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Paracladius alpicola (Zetterstedt, 1850), A New Chironomid Species for the Turkish Limnofauna

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ABSTRACT

Paracladius alpicola (Zetterstedt, 1850) is reported for the first time for Turkish limnofauna from Lake Kartal (Denizli, Beyagac), southwestern Turkey. Specifically including *P. conversus* and other similar taxon under genus *Paracladius,* the morphological characteristics of the fourth-instar *P. alpicola* larvae, and ecological attributes of the habitat are described.

Key words: Diptera, Chironomidae, Orthocladiinae, midge larvae, Lake Kartal.

INTRODUCTION

The larvae of Chironomidae are most abundant and diverse in freshwater habitats (Jacobsen, 2008). The family is more than 120 million years old, has undergone extensive adaptive radiation and occupies a wider range of microhabitats at present than any other aquatic insect groups (Cranston, 1995). The larva of Paracladius Hirvenoja (1973) occur in springs, standing and flowing water in the northern Holarctic (Brooks *et al.*, 2007). The genus includes eight worldwide species such as *P. alpicola* (Zetterstedt, 1850), *P. conversus* (Walker, 1856), *P. quadrinodosus* Hirvenoja, 1973, *P. akansextus* Sasa and Kamimura, 1987, *P. tusimoabeus* (Sasa and Suzuki, 1999), *P. antennarius* Yan and Wang, 2005, *P. omolonus* Makarchenko and Makarchenko, 2006, and *P. seutakanus* Makarchenko and Makarchenko, 2006 (Fu *et al.*). Prior to the current study, *Paracladius conversus* (Walker, 1856) was the only species reported in Turkey (Şahin, 1984, 1987a, 1987b, 1991; Özkan, 2006; Tanatmış, 1989).

In this paper, *Paracladius alpicola* (Zetterstedt, 1850) is reported as a new larval species for Turkish fauna.

MATERIAL AND METHODS

Sampling was carried out in July 2010 at Lake Kartal, which is a shallow, caldera lake located at 1903 m in elevation at 37°05” N, 28°51” E, southwest of Turkey (Fig. 1). The lake is fed by cool springs and remains under snow during certain periods of

the year. Samples of chironomid larvae were separated from the sediment by using sieves with mesh size 250 µm and were fixed in 4% formaldehyde solution in the field. In the laboratory, they were preserved in 70% ethyl alcohol until identification. Head capsule and body of each larvae were fixed separately on a single slide. A 6 mm diameter cover slip was carefully placed on to the drop ensuring the head capsules and body are covered. After the permanent preparation of sorted chironomid specimens with Euparal, larvae were identified to the species level using stereo and binocular microscopes. The photoimages of the chironomids were taken. The size of the body parts was measured by using ImageJ software (Abramoff *et al.*, 2004). Measurements are given as ranges and followed by the mean when more than three larvae taken in account for the material size. The number measured is followed by (n) in parentheses. A total of 22 specimens were identified and sampled. The morphological nomenclature with regard to larvae follows (Saether, 1980). The slides are preserved at Ege University, Faculty of Fisheries, Department of Limnology.

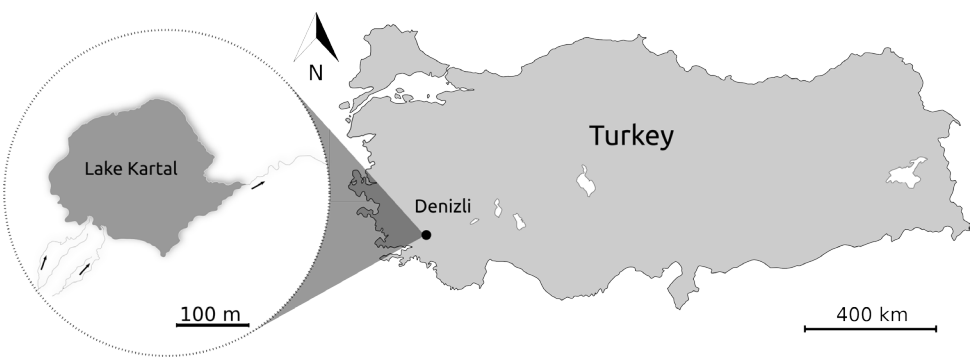

Fig. 1. Map of Lake Kartal.

RESULTS

As a result of the identification of 22 chironomid larval specimens collected from Lake Kartal, Beyagac, Denizli, *P. alpicola* (Zetterstedt, 1850) was reported as a new record for Turkish limnofauna. Morphological characters of the species were made by the first time (Hirvenoja, 1973). The detailed morphological characters belonging to *P. alpicola* are given in Fig. 2. All diagnostic features are based on our own samples.

Distribution: *Paracladius alpicola* (Zetterstedt, 1850) is a Holarctic species extending its range from North America (Canada, The United States), Europe (Sweden, Norway, Germany, Austria and Romania) and to northern Russia (Siberia) (Hirvenoja, 1973).

Ecology: *Paracladius alpicola* is a cold stenotherm alpine taxon and inhabits springs, owing and still water bodies, and mostly found in montane lake environments (Saether, 1975; Langton, 1991; Ruse *et al.*, 2000; Gandouin and Franquet, 2002; Velle, 2005; Hayford *et al.*, 2006). Lake Kartal is fed by cool springs and remains under snow during certain periods of the year.

In situ measurements of environmental variables were obtained: water surface temperature 17.7°C, lake depth 120 cm, pH 8.58, dissolved Oxygen 8.6 mg/l and conductivity (at 25°C) 102 µS.

Diagnosis: Medium sized larvae up to 8 mm long and colored yellowish brown. Head capsule length is 450 µm (Fig. 2a). Body setae absent. Posterior parapods separate and each bearing an apical circlet of claws (Fig. 2b). Height of procercus subequal to width, bearing 6-7 anal setae at the apex and 1-2 at base without spur (Fig. 2c).

Antenna: Antenna with five segments. Basal segments straight. Antennal ratio (AR) length of basal segment to combined length of the remaining segments is 3. Combined length of 3-5 segments subequal to second. Ring organ (RO) at base on basal segment. Blade subequal to fifth segment and ending before apex of agellum. Lauterborn organs (LO) are large and opposite to each other (Fig. 2d).

Labrum: Labral basal sclerite single and quadrangle shaped. SI bifid while SII and SIII simple (Figs. 2e, f, g). Labral lamellae absent. Pecten epipharyngis with 3 scales in approximately equal length. Simple chaetulae laterals with 6 pairs and extends outwardly from the basal joint. Basal sclerite quadrangle shaped (Fig. 2h). Premandible narrow and has two apical teeth with brush (Fig. 2i).

Mandible: Three inner teeth and an apical tooth present. Outer margin of mandible is not crenulated. Length of apical tooth 1.7 (4) times longer than combined width of inner teeth. Seta subdentalis straight and reaches the last inner tooth (Fig. 2j). Seta interna with 5 long simple branches (Fig. 2k).

Mentum: Mentum with single median tooth and six pairs of lateral teeth. Median tooth quite broad, 7.5 (4) times wider than first lateral teeth, dome shaped and paler than laterals (Fig. 2l). Outer lateral tooth distinctly separate from the rest. Hypochilum pale. Ventromental plate narrow and broadening towards apex and projecting laterally beyond outer lateral tooth of mentum (Fig. 2m). Beard present. Prementum with narrow teeth (Fig. 2n).

Maxilla: Lacinial chaetae of maxilla barely feathered. Pecten galearis absent and setae maxillaris simple. Appendix seta present (Fig. 2o).

Remarks

The form of the mentum with a quite broad median tooth, angled outer lateral tooth and narrow blunt ventromental plates differs in *Paracladius* than other orthocladiine genus (Brooks *et al.*, 2007). However, it is difficult to distinguish similar species (such as *P. alpicola* and *P. conversus*) than other. The most striking differences can be summarized as follows: Quadrangle shaped basal sclerite of *P. alpicola* differs than rounded single basal sclerite of *P. conversus*; premandible with brush difficult to distinguish and narrower than *P. conversus*; hypochilum paler than in *P. conversus;* prementum teeth of *P. alpicola* is narrower and rectangular than in *P. conversus*.

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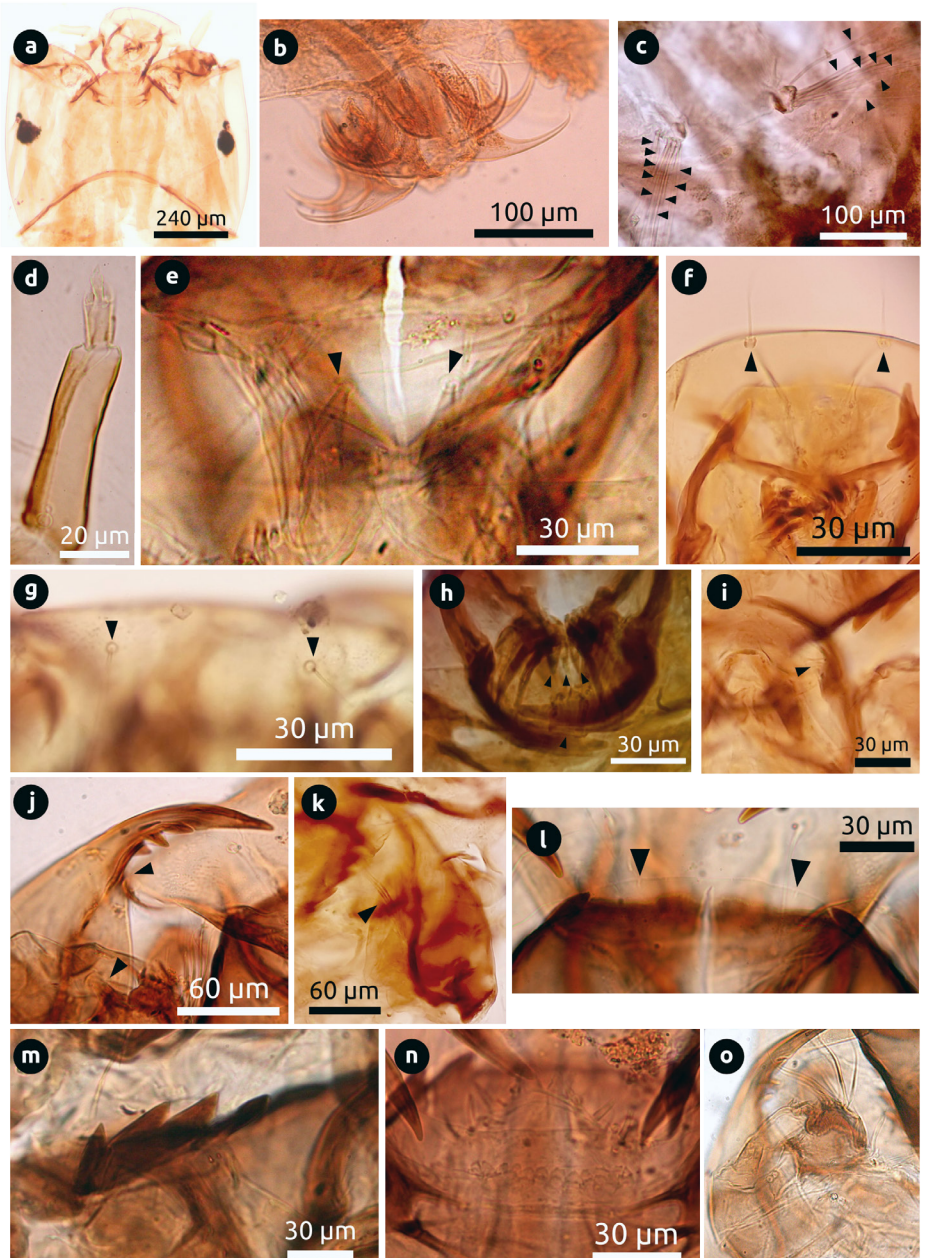

Fig. 2. a) Head capsule; b) Posterior claws; c) Procercus and base Labrum, SI and SII; d) Antenna; e) SI, Posterior claws; f) SIII; g) SII; h) Labrum, epipharynghis and basal sclerite; i) Premandible and brush; j) Mandible; k) Seta interna; l) Median teeth of mentum and first lateral tooth; m) Lateral teeth of mentum; n) Prementum; o) Maxillary palp.

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