



A revision of the *Elachista dispilella* complex (Lepidoptera: Gelechioidea: Elachistidae)

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Abstract

The *Elachista dispilella* group and its subordinate *E. dispilella* species complex are characterized. Identity of the long confused oldest names applicable for taxa in the *E. dispilella* complex, i.e., *E. dispilella* Zeller, *E. festucicolella* Zeller, and *E. distigmatella* Frey, is resolved. *Elachista dispilella* Zeller is the valid name for the species often identified as *E. festucicolella*, *E. steueri* Traugott-Olsen, or *E. manni* Traugott-Olsen. *Elachista distigmatella* Frey is the valid name for the species regularly identified as *E. dispilella*. The identity of *E. festucicolella* Zeller, so far entirely dubious, is clarified.

Nineteen species attributable to the *E. dispilella* complex *sensu* Traugott-Olsen are recognized. The following new synonymies are proposed: *Elachista steueri* Traugott-Olsen, 1990, **syn. nov.**; *E. manni* Traugott-Olsen, 1990, **syn. nov.**; *E. jaeckhi* Traugott-Olsen, 1990, **syn. nov.**; and *E. gebzeensis* Traugott-Olsen, 1990, **syn. nov.**, are considered synonyms of *E. dispilella* Zeller, 1839. *Elachista klimeschiella* Parenti, 2002 is synonymized with *E. festucicolella* Zeller, 1853; and *Elachista purella* Sruoga, 2000 with *E. levasi* Sruoga, 1998, **syn. nov.** Identification keys for males and females are provided. All species are diagnosed, the lesser known are also redescribed. Four new species are described: *Elachista implana* Kaila, **sp. nov.**, from Austria; *E. ripai* Kaila, **sp. nov.**, from Kyrgyzstan; *Elachista sitibunda* Kaila, **sp. nov.**, from Uzbekistan; and *Elachista laterotis* Kaila, **sp. nov.**, from Turkey.

Key words: nomenclature, taxonomy, new synonymy, new species, DNA barcoding, integrated taxonomy

Introduction

Elachistinae (Gelechioidea: Elachistidae) are a group of Lepidoptera with notoriously difficult species taxonomy. This situation has prevailed in several groups even in the presumably well-known European fauna (e.g., Traugott-Olsen 1988, 1990, 1992; Kaila 2011a, b, c, 2015; Kaila *et al.* 2001, Kaila & Junnilainen 2002, Kaila & Varalda 2004, Mutanen *et al.* 2013). The family concept of Elachistidae has been illusive, reflecting the uncertainties in the systematics of the superfamily in general. The most recent delineation of Elachistidae is suggested by Kaila *et al.* (2011) and formalized by Heikkilä *et al.* (2014). The generic classification of the Elachistinae was proposed by Kaila (1999) and elaborated further by Kaila and Sugisima (2011).

The *Elachista dispilella* complex was defined by Traugott-Olsen (1990) for a group of *Elachista* species that share the following combination of characters: unicolorous white or amber-coloured forewings with often two darker brown or grey spots as the sole markings; the male genitalia with uncus lobes curving outwards and tapering to a point. In addition, the phallus is ‘strong’ [large], bent, and has a conglomeration of long and short cornuti, or only one ‘strong’ cornutus. Traugott-Olsen considered 17 species as belonging to this complex. Subsequently, Kaila (1992) described one, and Sruoga (Sruoga & Puplesienė 1998; Sruoga 2000) two further species.

The delineation of the *E. dispilella* complex is not entirely unequivocal as there are other species and species complexes that display at least some of these characteristics. Even so, it is a practical unit for structuring the species-rich *E. dispilella* group into manageable, and for the most part, identifiable units. Kaila (1999) attributed this group to the subgenus *Apheloseitia* of *Elachista*. Kaila (1997) suggested an informal division of the species of this subgenus to two main groups, based on the shape of the juxta. In this grouping, the species with a dorsally projected tongue-shaped appendix in the median plate of the juxta are attributed to the *E. bedellella* group. This circumscription is narrower than the one proposed by Traugott-Olsen and Nielsen (1977) in which the *E. bedellella* group is equivalent to the subgenus *Apheloseitia sensu* Kaila (1997). Subsequently, Kaila (2007, 2012) implied the presence of a probably monophyletic, informal *E. dispilella s. l.* group, of which the *E. dispilella* complex of Traugott-Olsen (1990) is a subset. Members of the *E. dispilella* group are characterized by a narrow valva with an elongate cucullus, and phallus without caecum, and the basal opening posteriorly oriented in the male genitalia. The papillae anales of the females are always entirely membranous, triangular in lateral aspect, and ventrally with a basal swelling. The swelling seems to be a unique character defining the *E. dispilella* group (Kaila 1999, Kaila & Sugisima 2011). This clade is probably monophyletic itself, yet likely subordinate to both *E. argentella* group *sensu* Kaila (1997) and *E. bedellella* group (Kaila 1999, Kaila & Sugisima 2011). The *Elachista dispilella* group comprises the *E. dispilella*, *E. triseriatella*, and *E. dispunctella* complexes as defined by Traugott-Olsen (1988, 1990, 1992), and a miscellanea of taxa presently not placed in any species complex. Exemplar species representing the unplaced taxa of the *E. dispilella* group are *E. deceptricula* Staudinger, 1880, illustrated by Nielsen & Traugott-Olsen (1978), *E. subula* Parenti, 1991, and *E. chamaea* Kaila, 2003 (Kaila *et al.*, 2003). In total, the *E. dispilella* group comprises nearly 100 species, all occurring in the Old World.

The species taxonomy of the *E. dispilella* complex is difficult and currently confused. The confusion stems in part from misconceptions of the oldest names (as detailed below) and dubious characterizations of species introduced by Traugott-Olsen (1990), with no accompanying diagnoses to explain the supposed differences between or among species. A close scrutiny of the species descriptions and comparisons, along dissection experiments based on actual samples, indicates that the genitalia are easily distorted by the amount of pressure applied to them during dissections; in particular, this affects the apparent length and direction of the cornuti.

Apparent features of the cornuti also are dependent on the position of the vesica in the phallus. Minor details of wing venation also have been a part of the vague species delineation, especially in dividing *E. dispilella* (*E. festucicolella sensu* Traugott-Olsen) into several nominal species by Traugott-Olsen (cf. Albrecht & Kaila 1997). This view is substantiated by the results of DNA barcoding which links most of the recognized taxa together with a distinct taxon gap between them and the next closest taxon, while at the same time failing to recover differences between some nominal species. Importantly, the pattern observed by barcoding is the same as that based on morphology, i.e. barcodes of specimens belonging to taxa characterized by their morphology are also clustered as distinct groups, and vice versa. Even though some species in this complex are rather straightforward to identify (cf. Traugott-Olsen 1990), others are not, and there are crucial issues to be addressed with the oldest nominal species, *E. dispilella* Zeller, 1839, *E. festucicolella* Zeller, 1853, and *E. distigmatella* Frey, 1859. Confusion regarding the current identity of these names, actually attributed to non-existing chimaeras of adult + genitalia of the lectotypes, supplemented with some creative further adjustments has led to a significant additional confusion, with the introduction of several ‘new’ species. These matters are detailed below.

Confusion of *E. dispilella*, *E. festucicolella* and *E. distigmatella*

Elachista dispilella was described on the basis of material collected by Zeller in Głogów (originally Glogau) (Zeller 1839), a town situated in south-western part of Poland. It is the oldest taxon name of the *E. dispilella* complex. The identity of *E. dispilella* was established by Parenti (1977) by designating a lectotype for this species and for *E. festucicolella* Zeller, 1853. E. S. Nielsen, during the preparation of a monograph on North European fauna (Traugott-Olsen & Nielsen 1977), took the view that Parenti had unintentionally transposed the abdomens or the slide labels of *E. dispilella* and *E. festucicolella*. Nielsen and G. S. Robinson transferred the slides to the supposedly correct position, with a note: “According to E. S. Nielsen, Parenti accidentally switched the abdomens of *festucicolella* and *dispilella*. I have accordingly reversed the labels and numbers on the slides; Parenti’s original labels are below. Specimens untouched; signed G. S. R. [Gaden S. Robinson] 14.VIII.1979. Representatives of Parenti’s concept of species are illustrated in Parenti (1977). Apparently, the suspicion of Parenti’s error stems from the so far understood ‘traditional’ identity of these species, based on works of Hering (1891), Rebel (1901) and Martini (1902).

After the lectotype designation and the events that followed, the identification of these species has not been straightforward, and specimens with genitalia as illustrated by Parenti (1977) for *E. dispilella* have been considered *E. festucicolella*, or following Traugott-Olsen (1990) *E. steueri* Traugott-Olsen, 1990, *E. manni* Traugott-Olsen, 1990, *E. gebzeensis* Traugott-Olsen, 1990, or *E. jaeckhi* Traugott-Olsen, 1990, with no apparent basis for the distinction of these three, apart from one: Traugott-Olsen & Nielsen (1977) depicted the *E. festucicolella* as unicolorous white (it is, indeed, unicolorous, but not pure white according to Zeller). However, the specimen illustrated in Traugott-Olsen & Nielsen (1977) is from a population occurring in the island of Öland in Sweden, in which the two spots typical of *E. dispilella sensu* Zeller are either faintly present or entirely absent.

Another fairly widespread species in Western Europe has been identified as *E. dispilella*. This concept, however, is not in accordance with Zeller’s original account of this taxon, nor to either of the genitalia of the lectotypes of *E. dispilella* or *E. festucicolella*. It is externally similar to the so-called *E. dispilella*. Traugott-Olsen (1990) recognized that such a species exists, and concluded that it is *E. distigmatella* Frey, 1859, hitherto considered a synonym of *E. dispilella* (Hering 1891, Rebel 1901, Martini 1902, Nielsen and Traugott-Olsen (1977). Traugott-Olsen (1990) re-instated it as a valid species, yet somewhat illogically continued considering the identity of *E. dispilella* and *E. festucicolella* as in Traugott-Olsen & Nielsen (1977).

Parenti (1981) recognized a taxon with external appearance of *E. festucicolella sensu* Zeller—and actually also genitalia as in the lectotype of *E. festucicolella*, designated by Parenti himself, and described it as a new species, *E. klimeschi*. This decision is hard to understand, especially as in connection of the lectotype designation of *E. festucicolella* Parenti (1977) does not illustrate the genitalia of the lectotype of *E. festucicolella* but of an Italian specimen—from where *E. klimeschi* was later described. The only reason conceivable to us for this decision is that Parenti had become convinced that he had indeed made a mistake while dissecting the genitalia of the lectotypes of *E. dispilella* and *E. festucicolella*. There is no information supporting the decision in connection of the very brief original description of *E. klimeschi*. The matter remains therefore unexplained and odd, especially as Parenti was

generally conservative regarding description of new species. The biology, external appearance, or the genitalia of *E. klimeschi* do not differ from the original account of *E. festucicolella* by Zeller in any way. A series of specimens, including probable paralectotypes present in the collection of J. M. J. af Tengström, now housed in MZH, show external appearance with two spots as *E. dispilella* s. authors, but genitalia as *E. festucicolella* s. authors. Likewise, specimens that externally resemble *E. festucicolella* have genitalia as *E. dispilella* s. authors. We have never encountered specimen/genitalia combination as in the lectotypes in BMNH as currently labeled. We take all the above mentioned notions as definite evidence that Parenti never made a mistake when dissecting and designating lectotypes for *E. dispilella* and *E. festucicolella*. Therefore, the genital slide numbers of the lectotypes of *E. dispilella* and *E. festucicolella* must again be reversed to be B.M. genitalia slide 19364 for *E. dispilella* and B.M. genitalia slide 19363 for *E. festucicolella*. *Elachista festucicolella* is a senior synonym of *E. klimeschi* Parenti (later emended to *E. klimeschiella* Parenti, 2002 due to homonymy). *Elachista dispilella* is the species that has usually been called *E. festucicolella*. *Elachista distigmatella* is the species that has been understood to be *E. dispilella* in Western Europe.

The aim of this study is to revise the taxonomy of the *Elachista dispilella* species complex using integrated approach. We examined the morphology of extensive material of the *E. dispilella* complex, including type material. Furthermore, we sequenced DNA barcode region (a standard 658 bp fragment of mitochondrial COI gene) of 101 specimens to obtain additional insights into genetic patterns within and between the species. Full taxonomic and collection data, including GenBank accession numbers, of these 101 specimens is available through the public dataset DS-ELADIS at BOLD database at <http://www.boldsystems.org>, accessible from <http://dx.doi.org/10.5883/DS-DISPI>.

Material

Specimens were examined from the following collections:

BMNH	Natural History Museum, London, U.K. (K. Tuck and J. De Prins)
ISEZ	Institute of Systematics and Evolution of Animals, Polish Academy of Science, Kraków, Poland
MIZW	Museum and Institute of Zoology, Polish Academy of Science, Warszawa, Poland
MZH	Finnish Museum of Natural History, Helsinki, Finland (L. Kaila)
NHMW	Naturhistorisches Museum, Wien Austria (S. Gaal-Haszler)
SMNK	Staatliches Museum für Landeskunde Karlsruhe, Germany (R. Trusch)
TLMF	Tiroler Landesmuseen Ferdinandeum, Innsbruck, Austria (P. Huemer)
VPU	Vilnius Pedagogical University, Lithuania (V. Sruoga)
ZIN	Zoological Museum of the Zoological Institute of the Russian Academy of Sciences, St. Petersburg, Russia (S. Yu. Sinev)
ZMKU	Zoological Museum, Kiev National Taras Shevchenko University, Ukraine (O. Bidzilya)
ZMUC	Zoological Museum, Natural History Museum of Denmark (O. Karsholt)
ZSM	Zoologische Staatssammlung München, Germany (A. Hausmann, A. Segerer)
SZMN	Siberian Branch of the Russian Academy of Sciences, Novosibirsk (V. Dubatolov).

Specimens were also examined from the personal collections of T. Baran, J. Buszko, K. & T. Nupponen, J. Junnilainen, J. Tabell, Z. Tokár, Ch. Wieser, and V. Zolotuhin.

Terminology for wing pattern and anatomical structures follows Traugott-Olsen & Nielsen (1977) and Kaila (1999, 2007). The specific epithets of the new species are names in apposition.

Results

Patterns of variability in DNA barcodes

Sequence data (DNA barcodes) from 101 specimens showed 10.58 % maximum variability (Kimura 2 parameter

model) across all specimens. This variability was grouped into 11 distinct clusters (Fig. 1) that were in broad agreement with morphology-based delimitation of specimens into species. Average distance between species was 6.47 %. The genetically closest species, *E. ripai* and *E. turkensis*, were separated by 2.5 % minimum distance. Average intraspecific variability was 0.29 % and in two species, *E. dispilella* and *E. festucicolella*, intraspecific variation was as high as 1.71 %. In *E. dispilella*, four Buryatian specimens were the most deviant, while in *E. festucicolella* the unusually high intraspecific variation was due to one specimen from Austria. Morphological examination did not reveal supporting evidence for their taxonomic uniqueness, for which reason they were considered conspecific with the other specimens of the same clusters, respectively.

Taxonomic treatment of species

We consider 19 species attributable to the *Elachista dispilella* complex as valid. This interpretation is primarily based on morphology because the primary type specimens of the nominal taxa were not available for DNA barcoding in many instances. The insight obtained from DNA barcodes, however, were extremely useful, providing support for the morphology-based conclusions, for instance, the delineation of *E. dispilella*. Several species morphologically indistinguishable from *E. dispilella* have been described with somewhat different geographical distributions. The negligible variation in haplotypes among these specimens gave us further confidence in proposing their synonymy with *E. dispilella* (see Fig. 1).

Key to males of the species of the *Elachista dispilella* complex

1. Antennae serrate 2
- Antennae simple 3
2. Gnathos oval-shaped. *E. flavescens*
- Gnathos rounded. *E. implana*
3. One cornutus in phallus. 4
- Cornutus formed of a cluster of elongate, spine-like cornuti 8
4. Gnathos rounded or broader than its length 5
- Gnathos oval-shaped. 6
5. Gnathos 1.5. times as broad as long; spine of cornutus as long as width of basal plate of cornutus *E. cornuta*
- Gnathos as broad as long; spine of cornutus shorter than width of basal plate of cornutus. *E. sitibunda*
6. Distal margin of juxta lobes with setose lobe laterally. *E. laterotis*
- Distal margin of juxta lobes without setose lobe laterally. 7
7. Digitate process longer than juxta lobes *E. vartianae*
- Digitate process shorter than juxta lobes. *E. bazaensis*
8. Uncus lobes evenly tapered to apex 9
- Uncus lobes narrowly or broadly sickle-shaped 10
9. Forewing white with one or two grey spots; wingspan 8–10 mm, juxta lobes strongly laterally produced. *E. bruuni*
- Forewing unicolorous, creamy or dirty greyish white, wingspan 6–7 mm, juxta lobes not laterally produced ... *E. nitidulella*
10. Posterior margin of juxta lobes with posteriorly directed seta-bearing lobe laterally. *E. ripai*
- Posterior margin of juxta lobes without lateral lobe. 11
11. Posterior half of phallus dilated, diameter twice that in distal half. *E. turkensis*
- Posterior half of phallus not conspicuously dilated 12
12. Length of cornutus group over 1/3 of the length of phallus. *E. dispilella*
- Length of cornutus group at most 1/4 of the length of phallus. 13
13. Apical spines of cornutus group bent, disproportionately long as compared to basal ones *E. curonensis*
- Spines of cornutus group straight, nearly evenly long or gradually lengthening towards distal part of phallus 14
14. At least some of the spines of cornutus group separate, or cornutus group divided into two separate groups. 15
- Spines of cornutus group in single conglomeration 16
15. Phallus shorter than valva. *E. festucicolella*
- Phallus as long as valva. *E. bigorrensis*
16. Gnathos rounded *E. teruelensis*
- Gnathos oval-shaped. 17
17. Forewing with plical and discal spots present; posterior margin of juxta lobes concave. *E. distigmatella*
- Forewing unicolorous; posterior margin of juxta lobes straight or convex 18
18. Forewing pale yellow; valva 4 times as long as wide. *E. filicornella*
- Forewing white; valva at least 6 times as long as wide. *E. levasi*

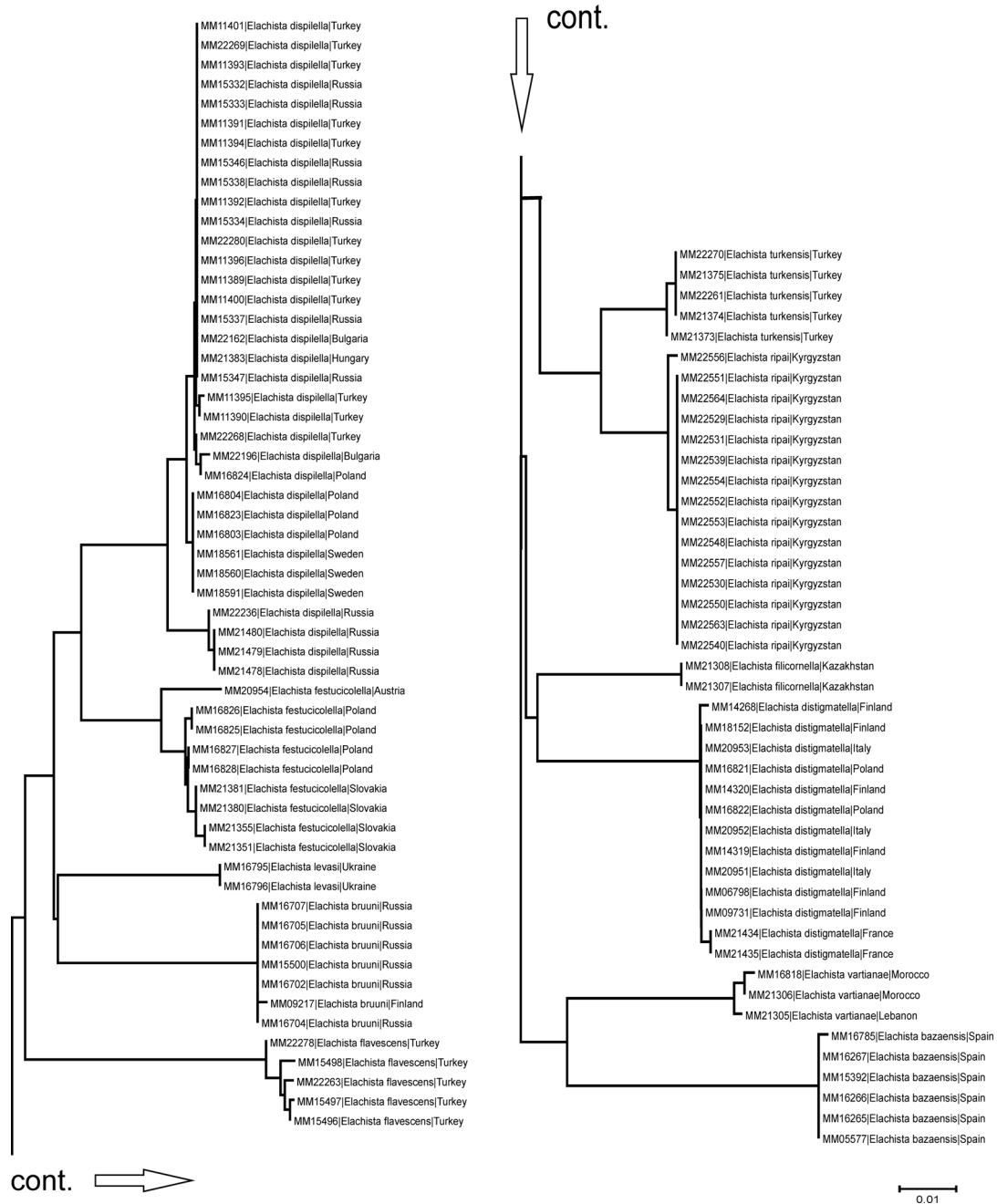


FIGURE 1. A Neighbor-joining tree, generated under the K2P nucleotide substitution model of 101 barcode sequences of specimens of the *E. dispilella* complex.

Key to females of the species of the *Elachista dispilella* complex
(Females of eight species included)

- 1. Length of antrum + colliculum + ductus bursae three times as long as apophyses posteriores. *E. bazaensis*
- Length of antrum + colliculum + ductus bursae at least four times long as apophyses posteriores2
- 2. Anterior third of ductus bursae (including colliculum) narrower than, or at most as wide as remaining part of ductus bursae .3
- Anterior third of ductus bursae (including colliculum) twice as broad as posterior two-thirds. *E. turkensis*
- 3. Length of antrum + colliculum + ductus bursae 6–7 times as long as apophyses posteriores. *E. dispilella*
- Length of antrum + colliculum + ductus bursae 4–5 times long as apophyses posteriores.4
- 4. Corpus bursae oval-shaped, incepted to ductus bursae without distinct border. *E. vartianae*
- Corpus bursae pyriform, incepted in ductus bursae with distinct border5

5. Distance between ostium bursae and inception of ductus seminalis shorter than apophyses anteriores. *E. distigmatella*
 - Distance between ostium bursae and inception of ductus seminalis longer than apophyses anteriores. 6
 6. Forewing with at least discal spot present; ostium bursae as broad as colliculum. *E. bruuni*
 - Forewing unicolorous, ostium bursae narrower than colliculum *E. festucicolella*, *E. bigorrensis*

Note. The interpretation of the female genitalia of *E. curonensis*, not studied here, is based on its characterization by Traugott-Olsen (1990), i.e., similar to *E. distigmatella*, *E. bruuni*, *E. festucicolella*, and *E. bigorrensis*. In the original description, the position of the ductus seminalis is not given, so this character could not be evaluated. Therefore, this species is not included in the key. Based on the unicolorous forewing, it most resembles *E. festucicolella* and *E. bigorrensis*. The female genitalia of *E. nitidulella* were not studied. The illustrations given by Traugott-Olsen & Nielsen (1977) and Traugott-Olsen (1990) are superficial and give no details that are useful in its characterization. The signum appears, however, to be shorter than in most species according to the illustrations.

***Elachista dispilella* Zeller, 1839**

Figs. 2–6, 35–49, 87–88

Elachista dispilella Zeller, 1839: 213 *Elachista festucicolella* auct., nec Zeller, 1853.

Elachista manni Traugott-Olsen, 1990: 51. **Syn. nov.**

Elachista steueri Traugott-Olsen, 1990: 54. **Syn. nov.**

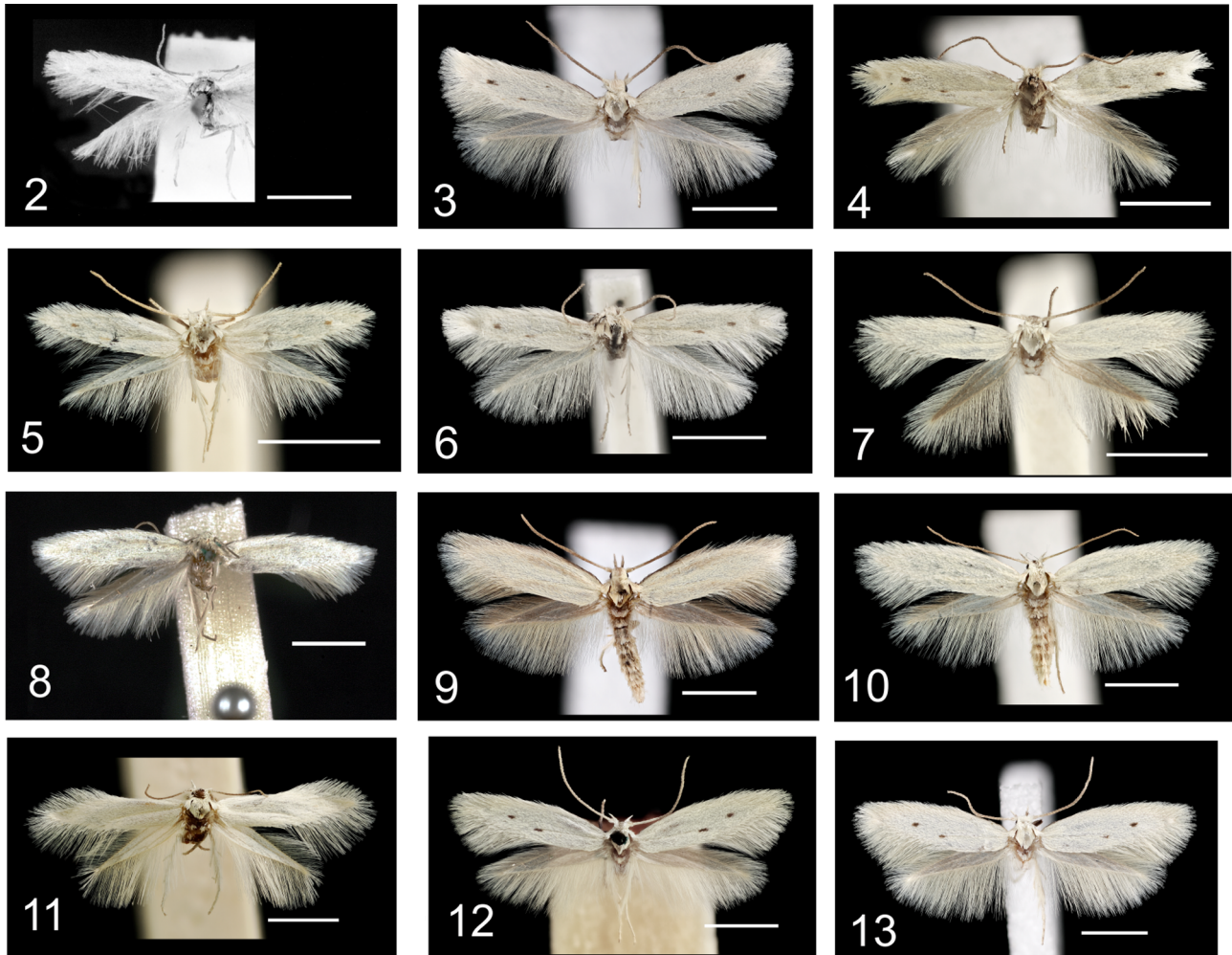
Elachista jaeckhi Traugott-Olsen, 1990: 58. **Syn. nov.**

Elachista gebzeensis Traugott-Olsen, 1990: 62. **Syn. nov.**

Material studied. Type material: lectotype ♂ of *E. dispilella*: LECTO-TYPE [rounded with blue margin]; Z.; *Dispilella*; *Dispilella* Z Stt. N.H3,8; Zeller Coll. Walsingham Collection 1910–427; B.M Genitalia slide No. 19363 [correct slide number 19364]; LectoTYPUS *Elachista dispilella* Z; TESTE U. PARENTI 1973. Paralectotypes of *E. dispilella*: Glogau, Zeller, [also with an illegible word]; 20; *dispilella* Z., Coll. Tengstr., ♂ L. Kaila prep. 4146 (MZH); Glogau, Coll. Tengstr., 2 ♂ L. Kaila prep. 4147, 4122 (MZH). Holotype ♂ of *E. jaeckhi*: Holo-type [rounded with red margin]; Kroatien YU Misucaynica, Krk 4.VIII.[19]76 E. Jäckh; *Elachista jaeckhi* [sic] sp. n. det. E. Traugott-Olsen; Genital præparat nr. A. 25.10.87 E. Traugott-Olsen; B.M. Genitalia slide 26344 (BMNH). Holotype ♂ of *Elachista gebzeensis*: Holotype [rounded with red margin]; Asia min. Turcia, Gebze (Izmit), 17.5.1969 leg. M. u. W. Glaser; genital præparat nr. G. 20.8.87 sex: ♂ E. Traugott-Olsen; *Elachista gebzeensis* [sic] sp. n. det. E. Traugott-Olsen (SMNK). Slide: *Elachista gebzeensis* [sic] sp. n. Asia min., Turcia. G.20.8.87 ♂ E. Traugott-Olsen, Holotype, Coll. Glaser, LNK [SMNK]. Paratype slide: *Elachista gebzeensis* [sic] sp. n. H.20.8.87 ♂ E. Traugott-Olsen, Paratype, Coll. Glaser, LNK [SMNK]. Paratypes of *E. gebzeensis*: Turkey: Asia min., Gebze (Izmit) 17.–18.V.1969 2 ♂ M. u. W. Glaser leg. (SMNK). Holotype ♂ of *Elachista steueri*: Holo-type [rounded with red margin]; 20.V.1980 [Czech Republic, Bohemia:] Radobil, 400 m, 20.V.1980 Dr. Steuer.; Brit. Mus. 1980 174. *Elachista steueri* sp. n. det. E. Traugott-Olsen; E. Traugott-Olsen genital præparat nro 5956 ♂ E. Traugott-Olsen; B.M. Genitalia slide ♂ No. 26346 (BMNH). **Other material: Bulgaria:** 4127'954"N, 2315'769"E, Malak, Ozuh Mt., 115 m, 6.V.2011, 1 ♂, Z. Tokár leg., DNA sample 22196 Lepid. Phyl. (Coll. Tokár); 4324'182"N, 2813'769"E, Tuzlata env., 50–100 m, 29.IX.2011, 1 ♂, Z. Tokár leg., DNA sample 22162 Lepid. Phyl. (Coll. Tokár); 40 km NE Varna, Tuzlata, 27.–28.VI.2001, 1 ♂, J. Junnilainen leg., L. Kaila prep. 3989 (Coll. Junnilainen); **Germany:** Oldenburg, Dötlingen, Helmshh., F., *Festuca ovina*, 29.V.1956, 1 ♂, E. Jäckh leg., Genital præparat nr 6048 ♂, E. Traugott-Olsen, Coll. Traugott-Olsen (ZMUC). **Hungary:** Matra Sárhegy, Szent Anna t, 22.IV.2002, 1 ♂, Cs. Szabóky leg., L. Kaila prep. 4377, DNA sample 21383 Lepid. Pphyl. (Coll. Tokár). **Poland:** Szczecin-Dąbie, 4.VI.1893, 1 ♂, E. Hering leg., (MIZW); Poznań-Główieniec, 26.V.1954, 3 ♂, 1 ♀, M. R. Lewandowski leg. (ISEZ); Poznań-Osiedle Warszawskie, 24.V.1958, 3 ♂, 1 ♀, A. Szmyt leg. (ISEZ); Rzepin, 13.V.1959, 1 ♂, A. Szmyt leg. (ISEZ); Toruń, 26.V.1987, 1 ♂, J. Buszko leg. (Coll. Buszko); Toruń, 9.V.2000, 7 ♂, 7 ♀; 1 ♂ ex larva (*Festuca psammophila*), 9.V.2001, T. Baran leg., L. Kaila prep. 4119, DNA samples 16803, 16804 Lepid. Phyl.(Coll. Baran, MZH); CD 38 Toruń, 9.V.2000, 1 ♂, 1 ♀, T. Baran leg. (Coll. Baran); Wrocław (Frey 1859, Wocke 1874), Bydgoszcz (Toll 1937). **Russia:** S. Ural, Kizilskoye, 27.V.1998, 4 ♂, J. Junnilainen leg., 11 ♂, T. & K. Nupponen leg., L. Kaila prep. 3361, 3391 (Coll. Nupponen, MZH); Moskovo, 26.V.1998, 3 ♂, J. Junnilainen leg., L. Kaila prep. 3409 (Coll. Junnilainen, MZH), 4 ♂ T. & K. Nupponen leg.; Kidriasovo, 28.–29.V.1998, 2 ♂, 1 ♀, J. Junnilainen leg. (Coll. Junnilainen), 1 ♂, 1 ♀, T. & K. Nupponen leg. (Coll. Nupponen) (reported as *E. manni* by Kaila *et al.* 2003); S. Ural, Orenburg district, 40 km WSW Orsk, spring nr. Guberlja river, 8.IX.2009, 2 ♂, K.

Nupponen leg., DNA samples 15333, 15337 Lepid. Phyl. (Coll. Nupponen); S. Ural, Orenburg district, 40 km W Orsk, nr. Guberlja village, 9.IX.2009, 3 ♂, K. Nupponen leg., DNA samples 15332, 15334, 15338 Lepid. Phyl. (Coll. Nupponen); Cheliabinsk district, 5224'N, 5904'E, 270 m, Ural river bank at Bogdanovskoye village, 21.V.2010, 5 ♂, K. Nupponen leg., DNA samples 15346, 15347 Lepid. Phyl. (Coll. Nupponen); Ul'yanovsk obl., Vjazovka, Radishchevo distr., 160 km S Ul'yanovsk, 5253'N, 4826'E, 24.V.1994, 1 ♂, V. Isajeva leg., 3.–6.V.1998, 1 ♂, V. V. Zolotuhin leg. L. Kaila prep. 3960 (MZH), 9.V.2000, 24 exx., 29.V.2000, 8 exx., L. Kaila prep. 4123–4130, V. V. Zolotuhin leg. (Coll. Zolotuhin); Vjazovka, 6 km S, Radishchevo distr., 166 km S Ul'yanovsk, 5251'N, 4821'E, 7.V.2000, 1 ♂, 29.V.–3.VI.2000, 3 ♂, V. V. Zolotuhin leg. (Coll. Zolotuhin); Akulovka, Nikolaevka distr., 150 km SWS Ul'yanovsk, limestone steppe, 5306'N, 4729'E, 14.V.1996, 1 ♂, 24.V.1996, 1 ♂, V. V. Zolotuhin leg. L. Kaila prep. 3961 (Coll. Zolotuhin, MZH), 6.V.1998 1 ♂ [no collector], 25.VI.1998, 1 ♂, A. & V. B. Isajev leg. (Coll. Zolotuhin); S. Buryatia, 5058–59'N, 10638–40'E, 550–600 m, 10 km S. Chikov valley, Novoselengnisk vill., sand dunes/sand steppe, 25.VI.2002, 1 ♂, K. Nupponen leg., L. Kaila prep. 4439 (Coll. Nupponen); 2.–3.VI.2006, 6 ♂, K. Nupponen leg., L. Kaila prep. 4820, 4821, 5534, 5539, 5540, DNA samples 21478–21490, 22236 Lepid. Phyl. (Coll. Nupponen, MZH); Altai Mts., 5014–16'N, 8750–55'E, Kuraiskaja step, 1500–1700 m, 25.VI.2000, 1 ♂, T. & K. Nupponen leg. (Coll. Nupponen). **Slovakia:** Vel'k vrch, 3.VII.2000, 1 ♂, I. Richter leg., Z. Tokár prep. 8486, *E. manni* det. Tokár, L. Kaila prep. 5449, DNA sample 21398 Lepid. Phyl. (Coll. Tokár); Viniansky hrad, vrch, 22.V.1991, 1 ♂, Z. Tokár leg., L. Kaila prep. 5445, *Elachista manni* Tokár det., DNA sample 21355 Lepid. Phyl. (Coll. Tokár); Vinianska stráň, 13.V.1993, 2 ♂, 6.V.2000, 1 ♂, Z. Tokár leg., det. as *E. manni*, L. Kaila prep. 3069, DNA sample 21407 Lepid. Phyl. (Coll. Tokár). **Sweden:** Öland, Gårdby, 21.VI.1998, 2 ♂, DNA sample 22103 Lepid. Phyl., 8.VII.1999 1 ♀, DNA sample 22104 Lepid. Phyl., L. Kaila prep. 5799, Gårdby, Skarpa Alby, 29.V.1981, 1 ♂, all H. Hendriksen leg. (ZMUC); Öland, Högsrum, 24.VI.1973, 2 ♂, I. Svensson leg., L. Kaila prep. 3419 (MZH); Öland, Karums alvar, 23.VI.1959, 2 ♂, I. Svensson leg., L. Kaila prep. 3624 (MZH); Öland, Möckelmossen, 30.V.1981, 1 ♂, K. Schnack leg. (ZMUC); Öland, St. Alvar, Tornrör, 10.VI.1996, 1 ♂, H. Hendriksen leg. (ZMUC) [specimens from Öland identified as *E. festucicolella*]. **Turkey:** Anatolia, Kizilcahamam, 925 m, 17.VI.1968, 1 ♂, M. u. V. Glaser leg. (SMNK); 5 km NE Aksaray, 16.V.2005, 11 ♂, J. Junnilainen leg., DNA samples 11391–11396, 11400, 11401 Lepid. Phyl. (Coll. Junnilainen, MZH); 25 km SW Aksehir, Sultan Daglari, 1500 m, 27.VII.1997, 1 ♂, T. Nupponen leg., J. Tabell prep. 4585, DNA sample 21413 Lepid. Phyl. (Coll. Nupponen); 30 km SW Aksehir, Sultan Daglari, 1500 m, 29.V.1997, 1 ♂, K. Nupponen & J. Junnilainen leg., DNA sample 22274 Lepid. Phyl. (Coll. Junnilainen), 30.VIII.1997, 1 ♂, K. Nupponen & J. Junnilainen leg., DNA sample 22268 (MZH); 20.V.2005, 1 ♂, J. Junnilainen leg., L. Kaila prep. 5061 (MZH); Ankara Baraje, 900 m, 28.VI.1968, M. u. V. Glaser leg. (SMNK); 30 km W Konya, 21.V.1997, 1 ♂, K. Nupponen & J. Junnilainen leg., DNA sample 22269 Lepid. Phyl. (Coll. Junnilainen); Ürgüp, 30.VI.1998, 2 ♂, T. Nupponen leg., L. Kaila prep. 4732, DNA sample 22280 Lepid. Phyl. (Coll. Nupponen); 18.V.2005, 2 ♂, J. Junnilainen leg., DNA samples 11389, 11390 Lepid. Phyl. (Coll. Junnilainen); 50 km SE Seydisehir, 13.VI.2000, 3 ♂, T. Nupponen leg., L. Kaila prep. 4317, 4321, 4320 (Coll. Nupponen); prov. Ankara, Çamlidere, 1300 m, 31.VII.1996, 1 ♂ K. E. Stovgaard (ZMUC).

Diagnosis. *Elachista dispilella* is a small species with a white or somewhat creamy forewing ground colour. It usually has both plical and discal spots, their colour varying from grey to nearly brown. Sometimes the spots are weak and in some populations nearly or entirely absent. The labial palpi are short and porrect, their length less than the diameter of the head, as in *E. curonensis*. The male genitalia are characterized by the short, broad valva, the broad uncus lobes, and the very large phallus, which is longer than the valva. The cornuti are on average larger than in any other member of this species complex, except for *E. flavescens*, which is easily differentiated from *E. dispilella* by its serrate antennae and narrower valvae. The cornutus cluster of *E. dispilella* is formed from basally joined, long spines; their number is around 10 with some variation, and their length gradually increases towards the apex; however, even the most basal ones are long as compared to other species. The distal ones are about 1.5 times as long as the diameter of the phallus at its apical part. The spinose knob of the gnathos is rounded or slightly ovoid. The female genitalia differ from other species by the longer ductus bursae.



FIGURES 2–13. Adults of *Elachista* spp. Scale 2 mm. 2. *E. dispilella* Zeller, ♂ lectotype (image in greyscale). 3. *E. dispilella* Zeller ♂ (Poland, Torún). 4. *E. dispilella* Zeller (holotype ♂ of *E. steuri* Traugott-Olsen). 5. *E. dispilella* Zeller (holotype ♂ of *E. jaeckhi* Traugott-Olsen). 6. *E. dispilella* Zeller (holotype ♂ of *E. gebzeensis* Traugott-Olsen). 7. *E. curonensis* Traugott-Olsen, ♂, holotype. 8. *E. festucicolella* Zeller, ♂ lectotype. 9. *E. festucicolella* Zeller, ♂ (Poland). 10. *E. festucicolella* Zeller, ♀ (Poland). 11. *E. bigorrensis* Traugott-Olsen, ♀, holotype. 12. *E. distigmatella* Zeller, ♂ lectotype. 13. *E. distigmatella* Zeller, ♂ (Italy).

Molecular characterization. Thirty-four specimens of *E. dispilella* showed a maximum variability of 1.71 %. Average distance between the specimens was 0.37 %. The genetically closest species was *E. festucicolella* with 3.69 % minimum distance to *E. dispilella*.

Redescription. Wingspan 7–8 mm. Labial palpus 0.8 times as long as diameter of head, porrect, creamy white above, fuscous below. Head, neck tuft, thorax, scape and pedicel creamy white, sometimes pale fuscous, flagellum grey. Foreleg inwardly dark leaden grey, fore- and midleg otherwise grey, hindleg ochreous with grey spurs and tarsal articles. Forewing white or creamy white with concolorous fringe, costa basally narrowly black. Plical and discal spots variably present, brownish grey, sometimes one or both of them absent. Hindwing white or pale grey, translucent, with concolorous fringe except along anterior margin grey. Underside of wings varying from pale to dark grey, fringe white.

Male genitalia. Uncus lobes broad, width of their length, tapered towards pointed and outward bent apex, sickle-shaped; mesial margin convex, lateral margin concave, rounded. Spinose knob of gnathos rounded or slightly oval-shaped. Valva 1.5 times as long as tegumen + uncus, four times as long as broad at its broadest part at distal 3/4 length, nearly parallel-sided; base of sacculus somewhat dilated, valva slightly narrowed in the middle of its length; cucullus broad and elongate. Digitate process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, distinctly laterally produced, mesial margin slightly convex, joins the straight distal margin in an obtuse angle. Phallus longer than valva, bent, broadest basally; cornutus

cluster comb-shaped, formed from basally joined long and stout spines, their number around 10 with some variation, length gradually increasing towards apex; length of most basal ones about half the diameter of phallus, most distal ones about 1.5 times as long as the diameter of phallus.



FIGURES 14–25. Adults of *Elachista* spp. Scale 2 mm. 14. *E. bruuni* Traugott-Olsen, ♂, holotype. 15. *E. bruuni* Traugott-Olsen, ♂ (Finland). 16. *E. bruuni* Traugott-Olsen, ♀ (Finland). 17. *E. nitidulella* Herrich-Schäffer ♂ (Austria). 18. *E. turkensis* Traugott-Olsen, ♂ (Turkey). 19. *E. turkensis* Traugott-Olsen, ♀ (Turkey). 20. *E. turkensis* Parenti, ♀ (Turkey). 21. *E. ripai* Kaila, *sp. nov.*, ♂ holotype. 22. *E. flavescens* Parenti, ♂ (Turkey). 23. *E. implana* Kaila, *sp. nov.*, ♂ holotype. 24. *E. filicornella* Kaila, ♂ holotype. 25. *E. levasi* Sruoga, ♂ holotype, head (courtesy by V. Sruoga).

Female genitalia. Apophyses posteriores slender, straight, a little longer than papillae anales. Apophyses anteriores about 1/3 as long as apophyses posteriores. Posterior margin of sternum 7 forming indistinct, shallow, bowl-shaped formation almost as wide as distance between apophyses anteriores. Ostium bursae invaginated in sternum 8, very narrow; colliculum posteriorly narrow, abruptly widening with short sclerotized band; ductus seminalis granulose, distance between its inception and ostium bursae about as long as apophyses posteriores; ductus bursae 6–7 times as long as apophyses posteriores, tubular, membranous, granulose, pronouncedly so in both posterior and anterior third, incepted in corpus bursae with distinct border; corpus bursae relatively small, pyriform, with small internal granules in median zone; signum large, dentate, boomerang-shaped.

Biology. In Sweden *E. dispilella* occurs in xerothermic limestone sites. In Poland it occurs locally in sandy, xerothermic places with psammophilous vegetation, e.g., in inland dunes. Larvae are leaf miners on *Festuca psammophila*, and mature larvae are found mainly in April (T. Baran, personal observation). Traugott-Olsen (1990) and Baran (2005) give *Corynephorus canescens* as the host plant of the species. The moths are often found sitting on the host plant during sunny days. *Elachista dispilella* is univoltine in the northern part of its range, flying from the beginning of May to about the first week of July; it is most common in mid-May. It is the earliest appearing member of the *E. dispilella* complex in Poland. Hering (1891) considered *E. dispilella* bivoltine, likely because he

thought *E. dispilella* and *E. distigmatella* were conspecific. Nevertheless, at least in Bulgaria, *E. dispilella* has been recorded in May–June and in September, indicating that in southern Europe *E. dispilella* indeed has two generations.



FIGURES 26–34. Adults of *Elachista* spp. Scale 2 mm. 26. *E. levasi* Sruoga, ♂ holotype (courtesy by V. Sruoga). 27. *E. levasi* Sruoga, ♂ (Ukraine). 28. *E. bazaensis* Traugott-Olsen, ♂ holotype. 29. *E. bazaensis* Traugott-Olsen, ♀ (Spain). 30. *E. vartianae* Parenti, ♂ (Morocco). 31. *E. vartianae* Parenti, ♀ (Morocco). 32. *E. laterotis* Kaila, **sp. nov.**, ♂ holotype. 33. *E. cornuta* Parenti, ♂ holotype (Iran). 34. *E. sitibunda* Kaila, **sp. nov.**, ♂ holotype.

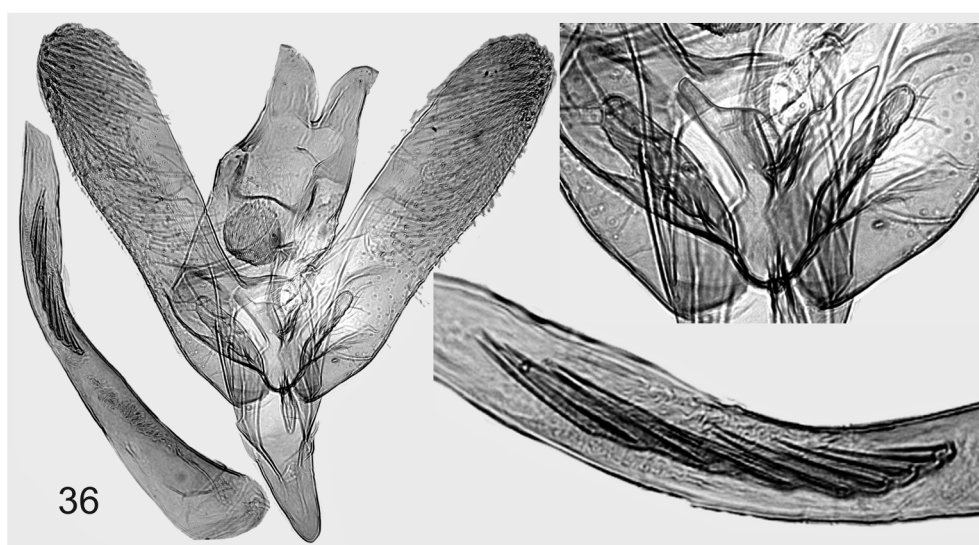
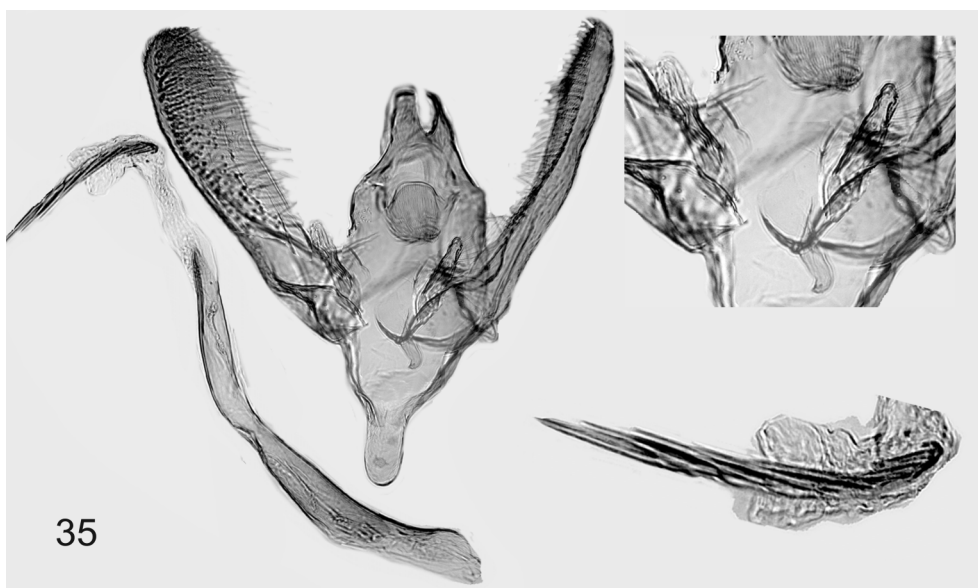
Distribution. Austria, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Poland, Russia to Buryatia in the east, Slovakia, Sweden, Turkey. Other records need verification.

Remarks. The taxonomic confusion between *E. dispilella*, *E. festucicolella*, and *E. distigmatella* is detailed above. *Elachista manni* Traugott-Olsen was described to denote the taxon with male genitalia matching Zeller's *dispilella*, one of its paratypes explicitly mentioned to have been taken from Zeller's original series of *E. dispilella*. The holotype of *E manni* was not available for the present study. The illustration and description of the holotype by Traugott-Olsen (1990) with no indication of differences to *E. dispilella sensu* Zeller, combined with the present knowledge of the wide distribution range of *E. dispilella* supports this synonymy.

In his original description of *E. dispilella*, Zeller mentions *Aira* [now *Corynephorus*] *canescens* as the host plant of *E. dispilella*; however, all subsequent authors report *Festuca ovina* and other *Festuca* species as the food plant; however, due to the taxonomic confusion in the *E. dispilella* complex, the host plant records should be verified.

Extensive samples of *Elachista dispilella* and other nominal taxa from the areas of their type localities have been examined by their morphology and DNA barcodes. With nearly no variation in DNA barcodes or in facies or genital morphology, we consider the following nominal species synonyms of *Elachista dispilella*: *E. manni* Traugott-Olsen, **syn. nov.**, *E. steueri* Traugott-Olsen, **syn. nov.**, *E. jaeckhi* Traugott-Olsen, **syn. nov.**, and *E. gebzeensis* Traugott-Olsen, **syn. nov.** There are slight differences in DNA barcodes and external appearance of Buryatian specimens as compared to other samples of *E. dispilella*. As these differences are minor, and there seem to be no differences in genitalia between them, we here deem the Buryatian population conspecific with *E. dispilella*.

The illustration of *E. jaeckhi* by Traugott-Olsen (1990) is not drawn from the holotype.



FIGURES 35–36. Male genitalia of *E. dispilella* Zeller. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 35. Lectotype, B.M. 19364. 36. Paralectotype, L. Kaila prep. 4146.

***Elachista curonensis* Traugott-Olsen, 1990**

Figs. 7, 50

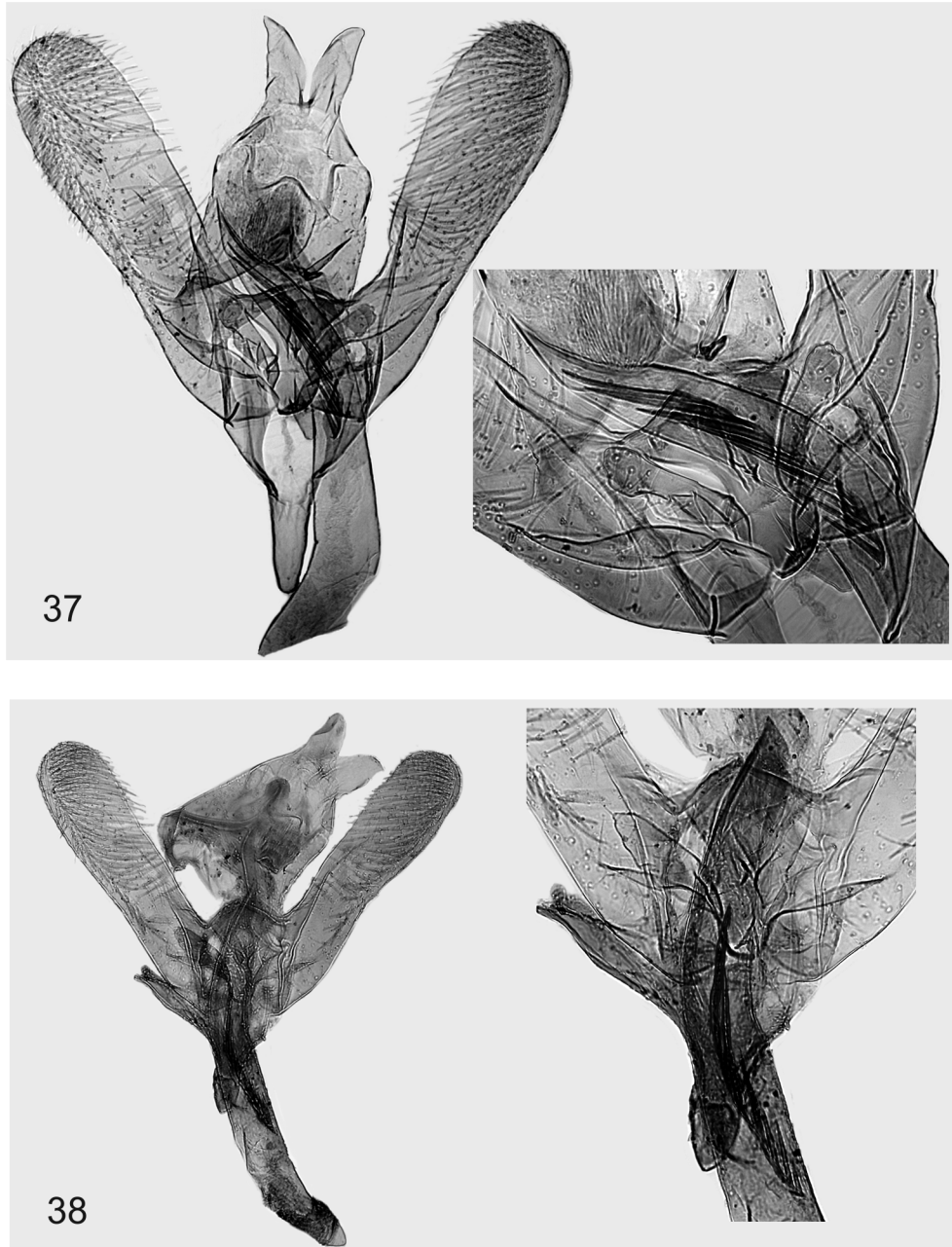
Elachista curonensis Traugott-Olsen, 1990: 63

Material studied. Type material. Holotype ♂: Holo-type [rounded with red margin], Italia Piemonte V. Curone/ Poggia di Casane (AL) 6.VI.1987 leg. Baldizzone; *Elachista curonensis* det. Traugott-Olsen, B.M. Genitalia Slide No.26342 (BMNH).

Diagnosis. *Elachista curonensis* is a relatively small species with a unicolorous creamy white forewing and grey hindwing. It most resembles *E. nitidulella* from which it is distinguished by the shape of the uncus lobe shape which is narrow and pointed in *E. nitidulella*, broad and distally nearly rounded in *E. curonensis*. The male genitalia of *E. curonensis* differ from those of *E. dispilella* by the large and somewhat ovoid gnathos and the shorter phallus of *E. curonensis* as compared to *E. dispilella*. The cornutus group is also shorter in *E. curonensis* than in *E. dispilella*. The female genitalia of *E. curonensis*, not studied here, are similar to those of *E. distigmatella*, *E. bruuni*, *E. festucicolella*, and *E. bigorrensis* on the basis of its characterization by Traugott-Olsen (1990). In the

original description the position of ductus seminalis is not mentioned, so this character cannot be evaluated in the present context. Therefore this species is not included in the key. On the basis of the unicolorous forewing, it most resembles *E. festucicolella* and *E. bigorrensis*, but the small size of *E. curonensis* may distinguish it from these species.

Molecular characterization. No material was available for genetic study.



FIGURES 37–38. Male genitalia of *E. dispilella* Zeller. 37. Holotype of *E. steuri* Traugott-Olsen (B.M. 26346). Left: general image of genitalia. Right: cornutus group, juxta and digitate process. 38. Holotype of *E. jaeckhi* Traugott-Olsen, B.M. 26344. Left: general image of genitalia. Right: cornutus group, juxta, and digitate process.

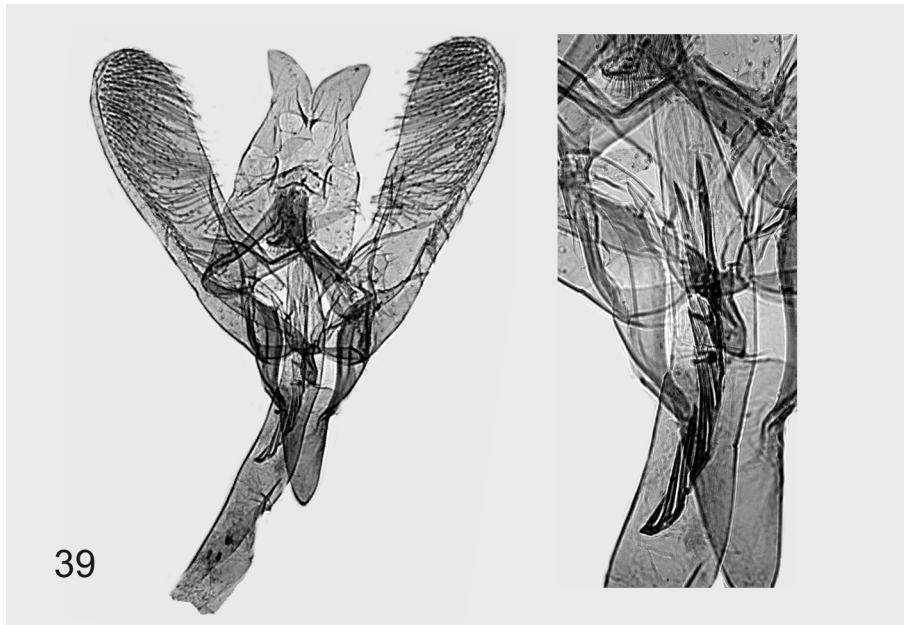


FIGURE 39. Male genitalia of *E. dispilella* Zeller. Holotype of *E. gebzeensis* Traugott-Olsen, ETO G. 20.8.87. Left: general image of genitalia. Right: cornutus group, juxta, and digitate process.

Redescription of male genitalia. Uncus lobes twice as long as wide, distally tapered towards nearly rounded and outward bent apex, mesial margin convex, lateral margin straight. Spinose knob of gnathos large, somewhat longer than its width. Valva 1.3 times as long as tegumen + uncus, narrow, 5.5 times as long as its width, nearly parallel-sided; cucullus elongate. Digitate process tongue-shaped with rounded apex, 0.25 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesial margin slightly convex, joining weakly concave distal margin without an angle. Phallus as long as valva, bent, broadest basally; cornutus cluster comb-shaped, comprised of a few basally joined long, bent spines, apical one longest, 1.5 times as long as diameter of phallus.

Female. Not studied (characterized by Traugott-Olsen 1990, see the note after the key to females, and the diagnosis above).

Biology. Unknown.

Distribution. Italy.

***Elachista festucicolella* Zeller, 1853**

Figs. 8–10, 51–63, 89–90

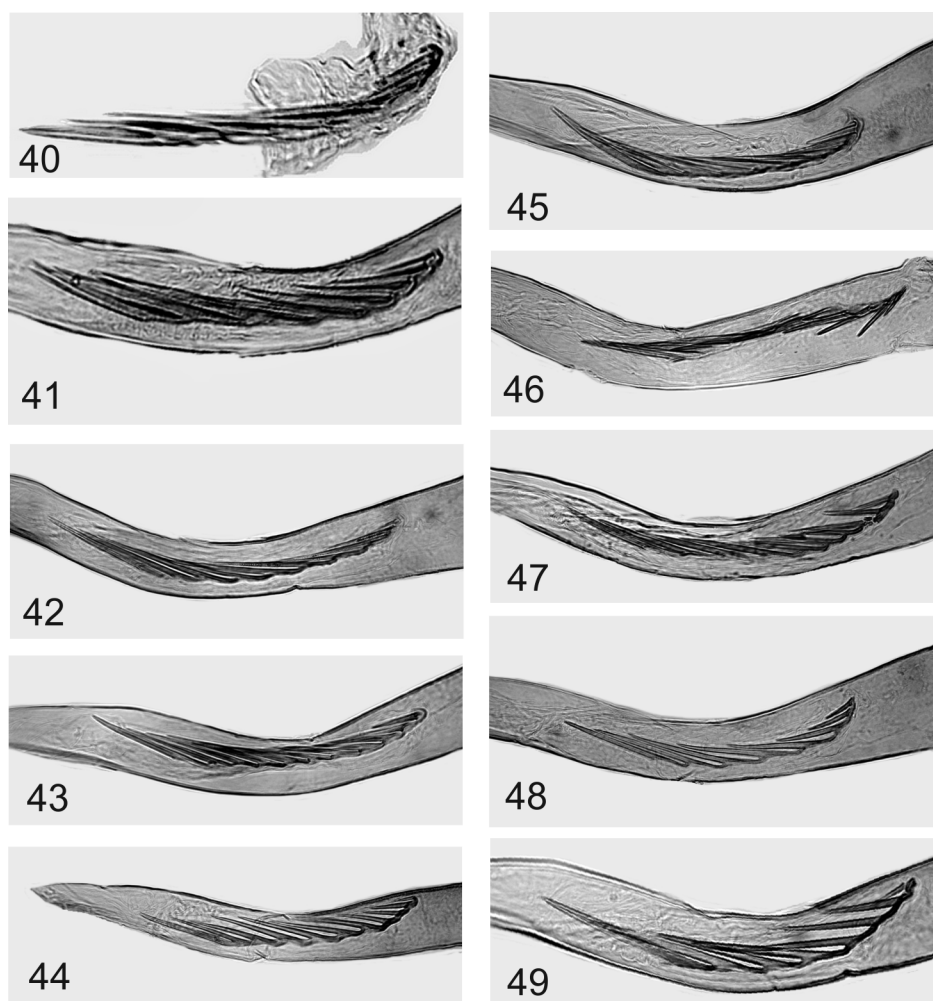
Elachista festucicolella Zeller, 1853: 415

Elachista klimeschi Parenti, 1981: 49, nec Dufrane, 1957

Elachista klimeschiella Parenti, 2002: 151. Replacement name for *klimeschi* **syn. nov.**

Material studied. Type material. Lectotype of *E. festucicolella*: LECTO-TYPE [rounded with blue margin]; 936 [handwritten]; 14. [handwritten]; Glogau, Zeller, 10/53 [handwritten]; Stainton Coll. Brit. Mus. 1893–134 [printed]; B.M. ♂ Genitalia Slide No. 19364 [correct slide number 19363]; LectoTYPUS *Elachista festucicolella* Z. TESTE U. PARENTI 1973 (BMNH). **Other material. Austria:** Carinthia, Untergunschach, Sattnitzwände, LF3, 21.VI., 1 ♂, Ch. Wieser leg., L. Kaila prep. 3457, DNA sample 20954 Lepid. Phyl. (Coll. Wieser); Styria [Steiermark], Preg a Mur Gulsen, ca. 700 m, 16.IV.1941, 6 ♂, J. Klimesch leg., L. Kaila prep. 5870 (ZSM); **Italy:** Piemonte, Varallo (Vercei, LI), Ponte Gula, M. 543, A133. 3.VI.1994, 1 ♂, reared from *Festuca acuminata*, P. G. Varalda leg., *Elachista klimeschi* Parenti, P. G. Varalda det., L. Kaila prep. 5428, DNA sample 16736 Lepid. Phyl. (MZH); same data, except date 6.VI.1994, 1 ♀, L. Kaila prep. 5439, DNA sample 16737 Lepid. Phyl. (MZH); Ortles, St. Caterina, V. di Gavia, 2100 m, 4.–5.VII.2004, 1 ♂, J. Junnilainen leg. (Coll. Junnilainen); Trentino, Alpi

Adamello di Sopra Bedule, 2000 m, 12.VII.1959, 1 ♂, 1 ♀, E. Jäckh leg., L. Kaila prep. 4675, 4676 Coll. N. L. Wolff (ZMUC). **Poland:** Jerzmanowice, 23.VII.1988, 1 ♀, J. Buszko leg. (Coll. Buszko); EB 68 Męcierz, ad Kazimierz DLN., 15.VII.1996, A. Mazurkiewicz leg. (Coll. Baran); 2.VII.2008, 1 ♂, 3 ♀, 3.VII.2008, 2 ♂, 1 ♀, 6.VII.2008, 1 ♂, 2 ♀, 30.VI.2009, 4 ♂, 5 ♀, T. Baran leg. (Coll. Baran), 30.VI.2009, 2 ♂, 2 ♀, T. Baran leg., *E. festucicolella*. T. Baran det., L. Kaila prep. 5425, 5436, DNA samples 16825–16828 Lepid. Phyl. (Coll. Baran); Oblasy, 29.VI.1998, 1 ♂, A. Mazurkiewicz leg. (Coll. Baran); Pieniny Mts., Trzy Korony Mt., 850 m, 13.VII.1995, 1 ♀, 11.VII.2003, 1 ♀, 18.VII.2006, 2 ♂, T. Baran leg. (Coll. Baran); **Slovakia:** Doln Vestenice, 1.VII.1999, 1 ♀, I. Richter leg., Tokár prep. 8413, L. Kaila prep. 4373, DNA sample 21381 Lepid. Phyl. (MZH); Rudnany, 10.VI.2001, ex pupa, 1 ♂, J. Ošust leg., Tokár prep. 7753, L. Kaila prep. 4376, DNA sample 21380 Lepid. Phyl. (Coll. Tokár); Velk Fatra, Majerova Skala, 4.VII.2000, 1 ♀, I. Richter leg., L. Kaila prep. 5444, DNA sample 21354 Lepid. Phyl. (Coll. Tokár); 24.VII.2004, 1 ♂, I. Richter leg., Gen. Pr. 8943 Tokár, L. Kaila prep. 5442, DNA sample 21351 Lepid. Phyl. (Coll. Tokár); **Slovenia:** Kozina, 400 m, 30.V.2008, 1 ♂, J. Junnilainen leg., L. Kaila prep. 5066 (Coll. Junnilainen).

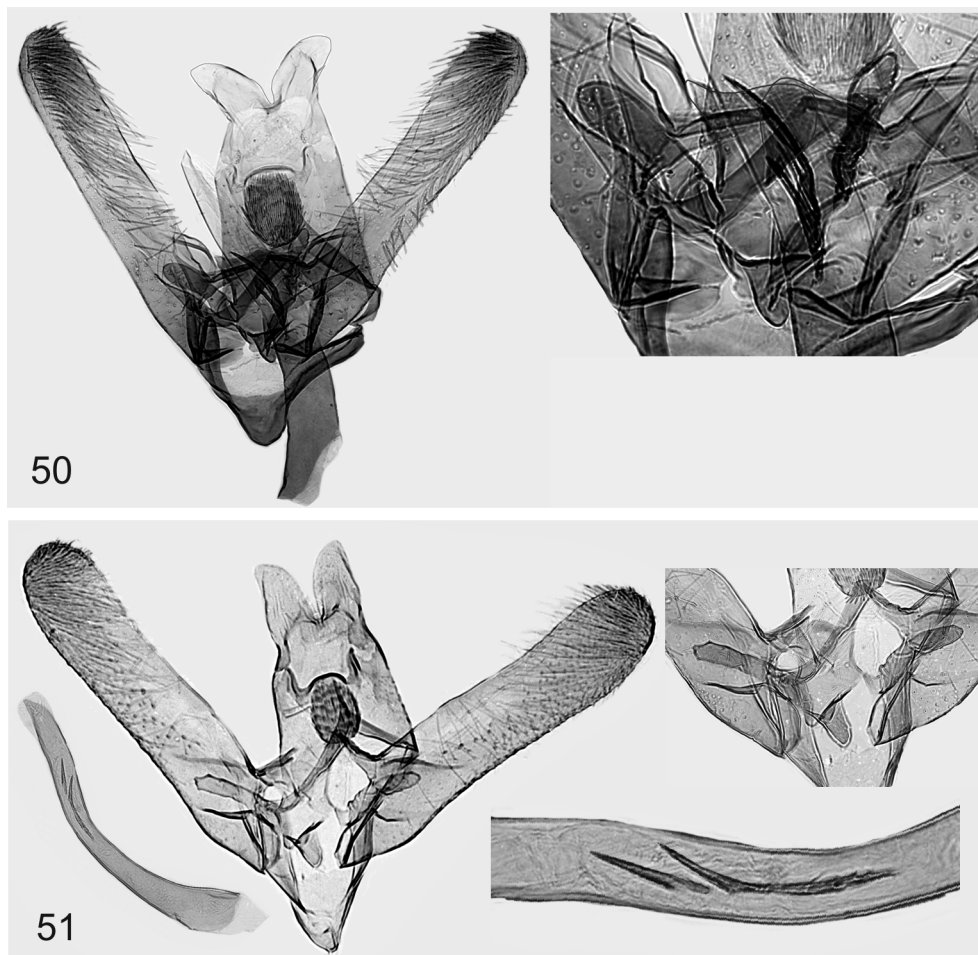


FIGURES 40–49. Male genitalia of *E. dispilella* Zeller. Variation of cornuti. 40. Lectotype Poland Głogów [Germany, Glogau] (B.M. 19364 . number as corrected to original). 41. paralectotype Poland Głogów [Germany, Glogau], L. Kaila prep. 4146. 42. Sweden, Öland, L. Kaila prep. 3624. 43. Russia, Ulyanovsk, L. Kaila prep. 4127. 44. Russia, Ulyanovsk, L. Kaila prep. 4128. 45. Russia, Cheliabinsk, L. Kaila prep. 3361. 46. Turkey, Ürgüp, L. Kaila prep. 4732. 47. Turkey, Seydesiher, L. Kaila prep. 4320. 48. Turkey, Seydesiher, L. Kaila prep. 4319. 49. Russia, Altai Mts. Kuray, L. Kaila prep. 3957.

Diagnosis. *Elachista festucicolella* is a unicolorous, dirty yellowish-white species with pale grey hindwings; the forewing colour varies to some extent, sometimes nearly white, often with faintly darker brown longitudinal areas. In its original description, Zeller (1853) compared it to *E. dispilella*, stating that *E. festucicolella* is larger, and also to *E. argentella*, stating that *E. festucicolella* is smaller, and the wing colour yellowish white [flavescenti-albis], unlike the pure white of *E. argentella*, but like the smaller *E. nitidulella*. This characterization is in

accordance with our observations. In male genitalia the cornutus group is characteristic of *E. festucicolella*, the spines very stout and blunt-tipped, and at least partly only loosely connected or separate. For the female, see the key.

Molecular characterization. The nine sequenced specimens of *E. festucicolella* showed a maximum variability of 1.71 %. Average distance between the specimens was 0.53 %. The genetically closest species was *E. dispilella* with 3.69 % minimum distance to *E. festucicolella*.



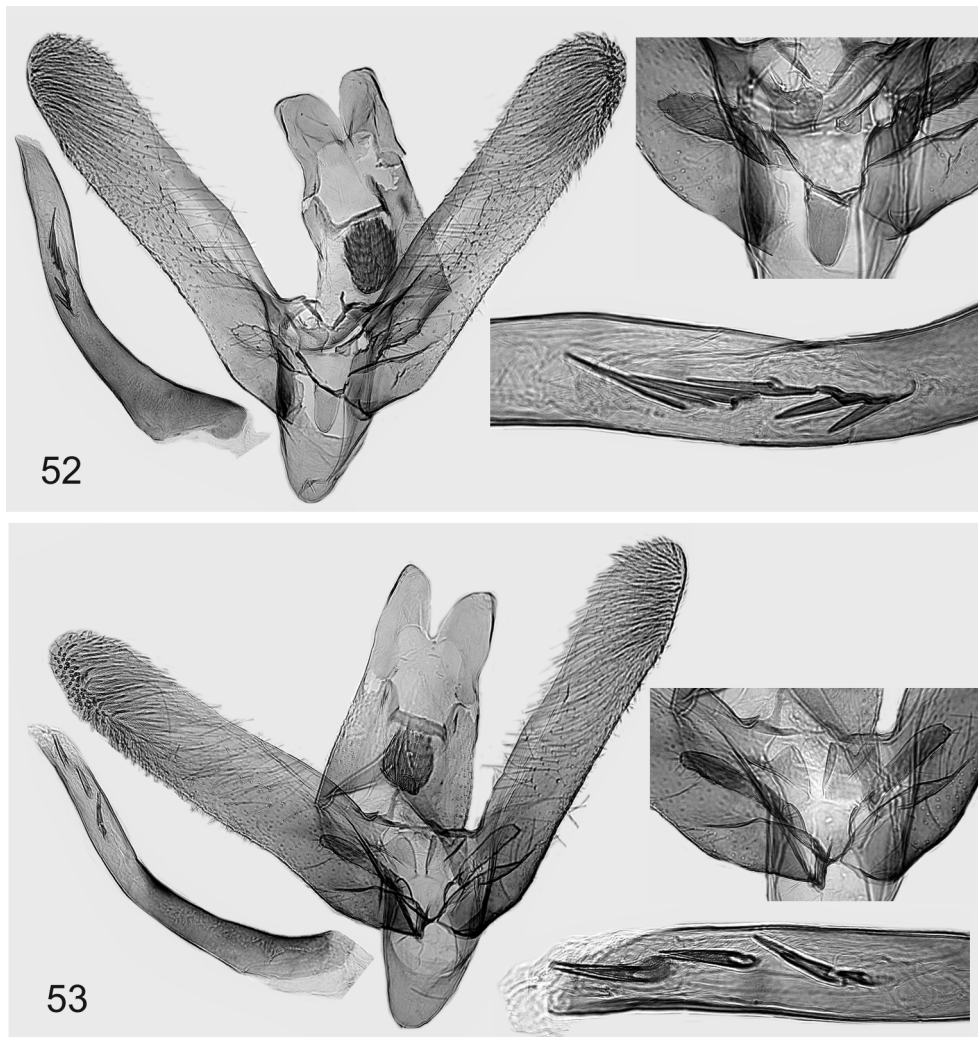
FIGURES 50–51. Male genitalia of *Elachista* spp. 50. *E. curonensis* Traugott-Olsen, holotype, B.M. 26342. Left: general image of genitalia. Right: cornutus group, juxta, and digitate process. 51. *E. festucicolella* Zeller, lectotype, B.M. 19363. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged.

Redescription. Wingspan 8.5–11.5 mm. Labial palpus varying from creamy white to fuscous, length equal to diameter of head, scales of second segment distally long and somewhat raised. Head, neck tuft, thorax, scape and pedicel of antenna pale ochreous grey; flagellum dark grey. Foreleg inwardly leaden grey, legs otherwise varying from ochreous white to pale grey, spurs of hindleg darker grey. Forewing unicolorous, varying from chalky white to pale yellow with concolorous fringe, often with slightly darker brown longitudinal areas, basal half of costa narrowly black or dark grey. Hindwing grey with concolorous fringe along anterior margin, fringe otherwise white. Underside of wings grey with fringe varying from white to grey.

Male genitalia. Uncus lobes somewhat longer than their width [level of pressure applied in mounting the genitalia easily distorts this feature]; somewhat tapered distally, apex narrowly rounded, mesial margin distally convex, lateral margin weakly S-shaped. Spinose knob of gnathos oval-shaped. Valva twice as long as tegumen + uncus, nearly 5 times as long as broad, slightly bent as S-shaped, parallel-sided; cucullus elongate. Digitate process tongue-shaped, 0.25 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesially produced, mesial margin straight, joins the concave distal margin without an angle. Phallus 0.8–0.9 times as long as valva, bent, parallel-sided; cornutus cluster formed of about six separate or basally weakly joined, stout, blunt-tipped spines, group often divided into two approximate clusters; length of basal spines about half the

diameter of phallus, distal ones as long as diameter of phallus.

Female genitalia. Apophyses posteriores slender, straight, 1.5 times as long as papillae anales. Apophyses anteriores about half the length of apophyses posteriores. Posterior margin of sternum 7 forming indistinct, shallow, bowl-shaped formation almost as wide as distance between apophyses anteriores. Ostium bursae invaginated in sternum 8, very narrow; colliculum posteriorly narrow, abruptly widening with short sclerotized band; ductus seminalis granulose, distance between its inception and ostium bursae about as long as apophyses posteriores; ductus bursae 4 times as long as apophyses posteriores, tubular, membranous, granulose, medially slightly sclerotized, incepted in corpus bursae with distinct border; corpus bursae large, pyriform, with small internal granules in median zone; signum narrow and long, dentate, boomerang-shaped.



FIGURES 52–53. Male genitalia of *E. festucicolella* Zeller. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 52. Poland, L. Kaila prep. 5425. 53. Italy, Piemonte, L. Kaila prep. 5428.

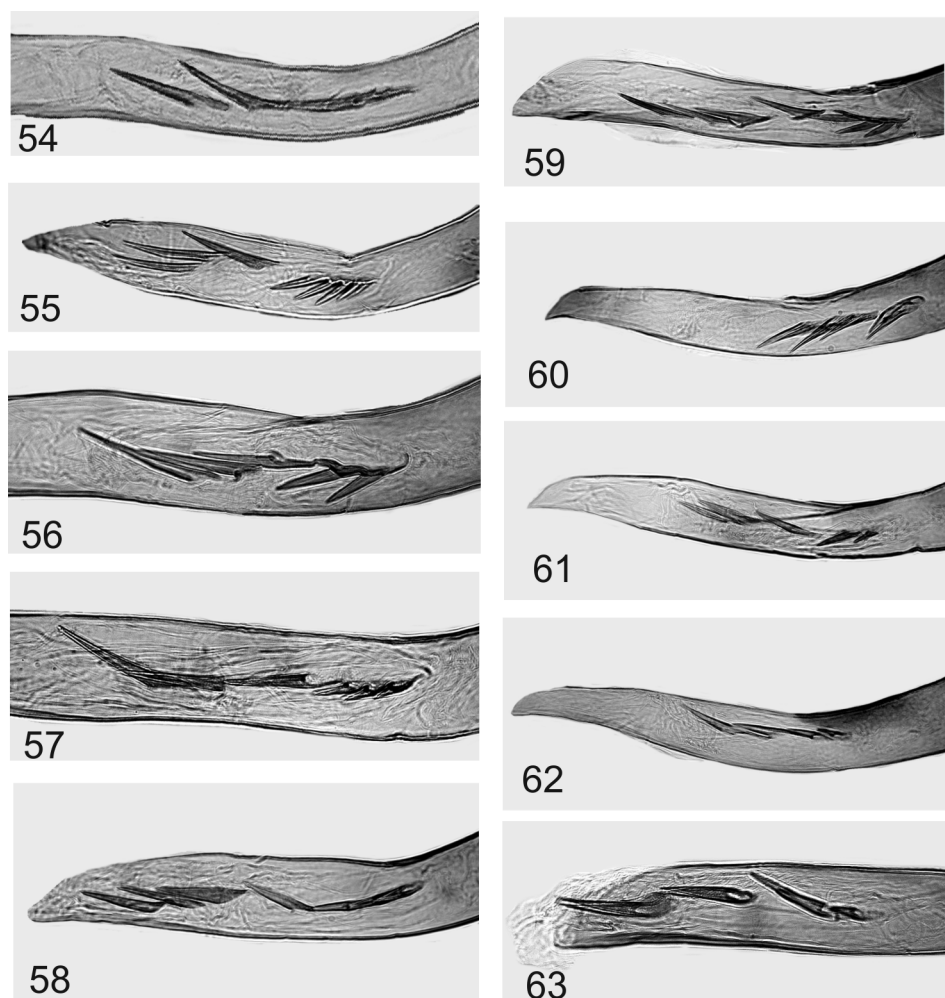
Biology. Biological information of *E. festucicolella* from Poland is elucidated here. There it is rare, but locally rather abundant. The species is xerothermic, inhabiting psammophilous grasslands, as well as dry grasslands on calcareous, rocky ground. The larval stage is unknown in Poland. However, field observations by TB indicate that larvae are associated with two closely related narrow-leaved *Festuca* species in Poland, *F. psammophila* and *F. pallens*. *F. psammophila* occurs in sandy habitats of lowlands, and the rarer *F. pallens* is characteristic of only calcareous grasslands of the Pieniny Mts. and the Polish Jurassic Highland. Parenti & Varalda (1994) also mention *Festuca ovina*, *F. rupicola* (for '*E. festucicolella*'), *F. acuminata*, and *F. cinerea* (for '*E. klimeschi*') as host plants. Adults of *E. festucicolella* are diurnal, and they can often be encountered sitting on leaves of *F. psammophila* or *F. pallens* during sunny and windless days. The species is univoltine, occurring from the end of June to the end of

July, most numerous in early July. In Poland, the species has been recorded from lowlands up to about 850 m a.s.l in lower mountains. According to Parenti (1981), it can be found up to about 2100 a.s.l in other regions of Europe.

Distribution. Austria, France, Italy, Poland, Slovakia, Slovenia, Switzerland, (Parenti 1981, see also account of *E. bigorrensis* below).

Remarks. Zeller (1853) stated that when he encountered specimens of *E. festucicolella* in a sandy place at the end of June, he thought initially that they might belong to *E. dispilella* which he had already described (Zeller 1839). He found, however, that the moths were spotless, unlike *E. dispilella* he had collected in similar sandy habitat in May. He suspected that the specimens might represent small individuals of *E. argentella* (Clerck, 1759). However, flight period, detailed morphology, and habitat preferences of the newly discovered specimens did not exactly agree with those of the common *E. argentella* either. Consequently, he concluded that he had discovered a new species. *Elachista festucicolella* was originally described from material collected in Głogów (Zeller 1853). In addition to the type locality, the species has been recorded only from only a few sites of the southern area of Poland: Jerzmanowice, Ojców (Buszko 1990, the identification verified by T. Baran), the Pieniny Mts. (850 m a.s.l.) (Baran 2000), Męcierz, Oblasy, and Karczmiska (Baran *et al.* 2007).

Specimens from Italy, collected in the vicinity of the type locality of *E. klimeschiella*, do not differ in any way from the holotype of *E. klimeschiella* depicted by Parenti (1981, as *E. klimeschi*) or *E. festucicolella*. Therefore, *E. klimeschiella* is considered a junior synonym of *E. festucicolella*, **syn. nov.** There is a specimen from Austria with barcode differentiated by 2.2 % from the nearest other specimens. No morphological differences between it and other specimens of *E. festucicolella* have been found. It is here considered conspecific with *E. festucicolella*.



FIGURES 54–63. Male genitalia of *E. festucicolella* Zeller. Variation of cornuti. 54. Lectotype, Poland Głogów [Germany, Glogau], B.M. 19363 (number as corrected to original). 55. Poland, Pieniny Mts. (L. Kaila prep. 5417). 56. Poland, Męcierz (L. Kaila prep. 5425). 57. Slovakia, Velká Fatra (L. Kaila prep. 5442). 58. Austria, Steiermark [Styria] L. Kaila prep. 5870. 59. Austria, Kärnten [Carinthia] L. Kaila prep. 3457. 60. Slovenia, Kozina, L. Kaila prep. 5066. 61. Italy, Gavia Pass, L. Kaila prep. 5065. 62. Italy, Lombardia, Gavia Pass, L. Kaila prep. 5072. 63. Italy, Piemonte, L. Kaila prep. 5428.

Elachista bigorrensis Traugott-Olsen, 1990

Figs. 11, 91

Elachista bigorrensis Traugott-Olsen, 1990: 56

Material studied. Type material. Holotype ♀: Holo-type [rounded with red margin], Pyrenees Cent.: Pic du Midi de Bigorre 2400 m 3.VIII.1981, S. France: Sattler, Tuck & Robinson B.M. 1981–313; *Elachista bigorrensis* n. sp. det. Traugott-Olsen. B.M. Genitalia slide 24887 (BMNH).

Diagnosis. According to Traugott-Olsen (1990), *E. bigorrensis* is a medium-sized, silky white species. The female holotype is not shiny (silky), but rather chalky white, reminiscent of pale specimens of *E. festucicolella*. The male genitalia (not studied) are as in *E. festucicolella*, but the cornutus group is as follows according to Traugott-Olsen (1990) “one large separate cornutus and a conglomeration of 7–8 smaller cornuti on a common base and a multitude of spines along the conglomeration. This account also agrees with the variation observed in *E. festucicolella* apart from the multitude of spines. However, figures 57 and 75 of Traugott-Olsen (1990), drawn from the same genitalia slide, do not match each other regarding the cornutus group, and the row of spines is indecipherable in these images. R. Puplesis, having checked the same slide, states as a personal communication in Sruoga (2000) the following: “the first four cornuti are very large, remaining 4–5 ones are in the conglomeration and are evidently smaller, with no mention of spines. Since the shape and size of the cornutus group and its possible accessory spines are apparently unclear to decipher with certainty from the only slide available, the examination of this character is pending further material. The female genitalia are identical to *E. festucicolella*. A potentially diagnostic character between these taxa is the size of the phallus, which is always shorter than the valva in *E. festucicolella*, but as long as the valva in the illustration of male *E. bigorrensis* by Traugott-Olsen (1990).

Molecular characterization. No material was available for genetic study.

Biology. Unknown.

Distribution. France.

Remarks. Parenti (1981) included in the type series of *E. klimeschi* specimens from French Pyrenees, close to the type locality of *E. bigorrensis*. The identity of these specimens should be re-assessed.

Elachista distigmatella Frey, 1859

Figs. 12–13, 64–65, 92

Elachista distigmatella Frey, 1859: 302

Elachista dispilella auct., nec Zeller, 1839

Elachista variabilis Martini, 1902: 26

Material studied. Type material. Lectotype ♂: LECTO-TYPE [rounded with blue margin]; *E. distigmatella* Frey Zürich e. l.; Frey Coll. Brit. Mus. 1890-62; Lectotypus *Elachista distigmatella* Frey. TESTE U. Parenti 1976. B.M. Genitalia slide No. 19395 (BMNH). **Other material: Denmark:** Fan, 17.VII.1949, 1 ♂, 1 ♀, 30.VI.1952, 1 ♂, N. L. Wolff leg., O. Karsholt prep. 4566, 4571 (ZMUC); Højerup, 18.VI.1989, 2 ♂ O. Karsholt leg., O. Karsholt prep. 4618 (ZMUC); NWJ Hansted Reservat, 11.–15.VII.1994, 1 ♂, O. Karsholt leg., O. Karsholt prep. 4839 (ZMUC). **Finland** (material of MZH examined): all from the province Åland. Ecker, 1.VII.1983, 1 ♂, H. Holmberg leg., 3 ♂, H. Krogerus leg., L. Kaila prep. 3073, 4.VII.1994, 1 ♂, H. Krogerus leg., L. Kaila prep. 3071; Ecker, Degersand, 1.VII.1983, 1 ♂, H. Holmberg leg.; Ecker, Skag, 13.–18.VII.1998, 4 ♂, K. Mikkola leg.; Ecker, Käringsund, 9.–VII.1998, 3 ♂, J. Flinck leg.; Finström, 1 ♀, A. Nordman leg. [no date], L. Kaila prep. 3086, Finström, various sites, 21.VI.–12.VII. 1945, 18 ♂, 3 ♀, J. Jalava prep. 728/1979, 729/1979, L. Kaila prep. 486, 1787, 3084, 3087, 3099, *Elachista dispilella* E. Traugott-Olsen det., 28.–30.VI.1983, 13 ♂, 2 ♀, E. Franssila, H. Holmberg, I. Kontuniemi, K. Saloranta & K. Vaalamo leg., L. Kaila prep. 3081, 3082; 1986, 1987, 5 ♂, 1 ♀, H. Krogerus leg., L. Kaila prep. 3070, 3072; Finström, Hus, 26.VI.1976, 2 ♂, 27.VI.1977, 1 ♂, R. Teriaho leg.; Finström, Tjud, 30.VI., 3 ♂, O. Hytönen leg.; Fögl, Bän, 4.VII.1987, 1 ♂, P. Grotenfelt leg.; Geta, 1.–2.VII.1945, 5 ♂, 1 ♀, A. Nordman leg., L. Kaila prep. 488, 3088, *E. dispilella* E. Traugott-Olsen det., 21.VI.1951, 1 ♂, M. v. Schantz leg., 2.VII.1983, 1 ♂, I. Kontuniemi leg., 23.–VI.1985, 5 ♂, K. Vaalamo leg., L. Kaila prep. 3097, 3098; Jomala, 29.VI.1983, 1 ♂, J.-P. Kaitila leg.; Saltvik, 1.VII.1987, 1 ♂, L. Sippola leg., L. Kaila prep. 3096 (MZH). **France:** Provence:

Domaine de Maure Vicil, 27.–31.V.2003, 2 ♀, H. Hendriksen leg. [abdomen missing] (ZMUC). **Poland:** Komarówka Podl., 14.VII.1978, J. Buszko leg., Genital præparat 6089 ♂ *E. Traugott-Olsen, Elachista dispilella* det. Traugott-Olsen Coll. Traugott-Olsen (ZMUC); Oblasy, 23.VI.1998, 3 ♂, A. Mazurkiewicz leg. (coll. Baran); Styków ad Głogów Małopolski, 10.VI.2008, 10 ♂, 8 ♀, 11.VI.2008, 5 ♂, 3 ♀, 14.VI.2008, 6 ♂, 3 ♀, 5.VII.2008, 1 ♂, T. Baran leg. (Coll. Baran). **Sweden:** Gotland, Silte, Mästermyr, 24.VII.1985, 1 ♂, O. Karsholt leg., O. Karsholt prep. 4619 (ZMUC); Scania, Sandhammaren, 22.VII.1956, 1 ♂, I. Svensson leg. Genital præparat 6049 *E. Traugott-Olsen, Coll. Traugott-Olsen (ZMUC).*

Diagnosis. *Elachista distigmatella* resembles *E. dispilella* externally. The forewing ground colour of *E. distigmatella* is pure white, whereas that of *E. dispilella* has a creamy tinge. The male genitalia of these species differ especially by the broader valva and the much larger cornutus comb of *E. dispilella*. For the female, see the key. These species differ also in phenology (see above). Larvae of the two can be distinguished by the different shapes of the prothoracic sclerites (TB).

Molecular characterization. The analyzed 13 specimens of *E. distigmatella* showed a maximum variability of 0.31 %. Average distance between the specimens was 0.07 %. The genetically closest species was *E. filicornella* with 5.06 % minimum distance to *E. distigmatella*.

Redescription of genitalia. Male genitalia. Uncus lobes 1.5 times as long as broad, tapered towards pointed and outward bent apex, sickle-shaped, mesial margin convex, lateral margin concave. Spinose knob of gnathos oval-shaped. Valva 1.5 times as long as tegumen + uncus, five times as long as broad, parallel-sided; cucullus elongate. Digitate process broad, tapered towards rather acute apex, 0.25 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, distinctly laterally produced, mesial margin straight, joins the concave distal margin in an acute angle. Phallus 0.8–0.9 times as long as valva, bent, parallel-sided; cornutus cluster formed of a few basally joined spines that are closely joined to each other, length of cluster a little more than twice the diameter of phallus.

Female genitalia. Apophyses posteriores slender, straight, 1.5 times as long as papillae anales. Apophyses anteriores about half the length of apophyses posteriores. Posterior margin of sternum 7 forming indistinct, shallow bowl-shaped formation almost as wide as distance between apophyses anteriores. Ostium bursae invaginated in sternum 8, very narrow; colliculum posteriorly narrow, gradually widening with elongate lateral sclerotizations; ductus seminalis granulose, distance between its inception and ostium bursae half the length of apophyses posteriores; ductus bursae 5 times as long as apophyses posteriores, tubular, membranous, granulose, anteriorly with longitudinal, slightly sclerotized foldings, incepted in corpus bursae with distinct border; corpus bursae large, pyriform, with small internal granules in median zone; signum narrow and long, dentate, boomerang-shaped.

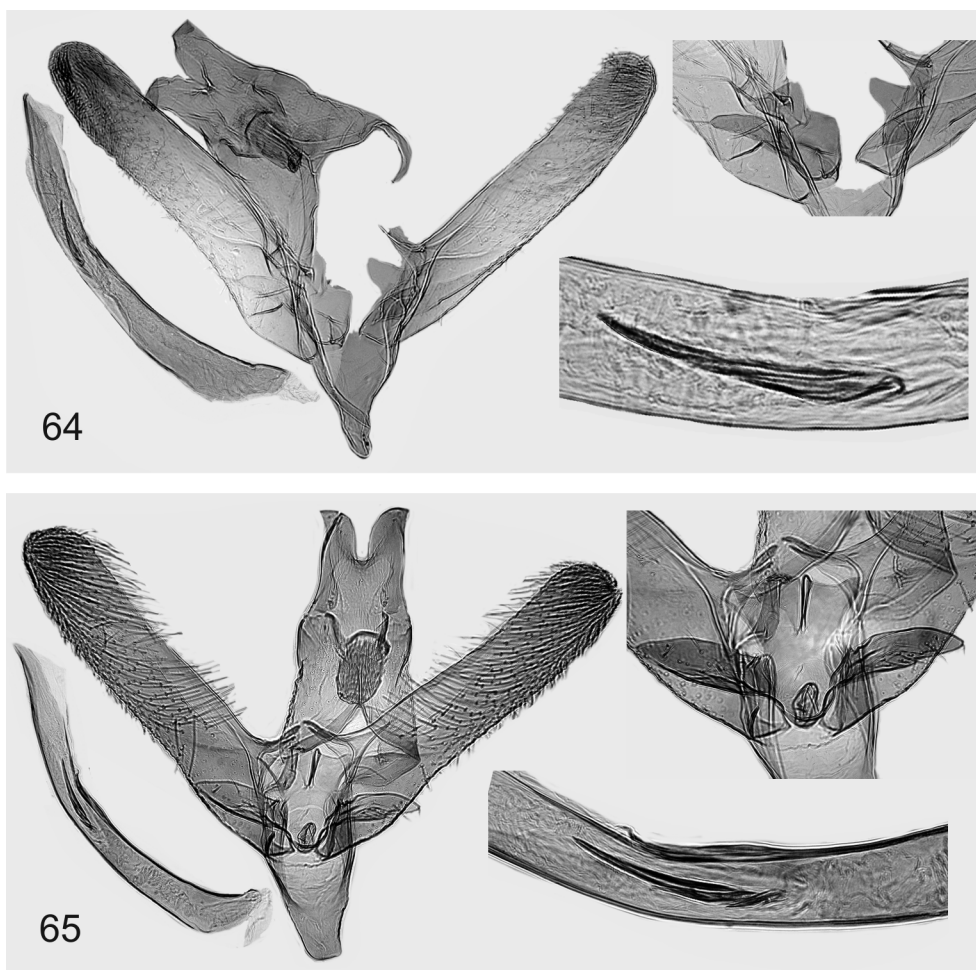
Biology. The following account is based on observations made in Poland. *Elachista distigmatella* occurs in sandy, dry habitats, e.g., in sunny edges of pine or mixed forests. Larvae have been found mining the leaves of *Festuca trachyphylla* in May (TB). The host record of *F. ovina* given by Frey (1859) and repeated by Traugott-Olsen (1990) needs to be confirmed; however, this is the most likely host plant at the Finnish localities for this species. The species has one generation annually, with adults from about the second half of June to the first half of July; it is most numerous in the second half of June. Adults of this species appear somewhat later in the season than those of *E. dispilella*, but occasionally both species may be present in the first half of June. Adults can be encountered sitting on leaves of the food plant during late afternoon in sunny weather.

Distribution. Czech Republic (Šumpich 2007), Denmark, Finland, France, Lithuania (Sruoga & Ivinskis 2005), Poland, Sweden, Switzerland.

Remarks. The species was described by Frey (1859) on the basis of material from Zürich (Switzerland). Hering (1891), however, did not accept its validity and considered it a variation of *E. dispilella*. This view had been accepted until recently when Traugott-Olsen (1990) and Baran (2005) suggested otherwise. *Elachista distigmatella* seems to be more widespread in Western Europe than *E. dispilella*, which is more often encountered in Eastern Europe.

Elachista variabilis Martini was described from Thüringen, Germany to denote its distinction from *E. dispilella* Zeller. The author suspected it to be conspecific with *E. distigmatella* Frey, but decided to follow the opinion of Hering (1891) that *E. distigmatella* is conspecific with *E. dispilella*. Knowing that his species was not *E. dispilella*, Martini described it as new. The type series of *E. variabilis* was studied by Traugott-Olsen (1990) and deemed conspecific with *E. distigmatella*. We have not examined the lectotype but consider the genital-based identification of Traugott-Olsen to be correct. This opinion is substantiated by the original view of Martini, as well

as by the type locality of *E. variabilis*, which falls well within the distribution range of *E. distigmatella* and dissimilar to other species.



FIGURES 64–65. Male genitalia of *E. distigmatella* Frey. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 64. Lectotype, B.M. 26349. 65. France, L. Kaila prep. 4226.

***Elachista teruelensis* Traugott-Olsen, 1990**

Elachista teruelensis Traugott-Olsen, 1990: 65

Material. Not examined.

Diagnosis. According to the illustrations provided in the original description, *E. teruelensis* is similar to *E. distigmatella*. The gnathos is rounded or even wider than long in *E. teruelensis*, oval-shaped in *E. distigmatella*. The female is unknown.

Molecular characterization. No material was available for genetic study.

Biology. Unknown.

Distribution. Spain.

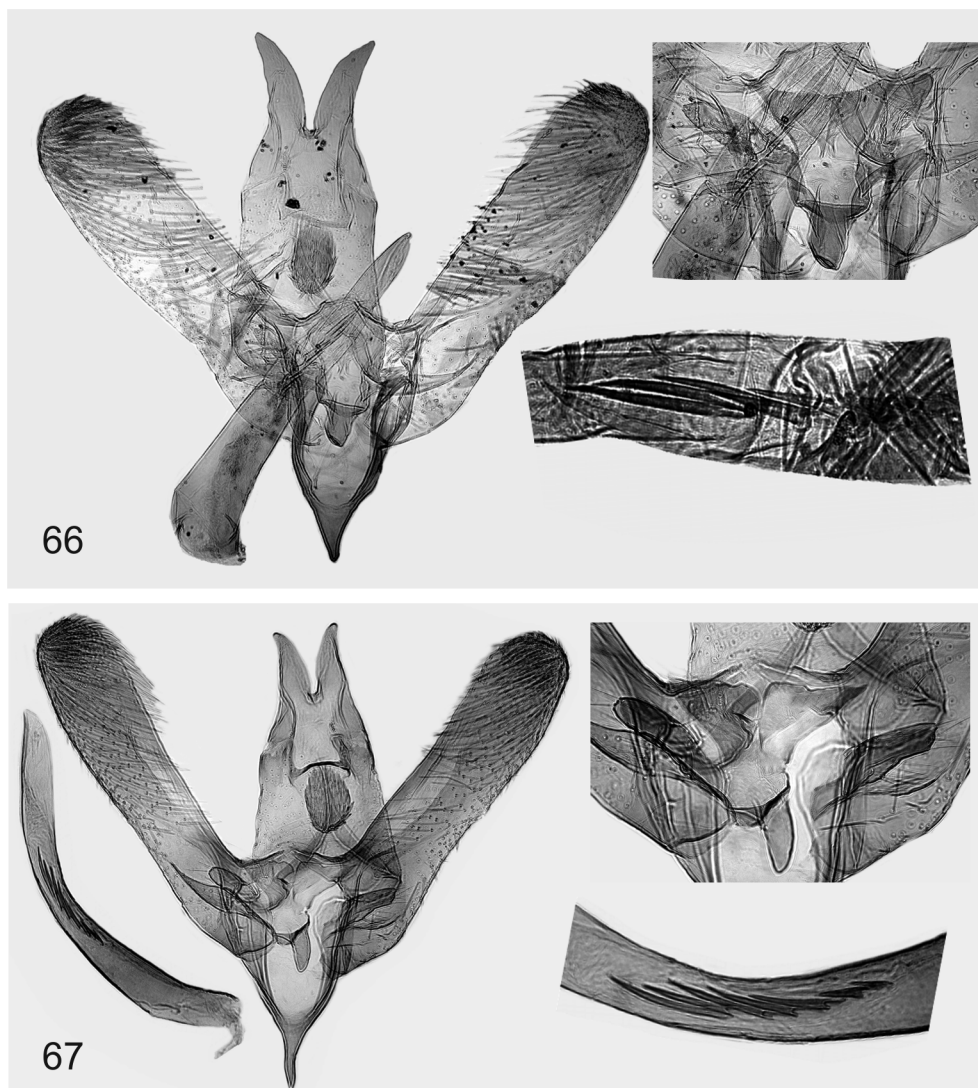
Remarks. The species is known from a singleton sufficiently illustrated by Traugott-Olsen, with no further material known to us. More material is needed, preferably with information from DNA, for evaluating whether the status of *E. teruelensis* would be in need of re-consideration.

***Elachista bruuni* Traugott-Olsen, 1990**

Figs. 14–16, 66–67, 93

Elachista bruuni Traugott-Olsen, 1990: 48.

Material studied. Type material. Holotype ♂ labelled: Holotype (rounded with red margin); [Finland] Hang; 7.7.69; genital præparat nr. A 27.6.87, sex ♂ E. Traugott-Olsen; Forwing [sic] præparat nr. A 28.6.87, sex ♂ E. Traugott-Olsen NMH; Hindwing præparat nr. A 28.6.87, sex ♂ E. Traugott-Olsen; Holotype *Elachista bruuni* Traugott-Olsen (MZH). **Other material. Finland:** N. Hanko peninsula, 200 exx in MZH, with genital slides: Genital præparat C 27.8.87, G, H, I, 27.6.87, E. Traugott-Olsen, L. Kaila prep. 480, 481, 3074–3077, 3081 (MZH). **Estonia:** Piusa, 7.VII.2984, 2 ♂, K. Nupponen leg. (Coll. Nupponen); Saaremaa, Pidula, 23.VII.1983, 2 ♂, K. Nupponen leg., L. Kaila prep. 1451 (Coll. Nupponen, MZH). **Latvia:** Carnikava, 2.VI.2000, 5 ♂, 1 ♀, Junnilainen leg., L. Kaila prep. 3466 (Coll. Junnilainen, MZH). **Russia:** Karelia, Olonets region, Vidlitsa, 19.VI.1991, 14 ♂, L. Kaila, J. Kullberg & P. Martikainen leg., L. Kaila prep. 482–484, 3079, 3080; C 20.12.94 E. Traugott-Olsen (MZH).



FIGURES 66–67. Male genitalia of *E. bruuni* Traugott-Olsen. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 66. Holotype, ETO A.27.6.87. 67. Finland, L. Kaila prep. 3075.

Diagnosis. *Elachista bruuni* is a white species with two brown spots; sometimes the plical spot is faint or absent. Distinguishing it from similar species such as *E. dispilella* and *E. distigmatella* requires an examination of

the genitalia. The uncus lobes of *E. bruuni* are narrow, reminiscent of those of *E. nitidulella*; the cornuti are larger than those of *E. distigmatella* and smaller than those of *E. dispilella*. *Elachista bruuni* is easiest to distinguish from *E. nitidulella* by their outer appearance; *E. nitidulella* is smaller, the forewing unicolorous dirty white, and the hindwing darker grey than in *E. bruuni*. The male genitalia of the two are similar; the valva is a little longer and the cornutus group larger in *E. bruuni* than in *E. nitidulella*. The juxta lobes are strongly produced laterally in *E. bruuni*, not so in *E. nitidulella*. For female genitalia, see the key.

Molecular characterization. The analyzed seven specimens of *E. bruuni* showed a maximum variability of 0.15 %. Average distance between the specimens was 0.04 %. The genetically closest species was *E. ripai* with 5.56 % minimum distance to *E. bruuni*.

Redescription of genitalia. Male genitalia. Uncus lobes narrow, tapered towards pointed and outward bent apex, length 2.5 times as long as wide at their widest point, sickle-shaped, mesial margin convex, lateral margin concave, rounded. Spinose knob of gnathos oval-shaped. Valva nearly 1.4 times as long as tegumen + uncus, 4.5 times as broad as long, parallel-sided; base of sacculus somewhat dilated; cucullus elongate. Digitate process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Juxta lobes distinctly laterally produced, mesial margin slightly convex, joining the straight distal margin in an obtuse angle. Phallus as long as valva, bent, nearly parallel-sided; cornutus cluster elongate group formed of less than ten spines, basal ones somewhat shorter than distal ones; length of longest spines about equal to diameter of phallus.

Female genitalia. Apophyses posteriores slender, straight, 1.5 times as long as papillae anales. Apophyses anteriores about half the length of apophyses posteriores. Ostium bursae invaginated in sternum 8, rounded; colliculum as wide as ostium bursae with elongate lateral sclerotizations; ductus seminalis narrow, granulose, distance between its inception and ostium bursae equal to length of apophyses posteriores; ductus bursae 5 times as long as apophyses posteriores, tubular, membranous, granulose, particularly so in anterior half, apart from the most anterior 1/5, incepted in corpus bursae with distinct border; corpus bursae large, pyriform, with small internal granules in median zone; signum narrow and long, dentate, boomerang-shaped.

Biology. *Elachista bruuni* inhabits sandy habitats, often dunes. It has been reared from *Festuca polesica* (J. Junnilainen, personal communication). In Russia adults were found on *F. ovina*, which is likely another hostplant. Adults climb onto the host plants before sunset and where they are easily observed. Occasionally they are also attracted to artificial light.

Distribution. Estonia, Finland, Latvia, Russia, Sweden (Svensson 2006).

***Elachista nitidulella* (Herrich-Schäffer, 1855)**

Figs. 17, 68

Poeciloptilia nitidulella Herrich-Schäffer, 1855: 302, 314.

Material studied. **Austria:** Austria inf., Herzograd 19.–24.IV.1968 1 ♂ J. Klimesch leg. (ZSM); [no locality], Hoffmann leg. (MZH); **Kyrgyzstan:** nr. Lake Song-Köl, 3050 m, 11.VIII.1987, 1 ♂, V. Mironov leg. (ZIN). **Russia:** S. Ural, Arkaim, 14.VI.1996, 1 ♂, K. Nupponen, J.-P. Kaitila, J. Junnilainen & M. Ahola leg. (Coll. Nupponen); Ul'yanovsk obl., Akulovka, Nikolaevka distr., 150 km SWS Ul'yanovsk, limestone steppe, 5306'N, 4729'E, 24.V.1996, 1 ♂, V. V. Zolotuhin leg. (MZH); Vjazovka, Radishchevo distr., 160 km S Ul'yanovsk, 5253'N, 4826'E, 3.VI.1993, 1 ♂, V. V. Zolotuhin leg. (Coll. Zolotuhin). **Ukraine:** Homutovskaya step, 15.VI.1996, 1 ♂, A. Bidzilya leg. (ZMKU).

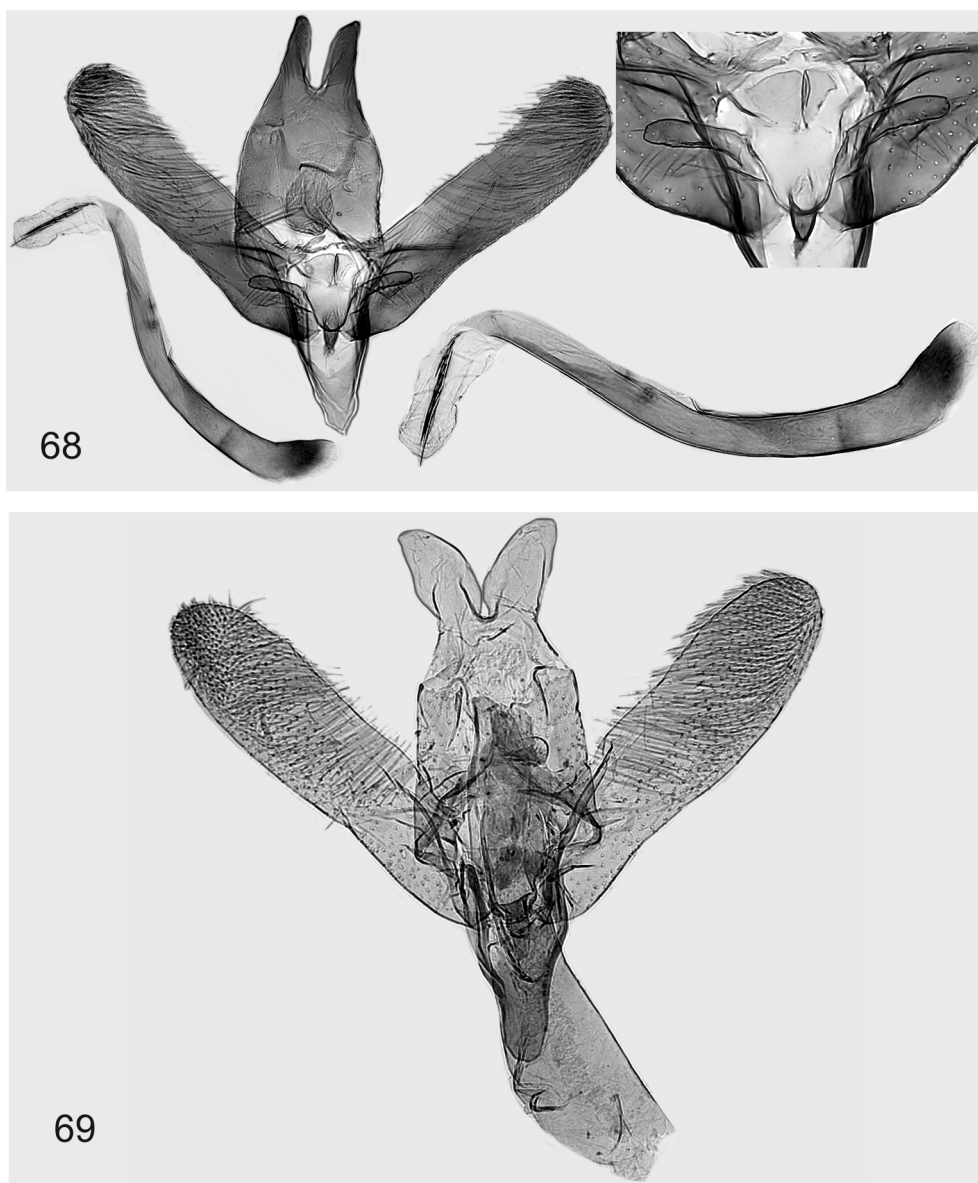
Diagnosis. *Elachista nitidulella* is a small species with a dirty white forewing and a relatively dark grey hindwing. The male genitalia are characterized by the narrow and elongate uncus lobes. Superficially, the most similar species is *E. curonensis*; for distinguishing these species see the diagnosis of *E. curonensis*. The male genitalia are most similar to those of *E. bruuni*. For differentiation of these species, see the diagnosis of *E. bruuni*. The female genitalia of *E. nitidulella* were not studied. The illustrations given by Traugott-Olsen & Nielsen (1977) and Traugott-Olsen (1990) are superficial and give little details that would be useful in characterization it. The signum, however, appears to be shorter than in most species according to the illustrations.

Molecular characterization. No material was available for genetic study.

Distribution. Kaila (2009, in FaEU) lists the following European countries: Austria, Belgium, Czech

Republic, France, Germany, Hungary, Romania, Slovakia and Switzerland. In addition, material has now been examined from Kyrgyzstan, Russia and Ukraine.

Remarks. We follow the long accepted identity of this species, which is supported by the identity of the possibly only surviving, apparent syntype that was studied by Traugott-Olsen & Nielsen (1977).



FIGURES 68–69. Male genitalia of *Elachista* spp. 68. *E. nitidulella* (Herrich-Schäffer), Kyrgyzstan, L. Kaila prep. 5759. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: phallus as enlarged. 69. *E. turkensis* Traugott-Olsen, holotype, ETO K.20.8.87.

Elachista turkensis Traugott-Olsen, 1990

Figs. 18–20, 69–70, 94

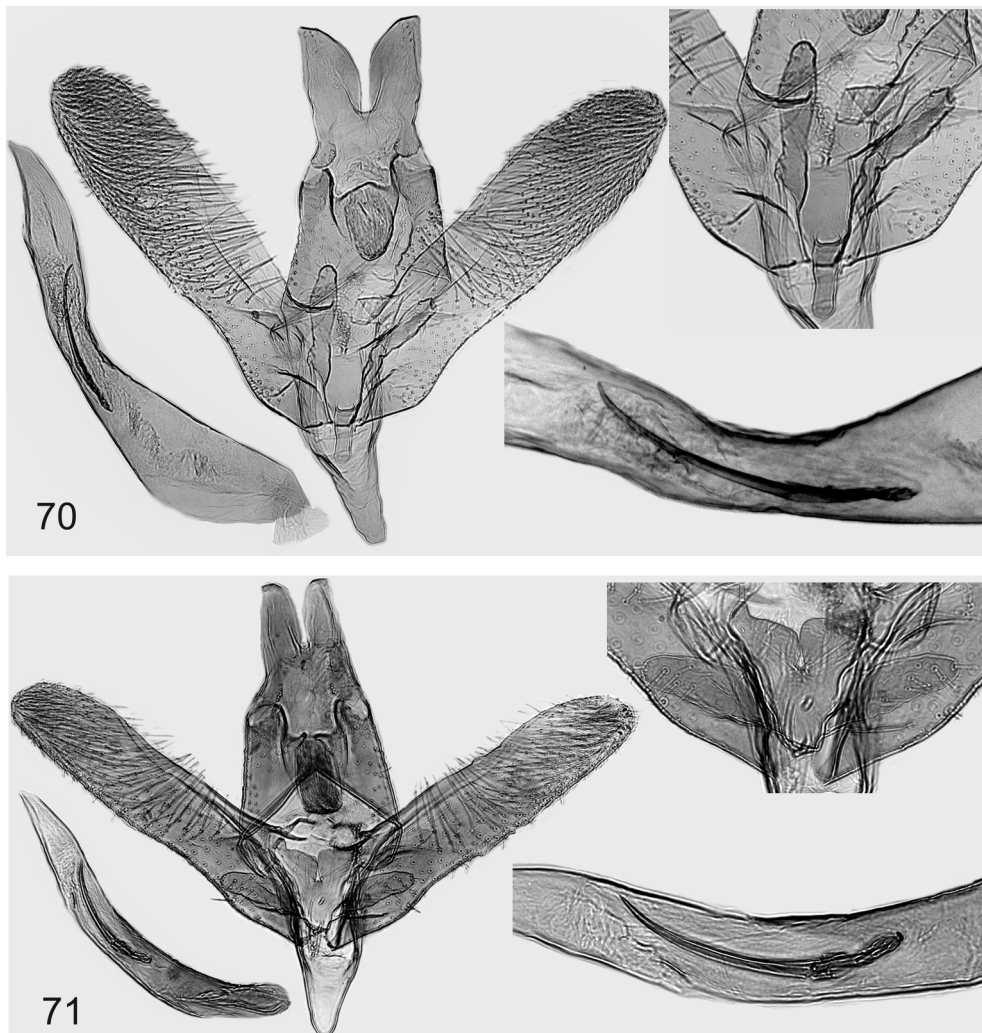
Elachista turkensis Traugott-Olsen, 1990: 61

Material studied. Type material. Holotype ♂ labelled: Holotype (rounded with red margin); Asia min. Turcia, Tuz Göl 1100 m (Salzsee) 19.5.–25.6.65 leg. M. u. W. Glaser; Genital præparat nr K.20.8.87 sex: ♂ E. Traugott-Olsen; Wing præparat nr. D. 12.10.87 sex: ♂ E. Traugott-Olsen; *Elachista turkensis* n. sp. det. E. Traugott-Olsen. Holotype slide: K.20.8.87 ♂ E. Traugott-Olsen Coll. Glaser LNK [SMNK] *Elachista turkensis* sp. n. (SMNK).

Other material. Turkey: Anatolien Tuz Göl, N.-Ufer, 14.–18.IX.1969, 1 ♀, M. u. W. Glaser leg. (SMNK); 35 km

SW Aksehir, Cetince, 1200 m, 15.VI.1999, 1 ♀, J. Junnilainen leg., L. Kaila prep. 4735 (MZH); Aksehir, 30 km SW Sultan Daglari, 1200–1500 m, 6.–7.V.1996, 6 ♂, K. Nupponen & J. Junnilainen leg. (Coll. Nupponen, Junnilainen, MZH); 30 km SW Keyseri, Erciyes Dagi, 24.V.1997, 1 ♂, K. Nupponen & J. Junnilainen leg., L. Kaila prep. 6024, DNA sample 22270 Lepid. Phyl. (Coll. Junnilainen); 50 km SE Seydesiher, 13.VI.2002, 1 ♂, T. Nupponen leg., L. Kaila prep. 4325 (Coll. Nupponen); 5 km NW Ürgüp, 17.VI.1999, 1 ♂, J. Junnilainen leg., DNA sample 22261 Lepid. Phyl. (Coll. Junnilainen).

Diagnosis. *Elachista turkensis* is a narrow-winged, usually large species. Its forewing is dirty ochreous white, with more or less indistinct, grey plical and discal spots. Along the fold to the apex is a somewhat darker ochreous area, resembling that of *E. arenbergeri* Traugott-Olsen in the *E. triseriatella* complex (Traugott-Olsen 1988) and *E. rutjani* Kaila of the *E. pollutella* complex (Kaila 2011c). In the male genitalia the dilated basal half of the phallus is characteristic. The distal spine in the cornutus group is very long and bent. The genitalia most resemble those of *E. ripai*, with a similarly very long distal spine of the cornutus group; the spine, however, is even longer in *E. ripai* than in *E. turkensis*. These species are externally different—*E. ripai* is a small and unicolorous white species. The juxta lobes of *E. ripai* have laterally positioned, distally projected tongue-shaped lobes that are lacking in *E. turkensis*. The phallus of *E. ripai* is smaller than that of *E. turkensis*, and it is not basally dilated. The female genitalia are characterized by the dilated posterior part of ductus bursae, with the colliculum represented by a strongly sclerotized band.



FIGURES 70–71. Male genitalia of *Elachista* spp. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 70. *E. turkensis* Traugott-Olsen, Turkey, L. Kaila prep. 4325. 71. *E. ripai* Kaila, **sp. nov.**, holotype, L. Kaila prep. 5911.

Molecular characterization. The five sequenced specimens of *E. turkensis* showed a maximum variability of 0.15 %. Average distance between the specimens was 0.06 %. The genetically closest species was *E. ripai* with 2.5 % minimum distance to *E. turkensis*.

Redescription. Wingspan 9–12 mm. Labial palpus white above, fuscous below, length equal to diameter of head. Head, neck tuft, thorax, scape and pedicel of antenna pale ochreous grey; flagellum dark grey. Legs grey. Forewing ochreous white, with slightly darker grey or brown longitudinal areas, grey plical and distal spots present; base of costa narrowly black; fringe concolorous with forewing ground colour. Hindwing grey with concolorous fringe. Underside of wings grey, forewing fringe pale ochreous, hindwing fringe concolorous with wing colour.

Male genitalia. Uncus lobes large, twice as long as wide at their widest point, mesial margin convex, apex pointed, lateral margin straight. Spinose knob of gnathos oval-shaped. Valva 1.3 times as long as tegumen + uncus, 4 times as long as broad, parallel-sided; sacculus somewhat concave at basal 1/3; cucullus short and broad. Digitate process tongue-shaped, 0.25 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesial margin straight, joining distal margin at a right angle; distal margin mesially straight, laterally somewhat convex. Phallus slightly longer than valva, basal half strongly dilated, bent; distally tapered toward pointed and reinforced apex; cornutus group formed of several small and closely set spines and apically one very long, slender and curved one; length of apical spine over twice the diameter of phallus at its median part.

Female genitalia. Apophyses posteriores slender, straight, 1.5 times as long as papillae anales. Apophyses anteriores about 2/3 the length of apophyses posteriores. Ostium bursae invaginated in sternum 8, rounded; colliculum as wide as ostium bursae with short sclerotized band; ductus seminalis basally with a dilated bulla seminalis, incepted close to colliculum; ductus bursae 5 times as long as apophyses posteriores, tubular, widest in its anterior and posterior thirds, membranous, granulose, particularly so in anterior third, incepted in corpus bursae with distinct border; corpus bursae fairly small, pyriform, with small internal granules; signum short, dentate, boomerang-shaped.

Biology. Unknown.

Distribution. Turkey.

Remarks. The uncus lobes appear more rounded, and the valva broader in the holotype than in other material examined. This is due to the stronger pressure applied during the dissection of the holotype by Traugott-Olsen than in the samples dissected by the author (LK).

Elachista ripai Kaila, sp. nov.

Figs. 21, 71

Type material. Holotype ♂, Kyrgyzstan, Trans-Alai Mts., 3010 m, 3922'45.5"N, 7216.30'E, Altyn-Dara River valley, 27.VII.2010, K. Nupponen & R. Haverinen leg., L. Kaila prep. 5911, DNA sample 22563 Lepid. Phyl. (Coll. Nupponen). Paratypes (20 ♂): same collecting data as in holotype, L. Kaila prep. 5827, 5867, 5913, 5914, DNA samples 22529–31, 22539, 22540, 22548, 22550–22554, 22556, 22557, 22563, 22564 Lepid. Phyl. (Coll. Nupponen, MZH); Alai Mts., 3220 m, 3940'57"N, 7232'32"E, nr. Kashka-Suu village, 21.VII.2010, 1 ♂, K. Nupponen & R. Haverinen leg., L. Kaila prep. 5913 (Coll. Nupponen); 3949'51"N, 7316'15"E, 31.VII.2010, 1 ♂, K. Nupponen & R. Haverinen leg. (Coll. Nupponen).

Diagnosis. *Elachista ripai* is a small or medium-sized species in the *E. dispilella* complex. Its forewings are unicolorous, dirty or creamy white. The distal spine in the cornutus group is very long and bent. The genitalia most resemble those of *E. turkensis*, with similarly very long distal spine of the cornutus group; the spine is, however, even longer in *E. ripai* than in *E. turkensis*. These species are externally different—*E. turkensis* is a large and dirty ochreous white species. The juxta lobes of *E. ripai* have laterally-arranged, distally-projecting tongue-shaped lobes that are lacking in *E. turkensis*; similar lobes are also present in the otherwise easily distinguishable *E. laterotis*. The phallus of *E. ripai* is smaller than that of *E. turkensis*, and it is not basally dilated. The female is unknown.

Molecular characterization. The analyzed 15 specimens of *E. ripai* showed a maximum variability of 0.31 %. Average distance between the specimens was 0.04 %. The genetically closest species was *E. turkensis* with 2.5 % minimum distance to *E. ripai*.

Description. Wingspan 7–10 mm. Labial palpus creamy white to fuscous, length equal to, or slightly longer

than diameter of head, scales of second segment distally somewhat raised. Head, neck tuft, thorax, scape, pedicel and base of flagellum white, flagellum otherwise grey. Foreleg inwardly leaden grey, legs otherwise varying from ochreous white to pale grey, spurs and tarsal articles of hindleg grey. Forewing unicolorous, chalky white with concolorous fringe, costa basally narrowly black. Hindwing pale grey with concolorous fringe. Underside of wings pale grey with concolorous fringe.

Male genitalia. Uncus lobes elongate, twice as long as wide, mesial margin slightly convex, apex outward directed, pointed, lateral margin straight. Spinose knob of gnathos elongate, oval-shaped. Valva 1.25 times as long as tegumen + uncus, 5 times as long as broad, sacculus basally somewhat dilated, valva otherwise parallel-sided; cucullus elongate, slightly tapered in costal margin. Digitate process broad, tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Mesial margin of juxta lobes convex, joining distal margin without an angle; distal margin mesially straight, laterally with distally projected lobe that bears a few setae. Phallus 9/10 as long as valva, bent; distally tapered toward pointed and reinforced apex; cornutus group formed of several small and closely set spines and one apical very long, slender and curved spine; length of apical spine three times the diameter of phallus at its median part.

Female. Unknown.

Biology. Specimens have been collected by net diurnally above tree line in a meadow characterized by rock outcrops on the ground surface.

Distribution. Kyrgyzstan, Alai Mts.

***Elachista flavescens* Parenti, 1981**

Figs. 22, 72

Elachista flavescens Parenti, 1981: 49

Material studied. Type material: Holotype ♂: Asia minore, 5 km a nor-ovest di Gümüşchane, 1050 m. F. Kasy leg.; Prep. Gen. ♂ N. 2727 U Parenti (NHMW); 3 ♂ paratype slides: U. Parenti prep. 3706, Mus. Vind. 11049; U. Parenti prep. 2734, Mus. Vind. 11047, U. Parenti prep. 2741, Mus. Vind. 11099 (all in NHMW). **Other material:** **Russia:** S. Ural, Chalk Hills, 3.–7.VI.1998, 2 ♂, J. Junnilainen leg. (Coll. Junnilainen), 1 ♂, T. & K. Nupponen leg., 22.VI.1999, 1 ♂, T. & K. Nupponen leg. (Coll. Nupponen); Volgograd distr., 80 km NW Volgograd nr. Ilovla village, 2.VI.2001, 2 ♂, K. Nupponen leg., L. Kaila prep. 3407 (Coll. Nupponen, MZH); S. Ural, Orenburg dr., 5040–45°N, 5426–28°E, 170–230 m, 20 km S Pokrovka village, Schibendy Valley, 1.VII.2003, 3 ♂, 1 ♀, K. Nupponen leg. (Coll. Nupponen, MZH). **Turkey:** Ankara Baraje, 900 m, 28.VI.1968, 1 ♂, MM. u. V. Glaser leg. (SMNK); Asia min, Aksehir, 1200 m, Sultan Daglari, 25.–27.VI.1968, 2 ♂, M. u. W. Glaser leg. (SMNK); Aksehir, 25 km SW Sultan Daglari, 1500 m, 9.VI. 2002, 3 ♂, T. Nupponen leg., Lepid. Phyl. 15496, 15497, 22263 (Coll. Nupponen); 30 km SW Sultan Daglari, 1200 m, 28.VI.1998, 2 ♂, 29.VI.1998, 1 ♂, T. Nupponen leg., L. Kaila prep. 5865, DNA samples 15495, 22277, 22278 Lepid. Phyl. (Coll. Nupponen); 5 km W. Yesilhisar, 20.–21.VI.1999, 8 ♂, J. Junnilainen leg., L. Kaila prep. 3446 (Coll. Junnilainen, MZH); 35 km SW Aksehir, Cetince, 1200 m, 15.VI.1999, 4 ♂, J. Junnilainen leg. (L. Kaila prep. 3481), 9.–13.V.2000, 2 ♂, J. Junnilainen leg., L. Kaila prep. 3445, 3483 (Coll. Junnilainen, MZH).

Diagnosis. *Elachista flavescens* is a unicolorous white or pale yellow species. It is distinguished by the strongly serrate antennae which separate it from all other species of *E. dispilella* complex, except *E. implana*. The differences between these two species are presented in the diagnosis of *E. implana*. The cornutus group is similar to that of *E. dispilella*, the latter of which has simple antennae and broader valvae than *E. flavescens*. The female genitalia are characterized by the dilated posterior part of ductus bursae, with the colliculum represented by a strongly sclerotized band.

Molecular characterization. The analyzed 5 specimens of *E. flavescens* showed a maximum variability of 0.63 %. Average distance between the specimens was 0.25 %. The genetically closest species was *E. ripai* with 6.54 % minimum distance to *E. flavescens*.

Redescription. Wingspan 9–11 mm. Labial palpus creamy white, length 1.2 times diameter of head, scales of second segment distally long and somewhat raised. Head, neck tuft, thorax, scape and pedicel of antenna white or creamy white; flagellum dark grey, distinctly serrate. Foreleg inwardly leaden grey, legs otherwise ochreous white.

Forewing ground colour varying from nearly white to pale yellow with concolorous fringe, base of costa narrowly black; sometimes costal and/or ternal spot faintly visible, brown. Hindwing creamy white with concolorous fringe. Underside of forewing dark grey with creamy white fringe, underside of hindwing grey in anterior half, nearly white in posterior half, fringe pale grey along anterior margin, white along posterior margin.

Male genitalia. Uncus lobes twice as long as wide, sickle-shaped, somewhat distally tapered, mesial margin convex, apex acute. Spinose knob of gnathos oval-shaped. Valva $3/4$ as long as tegumen + uncus, 4.5 times as long as broad, bent as s-shaped, parallel-sided; sacculus dilated; cucullus elongate, somewhat bent towards costa. Digitate process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesial margin straight, joining the straight distal margin in a right angle. Phallus 1.1 times as long as valva, bent, parallel-sided; cornutus cluster prominent, formed of about ten spines set comb-like, basal spines slightly shorter than distal ones that are as long as diameter of phallus.

Female genitalia. Unknown.

Biology. Unknown.

Distribution. Armenia (Parenti 1981), Russia, Turkey.

Remarks. The apparent length of the cornuti is dependent on the position of the vesica in the phallus.

Elachista implana Kaila, sp. nov.

Figs. 23, 73–74

Type material. Holotype ♂: Italy: Teriolis mer. Naturns p. Meran, 20.–30.VI.1935, J. Klimesch leg., 6, 24, L. Kaila prep. 5909 (ZSM). Paratype ♂: the same collecting data except 30.VI.–5.VII.1935, L. Kaila prep. 5910 (ZSM).

Diagnosis. *Elachista implana* is a close relative of *E. flavescens*, both species having strongly serrate antennae that distinguish them from other species in the *E. dispilella* complex. These species can be separated from each other as follows: spinose knob of the gnathos is oval-shaped in *E. flavescens*, rounded in *E. implana*; the valva is straight, slightly broader and longer in *E. implana* than in *E. flavescens* as related to the length of uncus + tegumen; the cornutus group is composed of regularly arranged row of slender spines in *E. flavescens*, that of *E. implana* is irregular with respect of both size and arrangement of spines that are stouter than in *E. flavescens*. The female is unknown.

Molecular characterization. No material was available for genetic study.

Description. Wingspan 9.5–10 mm. Labial palpus creamy white length 1.2 times diameter of head, scales of second segment somewhat raised. Head, neck tuft, thorax, scape and pedicel of antenna white or creamy white; flagellum dark grey, distinctly serrate. Legs grey, hindleg pale ochreous, except spurs and tarsal articles grey. Forewing ground colour varying from nearly white to pale yellow with concolorous fringe, basal $2/3$ of costa grey. Hindwing grey with concolorous fringe. Underside of forewing dark grey, fringe scales basally ochreous, distally white, underside of hindwing grey in costal half, nearly white in dorsal half, fringe pale grey along anterior margin, white along posterior margin.

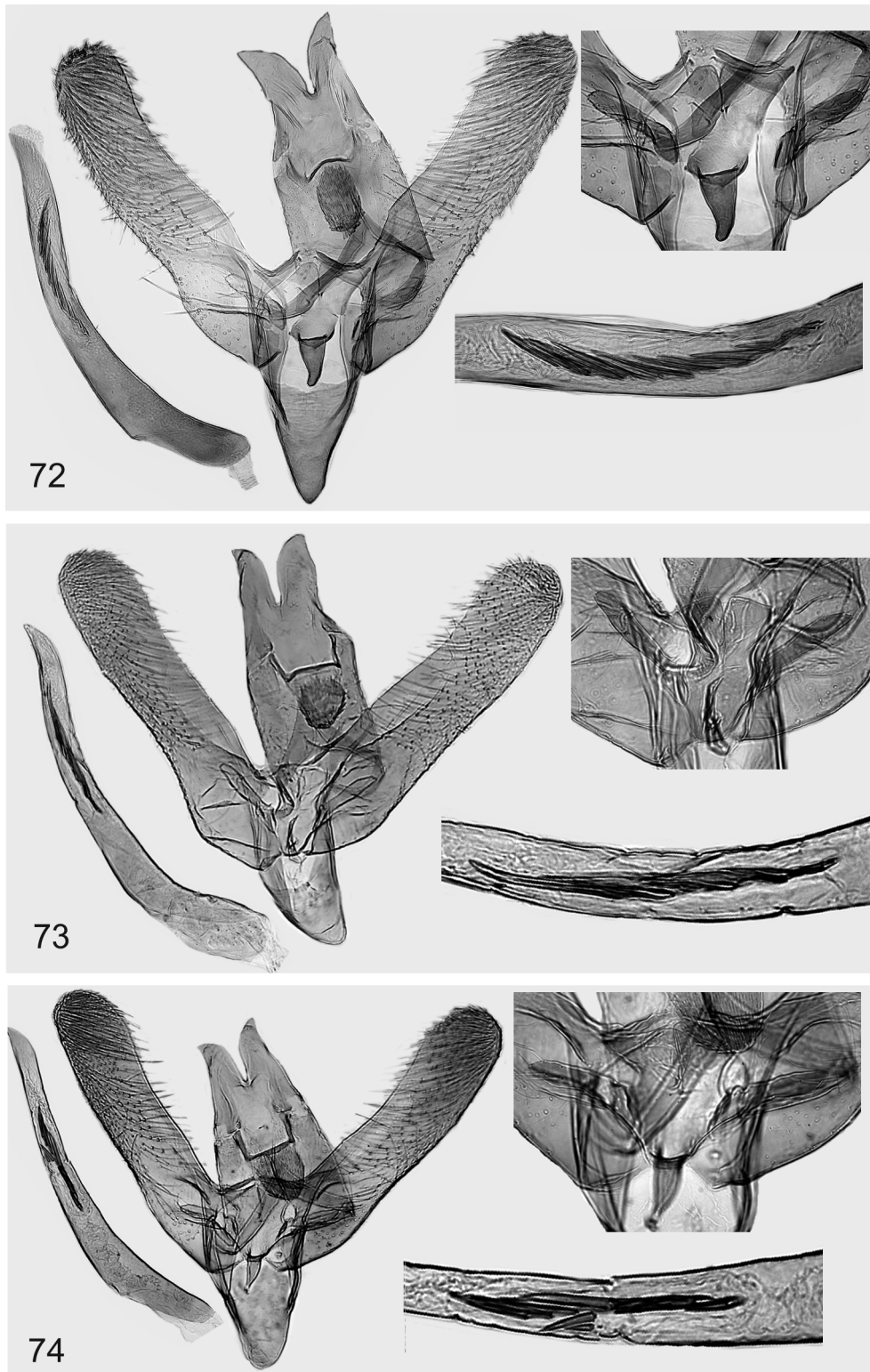
Male genitalia. Uncus lobes twice as long as wide, sickle-shaped, distally tapered, mesial margin convex, apex acute. Spinose knob of gnathos rounded. Valva $3/5$ as long as tegumen + uncus, 4.8 times as long as broad, straight, parallel-sided; cucullus elongate, somewhat bent towards costa. Digitate process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesial margin straight, joining the straight distal margin in a right angle. Phallus 1.1 times as long as valva, bent, parallel-sided; cornutus cluster formed of about ten closely set stout spines, with short and long spines intermixed.

Female. Unknown.

Biology. Unknown.

Distribution. Italy.

Remarks. During the dissection of the male genitalia of *E. implana* somewhat less pressure has been applied during mounting as compared to *E. flavescens*. Therefore the width of valva in the images of *E. implana* appears narrower than it actually is, and the width difference to *E. flavescens* is in reality more pronounced.



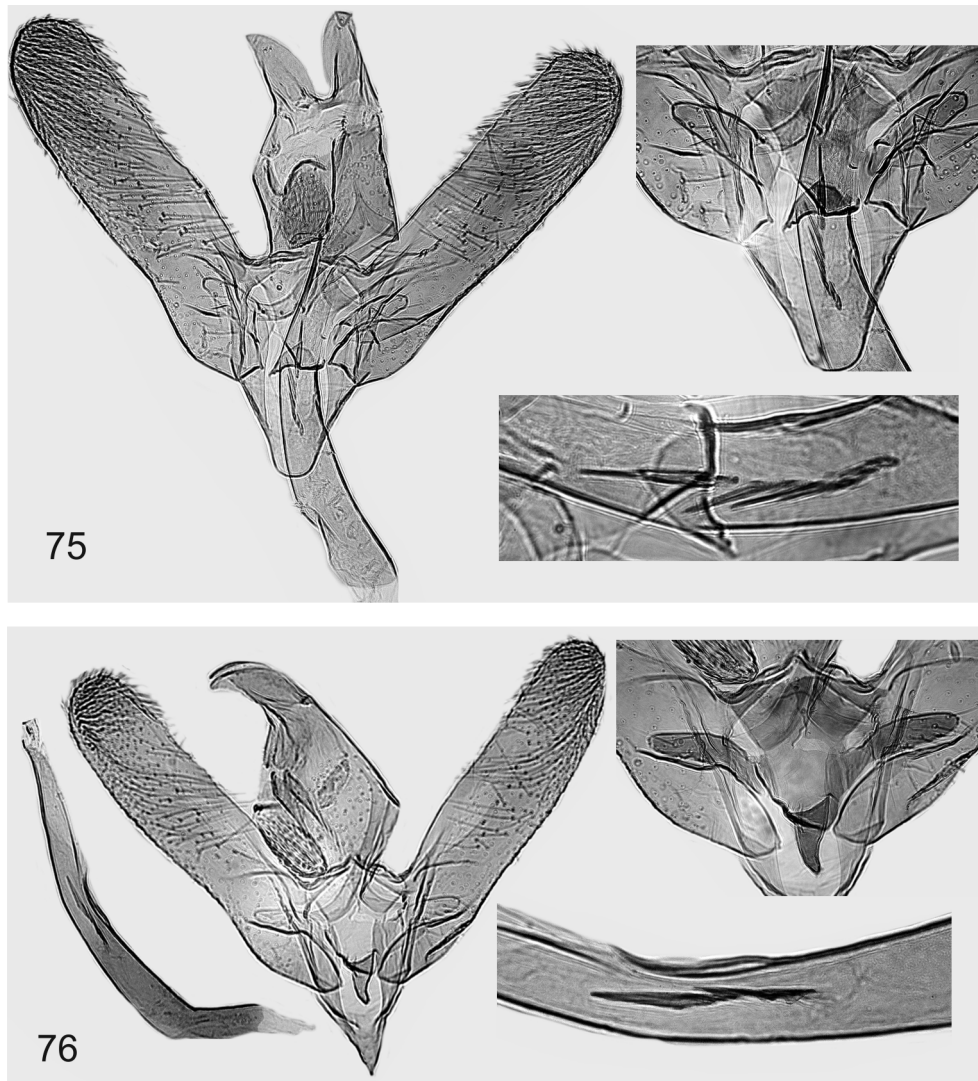
FIGURES 72–74. Male genitalia of *Elachista* spp. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 72. *E. flavescens* Parenti, Turkey, L. Kaila prep. 3483. 73. *E. implana* Kaila, **sp. nov.**, holotype, L. Kaila prep. 5909. 74. *E. implana* Kaila, **sp. nov.**, paratype, L. Kaila prep. 5910.

***Elachista filicornella* Kaila, 1992**

Figs. 24, 75–76

Elachista filicornella Kaila, 1992: 191.

Material studied. Type material: Holotype ♂: USSR 435°NN 7715°E Kazakhstan, Zailiskiy [now Transilij] Alatau, Alma-Atinskij Nat. Pk., 1700 m, steppe/*Carex*, 14.VII.1990 L. Kaila leg.; L. Kaila prep. 559; HOLOTYPE *Elachista filicornella* Kaila (MZH). Paratypes (11 ♂): the same locality and year, 23.VI., 2 ♂, L. Kaila prep. 359, 558; 26.VI., 2 ♂, L. Kaila prep. 660, 3417; 2.VII., 3 ♂, L. Kaila prep. 557, *Elachista manni* det. E. Traugott-Olsen; L. Kaila prep. 3416, DNA sample 21308 Lepid. Phyl., 14.VII., 4 ♂, L. Kaila prep. 393, 394, 556 (MZH).



FIGURES 75–76. Male genitalia of *E. filicornella* Kaila. 75. Holotype, L. Kaila prep. 542. Left: general image of genitalia. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 76. Paratype, L. Kaila prep. 3418. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged.

Diagnosis. *Elachista filicornella* is a unicolorous pale yellow species, resembling *E. flavescens*. The latter species has distinctly serrate antennae that distinguishes it from all other species except *E. implana*. The labial palpi of *E. filicornella* are relatively short, not longer than the diameter of the head. The valvae of *E. filicornella* are relatively broad, somewhat reminiscent of those of *E. dispilella*. These species are readily distinguished by the larger phallus, and much larger cornutus group of *E. dispilella* as compared to *E. filicornella*. The male genitalia of *E. filicornella* are closer to those of *E. distigmatella*. The uncus lobes and the valva of *E. filicornella* are somewhat narrower than in *E. distigmatella*. The distal margin of the juxta lobes is concave in *E. distigmatella*, convex in *E. filicornella*. The female of *E. filicornella* is unknown.

Molecular characterization. The analyzed two specimens of *E. filicornella* did not show intraspecific variability. The genetically closest species was *E. turkensis* with 5.39 % minimum distance to *E. filicornella*.

Redescription. Wingspan 8–9 mm. Labial palpus creamy white, variably fuscous below, length equal to diameter of head. Head, neck tuft, thorax, scape and pedicel of antenna creamy white; flagellum dark greyish brown. Foreleg inwardly leaden grey, legs otherwise ochreous white. Forewing unicolorous, pale yellow with concolorous fringe, basal fourth of costa grey. Hindwing creamy white with concolorous fringe. Underside of both wings pale grey with concolorous fringe, except along costa and termen of forewing creamy white.

Male genitalia. Uncus lobes twice as long as wide, sickle-shaped, somewhat tapered distally, mesial margin convex, apex acute. Spinose knob of gnathos oval-shaped. Valva less than twice as long as tegumen + uncus, 4.5 times as long as broad, straight and parallel-sided; sacculus slightly dilated; cucullus elongate. Digitate process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Juxta lobes with a few setae, mesial margin straight, joining the convex distal margin in a right angle. Phallus 0.8–0.9 times as long as valva, bent, parallel-sided; cornutus cluster formed of about six basally weakly joined, slender spines, basal spines short, distal one as long as diameter of phallus.

Female. Unknown.

Biology. The specimens were caught in flight at sunset and attracted to UV light during night. The habitat is a south-facing slope with lush and diverse meadow vegetation; most of the specimens were caught at a somewhat moist site along a seasonally dry creek. The immature stages are unknown.

Distribution. Kazakhstan: Transili Mts.

Elachista levasi Sruoga, 1998

Figs. 25–27, 77–80

Elachista levasi Sruoga, in Sruoga & Puplesiene 1998: 40.

Elachista purella Sruoga, 2000: 55. **Syn. nov.**

Material studied. Type material. Holotype ♂ of *E. levasi*: photographs of the holotype of *E. levasi* (as a courtesy by V. Sruoga): Turkmenistan W. Kopet Dag, H-800 m, 40 km E. Garrygala =Karak Kala, 16.VI.1993 V. Sruoga; VVE 150 m Gen. pr.; Holotype ♂. Photographs of the genitalia of the holotype of *E. purella* (as a courtesy by V. Sruoga): Kazakhstan, Karaganda Reg., Koksengir 40 km N Zhana-Arka, 14.VI.1958 ♂ A. Zagulayev leg. (ZIN).

Other material. Greece: Makedonia, Promahonas, 41 km NW Serres, 25.–26.V.2001, J. Junnilainen leg., L. Kaila prep. 5027 (Coll. Junnilainen); **Ukraine:** Krim, Karadagh, 15.V.1989, 2 ♂, 24.V.1991, 1 ♂, 25.V. 1991, 1 ♂, 11.VI.1991, 1 ♂, 13.VI.1991, 1 ♂, 28.V.1992, 1 ♂, L. Kaila prep. 3428, DNA sample 16797 Lepid. Phyl., 24.V.1996, 1 ♂, DNA sample 16795 Lepid. Phyl., 26.V.1996, 1 ♂, DNA sample 16796 Lepid. Phyl., 28.V.1996, 1 ♂, all. Yu. Budashkin leg. (MZH); **Turkey:** [slide only examined] Asia min., 5 km N. Gümüşchane, 1050 m, 12.VI.1969, 1 ♂, F. Kasy leg., U. Parenti 934, Mus. Vind. 5086 (NHMW); **Turkmenistan:** Mt. Dushak, 7.–8.VII.1990, 2 ♂, V. V. Dubatolov leg., L. Kaila prep. 4810, 4811 (MZH, SZMN).

Diagnosis. *Elachista levasi* is a medium-sized, pure white species with relatively short labial palpi. The forewing colour distinguishes it from the pale yellow *E. filicornella* whose genitalia, especially the cornutus group, are rather similar; in addition, the valva of *E. filicornella* is considerably wider than that of *E. levasi*. The length of the phallus is equal to the length of the valva.

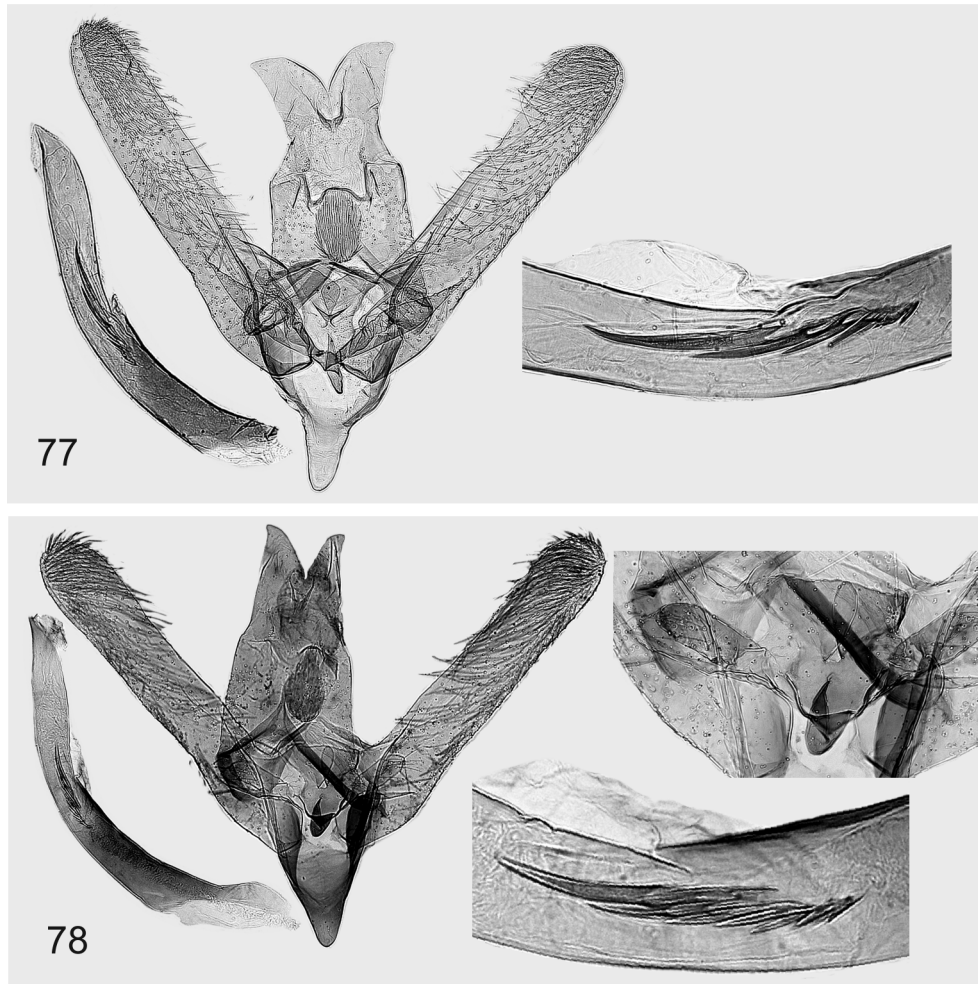
Molecular characterization. The analyzed two specimens of *E. levasi* did not show intraspecific variability. The genetically closest species was *E. turkensis* with 5.39 minimum distance to *E. levasi*.

Redescription. Wingspan 8 mm. Labial palpus ascending, white above, slightly fuscous below, length equal to diameter of head. Head, neck tuft, thorax, scape and pedicel white, flagellum brownish grey. Foreleg inwardly dark leaden grey, legs otherwise brownish grey. Forewing white with concolorous fringe, costa basally narrowly black. Hindwing pale grey, translucent, with concolorous fringe. Underside of forewing white or pale grey with white longitudinal area on posterior side of fold, veins visible as grey, fringe white. Underside of hindwing white or pale grey with concolorous fringe.

Male genitalia. Uncus lobes large, 1.5 times as long as wide at their widest point, mesial margin convex, apex pointed, outward directed, lateral margin slightly concave. Spinose knob of gnathos drop- or oval-shaped. Valva 1.5 times as long as tegumen + uncus, 6 times as long as broad in its median area, cucullus elongate. Digitate

process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesial margin straight, joining distal margin without an angle; distal margin mesially straight or laterally convex. Phallus as long as valva, 8 to 15 times as long as broad depending on the level of pressure applied in dissection, parallel-sided, slightly bent; distally tapered toward pointed and reinforced apex; cornutus group formed of several stout spines that are lengthening towards apex of phallus; length of apical spine about the same as the diameter of phallus.

Female genitalia. Unknown.



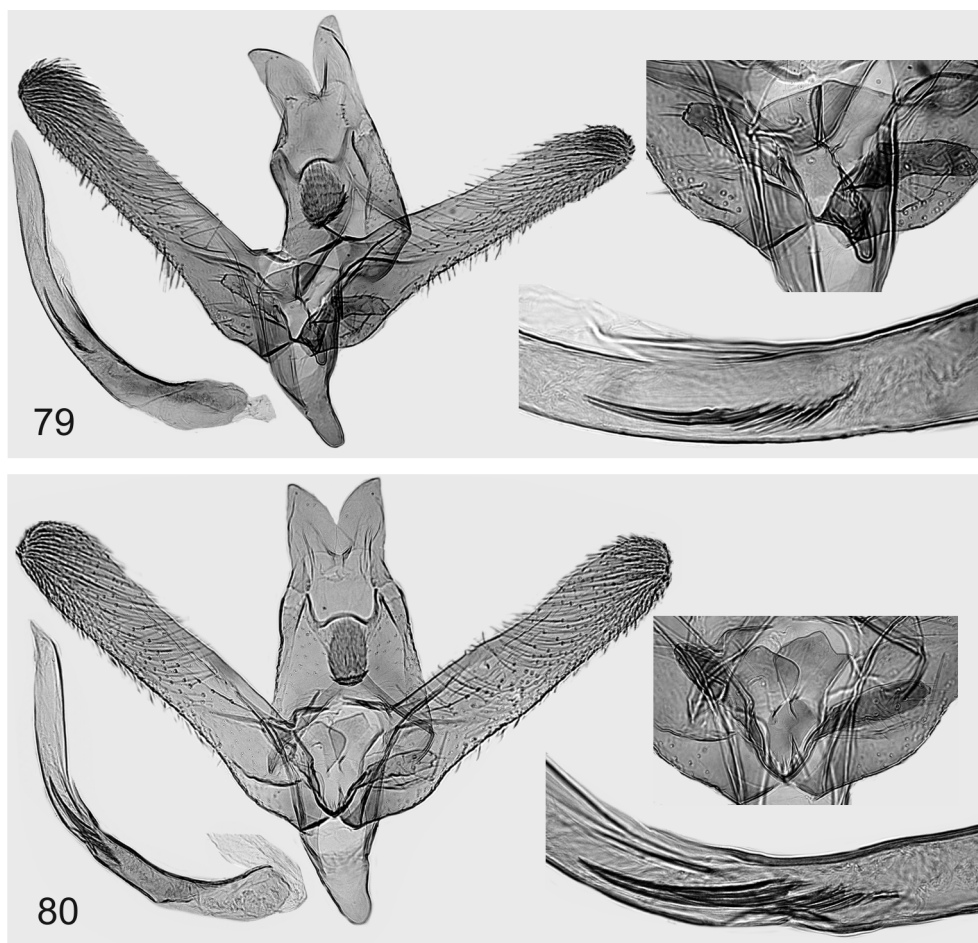
FIGURES 77–78. Male genitalia of *E. levasi* Sruoga, photographs provided by V. Sruoga. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom. cornutus as enlarged. 77. Holotype, V. Sruoga prep. 150. 78. Holotype of *E. purella* Sruoga, V. Sruoga prep. 149.

Biology. Unknown.

Distribution. Greece, Kazakhstan, Ukraine, Turkey, Turkmenistan.

Remarks. The holotypes of *E. levasi* and *E. purella* appear to have differences in the width of the phallus and in the shape of the gnathos, which is drop-shaped in the holotype of *E. purella*, oval-shaped in *E. levasi*. Examination of further samples shows that there is continuous variation in the shape of the gnathos. Width of the phallus, as well as the shape of the cornutus group is affected by the amount of pressure applied in genital dissection. In the absence of any reliable differences, *E. purella* is considered a synonym of *E. levasi*, **syn. nov.**

A series collected by Yu. Budashkin from Ukraine: Crimea (reported as *E. festucicolella* Zeller by Budashkin & Sinev 1991) has been indispensable in examination of the variation within one population. The holotypes of *E. levasi* and *E. purella* fall within the variation observed.



FIGURES 79–80. Male genitalia of *E. levasi* Sruoga. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 79. Ukraine, L. Kaila prep. 4121. 80. Turkmenistan, L. Kaila prep. 4810.

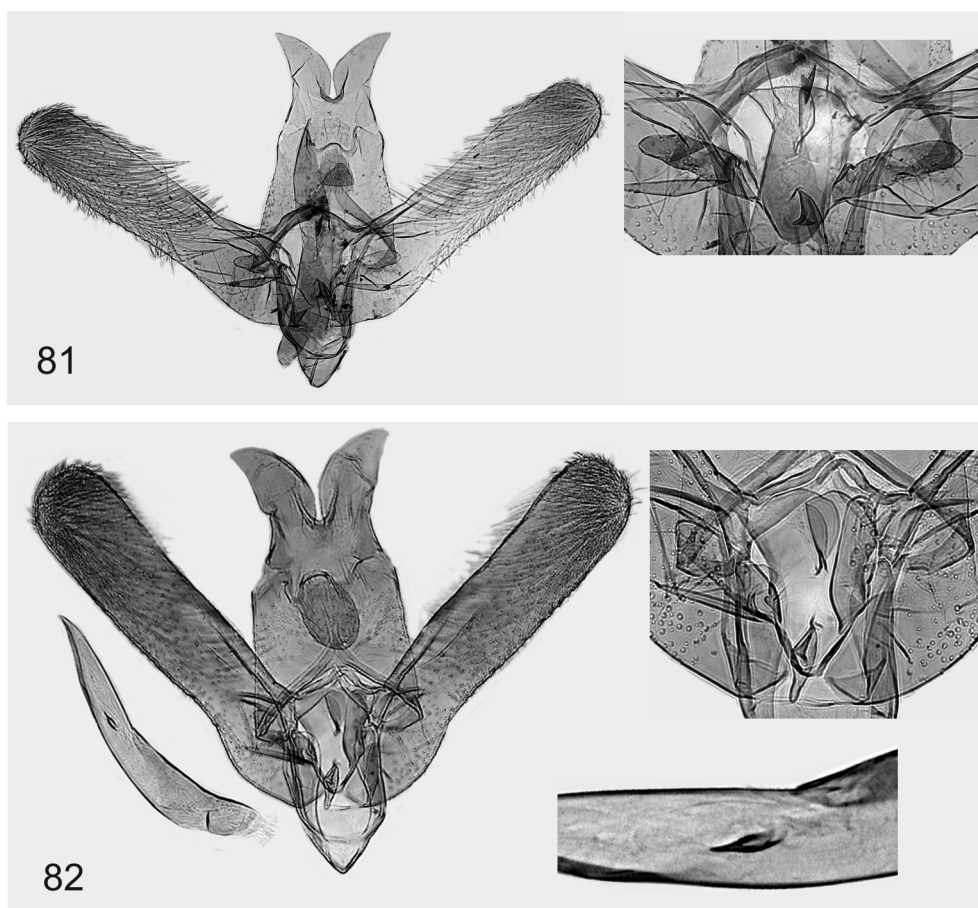
***Elachista bazaensis* Traugott-Olsen, 1990**

Figs. 28–29, 81–82, 95

Elachista bazaensis Traugott-Olsen, 1990: 66.

Material studied. Type material. Holotype ♂: Holotype (rounded with red margin); Hispania, Granada, Baza, 110 km n Granada 2.6.1975 leg. M. u. W. Glaser; genital præparat nr. F.30.8.87 sex: ♂ E. Traugott-Olsen; *Elachista bazaensis* det. E. Traugott-Olsen. Slide: E.30.8.87 E. Traugott-Olsen Holotype LNK. Col. Glaser *Elachista bazaensis* sp. n. (SMNK). **Other material: Spain:** Alicante, 8.5 km NNW Albaterra, 300 m, 22.V.2009, 1 ♀, J. Tabell leg., J. Tabell prep. 4439, DNA sample MM05577 Lepid. Phyl. (Coll. Tabell); Aragon, Caspe, 6.V.2005, 1 ♀, J. Junnilainen leg., L. Kaila prep. 5908 (Coll. Junnilainen); Murcia, 4 km Yecla, 770 m, 6.VI.2010, 5 ♂, J. Tabell leg., J. Tabell prep. 4634, DNA samples 16266, 16785 Lepid. Phyl. (Coll. MZH, Tabell); Prov. Cuenca, Castilla-La Mancha, 7 km ESE Fuentes, 970–1100 m, 12.VI.2008, 1 ♂, 1 ♀, K. Nupponen leg., L. Kaila prep. 5260, 5927, DNA sample 15392 Lepid. Phyl. (Coll. Nupponen); Teruel, 3.5 km SWW Albarracin, 1200 m, 5.VI.2010, 2 ♂, J. Tabell leg., DNA samples MM16265, MM16267 Lepid. Phyl. (Coll. Tabell).

Diagnosis. *Elachista bazaensis* is a unicolorous white or pale yellow species. It is very close to *E. vartiana*, which is larger and more narrow-winged. Their male genitalia are similar to each other, and the length of the digitate process appears to be the only difference: it is longer than the juxta lobes in *E. vartiana*, shorter than the juxta lobes in *E. bazaensis*. Female genitalia are characterized by the short ductus bursae that is only about 3 times as long as apophyses posteriores.



FIGURES 81–82. Male genitalia of *E. bazaensis* Traugott-Olsen. 81. Holotype, ETO E. 30.08.87. Left: general image of genitalia. Right: cornutus, juxta and digitate process. 82. Spain, J. Tabell prep. 4488. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged.

Molecular characterization. The analyzed six specimens of *E. bazaensis* showed a maximum variability of 0.15 %. Average distance between the specimens was 0.05 %. The genetically closest species was *E. vartianae* with 7.44 % minimum distance to *E. bazaensis*.

Redescription. Wingspan 9–11 mm. Labial palpus fuscous white, length 1.2 times diameter of head. Head, neck tuft and thorax fuscous, scape of antenna varying from white to brownish grey, pedicel and flagellum grey. Foreleg inwardly leaden grey, legs otherwise ochreous white except spurs of hind legs that are ochreous grey. Forewing ground colour varying from nearly white to pale yellow with concolorous fringe, base of costa narrowly black. Hindwing pale grey, fringe along anterior margin darker grey, otherwise concolorous with wing colour. Underside of wings grey with creamy white with concolorous fringe, except along anterior margin darker grey.

Male genitalia. Uncus lobes broad, 1.5 times as long as wide at their widest point, sickle-shaped, mesial margin convex, apex pointed, lateral margin concave. Spinose knob of gnathos oval-shaped. Valva nearly 1.5 times as long as tegumen + uncus, 4.5 times as broad as long, parallel-sided; cucullus elongate. Digitate process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, somewhat laterally produced, mesial and distal margin rounded without distinct limit. Phallus 0.75 times as long as valva, bent, basally broad, gradually tapered toward pointed and reinforced apex; basal opening posteriorly oriented, caecum absent; one small cornutus with oval and plate-shaped part and apically directed small spine, the cornutus sometimes absent.

Female genitalia. Apophyses posteriores slender, straight, twice as long as papillae anales. Apophyses anteriores about half the length of apophyses posteriores. Ostium bursae invaginated in sternum 8, narrow; colliculum as wide as ostium bursae, with elongate lateral sclerotizations; distance between ostium bursae and inception point of ductus seminalis 1.5 times as long as apophyses anteriores; ductus bursae + colliculum about 3 times as long as apophyses posteriores, tubular, widest in its posterior third, membranous, anterior half granulose,

with longitudinal foldings, incepted in corpus bursae with distinct border; corpus bursae fairly small, oval-shaped, with small internal granules in median area; signum rather short, dentate, boomerang-shaped.

Biology. Unknown.

Distribution. Spain.

Elachista vartianae Parenti, 1981

Figs. 30–31, 83, 96

Elachista vartianae Parenti, 1981: 84

Material studied. Type material. Paratype slide U. Parenti 974, Mus. Vind. 11057 (NHMW) [the whole type series is from Syria: 25 km W. Damaskos]. **Other material: Lebanon:** 33°19'33"N 35°47'24"E Koura, 308 m, NW Beshmezzine, olive orchard, 25.VIII.2010, 1 ♂, J. Kullberg leg., L. Kaila prep.5343, DNA sample 21305 Lepid. Phyl. (MZH). **Morocco:** 33°24'54"N, 5°04'42"W, Middle Atlas, 1,900 m a.s.l., Ifrane Prov., Michilinen resort, volcano crater & mixed forest, 7.–9.V.2010, 2 ♂, 3 ♀, J. Kullberg & Z. Kolev leg., L. Kaila prep. 5275, 5300, DNA samples 16818, 21306 Lepid. Phyl.; 33°27'20"N, 5°21'18"W, Meknès-Tafilalet, Ifrane, 1920 m, 9.V.2011, 51 ♂, 5 ♀, J. Kullberg leg. (MZH).

Diagnosis. *Elachista vartianae* is a large species in the *E. dispilella* complex. Its forewings are relatively narrow and unicolorous chalky white. The hindwings are pale grey, with characteristic ochreous fringe. The hindwing fringe colour distinguishes *E. vartianae* from the otherwise externally similar *E. laterotis*; but it is also similar to the sympatric *E. catalana* Parenti and *E. vulcana* Kaila (cf. Kaila 2011b). The male genitalia are similar to those of *E. bazaensis*, but its digitate processes are longer than the juxta lobes, shorter than juxta lobes in *E. bazaensis*. The female genitalia are diagnostic—there is no distinct junction between the corpus bursae and the ductus bursae. The ductus bursae is also longer in *E. vartianae* than *E. bazaensis*.

Molecular characterization. The three specimens of *E. vartianae* analyzed showed a maximum variability of 0.46 %. Average distance between the specimens was 0.31 %. The genetically closest species was *E. ripai* with 6.39 % minimum distance to *E. vartianae*.

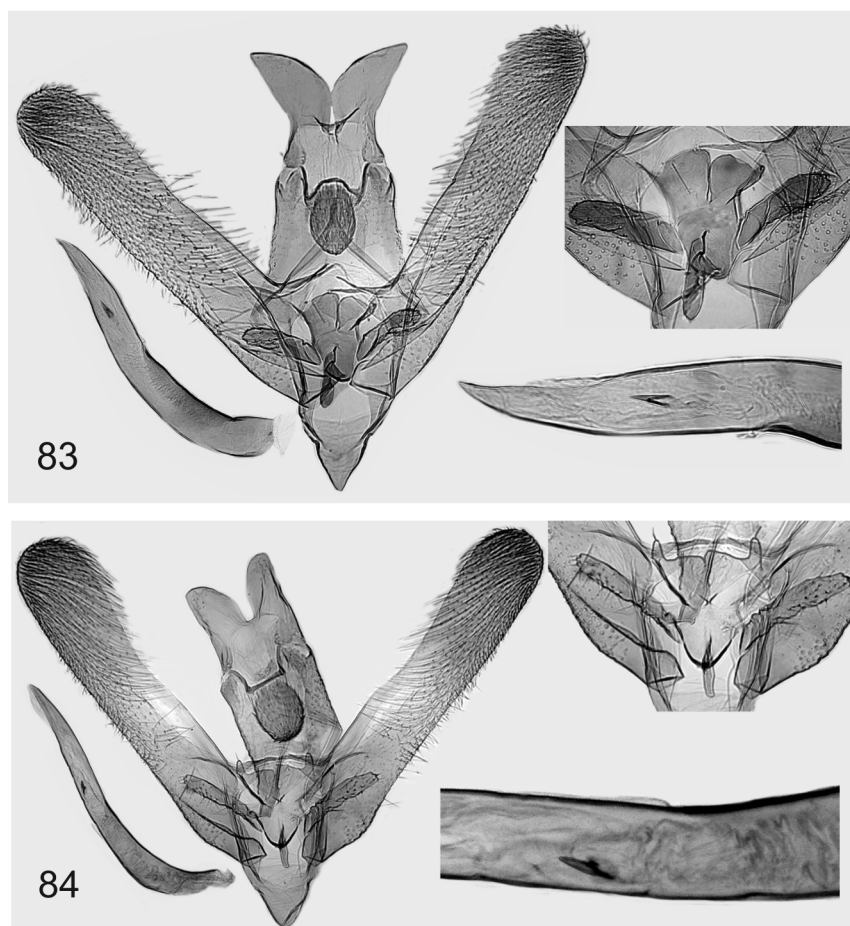
Redescription. Wingspan 10–13 mm. Labial palpus white, length 1.2 times diameter of head. Head, neck tuft, thorax, scape and pedicel of antenna white; flagellum grey. Legs grey, hindleg outwardly pale ochreous grey. Forewing chalky white with concolorous fringe. Hindwing almost white or pale grey, translucent; fringe ochreous. Underside of forewing dark grey, fringe white; underside of hindwing dark grey along anterior half, pale grey along posterior half; fringe ochreous grey.

Male genitalia. Uncus lobes broad, 1.5 times as long as wide at their widest point, sickle-shaped, mesial margin convex, apex pointed, lateral margin concave. Spinose knob of gnathos oval-shaped. Valva nearly 1.5 times as long as tegumen + uncus, 4.5 times as broad as long, parallel-sided; cucullus elongate. Digitate process tongue-shaped, 0.25 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesial and distal margin rounded without distinct limit. Phallus 0.75 times as long as valva, bent, basally broad, gradually tapered toward pointed and reinforced apex; basal opening posteriorly oriented, caecum absent; one small cornutus with oval and plate-shaped part and apically directed small spine.

Female genitalia. Apophyses posteriores slender, straight, twice as long as papillae anales. Apophyses anteriores about 2/3 the length of apophyses posteriores. Ostium bursae invaginated in sternum 8, narrow; colliculum as wide as ostium bursae, with elongate lateral sclerotizations; distance between ostium bursae and inception point of ductus seminalis 2/3 times as long as apophyses anteriores; ductus bursae + colliculum about 4 times as long as apophyses posteriores, tubular, membranous, anterior half granulose, incepted in corpus bursae without distinct border; corpus bursae fairly small, oval-shaped, with small internal granules in median area; signum dentate, boomerang-shaped.

Biology. Immature stages are unknown. Adults are attracted to artificial light.

Distribution. Lebanon, Morocco, Syria.



FIGURES 83–84. Male genitalia of *Elachista* spp. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 83. *E. vartiana* Parenti, Morocco, L. Kaila prep. 5435. 84. *E. laterotis* Kaila sp. nov., holotype, L. Kaila prep. 3000.

***Elachista laterotis* Kaila, sp. nov.**

Figs. 32, 84

Type material. Holotype ♂: Turkey, 30 km Sw Aksehir, Sultan Daglari, 1200 m, 28.V.1997, K. Nupponen & J. Junnilainen leg., L. Kaila prep. 3000 (Coll. Nupponen). Paratype ♂: same locality, 8.VI.2002, T. Nupponen leg., L. Kaila prep. 4318 (Coll. Nupponen).

Diagnosis. *Elachista laterotis* is a large white species externally resembling *E. vartiana* in the *E. dispilella* complex, and *E. catalana* Parenti in the *E. catalana* complex. From the latter it is readily distinguished by the genitalia (cf. Kaila 2011b). Externally, *E. laterotis* differs from the potentially sympatric and likely closely related *E. vartiana* by the ochreous hindwing fringe of the latter species; the fringe of *E. laterotis* is grey. Both these species have a single small spine-like cornutus. The male genitalia of these species differ as follows: the gnathos is rounded in *E. laterotis*, oval-shaped in *E. vartiana*; the uncus lobes are distinctly outward bent in *E. vartiana*, not so in *E. laterotis*; the valva is proportionally longer in *E. laterotis*, less so in *E. vartiana*; the juxta lobes have a laterally situated, tongue-shaped posteriorly-directed lobe in *E. laterotis* that is lacking in *E. vartiana*. The male genitalia of *E. ripai* have a similar lobe, but the latter species is otherwise quite different.

Molecular characterization. No material was available for genetic study.

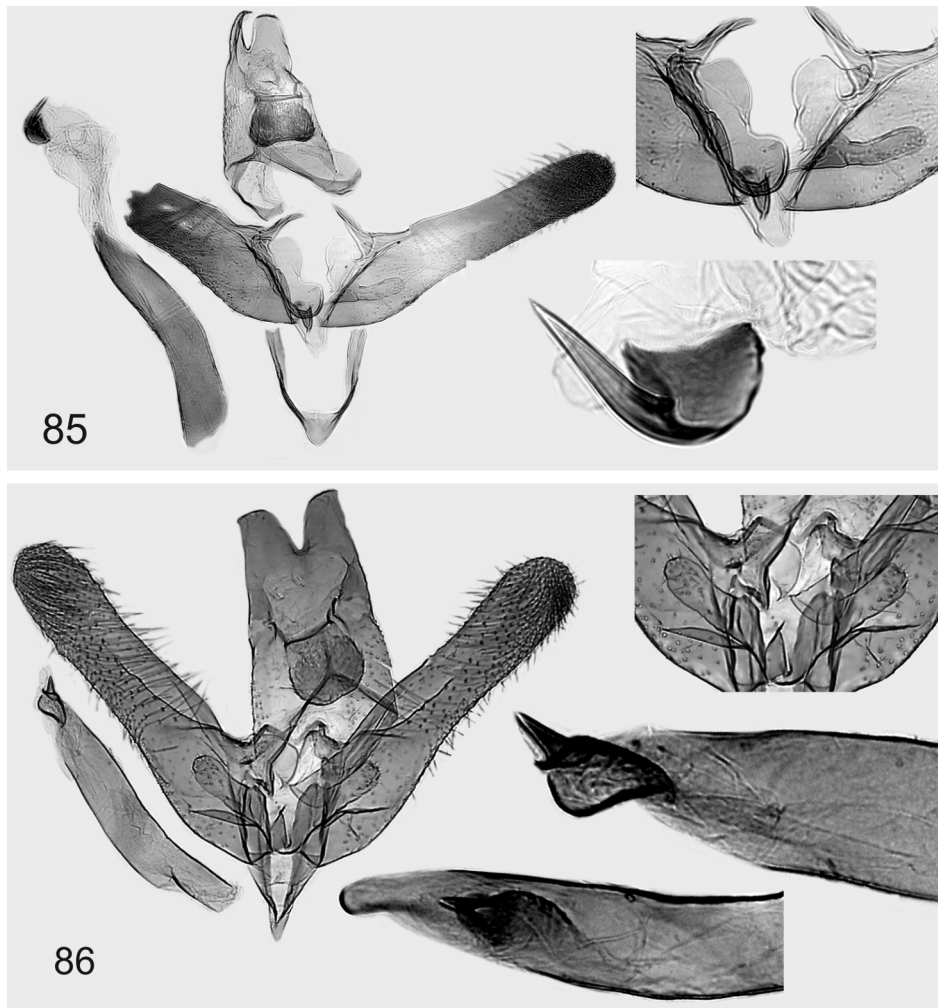
Description. Wingspan 12.5 mm. Labial palpus white, second segment fuscous below, length 1.2 times diameter of head. Head, neck tuft, thorax, scape and pedicel of antenna white; flagellum brown. Legs outwardly leaden grey, inwardly pale ochreous, hindleg dirty white. Forewing unicolorous white with concolorous fringe, basal fifth of costa grey. Hindwing pale grey with concolorous fringe. Underside of both wings grey with white fringe.

Male genitalia. Uncus lobes 1.5 times as long as wide, distally tapered to nearly rounded apex, mesial margin convex, lateral margin straight. Spinose knob of gnathos rounded. Valva $\frac{3}{5}$ as long as tegumen + uncus, 5.7 times as long as broad, straight, parallel-sided; cucullus somewhat dilated, a little bent towards costa. Digitate process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Mesial margin of juxta lobes straight, joining the straight distal margin in a right angle, laterally with posteriorly directed lobe that bears a few setae. Phallus $\frac{3}{4}$ times as long as valva, bent, parallel-sided, distally tapered into sharp reinforced apex; one small cornutus formed of weakly sclerotized plate and short and blunt spine.

Female. Unknown.

Biology. Unknown.

Distribution. Turkey.



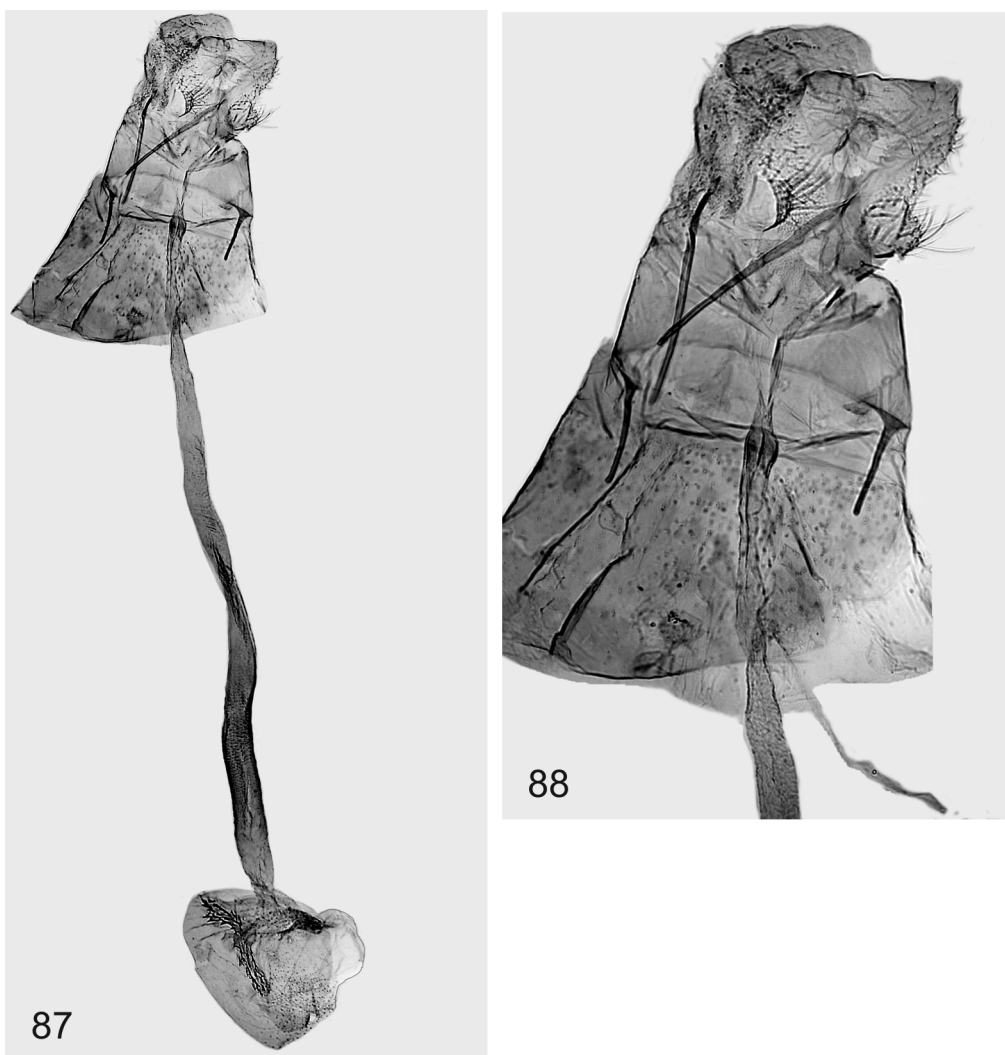
FIGURES 85–86. Male genitalia of *Elachista* spp. Left: general image of genitalia, phallus in same scale. Right top: juxta and digitate process. Right bottom: cornutus as enlarged. 85. *E. cornuta* Parenti, paratype, U. Parenti prep. 944. 86. *E. sitibunda* Kaila sp. nov., holotype, L. Kaila prep. 5762. Middle bottom: cornutus, paratype, L. Kaila 5760.

***Elachista cornuta* Parenti, 1981**

Figs. 33, 85

Elachista cornuta Parenti, 1981: 52.

Material examined. Type material. Holotype ♂: Iran, Derbend, 25 km N. v. Teheran, 2000 m, 7.-15.6.1963, Kasy & Vartian leg. (NHMW); Paratype ♂: same collecting data as in holotype, U. Parenti prep. 944, Mus. Vind. 11.104 (NHMW).



FIGURES 87–88. Female genitalia of *E. dispilella* Zeller. 86. Poland, L. Kaila prep. 5438. 87. Ostium bursae, Poland, L. Kaila prep. 5438.

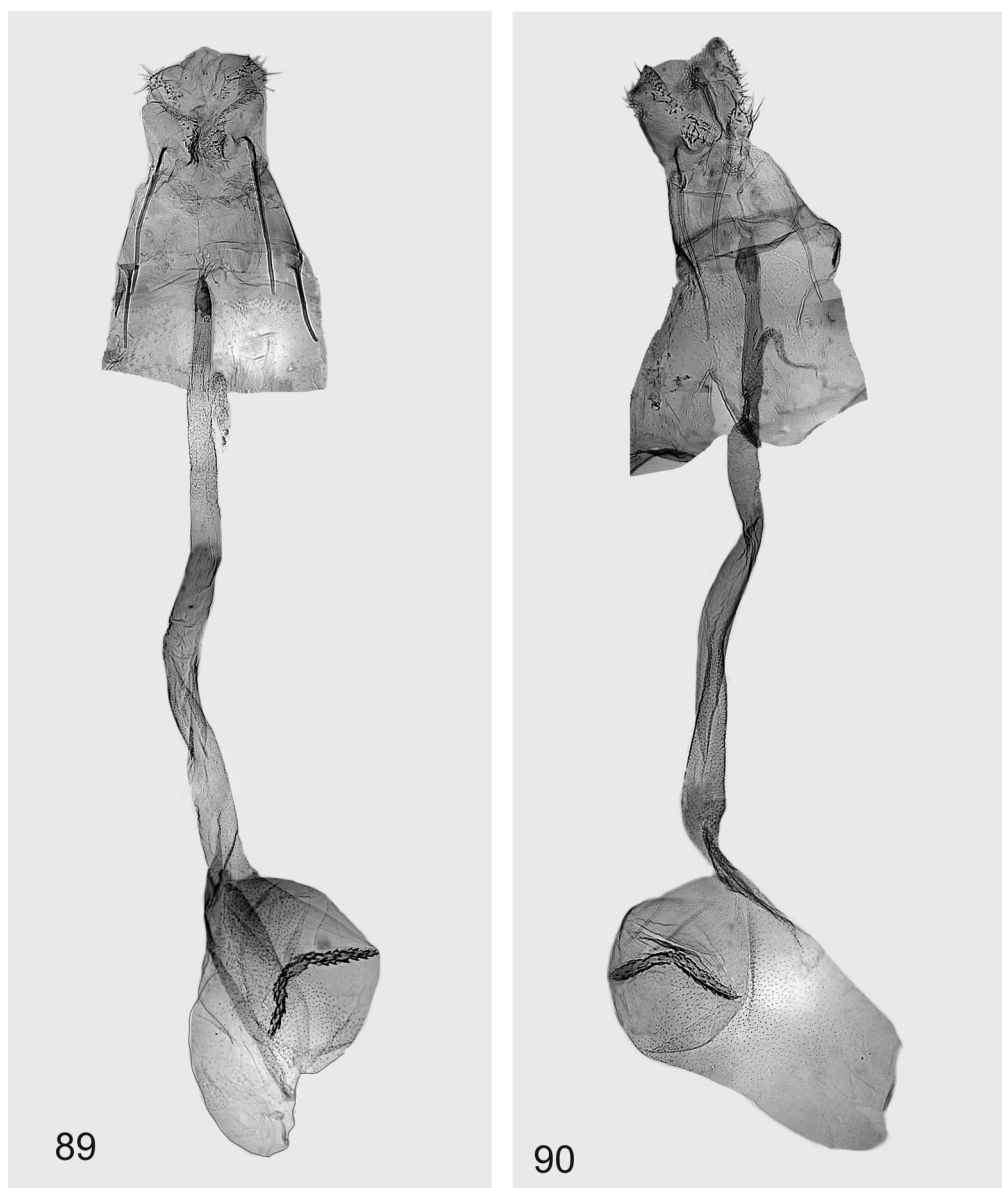
Diagnosis. *Elachista cornuta* is a medium-sized white species with brown plical and discal spots on the forewing. The male genitalia are characterized by the wide gnathos and the size of the single cornutus, which is much larger than in related species, except for *E. sitibunda*. The separation of these species is explained in the diagnosis of *E. sitibunda* below.

Molecular characterization. No material was available for genetic study.

Redescription. Wingspan 9–11 mm. Labial palpus porrect, creamy white, length equal to diameter of head, apical scales of second segment elongate. Head, neck tuft, thorax, scape and pedicel of antenna creamy white; flagellum brown. Fore- and midleg grey, hindleg ochreous, spurs and tarsal articles slightly darker brown. Forewing creamy white with concolorous fringe, plical and discal spots brown, basal fifth of costa dark grey. Hindwing pale grey with concolorous fringe. Underside of forewing grey with creamy white fringe, hindwing pale grey, fringe concolorous.

Male genitalia. Uncus lobes broad, as wide as long, mesial margin convex, apex pointed and slightly laterally directed, lateral margin straight. Spinose knob of gnathos 1.5 times as broad as long, anterior margin slightly concave. Valva 1.5 times as long as tegumen + uncus, broadest basally, 4 times as long as broad as its width basally, and 5.5 times as long as its width medially; sacculus dilated, cucullus elongate. Digitate process tongue-shaped, 0.2 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesial and distal margin rounded without distinct limit. Phallus 0.7 times as long as valva, broad, apex pointed and shortly reinforced; basal opening posteriorly oriented, caecum absent; one large cornutus with oval and plate-shaped part and apically directed, stout spine, length of which equal to the width of the basal plate of cornutus.

Female. Unknown.
Biology. Unknown.
Distribution. Iran.



FIGURES 89–90. Female genitalia of *E. festucicolella* Zeller. 84. Poland, L. Kaila prep. 5436. 85. Italy, Piemonte, L. Kaila prep. 5439.

***Elachista sitibunda* Kaila, sp. nov.**

Figs. 34, 86

Type material. Holotype ♂: Uzbekistan, Shamansay, Kyzylkum desert, 12.V.1965, Falkovitsh leg., L. Kaila prep. 5760 (ZIN). Paratypes (3 ♂): 2 ♂, same collection data except 13.VI.1970 and 19.VI.1970, L. Kaila prep. 5761, 5916 (ZIN, MZH); Kazakhstan, 4227'51''N, 6741'17''E, NNE Kyzylkum desert, 220 m, 40 km W. Koksarai village, 2.V.2010, 1 ♂, K. Nupponen leg., L. Kaila prep. 5916 (Coll. Nupponen).

Diagnosis. *Elachista sitibunda* is a medium-sized creamy-white species with faint pale brown plical and discal spots on the forewing. The male genitalia are characterized by a single cornutus that is much larger than in related species, except for *E. cornuta*. These two species differ by the shape of the gnathos, which is considerably wider in *E. cornuta*, as well as by the shape of the cornutus, which has a spine as long as the width of the basal plate of the cornutus in *E. cornuta*, significantly shorter than the basal plate of the cornutus in *E. sitibunda*.

Molecular characterization. No material was available for genetic study.

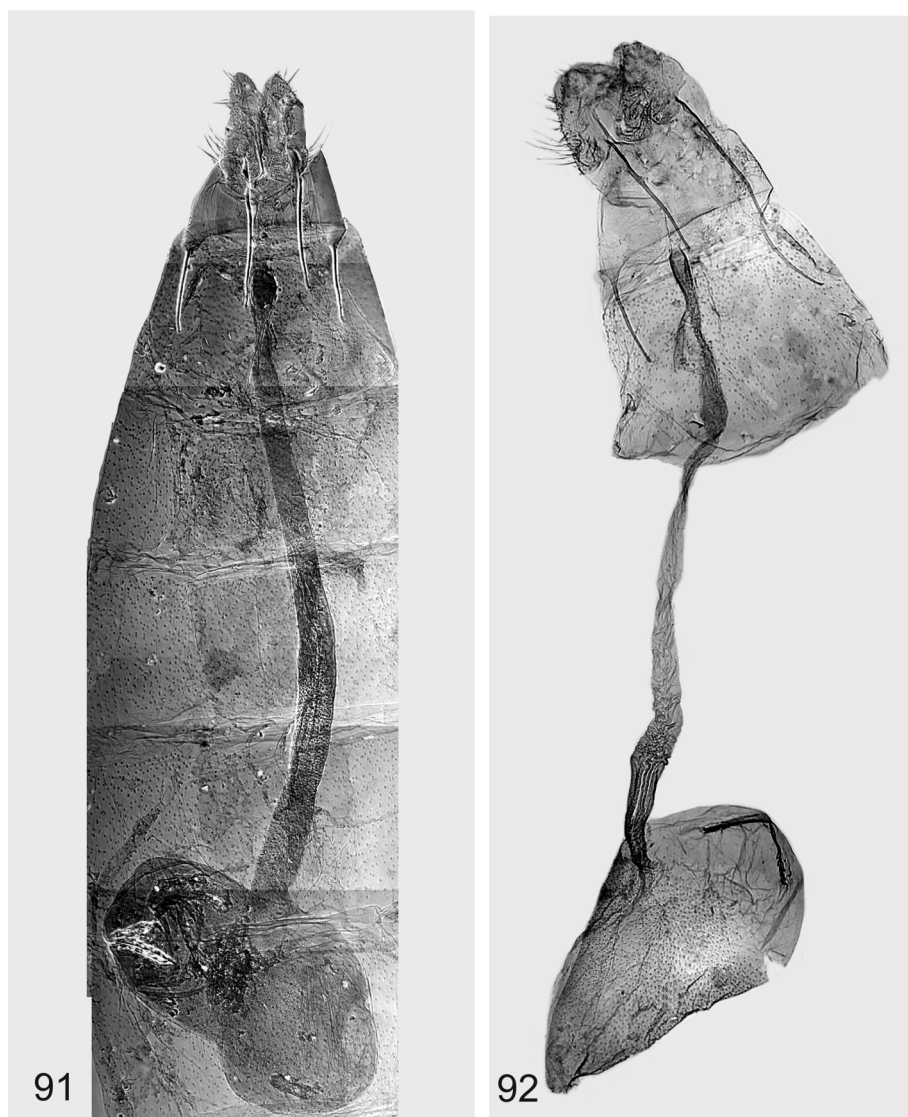
Description. Wingspan 9 mm. Labial palpus porrect, creamy white, length equal to diameter of head, apical scales of second segment elongate. Head, neck tuft, thorax, scape and pedicel of antenna creamy white; flagellum greyish brown. Fore- and midleg grey, hindleg ochreous, spurs and tarsal articles slightly darker brown. Forewing creamy white with concolorous fringe, plical and discal spots faintly visible, pale brown, plical spot often absent, basal fifth of costa dark grey. Hindwing white with concolorous fringe. Underside of forewing varying from ochreous to pale grey with white fringe, hindwing nearly white, fringe concolorous.

Male genitalia. Uncus lobes broad, as wide as long, mesial margin convex, apex pointed and laterally directed, lateral margin straight. Spinose knob of gnathos nearly rounded, slightly broader than long. Valva as long as tegumen + uncus, 4 times as long as broad at its broadest point; sacculus dilated, cucullus elongate. Digitate process tongue-shaped, 0.25 times as long as valva, medially and distally with stout setae. Juxta lobes devoid of setae, mesial and distal margin rounded without distinct limit. Phallus 0.75 times as long as valva broad, apex pointed and shortly reinforced; basal opening posteriorly oriented, caecum absent; one large cornutus with oval and plate-shaped part and apically directed, stout spine, length of which 0.5 times of the width of the basal plate of cornutus.

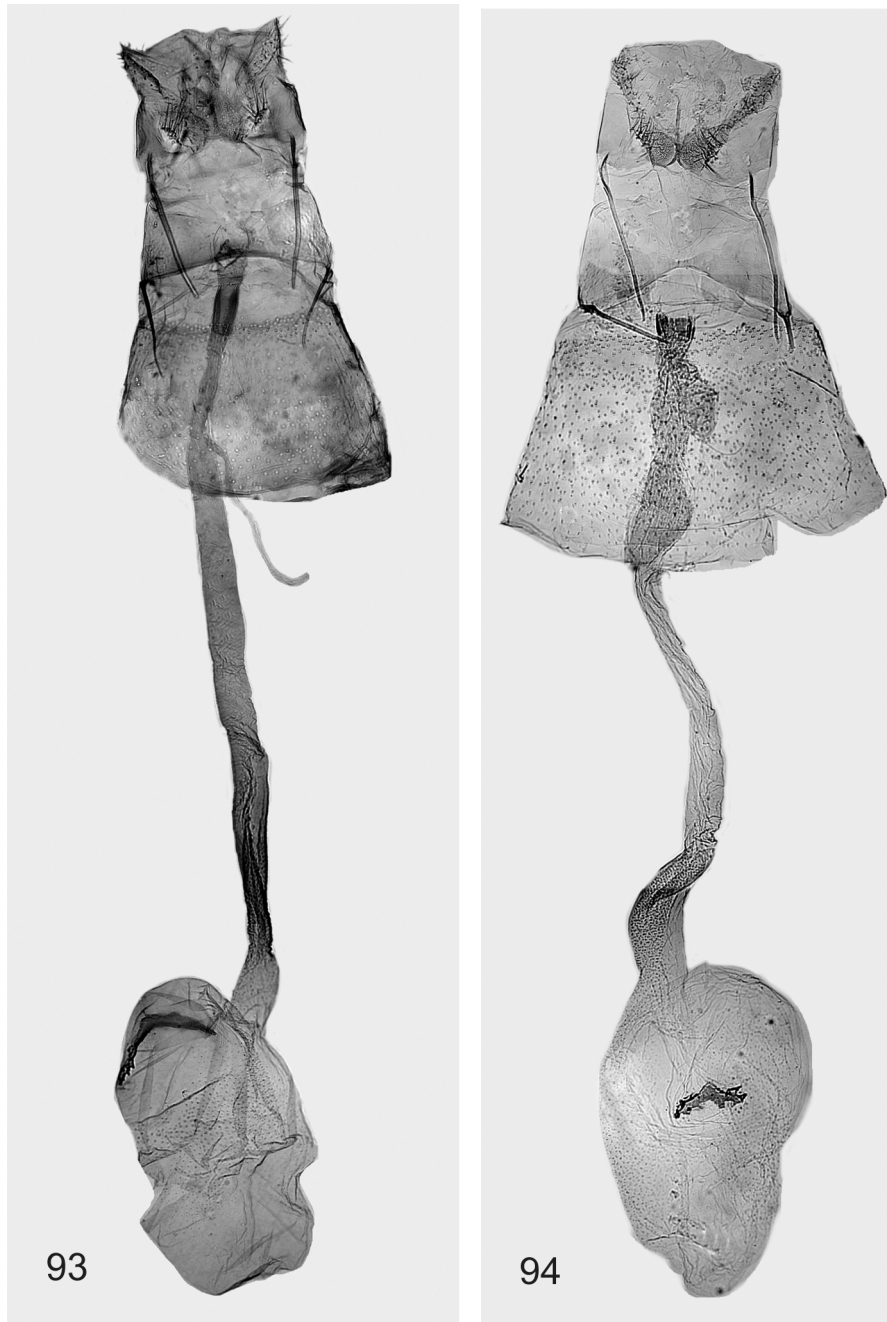
Female. Unknown.

Biology. Unknown.

Distribution. Kazakhstan, Uzbekistan.



FIGURES 91–92. Female genitalia of *Elachista* spp. 91. *E. bigorrensis* Traugott-Olsen, holotype, B.M. 24887. 92. *E. distigmatella* Frey, Finland, L. Kaila prep. 3089.



FIGURES 93–94. Female genitalia of *Elachista* spp. 93. *E. bruuni* Traugott-Olsen, Finland, L. Kaila prep. 6021. 94. *E. turkensis* Traugott-Olsen, Turkey, L. Kaila prep. 4735.

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FIGURES 95–96. Female genitalia of *Elachista* spp. 95. *E. bazaensis* Traugott-Olsen, Spain, L. Kaila prep. 5260. 96. *E. vartianae* Parenti, Morocco, L. Kaila prep. 5283.

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