Zootaxa 4521 (2): 151–182
http://www.mapress.com/j/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.4521.2.1
http://zoobank.org/urn:lsid:zoobank.org:pub:B8EA1721-D5EF-4605-BA03-93E3CF255E3E

A Gondwanan concept of *Simplimorpha* Scoble (*sensu lato*): a step toward clarity in the generic diagnostics of global Nepticulidae (Lepidoptera)

JONAS R. STONIS[1,2,4], ARŪNAS DIŠKUS[1,2], ANDRIUS REMEIKIS[2] & M. ALMA SOLIS[3]

[1]*Vytautas Magnus University and Baltic-American Biotaxonomy Institute, Studentų St. 39, Vilnius LT-08106, Lithuania*
[2]*Nature Research Centre, Akademijos St. 2, Vilnius LT-08412, Lithuania*
[3]*Systematic Entomology Laboratory, ARS, USDA, National Museum of Natural History, Smithsonian Institution, Washington, D.C., 20013-7012, USA*
[4]*Corresponding author. E-mail: stonis.biotaxonomy@gmail.com*

Abstract

The genus *Simplimorpha* Scoble is recognized for the first time from South America. We describe a subgenus, *Myrtinepticula* Stonis & Diškus, **subgen. nov.**, for three new species from the southern Andes (Chile and Argentina): *Simplimorpha* (*Myrtinepticula*) *cercaria* Diškus & Stonis, **sp. nov.**, *S.* (*M.*) *nielseni* Remeikis & Stonis, **sp. nov.**, *S.* (*M.*) *sapphirella* Remeikis & Stonis, **sp. nov.**; and one new species from the southwestern Amazon (Peru): *S.* (*M.*) *kailai* Stonis, **sp. nov**. We provide a pictorial differentiation scheme for *Simplimorpha* Scoble and *Pectinivalva* Scoble. We synonymize the recently erected, predominantly Australian *Menurella* Hoare, **syn. nov.** and *Cosanovula* Hoare, **syn. nov.** with *Pectinivalva* Scoble. We also revise the taxonomic status of the Australian *Roscidotoga* Hoare as a subgenus of *Simplimorpha* which now exhibits a Gondwanan distribution in the Southern Hemisphere, with the presence of a single species in the Mediterranean. All new taxa are illustrated with photographs of the adults and the genitalia; the leaf mines of *Simplimorpha* (*Myrtinepticula*) *nielseni* **sp. nov.** are also provided.

Key words: *Cosanovula* Hoare, Nepticulidae, *Menurella* Hoare, Myrtaceae, *Myrtinepticula* Stonis & Diškus, new subgenus, new species, *Pectinivalva* Scoble, *Roscidotoga* Hoare, *Simplimorpha* Scoble

Introduction

Nepticulidae or pygmy moths with a possibly Early Cretaceous origin (Doorenweerd *et al.* 2016) are distributed worldwide, and occur in most terrestrial ecosystems and habitats, from tundra and temperate forests to arid subtropical deserts and steamy rainforests. General characterization of this peculiar, predominantly leaf-mining family were provided by several authors, notably Wilkinson & Scoble (1979), Scoble (1983), van Nieukerken (1986), Johansson *et al.* (1990), Puplesis (1994), Puplesis & Robinson (2000), Puplesis & Diškus (2003) and Diškus & Stonis (2012).

Nepticulidae consist of a dozen genera, some well differentiated and easily recognizable, some scarcely diagnosed and some with their status still in dispute. For example, many species of *Muhabbetana* Koçak & Kemal, elevated to genus rank (van Nieukerken *et al.* 2016a), are not distinguishable from many members of *Fomoria* Beirne. *Neotrifurcula* van Nieukerken was recently synonymized with *Glaucolepis* Braun (Stonis *et al.* 2017). Some genera, for example *Ozadelpha* van Nieukerken and *Hesperolyra* van Nieukerken (van Nieukerken *et al.* 2016b), require more study because their diagnostics are still in doubt.

Simplimorpha was described by Scoble (1983) on the basis of two species (Staudinger 1870, Vári 1955). This taxon has been neglected despite its remarkable species with striking morphological characters and distribution. *Roscidotoga* Hoare (2000) was described as endemic to Australian fauna, and characterized by a distinct forewing pattern. Although Hoare (2000) found that the newly described taxon represented a sister group to another Australian endemic genus, *Pectinivalva* Scoble, he clearly stated that there were "considerable differences in morphology between *Roscidotoga* and *Pectinivalva*, especially in the genitalia, and [that] the synapomorphies

Accepted by L. Kaila: 27 Sept. 2018; published: 14 Nov. 2018

linking the two are problematic....” Nevertheless, using the well written original description and genital drawings of *Roscidotoga* (Hoare 2000), it is now obvious that *Roscidotoga* likely is not an Australian endemic taxon, but rather a subset of *Simplimorpha*. We have achieved more clarity regarding these taxa with the discovery and study of South American material, and our observations and results are presented below.

We detected a set of similar species during the study of South American material collected in Chile and Argentina from 1981 to1988, and in Peru in 2017. These species despite their overall “exotic look”, also possess striking, derived characters that are shared with *Simplimorpha* and/or *Roscidotoga*. We describe here four new species *Simplimorpha* s.g. *Myrtinepticula*, new subgenus, and sink *Roscidotoga* as a subgenus of *Simplimorpha*. Although we did not perform a phylogenetic analysis on the relationships among the genera we were unable to find evidence to support *Simplimorpha* as a sister taxon to *Pectinivalva*.

Below, we provide a pictorial key to *Simplimorpha* Scoble and its three, newly recognized subgenera (*Simplimorpha* Scoble, *Roscidotoga* Hoare, and *Myrtinepticula* Stonis & Diškus, **subgen. nov.**), and describe four new species: *Simplimorpha* (*Myrtinepticula*) *cercaria* **sp. nov.**, *S.* (*M.*) *nielseni* **sp. nov.**, *S.* (*M.*) *kailai* **sp. nov.**, and *S.* (*M.*) *sapphirella* **sp. nov.**

We also provide a pictorial key to *Pectinivalva* Scoble, *Menurella* Hoare, and *Casanovula* Hoare which were recently elevated to generic rank by van Nieukerken *et al.* (2016a). Because of their close similarity (shared apomorphies), we synonymize the latter two genera with *Pectinivalva.* All new taxonomic changes, including new combinations of species names, are summarized in an updated Catalogue (see Appendix).

Material and methods

Descriptions of the new species treated in this paper are based on material deposited in the collections of the Zoological Museum, Natural History Museum of Denmark, Copenhagen (ZMUC), and National Museum of Natural History, Smithsonian Institution, Washington D.C., USA (USNM) collected in 1981–1988 in Argentina and Chile by E. S. Nielsen and O. Karsholt, and in 1981–1988 in Chile by D.R. Davis and L.E. Peña. Recently in 2017, additional material was collected by J. R. Stonis in Peru, to be deposited in ZMUC.

Methods and protocols for species identification and description are outlined in Puplesis (1994), Puplesis & Robinson (2000), Puplesis & Diškus (2003), and Stonis *et al.* (2016). Due to the high reflective nature of external coloring of these moths, high intensity, daylight illumination was used to study the specimens that were rotated under this light to ascertain the ground color and reflection of the adult scaling. Preparation of temporary and permanent micro-mounts of genital structures were undertaken following the method according to Stonis *et al.* (2014). After maceration of the abdomen in 10% KOH and subsequent cleaning, abdominal segments and female genitalia were stained with Chlorazol Black (Direct Black 38/Azo Black), and male genitalia were left unstained. The male genital capsules were removed from the abdomen and mounted ventral side upward. The phallus was severed from the genital capsule. Both male and female genitalia were mounted in Euparal.

Permanent slides were photographed and studied using a Leica DM2500 microscope and Leica DFC420 digital camera.

The terminology of morphological structures follows Johansson *et al.* (1990) and Puplesis & Robinson (2000), except for the term "aedeagus", which is referred here as "phallus" and the term "cilia", which is referred here as "fringe".

Institutional abbreviations used in the text:

LEU	Lithuanian University of Educational Sciences, Vilnius, Lithuania.
USNM	United States National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA.
ZMUC	Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark.

Taxonomic treatment

Genus *Simplimorpha* Scoble, 1983

Simplimorpha **Scoble, 1983: 15.**

(Figs. 1–64)

Roscidotoga Hoare, 2000: 293, 294, **syn. nov.**
Type species: *Stigmella lanceifoliella* Vári, 1955: 331, 332.

Diagnostics. In contrast to all other Nepticulidae, male genitalia with two sclerites i.e. gnathos + uncus reduced (except for a single species with a partially reduced uncus); female genitalia with a small or partially reduced corpus bursae and often broad anterior apophyses. The genus *Ectoedemia* Busck (including both the subgenera *Ectoedemia* Busck and *Zimmermannia* Hering) and species from the genus *Enteucha* Meyrick (*sensu stricto*) are also characterized by a reduced uncus. However, in contrast to *Simplimorpha*, the male genitalia of *Ectoedemia* and *Enteucha* always possess a well-developed gnathos. Additionally, in contrast to *Simplimorpha*, the forewing venation of *Ectoedemia* is with a closed cell (without a closed cell in *Simplimorpha*), and the venation in *Enteucha* is reduced to four veins in total (Stonis *et al.* 2018).

Description. Adults with collar comprised of piliform or lamellar scales. Forewing pattern varying, from shiny without fascia (Figs. 65, 66, 69, 74) to dark with one shiny fascia (Fig. 70), or with distinctive, shiny scales (Figs. 63, 64, and the Australian species). Wing venation (Figs. 50–57) principally similar to the venation in *Stigmella* Schrank but may vary from species to species. In the male genitalia, tegumen broadly rounded or truncate, laterally setose (Figs. 1–5). Vinculum large, rounded or truncate (Figs. 7–10, 12), or with large lateral lobes (Fig. 11). Valva slender, with a variously developed basal part (Figs. 13–19). Transtilla with a transverse bar (Figs. 20–22, 24) or without transverse bar (Fig. 25), or intermediate, broken medially (Fig. 23). Phallus with a juxta-like, ventral (occasionally dorsal) process (Figs. 26, 28–30, 34), and a spiny cathrema (Figs. 27, 30–33, 37). In the female genitalia, anterior apophyses broad (Figs. 43, 44, 47–49), except for the subgenus *Simplimorpha* (Figs. 38, 40). Ductus spermathecae with many distinctive coils (Figs. 39, 41, 45, 47). Corpus bursae small (Figs. 38, 41) or greatly reduced (Figs. 42, 46, 47), usually not preserved during slide preparation.

Larvae are leaf miners of certain Malvids (=Eurosids II) and Fabids (=Eurosids I) producing a rather long to very long linear leaf mine (Figs. 58–61), with an initial part of the gallery (or more) fully filled with frass.

Currently the genus comprises ten species, which almost all, except for a single species, are known from the Southern Hemisphere (Gondwanan distribution) (Fig. 62).

Subgenus ***Simplimorpha*** **Scoble, 1983**

(Figs. 1, 2, 7, 8, 13, 14, 20, 21, 26–28, 38–40, 52–55, 59, 60, 62–64)

Type species: *Stigmella lanceifoliella* Vári, 1955: 331, 332.

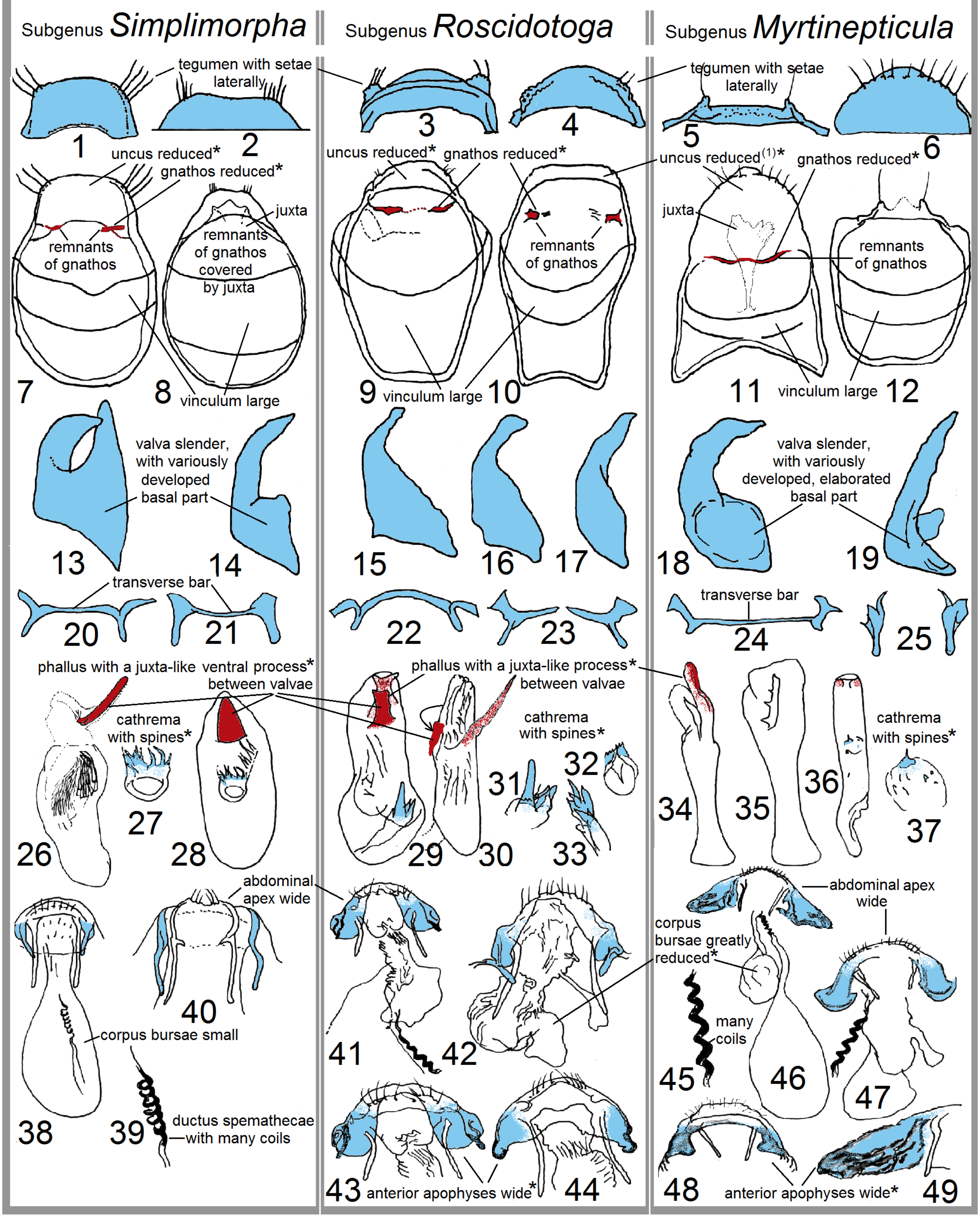
Diagnosis. From s.g. *Roscidotoga* Hoare, s.g. *Simplimorpha* differs by the lack of shiny markings on forewing, the presence of two distal veins on forewing (three in *Roscidotoga*), valva with a ventral lobe (without a lobe in *Roscidotoga*), and the slender anterior apophyses in the female genitalia (anterior apophyses very wide in *Roscidotoga*). The feeding preference on Anacardiaceae, Sapindales (Malvids / Eurosids II), and the South African-Mediterranean distribution make *Simplimorpha* distinctive compared with s.g. *Roscidotoga* that occurs in Australia and feeds on Cunoniaceae and Elaeocarpaceae, Oxalidales (Eurosids I / Fabids).

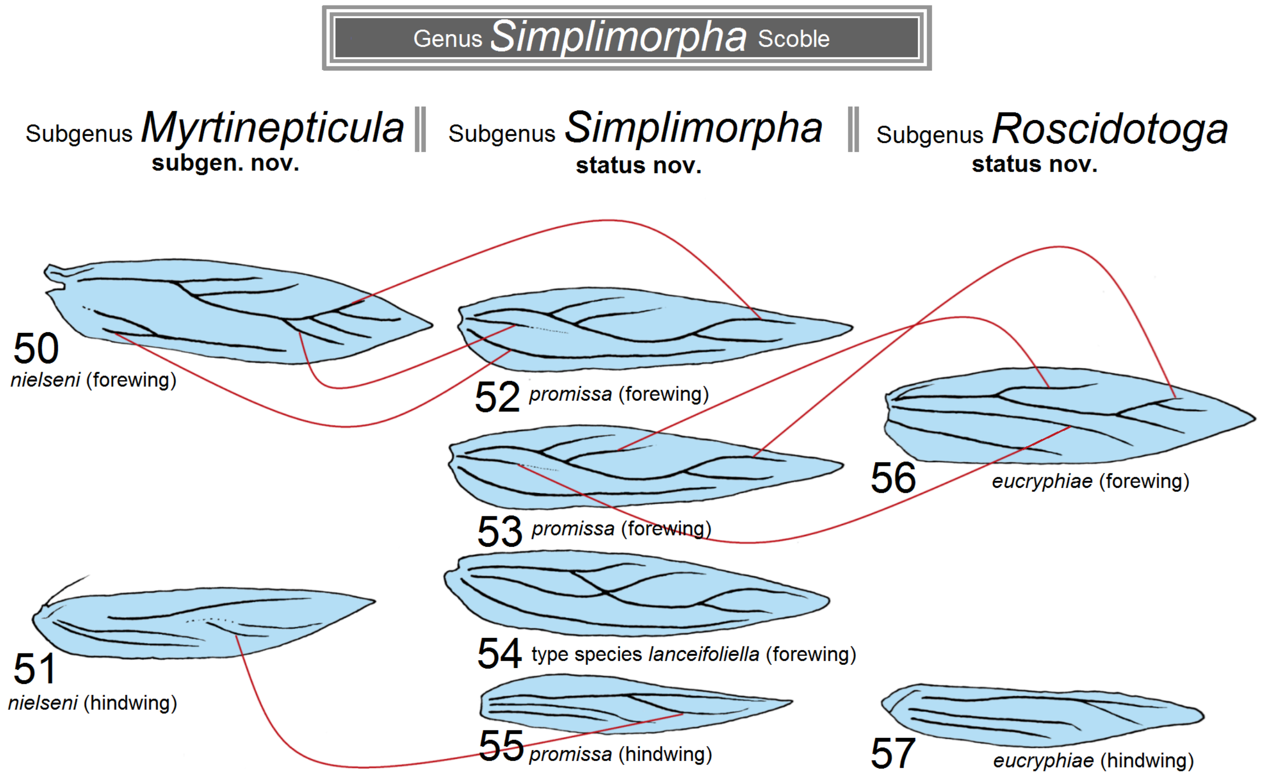
From *Myrtinepticula* subgen. nov., s.g. *Simplimorpha* differs by the absence of strong purple or blue iridescence of adult scaling, the presence of two distal veins (four in *Myrtinepticula*), the absence of anal loop of forewing, presence of two distal veins of hindwing (three in *Myrtinepticula*), presence of transverse bar of transtilla (usually absent in *Myrtinepticula*), wide phallus (slender in *Myrtinepticula*), small corpus bursae (greatly reduced in *Myrtinepticula*), and the slender anterior apophyses (very broad in *Myrtinepticula*). *Simplimorpha* is distinctive because it feeds on Anacardiaceae (Sapindales) and is distributed in Africa and the Mediterranean in contrast to *Myrtinepticula* subgen. nov. that feeds on Myrtaceae (Myrtales) and is distributed in South America.

Description. Adults with collar comprised of piliform or lamellar scales. Forewing with distinctive pale scales (Figs. 63, 64). Forewing venation (Figs. 52–54) with four veins on Rs+M stem, or two veins distally. Male genitalia: tegumen wide, truncate, laterally setosae (Figs. 1, 2); vinculum large, rounded (Figs. 7, 8); valva slender, with a basal part little or greatly extended in the shape of ventral lobe (Figs. 13, 14); transtilla with a transverse bar

Genus *Simplimorpha* Scoble

In contrast to all other Nepticulidae, moths with reduced gnathos and uncus(1) in the male genitalia, and usually small or partially reduced corpus bursae in the female genitalia.





Note the venation difference in Figs 53 and 54

FIGURES 50–57. Wing venation of *Simplimorpha* Scoble, 1983 (*sensu lato*). 50, *S. nielseni*, forewing, Hua-Hum, Argentina, slide RA619; 51, same, hindwing; 52, 53, *S. promissa*, forewing, Crimea, Europe, temporary slide, LEU; 54, *lanceifoliella*, forewing (modified after Scoble 1983); 55, same, hindwing; 56, *S. eucryphiae*, forewing (modified after Hoare 2000); 57, same, hindwing

Remarks: yet although the wing venation in general is valuable it is not without its limitations: independent losses are likely; being extreme tiny moths, the venation can be rather easily got reduced even in cases of related species (Figs. 53, 54) or, occassionally, within same species (Puplesis & Robinson 2000). Note that the morphological structures are drawn in different scales.

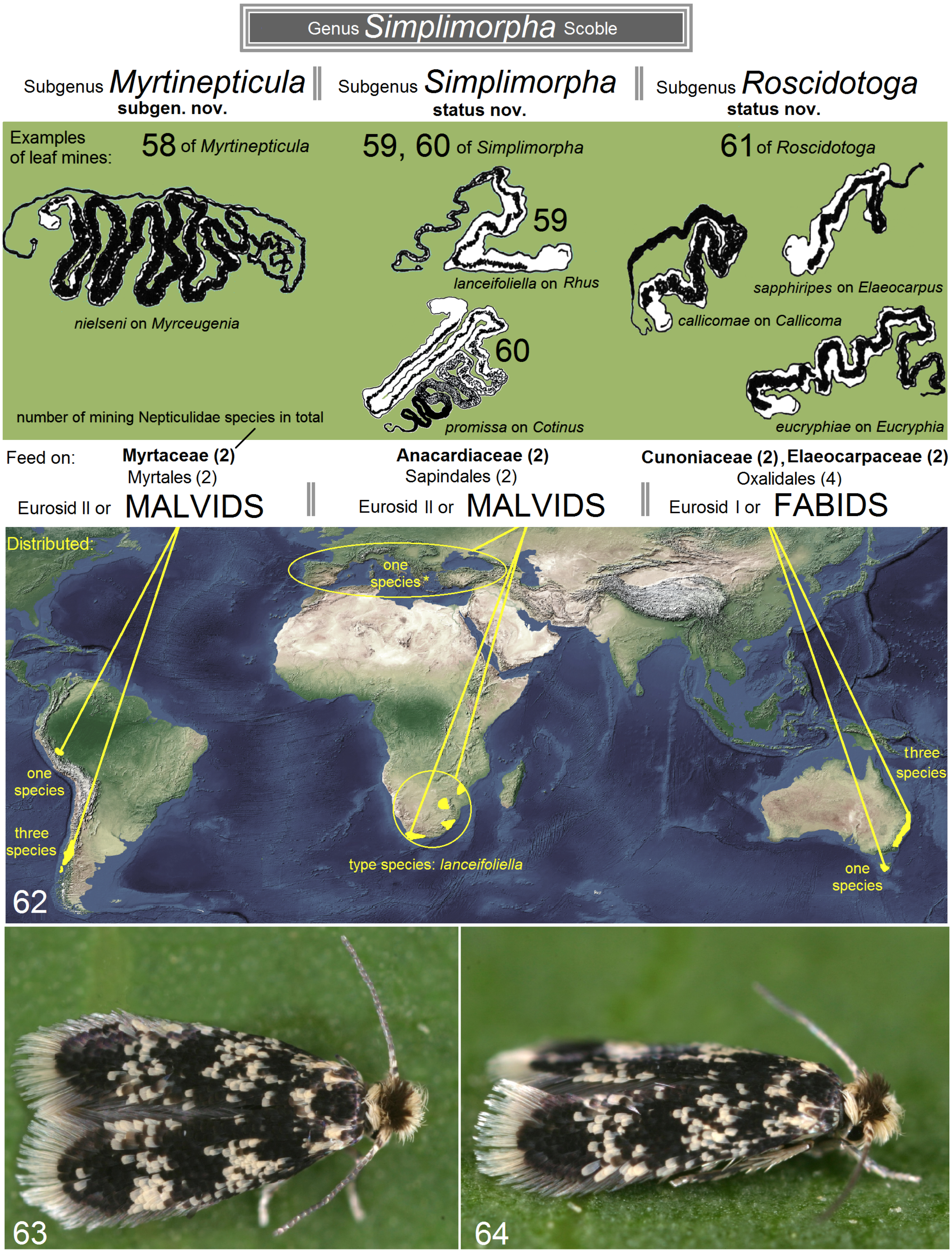
←

FIGURES 1–49. Details of genitalia morphology of *Simplimorpha* Scoble, 1983 (*sensu lato*). 1–6, tegumen: 1, *S. promissa* (modified after van Nieukerken 1986); 2, *S. lanceifoliella* (modified after Vári 1955); 3, *S. callicomae* (modified after Hoare 2000); 4, *S. eucryphiae* (modified after Hoare 2000); 5, *S. cercaria*, Osorno, Chile, slide AD707; 6, *S. kailai*, Satipo, Peru, slide AD935; 7–12, tegumen and vinculum: 7, *S. promissa* (modified after van Nieukerken 1986); 8, *S. lanceifoliella* (modified after Vári 1955); 9, *S. eucryphiae* (modified after Hoare 2000); 10, *S. sapphiripes* (modified after Hoare 2000); 11, *S. kailai*, Satipo, Peru, slide AD935; 12, *S. cercaria*, Osorno, Chile, slide AD707; 13–19, valva: 13, *S. promissa* (modified after van Nieukerken 1986); 14, *S. lanceifoliella* (modified after Vári 1955); 15, *S. callicomae* (modified after Hoare 2000); 16, *S. eucryphiae* (modified after Hoare 2000); 17, *S. sapphiripes* (modified after Hoare 2000: Fig. 19); 18, *S. kailai*, Satipo, Peru, slide AD935; 19, *S. cercaria*, Osorno, Chile, slide AD707; 20–25, transtilla: 20, *S. promissa*, the Crimea, Europe, slide AD938; 21, *S. lanceifoliella* (modified after Vári 1955); 22, *S. eucryphiae* (modified after Hoare 2000); 23, *S. sapphiripes* (modified after Hoare 2000); 24, *S. kailai*, Satipo, Peru, slide AD935; 25, *S. cercaria*, Osorno, Chile, slide AD707; 26–37, phallus and cathrema: 26, *S. promissa*, the Crimea, Europe, slide AD938; 27, 28, *S. lanceifoliella* (modified after Vári 1955); 29, *S. callicomae* (modified after Hoare 2000); 30, *S. lamingtonia* (modified after van Nieukerken *et al*. 2011); 31, *S. callicomae* (modified after Hoare 2000); 32, *S. eucryphiae* (modified after Hoare 2000); 33, *S. sapphiripes* (modified after Hoare 2000); 34, *S. cercaria*, Osorno, Chile, slide AD707; 35, *S. nielseni*, Lago Lacar, Argentina, slide RA621; 36, 37, *S. kailai*, Satipo, Peru, slide AD935; 38–49, details of female genitalia: 38, 39, *S. promissa* (modified after Laštůvka & Laštůvka 1997); 40, *S. lanceifoliella* (modified after Vári 1955); 41, *S. callicomae* (modified after Hoare 2000); 42, *S. sapphiripes* (modified after Hoare 2000); 43, *S. callicomae* (modified after Hoare 2000); 44, *S. eucryphiae* (modified after Hoare 2000); 45, 46, *S. cercaria*, Osorno, Chile, slide AD709; 47, *S. sapphirella*, Cauquenes, Chile, slide RA594; 48, *S. nielseni*, Hua-Hum, Argentina, slide RA619; 49, *S. cercaria*, Osorno, Chile, slide AD709.

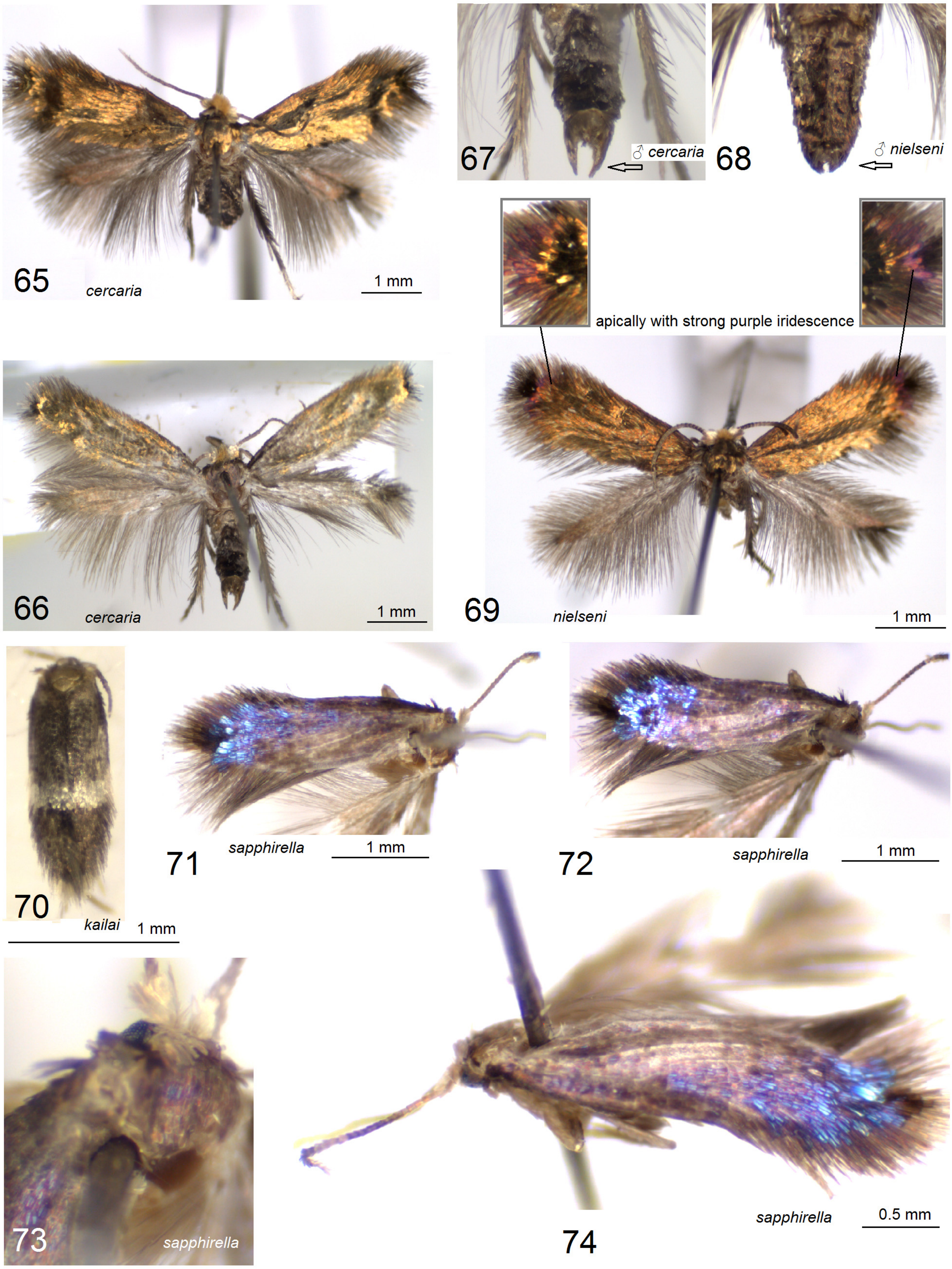
(1) weakly chitinized uncus is preserved in *S. nielseni*, see further for Figs. 97–99

* Character states hypothesized as apomorphic indicated by an asterisk

Note: the morphological structures are drawn in different scales



FIGURES 58–64. *Simplimorpha* Scoble, 1983 (*sensu lato*). 58–61, examples of leaf mines: 58, *S. nielseni*, Hua-Hum, Argentina, ZMUC; 59, *S. lanceifoliella* (modified after Vári 1955); 60, *S. promissa*, Crimea, Europe, LEU; 61, *S. sapphiripes*, *S. callicomae* and *S. eucryphiae* (modified after Hoare 2000); 62, distribution map; 63, 64, adult of *S. promissa* (Staudinger, 1870), currently the only *Simplimorpha* species known from the Northern Hemisphere (courtesy of Peter Buchner, Schwarzau am Steinfeld, Austria). Note: the plant taxa names follow APG IV (2016) and Stevens (2017)
* approximate, without details, distribution area of *S. promissa*



FIGURES 65–74. Adults of new *Simplimorpha* (*Myrtinepticula*) species. 65, *S. cercaria* Diškus & Stonis, sp. nov., male paratype; 66, same, other male paratype; 67, same, abdomen; 68, *S. nielseni* Remeikis & Stonis, sp. nov., male paratype, abdomen; 69, same, male holotype; 70, *S. kailai* Stonis sp. nov, male holotype; 71–74, *S. sapphirella* Remeikis & Stonis, sp. nov., female holotype (ZMUC)

(Figs. 20, 21); phallus with a juxta-like ventral process (Figs. 26, 28), and cathrema with or without spines (Fig. 27). Female genitalia: anterior apophyses slender (Figs. 38, 40, 40); ductus spermathecae with many distinctive coils (Fig. 39); corpus bursae small (Fig. 38), sometimes not preserved during slide preparation.

Larvae are leaf miners on Anacardiaceae (Sapindales, Malvids or =Eurosids II).

Currently the subgenus comprises species, occurring either in Africa or Mediterranean (Fig. 62).

Subgenus *Roscidotoga* Hoare, 2000, stat. nov.

(Figs. 3, 4, 9, 10, 15–17, 22, 23, 29–33, 41–44, 56, 57, 61, 62)

Roscidotoga Hoare, 2000: 293, 294.
Type species: *Roscidotoga callicomae* Hoare, 2000: 295, 296.

Diagnosis. From the subgenus *Simplimorpha*, *Roscidotoga* differs in the presence of triangular silver mark on the costa of forewing, three distal veins of forewing (two in *Simplimorpha*), simply shaped, triangular valva in the male genitalia (valva with a ventral lobe in *Simplimorpha*), and the broad anterior apophyses in the female genitalia (anterior apophyses slender in *Simplimorpha*). *Roscidotoga* is also distinctive because it feeds on Oxalidales (Eurosids I / Fabids) and is distributed in Australia, compared to the subgenus *Simplimorpha* that occurs in Africa and Mediterranean and feeds on Sapindales (Anacardiaceae).

From *Myrtinepticula*, s.g. *Roscidotoga* differs by the presence of three distal veins (four in *Myrtinepticula*), absence of an anal loop in the forewing (present in *Myrtinepticula*), two distal veins of the hindwing (three in *Myrtinepticula*), and the simple-shaped, generally triangular valva (in *Myrtinepticula* valva is very elaborate basally, see Figs. 18, 19). *Myrtinepticula* occurs in South America. The constituent species feed on Myrtales (i.e. Eurosids II / Malvids), while *Roscidotoga* species feed on Oxalidales (Eurosids I / Fabids). See also Discussion.

Remarks. Description was provided by Hoare 2000: 293, 294. Larvae are leaf miners (Fig. 61) of Cunoniaceae and Elaeocarpaceae (Oxalidales, Fabids or =Eurosids I). Currently the subgenus is comprised of four species, distributed in eastern Australia, including Tasmania (Hoare 2000, van Nieukerken *et al.* 2011) (Fig. 62).

Subgenus *Myrtinepticula* Stonis & Diškus, subgen. nov.

(Figs. 5, 6, 11, 12, 18, 19, 24, 25, 34–37, 45–51, 58, 62, 65–129)

Type species: *Simplimorpha* (*Myrtinepticula*) *cercaria* Diškus & Stonis, **sp. nov.**

Diagnosis. From the subgenus *Simplimorpha*, s.g. *Myrtinepticula* differs by its usually strong purple or blue iridescence of adult scaling, the presence of four distal veins (two in *Simplimorpha*), the presence of semi-developed anal loop of the forewing (absent in *Simplimorpha*), three distal veins of hindwing (two in *Simplimorpha*), very elaborate basal part of the valva, the absence of transverse bar of transtilla with some exceptions (always present in *Simplimorpha*), slender phallus, greatly reduced corpus bursae, and the very wide anterior apophyses (slender in *Simplimorpha*). The feeding habit on Myrtaceae and its distribution in South America also make this new subgenus distinct compared to the subgenus *Simplimorpha* occurring in Africa and the Mediterranean and feeding on Anacardiaceae.

From subgenus *Roscidotoga*, *Myrtinepticula* differs by the presence of four distal veins (two in *Roscidotoga*), the presence of semi-developed anal loop of the forewing (absent in *Roscidotoga*), three distal veins of hindwing (two in *Roscidotoga*), very elaborate basal part of valva (see Figs. 18, 19), and the usual absence of transverse bar of transtilla (usually present in *Roscidotoga*). The host plants from Myrtales (i.e. Eurosids II / Malvids) and the distribution in South America also make new subgenus distinctive compared to the subgenus *Roscidotoga* that occurs in Australia and feeds Oxalidales (i.e. Eurosids I / Fabids).

Description. Adults with a collar comprised of piliform or lamellar scales. Head (Figs. 88–90) with a three-segmented labial palpus and five-segmented maxillary palpus. Forewing varying, from shiny without fascia (Figs. 65, 66, 69, 74) to dark with one shiny fascia (Fig. 70). Hindleg (Figs. 91, 92) with two pairs of spurs. Forewing venation with four terminal (apical) veins and half-presented/half-reduced anal loop (Figs. 50, 93, 94); hindwing venation with three terminal veins (Figs. 51, 95). Male genitalia: tegumen truncate or broadly rounded, setose

(Figs. 5, 6); vinculum large, usually rounded or truncate (Fig. 12), sometimes with large lateral lobes (Fig. 11); valva slender, with a variously developed, elaborate basal part (Figs. 18, 19). Transtilla with a very weak, half-membranous transverse bar (Fig. 24) or, usually, entirely without such (Fig. 25). Female genitalia: anterior apophyses very broad (Figs. 46–49); ductus spermathecae usually with many distinctive coils (Figs. 45, 47); corpus bursae greatly reduced (Figs. 46, 47), sometimes not preserved during slide preparations.

So far as known, larvae are leaf miners on Myrtaceae, Myrtales, Malvids (=Eurosids II) and produce a very long, contorted, linear leaf mine (Figs. 58, 109–116), with most of the gallery filled with frass. Cocoon round, with a broad, flat rim (Fig. 117).

Currently the genus comprises four species, all of which occur in South America: three species from Patagonian Andes and one from the Peruvian Amazon (Fig. 62).

Etymology. The subgenus name is derived from the plant family Myrtaceae combined with *Nepticula* (synonymous name for the genus *Stigmella*) in reference to the feeding on Myrtaceae.

***Simplimorpha* (*Myrtinepticula*) *cercaria* Diškus & Stonis, sp. nov.**
(Figs. 65–67, 75–86)

Type material. Holotype: ♂, CHILE, Osorno, Parque Nacional Puyehue, Aguas Calientes, 450 m, 13.xi.1981, leg. E. S. Nielsen & O. Karsholt, genitalia slide no. AD707♂ (ZMUC). Paratypes (10 ♂, 14 ♀): 3 ♂, 2 ♀, same label data as holotype, genitalia slide no. Diškus 192 ♂ (ZMUC); 5 ♂, 11 ♀, same locality as holotype, 12.xii.1981, collected around *Myrceugenella apiculata*, leg. E. S. Nielsen & O. Karsholt, genitalia slide nos AD709♀, AD720♀ (ZMUC); 1 ♂, same locality, 600 m, 3 km W Aguas Calientes, 12–20.xii.1981, leg. D. R. Davis, genitalia slide nos AD706♂ (wing venation), AD726♂ (capsule with phallus missing) (USNM); 1 ♂, Chiloe Id., Hueque Trumao, 22 km N Quellon, 50 m, 26–27.xii.1981, leg. D. R. Davis (USNM); 1 ♀, ARGENTINA, Neuquén, Lago Lacar, 5 km E of Hua-Hum, 26–27.xii.1981, E. S. Nielsen & O. Karsholt (ZMUC).

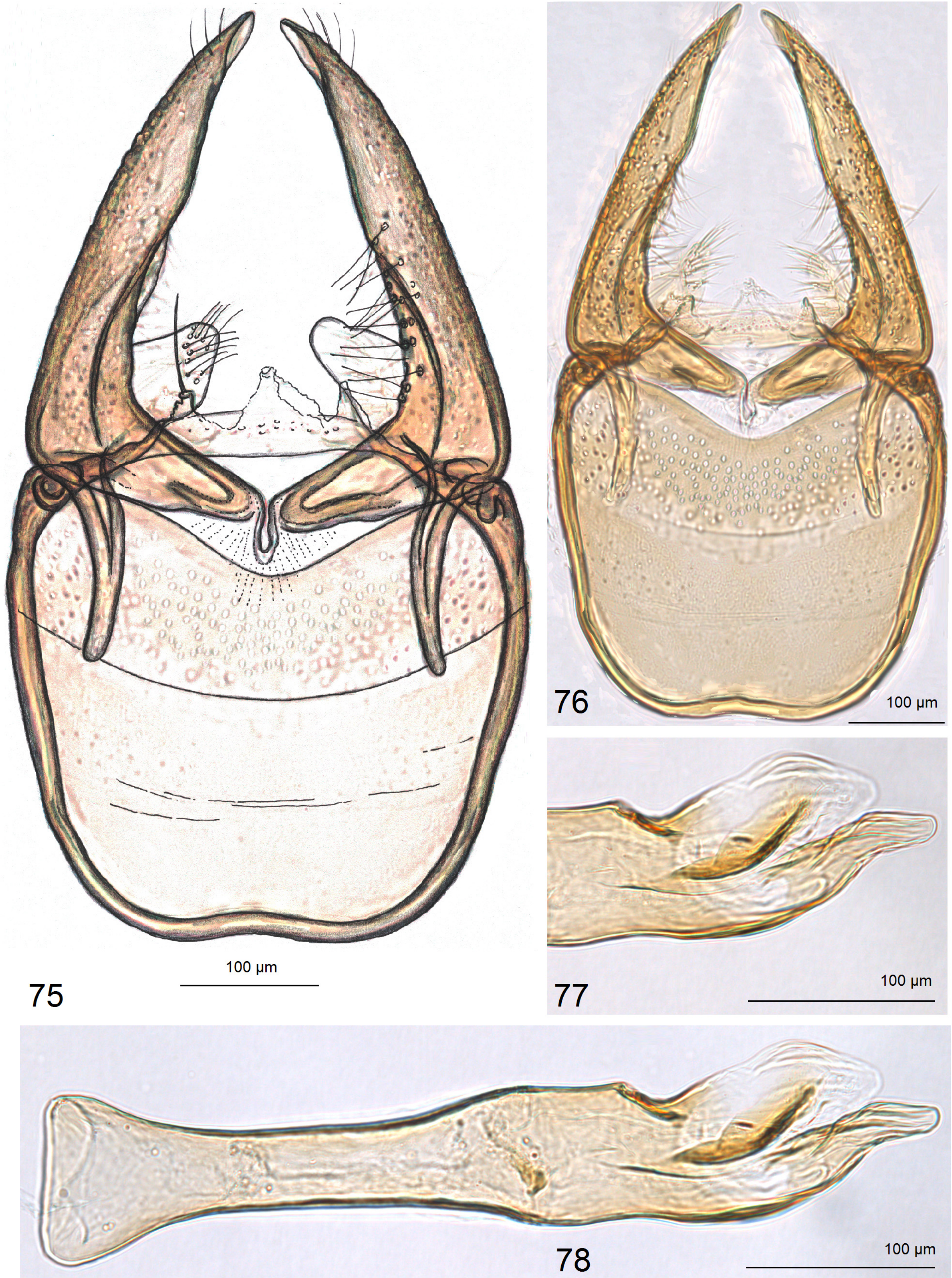
Diagnosis. Externally, adults resemble *M. nielseni* sp. nov. However, purple iridescence is significantly weaker (mostly only along costa in the basal half of forewing, only seldom wider) or absent (in *S. nielseni* the purple iridescence usually is very strong, particularly on forewing apex). Males of *S. cercaria* are also recognizable by the anal end of abdomen: large, claw-like genital segments (which are valvae emerging from the abdomen) which can instantly identify the species (Fig. 67). In male genitalia, the combination of the very large, distally broadly rounded vinculum, very long slender valva with inner lobe, and the specific shape of phallus (see Fig. 78) distinguishes the species from all other Nepticulidae.

Male (Figs. 65–67). Forewing length 3.4–3.7 mm; wingspan 7.6–8.2 mm. Head: palpi yellowish cream to pale brown; frontal tuft orange to yellowish orange; collar large, comprised of lamellar scales, which are golden coppery to pale grey-brown with some golden gloss; scape golden cream to cream, posteriorly sometimes shadowed with brown or pale grey scales; antenna half the length of forewing or slightly longer; flagellum with 29 segments, brown-grey with golden gloss to very pale brown on upper side and underside. Thorax, tegula and forewing golden coppery, shiny; basal half of forewing with light to strong purple iridescence along costal margin; occasionally weak purple iridescence covers broader areas; no fascia; fringe grey-brown; underside of forewing fuscous brown, with a weak purple iridescence, sometimes with pale, elongate basal spots; no androconia. Hindwing grey-brown with some purple iridescence on upper side, fuscous brown with or without purple iridescence on underside; no androconia; fringe grey-brown without purple iridescence. Legs dark brown to grey-brown on upper side, distally, mainly tarsi, orange-cream to cream; on underside, legs mostly whitish cream. Abdomen dark brown to fuscous on upper side, grey-brown on underside; anal tufts short, dark grey; genital plates glossy grey to brownish cream, very distinct.

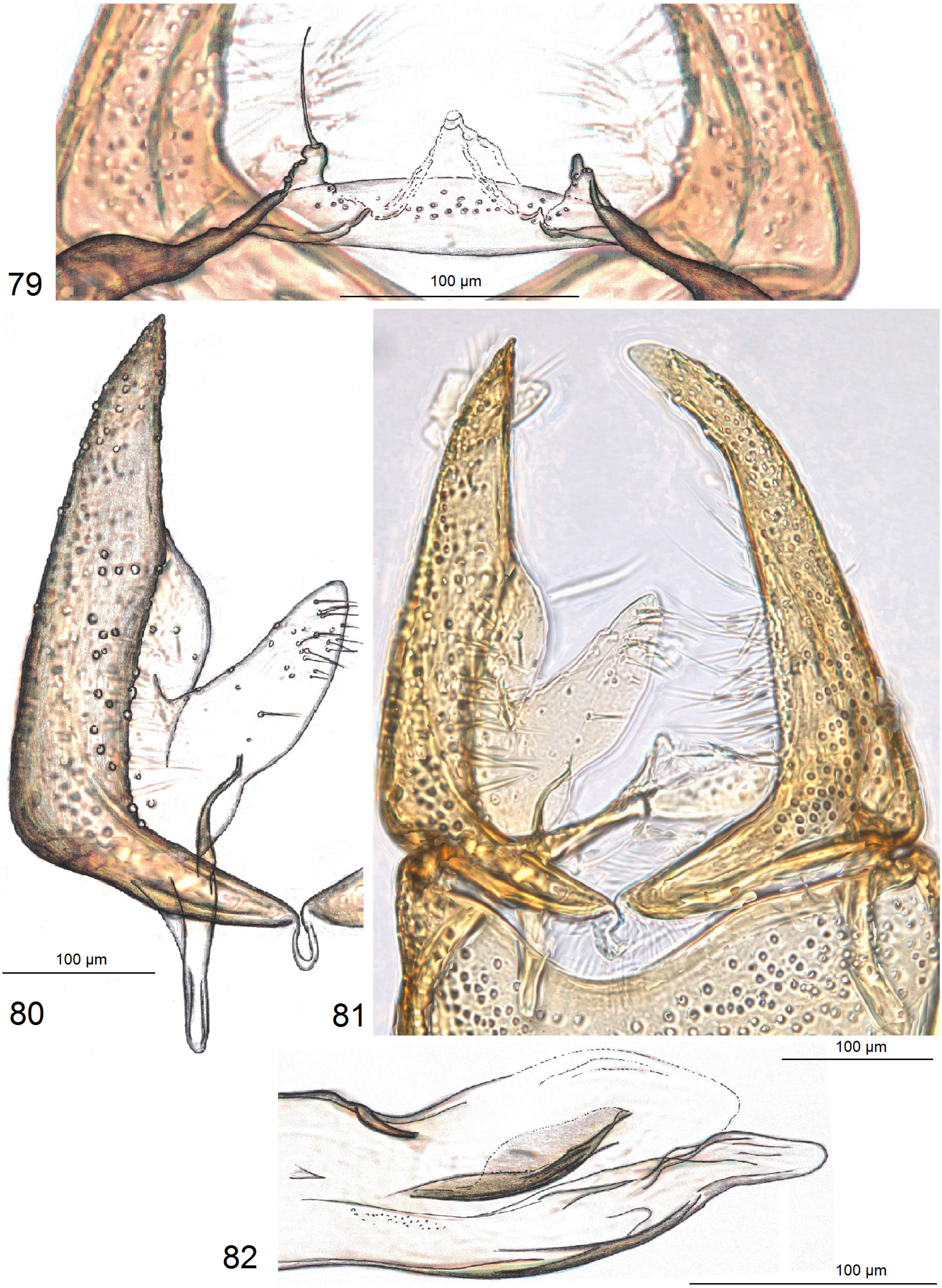
Female. Very similar to male. Flagellum with about 25–26 segments. Abdomen distally ochre-brown on underside, only proximally greyish white. Apex of abdomen broadly rounded (Fig. 86). Otherwise as male.

Male genitalia (Figs. 75–82). Capsule longer (450–560 µm) than broad (405–410 µm). Vinculum very large, without lateral lobes; ventral plate of vinculum broadly rounded, almost truncate. Uncus reduced, tegumen with weakly developed, short, asymmetrical lateral lobes (Fig. 79). Gnathos absent. Valva (Figs. 75, 80) slender and very long (405–410 µm), strongly broadned and thickened at the base, with a large basal process and large dorsal lobe (Figs. 80, 81) that functionally may be replacing the transtilla which is absent. Phallus (Figs. 77, 78, 82) 465–

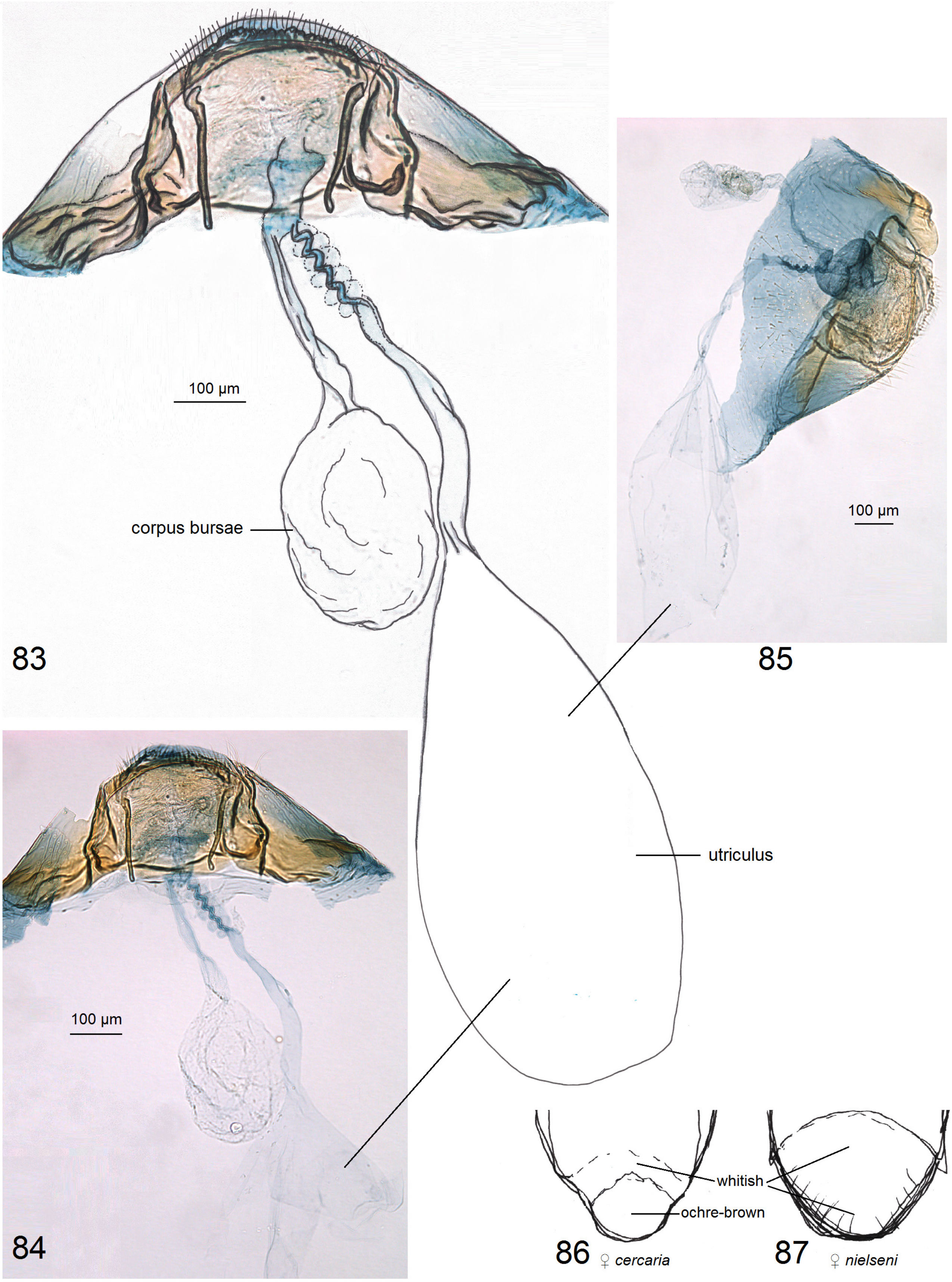
470 µm long; minimal width 40 µm, maximal width 70 µm; at base broadened, angular, tube of phallus thickened; vesica with a cathrema and thickened cornutus-like fold (Figs. 78, 82). Manica absent.



FIGURES 75–78. Male genitalia of *Simplimorpha* (*Myrtinepticula*) *cercaria* Diškus & Stonis, sp. nov., holotype, genitalia slide AD707 (ZMUC). 75, 76, capsule with phallus removed; 77, 78, phallus.



FIGURES 79–82. Male genitalia of *Simplimorpha* (*Myrtinepticula*) *cercaria* Diškus & Stonis, sp. nov. 79, tegumen, holotype, genitalia slide AD707; 80, 81, valva, paratype, genitalia slide AD726; 82, apical part of phallus, holotype, genitalia slide AD707 (ZMUC)



FIGURES 83–86. Female genitalia of *Simplimorpha* (*Myrtinepticula*) *cercaria* Diškus & Stonis, sp. nov. 83, 84, paratype, genitalia slide AD709; 85, same, genitalia slide AD720; 86, female abdomen apex, *cercaria* Diškus & Stonis, sp. nov. ; **87,** same, *nielseni* Remeikis & Stonis, sp. nov. (ZMUC).

Female genitalia (Figs. 83–85). Total length 1285–1500 µm. Anterior apophyses as a complex of thickened rods and lobes fused with thickened abdominal segments; posterior apophyses simple, rod-like, about 145–170 µm long, slender. Vestibulum slender, without sclerites. Corpus bursae small (reduced), without pectinations or signa, rounded. Accessory sac absent; ductus spermathecae with 4.5–5 convolutions, extended into very large (300–700 µm long, 215–290 µm broad) utriculus; spines or pectinations absent. Apex of abdomen very broadly rounded.

Bionomics. Some adult specimens were collected around the Chilean myrtle *Luma apiculata* (DC.) Burret (previously also known as *Eugenia apiculata* DC., *Myrceugenia apiculata* (DC.) Niedenzu, or *Myrceugenella apiculata* (DC.) Kausel.)(Myrtaceae) which is expected to be the host-plant of this species. *Luma apiculata* is native to the southern Andes between Chile and Argentina, at 33 to 45° S. However, no reared material or leaf-mines on *Luma* (=*Myrceugenella*) are known. Adults fly mostly in November–December; one specimen was also collected in early January. Otherwise the biology is unknown.

Distribution. This species occurs in the southern Andes (central Chile and eastern Argentina) at altitudes ca. 50–600 m.

Etymology. The species name is derived from the Latin *cercarius* (tailed) in reference to the claw-like valvae of the male genitalia, distinctly visible in non-dissected specimens.

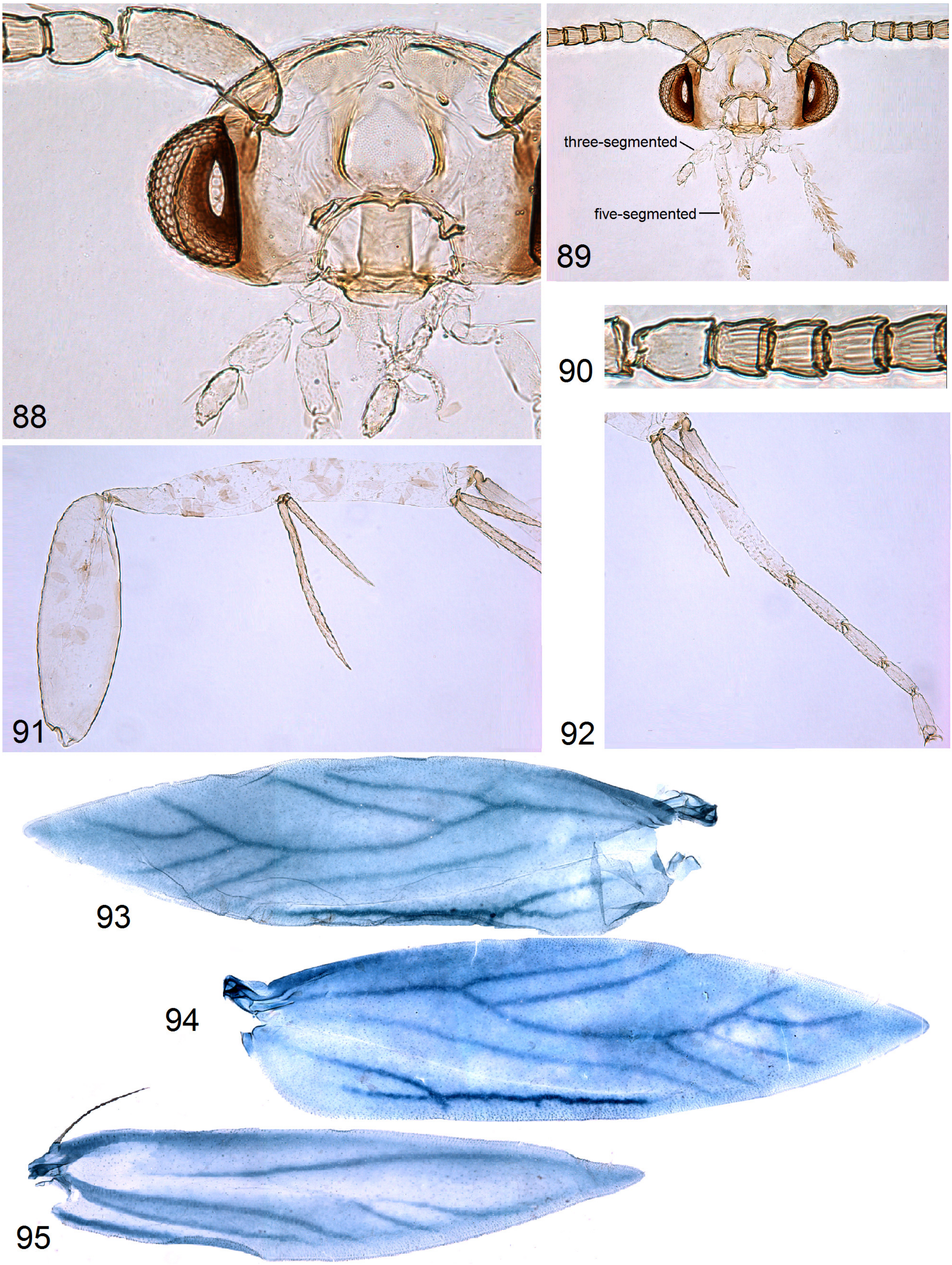
Simplimorpha **(*Myrtinepticula*)** ***nielseni*** **Remeikis & Stonis, sp. nov.**

(Figs. 35, 68, 69, 87–117)

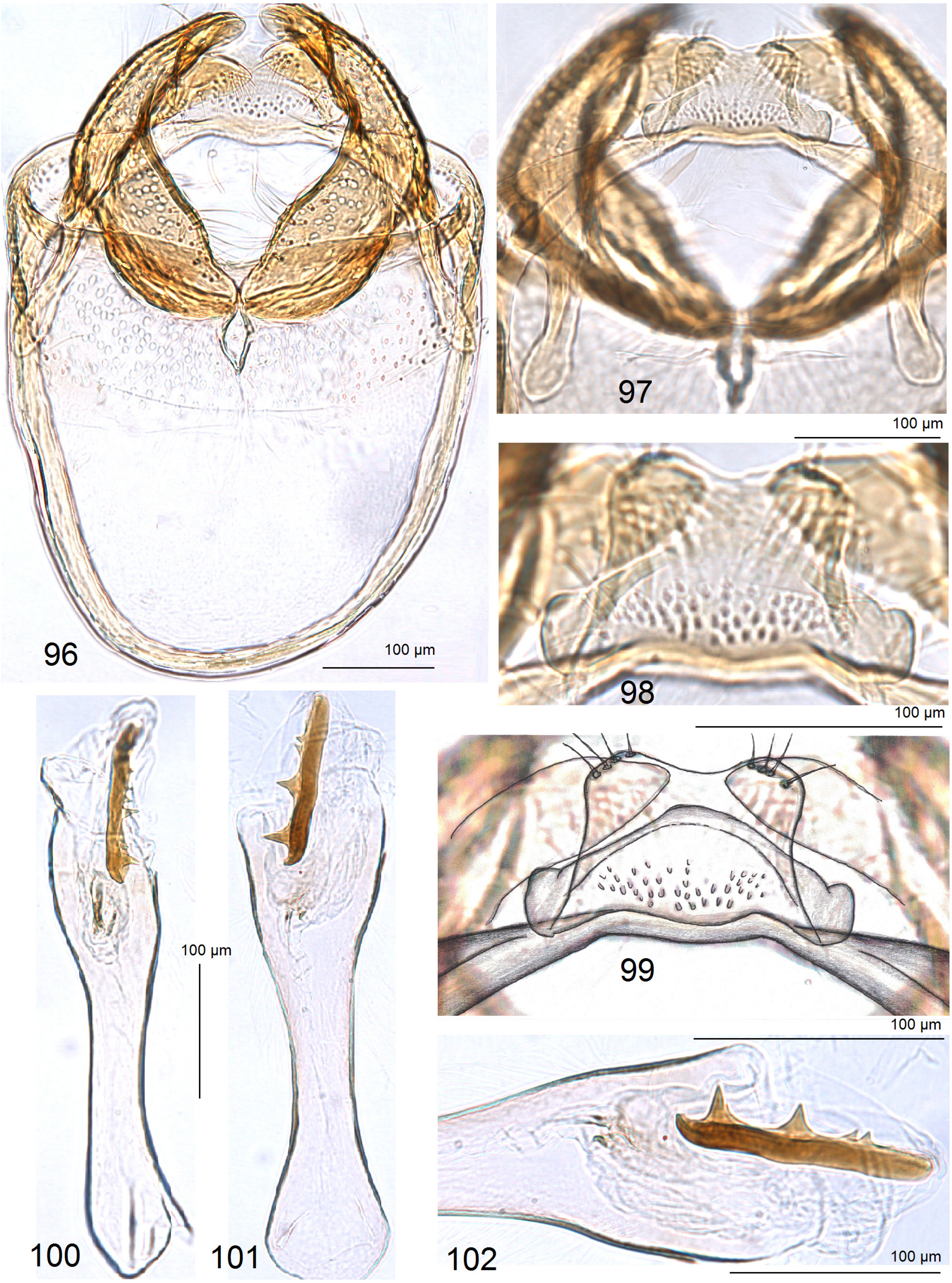
Type material. Holotype: ♂, ARGENTINA, Neuquén, Lago Lacar, Pucará, collected around mined *Myrceugenia planipes*, elevation ca. 650 m, 26–27.xii.1981, E. S. Nielsen & O. Karsholt, genitalia slide no. RA620♂ (ZMUC). Paratypes (26 ♂, 6 ♀): 17 ♂, 2 ♀, same label data, collected around mined *Myrceugenia planipes*, E. S. Nielsen & O. Karsholt, slide nos Diškus191♂, RA622♂, AD708♀, slide RA621♂ (genitalia, head, wing venation, hindleg), O.Karsholt4270♂ (ZMUC); 1 ♂, Pucará, elevation ca. 750 m, 26.xii.1978, *Mision Cientifica Danesa* (ZMUC); 2 ♀, 5 km E Hua-Hum, larvae on *Myrceugenia planipes*, elevation ca. 640 m, 8.x.1981, E. S. Nielsen & O. Karsholt, genitalia slide nos RA618♀, RA619♀ (ZMUC); 1 ♂, Chubut, El Bolson, Lago Puelo, elevation ca. 220 m, 21.xi.1978, *Mision Cientifica Danesa* (ZMUC); 3 ♂, 1 ♀, CHILE: Osorno, Anticura, Puyehue, 1–5.i.1986 m, L. E. Pena G. (USNM); 1 ♀, Osorno, Parque Nacional Puyehue, Aguas Calientes, larvae on *Myrceugenia planipes,* elevation ca. 450 m, 26.ix.1981, E. S. Nielsen & O. Karsholt (ZMUC); 1 ♂, 3 km W Aguas Calientes, elevation ca. 600 m, 12–20.xii.1981, D. R. Davis (USNM); 2 ♂, Chiloe Id., Hueque Trumao, 22 km N. Quellon, elevation ca. 50 m, 26–27.xii.1981, D. R. Davis, genitalia slide no. RA623♂ (USNM); 1 ♂, Temuco Province, Fundo Chacamo, 35 km NW Nueva Imperial, elevation ca. 600 m, 5–8.xii.1981, D. R. Davis (USNM). Leaf mines: a set (collection) of mined leaves of *Myrceugenia planipes*, sample no. K27, ARGENTINA, 5 km E Hua-Hum, 8.x.1981, E. S. Nielsen & O. Karsholt (ZMUC).

Diagnosis. Externally, adults of the new species resemble another congeneric species, *S. cercaria.* However, purple iridescence is significantly stronger (not only along the forewing costa but particularly on the forewing apex). Male of *S. nielseni* is also distinguishable from male of *S. cercaria* because the latter possesses claw-like genital segments (ie. the valvae emerging from the abdomen) while in *S. nielseni* they look shorter (Fig. 68). In the male genitalia, the combination of the very large, distally broadly rounded vinculum, strongly curved valva with dorsal lobe, and the specific shape of the phallus with prominent spines on the cornutus distinguishes the species from all other Nepticulidae.

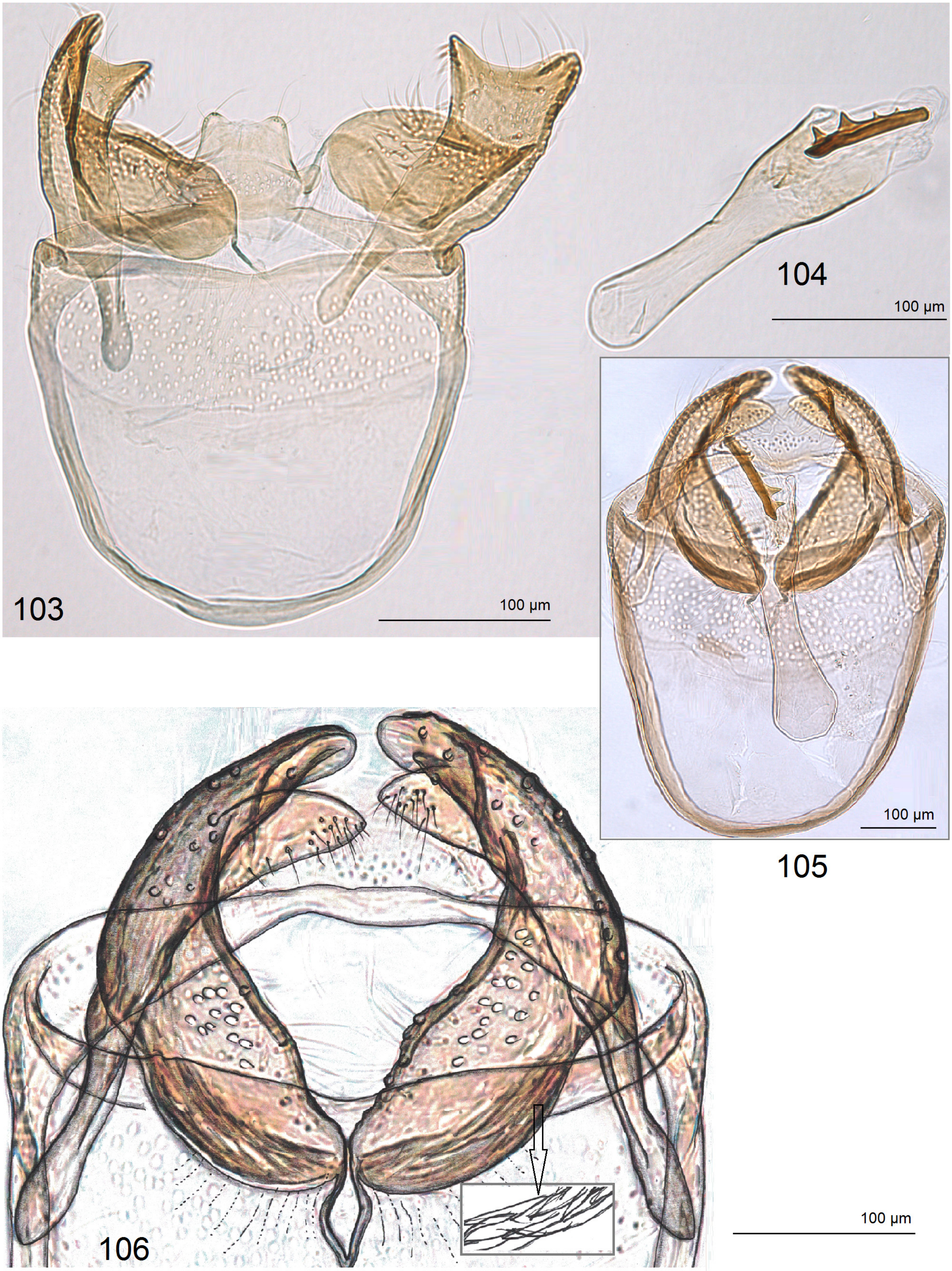
Male (Figs. 68, 69). Forewing length 3.0–3.4 mm; wingspan 6.6–7.2 mm. Head (Figs. 88–90): palpi yellowish cream to pale brown; frontal tuft orange to yellowish orange; collar large, comprised of lamellar scales, which are pale grey-brown with some golden gloss to golden coppery; scape golden cream to cream, sometimes posteriorly shadowed with brown or pale grey scales; antenna half the length of forewing or slightly longer; flagellum with 28–30 segments, brown-grey with golden gloss on upper and underside or fuscous on upper side but grey cream basally on underside. Thorax, tegula and forewing golden coppery, shiny; at apical part, also sometimes over other areas of forewing, with strong to very strong purple iridescence; no fascia; fringe grey-brown; underside of forewing fuscous brown, with weak purple iridescence, sometimes with pale, elongated spots at the base of forewing; no androconia; forewing venation with incomplete anal loop, with four distal veins (Figs. 93, 94). Hindwing grey-brown with some purple iridescence on upper side, fuscous brown, with or without purple



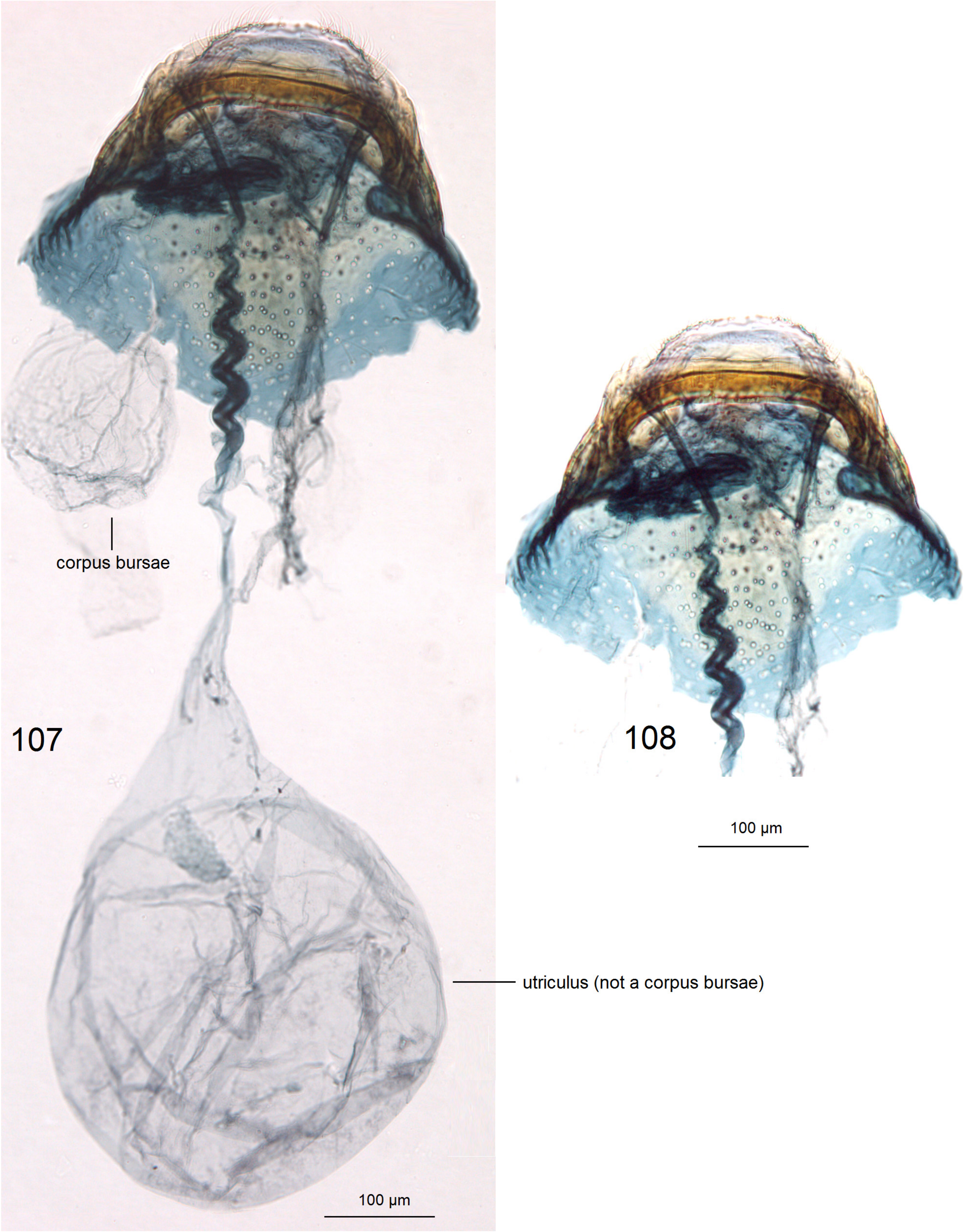
FIGURES 88–95. Details of morphology of *Simplimorpha* (*Myrtinepticula*) *nielseni* Remeikis & Stonis, sp. nov., slide RA621 (ZMUC). 88, 89, descaled head; 90, fragment of flagellum; 91, 92, hindleg; 93, forewing venation; 94, same, right wing; 95, hindwing venation.



FIGURES 96–102. Male genitalia of *Simplimorpha* (*Myrtinepticula*) *nielseni* Remeikis & Stonis, sp. nov. 96, capsule with phallus removed, holotype, genitalia slide RA620; 97–99, uncus (partially reduced), paratype, slide RA621; 100, phallus, holotype, genitalia slide RA620; 101, 102, same, paratype, genitalia slide RA621 (ZMUC)



FIGURES 103–106. Male genitalia of *Simplimorpha* (*Myrtinepticula*) *nielseni* Remeikis & Stonis, sp. nov. 103, capsule with phallus removed, paratype, genitalia slide O.Karsholt4270; 104, same, phallus; 105, general view of male genitalia, paratype, slide RA622; 106, valvae, holotype, genitalia slide RA620 (ZMUC)

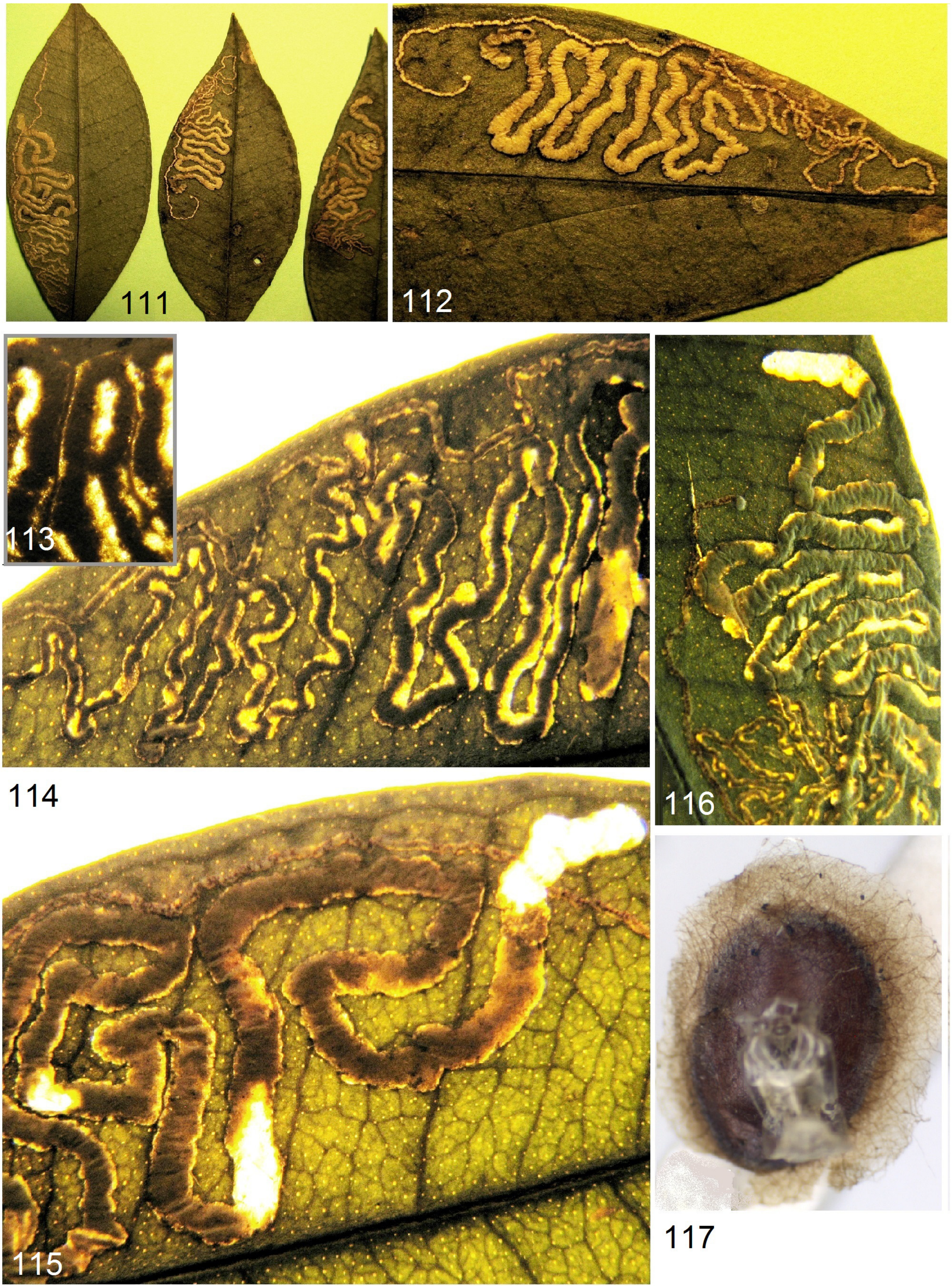


FIGURES 107, 108. Female genitalia of *Simplimorpha* (*Myrtinepticula*) *nielseni* Remeikis & Stonis, sp. nov. 107, general view, paratype, slide RA619; 108, same, apophyses and coils of ductus spermathecae (ZMUC)

109

110

FIGURES 109, 110. Leaf mines of *Simplimorpha* (*Myrtinepticula*) *nielseni* Remeikis & Stonis, sp. nov. on *Myrceugenia planipes* (Hook. & Arn.) O.Berg (Myrtaceae), Argentina, Neuquén, Lago Lacar, Pucará (ZMUC)



FIGURES 111–117. Bionomics of *Simplimorpha* (*Myrtinepticula*) *nielseni* Remeikis & Stonis, sp. nov. 111–116, leaf mines on *Myrceugenia planipes* (Hook. & Arn.) O.Berg (Myrtaceae), Argentina, Neuquén, Lago Lacar, Pucará; 117, coccon (ZMUC).

iridescence on underside; no androconia; fringe grey-brown, without purple iridescence; hindwing venation with three distal veins (Fig. 95). Legs (Figs. 91, 92) dark brown to grey-brown on upper side, distally (mainly tarsi) orange-cream to cream. Abdomen dark brown to fuscous with purle iridescence on upper side, grey-brown golden glossy on underside; anal tufts very short, dark grey; genital plates glossy grey to brownish cream, very distinct.

Female. Very similar to male but antenna, hindwing, legs, and abdomen may be slightly paler. Flagellum with 24–26 segments. Forewing usually with strong purple iridescence apically, only occassionally forewing with very weak purple iridescence. Abdominal tip broadly trapezoid (Fig. 87), greyish white on underside. Otherwise as male.

Male genitalia (Figs. 96–106). Capsule longer (570–575 µm) than broad (420–425 µm). Vinculum very large, without lateral lobes; ventral plate of vinculum broadly rounded. Uncus weakly thickened, sometimes hardly visible in genitalia slides; ventral element trapezoid, with a caudal excavation and few sublateral setae, dorsal element triangular with lateral lobes (Figs. 97–99). Gnathos absent. Valva (Figs. 103, 106) 265–280 µm long, strongly curved inwardly, maximal width 85–95 µm, strongly thickened basally, with large basal process and large dorsal lobe (Fig. 106); transverse bar of transtilla absent. Phallus (Figs. 35, 100–102, 104) 455–460 µm long; minimal width 40 µm, maximal width 85 µm; at base rhomboid (angular), chitinization of phallus tube strong; vesica with a cathrema and single cornutus possessing four spines (Figs. 35, 102). Manica absent.

Female genitalia (Figs. 107, 108). Total length about 1180 µm. Anterior apophyses as a complex of thickened rods fused with abdominal segments and strongly thickened caudal belt; posterior apophyses simple, about 150–155 µm long, slender. Vestibulum slender, without sclerites. Corpus bursae small (reduced), without pectinations or signa, rounded. Accessory sac absent; ductus spermathecae with 5–5.5 convolutions, extended into a large (455–460 µm long, 410 µm broad) utriculus; spines or pectinations absent. Apex of abdomen blunt, broadly rounded or almost truncate.

Bionomics. Host plant: *Myrceugenia planipes* (Hook. & Arn.) O. Berg (Myrtaceae). Some specimens of the type series were collected around or reared from leaf mines on the Patagua de Valdivia (*Myrceugenia planipes*), an evergreen plant growing in Chile and Argentina from 37 to 45° S. Egg white or cream white, occasionally grey, glossy, distinctly oval-shaped, usually on upper side, occasionally on underside of the leaf. Larvae mine in October. Mine (Figs. 109–116) as a long, slender, gradually broadening and very contorted gallery with brown-black or black frass filling most of the gallery width (Figs. 113, 115). Color of larva unknown. Larval exit slit on underside of the leaf. Cocoon purplish brown but with a pale beige-brown flattened rim (Fig. 117); length 4 mm (3 mm without the flattened rim), maximal width 3 mm (2 mm without the flattened rim). Adults fly October–December.

Distribution. This species occurs in the southern Andes (mountainous western Argentina and central Chile) at altitudes of about 200–750 m.

Etymology. This peculiar new species of leaf miner is named after Ebbe Schmidt Nielsen (1950–2001), a great Danish entomologist, influential in systematics and Lepidoptera research, an early proponent of biodiversity informatics, and who, together with Ole Karsholt, collected most of the type series.

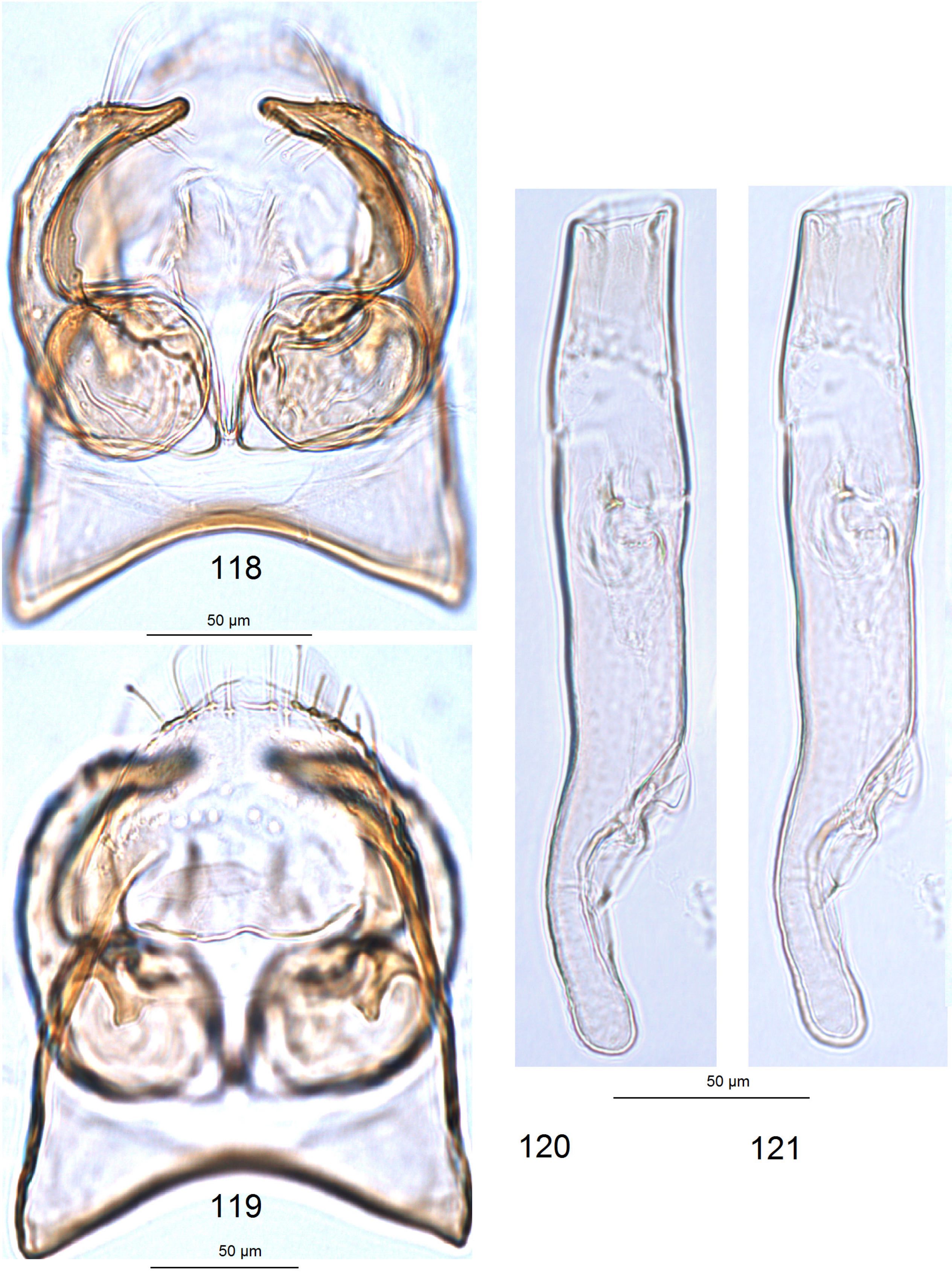
Simplimorpha **(*Myrtinepticula*)** ***kailai*** **Stonis & Diškus, sp. nov.**

(Figs. 36, 70, 118–125)

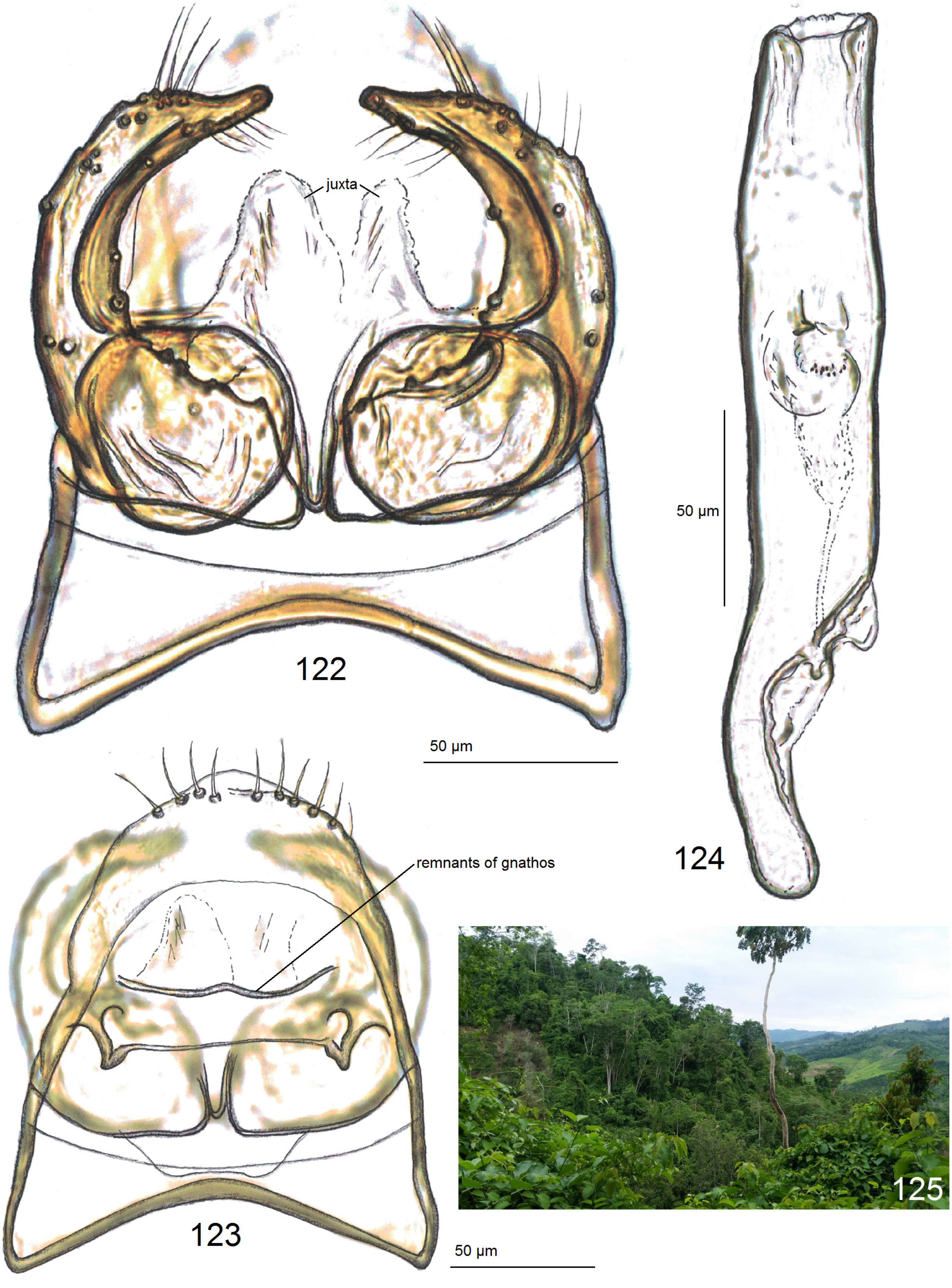
Type material. Holotype: ♂, PERU, Junín Region, 1 km E of Satipo, Satipo Hill, 11°15' 30' ' S, 74°37' 56' ' W, elevation about 750 m, at light, 20.xi.2017, J. R. Stonis, genitalia slide no. AD935 (ZMUC).

Diagnosis. *S.* (*M.*) *kailai* **sp. nov.** is distinctive, extremely small and easily recognizable species. The combination of a dark forewing with one silvery white fascia, basally rounded valva, short vinculum with large triangular lateral lobes, and a slender phallus possessing no cornuti in the male genitalia distinguishes *S.* (*M.*) *kailai* **sp. nov.** from all Nepticulidae including the congeneric species.

Male (Fig. 70). Forewing length about 1.3 mm; wingspan about 3.0 mm. Head: palpi cream; face brownish cream, smooth-scaled, glossy; frontal tuft cream; scape large, glossy cream; antenna half the length of forewing; flagellum with about 17 segments, cream on underside, annulated with dark brown scales on upper side, except for cream base. Thorax and tegula blackish brown. Forewing coarsely speckled with blackish brown scales, with silvery white fascia, and purple iridescence: weak on basal half before fascia, strong on apical part, beyond fascia (therefore the apical area of forewing appears darker); fringe grey, distally cream; underside of forewing dark grey-brown, without spots. Hindwing grey to dark grey (depending from angle of view) on upper side and underside,



FIGURES 118–121. Male genitalia of *Simplimorpha* (*Myrtinepticula*) *kailai* Stonis, sp. nov., holotype, genitalia slide AD935 (ZMUC). 118, capsule with phallus removed, ventral view; 119, same, dorsal view; 120, 121, phallus



FIGURES 122–125. *Simplimorpha* (*Myrtinepticula*) *kailai* Stonis, sp. nov. 122, male genitalia, slide AD935, ventral view of capsule; 123, same, dorsal view of capsule; 124, same, phallus; 125, habitat, disturbed tropical premontane forest (south western Amazonian selva), elevation ca. 700 m, Peru, Junín Region, Satipo.

without spots; fringe dark grey. Legs brownish cream with some grey to blackish brown scales on forelegs upper side. Abdomen fuscous on upper side, with numerous cream scales on underside; genital plates large, brownish cream; anal tufts indistinct, brownish cream.

Female. Unknown.

Male genitalia (Figs. 6, 118–124). Capsule 190–195 µm long, 140–150 µm broad. Tegumen with many setae distally (Figs. 6, 119, 123). Uncus absent. Gnathos almost completely reduced, with a slender, rod-like rudiment left (Figs. 119, 123). Valva 110 µm long, with a slender, curved apical part, and 50 µm long, rounded and elaborated (see Figs. 118, 122) basal part; transtilla with very thin and weakly chitinized, almost membranous transverse bar and tiny, triangularly-shaped sublateral processes (Figs. 119, 123). Juxta membranous. Ventral plate of vinculum very short, with very large, triangular lateral lobes. Phallus (Figs. 120, 121, 124) 220 µm long, 25–35 µm broad (15 µm at base); vesica without cornuti.

Bionomics. Adults fly in November. Otherwise biology unknown.

Distribution. This species occurs in Peru, in the tropical premontane forest of the southwestern Amazon Basin at an elevation of about 750 m (Fig. 125).

Etymology. This peculiar new species is named in honor of Dr. Lauri Kaila, a Senior Curator at the Finnish Museum of Natural History, University of Helsinki (Finland), mostly working on Gelechioidea, and probably the greatest expert on the wing venation of microlepidoptera.

***Simplimorpha* (*Myrtinepticula*) *sapphirella* Remeikis & Stonis, sp. nov.**

(Figs. 71–74, 126–129)

Type material. Holotype: ♀, CHILE, Cauquenes, Alto Tregualemu, 500 m., 10–12.i.1988, L. E. Peña G., genitalia slide no. RA594♀ (ZMUC).

Diagnosis. The combination of a fuscous brown forewing with strong blue iridescence and unique shape of distally broadened anterior apophysis in the female genitalia (see Fig.129) distinguishes the species from all other congeneric Nepticulidae.

Male. Unknown.

Female (Figs. 71–74). Forewing length about 2.9 mm; wingspan about 6.6 mm. Head: palpi brownish cream to cream; frontal tuft brownish orange; collar large, comprised of lamellar scales, grey cream, glossy, with some purplish iridescence; scape golden cream; antenna half the length of forewing; flagellum with 28 segments, fuscous brown on upper side (except for the basal third and the tip which remain cream brown or grey cream), pale grey-brown on underside. Thorax, tegula and forewing fuscous brown with very strong blue and some purple iridescence, particularly strong on apical half; fringe dark brown, with some slender lamellar scales overlapping; underside of forewing dark brown, with strong purple iridescence, without spots. Hindwing dark grey-brown to blackish brown with little purple iridescence on upper side and underside; fringe dark grey-brown. Legs glossy, brownish cream with a few dark scales on upper side of forelegs. Abdomen fuscous grey on upper side, brownish cream on underside.

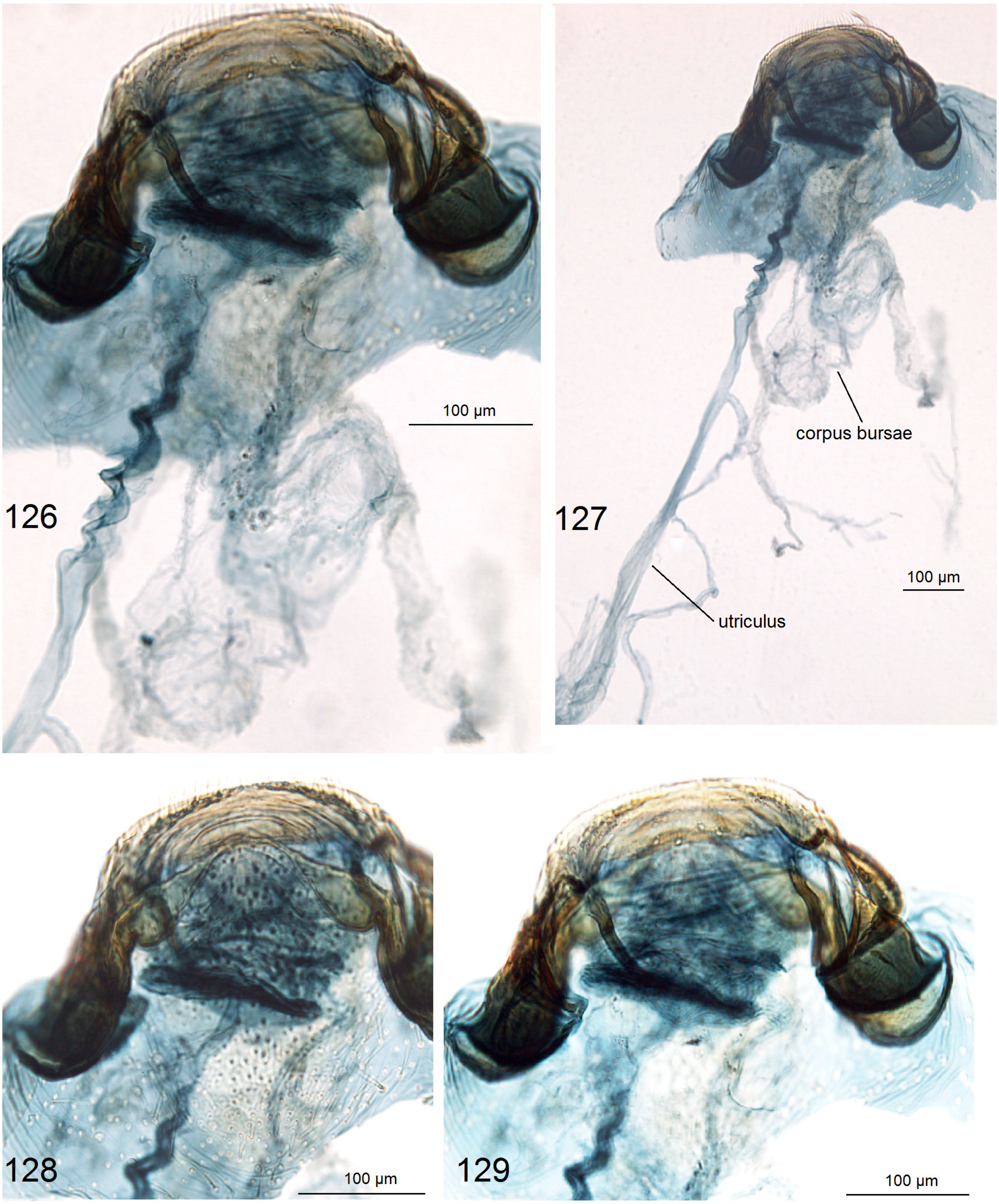
Female genitalia (Figs. 126–129). Total length about 1200 µm. Anterior apophyses very broad, rounded and broadned distally; posterior apophyses rod-like. Vestibulum slender, without sclerites. Corpus bursae small (reduced), without pectinations or signum, oval-shaped. Accessory sac absent; ductus spermathecae with about 4.5 convolutions, extended into a slender, 710 µm long utriculus; spines or pectinations absent. Abdominal tip broad, truncate.

Bionomics. Adults fly January. Otherwise biology is unknown.

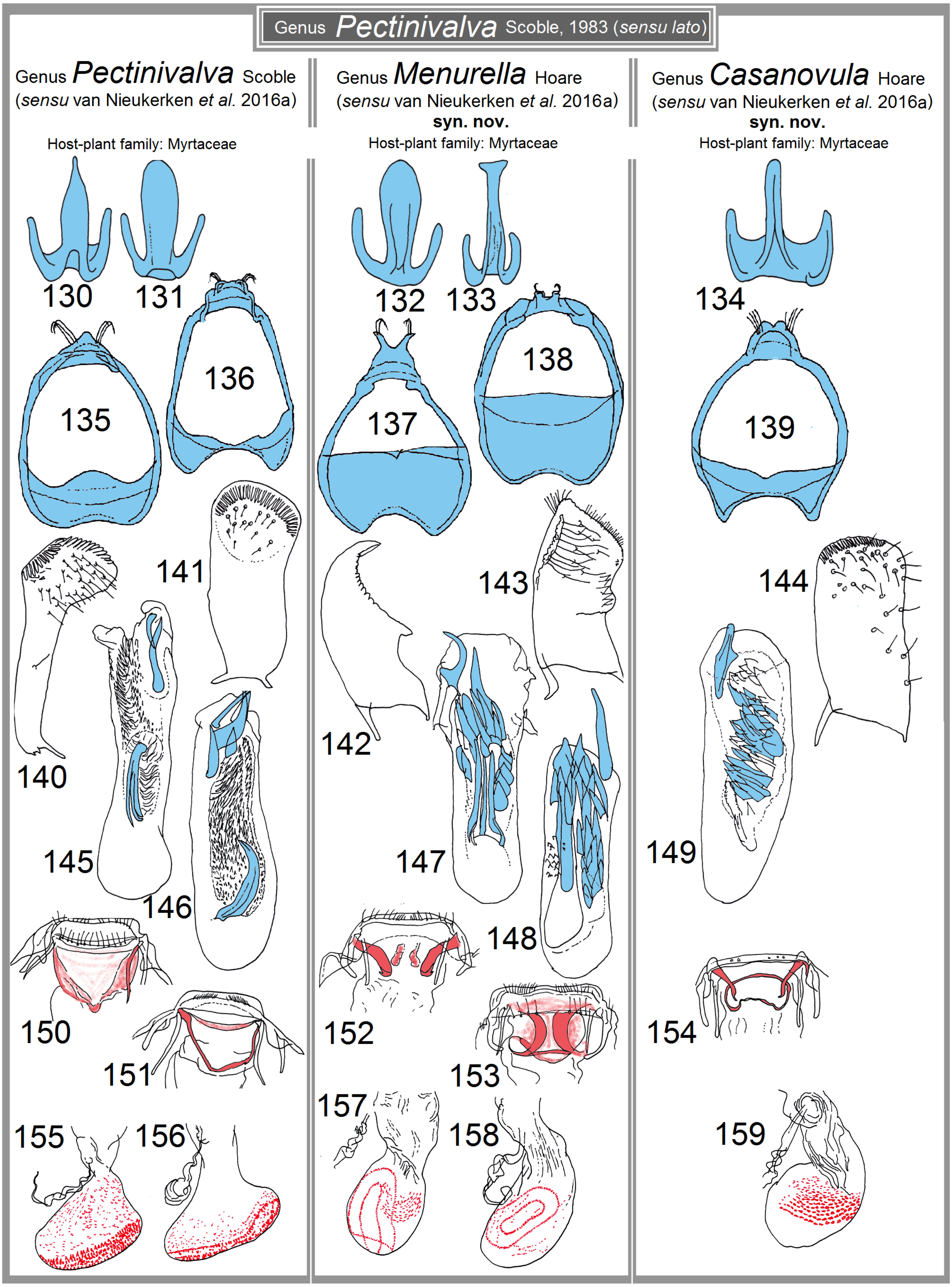
Distribution. This species occurs in the southern Andes (Chile: Cauquenes) at an altitude about 500 m.

Etymology. The species name is derived from the Latin *sapphires* (sapphire) in reference to the very distinct blue iridescence of the forewing.

Remarks. There is no wing venation slide available. However, in the holotype, as far as is visible in the non-descaled specimen, the hindwing venation looks almost identical with that of *S. nielseni*. Additionally, the forewing venation also possesses the incomplete loop of vein A; distally there is one vein less in comparison to *S. nielseni*.



FIGURES 126–129. Female genitalia of *Simplimorpha* (*Myrtinepticula*) *sapphirella* Remeikis & Stonis, sp. nov., holotype, genitalia slide RA594 (ZMUC)


Genus *Pectinivalva* Scoble, 1983 (*sensu lato*)
Genus *Pectinivalva* Scoble
(*sensu* van Nieukerken *et al.* 2016a)
Host-plant family: Myrtaceae
Genus *Menurella* Hoare
(*sensu* van Nieukerken *et al.* 2016a)
syn. nov.
Host-plant family: Myrtaceae
Genus *Casanovula* Hoare
(*sensu* van Nieukerken *et al.* 2016a)
syn. nov.
Host-plant family: Myrtaceae
130
131
132
133
134
135
136
137
138
139
140
141
142
143
144
145
146
147
148
149
150
151
152
153
154
155
156
157
158
159

Discussion

Simplimorpha (*sensu lato*) is characterized by a unique character, the strong (or usually total) reduction of a set of two functionally connected, but morphologically separate, sclerites of the male genitalia which is unknown in all other nepticulids. In *Simplimorpha* (*sensu stricto*) and *Roscidotoga*, the reduced gnathos is represented only by two remnants (rudiments), i.e. very small lateral sclerites (Figs. 7, 10), and in *Myrtinepticula* as a rudimentary transverse rod (Fig. 11), or fully absent (Fig. 12). The uncus appears totally reduced except for *S. nielseni*. However, Hoare (2000) hypothesized that the lobe-like lateral corners of the tegumen, each bearing a small number of setae, may represent a reduced uncus, which could be the case.

A scenario that the subgenera *Simplimorpha* Scoble, *Roscidotoga* Hoare and *Myrticnepticula* subgen. nov. may actually represent three different genera was also considered. However, their differentiation (see Figs. 1–49) depends only on minimal differences in the genitalia structures and host plant preferences. Therefore we consider a subgeneric ranking to be more appropriate, and for clarity of characters in the diagnostics of global Nepticulidae, we synonymize *Roscidotoga* with *Simplimorpha*, describe *Myrtinepticula* within *Simplimorpha* (*sensu lato*), and hypothesize a Gondwanan origin for this genus (see Fig. 62).

The male genitalia of *Simplimorpha* and *Roscidotoga* appear to be indistinguishable (Figs. 1–4, 7–10, 13–17, 20–23, 26–33). Monophyly of *Roscidotoga* was originally diagnosed with nine characters (Hoare 2000), but they are no longer valid with the current state of knowledge: 1) gnathos strongly reduced or lost (shared with *Simplimorpha* and *Myrtinepticula*); 2) tegumen with appressed setose lobes (shared with *Simplimorpha* and *Myrtinepticula*); 3) anterior extension of vinculum elongate (shared with *Simplimorpha* and *Myrtinepticula*, possibly even not an apomorphy); 4) phallus with one ventral and one dorsal process (shared with *Simplimorpha* and some *Myrtinepticula*); 5) transverse bar of transtilla broken in middle (represents an intermediate state between *Simplimorpha* and some *Myrtinepticula*); 6) pectinifer strongly reduced (it is possibly a misunderstood character, see below in the Discussion on *Pectinivalva*); 7) in the female genitalia, anterior apophyses with expanded bases (shared with *Myrtinepticula*); 8) corpus bursae with diverticulum (shared with *Myrtinepticula*); 9) forewing with a silver streak from costa and apical suffusion of metallic scales (this is a variable character; in general, the forewing pattern often drastically varies from dull and unicolorous to metallic shiny with bright metallic markings even in very closely related species within the same species group, see Stonis *et al.* 2017).

Hoare (2000) emphasized the bluish to purplish iridescence of the forewing, combined with a triangular silver mark on the costa in the primary description of *Roscidotoga* which allowed the author to provide a nice name for the taxon. By using Latin *roscidus* (dewy) and *toga* (a garment), he suggested the name *Roscidotoga*. It should be noted that the predominantly Mediterranean *Simplimorpha promissa* also looks "dewy" (Figs. 63, 64) and South American *Myrtinepticula* are characterized by a strong blue or purple iridescence. However, as it was mentioned above, the scaling color characters are not reliable, especially at the genus level, and the genitalia characters now appear to be shared.

FIGURES 130–159. Details of genitalia morphology of *Pectinivalva* Scoble, 1983 (*sensu lato*). 130–134, gnathos: *P. commoni* (modified after Hoare *et al*. 1997); 131, *P. endocapna* (modified after Hoare *et al*. 1997); 132, *P. scotodes* (modified after Hoare & van Nieukerken 2013); 133, *P. funeralis* (modified after Hoare *et al*. 1997); 134, *P. brevipalpa* (modified after Hoare & van Nieukerken 2013); 135–139, tegumen and vinculum: 135, *P. commoni* (modified after Hoare *et al*. 1997); 136, *P. endocapna* (modified after Hoare *et al*. 1997); 138, *P. scotodes* (modified after Hoare & van Nieukerken 2013); 139, *P. brevipalpa* (modified after Hoare & van Nieukerken 2013); 140–144, valva: 140, *P. endocapna* (modified after Hoare *et al*. 1997); 141, *P. commoni* (modified after Hoare *et al*. 1997); 142, *P. scotodes* (modified after Hoare & van Nieukerken 2013); 143, *P. funeralis* (modified after Hoare *et al*. 1997); 144, *P. brevipalpa* (modified after Hoare & van Nieukerken 2013); 145–149, phallus: 145, *P. endocapna* (modified after Hoare *et al*. 1997); 146, *P. commoni* (modified after Hoare *et al*. 1997); 147, *P. funeralis* (modified after Hoare *et al*. 1997); 148, *P. scotodes* (modified after Hoare & van Nieukerken 2013); 149, *P. brevipalpa* (modified after Hoare & van Nieukerken 2013); 150–159, details of female genitalia: 150, *P. endocapna* (modified after Hoare *et al*. 1997); 151, *P. commoni* (modified after Hoare *et al*. 1997); 152, *P. scotodes* (modified after Hoare & van Nieukerken 2013); 153, *P. anazona* (modified after Hoare *et al*. 1997); 154, *P. brevipalpa* (modified after Hoare & van Nieukerken 2013); 155, *P. endocapna* (modified after Hoare *et al*. 1997); 156, *P. commoni* (modified after Hoare *et al*. 1997); 157, *P. scotodes* (modified after Hoare & van Nieukerken 2013); 158, *P. anazona* (modified after Hoare *et al*. 1997); 159, *P. brevipalpa* (modified after Hoare & van Nieukerken 2013)
* one species on Paracryphiaceae (Hoare & van Nieukerken 2013)
Note: the morphological structures are drawn in different scales

The host-plant families of *Roscidotoga*, Cunoniaceae (incl. Eucryphiaceae) and Elaeocarpaceae are considered to have formed part of the ancient angiosperm flora that covered large areas of Australia, Antarctica and South America in the late Cretaceous and early Tertiary when these continents were still joined as part of the supercontinent Gondwana (Hoare 2000). Myrtaceae is also an old Gondwanan family, with a long history in southern continents (Johnson & Briggs 1984).

Most of the taxonomic work on the Nepticulidae has dealt adults but not the larval stages. Although Hoare (2000) described the larva of *Roscidotoga*, it is not possible to compare larval data because of the lack of larval studies of the type species of *Simplimorpha* and any species in *Myrtinepticula*.

Previously, *Roscidotoga* was believed to be a sister-group to *Pectinivalva* Scoble (van Nieukerken *et al.* 2011; Hoare & van Nieukerken 2013; Doorenweerd *et al.* 2016). It is obvious that the male and female genitalia of *Roscidotoga* (Figs. 3, 4, 9, 10, 15–17, 22, 23, 29–33, 41–44) and *Pectinivalva* (Figs. 130–159) have no characters in common, except for the ground plan characters of Nepticulidae. Seven synapomorphies of *Roscidotoga* + *Pectinivalva* listed by Hoare (2000), mainly on interpretations of the wing venation and details of morphology of immature stages, are problematic. Therefore, we cannot adopt the sister-relationship concept or the hypothesized Pectivalvinae (Scoble 1983, Hoare & van Nieukerken 2013). There is no description of the subfamily Pectinivalvinae with well-defined characters. The monophyly of the expanded Pectinivalvinae (*Pectinivalva* + *Roscidotoga*) was also questioned earlier (Puplesis & Diškus 2003).

These problematic issues regarding *Pectinivalva* have broadly hindered the consistency of ranking within the general framework of the generic composition of the Nepticulidae and the need for easy differentiation and/or diagnostics of the global Nepticulidae. In 2013, *Pectinivalva* was divided into three subgenera: *Pectivalva* Scoble, *Casanovula* Hoare, and *Menurella* Hoare (Hoare & van Nieukerken 2013), each of which was elevated to a genus rank later (van Nieukerken *et al.* 2016a). In our work, taxa that share apomorphic characters, are regarded as being closely related. For practical reasons, genera should be well-distinguishable based on characters. *Pectinivalva*, *Casanovula* and *Menurella* exhibit no substantial differences (Figs. 130–159), include so-called intermediate species, and are distributed in generally the same region (Australia and adjacent areas, including Borneo), with probably the same time of their origin (see Doorenweerd *et al.* 2016). The close relationship of *Pectinivalva*, *Casanovula* and *Menurella* is further reinforced by the shared host-plant family (Myrtaceae). *Eucalyptus* L'Hér. is a host-plant genus for at least some, if not all species, of these three Nepticulidae taxa. With a few exceptions, related taxa of Nepticulidae feed on host plants that are themselves related. We appreciate that this could make them at least subgenera, but it seems that the differences in external characters (like a forewing pattern) are not enough. Small differences in wing venation could be a result of independent reduction in these tiny moths (on the other hand, the venation characters are difficult to apply and/or use in every-day species diagnostic practice), and differences in the remaining morphology are so small for the taxa even to be called subgenera. It is interesting to note that in the molecular phylogenetic tree there is no obvious support for taxonomic status of these three genera, except as informal species groups as was admitted by Hoare & van Nieukerken (2013). An expanded molecular study would be particularly worthwhile. Therefore, because of the distinct similarity and difficulty to diagnose, all three previously erected genera now are merged into *Pectinivalva* Scoble (*sensu lato*) (Figs. 130–159).

Subgenera allow us to convey more information about the characters and relationships of species within a genus. In van Nieukerken *et al.* (2016a), subgeneric ranks were abandoned and subgenera were elevated to genera, except for *Levarchama* Beirne, because the previous classification system (van Nieukerken 1986) was not supported by molecular treatments, particularly in the case of artificial conglomerates such as *Ectoedemia* Busck, *sensu lato* (van Nieukerken *et al.* 2016a).

Acknowledgements

We are indebted to O. Karsholt and the late Professor N. P. Kristensen (ZMUC) for the loan of the material collected during the expedition *Mision Cientifica Danesa.* We are also grateful to our colleague Peter Buchner, Schwarzau am Steinfeld (Austria) for the photographs of *Simplimorpha promissa* (Figs. 63, 64). The paper was reviewed by Dr. Donald R. Davis of the Department of Entomology, Smithsonian Institution. We thank Donald R. Davis and also anonymous reviewers for corrections and useful suggestions. We are also grateful to Dr. Lauri Kaila (Finnish Museum of Natural History, University of Helsinki, Finland) for the discussion. This study was supported in part by the Research Foundation of the Lithuanian University of Educational Sciences (2018). MAS thanks

Donald R. Davis for his early mentorship in her career regarding leaf-mining moths in northeastern Mexico that led to her work in other Lepidoptera and Jason P.W. Hall for discussion on the importance of subgenera. Mention of trade names or commercial products in this publication is solely for the purpose of providing specific information and does not imply recommendation or endorsement by USDA. USDA is an equal opportunity provider and employer.

References

APG IV (2016) An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Botanical Journal of the Linnean Society*, 181, 1–20.
https://doi.org/10.1111/boj.12385

Diškus, A. & Puplesis, R. (2003) Catalogue of the world Nepticuloidea & Tischerioidea. *In*: Puplesis, R. & Diškus, A. (Eds.), *The Nepticuloidea & Tischerioidea (Lepidoptera)—a global review, with strategic regional revisions*. Lututė Publishers, Kaunas, pp. 318–436.

Diškus, A., Stonis, J.R. (2012) *Leaf-mining insects of Lithuania. The Nepticulidae (Lepidoptera): taxonomy, chorological composition and trophic relationships. Monograph*. Lututė Publishers, Kaunas, 220 pp. [in Lithuanian]

Doorenweerd, C., Nieukerken, E.J. van & Hoare, R.J.B. (2016) Phylogeny, classification and divergence times of pygmy leaf-mining moths (Lepidoptera: Nepticulidae): the earliest lepidopteran radiation on Angiosperms? *Systematic Entomology*, 42 (1), 267–287.
https://doi.org/10.1111/syen.12212

Gustafsson, B. (1973) A new species of *Nepticula* v. Heyden from Rhodes (Lep. Nepticulidae). *Entomologisk Tidskrift*, 94 (3/4), 197–198.

Hoare, R.J.B. (2000) A new genus of primitive Nepticulidae (Lepidoptera) from eastern Australia, with a revised diagnosis of nepticulid subfamilies. *Zoological Journal of the Linnean Society*, 128 (3), 289–317.
https://doi.org/10.1111/j.1096-3642.2000.tb00165.x

Hoare, R.J.B., Johansson, R., Nieukerken, E.J. van & Nielsen, E.S. (1997) Australian Nepticulidae (Lepidoptera): redescription of the named species. *Entomologica Scandinavica*, 28 (1), 1–26.
https://doi.org/10.1163/187631297X00132

Hoare, R.J.B. & Nieukerken, E.J. van (2013) Phylogeny and host-plant relationships of the Australian Myrtaceae leafmining moth genus *Pectinivalva* (Lepidoptera, Nepticulidae), with new subgenera and species. *Zookeys*, 278, 1–64.
https://doi.org/10.3897/zookeys.278.4743

Johansson, R., Nielsen, E.S., Nieukerken, E.J. van & Gustafsson, B. (1990) The Nepticulidae and Opostegidae (Lepidoptera) of north west Europe. *Fauna Entomologica Scandinavica*, 23 (1/2), 1–739.

Johnson, L.A.S. & Briggs, B.G. (1984) Myrtales and Myrtaceae – a phylogenetic analysis. *Annals of the Missouri Botanic Garden*, 71, 700–756.
https://doi.org/10.2307/2399159

Meyrick, E. (1906) Descriptions of Australian Tineina. *Transactions and Proceedings and Report of the Royal Society of South Australia*, 30, 33–66.

Nieukerken, E.J. van (1986) Systematics and phylogeny of Holarctic genera of Nepticulidae (Lepidoptera, Heteroneura: Monotrysia). *Zoologische Verhandelingen*, 236, 1–93.

Nieukerken, E.J. van, Berg, C. van den & Hoare, R.J.B. (2011) A new species of the endemic Australian genus *Roscidotoga* Hoare from rainforests in southern Queensland (Lepidoptera: Nepticulidae). *Tijdschrift voor Entomologie*, 154, 193–201.
https://doi.org/10.1163/004074912X13397496981508

Nieukerken, E.J. van, Doorenweerd, C., Hoare, R.J.B. & Davis, D.R. (2016a) Revised classification and catalogue of global Nepticulidae and Opostegidae (Lepidoptera, Nepticuloidea). *ZooKeys*, 628, 65–246.
https://doi.org/10.3897/zookeys.628.9799

Nieukerken, E.J. van, Doorenweerd, C., Nishida, K. & Snyers, C. (2016b) New taxa, including three new genera show uniqueness of Neotropical Nepticulidae (Lepidoptera). *ZooKeys*, 628, 1–63.
https://doi.org/10.3897/zookeys.628.9805

Puplesis, R. (1994) *The Nepticulidae of Eastern Europe and Asia: western, central and eastern parts*. Backhuys Publishers, Leiden, 291 pp., 840 figs.

Puplesis, R. & Diškus, A. (2003) *The Nepticuloidea & Tischerioidea (Lepidoptera) – a global review, with strategic regional revisions*. Lututė Publishers, Kaunas, 512 pp.

Puplesis, R. & Robinson, G.S. (2000) A review of the Central and South American Nepticulidae (Lepidoptera) with special reference to Belize. *Bulletin of the Natural History Museum, London* (*Entomology*), 69 (1), 3–114.

Scoble, M.J. (1983) A revised cladistic classification of the Nepticulidae (Lepidoptera) with descriptions of new taxa mainly from South Africa. *Transvaal Museum Monograph*, 2, i–xi + 105 pp.

Staudinger, O. (1870) Beschreibung neuer Lepidopteren des europäischen Faunengebiets. *Berliner Entomologische Zeitschrift*, 14 (3/4), 273–330.

Stevens, P.F. (2017) Angiosperm Phylogeny Website. Version 14. Available from: http://www.mobot.org/MOBOT/research/APweb/ (accessed 24 October 2018)

Stonis, J.R., Diškus, A., Remeikis, A., Gerulaitis, V. & Karsholt, O. (2016) Leaf-mining Nepticulidae (Lepidoptera) from record high altitudes: documenting an entire new fauna in the Andean páramo and puna. Monograph. *Zootaxa*, 4181 (1), 1–94. https://doi.org/10.11646/zootaxa.4181.1.1

Stonis, J.R., Diškus, A., Remeikis, A. & Navickaitė, A. (2014) Study methods of Nepticulidae: micro-mounts of genitalia structures. *In*: Stonis, J.R., Hill, S.R., Diškus, A. & Auškalnis, T. (Eds.), *Selected abstracts and papers of the First Baltic International Conference on Field Entomology and Faunistics*. Edukologija Publishers, Vilnius, pp. 32–35.

Stonis, J.R., Diškus, A., Remeikis, A. & Solis, M.A. (2018) The American *Brachinepticula* gen. nov. and *Manoneura* Davis (Nepticulidae): a new generic concept based on a reinforced cathrema in the phallus. *Biologija*, 64 (2), 99–128. https://doi.org/10.6001/biologija.v64i2.3735

Stonis, J.R., Remeikis, A., Diškus, A. & Solis, M.A. (2017) The American species of the genus *Glaucolepis* Braun, 1917 (*Neotrifurcula* van Nieukerken, syn. nov.) (Lepidoptera: Nepticulidae). *Zootaxa*, 4338 (3), 489–506. https://doi.org/10.11646/zootaxa.4338.3.5

Vári, L. (1955) South African Lepidoptera I. Descriptions of new leafmining Tineina. *Annals of the Transvaal Museum*, 22 (3), 331–351.

Wilkinson, C. & Scoble, M.J. (1979) The Nepticulidae (Lepidoptera) of Canada. *Memoirs of the Entomological Society of Canada*, 107, 1–129.
https://doi.org/10.4039/entm111107fv

Wilson, J.O. (1939) A new species of the family Nepticulidae (Lepidoptera). *Transactions of the Royal Society of South Australia*, 63 (2), 238–239.

APPENDIX. An updated catalogue of global *Simplimorpha* Scoble and *Pectinivalva* Scoble.

Genus *Simplimorpha* Scoble, 1983 (*sensu lato*)
Simplimorpha Scoble, 1983: 15.
Roscidotoga Hoare, 2000: 293, 294 (**syn. nov.**).
Type species: *Stigmella lanceifoliella* Vári, 1955: 331, 332.

Subgenus *Simplimorpha* Scoble, 1983
Simplimorpha Scoble, 1983: 15.
Type species: *Stigmella lanceifoliella* Vári, 1955: 331, 332.

Simplimorpha* (*Simplimorpha*) *promissa (Staudinger, 1870)
Nepticula promissa Staudinger, 1870: 325, 326.
Nepticula robiniella Gustafsson, 1973: 197, 198.
Simplimorpha promissa (Staudinger), in Diškus & Puplesis 2003: 320; van Nieukerken *et al.* 2016a: 103.
Host plants. *Cotinus coggygria* Scop., *Pistacia atlantica* Desf., *P. lentiscus* L., *P. terebinthus* L., *Rhus coriaria* L. (Anacardiaceae).
Distribution. Predominantly Mediterranean and central Europe: from Spain to Slovakia, Greece and Georgia in the Caucasus.

Simplimorpha* (*Simplimorpha*) *lanceifoliella (Vári, 1955)
Stigmella lanceifoliella Vári, 1955: 331, 332.
Simplimorpha lanceifoliella (Vári), in Diškus & Puplesis 2003: 320; in van Nieukerken *et al.* 2016a: 103.
Host plants. *Protorhus longifolia* (Bernh.) Engl., *Rhus chirindensis* E. G. Baker, *R. dentata* Thunb., *R. lancea* L. f., *R. leptodictya* Diels, *R. lucida* L., *R. pyroides* Burch., *Schinus molle* L. (Anacardiaceae).
Distribution. Zimbabwe and Republic of South Africa.

Subgenus *Roscidotoga* Hoare, 2000 (stat. nov.)
Roscidotoga Hoare, 2000: 293, 294.
Type species: *Roscidotoga callicomae* Hoare, 2000: 295, 296.

Simplimorpha* (*Roscidotoga*) *callicomae Hoare, 2000 (**comb. nov.**)
Roscidotoga callicomae Hoare, 2000: 295, 296.
Roscidotoga callicomae Hoare, in van Nieukerken *et al.* 2011:199, 200; Diškus & Puplesis 2003: 320; van Nieukerken *et al.* 2016a: 130;
Host plant. *Callicoma serratifolia* Andrews (Cunoniaceae).
Distribution. Australia: New South Wales.

Simplimorpha* (*Roscidotoga*) *eucryphiae Hoare, 2000 (**comb. nov.**)
Roscidotoga eucryphiae Hoare, 2000: 296, 297; in Diškus & Puplesis 2003: 320; van Nieukerken *et al.* 2016a: 130.
Host plant. *Eucryphia lucida* (Labill.) Baill. (Cunoniaceae).
Distribution. Australia: Tasmania.

Simplimorpha* (*Roscidotoga*) *sapphiripes Hoare, 2000 (**comb. nov.**)
Roscidotoga sapphiripes Hoare, 2000: 297, 298; in Diškus & Puplesis 2003: 320; van Nieukerken *et al.* 2016a: 130.
Host plant. *Elaeocarpus obovatus* G. Don. (Elaeocarpaceae).
Distribution. Australia: Queensland.

Simplimorpha* (*Roscidotoga*) *lamingtonia van Nieukerken, Berg & Hoare, 2011 (**comb. nov.**)
Roscidotoga lamingtonia van Nieukerken, Berg & Hoare, 2011: 193–201; in van Nieukerken *et al.* 2016a: 130.
Host plant. *Sloanea woollsii* F. Muell. (Elaeocarpaceae).
Distribution. Australia: southern Qeensland and New South Wales.

Subgenus *Myrtinepticula* Stonis & Diškus, subgen. nov.
Type species: *Simplimorpha (Myrtinepticula) cercaria* Diškus & Stonis, **sp. nov.**

Simplimorpha (Myrtinepticula) cercaria Diškus & Stonis, **sp. nov.**
Host plant. *Luma apiculata* (DC.) Burret (previously also known as *Eugenia apiculata* DC., *Myrceugenia apiculata* (DC.) Niedenzu, or *Myrceugenella apiculata* (DC.) Kausel.), Myrtaceae.
Distribution. The southern, Patagonian Andes: Chile and eastern, Andean Argentina.

Simplimorpha (Myrtinepticula) nielseni Remeikis & Stonis, **sp. nov.**
Host plant. *Myrceugenia planipes* (Hook. & Arn.) O. Berg, Myrtaceae.
Distribution. The southern, Patagonian Andes: Chile and eastern Andean Argentina.

Simplimorpha (Myrtinepticula) kailai Stonis, **sp. nov.**
Host plant. Unknown.
Distribution. Peru (south western Amazonian selva).

Simplimorpha (Myrtinepticula) sapphirella Remeikis & Stonis, **sp. nov.**
Host plant. Unknown.
Distribution. The southern, Patagonian Andes: Chile.

Genus *Pectinivalva* Scoble, 1983 (*sensu lato*)
Pectinivalva Scoble, 1983: 12, 13.
Casanovula Hoare, 2013; in Hoare & van Nieukerken 2013: 24–26.
Menurella Hoare, 2013; in Hoare & van Nieukerken 2013: 35–37.
Type species: *Pectinivalva commoni* Scoble, 1983: 13.

The *commoni* species group (designated by Hoare *et al.* 1997)

Pectinivalva caenodora (Meyrick, 1906)
Nepticula caenodora Meyrick, 1906: 58, 59.
Pectinivalva caenodora (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 318; van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Australia: New South Wales (Sydney).

Pectinivalva gilva (Meyrick, 1906)
Nepticula gilva Meyrick, 1906: 59.
Pectinivalva gilva (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 318; van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Australia: New South Wales (Sydney).

Pectinivalva melanotis (Meyrick, 1906)
Nepticula melanotis Meyrick, 1906: 59.
Pectinivalva melanotis (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319; van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Australia: New South Wales (Sydney).

Pectinivalva endocapna (Meyrick, 1906)
Nepticula endocapna Meyrick, 1906: 60.
Pectinivalva endocapna (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319; van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Western Australia: Albany.

Pectinivalva chalcitis (Meyrick, 1906)
Nepticula chalcitis Meyrick, 1906: 60.
Pectinivalva chalcitis (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319; van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Western Australia: Albany.

Pectinivalva commoni Scoble, 1983
Pectinivalva commoni Scoble, 1983: 13.
Pectinivalva commoni Scoble, in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319; van Nieukerken *et al.* 2016a: 131.
Host plant. *Eucalyptus delegatensis* R.T. Baker (Myrtaceae).
Distribution. Australia: New South Wales.

Pectinivalva mystaconota Hoare, 2013
Pectinivalva (*Pectinivala*) *mystaconota* Hoare, 2013, in Hoare & van Nieukerken 2013: 20–24.
Pectinivalva mystaconota Hoare, in van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Eastern Australia.

The *funeralis* species group (designated by Hoare *et al.* 1997)

Pectinivalva anazona (Meyrick, 1906)
Nepticula anazona Meyrick, 1906: 58.
Pectinivalva anazona (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319.
Pectinivalva (*Menurella*) *anazona* (Meyrick), in Hoare & van Nieukerken 2013: 17.
Menurella anazona (Meyrick), in van Nieukerken *et al.* 2016a: 130.
Host plant. *Lophostemon confertus* (R. Br.) P. G. Wilson & J. T. Waterhouse (Myrtaceae).
Distribution. Australia: Queensland (Brisbane).

Pectinivalva primigena (Meyrick, 1906)
Nepticula primigena Meyrick, 1906: 58.
Pectinivalva primigena (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319.
Pectinivalva (*Menurella*) *primigena* (Meyrick), in Hoare & van Nieukerken 2013: 17.
Menurella primigena (Meyrick), in van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Australia: New South Wales (Sydney).

Pectinivalva planetis (Meyrick, 1906)
Nepticula planetis Meyrick, 1906: 58.
Pectinivalva planetis (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319.
Pectinivalva (*Menurella*) *planetis* (Meyrick), in Hoare & van Nieukerken 2013: 17.
Menurella planetis (Meyrick), in van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Australia: New South Wales (Sydney).

Pectinivalva funeralis (Meyrick, 1906)
Nepticula funeralis Meyrick, 1906: 59, 60.
Pectinivalva funeralis (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319.
Pectinivalva (*Menurella*) *funeralis* (Meyrick), in Hoare & van Nieukerken 2013: 17.
Menurella funeralis (Meyrick), in van Nieukerken *et al.* 2016a: 130.
Host plant. Unknown.
Distribution. Australia: New South Wales (Sydney).

Pectinivalva libera (Meyrick, 1906)
Nepticula libera Meyrick, 1906: 61.
Pectinivalva libera (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319.
Pectinivalva (*Menurella*) *libera* (Meyrick), in Hoare & van Nieukerken 2013: 17.
Menurella libera (Meyrick), in van Nieukerken *et al.* 2016a: 130.
Host plant. Unknown.
Distribution. Australia: New South Wales (Sydney).

Pectinivalva trepida (Meyrick, 1906)
Nepticula trepida Meyrick, 1906: 61.
Pectinivalva trepida (Meyrick), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319.
Pectinivalva (*Menurella*) *trepida* (Meyrick), in Hoare & van Nieukerken 2013: 18.
Menurella trepida (Meyrick), in van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Australia: Victoria.

Pectinivalva warburtonensis (Wilson, 1939)
Nepticula warburtonensis Wilson, 1939: 239.
Pectinivalva warburtonensis (Wilson), in Hoare *et al*. 1997: 1–26; Diškus & Puplesis 2003: 319.
Pectinivalva (*Menurella*) *warburtonensis* (Wilson), in Hoare & van Nieukerken 2013: 18.
Menurella warburtonensis (Wilson), in van Nieukerken *et al.* 2016a: 131.
Host plant. Unknown.
Distribution. Western Australia.

Pectinivalva scotodes Hoare, 2013
Pectinivalva (*Menurella*) *scotodes* Hoare, 2013, in Hoare & van Nieukerken 2013: 18, 37–41.
Menurella scotodes (Hoare), in van Nieukerken *et al.* 2016a: 131.
Host plants. *Eucalyptus pilularis* Smith, *E. carnea* R. Baker, *E. acmenoides* Schauer, probably *E. saligna* Smith. (Myrtaceae).
Distribution. Australia: N.S.W, Southern Queensland.

Pectinivalva acmenae Hoare, 2013
Pectinivalva (*Menurella*) *acmenae* Hoare, 2013, in Hoare & van Nieukerken 2013: 18, 41, 43–44.
Menurella acmernae (Hoare), in van Nieukerken *et al.* 2016a: 130.
Host plant. *Syzygium smithii* (Poir.) Nied. (Myrtaceae).
Distribution. Australia: New South Wales.

Pectinivalva xenadelpha van Nieukerken & Hoare, 2013
Pectinivalva (Menurella) xenadelpha van Nieukerken & Hoare, 2013, in Hoare & van Nieukerken 2013: 18, 44, 46.
Menurella xenadelpha (van Nieukerken & Hoare), in van Nieukerken *et al.* 2016a: 131.
Host plant. *Syzygium acuminatissimum* (Blume) A. DC. (Myrtaceae).
Distribution. Indonezia: Borneo, East Kalimantan: Gunung Lumut.

Pectinivalva quintiniae Hoare & van Nieukerken, 2013
Pectinivalva (*Menurella*) *quintiniae* Hoare & van Nieukerken, 2013: 18, 47, 48.
Menurella quintiniae (Hoare & van Nieukerken), in van Nieukerken *et al.* 2016a: 131.
Host plant. *Quintinia verdonii* F. Muell. (Paracryphiaceae).
Distribution. Australia: Northern N.S.W.; Southern Queensland.

Pectinivalva tribulatrix van Nieukerken & Hoare, 2013
Pectinivalva (*Menurella*) *tribulatrix* van Nieukerken & Hoare, 2013, in Hoare & van Nieukerken 2013: 18, 48–52.
Menurella tribulatrix (van Nieukerken & Hoare), in van Nieukerken *et al.* 2016a: 131.
Host plant. *Rhodomyrtus macrocarpa* Benth. (Myrtaceae).
Distribution. Australia: Northern Queensland.

The *brevipalpa* species group (it is equivalent to the subgenus *Casanovula* Hoare, 2013)

Pectinivalva brevipalpa Hoare, 2013
Pectinivalva (*Casanovula*) *brevipalpa* Hoare, 2013, in Hoare & van Nieukerken 2013: 27–29.
Casanovula brevipalpa (Hoare), in van Nieukerken *et al.* 2016a: 130.
Host plant. *Tristaniopsis collina* Peter G. Wilson & J.T. Waterhouse (Myrtaceae).
Distribution. Australia: New South Wales.

Pectinivalva minotaurus Hoare, 2013
Pectinivalva (*Casanovula*) *minotaurus* Hoare, 2013, in Hoare & van Nieukerken 2013: 29–34.
Casanovula minotaurus (Hoare), van Nieukerken *et al.* 2016a: 130.
Host plants. *Lophostemon confertus* (R.Br.) Peter G.Wilson & J.T.Waterh., *L. suaveolens* (Sol. ex Gaertn.) Peter G.Wilson & J.T.Waterh. (Myrtaceae).
Distribution. Australia: Southern Queensland.