

NOTA CIENTÍFICA

Stenomicra* (Diptera: Opomyzoidea) in Argentina, with information on the biology of the genus*CAMPOS, Raúl E.* , María C. GRAMAJO** and Mercedes LIZARRALDE DE GROSSO*****

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***Stenomicra* (Diptera: Opomyzoidea) en Argentina, con información sobre la biología del género**

■ **RESUMEN.** En este estudio, se publica por primera vez para Sudamérica (Región Neotropical) el género *Stenomicra* Coquillett (Diptera: Periscelididae). Se aporta información sobre su ciclo biológico en condiciones naturales y se mencionan cuatro especies del género *Eryngium* L. (Apiaceae), como plantas hospedadoras de los estados inmaduros. Los ejemplares de *Stenomicra* sp. fueron colectados en Sierra de la Ventana, Provincia de Buenos Aires, Argentina.

PALABRAS CLAVE. Brachycera. Opomyzoidea. Acalypratae. *Eryngium*. Fitotelmata.

■ **ABSTRACT.** This is the first literature record of the genus *Stenomicra* Coquillett (Diptera: Periscelididae) from South America (Neotropical Region). New information on the biological cycle of *Stenomicra* species in the wild is provided, and four species of the genus *Eryngium* L. (Apiaceae) are recorded as host plants for immature stages of this taxon. The specimens of *Stenomicra* sp. were collected in Sierra de la Ventana, Buenos Aires province, Argentina.

KEY WORDS. Brachycera. Opomyzoidea. Acalypratae. *Eryngium*. Phytotelmata.

The genus *Stenomicra* Coquillett has been assigned to different six families since its description early in 20th century: Anthomyzidae, Drosophilidae, Asteiidae, Geomyzidae, Periscelididae and Aulacigastridae. The genus is also the type genus for a more recently described family Stenomicridae (Papp, 1984; Khoo & Sabrosky, 1989).

Hennig (1971), Teskey (1987) and J.

F. McAlpine (1989) classified the genus in the family Aulacigastridae, while D. K. McAlpine (1983) treated the genus in the family Periscelididae; the latter classification has been followed by several authors such as Mathis & Papp (1998), Baptista & Mathis (1994) and Grimaldi & Mathis (1993).

A recent phylogenetic study based on molecular markers (Winkler *et al.*, 2010) suggests that *Stenomicra* is phylogenetically

closer to the Aulacigastridae than to the Perisclididae, as was noted by Hennig (1971) and followed by J. F. McAlpine (1989). However, Mathis and Rung (in press) highlight the need for a more detailed study on the phylogeny of these groups, because the study of Winkler *et al.* (2010), on the other hand failed to find any support for a sister-group relationship between Perisclididae and Neurochaetidae. In this note, we follow McAlpine (1983) and Mathis and Rung (in press), considering *Stenomicra* as a Perisclididae.

The genus *Stenomicra* comprises 36 species distributed in the Afrotropical, Oriental, Australasian, Palearctic, Nearctic and Neotropic regions. Six species are known from the Neotropic region: *S. anacrostichalis* Grimaldi & Mathis, and *S. sabrosky* Grimaldi & Mathis from Dominican Republic; *S. flavida* Hennig, *S. parataeniata* Hennig, and *S. taeniata* Hennig, from Costa Rica, and *S. angustata* Coquillett, from Puerto Rico (Mathis & Rung, in press), all from countries of Central America. However, the *Stenomicra* genus, in South America has not been mentioned so far in the bibliography.

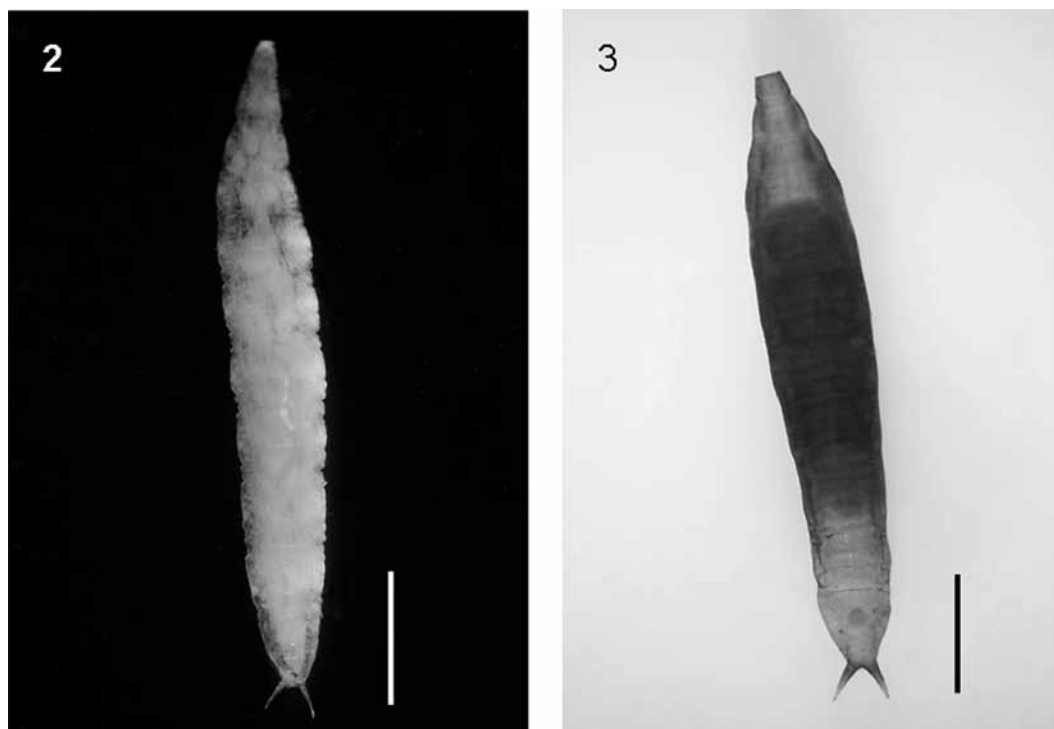
Stenomicra flies are slender, very small, usually pale yellow and are fast-moving. They often occur on leaf surfaces (Khoo & Sabrosky, 1989). Their larvae have only been found in aquatic and semiaquatic habitats of phytotelmata in Bromeliaceae, Gramineae (*Pandanus* Parkinson, *Coik lacrymajobi* L.) and Araceae, (*Xanthosoma* sp.); they have been observed to prey on Culicidae larvae (Fish, 1983). Species of *Stenomicra* differ from other Perisclididae by the presence of two reclinate fronto-orbital setae (lower seta occasionally mesocline); frons lacking interfrontal setae; ocellar setae absent; postpronotum lacking a well-developed seta; eyes microsetulose, sometimes sparsely so; katapisternum bearing 1 prominent seta; hindfemur lacking anterodorsal, preapical seta; supra-alar seta lacking; lateral scutellar setae 1 pair, apical; wing with anal lobe greatly reduced; costa long, extended to vein M; alula indistinct; vein CuA₂ weak or lacking; cell cup usually lacking (Mathis & Rung, in press).

This scientific note reports the knowledge on the biodiversity and geographical distribution of *Stenomicra* in the Americas, and provides biological information on the life cycle of the genus and on its "host" plants. It is also the first report of the genus *Stenomicra* from Argentina.

Specimens were collected from March 2006 to December 2007, in "Ernesto Tornquist" Provincial Park, Sierra de la Ventana (38° 10' S and 62° 8' W), located in southeastern Buenos Aires province, Argentina. The area is flat and occupied by extensive grasslands broken by a mountainous system with a maximum height of 1243 m a.s.l, which extends for 170 km in northwest-southeast direction (Harrington, 1947). The climate in the mountains is humid/sub-humid with little or no water deficit (Burgos & Vidal, 1951). Mean annual temperature and precipitation are 14° C and 896 mm (SMN, 1981, 1986),



Fig. 1. *Eryngium horridum* Malme (Apiaceae) at the field site in Sierra de la Ventana, Buenos Aires Province, Argentina.



Figs. 2-3. *Stenomicra* sp.: Fig. 2, larva; Fig. 3, pupa. (Scale: 1 mm).

respectively. Rainfalls occur mainly during springtime and summer, with occasional snowfalls during winter.

Larvae and pupae were collected as part of a study of the macroinvertebrate communities that inhabit phytotelmata of the genus *Eryngium* L. (Apiaceae) (*Eryngium horridum* Malme, *E. stenophyllum* Urb., *E. aff. serra* Cham. and Schldl. and *E. elegans* Cham. and Schldl.) (Fig. 1). The imbricate arrangement of the leaves of these plants delimits axils that hold water and detritus and are colonized by aquatic or semiaquatic organisms.

Samples were taken from 80 plants of each species of *Eryngium*. The liquid content was extracted using a pipette connected to a suction pump; subsequently each plant was rinsed twice with clear water and the contents were extracted. All larvae were fixed in the field and kept in 80% ethyl alcohol, except for some immature forms that were taken to the laboratory for further development. Puparia were collected by cutting out the piece of leaf to which they were adhered

(out of the water). Each puparium was reared in an individual vial until the adults hatched. The larvae, puparia and adults (males and females) were dissected and mounted on slides with Canada balsam.

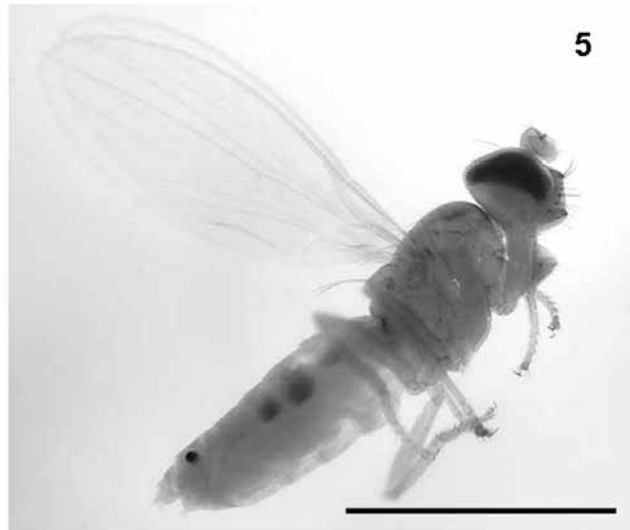
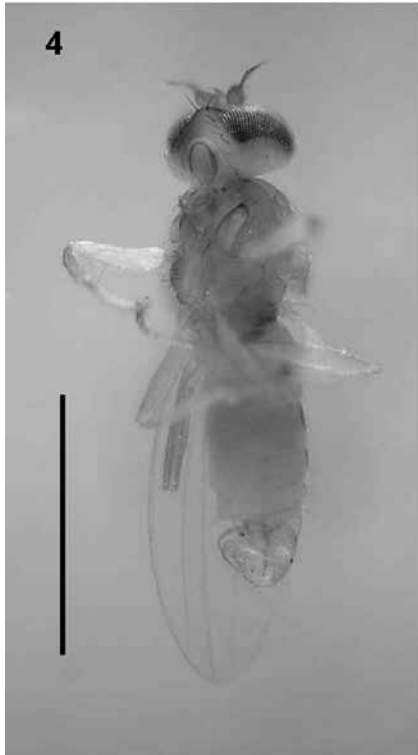
The materials were deposited in the Instituto-Fundación Miguel Lillo, Tucumán, Argentina and in the Instituto de Limnología "Dr. Raúl A. Ringuelet" (ILPLA), La Plata, Argentina.

Stenomicra sp. larvae (Fig. 2) developed in the water-filled axils of *Eryngium horridum*, *E. stenophyllum*, *E. aff. serra* and *E. elegans*; however, the population was abundant only in *E. horridum* (Table I). The phytotelmata of individuals of this species had the greatest abundance of culicid larvae (Campos, 2010), which could serve as prey for *Stenomicra* larvae.

The larvae of *Stenomicra* sp. remained in the water-filled axils of *Eryngium* from March (fall) to October (spring); afterwards they migrated and adhered to the aerial portion of the leaves, where they pupated (Fig. 3). Adult emergence (Figs. 4-5) occurred in December

Table I. Number (n), mean and standard deviation (\pm SD) of *Stenomicroa* sp. larvae collected from 320 plants with four phytotelmata each belonging to genus *Eryngium*, in Sierra de la Ventana, Argentina.

Season	Phytotelmata							
	<i>E. horridum</i>		<i>E. stenophyllum</i>		<i>E. aff. serra</i>		<i>E. elegans</i>	
	n	Mean (\pm SD)	n	Mean (\pm SD)	n	Mean (\pm SD)	n	Mean (\pm SD)
Fall	460	22 (9.6)	-	-	1	0 (0.2)	3	0.08 (0.47)
Spring	319	15.6 (6.42)	4	0.2 (0.5)	-	-	-	-



Figs. 4-5. *Stenomicroa* sp.: Fig. 4, adult male; Fig. 5, adult female. (Scale: 1 mm).

(late spring).

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LITERATURE CITED

1. BAPTISTA, A. R. & W. N. MATHIS. 1994. A revision of New World *Cyamops* Melander (Diptera, Perisclididae). *Smithson. Contrib. Zool.* 563: 1-28.
2. BURGOS, J. J. & A. L. VIDAL. 1951. Los climas de la república Argentina según la nueva clasificación de Thornthwaite. *Meteoros* 1: 3-32.

3. CAMPOS, R. E. 2010. *Eryngium* (Apiaceae) phytotelmata and their macro-invertebrates communities, including a review and bibliography. *Hydrobiologia* 652: 311-328.
4. FISH, D. 1983. Phytotelmata: flora and fauna. In: Frank, J. H. & L. P. Lounibos (eds.), *Phytotelmata: terrestrial plants as hosts of aquatic insects communities*. Plexus Inc., New Jersey, pp. 1-27.
5. GRIMALDI, D. A. & W. N. MATHIS. 1993. Fossil Perisclididae (Diptera). *Proc. Entomol. Soc. Wash.* 95 (3): 383-403.
6. HARRINGTON, H. 1947. Explicación de las hojas 33m y 34m: Sierra de Curamalal y Ventana, Provincia de Buenos Aires. *Dir. Min. Geol. Bs. As. Bol.* 51: 1.
7. HENNIG, W. 1971. Neue Untersuchungen über die Familien der Diptera Schizophora (Diptera: Cyclorrhapha). *Stuttg. Beitr. Naturk. (A) Biol.* 226: 1-76.
8. KHOO, K. C. & C. W. SABROSKY. 1989. Family Stenomicridae. In: Evenhuis, N. L. (ed.), *Catalog of the Diptera of the Australasian and Oceanian Regions*. B.P. Bishop Museum Special Publication No. 86. E.J. Brill and Bishop Museum Press, Honolulu, p. 551.
9. MATHIS W. N. & A. RUNG. (In press). World catalog and conspectus on the family Perisclididae (Diptera: Schizophora). *Myia*.
10. MATHIS, W. N. & L. PAPP. 1998. Family Perisclididae. In: Papp, L. & B. Darvas (eds.), *Contributions to a Manual of Palearctic Diptera, Volume 3: Higher Brachycera*. Science Herald, Budapest, pp. 285-294.
11. McALPINE, D. K. 1983. A new subfamily of Aulacigastridae (Diptera: Schizophora), with a discussion of aulacigastrid classification. *Aust. J. Zool.* 31: 55-78.
12. McALPINE, J. F. 1989. Phylogeny and classification of the Muscomorpha. In: McAlpine, J. F. & D. M. Wood (eds.), *Manual of Nearctic Diptera Volume 3*, Research Branch Agriculture Monograph 32, Ottawa, Canada, pp. 1397-1518.
13. PAPP, L. 1984. Family Aulacigastridae. In: Soós, A. & L. Papp (eds), *Catalogue of Palearctic Diptera*. Elsevier Science Publishers and Akadémiai Kiadó, Budapest, pp. 60-61.
14. PAPP, L. 1998. Family Aulacigastridae. In: Papp, L. & B. Darvas (eds.), *Contributions to a Manual of Palearctic Diptera Volume 3: Higher Brachycera*. Science Herald, Budapest, pp. 279-284.
15. SMN. 1981. *Estadísticas climatológicas. 1961-1970*. Servicio Meteorológico Nacional, Fuerza Aérea Argentina. <http://www.smn.gov.ar> (2010).
16. SMN. 1986. *Estadísticas climatológicas: 1971-1980*. Servicio Meteorológico Nacional, Fuerza Aérea Argentina. <http://www.smn.gov.ar> (2010).
17. TESKEY, H. J. 1987. Aulacigastridae. In: J. F. McAlpine, B. V. Peterson, G. E. Shewell, H. J. Teskey, J. R. Vockeroth & D. M. Wood (eds), *Manual of Nearctic Diptera, Volume 2*, Research Branch Agriculture Monograph 32, Ottawa, Canada, pp. 891-894
18. WINKLER, I. S., A. RUNG & S. J. SCHEFFER. 2010. Hennig's orphans revisited: Testing morphological hypotheses in the "Opomyzoidea" (Diptera: Schizophora). *Mol. Phyl. Evol.* 54: 746-762.