 3 specimens (LM). – France: Nièvre Vallée de Sardy / leaf litter / P. M. Hammond 8-20.viii.1982 B. M. 1982-354, 4 specimens (NHML). – Tarbes, 3 specimens (ZIN). – Vosges. / (Bône) [mislabelled], 4 specimens (ZIN). – 3. M. 746. Gall. M. muscorum, 3 specimens (ZIN). – St. Béat H.-Garonne, 7 specimens (ZIN). – France Chamonix 200 m / 19.VIII.1974 leg. S. Mahunka, 3 specimens (HNHM). – Moisd., 9 specimens (DEI). – Corsica 19.6.09, 1 specimen (DEI). – Vizzavona Corsica 19.6.09, 1 specimen (DEI). – Corsica Diener, 1 specimen (HNHM). – Corsica, 1 specimen (MTD).
Spain: Mniophila muscorum Altos Pirineos col. Perez Arcas, 2 specimens (MNCN).
Belgium: Belgie Nemen / Mon-sur-Lesse 19.21-V-1977 N. I. V. Krift, 3 specimens (ZMUA).
Germany: Thür. Wald gebel 4.6.22 W. Liebmann, 5 specimens (DEI). – Ob. Bayern Umg. Königsee 2.8.21, 2 specimens (DEI); the same, 21.7.21, 3 specimens (DEI); the same, 26.7.21, 2 specimens (DEI); the same, 27.7.21, 1 specimen (DEI); the same, 30.7.21, 1 specimen (DEI). – Ramsau / Obb / 14.6.1962 Willi Lucht, 1 specimen (HNHM). – Grünwald 28.11.49 / München Bühlmann, 1 specimen (DEI). – Germania Rhön 16.5.21 W. Liebmann, 1 specimen (DEI). – Germ. m., 1 specimen (DEI). – Germ. c., 1 specimen (DEI). – Boppard, 2 specimens (DEI). – Wechley Oldenburg 25.VI.91, 1 specimen (DEI). – Eifel Boellger, 1 specimen (DEI). – Ems v. Heyden Nassau, 1 specimen (DEI). – aenea Melsheimer Heidelberg Jenisson, 1 specimen (DEI). – Bayern Muscorum Kork., 2 specimens (ZMUC). – Gees Eifel 14.VII.1972 S. v. Helinsbergen, 1 specimen (ZMUA). – P. Lamy Hanau, 5 specimens (ZIN). – Mniophila muscorum E. H. German. Dohrn, 1 specimen (ZMKU). – Heidelbg. Haag., 4 specimens (HNHM). – Welle, 1 specimen (MTD). – Rein SK x.92, 3 specimens (MTD). – Heidelberg, 2 specimens (MTD). – Preetz, 2 specimens (MTD). – Ulm Württbg, 226 specimens (MTD).
Poland: Silesia, 1 specimen (DEI). – Beskiden Lissahora-Geb. TH. v. Wanka, 5 specimens (DEI). – Westpreussen, 4 specimens (DEI). – Beskiden Reitter, 2 specimens (ZMUA). – Beskiden Lisahora-Geb. TH. v. Wanka, 1 specimen (ZMUA). – Beskiden Lissagebiet TH. v. Wanka, 2 specimens (ZMUA). – Bolechow VIII.1924, 1 specimen (HNHM). – Polonia Bolechow. VIII.1926, 1 specimen (HNHM). – Silesia coll. Lichtn., 1 specimen (HNHM). – Tatra, 1 specimen (MTD). – Glatz-Geb., 1 specimen (MTD). – G. Schneebrg, 1 specimen (DEI). – Lysahora, 1 specimen (MTD).
Switzerland: Pilatus, 3 specimens (DEI). – Switzerland Crans: Valais moss. VIII.73, 5 specimens (NHML). – Switzerland near Zurich, Sihlwald 10 year Fagus forest barber trap 27.V.1999 V. Chumak, 1 specimen (NC). – Helvetia Bürgenstock 880 M. X.6.52 v. d. Wiel, 1 specimen (ZMUA).
Austria: Austria, 1 specimen (DEI). – leodinensis Wesm. Tirol Rosenhauer, 1 specimen (DEI). – Stiermark, 1 specimen (ZMUC). – Miller Austria, 2 specimens (ZMUA). – Wien Reitter, 3 specimens (ZMUA). – Wechselgeb. A. i., Mader, 8 specimens (HNHM). – Umgeb. von Wien, 2 specimens (MTD). – Wien Umgeb. A. Winkler Tullnerbach, 1 specimen (NHMW). – Lunz Austria, 5 specimens (MTD). – Steiermark Stuhleck, 1 specimen (NHMW). – Holdhaus Villach, 2 specimens (NHMW).
Italy: Italia. Novara Macugnana Geo. C. Krüger Coll. O. Leonhard, 1 specimen (DEI). – Certosa di Pesio Ligur. Alp. 23.VII.11, 1 specimen (DEI). – Calabria Sta Eufemia d'Aspromonte 1905, 1 specimen (DEI). – Como-See Villa, 1 specimen (DEI). – Folgaria S. Tirol 11.VII.14, 1 specimen (DEI). – Bozen Ti. V. Oertzen, 2 specimens (ZMUA). – Südtyrol Bozen 79 Reitter, 1 specimen (HNHM). – Castrozza, 1 specimen (HNHM). – Tauf. Sand. Schneifer, 5 specimens (MTD).
Slovenia: Dr. V. Beszédes St. Radegund, 1 specimen (HNHM).
Czech Republic: Altvater Letzner, 4 specimens (DEI). – Altvater, 6 specimens (DEI). – Moravia, 3 specimens (ZMUA). – Staudg. Moravia, 1 specimen (ZMUA). – Moravia Reitter, 1 specimen (ZMUA). – Altvater Mähren A. Otto, 1 specimen (ZMUA). –Fleischer Moravia, 1 specimen (ZIN). – Mniophila muscorum Koch. Fleischer Morav., 2 specimens (ZIN). – Moravia Reitter, 3 specimens (HNHM). – Moravia Besciden Reitter, 1 specimen (HNHM). – Altvater Letzner, 6 specimens (MTD). – Gesenke 7.92, 24 specimens (MTD).
Rumania: Carpathes Azuga A. L. Montandon, 2 specimens (DEI). – Bullea-See Schuster 95 / Siebenbürg., 3 specimens (DEI). – Banat 1909 Herculesbad leg. M. Hilf Coll. O. Leonhard, 1 specimen (DEI). – Siebenbürg. / Negoi 95 Schuster, 1 specimen (DEI). – Siebenbürg. / Bucsecs 95 Schuster, 1 specimen (DEI).

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– Siebenbürgen Roterturmpass, 1 specimen (NHMW). – Bucsecs 98 Schuster, 1 specimen (ZMUA). – Transsylvania Strobl., 1 specimen (ZMUA). – Schuler-Geb. Schuster 98, 2 specimens (NHMW). – Schuler-Geb. Schuster 98, 1 specimen (SMF). – Schuler Geb. Flach. VI.96, 1 specimen (SMF). – Rumänien Sinaia v. Bodemeyer, 1 specimen (SMF). – Deubel Tr. Rosenauer G., 1 specimen (SMF). – Transsilvania Ober Kerz Reitter, 1 specimen (ZIN). – Azuga Walachei, 9 specimens (HNHM). – Azuga Rumänien, 4 specimens (HNHM). – Flinsberg, 1 specimen (HNHM). – Rumänien Fogarasch-Geb. Barcaci 31.V.1981, 1 specimen (MTD). – Flinsberg D. Ludy, 1 specimen (MTD). – Transsylv, 2 specimens (MTD). – Siebenbg., 6 specimens (MTD). – N. Hagymás Holdhaus, 2 specimens (NHMW).

Hungary: Bokony Hungar. Heyden, 2 specimens (DEI). – Mniophila muscorum Ungarn, 1 specimen (ZIN). – Hung. 2 specimens (ZIN).

Ukraine: Gadzhyna Çerna-Gora, 2 specimens (LM). – Diana-lak Podk. Rusy VI. Zoufal., 4 specimens (ZMUA). – Ukraine, E Carpathians Zakarpattya, nr. Velyka Ugol'ka Vill., karst 19.VII.2001 N. N. Yunakov, 3 specimens (NC). – Ukraine, Zakarpatskaya obl., Marmarosh, chrebet Holovatschiu, g. Nenyaska 12.07.2000 N. Yunakov / verkhnyaja chast' lesnogo poyasa 1800 m, elnik, v mokhovoy podstilke vozle pney, 9 specimens (NC).

Croatia: Plitvica Croatia Heyden, 4 specimens (DEI).

Bosnia and Herzegovina: Bosnia 1902 Maklen-Pass O. Leonhard, 2 specimens (DEI). – Bosnia Bjelašnica Pl. O. Leonhard, 1 specimen (DEI). – Bosnia Bjelasnica–Pl. O. Leonhard, 1 specimen (DEI). – Bosnia Rovinaja Planina 1931.VII.7. leg. Dr. J. Fodor, 1 specimen (HNHM). – Bosnia, Jahorina 1935. X. leg. Dr. J. Fodor, 1 specimen (HNHM). – Bosnien Reitter. Leder, 1 specimen (HNHM). – Trebevic. Bosnia Fodor 1929.V.11, 1 specimen (HNHM). – Bosnia, Brdo Tresnjevik 1938.VII.26 leg. Dr. J. Fodor, 4 specimens (HNHM). – Herzegovina Bjelasnica 1901, 2 specimens (DEI). – Herzegovina Ubli 1903 O. Leonhard, 6 specimens (DEI). – Herzegovina, 2 specimens (ZIN).

Montenegro: Krivosije Paganetti, 6 specimens (DEI). – Krivosije Paganetti, 2 specimens (ZMUA). – Krivosije Paganetii, 5 specimens (HNHM). – Crna Gora, Durmitor Dolina Susice 1933.VII.7-27. leg. Dr. J. Fodor, 3 specimens (HNHM). – Crna Gora, Biela Gora Trebinje 1929.VII.25 leg. Dr. J. Fodor, 1 specimen (HNHM). – Crna Gora Zabljak 1934.VII.18. leg. Dr. J. Fodor, 2 specimens (HNHM). – Crna Gora Han Garancic 1938.VII.19-20. leg. Dr. J. Fodor, 4 specimens (HNHM). – Durmitor, Mont. 26.VI.1958 / Crno Jezero 1400 m / leg. Kaszab & Székessy, 18 specimens (HNHM). – Durmitor, Mont. 3.VII.1958 / Zmijinje Jezero 1400 m / leg. Kaszab & Székessy, 3 specimens (HNHM). – Durmitor, Mont. 27.VI.1958 / Crno Jezero cribri ope 1700 m / leg. Kaszab & Székessy, 1 specimen (HNHM).

Macedonia: Macedonia Crepolsko Ketsana Stjena, 4 specimens (HNHM).

Bulgaria: Bulg. Tschamkorija M. Hilf 1911 Coll. O. Leonhard, 3 specimens (DEI). – BG: Stara Planina, Botev-Massiv, N-Seite, Kar an der Pobita Glava, 1775 m / unter Juniperus, Moos 42°43'36'' N 24°53'38'' O 27.V.2000 leg. Zerche, 2 specimens (DEI). – BG: Ossogovska Planina, O-Gipfel des Ruen-Massivs, N-Hang, 1900 m, unter Steinen am Schneerand gesiebt 42°10'41'' N 22°33'49'' O 17.V.2000 leg. Zerche, 3 specimens (DEI). – BG: Stara Planina, Botev-Massiv, Schaltez-Nordhang S Hütte Pleven, 1705–1730 m. Schneefelder in Lawinenrinnen, 16.V.2001 42°43'43'' N 24°53'16'' O leg. Zerche & Behne, 1 specimen (DEI). – BG: Stara Planina, Kom-Massiv, Mali Kom, N-Seite Lawinenrinnen mit Schnee, 1645–1750 m, 43°09'52'' N 23°05'15'' O 6.V.2001 leg. Zerche & Behne, 1 specimen (DEI). – BG: Rila-Gebirge, Sitnjakovo S Borovez, 1740 m, Abies, letzte Schneeflecken / 42°14'42'' N 23°37'37'' O 28.IV.2001, leg. Zerche & Behne, 1 specimen (DEI). – Bulgaria. 1928 Mts. Rila. Biro. IX., 5 specimens (HNHM). – Bulgaria 1928. Rila. Biro. IX.24, 2 specimens (HNHM).

Unknown provenance: Muscorum Korch. Pyrenaei, 2 specimens (ZMUC). – Bar. Fux. Haltica muscorum E. H., 1 specimen (ZMUA). – Pyrenäen, 1 specimen (MTD). – Karpaten Scirba / Brancsik, 4 specimens (SMF).

Distribution:

Albania, Austria, Belgium, Bosnia, Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, France, Germany, Hungary, Ireland, Italy, Luxemburg, Macedonia, Montenegro, Netherlands, Norway, Poland, Spain, Rumania, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Ukraine (Carpathians).

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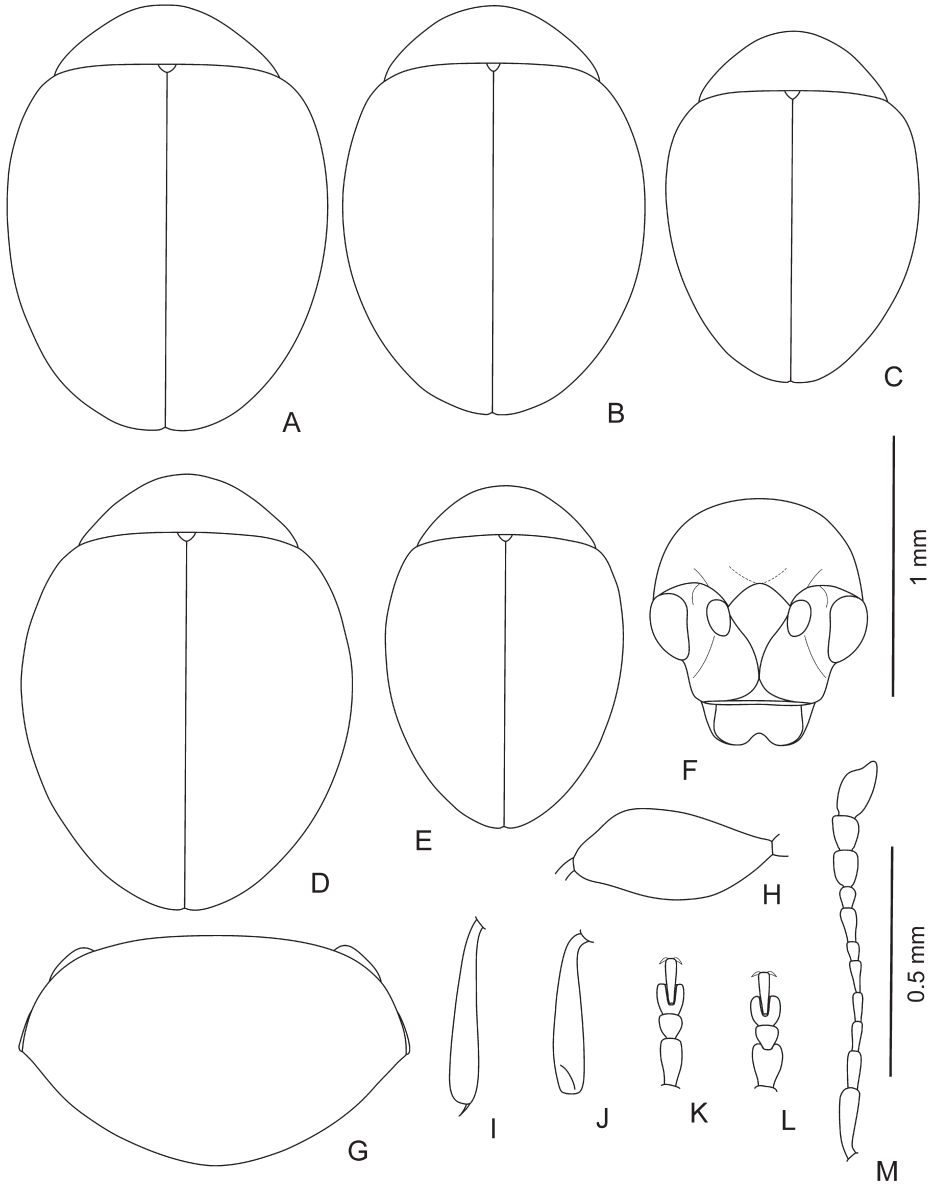

Fig. 1: *Mniophila muscorum* (Koch): A-E – body outline: A-C – female, D, E – male; F – head; G – pronotum outline; H – hind femur; I – hind tibia of male; J – fore tibia of male; K – hind tarsus of male; L – fore tarsus of male; M – antenna. Scale bar: A-E – 1 mm, F-M – 0.5 mm.

Redescription:

Body dark to black, shining, with greenish or rarely bronzy luster. Antennae and legs brown. Body shape rounded with weakly elongated elytral apices to distinctly elliptical. Head large; vertex wide; eyes gently convex to usually clearly convex. Antennae with thick segments. Head surface covered with well developed, large shagrination. Pronotum long with clearly rounded

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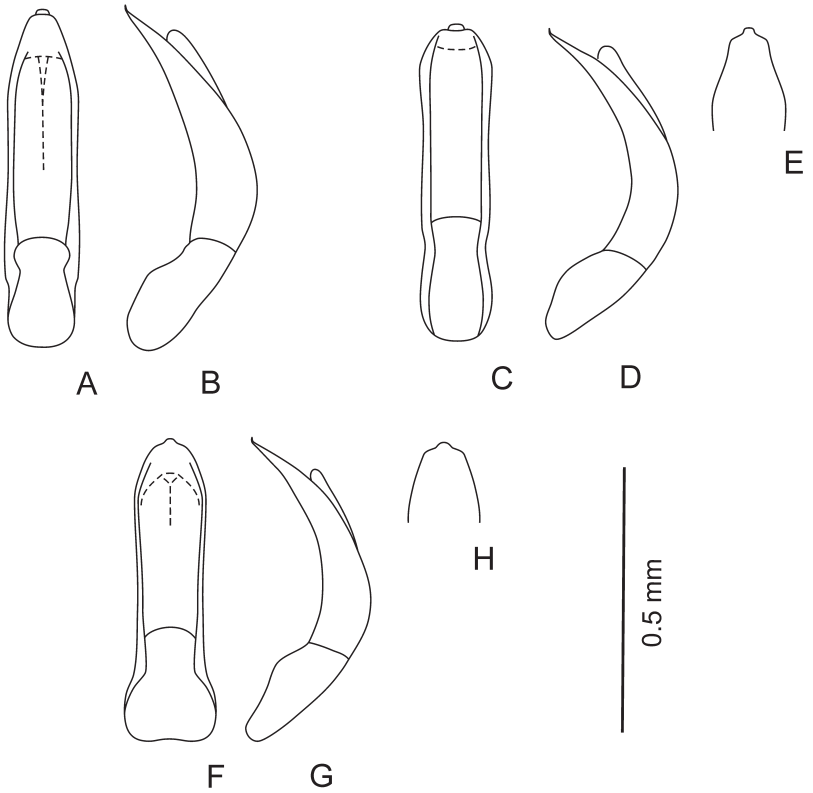

Fig. 2: *Mniophila muscorum* (Koch): Aedeagi. A, C, F – ventral view; B, D, G – lateral view; E, H – aedeagal apex, ventral view. Scale bar: 0.5 mm.

base. Pronotal surface covered with shagrination; punctation large, sparce, shallow, weakly visible. Elytra with greatly variable punctation. Usually punctation well developed, small, dense, striae confused; secondary punctation well developed, often as large as strial. Rarer strial punctation regular and secondary punctation smaller or almost indistinct. Legs thickened; tibiae straight or weakly curved; hind femora wide. First protarsomere of male usually short and moderately narrow. Aedeagus (Fig. 2) ventrally with apical third short with straight margins and nearly straight apex with denticle to elongated, narrow, with narrow apex without denticle. From lateral view apical third clearly gradually narrowed to apex, sometimes wider.

Body length – 1.20-1.68 mm, width – 0.89-1.21 mm.

Differential diagnosis:

Differs from *M. bosnica* in structure of aedeagus (Fig. 2): apical third in posterior view elongate with straight margins instead of short with round margins, apex straight or nearly straight with a denticle instead of apex rounded without denticle (Fig. 3J, K); body more elongate (Fig. 1A-E); eyes convex (Fig. 1F); pronotum longer (Fig. 1G); first metatarsomere thinner and shorter (Fig. 1K), first protarsomere of male shorter (Fig. 1L), colouration of the body darker, dark brown to black, usually with weak green luster; elytral punctation usually denser, punctation often confused, secondary punctation well developed, usually as large as punctures in striae. From *M. taurica* sp. n. differs in structure of aedeagus: apex usually elongate, with narrowing straight margins in

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posterior view or apical third with straight margins instead of sides toward apex parallel-sided, apical 1/4 with straight margins (Fig. 5K), denticle always present and well developed instead of denticle short or poorly developed; shagrination of the head more developed; eyes more convex; legs thicker; hind femur broader (Figs 1H, 5D); punctation of pronotum usually more developed; differs also in the shape of pronotum.

Discussion:

Mniophila wroblewskii Wańkowicz was described as a separate species and later was regarded as a variation of *Mniophila muscorum* by Weise (1883). This variation was also recorded from Caucasus and Crimea (Weise 1906; Heikertinger & Csiki 1939; Doguet 1994). Study of the material from Caucasus and Crimea revealed no *Mniophila muscorum* in these regions but three species new to science. The name "*wroblewskii*" was based on European specimens of *Mniophila* and treated as variation of *Mniophila muscorum.* Therefore, this name cannot be used for one of the new species from Caucasus or Crimea. Study of the variability of *Mniophila muscorum* reveals neither forms and variations nor subspecies. The main basis for description of the new forms or variations was the elytral punctation character. The state of this character is significantly variable and there is no correlation with geographic distribution. The character of punctation varies greatly at the level of population. There are individuals with more or less confused or regular punctation in the same population as well as with reduced or developed punctation. Therefore, I cannot agree with Mohr (1966) and Strejček (1993) on the subspecies status of *Mniophila wroblewskii*.

The same concerns also *Mniophila muscorum* fa. *seriatopunctata* described by Roubal (1932) and *Mniophila muscorum* fa. *fortepunctata* described by Horion (1939). These were described as definite forms and cannot be recognized as a species or as a subspecies (ICZN 2000, Arts. 45.5, 45.6, 45.6.4). The descriptions of these forms were based on intraspecific variability of elytral punctation and they are not localized geographically.

Mniophila bosnica Apfelbeck, 1914

(Figs 3, 9)

Mniophila bosnica Apfelbeck, 1914: 446. – Gruev 1979: 138, figs 2a, b (species level status restored). – Gruev & Döberl 1997: 240 (distribution, bibliography). – Warchałowski 2000: 25 (description, distribution). – Gruev 2001: 21 (checklist).

Mniophila muscorum var. *bosnica* Apfelbeck. – Heikertinger 1930: 1346. – Heikertinger & Csiki 1940: 522 (catalogue).

Mniophila muscorum bosnica Apfelbeck. – Medvedev 1970: 317 (subspecies level status).

Type material:

Syntypes: **Bosnia.** Trebević, Apf. / TYPUS, 1 specimen. – Zvijezda / TYPUS, 2 specimens. Type material is deposited in the National Museum of Bosnia and Herzegovina, Sarajevo. Not examined.

Type locality: Bosnia (South).

Other material examined:

Great Britain: Power. Darenth., 8 specimens (NHML). – Surrey. Leith Hill. 16.VI.1951. J. T. Salmon / in moss, 3 specimens (NHML). – Chatham, Kent. G. C. C., 1 specimen (NHML). – H. Donisthorpe. B. M. 1934-4., 3 specimens (NHML). – Oxford Kent 26.3.70 / in moss, 5 specimens (NHML).
France: St. Béat H.-Garonne, 7 specimens (ZIN).

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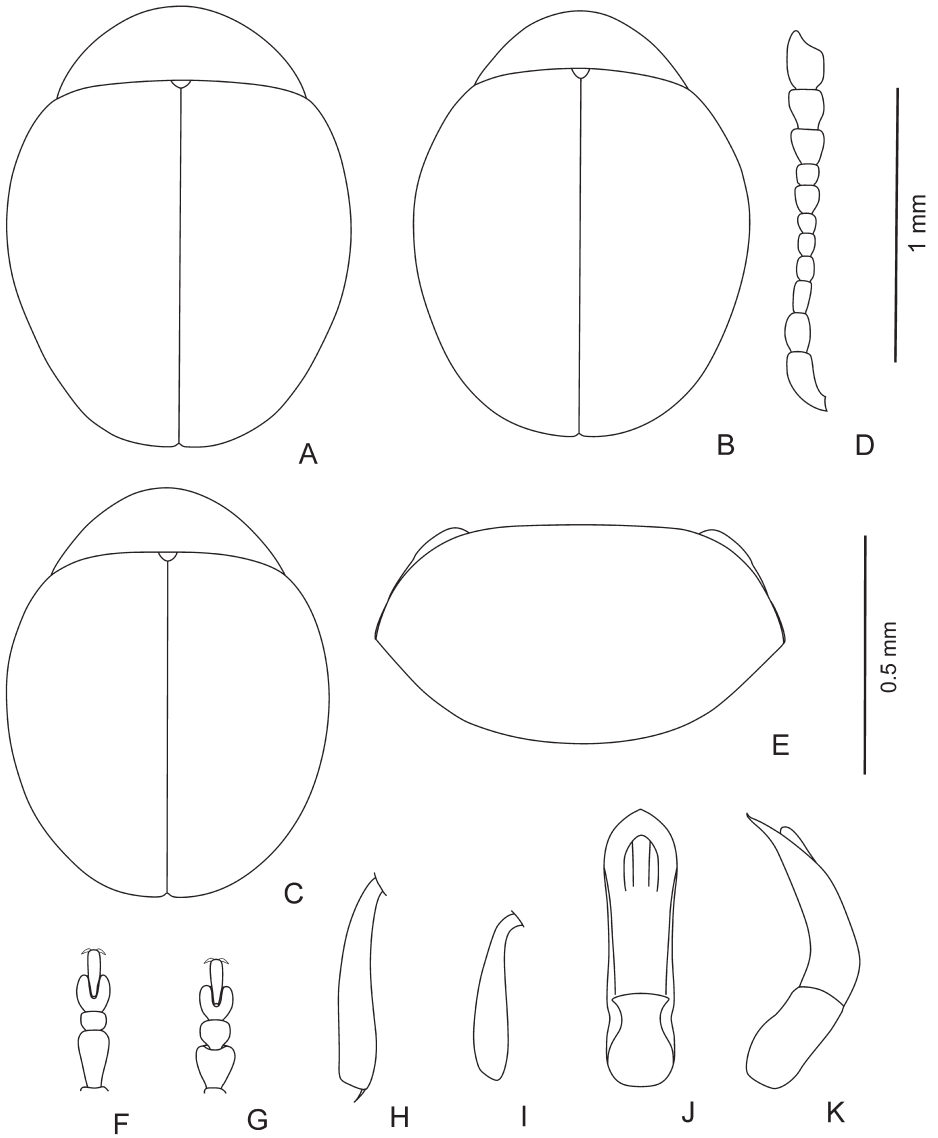

Fig. 3: *Mniophila bosnica* Apfelbeck: A-C - body outline: A, B – female, C – male; D – antenna; E – pronotum outline; F – hind tarsus of male; G – fore tarsus of male; H – hind tibia of male; I – fore tibia of male; J – aedeagus, ventral view; K – aedeagus, lateral view. Scale bar: A-C – 1 mm, D-K – 0.5 mm.

Germany: Boppard, 3 specimens (DEI).
Poland: Riesengebirge Letzner, 3 specimens (DEI).
Austria: N-Tirol Reutte leg. Knabl, 1 specimen (DEI). – Zirbitzkogel Diener, 1 specimen (HNHM). – Vorarlb. Allgäu Riezlern 6.-7.21, 1 specimen (HNHM). – Dobratsch Diener, 2 specimens (HNHM).
Czech Republic: Moravia Reitter, 2 specimens (DEI). – Moravia, 1 specimen (ZMUA).
Rumania: Ungarn Hatszeg v. Bodemeyer, 1 specimen (DEI).
Italy: Italia. Novara Macugnana Geo. C. Krüger Coll. O. Leonhard, 2 specimens (DEI). – Görz 22.VII.11

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Gradisca, 1 specimen (DEI). – Calabria Sta. Eufemia d'Aspromonte 1905 Paganetti, 1 specimen (ZIN). – Calabria Aspromonte Paganetii 1905, 2 specimens (HNHM). – Calabria Aspromonte leg. Paganetti, 1 specimen (HNHM). – Foresta d. Reso (Prov. Pistoia) 5-6-971 S. Failla, 6 specimens (MZUF). – m. Amiata 24-5-1969 Castelini-Failla, 1 specimen (MZUF). – S. Vito di Cadore 13-VIII-972 S. Failla, 1 specimen (MZUF). – Bozen Ti. V. Oertzen, 3 specimens (ZMUA). – Bozen, 9 specimens (ZMUA).
Slovenia: Oestr. Küstenland Fužina 1906 legit. M. Hilf Coll. O. Leonhard, 1 specimen (DEI).
Croatia: Capela Croatia Heyden, 10 specimens (DEI). – Brušane Pawel, 10 specimens (HNHM).
Bosnia: Bosnia 1909 Kladani leg. M. Hilf Coll. O. Leonhard, 2 specimens (DEI). – Bjelasnica planina Bosnien coll. Leonhard, 2 specimens (DEI). – Bosnia 1902 Maklen-Pass O. Leonhard, 1 specimen (DEI). – Bosnia Bjelasnica-Pl. O. Leonhard, 20 specimens (DEI). – Bosnia, 2 specimens (ZIN). – Bosnia, Sarajevo Bjelasnica Planina 1930.VII.25. leg. Dr. J. Fodor, 1 specimen (HNHM). – Bosnia Rovinaja Planina 1931. VII.7 leg. Dr. J. Fodor, 1 specimen (HNHM). – Bosnia, Jajce 1934.XI.5. leg. Dr. J. Fodor 1929.V.11, 1 specimen (HNHM). – Bosnia, Brdo Tresnjevik 1938.VII.26 leg. Dr. J. Fodor, 1 specimen (HNHM). – Trebovic. Bosnia Fodor 1929.V.11, 1 specimen (HNHM). – Bosn. Herzeg. Ivan Reitter, 1 specimen (HNHM). – Bosnia, Kamenica R. Susica, 1 specimen (HNHM).
Herzegovina: Herzegovina Jablanica, 4 specimens (DEI). – Herzegovina, 1 specimen (ZIN). – Herzegovina Vucije bara Jacko. Fodor, 1 specimen (HNHM).
Montenegro: Crna Gora, Biela Gora Trebinje 1929.VII.25, leg. Dr. J. Fodor, 2 specimens (HNHM). – Durm. Mont. 26.VI.1968 / Crno Jezero 1400 m / leg. Kaszab & Székessy, 1 specimen (HNHM).
Bulgaria: BG: Slavianka (Ali-Botusch), S Goleschovo, NW Mt. Gozev Vrach, N-Hang. 1955 m. Schneefeld / einzelne Pinus, 41°22'26'' N 23°36'28'' O 6.V.2000 leg. Zerche, 1 specimen (DEI). – Bulgaria 1912 Trevna V-VI leg. M. Hilf Coll. O. Leonhard, 4 specimens (DEI). – Bulg. Tschamkorija M. Hilf 1911 Coll. O. Leonhard, 4 specimens (DEI). – Bulgaria. 1928. Mt. Rila. Biro. IX., 1 specimen (HNHM).
Macedonia: Macedonia Crepolsko Ketsana Stjena, 1 specimen (HNHM).
Albania: Ueskueb Albania Dilon, 2 specimens (DEI).
Unknown Provenance: Moldavia 1903-67, 1 specimen (NHML) [? mislabelled].

Distribution:

Albania, Austria, Bosnia, Bulgaria, Croatia, Czech Republic, France, Germany, Great Britain, Herzegovina, Italy, Macedonia, Montenegro, Poland, Rumania, Slovenia.

Redescription:

Body brown with bronzy lustre or without, sometimes dark-brown, margins of pronotum and elytra sometimes lighter; legs brown. Body distinctly rounded, wide, elytral apices not elongated or weakly elongated. Head large, vertex wide, eyes flattened, rarely weakly convex. Surface of a head with well developed shagrination. Antennae (especially in males) clearly thickened. Pronotum short with very wide and weakly rounded base. Pronotal surface covered with well developed, large shagrination; punctation large, shallow, usually poorly visible. Elytra with punctation arranged in regular striae, sometimes partly confused, secondary punctation smaller than strial, not dense, rarely striae more confused and secondary punctation large. Legs distinctly thickened, wide (especially in males). First protarsomere of male large, long, and wide. Tibiae straight or weakly curved. Hind femora wide. Aedeagus (Fig. 3J, K) ventrally with apical 1/3 with clear, often rounded margins and rounded apex without distinct denticle, medial third usually narrower than apical, from lateral view apical third wide, sharply narrowed to apex.

Body length – 1.28-1.61 mm, width – 0.95-1.19 mm.

Differential diagnosis:

Differs from *M. muscorum*: structure of aedeagus (Fig. 3J, K) with apex short in posterior view rounded, apex laterally rounded, apically without denticle instead of apex elongated or short with straight margins and well developed denticle (Fig. 2); body more rounded (Fig. A-C); eyes

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flattened; prothorax shorter (Fig. 3E); first protarsomere of male thicker and longer (Fig. 3G); first metatarsomere of male longer (Fig. 3F); colouration of the body somewhat lighter, brown to dark brownish with bronzy lustre; elytral punctures usually sparser, usually arranged in regular striae, secondary punctation smaller, usually weakly developed. From *M. turcica* differs: in structure of aedeagus: apex short at view from behind with rounded sided, apex rounded, without denticle instead of aedeagus ventrally with apical third gradually narrowed to apex; apex almost straight with large denticle; punctated pronotum, tibiae usually thinner and less curved, segments of antennae wider. From *M. taurica* sp. n. differs: structure of aedeagus with apex short in posterior view, laterally rounded, apex rounded, without denticle instead of aedeagus ventrally toward apex parallel-sided, wide, apical 1/4 with straight, narrowing sides and with distinct and straight apex with rather short and wide denticle or with poorly developed one; coloration of the body (without green reflection); legs and antennae thicker, head larger and of another structure, shagrination of the head more developed, punctation of elytra usually more regular and larger; differs also in the shape of pronotum.

Discussion:

Mniophila bosnica was described as separate species by Apfelbeck (1914). Later this species was regarded as variation of *Mniophila muscorum* (Heikertinger 1930). A subspecies level status was applied by Medvedev (1970) without any comments. The species level status of *Mniophila bosnica* was restored by Gruev (1979) based on morphological differences in the structure of aedeagus, the present study confirms this. *Mniophila bosnica* is closely related to *Mniophila muscorum* but differs in the aedeagal structure and other characters mentioned above.

The data on the distribution of *Mniophila bosnica* were limited by records from Bosnia and Montenegro (Gruev 1979; Gruev & Döberl 1997; Warchałowski 2000). A detailed examination of the material revealed that this species is more widely distributed. The distribution presented here is based on the material examined in the course of this study. It is highly possible that real range of distribution of this species is larger.

Mniophila turcica L. Medvedev, 1970 stat. n.

(Figs 4, 10)

Mniophila muscorum turcica L. Medvedev, 1970: 317, figs 1a, b. – Gruev & Döberl 1997: 241. – Aslan et al. 1999: 397.

Type material:

Holotype: **Turkey:** Between Yol-Üstü and Rize, 600 m., 15.V.1967, C. Besuchet leg., male. – Paratypes: the same label as holotype, 8 specimens. – Hopa-Arhavi, 14.V.1967, C. Besuchet leg., 3 specimens. – deposited in the Museum of Natural History of Geneva. Two paratype specimens studied (labels numbered): 1. Turquie Rize yol üstu / Rize 600 m, 14.V.67 Cl. Besuchet; 2. Paratypus Mniophila muscorum turcica L. Medv. – male and female (LM).

Type locality: Turkey: Rize.

Distribution:

Turkey (Rize, Artvin).

Redescription:

Body dark brown with weak bronzy luster; legs and antennae brown. Body almost rounded with

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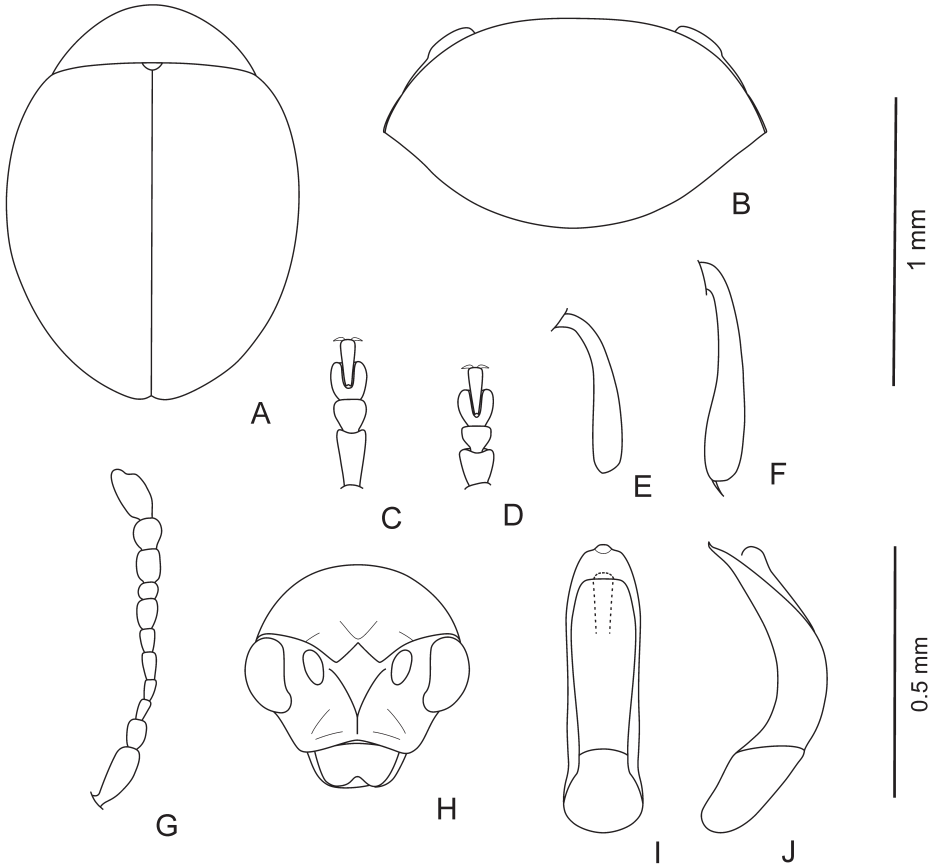

Fig. 4: *Mniophila turcica* L. Medvedev: A - body outline, male; B – pronotum outline; C – hind tarsus of male; D – fore tarsus of male; E – fore tibia of male; F– hind tibia of male; G – antenna; H – head; I – aedeagus, ventral view; J – aedeagus, lateral view. Scale bar: A– 1 mm, B-J – 0.5 mm.

weakly elongated elytral apices. Head large, long, eyes moderately convex; frons long, frontal ridge strongly convex; antennal grooves rather deep. Head surface covered with shagrination. Antennae not thick, segments short. Pronotum moderately long with wide and widely rounded base. Its surface covered with well developed shagrination, impunctate. Elytra smooth, punctation weakly developed, punctures large, poorly visible, shallow; in apical third invisible. Punctures arranged in partly confused striae; secondary punctation not developed. Notch between metathoracic cavities concave. Legs rather thick, clearly curved. First protarsomere of male moderately wide, not very long; metafemora wide. Aedeagus ventrally with apical third gradually narrowed to apex; apex almost straight with large denticle; basal 2/3 gradually widened toward apical third; from lateral view apical 2/3 almost straight, slightly curved apically.

Body length – 1.2-1.5 mm, width – 0.98 mm.

Differential diagnosis:

From *M. transcaucasica* sp. n. differs: in structure of aedeagus (Fig. 4I, J), apex almost straight instead of apex obtuse; structure of head (Fig. 4H), particularly in more convex eyes, frontal ridge more convex and more developed, antennal grooves deeper, frontal calli more developed;

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notch between metathoracic cavities concave; first metatarsomere longer and narrower (Fig. 4C); dorsal punctation poorly developed. From *M. caucasica* sp. n. differs: in structure of aedeagus, apex almost straight instead of aedeagal apex rather wide, straight, apical 1/4 in posterior view more or less sharply narrowed to apex; apical segments of antennae shorter; tibiae thicker and more curved; first protarsomere (Fig. 4D) and that of mesotarsomere of males shorter and wider; dorsal punctation poorly developed and shagrination well developed. From *M. bosnica* differs: in structure of aedeagus, ventrally with apical third gradually narrowed to apex, the latter almost straight with large denticle instead of aedeagal apex with rounded sides and apex, the latter without denticle; pronotum impunctate; tibiae usually more curved (Fig. 4E, F), antennal segments thinner (Fig. 4G).

Discussion:

This form has been described as a subspecies by Medvedev (1970). Study of the type material reveals that this form is well differentiated from other species of the genus and should be recognized at the level of species. This form differs from *M. muscorum* and other species in a set of characters and their states are at a level significant enough to regard this form in a specific rank.

The above description of this species is based on two paratypes. The quite confused elytral punctation is mentioned in the original description. The two paratypes examined have elytral punctation is arranged in partly confused striae.

Mniophila taurica sp. n.

(Figs 5, 10)

Type material:

Holotype (labels numbered): 1. **Ukraine,** Crimea, ascent to Chatyr-Dagh mid plateau from Sosnovka Vill. 18.VI.2003 Nadein K.; 2. Quercus-Fraxinus-Fagus forest, on Fagus stem and in moss, male (ZIN). – Paratypes: the same label as holotype, 4 females (NC). – Ukraine, Crimea, ascent to Chatyr-Dagh mid plateau from Sosnovka Vill. 18.VI.2003 Yunakov N., 1 male, 1 female (NC). – Crimea, Chatyr-Dagh nr. Bin-Bash-Koba Cave mid plateau, on Fagus stem in forest, 100 m, 22.VI.2003 Nadein K., 1 female (ZIN). – 1. Crimea Bakhchisarayskiy Distr. Bol'shoy Kan'yon Gorge, 5.05.1999 N. Yunakov; 2. in forest, on moss among stones, 5 females (ZIN), 4 females (DEI). – 1. Crimea Bol'shoy Kan'yon Gorge, reserved area, 05.05.1999 A. Drogvalenko; 2. in moss on stones, 12 females (KUMN). – 1. Ukraine, Crimea, 1 km S Pereval'noe Vill., left bank of Angara Riv., 1.VII.2008 Nadein K. leg.; 2. Quercus-Fagus-Carpinus forest, in moss at base of Quercus stem, 2 females (DEI). – Ukraine, Crimea, Dolgorukovskaya Yajla, upper stream of Burul'cha Riv., env. Kolan-Bair Mt., h=800 m, 29.VI.2008 Nadein K. leg.; 2. Fagus-Quercus-Carpinus forest, in moss on stones, 2 males 3 females (SIZK), 3 males, 3 females (NHML).

Etymology:

The specific epithet refers to geographical distribution of the new species that is endemic to Crimea.

Distribution:

Ukraine: Crimean Mountains.

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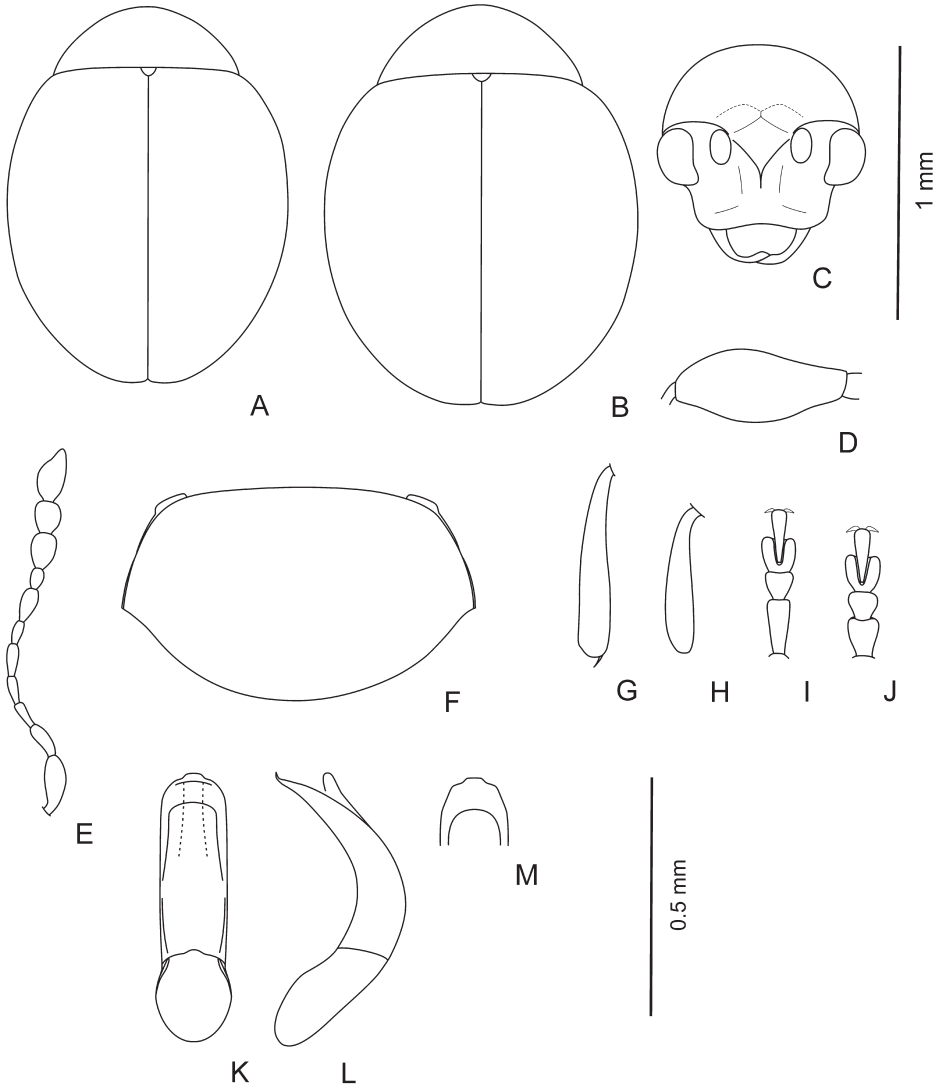

Fig. 5: *Mniophila taurica* sp. n.: A, B – body outline: A – male; B – female; C – head; D – hind femur; E – antenna; F – pronotum outline; G – hind tibia of male; H – fore tibia of male; I – hind tarsus of male; J – fore tarsus of male; K – aedeagus, ventral view; L – aedeagus, lateral view; M – aedeagal apex, ventral view. Scale bar: A, B – 1 mm, C-M – 0.5 mm.

Description:

Body black, shining, often with greenish luster; legs and antennae yellow-reddish to light brown. Body almost rounded, with weakly elongated elytral apices. Head small, vertex moderately wide; eyes convex. Head surface covered with poorly developed, smoothed shagrination, sometimes vertex almost smooth. Antennae thin. Pronotum comparatively long, with distinctly rounded base, its surface covered with fine shagrination, punctation small, weakly visible among surface's microsculpture. Elytra with small, dense punctation, striae usually confused; secondary punctation usually well developed, size as large as in striae or nearly so; rarely striae regular. Legs thin; first

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protarsomere of male almost not widened or weakly widened; tibiae straight or slightly curved, metafemora narrow. Aedeagus (Fig. 5K-M) ventrally toward apex parallel-sided, wide, apical 1/4 with straight, narrowing sides and with distinct and straight apex with rather short, wide denticle or denticle poorly developed; from lateral view apical half gradually narrowed to apex.

Body length – 1.34-1.59 mm, width – 0.95-1.21 mm.

Differential diagnosis:

From *M. caucasica* sp. n. differs: in structure of aedeagus (Fig. 5K-M) with poorly developed denticle or with wider and shorter one, from lateral view narrower; flattened eyes (Fig. 5C); apical antennal segments shorter (Fig. 5E); shape of pronotum with more rounded and more elongated base (Fig. 5F); head more elongated with vertex narrower, hind femora narrower (Fig. 5D). From *M. transcaucasica* sp. n. differs: in structure of aedeagus, wide, ventrally toward apex parallel-sided, apical 1/4 with straight, narrowing sides and with distinct and straight apex with rather short, wide denticle or poorly developed instead of aedeagus ventrally with apical third gradually narrowed to apex, the latter obtuse with well developed denticle; head longer, shagrination of head less developed, frontal calli more developed; pronotum longer with more convex base; tibiae less curved and usually straight (Fig. 5G, H); hind femora narrower; notch between metathoracic cavities concave; first protarsomere of male narrower. From *M. turcica* differs: in structure of aedeagus, wide, ventrally toward apex parallel-sided, apical 1/4 with straight, narrowing laterally, apex distinct and straight with rather short, wide denticle or poorly developed compared to aedeagus ventrally with apical third gradually narrowed to apex, the latter almost straight with large denticle; tibiae nearly straight and usually less curved; shagrination of head less developed; hind femora narrower; pronotum punctate; tibiae thicker; eyes more flattened.

Key to the Caucasian species of *Mniophila* Stephens, 1831

1. Aedeagus ventrally with apical 1/4 more or less sharply narrowed to apex (Fig. 6L-N), the latter rather wide, straight; hind tibiae less curved; first protarsomere of male longer and thinner (Fig. 6F); last metatarsomere thicker (Fig. 6G); eyes more convex, ocular sulci and frontal calli more developed; apical antennal segments longer (Fig. 6K); pronotum longer (Fig. 6E); notch between metathoracic cavities concave (Fig. 6H). ..... *M. caucasica* sp. n.

– Aedeagus ventrally with apical third gradually narrowed to apex (Fig. 7J, K), apex obtuse; hind tibiae distinctly curved, first tarsomeres shorter and thicker (Fig. 7I); last metatarsomere thinner (Fig. 7H); eyes more flattened (Fig. 7E); ocular sulci and frontal calli less developed; apical antennal segments shorter and thicker (Fig. 7D); pronotum shorter (Fig. 7B); notch between metathoracic cavities straight (Fig. 7C). ..... *M. transcaucasica* sp. n.

***Mniophila caucasica* sp. n.**

(Figs 6, 10)

Type material:

Holotype (labels numbered): **Georgia:** 1. Manglis 1879, 2. k. G. Siversa, male (ZIN). – Paratypes: **Russia:** Krasnodarsk. Kray Severskiy r-n Ubinskoe lesn. Belov 12.VII.1975, 3 females (DEMU). – The same label, 24.VII.1975, 1 female (DEMU). – The same label, 18.V.1975, 1 male (DEMU). – Sev. Osetia, 1300 m, Buron yuzh. Alagir 16.VIII.1979 Kurbatov, 1 female

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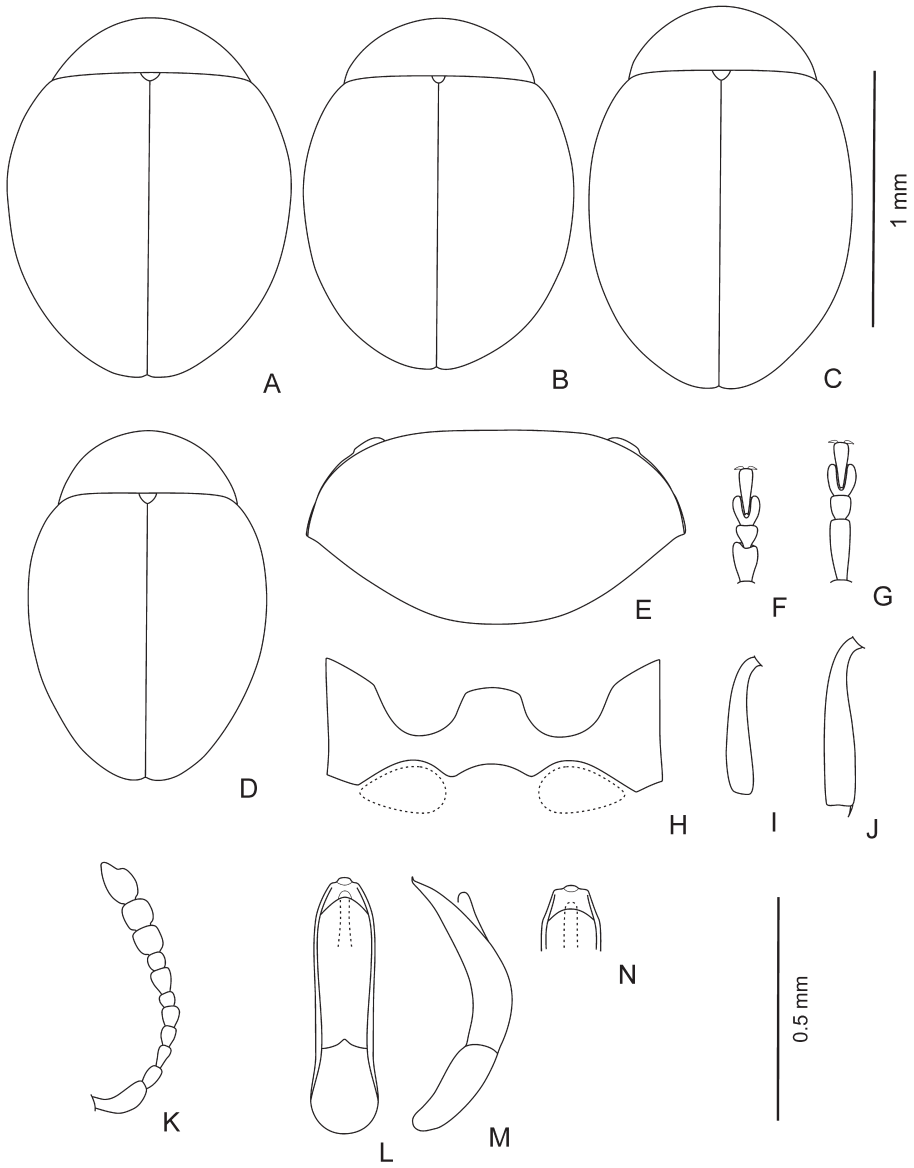

Fig. 6: *Mniophila caucasica* sp. n.: A-D – body outline: A-C – female, D – male; E – pronotum outline; F – fore tarsus of male; G – hind tarsus of male; H – metasternum; I – fore tibia of male; J – hind tibia of male; K – antenna; L – aedeagus, ventral view; M – aedeagus, lateral view; N – aedeagal apex, ventral view. Scale bar: A-D – 1 mm, E-N – 0.5 mm.

(DEMU). – Kavkazskiy zapov. Yuzhnoe lesn. Kordon Pslukh Nikitskiy 15.VII.1976, 1 male, 1 female (DEMU). – The same label, 14.VII.1976, 1 male, 1 female (DEMU).

Abkhazia: Abkhazia Myusserskiy zapov. 11-16.III.1988 leg. V. Belov, 1 female (BMPU). – Abkhazia, okrestn. Pitsundy, Myussera 4-12.X.1986 leg. V. Belov, 1 female (BMPU). – 13.04.1990 Abkhazia Gumistinskiy zapov. Tsimur. V podstilke, S. Kurbatov, 1 female (LM). –

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W Caucasus Abkhazia Pskhu valley, Bzyb' River, mouth of Reshevie Riv., 591 m N43°20'19.23" E40°50'27.64" 28.VI.2007 K. Nadein leg. / lower terrace, in moss on Carpinus stems and on stones in forest, 1 male, 7 females (DEI). – W Caucasus Abkhazia W Gumista Riv., 1 km above mouth Gumiripsha Riv. 450 m N43°14'45.80" E40°54'40.26" 21.VI.2007 K. Nadein leg. / *Fagus-Carpinus* forest, slopes in gorge, in moss and in litter, 2 males, 6 females, (NC). – W Caucasus Abkhazia W Gumista Riv., 1 km above mouth Gumiripsha Riv. 450 m N43°14'45.80" E40°54'40.26" 20.VI.2007 K. Nadein leg. / *Fagus-Carpinus* forest, slopes to river, in moss on *Fagus* stem, 4 males (ZIN). – W Caucasus Abkhazia Bagri-Yashta MtR, nr Anchkho Pass, h=1800-2000 m N43°28'39.64" E40°42'28.49" 2.VII.2007 K. Nadein leg. / sweeping in *Fagus-Carpinus* forest and edge of meadows, 6 males, 1 females (KUMN). – W Caucasus Abkhazia middle course of Ghegha Riv. Gheghskoe Gorge, h=500 m N43°25'43.11" E40°26'51.04" 13.VII.2007 K. Nadein leg. / *Picea-Abies-Fagus* forest in moss, lower and middle terrases along river, 2 males, 4 females (HNHM). – W Caucasus Abkhazia Psheghishkhva Mt., nr Malaya Ritsa Lake, h= 1200 m N43°28'25.73" E40°30'04.47" 8–9.VII.2007 K. Nadein leg. / *Abies-Fagus* forest, in moss on stones and on *Abies* stem, 2 males, 6 females (DEI). – W Caucasus Abkhazia Bagri-Yashta MtR., Anchkho Mt. nr Auatkhara loc., h=1500 m N43°29'38" E40°40'26" 5.VII.2007 K. Nadein leg. / *Abies-Fagus* forest, in moss on stones, 4 males, 4 females (NHML). – W Caucasus Abkhazia Aguripsta Riv., 4 km NW of Pskhu Vill., nr. Svyataya Mt. N43°25'36.80" E40°49' 08.40" 29.VI.2007 K. Nadein leg. / *Fagus-Carpinus* forest, in moss on *Carpinus* stem, h=800 m, 3 males, 7 females (IRSNB). – W Caucasus Abkhazia Bzybskiy Mount. Range, S slope of Dou Mt., h=1200 m N43°17'12.00" E40°53'39.21" 23.VI.2007 K. Nadein leg. / *Fagus-Carpinus-Quercus-Castanea* forest, in moss on stony slopes along road under *Rhododendron* bushes, 4 males, 9 females (NHMW).

Georgia: The same labels as holotype, 1 male (ZIN). – Manglis [illegible words in a second line] 1881, 2 females (ZIN). – Manglis 1880 / G. Siversa, 6 females, 2 males (ZIN). – Caucasus Swanetien Leder. Reitter / M. muscorum Koch. Coll. Reitter, 1 female (HNHM). – Gruzia okr. Borzhomi 28-29.VII.1977 v lesu pod kamnem Belov, 1 male, 1 female (DEMU). – Caucasus Tbatani 79 Leder (Reitter), 1 female (ZMUA). – Kaukas Leder / M. muscorum v. wroblewskii Wk. Coll. Reitter, 1 female (HNHM). – Kaukas Leder / M. muscorum Koch. Coll. Reitter, 2 females (HNHM). – Caucasus Leder. Reitter / M. muscorum v. wroblewskii Wk. Coll. Reitter, 1 female (HNHM). – Kaukas Leder / Mn. muscorum v. caucasica Hktg., 1 female (DEI). – Kaukas. Schneider / Mn. muscorum v. caucasica Hktg., 1 female (DEI).

Azerbaijan: Azerbaijan: Caucasus Belokany Distr., 9 km N Vill. Katekh, Zagatala Res. Katekhchay Riv. valley 26.VI.2004 K. Nadein leg.; 2. N 41°45'02'' E 46°37'01'' left bank, E slope of Fidjugel' MtR, 700-800 m Fagus forest, 1 male, 2 females (NC). – Caucasus Helenendorf Reitter, 1 female (ZMUA).

Etymology:

The specific epithet refers to geographical distribution of this new species that is widespread in Caucasus.

Distribution:

Russia (North Caucasus: Krasnodarskiy Terr.), Abkhazia, Georgia, Azerbaijan.

Description:

Body dark to black, shining, often with greenish luster; rarely brown with bronze luster in partly coloured specimens; legs brown. Body roundellipticall. Head large, short; eyes convex; frontal ridge moderately convex; frontal calli well developed, convex; supracallinal sulcus visible. Head surface

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covered with large, well developed shagrination. Antennal grooves not very deep. Antennae with moderately thick and comparatively long segments. Pronotum long, quite apparently not widely rounded, its surface covered with distinct shagrination, rarely smooth; punctation developed, not large and dense, weakly visible among surface's microsculpture. Elytra with variable states of punctuation, usually punctation well developed, sometimes elytra almost impunctate; elytral striae usually confused, not large; secondary punctation well developed, dense, size often as large as strial punctures; interstices smooth. Notch between metathoracic cavities concave (Fig. 6H). Legs not very thick; tibiae curved; metafemora wide; first protarsomere of male not wide. Aedeagus (Fig. 6L-N) ventrally with apical 1/4 more or less sharply narrowed to apex; apex rather wide, straight, with denticle; from lateral view apical 2/3 almost straight, wide, clearly narrowed to apex.

Body length – 1.14-1.58 mm, width – 0.91-1.12 mm.

Differential diagnosis:

From *M. transcaucasica* sp. n. differs: in structure of aedeagus (Fig. 6L-N), ventrally with apical 1/4 more or less sharply narrowed to apex, the latter rather wide and straight instead of aedeagus ventrally with apical third gradually narrowed to apex; less curved tibiae (Fig. 6I, J); first protarsomere of male longer and thinner (Fig. 6F); eyes more convex; ocular sulci and frontal calli more developed, apical antennal segments longer (Fig. 6K); pronotum longer (Fig. 6E), notch between metathoracic cavities concave (Fig. 6H); last metatarsomere thicker (Fig. 6G). From *M. turcica* differs: in structure of aedeagus, ventrally with apical 1/4 more or less sharply narrowed to apex, the latter rather wide, straight instead of aedeagus ventrally with apical third gradually narrowed to apex, the latter almost straight; head shorter with deep antennal grooves; apical antennal segments longer; tibiae thinner and less curved; usually well developed punctation of pronotum and usually poorer developed shagrination. From *M. taurica* sp. n. differs: in structure of aedeagus, ventrally with apical 1/4 more or less sharply narrowed to apex, the latter rather wide, straight, denticle well developed instead of aedeagus ventrally toward apex parallel-sided, wide, apical 1/4 with straight, narrowing sides and with distinct and straight apex with rather short, wide denticle or poorly developed; head shorter and wider, eyes more convex, apical antennal segments longer; hind femora thicker; differs also in the shape of pronotum with less rounded base.

Mniophila transcaucasica sp. n.

(Figs 7, 10)

Type material:

Holotype: **Armenia:** Kaukasus Dshelal ogly, male (ZIN). – Paratypes: **Georgia:** Kaukas Leder / M. muscorum Koch. Coll. Reitter, 2 males (HNHM).

Caucasus. Mniophila muscorum Caucas / k. Rybakova, male (ZIN).

Etymology:

The specific epithet refers to geographical distribution of the new species that is distributed in Transcaucasus.

Distribution:

Armenia, Georgia.

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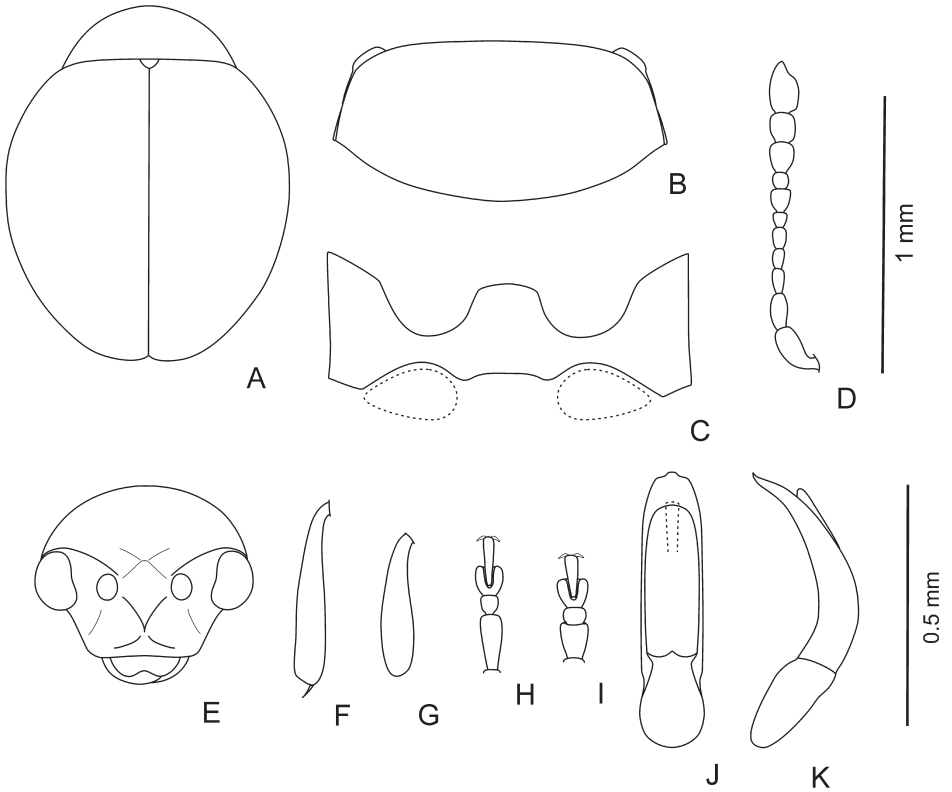

Fig. 7: *Mniophila transcaucasica* sp. n.: A – body outline, male; B – pronotum outline; C – metasternum; D – antenna; E – head; F – hind tibia of male; G – fore tibia of male; H – hind tarsus of male; I – fore tarsus of male; J – aedeagus, ventral view; K – aedeagus, lateral view. Scale bar: A – 1 mm, B-K – 0.5 mm.

Description:

Body brown to dark-brown with weak bronze luster or without one; legs reddish-brownish. Body nearly elongated to clearly rounded. Head large, short; vertex covered with well developed, large shagrination; frontal calli almost not convex; supracallinal sulci poorly visible; frontal ridge short, weakly convex; eyes flattened. Antennae with segments short and thick. Pronotum short, widely transversal, with very widely rounded base, its surface usually covered with well developed, large shagrination; punctures large, sparse, poorly visible. Elytra impunctate to well developed, dense punctation, punctures not large; striae partly confused, secondary punctation well developed. Notch between metathoracic cavities straight (Fig. 7C). Legs not very thick, tibiae moderately curved; metafemora wide; first protarsomere of male wide and thick. Aedeagus (Fig. 7J, K) ventrally with apical third gradually narrowed to apex; apex obtuse with well developed denticle; from lateral view nearly gradually curved from basal third, weakly and gradually narrowed toward apex.

Body length – 1.34-1.47 mm, width – 0.91-1.05 mm.

Differential diagnosis:

From *M. caucasica* sp. n. differs: in structure of aedeagus (Fig. 7J, K), ventrally with apical third gradually narrowed to apex; apex obtuse instead of aedeagus ventrally with apical 1/4 more or less

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Fig. 8: Distribution of *Mniophila muscorum* (Koch) based on the material examined.

sharply narrowed to apex, the latter rather wide, straight; hind tibiae distinctly curved (Fig. 7F), first tarsomeres of male shorter and thicker (Fig. 7H, I); eyes more flattened; ocular sulci and frontal calli less developed (Fig. 7E); apical antennal segments shorter and thicker (Fig. 7D), differs in pronotum shape (Fig. 7B); notch between metathoracic cavities straight (Fig. 7C); last metatarsomere thinner (Fig. 7H). From *M. taurica* sp. n. differs: in structure of aedeagus, ventrally with apical third gradually narrowed to apex; apex obtuse with well developed denticle instead of aedeagus ventrally toward apex parallel-sided, wide, apical 1/4 with straight, narrowing sides and with distinct and straight apex with rather short, wide denticle or poorly developed; head shorter, frontal calli less developed, shagrination of head more developed; pronotum shorter with less elongated base; hind femora thicker; tibiae thicker and more curved; notch between metathoracic cavities straight; first protarsomere of male wider. From *M. turcica* differs: in structure of aedeagus, apex obtuse instead of apex almost straight; head shorter, frontal ridge less convex, antennal grooves shallower; notch between metathoracic cavities straight; eyes more flattened; tibiae thinner; punctation of pronotum well developed; first metatarsomere shorter and wider.

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Fig. 9: Distribution of *Mniophila bosnica* Apfelbeck based on the material examined.

Remarks:

The materal labelled "Kaukas Leder" possibly orignates from Georgia according to Leder (1878).

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I thank S. Shute (NHML), I. Izquierdo (Spain), O. Jäger (MTD), L. Bartolozzi (MZUF), L. Zerche (DEI), O. Merkl (HNHM), P. Limbourg (IRSNB), B. Brugge (ZMUA), O. Martin (ZMUC), H. Schoenmann (NHMW), A. Drogvalenko (KUMN), N. Yunakov (ZIN), N. Nikitsky (ZMMU), K. Makarov (BDMP), Yu. Savitskii (DEMU), and L. Medvedev (Moscow, Russia) for the opportunity to study material in their care. I am thankful to D. Kulijer (National Museum of Bosnia and Herzegovina, Sarajevo) for the information about the type materail of *Mniophila bosnica*. I sincerely gratitude to V. Virtshenko (Kholodnyi Institute of Botany, Kiev, Ukraine) for the determination of mosses. I thank A. Samuelson (Honoloulu, Hawaii) for the information on *Mniophila exulans*. I am indebted to D. Furth (Smithsinian Institution, USA) for his linguistic help and valuable suggestions. This study has been partly supported by Ernst Mayr Foundation travel grant in 2007.

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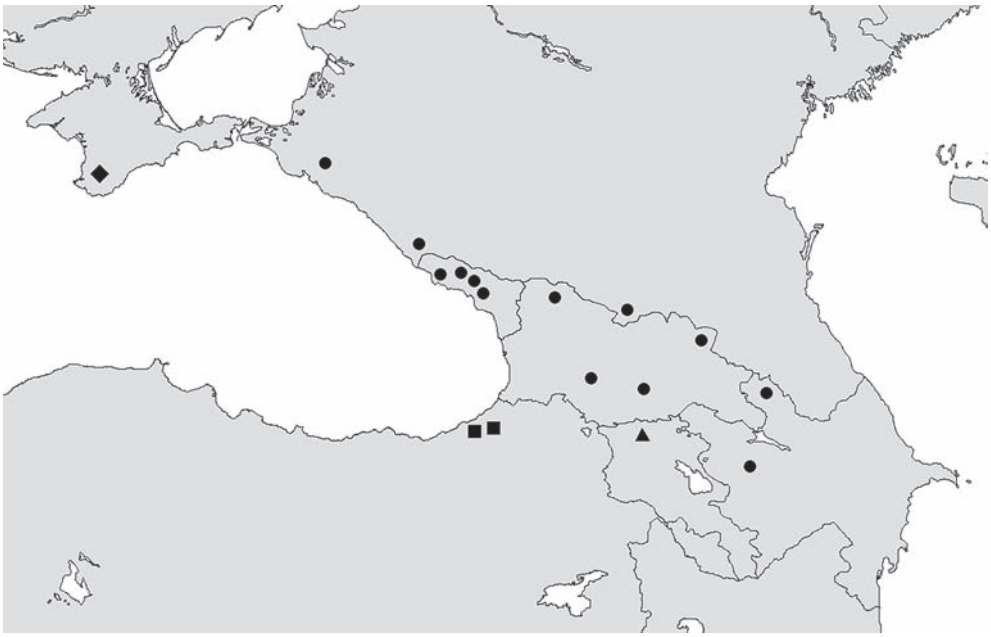

Fig. 10: Distribution of the *Mniophila* species. Rhomb – *Mniophila taurica* sp. n.; circle – *Mniophila caucasica* sp. n.; triangle – *Mniophila transcaucasica* sp. n.; square – *Mniophila turcica* L. Medvedev.

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