

## Two new species of *Tipula* (*Lunatipula*) Edwards (Diptera: Tipulidae) from Turkey

HASAN KOÇ

Muğla University, Science and Arts Faculty, Department of Biology, 48170 Kötekli/Muğla, Turkey

**Abstract.** Two new species in the *acuminata* group of subgenus *Tipula* (*Lunatipula*), *Tipula* (*Lunatipula*) *oosterbroeki* **sp. n.** and *T. (L.) jaroslavi* **sp. n.**, were described and illustrated from Southwest part of Asian Turkey.

**Résumé. Deux nouvelles espèces de *Tipula* (*Lunatipula*) Edwards (Diptera : Tipulidae) de Turquie.** L'auteur décrit deux nouvelles espèces du groupe *acuminata* du sous-genre *Tipula* (*Lunatipula*) : *Tipula* (*Lunatipula*) *oosterbroeki* **sp. n.** et *T. (L.) jaroslavi* **sp. n.** Elles proviennent du sud-ouest de la Turquie d'Asie.

**Keywords:** *Tipula* (*Lunatipula*) *acuminata* group, *Tipula oosterbroeki*, *Tipula jaroslavi*, Anatolia.

Tipulidae are a family of Diptera Nematocera with about 4250 species and distributed worldwide. Adults are characterized by their breakable long legs, the venation of the wing, elongate maxillar palps, last segments usually being longer than the preceding segments together and absent ocelli. Their body size is relatively large, ranging from 10 to over 30 mm.

A revised checklist for Turkey included 130 species and subspecies (Koç & Oosterbroek 2001). Since then, another 10 species were found in Turkey, four of them being new for science and six species recorded from Turkey for the first time (tab.1).

In this study, two new species of the *Tipula* (*Lunatipula*) *acuminata* group are described. This group contains 54 species, most of which are distributed in the south-eastern part of the Mediterranean and the Transcaucasus.

### Material and Methods

The material that includes these two new species was collected using an entomological hand net with a diameter of 40 cm in 2003, 2004 and 2006.

Genitalia of some specimens of the two new species were macerated in 10% KOH at room temperature for one day to remove soft tissue, then rinsed in distilled water and dilute glacial acetic acid, and dissected in 80% ethanol. Genitalia preparations were placed in glycerin in a genitalia vial mounted on the pin beneath the specimen. Figures were drawn with the aid of drawing attachment of a stereomicroscope. Terminology for genitalia follows McAlpine (1981) and H. De Jong (1997). These new species were checked by Dr. Piotr Oosterbroek

(Department of Entomology, Zoological Museum, University of Amsterdam, The Netherlands).

### Systematics

#### *Tipula* (*Lunatipula*) *oosterbroeki* **sp. n.** (Figs 1–7)

**Type material. Holotype.** ♂, Turkey, Isparta, Sütçüler Road 40. km (37°35'N 30°59'E), 1200 m a.s.l., 15.V.2004 (leg. H.Koç). **Paratypes.** 1 ♂, Turkey, same locality and date as holotype; 3 ♂♂, Turkey, Isparta, Sütçüler, Sipahiler Village (37°39'N 30°59'E), 1250 m a.s.l., 20.V.2006 (leg. H.Koç). Holotype and 3 paratypes are preserved at the Department of Biology, Science and Arts Faculty, Muğla University; 1 paratype at the Section Entomology, Zoological Museum, University of Amsterdam.

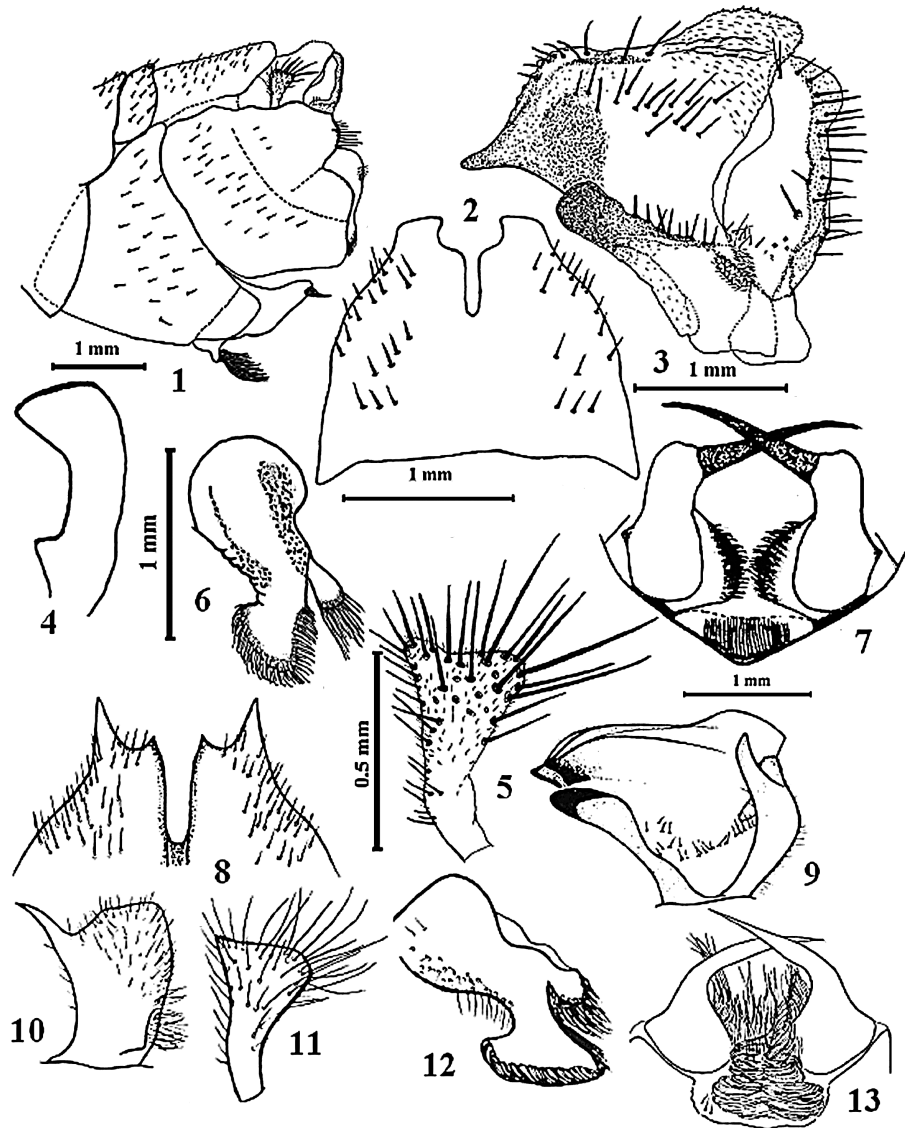
**Description. Male.** Body length 18–19 mm; antennal length 5.5–6 mm; wing length 19–20 mm.

Head black brown and grayish brown along middle line and around compound eyes. Rostrum largely yellow gray only a little dark colored on dorsal and ventral. Nasus considerably short, with golden colored hairs at the apex. Palp yellowish brown except for darken last segment. Antennae 13 segmented, scape and pedicel yellowish brown, flagellar segments slightly dark colored at base, colored from yellowish brown to black brown. Flagellar segments are a little dark colored at base from yellowish brown to blackish brown. Flagellar segments distinctly thickened beginning from second flagellar segment at base. Apical segment considerably short. Longest verticils are longer than flagellar segments.

Pronotum light yellowish brown. Scutum yellowish brown, with three brown longitudinally stripes. Lateral part of thorax yellowish brown with black marks. Scutellum and mediotergite are yellowish grey. Halter with dull yellow stem and black marked knob. Squama with clear spine. Wings with lunula receiving into discal cell. Pterostigma brown. Membrane nearly yellowish white, only along front margin brownish yellow and

**Table 1.** Recent additions to Turkey fauna of Tipulidae

Species	Distribution in Turkey
<i>Tipula (Lunatipula) murati</i> Koç 2004	Muğla and Denizli Provinces (Koç 2004; Koç <i>et al.</i> 2005)
<i>T. (L.) cillibema</i> Koç 2004	Muğla Province (Koç 2004; Koç & Oosterbroek 2005)
<i>T. (Pterelachisus) aspoecki</i> Vogtenhuber 2004	Bolu Province (Vogtenhuber 2004)
<i>T. (P.) luteobasalis abant</i> Vogtenhuber 2004	Bolu Province (Vogtenhuber 2004)
<i>T. (L.) pseudopeliostigma</i> Mannheims 1965	Muğla Province (Koç 2004)
<i>T. (L.) selenis</i> Loew 1873	Denizli Province (Serçe & Koç 2005)
<i>T. (L.) vermooleni</i> Theischinger 1987	Muğla Province (Koç 2004), Denizli (Serçe & Koç 2005)
<i>T. (L.) subternalis</i> Oosterbroek 1997	Şırnak Province (Oosterbroek 2007)
<i>T. (L.) sepiiformis</i> Vogtenhuber 2002	Bolu Province (Oosterbroek 2007)
<i>T. (Beringotipula) unca unca</i> Wiedemann 1817	Erzurum Province (Oosterbroek 2007)

**Figures 1–13**

**1–7, *Tipula (Lunatipula) oosterbroeki* n. sp.; 8–13, *T. (L.) subacuminata* Mannheims 1963 (after Theischinger, 1987).** 1, hypopygium, lateral view; 2, 8, tergite 9, dorsal view; 3–4, 9–10, inner gonostyle, outside view and from behind; 5, 11, outer gonostyle, outside view; 6, 12, appendages of sternite 9, lateral view; 7, 13, hind margin and of lobes of sternite 8, hind view.

delicate brown vein.  $M_{1+2}$  with petiole. Coxae, trochanters and femora are yellowish brown except darken tip parts. Tibiae and tarsal segments colored from brown to blackish brown. Coxae and trochanters with yellow hairs, other parts of legs with dense black hairs. Tibial spur formula 1.2.2. Claws black and with a distinct secondary tooth.

Abdomen largely yellowish brown, only basis half of first segment and all sternites yellow. Also brownish black in the end. Hypopygium well developed (fig. 1). Hind margin of Tergite is at first wide and oval, then in the middle with narrow and rather deep "U" shaped incision. Lateral corners wide built, short and blunt ending (fig. 2). Anterior part of inner gonostylus clearly beak shaped and in the back upward with conical spout. Posterior part simple and narrower in dorsal half (fig. 3), along hind margin slanted (fig. 4). Outer gonostyle hatchet shaped, a little indented in dorsal and with reaching

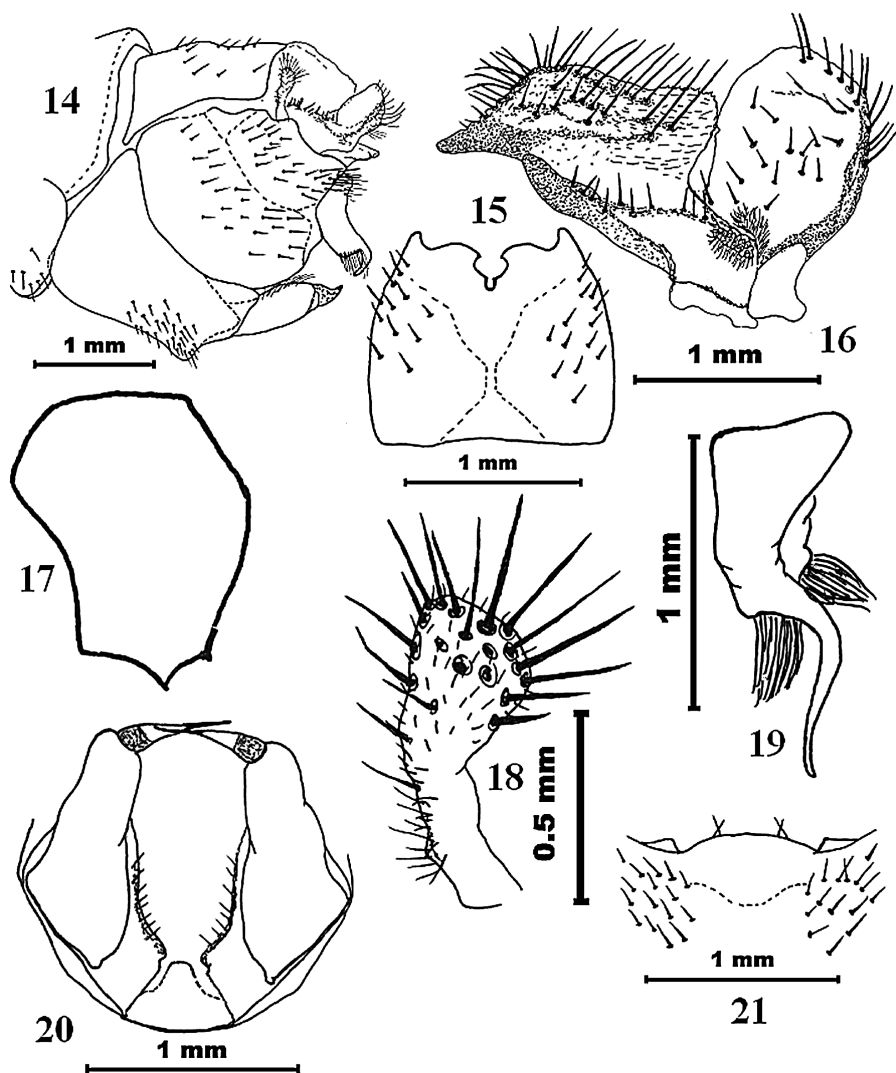
backward long hairs (fig. 5). The appendages of hind margin of sternite 9 with conical base and a flabellum shaped strongly broaden external branch and a short cudgel shaped with hairs bunch inner branch in apex (fig. 6). Hind margin of sternite 8 with two wide lobes that have reaching transverse rather long spine in apex. Inner margin of these lobes with short, thin and golden colored hairs (fig. 7). Hind margin of sternite 8 with hairy surface that are long and yellow hairs (fig. 1).

**Female.** Not known.

**Etymology.** Named in honor of Dr. Pjotr Oosterbroek from Amsterdam University (Department of Entomology, Zoological Museum, the Netherlands).

**Habitat.** These materials collected from rocky place, near small stream, under heder and oriental plane in the mixed forests.

**Distribution.** South-west Anatolia (fig. 44).



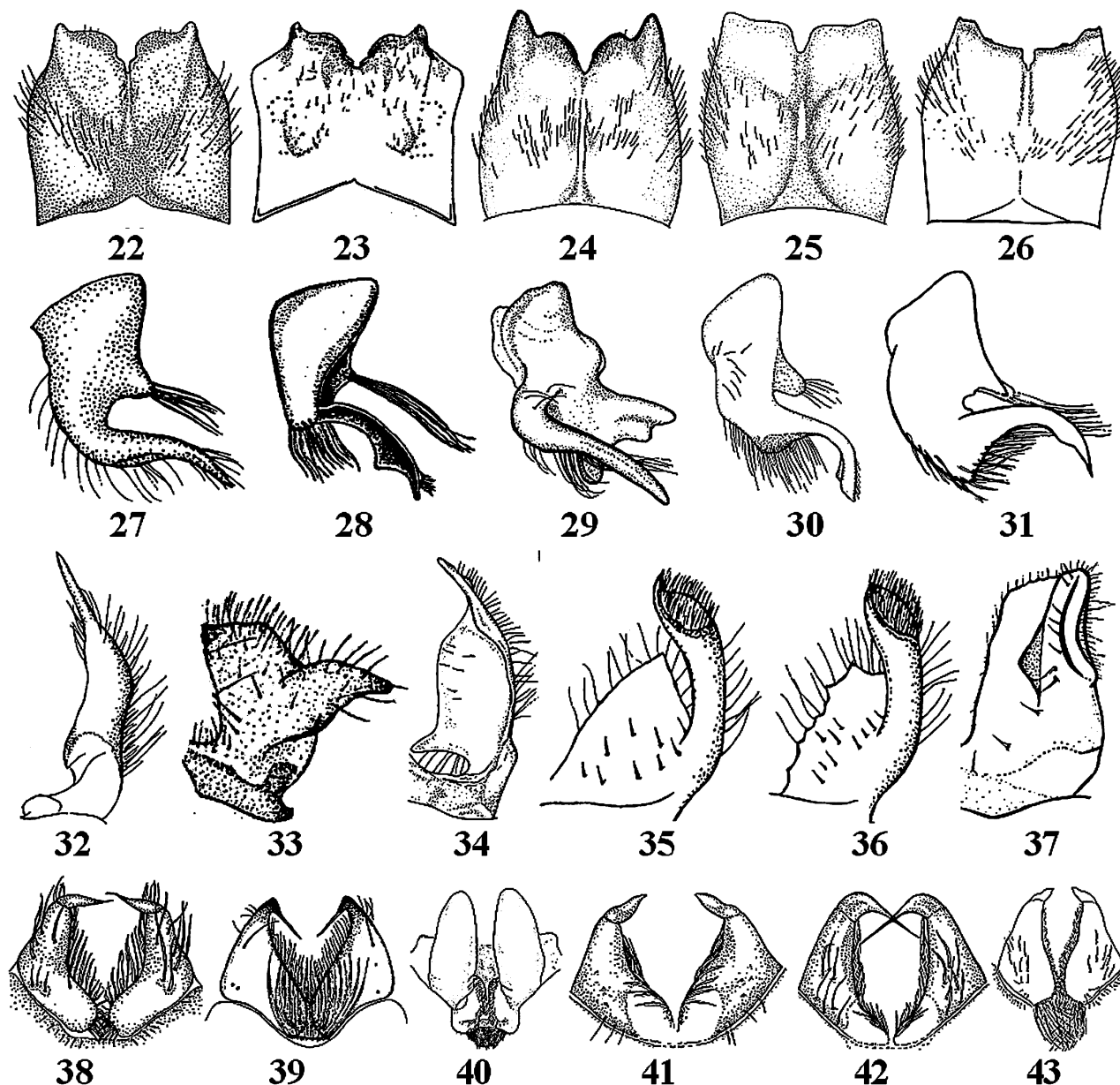
Figures 14–21

*Tipula (Lunatipula) jaroslavi* n. sp. 13, hypopygium, lateral view; 14, tergite 9, dorsal view; 15–16, inner gonostyle, outside view and from behind; 17, outer gonostyle, outside view; 18, appendages of sternite 9, lateral view; 19, lobes of sternite 8, hind view; 20, hind margin of sternite 8, ventral view.

*Tipula (Lunatipula) jaroslavi* sp. n.  
(Figs 12–19)

**Type material. Holotype.** ♂, Turkey, Aydın, Çine, Söğütçük Village (37°27'N 28°08'E), 400 m a.s.l., 6.V.2004<sup>a</sup> (leg. H.Koç, A.Karaman). **Paratypes.** 4 ♂♂, Turkey, same locality and date as holotype; 2 ♂♂, Turkey, Aydın, Bozdoğan, Altıntaş Village (37°38'N 28°19'E), 850 m a.s.l., 17.V.2003; 3 ♂♂, Aydın,

Bozdoğan, Akseki Village (37°37'N 28°30'E), 316 m a.s.l., 17.V.2003; 2 ♂♂, Aydın, Çine, Soğukoluk Village (37°31'N 27°53'E), 470 m a.s.l., 26.IV.2003; 1 ♂, Aydın, Didim, Akköy Village (37°28'N 27°21'E), 48 m a.s.l., 12.IV.2003; 1 ♂, Aydın, Kavaklıdere, Salkım Village (37°26'N 28°18'E), 825 m a.s.l., 22.IV.2005 (leg. H.Koç, A.Karaman & O.Özgül). Holotype and 11 paratypes are preserved at the Department of Biology, Science and Arts Faculty, Muğla University; 2 paratype



Figures 22–43

22, 27, 32, 38, *Tipula (Lunatipula) franzressli* Theischinger 1982; 23, 28, 33, 39, *T. (L.) istriana* Erhan & Theowald 1961; 24, 29, 34, 40, *T. (L.) peteri* Theischinger 1979; 25, 30, 35, 41, *T. (L.) artemis artemis* Theischinger 1977; 36, 42, *T. (L.) artemis asiaeminoris* Theischinger 1982; 26, 31, 37, 43, *T. (L.) canakkalensis* Theischinger 1987. 22–26, tergite 9, dorsal view; 27–31, appendages of sternite 9, lateral view; 32–37, posterior parts of inner gonostyle, outside view; 38–43, lobes of sternite 8, hind view (figs. 25 and 30, after Theischinger 1977; 24, 29, 34, 40, after Theischinger 1979; 22, 27, 32, 35–36, 38, 41–42, after Theischinger 1982; 26, 31, 37, 43, after Theischinger 1987; 23, 28, 33, 39, after Mannheims 1963).



at the Section Entomology, Zoological Museum, University of Amsterdam.

**Description. Male.** Body length 15–16 mm; antennal length 5–5.5 mm; wing length 17–18 mm.

Head largely yellowish grey, grey brown along middle line and around compound eyes. Rostrum yellowish brown, only a little dark colored in dorsal and ventral part. Nasus simple, with long yellow hair bangs at tip. Palp yellowish brown, only with darken last segment. Antenna 13 segmented, scape and pedicel yellowish brown. Flagellar segments colored from yellowish brown to blackish brown, a little lighter colored than base on distal. All flagellar segments thickened beginning from second segment at base. Apical antenna segment considerably short. Longest verticils are much longer than flagellar segments.

Pronotum light grayish brown. Scutum yellowish brown, with four brown longitudinally stripes. Scutellum and mediotergit yellowish grey. Squama with spine. Wing's membrane is with grayish white tone, only darken along front margin. Veins colored from yellowish brown to brown. Pterostigma light yellowish brown. Lunula clearly and overcome to discal cell.  $M_1$  and  $M_2$  are with petiole. Halter whitish and with dirty yellow stem and with brownish black marked knob. Lateral of thorax colored from yellowish grey to grayish black. Coxae and trochanters yellow, femora yellowish brown, with black distal end. Tibiae and tarsus colored from brown to black. Tibiae spur well developed and formula 1.2.2. Claws with strongly developed secondary tooth. Coxae and trochanters are with particularly long and yellow hairy. Other leg segments dense black hairy.

Abdomen largely yellowish brown, only brownish black at Tergites 2.–6., and black at end. Hypopygium well developed (fig 14). Tergite 9 looks like a barrel from dorsal, rather orderly wide, narrowed and one more time narrowed indented. Lateral corners towards the interior short and conical built (fig. 15). Anterior part of inner gonostyle clearly beak shaped and with simple spout at hind margin. Posterior part considerably broad, without a difference on dorsal, approximately round built (figs 16 and 17). Outer gonostyle approximately knob shaped, with round dorsal margin and short hairs (fig. 18). Hind margin appendages of sternite 9 curled “S” shaped, and ending long, sharp tip. Long hairs bunch present at base of tip art and inner parts of middle parts of promontories (fig. 19). Adminiculum with strongly slanted lateral part. Hind margin of sternite 8 with two strong lobes, and with reduced hair shaped, short diagonally directed last spine in apex (fig. 20). Inner margin of these lobes short and thin hairs. Hind margin of sternite 8 without hair (fig. 21).

**Female.** Not known.

**Etymology.** Named in honor of Dr. Jaroslav Starý (Palacký University, Czech Republic).

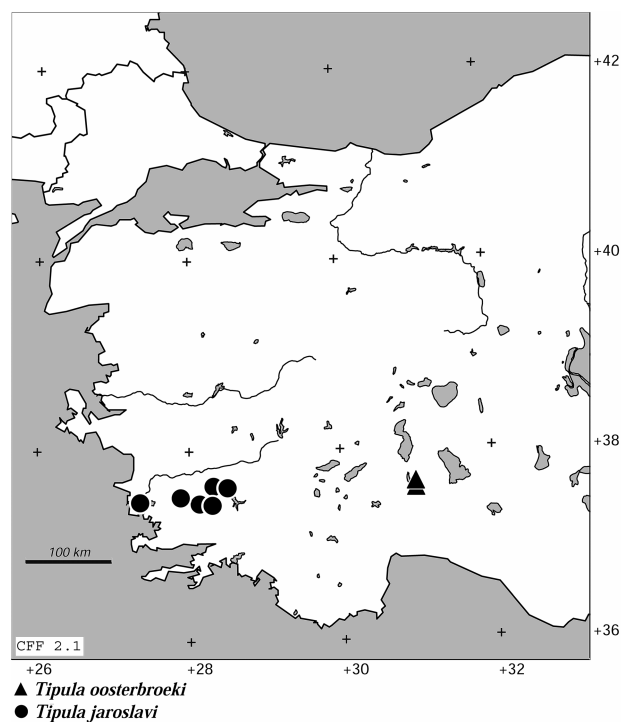
**Habitat.** These materials collected from mixed of *Pinus* and *Quercus* forest, containing *Pinus nigra*, *Platanus orientalis*, *Nerium oleander*, *Cistus creticus*, *Lavandula* sp., *Rubus* sp., *Myosotis* sp., *Sedum* sp. ve *Trifolium* sp., rocky and meadow areas near the streams.

**Distribution.** South-west Anatolia (fig. 44).

## Discussion

The new species, *Tipula (Lunatipula) oosterbroeki* belongs to *acuminata* group. According to checks, definitions of these species showed *T. (L.) oosterbroeki* is a new species. Outer gonostyle (figs 5 and 11) and hind margin appendages of sternite 9 (figs 6 and 12) and many hypopygial characters of *T. (L.) oosterbroeki* n.sp are same as *T. (L.) subacuminata* Mannheims 1963. *T. (L.) subacuminata* is known Adana, Antalya, Bingöl, Bitlis, Çankırı, Denizli, Erzurum, Gaziantep, İçel and Kahramanmaraş Provinces in Turkey. Males of *T. (L.) oosterbroeki* n. sp. are easily separated from *T. (L.) subacuminata* in the following characters: while lateral corners of hind margin of tergite 9 end narrow built, long and sharp on *T. (L.) subacuminata* Mannheims 1963 (fig. 8), on new species they end wide built, short and blunt (fig. 2). Posterior half of inner gonostyle recessed in dorsal and with sharp appendage outwards on *T. (L.) subacuminata* (figs 9 and 10). Whereas it is not recessed on *T. (L.) oosterbroeki* n.sp. (figs 3 and 4), and space of hind margin lobes of sternite 8 is longer and denser hairy on *T. (L.) subacuminata* (fig. 13).

Although *Tipula (Lunatipula) jaroslavi* n.sp. has no hairy surface on hind margin of sternite 8 which according to Mannheims (1963) is a characteristic



**Figure 44**  
*Tipula (Lunatipula) oosterbroeki* n.sp. (▲) and *T. (L.) jaroslavi* n.sp. (●).

feature for the *acuminata* group, due to being well developed apikal thorn on hind margin lob of sternite 8, it is member of some group. New species is similar to species of *peteri* subgroup of *acuminata* group [*T. (L.) artemis artemis* Theischinger 1977; *T. (L.) artemis asiaminoris* Theischinger 1982; *T. (L.) canakkalensis* Theischinger 1987; *T. (L.) franzressli* Theischinger 1982; *T. (L.) istriana* Erhan & Theowald 1961 and *T. (L.) peteri* Theischinger 1979] of *acuminata* group. Some of these species do not have hairy surface on hind margin of sternite 8. All species in subgroup of *peteri* are similar to each other in dorsal view of tergite 9 (figs 22–26), appendages of sternite 9 that nearly twisted like “S” (figs 27–31) and slanted side part of adimiculum that is very long and strong.

In addition to hypopygial characters *Tipula* is similar to *T. (L.) franzressli* Theischinger 1982 which is one of *peteri* subgroup species is following characters; last thorns of hind margin lob of sternite 8 (figs 38–43) and hind margin of sternite 8 which does not have hair surface. *Tipula (Lunatipula) jaroslavi* n. sp. differences from *T. (L.) franzressli* Theischinger 1982 and all other species of subgroup in expanded and different in dorsal posterior parts of inner gonostylus (figs 32–37).

**Acknowledgements.** I would like to thank to Dr. Pjotr Oosterbroek (Department of Entomology, Zoological Museum, University of Amsterdam, Plantage Middenlaan 64, 1018 DH Amsterdam, The Netherlands) for checking the new species identifications and for financial support of this research was provided by TUBITAK (The Scientific and Technological Research Council of Turkey) (Research Project No 2245).

## References

- Jong H. De.** 1997. Intersexes and the homology of Genital Structures in Tipulidae (Diptera). *Bulletin de la Société Neuchâteloise des Sciences Naturelles* **120**: 149–160.
- McAlpine J.F.** 1981. Morphology and terminology: Adults, p. 9–63 in: **McAlpine J.F. Peterson B.V., Shewell G.E., Teskey H.J., Vockeroth J.R., Wood D.M. (eds)**, *Manual of Nearctic Diptera 1*. Monograph 27, Biosystematic Research Institute, Ottawa, Ontario, 6 + 674 p.
- Mannheims B.** 1963. 15. Tipulidae, p. 137–176 in: **Lindner E. (ed.)**, *Die Fliegen der Paläarktischen Region 3 (5)*, Schweizerbart, Stuttgart, 538 p.
- Koç H.** 2004. *Muğla ili Tipulidae ve Limoniidae familyalarının faunistik ve ekolojik yönden incelenmesi* [Faunistic and investigation of ecological aspects of Tipulidae and Limoniidae families in Mugla province]. Mugla Üniversitesi Yayınları 55 (Rektörlük Yayınları 35), Mugla, 18+154 p. (in Turkish with English abstract).
- Koç H., Oosterbroek P.** 2001. Checklist of the Turkish Tipulidae (Diptera), with new records. *Studia dipterologica* **8(2)**: 463–468.
- Koç H., Oosterbroek P.** 2005. A new species of *Tipula (Lunatipula)* from Turkey, close to *T. (L.) imbecilla* Loew (Diptera: Tipulidae). *Entomologica Fennica* **16(1)**: 19–22.
- Koç H., Oosterbroek P., Özgül Ö.** 2005. A new Turkish *Tipula (Lunatipula)* species of the *acuminata* group (Diptera: Tipulidae). *Entomologica Fennica* **16(4)**: 251–253.
- Oosterbroek P.** 2007. *Catalogue of the Craneflies of the World (Insecta, Diptera, Nematocera, Tipuloidea)*. Available from: <http://ip30.eti.uva.nl/ccw/> (Access 11 Apr 2007).
- Serçe Ö., Koç H.** 2005. Contributions to Tipulidae of Turkey (Diptera). *Journal of Institute of Science and Technology of Gazi University* **18(1)**: 39–50.
- Theischinger G.** 1977. Neue Taxa von *Lunatipula* Edwards aus der Mediterranen Subregion der Paläearktis (Diptera, Tipulidae, *Tipula* Linnaeus). *Beaufortia* **26**: 1–38.
- Theischinger G.** 1979. Neue Taxa von *Lunatipula* Edwards aus der Mediterranen Subregion der Palaearktis (Diptera, Tipulidae, *Tipula* Linnaeus), II. Fortsetzung. *Beaufortia* **29**: 275–308.
- Theischinger G.** 1982. Neue Taxa von *Lunatipula* Edwards aus der Mediterranen Subregion der Palaearktis (Diptera, Tipulidae, *Tipula* Linnaeus), IV. Fortsetzung. *Beaufortia* **32**: 79–96.
- Theischinger G.** 1987. Neue Taxa von *Lunatipula* Edwards aus der Mediterranen Subregion der Palaearktis (Diptera, Tipulidae, *Tipula* Linnaeus), V. Fortsetzung. *Beaufortia* **37**: 99–120.
- Vogtenhuber P.** 2004. Neue Taxa von *Pterelachisus* aus der Türkei (Diptera, Tipulidae). *Denisia* **13**: 347–350.