

Redescription of the shallow water calappid *Mursia spiridonovi* Karasawa, 2018 (Brachyura: Calappidae) from India

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ABSTRACT

Mursia spiridonovi Karasawa, 2018 known only from the western Indian Ocean, is the smallest species of the genus, measuring only 18 mm in carapace length. The species is redescribed from fresh material collected in Tamil Nadu in southern India. It is compared with similarly sized specimens of *M. bicristimana* Alcock and Anderson, 1894, all of which are immature. *Mursia spiridonovi* is characterised not only by its occurrence in shallow waters (less than 300 m depth) and small adult size but also by the prominently granular carapace and structure of the cheliped merus, male pleonal somites and gonopods.

KEYWORDS

Taxonomy, India, Lakshadweep, Gulf of Aden, Indian Ocean, Calappidae, redescription

INTRODUCTION

The Indo-West Pacific calappid genus *Mursia* Desmarest, 1823, currently contains 30 species (Galil, 1993; 2001; 2013; Crosnier, 1997; Galil and Spiridonov, 1998; Galil and Takeda, 2004; Takeda and Galil, 2005; Spiridonov and Apel, 2007; Ng *et al.*, 2008; Galil and Ng, 2009; Kumar *et al.*, 2013; Karasawa, 2018). Among them, three species have been known from India: *M. bicristimana* Alcock and Anderson, 1894, *M. curtispina* Miers, 1886, and *M. spiridonovi* Karasawa, 2018 (replacement name for *M. minuta* Spiridonov and Apel, 2007) (Trivedi *et al.*, 2018).

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The taxonomy of the Indian species has been constantly changing over the last few decades, with most of the problems associated with the poorly known *M. bicristimana*. Spiridonov and Apel (2007) reappraised the taxonomy of this species using fresh material and argued that Galil's (1993) concept of *M. bicristimana* was mixed, and in the process, recognised a new species, *M. minuta*, from Sri Lanka, Laccadives (Lakshadweep) and the Gulf of Aden. Kumar *et al.* (2013) examined fresh material from Kerala in India and clarified the identity of *M. bicristimana s. str.*, and decided that Spiridonov and Apel's (2007) material of "*M. bicristimana*" from the Arabian Sea should be referred to a new species, *M. arabica* instead. As a result of this reappraisal, Kumar *et al.* (2013) also synonymised *M. xianshengi* Lai and Galil, 2006, from the Andaman Sea with *M. bicristimana s. str.*

Kumar *et al.* (2007: 285) recorded *M. curtispina* from Kerala in India and this was followed by Trivedi *et al.* (2018: 32) who listed the species from India. Kumar *et al.* (2013) discussed the calappids from Kerala but made no mention of *M. curtispina*. The record of *M. curtispina* by Kumar *et al.* (2007) is a misidentification of *M. bicristimana* (based on the verification of a voucher specimen deposited in the Department of Aquatic Biology and Fisheries, University of Kerala, India) and we have seen no specimens of the species from India so far. The present paper redescribes and refigures *M. spiridonovi* Karasawa, 2018, on the basis of fresh specimens recently obtained from Tamil Nadu, India.

Material examined is deposited in the collections of the Department of Aquatic Biology and Fisheries, University of Kerala (DABFUK), Trivandrum, India, and the Zoological Reference Collection (ZRC), Lee Kong Chian Natural History Museum, National University of Singapore. Measurements provided are of the maximum carapace width (cw) and length (cl, including spines), in millimetres shown as "cw × cl". The abbreviations G1 and G2 are used for the male first and second gonopods, respectively.

SYSTEMATICS

Superfamily Calappoidea De Haan, 1833

Family Calappidae De Haan, 1833

Genus *Mursia* Desmarest, 1823

Type species. *Mursia cristiata* H. Milne Edwards, 1837

Mursia spiridonovi Karasawa, 2018

(Figs. 1–4)

Mursia bicristimana – Laurie, 1906: 355; Galil, 1993: 356 (part); figs. 1f, 3j, k, 5c, d (not *Mursia bicristimana* Alcock and Anderson, 1894).

Mursia minuta Spiridonov and Apel, 2007: 2870, figs. 2G, H, 4E, F, 8C, 10A–D, 11A, B, 12A, B; Trivedi *et al.*, 2018: 32; Suvarna Devi *et al.*, 2019: 493 (name preoccupied by fossil calappid *Mursia minuta* Karasawa, 1993)

Mursia spiridonovi Karasawa, 2018: 587 (replacement name).

Material. 1 male (23.9 × 14.6 mm) (ZRC 2019.0492), bycatch at Colachel port, approximately 12 km north of Muttom, Tamil Nadu, India, coll. Suvarna S. Devi, 4 March 2019; 1 ovigerous female (26.7 × 16.1 mm) (ZRC 2019.0511), 1 ovigerous female (28.4 × 18.1 mm) (DABFUK), Jeppiaar fishing harbour, Muttom, Kanyakumari district, Tamil Nadu, India, coll. Suvarna S. Devi, 30 January 2019.

Comparative material. *Mursia bicristimana* Alcock and Anderson, 1894 — 1 male (37.2 × 19.6 mm), 1 female (43.2 × 23.2 mm) (ZRC 2017.0134), Kollam port, Kerala, southern India, coll. fishermen, 20 March 2017; 1 male (76.4 × 46.2 mm), 1 ovigerous female (62.1 × 36.4 mm) (ZRC 2018.0880), Kollam harbour, Kerala, southern India, coll. fishermen, 20 March 2017; 3 males (75.7 × 43.9 mm, 80.1 × 47.4 mm, 78.9 × 46.9 mm) and 2 females (68.2 × 42.1 mm, 70.1 × 38.2 mm) (DABFUK 2018), Kollam harbour, Kerala, southern India, coll. fishermen, 2 February 2018; 2 males (82.2 × 49.6 mm, 73.5 × 41.8 mm) (ZRC 2017.0885), Tuticorin, Tamil Nadu, India, coll. trawl fishermen, March 2017; 1 male (75.0 × 42.2 mm) (ZRC 1999.0086) [holotype of *Mursia xianshengi* Lai and Galil, 2006], trawled from the Andaman Sea, off southern Thailand-Burma coast, 06°41.7'N 97°58.2'E, 342 m, coll. fishing vessels, 20 March 1989.

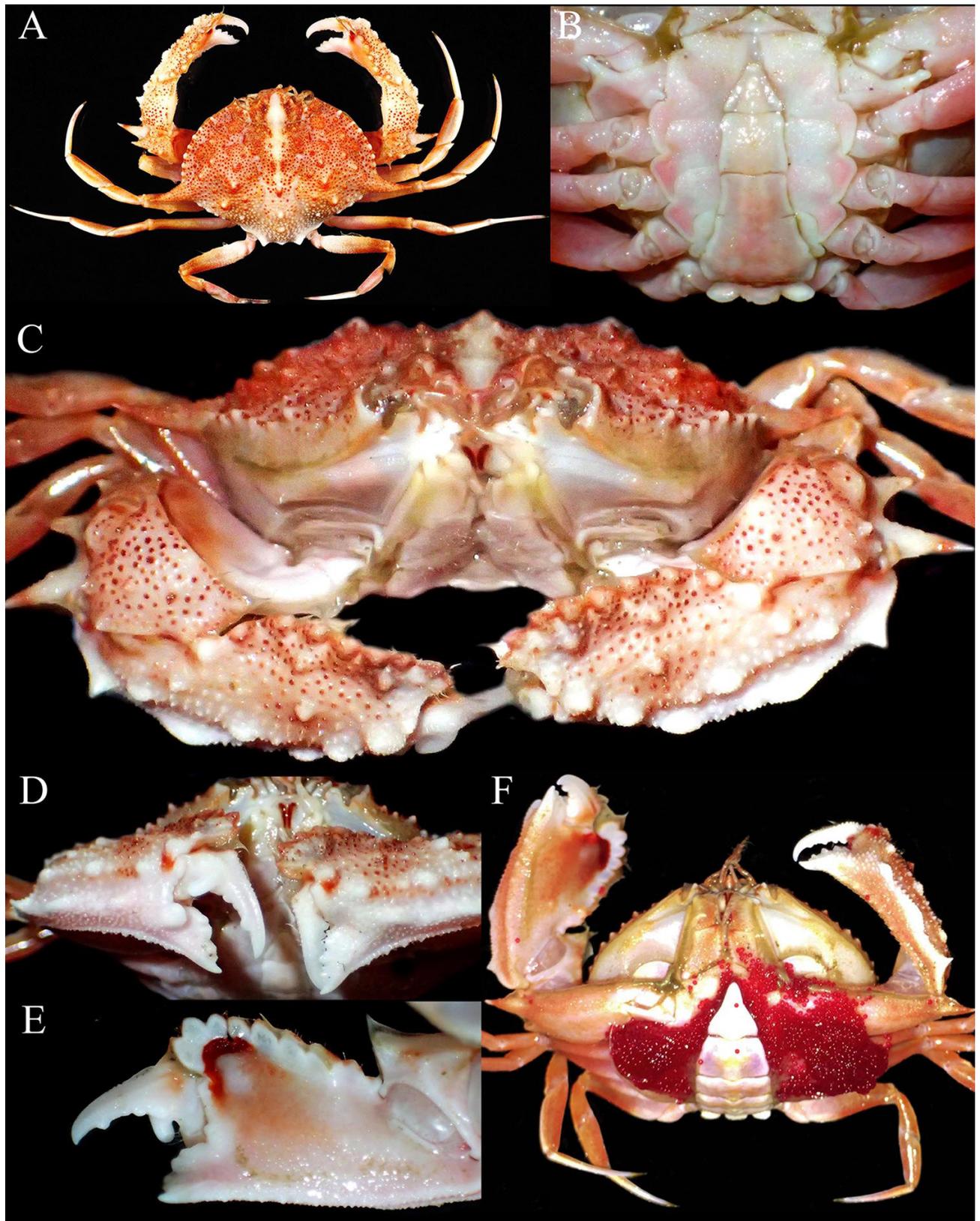


Figure 1. *Mursia spiridonovi* Karasawa, 2018, color in life. **A–E**, male (23.9 × 14.6 mm) (ZRC 2019.0492); **F**, ovigerous female (28.4 × 18.1 mm) (DABFUK). **A**, overall dorsal view; **B**, **F**, thoracic sternum and pleon; **C**, frontal view of cephalothorax and chelae; **D**, outer view of chelae; **E**, inner surface of right chela. Photographs: Chan T.-Y., P. K. L. Ng, Suvarna S. Devi.

Diagnosis. Small species, females ovigerous at 28.4 × 18.1 mm. Dorsal carapace surface with numerous prominent granules with regions well defined (Figs. 1A, 2E, F); gap between last two distal spines on merus of cheliped relatively narrow, acute (Fig. 2G); third short spine present on merus of cheliped (Fig. 2G); anterolateral teeth clearly defined (Fig. 2F); granules on posterolateral margin and the median lobe on posterior carapace margin distinct, relatively larger (Fig. 2F, H); granules on outer surface of chela, prominent granules with subventral ridge more undulating, rounded, with 2 clear lobes (Fig. 3E, F); outer surface of ambulatory merus distinctly granulated (Fig. 2H); male telson as long as broad (Fig. 3G); median lobe on male pleonal somite 2 convex (Fig. 3H); G1 relatively stouter, curved, tip sharper, opening very narrow, distal (Fig. 4H–J); distal part of G2 (flagelliform part) twisted twice with the extremity tapering laterally (Fig. 4K–N).

Description of males. Carapace transversely ovate, broader than long; dorsal surface unevenly convex, regions well defined by grooves, distinctly granular all over, granules on lateral and posterior parts proportionately larger; mesogastric region with 2 low larger median granules; metagastric, urogastric, cardiac and intestinal regions with 4 low median tubercles; branchial region with 4–6 low tubercles (Figs. 1A, 2E, F). Median frontal lobe broadly triangular with low, slightly acuminate to gently rounded lateral lobes; supraorbital margin deeply concave, with deep, prominent median fissure; external orbital tooth low, rounded; anterolateral margin with 10 or 11 distinct acuminate granules or teeth (excluding external orbital angle), those on distal two-thirds more dentiform, wider; lateral carapace spine prominent, slightly directed obliquely and posteriorly, surface covered with small granules and short spinules, distinctly less than half-width of carapace at base of spines; posterolateral margin sinuous, proximal third with 3 low, uneven lobes, rest of margin finely denticulate; posterior carapace margin with 2 prominent triangular lateral lobes and median, posteriorly directed intestinal protuberance shorter than lateral teeth (Figs. 1A, 2F). Eye short, peduncle stout, cornea large; completely covered by short, rounded orbits when retracted (Fig. 1C). Suborbital margin with deep, U-shaped cleft (Fig. 1C); suborbital and pterygostomial regions mostly smooth, separated by granulated ridge (Fig. 1C).

Chelipeds almost symmetrical, right slightly larger; outer surface covered with low tubercles and numerous small granules, inner surface smooth (Figs. 1A, C–E, 2E). Merus short, with 3 laterally directed, stout, spinule-covered spines on distal margin, outermost spine largest, innermost spine smallest, outer 2 spines separated by relatively narrow gap (Fig. 2G). Carpus subtriangular, outer surface with 3–5 low tubercles and numerous granules, inner distal angle with low triangular, non-spiniform tooth (Figs. 1A, C, 2E). Palm of chela with 9 lobiform teeth of various sizes on dorsal margin; inflated on median part, with 5 tubercles of different sizes, subventral ridge gently undulating, rounded, with 2 clear sections, posterior section larger, with hook-like tubercle basally; ventral margin lined with sharp granules, serrated (Figs. 1C–E, 3E, F). Right chela with distinct basal cutting teeth at base of propodus and dactylus, rest of cutting margins with blade-like teeth; dorsal margin of dactylus usually with low protuberance. Left chela similar to right chela except basal cutting teeth absent (Figs. 1C–E, 3E, F).

Ambulatory legs relatively short, laterally compressed. Merus with cristate margins, without subdistal spine; outer surface distinctly granular, especially on proximal ventral part (Fig. 2H). Carpus and propodus also with cristate margins, surface weakly granular. Dactylus distinctly longer than propodus, gently curved, slender, unarmed (Figs. 1A, 2E, H).

Thoracic sternum transversely narrow, surface generally smooth; sternites 1 and 2 completely fused, separated from fused sternites 3 and 4 by shallow sinuous suture; sternite 7 partially visible when pleon closed but sternite 8 completely covered; sternopleonal cavity deep, reaching to imaginary line joining anterior margins of coxae of chelipeds, but extending beyond edge of telson as shallow longitudinal channel reaching to suture between sternite 2 and 3 (Fig. 1B). Pleonal locking mechanism present as low tubercle on anterior edge of sternite 5. Pleon relatively narrow; somite 1 mostly hidden under posterior edge of carapace; somite 2 with distal part prominently lamellate, trilobed with margin of median lobe distinctly convex (Figs. 1B, 3G, H); somites 3–5 fused, somites 3 and 4 demarcated by short lateral cleft, somites 4 and 5 marked by deeper, longer fissure (Fig. 3G); telson as long as broad, almost equilateral in shape (Fig. 3G).

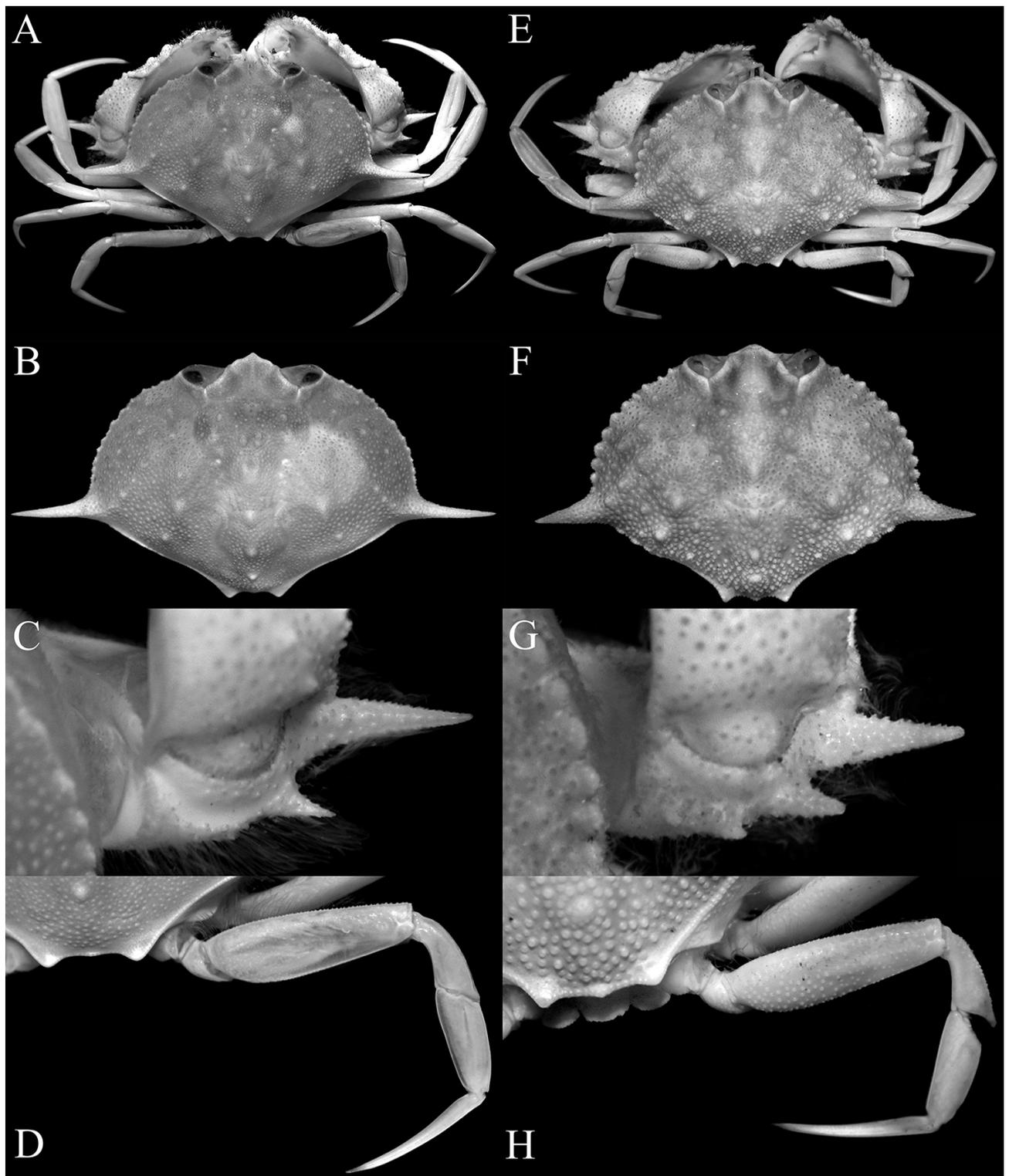


Figure 2. **A–D**, *Mursia bicristimana* Alcock and Anderson, 1894, young male (37.2 × 19.6 mm) (ZRC 2017.0134), **E–H**, *M. spiridonovi* Karasawa, 2018, male (23.9 × 14.6 mm) (ZRC 2019.0492). **A, E**, overall dorsal view; **B, F**, dorsal view of carapace; **C, G**, dorsal view of right distal margin of merus of right cheliped; **D, H**, posterior carapace margin and right fourth ambulatory leg.

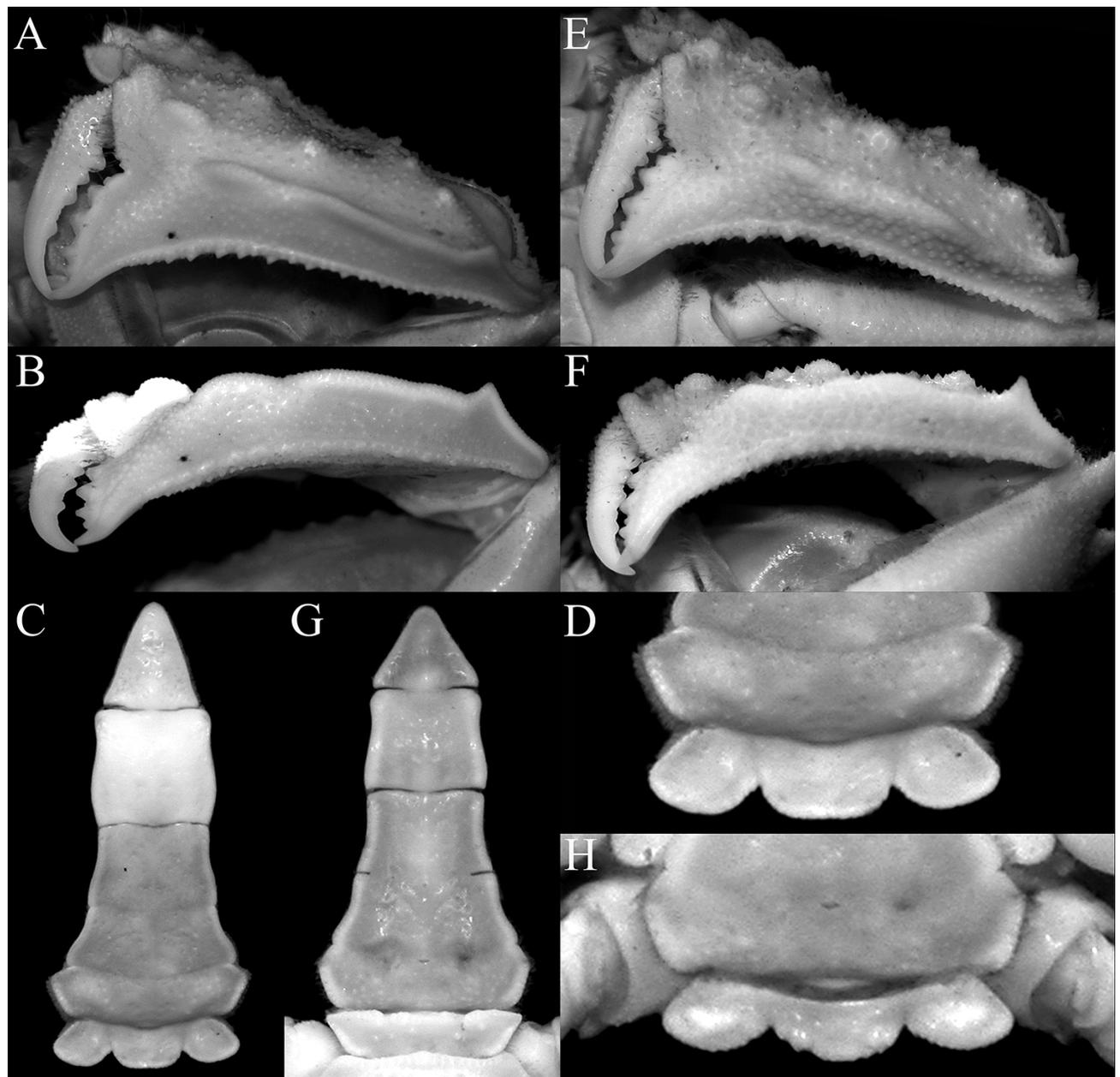


Figure 3. **A–D**, *Mursia bicristimana* Alcock and Anderson, 1894, young male (37.2 × 19.6 mm) (ZRC 2017.0134); **E–H**, *M. spiridonovi* Karasawa, 2018, male (23.9 × 14.6 mm) (ZRC 2019.0492). **A, E**, outer view of left chela; **B, F**, subventral view of left chela; **C, G**, pleon; **D, H**, pleonal somites 2 and 3.

G1 stout, distinctly curved, distal third almost straight, with sharper tip, narrow opening distally (Fig. 4H–J). G2 longer than G1; distal segment as long as basal segment, distal part flagelliform, prominently twisted twice with extremity tapering laterally (Fig. 4K–N).

Females. Similar to males except that the pleon is ovate and covers most of the thoracic sternum. In ovigerous females, the egg mass is large and extends

laterally beyond the base of the ambulatory legs (Fig. 1F). When freshly obtained, the eggs are small, less than 1.0 mm in diameter and bright red in color (Fig. 1F).

Color in life. The carapace is entirely orange on the dorsal surface, with a white longitudinal stripe medially in males (Fig. 1A), but in females, the white stripe is reduced to a spot. The inner margins of the mandibles are bright red (Fig. 1C). The upper half

of the chela has the granules orange to red, with the subventral ridge and outer lower surfaces all white (Fig. 1D); the inner surface of the chela has a bright red rim at the base of the dactylus (Fig. 1E). The thoracic sternum and abdomen are white with patches of pink (Fig. 1B).

Remarks. *Mursia spiridonovi* (as *M. minuta*) was described on the basis of the holotype male (28.0 × 17.1 mm) and a paratype female (25.4 × 16.8 mm) from the Gulf of Mannar in Sri Lanka as well as four other complete males (20.5 × 13.0 mm – 32.4 × 19.5 mm) and an ovigerous female (25.4 × 16.8 mm) from the Laccadives (Lakshadweep) and Gulf of Aden (see also Suvarna Devi et al., 2019). As the name *Mursia minuta* of Spiridonov and Apel (2007) was preoccupied by that of a fossil species, Karasawa (1993) provided a replacement name, *M. spiridonovi*. Spiridonov and Apel (2007: 2870) characterized the species by its small adult size (carapace width not exceeding 32.4 mm), hence its specific name. They commented that the juvenile material identified as *M. bicristimana* by Laurie (1906) and Galil (1993) is actually *M. spiridonovi*.

In contrast to almost all other *Mursia* species that occur in depths over 300 m (see Galil, 1993), *M. spiridonovi* appears to prefer shallower waters. Spiridonov and Apel (2007) noted that their specimens from the Gulf of Aden occurred on muddy sand bottom at depths of 83–87 m, while the Laccadives (Lakshadweep) material was collected from sandy and stony substrates at depths of 124–271 m. The two type specimens from the Gulf of Mannar were almost certainly from shallow waters as they were collected from pearl oyster banks. The present materials from Tamil Nadu were all obtained from waters shallower than 200 m. They were not collected with *M. bicristimana* which invariably comes from depths exceeding 200–300 m.

Comparisons between specimens of markedly different sizes are always difficult as we do not know the ontogenetic changes that take place during growth. Fortunately, we have on hand two small specimens of *M. bicristimana* that allow us to make suitable comparisons with *M. spiridonovi*. The differences are clear. *Mursia bicristimana* differs in possessing a relatively smoother carapace, with the granules and regions less marked and prominent (Fig. 2A, B) (versus

the granules on the carapace are large and strong, and the regions are better defined in *M. spiridonovi*; Fig. 2E, F); the gap between the last two distal spines on the merus of the cheliped is relatively wider (Fig. 2C) (versus it is narrower and acute in *M. spiridonovi*; Fig. 2G), a small third spine is visible on the merus of the cheliped in *M. spiridonovi* which is absent in *M. bicristimana* (Fig. 2C, G); the anterolateral teeth of the carapace are low and poorly defined (Fig. 2B) (versus they are clearly defined in *M. spiridonovi*; Fig. 2F); the granules on the posterolateral margin and the median lobe on the posterior margin of the carapace are low (Fig. 2B, D) (versus the granules and the median lobe are prominently larger in *M. spiridonovi*; Fig. 2F, H); the granules on the outer surface of the chela are small with the subventral ridge, which is distinct and sharp, forming only one lobe distally and the rest is almost entire (Fig. 3A, B) (versus the granules are prominent and the subventral ridge is more undulated and rounded, with two clear lobes in *M. spiridonovi*; Fig. 3E, F); the outer surface of the ambulatory merus is smooth (Fig. 2D) (versus it is distinctly granulated in *M. spiridonovi*; Fig. 2H); the male telson is distinctly longer than broad (Fig. 3C) (versus it is as long as broad in *M. spiridonovi*; Fig. 3G); the median lobe on the male pleonal somite 2 is truncate (Fig. 3D) (versus it is rounded and more convex in *M. spiridonovi*; Fig. 3H); the G1 is more slender with the distal part straighter, and the tip has a distinct, ovate subdistal opening (Fig. 4A–C) (versus the G1 is relatively stouter and more curved, with a sharper tip, and the opening is very narrow and situated distally in *M. spiridonovi*; Fig. 4H–J); and the distal section of the G2 flagelliform part is gently curved with a distinctly narrowed extremity which is directed downwards (Fig. 4D–G) (versus it is twisted twice with the extremity tapering laterally in *M. spiridonovi*; Fig. 4K–N). The G1 and G2 structures of *M. spiridonovi* agree very well with those figured by Spiridonov and Apel (2007: fig. 4D–F) (as *M. minuta*).

Mursia spiridonovi is thus a species clearly smaller than *M. bicristimana*. The two small females of *M. spiridonovi* on hand (26.7 × 16.1 mm, ZRC 2019.0511 and 28.4 × 18.1 mm, DABFUK) are ovigerous, while a female of *M. bicristimana* measuring 43.2 × 23.2 mm (ZRC 2017.0134) is still immature, with the pleon relatively narrow and the pleopods not developed.

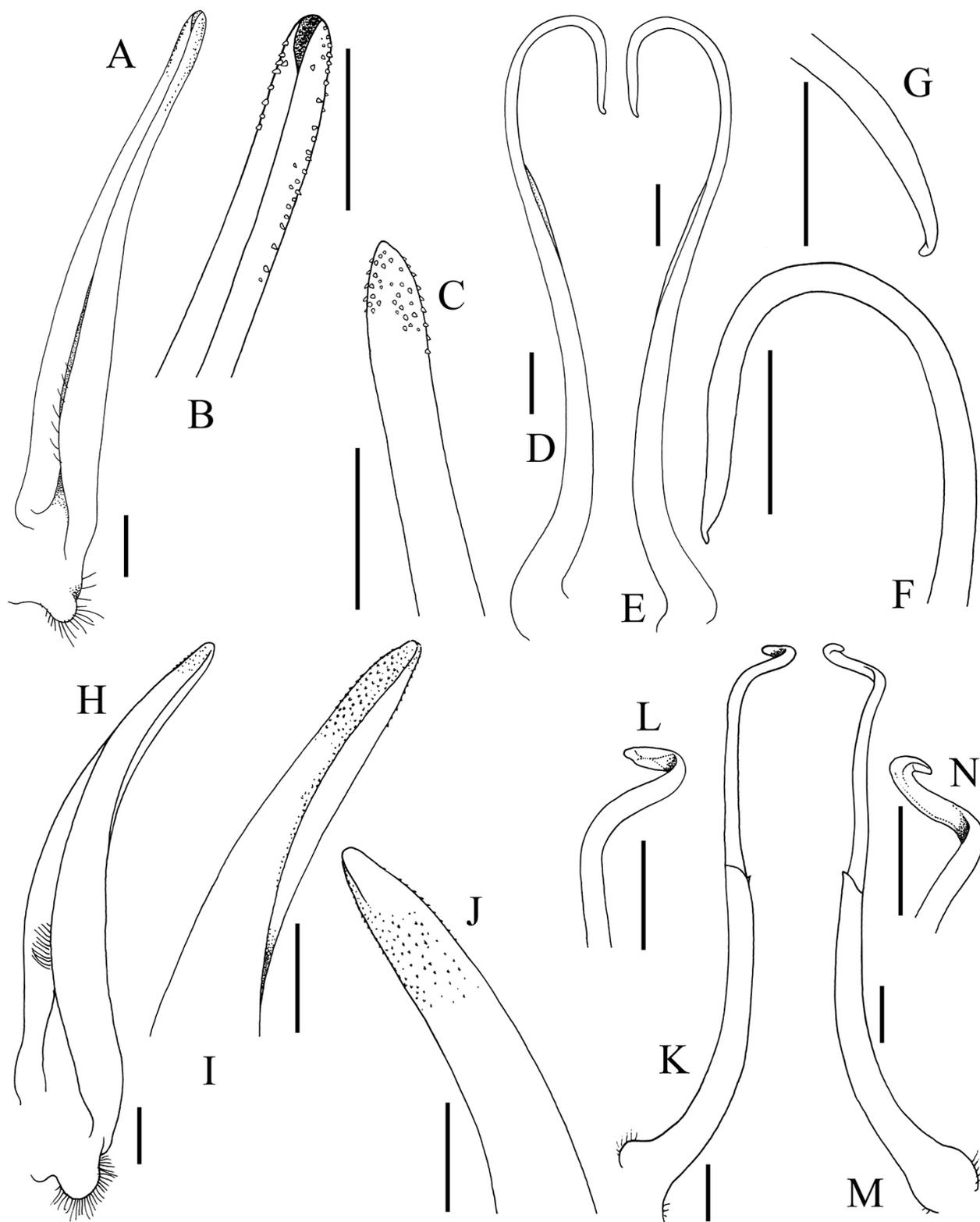


Figure 4. A–G, *Mursia bicristimana* Alcock and Anderson, 1894, young male (37.2 × 19.6 mm) (ZRC 2017.0134); H–N, *M. spiridonovi* Karasawa, 2018, male (23.9 × 14.6 mm) (ZRC 2019.0492). A, H, left G1 (ventral view); B, I, distal part of left G1 (ventral view); C, J, distal part of left G1 (dorsal view); D, K, left G2 (ventral view); E, L, distal part of left G2 (ventral view); E, M, left G2 (dorsal view); F, N, distal part of left G2 (dorsal view); G, distal part of left G2 (dorsomesial view). Scales = 0.5 mm.

The gonopods of a young male of *M. bicristimana* are figured here for the first time (Fig. 4A–G). The structures on the gonopods are not clearly developed, being not fully chitinized, and relatively soft, and most of the setae are absent. The G1 of the young specimen differs from that of adult specimens in being distinctly less curved (Fig. 4A–C versus Kumar et al., 2013: fig. 6). The G2 of the young specimen has the tip of the flagellum less dilated and not bilobed with the median part not dilated or spinose (Fig. 4D–G versus Kumar et al., 2013: fig. 7). The gonopods of “*M. bicristimana*” reported from the Gulf of Aden by Spiridonov and Apel (2007): fig. 4A–C) have been referred to those of another species, *M. arabica* (see Kumar et al., 2013).

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