

Figure 37. *Naiopegia xiphagrostis* gen. nov., sp. nov. Paratype male (AM P61424) A, G–H, paratype male (AM P61426) B–F. A, paragnaths. B–C, maxillula. D–E, maxilla. F–H, maxilliped. Scale bar 0.2 mm.

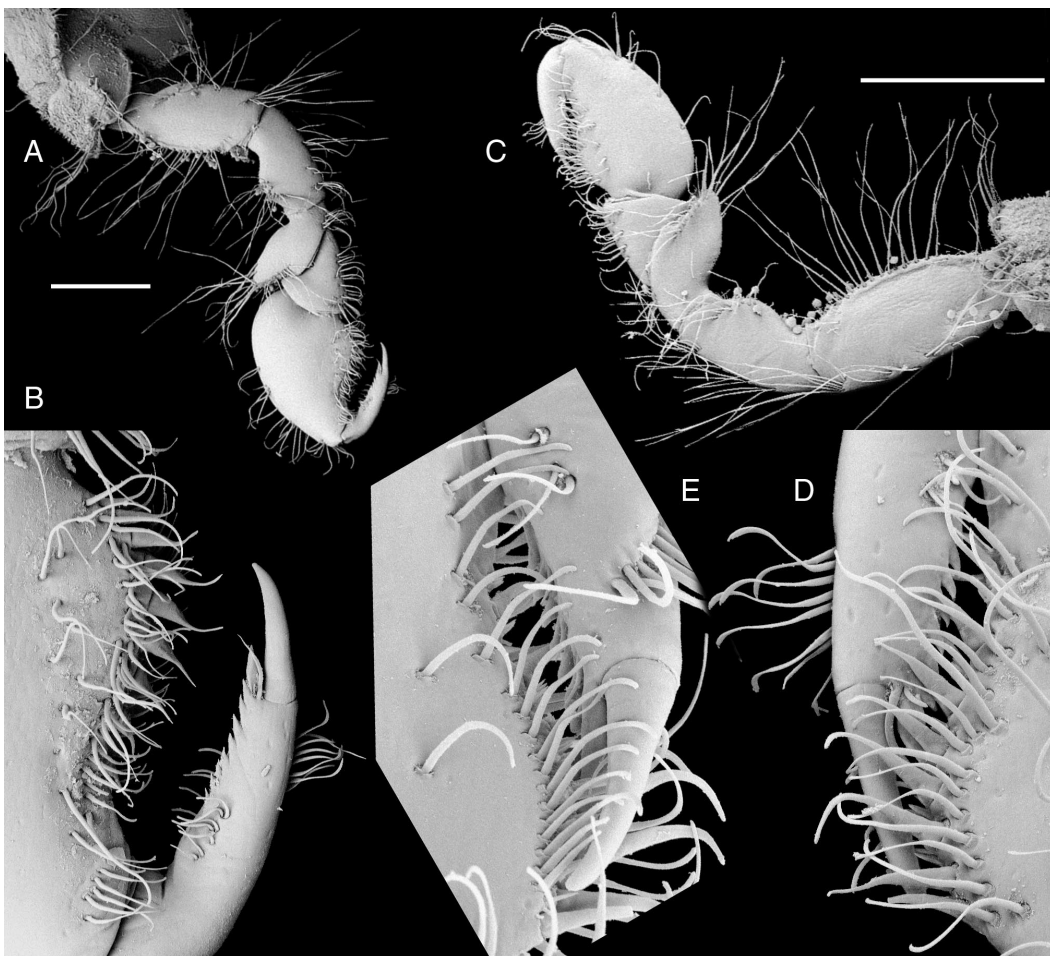


Figure 38. *Naoipegia xiphagrostis* gen. nov., sp. nov. Paratype male (AM P61424), paratype female (AM P61425). A–B, male pereopod I. C–E, female pereopod I. Scale bar 0.5 mm.

The number of distal antennulae articles may be variable among adults of *N. xiphagrostis* sp. nov. – one female has 6 on one side and 7 on the other.

Gariwerdeus gen. nov.

Type Species. Gariwerdeus turrentensis sp. nov.

Etymology. The Grampians (an English name deriving from a mountain range in Scotland) National Park is given the name “Gariwerd” by the indigenous Jardwadjali and Djab Wurrung people. The species of this genus appear to be ubiquitous in streams, springs or groundwater seeps within the Park, and thus should bear the original name for this region. *Gariwerdeus* is treated as a masculine noun.

Diagnosis. *Cephalon* without eyes; clypeal notch absent. *Typhlosole* minimal, ventral invagination simple (either laminar or ‘u’ shaped in cross section). *Pleotelson* dorsal surface with abundant long setae and rugose with dense cuticular hairs; medial and lateral lobes distinct; posterior margin reflexed dorsally, medial lobe compressed anteriorly, shorter than lateral lobes; lateral lobes acutely angular in dorsal or ventral view, in lateral view depressed ventrally, protruding posteriorly from insertion of uropods. *Antennula* with 6 or fewer articles, distal articles inflated. *Antenna* flagellum proximal articles without dense cover of cuticular hairs. *Mandible* palp article 2 with elongate setal row (setae longer than distal article). *Pereopod* I propodal palm concave,



Figure 39. *Naoiepegia xiphagrostis* gen. nov., sp. nov. Paratype male (AM P61424), paratype female (AM P61425). A–B, male pereopod II. C–D, male pereopod IV. E, female pereopod IV. F–G, male pereopod VII. H, male pleopod II appendix masculina. I, male pereopod VII proximal articles, with penes. Scale bar 0.5 mm.

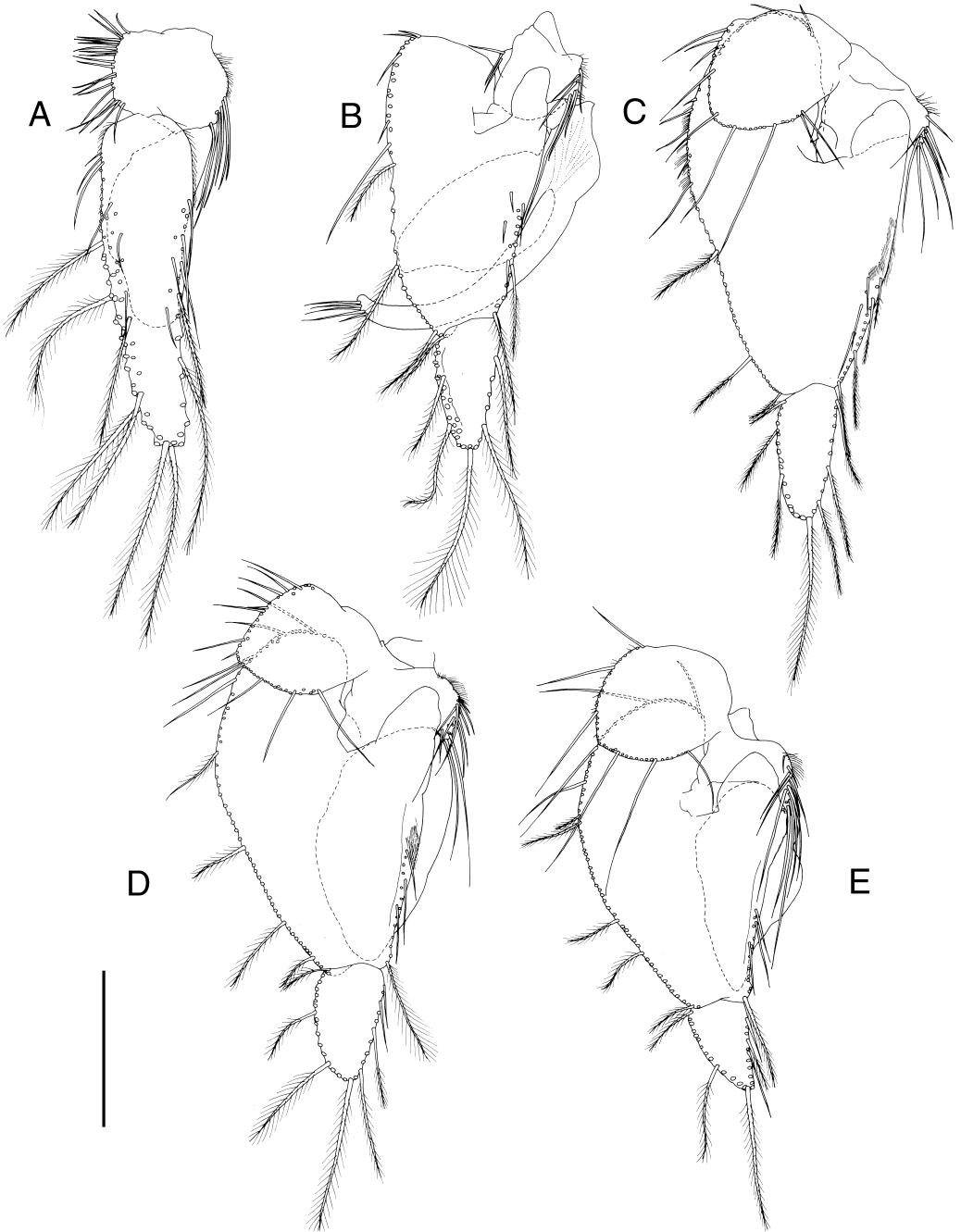


Figure 40. *Naoiepegia xiphagrostis* gen. nov., sp. nov. Paratype male (AM P61424). A–E, pleopods I–V. Scale bar 0.5 mm.

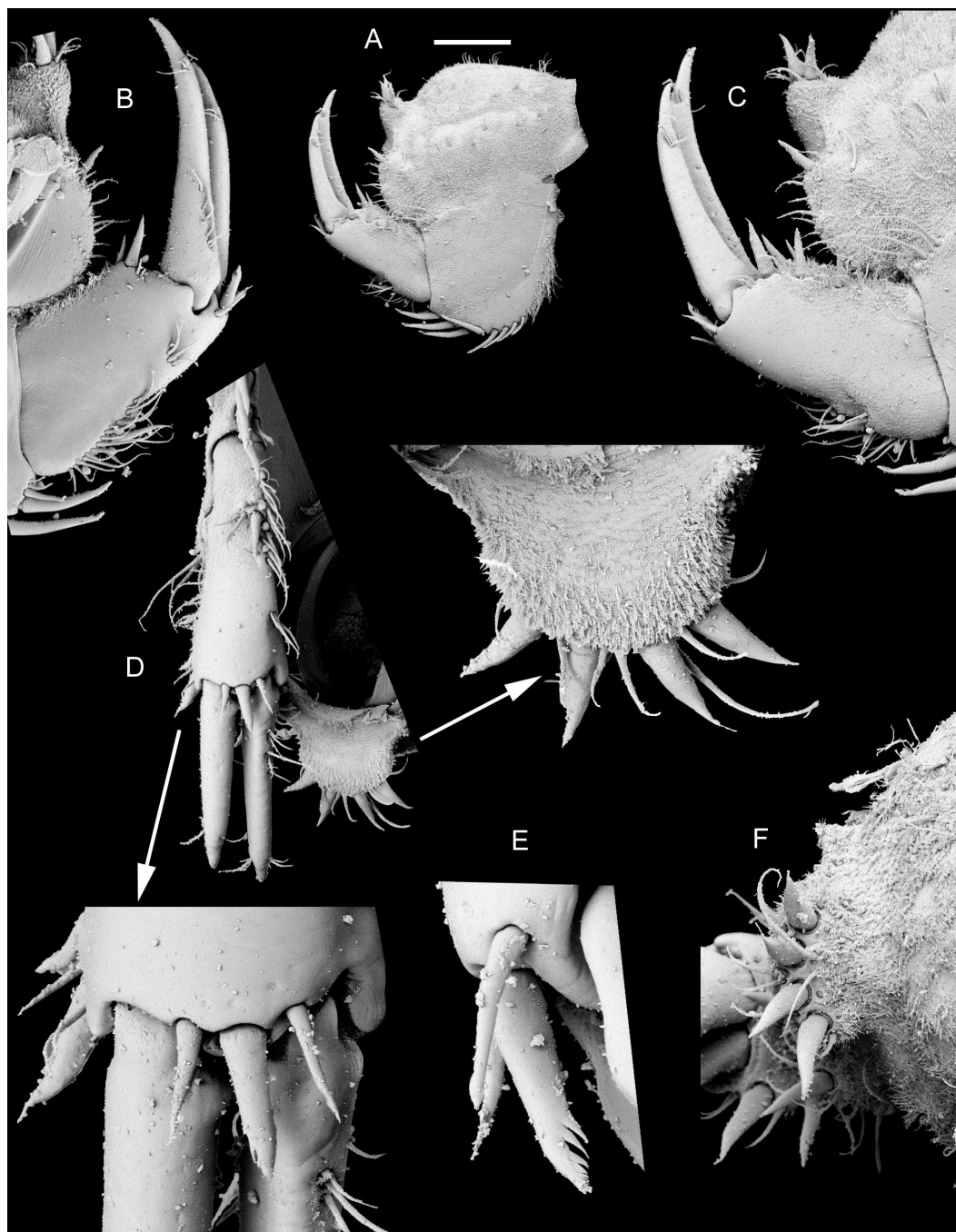


Figure 41. *Naiopegia xiphagrostis* gen. nov., sp. nov. Paratype male (AM P61424). A–D, pleotelson and uropod, lateral, medial and ventral views. E, uropod protopod distoventral margin robust setae. F, pleotelson distal margin, dorsal view. Scale bar 0.5 mm.

spines absent, with stout conical robust, elongate or denticulate setae, setal ridge absent. *Pereopods* I–VII proximal portions (basis, merus, ischium) with numerous elongate setae (many longer than ischium) on dorsal and ventral margins; pereopod VII basis dorsal ridge in cross section angular. *Pleopod* II endopod appendix masculina proximal half of shaft solid and rod-like, indented in ventral cross section, lacking setae on lateral or medial margins. *Uropod* protopod distoventral margin with 1–2 robust spinose seta and several simple setae.

Remarks. In addition to having a setose, light coloured and rugose cuticle, species of *Gariwerdeus* gen. nov. can be recognised most readily by their greatly reduced pleotelson tip, giving an almost truncate appearance to the end of the body. This feature can be seen when collecting specimens in the field. All species of *Gariwerdeus* are also blind. The antennula is pauciarticulate, similar to that of *Naiopegia* gen. nov., but the distal articles differ in all of the *Gariwerdeus* species. Our cursory investigation of the Grampians has detected three species in this genus.

***Gariwerdeus turrentensis* sp. nov.**

Figures 42–49

Material examined. Holotype. Victoria, Stony Creek directly above Turret Falls on Twin Falls Trail, Grampians National Park, 37°09.62' S 142°29.82' E (GPS), sand, silt and fern roots at edge of creek, hand sieve, S. Keable, 21 Sep 1999, VIC-93, NMV J40733 (male bl 7.4 mm).

Paratypes. As for holotype. AM P61271 (20 ind.), AM P61427 (male bl 8.6 mm, dissected for illustration, SEM and description), AM P61428 (female bl 8.4 mm,

dissected for SEM and description), AM P61429 (male bl 8.3 mm, used to supplement description and SEM).

Other material. Series from Vic., Stony Creek, Grampians, hand sieves, collected G. Wilson, R. Wetzer and S. Keable, 21 Sep 1999, preserved in 95% ethanol – below Turret Falls on Twin Falls Trail, 37°09.41' S 142°29.90' E (GPS), from vegetation at edge of stream in sand, pH 6.7 (out of calibration), 7.2°C, VIC-89, AM P61273 (12 ind.); below Turret Falls on Twin Falls Trail, 37°07.93' S 142°30.26' E (GPS), fern roots at stream side, VIC-90, AM P61274 (male, female); directly below Turret Falls on Twin Falls Trail, 37°09.66' S 142°29.83' E (GPS), from sphagnum at waters edge, hand sieves, VIC-92, AM P61272 (12 ind.) and NMV J40734 (male, 2 females). Vic., Stony Creek, Grampians, 37°09.72' S 142°29.74' E (map), stream riffles, altitude 510 metres, kick sampling, D. Crowther, 10 Dec 1998, 98-220 Site 87, AM P61257 (male).

Etymology. The name refers to Turret Falls on Stony Creek in The Grampians National Park, around which this species was collected.

Diagnosis. *Pleotelson* tip medial lobe lacking robust sensillate setae but with 8 fine simple setae. *Antennula* article 6 inflated and bulbous, terminal two segments with one aesthetasc each, article 5 length subequal to article 6 length. *Mandible* right lacinia mobilis with 1 row of denticles. *Pereopod* I of male dactylus posterodistal margin smooth; propodus dorsal margin proximally produced, greatly expanded beyond dorsal margin of carpus; propodal palm cuticular fringe weakly developed. *Pereopods* II–IV basis dorsal margin elongate setae in row, not clustered. *Pleopod* II endopod appendix masculina distal tip truncate, with 3 setae on margin. *Uropodal* protopod distoventral margin with 1 robust spinose seta and 7 simple setae.

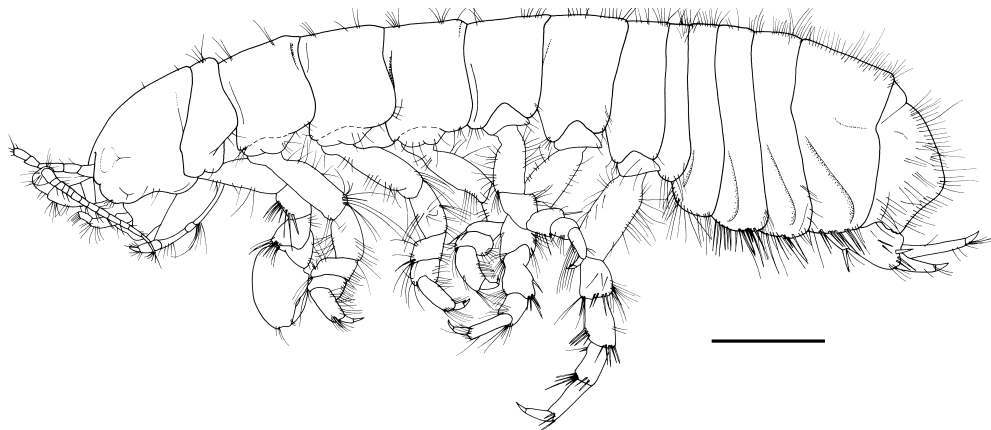


Figure 42. *Gariwerdeus turrentensis* gen. nov., sp. nov. Holotype male (NMV J 40733), lateral view. Scale bar 1 mm.

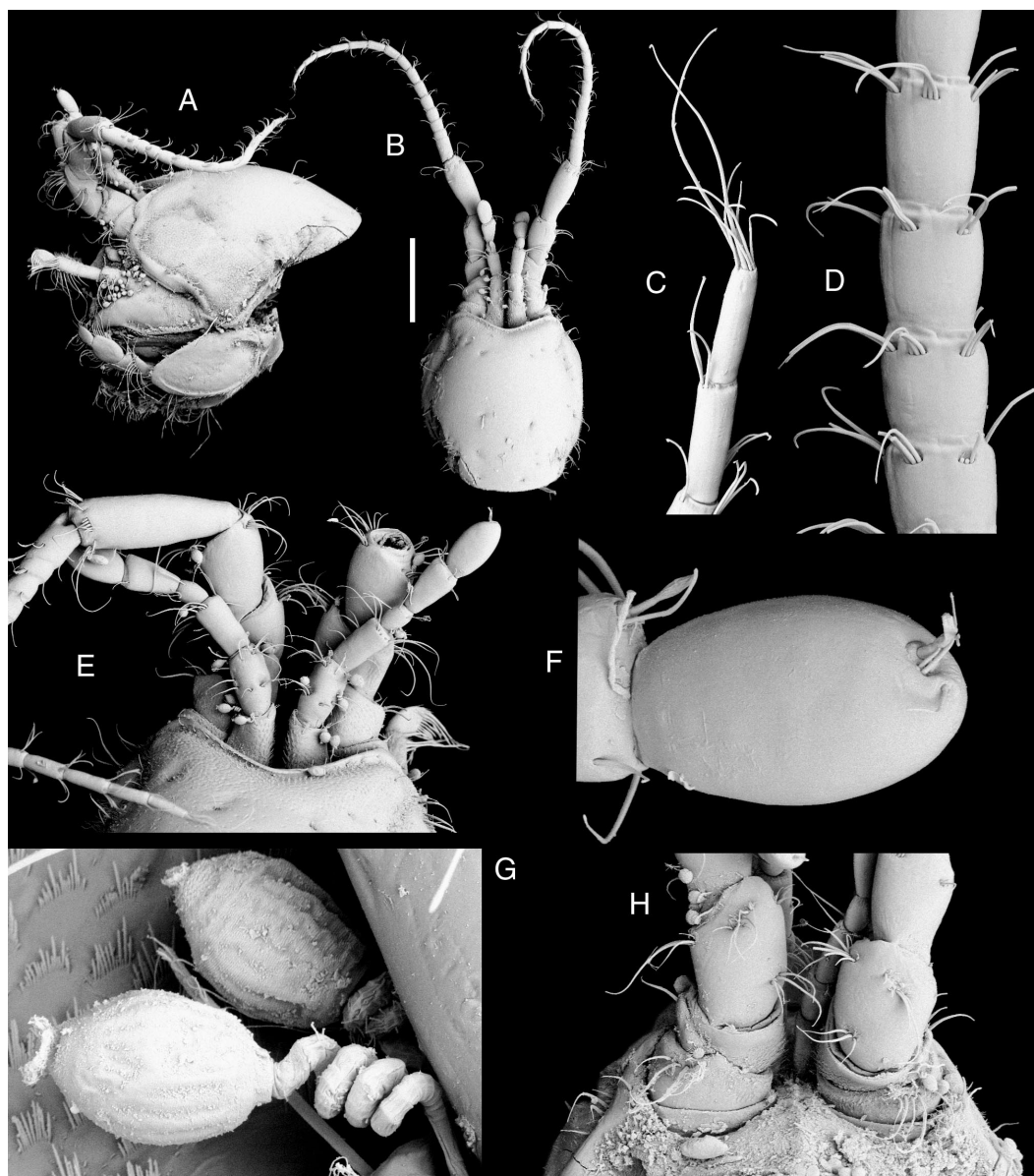


Figure 43. *Gariwerdeus turrentensis* gen. nov., sp. nov. Paratype male (AM P61427) A–D, H, paratype female (AM P61428) E–G. A–B, H, male head, antenna, antennule, lateral, dorsal and ventral views. C–D, male antenna flagellum, distal and proximal articles. E, female head, antenna, antennula, dorsal view. F, female antennula, distal articles. G, ciliate protozoan epibiont (*Vorticella* sp.) on female antenna. Scale bar 0.5 mm.

Description based on male. *Coloration* in life translucent with dark patches on posterior pleonites, white dorsum anteriorly, head white in eye region; in 95% ethanol eye region lacking colour, gray-white head to pereonite 6, pereonite 7 to pleotelson light brown.

Head (fig. 43B) length subequal to width in dorsal view; width 0.85 pereonite 1 width; surface smooth and shiny (with scattered cuticular combs), dorsal setae sparse.

Pereon narrow, width near head width (1.18 head width); smooth. Typhlosole minimal, ventral

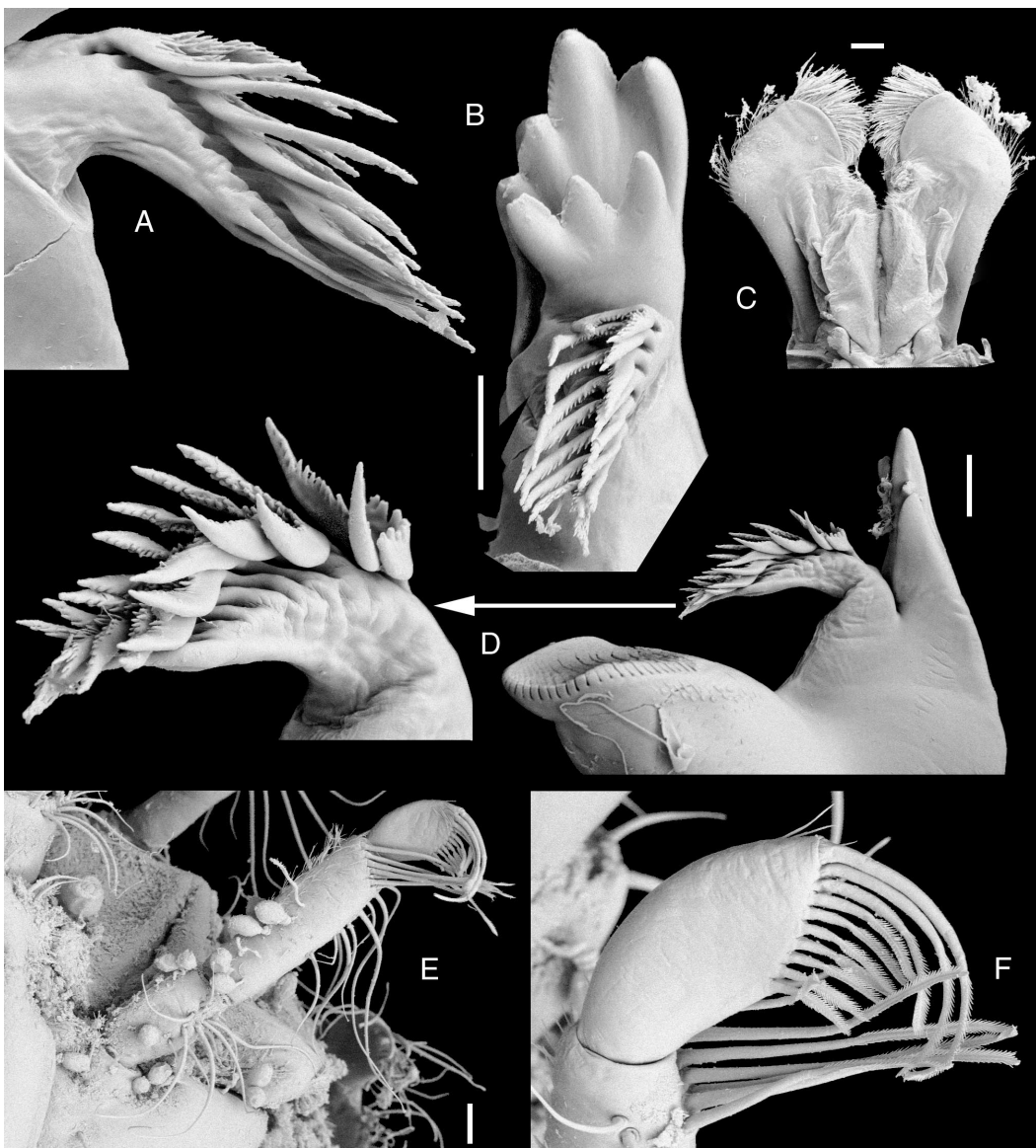


Figure 44. *Gariwerdeus turretensis* gen. nov., sp. nov. Paratype male (AM P61429), paratype female (AM P61428). A–B, male left mandible. C, male paragnaths. D, male right mandible. E–F, female right mandible palp. Scale bar 0.05 mm.

invagination forming laminar projection in cross section.

Pleonites in dorsal view 2–3 respective lengths less than half length of pleonite 5, *pleonite* 4 length more than half length of pleonite 5; *pleonites* 1–4 relative lengths unequal, increasing in length from anterior to posterior, width 0.88 composite length in dorsal view.

Pleotelson (figs 49A–D, G) lateral length 0.13 body length, 0.93 depth; dorsal length 1.3 width; depth 1.47

pereonite 7 depth. Dorsal surface with abundant long setae. Medial lobe width 0.27 pleotelson width, greatest length 0.04 pleotelson total length. Lateral lobes medial length 0.04 pleotelson total length, without robust sensillate setae. Ventral margin anterior to uropods with 4–6 denticulate and smooth setae (posterior seta smooth, anterior setae weakly denticulate), posterior seta smaller than anterior adjacent setae (thicker but shorter).



Figure 45. *Gariwerdeus turretensis* gen. nov., sp. nov. Paratype male (AM P61429). A, maxillula. B–C, maxilla. D–E, maxilliped. Scale bar 0.2 mm.

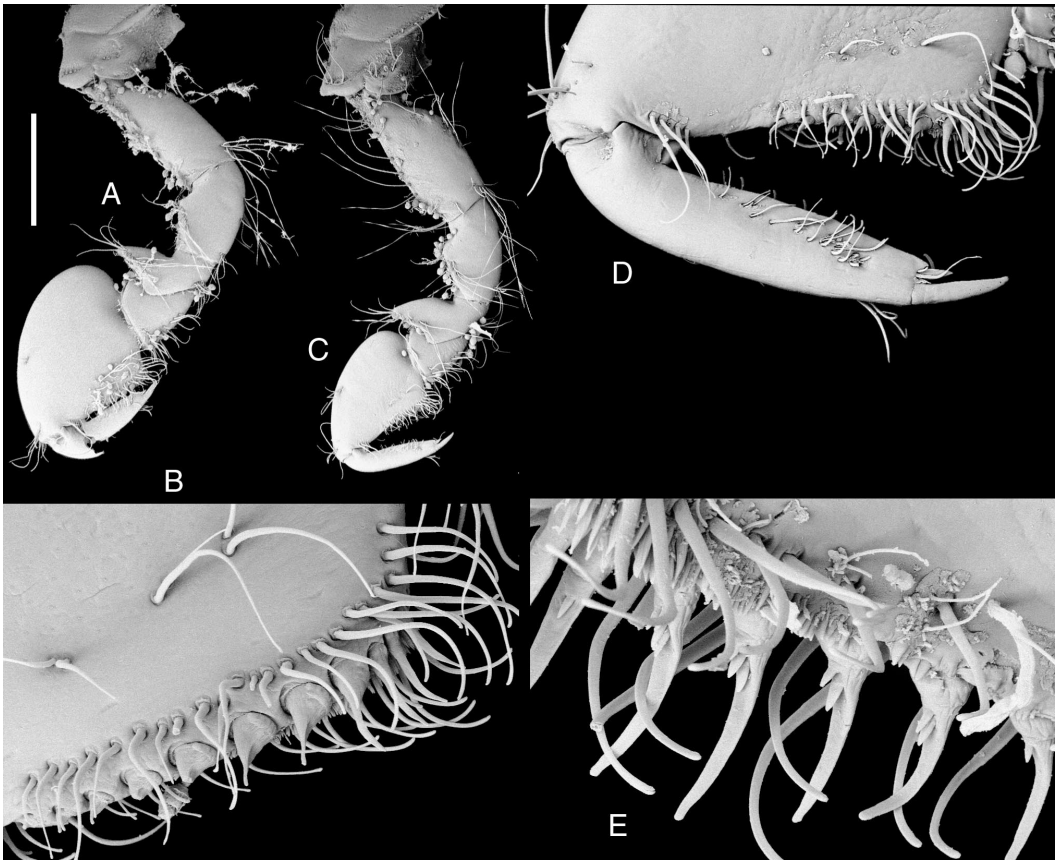


Figure 46. *Gariwerdeus turrentensis* gen. nov., sp. nov. Paratype male (AM P61427) A, paratype female (AM P61428), paratype male (AM P61429) B. A, B, male pereopod I. C–E, female pereopod I. Scale bar 0.5 mm.

Antennula (figs 43E–F) length 0.11 body length, with 6 articles. Single tiny aesthetasc on article 5 to terminal article. *Antenna* (figs 43B–D) length 0.34 body length. Flagellum length 0.57 total antenna length, with 16 articles.

Mouthfield clypeus broader medially, width 0.65 head width. *Mandible* (fig. 44) palp length 0.8 mandible length; article 3 with 11 setae; separate distal group of setae present; articles 1–2 with elongate setal row. Left spine row with 7–8 bifurcate spines, without additional spines between pedunculate projection and molar. Right spine row with 8 bifurcate spines, without additional spines between pedunculate projection and molar. Molar process setulate spines forming posterior row (2 tiny on right). *Maxillula* (fig. 45A) medial lobe length 0.86 lateral lobe length; width 0.67 lateral lobe width. Lateral lobe distal margin with 5 denticulate robust setae, 7 smooth robust setae. *Maxilla* (figs 45B–C) medial lobe width 0.56 outer lateral lobe width. *Maxilliped* (figs 45D–E) endite with 2 receptaculi on right side; dorsal ridge with 12 large distally denticulate

plumose setae. Palp insertion on basis ventral surface without subdistal smooth setae.

Pereopod I (figs 46A–B) dactylus length 1.07 palm length. Propodus dorsal margin setae confined to single group at distal margin. Propodal palm convex to straight; stout denticulate setae absent; with 4 basally inflated stout robust simple setae; with 3 elongate broad based setae. Basis ventrodorsal margin with 7 elongate setae. *Pereopod* IV (figs 47B–C) dactylus length subequal to propodal palm. Propodus with 3 broad based setae on ventral margin, none distinctly larger than others; articular plate shorter than dactylar claw. *Pereopods* V–VII (fig. 47E) basis dorsal ridge in cross section angular.

Penes (fig. 47F) length 0.26 body width at pereonite 7, distally tubular.

Pleopod (figs 48, 47G, 49H) I exopod distal margin rounded; medial margin concave from proximal to distal half, subparallel to lateral margin; dorsal surface lacking setae. *Pleopod* II endopod appendix masculina length 0.59 pleopod length.

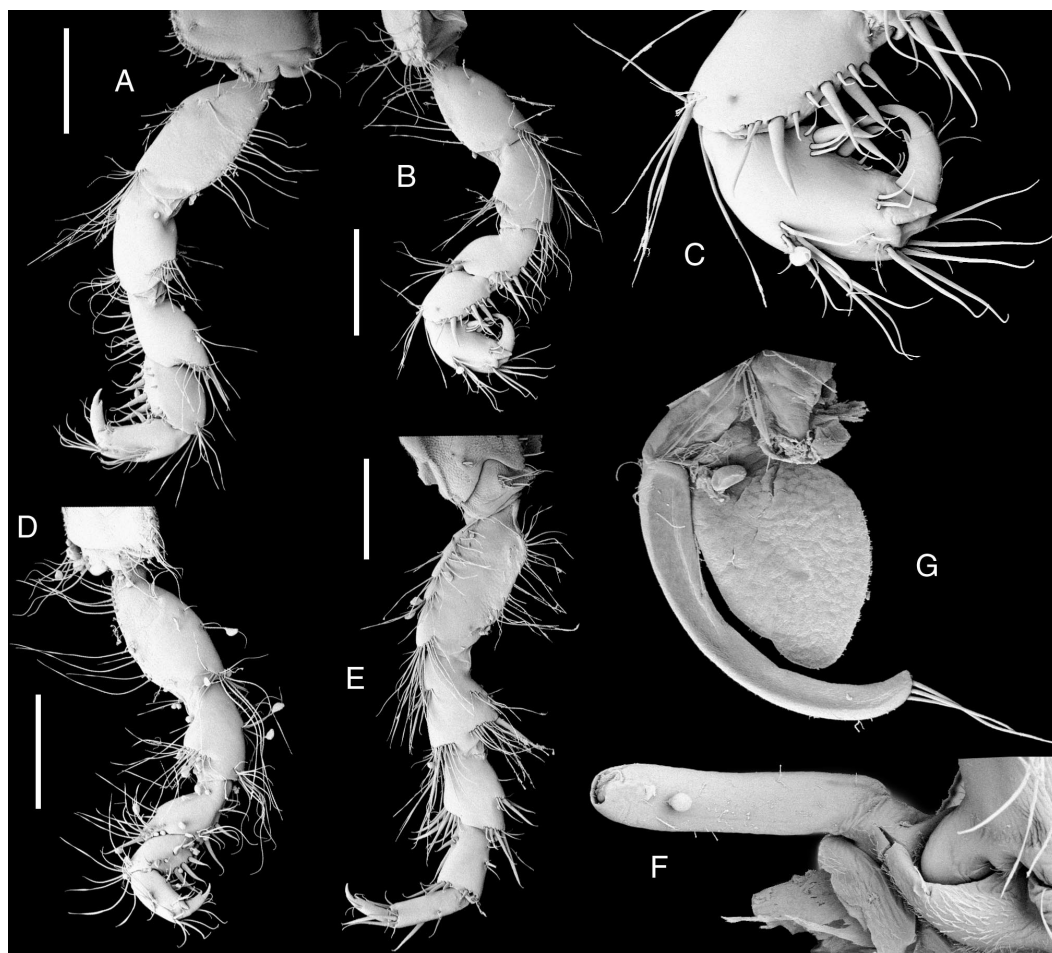


Figure 47. *Gariwerdeus turretensis* gen. nov., sp. nov. Paratype male (AM P61429), paratype female (AM P61428). A, male pereopod II. B–C, male pereopod IV. D, female pereopod IV. E–F, male pereopod VII, including proximal articles, with penes. G, male pleopod II appendix masculina and endopod. Scale bar 0.5 mm.

Uropod (figs 49C–D, F–G) total length 1.04 pleotelson length. Protopod length 0.36 uropod total length; dorsomedial margin in dorsal view strongly concave laterally, margin setae absent. Exopod length 0.63 endopod length.

Sexual dimorphism, female differences. Antenna length 0.31 body length, flagellum length 0.63 total antenna length, with 17 articles. *Pereopod I* (figs 46C–E) dactylus length 1.13 palm length; propodal palm with 5 stout denticulate serrate setae, 2 stout robust conical simple setae and 3 elongate broad based setae. *Uropod* length 1.06 pleotelson length, protopod length 0.44 uropod total length, exopod length 0.8 endopod length.

Distribution. Stony Creek, above and below Turret Falls, Grampians National Park.

Remarks. *Gariwerdeus turretensis* sp. nov. is easily distinguished from other species in the genus and from *Naiopegia xiphagrostis* sp. nov. by the enlarged male pereopod I propodus, much larger than males of the other species where the first pereopods of males resemble those of females. A short, almost truncate pleotelson with a highly abbreviated medial lobe that lacks robust setae, and an inflated article 6 on the antennula, also serve to identify this species.

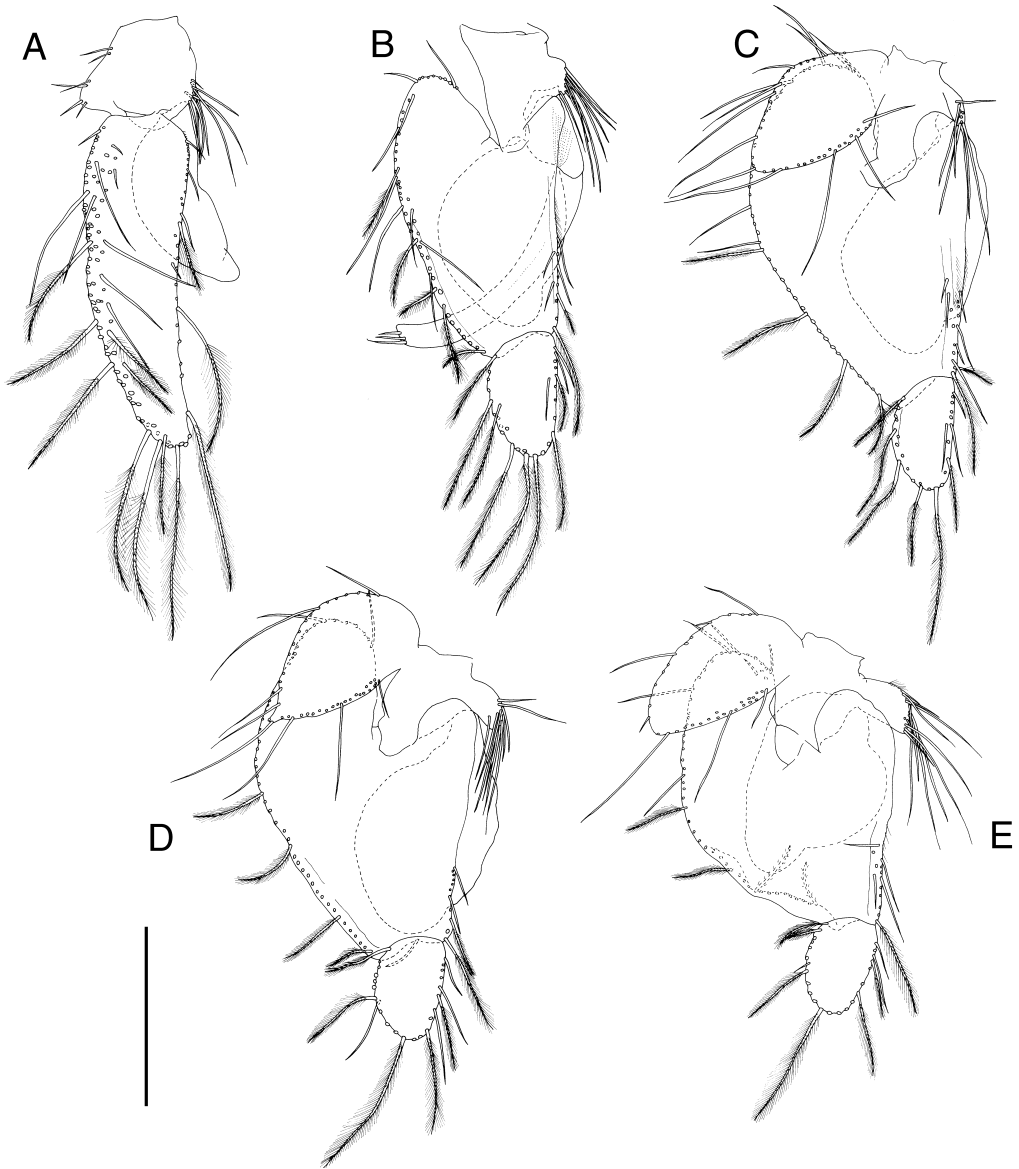


Figure 48. *Gariwerdeus turrentensis* gen. nov., sp. nov. Paratype male (AM P61427). A–E, pleopods I–V. Scale bar 0.5 mm.

***Gariwerdeus beehivensis* sp. nov.**

Figures 50–57

Material examined. Holotype. Victoria, among roots of treefern at the base of Beehive Falls, Mud Hut Creek, near Roses Gap, Grampians National Park, 36°58.54' S 142°27.01' E (GPS), hand sieves, pH 4.6, 10.3°C, G. Wilson, R. Wetzer and S. Keable, 22 Sep 1999, VIC-97, NMV J40735 (male bl 7.3 mm).

Paratypes. All lots collection details as for holotype. AM P61276 (39 ind., including male bl 7.8 mm, female bl 5.4 mm used to supplement description), AM P61430 (male bl 8.7 mm, dissected for illustration, SEM and description), AM P61431 (female bl 5.9 mm, dissected for SEM and description).

Other material. Series from Vic., Grampians, collected hand sieves, G. Wilson, R. Wetzer and S. Keable, Sep 1999, preserved in 95% ethanol – base of Fish

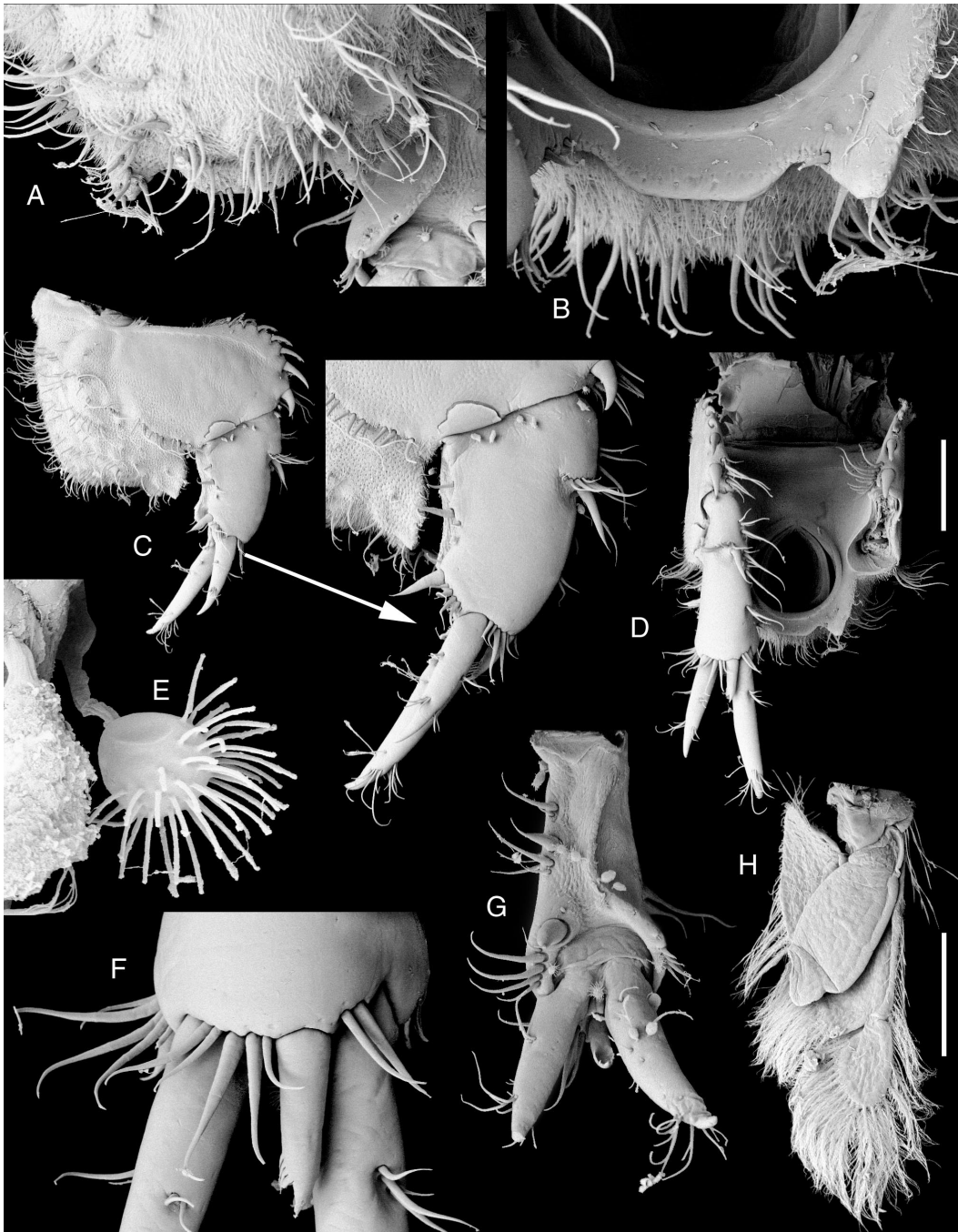


Figure 49. *Gariwerdeus turretensis* gen. nov., sp. nov. Paratype male (AM P61429), paratype female (AM P61428). A–D, G, male pleotelson and uropod, dorsal, ventral and lateral views. E, suctorian ciliate protozoan epibiont on male uropod. F, male uropod protopod distal margin, ventral view. H, female pleopod II. Scale bar 0.5 mm.

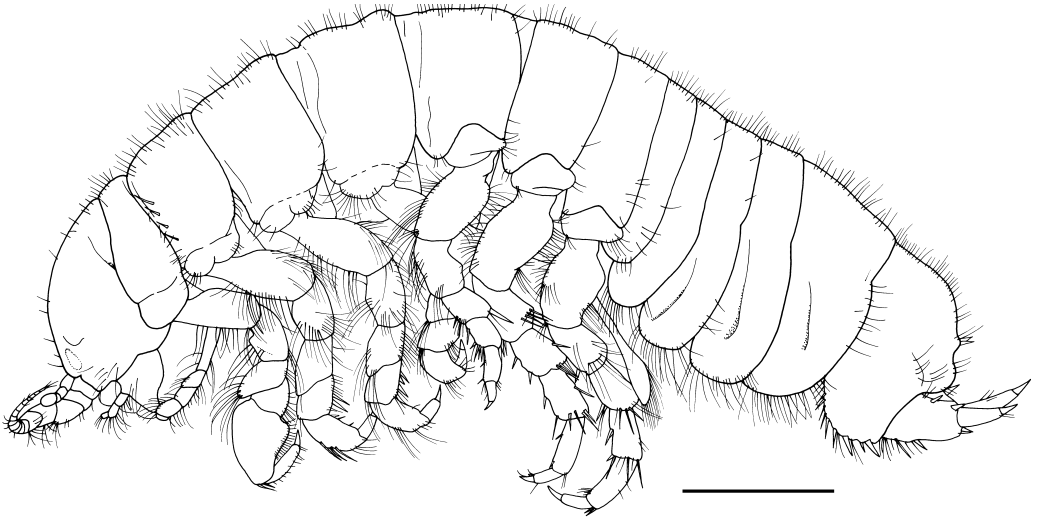


Figure 50. *Gariwerdeus beehivensis* gen. nov., sp. nov. Holotype male (NMV J40735), lateral view. Scale bar 1 mm.

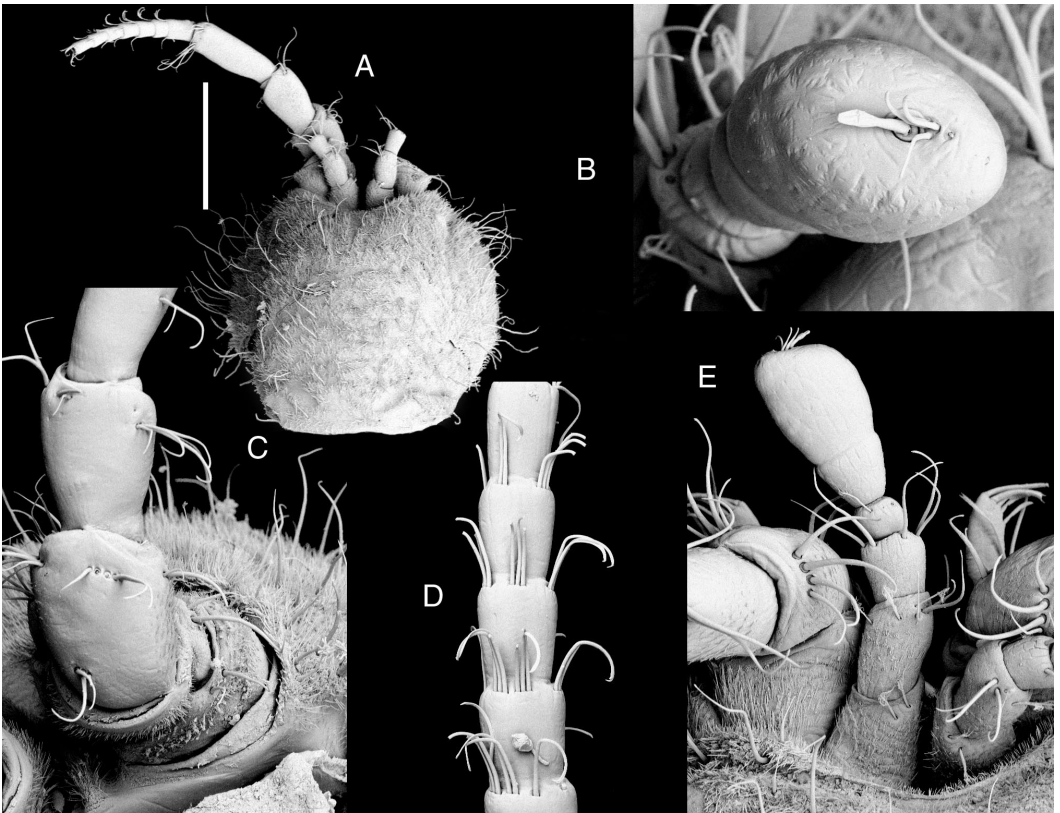


Figure 51. *Gariwerdeus beehivensis* gen. nov., sp. nov. Paratype male (AM P61430), paratype female (AM P61431). A, male head, dorsal view. B, female antennula distal articles. C, male antenna proximal articles. D, male antenna flagellum articles. E, female antennula, dorsal view. Scale bar 0.5 mm.

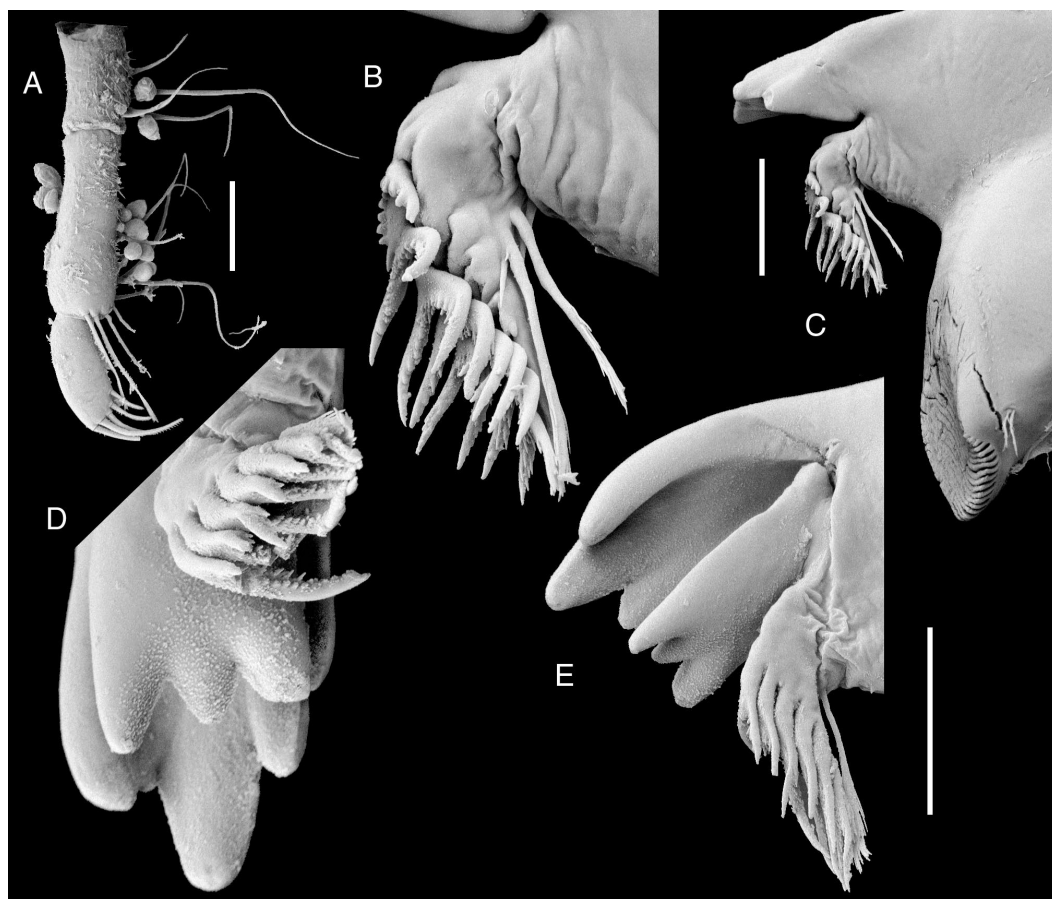


Figure 52. *Gariwerdeus beehivensis* gen. nov., sp. nov. Paratype male (AM P61430). A, D–E, left mandible. B–C, right mandible. Scale bar 0.1 mm.

Falls, Mackenzie R., 37°06.59'S 142°24.01'E (GPS), from reedy pool close to main falls, pH 6.6, 10.6°C, 20 Sep, VIC-86, AM P61277 (male, female); S side of Goulton Gorge, 36°55.89'S 142°25.09'E (GPS), gravel from roots of trees and grasses half way up steep water course, pH 6.7, 14.3°C, 22 Sep, VIC-98, AM P61278 (30 ind.); Goulton Creek on west side of Pohlner Road, 36°58.35'S 142°24.83'E (GPS), roots and sediment, pH 6.1, 17.1°C, 22 Sep, VIC-99, AM P61279 (18 ind.) and NMV J40736 (male, 2 females).

Etymology. This species name is derived from the type locality, Beehive Falls (on Mud Hut Creek) in The Grampians National Park.

Diagnosis. *Pleotelson* medial lobe with 2 robust smooth setae and several small simple setae. *Antennula* terminal segment inflated and bulbous; article 5 distal articulation rudimentary, length less than article 6 length, lacking aesthetasc.

Mandible right lacinia mobilis with 1 row of denticles. *Pereopod* I of male dactylus ventrodistal margin with row of thin scale-like spines; propodus dorsal margin not produced proximally; propodal palm cuticular fringe strongly developed, extending along length of setal row. *Pereopods* II–IV basis dorsal margin elongate setae in row, not clustered. *Pleopod* II endopod appendix masculina distal tip broadly rounded, with 3 setae on margin. *Uropod* distoventral margin with 2 robust distally spinose setae, simple setae absent.

Description based on male. *Coloration* in life brown mottled (although brown colour mostly appears to be fine sediment) with white head, white patch in eye region.

Head (fig. 51A) length subequal to width in dorsal view; width 0.83 pereonite 1 width; dorsal surface with dense cuticular hairs, setae sparse.

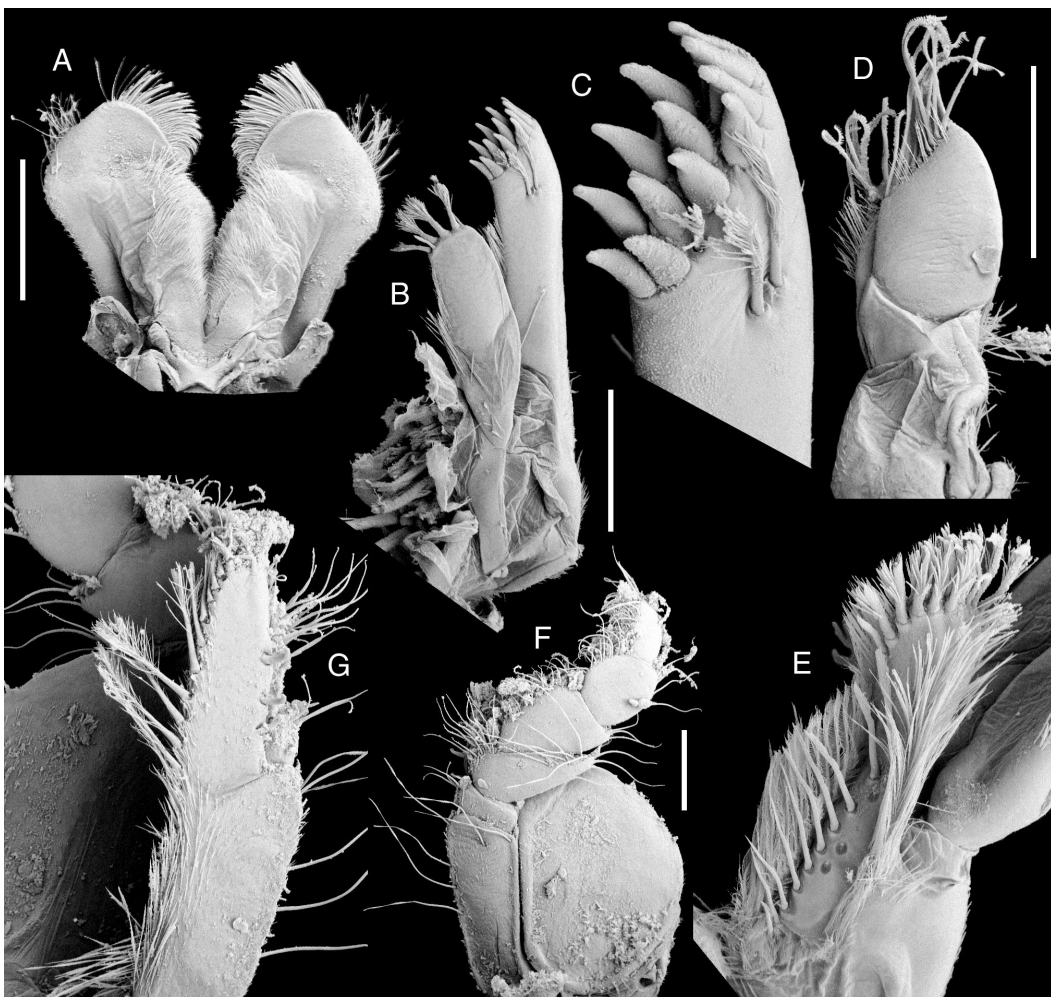


Figure 53. *Gariwerdeus beehivensis* gen. nov., sp. nov. Paratype male (AM P61430). A, paragnaths. B–C, maxillula. D–E, maxilla. F–G, maxilliped. Scale bar 0.2 mm.

Pereon broad, smooth, width exceeding head width (1.55 head width). Typhlosole minimal, ventral invagination forming inverted 'u' shape in cross section.

Pleonites 2 length less than half length of 5 in dorsal view, 3–4 respective lengths more than half length of 5; 1–4 relative lengths unequal, increasing in length from anterior to posterior, width 1.44 composite length in dorsal view.

Pleotelson (figs 57A–D) lateral length 0.1 body length, 0.61 depth; dorsal length 1.03 width; depth 1.38 pereonite 7 depth. Dorsal surface with abundant long setae. Medial lobe width 0.33 pleotelson width, greatest length 0.07 pleotelson total length. Lateral lobes medial length 0.1 pleotelson total length. Ventral margin anterior to uropods with 5–9 denticulate setae (anterior 5 setae large and robust, posterior 4 less robust, inter-

spersed with fine setae), posterior seta subequal to anterior adjacent setae.

Antennula (figs 51B, E) length 0.07 body length, with 6 articles, 1–2 tiny aesthetascs on terminal article. *Antenna* (figs 51A, D) length 0.21 body length. Flagellum length 0.57 total antenna length, with 12 articles.

Mouthfield clypeus broader on left side, width 0.44 head width. *Mandible* (fig. 52) palp length 0.64 mandible length; article 3 with 6 setae; separate distal group of setae present; articles 1–2 with elongate setal row. Right incisor process with 3 cusps. Left spine row with 8 spines, 6 bifurcate, total count includes 2 on margin between pedunculate projection and molar. Right spine row with 10 spines, 8 bifurcate, total count including 2 on margin between pedunculate projection and molar. Molar process length subequal to width;

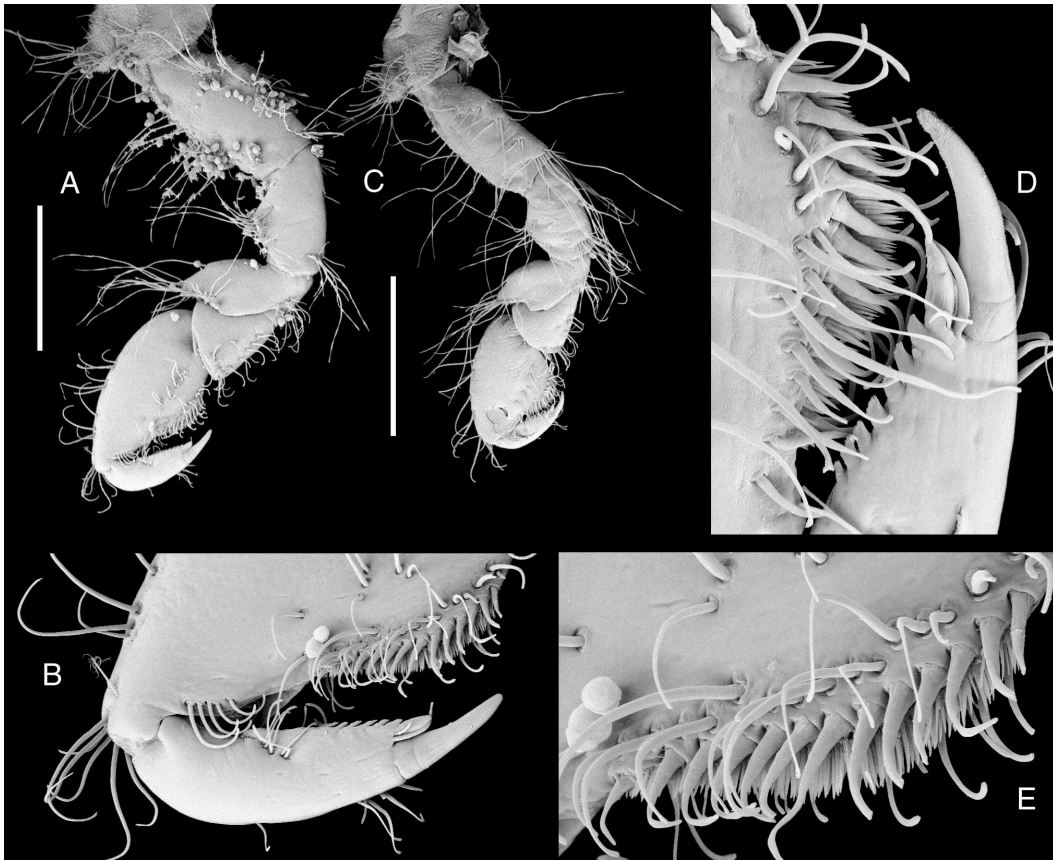


Figure 54. *Gariwerdeus beehivensis* gen. nov., sp. nov. Paratype male (AM P61430), paratype female (AM P61431). A–B, E, male pereopod I. C–D, female pereopod I. Scale bar 0.5 mm.

complex setulate spines forming posterior row (left) or ciliated spines forming posterior row (right, 2). *Maxillula* (figs 53B–C) medial lobe length 0.82 lateral lobe length; width 0.73 lateral lobe width. Lateral lobe distal margin with 3 denticulate robust setae, 9 smooth robust setae. *Maxilla* (figs 53D–E) medial lobe width 1.0 outer lateral lobe width. *Maxilliped* (figs 53F–G) endite with 3 receptaculi on right side; dorsal ridge with 10 large distally denticulate plumose setae. Palp insertion on basis ventral surface with 1 subdistal smooth seta.

Pereopod I (figs 54A–B, E) dactylus length subequal to palm, length 1.03 palm length; ventrodistal margin thin scale-like spines along 0.28 total length of margin. Propodus dorsal margin with 10 setae in several groups between proximal and distal margin (excluding distal group). Propodal palm sinuate; cuticular fringe weakly developed; stout denticulate setae absent; with 12 stout robust simple conical setae; elongate broad based setae absent. Basis ventrodistal margin with 9 elongate setae in male. *Pereopod IV* (figs 55B–C) dactylus length subequal to propodal palm; distal accessory claw-spines absent. Propodus with 5 broad based setae on ventral

margin, 3 distinctly larger than others; articular plate shorter than dactylar claw. *Pereopods V–VII* (fig. 55E) basis dorsal ridge in cross section rounded on pereopod V, angular on pereopods VI–VII.

Penes (fig. 55F) length 0.33 body width at pereonite 7, distally tapering.

Pleopod (figs 56, 57G–I) I exopod distal margin pointed, medial margin sinuate – divergent from lateral margin along most of length, dorsal surface with setae. *Pleopod II* endopod appendix masculina length 0.55 pleopod length.

Uropod (figs 57D–F) total length 1.11 pleotelson length. Protopod length 0.39 uropod total length; dorso-medial margin in dorsal view parallel to lateral margin, margin setae present distally. Exopod length 0.68 endopod length.

Sexual dimorphism, female differences. *Antenna* length 0.25 body length. Flagellum length 0.52 total antenna length, with 11 articles. *Pereopod I* (figs 54C–D) dactylus length 0.93 palm length, ventrodistal margin with 6 narrow scale-like spines, along 0.37 total length;

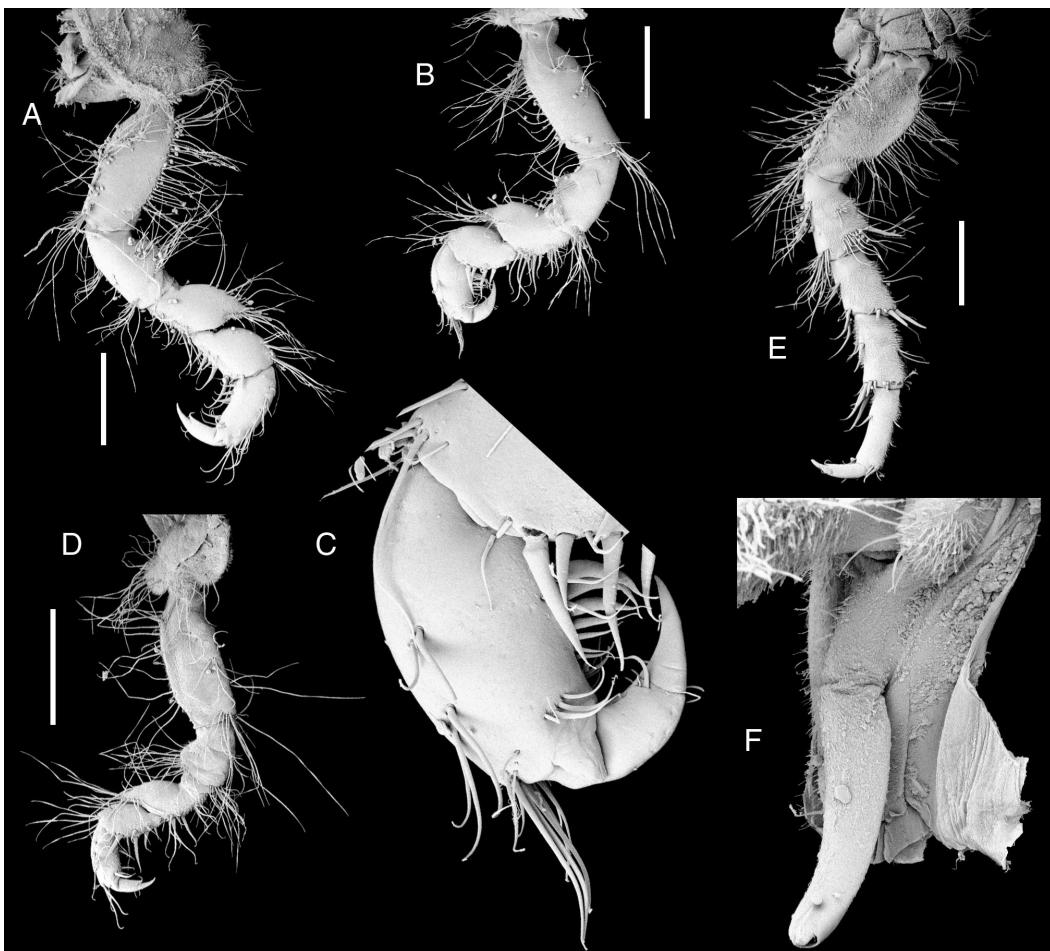


Figure 55. *Gariwerdeus beehivensis* gen. nov., sp. nov. Paratype male (AM P61430), paratype female (AM P61431). A, male pereopod II. B–C, male pereopod IV. D, female pereopod IV. E–F, male pereopod VII, including proximal articles, with penes. Scale bar 0.5 mm.

propodal palm with 9 stout robust conical simple setae; basis ventrodistal margin with 7 elongate setae. *Uropod* protopod length 0.46 uropod total length; exopod length 0.83 endopod length.

Distribution. Beehive Falls, Mud Hut and Goulton Creek drainages and Fish Falls (Mackenzie R.), Grampians National Park.

Remarks. Several characters distinguish *Gariwerdeus beehivensis* sp. nov. from other species of the genus: the 2 inflated distal antennular segments have only a rudimentary articulation with article 5 lacking aesthetascs, the head is rugose with many fine cuticular hairs, and the medial lobe of the pleotelson has 2–4 robust setae.

The specimens from Goulton Gorge and Goulton Creek (AM P61278–9) contains larger specimens than found in the types (males reaching a length of 11.8 mm versus 8.7 mm in type material). These larger specimens have more prominent medial and lateral lobes on the pleotelson, and have more robust setae on the medial lobe (4 versus 2). The same samples, however, have specimens of similar size to, and indistinguishable from, the type material. The male and female specimens from Fish Falls (AM P61277) are of similar size to the type material and have similar posterior pleotelson lobes; the male from this sample has four robust setae on the medial lobe and the female has three.

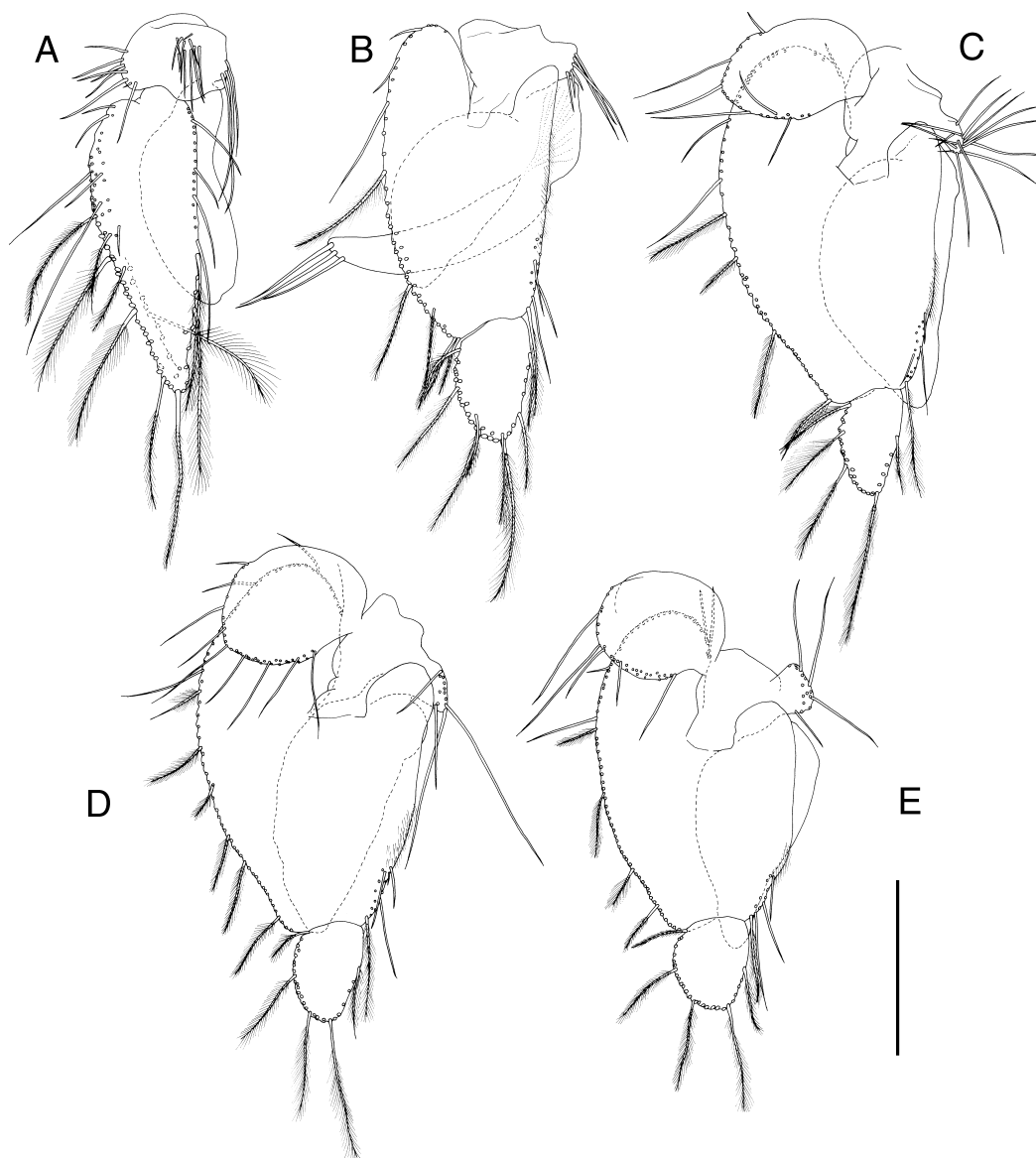


Figure 56. *Gariwerdeus beehivensis* gen. nov., sp. nov. Paratype male (AM P61430). A–E, pleopods I–V. Scale bar 0.5 mm.

***Gariwerdeus ingletonensis* sp. nov.**

Figures 58–65

Material examined. Holotype. Vic., Ingleton Spring at picnic ground off Syphon Road, Grampians National Park, 37°18.17'S 142°22.01'E (GPS), in white sand at point where spring flows from under a rock, hand sieves, pH 4.7, 12.7°C, G. Wilson, R. Wetzer and S. Keable, 21 Sep 1999, VIC-94, NMV J40737 (male bl 7.2 mm).

Paratypes. All lots collection details as for holotype. AM P61280 (26 ind., including female bl 6.6 mm used to supplement description), AM P61432 (male bl 8.3 mm, dissected for SEM and description), AM P61433 (female bl 6.7 mm, dissected for SEM and description), AM P61444 (male bl 7.9 mm, dissected for pleopod illustrations), NMV J40738 (male, female, juvenile female).

Etymology. As in other species of *Gariwerdeus*,



Figure 57. *Gariwerdeus beehivensis* gen. nov., sp. nov. Paratype male (AM P61430), paratype female (AM P61431). A–D, male pleotelson and uropod, dorsal and lateral views. E, male uropod lateral view. F, male uropod protopod distal margin, ventral view. G, female pleopod I. H, male pleopod I. I, male pleopod II appendix masculina and endopod. Scale bar 0.25 mm.

this species is named after the type locality, Ingleton Spring, The Grampians National Park, in this case.

Diagnosis. *Pleotelson* medial lobe robust sensillate setae absent (but with 6 fine simple setae).

Antennula with 5 free articles, articles 5 and 6 inflated, each with 1 aesthetasc, terminal segment with unexpressed articulation. *Mandible* right lacinia mobilis with 2 rows of denticles. *Pereopod* I dactylus ventrodistal margin with thin

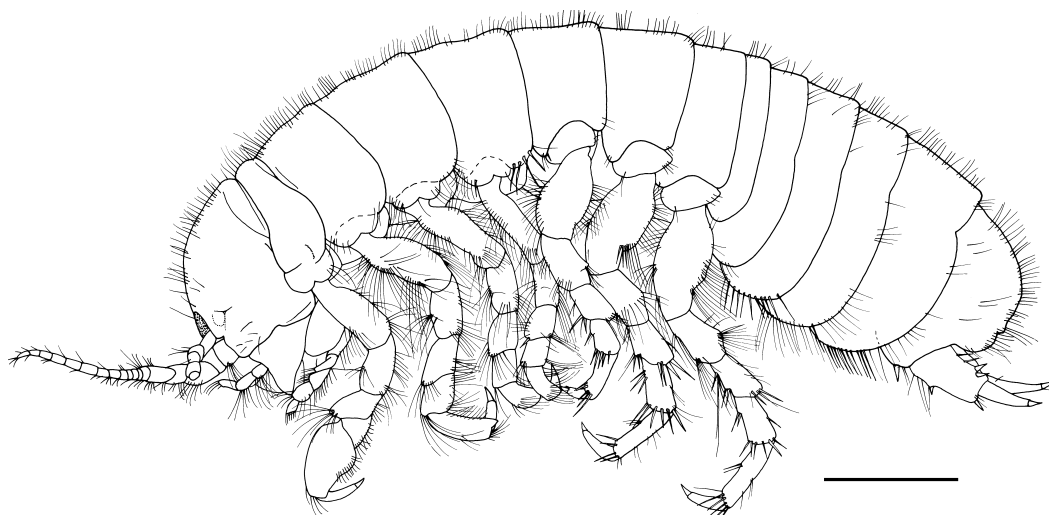


Figure 58. *Gariwerdeus ingletonensis* gen. nov., sp. nov. Holotype male (NMV J40737), lateral view. Scale bar 1 mm.

truncate spines; propodus dorsal margin not produced proximally, palm cuticular fringe weakly developed. *Pereopods* II–IV basis dorsal margin elongate setae divided into proximal and distal cluster. *Pleopod* II endopod appendix masculina distal tip truncate, with 6 setae on margin. *Uropod* protopod distoventral margin with 2 robust distally spinose setae and 2 robust simple setae.

Description based on male. *Coloration* in life creamy white, head with bright white patch in eye region; in 95% ethanol, cream with lighter white patch in eye region.

Head (fig. 59D) length shorter than width in dorsal view; width 0.82 pereonite 1 width; surface with dense cuticular hairs and scattered setae.

Pereon broad, width exceeding head width (1.32 head width); smooth. Typhlosole minimal, ventral invagination forming laminar projection in cross section.

Pleonites 2–4 respective lengths more than half length of pleonite 5 in dorsal view; *pleonites* 1–4 relative lengths unequal, increasing in length from anterior to posterior, width 0.84 composite length in dorsal view.

Pleotelson (figs 65A–B) lateral length 0.11 body length, 0.7 depth; dorsal length 1.06 width; depth 1.5 pereonite 7 depth. Dorsal surface with abundant long setae. Medial lobe width 0.35 pleotelson width, greatest length 0.06 pleotelson total length. Lateral lobes medial length 0.14 pleotelson total length; lateral lobes robust sensillate setae absent. Ventral margin anterior to uropods with 5 denticulate and smooth setae (posterior setae weakly denticulate), posterior seta subequal to anterior adjacent setae (length subequal posterior seta slightly thicker).

Antennula (figs 59E–H) length 0.1 body length, with 5 articles, 2 tiny aesthetascs on terminal article. *Antenna* (figs 59A–B) length 0.32 body length. Flagellum length 0.61 total antenna length, with 14–15 articles.

Mouthfield clypeus projecting anteriorly in medial region, width 0.48 head width. *Mandible* (fig. 60) palp length 0.64 mandible length; article 3 with 6 setae; articles 1–2 with elongate setal row. Left spine row with 11 spines, 8 bifurcate, total count including 3 on margin between pedunculate projection and molar. Right spine row with 15 spines, 9 bifurcate, including 6 on margin between pedunculate projection and molar. Molar process length subequal to width; complex setulate spines forming posterior row (both sides). *Maxillula* (figs 61B–D) medial lobe length 0.85 lateral lobe length; width 0.73 lateral lobe width. Lateral lobe distal margin with 4 denticulate robust setae, 8 smooth robust setae. *Maxilla* (figs 61E–F) medial lobe width 0.8 outer lateral lobe width. *Maxilliped* (figs 61G–H) endite with 4 receptaculi on right side; dorsal ridge with 13 large distally denticulate plumose setae. Palp insertion on basis ventral surface with 9 subdistal smooth setae (forming row).

Pereopod I (fig. 62A) dactylus length subequal to palm; ventrodorsal margin thin denticulate spines along 0.51 total length. Propodus dorsal margin with 5 setae in several groups between proximal and distal margin (excluding distal group). Propodal palm concave, with 6 stout serrate setae and 4 elongate broad based setae. Basis ventrodorsal proximal margin with 8–14 elongate setae. *Pereopod* IV (fig. 63B) dactylus length subequal to propodal palm. Propodus with 4 broad based setae on ventral margin, 1 distinctly larger than others; articular plate longer than dactylar claw. *Pereopods* V–VII (fig. 63C) basis dorsal ridge in cross section angular.

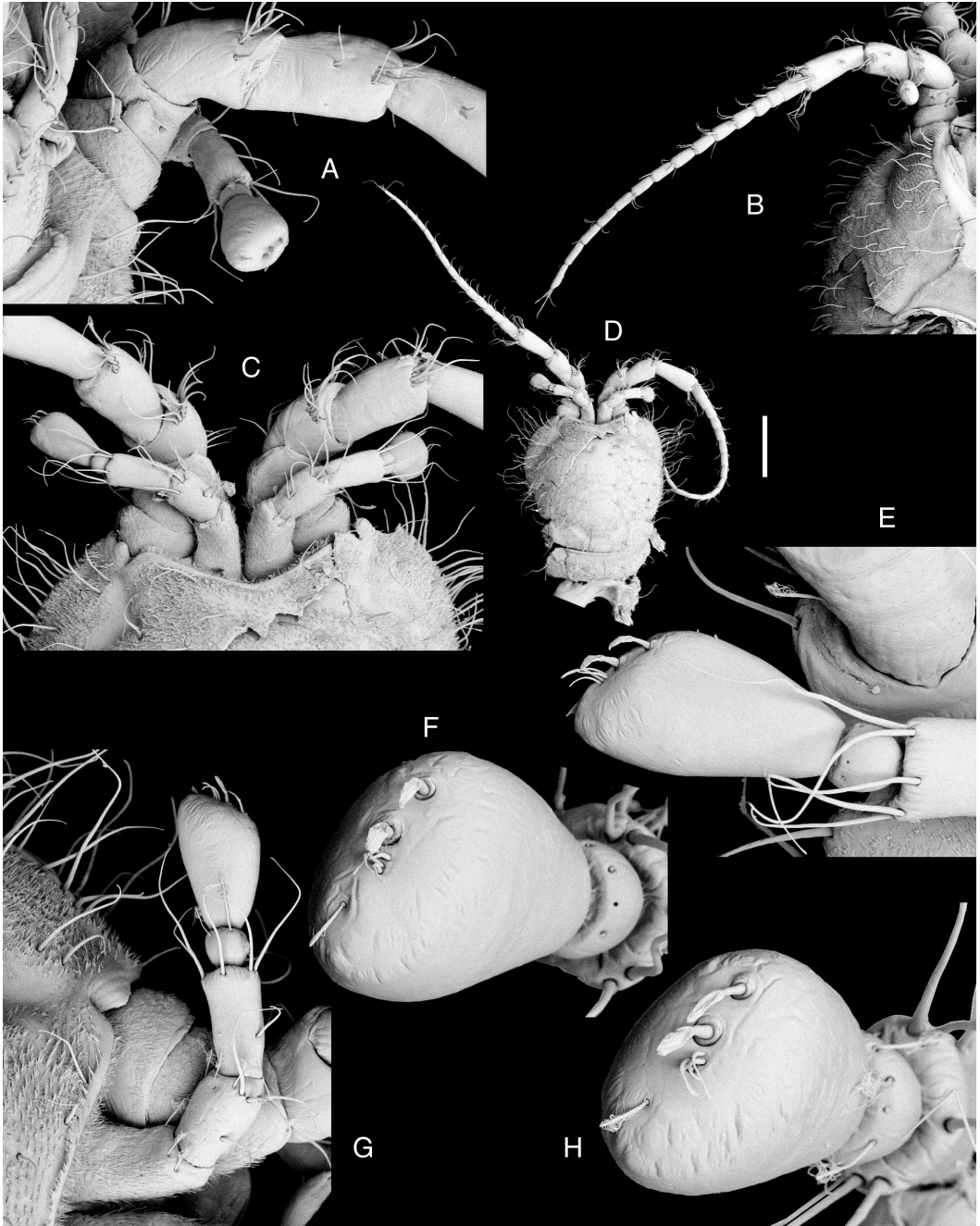


Figure 59. *Gariwerdeus ingletonensis* gen. nov., sp. nov. Paratype female (AM P61433), paratype male (AM P61432). A–B, female antennula and antenna. C–D, male head, antennula and antenna, dorsal view. E–F, male antennula distal articles. G, female antennula, dorsal view. H, female antennula distal articles. Scale bar 0.5 mm.

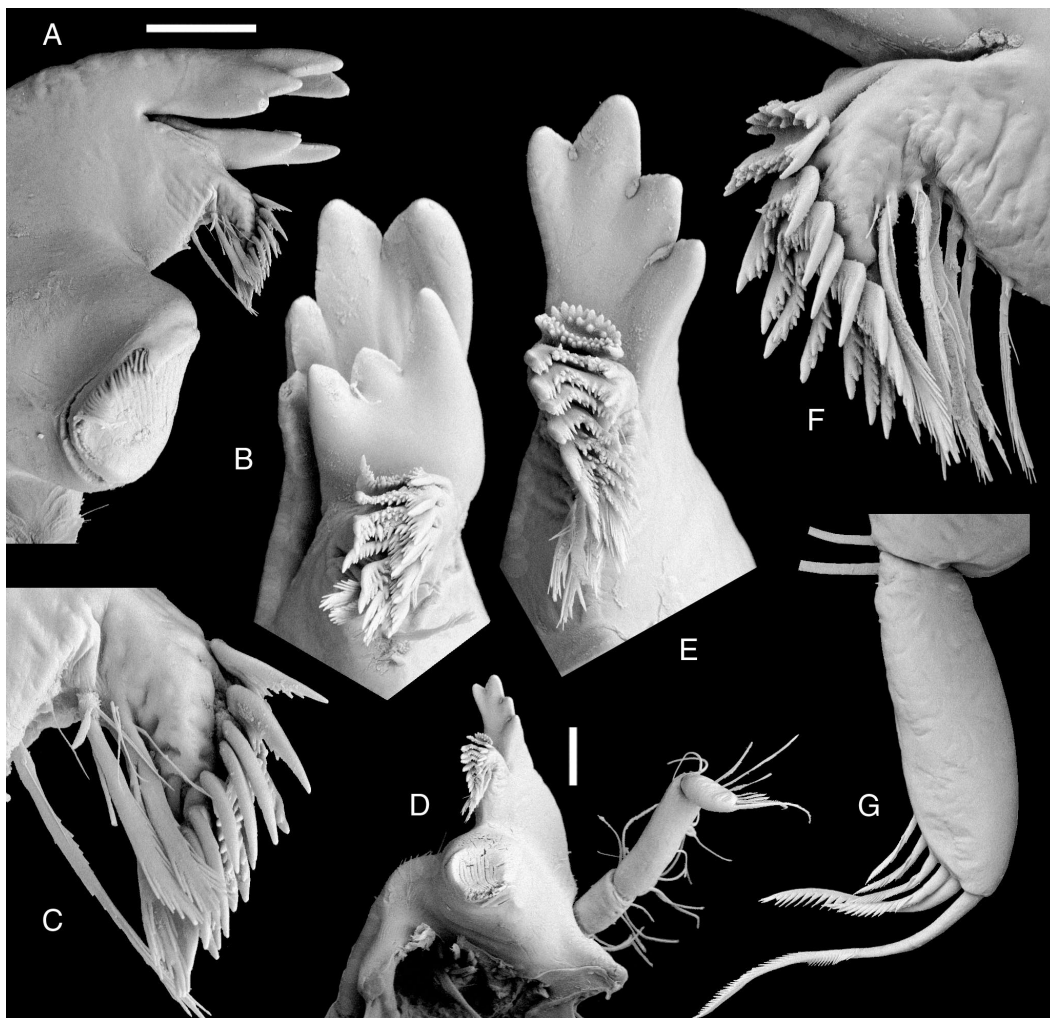


Figure 60. *Gariwerdeus ingletonensis* gen. nov., sp. nov. Paratype male (AM P61432). A–C, G, left mandible. D–F, right mandible. Scale bar 0.1 mm.

Penes (fig. 63F) length 0.19 body width at pereonite 7, distally tapering.

Pleopod I (figs 64, 63D–E) exopod distal margin rounded, medial margin concave from proximal to distal half, subparallel to lateral margin, dorsal surface lacking setae. *Pleopod II* endopod appendix masculina length 0.54 pleopod length.

Uropod (figs 65A, C–D) total length 1.22 pleotelson length. Protopod length 0.46 uropod total length; dorso-medial margin in dorsal view concave laterally, margin setae present distally. Exopod length 0.8 endopod length.

Sexual dimorphism, female differences. *Antenna* flagellum length 0.63 total antenna length, with 12–14 articles. *Pereopod I* (figs 62B–D) dactylus ventrodistal

margin with 8 broad cuticular fringe spines. *Pereopod IV* propodus with 1 broad based seta on ventral margin. *Uropod* total length 1.1 pleotelson length; exopod length 0.89 endopod length.

Distribution. Ingleton Spring, Grampians National Park.

Remarks. An abbreviated antennule, consisting of only 5 segments, is the most distinctive feature of *Gariwerdeus ingletonensis* sp. nov. The inflated, distally expanding distal antennular segment is a composite of two segments with their articulation being unexpressed, but with two separate aesthetascs present. This morphology is similar to

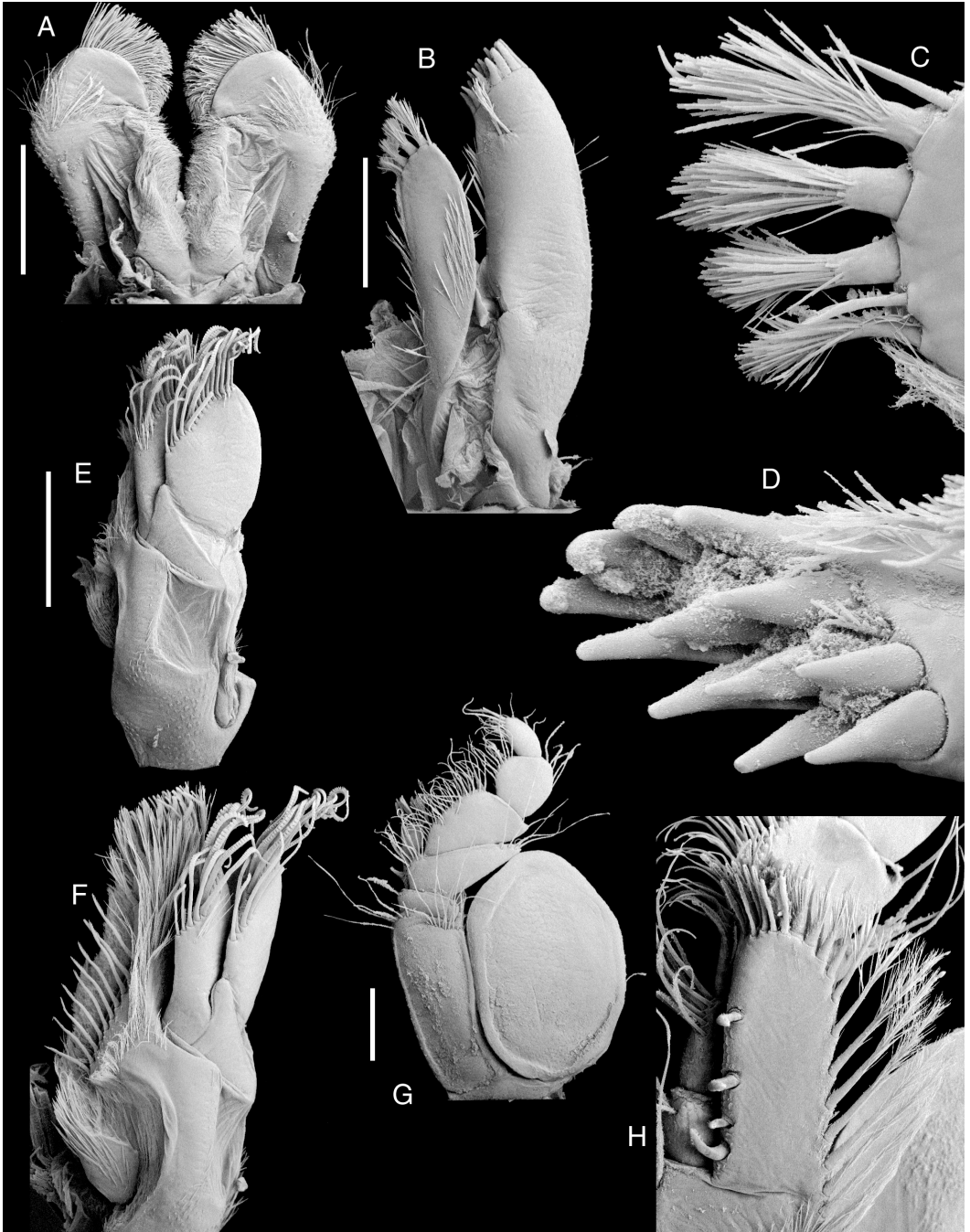


Figure 61. *Gariwerdeus ingletonensis* gen. nov., sp. nov. Paratype male (AM P61432). A, paragnaths. B–D, maxillula. E–F, maxilla. G–H, maxilliped. Scale bar 0.2 mm.

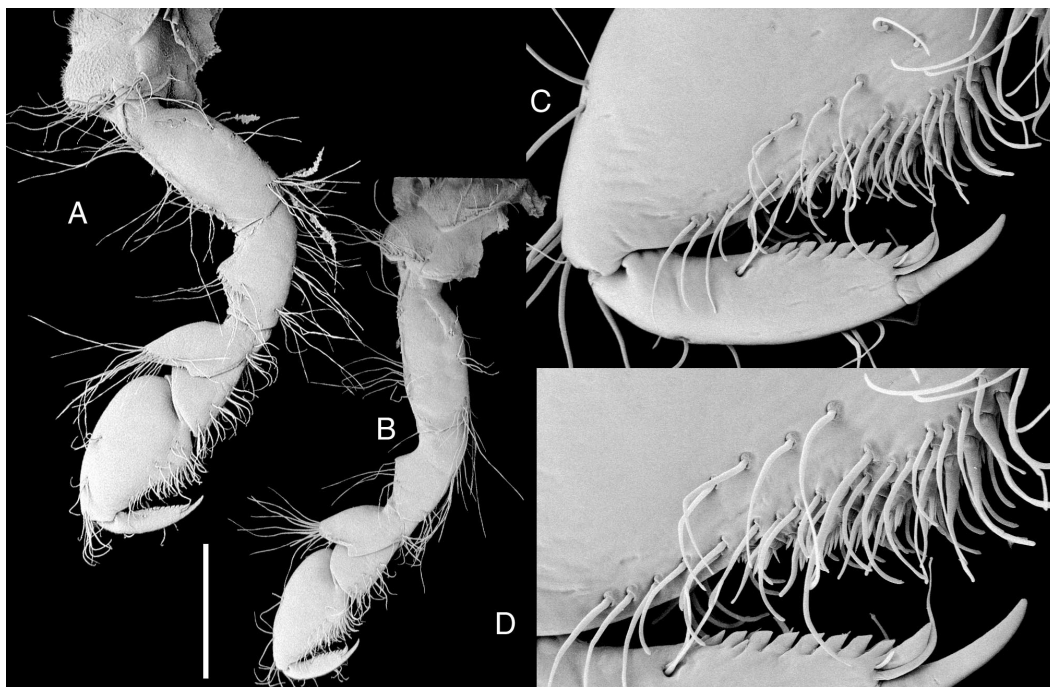


Figure 62. *Gariwerdeus ingletonensis* gen. nov., sp. nov. Paratype male (AM P61432), paratype female (AM P61433). A, male pereopod I. B–D, female pereopod I. Scale bar 0.5 mm.

that seen in amphispodid species, where the terminal antennular segment is also composite. Of the two species of *Gariwerdeus* that lack robust setae on the medial lobe of the pleotelson, *G. ingletonensis* has a more rounded posterodorsal margin of the pleotelson in lateral view than *G. turretensis* where the pleotelson appears almost truncate in lateral view.

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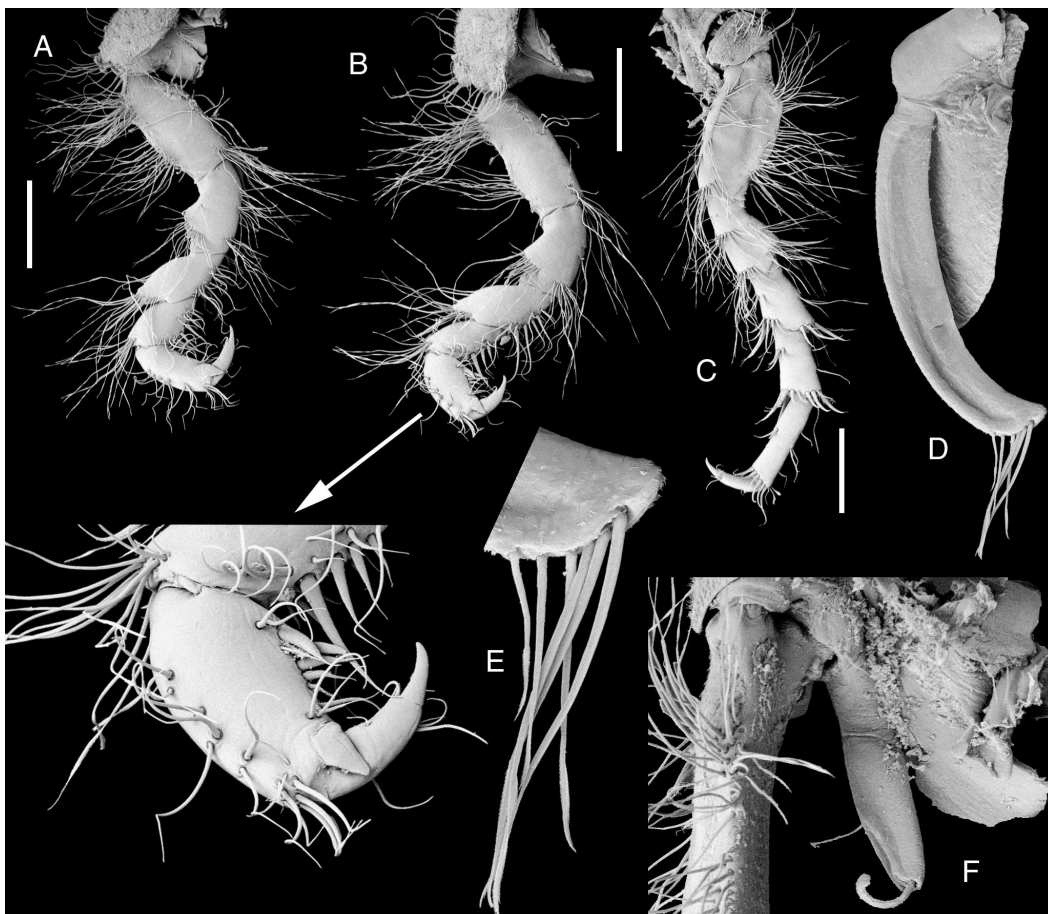


Figure 63. *Gariwerdeus ingletonensis* gen. nov., sp. nov. Paratype male (AM P61432). A, pereopod II. B, pereopod IV. C, F, pereopod VII, including proximal articles, with penes. D–E, pleopod II appendix masculina. Scale bar 0.5 mm.

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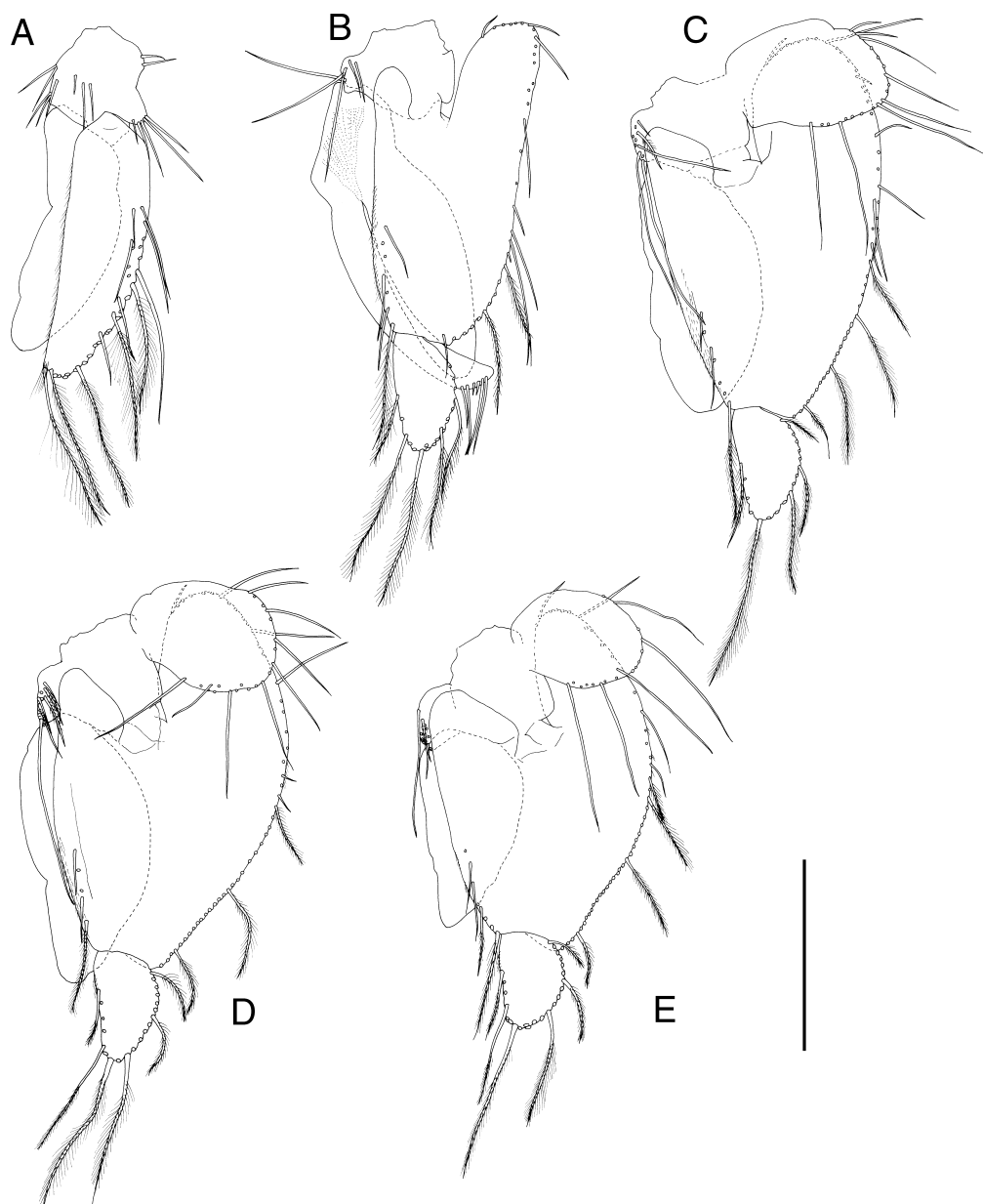


Figure 64. *Gariwerdeus ingletonensis* gen. nov., sp. nov. Paratype male (AM P61444). A–E, pleopods I–V. Scale bar 0.5 mm.

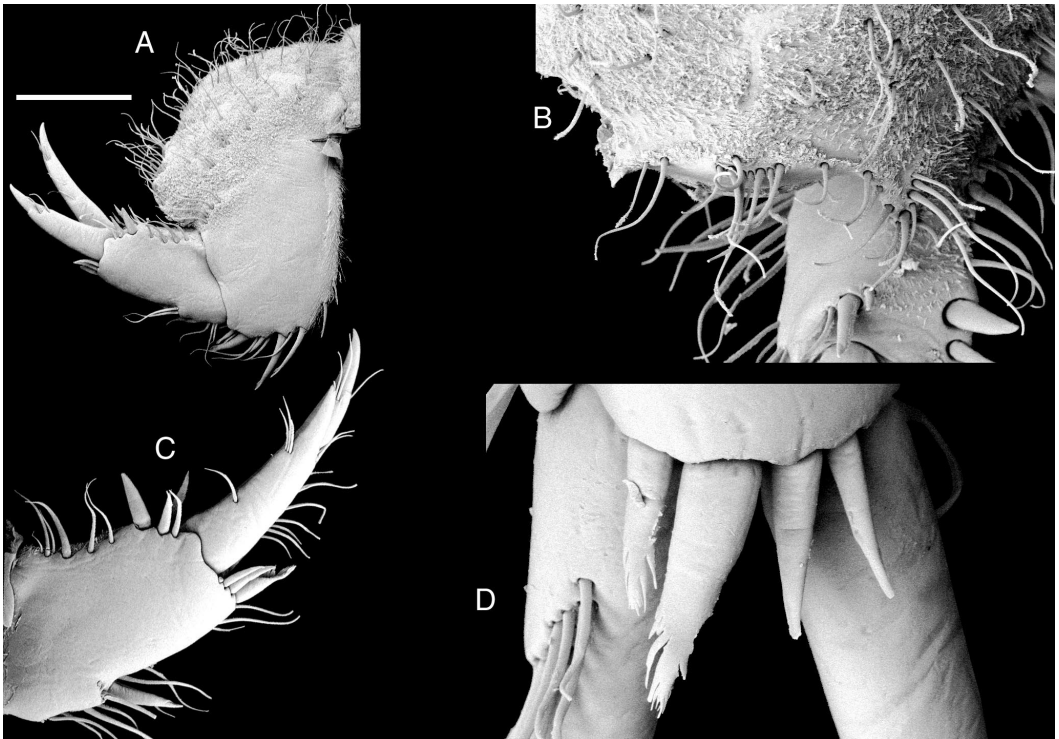


Figure 65. *Gariwerdeus ingletonensis* gen. nov., sp. nov. Paratype male (AM P61432). A–B, pleotelson and uropod, lateral and dorsal views. C, uropod, medial view. D, uropod protopod distal margin, ventral view. Scale bar 0.5 mm.

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