

THE GENERA *XENOLIMOSINA* AND *TERRILIMOSINA*
(DIPTERA: SPHAEROCERIDAE: LIMOSININAE)
IN NORTH AMERICA

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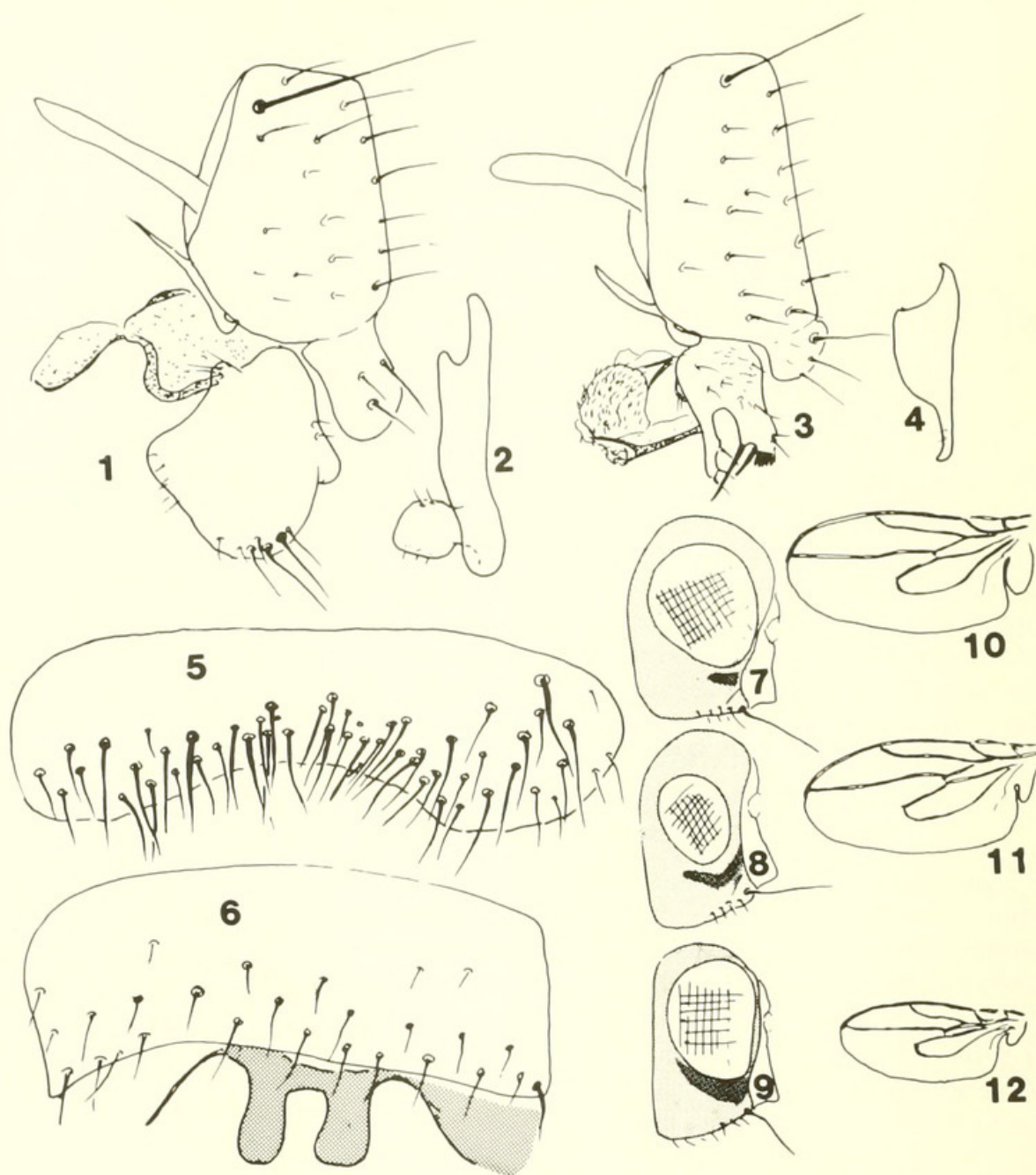
Abstract. —The genus *Terrilimosina* Roháček 1983 includes three species from North America. *Terrilimosina racovitzai* (Bezzi) is common in European caves and has been found in a few eastern North American caves. *Terrilimosina pexa* new species is described from Ontario, Arkansas and Oklahoma. *Terrilimosina* otherwise includes only the European species *T. sudetica* Roháček, and the holarctic *T. schmitzi* (Duda). The genus *Xenolimosina* Roháček is recorded from North America for the first time. Two new species are described, *X. sicula* from Ontario, Quebec, Arkansas, and California and *X. phoba* from Ontario and Quebec. *Xenolimosina* otherwise includes only the type species, *X. setaria* (Villeneuve) from Europe. Keys to the world species of both genera are provided.

Terrilimosina Roháček and *Xenolimosina* Roháček are small genera of the sphaerocerid subfamily Limosinininae, probably related to the large genus *Minilimosina* Roháček. All three genera are characterized by a long, telescoping female abdomen and relatively small size.

This paper provides keys and descriptions for the North American species of *Terrilimosina* and *Xenolimosina*, most of which are new species or new North American records.

***Terrilimosina* Roháček**

The genus *Terrilimosina* was described by Roháček (1983) with *Limosina racovitzai* Bezzi as type species. He included only two other species in the genus, *T. sudetica* (Roháček) and *T. schmitzi* (Duda). *Terrilimosina sudetica* is still known only from Czechoslovakia, but *T. racovitzai* and *T. schmitzi* are now known also from North America, along with a new species, *T. pexa*. Members of this genus can be separated from other Limosinininae by the rounded posterior outer corner of wing cell dm and the presence of a surstylar comb. Because the females have long, telescoping terminalia they are superficially similar to other genera that retain this plesiomorphic character state, especially *Minilimosina*. In addition to the above diagnostic characters, *Terrilimosina* species differ from other Limosinininae with telescoping female terminalia in having a broad alula and, with the exception of *T. racovitzai*, a mid ventral bristle on the mid tibia. The addition of one new species to *Terrilimosina* necessitates only one minor change to Roháček's (1983)



Figs. 1-12. *Terrilimosina* spp. 1, 2, 5, 7, 10, *T. schmitzi*. 1, Male terminalia, left lateral. 2, Left paramere, lateral. 5, Sternite 5 of male. 7, Head, side. 10, Wing. 3, 4, 6, 8, 11, *T. racovitzai*. 3, Male terminalia, left lateral. 4, Left paramere, lateral. 6, Sternites 5 and 6 of male. 8, Head, side. 11, Wing. 9, 12, *T. pexa*. 9, Head, side. 12, Wing.

generic description. *T. pexa* has only 3 interfrontals, rather than the 4 or 5 previously thought to be diagnostic for the genus.

KEY TO THE SPECIES OF *TERRILIMOSINA*

1. Eye small, height about $1.5 \times$ genal height (Fig. 8). Mid tibia ventrally with only an apical bristle. Sternite 6 of male with a large, bifurcate posteromedial process (Fig. 6); Europe and northeastern North America *racovitzai* (Bezzi)
- Eye height greater than or equal to $2.0 \times$ genal height. Mid tibia with a

- mid ventral bristle (Fig. 17). Sternite 6 of male not projecting posteromedially 2
2. Wing short, always shorter than body in dried specimens. Sternite 5 of male with a prominent posteromedial lobe. Epiproct bare; Europe
.....*sudetica* (Roháček)
- Wing always longer than body length in dried specimens. Posteromedial part of male sternite 5 on the same plane as the rest of the sternite. Epiproct with 2 bristles 3
3. Alula as broad as cell dm, cleft separating alula from wing longer than $0.5 \times$ length of alula (Fig. 10). Gena with a small triangular shining area restricted to anterodorsal corner of gena (Fig. 7). Sternite 5 of male simple posteromedially (Fig. 5); paramere broadly bilobed at apex (Fig. 2); holarctic *schmitzi* (Duda)
- Alula narrower than cell dm, cleft shorter than $0.5 \times$ length of alula (Fig. 12). Gena with a large shining area extending along ventral margin of eye (Fig. 9). Sternite 5 of male with a posteromedial patch of small, flat spines (Fig. 13); paramere simply lobate at apex (Fig. 16); North America
.....*pexa*, new species

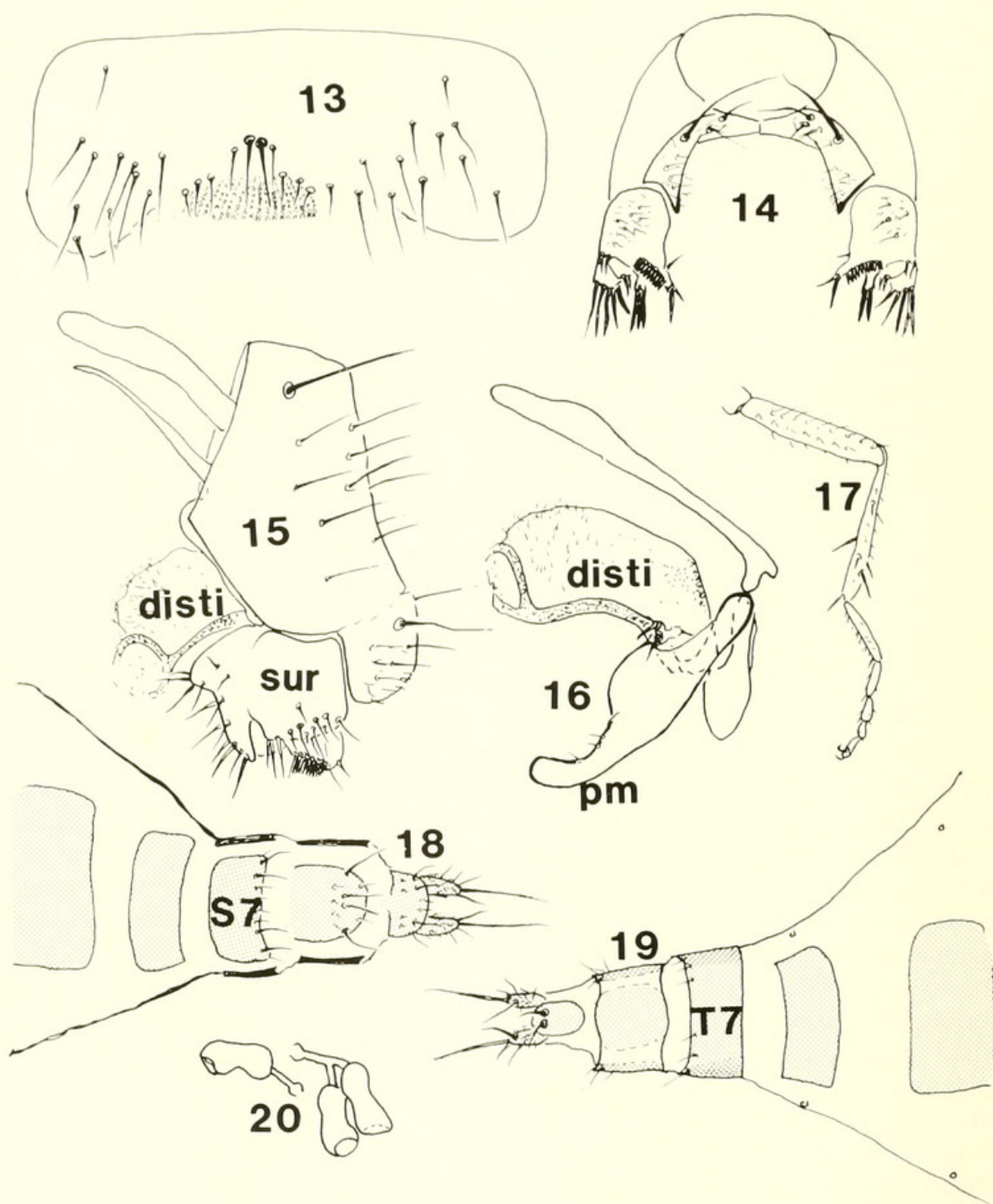
Terrilimosina pexa Marshall, NEW SPECIES
Figs. 9, 12–20

Description.—Length 1.4–1.7 mm. Colour brown, pruinose, tibiae and tarsi lighter brown. Interfrontal plate slightly higher than wide, bordered by 3 long, subequal interfrontal bristles. Postocellar bristle absent. Eye height $2.0\text{--}2.2 \times$ genal height. Gena with a large shining area below eye, widest anteriorly (Fig. 9). Scutum with 8 or 9 rows of small acrostichal setulae between dorsocentral lines. Dorsocentral bristles in 2 pairs; anterior pair weak, half as long as posterior pair; 2 pairs of small prescutellar acrostichal bristles present between posterior dorsocentral bristles. Katepisternum pruinose, with 2 posterodorsal bristles, the anterior one minute. Mid tibia with an anteroventral bristle near middle, an apicoventral bristle, a proximal anterodorsal, distal dorsal, distal anterodorsal and smaller posterodorsal bristles (Fig. 17). Halter light brown, stem yellow to light brown. Wing (Fig. 12) with costa surpassing tip of vein R_{4+5} and cell dm broadly rounded on posterior outer corner; second costal sector $0.7\text{--}0.9 \times$ as long as third. Alula narrow-oval, distance over which alula fused to wing longer than $0.5 \times$ length of alula (Fig. 12).

Male abdomen.—Sternite 5 with a posteromedial patch of small, flat bristles, at least the apical row bifurcate (Fig. 13). Surstylus complex, with 3 major lobes, posterior lobe with a straight comb-like row of bristles (Figs. 14, 15). Paramere simply lobate (Fig. 16). Basiphallus short, frame-like; distiphallus largely membranous, with a sclerotized dorsal process expanded distally into a ring (Fig. 16).

Female abdomen.—Tergites 3–5 progressively narrowed; tergite 6 wider and darker; tergite 8 with tripartate pigmentation; epiproct oval, with 2 bristles (Fig. 19). Sternite 8 subequal in length and width; sternite 8 and hypoproct uniformly pigmented (Fig. 18). Spermathecae peanut-shaped (Fig. 20).

Types.—Holotype ♂ and 34 paratypes (14 ♂, 20 ♀): CANADA. *Ontario*: Deux Rivieres, 2–30.ix.1979, mixed forest, carrion trap, S. & J. Peck (13 ♂, 19 ♀, BRI,



Figs. 13–20. *Terrilimosina pexa*. 13–17, Male. 13, Sternite 5. 14, External terminalia, postero-ventral. 15, Terminalia, left lateral. 16, Aedeagus and associated structures, left lateral. 17, Mid leg, anterior. 18–20, Female. 18, Terminalia, ventral. 19, Terminalia, dorsal. 20, Spermathecae. Abbreviations: disti—distiphallus; sur—surstylus; pm—paramere; T7—tergite 7; S7—sternite 7.

1 ♂, 1 ♀, J. Roháček collection, Opava, Czechoslovakia). Other paratypes: CANADA. *New Brunswick*: St. Andrews, Gibson Lake, viii.1978, pitfall traps, S. A. Marshall (1 ♂, author's collection). *Ontario*: Alfred, Alfred Bog, 25.ix.1983, sifted moss under fungi and moose dung (Berlese funnel), S. Peck (1 ♂, author's collection); Constance Bay, 26.viii.1980, on mushroom, S. A. Marshall (1 ♂, author's collection). UNITED STATES. *Arkansas*: Garland Co., 1.2 mi N Crystal Springs,

Hwy. 270, 6–8.iii.1977, Woodruff and Wiley, pig dung traps (135 ♂, 177 ♀, most in FSC but some retained for distribution at the author's discretion); Scott Co., 7 mi E Y City, Jct. Hwy. 270 & Rt. 71 on 270, 6–8.iii.1977, Woodruff & Wiley, pig dung trap (7 ♂, 14 ♀, FSC). *Oklahoma*: Latimer Co., 5 mi W Red Oak, 9.iii.1977, pig dung trap, K. Stephen (2 ♂, 3 ♀, FSC).

Comments.—Although large numbers of specimens are available, this species is known from very few collections. It has been collected from dung, fungi, and carrion. Nothing further is known of its life history. *Terrilimosina pexa* is probably most closely related to *T. racovitzai*, which also has the dorsal process of the distiphallus expanded distally into a ring, and the surstylus divided into separate lobes.

Etymology.—The name of this species is from the Latin for comb, and refers to the comb-like row of bristles on the posterior surstyler lobe.

***Terrilimosina racovitzai* (Bezzi)**

Figs. 3, 4, 6, 8, 11

Limosina racovitzai Bezzi, 1911: 66.

Terrilimosina racovitzai: Roháček, 1983: 23, complete synonymy and description.

Diagnosis.—Eye small, height $1.4\text{--}1.5 \times$ genal height; gena with a long shining area beneath eye (Fig. 8). Mid tibia of male with a double row of short spinules ventrally, apicoventral bristle reduced; mid tibia of female ventrally with an apical bristle only. Second costal sector subequal to third (Fig. 11). Male abdomen: Sternite 5 simple, sternite 6 with a large bifurcate posteromedial process (Fig. 6). Surstylus divided into 2 lobes on ventral half, posterior lobe with comb-like row of bristles (Fig. 3). Paramere narrowed apically (Fig. 4). Basiphallus short, frame-like; distiphallus similar to *T. pexa* (Fig. 3). Female abdomen: Epiproct wider than long. Spermathecae conical, short.

Material examined.—Eighteen specimens from the following localities. CANADA. *Ontario*: Mt. Nemo Cave, Burlington, 10.vi.1971, G. Muller. UNITED STATES. *Illinois*: Henderson Co., Goose Hollow Cave, 13.xi.1965, S. B. Peck. *Iowa*: Jackson Co., Maquoketa St. Pk., Barred Cave, 1–14.xi.1965, S. B. Peck. *New York*: Schoharie Co., Onesquethaw Cave, Clarkesville, under rotting wood, 6.xi.1982, S. A. Marshall. *Pennsylvania*: Berks Co., Wernersville, Hobo Cave, 3.xii.1937, Dierhoff Coll.; York Co., Lisburn Cave, Dierhoff Coll. *Wisconsin*: Pierce Co., Crystal Cave, July KC379c, side pass, mud floor, K. Christanson.

Comments.—*Terrilimosina racovitzai* is a common, polysaprophagous species in European caves, occasionally found in cellars and mammal burrows (Roháček, 1983). It appears to be restricted to northeastern North America, and has not been found in the many well studied caves of the southeast where it is replaced by *Spelobia tenebrarum*. The distribution of cave-dwelling Sphaeroceridae of eastern North America is discussed by Marshall and Peck (1985).

***Terrilimosina schmitzi* (Duda)**

Figs. 1, 2, 5, 7, 10

Limosina (*Scotophilella*) *schmitzi* Duda, 1918: 27.

Terrilimosina schmitzi: Roháček, 1983: 26, complete synonymy and description.

Diagnosis.—Eye height $2.5\text{--}3.4 \times$ genal height; gena with a small, triangular

shining area at anterodorsal corner (Fig. 7). Mid tibia of both sexes with mid ventral and apicoventral bristles. Second costal sector $0.9 \times$ as long as third; alula broad (Fig. 10). Male abdomen: Sternite 5 simple, strongly setose along posterior margin (Fig. 5). Surstylus large, flattened; comb-like row of bristles present but not visible in lateral view (Fig. 1). Paramere distinctive, with a large inner, preapical lobe (Fig. 2). Female abdomen: Epiproct longer than wide. Spermathecae elongate cylindrical.

Material examined.—255 specimens from the following localities. CANADA. *Alberta*: Lake Louise; Hinton; Coleman; Elkwater. *British Columbia*: Chetwund; Kledo Creek Pk.; Kiskatinaw Public Campground; Glacier Nat. Pk.; Ainsworth; Skagit; Buckinghorse Provincial Campground; Terrace; Vancouver; Hixon; Bowser; Mission City; Tunjony Lake; Hope. *New Brunswick*: St. Andrews. *Newfoundland*: Port Saunders. *North West Territories*: Aklavik. *Nova Scotia*: Cape Breton Highlands Nat. Pk. *Quebec*: Laniel; Camp LeRelais, Laurentide Pk.; Old Chelsea; Indian House Lake. *Saskatchewan*: Cypress Hills. *Yukon*: Wolf Creek Territorial Campground; North Fork Pass, Ogilvie Mts.; North Fork Crossing. UNITED STATES. *Alaska*: Matanuska; Isabel Pass; Tiekell River; Valdez; King Salmon, Naknek River; Savonoski, Naknek Lake. *New Hampshire*: Passaconaway. *New York*: Whiteface Mt. *North Carolina*: Wayah Gap. *Oregon*: Marion Co. *Washington*: Lewis Co.; Seattle.

Comments.—*Terrilimosina schmitzi* is widespread throughout the Holarctic Region, and is commonly collected in association with decaying vegetation in wooded areas. Roháček (1983) records it as terricolous and probably phytosaprophagous. Richards (1930) recorded it only from rabbit and mouse runs. The majority of the specimens examined were collected in June, July and August, but there are a few October (Quebec) and May (New Brunswick) records.

Xenolimosina Roháček

Xenolimosina was described by Roháček (1983) to contain a single rare species, *X. setaria* (Villeneuve), known from England, Belgium and Germany. Members of this genus can be recognized by the following combination of characters: hind tibia with a long exserted preapical dorsal bristle; scutum with two pairs of long dorsocentral bristles; mid tibia ventrally with only an apical bristle; female terminalia narrow and retractile into abdomen. Other diagnostic characters include a basiphallus with a pre-epiphallus, male sternite 5 with two separate patches of small flat bristles posteromedially, and a single katepisternal bristle. Roháček's (1983) description of the genus, although based on only one species, needs very little alteration to fit the 2 new species. Two of his generic characters, the shining katepisternal spot and the simple, flat surstylus, are now seen as diagnostic of subgroups within *Xenolimosina*.

KEY TO THE SPECIES OF *XENOLIMOSINA*

1. Eye small, height less than $1.5 \times$ genal height. Size over 2.0 mm. Katepisternum pruinose; North America *sicula*, new species
- Eye height over $1.5 \times$ genal height. Size less than 2.0 mm. Katepisternum with a large shining spot 2
2. Anterior lobe of surstylus with a tuft of flat bristles (Fig. 21). Female unknown; Ontario and Quebec *phoba*, new species

- Anterior lobe of surstylus with setulae only (similar to Fig. 22); Europe
 *setaria* (Villeneuve)

***Xenolimosina sicula* Marshall, NEW SPECIES**

Figs. 22–27

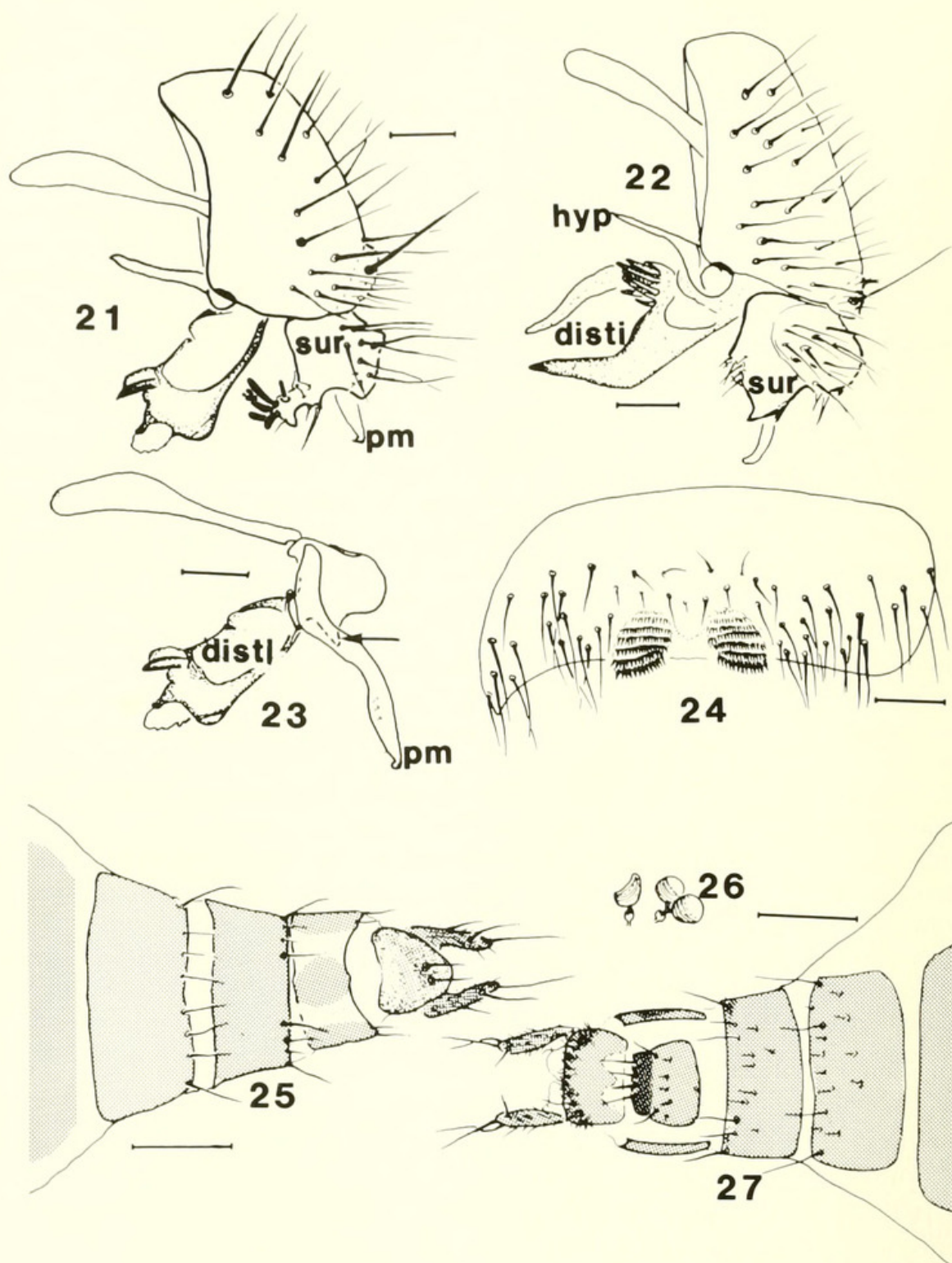
Description.—Length 2.0–2.4 mm. General colour pruinose-brown, lower frons, gena, and legs reddish brown. Interfrontal plate $1.6 \times$ as high as width at middle, bordered by 3–5 pairs of long, thin, barely cruciate interfrontal bristles. Postocellar bristles absent. Eye small, height $1.1\text{--}1.3 \times$ genal height, anterodorsal part of gena bare and shining. Scutum with 5–6 rows of acrostichal setulae between anterior dorsocentral bristles. Dorsocentral bristles in 2 pairs, anterior pair $0.6 \times$ as long as posterior pair, posterior pair equal to scutellar length. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Katepisternum pruinose, with one small dorsal bristle. Fore femur with a row of 2–4 very long posteroventral bristles. Mid tibia with long proximal anterodorsal, distal anterodorsal and distal dorsal bristles. Halter uniformly yellow-brown. Wing length $2.5 \times$ width; second costal sector $1.3\text{--}1.4 \times$ as long as third in male, $1.5\text{--}1.7 \times$ as long in female; costa indistinctly surpassing R_{4+5} . Alula small.

Male abdomen.—Sternite 5 with 2 posteromedial spinose patches (as in *X. phoba*, Fig. 4). Surstylus swollen and setose posteriorly, ventrally angulate and with a setose patch anteriorly (Fig. 22). Paramere long, thin. Basiphallus with a long pre-epiphallus (slightly longer than Fig. 23). Distiphallus with a long, pointed dorsal process, the basal ventral angle of which curves posteriorly and supports a distinctive row of long, flat processes (Fig. 22).

Female abdomen.—Tergites 6 and 7 uniformly pigmented; tergite 8 with tripartate pigmentation (Fig. 25). Epiproct bare except for 2 bristles and a patch of setulae between them. Cerci long, narrow, with a long apical bristle. Sternite 8 subquadrate, setulose except for a bare anteromedial patch; posterior margin with a row of 4 long, straight bristles (Fig. 27). Hypoproct pigmented such that it appears to have 3 anterior lobes; setulae restricted to a narrow posterior band. Each spermatheca almost spherical, ridged on basal half; distal half smooth and usually invaginated (Fig. 26). Internal sclerite (spectacles-shaped sclerite) well developed, $2\text{--}3 \times$ as large as spermatheca, median part ridged and wider than rings.

Types.—Holotype ♂ and 1 ♂ paratype (both BRI). Meaford, on compost heap, 11.x.1981, S. A. Marshall. Other paratypes: CANADA. Ontario: Meaford, 20.v.1981, on raccoon dung, S. A. Marshall (1 ♀, author's collection); Stittsville, 3.x.1978, B. A. Jenkinson (1 ♀, BRI). Quebec: Camp Fortune, 5–13.x.1982, J. Denis, low intercept trap (2 ♂, BRI). UNITED STATES. Arkansas: Scott Co., 7 mi E Y City, Jct. Hwy. 270 & Rt. 71 on 270, 6–8.iii.1977, Woodruff and Wiley, pig dung trap (7 ♂, 4 ♀, FSC; author's collection). California: Trinity Co., Forest Glen Cave, 28.xi.1959, R. Graham, #1533 (1 ♀, AMNH).

Comments.—Although *X. sicula* is very similar to the European *X. setaria* in the general structure of both male and female terminalia, these species differ widely in external features such as eye size, pollinosity of the pleuron, and wing venation. Like its European counterpart, *X. sicula* appears to be rare, and its life history is unknown. The reduced eyes and relatively large size of *X. sicula* suggest a hypogean habitat, a possibility supported by only one of the above records. Most of the type series was collected in late fall or early spring, from a variety of substrates.



Figs. 21–27. *Xenolimosina* spp. 21, 23, 24, *Xenolimosina phoba*, male. 21, Terminalia, left lateral. 23, Aedeagus and associated structures, left lateral. 24, Sternite 5. 22, 25, 26, 27, *Xenolimosina sicula*. 22, Male terminalia, left lateral. 25, Female terminalia, dorsal. 26, Spermathecae. 27, Female terminalia, ventral. Abbreviations: sur—surstylus; pm—paramere; hyp—hypandrium; disti—distiphallus; pe—pre-epiphallus. All scales 0.5 mm.

Etymology.—The name *sicula* is from the Latin for dagger, and refers to the dagger-like processes of the distiphallus.

Xenolimosina phoba Marshall, NEW SPECIES

Figs. 21, 23, 24

Description (male only).—Length ca. 1.5 mm (both available specimens have the abdomen removed). General colour pruinose-brown, head darker except reddish lower frons (paratype teneral). Interfrontal plate $1.5\times$ as high as width at middle, bordered by 3 pairs of weak, subequal interfrontal bristles. Postocellar bristles absent. Eye $1.7\text{--}1.8\times$ as high as gena, anterodorsal part of gena bare and shining. Fore femur with a row of 2–4 very long posteroventral bristles. Mid tibia with long proximal anterodorsal, distal anterodorsal, and distal dorsal bristles. Scutum with 5–6 rows of acrostichal setulae between anterior dorsocentral bristles. Dorsocentral bristles in 2 pairs, anterior pair $0.7\times$ as long as posterior pair, posterior pair equal to scutellar length. Prescutellar acrostichal bristles in a single pair twice as long as acrostichal setulae. Katepisternum with a large, bare, shining area on anterodorsal half; one posterodorsal bristle arising on pruinose part of katepisternum. Halter dark brown with a yellow stem. Wing twice as long as wide; second costal sector $1.4\times$ as long as third; costa slightly surpassing tip of R_{4+5} . Alula small.

Male abdomen.—Sternite 5 with 2 posteromedial spinose patches (Fig. 24). Surstylus with a tuft of large, flat bristles on a narrow anterior lobe, posterior lobe broad and setose (Fig. 21). Paramere long, thin; apex constricted. Basiphallus with a well developed pre-epiphallus (Fig. 23). Distiphallus with a rounded dorsal process, the distal ventral angle of which supports a single pair of dark, flat processes (Fig. 23).

Types.—Holotype: CANADA. *Quebec*: Old Chelsea, 15.x.1964, J. R. Vockeroth (δ , BRI). Paratype: UNITED STATES. *Maryland*: near Plummer's I., at light, 10.x.1914, R. C. Shannon (δ , USNM).

Comments.—*Xenolimosina phoba* is externally very similar to the European *X. setaria*, but these two species differ widely in features of the male terminalia. The tuft of flat surstylar bristles is a particularly distinctive feature of *X. phoba*. The biology of this species is unknown, but it is interesting that both type specimens were collected in late fall. The other North American *Xenolimosina*, *X. sicula*, is also known almost exclusively from late fall or early spring collection records. The European *Xenolimosina setaria* is known exclusively from September, October, and November records.

Etymology.—The specific name *phoba* is from the Latin for tuft, and refers to the tuft of flat surstylar bristles.

RELATIONSHIPS

Roháček (1982) defined a "*Minilimosina* genera-group," to include *Xenolimosina*, *Terrilimosina*, and the large genus *Minilimosina* which includes 32 nearctic species (Marshall, 1985). The females of each genus in this group exhibit a superficial similarity due to the possession of a long, retractile abdomen, which is a plesiomorphic character. Roháček lists small size, a short basiphallus, and a costa extending beyond R_{4+5} as putative synapomorphies linking these three

genera on his cladogram (1982, p. 247). An additional character, "often a narrow T9" is cited in his text characterization of this group (1982, p. 22). I cannot agree that any of these characters provides evidence for a monophyletic "*Minilimosina* genera-group." Species of *Terrilimosina*, *Xenolimosina*, and many *Minilimosina* are larger than common species in most other genera of the Limosininae, such as *Pullimosina* Roháček, *Telomerina* Roháček, and *Opalimosina* Roháček, and are much larger than any species in other genera such as *Trachyopella* Duda and *Elachisoma* Rondani. In any case, average size is a very poor cladistic character. Similarly, the "short basiphallus" of *Xenolimosina* and many *Minilimosina* is a widespread character state in almost all genera of Limosininae, as can be seen by comparing Roháček's own figures of *Xenolimosina* with figures of *Spelobia*, *Pullimosina*, or most other Limosininae. The greatly shortened basiphallus found in *Terrilimosina* is similar to that found in *Telomerina*, and has probably developed convergently in each genus. The character "costa bypassing R_{4+5} " is also found to some degree in many other genera such as *Pullimosina*, *Telomerina*, *Halidayina* Duda, and *Aptilotus* Mik. The last character, "narrow female T9" (T9 of Roháček = epiproct of this paper) is invalid since all *Xenolimosina* have a very wide epiproct, and in fact Roháček lists "female T9 large, broad" as a diagnostic character of *Xenolimosina* (1983, p. 47).

Roháček suggests a sister-group relationship within the "*Minilimosina* genera-group" between *Xenolimosina* and *Minilimosina*, based on the absence of an anteroventral bristle on the mid tibia, reduced male cerci, and a reduced male sternite 8. The latter two characters can be discounted since a large sternite 8 is in the ground plan of *Minilimosina* (as recognized by Roháček), and cerci of male *Xenolimosina* and *Minilimosina* are not consistently or significantly reduced with respect to the condition found in most other genera in the subfamily. The absence of an anteroventral mid tibial bristle is a more unusual character and could reflect cladistic relationship, but this simple character is also found in part of *Terrilimosina* and occasionally in other genera such as *Aptilotus* and male *Pullimosina*.

In conclusion, *Terrilimosina* and *Xenolimosina* are well defined genera with no clear affinities to other Limosininae. Roháček's evidence for a monophyletic *Minilimosina* genera-group including these two genera is rejected, but his hypothesis that such a group exists is not disproved. Falsification of a cladistic hypothesis requires the discovery of synapomorphies supporting an alternative cladistic hypothesis. At the present time there are no defensible synapomorphies suggesting relationships between *Terrilimosina* or *Xenolimosina* and any other subgroup of the Limosininae.

ACKNOWLEDGMENTS

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PROC. ENTOMOL. SOC. WASH.
87(4), 1985, p. 769

NOTE

Further Evidence of Nuptial Feeding in *Sepedon* (Diptera: Sciomyzidae)

We had already submitted our manuscript on nuptial feeding in *Sepedon* (Berg and Valley, 1985, Proc. Entomol. Soc. Wash. 87, pp. 622-633) when R. E. Orth alerted us to a relevant paper that we had overlooked. It is: Barraclough, D. A., 1983. The biology and immature stages of some *Sepedon* snail-killing flies in Natal (Diptera: Sciomyzidae). Ann. Natal Mus. 25: 293-317.

That author reported (p. 312) that the copulating male of *Sepedon neavei* Steyskal "... extends his proboscis downwards, between the bases of the female's antennae, and makes contact with the female's partially extended proboscis. The male's labellum everts and preens the female's labellum—the male possibly passing regurgitated food to the female." His illustrations include a figure of this labellar contact during copulation.

If Barraclough's interpretations are correct, three conclusions pertinent to points raised in our paper are inescapable.

(1) Males of *S. neavei* must be included among those that expel nuptial food orally.

(2) Means of transmission of nuptial food are even more varied than we indicated; they include direct oral contact and may include regurgitation. We cannot assume that nuptial food was secreted by the salivary glands simply because it is transmitted orally.

(3) If this Ethiopian species practices nuptial feeding, this mating system almost certainly is used by some species of the *Sepedon* group in all zoogeographic regions. The species mentioned in our previous paper occupy parts of all zoogeographic regions except the Ethiopian. The ranges of the four "Asiatic" species discussed there are primarily Oriental, not Palearctic, as we indicated. However, *Sepedon aenescens* Wiedemann extends northward well into the Palearctic Region, and *S. plumbella* Wiedemann occurs throughout most of both the Oriental and the Australian Regions. The widespread occurrence of nuptial feeding in *Sepedon* and related genera may suggest that it evolved in primitive ancestral stock, and was then carried along by several species that descended from that stock when they dispersed to occupy their present ranges.

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