

A NEW SPECIES OF *RIDGEWAYIA* (COPEPODA, CALANOIDA)
FROM THE GULF OF CARPENTARIA

B.H.R. OTHMAN AND J.G. GREENWOOD

Othman, B.H.R. and Greenwood, J.G. 1988 11 7: A new species of *Ridgewayia* (Copepoda, Calanoida) from the Gulf of Carpentaria. *Mem. Qd Mus.* 25(2): 465-469. Brisbane. ISSN 0079-8835.

Plankton collections in the Gulf of Carpentaria yielded two male specimens of a new species of copepod, *Ridgewayia flemingeri*, which is here described. The genus now contains 11 species, with the new species showing close similarity to *Ridgewayia typica* Thompson and Scott, 1903, and *Ridgewayia canalis* (Gurney, 1927). Males of *R. flemingeri* differ from all others of the genus in having numerous hairs on segments 11-17 of the right antennule, and in structure of the 5th legs.

□ *Copepoda, Calanoida, Ridgewayia, Gulf of Carpentaria, Australia*

B.H.R. Othman, 121 Jalan Athinahan Dua, Taman Tun Dr Ismail, 60000 Kuala Lumpur, Malaysia; J.G. Greenwood, Department of Zoology, University of Queensland, St Lucia, Queensland 4067, Australia; 1 January, 1987.

During studies of copepods from the Gulf of Carpentaria, two male specimens belonging to a new species of *Ridgewayia* were sampled. The species is described below. The specimens were taken in a net of mesh aperture size 140 μ m towed from near-bottom to the sea surface through 50 metres of water in stepped-oblique hauls. Specimens were examined and dissected in glycerine/water and drawings were made using a Leitz HM-LUX microscope with the aid of a camera lucida. Type specimens have been deposited in the Queensland Museum (QM).

***Ridgewayia flemingeri* sp. nov.**
(Figs 1 A-G, 2 A-F)

MATERIAL EXAMINED

HOLOTYPE: QM W12200 ♂♂ of total length 0.7 mm.

PARATYPE: QM W12201 ♂♂ dissected on two slides.

Both type specimens collected in plankton sample No. 8A2 at lat. 14°0.0'S, long. 141°25.5'E in the Gulf of Carpentaria on August 14th 1975 (see Rothlisberg and Jackson (1982) for sample details).

DESCRIPTION

Male: Length (TL) from anterior tip of prosome to extremity of furcal rami for 2 specimens is 0.63 and 0.70 mm. Prosome length to width ratio 2.28:1; prosome to urosome length ratio 2.51:1.

Body slender (Fig. 1 A,B) and more elongate than most other members of the genus. Head free from thorax. Fourth and 5th thoracic somites separated, 5th tapering into 2 symmetri-

cal, narrow and slightly pointed margins in dorsal view; in lateral view these margins smoothly rounded except for conspicuous notch on ventral surface (Fig. 1 B). Posterior corners of 5th somite extend to posterior end of genital segment.

Urosome 5-segmented, all somites symmetrical but vary in size. Proportional lengths of these somites are given in Table 1.

TABLE 1: Proportional lengths of urosomal somites and furcal rami.

Somites Proportions	1	2	3	4	5	furcal rami
	24	21	19	13	4	19 = 100

Anal operculum with dentate distal margin is visible from dorsal aspect. Each furcal ramus about 1½ times longer than broad, with 5 prominent setae: First seta (from inner margin) about length of urosome; 2nd seta very strong, extending about twice length of urosome; 3rd seta strong and slightly longer than 1st; 4th seta 0.5 × length of 3rd; 5th seta equal length to furca itself.

First antenna of similar length to prosome. Left antenna 26-segmented, right with 22 free segments. Proximal 2 segments of right antenna broad and long, 4 distal segments narrow and long (Fig. 1 C); segments 11-17 furnished with plumous hairs on surface.

Second antenna with both basipod and endopod 2-segmented. First basipodal segment

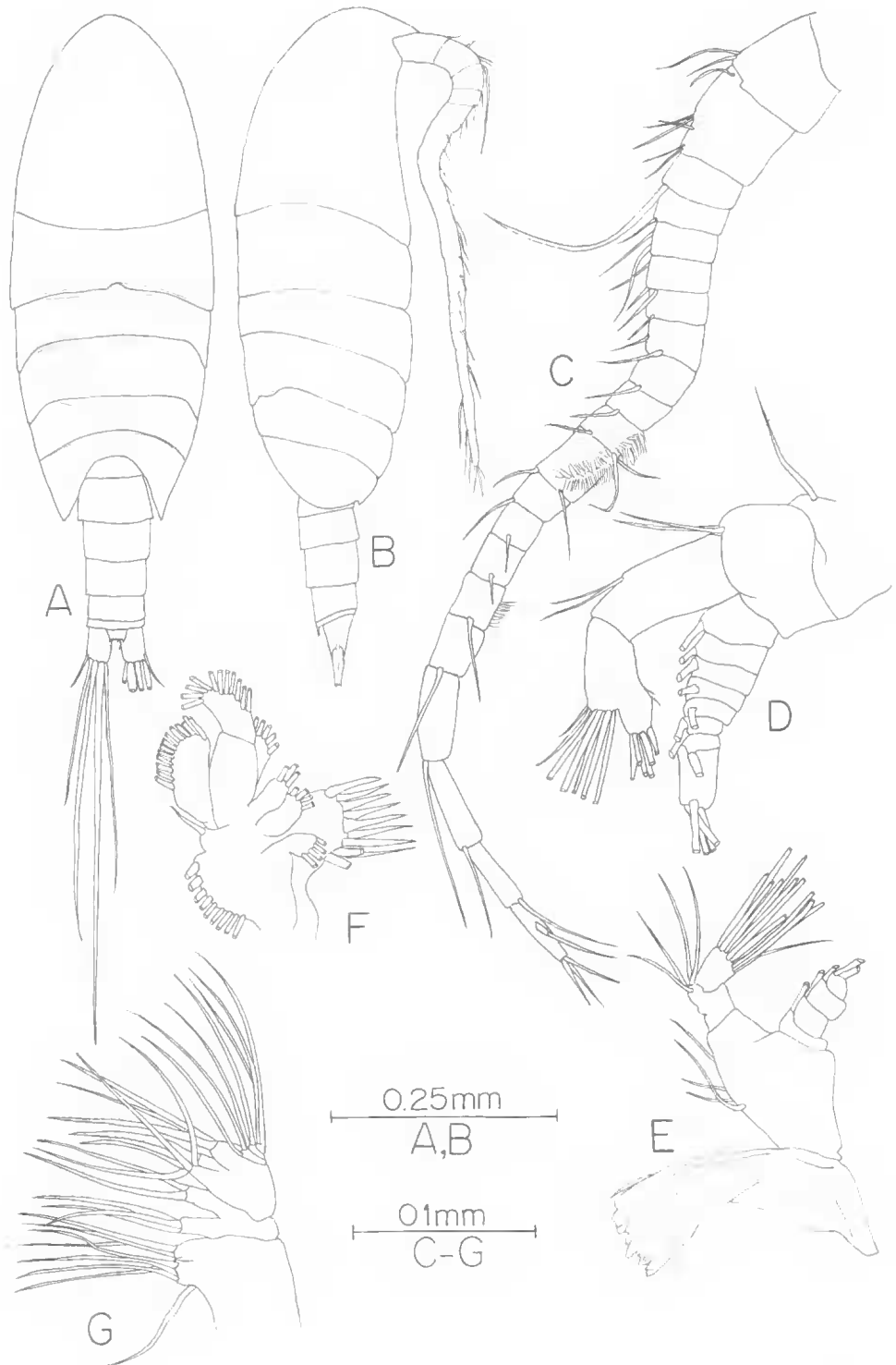


FIG. 1 *Ridgewayia flemingeri* sp. nov., male; A — dorsal view; B — lateral view; C — left 1st antenna; D — 2nd antenna; E — mandible; F — 1st maxilla; G — 2nd maxilla.

with one plumose inner distal seta; 2nd with 2 inner distal setae. First endopod segment $1\frac{1}{2}$ times length of 2nd, with 2 setae on inner margin about $\frac{1}{3}$ length from distal end; 2nd segment is 2-lobed, inner lobe with 8 setae of gradually increasing length from lateral to medial edge, except for most medial seta; outer lobe carries 6 terminal setae and 2 lateral spines at about $\frac{1}{3}$ length from distal end. Exopod is of similar length to endopod, with 8 segments; first 7 segments progressively smaller (length and breadth), each bearing single medial seta; apical segment 4 times length of preceding segment and with 4 terminal setae.

Mandibular palp with large triangular basipod with 4 medial marginal setae (Fig. 1 E). Exopod 4-segmented, lengths of segments similar except for short 1st segment; first 3 segments each with single distomedial seta; 4th segment with 2 long 1 short apical setae. Endopod 2-segmented, the segments of equal length; first segment slightly broader than 2nd, with 4 medial marginal setae; 2nd segment has 10 apical setae. Mandibular blade expanded at apex, with numerous irregular sized and blunt teeth.

Basipod on 1st maxilla (Fig. 1 F) with 9 lateral setae, and a distal lobe bearing a single short seta. Medial margin 4-lobed; first lobe broadest, with 9 strong plumose spines and 1 small submarginal seta; remaining 3 lobes small, of equal size, with 4, 4 and 3 terminal setae respectively. Exopod a single segment, with 13 setae along lateral margin. Endopod 2-segmented, 1st bearing 5 medial setae, 2nd with 11 apical setae.

Second maxilla has 3 distinct segments (Fig. 1 G). Medial margins of the first 2 segments each bear 2 lobes: Proximal lobe of 1st segment bears 4 apical and 1 basal setae, distal lobe has 3 setae; lobes on the 2nd segment bear 3 and 2 setae respectively. Third segment 3-lobed, proximal lobe with 5 setae, middle with 3 setae, apical lobe with 7 setae; two setae, (one seta on the proximal and one on the middle lobe) of the 3rd segments are noticeably stouter than the rest and have pectinated margins.

Maxilliped 7-segmented (Fig. 2 A): First segment largest, with 3 groups of setae (1 + 2 + 3) on the medial margin. Second segment slightly shorter and much narrower than 1st, row of fine hairs near proximal medial margin, 3 short setae more distally, distal end of segment with 2 long setae; third and 4th segments each bear 4 setae; fifth segment with 1 seta on the distolateral margin, 3 setae on medial

margin; sixth segment with 2 medial setae; seventh segment bears 4 terminal setae. Row of minute surface spines present on anterior surfaces of segments 4 and 5.

Basis of 1st leg with a curved seta on distomedial inner margin extending midlength of 2nd endopod (Fig. 2 B). First and 2nd exopodal segments with a strong lateral spine of equal length to segment; distal to each spine is a flattened club-shaped process, naked and small in segment 1, large and serrate in segment 2. Third exopodal segment with lateral spine about midlength of the segment, plus an apical and a terminal spine; terminal spine approx. combined lengths of last 2 exopodal segments. Medial margin of exopod with one seta each on 1st and 2nd segments, 3 on 3rd segment. Endopod has 1, 2 and 5 setae on medial margin of the 1st, 2nd and 3rd segments respectively; triangular process present on distal outer margin of segments 1 and 2; 3rd segment with short terminal spine and a short naked seta about midlength of lateral margin.

Second to 4th legs similar in numbers and positions of setae and spines (Fig. 2 C, D, E). First and 2nd exopodal segments with 2 spines on distolateral margin, the most lateral being 3 times length of other. Third segment with 3 apical spines; innermost spine longest, almost equal to segment; outermost spine about $\frac{1}{2}$ length of longest spine; central spine is minute. Third exopod segment with two lateral spines on 3rd and 4th legs, one on 2nd leg. Medial margins of exopods bears 1, 1 and 5 setae on 1st and 2nd and 3rd segments respectively.

Fifth leg complex (Fig. 2 F), both legs biramous, with 1-segmented endopod. Exopod 2-segmented in left, 3-segmented in right leg. Coxal segments of both legs fused, devoid of setae. Basis with a seta on anterior surface about $\frac{1}{3}$ length from proximal end; 2 obtuse spines on distal margin of this segment in left leg, one directed toward endopod the other toward exopod. Segments of left exopod unequal, the 1st being slightly longer and broader. Distolateral margin of 1st segment with a small spinous process, and a long spine with serrate margins, reaching to slightly beyond end of 2nd segment. Second exopod segment with spinous process and long serrate spine similar in shape but slightly longer than those of 1st segment. Exopod ends with 2 naked seta-like apical structures, one short, other longer than segment and extending beyond serrate spine. Endopod of similar length to exopod; lateral margin with

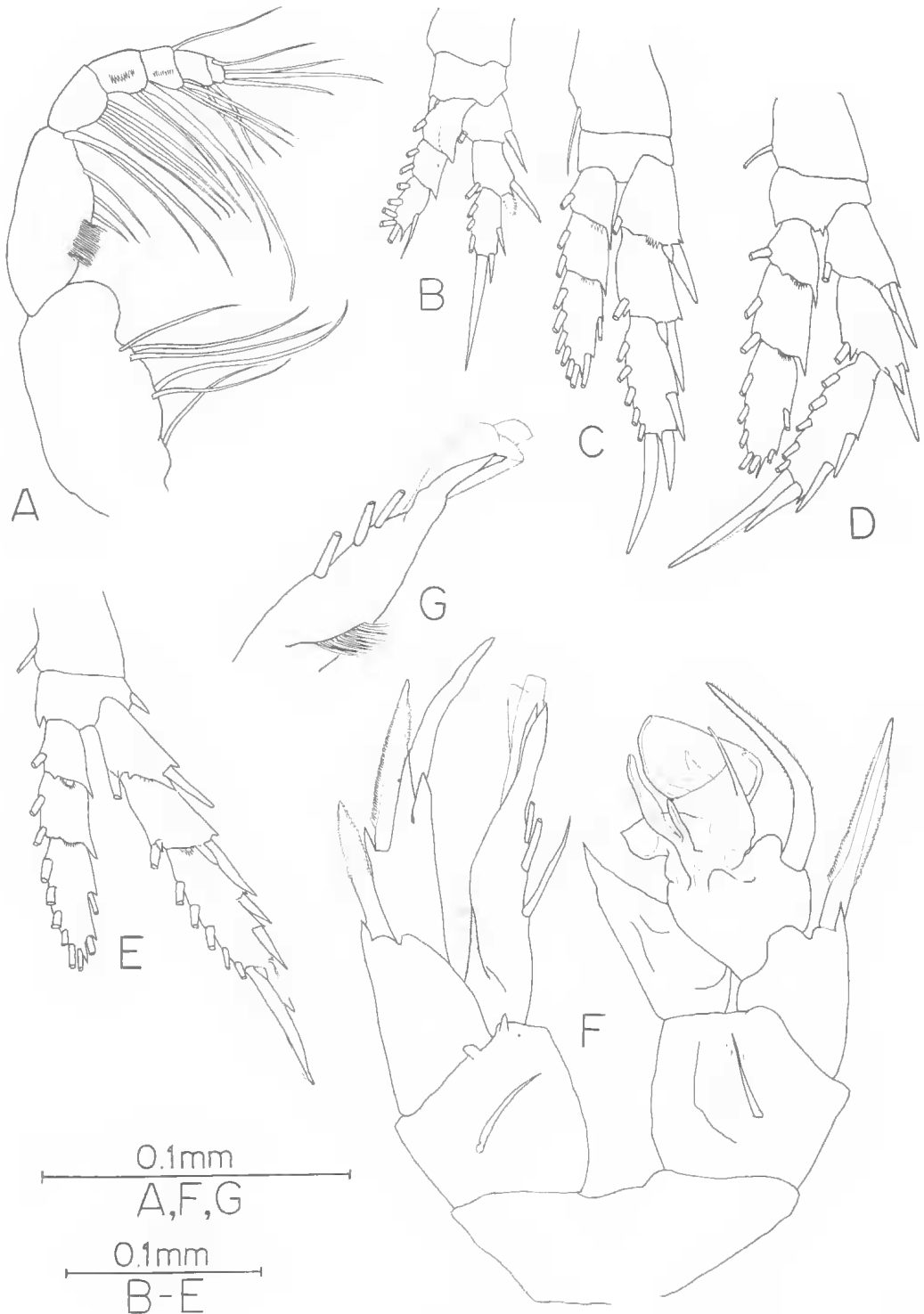


FIG. 2 *Ridgewayia flemingeri* sp. nov., male: A — maxilliped; B — 1st leg; C — 2nd leg; D — 3rd leg, E — 4th leg; F — 5th leg; G — terminal part of endopod of left 5th leg.

row of fine hairs proximally; medial margin bears 3 setae. Endopod terminates in 2 seta-like apical structures of equal length and a lobed lamellar sheath (Fig. 2 G).

Right fifth leg with seta on anterior surface of basipodite; 3 spinules also on this surface about ? length from distal end. First and 2nd exopodal segments of similar size; 1st segment with a minute stout spine on lateral margin at base of long serrate spine about twice length of segment; 2nd segment with strong medially curved spine distolaterally, reaching beyond tips of processes from 3rd segment; 3rd segment highly modified, having at least 4 membranous processes of various shapes and sizes. Endopod conical, tapering to very sharp point and extending to about the middle of the 3rd exopod segment.

ETYMOLOGY

The species is named in honour of the late Dr Abraham Fleminger of the Scripps Institute of Oceanography, La Jolla, USA for his overwhelming contributions to our knowledge of copepod taxonomy.

REMARKS

The family Ridgewayiidae was proposed by Wilson (1958) to accommodate a single genus *Ridgewayia*. Since then Fosshagen (1970) described two more genera, *Exumella* and *Placocalanus*, belonging to this family.

There are now 11 known species of *Ridgewayia*. The genus was first described by Thompson and Scott (1903) from the females of *Ridgewayia typica*. Later males of this species were described by Ummerkutty (1963). In her revision of the familial and generic placement of *Ridgewayia*, Wilson (1958) included Gurney's (1927) *Suezia canalis* and Esterly's (1911) *Lampoidopus marki* as members of this genus. The inclusion of the latter species was further substantiated by Yeatman's (1969) redescription of it. The following species are therefore now included in this genus: *Ridgewayia typica* Thompson and Scott, 1903; *Ridgewayia marki* (Esterly, 1911); *Ridgewayia canalis* (Gurney, 1927); *Ridgewayia gracilis* Wilson, 1958; *Ridgewayia shoemakeri* Wilson, 1958; *Ridgewayia krishnaswami* Ummerkutty, 1963; *Ridgewayia* sp. Yeatman, 1969; *Ridgewayia wilsoni* Fosshagen, 1970; *Ridgewayia* sp. Fosshagen, 1970, and *Ridgewayia fosshageni* Humes and Smith, 1974.

Ridgewayia flemingeri closely resembles *Ridgewayia typica* and *Ridgewayia canalis* in that the male right antennule is 22-segmented. *R. flemingeri* males differ from those of all other members of the genus in the presence of numerous hairs on segments 11-17 of the right antennae. The structure of the 5th leg, viz. the hirsute lateral surface of the left endopod and the pointed distal end of the right endopod, is unique in *R. flemingeri*.

ACKNOWLEDGEMENTS

We are very grateful to Dr P.C. Rothlisberg of the CSIRO Division of Fisheries Research, Cleveland, Australia for providing us with the plankton samples.

LITERATURE CITED

- ESTERLY, C.O. 1911. Calanoid Copepoda from the Bermuda Islands. *Proc. Amer. Acad. Arts Sci.* 47: 219-226.
- FOSSHAGEN, A. 1970. Marine biological investigations in the Bahamas 15. *Ridgewayia* (Copepoda, Calanoida) and two new genera of calanoids from the Bahamas. *Sarsia* 44: 25-58.
- GURNEY, R. 1927. Zoological results of the Cambridge expedition to the Suez Canal, 1924. XXXIII. Report on the Crustacea: — Copepoda (Littoral and Semi-parasitic). *Trans. Zool. Soc. London* 22: 451-577.
- HUMES, A.G. AND SMITH, W.L. 1974. *Ridgewayia fosshageni* n. sp. (Copepoda: Calanoida) associated with an actinarian in Panama, with observations on the nature of the association. *Can. J. Sci.* 14: 125-139.
- ROTHLISBERG, P.G. AND JACKSON, C.J. 1982. Temporal and spatial variation of plankton abundance in the Gulf of Carpentaria, Australia 1975-1977. *J. Plankton Res.* 4(1): 19-40.
- THOMPSON, I.C. AND SCOTT, A. 1903. Report on the Copepoda collected by Professor Herdman, at Ceylon, in 1902. *Ceylon Pearl Oyster Fish., Supp. Rep.* 7: 227-307.
- UMMERKUTTY, A.N.P. 1963. Studies on Indian copepods - 7. On two calanoid copepods. *Ridgewayia typica* Thompson and Scott and *R. krishnaswami* n. sp. *Bull. Dept. Mar. Biol. Oceanogr. Univ. Kerala* 1: 15-28.
- WILSON, M.S. 1958. A review of the copepod genus *Ridgewayia* (Calanoida) with descriptions of new species from the Dry Tortugas, Florida. *Proc. U.S. natn. Mus.* 108: 137-179.
- YEATMAN, H.C. 1969. A redescription of copepod, *Ridgewayia marki*, with description of an unusual specimen. *J. Tenn. Acad. Sci.* 44: 7-10.