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RESEARCH PAPER

The true identity of *Periscelis winnertzii* and description of *P. laszloi* sp. nov. from Europe (Diptera: Periscelididae)

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Abstract. The only preserved (damaged, sex unknown) type specimen of *Periscelis* (*Periscelis*) *winnertzii* Egger, 1862 has been revised and designated as a lectotype. Its revision revealed that *P. winnertzii* has recently been misinterpreted and is in fact identical with *P.* (*P.*) *fugax* Roháček & Andrade, 2017, syn. nov. Therefore, true *P. winnertzii* is re-diagnosed, with all its synonomies listed. *Periscelis winnertzii* auctt. (not Egger, 1862) is described as a new species, *P. laszloi* sp. nov., based on a series of specimens from Hungary (holotype), Portugal, Switzerland and Slovakia. An intersex specimen of *P. laszloi* sp. nov., female puparium and cephalopharyngeal skeleton of 3rd instar larva (ex puparium) of *P. winnertzii* (all from Hungary) are described and illustrated. Both species are also characterized by means of the barcoding region of COI, illustrated in detail (including structures of male and female terminalia) and their biology and distribution reviewed with new original data.

Key words. Diptera, Periscelididae, *Periscelis winnertzii*, biology, COI barcoding, distribution, intersex, new species, new synonym, puparium, redescription, relationships, taxonomy, Palaearctic Region

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Introduction

The Palaearctic species of the subgenus *Periscelis* (*Periscelis*) Loew, 1858 have recently been treated by Papp & Withers (2011), including revision and redescription of the European species *Periscelis* (*P.*) *winnertzii* Egger, 1862. Subsequently, Roháček & Andrade (2017) found that two species are in fact mixed under the latter name and, therefore, described a new species, *P.* (*P.*) *fugax* Roháček & Andrade, 2017 and distinguished it from *P. winnertzii* following the redescription of the latter species by Papp & Withers (2011).

In 2018 I had the opportunity to visit the Naturhistorisches Museum in Vienna (Austria) and thanks to kind assistance of the Diptera curator Dr. Peter Sehnal I could also examine type specimens of various Acalyptratae in the "Alte Sammlung" (= old collection) of Diptera. Among others, I had also spotted the only preserved type specimen of *P. winnertzii* Egger in this collection. To my surprise, a more detailed examination revealed that this specimen is conspecific with *P. fugax*, not with *P. winnertzii* sensu Papp & Withers (2011).

This study therefore aims to rectify the incorrect taxonomic concept and redescriptions of *P. winnertzii* by Papp & Withers (2011) and Roháček & Andrade (2017). The true *P. winnertzii* is re-diagnosed and illustrated below, with complete synonymies, including *P. fugax* Roháček & Andrade, syn. nov., and the species formerly treated as "*P. winnertzii*" is described as a new species, viz. *P.* (*P.*) *laszloi* sp. nov. Moreover, revision of the series of specimens, identified by L. Papp as *P. winnertzii* in Diptera collection of the Hungarian Natural History Museum, revealed that it includes both of the above species. In this series there is also a female of true *P. winnertzii* reared by L. Papp from a larva, with a puparium glued on a small card pinned below this specimen. The puparium of *P. winnertzii* is therefore described and illustrated below, along with the larval cephalopharyngeal skeleton extracted from inside of the puparium. Another surprising finding has been an intersex specimen found in a series of *P. laszloi* sp. nov. It also is illustrated and described in this paper. In addition, the barcoding region of COI gene of both species has been obtained and their genetic distances tested.

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Material and methods

Material. The material listed in this paper is deposited in collections as follows:

ARGC	Ana R. Gonçalves private collection, Coimbra (Portugal);
HNHM	Hungarian Natural History Museum, Budapest (Hungary);
JMB	Jan Máca, private collection, Veselí nad Lužnicí nr. České Budějovice (Czech Republic);
MBP	Miroslav Barták private collection, Praha (Czech Republic);
MCSN	Museo Cantonale di Storia Naturale, Lugano (Switzerland);
NHMW	Naturhistorisches Museum, Wien (Austria);
NHRS	Naturhistoriska Riksmuseet, Stockholm (Sweden);
NMPC	National Museum, Praha (Czech Republic);
PCB	Peter J. Chandler private collection, Melksham (England, U. K.);
RAP	Rui Andrade private collection, Porto (Portugal);
SMLC	Severočeské Muzeum, Liberec (Czech Republic);
SMOC	Silesian Museum, Opava (Czech Republic).

Methods. Specimens have been examined, drawn and measured using two types of binocular stereoscopic microscopes (Reichert, Olympus SZX10). Detailed examinations were performed with a compound microscope (JENAVAL). Abdomens of a number of specimens were detached and boiled in 10% solution of KOH in water for several minutes. KOH was neutralized in 10% solution of CH_3COOH and abdomen washed in water and transferred to glycerine. Terminalia were dissected and studied in a drop of glycerine under a binocular microscope. The same procedure has been adopted for study of the dry puparium. After examination all parts of the abdomen (and the puparium) were transferred to glycerine in a coalesced plastic tube or microvial and pinned below the respective specimen. In specimens used for molecular study, after DNA exctraction, all remnants of the body were preserved in glycerine in a larger pinned microvial.

Drawing techniques and photography. Genital structures were drawn by means of Abbe's drawing apparatus on a compound microscope at a higher magnification (130–350×). For more details see Roháček (2006). Living *Periscelis* specimens were photographed in special boxes by means of a digital camera Canon EOS 60D with a macro lens (Canon MP-E 65 mm 1–5×) and ring macro flash (Canon MR-14EX). Dry-mounted adult specimens or their parts were photographed by means of a digital camera Canon EOS 5D Mark III with a Nikon CFI Plan 4× /0.10NA 30 mm WD objective attached to Canon EF 70–200mm f/4L USM zoom lens. The specimen photographed by means of the latter equipment was repositioned upwards between each exposure using a Cognisys StackShot Macro Rail and the final photograph was compiled from about 40 layers using Helicon Focus Pro 7.0.2. The final images were edited in Adobe Photoshop CS6. Wings were photographed on a compound microscope Olympus BX51 with an attached digital camera (Canon EOS 1200D).

Measurements. Five main characteristics of adults were measured: body length (measured from anterior margin of head to end of cercus, thus excluding the antenna), wing length (from wing base to wing tip), wing width (maximum width), C-index (Cs_3 : Cs_4) (= ratio of length of 3rd costal sector : length of 4th costal sector) and index rm\dm-cu : dm-cu (= ratio of length of section between rm and dm-cu on discal cell : length of dm-cu). All type specimens were measured.

Presentation of faunistic data. Label data of primary type specimens are presented strictly verbatim including information on colour of all associated labels. Data from other material examined are standardized and presented in full. Phenological and other biological information obtained from the material examined and literature are given in the Biology paragraph; data on occurrence are summarized in the Distribution paragraph.

Barcoding. To display molecular differences between *Periscelis* (*Periscelis*) *winnertzii* and *P.* (*P.*) *laszloi* sp. nov. the barcoding region of COI was amplified (see below). Specimens of these two species plus those of two *P.* (*Myodris*) species, viz. *P. annulata* (Fallén, 1813) and *P. piricercus* Carles-Tolrá & Verdugo Páez, 2009 (all from Switzerland, Canton of Ticino: Losone), all preserved in 80% ethanol, were used for analysis. The DNA was extracted using NucleoSpin Tissue Kit (Macherey-Nagel, Düren, Germany) following manufacturer's protocols. Individual fly samples were rinsed in PBS buffer, placed in sterile Eppendorf tubes and incubated overnight at 56°C with proteinase K. PCRs (total volume = 20 µL) were performed using primers for mitochondrial COI barcoding gene region: dipt2-COI-F (5′-TACAATTTATCGCCTAAACTTCAGCC-3′) (Su et al. 2008) or LCO1490 (5′-GGTCAACAAATCATAAAGATATTGG-3′) and HC02198 (5′-TAAACTTCAGGGTGACCAAAAAATCA-3′) (Folmer et al. 1994). Amplified products were purified using the Gel/PCR DNA Fragments Extraction Kit (Geneaid, New

Table 1. GenBank accession numbers of COI sequences of *Periscelis* and outgroup species.

Species	COI	Family	Locality
Periscelis (*Myodris*) *annulata*	OM314930	Periscelididae	Switzerland
Periscelis (*Myodris*) *piricercus*	OM314932	Periscelididae	Switzerland
Periscelis (*Periscelis*) *winnertzii*	ON637245	Periscelididae	Switzerland
Periscelis (*Periscelis*) *laszloi*	OM314933	Periscelididae	Switzerland
Stenomicra cogani	ON637944	Stenomicridae	Czech Republic
Anthomyza gracilis	KJ418548	Anthomyzidae	Czech Republic
Opomyza florum	KJ418572	Opomyzidae	Czech Republic
Clusia flava	KJ418571	Clusiidae	Slovakia

Taipei City, Taiwan), following manufacturer's protocol. PCR products were sequenced by Eurofins Genomics (Germany). Sequences of COI gene were assembled, manually inspected and primers trimmed in SeqTrace 0.9.0 (Stucky 2012). All the sequences were aligned using MAFFT version 7 (Katoh & Standley 2013) on the MAFFT server (http://mafft.cbrc.jp/alignment/server/). GenBank accession numbers for COI sequences of *Periscelis* species, as well as those of all outgroup species, are listed in Table 1. The dataset has been analyzed using maximum likelihood (ML) method. The analysis was conducted on the CIPRES computer cluster using RAxML-HPC BlackBox 8.2.12 (Stamatakis 2014). The phylogenetic tree was visualized using Interactive Tree Of Life (iTOL) (Letunic & Bork 2016). The species *Clusia flava* (Meigen, 1830) (Clusiidae) was used as a root. The outgroup was represented by *Anthomyza gracilis* Fallén, 1823 (Anthomyzidae), *Opomyza florum* (Fabricius, 1794) (Opomyzidae) and *Stenomicra cogani* Irwin, 1982 (Stenomicridae). Genetic distances of *Periscelis* species were calculated in MEGA version 11 (Tamura et al. 2021) using Kimura 2-parameter model (K2P) and they are presented in Table 2.

Morphological terminology generally follows that used for Anthomyzidae by Roháček (2006) and Roháček & Barber (2016) and adapted to Periscelididae by Roháček & Andrade (2017), including terms of the male hypopygium and female postabdomen. The "hinge" hypothesis of the origin of the eremoneuran hypopygium (Zatwarnicki 1996) has been accepted for homonymies of structures of male terminalia. The following synonymous terms of the male genitalia (emanating from other hypotheses, including those used in Mathis & Papp 1998, Mathis & Rung 2010, and Papp & Withers 2011) need to be listed (terms used here first): aedeagus = phallus; ejacapodeme = ejaculatory apodeme; epandrium = periandrium; gonostylus = surstylus, epandrial process of Papp & Withers (2011); medandrium = bacilliform sclerite, intraepandrial or intraperiandrial sclerite; phallapodeme = aedeagal apodeme; postgonite = gonite, paramere. Morphological terms of the male postabdomen and genitalia are depicted in Figs 13–21, those of the female postabdomen in Figs 23–25 and those of preimaginal stages in Figs 35–42.

Abbreviations of morphological terms used in text and/or figures:

A_1	anal vein
ac	acrostichal (setulae)
as	anus
asp	anterior spiracular process
bm	basal medial cell
bpha	basal part of phallapodeme
C	costa
ce	cercus
CP	cephalic segment
cps	cephalopharyngeal skeleton
Cs_3, Cs_4	3rd and 4th costal sector
CuA_1	cubitus
Cup	posterior cubital cell
db	dorsal bridge
dc	dorsocentral setae
dcr	dorsal cornu
dp	distiphallus
dpha	distal part of phallapodeme
dm-cu	discal medial-cubital (= posterior, t_p) cross-vein
ds	dental sclerite
ea	ejacapodeme
ed	ejaculatory duct
ep	epandrium
es	epistomal plate
f_1, f_2, f_3	fore, middle, hind femur
gs	gonostylus
hu	humeral (seta)
hy	hypandrium
im	intermediate sclerite
isp	interspiracular hairs
M	media
ma	medandrium
mh	mouthhooks
MS	mesothorax
npl	notopleural (setae)
oc	ocellar (setae)
ors	fronto-orbital (setae)
pa	postalar (seta)
pb	parastomal bar
pg	postgonite
pha	phallapodeme
PR	prothorax
psp	posterior spiracular process
Pvt	postvertical (seta)
R_1	1st branch of radius
R_{2+3}	2nd branch of radius
R_{4+5}	3rd branch of radius
r_{2+3}	second radial cell
r-m	radial-medial (= anterior, t_a) cross-vein
S1–S10	abdominal sterna
sa	supra-alar (seta)
sc	scutellar (seta)
Sc	subcosta
ss	surstylus
ssl	spiracular slit
stpl	sternopleural (= katepisternal) (seta)
T1–T10	abdominal terga 1–10
t_1, t_2, t_3	fore, middle, hind tibia
vcr	ventral cornu
vte	external vertical (seta)
vti	internal vertical (seta)

Table 2. Genetic distances of COI of *Periscelis* species using Kimura 2-parameter (K2P).

	P. annulata	*P. piricercus*	*P. winnertzii*	*P. laszloi*
Periscelis (*M.*) *annulata*				
Periscelis (*M.*) *piricercus*	6.88%			
Periscelis (*P.*) *winnertzii*	15.48%	16.37%		
Periscelis (*P.*) *laszloi*	13.88%	14.23%	**8.44%**	

Results

Periscelis (*Periscelis*) *winnertzii* Egger, 1862

(Figs 1–5, 8–43)

Periscelis Winertzii Egger, 1862: 780 (description, error due to misspelling of the name Winnertz).
Periscelis winertzii: Mathis & Rung (2011): 358 (catalogue; in part, misspelling).
Periscelis Winnertzii: Schiner (1864): 272 (revision, key, emendation of name).
Periscelis Winnertzi: Becker (1905): 217 (catalog; misspelling).
Microperiscelis Winnertzi: Oldenberg (1914): 37 (generic combination; in part?, misspelling); Séguy (1934): 394 (key; in part?, misspelling).
Periscelis (*Microperiscelis*) *Winnertzi*: Duda (1934): 11 (revision; in part?, misspelling)
Periscelis (*Microperiscelis*) *winnertzi*: Papp (1984): 234 (catalogue; in part, misspelling).
Parclioscena Winnertzii: Enderlein (1936): 177 (generic combination).
Periscelis (*Periscelis*) *fugax* Roháček & Andrade, 2017: 234 (description, illustr.), **syn. nov.**

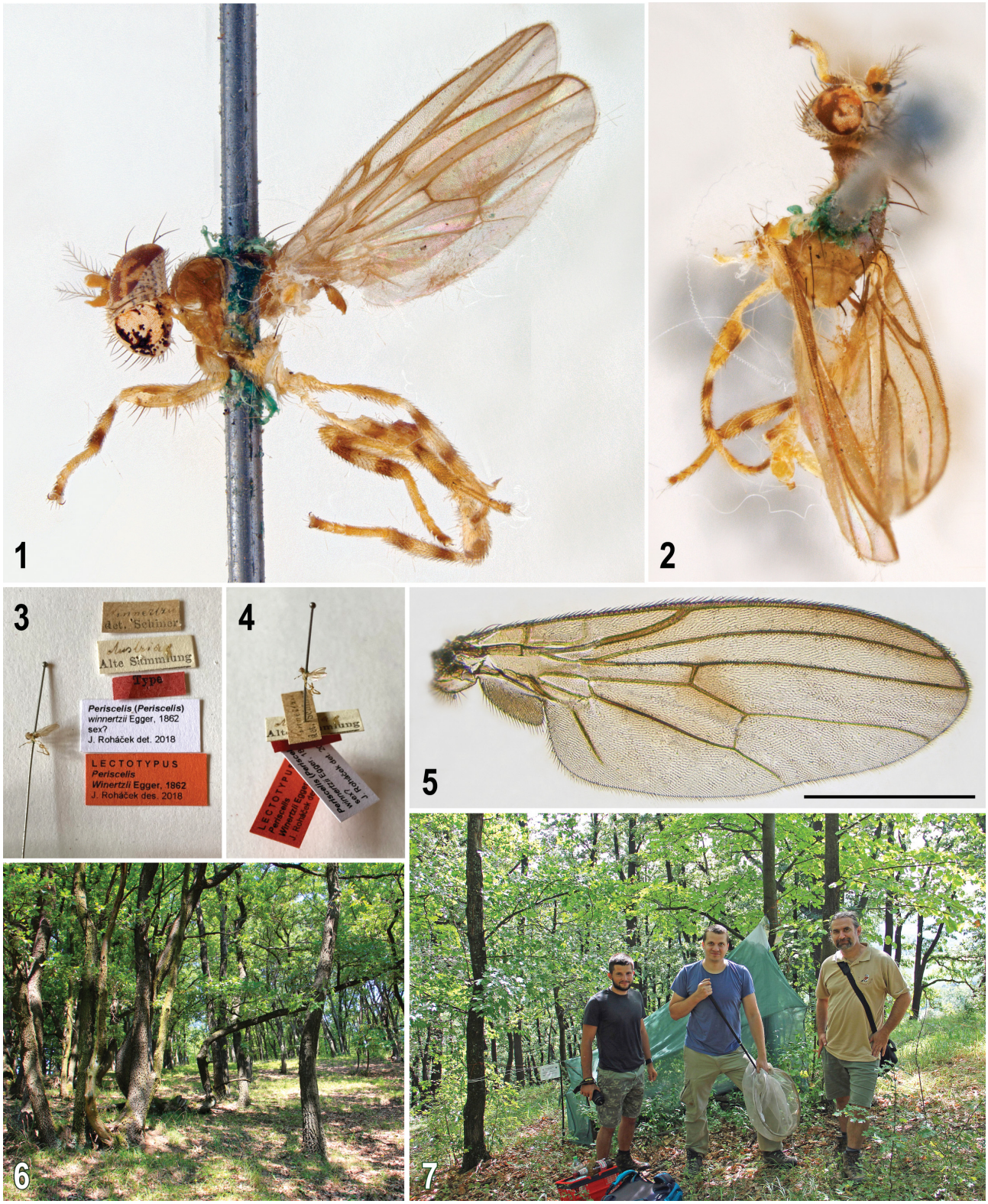
Type material. *Periscelis winnertzii* Egger. Lectotype (here designated): sex unknown (probably female), labelled: "Winnertzii [handwritten], det. Schiner" [printed] (pale brown label); "Austria [handwritten], Alte Sammlung" [printed]; "Type" [printed] (red label); "*Periscelis (Periscelis) winnertzii* Egger, 1862, sex?, J. Roháček det. 2018" and "LECTOTYPUS, *Periscelis Winertzii* Egger, 1862, J. Roháček des. 2018" (red label) (see Figs 3, 4). The specimen is heavily damaged by *Anthrenus* larvae (their setae are visible on specimen, cf. Fig. 2), with ventral part of head, ventral and some left lateral sclerites of thorax and entire abdomen missing (Figs 1, 2) but left fore leg is glued on label "Austria, Alte Sammlung" (NHMW, examined).

Periscelis fugax Roháček & Andrade. Holotype: ♂, labelled: "PORTUGAL: Porto: Valongo, Valongo, 41°09′33.4″N, 8°29′05.6″W, 50–100 m, R. Andrade leg.", "10.x.2011, sweeping over bark of *Quercus* trees with sap runs", "Holotypus ♂, *Periscelis* (*P.*) *fugax* sp.n., J. Roháček & R. Andrade det. 2016" (red label) and "*Periscelis (Periscelis) winnertzii* Egger, 1862, ♂, J. Roháček det. 2022" (SMOC, intact, examined, Fig. 10). Paratypes: 9 ♂♂ 10 ♀♀, same data as for holotype (4 ♂♂ 4 ♀♀ including 1 ♂ 1 ♀ with genit. prep. SMOC; 2 ♂♂ 2 ♀♀ NMPC; 3 ♂♂ 4 ♀♀ in RAP); 1 ♀ with same data but collected 26.ix.2011 (RAP); 6 ♂♂ with same data but collected 1.x.2011 (3 ♂♂ SMOC, 3 ♂♂ /1 ♂ genit. prep./ RAP); 7 ♂♂ 2 ♀♀ with same data but collected 4.x.2011 (4 ♂♂ SMOC, 3 ♀♀ /1 ♀ genit. prep./ RAP); 8 ♂♂ 4 ♀♀ with same data but collected 14.x.2011 (2 ♂♂ 2 ♀♀ /1 ♂ 1 ♀ genit. prep./ SMOC, 6 ♂♂ 2 ♀♀ RAP); PORTUGAL: Bragança: Bragança, Parâmio, Parque Natural de Montesinho, 41°53‘54.0“N, 6°51‘16.3“W, 780 m, 21.vi.2015, sweeping over bark of *Quercus* trees with sap runs, 1 ♂, R. Andrade leg. (RAP); Portalegre: Marvão, Santa Maria de Marvão, 39°23‘50.2“N, 7°21‘52.3“W, 616 m, 21.ix.2014, sweeping over bark of *Quercus pyrenaica* trees with sap runs, 1 ♂ 1 ♀, Ana Gonçalves leg. (ARGC); all specimens in SMOC and NMPC dried from ethanol and mounted on pinned triangular cards, those in RAP and ARGC retained in ethanol. CZECH REPUBLIC: C. Bohemia: Roztoky, Tiché údolí, Roztocký háj (5852), 50°8‘47.5“N, 14°23‘10.1“E, beer trap, 2.–10.ix.2009, 1 ♂, J. Preisler leg. (SMLC); Český kras PLA, Na Voskopě res., 49°54‘25“N, 14°04‘05“E, beer trap, oak-hornbeam forest, 16.ix.–2.x.2016, 1 ♀, P. Heřman leg. (JMB); S Moravia: Podyjí NP, Liščí skála, 48°49‘52“N, 15°56‘35“E, 410 m, Quercetum, Malaise trap, 3.viii.–9.ix.2004, 1 ♀, 9.ix.–28.x.2004, 6 ♂♂ 7 ♀♀, M. Barták & Š. Kubík leg. (2 ♂♂ 4 ♀♀ MBP; 2 ♂♂ 2 ♀♀ /1 ♂ genit. prep./ SMOC; 1 ♀ JMB); Podyjí NP, Fládnická chata, 48°48‘42“N, 15°58‘03“E, 360 m, forest, 9.ix.–28.x.2004, Malaise trap, 2 ♂♂, M. Barták & Š. Kubík leg. (MBP); Podyjí NP, Havrarníky, 48°48‘52“N, 15°59‘48“E, 330 m, forest-steppe, 1.–24.vii.2002, Malaise trap, 1 ♀, O. Meixnerová leg. (MBP); Podyjí NP, Vraní skála, 48°51‘03“N, 15°53‘42“E, 390 m, mixed wood, 8.vii.–28.x.2003, Malaise trap, 1 ♂, O. Meixnerová leg. (JMB); all dried from ethanol and mounted on triangular cards. All paratypes with yellow label "Paratypus ♂ (or ♀), *Periscelis* (*P.*) *fugax* sp.n., J. Roháček & R. Andrade det. 2016" and most of them also with white label "*Periscelis (Periscelis) winnertzii* Egger, 1862, ♂ (or ♀), J. Roháček det. 2022".
Other material examined. SWITZERLAND: TI 701.168 113.372, Losone: Arcegno, Collina di Maia, Castagneto con querce, 419 m, prd. 28, vino bianca [white wine trap], ARC 2, 23.viii.–7.xi.2017, 13 ♂♂ 13 ♀♀, L. Pollini P. & M. Abderhalden leg. (all dried from ethanol, SMOC); 1 ♀ (SMOC, body after DNA extraction preserved in a pinned microvial in glycerine, with blue label: JR 34, ON637245); same locality data and method but prd. 8, 9.–23.x.2015, 1 ♂, L. Pollini P. & M. Abderhalden leg. (MCSN). **SLOVAKIA:** S. Slovakia: Cerová vrchovina PLA, Hajnáčka-Gortva 0.9 km E, Steblová skala res., 240 m, 48°14‘51“N, 19°58‘12“E, beer trap, 27.ix.–1.xi.2017, 1 ♀, J. Roháček, J. Ševčík & M. Tkoč leg. (SMOC); Cerová vrchovina PLA, Hajnáčka-Buková 0.4 km NNE, 48°13′39″N, 19°58′25″E, 375 m, beer trap, 12.ix.–11.x.2018, 3 ♂♂ 1 ♀, J. Roháček, J. Ševčík & M. Tkoč leg. (SMOC, 1 ♂ genit. prep.); Cerová vrchovina PLA, Gemerský Jablonec-Vodokáš 0.5 km N, 320 m, 48°12‘47“N, 19°59‘30“E, beer trap, 7.–27.ix.2017, 3 ♀♀, 27.ix.–1.xi.2017, 1 ♀; same locality, Malaise trap, 27.ix.–1.xi.2017, 1 ♀; all J. Roháček, J. Ševčík & M. Tkoč leg. (SMOC); Cerová vrchovina PLA: Jestice 1.3 km SSE, Hradisko Mt., 48°12’31”N, 20°03’39”E, 255 m, wine traps on *Quercus cerris*, 19.vii.–17.viii.2022, 4 ♂♂ 4 ♀♀, 17.viii.–13.ix.2022, 2 ♀♀, 13.ix.–26.x.2022, 2 ♀♀, J. Roháček leg. (2 ♂♂ 2 ♀♀ NMPC, 2 ♂♂ 6 ♀♀ SMOC). **HUNGARY:** Szokolya: Királyrét, Szénpatak, [larva] 23.v.1996, reared from a wound of *Quercus* tree, [adult ♀ emerged] 13.vii.1996, [L. Papp leg.], 1 ♀ with puparium originally glued to a card, now preserved in glycerine in a pinned microvial (HNHM); Szokolya, Vasfazék-v., Magas Tax alatt, 450 m, fekete tölgyfaseb, kifolyó nedvéről, 13.ix.1997, 1 ♂ 6 ♀♀, L. & J. Papp leg. (HNHM, ♂ with terminalia lost). **CROATIA:** Oprtalj, 45.403 N, 13.842 E, 430 m, Swissino baited trap nr. bee hive, 10.ix.–14.x.2019, 1 ♂; Benčani, 45.283 N, 13.740 E, 269 m, Swissino baited trap nr. bee hive, 10.ix.–15.x.2019, 1 ♂, both B. Sladonia leg. (SMOC).

Diagnosis. A rather large *Periscelis* (s. str.) species (Figs 10, 22) with body ca 2.4–3.8 mm long, sexually dichroic face (Figs 8, 9) and wing with cross-vein dm-cu developed but attenuated (or interrupted) by spurious vein in the middle. It is most similar to its closest relative *P. laszloi* sp. nov. (described below) but differs from the latter by a distinctly smaller black spot on antennal pedicel (not extended ventrally at anterior margin of its external side, see Figs 10, 11); mesonotum usually with a distinct pair of brown microtomentose elongate spots or vittae medially (Fig. 12); largely to entirely yellow scutellum (Fig. 12); wing with more extensive dark pattern (Figs 5, 10); suboblong male S6 with brown lateral pigmentation and narrow medial depression (Fig. 20); surstylus with apex (albeit slender) blunt at tip (Figs 13, 14); gonostylus smaller and gradually tapering towards simple apex (Figs 13, 16); postgonite with dilated basal part being expanded posteroventrally (see Fig. 15, arrow); female T8 brown pigmented (Fig. 26); female S8 darkened brown at lateral and posterior margins (Fig. 27).
Redescription. The species has been described in detail as *Periscelis fugax* by Roháček & Andrade (2017: 234–240). Consequently, it is unnecessary to redescribe *P. winnertzii* here and only illustrations of diagnostic characters and, particularly, of structures of the male and female terminalia are presented to facilitate its safe identification (Figs 5, 8–29). However, some new information on the variability of some external morphological characters are given below.
Variability. While the extent of the black spot on the pedicel seems to be relatively stable, the colouration of scutum and scutellum can vary. Although the scutellum is usually largely yellow and contrasting with adjacent part of scutum, it can be rarely ochreous or even brown darkened, particularly basally, exceptionally (1 ♀ from Switzerland, 1 ♂ from Slovakia) largely brown with only apex yellowish,

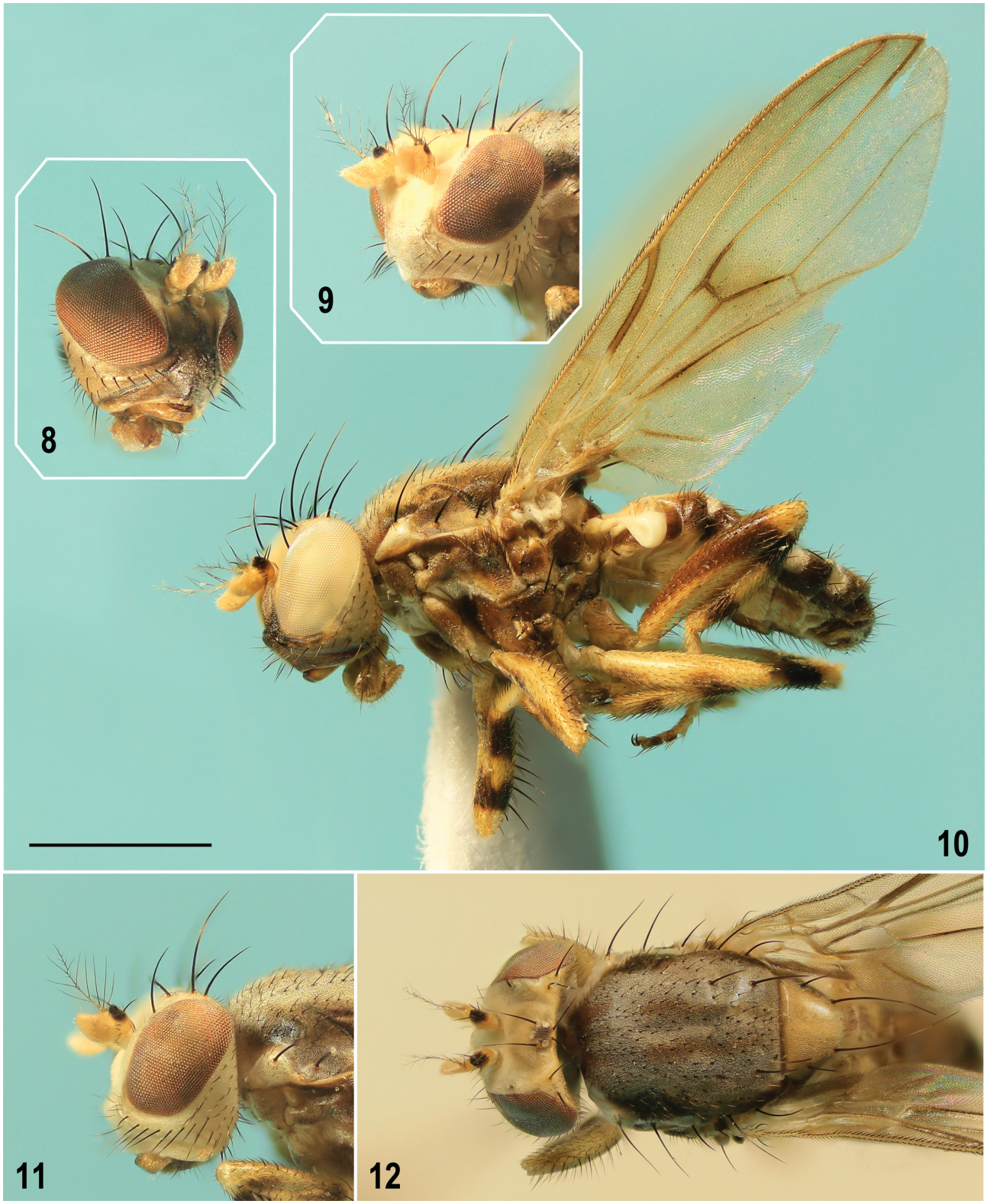
thus most resembling that of *P. laszloi* sp. nov. Also the brown microtomentose vittae on mesonotum seem to be variable, both in length and distinctness. Moreover, immature adults and specimens faded due to preservation in alcohol or long stored in collections can have these colour characters obscured and sometimes cannot be identified safely. For these aberrant and/or faded specimens it is recommended to study structures of the male or female terminalia for safe identification.

Preimaginal stages. ***Larva.*** Cephalopharyngeal (= head) skeleton of 3rd instar larva (Figs 35–37) of saprophagous type, as known in the majority of other acalyptrate larvae,



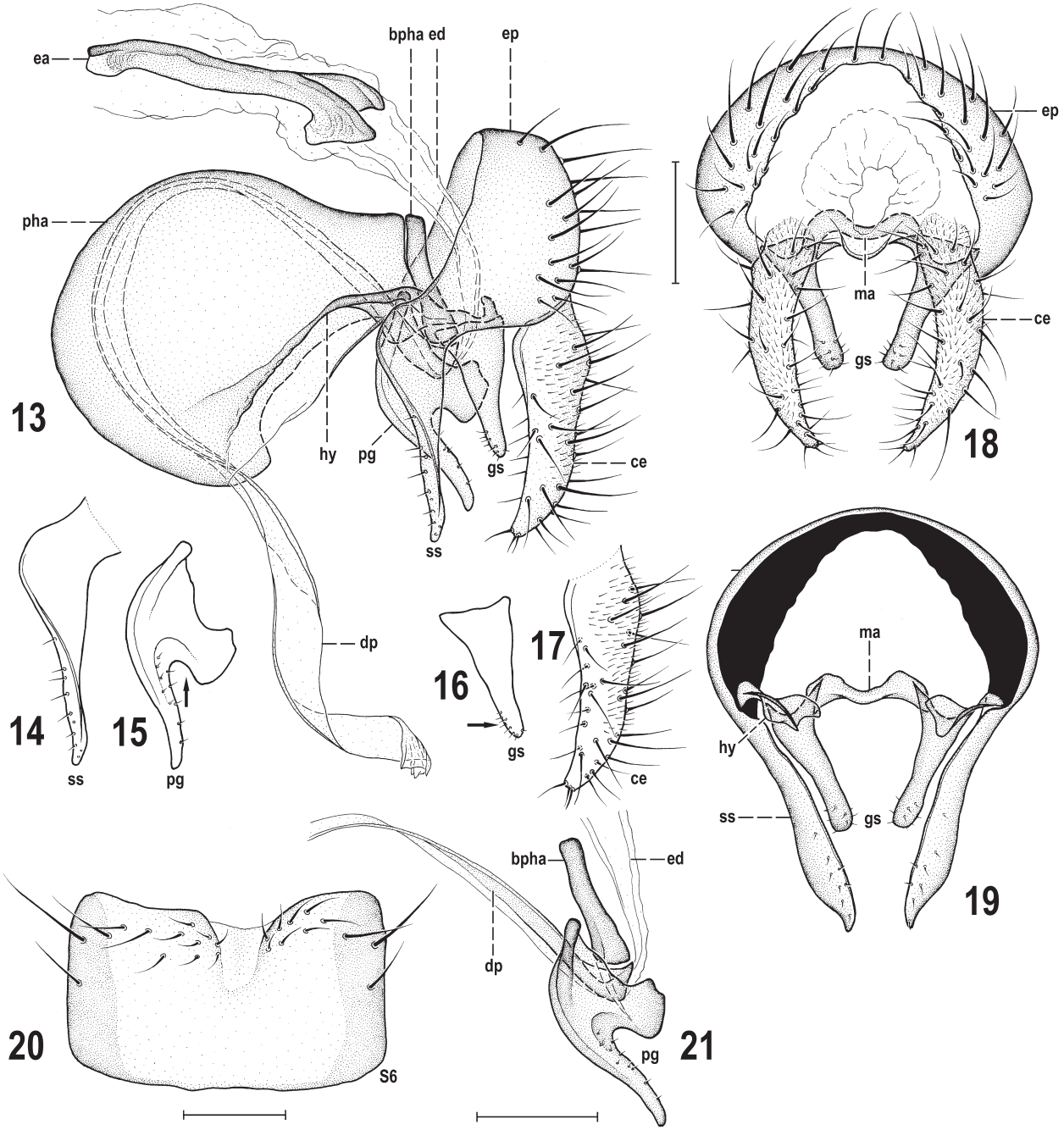
Figs 1–7. *Periscelis* (*P.*) *winnertzii* Egger, 1862 lectotype, wing and habitat. 1 – lectotype, sex unknown, sublaterally; 2 – same, subdorsally; 3 – lectotype with labels removed; 4 – ditto, with labels pinned under specimen; 5 – right wing, male (Hungary), scale = 1 mm; 6 – habitat of both *P. winnertzii* and *P. laszloi* sp. nov., a thermophilous oak (*Quercus cerris*) forest in S. Slovakia (Cerová vrchovina PLA: Hajnáčka-Buková); 7 – same, with Malaise trap and zoologists in foreground (from left: Attila Balász, Michal Tkoč, Csaba Balász). Photos by G. Wöss (1, 2), P. Sehnal (3, 4), J. Roháček (5, 6) and J. Ševčík (7).

most resembling that of *Periscelis* (*Myodris*) *annulata*, described by Papp (1988, 1995) and Mathis & Papp (1998). The paired mouthhooks (= mandibles) relatively large and long compared to other parts of skeleton (Fig. 36, mh); each laterally flattened, with simple, slightly bent distal hook, in the middle projecting ventrally as a blunt tooth (less strongly than in *P. annulata*), posteriorly widened (more distinctly laterally than dorsoventrally, cf. Fig. 37) and in lateral view somewhat incised (Figs 35, 36), all simply pigmented, gradually becoming paler distally. Dental sclerites (Figs 35, 36, ds) situated below mouthhooks at their posterior margin, small, rounded block-shaped, with slightly project-



Figs 8–12. *Periscelis* (*P.*) *winnertzii* Egger, 1862. 8 – male head, right anterolaterally; 9 – female head, left anterolaterally; 10 – entire male, left laterally; 11 – female head, left laterally; 12 – female head and thorax, dorsally. Fig. 10 based on holotype of *P. fugax* Roháček & Andrade, 2017 (Portugal), others on specimens from Hungary. Scale = 1 mm. Photo by J. Roháček.

ing ventral ends. No accessory oral sclerites. Intermediate (= hypostomal) sclerite (Figs 35–37, im) situated between mouthhooks and pharyngeal sclerite and clearly separate from both of them, strikingly short (markedly shorter than mouthhook and also shorter than that of *P. annulata*) and relatively broad, H-shaped in ventral view (Fig. 37), with connecting bridge-shaped part between lateral rods expanded ventrally (but less than in *P. annulata*). Epistomal plate flat (Fig. 37, es), elongately rounded subtriangular, pale-pigmented, between anterior arms of intermediate sclerite, with minute, closely attached oval ?perforations in the middle (see Fig. 37). Pharyngeal sclerite (Fig. 35) elongate and relatively low. Its paired anterior projections (parastomal bars, pb) very slender, slighly bent and situated just above intermediate sclerite, each distally connected to posterodorsal end of mouthhook. Dorsal (dcr) and ventral (vcr) cornua of pharyngeal sclerite well developed. Dorsal cornu shorter, darker, only slightly tapered posteriorly and its end blunt (Fig. 35) in contrast to that of *P. annulata*. Dorsal cornua anterodorsally connected by rather unusual dorsal bridge (db) which is strikingly projecting dorsally and posteriorly, with dorsal side distinctly perforated (see Fig. 35). Also anteroventral part of dorsal cornu with distinctive structure and pigmentation. Ventral cornua longer

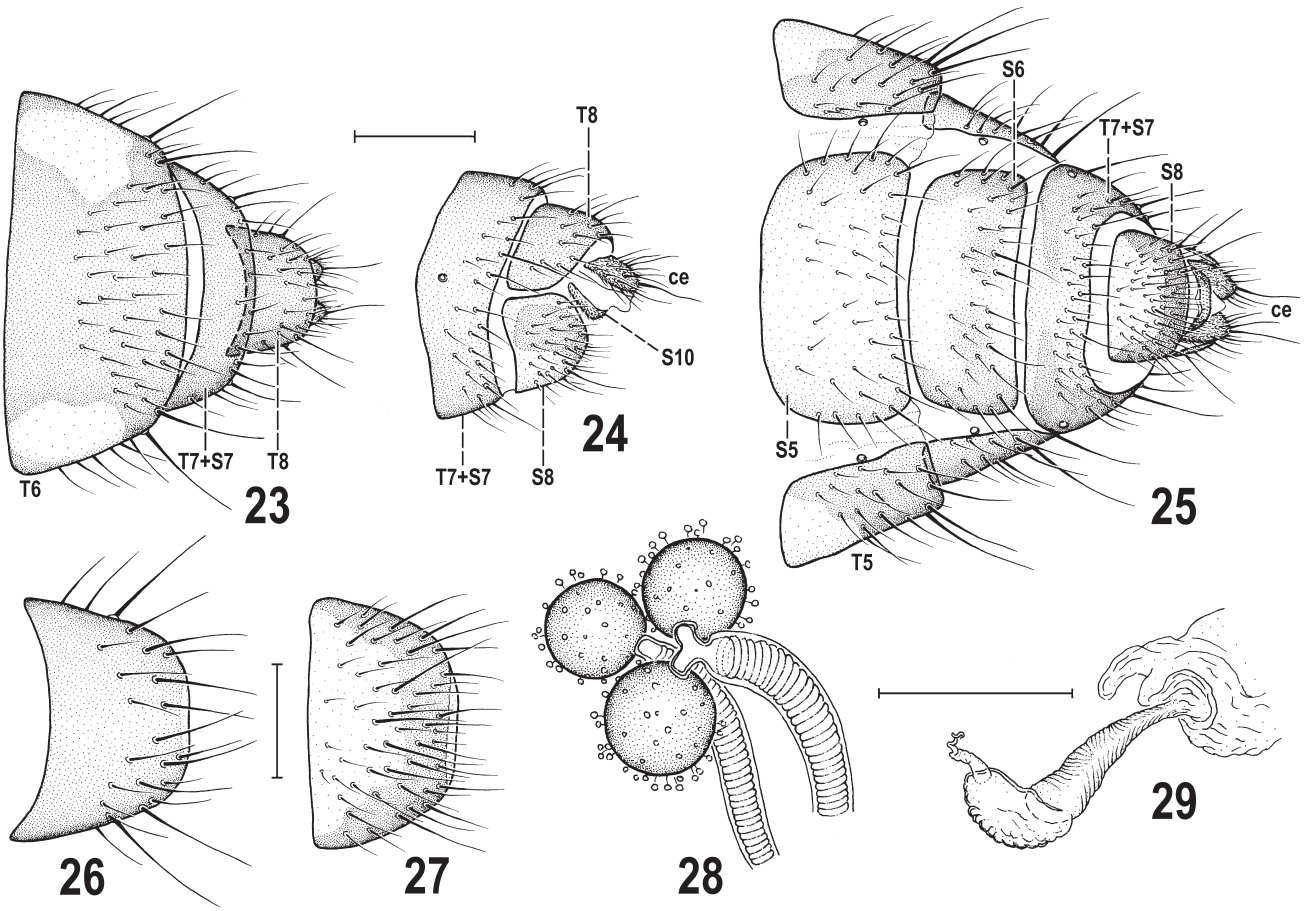


Figs 13–21. *Periscelis* (*P.*) *winnertzii* Egger, 1862, male. 13 – entire genitalia, laterally; 14 – surstylus, laterally; 15 – postgonite, laterally; 16 – gonostylus, sublaterally (widest extension); 17 – cercus, laterally; 18 – external genitalia caudally (surstyli omitted); 19 – same, cranially (cerci omitted); 20 – pregenital sternum (S6), ventrally; 21 – aedeagal complex, laterally (only basal part of distiphallus depicted). All figures based on male paratype of *P. fugax* Roháček & Andrade, 2017 (Portugal), adapted from Roháček & Andrade (2017, figs 6–14). Scales = 0.1 mm. For abbreviations see text (p. 303).

Fig. 22. *Periscelis* (*P.*) *winnertzii* Egger, 1862, female (Hungary), left laterally. Scale = 1 mm. Photo by J. Roháček.

and more robust (mainly posteriorly) than dorsal cornua, pale brown pigmented and posteriorly weakly sclerotized, longitudinally striated. Ventral trough, connecting ventral cornua, entirely membranous and very finely striated. Dorsal margin of posterior half of ventral cornu without dorsal apodeme, only slighly bulging (Fig. 35).

Puparium (Figs 30–34) rather spindle-shaped than barrel-shaped, moderately elongate, distinctly wider than high but not dorsoventrally flattened, with more tapered anterior end and less narrowed and rounded posterior end (apart from larval posterior digitiform processes). Measurements (based on single female puparium examined): length 2.98 mm, maximum width 1.23 mm, maximum height 0.81 mm, maximum length of lateral process 0.13 mm, length of caudal process with posterior spiracle 0.28 mm. Integument of (empty) puparium ochreous yellow to ochreous brown (darker posteriorly), all surface finely and densely spinulose apart from being sparsely and finely transversely wrinkled. All thoracic and abdominal segments with lateral digitiform and spinose processes (= secondarily sclerotized fleshy processes of larva) and smaller bulbous projections (Figs 30, 33). Thus, larval characters are rather well preserved on puparium but modified by sclerotization of puparium. Segmentation of body more or less visible (Figs 30, 31). Anterior end of puparium (Figs 34, 38, 39) distinctly tapered but dorsoventrally flattened, equalling to thoracic (plus integrated cephalic) segments of larva. First visible segment (= cephalic + prothoracic part) laterally with (larval) anterior spiracles; each spiracle very small, short (Figs 38, 41), terminated in 3 bulbous papillae (hence different from that of larva of *P. annulata* having 4 or 5 papillae). First visible segment distinctly narrower but longer than 2nd segment, anteromedially simple, rounded, dorsally (Fig. 38) and ventrally (cf. Fig. 39) only very finely wrinkled but densely spinose, with finest spinulae anteromedially, largest spinulae laterally. Dorsal side of first visible segment with cephalic part (Fig. 38, CP) flat, spinulose only at anterior margin and anteromedially, and with a pair of plain rounded areas; prothoracic part (Fig. 38, PR) with minute spinulae restricted to anterior submarginal area, otherwise with longer spines. Ventral side of first visible segment having in cephalic part distinctive dark palmately branched pigmentation (Fig. 39) obviously representing remnants of larval oral ridges; its prothoracic part characterized by fine transverse wrinkles, finely spinulose anteromedially and sparsely spinose in other areas except for the posteromedial part being finely tuberculate. Second (mesothoracic) segment dorsally (Fig. 38) sculptured and spinulose similarly as is foregoing segment but distinguished by medial semicircular incision of anterior margin. Third (metathoracic) segment provided with lateral digitiform and spinose processes similarly as all following (abdominal) segments. Cephalopharyngeal skeleton of 3rd-instar larva situated inside of anterior part of puparium, affixed to its ventral wall (see Fig. 33). Posterior end (= caudal segment) of puparium more convex and posteriorly rounded (Figs 30, 33) and bearing several digitiform processes, posteriorly, laterally and also ventrally (Fig. 40); posterior pair of processes longest and carrying posterior spiracles (see below). Dorsal side of caudal segment medially more tuberculate and densely spinose (Fig. 30); ventral side of caudal segment anteriorly finely and sparsely transversely wrinkled but in front of (larval) anus with a more elevated and dark transverse ridge that is very finely spinulose (Fig. 40). Anus surrounded by bent spinose structures (Fig. 40, as). Posterior spiracles situated on long, digitiform and strongly spinose processes (Figs 40, 43) being distally bare, ringed and originally (in larva) obviously retractable; no lateral projections on these spiracular processes (in contrast to those of *P. annulata*) but

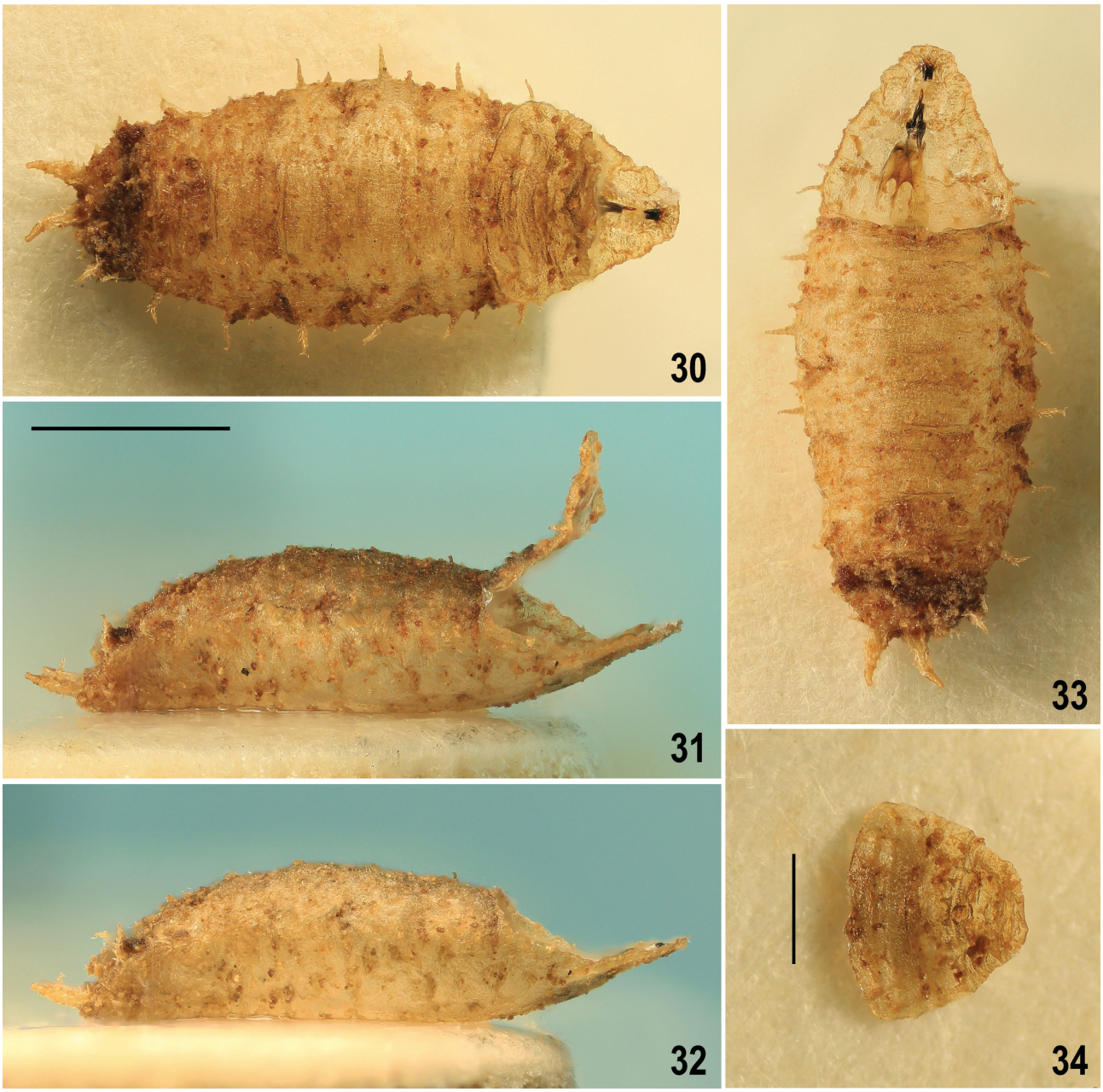


Figs 23–29. *Periscelis* (*P.*) *winnertzii* Egger, 1862, female. 23 – postabdomen, dorsally; 24 – posterior part of postabdomen (from 7th segment), laterally. 25 – 5th segment and postabdomen, ventrally; 26 – T8, dorsally; 27 – S8, ventrally; 28 – spermathecae; 29 – ventral receptacle, laterally. All figures based on female paratype of *P. fugax* Roháček & Andrade, 2017 (Portugal), adapted from Roháček & Andrade (2017, figs 15–21). Scales = 0.2 mm (Figs 23–25) and 0.1 mm (Figs 26–29). For abbreviations see text (p. 303).

ventrally, at their bases with an additional pair of smaller spinose processes (Fig. 40). Posterior spiracle small, set on short, stump-like end of posterior spiracular process (Fig. 40). Each spiracle with only 3 subcircular spiracular slits and 3 tufts of lateroclinate interspiracular hairs, some of which can be branched (Fig. 42).

Remarks. ***Nomenclature.*** Egger (1862, p. 780) used the name "*Winertzii*" throughout the original description including the derivatio nominis in the last paragraph of his text. Thus, the incorrect spelling of this name was not typographical or typing error as given by Papp & Withers (2011: 356) and repeated by Roháček & Andrade (2017: 247) but an unwanted (albeit several times repeated) distortion of the name of the collector, Johann Winnertz, to whom the species was dedicated. Jean Jean (also Johannes or Johann) Winnertz (11.ii.1800–24.vii.1890) was a factory owner, businessman and Commercial Court President in Crefeld (W. Germany) but also a well-known dipterist (mainly studying nematocerous flies) and sponsor of natural sciences (Enss et al. 2020). Egger (1862, p. 780) literally wrote "Winertz hat sie schon vor Jahren gekannt und beschrieben, aber nicht veröffentlicht. Er hat sie Herrn Dr. Schiner bei Abfassung seines grossen Dipteren-Werkes zur Verfügung gestellt, wobei sich gezeigt hat, dass sie auch in Oesterreich einheimisch ist." [my translation: Winertz knew and described it years ago but did not publish it. He gave it to Dr. Schiner to be available when he was writing his large Diptera work, whereby it has been shown that it is also native to Austria]. Consequently, J. Egger described this species from Austrian specimens (collected by J. Winnertz?) received from J. R. Schiner so that this species could be included in Fauna Austriaca (Schiner 1864: 272). Apparently, J. R. Schiner only orally asked J. Egger to name the species in honour of J. Winnertz which resulted in distortion of his surname. Therefore, already Schiner (1864) correctly emended the name of this species to *P. winnertzii*. Subsequently, the species' name has been variously misspelled; moreover, in the past *P. winnertzii* had been placed (besides *Periscelis* Loew, 1858) in two other genera and/or subgenera, viz. *Microperiscelis* Oldenberg, 1914 (= junior synonym of *Myodris* Lioy, 1864) and *Parclioscena* Enderlein, 1936 (here as type species!), see synonymies above.

Preimaginal stages. Papp (1998) and partly also Mathis & Papp (1998) mention larvae and a puparial shell of *P. winnertzii* collected in Hungary (see in "Biology" below). However, only one larva was reared to a female adult and really belonged to *P. winnertzii*. The identity of the remaining larvae is uncertain, inasmuch as both *P. winnertzii* and *P. laszloi* sp. nov. occurred syntopically on oak wounds studied by him. Although Papp (1998: 115) wrote that these larvae will be described in a forthcoming paper, this in-

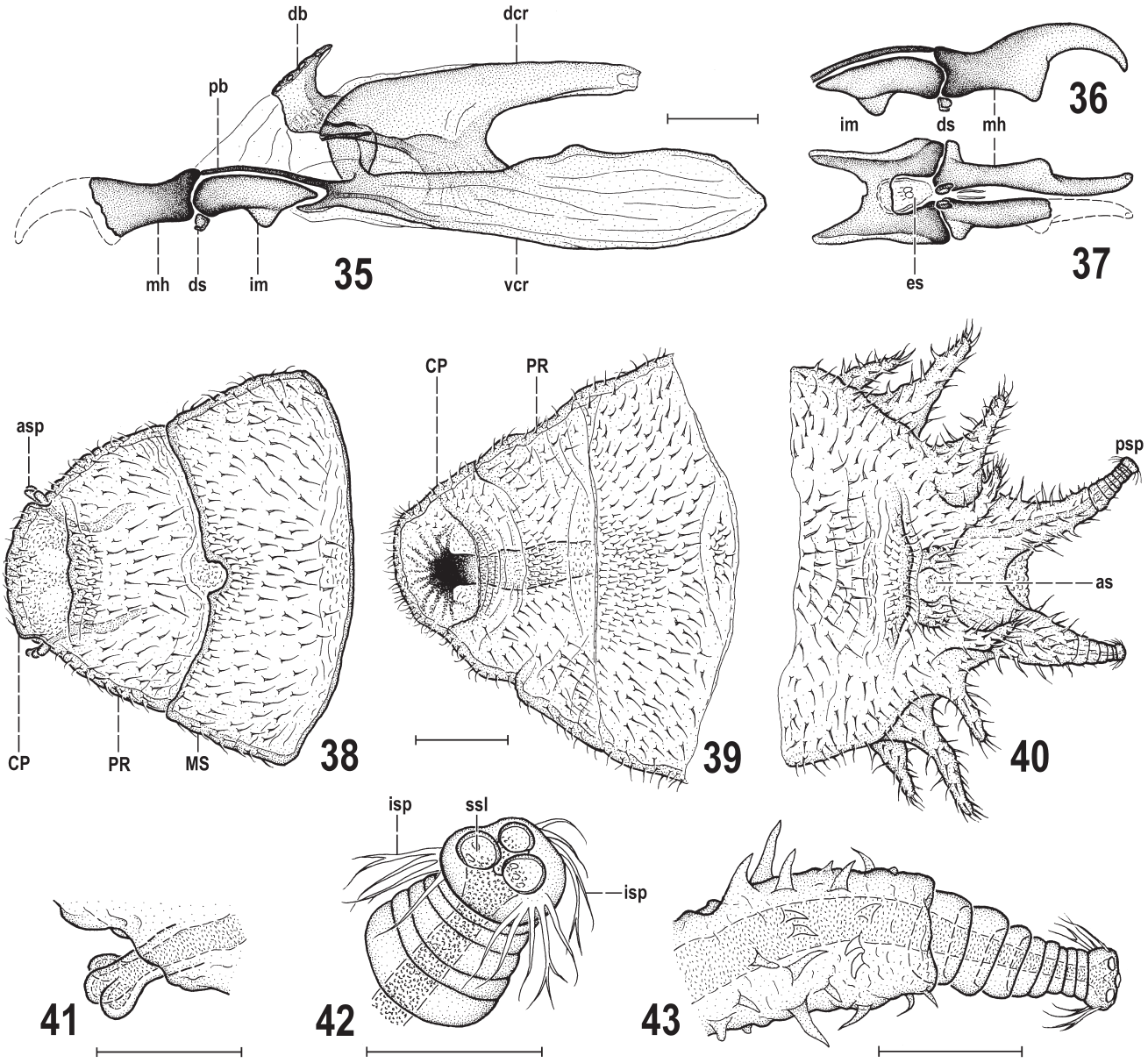


Figs 30–34. *Periscelis* (*P.*) *winnertzii* Egger, 1862, puparium (female, Hungary). 30 – puparium dorsally; 31– same, right laterally; 32 – same, with anterodorsal part removed; 33 – same, dorsally, without anterdorsal part; 34 – anterodorsal part of puparium, dorsally. Scales = 0.5 mm (Fig. 34) and 1 mm (others). Photo by J. Roháček.

tention failed to materialize. Therefore, only the puparium (and larval cephalopharyngeal skeleton extracted from it) of the reared female has been studied and described above with notes on differences from 3rd instar larval characters of *P.* (*Myodris*) *annulata* as described and illustrated by Papp (1995) and Mathis & Papp (1998).

Relationships. Both *P. winnertzii* and its closest relative *P. laszloi* sp. nov. clearly belong to *Periscelis* (s. str.) as demonstrated by the construction of the male genitalia being very similar to that of *P. annulipes* Loew, 1858, the type species of the subgenus (cf. Papp & Withers 2011: fig. 1) irrespective of the fact that these two species have the posterior cross-vein (dm-cu) complete. However, as shown by Roháček & Andrade (2017), their dm-cu is interrupted by a "vena spuria" (cf. Figs 5, 76), which may indicate tendency to reduction of this cross-vein as is known in *P. annulipes* and some other species of the subgenus. *Periscelis winnertzii* and *P. laszloi* sp. nov. were considered a sister-pair already by Roháček & Andrade (2017), albeit under different names. For more detail see below under *P. laszloi* sp. nov.

Biology. Previously Egger (1862) wrote that this species occurs like *P. annulata* on sap running from poplars, oaks and horse chestnuts. However, this information is probably somewhat simplified or generalized – in fact *P. winnertzii* (and also *P. laszloi* sp. nov.) are usually associated with sap runs on oaks of various species (for habitat see Figs 6, 7). Papp (1998) collected 28 adults on black oozing wounds of two oak trees but this series in fact included both true *P. winnertzii* and *P. laszloi* sp. nov. as found by



Figs 35–43. *Periscelis* (*P.*) *winnertzii* Egger, 1862, larva and puparium (female, Hungary). 35 – cephalopharyngeal skeleton of 3rd instar larva, left laterally; 36 – anterior part of the same, right laterally; 37 – same, ventrally; 38 – anterodorsal part of puparium, dorsally; 39 – anteroventral part of puparium, ventrally; 40 – posterior end of puparium, ventrally; 41 – right anterior spiracular process, sublaterally; 42 – end of posterior spiracular process, subcaudally; 43 – posterior spiracular process, dorsally. Scales = 0.1 mm (Figs 35–37), 0.2 mm (Figs 38–40) and 0.05 mm (others). For abbreviations see text (p. 303).

their revision. Papp (1998) also reported on 13 (1 first instar, 3 second instar, 9 third instar) larvae and 1 pupal shell (empty puparium) collected from wounds of oak tree. These could probably also belong to both species but one 3rd instar larva that was collected on 23 May 1997 and reared in a vial with sap and wet corky bark in lab at 20°C, pupated on 17 June and emerged on 13 July was a female of true *P. winnertzii* (its empty puparium has been described above). Because both species occurred here on the same locality, habitat (wounds on oak trees) and time (September) they probably have also very similar phenology. According to his observations Papp (1998: 118) believes that adults emerge in mid-July to early September, mate and lay eggs up to the beginning of September. Larvae develop around wounds under bark moistened by tree sap and reach at least to the 2nd instar during September. The species overwinter as 3rd instar larvae because they were caught in May (of the next year). Thus, *P. winnertzii* (and surely also *P. laszloi*) has only one generation per year. We now know at least four localities where both species occurred syntopically, viz. in an oak-chestnut forest in Switzerland, in an oak forest in Hungary and in two thermophilous oak (*Quercus cerris*) forests in Slovakia. The most efficient method to collect adults apparently are traps baited by wine, vinegar or beer (thus simulating fermenting tree sap), particularly those hanging higher (some 5 m) in canopies (cf. Bächli 1997; Papp 1998; Pollini Paltrinieri, personal communication 2021). The majority of the known specimens of *P. winnertzii* were collected in August–October, but there are

some exceptional records from June and July.

Distribution. *Periscelis winnertzii* seems to be widespread in Europe. Because it was formerly mixed with its closest relative *P. laszloi* sp. nov. (= *winnertzii* auctt.), the reliable old records are only those by Egger (1862) and Schiner (1864) from Austria (both based on type specimens). Further reliable records are those recorded recently (after Roháček & Andrade 2017) under *P. fugax* and those revised here. Currently, *P. winnertzii* is known from the following countries: Portugal (Roháček et al. 2016, as *P.* sp. cf. *winnertzii*; Roháček & Andrade 2017, as *P. fugax*); Spain (Carles-Tolrá et al., 2018, as *P. fugax*), Great Britain: England (Chandler 2017, Hellqvist 2020, both as *P. fugax*), France (Withers 2017, Chandler 2017, both as *P. fugax*), Switzerland (material examined), Czech Republic: Bohemia and Moravia (Máca et al. 2005; Máca 2009; Roháček & Andrade 2017, as *P. fugax*), Slovakia (new), Hungary (new), Croatia (new), Albania (de Bree 2022, as *P. fugax*). *Periscelis winnertzii* has been confirmed to occur sympatrically with *P. laszloi* sp. nov. in the following countries: Portugal, Spain, Great Britain, Switzerland, Slovakia and Hungary.

Periscelis (*Periscelis*) *laszloi* sp. nov.

(Figs 44–76)

Periscelis winnertzii: Papp & Withers (2011): 354 (revision, illustr.)
Periscelis (*Periscelis*) *winnertzii*: Roháček & Andrade (2017): 244 (diagnosis, illustr.)

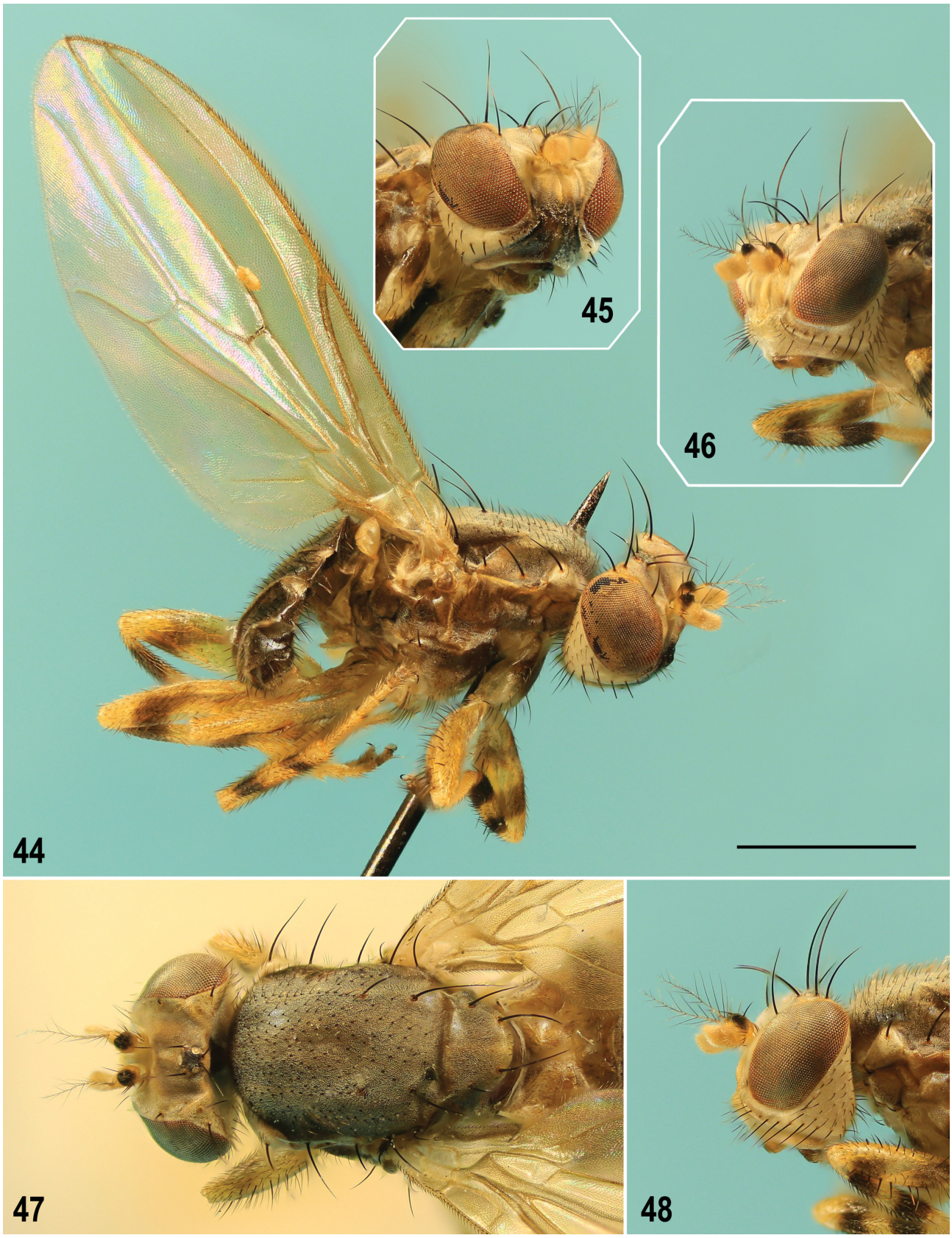
Type material. Holotype: ♂, labelled: "Szokolya, Vasfazék-v., Magas Tax alatt, 450 m, Papp László és János", "fekete tölgyfaseb, kifolyó nedvéről" (obverse), "13 Sep 1997" (reverse, handwritten), "Hungarian Natural History Museum, Diptera Coll. Budapest" (blue label) and "Holotypus ♂, *Periscelis* (*P.*) *laszloi* sp.n., J. Roháček det. 2022" (red label) (HNMH, intact, examined, Fig. 44).

Paratypes: 3 ♂♂ 12 ♀♀, same data as for holotype (2 ♂♂ 2 ♀♀ genit. prep., 2 ♂♂ 2 ♀♀ captured in copula) (all HNMH). [fekete tölgyfaseb, kifolyó nedvéről = on black sap runs from wound of oak]. Other paratypes: **PORTUGAL: Porto:** Vila Nova de Gaia, Avintes, Parque Biológico de Gaia, 41°06′00.0″N, 8°33′35.3″W, 50 m, 29.vi.2011, sweeping over bark of *Quercus* trees with sap runs, 1 ♂, R. Andrade leg. (dried from ethanol, genit. prep., SMOC); Valongo, Valongo, 41°09′33.4″N, 8°29′05.6″W, 50–100 m, sweeping over bark of *Quercus* trees with sap runs, 4.x.2011, 1 ♂ 1 ♀, R. Andrade leg. (in glycerine, ♂ genit. prep., SMOC). **SWITZERLAND:** TI 701.168 113.371, Losone: Arcegno, Collina di Maia, Castagneto con querce, 417 m, prd. 32B, Finestra [window trap], ARC 2, 20.xi.–22.xii.2017, 2 ♂♂ 1 ♀ (SMOC, 1 ♂ genit. prep.); same locality but TI 701.298 113.204, 365 m, prd. 3, SLAM trap UP [Malaise type trap in tree canopy], ARC 1, 7.–18.viii.2015, 1 ♂ (MCSN); same locality but TI 701.013 113.741, 411 m, prd. 7, VINO Gialla [trap with yellow wine], ARC 3, 24.ix.–9.x.2015, 1 ♂ 9 ♀♀ (MCSN); same locality but TI 701.168 113.372, prd. 8, VINO Bianca [trap with white wine], ARC 2, 9.–23.x.2015, 4 ♂♂ 15 ♀♀ (2 ♂♂ 11 ♀♀ MCSN, 1 ♂ 2 ♀♀ NMPC, 1 ♂ 2 ♀♀ SMOC); same locality but TI 701.011 113.773, prd. 6, BIRRA Bianca [trap with pale beer], ARC 3, 8.–24.ix.2015, 1 ♂ 9 ♀♀ (MCSN), all L. Pollini P. & M. Abderhalden leg. **HUNGARY:** W. Hungary: Kőszegi TK: Kőszek, Hétforrás patak fölött, 10.vii.2002, 1 intersex (PHOTO), L. Papp leg. (det. L. Papp 2002 as *P. winnertzii*) (intact, HNHM); N. Hungary, Bükk Mts: Varbó env., Fonagy sági-tó, 48°08′56″N 20°35′21″E, 250 m, on oak tree bark in deciduous forest, 9.viii.2018, 1 ♀, J. Roháček leg. (PHOTO) (SMOC). **SLOVAKIA:** C. Slovakia: Muránska Dlhá Lúka 2 km SE, 48°42′12″N, 20°05′51″E, 360 m, beer trap in hornbeam forest, 3.ix.–27.x.2012, 1 ♀, J. Roháček & J. Ševčík leg. (dried from ethanol, SMOC); Muránska planina NP: Muránska Lehota 3.7 km E, above Javorníčková dolina, 48°43′15″N, 19°59′56″E, 780 m, sweeping undergrowth of oak-linden forest, 13.viii.2015, 1 ♀, J. Roháček leg. (PHOTO) (genit. prep., SMOC); Muránska planina NP: Šarkanica res., 48°42′45″N, 19°59′19″E, 580 m, protein trap, 9.viii.–5.ix.2017, 1 ♀; same locality, Malaise trap, 6.–27.ix.2017, 1 ♂, J. Roháček, J. Ševčík & M. Tkoč leg. (both dried from ethanol, NMPC); S. Slovakia: Cerová vrchovina PLA: Hajnáčka-Buková 0.4 km NNE, 48°13′39″N, 19°58′25″E, 375 m, beer trap, 12.ix.–11.x.2018, 1 ♂, J. Roháček, J. Ševčík & M. Tkoč leg. (dried from ethanol, genit. prep., SMOC); Cerová vrchovina PLA: Jestice 1.3 km SSE, Hradisko Mt., 48°12′31″N, 20°03′39″E, 255 m, wine traps on *Quercus cerris*, 19.vii.–17.viii.2022, 1 ♂ 1 ♀, 13.ix.–26.x.2022, 1 ♀, J. Roháček leg. (dried from ethanol, SMOC). **SWEDEN:** Ög: Boxhom k:n: Björneberg, WGS84: 58.196997/14.911511, inäga, 28.vi.–23.vii.2019, 1 ♂, 31.viii.–19.x.2019, 1 ♀, Niklas Johansson leg. (dried from ethanol, ♀ with right wing glued to card) (NHRS, ♂ no. 000104579, ♀ no. 000104337). According to Hellquist (2020, as *P. winnertzii*) these specimens were collected in a Malaise trap.

Other material examined (excluded from type series). **SWITZERLAND:** TI 701.168 113.371, Losone: Arcegno, Collina di Maia, Castagneto con querce, 417 m, prd. 32B, Finestra [window trap], ARC 2, 20.xi.–22.xii.2017, 1 ♀, used for mo1ecular study (SMOC, body after DNA extraction preserved in a pinned microvial in glycerine, with blue label: JR 35, OM314933). **HUNGARY:** Kapornak [= Nagy Kapornak], without further data, 3 ♂♂, heavily damaged, all Aradi det. as „*Microperiscelis Winnertzi*" (HNHM, all genit. prep.); Badacsony, without further data, 1 ♂, heavily damaged, Thalhammer leg., Aradi det. as „*Microperiscelis Winnertzi*" (HNHM, genit. prep.). **Note.** There are 2 other specimens from Badacsony in HNHM but they are headless and without abdomen, hence not safely identifiable. **GREAT BRITAIN: England:** Herefordshire, Little Doward, 9.viii.–20.ix.2021, 1 ♀, flight interception trap in large cavity of live beech, K.N.A. Alexander leg., P. J. Chandler det. (PCB, not examined) (P. J. Chandler, personal communication 2022).

Diagnosis. Slightly larger on average (2.66–4.17 mm) and more robust than *P. winnertzii*, with similar body colouration, wing venation and chaetotaxy. It distinctly differs from the latter species by: pedicel with black spot larger, extended laterally towards its ventral side (Figs 44, 48, 72); mesonotum more uniformly grey microtomentose, with brown medial spots small, indistinct to absent (Figs 47, 75); acrostichal setulae more numerous than in *P. winnertzii*, in 10–12 rows on suture; scutellum normally darker, with yellow colour reduced (Figs 47, 75); wing with brown infuscation reduced, particularly at apex, between r-m and dm-cu and on A_1 (Figs 44, 76); male pregenital sternum (S6) more or less widened posteriorly, without posteromedial depression but with acutely projecting anterior corners (Figs 60, 61); surstylus distally more slender and acutely pointed (Fig. 50); gonostylus with apex distinctly curved (Fig. 51); postgonite with basal part not expanded ventrally (Figs 58, 59); female T8 wider, posteromedially pale pigmented (Fig. 66); female S8 also wider, less densely setose, only laterally dark-pigmented (Fig. 67); spermathecae (Fig. 69) larger, with diameter more than 3.5 times larger than diameter of duct. For other (smaller) differences see description below.

Description. ***Male.*** Total body length 2.66–3.81 (holotype 3.30) mm. General colour brown, dull, grey (with silvery blue tinge) microtomentose; some parts of head, thorax and all legs yellow to whitish variegated; abdomen with silvery white microtomentose lateral maculae on terga T2–T5 (Figs 44, 47, 72). Head distinctly longer ventrally than dorsally in profile (Fig. 44); face medially keel-like, protruding below antennae and relatively pale-pigmented (ochreous to whitish) but with some parts darkened (Fig. 45), largely microtomentose and dull. Eye elongately



Figs 44–48. *Periscelis* (*P.*) *laszloi* sp. nov. 44 – entire male, right laterally; 45 – male head, right anterolaterally; 46 – female head, left anterolaterally; 47 – female head and thorax, dorsally; 48 – female head, left laterally. Fig. 44 based on male holotype, others on specimens from Hungary. Scale = 1 mm. Photo by J. Roháček.

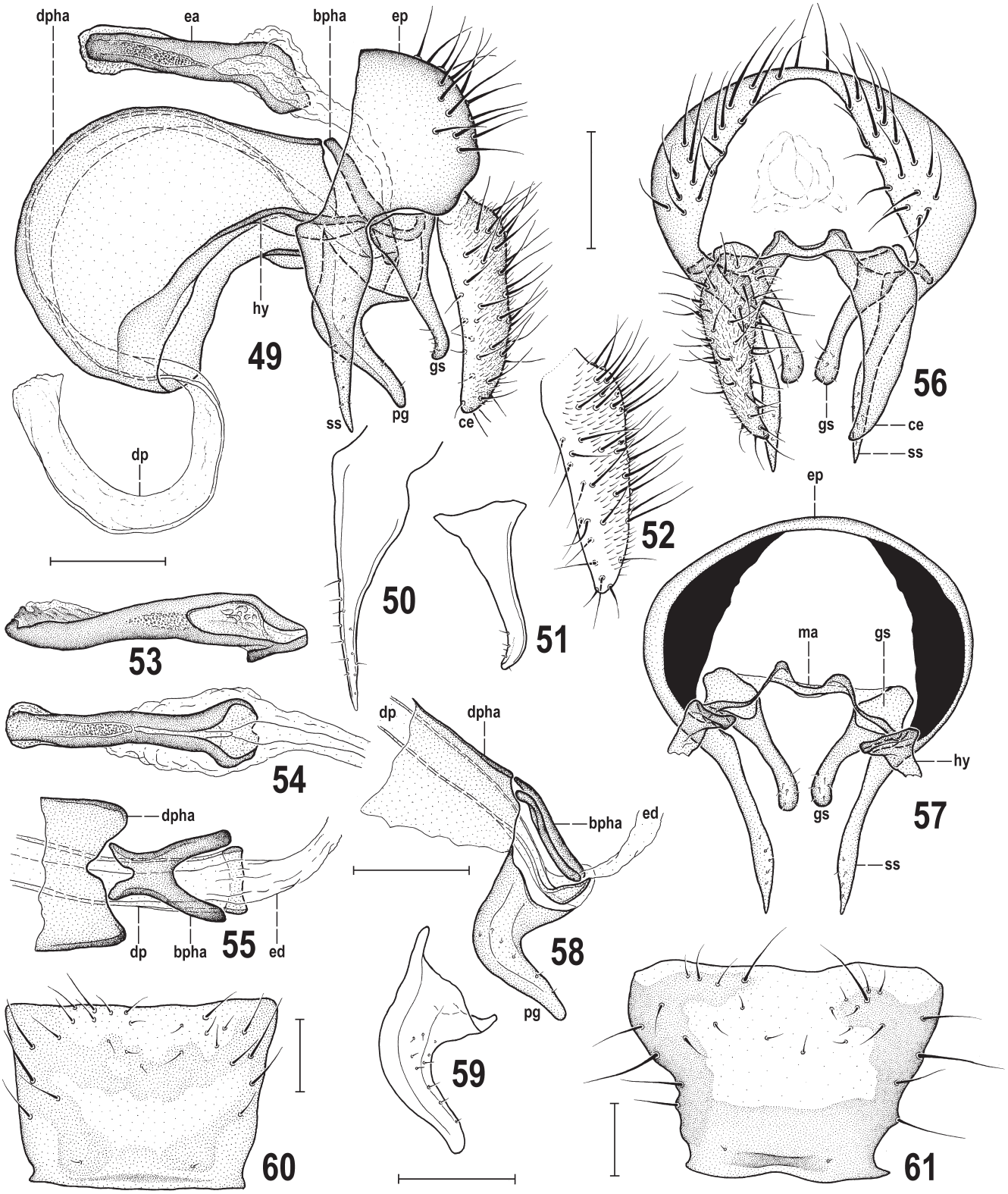
suboval, ellipsoid to slightly ovoid with longest diameter oblique and 1.6–1.7 times as long as shortest. Postgena expanded towards occiput (mainly ventrally) due to eye shape and position; eye brightly red in living adults (cf. Figs 73–75), with sparse and short whitish interfacetal microsetulae. Occiput distinctly concave, brown to pale brown, only marginally yellow to (ventrally) whitish yellow; concave brownish area of occiput with relatively large patch of silvery microtomentum on each side. Frons without microsetae, broad (ca 1.7 times as wide as high), very slightly narrowed anteriorly; medially slightly but distinctly depressed against orbits and ochreous or pale brown; lateral parts of frons (mainly orbits) yellow to (anteriorly) whitish yellow and whitish microtomentose; ocellar triangle at posterior margin of frons, small but somewhat elevated, brown to blackish brown (darkest part of frons); ocelli relatively large, arranged in equilateral triangle. Face (Fig. 45) distinctly bicolourous: ventrally brown to blackish brown, dorsally yellow to pale yellow including narrow medial keel-like carina [thus face dorsally distinctly paler than in *P. winnertzii* where carina is normally brownish], only in Swedish specimen distinctly darkened laterally. Dark ventral part of face protruding above mouthedge and medially shining tuberculate but ventrolateral areas with distinct silvery, slightly bluish, microtomentum. Facial sensilla absent but ventrolateral part of face (below anterior end of gena) with fine inclinate setae. Gena relatively low, with only anterior corner brown, otherwise pale, largely dirty white and whitish microtomentose but its ventral margin more (anteriorly) or less darkened (ochreous to pale brown); postgena and adjacent part of occiput pale yellow to dirty white. Antennae very slightly divergent and largely yellow, 1st flagellomere whitish yellow, but pedicel with dull blackish anterodorsal spot extended anterolaterally more ventrally that in *P. winnertzii*, see Fig. 44, in extreme (specimen from Sweden) covering its entire outer side. Pedicel somewhat expanded dorsally, setose at anterior margin, with dorsal setae longer than those lateral. 1st flagellomere elongate, with dorsal margin straight to slightly concave and apex with short whitish pilosity; arista dirty yellow, somewhat longer than antenna, long-pectinate (longest dorsal rays about as long as 1st flagellomere), dorsally with 4–5, ventrally usually with 3 long brown rays in addition to shorter rays basally and in its distal half. Mouthparts ochreous to pale brown; clypeus usually dark brown; palpus slightly clavate, pale brown to brown, with a number of short dark setulae.

Cephalic chaetotaxy (Figs 44, 45): all macrosetae blackish brown; pvt well developed (but shortest of frontal setae), strongly divergent, arising behind and between posterior ocelli; vti robust and very long (longest cephalic seta, almost as long as eye longest diameter), upright, very slightly inclinate; vte and oc subequal in length, strong but much shorter than vti; vte lateroclinate; oc proclinate, subparallel to slightly divergent, inserted outside ocellar triangle; only 1 reclinate ors, shorter than vte and situated in middle of orbit; 3–5 microsetulae in front of ors; no vibrissa or pseudovibrissa but with 3–5 short ventro-proclinate setae on ventral side of vibrissal angle and anterior part of gena; 4 or 5 smaller inclinate setae also on lateroventral margin of face; gena posteriorly to vibrissal part with a series of 6–7 thicker and longer ventroclinate peristomal setae; no true genal seta; posteriorly extended postgena and occiput behind eye with a number of short setae; also posteroventral angle of occiput with a number of setae, 1 or (less often) 2 longer than others; postocular setulae behind posterodorsal margin of eye numerous, dorsally in single, ventrally in 2 to 3 rows.

Thorax (Figs 44, 47, 72) slightly narrower than head, brown to dark brown but laterally pale (yellow to whitish) variegated, densely microtomentose and mostly dull (except for some parts of pleural sclerites). Mesonotum (cf. Fig. 47) dark brown, dorsally almost uniformly densely bluish grey microtomentose (at most dorsomedially with some brownish microtomentum) but laterally with a narrow dark brown microtomentose stripe. Scutellum normally concolourous with mesonotum, thus largely brown with greyish microtomentum but with apex often ochreous to yellow, more rarely (as in holotype, intersex (see below) and some other specimens, particularly those faded in ethanol) also medially ochreous yellow. Humeral callus (postpronotal lobe) white to whitish yellow; notopleural area also lighter than adjacent mesonotum, pale brown to yellowish around posterior npl (Figs 44, 72). Pleural part of thorax generally paler than mesonotum, less microtomentose and subshining, with narrow ochreous to yellow longitudinal stripe dorsally and yellow to white (anteriorly) and whitish microtomentose band in the middle, ranging from base of fore coxa to haltere (Fig. 44). Sternopleuron (katepisternum) dorsally brown but its ventral corner lighter brown to ochreous yellow. Mediotergite brown. Scutellum basally wider than long, rounded trapezoidal; subscutellum small but distinct and dark brown.

Thoracic chaetotaxy (Figs 44, 47): macrosetae and setulae blackish brown to black; ac setulae more numerous than in *P. winnertzii*, in 10–12 rows on suture but with only 4 rows reaching almost to scutellum, prescutellar ac setulae enlarged (more so than in *P. winnertzii*); 2 very long and strong postsutural dc, the anterior about two-thirds of the more robust posterior, 12–15 dc setulae in front of anterior dc but no or only 1 setula between dc setae; 1 strong hu (postpronotal) seta plus 5 or 6 setulae on whitish humeral callus; 2 strong npl, anterior as long as or slightly longer than hu, posterior distinctly shorter; 1 sa (as long as anterior npl) and 1 slightly shorter to subequal pa; 2 sc, apical as long as posterior dc, laterobasal distinctly shorter than anterior dc; 1 pair of fine setulae between apical sc (sometimes absent); 1 short but distinct ppl, sometimes with 1 ppl setula in addition; anepisternum with a number of short setulae in posterodorsal half; 2 stpl (katepisternal) setae, anterior always shorter, some setulae between stpl, numerous setulae on disc and 4 longer but fine setae on ventral corner of katepisternum.

Wing (Fig. 76) relatively broad, with pale brown membrane darker infuscated in some small parts; veins ochreous to dark brown. Wing pattern less distinct than in *P. winnertzii*: infuscation around apices of R_{2+3} and R_{4+5} reduced, more distinct only around r-m and along M



Figs 49–61. *Periscelis* (*P.*) *laszloi* sp. nov., male. 49 – entire genitalia, laterally; 50 – surstylus, laterally; 51 – gonostylus, laterally; 52 – cercus, laterally; 53 – ejacapodeme, laterally; 54 – same, dorsally; 55 – base of aedeagal complex, dorsally; 56 – external genitalia caudally (setae on right side omitted); 57 – same, cranially (cerci and epandrial setae omitted); 58 – base of aedeagal complex, laterally; 59 – postgonite, laterally; 60, 61 – pregenital sternum (S6) of specimens from Slovakia (60) and Hungary (61), ventrally. Figures based on male paratypes from Slovakia (49, 60), Hungary (50–53, 59, 61, adapted from Roháček & Andrade 2017: figs 22–27) and Switzerland (54–58). Scales = 0.1 mm. For abbreviations see text (p. 303).

between r-m and dm-cu; also alula is darkened. Veins are distinctly darkened in all these fumose parts and also in distal two-thirds of R_1, almost entire R_{4+5} and basal parts of M and CuA_1; in contrast to *P. winnertzii* A_1 is not so much darkened. C entire, without breaks, uniformly setulose and reaching to apex of R_{4+5}. Sc short, seemingly ending free in subcostal cell but its apex upcurved to C as a somewhat darkened venal fold. R_1 short but robust, slightly bent to C; R_{2+3} long, running more distantly from R_{4+5} than in *P. winnertzii* and with upcurved apex ending closer to apex of R_{4+5} than M. R_{4+5} slightly sinuate (not straight) and ending at wing apex. Distal part of M apically recurved, diverging from R_{4+5}. M normally reaching wing margin (1 ♂ from Hungary and 1 ♀ from Slovakia aberrant, with M on one wing ending far from it). Cross-vein r-m situated in distal half of dm cell; cross-vein dm-cu distinct but attenuated or interrupted by spurious vein. CuA_1 apically slightly bent, ending just in front of wing margin. Cells bm and cup closed, veins of cup somewhat attenuated. A_1 distinct but ending far from wing margin. Alula well developed, darkened, with marginal ciliation as long as that of anal lobe of wing. Wing measurements: length 2.90–4.01 (holotype 3.93) mm, width 1.11–1.49 (holotype 1.45) mm, $Cs_3 : Cs_4$ = 0.53–0.61, r-m/dm-cu : dm-cu = 1.44–2.50. Haltere relatively large, yellowish; knob usually with slightly darker apex.

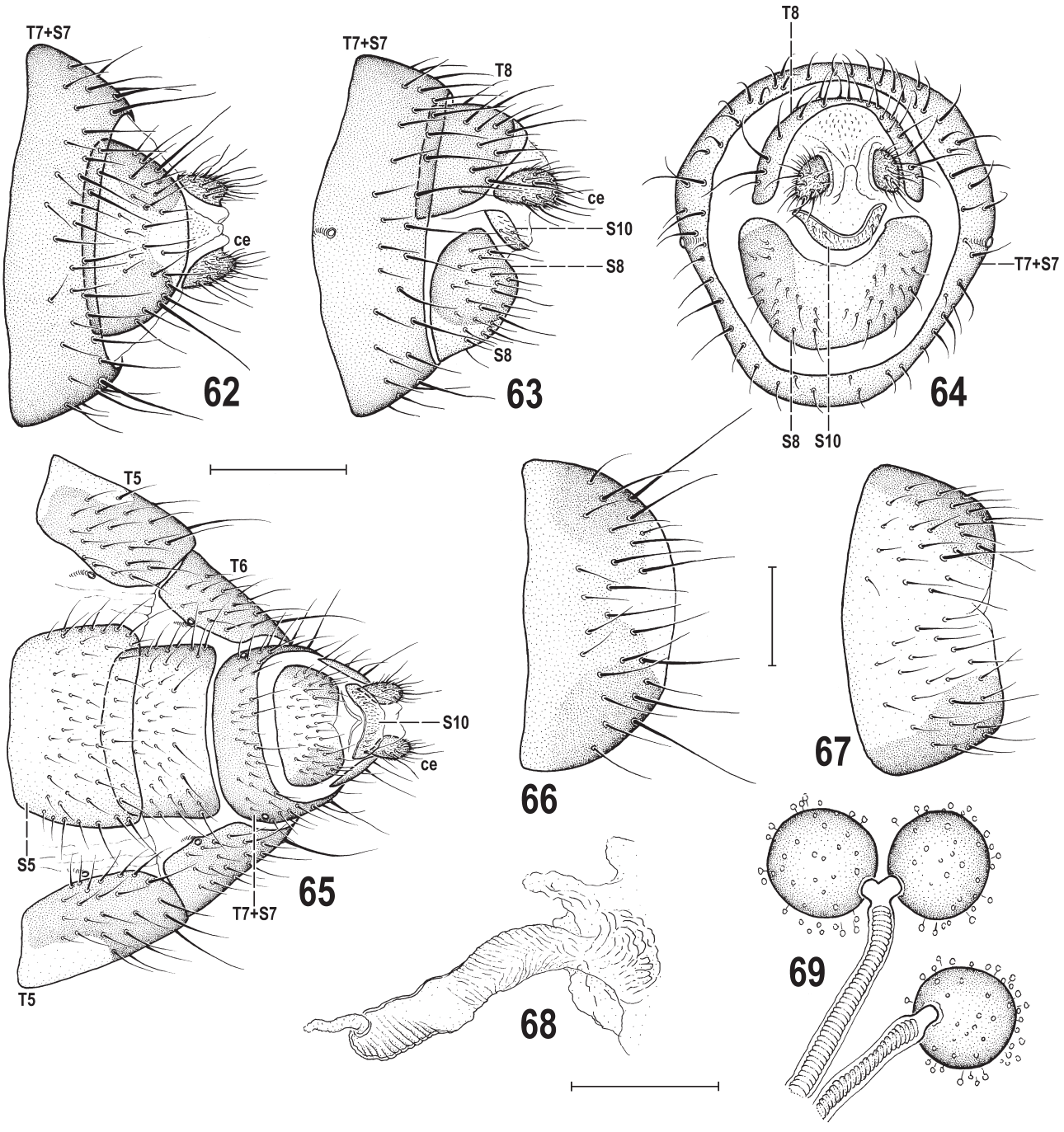
Legs (Figs 44, 71, 72) yellow or yellowish white and brown variegated on fore coxa (with posterodorsal and ventral part pale yellow) and all femora, tibiae and tarsi; setae brown but setulae pale, often ochreous. f_1 and f_2 have two incomplete (dorsally interrupted) brown rings, the basal paler, the subapical darker (thus with knees and dorsal side of femur yellow); while f_3 has anterodorsally (or only anteriorly) longitudinal brown spot being distally dilated and darkened to form an almost complete ring subapically, leaving knee and all remaining parts of femur yellow. Thus, f_3 is generally paler (more yellow) than that of *P. winnertzii*. Tibiae with two brown rings: a proximal below knee and a distal subapically but t_1 has distal ring longer, almost reaching tibial apex. Tarsi largely yellowish white to (fore tarsus) white, each with 2 distal segments brown (apical segment darker). Chaetotaxy: f_1 (Fig. 71) with a series of 8–11 (more on the average than in *P. winnertzii*) long and thicker posteroventral setae and with a double row of shorter and finer upright posterodorsal setae (4 or 5 in more dorsal row thicker); f_2 posteroventrally with a row of numerous fine setae (longest about three-fourths of maximum width of femur); t_1 with 1 short (slightly longer than other tibial setulae) posterodorsal subapical seta; t_2 with 1 distinct and thicker ventroapical seta (slightly shorter than maximum width of tibia); remaining parts of legs simply shortly setulose.

Abdomen relatively broad, of subovoid outline in dorsal view, dorsally largely brown to dark brown, with some parts ochreous to yellow, ventrally pale brown. T1 + T2 as long as T3 + T4, with distinct boundary between T1 and T2. T1 dorsally ochreous yellow, only laterally brown; T2–T5 broad and transverse, bent laterally onto ventral side, gradually becoming narrower posteriorly and each brown, with a blackish brown transverse band in front of posterior margin, T3–T5 with yellowish white, silvery microtomentose spot on each side (Figs 44, 72). All preabdominal terga shortly setose, with longest and thickest setae in posterolateral corners. Preabdominal sterna (S1–S5) relatively large (hence membrane between terga and sterna narrow), broad and more or less transverse. S1 undescribed, probably short and pale; S2 transversely suboblong, almost completely yellow to pale ochreous; S3–S4 subequal, of similar, slightly transversely trapezoidal, brown, darker laterally; S5 narrower than S4, slightly transversely suboblong, with corners rounded. S2–S5 with scattered short fine setosity. Abdominal spiracles (1–6) in membrane close to lateral margins of terga.

Postabdomen: T6 relatively large, although narrower and somewhat shorter than T5, transverse but distinctly tapered posteriorly, setose similarly and also bearing lateral silvery spots as have T3–T5 (Fig. 44). S6 (= pregenital sternum, Figs 60, 61) narrower and generally paler than S5, more or less widened posteriorly, with anterior corners acutely projecting and always without posteromedial depression, typically with brown pattern along margins (Fig. 61) and sparse fine setae in posterior half (longest laterally); rarely S6 is less widened posteriorly and with more irregular pigmentation (see Fig. 60); dorsal pregenital synsclerite (a fusion of T7 and S7 and, possibly, also T8 and S8) relatively short, arch-shaped, symmetrical and laterally reaching far onto ventral side of postabdomen, dark brown and shortly setose in posterior half and also embedding 7th spiracles in its lateral parts.

Genitalia (Figs 49–59). Epandrium relatively small, dark brown, wider than high, in form of an arch-like sclerite, with large anal opening (Fig. 56), setose only in posterior third, anteriorly projecting ventrally to form slender and long surstylus (Figs 49, 50, 57) on each side. Cerci large and robust, longer than heigth of epandrium without surstylus (Figs 49, 52), relatively distant from each other (Fig. 56). Each cercus elongate, with apex tapered and slightly incurved but not acute (Figs 49, 56) and rather uniformly setose, mainly posteriorly (distinctly more densely than in *P. winnertzii*); micropubescence restricted to posterior and posterolateral surface (Fig. 52). Surstylus (Figs 49, 50) proximally wider (with more or less angular anterodorsal corner), distally tapered, slender, with microsetulae in distal third, largely at outer side, and with apex acute in lateral view (Fig. 50), somewhat lanceolate in anterior view (Fig. 57) but more slender than that of *P. winnertzii*. Gonostylus (Figs 49, 51, 57) distinctly shorter than surstylus, basally wider, distally tapered and rod-like (in distal two-thirds), with apex curved anteriorly and with a group of microsetulae in distal fourth. Gonostyli are dorsomedially posteriorly movably attached to medandrium (Figs 56, 57, ma); the latter reduced to a small transverse, slightly arched and bare sclerite. Hypandrium (Fig. 49, hy) frame-like, bare, relatively symmetrical and slender, but dorsally fused to ventral parts of enlarged pocket-shaped anterior part of phallapodeme and its sides projecting posteriorly to reach medandrium. Pregonites not developed. Aedeagal complex (Figs 49, 58) more voluminous than epandrium

due to enlarged phallapodeme. Phallapodeme (Fig. 49, pha) composed of two sclerites: anterior (distal) sclerite strongly expanded and pocket-shaped, arched anterodorsally and ventrolaterally fused with hypandrium (Fig. 49, dpha); posterior sclerite short, more heavily sclerotized, forked (shallowly anterodorsally, deeply posteroventrally (see Figs 55, 58, bpha) and attached to posterior end of anterior sclerite. Aedeagus simple, undivided (no separate phallophore), basally very slightly dilated and darker-pigmented (Figs 55, 58), otherwise formed by a very long, ribbon-shaped, submembranous distiphallus being proximally hidden in a pocket-shaped part of phallapodeme and distally projecting from its ventral part (see Fig. 49); apex of distiphallus somewhat flattened and widened, simple to somewhat denticulate on tip. Postgonite (Figs 58, 59, pg) relatively stout, much larger and thicker than gonostylus, with proximal part dilated but not expanded posteroventrally, knee-like bent in the middle, and distally slender, digitiform (but more robust than in *P. winnertzii*) and with several microsetulae at posterior margin of outer side. Ejacapodeme large but smaller than phallapodeme, generally rod-like but its shape and (particularly) thickness



Figs 62–69. *Periscelis* (*P.*) *laszloi* sp. nov., female paratypes (Hungary). 62 – posterior part of postabdomen (from 7th segment), dorsally; 63 – same, laterally; 64 – same, caudally; 65 – 5th segment and postabdomen, ventrally; 66 – T8, dorsally; 67 – S8; 68 – ventral receptacle, laterally; 69 – spermathecae. Partly adapted from Roháček & Andrade (2017, figs 28–32). Scales = 0.2 mm (Figs 62–65) and 0.1 mm (Figs 66–69). For abbreviations see text (p. 303).

somewhat variable (cf. Figs 49, 53), with both ends dilated, proximal end more widened and somewhat forked at insertion of ejaculatory duct (Fig. 54).

Female. Similar to male unless mentioned otherwise. Total body length 3.02–4.17 mm. Head with lighter colouration of frons and, particularly, face. Frons somewhat paler, medially ochreous, laterally and anteriorly yellow to white, only ocellar triangle brownish (Fig. 47); face dorsally almost entirely yellow to whitish yellow (Fig. 46), at most darkened pale brownish near vibrissal angle; ventrally, including shining protruding tuberculate part, dirty ochreous and below the latter densely whitish microtomentose; parafacialia with distinct small elongate brown spot above vibrissal angle (this is reduced or pale in *P. winnertzii*); gena whitish yellow to (posteriorly) white (Fig. 48), with vibrissal angle and bases of peristomal setae somewhat darkened and ventral marginal line ochreous. f_2 posteroventrally without long row of setae, only subapically with 4 or 5 longer setae. Wing measurements: length 3.30–4.25 mm, width 1.29–1.63 mm, $Cs_3 : Cs_4 = 0.52–0.65$, rm/dm-cu : dm-cu = 1.67–1.94. An aberrant specimen with supernumerary r-r cross-vein between R_{2+3} and R_{4+5} near apex of left wing has been found among specimens from Switzerland. Abdomen wider than in male, broadly ovoid. Preabdominal terga T3–T5 more transverse and brown (dorsomedially paler than laterally), without darker transverse bands (darkening of posterior margins is caused by overlap of sclerites) but with silvery lateral spots as in male (Fig. 73). T5 distinctly narrowed posteriorly (Fig. 65) in contrast to foregoing terga. Preabdominal sterna with similar colouration and setosity as in male but S2–S3 more transverse; S3–S5 subequal or becoming very slightly wider posteriorly, laterally less distinctly darkened and all transversely suboblong, with corners more or less rounded.

Postabdomen (Figs 62–65) broad anteriorly, strongly tapered posteriorly. T6 large, not shorter than T5 but smaller and very strongly tapered posteriorly, with lateral part bent ventrally, brown but laterobasally bearing white and silvery microtomentose spots (visible on Fig. 73 but not on Fig. 65 because they are situated dorsolaterally), finely setose in posterior half and laterally. S6 simple (Fig. 65), transversely suboblong, smaller than S5 but distinctly longer and less transverse than that of *P. winnertzii,* ochreous but posterolaterally more or less darkened, with 3 pairs of longer setae at posterior margin besides short setosity. 6th spiracle situated in margin of T6 (Fig. 65), which is more bent ventrally than that of *P. winnertzii*. T7 and S7 fused to tergosternum T7+S7 forming a complete ring (Figs 64, 65), uniformly brown and ventrally more densely setose than dorsally, with longest setae at posterior margin laterodorsally. 7th spiracle situated laterally, inside T7+S7 (Fig. 63). T8 forming a bent, subcircular to crescent-shaped sclerite (Figs 62, 64, 66), markedly wider than that of *P. winnertzii* and posteromedially pale pigmented, relatively long setose in posterior two-thirds (longest setae posterolaterally). S8 (Figs 67, 65) of size similar to T8 but round trapezoidal, narrower posteriorly, setose on entire disc (less densely than that of *P. winnertzii*), largely yellowish, dark-pigmented only laterally. Genital chamber elongate, membranous; ventral receptacle (Fig. 68) submembranous, digitiform, distally not dilated, finely striated both proximally and distally (without tuberculate surface /known in *P. winnertzii/* subterminally), and with terminal projection simple, rather finger-like, in contrast to being tail-like and twisted in *P. winnertzii*. Spermathecae (1+2) globular (Fig. 69) as in *P. winnertzii*, but larger compared to ducts, blackish brown and heavily sclerotized; spermathecal ducts long, with internal spiral structure; duct fork connecting 2 spermathecae very short. T10 (supraanal plate) practically absent or entirely membranous (Fig. 62). S10 (subanal plate) reduced to short, crescent-shaped, weakly sclerotized and pale-pigmented sclerite (Figs 64, 65), somewhat micropubescent and with 2 or 3 posterolateral setulae. Cercus (Figs 62, 63) small, short, subovoid, with numerous (but not long) fine setae apart from dense micropubescence; lateral setae usually slightly longer than longest apical seta.

Intersex. A peculiar adult specimen from Hungary, obviously an intersex, has been examined (Fig. 72). Its terminalia are distinctly male, with all characters (including the apically curved gonostylus, visible on Fig. 72) identical to those of a typical male. Also the mid femur is of a male, with a long row of posteroventral setae. However, its head has frons and face coloured as in female, including characteristically pale lower face (Fig. 70) and there are no dark transverse bands on preabdominal terga (as in female). Thus, the dimorphic male and female characters seem to have mosaic distribution on body. Moreover, it has an unusually pale (ochreous with yellow apex) scutellum, resembling more that of *P. winnertzii* than that of typical *P. laszloi*. Because this interesting intersex specimen undoubtedly belongs to *P. laszloi* sp. nov., it has been included in the type series as a paratype.

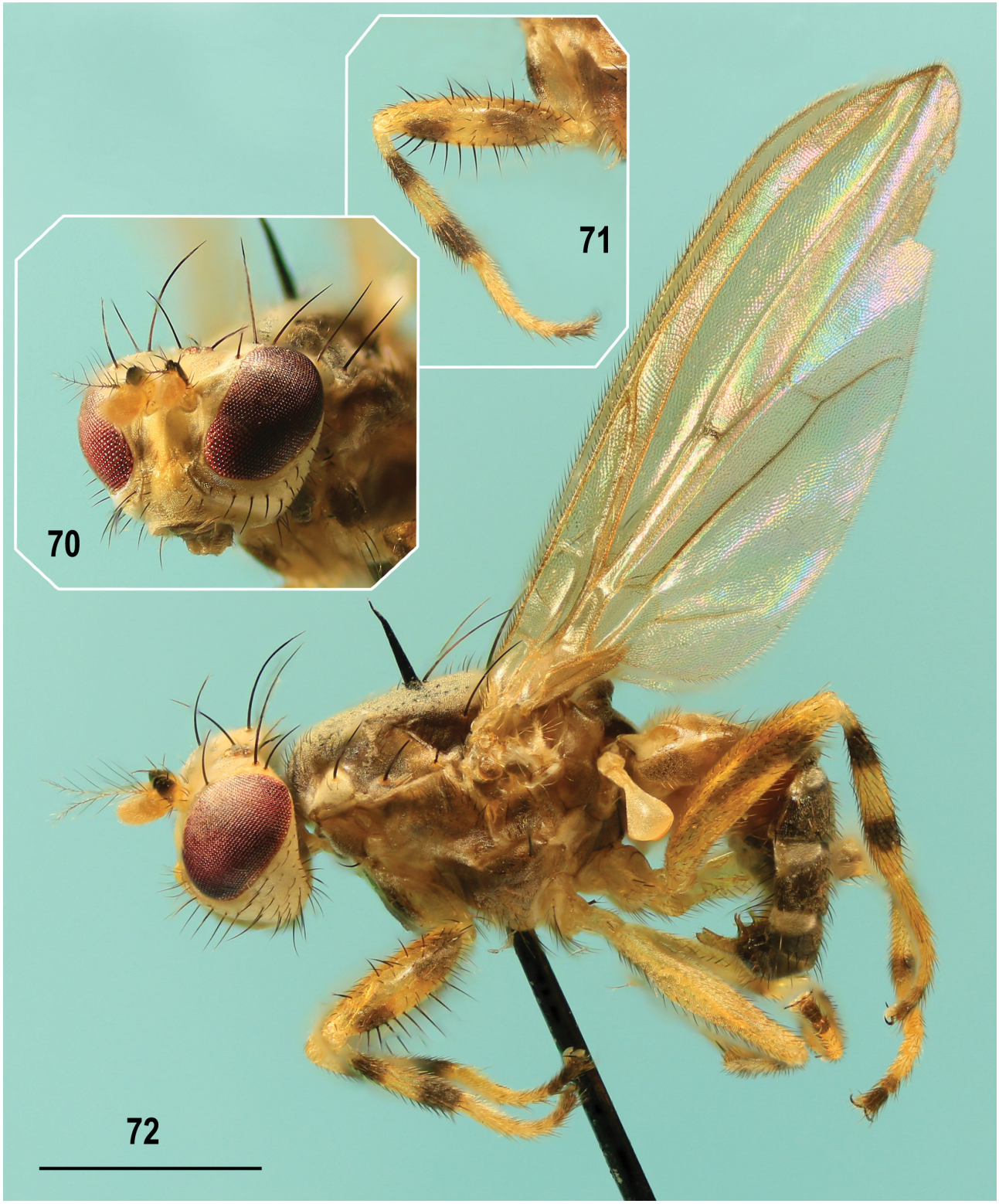
Etymology. The species is named in honour of the late Laszló Papp (1946–2021), an eminent Hungarian dipterist and my friend, who essentially contributed to the knowledge of the family Periscelididae and many other families of Acalyptratae.

Remarks. As noted above, *Periscelis* (*P.*) *laszloi* sp. nov. is identical with the species previously interpreted by Papp & Withers (2011) as *P. winnertzii*. This erroneous concept of *P. winnertzii* was followed by Roháček & Andrade (2017) who described a closely allied sister-species, *P. fugax*, being recognized here as a synononym of true *P. winnertzii* Egger (see above). However, the series identified by L. Papp in HNHM included in fact both species (*P. laszloi* sp. nov. and true *P. winnertzii*). He apparently had not differentiated them because the only male of true *P. winnertzii* in the collection of HNHM has lost its terminalia.

Relationships. As given above, *P. laszloi* sp. nov. is the closest relative of *P. winnertzii* Egger, 1862. Their sister-species relationships seems to be demonstrated by close similarity of external features and, particularly, of characters of their male and female terminalia. Particularly, the gonostylus with microsetulae restricted to the apical part and the male cercus with shortly setose apex can be considered putative synapomorphies of this pair. Also the sexual dichroism of the lower face (dark brown in male,

yellow in female) can be another synapomorphy of these species. No synapomorphy can be currently found in the female postabdomen because female terminalia remain unknown in other congeners. However, the close alliance of both species is also supported by similarity of their barcoding region of COI gene (see Tab. 2 and Fig. 78). This sister-pair belongs to the subgenus *Periscelis* (s. str.) which has been elevated to genus by Papp & Withers (2011) but this act has not been accepted by Mathis & Rung (2011) or Roháček & Andrade (2017).

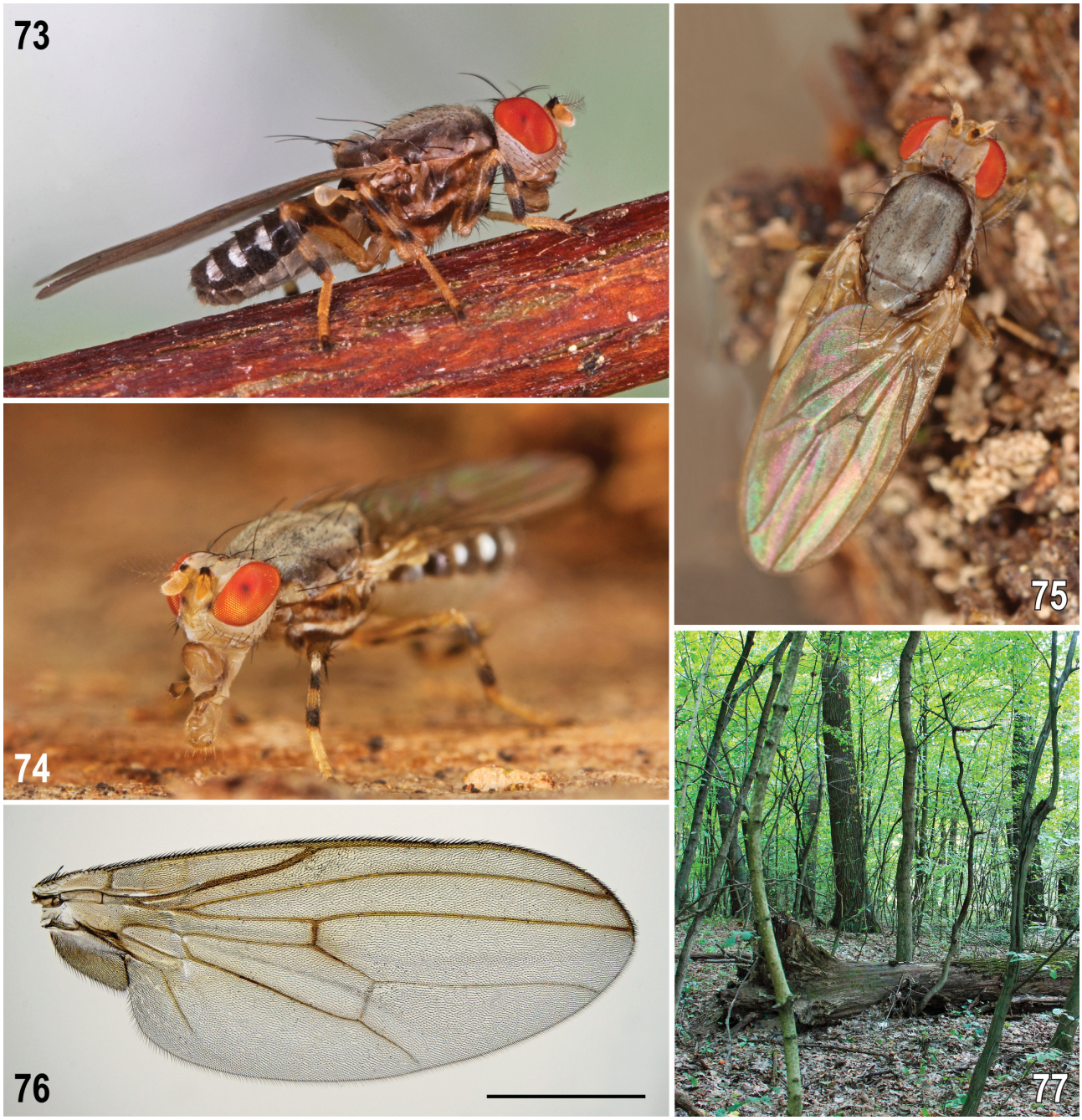
Biology. Papp (1998, as *P. winnertzii*) studied the biology and behaviour of the species in Hungary. Although he did not distinguish between species under study (*P. laszloi* and *P. winnertzii* were mixed in his series of adults) it seems that they have very similar biology, including the univoltine life-history (for detail see above under *P. winnertzii*).



Figs 70–72. *Periscelis* (*P.*) *laszloi* sp. nov., intersex paratype (Hungary). 70 – head, left anterolaterally; 71 – fore leg, posteriorly; 72 – entire specimen, left laterally. Scale = 1 mm. Photo J. Roháček.

Although preferentially associated with sap runs on oak (*Quercus robur*, *Q. petraea*) trees in warm forests (Fig. 77) including *Quercus cerris* in Slovakia (Figs 6, 7), *Q. pyrenaica* and other *Quercus* species in Portugal (Roháček et al. 2016, fig. 11), the data obtained from material examined indicate that *P. laszloi* can similarly live also on other trees. Adults were also collected in oak-chestnut (*Querceto-Castanetum*) forest, hornbeam (*Carpinetum*) forest, mixed submontane deciduous forest with prevailing beech and, according to Hellquist (2020, as *P. winnertzii*), a pair of Swedish specimens was even captured in a Malaise trap installed among uprooted aspen tree trunks. As in *P. winnertzii* adults of *P. laszloi* are attracted to wine and beer and can be most easily collected by mean of traps with this bait installed in tree canopy; interestingly, in Slovakia, one female was also captured into a protein (meat-baited, with ethanol as preservation medium) trap. Adults occur from July to November (most commonly in August to October) but two specimens were captured already in late June.

Distribution. Because previous records of "*Periscelis winnertzii*" have not all been revised, data on distribution of *Periscelis laszloi* sp. nov. remain rather fragmentary. Only as and when the two species have been separated by Roháček & Andrade (2017) subsequent authors recorded this species reliably but under the name *P. winnertzii*.



Figs 73–77. *Periscelis* (*P.*) *laszloi* sp. nov., living adults, wing and habitat. 73 – female paratype (Slovakia), right laterally, body length ca. 4.2 mm; 74 – female paratype (Hungary), left anterolaterally, body length ca. 3.8 mm; 75 – same specimen, dorsally; 76 – right wing (male paratype, Hungary); 77 – habitat of the species in N. Hungary (Varbó env.: Fonagy sági-tó), deciduous forest with old oaks. Scale = 1 mm. Photo J. Roháček.

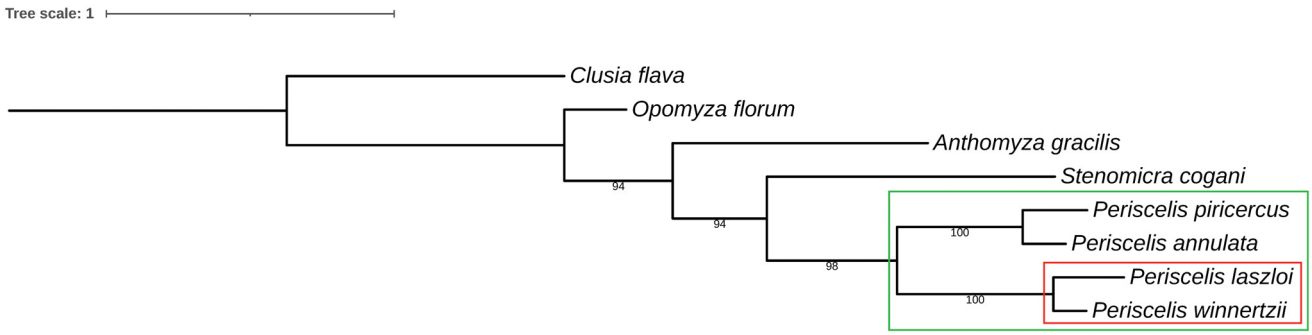


Fig. 78. Maximum likelihood tree outlining genetic similarities of *Periscelis* species based on barcode region of COI. Species of the genus *Periscelis* green framed, those of subgenus *Periscelis* s. str. (under study) red framed.

Thus, *P. laszloi* has hitherto been only confirmed in Portugal (Roháček & Andrade 2017, as *P. winnertzii*, see also type material), Spain (Carles-Tolrá 2018, as *P. winnertzii* = a revised previous record by Carles-tolrá & Pagola-carte 2013), Switzerland (Pollini Paltrinieri & Roháček 2022, as *P. winnertzii* and type material), Slovakia (Roháček 2013, Roháček & Andrade 2017, both as *P. winnertzii*, and type material), Hungary (Roháček & Andrade 2017, as *P. winnertzii*, and type material) but also in Great Britain (England, P. J. Chandler, personal communication 2022, see above), southern Sweden (Hellquist 2020, as *P. winnertzii*) and southern Finland (Haarto & Winqvist 2014, as *P. winnertzii*). The identity of the specimen from the latter country, viz. from N: Raasepori, Dragsvik has been verified by comparison of its photograph and COI sequence in BOLD system, see https://www.boldsystems.org/index.php/Public_BarcodeCluster?clusteruri=BOLD:ACE1527. A record of *P. winnertzii* from Poland (Breslau = Wrocław) revised by Papp & Withers (2011) is uncertain because these authors have not recognized both species. This also is true for some of the previous records of *P. winnertzii* from Great Britain, France, The Netherlands, and Germany (summarized by Mathis & Rung 2011). Hitherto, *P. laszloi* has not been ascertained in the Czech Republic because all specimens recorded by Máca et al. (2005) proved to belong to true *P. winnertzii* (= *P. fugax*, see above), thus the latter species is listed correctly in Máca (2009). Obviously, *P. laszloi* is widespread in southern and temperate Europe, and, consequently, it is expected to be recorded from other countries in future, particularly by means of wine and beer baited traps installed in canopies of deciduous trees.

Discussion and conclusions

Although the study of *Periscelis* by Roháček & Andrade (2017) contributed essentially to the taxonomy, morphology and relationships of both above species the revision of the only preserved type of *P. winnertzii* and the series of specimens deposited in HNHM Budapest and the examination of additional (recently collected) material revealed much new knowledge.

(1) The concept of *P. winnertzii* by Papp & Withers (2011) and Roháček & Andrade (2017) proved to be erroneous. *Periscelis winnertzii* Egger, 1862 (fixed by a lectotype designation) has been found to be identical with *P. fugax* Roháček & Andrade, 2017 (syn. nov.) and the species treated as *P. winnertzii* by the above authors has been described as *P. laszloi* sp. nov.

(2) Variability in colour characters, particularly the colouration of scutellum and dorsal microtomentose pattern of mesonotum is greater than presupposed by Roháček & Andrade (2017). There are (uncommon) cases when usage of only these features is not sufficient for secure identification of these species. Examination of characters of male and/or female terminalia is necessary in these atypically coloured specimens. The same also applies to specimens faded for various reasons.

(3) Because both species are sexually dimorphic (they have not only dichroic face and preabdominal terga, cf. also Roháček & Andrade 2017: 340 but also dimorphic chaetotaxy of mid femur) an intersex specimen has been revealed among series of *P. laszloi* examined. The specimen has male terminalia and mid leg but female head (face) and preabdominal terga. This is the first case of intersex specimen in the family Periscelididae.

(4) The comparison of COI sequences of both species and also of two species of the subgenus *Myodris* (*P. annulata* and *P. piricercus*) confirmed the molecular distinctness and (hence) validity of both species under study (Table 2). The larger genetic distance between species of *Periscelis* (s. str.) and those of the subgenus *Myodris* corroborates the validity of both subgenera (Fig. 78). In addition, knowledge of COI barcoding region enabled to identify the no longer existing specimen recorded by Haarto & Winqvist (2014, as *P. winnertzii*) from Finland by means of COI sequence registered in the BOLD (https://www.boldsystems.org/) as *P. laszlo*i sp. nov. (see above).

(5) In Periscelididae only 3rd instar larvae of two species and the puparium of one species of the subgenus *Myodris* have hitherto been described (Teskey 1976; Papp 1988, 1995; Mathis & Papp 1998; Rotheray & Robertson 1998). Although Papp (1998) refers to availability of larvae also in two *Periscelis* s. str. species, viz. *P. nigra* (Zetterstedt, 1860) and *P. winnertzii*, they have never been treated in publications. On the other hand, the egg of *P. nigra* was described and illustrated in Mathis & Papp (1998). Rotheray & Robertson (1998) described but did not illustrate (except for anterior and posterior spiracles and larval head skeleton) the puparium of *P.*

annulata. Consequently, the puparium (of *P. winnertzii*) is illustrated here in detail for the first time in Periscelididae. Larval characters preserved in this puparium (including cephalopharyngeal skeleton) have been compared with those known in 3rd instar larva of *P.* (*Myodris*) *annulata* (see Papp 1995) and differences between them have been found, supporting the distinct dissimilarity of these taxa belonging to different subgenera.

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