A new species of hermit crab in the genus *Strigopagurus* Forest, 1995 (Crustacea: Anomura: Diogenidae) from the continental shelf off south-east Queensland, Australia

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ABSTRACT

A new species of hermit crab, *Strigopagurus fragarchela*, is described from the continental shelf off south-east Queensland. It can be separated from congeneric species by characters such as chelae shape, armature, and stridulatory plates; pereiopod shape and armature; and characteristic live colouration. Four endemic species are now known from Australia. A key is provided to all six species in the genus, and all are illustrated for easy comparison. New records of *S. bilineatus* Forest, 1995 are recorded, increasing its known southerly distribution.

The central Indo-West Pacific diogenid genus *Strigopagurus* Forest, 1995 currently contains five species: *S. strigimanus* White, 1847; *S. bilineatus* Forest, 1995; *S. boreonotus* Forest, 1995; *S. elongatus* Forest, 1995; and *S. poupini* Forest, 1995. Two of these, *S. strigimanus* and *S. elongatus*, are endemic to temperate southern Australia, while *S. bilineatus* is currently only known from off tropical Queensland (Davie 2002). The remaining two species have not been recorded in Australian waters. The known distribution of *S. poupini* is limited to French Polynesia, but the more widespread *S. boreonotus* could potentially occur in tropical Australian waters, as it has been recorded from the surrounding seas of southeastern Indonesia, the eastern Coral Sea, and New Caledonia. Recent trawl surveys of shelf waters off SE Queensland have brought to light numerous large, strikingly coloured *Strigopagurus* specimens that represent a further new Australian endemic species.

Strigopagurus is a sister genus to *Trizopagurus* Forest, 1952 and *Ciliopagurus* Forest, 1995. *Trizopagurus* was originally a catch-all genus, named for the 'curious formation' (Forest 1952) of stridulating rods present on the chelipeds of relevant specimens ('trizo' from the Greek τρίξιμο, meaning 'squeak'). It was split into three genera by Forest (1995), all of which are characterised by stridulatory ridges on the chelipeds, with increasingly developed stridulatory apparatuses separating *Trizopagurus*, *Ciliopagurus* and *Strigopagurus*, being most elaborate in the last (Forest 1995: 14). *Trizopagurus* now contains only three species, none occurring in the Indo-West Pacific region (two species in the tropical eastern Atlantic along the coast of West Africa, and one species in the central east Pacific off the Americas). *Ciliopagurus* is the largest genus, with 19 species: 18 found across the Indo-West Pacific region, and one from the eastern Atlantic (McLaughlin et al. 2010, Komai et al. 2012). The genus was named for fine hairs present on the chelipeds (Latin *cilium*, meaning 'eyelash'), while *Strigopagurus* is derived from the Latin *striga* (meaning 'furrow'), again referring to the stridulatory ridges present on the top of the chelae. However, as noted, this character also occurs across the other two genera, so is not an immediately diagnostic feature (for a comparison of the stridulatory crests across the three genera, see Figs 37–39 in Forest (1995)).

Stridulation in *S. strigimanus*, and in related genera and species in the same group, is produced by reciprocal flexion and extension of the carpo-propodite and mero-carpopodite joints of tightly apposed chelae (Field et al. 1987). Field et al. (1987) concluded that its sole purpose was defensive — both male and female hermits stridulated in response to attacks by a conspecific. They proposed that the kHz frequency and sound intensity produced by stridulation in the defending hermit may act as a form of sonic annoyance, irritating the attacker until it desists aggressive behaviour. Only one other hermit family (the terrestrial Coenobitidae) contains species known to stridulate. Species of *Coenobita* have been reported to produce a chirping sound by rubbing a longitudinal ridge, found on the lower margin of the dactylus of the second or third pereiopod, across a row of short crests on the cheliped propodus (Borradaile 1901, Field et al. 1987). Ball (1972) studied *C. compressus* H. Milne Edwards, 1836, and noted that, like *Strigopagurus*, stridulation was used defensively. More recently, Roberts (2021) also reported 'chirping' in *C. compressus* during agonistic interactions, but surmised that this sound was being caused by rubbing the uropod against the shell. Therefore, it seems that sound production in hermits, regardless of the mechanism, acts as a defensive response to attack. Stridulation in other crustaceans may serve other purposes, e.g. courtship or aposematism; sound production in brachyuran crabs has been extensively reviewed by Davie et al. (2015: 86–90).

Strigopagurus fragarchela sp. nov. is here attributed to *Strigopagurus* rather than *Ciliopagurus* because the chelipeds have characteristic acute, corneous-tipped spines on the carpi and chelae, and the males have pleopod 2 paired (unpaired in *Ciliopagurus*).

MATERIALS AND METHODS

Specimen size is indicated by shield length (sl), measured in the mid-line from the tip of the rostrum to the posterior margin of the shield.

Abbreviations: CSIRO: Commonwealth Scientific and Industrial Research Organisation; DAF: Department of Agriculture and Fisheries, Queensland; DPI: Department of Primary Industries, Queensland; MEQ: mid-east Queensland; NEQ: north-east Queensland; NSW: New South Wales; P2, P3: pereiopod 2, pereiopod 3; Qld: Queensland; QM: Queensland Museum; SEQ: south-east Queensland; sl: shield length.

TAXONOMY

Strigopagurus Forest, 1995

Strigopagurus Forest, 1995: 103–104; Davie, 2002: 56; Poore & Ahyong, 2023: 309.

Diagnosis: Diogenidae with 14 pairs of gills; pleurobranch present on thoracomere 8 above P5, and on thoracomere 5 above P2; well-developed arthrobranchs present on arthrodial membranes at bases of cheliped and maxilliped 3. Endopod of maxillule with prominently recurved external lobe. Ischium of maxilliped 3 with well-developed

crista dentata. Chelipeds similar in size and form, or left slightly larger; armed with acute, corneous-tipped spines on carpi and chelae; chelae with stridulatory plates developed on mesial face of palm, composed of close, corneous parallel ridges, distinctly grouped, largest plate distally placed adjacent to dactylar-propodal articulation; dactyl with similar short, ridged crests near inner base. P2 and P3 with dactyli longer than propodi; three distal segments armed dorsally with sharp, fine horn-pointed teeth. Males usually with pleopod 2 paired (except *S. elongatus*, where right pleopod absent), endopod well-developed, reduced or absent. Female pleopods unpaired. Maximum sl 37 mm. Subtidal–slope (3–580 m).

Key to species of *Strigopagurus*

(emended after Forest, 1995: 109)

1. Outer face of chelae bearing even covering of individual prominent sharp spines; without raised scutella **2**

   Outer face of palm with sparse, regular, short sharp spines, each placed near leading edge of raised scutella; each scutellum distally convex, with small spinules or sharp granules along edge. Chelipeds with dactyl and pollex bright crimson red to maroon; P2 and P3 with red dactyli armed with black-tipped spinules and black apical claw; ocular peduncles red with one white lateral stripe on inner edge ..... *S. fragarchela* sp. nov.

2. Main stridulatory band of chela less than twice as long as wide. Male with either a pair of pleopods, or a single left pleopod, on the 2nd pleonal somite; exopodite generally well-developed and leafy, with reduced endopod, and not modified as a copulatory organ (Fig. 6A–F) **3**

   Main stridulatory band of chela 2.5–3.5 times longer than wide. Males with 2nd pleopods always paired; endopodite modified into copulatory organ; exopodite rudimentary (Fig. 6G–O) **4**

3. Stridulatory apparatus barely reaching behind middle of palm. Male 2nd pleopods always paired. Maximum width of propodus of P2 ranging from 2.2–2.4 times length in adults. Red eye stalks with small white triangular basal spot just in front of eye scales; clear sub-corneal white edging; shield uniform reddish in colour, or with spots and lighter irregular markings. P2 and P3 reddish with yellowish spots on merus. ..... *S. strigimanus* (White, 1847)

   Stridulatory apparatus extending backwards onto proximal third of palm. Male with only 2nd left pleopod present. Maximum width of propodus of P2 2.5–3.0 times length in adults. Dorsal face of eye stalks with two white longitudinal lines extending from base to beneath cornea; sometimes diffuse white spots on shield and thoracic appendages ..... *S. elongatus* Forest, 1995

4. Dactylus of left P3 about twice length of propodus. Length of endopodite of male 2nd pleopods approximately 3.6 times maximum width. White eye stalks with two red lateral bands. Shield and thoracic appendages faintly reddish in colour. ..... *S. bilineatus* Forest, 1995

   Dactylus of left P3 less than 1.7 times length of propodus. Length of endopodite of male 2nd pleopods approximately 4.5 times maximum width **5**

5. Length of endopodite of male second pleopod about 3/5 length of protopodite. Red eye stalks with a broad white dorsal stripe over whole length; white spots on shield and on all pereiopods ..... *S. boreonotus* Forest, 1995

   Length of endopodite of male second pleopod about 2/3 length of protopodite. Red eye stalks with or without white spots; light narrow smudge, but no white edging under cornea; reddish shield marked with white spots; all pereiopods also with white spotting. ..... *S. poupini* Forest, 1995

Strigopagurus fragarchela sp. nov.

(Figs 1, 2, 3F, H, 4E, J, 5K, L, 6N, O)

Material examined: *Holotype:* QM-W29653, male (sl 13.9 mm), c. 10 km off Cape Moreton, SEQ, 27°S, 153°30'E, trawl 146 m, commercial trawler bycatch, June 2020.
Paratypes: QM-W29645, male (sl 23.6 mm), 30 km east of Point Lookout, North Stradbroke Island, SEQ, 27°24'S, 153°51'E, trawl 260 m, G. Smith (DPI, Fisheries), 25/09/1982. QM-W27160, female (sl 12.9 mm), male (sl 17.5 mm) [both with missing or partially missing pleons]; eastern Qld, DPI, Fisheries, 2000 [no precise locality or date recorded].

QM-W29674, 2 females (sl 12.4; 14.0 mm), c. 50 km ENE of Mooloolaba, SEQ, 26°37'12"S, 153°39'E, trawl 165 m, Southern Seabed Biodiversity Team (CSIRO, QM, DAF), 17/10/2022. QM-W29601, 2 females (sl 10.8; 10.4 mm) 7 males (sl 9.2; 10.1; 10.5; 10.6; 10.7 [some legs broken and pleon detached] 11.9; 14.0 mm), c. 10 km off Cape Moreton, SEQ, 27°S, 153°30'E, trawl 146 m, commercial trawler bycatch, June 2020. QM-W29761, 1 male (sl 15.4 mm), ESE of Point Lookout, North Stradbroke Island, SEQ, 27°30'S, 153°43'12" East, trawl 120 m, Southern Seabed Biodiversity Team (CSIRO, QM, DAF), 17/10/2022 [DNA sample taken and preserved in 100% ethanol].

Description: Cephalothorax (Fig. 1C, E) depressed dorsoventrally. Shield length subequal to breadth; anterolateral margins convergent anteriorly; anterior margin between rostrum and lateral projections slightly concave; posterior margin narrowly truncate, with short median longitudinal suture; dorsal surface relatively flat, covered in randomly-sized shallow pits, three short oblique low crests laterally on posterior part bearing tufts of long setae, otherwise small patches of very short setae anteriorly and laterally. Rostrum obtuse, rounded, slightly exceeding lateral projections. Lateral projections also obtuse, unarmed. Thoracic sternites (Fig. 1G): anterior lobe of sixth thoracic sternite (adjacent P3) broadly sub-semicircular; eighth thoracic sternite (adjacent P5) with shallow groove anteriorly.

Ocular peduncles (Fig. 1B, C, E, F) equal in length, long and slender, 0.7 times as long as shield, c. 4.5 times longer than corneal width, cylindrical, slightly inflated basally, cornea slightly dilated; dorsal surfaces with rows of longer setae towards inner margin reaching corneal invagination, otherwise only few short, scattered setae. Ocular acicles proximally inflated, smooth, narrowly separated basally; distal projection narrowly triangular, sharply pointed, mesial margins nearly straight, sometimes with short subdistal accessory spine, lateral margins straight.

Antennular peduncles moderately long. Ultimate segment reaching slightly beyond cornea, c. 0.4 times as long as shield, and about 1.5 times length of penultimate segment, dorsally with scattered short to moderately long setae. Basal segment short; ventrodistal margin produced in blunt process; laterodistal margin evenly denticulate; lateral surface unarmed. Antennal peduncles reaching to about three-quarters length of ocular peduncles. Fifth segment slightly flattened dorsoventrally, with scattered tufts of very short setae. Fourth segment unarmed, with short setae. Third segment with small spine at ventrodistal angle and some tufts of setae. Second segment with dorsolateral distal angle produced, terminating in a spine and tuft of long setae; lateral margin unarmed; dorsomesial distal angle with minute spinule; anteromesial margin with stiff setae. First segment almost concealed by anterolateral margin of branchiostegite; small tooth distolaterally; ventrodistal margin denticulate. Antennal acicle (Fig. 1F) reaching proximal two-thirds of ocular peduncle, terminating in acute spine; mesial margin armed with row of 8–9 small spines, lateral margin with 2–3 small spines over distal half, including one subdistally; both margins with long setae. Flagellum slightly overreaching chelipeds.

Third maxillipeds with basis and ischium separated; basis smooth, unarmed; ischium with well-developed crista dentata, without accessory tooth; merus and carpus unarmed on dorsodistal margins; exopod broad (broadest at proximal one-third), uncalcified in lateral half.

Chelipeds subequal, identical in armature and ornamentation (Fig. 1A, H). Left cheliped with dactylus subequal in length to palm; cutting edge with long black corneous cutting margin on distal third, longer than that of fixed finger, and closing against molar of fixed finger; large white rounded molar immediately behind, followed by one smaller tooth; dorsomesial margin not defined, dorsal and mesial surface with irregular rows of small, corneous-tipped spines, and 3–5 short transverse rows of yellow corneous-tipped rods on proximal mesial surface, forming extension of stridulating apparatus from palm (Fig. 4E); ventral surface with 2–3 tufts of stiff setae, longest and thickest distally. Palm longer than carpus; without defined dorsolateral or lateral margins, lateral, mesial and ventral surfaces scutellated (Figs 1A, H, 3F, H), scutes well separated, each scute tipped with one prominent corneous-tipped spinule, and several

smaller spinules along raised distal edge; fixed finger without scutes, lateral and ventral faces armed with numerous corneous-tipped spines interspersed with stiff setae; superior mesial surface with a pattern of raised plates formed by conspicuous transverse rows of corneous-tipped rods forming stridulating apparatus (Fig. 4E, J). Stridulatory apparatus consisting of primary large broad distal plate behind dactylar articulation, extending to ventral half of mesial surface, where it is separated by a narrow sulcus from small ridged accessory plate; main plate consists of 19–20 closely spaced ridges, c. 2.2–2.3 times longer than wide; a series of shorter and narrower plates lie proximal to main plate, extending back over mesial surface; a series of five short plates, decreasing in size proximally, extend across uppermost, distal-most consisting of 7–9 ridges; a longer narrow plate extends ventrally behind main plate consisting of c. 13 ridges, and behind this are 3–4 short narrow plates of 5–6 ridges (Fig. 4E, J). Carpus 0.7–0.8 times as long as merus, subtriangular; dorsal, lateral and mesial surfaces scutellated, scutes on dorsal and lateral faces with one or two raised denticles on leading edge; inner dorsal margin with 5–6 conspicuous corneous-tipped spines; distal margin microscopically denticulate dorsally and laterally. Merus subtriangular; dorsal margin broadly arcuate, without conspicuous spines; mesial face smooth, glabrous; lateral, and to lesser extent ventral, surfaces covered in low, flattened smooth scutes, ovate ventrolaterally, becoming longer and straighter dorsally, each fringed along leading edge with very short setae, distodorsal surface with about 5 long transverse ridges becoming shorter posteriorly, distal-most ridge armed with a row of small corneous-tipped spines that become lower on each succeeding ridge, until appearing finely crenelated. Ischium with ventromesial margin minutely denticulate.

Ambulatory legs (Fig. 1, 2A, B, 5K, L) moderately long, second (P3) overreaching tips of chelipeds by 0.3 times length of dactyli; generally similar in armature and ornamentation. Dactyli 1.4–1.7 times longer than propodi, terminating in strong terminal claws, weakly curved in lateral view; dorsal surface defined by two rows of closely spaced, strong, brown, distally-directed spinules, lateral row mostly longer and more regular, mesial row less regular and more widely spaced; lateral and mesial faces covered in small spinous brown prickles, tufts of setae ventrally on each side; ventral surface mostly smooth. Propodi lateral and ventral faces scutellate, similar to chelipeds; dorsal-most scutes finely denticulated on leading edge, becoming fringed with very short setae ventrally; inner mesial face mostly smooth and glabrous; inner dorsal margin of P2 edged with conspicuous, rounded, distally-directed corneous-tipped spines. Carpi similar in surface appearance to propodi, inner dorsal margin of P2 similarly edged, with slightly larger distally-directed corneous-tipped spines. Meri also with similar scutellation, but smooth and without denticles, dorsal margins without spines on either leg, distolateral edge below articulation with 1–2 small denticles, ventral margin of P2 bearing numerous small denticles, ventral margin of P3 unarmed.

Fourth pereiopods (Fig. 2C) semichelate; dactylus somewhat curved distally, longer than palm, overreaching tip of fixed finger by 0.2 × length, terminating in small corneous claw, edged with comb of very short closely-spaced corneous spinules ventrally; preungual process absent. Propodus with enlarged, smooth, rounded tubercle on proximodorsal margin; propodal rasp very well developed, encompassing about two-thirds of lateral surface, consisting of small evenly-sized scales. Carpus dorsal margin edged with conspicuous distally-directed corneous-tipped spines. Tufts of stiff long setae present on dorsal surfaces of dactylus to merus and ventral surfaces of merus. Fifth pereiopods typically chelate.

Pleon of males with first pair of pleopods paired, followed by 3 unpaired left pleopods (third to fifth pleopods; length: fifth = fourth > third > second); exopods well-developed, endopods 0.2–0.3 × length of exopods, but reduced to stub on second pair (Fig. 6N). Female with 4 biramous unpaired pleopods, with both rami multi-segmented and well-developed. Uropods asymmetrical. Sixth pleonite (Fig. 2E) about 1.3–1.4 times longer than broad, divided into two parts by distinct transverse groove at posterior two-thirds; lateral grooves deep, narrow; posterior part with relatively wide, deep median groove, posterolateral margins unarmed. Telson (Fig. 2D, E) with posterior lobes unequal, left lobe becoming

greatly enlarged as size increases (Fig. 2D compared to 2E), broadly rounded, without obvious median cleft; margins unarmed, but edged with moderately long, stiff setae.

Colouration: Chelipeds with dactyl and pollex bright crimson red to maroon, cutting margins with long black corneous apical cusps in front of cream molars; propodus and carpus cream with distinctive red tubercles, ventral face cream; merus with rows of cream squamiform patches with red borders, ventral face mostly cream with faint pink tinge. Pereiopods 2 and 3 with red dactyli armed with black-tipped spinules and with black distal claws, ventral face red; propodi, carpi and meri with similar, but slightly less distinctive, cream squamiform patches with red borders, ventral face pinkish-cream. Ocular peduncles red with one white lateral stripe on inner edge. Ocular acicles red with several white patches, terminal spinule white with red band near tip. Antennular peduncles and shield pinkish-tan. Antennal and antennular flagella tan. Fourth pereiopods pinkish-tan, with reduced pattern of squamiform patches, and faint red tinge on dorsal edge of carpus. Fifth pereiopods pinkish tan. Telson pinkish-tan with reddish-pink tinges on corners of posterior segment. Setae gold (Fig. 1).

Shell use: Present material found in gastropod shells, mostly from Volutidae (*Amoria jansae, A. molleri, Ericusa sowerbyi, E. sericata*), but one from a species of Fasciolariidae (*Pleuroploca australasia*).

Distribution: So far only known from shelf waters off SEQ, Australia, at depths of 120–260 m.

Etymology: Name is derived from the Latin for 'strawberry' (Fragaria), combined with 'chela' to highlight the bright red colour of the claws. A suitable common name could therefore be the Strawberry-clawed Hermit. It is used here as a noun in apposition.

Remarks: The key presented here can be used to separate the six presently known species of *Strigopagurus*. Figures 3–5 are also provided to facilitate easy comparative identification, and should be used in conjunction with the key.

Strigopagurus fragarchela sp. nov. is immediately distinguished from other congeners because the outer faces of the cheliped and ambulatory legs are covered in raised scutella. This is particularly evident on the outer face of the chela, where *S. fragarchela* has each scutellum tipped with one prominent short spine, along with small spinules or sharp granules along the edge (Fig. 3F, H); whereas on the other species, the outer face of the chela bears an even covering of individual prominent sharp spines, and scutella are not present (Fig. 3A–E, G). Scutellation is also prominent on the outer faces of the walking legs, though not armed with strong spinules as on the chela scutes (Figs 5A, C, E, G, I compared to *S. fragarchela*, Fig. 5K).

The cheliped stridulatory apparatus is also distinctive, and this is a further clear indication of species isolation. In overall shape and size, the primary plate of *S. fragarchela* sp. nov. most closely resembles its southern counterparts, *S. strigimanus* and *S. elongatus*, but that of the new species is much broader medially and less tapering ventrally (Fig. 4J compared to Fig. 4F (*S. strigimanus*) and Fig. 4G (*S. elongatus*)). In the form of the male second pleopods (Fig. 6), *S. fragarchela* sp. nov. more closely approaches its northern counterpart, *S. bilineatus*, however in the new species the terminal segment of the exopod is relatively shorter and broader than in any of the other species. The endopod, though reduced to a stub, is also more prominent than in *S. bilineatus* (Fig. 6N).

Interestingly, all species are geographically and bathymetrically separated in occurrence (Forest 1995). Of the four Australian taxa, *S. strigimanus* and *S. elongatus* appear to be sister species. This is based on both being southern temperate species clearly separated by an east-west divide either side of the Bass Strait, and sharing a very similar pattern of stridulations on the chelae. *Strigopagurus elongatus* is found across the southern coast of Australia, west of 145°E, and into the Indian Ocean off southern Western Australia; *S. strigimanus* lives on the east Australian coast, from southern Tasmania as far north as northern NSW. *Strigopagurus strigimanus* appears to enter shallower depths (<100m) than other species within the genus, but can be found down to 385 m off Eden, southern NSW (37°S) (Graham et al. 1997).

Strigopagurus bilineatus is currently only known from a few localities off central and northern

Queensland, and from the greater depths of 250–350 m. Perhaps this depth profile could be temperature-related, with hermits favouring colder water at increasing depths with decreasing latitude; if so, it would support the idea of a temperate origin for the genus. *Strigopagurus boreonotus* has not yet been found in Australian waters, however it does have a wide distribution, including Japan, Indonesia, New Caledonia and the Coral Sea off Chesterfield Reefs. *Strigopagurus poupini* Forest, 1995 is only known from further east in French Polynesia (distribution map, Fig. 29, in Forest (1995)). It appears that *Strigopagurus* species may play an important ecological role as part of invertebrate scavenging guilds. This has been shown for *S. strigimanus* along the continental shelf of temperate eastern Australia by Lowry & Smith (2003). To reinforce this, a recent fisheries bycatch study (Miller & Liggins 2024) found that *S. strigimanus* is the largest bycatch species for the eastern rock lobster fishing fleet, with an estimated mean annual catch of nearly 315,000 (based on their 2008/2009 survey period). They also found that it co-occurs with another large dardanid, *Dardanus arrosor*, across much of its range, with *S. strigimanus* more abundant with increasing latitude, and *D. arrosor* conversely more abundant with decreasing latitude. *Strigopagurus strigimanus* disappears from trawl catches by the Clarence River region of northern NSW (29.4°S) (Graham & Wood 1997), but is replaced by *S. fragarchela* sp. nov. in southern Queensland waters.

***Strigopagurus bilineatus* Forest, 1995**
(Figs 3C, G, 4C, H)

Strigopagurus bilineatus Forest, 1995: 119–122, Figs. 27e, 34c, 35c, 36a, f; Davie, 2002: 56.

Material examined: *Holotype:* QM-W15805, male (sl 20.8 mm), off Dunk Island, NEQ, between 17.59°S, 147.02°E and 17.57°S, 147.00°E, trawl 250–252 m, P. Davie, R.V. Soela, 29.11.1985.
Paratypes: QM-W20773, 2 females (sl 17.9; 17.2 mm), off Dunk Island, NEQ, between 17.59°S, 147.02°E and 17.57°S, 147.00°E, trawl 250–252 m, P. Davie, R.V. Soela, 29.11.1985. QM-W29936, 1 male (sl 14.1 mm), east of Elusive Reef, Swain Reefs, MEQ, 21°10'12"S, 153°3'36"E, trawl 331 m, Southern Seabed Biodiversity Team (CSIRO, QM, DAF), 21.4.2023. QM-W17110, 1 female (sl 9.7 mm), SE of Elusive Reef, Swain Reefs, MEQ, 21°21'S, 153°5'E, trawl 300 m, M.V. Karumba Pearl, April 1988. QM-W29898, 1 female (sl 18.3 mm), SE of Elusive Reef, Swain Reefs, MEQ, 22°4'42.96"S, 153°46'28.92"E, trawl 296 m, Southern Seabed Biodiversity Team (CSIRO, QM, DAF) 29.9.2023. QM-W29893, 1 female (sl 9.0 mm), SE of Swain Reefs, MEQ, 22°28'12"S, 153°45'36"E, trawl 348 m, Southern Seabed Biodiversity Team (CSIRO, QM, DAF), 30.09.2023. QM-W29891, 1 male (sl 12.6 mm), ESE of Sweetlip Reef, Swain Reefs, MEQ, 22°36'S, 153°25'12"E, trawl 256 m, Southern Seabed Biodiversity Team (CSIRO, QM, DAF), 1.10.2023. QM-W10124, 1 female (sl 16.6 mm), 70 km SW of Swain Reefs, MEQ, 22°54' 5"S, 152°12' 5"E, trawl 351 m, Queensland Fisheries Service, 3.10.1980.

Remarks: The present material agrees perfectly with the original description and figures, and a re-examination of the type specimens lodged in the Queensland Museum collection confirms the identification. These new samples mark both a small southerly range extension, and a small depth extension, from 250–300 m to 250–351 m.

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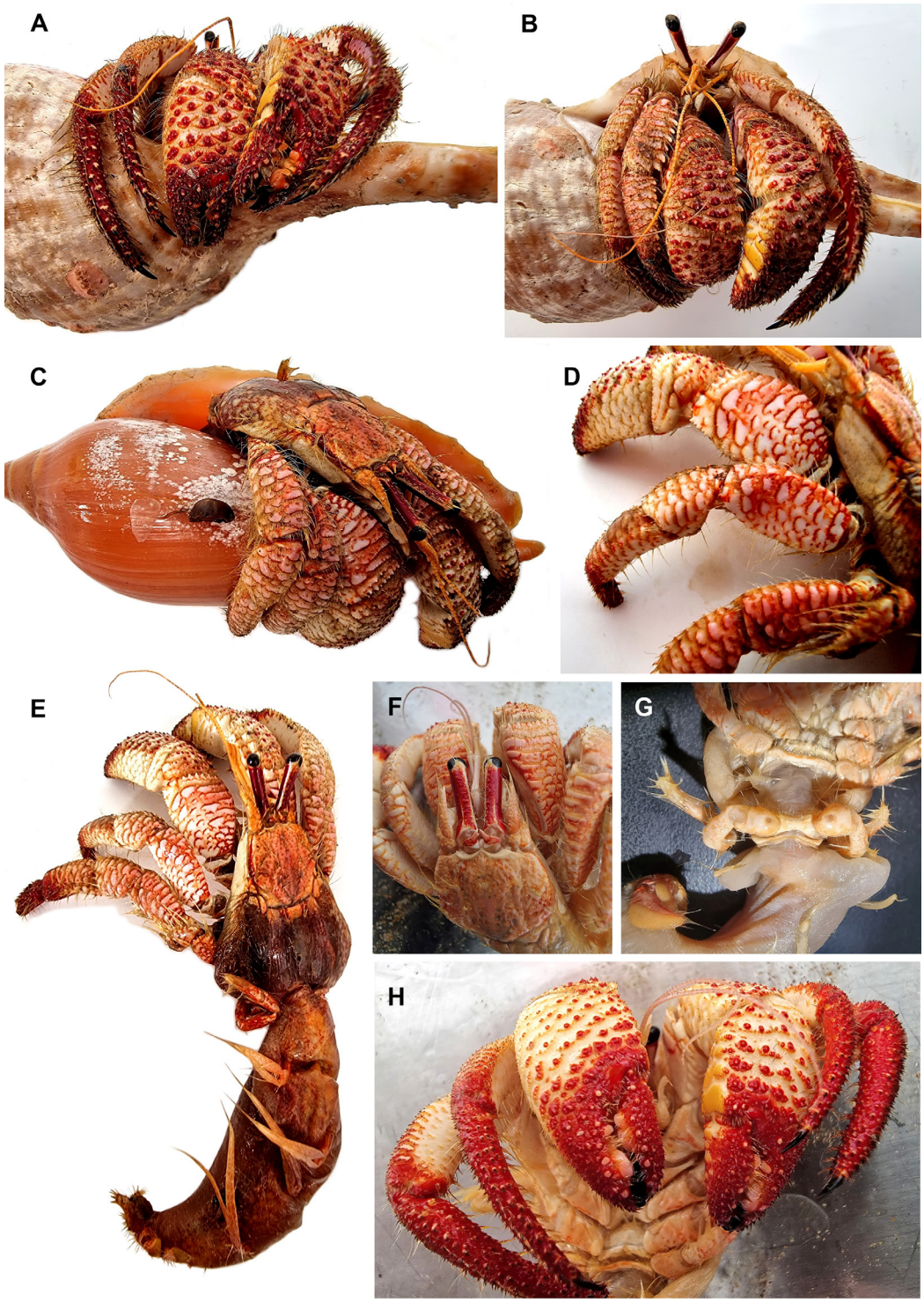

Figure 1. *Strigopagurus fragarchela* sp. nov. live colouration. **A–B**, **E:** QM-W29674; **C–D**, **F–H:** holotype male, QM-W29653.

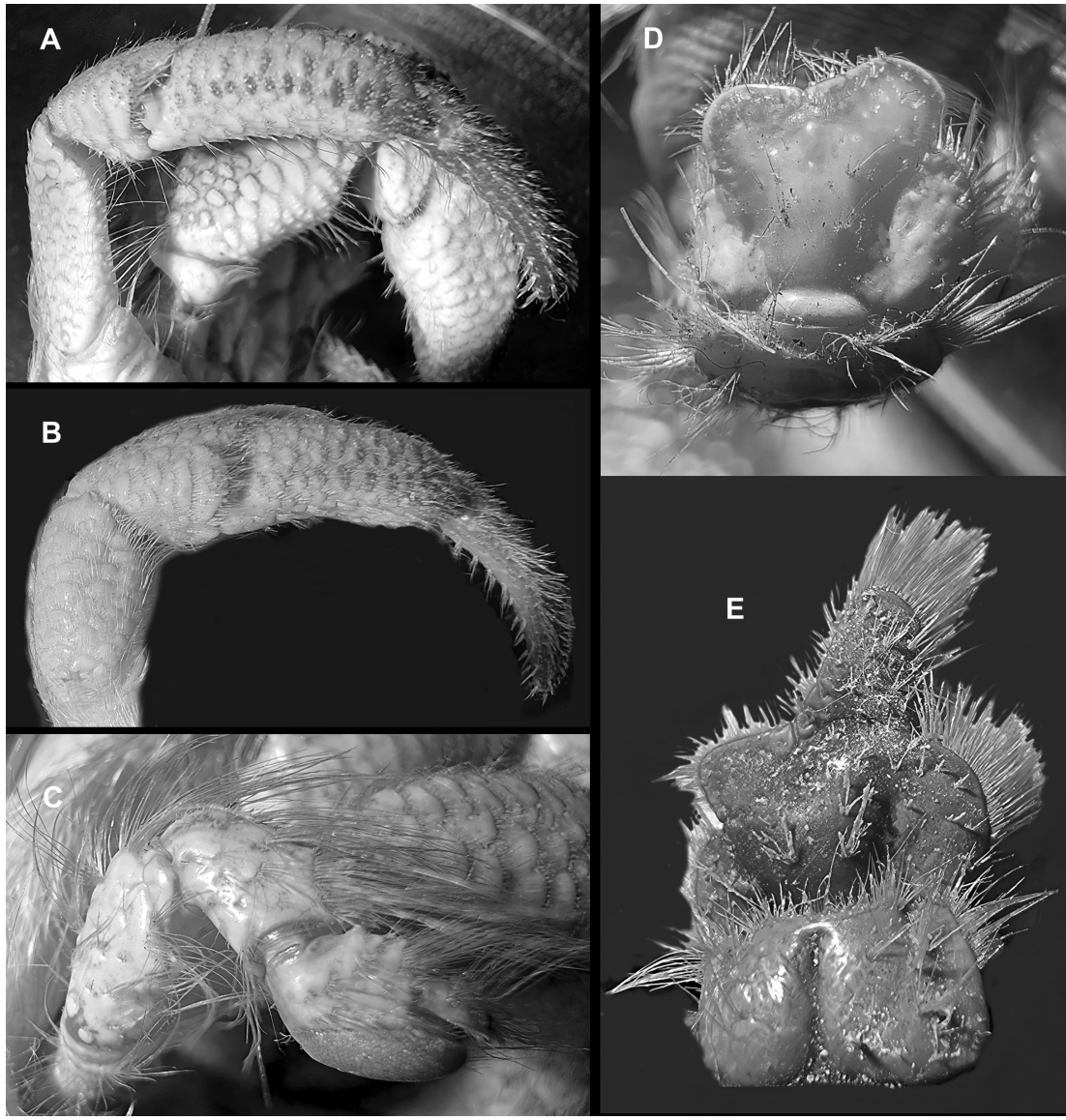

Figure 2. *Strigopagurus fragarchela* sp. nov. **A–D:** holotype male, QM-W29653 (sl 13.9 mm). **A–C:** pereiopods 2–4 respectively, outer face; **D:** telson; **E:** QM-W29645, male (sl 23.6 mm), telson and pleonite 6.

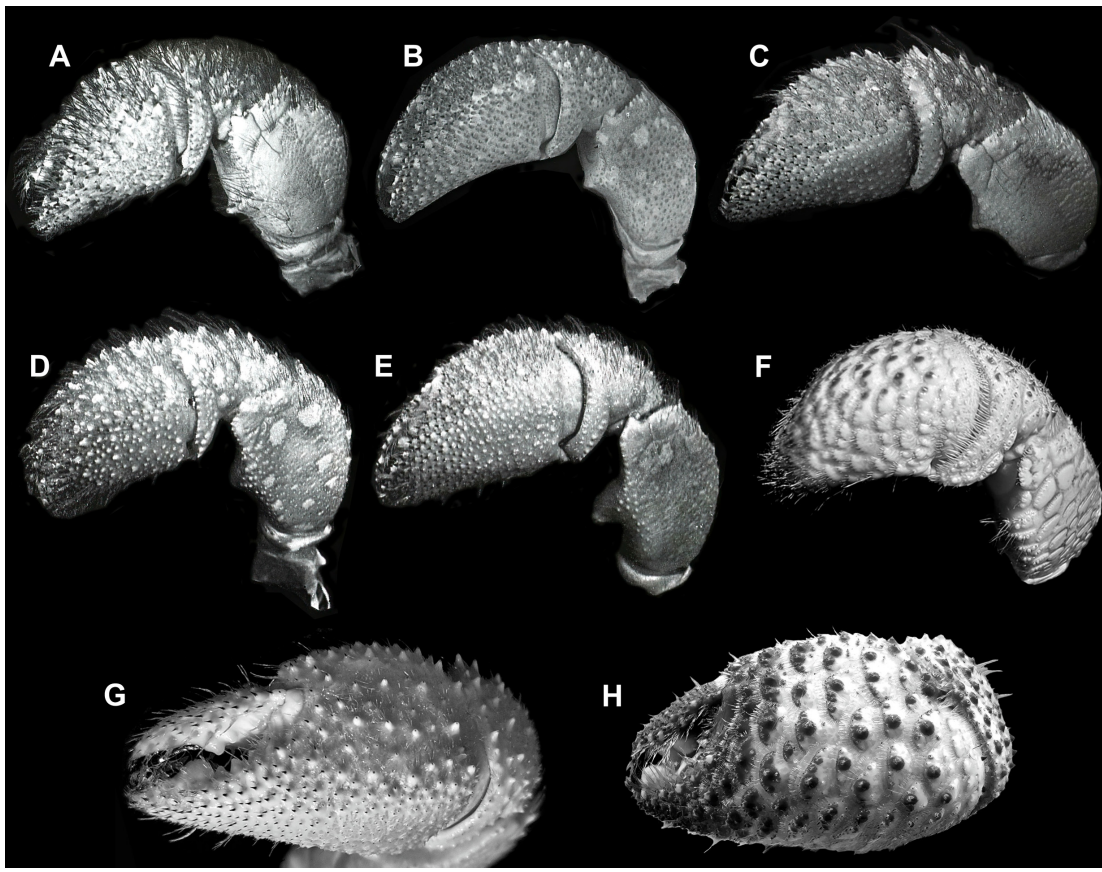

Figure 3. A–F: left cheliped, in fronto-ventral view. **A:** *S. strigimanus* (White, 1847), Victoria. Western Port, female sl 18.5 mm; **B:** *S. elongatus* Forest, 1995, South Australia, male sl 17.0 mm; **C:** *S. bilineatus* Forest, 1995, Queensland, female sl 17.6 mm; **D:** *S. boreonotus* Forest, 1995, Japan, male sl 16.0 mm; **E:** *S. poupini* Forest, 1995, Iles Tubuai, French Polynesia, male sl 18.2 mm, paratype; **F:** *S. fragarchela* holotype QM-W29653, sl 13.9 mm. **G–H:** frontal view of chela: **G:** *S. bilineatus* Forest, 1995 (QM-W15805); **H:** *S. fragarchela* sp. nov. holotype QM-W29653. [Figures A–E reproduced from Forest, 1995].

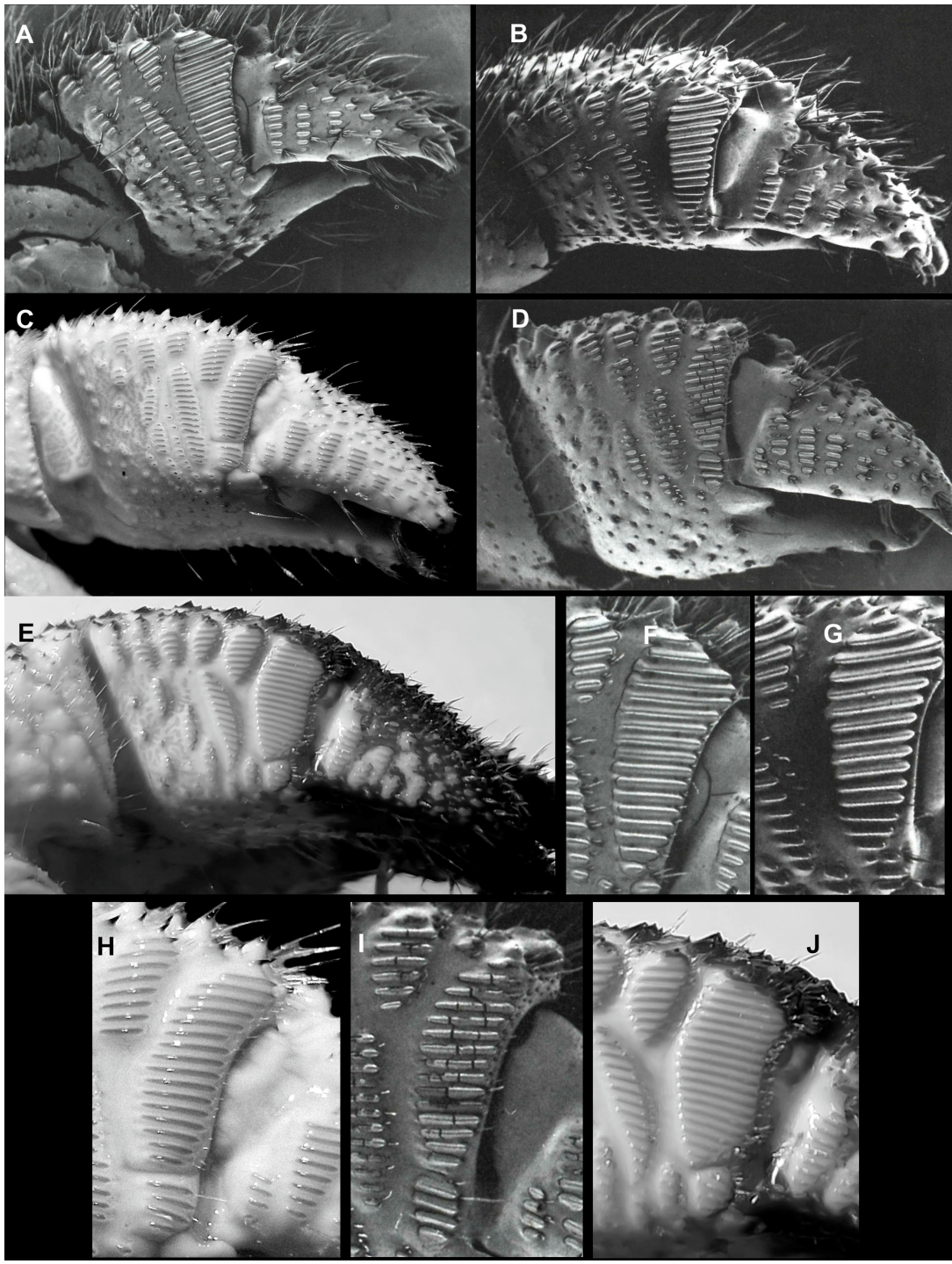

Figure 4. Comparison of stridulatory apparatus for Australian *Strigopagurus* species. **A–E:** entire view of superior face of palm and dactylus; **F–J:** enlargement of main plate. **A, F:** *S. strigimanus* (White, 1847); **B, G:** *S. elongatus* Forest, 1995; **C, H:** *S. bilineatus* Forest, 1995 (holotype male, QM-W15805); **D, I:** *S. boreonotus* Forest, 1995; **E, J:** *S. fragarchela* sp. nov. holotype QM-W29653 [Figures A, B, D, F, G, I reproduced from Forest, 1995].

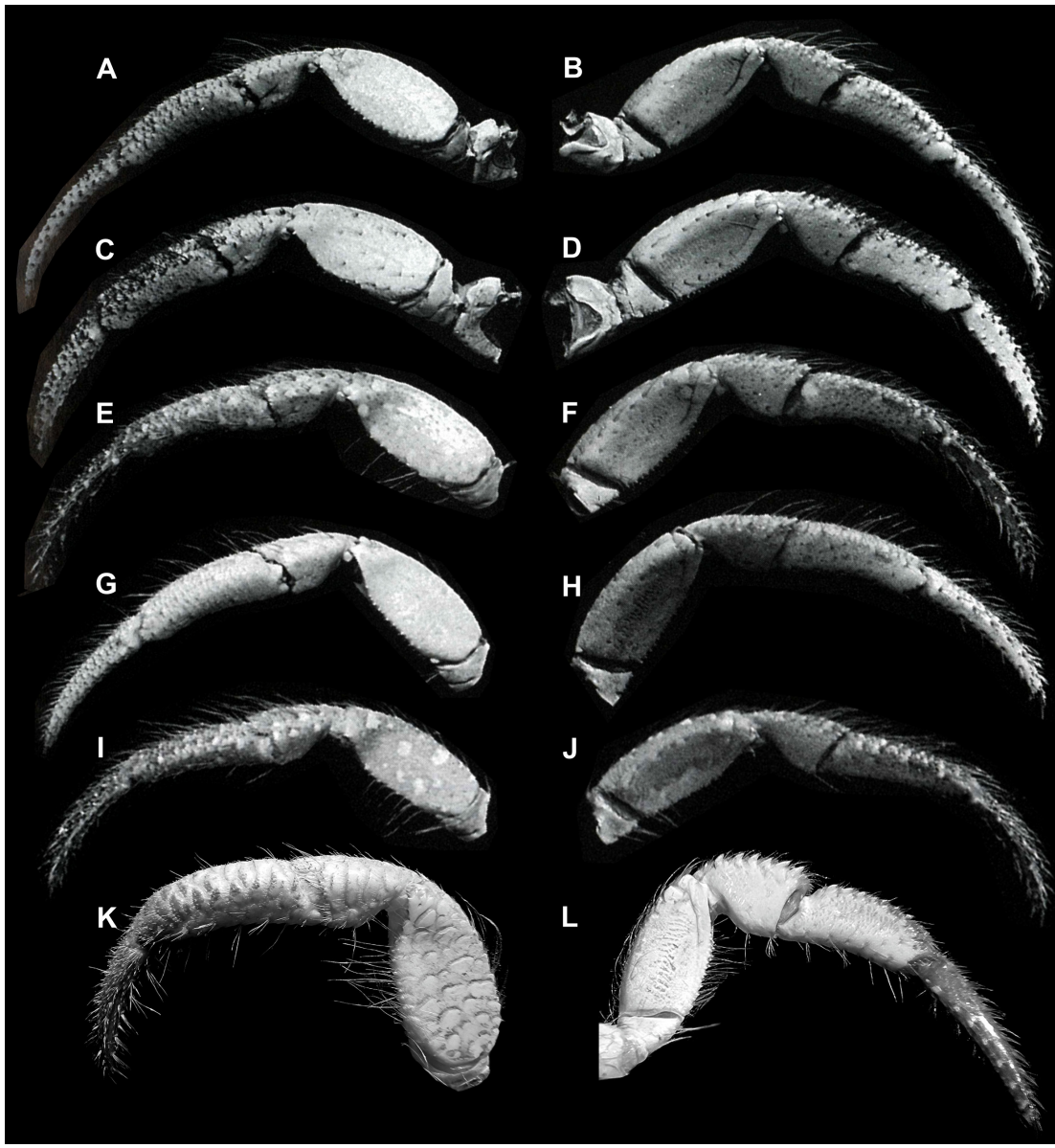

Figure 5. Second left pereiopod: lateral face (left column), mesial face (right column). **A–B:** *S. strigimanus* (White), Victoria, Western Port, female sl 18.5 mm; **C–D:** *S. elongatus* Forest, 1995, South Australia, paratype male sl 17.0 mm; **E–F:** *S. bilineatus* Forest, 1995, Queensland, female paratype sl 17.9 mm, QM-W20773; **G–H:** *S. boreonotus* Forest, 1995, Japan, male sl 16.0 mm; **I–J:** *S. poupini* sp. nov., Iles Tubuai, French Polynesia, paratype male sl 18.2 mm; **K–L:** *S. fragarchela* sp. nov. holotype QM-W29653. [Figures A–J reproduced from Forest, 1995].

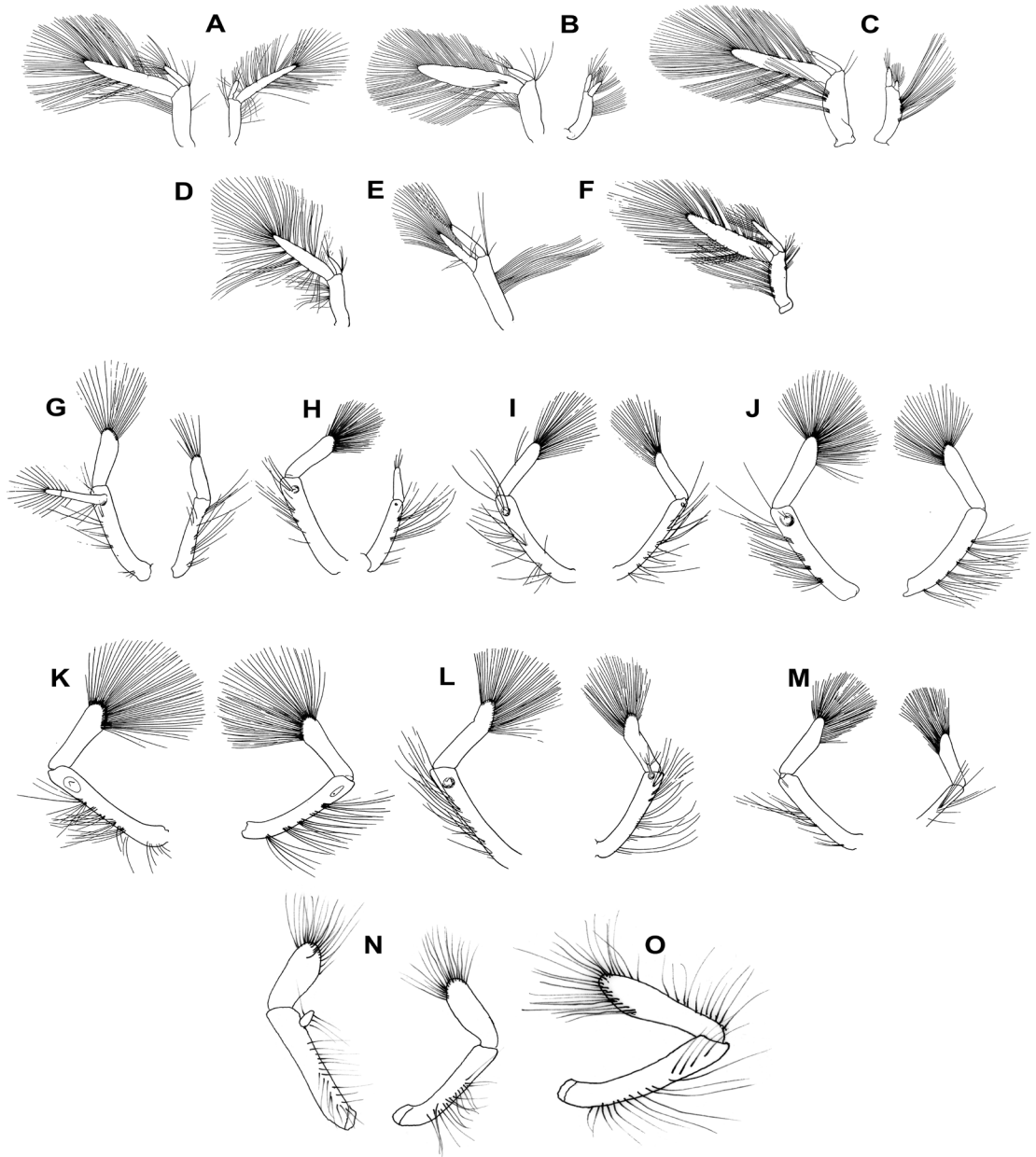

Figure 6. Second pleopods (paired). **A–C:** *S. strigimanus* (White, 1847); **A:** sl 18 mm; **B:** sl 19 mm; **C:** sl 26 mm. **D–F:** *S. elongatus* Forest, 1995; **D:** sl 15 mm; **E:** sl 21.5 mm; **F:** sl 25.5 mm (right second pleopod always absent on *S. elongatus*). **G–J:** *S. boreonotus* Forest, 1995; **G:** sl 10.9 mm; **H:** sl 14.2 mm; **I:** sl 14.5 mm; **J:** sl 18.0 mm. **K:** *S. bilineatus* Forest, 1995: sl 20.8 mm. **L–M:** *S. poupini* Forest, 1995; **L:** sl 14.7 mm; **M:** sl 18.0 mm. **N–O:** *S. fragarchela* sp. nov.; **N:** QM-W29653, holotype, sl 13.9 mm, **O:** QM-W29645, sl 23.6 mm (right pleopod lost). [Figures A–M reproduced from Forest, 1995].

LITERATURE CITED

Ball, E. E. (1972). Observations on the biology of the hermit crab *Coenobita compressus* H. Milne Edwards (Decapoda; Anomura) on the west coast of the Americas. *Revista De Biología Tropical*, **20**(2), 265–273.

Borradaile, L.A. (1901). Land Crustaceans in Gardiner, J.S., *The fauna and geography of the Maldive and Laccadive Archipelagoes. Being the account of the work carried on and of the collections made by an expedition during the years 1899 and 1900*. Volume 1, 64–100, pl. 3. University Press, Cambridge.

Davie, P.J.F. (2002). Crustacea: Malacostraca. Eucarida (Part 2). Decapoda – Anomura, Brachyura: *Zoological Catalogue of Australia*. 19.3B. CSIRO Publishing, 1–641.

Davie, P.J.F., Guinot, D. & Ng, P.K.L. (2015). Anatomy and functional morphology of Brachyura. Chapter 71–2, pp. 11–163 in Castro, P., Davie, P.J.F., Guinot, D., Schram, F.R. & Von Vaupel Klein, J.C. (eds.), Decapoda: Brachyura (Part 1). Treatise on Zoology — anatomy, taxonomy, biology. *The Crustacea*, 9C–I, 638 pp., Brill, Leiden & Boston.

Field, L.H., Evans, A. & Macmillan, D.L. (1987). Sound production and stridulatory structures in hermit crabs of the genus *Trizopagurus*. *Journal of the Marine Biological Association of the United Kingdom*, **67**(1), 89–110, https://doi.org/10.1017/S0025315400026382

Forest, J. (1952). Contributions a la revision des Crustacés Paguridae. I. Le genre *Trizopagurus*. *Mémoires du Muséum National d'Histoire Naturelle, Serie A, Zoologie*. **5**(1), 1–40.

Forest, J. (1995). Crustacea Decapoda Anomura: Révision du genre *Trizopagurus* Forest, 1952 (Diogenidae) avec l'établissement de deux genres nouveaux in Crosnier, A. (ed.), Résultats des campagnes Musorstom, **13**, *Mémoires du Muséum national d'Histoire naturelle*, 163, 9–149.

Graham, K.J. & Wood, B. (1997). The 1995–96 survey of Newcastle and Clarence River prawn grounds. *Kapala Cruise report no. 116*. NSW Fisheries: ISSN 0727–4335.

Graham, K.J., Wood, B. & Andrew, N.L. (1997). The 1996–97 survey of upper slope trawling grounds between Sydney and Gabo Island (and comparisons with the 1976–77 survey). *Kapala Cruise report no. 117*. NSW Fisheries: ISSN 0814–1487.

Komai, T., Reshmi, R. & Kumar, A.N.B. (2012). A new species of the hermit crab genus *Ciliopagurus* Forest (Crustacea: Decapoda: Anomura: Diogenidae) from southern India. *Zootaxa*, **3266**(1), 53–61, https://doi.org/10.11646/zootaxa.3266.1.4

Lowry, J.K. & Smith, S.D.A. (2003). Invertebrate scavenging guilds along the continental shelf and slope of eastern Australia — general description. *Final Report Fisheries Research and Development Corporation*, 1–63.

McLaughlin, P.A., Komai, T., Lemaitre, R. & Rahayu, D.L. (2010). Annotated checklist of anomuran decapod crustaceans of the world (exclusive of the Kiwaoidea and families Chirostylidae and Galatheidae of the Galatheoidea) Part I — Lithodoidea, Lomisioidea and Paguroidea. *The Raffles Bulletin of Zoology*, Supplement 23, 5–107.

Miller, M.E. & Liggins, G.W. (2024). Hermit crabs associated with catches from the eastern rock lobster (*Sagmariasus verreauxi*) fishery along the coast of NSW, Australia. *Fisheries Research*, **280**(107154), 1–13.

Poore, G.C.B & Ahyong, S.T. (2023). *Marine Decapod Crustacea. A Guide to Families and Genera of the World*. CSIRO Publishing, South Australia, 928 pp.

Roberts, L. (2021). Substrate-borne vibration and sound production by the land hermit crab *Coenobita compressus* during social interactions. *The Journal of the Acoustical Society of America*, **149**(5), 3261.