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A New Species of *Tipula*, Subgenus *Lunatipula* From Turkey (Diptera, Tipulidae)

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ABSTRACT

The specimens in this study were obtained in the Environmental Impact Assessment study (EIA) in 2013 and post-construction monitoring study in 2019 within the scope of the Trans Anatolian Natural Gas Pipeline (TANAP) project. As a result of the studies *Tipula* (*Lunatipula*) *tanap* sp. n. Koç & Can is described and diagnostic characters are illustrated. The distributions of new species are mapped. It distinguished from related congeners by the difference of ovipositor and sternite 8 shape of the ventral process of the aedeagus.

Key words: Diptera, TANAP, *Tipula*, *Lunatipula*, Crane flies, Palearctic, Turkey.

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INTRODUCTION

Tipulidae family are known as the crane flies. Adults are short-lived and found in moist and shady areas such as meadows, shrubs or forests where they feed on plant sap and nectar. Larval periods can be one year or longer. They generally live in semi-aquatic or terrestrial environments (Oosterbroek & Theowald, 1992).

Tipulidae, which includes mosquitoes of medium and large body size, is one of the well-known Diptera families in the world. In adults, rostrum often developed with nasus. Ocel eyes are absent. Antennae have 13 segments; some species may have more segments. The V-shaped mesonotal stur located in the dorsal of the thorax and the 2 anal veins on the wings are its outstanding features (Oosterbroek, 2006).

The family Tipulidae is represented in the world by 4321 taxa. There are more than 30% of these species (1360 species and subspecies) in the Palearctic region. Also, 521 taxa are recorded from Europe (Oosterbroek, 2020). The number of species known from Turkey has been increased significantly in recent years. So, the number of known Tipulidae taxa from Turkey are rise to 161 (Koç, Özgül & Hasbenli, 2015).

MATERIAL AND METHODS

Specimens of new species were collected from provinces of Ardahan, Gümüşhane and Sivas during the studies on the Trans Anatolian Natural Gas Pipeline (TANAP, passing through 20 provinces and having 1805 km line) in 2013 and 2019.

The adults in the study area were collected usually by sweeping method with the help of 40 cm in diameter swep net. Genital preparations of some of the specimens brought to the laboratory for diagnosis were made. These genitals were then placed in small capsules filled with glycerin and attached to the needles of the specimens.

The genital structures were drawn under a stereoscopic microscope (Olympus SZX-7) with the aid of a drawing tube. Photographs of the habitus and some part of aedeagus were taken at different depths with a digital camera Olympus E330. All photographs were edited with Helicon Focus v. 3.1. The map was created in ArcGIS 10.1 program.

Terminology of morphological features follows that of McAlpine (1981) and H. De Jong (1997). The materials referred to in this study are stored at Muğla Sıtkı Koçman University, Faculty of Science, Department of Biology, Zoology Research Laboratory.

RESULTS

Tipula (*Lunatipula*) *tanap* sp. n. Koç & Can (Figs. 1-12)

Material examined: Holotype**:** Turkey: Ardahan, Hanak, Baştoklu Village, 1996 m, 38T 314332 E/ 4562989 N, 23.07.2013, leg. Koç, 1 ♂; Holotypus, *Tipula* (*Lunatipula*) *tanap* sp. n. det. Koç (Muğla Sıtkı Koçman University, Faculty of Science, Department of Biology, Zoology Research Laboratory) 1 ♂.

Paratypes**:** Ardahan, Hanak, Baştoklu Village, 1996 m, 38T 314332 E/ 4562989 N, 23.07.2013, leg. Hasbenli, 8 ♂♂, 2 ♀♀; Ardahan, Baştoklu Village, 1958 m, 38T 313279 E/ 4562538 N, 23.07.2013, leg.

Çağlar, 3 ♂♂, 1 ♀; Ardahan, Alaçam, 2026 m, 38T 314356.94 E/ 4563169.14 N 27.07.2019, leg. Can 5 ♂♂, 1 ♀; Ardahan, Posof, Çamyazı Village, 2453 m, 38T 314397 E/ 4590645 N, 24.07.2013, leg. Koç, 4 ♂♂; Ardahan, Yeniköy, 1975 m, 38T 315805 E/ 4592457 N, 24.07.2013, leg. Koç, 3 ♂♂, 2 ♀♀; Ardahan, Derinsu, 1419 m, 38T 316595 E/ 4601085 N, 24.07.2013, leg. Çağlar, 2 ♂♂; Ardahan, Yeniköy, 2088 m, 38T 315759 E/ 4591741 N, 24.07.2013, leg. Hasbenli, 1 ♂; Sivas, İmranlı, Beğendik Village, 1635 m, 37S 416407 E/ 4415399 N, 19.06.2013, leg. Çağlar, 4 ♂♂; Sivas, Kapumahmut, 1690 m, 37S 430415 E/ 4418174 N, 20.06.2013, leg. Koç, 4 ♂♂, 2 ♀♀; Sivas, Kapumahmut, 1675 m, 37S 430507 E/ 4418198 N, 20.06.2013, leg. Çiftçi, 4 ♂♂; Sivas, Imranli, Kılıçköy Village, 1672 m, 37S 412446.28 E/ 4414439.15 N, 29.06.2019, leg. Koç, 1 ♂; Gümüşhane, Kelkit, Belenli Village, 2100 m, 37S 540966 E/ 4422098 N, 17.07.2013, leg. Koç. 1♂.

Male description: Habitus as in Fig. 1. Body length: 9-11 mm, antennal length: 4,5-5 mm, wing length: 12-14 mm.

Rostrum well-developed, yellowish brown. The behind of the eyes, forehead and vertex greyish brown. Basal segments of the antennas yellowish brown, flagellar segments yellowish brown to brown, but in some specimens the 1st flagellar segment yellowish brown. Flagellar segments cylindrical with the base slightly thickened. Circlet setae on flagellar segments shorter than the segments. Palp segments brown, the last one blackish brown. Nasus small.

Thorax usually greyish brown. Catepisternum and anepisternum gray to brown, dorsal parts darker. Prescutum stripes uncertain. Coxae, trochanters and femora basally greyish brown. The other leg parts brown to brownish black towards the tip. Spurs distinct, spur formula 1.2.2. Wing membrane greyish white and anterior parts light yellowish. Veins are brown, pterostigma indistinct, light yellowish brown. Discal cells small as in *Mediotipula* species and its length approximately 1,5 times its width. Petiole of veins M_{1+2} longer than m-cu. Squama with several short bristle. A_2 and Cu veins ends with curved, not straight.

Abdomen yellowish brown, dorsally somewhat darker in the middle of tergites. Hypopygium slightly wider than abdomen (Fig. 2). Sternite 8 appendages developed with pair of apical thorns that bend strongly against each other. Between these appendages, as in the *peliostigma*-group, covered with 3-4 setae transversely standing. Hind margin of sternite 8 have a bundle of yellow brown setae (Fig. 3).

Appendages of sternite 9 pillow-shaped, narrowed towards to apically, covered with setae, fleshy and two-lobed (Fig. 4). Hind margin of tergite 9 slightly indentation in the middle with a small thorn, laterally with developed lobes that extending awards (Figs. 5).

Fig. 1. Habitus of *Tipula* (*Lunatipula*) *tanap* sp. n. Koç & Can

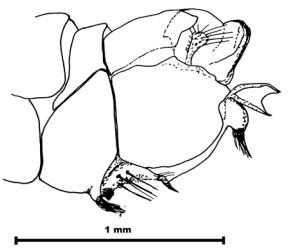


Fig. 2. Hypopyg (lateral view).

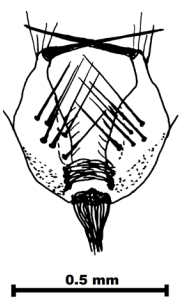


Fig. 3. Hind margin of sternite 8 and appendages (posterior view).

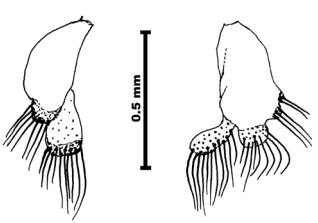


Fig. 4. Appendages of sternite 9 (posterior view).

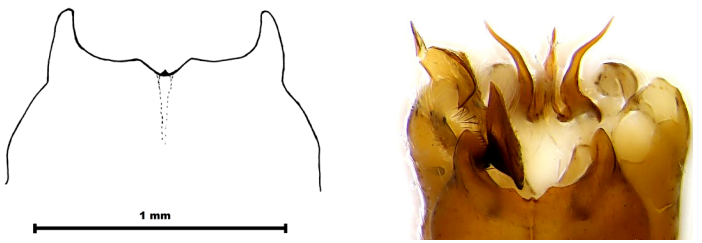
Outer gonostylus ax-shaped, leathery, anteriorly and dorsally covered with long prickly setae. Also, outer gonostylus a little protruding towards anterodorsally. Inner gonostylus wide, apically blunt, posteriorly notched and curved (Fig. 6). Adminiculum structures similar to *lunata* species group (Fig. 7).

Female Description: Body length: 9-10 mm, antennal length: 3,5-4 mm, wing length: 11-12 mm.

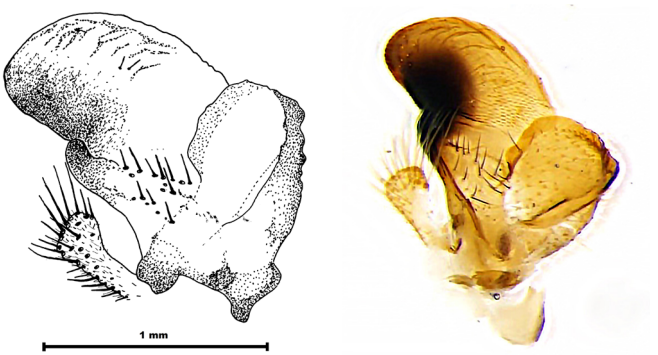
General coloration and appearance of female as in male but a little smaller than male. Female wing as in male, without folding or reduction. Ovipositor with long cerci, gradually tapering towards tip, and end of hypovalve blunt (Fig. 8).

Etymology: This species is named after the Trans Anatolian Natural Gas Pipeline (TANAP), the environmental baseline field studies for which provided the opportunity and financial support for the collection of the type materials.

Habitat: Specimens of the new species were collected from underneath bushy plants like wild pear, rose and berberis in meadows and forest areas.



Figs. 5. Tergite 9 (dorsal view). a. Drawing b. Photo of tergit and adminiculum



Figs. 6. Internal and external gonostylus (lateral view). a. Drawing b Photo

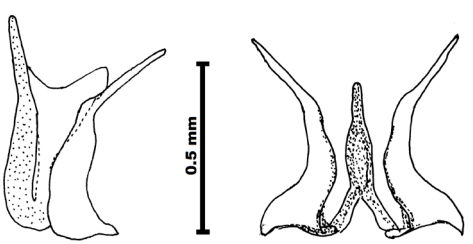
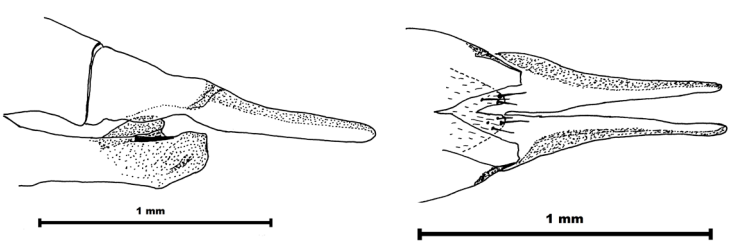


Fig. 7. Adminiculum (posterior and lateral view).



Figs. 8 . Ovipositor a. lateral view b ventral view

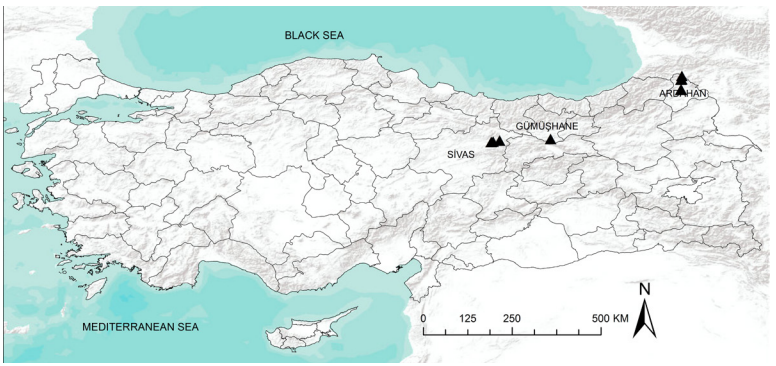


Fig. 9. Provinces in which *Tipula* (*Lunatipula*) *tanap* sp. n. Koç & Can was determined.

CONCLUSIONS AND DISCUSSION

The new species *Tipula* (*Lunatipula*) *tanap* sp. n. Koç & Can belongs to the *phaidra* species group of the subgenus *Lunatipula*. Today, 6 species are known from the western Palearctic region belonging to this group: *T*.(*L*.) *bulbosa*, *T*.(*L*.) *phaidra*, *T*.(*L*.) *cressa*, *T*.(*L*.) *circe*, *T*.(*L*.) *sciurus* and *T*.(*L*.) *lyrion* (Mannheims, 1965; Theischinger, 1977, 1987).

Tipula (*Lunatipula*) *tanap* sp. n. Koç & Can is included in this group because hind margin of sternite 8 with bristle bundle, sternite 8 appendages inter closes as a form of basket and sternite 9 appendages pillow-shaped. The other similarities with the species of the group are that wing squama thorny, spur formula 1.2.2 and secondary teeth of claws in male.

T. (*L*.) *tanap* sp. n. is distinguished from the *peliostigma* group species with a bunch of bristle in the middle of hind margin of sternite 8. In addition, this new species is easily separated from the *acuminata* group species by appendages of sternite 9 pillow-shaped and narrowed towards to apically. It is similar to the *peliostigma* group species due to the fact that it's the sternite 8 appendages inter is similar to a form of a basket.

The new species is similar to *Tipula* (*Lunatipula*) *cressa* from the *phaidra* group in terms of bristel bundles and inter of appendages on the hind margin of tergite 9 and sternite 8.

However, the females of new species are easily separated from *Tipula* (*Lunatipula*) *cressa* with their normal wings and ovipositor structure. In addition, there are fewer spiky setae (3, rarely 4) that cover the gap of sternite 8 appendages.

The new species is included in the *phaidra* species group. Thus, with the addition of the new species, the number of taxa defined in this group became two in Turkish fauna. On Hasan Mountain, located in the Central Taurus Mountains, *T.* (*L*.) *sciurus* has been previously described (Theischinger, 1977). The number of Tipulidae taxa in with the new species has risen to 162 in Turkey. This situation shows that Turkey is rich in fauna and reveals other new species in Tipulidae family in later times can be identified.

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