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Some Freshwater Cyclopoids (Crustacea: Copepoda) of the Island of Soqotra (Indian Ocean), with the Description of Three New Species

key words: Copepoda, distribution, Soqotra

Abstract

Copepods from Soqotra Archipelago, a largely unstudied microplate in the north-west Indian Ocean, were investigated. Seven species of six cyclopoid genera: *Ectocyclops* BRADY, 1904; *Halicyclops* NORMAN, 1903; *Mesocyclops* SARS, 1914; *Microcyclops* CLAUS, 1893; *Paracyclops* CLAUS, 1893 and *Tropocyclops* KIEFER, 1927 were identified. Three of them are new to Science, viz. *Mesocyclops wraniki* sp. n., *Halicyclops soqotranus* sp. n., and *Ectocyclops mozhae* sp. n. They are described and figured.

1. Introduction

In a recent article, listing the freshwater fauna of the Soqotra Archipelago, WRANIK (1998) mentioned the presence of only six Crustacea: three Decapoda, two Isopoda and one cladoceran; no Copepoda were included. Here, we report on the cyclopoids found in the first freshwater plankton samples ever collected from the island.

2. Material and Methods

Material collected by H. J. DUMONT (Ghent) and Wolfgang WRANIK (Rostock) was investigated. Samples were preserved in 4% formalin. Specimens were dissected under a Wild M3 dissecting microscope and transferred to a Medilux-12 microscope equipped with a camera lucida for identification and draw-

Table 1. List of samples and localities

Locality	Sampling date	Coordinates	Taxon
Mozhae: Small puddles in riverbed	28 March 1996	12°38′34″ N – 54°08′24″ E	– *Ectocyclops mozhae* sp. n. – *Mesocyclops aspericornis*
Wadi Go'oh	28 March 1996	12°32′36″ N – 54°10′20″ E	– *Microcyclops* cf. *varicans* – *Tropocyclops confinis* – *Mesocyclops aspericornis* – *Halicyclops soqotranus* sp. n. – *Ectocyclops mozhae* sp. n.
Deksam plateau		12°31′24″ N – 53°0′14″ E	– *Mesocyclops wraniki* sp. n. – *Paracylops* sp.

ing. Adult females were used to describe the species. VAN DE VELDE (1984) and LINDBERG (1957) were used for identifications. Abbreviations used are as follows: L: Length, W: Width, L/W: Ratio L to W, Si: Inner furcal seta, Smi: Outer furcal median seta, Sme: Outer furcal median seta, Sd: Dorsal seta, Sl: Lateral seta, Se: Outer seta, Si/Se: Ratio Si to Se, Sd/Sl: Ratio Sd to Sl, Se/Si: Ratio Se to Si, Spi: Inner spine of Enp_3P_4, Spe: Outer spine of Enp_3P_4, P_1–P_4: Thoracopods from first to fourth, Enp_3P_4: Third endopodite of fourth thoracopod; IG: General Inventory (Inventaire General).

3. Description of New Species

1. *Mesocyclops wraniki* sp. n. (Figs. 1, 2 and 3)

Type locality: Stagnant water on Deksam plateau (900 m altitude) leg. WOLFGANG WRANIK. Annual range of air temperature between 28 °C and 37 °C and range of annual rainfall between 130 and 170 mm (WRANIK, 1998).

Type material

Holotype: Female without egg-sacs, dissected and mounted in glycerine on three slides labeled *Mesocyclops wraniki* sp. n. (P_1–P_4) holotype, *Mesocyclops wraniki* sp. n. (urosome) holotype and *Mesocyclops wraniki* sp. n. (A_1, A_2 and mouth parts) holotype.

Paratypes: Three dissected specimens in glycerine and mounted in glycerine on seven slides labeled *Mesocyclops wraniki* sp. n. (P_1–P_4, A_1, A_2); *Mesocyclops wraniki* sp. n. (urosome); *Mesocyclops wraniki* sp. n. (urosome); *Mesocyclops wraniki* sp. n. (mouth parts); *Mesocyclops wraniki* sp. n. (A_1, A_2), *Mesocyclops wraniki* sp. n. (P_1–P_4) and *Mesocyclops wraniki* sp. n. (A_1, A_2, mouth parts). Accession numbers of dissected specimens: COP 4462 A–C (holotype) and COP 4463 A–C, COP 4464 A–D (paratypes). A further 10 undissected specimens (COP 4465) without egg-sacs are available in one tube.

Repository of type material

Holotype and paratypes are deposited in the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels (KBIN) at accession number: IG 28732

Derivatio nominis: The species is named after Dr. WOLFGANG WRANIK.

Description of holotype

Measurements of the holotype and nine paratypes are given in table 2.

Antennule: 17-segmented; reaching distal margin of first metasomal somite (Fig. 1: A, C), spinules on segments 1, 4, 5 and 7–13, hyaline lamella as in Fig. 1: D.

Antenna: Basipodite caudally with a continuous and a discontinuous row of spines (**F**ig. 2: F); a group of spinules near basis of segment. Frontal side (Fig. 2: G) with a continuous oblique row of strong spines, second endopodite with nine feathered setae.

Mandible: Pars molaris well developed, with series of sharp teeth (Fig. 3: L). Mandibular palp provided with three unequal setae: two strong and feathered, plus a small and glabrous, surface close to mandibular palp with tiny setules (Fig. 3: K).

Maxillula (Fig. 3: G): Basis of maxillular palp glabrous.

Maxilla (Fig. 3: F): Inner side precoxa with two strong, feathered setae. Median coxal seta strong and feathered. Outgrowth of coxa with two unequal, feathered setae. A claw-like endite with a row of spines bearing a strong seta at the basis. Maxillary palp with four distal unequal setae. Surfaces of coxa with tiny spinules as in most *Mesocyclops* and *Thermocyclops* species where the general structure of the maxilla is essentially the same (HOLYNSKA and FIERS, 1994).

Maxilliped (Fig. 3: H): Basal segment with three strong, feathered setae. Endopodite two-segmented; last segment with three unequal setae, the smallest glabrous.

Labrum (Fig. 3: E): Ventral side with 12 sharp teeth, dorsal side hairy.

Cephalosome (Fig. 1: C): 1.06 times as long as broad.

Table 2. Morphometric comparison between *M. wraniki* sp. n., *M. dussarti* and *M. aequatorialis similis* (Data for *M. dussarti* and *M. aequatorialis similis* are from VAN DE VELDE, 1984)

		Mesocyclops wraniki sp. n.												*M. dussarti*	*M. a. similis*
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Mean**	**Sd**		
Total length	**T.l**	1222.00	1194.00	1197.00	1244.00	1178.00	1038.00	1231.00	1209.00	1116.00	1116.00	1174.50	61.52	1320.00	1495.00
Cephalosome	**L**	416.00	466.00	422.00	416.00	438.00	438.00	428.00	456.00	438.00	448.00	436.60	15.85	–	–
	W	375.00	409.00	438.00	394.00	425.00	413.00	413.00	409.00	413.00	438.00	412.70	17.97	–	–
	L/W	1.11	1.14	0.96	1.06	1.03	1.06	1.04	1.11	1.06	1.02	1.06	0.05	–	–
Genital Somite	**L**	191.00	178.00	178.00	178.00	161.00	161.00	163.00	161.00	150.00	146.00	166.70	13.39	192.00	216.00
	W	138.00	131.00	134.00	131.00	132.00	125.00	141.00	134.00	134.00	100.00	130.00	10.79	133.00	167.00
	L/W	1.38	1.36	1.33	1.36	1.22	1.29	1.16	1.20	1.12	1.46	1.28	1.24	1.44	1.29
Furca	**L**	103.00	98.00	95.00	101.00	104.00	104.00	100.00	98.00	97.00	103.00	100.30	3.03	114.00	121.00
	W	34.00	34.00	30.00	30.00	30.00	28.00	30.00	30.00	31.00	31.00	30.80	1.78	33.00	38.00
	L/W	3.03	2.88	3.17	3.37	3.47	3.71	3.33	3.27	3.13	3.32	3.27	0.22	3.45	3.18
Furcal setae	**Si**	221.00	241.00	150.00	213.00	219.00	222.00	228.00	225.00	228.00	225.00	204.00	23.44	281.00	292.00
	Smi	484.00	500.00	506.00	484.00	488.00	463.00	481.00	506.00	516.00	484.00	491.00	14.82	527.00	566.00
	Sme	350.00	359.00	363.00	363.00	356.00	366.00	347.00	356.00	369.00	353.00	358.20	6.73	399.00	358.00
	Se	94.00	94.00	66.00	84.00	91.00	94.00	84.00	91.00	97.00	99.00	89.40	9.08	96.00	121.00
	Sd	63.00	72.00	37.00	66.00	66.00	47.00	59.00	59.00	56.00	69.00	59.40	10.09	96.00	83.00
	Sl	50.00	50.00	33.00	31.00	50.00	44.00	50.00	53.00	44.00	50.00	45.50	7.27	–	–
	Smi/Sme	1.38	1.39	1.39	1.33	1.37	1.27	1.39	1.42	1.40	1.37	1.37	0.04	–	–
	Sd/Si	0.29	0.30	0.25	0.31	0.30	0.21	0.26	0.26	0.25	0.31	0.27	0.03	–	–
	Sd/Sl	1.26	1.44	1.12	2.13	1.32	1.07	1.18	1.11	1.27	1.38	1.33	0.29	–	–
	Sd/Se	0.67	0.77	0.56	0.79	0.73	0.50	0.70	0.65	0.58	0.70	0.66	0.09	–	–
	Si/Se	2.35	2.56	2.27	2.54	2.41	2.36	2.71	2.47	2.35	2.27	2.43	0.13	–	–
Enp_3P_4	**L**	77.00	76.00	61.00	82.00									88.00	104.00
	W	27.00	28.00	21.00	27.00									32.00	37.00
	L/W	2.85	2.71	2.90	3.04									2.75	2.81
	Spi	51.00	55.00	54.00	54.00									65.00	79.00
	Spe	52.00	56.00	59.00	52.00									69.00	80.00
	Spi/Spe	0.98	0.98	0.92	1.04									0.86	0.98

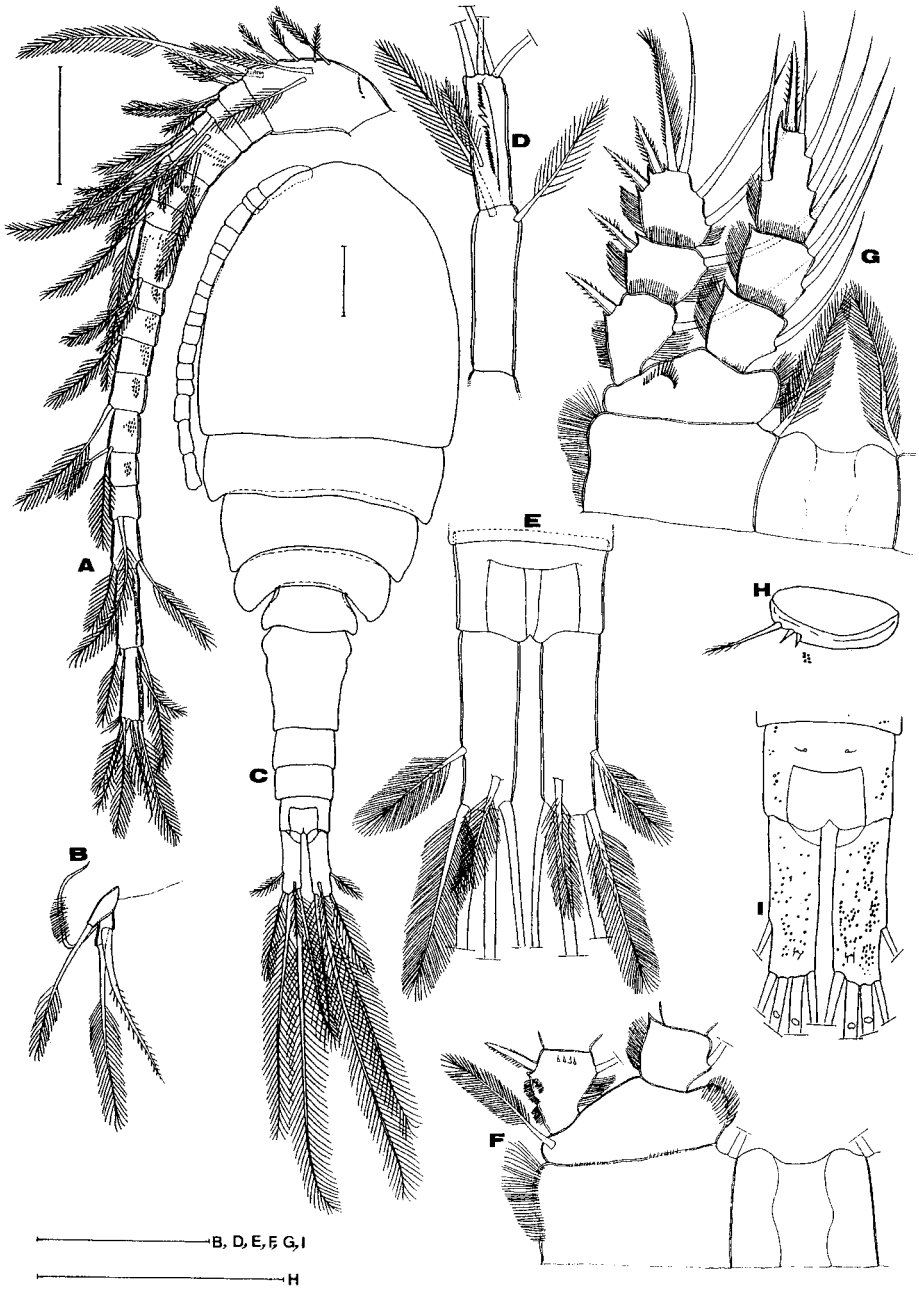

Figure 1. *Mesocyclops wraniki* sp. n. A: Antennule; B: P_5; C: Habitus; D: Hyaline lamella; E, I: Anal somite and furcal rami (dorsal side); F: P_1 caudal side (coxopodite, basipodite and intercoxal sclerite); G: P_1 (frontal side); H: P_6.

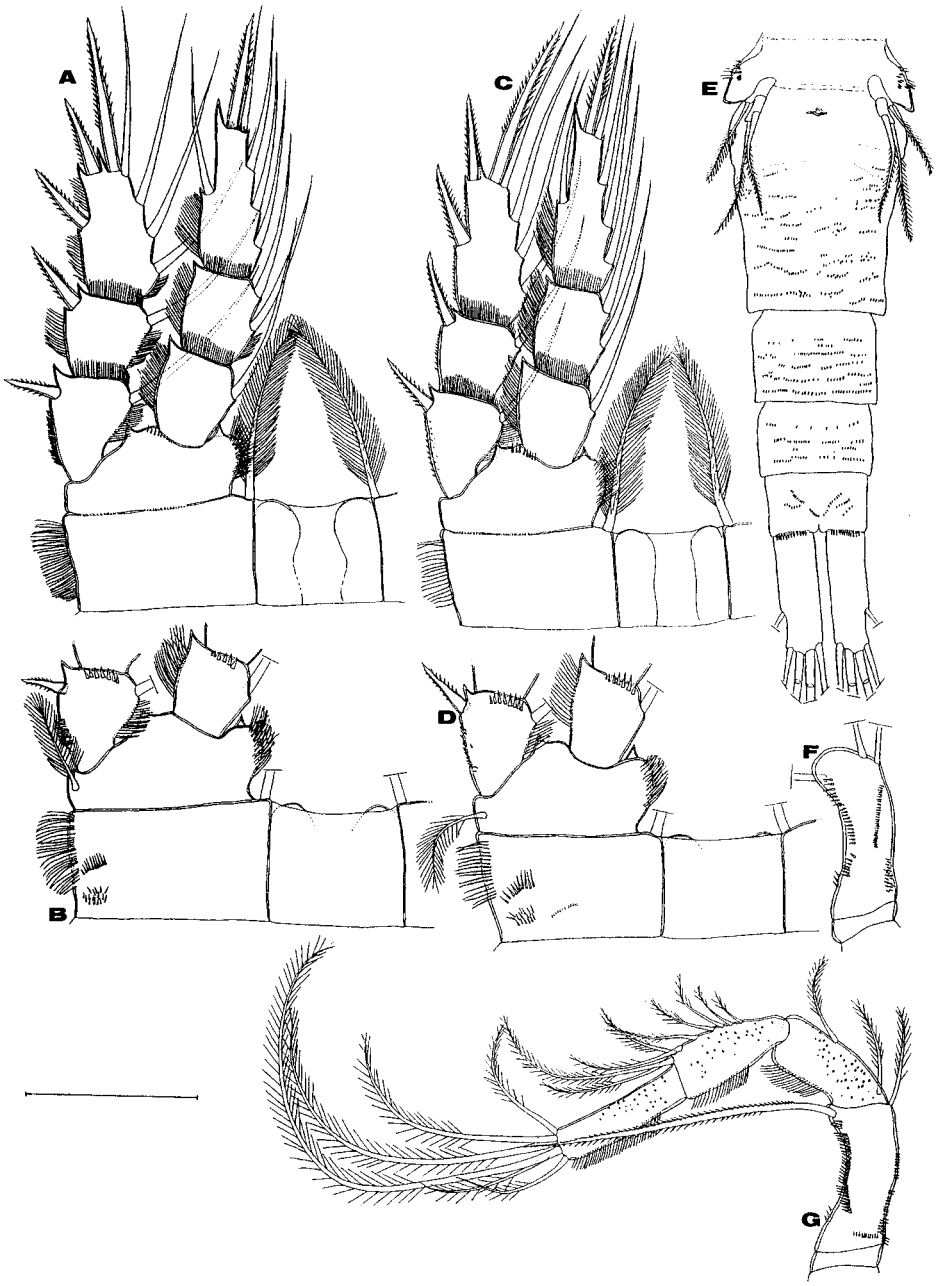

Figure 2. *Mesocyclops wraniki* sp. n. A: P_2 (frontal side), B: P_2 Caudal side (coxopodite, basipodite and intercoxal sclerite); C: P_3 (frontal side); D: P_3 Caudal side (coxopodite, basipodite and intercoxal sclerite); E: Last metasomal somite, urosomal somites and furca (ventral side); F: Basipodite antenna (caudal side), G: Antenna (frontal side).

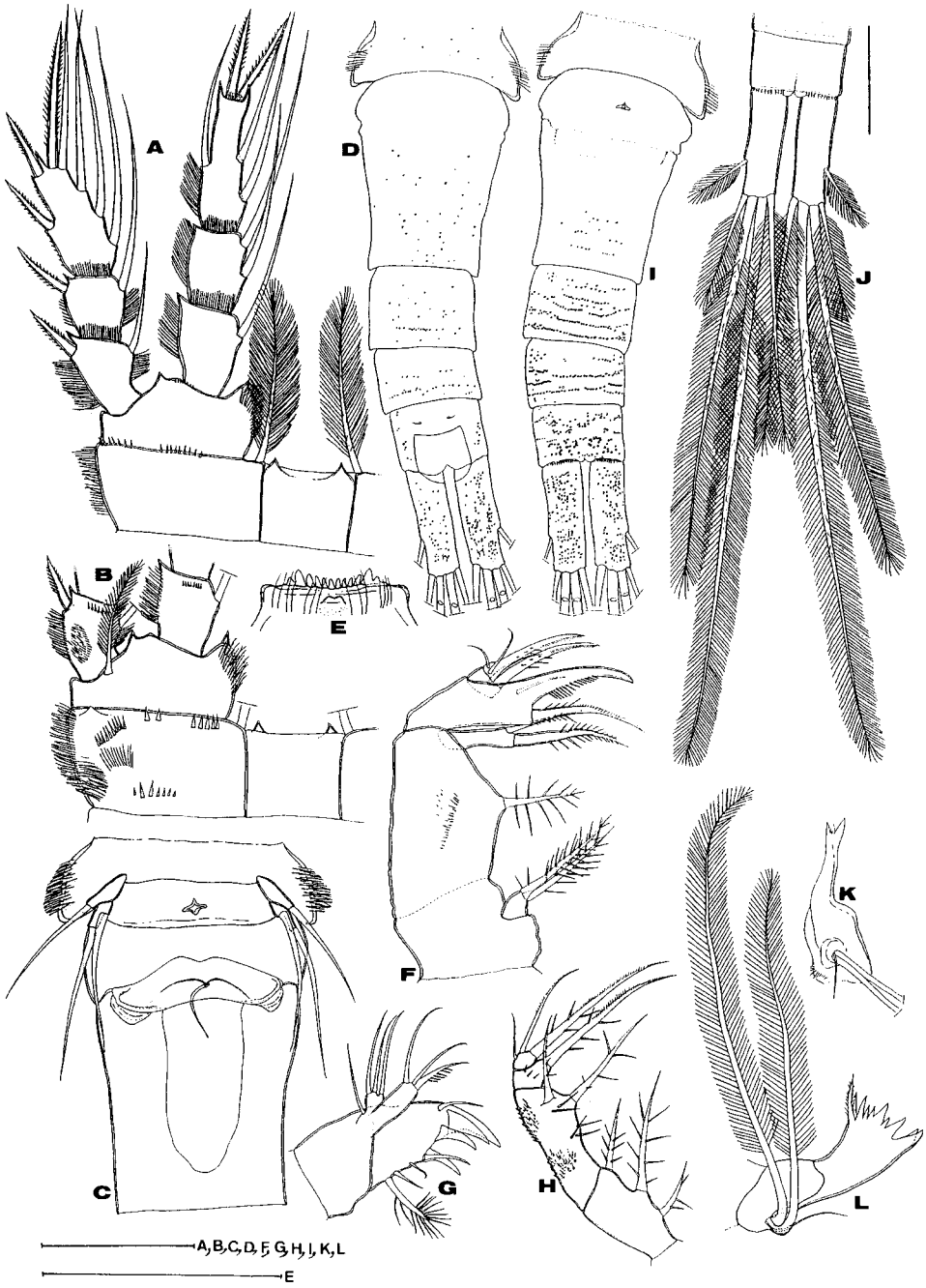

Figure 3. *Mesocyclops wraniki* sp. n. A: P_4 (frontal side), B: P_4 caudal side (coxopodite, basipodite and intercoxal sclerite); C: Last metasomal somite and genital somite; D, I: Last metasomal somite, urosome and furca (dorsal and ventral sides, respectively); E: Labrum; F: Maxilla, G: Maxillula; H: Maxilliped; J: Anal somite and furca (ventral); K, L: Mandible.

Last metasomal somite (Figs 1: B; 2: E; 3: C, D, I). Lateral margins with setules.

Receptaculum seminis (Fig. 3: C): Lateral wings straight.

Urosomal somites: Either ornamented with tiny spinules or glabrous (Fig. 2: E). Genital somite 1.28 times as long as broad, distal margin of anal segment ventrally with row of strong spines (Fig. 2: E; 3: I, J); dorsally either totally naked or with row of tiny spinules (Figs 1: E, I; 3: D).

Furca (Figs 1: C, E, I; 2: E; 3: D, I, J): Furcal rami 3.27 times as long as wide, inner side glabrous, dorsal seta 1.33 times as long as lateral, inner seta 2.43 times as long as outer. Implantation of lateral and outer furcal setae glabrous (Figs. 1: E, I; 2: E; 3: D, I, J).

Thoracopods: Endopodites and exopodites three-segmented; spine formula: 3–3-3–3.

P1 (Fig. 1: G, F): Inner distal edge of basipodite without seta, inner frontal and caudal sides of basipodite hairy. Median basipodite frontal side with continuous row of strong spines.

P2, *P3* (Fig. 2: A, B, C, D). The two thoracopods are similarly structured: Intercoxal sclerite glabrous, inner caudal and frontal sides of basipodites hairy, spinule pattern on coxopodite caudal side as in Fig. 2: C, D.

P4 (Fig. 3: A, B): Intercoxal sclerite glabrous, outgrowths pointed. Spine pattern on caudal side of coxopodite as in Fig. 3: B; inner caudal and frontal margins of basipodite with setules.

P5 (Fig. 1: B): Spine and seta on apical segment equal in length.

P6 (Fig. 1: H): Reduced to two unequal, small and naked spines plus a relatively long and hairy seta. Six minute openings distally from the implantation of the leg.

Variability

Ten specimens including the holotype and paratypes were measured. Range of total body length (furcal setae excluded) 1038–1244 μm (mean 1174 μm); cephalosome 416–466 μm (mean 436.60 μm); genital somite 146–191 μm (mean 166.7 μm) and furca 95–104 μm (mean 100.30 μm) (Table 2). Urosomal somites either totally naked or provided with tiny spinules, distal margin of anal somite either totally naked or with tiny spinules dorsally.

Differential diagnosis

Mesocyclops wraniki sp. n. can be recognised by the straight wings of its receptaculum seminis, spine pattern of its antenna which is simpler than in any described species, and by the distal margin of the anal somite which is dorsally glabrous.

Taxonomic relationship with other species

The new species might be confused with *M. dussarti* VAN DE VELDE, 1984 because of the spinulation covering the integument in some specimens, a similar P_5 and the glabrous distal zone of the dorsum of the anal somite. However, the two species differ in the spine pattern of the antennae (simplified in *M. wraniki* sp. n.), and outgrowths of intercoxal sclerite of P_4 (rounded in *M. dussarti*); the implantations of the lateral furcal setae (glabrous in the new species.), and the hyaline lamella with a deep notch in *M. dussarti*. Also, *M. wraniki* sp. n. is smaller (average length 1174 μm) than *M. dussarti* (length 1320 μm: from VAN DE VELDE, 1984) (Table 2). A relationship between the new species and the *M. aequatorialis* group is also obvious. Both share a glabrous maxillular palp and a similar spinulation pattern on the antennules. However, *M. wraniki* sp. n. has a P_5 with almost equally long seta and spine on the distal segment, the wings of the receptaculum seminis are fairly straight, the dorsum of the anal somite is distally glabrous, and it has a specific reduced spine pattern on the antennae. The new species, finally, differs from *M. a. similis* by its size (length 1495 μm for *M. a. similis* and 1174 μm for *M. wraniki* sp. n.), spine pattern on the antennae, shape of the dorsal edge of anal somite and its simple hyaline lamella.

2. *Ectocyclops mozhae* sp. n. (Figs 4, 5 and 6)
Type locality: Mozha (12°38′34″ N – 54°08′24″ E), puddles in riverbed.

Type material

Holotype: Female with egg-sacs, dissected and mounted in glycerine on six slides labeled: *Ectocyclops mozhae* sp. n. holotype (P_1), *Ectocyclops mozhae* sp. n. holotype (P_2), *Ectocyclops mozhae* sp. n. holotype (P_3), *Ectocyclops mozhae* sp. n. holotype (P_4), *Ectocyclops mozhae* sp. n. holotype (A_1-A_2), *Ectocyclops mozhae* sp. n. holotype (Urosome).

Paratypes: An adult female with egg-sacs, dissected and mounted in gycerine on four slides labeled: *Ectocyclops mozhae* sp. n. (A_1–A_2), *Ectocyclops mozhae* sp. n. (P_1), *Ectocyclops mozhae* sp. n. (P_2–P_3), *Ectocyclops mozhae* sp. n. (Urosome). Accession numbers of dissected material: COP 4459 A–C (holotype) and COP 4460 A–C (paratypes). Two adult specimens, a female without egg-sacs and an adult male (accession number: COP 4461), in alcohol are kept in one tube.

Repository of material

Holotype and paratypes are deposited in the Koninklijk Belgisch Istituut voor Natuurwetenschappen, Brussels (KBIN) at accession number: IG 28732

Derivatio nominis: The species name is derived from that of the type locality.

Description of holotype:

Antennule (Fig. 4: A, B): 11-segmented, extending only to the proximal half of the cephalosome.

Antenna: Frontal side of basipodite with a row of strong spines, spine and spinule pattern on endopodite as in Fig. 4: C.

Labrum (Fig. 4: F): Ventral side with rounded teeth.

Mandible: Pars molaris with sharp teeth, mandibular palp made of three long and hairy setae; two long plus a small one (Fig. 4: H).

Maxillula: Maxillular palp glabrous (Fig. 4: G).

Maxilla (Fig. 4: E): Precoxa with two hairy setae, surface of precoxa with two groups of strong spines, outgrowth with two setae, claw-like endite with a strong seta at basis, maxillary palp with four unequal setae.

Thoracopods (Figs 5: A, B, C, D, E, F, G; 6: A, B) : Spine formula 3–4–4–3, frontal side of basis of Exp_1 P_1–P_4 surrounded by a row of strong spines, frontal side of intercoxal sclerite P_1–P_3 with a row of spines, inner side of basipodite feathered, outer side of endopodites and exopodites of P_1–P_4 provided with strong spines, external seta on Enp_3 P_1–P_4 noticeably reduced.

P_1: Proximal inner side of basipodite frontally provided with a seta, surrounded at its basis by a row of strong spines (Fig. 5: C).

P_2-P_3: As in Fig. 5: B, D, E, F.

P_4: Exp_3 with only four setae; intercoxal sclerite with strong spines, two of which long and curved (Fig. 6: A, B), inner side of basipodite with only a row of strong spines.

P_5: Reduced to three equal setae implanted on distal lateral edge of fifth metasomal somite (Fig. 4. D).

P_6: Reduced to a seta plus two spines; one strong plus one small (Fig. 5: G).

Urosome: As in Fig. 6: C, D.

Differential diagnosis

Ectocyclops mozhae sp. n. is characterized by its Exp_3P_4 which carries only four setae, the intercoxal sclerite of P_4 with two hook-like spines, inner side of basipodite P_4 with a row of strong spines, P_5 with three equal setae, and an 11-segmented antennule. The species comes closest to *E. phaleratus* in spine pattern on the outer side of the endopodites and exopodi-

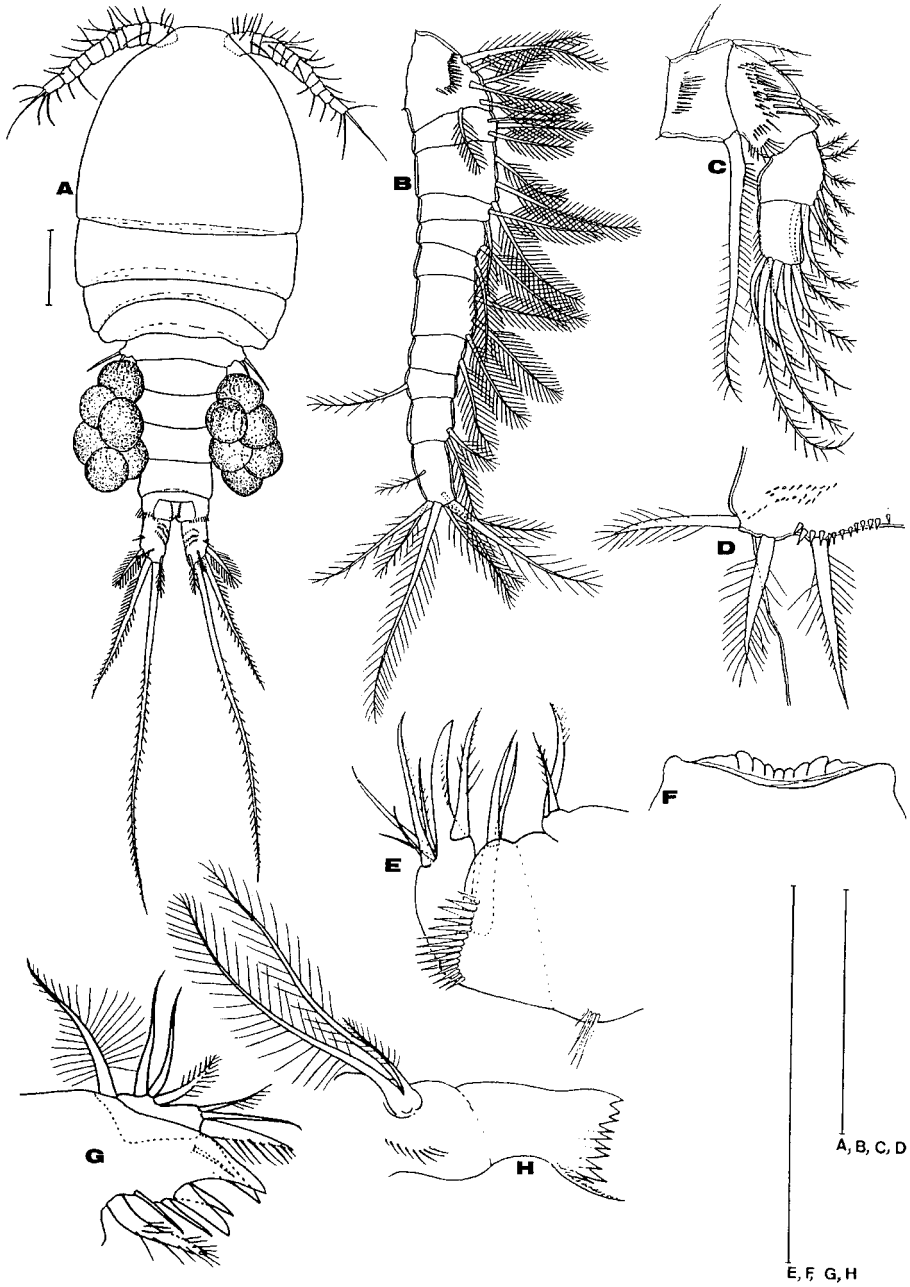

Figure 4. *Ectocyclops mozhae* sp. n.. A: Habitus; B: Antennule; C: antenna; D: P_5; E: Maxilla; F: Labrum; G: Maxillula; H: Mandible.

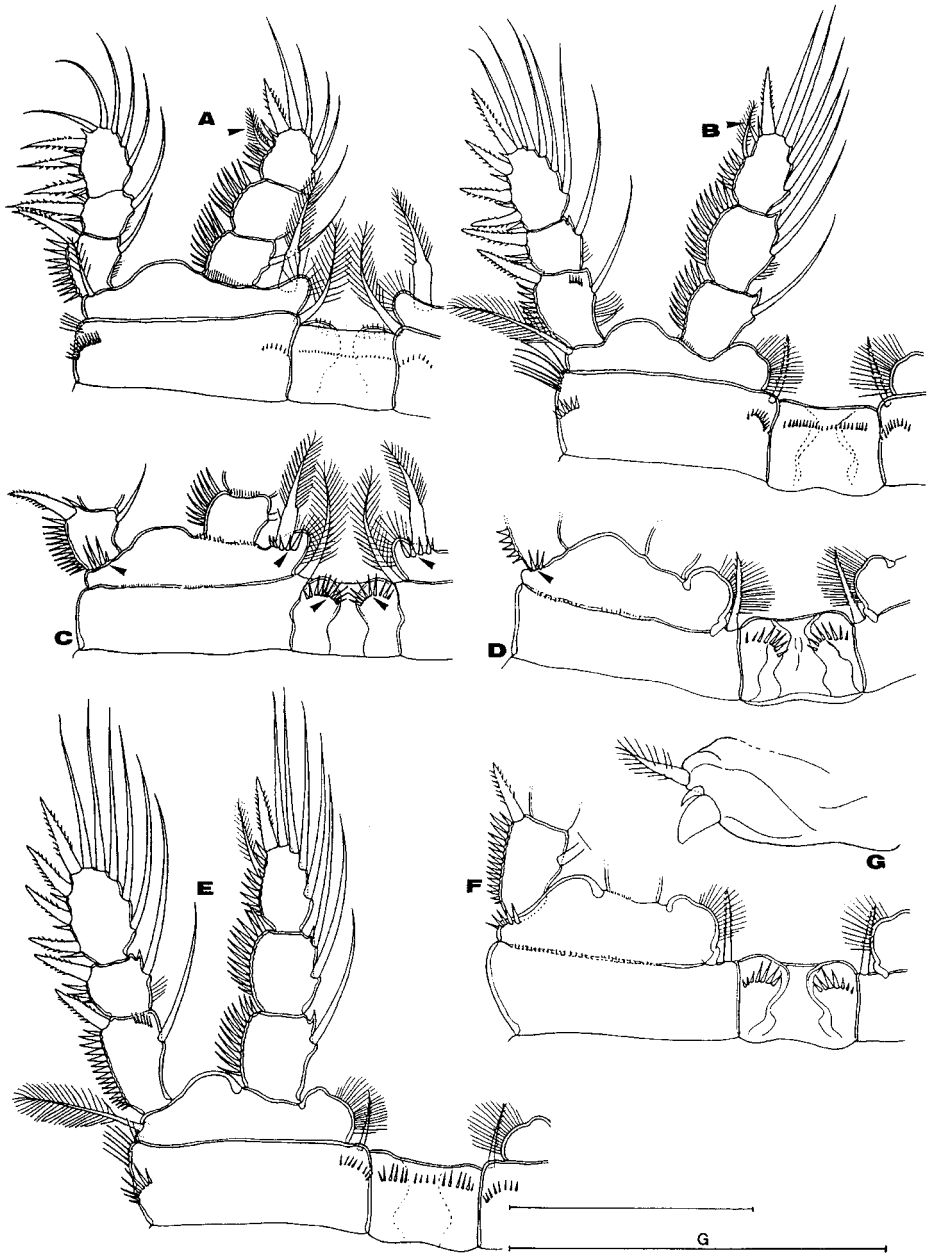

Figure 5. *Ectocyclops mozhae* A: P_1 (frontal side); B: P_2 (frontal side), C: P_1 (caudal side); D: P_2 (caudal side); E: P_3 (frontal side); F: P_3 (caudal side); G: P_6.

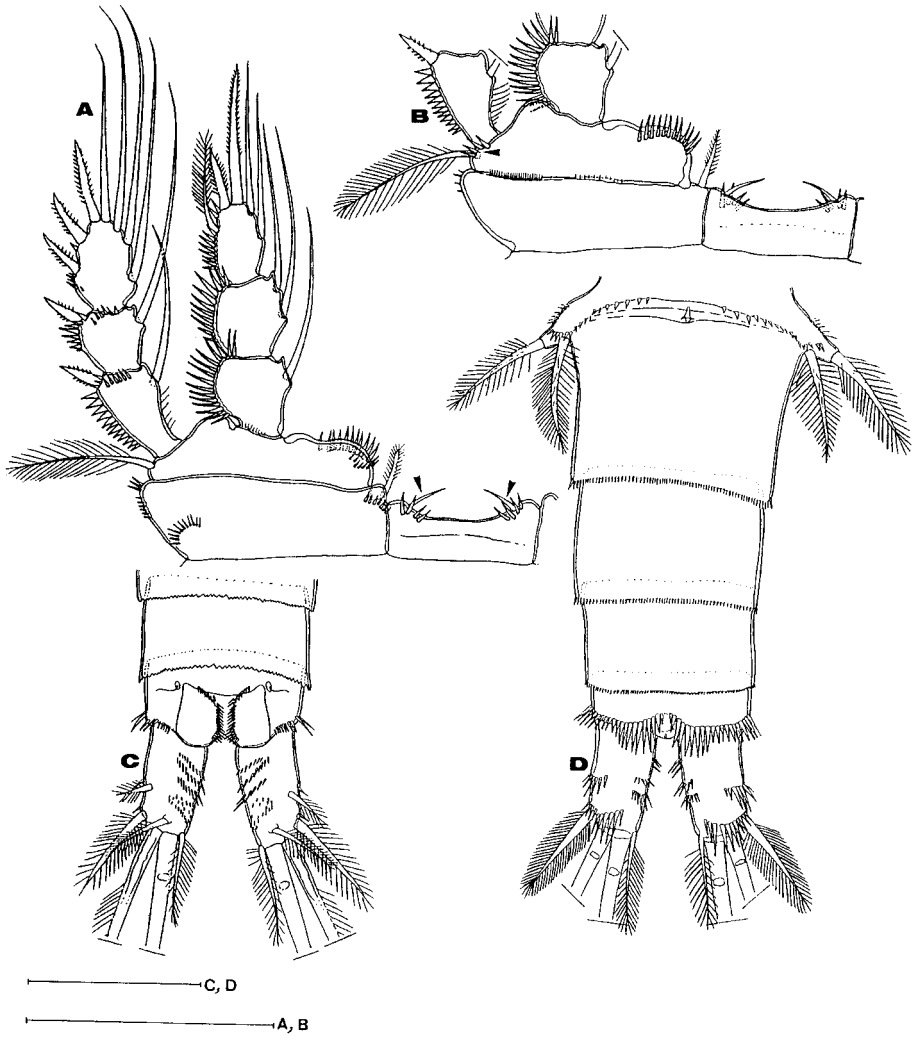

Figure 6. *Ectocyclops mozhae*. A: P_4 (frontal side); B: P_4 (caudal side); C: Furca (dorsal side); D: Urosome and furca (ventral side).

tes P_1–P_4; Enp_3 P_1–P_4 with reduced external seta. We compared the species with material of *E. phaleratus* from Overmere (Belgium) collected in 1965 and with the description in DUSSART, 1969. It has a 10-segmented antennule, Exp_3 P_4 with five setae, intercoxal sclerite P_4 with strong and equal spines, and inner side of basipodite P_1–P_4 fully feathered. The implantation and size of setae of P_5 in *E. mozhae* sp. n. resembles that of *E. phaleratus* as described by DEFAYE (1988). The presence of a row of spines at the basis of the inner distal margin of the basipodite of P_1, finally, distinguishes *E. mozhae* sp. n. from *E. rubescens* BRADY, 1904 as drawn by DUSSART (1974).

3. *Halicyclops soqotranus* sp. n. (Figs 7 and 8)
Type locality: Interstitial water in gravel bed of Wadi Gooh; 12°32′36″ N – 54°10′20″ E.

Type material:

Holotype: Female with egg-sacs, dissected and mounted in glycerine on five slides labeled as follows: *Halicyclops soqotranus* sp. n. (P_1) holotype, *Halicyclops soqotranus* sp. n. (P_2–P_3) holotype, *Halicyclops soqotranus* sp. n. (P_4) holotype, *Halicyclops soqotranus* sp. n. (A_{1-2}) holotype and *Halicyclops soqotranus* sp. n. (Urosome) holotype.

Paratypes: An adult female dissected and mounted in glycerine on three slides labeled *Halicyclops soqotranus* sp. n. (P_1–P_4), *Halicyclops soqotranus* sp. n. (A_1–A_2) and *Halicyclops soqotranus* sp. n. (urosome). Accession numbers of dissected material: COP 4456 A–C (holotype) and COP 4457 A–C (paratypes). Four other intact specimens in alcohol (COP 4458); two with egg-sacs are in one tube.

Repository of type material

The holotype and paratypes are deposited in the Koninklijk Belgisch Instituut voor Natuurwetenschappen, Brussels (KBIN) at accession number: IG 28732

Derivatio nominis: The species name is an adjective derived from the name of the Soqotra Archipelago.

Description of holotype:

Antennule (Fig. 7: A, C): 6-segmented; reaching middle of cephalosome.

Antenna: Only one group of tiny spinules on caudal side of basipodite (Fig. 7: B).

Labrum: Ventral side with a row of rounded teeth (Fig. 7: H).

Mandible (Fig. 7: F): Pars molaris with almost equal sharp teeth, mandibular palp with two long and hairy setae plus a small one, spinules present near mandibular palp.

Maxillula: Maxillular palp glabrous (Fig. 7: D).

Maxilla (Fig. 7: J): Inner side precoxa with two relatively small and hairy setae, outgrowth of coxa with two setae, proximal and distal parts of coxa with groups of strong spines, claw-like endite with a strong seta at basis, maxillary palp with four unequal setae.

Maxilliped (Fig. 7: E): Basal segment with two strong and hairy setae.

Thoracopods: 3-segmented, spine formula: 3–4–4–3; inner side of basipodite feathered; intercoxal sclerite glabrous.

P_1 (Fig. 8: A): Inner distal margin of basipodite lacking a spine.

P_2–P_3: As in Fig. 8 B, C respectively.

P_4 (Fig. 8: D): Unmodified setae on Exp_2 and Enp_3.

P_5 (Fig. 7: I, K): Spines equal in length.

P_6 (Fig. 7: G): Reduced to a seta and two small spines.

Urosome (Fig. 7: K ventral side, L dorsal side): Genital somite with short and truncate lateral hooks (Fig. 7: K).

Differential diagnosis

The species is obviously a member of the *Halicyclops thermophilus*-group. Group characters: genital somite with short and truncate lateral hooks, inner distal margin of basipodite P_1 devoid of a seta, inner distal margin of basipodite glabrous; intercoxal sclerite of P_1–P_4 naked, and unmodified setae on Exp_2 P_4 and Exp_3 P_4.

Halicyclops soqotranus sp. n. can be confused with *H. thermophilus* KIEFER, 1925 and *H. spinifer* KIEFER, 1935. However, its genital somite with short and truncate lateral hooks differs from that of *H. spinifer,* where these are long and pointed (KIEFER, 1935). It also differs from *H. thermophilus*, which has a genital somite with strong and pointed lateral hooks, intercoxal sclerite of P_1-P_4 provided with spines, Exp_2 P_4 with a modified long seta, Enp_3P_4 with two spine-like setae, inner distal edge basipodite P_1 with a seta, and caudal side of basipodite of P_1 with a row of spines (DUMONT and MAAS, 1987).

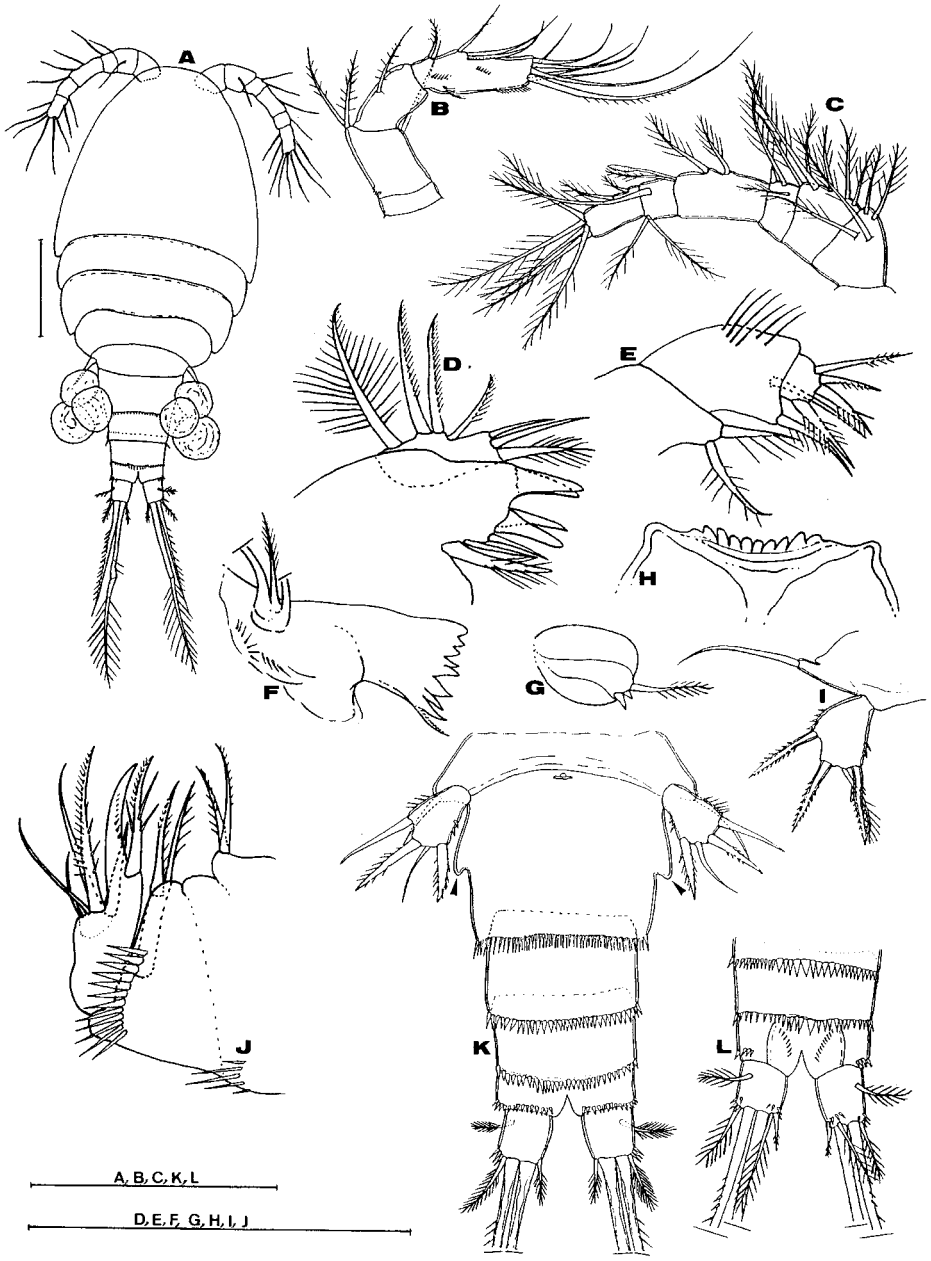

Figure 7. *Halicyclops soqotranus sp. n.*: A: Habitus; B: Antenna; C: Antennule; D: Maxillula; E: Maxilliped; F: Mandible; G: P_6; H: Labrum; I: P_5; J: Maxilla; K: Urosome and furca (ventral side); L: Furca (dorsal side).

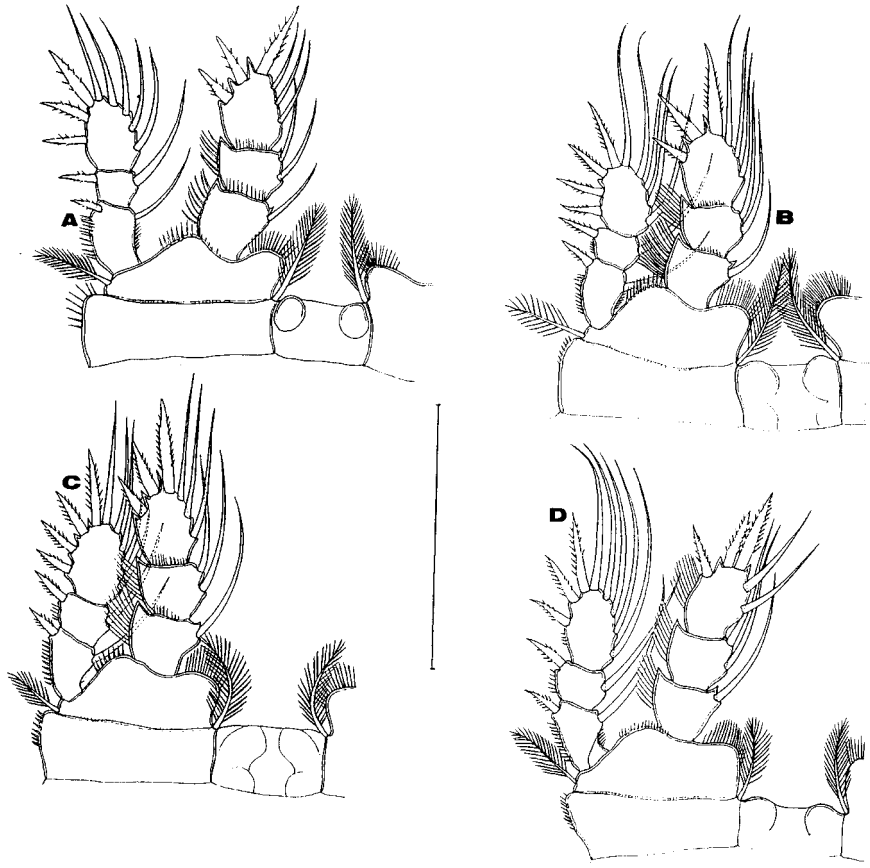

Figure 8. *Halicyclops soqotranus* sp. n. A: P_1; B; P_2; C: P_3; D: P_4.

Other species records

4. *Microcyclops* sp. aff. *varicans* (Figs 9 and 10)

Antennule (Fig. 9: A, C): 12-segmented.

Antenna: As in Fig. 9: F.

Thoracopods: 2-segmented, spine formula 3–3–3–3, inner side of basipodite feathered, intercoxal sclerite naked.

P_1 (Fig. 10: A, C): Inner distal margin of basipodite provided with a seta.

P_2: As in Fig. 10: B, E and P_3 as in Fig. 10: F, H.

P_4 (Fig. 10: G, I): Inner distal margin of coxopodite with a row of strong spines, Exp_1 devoid of a seta, spine pattern on caudal side of coxopodite as in Fig. 10: I.

P_5: Segment with a reduced spine implanted innerward of genital somite (Fig. 9: D; 10: D). Implantation of segment as drawn by CHAPPUIS (1922).

P_6 (Fig. 9: E): Reduced to a small seta plus two short and naked spines.

Urosome: P_5 implanted at apical edge of fifth metasomal somite, receptaculum seminis as in Fig. 9: D, anal operculum straight (Fig. 9: B).

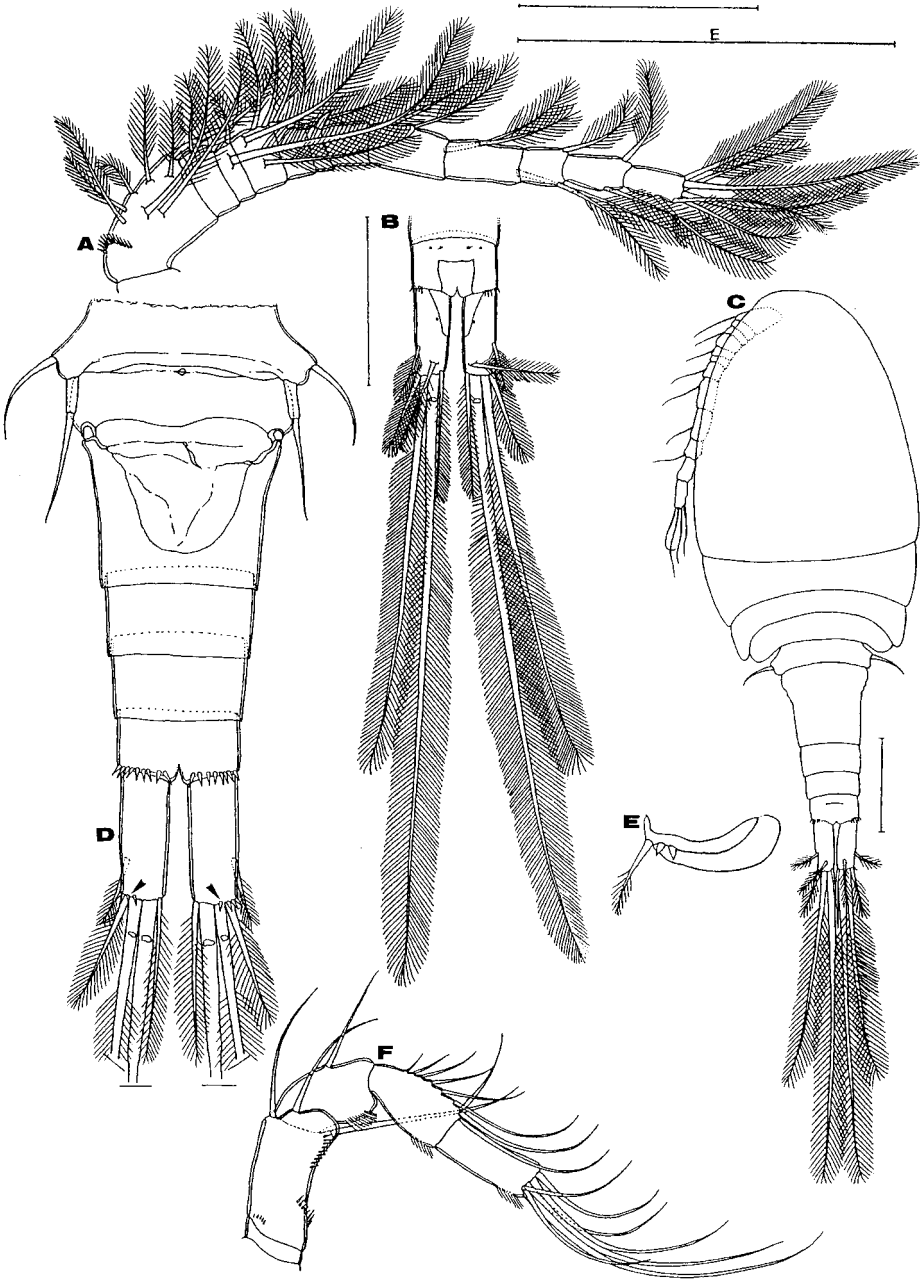

Figure 9. *Microcyclops* sp. aff. *varicans*: A: Antennule; B: Furca (dorsal side); C: Habitus; D: Urosome and furca (ventral side); E: P_6; F: Antenna.

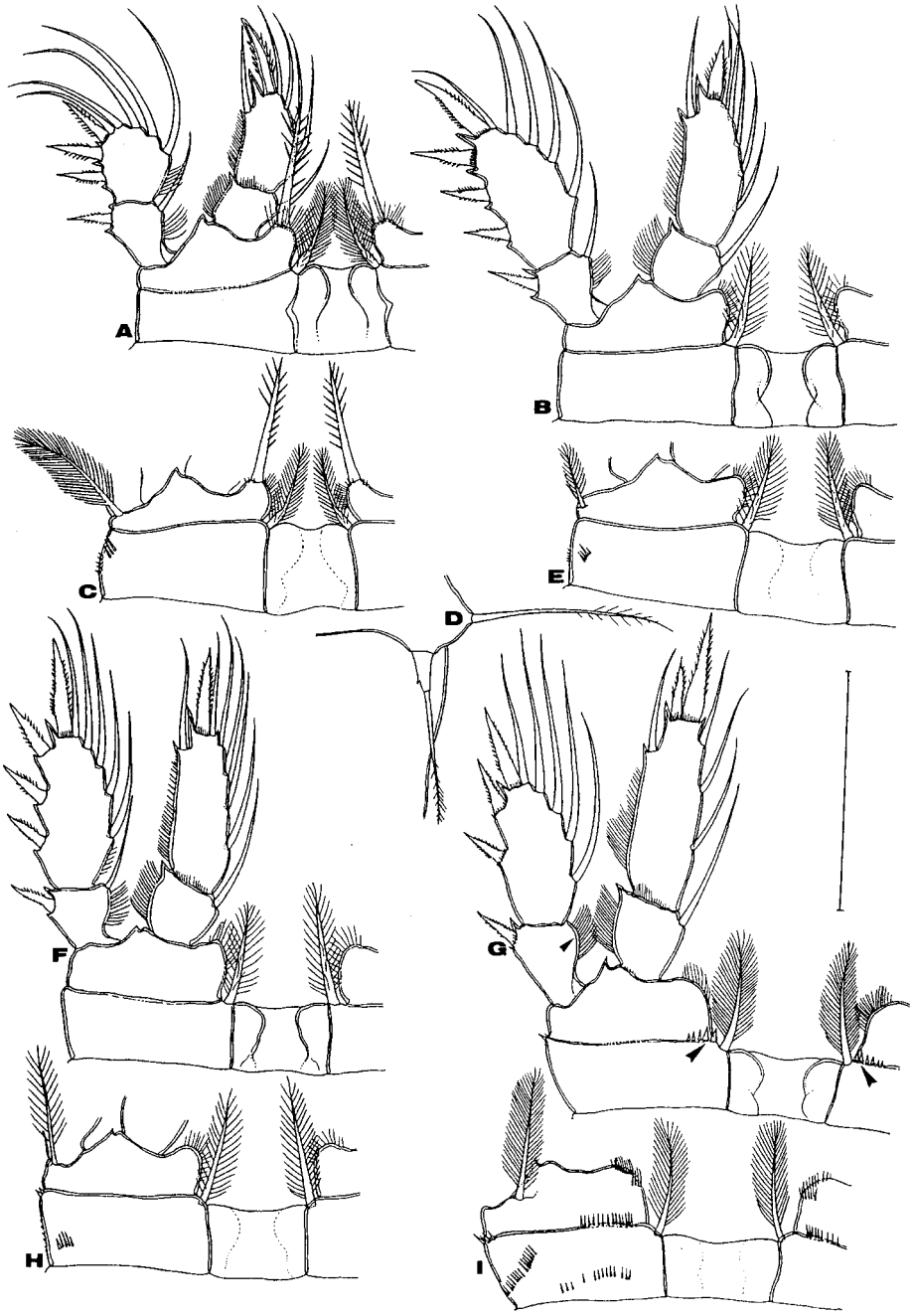

Figure 10. *Microcyclops* sp. aff. *varicans.* A: P_1 (frontal side); B: P_2 (frontal side); C: P_1 (caudal side); D: P_6; E: P_2 (caudal side); F: P_3 (frontal side); G: P_4 (frontal side); H: P_3 (caudal side); I: P_4 (caudal side).

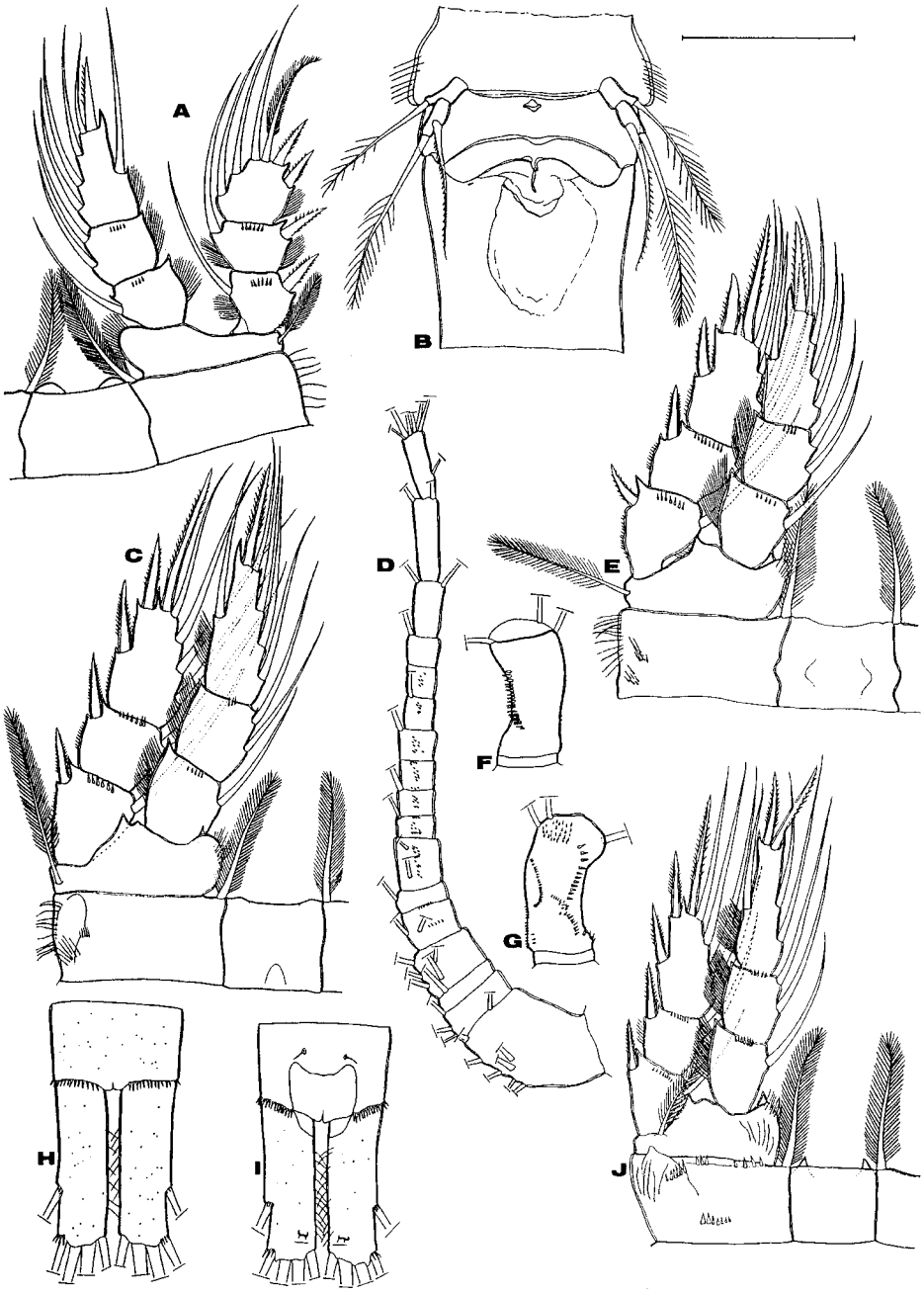

Figure 11. *Mesocyclops aspericornis*. A, C, E, J: Thoracopods (caudal side); B: Last metasomal somite, P_5 and genital somite, D: Antennule; F, G: Basipodite antenna (caudal and frontal sides, respectively); H, I: Anal somite and furca (ventral and dorsal sides, respectively).

Differential diagnosis

Microcyclops sp. aff. *varicans* is characterized by a row of strong spines on the frontal side of the inner distal margin of coxopodite P_4; Exp_1 P_4 devoid of a seta, and basis of furcal external seta surrounded ventrally by a row of spines (Fig. 9: D). It may represent a new species but we refrain from naming it in the absence of sufficient specimens; only two adult individuals were found.

5. *Mesocyclops aspericornis* (DADAY, 1906) (Fig. 11). The only *Mesocyclops* with a pantropical distribution (VAN DE VELDE, 1984). Only three, damaged specimens were present in our samples.

6. *Tropocyclops confinis* (KIEFER, 1930). a single specimen in material from Wadi Go'oh.

7. *Paracyclops* sp. Although only one specimen was found, the structure of P_5, allowed us to recognise the individual as belonging to the genus *Paracycylops*.

4. Conclusion

The cyclopoids present in a limited sample from Soqotra showed a dominance of genera with small-sized species and a limited species diversity. Common genera with large-sized species, such as *Afrocyclops*, *Eucyclops, Macrocyclops,* … were only represented by *Mesocyclops*. Whether this impression is truly representative of the fauna of this arid, isolated and virtually unstudied island remains to be confirmed by further collecting efforts. It is possible that seasonality, and especially the summer monsoonal rains influence the occurrence of cyclopoids on Soqotra. Because its mountain core has not been submersed since the Mesozoic, and because the island has been relatively little affected by man (no seaports, airports or large human settlements) (WRANIK, 1998), its aquatic fauna may be expected the more pristine than that of numerous other oceanic islands. The high proportion of endemism (up to 100%) in plant and animal groups that have no strong dispersing powers is well known (MILLER and BAZARA'A, 1998; WRANIK, 1998). It should therefore not be surprising to find that, of the seven copepod species recorded in the present paper, a minimum of three (but possibly five) species represent new taxa.

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