

CYCLOPIDS FROM GROUND WATERS OF TURKEY,  
AND DESCRIPTION OF *DIACYCLOPS LANGUIDOIDES*  
*ANATOLICUS* N. SSP.  
(Crustacea, Copepoda) (\*)

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The ground water cyclopid fauna of Turkey is incompletely known. To-date, only 6 true stygobiont or eustygophilic species and subspecies, viz.: *Paracyclops fimbriatus chiltoni* (Thomson, 1882), *Diacyclops languidoides languidoides* (Lilljeborg, 1901) *Diacyclops clandestinus* (Kiefer, 1926), *Diacyclops zschokkei* (Graeter, 1910), *Diacyclops antrincola* Kiefer, 1967 and *Diacyclops crassicaudis cretensis* Kiefer, 1928, have been reported from subterranean habitats of the Turkey (Lindberg, 1952, 1954, 1955, 1957; Pesce, 1980).

The present study, based on material collected in 1987 from different ground water habitats of SW Anatolia by members of the biospeleological group of "Speleo Nederland" and the Turkish Speleological Society, and from phreatic and hyporheic waters of the NW part of the region by the author (1979) and by Dr. G. Gentile (1988), led to a noteworthy lengthening of the list of ground water species known for Turkey (1).

Sixteen species and subspecies have been identified, of which eleven were already known for groundwater or epigeal habitats of the country, four [*Megacyclops viridis* (Jurine, 1820), *Acanthocyclops* cfr. *gordani* Petkovski, 1971, *Diacyclops skopljensis* Kiefer, 1932 and *Thermocyclops oblongatus* (G.O. Sars, 1927)] are for the first time recorded in this region, one subspecies, viz. *Diacyclops languidoides anatolicus* n. ssp., is new to Science.

Brief descriptions and taxonomic, ecological and distributional remarks on some rare or poorly known species, such as *Acanthocy-*

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*clops* cfr. *gordani*, *Diacyclops skopljensis* and *Diacyclops crassicaudis* s.l. are provided; widespread or cosmopolitan taxa, as well as species that were already known from Turkey, are not discussed in detail.

Ecology and distribution of each species is briefly mentioned.

Type-material has been preserved in the author's collections at the "Dipartimento di Scienze Ambientali", University of L'Aquila, Italy.

Family **CYCLOPIDAE** G.O. Sars, 1913

Subfamily **Eucyclopinae** Kiefer, 1927

**Macrocylops albidus** (Jurine, 1820)

MATERIAL. Sta. 87-5/59, May 29, Vilayet Konya, well just W of "Yesildag" (= 27 km S of Beysehir); UTM coordinates UG6457, 1125 m a.s.l., 1 ♀.

The presence of this large species in ground waters of Turkey has little ecological and zoogeographical value since the species occurs world-wide, both in epigeal and underground fresh-water habitats.

**Eucyclops serrulatus** (Fischer, 1851)

MATERIAL. Sta. 87-5/2, May 15, Vilayet Izmir, well about 700 m E of the mosque of Sigacik; UTM coordinates MC8220, 10 m a.s.l., 1 ♀. Sta. 87-5/3, May 15, Vilayet Izmir, well (2) about 1 km E of the mosque of Sigacik; UTM coordinates MC8228, 10 m a.s.l., 1 ♀. Sta. 87-5/5, May 15, Vilayet Izmir, well (4) about 1 km E of the mosque of Sigacik; UTM coordinates MC8227, 10 m a.s.l., 1 ♀. Sta. 87-5/6, May 15, Vilayet Izmir, well (5) about 1 km E of the mosque of Sigacik; UTM coordinates MC8227, 10 m a.s.l., 1 ♂. Sta. 87-5/10, May 15, Vilayet Izmir, well at the ruins of Teos, 1.5 km S of Sigacik; UTM coordinates MC8126, 25 m a.s.l., 2 ♀ ♀ + Sta. 87-5/11, May 16, Vilayet Izmir, well about 400 m N of "Haritacilar" = 7.5 km N of Doganbey, UTM coordinates MC8423; sea level, 1 ♀. Sta. 87-5/15, May 16, Vilayet Izmir, well at "Gol Ova" (= 5.5 km SSW of Torbali); UTM coordinates NC2615, 50-100 m a.s.l., 1 ♂. Sta. 87-5/21, May 16, Vilayet Izmir, well 1 km E of Armutlu (= 7 km of Kemalpaşa); UTM coordinates NC4751, 120 m a.s.l., 2 ♀ ♀. Sta. 87-5/22, May 16, Vilayet Izmir, well just W of Örenköv (= 14 km ESE of Kemalpaşa); UTM coordinates NC5451, 140 m a.s.l., 2 ♀ ♀. Sta. 87-5/24, May 17, Vilayet Mugla, well along the road 525 from Söke to Selimiye, 40 km NW of Milas; UTM coordinates NB3549, 100 m a.s.l., 1 ♀. Sta. 87-5/26, May 17, Vilayet Mugla, well (1) 3 km NW of Kazikli (= 14 km WSW of Selimiye); UTM coordinates NB4536, 100 m a.s.l., 2 ♀ ♀. Sta. 87-5/28, May 17, Vilayet Mugla, well (3) 1 km SE of Kazikli (= 13 km WSW of Selimiye); UTM coordinates NB4833, 110 m a.s.l., 1 ♀. Sta. 87-5/29, May 17, Vilayet Mugla, well (4) 8 km ESE of Kazikli (= 9 km SW of Selimiye); UTM coordinates NB5331, 125 m a.s.l., 1 ♀. Sta. 87-5/30, May 17, Vilayet Mugla, well just N of Ovakislacik (= 8 km S of Selimiye); UTM coordinates NB5635, 50 m a.s.l., 2 ♀ ♀. Sta. 87-5/33, May 16, Vilayet Izmir, hyporheic habitat Derebagaz river, 6.5 km upstream of Gümüşsu (= 18 km ENE of Doganbey); UTM coordinates NC0619, 10 m a.s.l., 1 ♀. Sta. 87-5/35, May 17, Vilayet Mugla, well 2 km NW of Selimiye, UTM coordinates NB5441, 50 m a.s.l., 1 ♀. Sta. 87-5/36, May 18, Vilayet Mugla, litoral

(1) Material from Netherlands exploration entrusted to me for study through the kindness of Dr. J. Notenboom, Amsterdam, to whom I wish to express my sincere thanks.

sub-marine freshwater springs, UTM coordinates NB5110, sea level, 1 ♀. Sta. 87-5/45, May 21, Vilayet Burdur, well 1.8 km NW of "Dereköy" (= 19 km N of Yesilova); UTM coordinates QB4773, 1100 m a.s.l., 1 ♂. Sta. 87-5/51, May 24, Vilayet Burdur, "Insuyu magarasi" cave, 8.5 km SE of Burdur, UTM coordinates TG6773, 1160 m a.s.l., 1 ♂. Sta. 87-5/56, May 26, Vilayet Konya, well 4 km NNW of Derebucak (= 15 km SW of Beysehir); UTM coordinates UG6642, 1160 m a.s.l., 2 ♀♀. Sta. 87-5/59, May 29, Vilayet Konya, well just W of "Yesildag", 27 km SW of Beysehir, UTM coordinates UG6457, 1125 m a.s.l., 1 ♀. Sta. 87-5/60, May 29, Vilayet Konya, well 500 m W of "Kayabasi", 27 km SW of Beysehir, UTM coordinates UG6853, 1125 m a.s.l., 2 ♀♀. Sta. 87-5/62, May 29, Vilayet Konya, well just W of "Adaköy", UTM coordinates UG6753, 1125 m a.s.l., 2 ♀♀. Sta. 87-6/24, June 11, Vilayet Antalya, well 25 m W of the dustroad to "Ürnlü"; UTM coordinates UF69, 600-1200 m a.s.l., 1 ♂. Sta. 87-6/27, June 15, Vilayet Konya, well just N of the road to Bozkir; UTM coordinates VG0241, 1170 m a.s.l., 1 ♀. Sta. 87-6/33, June 14, Vilayet Konya, well (5) just N of the road to Bozkir; UTM coordinates VG1238, 1000 m a.s.l., 2 ♀♀.

*E. serrulatus* is a widely distributed (cosmopolitan) species, which lives both in surface fresh waters and ground waters (stygophilic). Previously recorded from both water types in Turkey.

#### **Tropocyclops prasinus** (Fischer, 1860)

MATERIAL. Sta. 87-6/4, June 3, Vilayet Antalya, well just SE of "Homa", 11 km NE of Manauat; UTM coordinates UF6881, about 50 m a.s.l., 1 ♀.

Cosmopolitan and ubiquitous species, previously recorded from both epigeal and underground fresh waters of Turkey.

#### **Paracyclops fimbriatus** (Fischer, 1853)

MATERIAL. Sta. 87-5/16, May 16, Vilayet Aydin, small spring near water-trough about 500 m WSW of Davutlar, UTM coordinates NB2375, 10-50 m a.s.l., 2 ♀♀. Sta. 87-5/42, May 20, Vilayet Burdur, small spring at the border of Salda Gölü lake, 8.5 km WNW of Yesilova; UTM coordinates QB3356, 1200 m a.s.l., 1 ♀. Sta. 87-5/47, May 18, Vilayet Denizli, well (1) at "Unez", 20 km NNE of Denizli; UTM coordinates QB0096, 420 m a.s.l., 1 ♂. Sta. 87-5/48, May 18, Vilayet Denizli, well (2) at "Unez"; other data as for Sta. 87-5/47, 1 ♀.

Stygophilic species, which shows a wide distribution both in surface and underground (phreatic and hyporheic) waters. This species has been previously recorded from different localities (ground waters and epigeal fresh waters) of Turkey.

#### Subfamily **Cyclopinae** Kiefer, 1927

#### **Acanthocyclops robustus** (G.O. Sars, 1863)

MATERIAL. Sta. 87-5/58, May 29, Vilayet Konya, hyporheic habitat, small river 300 m N of "Cemeller", 27 km SW of Beysehir; UTM coordinates UG6358, 1125 m a.s.l., 2 ♀♀.

Widely distributed (cosmopolitan), stygophilic species, known from epigeal fresh waters and groundwaters. Previously recorded both in surface and underground fresh water habitats of Turkey.

**Magacyclops viridis** (Jurine, 1820)

MATERIAL. Sta. 87-5/51, 1 ♀ (data above). Sta. 87-5/58, 2 ♀ ♀ (data above).

Widely distributed (cosmopolitan) species, known from both fresh waters and ground waters. This very common and ubiquitous species has not previously been reported from ground waters of Turkey.

**Acanthocyclops** cfr. **gordani** Petkovski, 1971

MATERIAL. Sta. 87-5/11, 2 ♀ ♀ (data above). Sta. 87-5/39, May 18, Vilayet Aydin, well about 7 km SE of Eskiçine (= 14 km SSE of Çine), UTM coordinates NB9951, 400 m a.s.l., ♂. Sta. 87-6/4, 1 ♀ (data above). Sta. 87-5/5, 3 ♀ ♀ (data above).

DESCRIPTION (figg. 1-7). Length, excluding antennulae and caudal setae, about 1.07 mm. Antennula 17-segmented. Second antenna, basipodite with well developed exopod (fig. 2). All trunk limbs 3-segmented. Spinal and setal formula of the exopodites III of P1-P4: 2333; 4444. Distal segment of P4 endopod much longer than wide (length/width ratio: 1.5); apical spines subequal, both shorter than article, inner slightly shorter than outer one.

P5: distal article elongated, armed with one apical long plumose seta and a small subdistal spine. P6 consisting of a small chitinous lamella, armed with one inner seta and two short spines.

Genital segment stout, wider than long; receptaculum seminis as in fig. 3.

Caudal rami slightly divergent (length/width ratio: about 3), with some rows of thin setae along inner margin of each caudal ramus, as well as on dorsal surface.

Inner apical seta about three times longer than the outer one; dorsal seta about two times longer than outer apical one.

REMARKS. The present material is closely related to *Acanthocyclops gordani*, actually known only for ground waters of Yugoslavia. From this species it differs by the caudal rami (subparallel in *A. gordani*, slightly divergent in our specimens) and the length and armature of the distal segment of the endopod of leg 4 (length/width ratio about 2 in *gordani*, 1.5-1.6 in cfr. *gordani*; inner apical spine

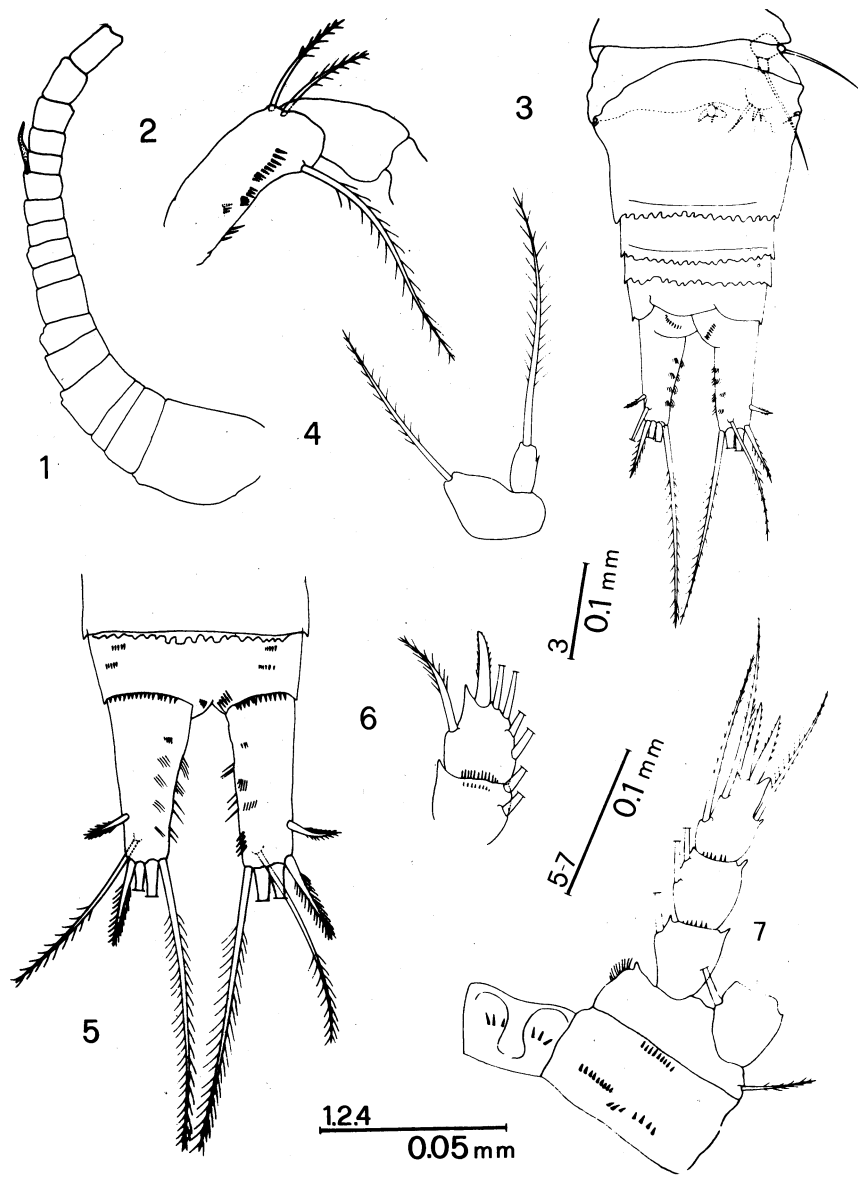


Fig. 1-7 — *Acanthocyclops* cf. *gordani* Petkovski, 1971. 1: antennula; 2: antenna, basipod; 3: abdomen and caudal rami, ventral view; 4: leg 5; 5: caudal rami; 6: endopod of leg 1, distal article; 7: endopod of leg 4.

slightly longer than the article in *gordani*, slightly shorter in cfr. *gordani*).

On account of the above differences (which, however, may be related to intraspecific variability), as well as having only 6 females available for study, the present material is dubitatively assigned to the species *A. gordani*.

### ***Diacyclops bicuspidatus* (Claus, 1857)**

**MATERIAL.** Sta. 87-5/54, May 26, Vilayet Burdur, well 0.7 km SW of "Incir Han", 6 km WNW of Buçak; UTM coordinates TG8153, 750 m a.s.l., 2 ♀♀, 1 ♂. Sta. 87-5/56, 1 ♀ (data above). Sta. 87-5/57, May 20, Vilayet Konya, well just S of the road to "Yesildag", 22 km SW of Beysehir; UTM coordinates UG6958, 1140 m a.s.l., 3 ♀♀. Sta. 87-5/62, 1 ♀ (data above). Sta. 87-6/4, 1 ♀ (data above). Sta. 87-6/5, June 3 and 8, Vilayet Antalya, well just E of the dustroad to "Tilkiler", 11.5 km NE of Manauyat; UTM coordinates UF6786, 50 m a.s.l., 1 ♀. Sta. 87-6/27, 1 ♀ (data above). Sta. 87-6/28, June 14, Vilayet Konya, well (3) along the road to Bozkir, 13 km E of Seydisehir; UTM coordinates VG0939, 1150 m a.s.l., 1 ♀. Sta. 87-6/30, June 14, Vilayet Konya, well (3) along the road to Bozkir, 8 km E of Seydisehir, UTM coordinates VG0540, 1150 m a.s.l., 2 ♀♀. Sta. 87-6/31, June 14, Vilayet Konya, well (4) along the road to Bozkir, 15 km E of Seydisehir; UTM coordinates VG1137, 1140 m a.s.l., 1 ♂.

Widespread, stygoxen species, *D. bicuspidatus* has been previously recorded from different localities (ground waters and surface fresh waters) in Turkey. It seems to be one of the most widely distributed cyclopoid copepod in ground waters of that country.

### ***Diacyclops bisetosus* (Rehberg, 1880)**

**MATERIAL.** Sta. 87-5/39, 4 ♀♀ (data above). Sta. 87-6/24, 1 ♂ (data above). Sta. 87-6/34, June 14, Vilayet Konya, well just E of the road to Hadim, 3 km S of Bozkir; UTM coordinates VG3313, 1150 m a.s.l., 1 ♀.

Cosmopolitan, stygoxen species, previously recorded from ground waters and surface fresh water habitats in Turkey.

### ***Diacyclops clandestinus* (Kiefer, 1926)**

**MATERIAL.** Sta. 87-5/30, 1 ♀ (data above). Sta. 87-5/41, May 20, Vilayet Burdur, handpump 8.5 km WNW of Yesilova; UTM coordinates QB3356, 1200 m a.s.l., 1 ♀. Sta. 87-5/51, 1 ♀ (data above). Sta. Tu. 6, Vilayet Bandirma, southern coast of Marmaris Lake, brackish water well, 2 ♀♀.

*D. clandestinus* belongs to the *languidoides* group of species (*sensu* Pesce & Galassi, 1985); it is a stygobiont, widely distributed in phreatic and hyporheic habitats of the Palaearctic (Europe, Ukraina, Syria) and Japan. Previously recorded from ground waters of Turkey.

***Diacyclops languidoide s a n a t o l i c u s* n. ssp.**

**MATERIAL.** Tu. 10, Vilayet Lapseti, along southern coast of Marmaris Lake, brackish water well, 1 ♀ (holotype), 9 ♀♀ (paratypes), completely dissected and mounted in polyvinyl-lactophenol. Holotype and paratypes in the author's collection.

**DESCRIPTION** (figg. 8-13). Total length, excluding antennulae and caudal setae, 0.550-0.600 mm ( $\bar{x}$  = 0.585). Genital segment nearly as broad as long in proximal third. Antennula 11-segmented. Antenna, basipod with exopod and reduced armature (fig. 8).

Both rami of P1 2-segmented, exopod of P2 3-segmented, endopod 2-segmented, those of P3 and P4 3-segmented. Spinal and setal formula: 3333 and 5444.

Distal article of endopod of P4 slightly longer than wide (length/width ratio: 1.15 - 1.25;  $\bar{x}$  = 1.20); both apical spines thin, without armature. Inner apical spine about as long as article, slightly longer than outer one.

P5, distal article about 3 times longer than wide, distal spine shorter than article.

Caudal rami longer than wide (length/width ratio: 2.9-3.1;  $\bar{x}$  = 3.1); outer and inner apical setae shorter than caudal ramus, inner longer than outer one; dorsal seta longer than caudal ramus and than both inner and outer apical setae.

**REMARKS.** The species *D. languidoide s* includes 27 stygophilic or stygobiont subspecies, as defined by Pesce & Galassi (1985, 1987). Among these, the new taxon is close to *D. languidoide s f. italiana* (Kiefer, 1931), from ground waters of northern Italy and from phreatic waters of Ukraine (as *Diacyclops languidoide s cfr. italianus*) (Monchenko, 1974) and *D. languidoide s zschokkei* (Graeter, 1910) (= *D. zschokkei* according to Petkovski, 1984), widely distributed in both epigeal and ground waters, of Europe.

From the above taxa, *D. languidoide s anatolicus* n. ssp. differs as follows: from the former in having shorter caudal rami (length/width ratio: 2.9-3.1; versus about 4) and an inner apical caudal seta longer than the corresponding outer one (versus shorter than the outer); from the latter in having shorter endopod distal segment of P4, and for the difference in length ratio between inner and outer distal caudal setae (about 2 in *D. zschokkei*, 1.25-1.30 in *D.l.anatolicus* n. ssp.).

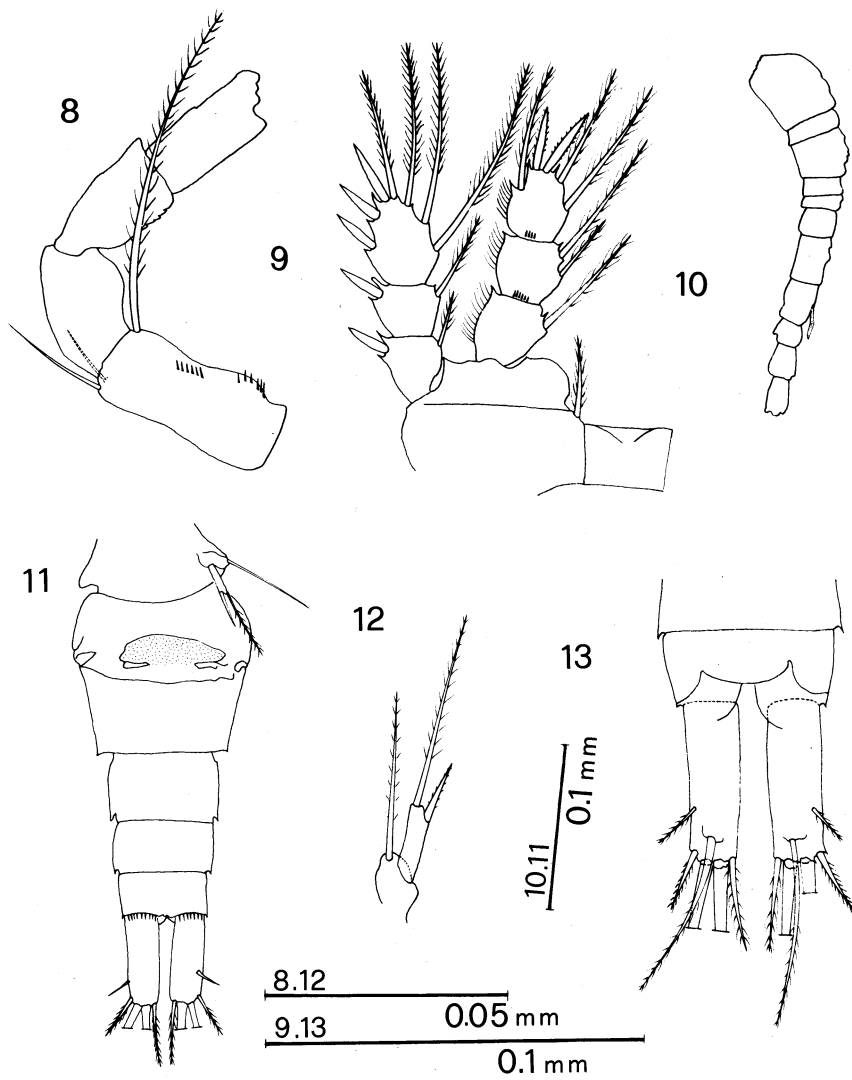


Fig. 8-13 - *Diacyclops languidoides anatolicus* n. ssp. 8: antenna; 9: leg 4; 10: antennula; 11: abdomen and caudal rami, ventral view; 12: leg 5; 13: caudal rami.



**Diacyclops antrincola** Kiefer, 1967

MATERIAL. Sta. 87-6/1, June 2, Vilayet Antalya, hyporheic habitat, Karpuzçay river, 5.5 km E of Kisilot (= 15 km E of Manaugat); UTM coordinates UF7665, 20 m a.s.l., 1 ♀. Sta. 87-6/5, 2 ♀♀ (data above). Sta. 87-6/23, June 11, Vilayet Köprü Irma river, 6.0 km E of Serik, UTM coordinates UF3788, 10 m a.s.l., 1 ♂.

Stygobiont, transadriatic species (Italy, Yugoslavia, Greece, NW Turkey) (Pesce, 1980).

**Diacyclops skopljensis** Kiefer, 1932

MATERIAL. Sta. 87-5/9, May 15, Vilayet Izmir, well (3) about 900 m SW of the mosque of Seferihisar; UTM coordinates MC8526, 20 m a.s.l., 1 ♀.

Eustygophilic (?) species belonging to the *Diacyclops crassicaudis* group, which is characterized by a 12-segmented second antenna and all trunk limbs 3-segmented.

As far as we know, it is recorded here for the first time outside of Yugoslavia.

**Diacyclops crassicaudis** (G.O. Sars, 1863) s.l.

MATERIAL. Sta. 87-6/27, 1 ♀ (holotype), 2 ♀♀ (paratypes), completely dissected and mounted in polyvinyl-lactophenol (data above). Sta. 87-5/18, May 18, Vilayet Muğla, hyporheic habitat, Kamis Çavi river, 900 m W of Yatagan; UTM coordinates NB9834, 400 m a.s.l., 1 ♀.

DESCRIPTION (figg. 14-19). Body length, excluding antennulae and caudal setae, 0.760-0.800 mm. Antennula 12-segmented. Antenna, basipod with well developed exopod, armature as in fig. 16. Trunk limbs 3-segmented. Spinal and setal formula of P1-P4 is 2333 and 4444, respectively. Endopod III of P4 (fig. 19) longer than wide (length/width ratio: 1.50-1.65), inner apical spine about 1.5 times longer than article and 1.57-1.73 times longer than outer spine; intercoxal plate of P4 with two naked protuberances (fig. 19).

Genital segment about as long as wide: receptaculum seminis without protuberances in anterior section. P5 as in fig. 18. P6 consisting of small chitinous lamella, bearing one outer seta and two small spines.

Caudal rami parallel, 3.62-3.82 times longer than wide. Inner apical seta longer than outer one (length/width ratio: 1.60-1.73); dorsal seta longer than caudal ramus.

REMARKS. The present material is related to the *D. crassicaudis* species group; it differs from the typical *D. crassicaudis* (G.O. Sars,

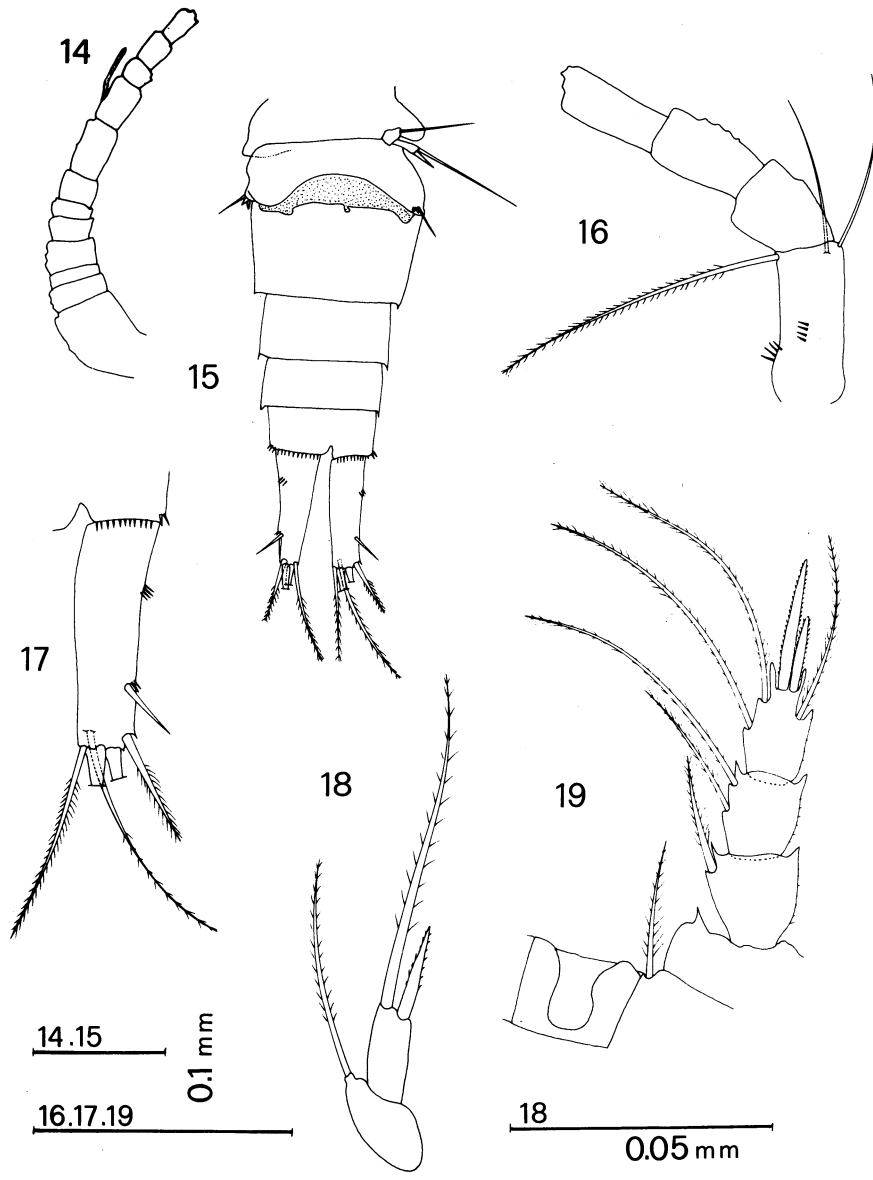


Fig. 14-19 — *Diacyclops crassicaudis* s. l. 14: antennula; 15: abdomen and caudal rami, ventral view; 16: antenna; 17: caudal ramus; 18: leg 5; 19: endopod of leg 4.

1863) in the morphology and armature of the distal article of the P4 endopod, as well as by the difference in ratios between the inner and the outer apical caudal setae. On the other hand, our material is close to some other species and subspecies of the same group such as *D. skopljensis*, *D. crassicaudis cretensis* Kiefer, 1928 (Greece, Turkey, Formose and China), and *D. crassicaudis lagrecai* Pesce & Galassi, 1987 (Sicily, Italy). From these taxa it differs as follows: from *D. skopljensis* in the length ratio between inner and outer apical caudal setae, in the morphology of the genital segment, in the armature of the distal article of the P4 endopod; from both *D. crassicaudis cretensis* and *D. crassicaudis lagrecai* in the morphology and armature of the caudal rami. However, on account of the large intraspecific variability of the *D. crassicaudis* group of species, as well as the lack of males in our samples, the material from Turkey is provisionally reported as *D. crassicaudis* s.l.

#### **Thermocyclops oblongatus** (G.O. Sars, 1927)

**MATERIAL.** Sta. 87-5/2, 1 (data above). Sta. 87-5/3, 2 ♀♀ (data above). Sta. 87-5/4, May 15, Vilayet Izmir, well (3) about 1 km E of the mosque of Sigacik; UTM coordinates MC8228, 10 m a.s.l., 2 ♀♀. Sta. 87-5/6, 1 ♂ (data above). Sta. 87-5/10, 1 ♂ (data above). Sta. 87-5/15, 1 ♀ (data above). Sta. 87-5/24, 2 ♀♀ (data above). Sta. 87-5/26, 2 ♀♀ (data above). Sta. 87-5/28, 2 ♀♀ (data above). Sta. 87-5/29, 2 ♀♀ (data above). Sta. 87-5/32, May 16, Vilayet Izmir, well about 1 km S of "Haritacilar", 5 km N of Doganbay; UTM coordinates MC8620, sea level, 2 ♀♀ (data above). Sta. 87-5/35, 1 ♀ (data above). Sta. 87-5/45, 1 ♀ (data above). Sta. 87-5/61, May 29, Vilayet Konya, about 5 km SW of "Kayabasi", 31 km SW of Beysehir; UTM coordinates UG6450, 1150 m a.s.l., 1 ♀.

Originally described by Sars (1927), as *Mesocyclops oblongatus*, to accommodate material from South-Africa, *T. oblongatus* was successively recorded in numerous underground fresh water localities in Africa, India and Europe. From an ecological point of view, on account of its regular presence in the interstitial and phreatic biotopes, it is to be considered a stygobiont (or eustygophilic) member of the subterranean biocoenoses.

The present record of the species is the first reliable one from ground waters of Turkey.

#### SUMMARY

A collection of ground water cyclopoid copepods from Turkey has been studied. Sixteen species and subspecies are identified, and taxonomic and distributional information on some rare or poorly known taxa is provided. A new subspecies, viz. *Diacyclops languidoides anatolicus* n. ssp. is described.

In general, the cyclopoid fauna of groundwaters of Turkey seems to be much

closely related to the South-East European fauna than to the Near East or African fauna.

According to data from the present study and from literature, the most common and widely distributed species in the ground waters of Turkey are *Eucyclops serrulatus* (Fischer, 1851), *Diacyclops bicuspidatus* (Claus, 1857) and *Thermocyclops oblongatus* (G.O. Sars, 1927).

#### RIASSUNTO

Nel corso delle ricerche in acque sotterranee della Turchia, condotte nel periodo 1979-1988 dal gruppo speleologico "Speleo Nederland" in associazione con la Società Speleologica Turca, dall'autore e dal dr. G. Gentile, sono state raccolte ed identificate 16 specie e sottospecie di copepodi ciclopidi. Tra queste, quattro, *Megacyclops viridis*, *Acanthocyclops* cfr. *gordani*, *Diacyclops skopljensis* e *Thermocyclops oblongatus* rappresentano nuove citazioni per la fauna di Turchia, una, *Diacyclops languidoides anatolicus* n. ssp., è risultata nuova per la scienza.

Le specie più ampiamente distribuite ed abbondanti nei diversi sistemi idrici sotterranei della regione risultano *Eucyclops serrulatus*, *Diacyclops bicuspidatus* e *Thermocyclops oblongatus*.

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