The hunter-flies of Armenia. III.
New records of the genus Limnophora Robineau-Desvoidy, 1830, with the description of a new species
(Insecta: Diptera: Muscidae)

Adrian C. Pont, Karine Harutyunova, Maria Harutyunova, Doreen Werner

Abstract. Five species of Limnophora Robineau-Desvoidy, 1830 have been recorded from Armenia, and in this paper we give further records of these species and record eight species as new to Armenia: L. obsignata (Rondani, 1866), L. olympiae Lyneborg, 1965, L. pollinifrons Stein, 1916, L. pulchriceps (Loew, 1860), L. rufimana (Strobl, 1893), L. setinerva Schnabl, 1911, L. tigrina (Am Stein, 1860) and L. triangula (Fallén, 1825). One new species, Limnophora mediterranea Pont sp. n., is described.

Key words. Diptera, Muscidae, Armenia, Limnophora, new records, new species.

Introduction
This third contribution to the hunter-flies of Armenia deals with the genus Limnophora Robineau-Desvoidy, 1830, which includes over 30 species in the western Palaearctic region. Species of Limnophora are closely associated with unpolluted rivers and streams. Adults can be found resting on boulders and stones, and among the plants lining the margins of rivers. Several species are active predators of the adult and immature stages of blackflies (Simuliidae) (see Werner & Pont 2006). Larvae are generally aquatic or subaquatic, and are predaceous on other small invertebrates that live in the water (Rozkošný & Gregor 2004), including blackfly larvae and pupae.

Five species are known from Armenia (Pont et al. 2005, 2011): L. femoriseta Pont, Vikhreva & Werner, 2011, L. maculosa (Meigen, 1826), L. pandellei Séguay, 1923, L. patellifera (Villeneuve, 1911), and L. riparia (Fallén, 1824). In this paper we record eight species as new to Armenia. We list new records based on our fieldwork in 2005, 2010 and 2011, and describe a new species, from Armenia, Turkey, Greece, Spain.

Material
The Armenian material was collected in 2005 by ACP and DW, and in 2010 and 2011 by ACP. This material has been identified by ACP and is deposited mainly in the Natural History Museum, London (BMNH), with some duplicates in the Zoologisches Museum der Humboldt-Universität, Berlin (ZMHU) and the Oxford University Museum of Natural History, Oxford (OUMNH). Additional material from Spain, Greece and Turkey has been made available by Verner Michelsson and is deposited in the Natural History Museum of Denmark, University of Copenhagen (ZMUC).
Results

Species of *Limnophora* can be recognized by absence of a prealar seta; presence of setulae on the prosternum; and the presence of setulae at the base of vein R₄+₅ on both upper and lower wing surfaces. There are keys for the identification of the Palaearctic species by Henning (1959) and to Central European species by Gregor et al. (2002). A second key to the Central European species, together with a review of the immature stages, was given by Rozkošný & Gregor (2004). The predaceous behaviour of the adult flies has been described by Werner & Pont (2006).

**Limnophora femoriseta** Pont, Vikhrev & Werner, 2011

Material: Further records since the original description (Pont et al. 2011): ARMENIA: Syunik: Shikahogh, 39°06’N 46°28’E, 930 m, 23.vii.2011, 1♂; River Vorovan, Vaghatin, 39°30’N 46°07’E, 1400 m, 25.vii.2011, 1♂.

Distribution: Known only from Armenia and Turkey.

**Limnophora mediterranea** Pont, sp. n. (Figs 1-3, 5-6)


This is the species listed in Pont et al. (2005: 80) as “*Limnophora* sp. near *triangula* (Fallén, 1825)”. The collection of more material has enabled a full description of both sexes to be made.

**Description of male** (Fig. 5). Head: Ground-colour black. Eye bare. Frons broad, at middle 0.36 of head-width at this point, widening slightly in lower half. Ocellar seta strong, slightly longer than inner vertical; outer vertical hardly distinct from the adjacent post-ocular setulae. Fronto-orbital plate and parafacial silvery-white pruinose; face, gena and occiput light grey. Frontal triangle light grey dusted, viewed from in front and below reaching only halfway from anterior ocellus to lunule. FrONTAL vitta black, matt. At middle of frons, a fronto-orbital plate one-third width of frontal vitta. 3-5 pairs of inclinate frontal setae, with a row of short setulae outside them, and 2 pairs of orbital setae, lower one exclinate and upper one
reclinate. Antenna black; postpedicel 2.3 times as long as wide and falling short of mouth- 
margin by half its own width. Arista short-pubescent, the longest individual hairs hardly as 
long as its basal width. Parafacial at middle half as wide as width of postpedicel, narrowing 
below, bare. In lateral view, mouth-margin below level of profrons. Depth below lowest eye-
margin equal to width of postpedicel. Genal setae strong. Palpus black, slender. Prementum 
of proboscis glossy, black. – Thorax (Fig. 5). Ground-colour black. Scutum light grey 
dusted, with dark brown markings as follows: before suture with a narrow vitta running 
through acrostichal rows, and sometimes with a brown mark between dorsocentrals, intraalar 
and supraalar; behind suture with a pair of vittae between the dorsocentral and intraalar 
setae, reaching third dorsocentral, and a median vitta reaching to the prescutellar acros-
tichals, these three sometimes wholly or partially confluent just behind suture and forming a 
band that extends transversely between the intraalar rows. Pleura light grey dusted. Prothorac-
ic spiracle dirty whitish. Scutellum light grey dusted and with a small dark spot around each 
subbasal lateral seta. Acrostichals 0+1, the presutural setulæ biserial in front, becoming 
triserial just before suture. Dorsocentrals 2+3. Propimeral seta with 2-3 additional short 
setulæ. Katepisternals 1+2, the lower one shorter than the upper two. Proepisternal depression, 
notopleuron (except for setae) and meron bare. Scutellum uniformly but sparsely setulose 
on disc, with a pair of subbasal and apical setae; lateral margins and ventral surface bare. – 
Legs. Black. Fore femur with a complete row of uniform posteroventral setae. Fore tibia 
without submedian setae; apical posteroventral and ventral setae inconspicuous. Fore tarsus 
without modifications. Mid femur without anteroventral setae, with 1-2 short posteroventral 
setae in basal third, with several anterior setae in basal half; 0 anterior and 2 posterior pre-
apical setae. Mid tibia with 2 posterior setae. Hind femur without ventral setae except 2-3 
anteoroventral setae in apical quarter. Hind tibia with 1 anterodorsal and 1 anteroventral seta; 1 
Costal spine inconspicuous. Veins bare except for costa and a few setulæ on the node at the 
base of vein R_{4+5}. Cross-vein r-m below the point where vein R_{1} enters costa. Cross-vein dm- 
cu weakly sinuous. Veins R_{4+5} and M_{1} parallel at wing-margin. Calypters white, margins
creamy. Haltere yellow. – **Abdomen.** Ground-colour black. With light grey dust on tergites, including sides and ventral surface, sternites, pregenital tergites and epandrium, and with dark brown to black markings as follows: syntergite 1+2 unmarked or with a pair of oval spots; tergites 3 and 4 each with a pair of large, bold, well-defined, subquadrate spots, narrowly separated from fore- and hind-margins and broadly separated medially; tergite 5 with a weakly marked median vitta. Tergites without strong setae, with a few lateral marginals on tergite 4, and a few lateral discals and a marginal row on tergite 5. Sternite 1 bare. Sternite 5: Fig. 1. – **Terminalia.** Figs 2-3. – **Measurements.** Length of body, 4.0-4.25 mm. Length of wing, 3.5-3.75 mm.

**Description of female.** Differs from the male as follows: **Head.** Frons at level of anterior ocellus 0.42 of head-width at this point. Outer vertical twice as long as an adjacent post-ocular setula. Fronto-orbital plate tinged with brown along inner margin. Frontal triangle tinged with yellow, almost reaching lunule. At middle of frons a fronto-orbital plate 0.44 width of frontal vitta. Postpedicel 3 times as long as wide. – **Thorax.** Scutum with the dark markings much more distinct, especially before suture where the median vitta and the two lateral spots are large and conspicuous. – **Legs.** Fore tibia with the posteroventral apical seta distinct, as long as tibial width at this point. Mid femur without any setae on ventral surfaces. – **Abdomen.** Markings as in male, but syntergite 1+2 with or without spots, and the markings on tergites 3 and 4 much smaller and broadly separated from the fore-margin of the tergites. Tergite 5 without marginal setae. – **Ovipositor.** Not examined. – **Measurements.** Length of body, 3.75-4.5 mm. Length of wing 3.25-4.0 mm.

**Relationships.** This species belongs in the *triangula*-group of *Limnophora*, sometimes ranked as subgenus *Pseudolimnophora* Strobl, 1893, and is most similar to *Limnophora triangula* (Fallén, 1825) on account of the presence of 2 pairs of orbital setae, bare sternite 1, and 3 postsutural dorsocentral setae. The very similar European *Limnophora nigripes* (Robineau-Desvoidy, 1830) and *L. rotundata* Collin, 1930 have 4 postsutural dorsocentrals. It differs from *L. triangula* as follows:

– Mid tibia with 1 posterior seta. Presutural acrostichal setulae triserial, becoming quadriserial towards suture in ♀. Knob of haltere dull orange. ♂: head, when viewed from in front and below, with the brownish-grey frontal triangle reaching lunule; scutum before suture brown to brownish-grey, with a narrow yellowish-grey vitta along the dorsocentral rows and a grey band along suture from the dorsocentral line to the postpronotum, behind suture with a broad dark band along suture between the dorsocentral rows from which three broad vittae arise and run along the acrostichal and dorsocentral lines; sternite 5 as in Figs 7, 9; terminalia as in Figs 4, 8, 10. ♀: scutum yellowish-grey with a broad brown median vitta running through the acrostichals, a pair of postsutural vittae between the dorsocentral and intraalar rows, and a pair of presutural patches between the dorsocentrals, intraalars and supraalars ....................................................... *triangula* (Fallén)

– Mid tibia with 2 posterior setae (very rarely 1 on one or both legs). Presutural acrostichal setulae biserial, becoming triserial towards suture in ♀. Knob of haltere light yellow. ♂: head, when viewed from in front and below, with the light grey frontal triangle reaching only halfway from anterior ocellus to lunule; scutum before suture light grey dusted, with a narrow dark median vitta running through the acrostichals, and sometimes with a pair of small spots between dorsocentrals, intraalar and supraalar, behind suture with three narrow vittae running along the acrostichal and dorsocentral lines, these sometimes
Fig. 5. *Limnophora mediterranea* Pont, sp. n., holotype ♂ (photo: K. CHILD).

Partially or wholly confluent just behind suture and forming a band that extends transversely between the intraalar rows; sternite 5 as in Fig. 1; terminalia as in Figs 2–3. ♀: scutum light grey with three brown vitæae running through the acrostichal and dorsocentral lines, the area between them sometimes partly to wholly darkened just behind suture ................................................................. *mediterranea* Pont, sp. n.

**Etymology.** The species is named after the Mediterranean Sea to reflect the distribution of the species, and the name is an adjective in agreement with the feminine noun *Limnophora.*

**Distribution.** Armenia, Turkey, Greece, Spain.

*Limnophora obsignata* (Rondani, 1866)


Distribution: South Europe, North Africa, the Middle East, and widespread in the Afrotropical region. New for Armenia.
Fig. 6. Limnophora mediterranea Pont, sp. n., a typical habitat on gravel and pebbles by the River Arpa at Jermuk, Armenia, 39°50′N 45°41′E (photo: A. C. Pont).

**Limnophora olympiae** Lyneborg, 1965


Distribution: Central and South Europe, Morocco, Israel. New for Armenia.

**Limnophora pandellei** Séguy, 1923

Material: ARMENIA: Aragatsotn: River Amberd near Amberd fortress, 40°24′N 44°14′E, 2210 m, 25.vi.2010, 1♂ 1♀. Gegharkunik: tributary of River Argichi at Nerkin Getashen, 40°09′N 45°16′E, 1940 m, 9.vi.2005, 1♀, Werner predation no. 2005/68 (Fig. 11). Kotayk: Azat River canyon, Garni N.P., 40°06′N 44°44′E, 1210 m, 4.vi.2005, 3♂ 1♀; Garni Canyon, 40°07′N 44°45′E, 1280 m, 14.vi.2010, 1♂; tributary of River Hrazdan at Bjni, 40°28′N 44°40′E, 1510 m, 17.vi.2010, 1♂. Vayots Dzor: stream below Noravank church, 39°41′N 45°14′E, 1460 m, 15 & 24.vi.2010, 2♂.

Distribution: Widespread in Europe, from Iceland to North Africa, and France to Turkey. Recorded from Armenia by Pont et al. (2005: 80).

Note: For an observation on predatory activity, see below under *Limnophora triangula* (Fallén, 1825).
**Limnophora patellifera** (Villeneuve, 1911)

Material: ARMENIA: *Syunik*: River Meghri near Lehvaz, 38°57’N 46°12’E, 1300 m, 22.vii.2011, 1♀; Nerkin Hand, River Tsav, 39°03’N 46°31’E, 690 m, 23.vii.2011, 1♂; River Vorovan, Vaghatin, 39°30’N 46°07’E, 1400 m, 25.vii.2011, 4♀ 2♂.

Distribution: Known only from Armenia, Turkmenistan, Syria. Recorded from Armenia by PONT et al. (2011: 92).

Note: There may be 3 or 4 pairs of postsutural dorsocentral setae, even sometimes 3 on one side and 4 on the other.

**Limnophora pollinifrons** Stein, 1916


Distribution: Widespread in Europe, Morocco, eastwards to Turkey and China. New for Armenia.

**Limnophora pulchriceps** (Loew, 1860)


Distribution: South and South-east Europe. New for Armenia. We have also seen a specimen from GEORGIA, Mamison Pass, 2500 m, 1.ix.1903, from BECKER’s collection (no. 50577) (ZMHU). New for Georgia.

**Limnophora riparia** (Fallén, 1824)


Distribution: Common in Europe and widespread throughout the Palaearctic region, as far east as Tajikistan and including North Africa. Recorded from Armenia by PONT et al. (2011: 91).

**Limnophora rufimana** (Strobl, 1893)


*Limnophora setinerva* Schnabl, 1911


Distribution: South Europe and North Africa, east to Japan. New for Armenia

*Limnophora tigrina* (Am Stein, 1860)


*Limnophora triangula* (Fallén, 1825) (Figs 4, 7-10)

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Figs 7-10. *Limnophora triangula* (Fallén) ♂: 5, sternite 5, and 6, cercal plate (from Germany, Westfalen, Rur-Eifel, Kaltal between Vossenack and Schmidt); 7, sternite 5, and 8, cercal plate (from Georgia, Mamison Pass, leg. BECKER). Scale-bar 0.25 mm.

Distribution: Common and widespread in the Palaearctic region, as far east as China and Japan. New for Armenia. Also seen from GEORGIA, Mamison Pass, 2500 m, 1.ix.1903 (BECKER collection), 1 ♂ (ZMHU). New for Georgia.

Note: The identity of this species has been confirmed by dissection of the male terminalia, which are very different from those of *L. mediterranea* sp. n. (compare Figs 4, 7-10 with Figs 1–3).

Predatory activity: At the tributary of River Argichi at Nerkin Getashen, on 9 June 2005, we found that a large pipe running along the tributary had become exposed to the air as the water level had dropped over the preceding days. This pipe was carpeted with pupae of *Simulium variegatum* Meigen, 1818, which were being vigorously attacked and fed upon by species of *Limnophora* (Fig. 11). We observed *Limnophora pandellei* and *L. triangula* feeding on the pupae, and also found *L. tigrina* visiting the pipe.

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Fig. 11. Limnophora sp., ♀, probably L. pandellei Séguy, feeding on pupae of Simulium variegatum Meigen, on the pipe running along a tributary of the River Argichi at Nerkin Getashen, Armenia, 40°09’N, 45°16’E (photo: D. WERNER).

References


Authors’ addresses: Adrian C. Pont, Oxford University Museum of Natural History, Parks Road, Oxford OX1 3PW, U.K. – Karine Harutyunova and Maria Harutyunova, Institute of Molecular Biology, 7 Hasratian Street, Yerevan 375 014, Armenia. – Doreen Werner, Leibniz-Centre for Agricultural Research, Institute of Land Use Systems, Working Group Medical Entomology, Eberswalder Strasse 84, 15374 Müncheberg, Germany. – Email contact: pont.muscidae@btinternet.com