

Groundwater Copepods from the Western Part of Japan

(With 11 text-figures and 12 tables)

By Takashi Ito

The present paper is based on the copepod materials collected by Messrs. Yoshinobu MORIMOTO and Toshihiko YOKOTA of Himeji Municipal High School, Yoshifumi MIURA of Tatsuno High School and Dr. Toshihiko MIZUNO of Osaka Gakugei University, from the seven pools in "Akiyoshi-dô" Cave (Yamaguchi Prefecture) and nine wells in Wakayama, Hyôgo, Kôchi and Yamaguchi Prefectures in the western part of Japan.

I wish to express my thanks to Messrs. Y. MORIMOTO, T. YOKOTA, Y. MIURA and T. MIZUNO, who have kindly sent valuable materials for my study. I wish also to express many thanks to Dr. Masuzô UÉNO of the Ostu Hydrobiological Station, Kyoto University, for his kind advice.

LIST OF THE LOCALITIES AND THE SPECIES FOUND

The pools in "Akiyoshi-dô Cave, Yamaguchi Prefecture

(Collected by Y. MORIMOTO)

- No. 1 : A pool at the entrance of "Akiyoshi-dô" Cave ; 22-XI-1956 ; pH 7.6.
Eucyclops serrulatus (FISCHER) 3 ♀ ♀ ; Copepodid (Cyclopoida) 5 ; Harpacticoida 1.
- No. 2 : A pool at "Hironiwa" in "Akiyoshi-dô" Cave ; 22-XI-1956 ; pH 7.6.
Macrocyclus albidus (JURINE) 1 ♀ ; *Eucyclops serrulatus* (FISCHER) 9 ♀ ♀ , 7 ♂ ♂ ; *Paracyclops fimbriatus* (FISCHER) 1 ♀ ; Copepodid (Cyclopoida) 8.
- No. 3 : A pool at "Saruberi" in "Akiyoshi-dô" Cave ; 22-XI-1956 ; W. T. 16.4° C, pH 7.5. Destroyed.
- No. 4 : A pool at the entrance of "Taishô-dô" Cave ; 23-XI-1956 ; W. T. 16.4° C, pH 7.6.
Macrocyclus albidus (JURINE) 7 ♀ ♀ , 3 ♂ ♂ ; Copepodid (*Macrocyclus albidus* ?) 3.
- No. 5 : A pool at "Jigoku" in "Taishô-dô" Cave ; 23-XI-1956 ; W. T. 9.2° C, pH

7. 6.

Diacyclops disjunctus (THALLWITZ) 11 ♀ ♀, 4 ♂ ♂ ; Copepodid (Cyclopoida) 2.

No. 6 : A pool in "Terayama-ana" Cave ; 24-XI-1956 ; W. T. 14.8°C, pH 7.6.

Tropocyclops prasinus (FISCHER) 1 ♂ ; *Mesocyclops leuckarti* (CLAUS) 2 ♀ ♀ ; Copepodid (Cyclopoida) 2.

No. 7 : A pool at "Karakasa-senbon" in "Akiyoshi-dô" Cave ; 24-XI-1956 ; pH 7.6.

Macrocyclus albidus (JURINE) 1 ♀, 1 ♂ ; *Eucyclops serrulatus* (FISCHER) 34 ♀ ♀, 7 ♂ ; *Paracyclops fimbriatus* (FISCHER) 7 ♀ ♀, 2 ♂ ♂ ; *Mesocyclops leuckarti* (CLAUS) 8 ♀ ♀ ; Copepodid (Cyclopoida) 7.**Five driven wells in the vicinity of "Akiyoshi-dô" Gave**

(Collected by Y. MORIMOTO)

No. 8 : A driven well at Ôta, Mitô-chô, Yamaguchi Prefecture ; 23-XI-1956 ; W. T. 15.4°C, pH 7.6.

Diacyclops disjunctus (THALLWITZ) 8 ♀ ♀, 12 ♂ ♂ ; *Diacyclops languidoides* (LILLJEBORG) 9 ♀ ♀, 1 ♂ ♂ ; *Diacyclops languidoides japonicus* Ito 2 ♀ ♀ ; Copepodid (Cyclopoida) 20 ; Harpacticoida 2.

No. 9 : A driven well at Ôta Primary School, Mitô-chô, Yamaguchi Prefecture ; 23-XI-1956, W. T. 16.8°C, pH 6.8.

Eucyclops serrulatus (FISCHER) 1 ♀ ; *Diacyclops disjunctus* (THALLWITZ) 1 ♀, 2 ♂ ♂ ; Copepodid (*Diacyclops*) 1.

No. 10 : A driven well at National Rail-Road Bus Station, Mitô-chô, Yamaguchi Prefecture ; W. T. 17.2°C, pH 6.2.

Acanthocyclops morimotoi Ito 1 ♂ ; *Diacyclops disjunctus* (THALLWITZ) 1 ♀, 2 ♂ ♂ ; *Diacyclops languidoides* (LILLJEBORG) 1 ♀, 1 ♂.

No. 11 : A driven well at Kamaichi, Shûhō-chô, Yamaguchi Prefecture ; 24-XI-1956, W. T. 16.0°C, pH 6.4.

Macrocyclus albidus (JURINE) 12 ♀ ♀ ; *Eucyclops serrulatus* (FISCHER) 11 ♀ ♀, 5 ♂ ♂ ; *Tropocyclops prasinus* (FISCHER) 3 ♀ ♀ ; *Paracyclops fimbriatus* (FISCHER) 17 ♀ ♀, 5 ♂ ♂ ; *Diacyclops disjunctus* (THALLWITZ) 6 ♀ ♀, 4 ♂ ♂ ; *Diacyclops languidoides japonicus* Ito 3 ♀ ♀ ; Copepodid (Cyclopoida) 14.

No. 12 : A driven well at Kamaichi, Shûhō-chô, Yamaguchi Prefecture ; 24-XI-1956 ; W. T. 14.0°C, pH 6.8. Destroyed.

The north-eastern part of Hyogo Prefecture

(Collected by Y. MIURA)

No. 13 : A driven well at Kaibara High School, Kaibara-machi, Hyôgo Pref. 10-V-

1953 ; W. T. 13.0° C, pH 6.4.

Macrocylops albidus (JURINE) 1♂ ; *Eucyclops serrulatus* (FISCHER) 6♀♀, 8♂♂ ; *Diacyclops disjunctus* (THALLWITZ) 1♀, 1♂ ; *Diacyclops languidoides japonicus* Ito 5♀♀, 3♂♂ ; *Speocyclops yezoensis* Ito 1♀ ; Copepodid (Cyclopoida) 16 ; Harpacticoida 51.

Island Tomoga-shima

(Collected by T. MIZUNO)

No. 14 : A well on Island Tomoga-shima, Wakayama Prefecture.

Thermocyclops uénoi Ito ♀ abundant ; *Eucyclops serrulatus* (FISCHER) 4♀♀, 2♂♂ ; *Microcylops* (*Microcylops*) *varicans* (SARS) 1♂.

The Shikoku District

(Collected by T. YOKOTA)

No. 15 : A driven well at Asakura, Kôchi City, Kôchi Prefecture ; 24-VIII-1955 ; W. T. 23.0° C, pH 6.0.

Macrocylops albidus (JURINE) 1♀ ; *Diacyclops languidoides* (LILLJEBORG) 2♀♀ ; Copepodid (Cyclopoida) 2.

No. 16 : A driven well in Sagawa-machi, Kôchi Prefecture ; 23-VIII-1955 ; W. T. 22.0° C, pH 5.6.

Eucyclops serrulatus (FISCHER) 3♀♀ ; Harpacticoida 1.

OCCURRENCE AND REMARKS

1) *Macrocylops albidus* (JURINE) (Table 1)

Occurrence : Loc. No. 2 (1♀, 1.50 mm) ; No. 4 (7♀♀, 3♂♂ ; female 1.57~1.67 mm) ; No. 7 (1♀, 1♂) ; No. 11 (12♀♀, 1.67 mm) ; No. 13 (1♂, 1.18 mm) ;

Table 1. *Macrocylops albidus* (JURINE)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 1.50	92:40=2.3:1	322:112=2.9:1	89:33=2.7:1	76:83=0.9:1	No. 2
♀ 1.57*	112:43=2.6:1	372:124=3.0:1	112:40=2.8:1	74:87=0.9:1	No. 4
♀ 1.67	106:40=2.7:1	298:124=2.4:1	109:36=3.0:1	73:86=0.8:1	No. 11
♀ 1.18	79:31=2.5:1	298:87=3.4:1	79:30=2.6:1	53:69=0.8:1	No. 13

*) with egg-sacs

No. 15 (1♀).

In the specimens of the two caves, "Akiyoshi-dô" and "Taisho-dô", body dark brown in colour. On the other hand, in the well forms, somewhat faint, yellowish white in colour. Nauplius eye entirely absent in all specimens.

2) *Eucyclops serrulatus* (FISCHER) (Table 2)

Occurrence : Loc. No. 1 (3♀♀, 1.19~1.30 mm); No. 2 (9♀♀, 7♂♂; female 1.54 mm, male 0.91~0.93 mm); No. 7 (34♀♀, 7♂♂; female 1.20 mm, male 0.91 mm); No. 8 (1♀); No. 11 (11♀♀, 5♂♂); No. 13 (6♀♀, 8♂♂; female 1.29 mm); No. 14 (4♀♀, 2♂♂; femlae 1.07 mm); No. 16 (3♀♀).

Body yellowish brown in colour, without nauplius eye.

Table 2. *Eucyclops serrulatus* (FISCHER)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 1.30	139:26=5.3:1	89: 83=1.1:1	73:33=2.2:1	73:53=1.4:1	No. 1
♀ 1.19	132:26=5.1:1	86: 79=1.1:1	66:26=2.5:1	69:53=1.3:1	"
♀ 1.54*	175:30=5.9:1	112:102=1.1:1	87:37=2.4:1	99:87=1.1:1	No. 2
♂ 0.91	83:20=4.2:1	73: 53=1.4:1	53:23=2.3:1	56:46=1.2:1	"
♀ 1.39	142:26=5.5:1	79: 76=1.0:1	76:33=2.3:1	73:53=1.4:1	No. 7
♂ 1.24	86:18=4.8:1	43: 36=1.2:1	56:23=2.4:1	59:43=1.4:1	"
♀ 1.29	155:30=5.2:1	96: 79=1.2:1	73:28=2.6:1	73:59=1.2:1	No. 13
♀ 1.07	116:26=4.5:1	96: 73=1.3:1	69:26=2.6:1	69:53=1.3:1	No. 14

*) with egg-sacs

3) *Tropocyclops prasinus* (FISCHER) (Table 3)

Occurrence : Loc. No. 6 (1♂, 0.62 mm); No. 11 (3♀♀, female with egg-sacs 0.73 mm).

Body yellowish white in colour, without nauplius eye.

Table 3. *Tropocyclops prasinus* (FISCHER)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♂ 0.62	33:17=2.0:1	30:25=1.2:1	33:13=2.5:1	46:23=2.0:1	No. 6
♀ 0.73	36:17=2.1:1	43:36=1.2:1	36:13=2.8:1	56:26=2.2:1	No. 11

4) *Paracyclops fimbriatus* (FISCHER) (Table 4)

Occurrence : Loc. No. 2 (1♀, 1.19 mm); No. 7 (7♀♀, 2♂♂, female 0.99 mm);

No. 11 (17♀ ♀, 5♂ ♂, female 0.89 mm).

Body dark brown in colour, without nauplius eye.

Table 4. *Paracyclops fimbriatus* (FISCHER)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 1.19	158:26=6.0:1	96:73=1.3:1	53:30=1.8:1	76:36=2.1:1	No. 2
♀ 0.99	149:20=7.5:1	86:66=1.3:1	40:26=1.5:1	59:36=1.6:1	No. 7
♀ 0.89	122:17=7.2:1	66:59=1.1:1	40:20=2.0:1	53:26=2.0:1	No. 11

5) *Acanthocyclops morimotoi* Iro (Figs. 1~11, Table 5)

Male : Length 1.00 mm except furcal setae. Body yellowish brown in colour, Nauplius eye entirely absent. Furcal rami relatively slender, placed somewhat wide apart, 3.9 times as long as wide ; inner margins of furcal rami without hairs ; lateral seta located at distal about 1/3 ; lengths of furcal setae (from inner to outer and dorsal) as follows : 149 : 459 : 273 : 56 : 116 (μ). Innermost furcal seta markedly long, 3 times as long as the outermost seta, and much longer than furcal rami (about 3 : 1) ; dorsal seta nearly twice as long as the outermost one (Figs. 1~2).

First antenna as shown in Fig. 3. Second antenna consists of 4 segments. Legs 1~4 : formula 3, 3/3, 3/3, 3/3, 3 ; spine-formula 2, 3, 3, 3 ; seta-formula 4, 4, 4, 4 ; spine-formula in endopodite 1, 1, 1, 1 ; seta-formula in endopodite 5, 5, 5, 3. Endopodite 3 of leg 4 moderately broad, 1.8 times as long as wide, with a single apical spine, 33 μ in length, and without outer spine or seta ; the apical spine shorter than the segment (about 70%) (Figs. 4~8).

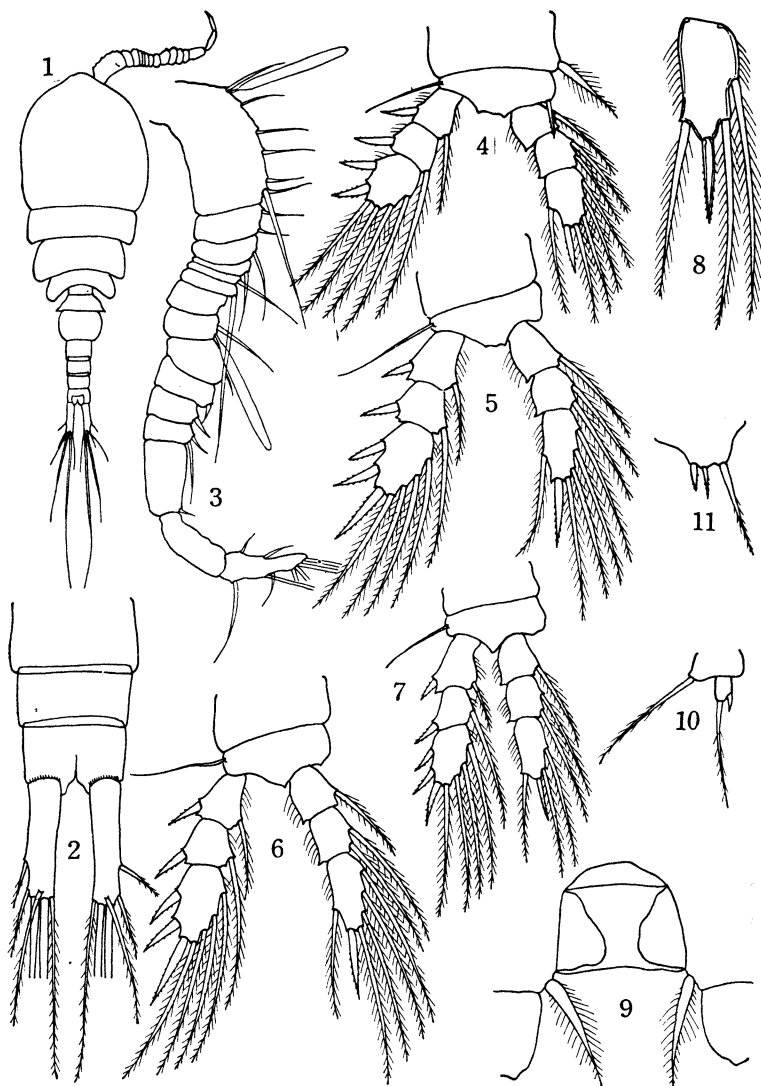
Connecting plate of leg 4 and leg 5 as shown in Fig. 9 and Fig. 10, respectively. Leg 6 with a stout, short inner spine and 2 outer setae ; the median seta scarcely longer than the inner spine, the outer seta much longer than the median one (about 3 : 1) (Fig. 11).

Occurrence : Loc. No. 10 (1♂).

Table 5. *Acanthocyclops morimotoi* Iro (male)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♂ 1.00	89:23=3.9:1	149:56=2.7:1	46:26=1.8:1	33 *	No. 10

*) absent



Figs. 1~11. *Acanthocyclops morimotoi* Iro
Male from a well in Yamaguchi prefecture.

- | | |
|--------------------------------|----------------------------------|
| 1. Male (dorsal) ; | 2. Abdomen and furca (ventral) ; |
| 3. First antenna ; | 4. Leg 1 ; |
| 5. Leg 2 ; | 6. Leg 3 ; |
| 7. Leg 4 ; | 8. Endopodite 3 of leg 4 ; |
| 9. Connecting plate of leg 4 ; | 10. Leg 5 ; |
| 11. Leg 6. | |

Remarks : In the preceding paper (Iro, 1954, Figs. 88~91, p. 392~293), the male described from a well in Aioi City, Hyôgo Prefecture under the name of *Acanthocyclops morimotoi* seems to be identical with *Megacyclops viridis* (JURINE), though bears more longer dorsal seta of furcal rami.

6) *Diacyclops disjunctus* (THALLWITZ) (Table 6)

Occurrence : Loc. No. 5 (11♀♀, 4♂♂, female 0.72~0.78 mm, male 0.61~0.69 mm) ; No. 8 (8♀♀, 12♂♂, female 0.84 mm, male 0.77 mm) ; No. 9 (1♀, 2♂♂, male 0.65~0.74 mm) ; No. 10 (1♀, 2♂♂) ; No. 11 (6♀♀, 4♂♂ ; female 0.91 mm) ; No. 13 (1♀, 1♂, female 0.75 mm, male 0.65 mm).

Body yellowish white in colour, without nauplius eye.

Table 6. *Diacyclops disjunctus* (THALLWITZ)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 0.78*	76:20=3.8:1	40:43=0.9:1	33:26=1.3:1	46:33=1.4:1	No. 5
♀ 0.72*	73:20=3.7:1	33:40=0.8:1	30:26=1.1:1	50:36=1.4:1	"
♂ 0.61	59:20=3.0:1	30:33=0.9:1	30:23=1.3:1	40:30=1.3:1	"
♂ 0.69	59:20=3.0:1	30:40=0.8:1	30:23=1.3:1	40:33=1.2:1	"
♀ 0.84	66:20=3.3:1	40:33=1.2:1	33:20=1.7:1	40:33=1.2:1	No. 8
♂ 0.77	73:18=4.0:1	56:30=1.9:1	30:20=1.5:1	28:23=1.2:1	"
♀ 0.91	106:18=5.9:1	56:40=1.4:1	36:26=1.4:1	36:26=1.4:1	No. 11
♀ 0.75	69:20=3.5:1	40:36=1.1:1	33:23=1.4:1	43:36=1.2:1	No. 13
♂ 0.65	69:17=4.1:1	50:30=1.7:1	26:20=1.3:1	36:26=1.4:1	No. 9
♂ 0.74	59:20=3.0:1	33:36=0.9:1	26:20=1.3:1	40:30=1.3:1	"

*) with egg-sacs

7) *Diacyclops languidoides* (LILLJEBORG) (Table 7)

Occurrence : Loc. No. 8 (9♀♀, 1♂, female 0.45~0.52 mm) ; No. 10 (1♀, 1♂, female 0.51 mm) ; No. 15 (2♀♀).

Body nearly white in colour, without nauplius eye.

Table 7. *Diacyclops languidoides* (LILLJEBORG)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 0.51	53:15=3.6:1	13:23=0.6:1	23:17=1.4:1	26:20=1.3:1	No. 10
♀ 0.45	40:13=3.1:1	13:23=0.6:1	20:15=1.3:1	20:15=1.3:1	No. 8
♀ 0.52	40:13=3.1:1	13:26=0.5:1	20:17=1.2:1	20:13=1.5:1	"

8) *Diacyclops languidoides japonius* Iro (Table 8)

Occurrence : Loc. No. 8 (2♀♀, 0.82 mm) ; No. 11 (3♀♀) ; No. 13 (5♀♀, 3♂♂).

Body almost white in colour. Nauplius eye entirely absent.

Table 8. *Diacyclops languidoides japonicus* Iro

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 0.82	79:20=4.0:1	46:43=1.1:1	30:20=1.5:1	33:26=1.3:1	No. 8

9) *Microcyclops (Microcylops) varicans* (SARS) (Table 9)

Occurrence : No. 14 (1♂).

Body nearly white in colour, without nauplius eye.

Table 9. *Microcyclops (Microcylops) varicans* (SARS)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♂ 0.56	43:17=2.5:1	56:43=1.3:1	50:20=2.5:1	30:17=1.8:1	No. 14

10) *Mesocyclops leuckarti* (CLAUS) (Table 10)

Occurrence : Loc. No. 6 (2♀♀) ; No. 7 (8♀♀, 1.47 mm) ;

Body yellowish brown in colour, without nauplius eye.

Table 10. *Mesocyclops leuckarti* (CLAUS)

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 1.47	132:35=3.8:1	277:97=2.9:1	86:33=2.6:1	96:79=1.2:1	No. 7

11) *Thermocyclops uénoi* Iro (Table 11)

Occurrence : Loc. No. 14 (female very common, male common, female 0.92~1.02 mm, male 0.71~0.80 mm).

Body yellowish white in colour, without nauplius eye.

12) *Speocyclops yezoensis* Iro (Table 12)

Female : Length 0.43 mm, not including furcal setae. Body somewhat flattened, dark brown in colour, nauplius eye entirely absent.

Table 11. *Thermocyclops uénoi* Iro

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 1.02*	116:26=4.5:1	109:76=1.4:1	69:23=3.0:1	63:40=1.6:1	No. 14
♀ 1.00*	116:26=4.5:1	109:76=1.4:1	69:23=3.0:1	63:43=1.5:1	"
♀ 0.92	86:23=3.7:1	99:56=1.8:1	63:20=3.2:1	63:40=1.6:1	"
♂ 0.80	89:20=4.5:1	89:50=1.8:1	59:23=2.6:1	50:36=1.4:1	"
♂ 0.71	79:20=4.0:1	63:43=1.5:1	56:20=2.8:1	56:33=1.7:1	"

*) with egg-sacs

Furcal rami very short, 1.2 times as long as wide ; lengths of furcal setae (from inner to outer and dorsal) as follows : 1 : 260 : 161 : 20 : 59 (μ). First antenna consists of 11 segments, not reaching to the end of cephalothorax. Second antenna of 4 segments.

Legs 1~4 : Formula 2, 2/2, 2/3, 2/3, 2 ; spine-formula 3, 4, 3, 3 ; seta formula 4, 3, 4, 3. Endopodite 3 of leg 4 moderately short, 1.2 times as long as wide ; the terminal spines unequal in length, the inner spine much longer than the outer one (1.8 : 1), and nearly as long as the segment (100%). Leg 5 consists of 2 segments.

Occurrence : Loc. No. 13 (1♀).

Remarks : This species was first described by the author (1954) from two wells at Samani-machi, Hokkaido. The present specimen collected from a well at Kaibara-machi, Hyôgo Prefecture is well identical with *Speocyclops yezoensis*, though having the rounded anal operculum.

Table 12. *Speocyclops yezoensis* Iro

Body-length mm	Furca μ	Furcal seta in. : out. μ	Endopod 3 Leg 4 L. : B. μ	Spines, endopod 3 Leg 4 in. : out. μ	Locali- ty
♀ 0.43	23:20=1.2:1	10:20=0.5:1	23:20=1.2:1	23:13=1.8:1	No. 13

S U M M A R Y

In the present paper are reported the following 12 groundwater species belonging to the Cyclopoid Copepoda which were collected in 16 localities, 9 driven wells and 2 limestone caves, "Akiyoshi-dô" and "Taisho-dô", in various districts in the western part of Japan, such as Hyôgo, Wakayama, Yamaguchi and Kôchi Prefectures.

Species	Caves "Akiyoshi-dô" and "Taisho-dô"	Wells
<i>Macrocyclops albidus</i> (JURINE)	+	+
<i>Eucyclops serrulatus</i> (FISCHER)	+	+
<i>Tropocyclops prasinus</i> (FISCHER)	+	+
<i>Paracyclops fimbriatus</i> (FISCHER)	+	+
<i>Acanthocyclops morimotoi</i> ITO		+
<i>Diacyclops disjunctus</i> (THALLWITZ)	+	+
<i>D. languidoides</i> (LILLJEBORG)		+
<i>D. languidoides japonicus</i> ITO		+
<i>Microcyclops (Microcyclops) varicans</i> (SARS)	+	+
<i>Mesocyclops leuckarti</i> (CLAUS)	+	
<i>Thermocyclops uénoi</i> ITO		+
<i>Speocyclops yezoensis</i> ITO		+

LITERATURE CITED

- ITO, T., 1952. Four new copepods from subterranean waters of Japan ; *Report of Faculty of Fisheries, Prefectural University Mie*, 1, 2, 115~120.
- , 1954. Cyclopoida copepods of Japanese subterranean waters ; *Ibid.*, 1, 3, 372~416.
- , 1957, Groundwater copepods from south-western Japan ; *Hydrobiologia*, 11, 1, 1~28.

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