

## Redescription of *Apocyclops dengizicus* (Lepeschkin, 1900) from Central Asia

(Crustacea, Copepoda)

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*Apocyclops dengizicus* (Lepeschkin) is redescribed based on material from Kazakhstan and Uzbekistan. Data on variability and distribution are given.

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### Introduction

*Apocyclops dengizicus* has been described by Lepeschkin (1900) as *Cyclops diaphanus* var. *dengizica* from the brackish-water lake Selety-Tengiz (northern Kazakhstan). Kiefer (1926) attributed this cyclopoid to as an independent species, and Lindberg (1942, 1954) attributed it to as an independent subgenus, in the genus *Apocyclops*. Later, this species was reported worldwide in waterbodies of temperate and tropical regions of Asia, Africa, South and North America (Dussart & Defaye 1985), Europe (Monchenko 1974). However, the original description given by Lepeschkin is significantly outdated from the point of view of modern systematics of Cyclopidae; the type material was also lost. This severely hampers the work on the systematics of the genus *Apocyclops* Lindberg, 1942.

In this paper, we redescribe *Apocyclops dengizicus* on material from Kazakhstan and Uzbekistan, and report data on variability and distribution of this species in Central Asia.

### Material examined

Samples from more than 200 various waterbodies of Uzbekistan and more than 50 lakes and reservoirs of Kazakhstan were examined (Fig. 1). *Apocyclops dengizicus* has been recorded in the following localities:

- Lake Tengiz (Akmola Region, central Kazakhstan) August 1991 (11 females and 6 males); July 1995 (1 female and 1 male); salinity 26.0 g/l;
- a pool near the city of Karshy (southern Uzbekistan) September 1991 (10 females);
- pools in vicinities of the city of Termez (southern Uzbekistan) May 1992 (many females and males);
- pools and a ricefield in vicinities of the city of Khiva (western Uzbekistan) June 1992 (many females and males);
- Lake Saykul near the city of Nukus (northern Uzbekistan) September 1995 (many females) (coll. G. Turemuratova);
- Lake Esen near south bank of the Aral Sea (northern Uzbekistan) August 1961 (10 females) (coll. S. Embergenov).



Fig. 1. Localities sampled (.), localities of *Apocyclops dengizicus* (Lepeschkin) according to Lepeschkin (1900) (type locality) (\*), Dobrokhotova (pers. comm.) (■), Chuykov (1993) (▲) and this study (●).

All specimens are preserved in 4% formaldehyde at the Institute of Zoology (Tashkent). A few specimens from Karshy are deposited in the National Museum of Natural History (Washington). All drawings were made using a camera lucida.

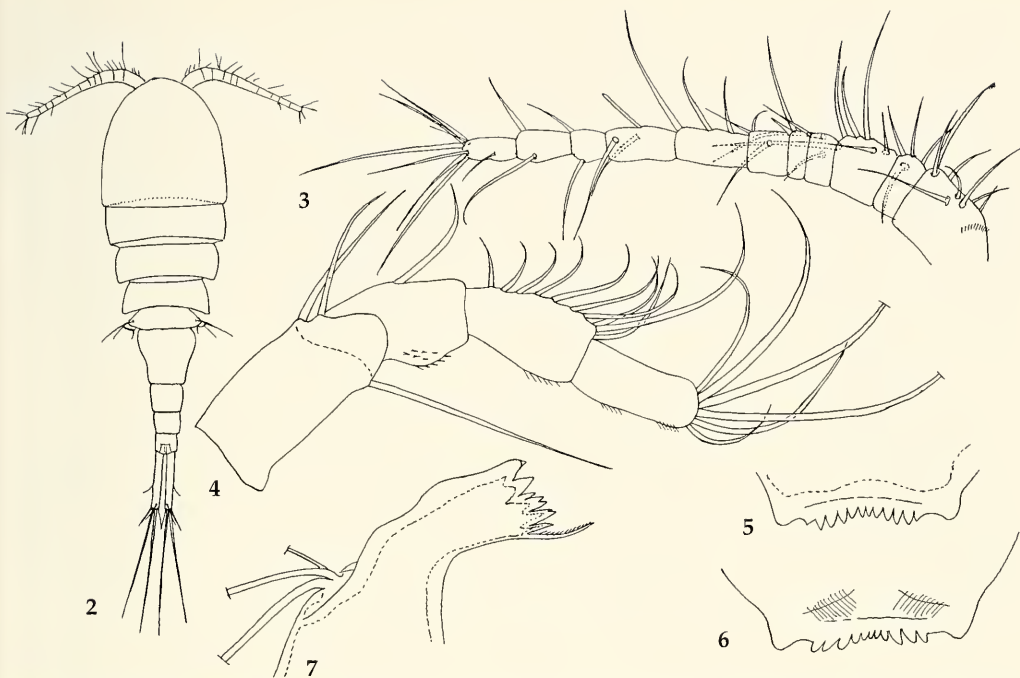
### *Apocyclops dengizicus* (Lepeschkin, 1900)

#### Redescription

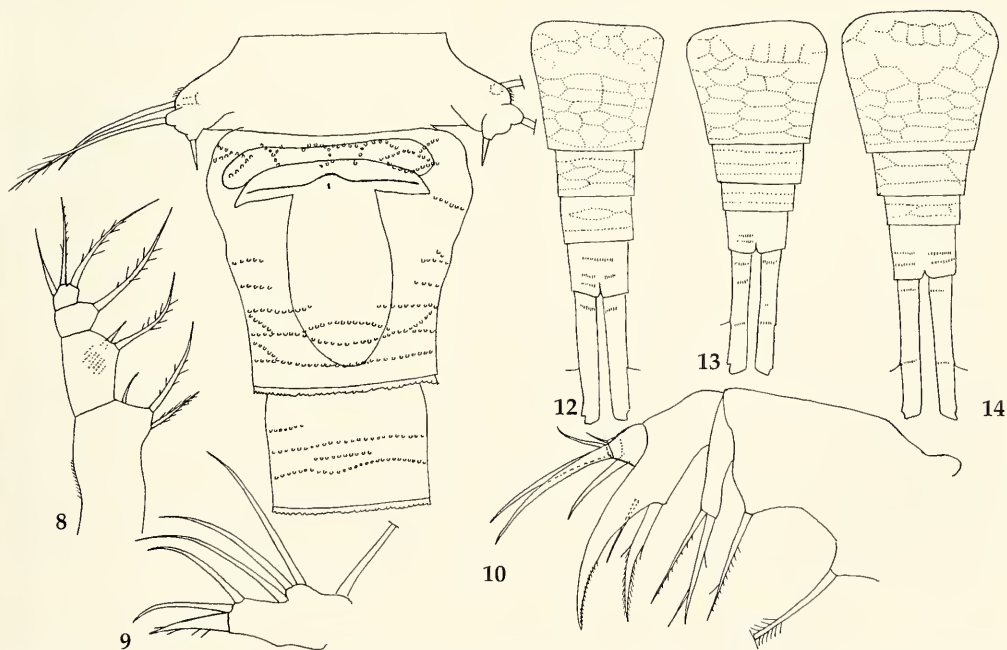
Female. Total body length 950-1350  $\mu\text{m}$ . Body widest at cephalothorax (Fig. 2). Antennule of 11 segments (19 specimens from 5 populations studied) (Fig. 3). Third segment of antenna with 10 setae (17 specimens studied) (Fig. 4). Labrum with 10-11 denticles (Figs 5, 6). Mandible, maxille, maxilleped and maxillular palp as in Figs 7-10. Lateral sides of last thoracic segment provided with short setules (Fig. 11). Genital segment expanded anteriorly (Fig. 11).

First three abdominal segments bearing rows (often interconnecting) of tiny pits (Figs 11-14). Last abdominal segment and furcal rami bear short rows of tiny spinules (Figs 12-15). Posterior margin of last abdominal segment with groups of tiny denticles on its ventral side. Furcal rami long and parallel, with lateral seta situated at the beginning of last third of rami (Figs 15-16). Implantation of external apical furcal setae provided with spinules.

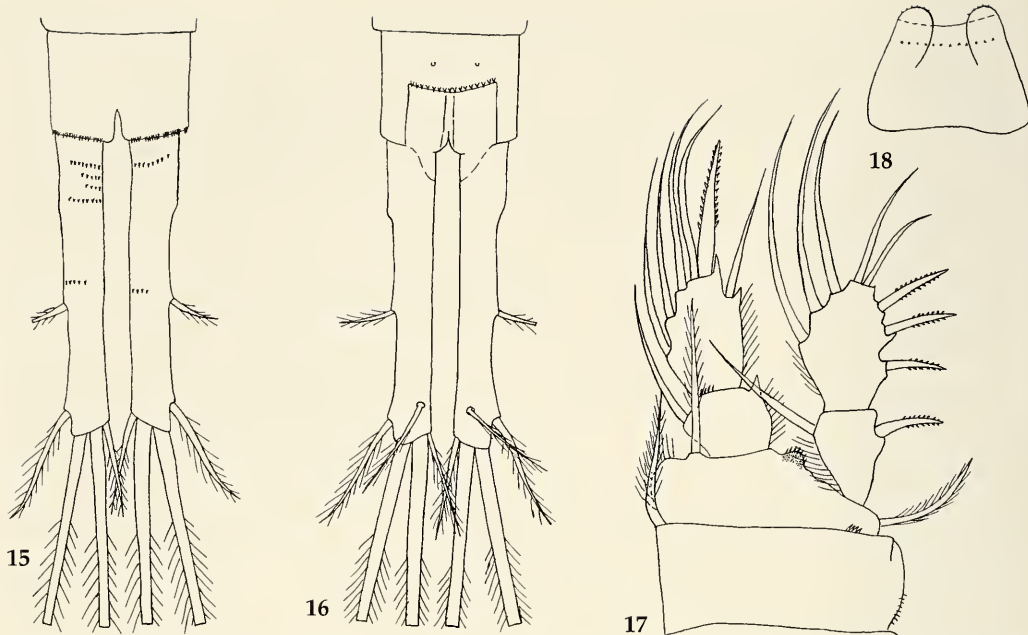
P1-P4 with biarticulated rami, spine formula 3.4.4.3, setal formula 5.5.5.5 (Figs 17, 19-21). Inner margin of basipodite P1 with long spine and setules (Fig. 17). Inner margins of basipodites of P1-P3 with setules (Figs 17, 19, 20), those of P4 devoid of setules. Precoxal plates of P1-P4 with rounded prominences, more developed at P1, and less at P4. The prominences bear tiny denticles (Figs 18, 22-24). Precoxal plates of P1-P3 bearing usually one row of tiny denticles on the caudal surface (Figs 18, 22, 24). However, specimens from a pool near Karshy and from Lake Saykul have 2 rows on the plates



Figs 2-7. *Apocyclops dengizicus* (Lepeschkin), ♀. 2. General view. 3. Antennule. 4. Antenna. 5-6. Labrum. 7. Mandible.



Figs 8-14. *Apocyclops dengizicus* (Lepeschkin), ♀. 8. Maxilliped. 9. Maxillular palp. 10. Maxilla. 11. Last thoracic and first two abdominal segments. 12. Abdominal segments, another specimen from Lake Tengiz. 13. The same of specimen from Lake Saykul. 14. The same of specimen from vicinities of Khiva.



Figs 15-18. *Apocyclops dengizicus* (Lepeshkin), ♀. 15. Furca ventrally. 16. Furca dorsally. 17. P1. 18. Precoxal plate of P1.

of P2 (Fig. 23). Precoxal plate of P4 with 4 rows of spinules (Fig. 25). Broad free article of P5 with relatively short inner spine and long external seta (Fig. 11).

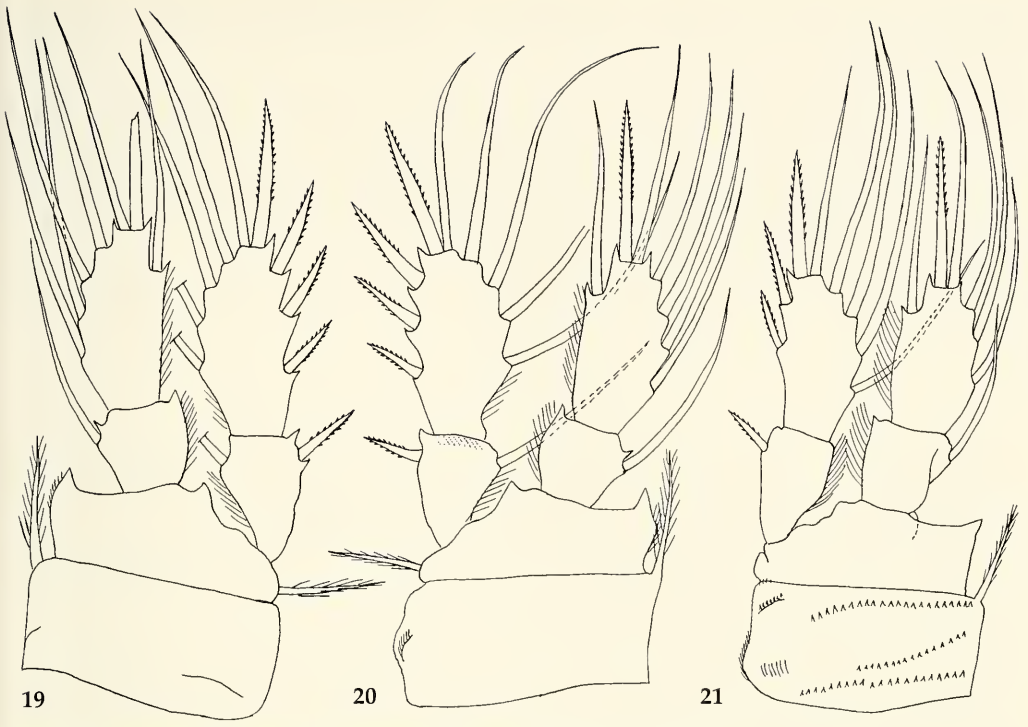
Elongated egg-sacs with 4-29 eggs.

Biometrical data are given in Tab. 1.

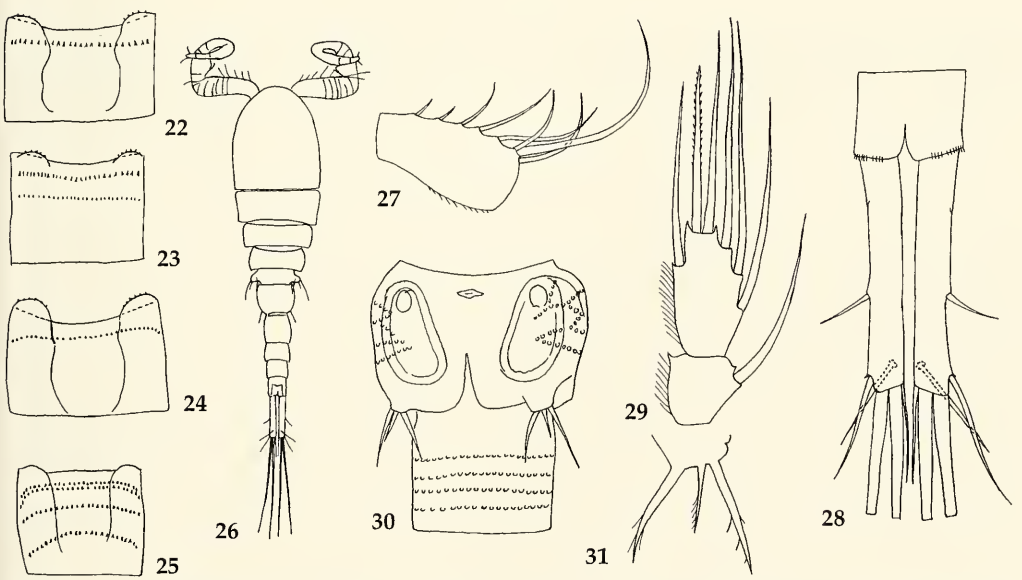
Male. Total body length 780-1.075  $\mu\text{m}$ . Third segment of antenna with 8-9 setae (8 specimens studied had 8 setae, and 7 specimens had 9 setae) (Fig. 27). Furcal rami 5.5-6.5 times as long as wide (Figs 26-28). 2EnpP4 1.70-2.00 times as long as wide. Apical spine of 2EnpP4 is relatively longer than those of female, 1.21-1.40 times as long as 2EnpP4 (Fig. 29). Setal and spine formula of P1-P4, ornament-

Tab. 1. Data on measurements of females of *Apocyclops dengizicus* (Lepeschkin) from Kazakstan and Uzbekistan.

	Lake Tengiz n = 10		Lake Esen n = 10		Lake Sykul n = 10		Khiva n = 10		Karshi n = 10		Termez n = 10	
	min-max	$\bar{x}$	min-max	$\bar{x}$	min-max	$\bar{x}$	min-max	$\bar{x}$	min-max	$\bar{x}$	min-max	$\bar{x}$
Body length, $\mu\text{m}$	1125-1350		975-1100		950-1200		1175-1225		1100-1200		1000-1200	
Furca L:W	5.25-6.78	6.08	6.11-7.50	6.80	6.10-7.70	7.03	6.00-6.60	6.25	5.00-6.22	5.46	6.00-8.00	6.97
Seta I:L furca	0.28-0.35	0.33	0.27-0.34	0.31	0.28-0.33	0.31	0.27-0.33	0.29	0.29-0.33	0.31	0.26-0.34	0.29
Seta I:Seta II	0.15-0.17	0.16	0.14-0.18	0.17	0.15-0.18	0.16	0.15-0.19	0.17	0.14-0.17	0.16	0.15-0.18	0.16
Seta I:Seta III	0.16-0.19	0.17	0.16-0.20	0.18	0.17-0.20	0.18	0.16-0.21	0.18	0.16-0.18	0.17	0.16-0.20	0.17
Seta I:Seta IV	0.75-0.90	0.80	0.85-1.00	0.92	0.85-1.00	0.92	0.80-1.00	0.88	0.84-0.97	0.91	0.85-1.00	0.92
Seta I:Seta V	0.74-0.91	0.84	0.77-0.82	0.79	0.71-0.91	0.76	0.80-0.86	0.84	0.73-0.86	0.77	0.72-0.90	0.81
2EnpP4:												
L art.:W art.	1.77-1.92	1.84	1.67-1.80	1.72	1.67-1.90	1.73	1.57-1.80	1.66	1.62-1.83	1.72	1.58-1.77	1.68
L sp.:L art.	1.00-1.12	1.04	1.00-1.15	1.05	0.98-1.20	1.06	1.02-1.20	1.08	1.04-1.23	1.11	1.04-1.19	1.09
L apical seta:												
L spina	1.43-1.55	1.49	1.23-1.40	1.34	1.16-1.40	1.30	1.15-1.35	1.26	1.16-1.39	1.25	1.15-1.40	1.23
Number of eggs/egg-sac	-	-	-	-	10-14	13.7	25-29	26.3	13-20	16.6	4-15	5.8



Figs 19-21. *Apocyclops dengizicus* (Lepeschkin), ♀. 19. P2. 20. P3. 21. P4.



Figs 22-31. *Apocyclops dengizicus* (Lepeschkin). 22-25. ♀. 26-31. ♂. 22. Precoxal plate of P2, Lake Tengiz. 23. The same, vicinity of Karshy. 24. Precoxal plate of P3. 25. Precoxal plate of P4. 26. ♂, general view. 27. 3<sup>rd</sup> segment of antenna. 28. Furca. 29. Endopodite of P4. 30. Genital and 2<sup>nd</sup> abdominal segments. 31. P6.

tation of precoxal plates and armoring of basipodites as in female. Inner seta of P6 shorter than the external one (Figs 30-31).

**Distribution.** Dobrokhotova (1975) did not mention *A. dengizicus* in her review on the distribution of Cyclopoida in Kazakstan but she informed us (pers. comm.) recently about records of this species in small lakes (salinity 10-12 g/l) in the Turgay Region of Kazakstan and in the small Lake Balkhash-Alakol (now dried) southward from Lake Balkhash (Fig. 1). Chuykov (1993) reported *A. dengizicus* in shallows of the northern part of the Caspian Sea. Sars (1903) recorded *A. dengizicus* – as well as we did – in Lake Tengiz. Studying the samples from the type locality, the Lake Selety-Tengiz (August-September 1987, June 1988) we failed to record *A. dengizicus*.

**Ecology.** *Apocyclops dengizicus* in Central Asia inhabits mainly ephemeral shallow waterbodies and shallows of some lakes. This species prefers brackish waters.

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