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Australian Species of *Nerocila* Leach, 1818, and *Creniola* n. gen. (Isopoda: Cymothoidae), Crustacean Parasites of Marine Fishes

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ABSTRACT. The genus *Nerocila* is rediagnosed, and the Australian species revised and redescribed in full. Species represented are *Nerocila orbignyi* (Guérin-Méneville), *N. congener* Miers, *N. phaiopleura* Bleeker, *N. barramundae* n. sp., *N. lomatia* n. sp., *N. monodi* Hale, *N. serra* and *Nerocila* sp. The genus *Emphyllia* Koelbel is synonymised with *Nerocila*. The new genus *Creniola* is created for the species *C. laticauda* (Schiödte & Meinert), *C. saurida* (Avdeev), and *C. breviceps* (Schiödte & Meinert) from Hawaii.

Several new synonymies are reported: *Nerocila cebuana* Schiödte & Meinert and *Nerocila philippinensis* Bovallius are synonymised with *N. congener*; *Nerocila laevinota* Miers is synonymised with *N. sundaica* Bleeker; *Nerocila maculata*, *N. affinis*, *N. adriatica*, *N. australasiae*, *N. cephalotes*, *N. macleayii*, *N. neapolitana*, *N. novaezelandiae*, *N. tartowskii*, *N. trailli*, *N. laticeps*, *N. vittata* and *Rosca rogans* are placed in synonymy with *Nerocila orbignyi*. The history of *Nerocila orbignyi* is fully discussed, and the species is distinguished from related species. The following species are regarded as *nomina dubia*: *N. aculeata* Dana, *N. aculeata* Edwards, *N. falklandica* Cunningham, *N. brasiliensis* Dana, *N. latiuscula* Dana, *N. tenuipes* Dana, *N. brongnartii* (Risso) and *N. cuspidata* Costa. The subfamily Anilocrinae Schiödte & Meinert is rediagnosed. Host preferences, morphological variability and distribution are discussed.

Notes and some figures are given on other poorly known Indo-Pacific genera, and a list of all species of *Nerocila* is provided. A key to the Indo-Pacific genera of Anilocrinae, and keys to the Australian species of *Nerocila* and *Creniola* are provided.

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This is the third study of a series dealing with Australian genera and species of the externally attaching lineage of the Cymothoidae. The two previous works (Bruce, 1987a, 1987b) dealt with the genera *Anilocra* Leach, *Pleopodias* Richardson and *Nerocila* Miers.

Nerocila poses some special problems compared with related genera. While most cymothoids are considered to be morphologically more variable than other flabelliferan families, recent work (Bruce, 1986, 1987a, b; Williams & Williams, 1980, 1981) has shown that once taxonomically useful species characters have been discerned the variation is far less than previously supposed. This is not the case for *Nerocila*. Variation within *Nerocila* is not yet fully documented, but certain species are very variable. The species for which variability has been documented, at least in part, are: *Nerocila acuminata* (see Brusca, 1981); *Nerocila sundaica* (in excellent detail by Bowman, 1978); *Nerocila armata* and *Nerocila orbigny* (Monod, 1931); *Nerocila orbigny*, *Nerocila monodi*, *Nerocila phaiopleura* (present study). As is demonstrated here by *Nerocila orbigny* from Walpole, WA, this variation occurs within a single isopod population, that is from one host species in one locality. Variation can rarely be correlated to geographic, host or habitat differences.

The problems caused by such variability are exemplified by the complex and lengthy synonymy for *Nerocila orbigny*, where 16 species names are placed in synonymy, including two *nomina nuda*, three *nomina dubia*, and a further two probable synonyms. Because of this variability and the inadequacy of the many earlier descriptions, there are several species in the literature that cannot reliably be

recognised. To try to bring some order into this genus I have provided an annotated list of all current species names for *Nerocila*, with notes on their current status, need of revision, and most useful recent literature. In some cases supplementary figures have been given to assist in species recognition.

Use of subfamily names within the Cymothoidae has been erratic. In their monograph Schiödte & Meinert (1879–1884) proposed the following classification.

- Cymothoarum (= superfamily Cymothoidea)
 - Aegidae Dana
 - Anilocridae Schiödte & Meinert
 - Saophridae Schiödte & Meinert
 - Cymothoidae Leach
 - Tribe Ceratothoinae (= subfamily)
 - Tribe Cymothoinae
 - Tribe Lironecinae

This classification was little used by later workers, all of whom recognised the Aegidae and Cymothoidae as two readily distinguished families within the Flabellifera, and the Anilocridae and Saophridae as part of the Cymothoidae. Of recent workers only Trilles (e.g. 1979) has consistently followed Schiödte & Meinert's (1881–1884) system, using the family names Anilocridae and Cymothoidae but placing them within Cymothoidae. Schiödte & Meinert's classification was highly perceptive, recognising the major difference between genera attaching externally (*Anilocra* and related genera) and those attaching to the gills or in the mouth ('Cymothoidae'). Within the latter they recognised three clear generic groups (Schiödte & Meinert's (1883) family Saophridae clearly belongs within their

Ceratothoinae). Their classification is supported in part by Brusca's (1981) analysis which recognises a major division between the gill/buccal lineage (= Cymothoidae and Saophridae) and the externally attaching lineage (= Anilocridae).

I propose to recognise the subfamily Anilocrinae and offer a diagnosis that separates it from other genera. At present I do not intend to attempt to define another subfamily (other than by 'not Anilocrinae'). There is at present a lack of understanding of cymothoid characters, and the larger genera *Lironeca*, *Ceratothoa*, *Cymothoa* and most of their species, are urgently in need of revision. Until detailed description of the greater proportion of species has been undertaken, generic characters cannot be assessed, and similarly for genera on an analysis of subfamily characters. Notwithstanding, it is evident to most who study the Cymothoidae that the gill attaching and buccal attaching genera form two distinct groups. Convergence can be argued, but when a species of a gill attaching genus (e.g. *Mothocya ihi* Bruce, 1986) secondarily becomes buccal attaching, it still retains the essential characters of the gill attaching genera. Similarly, *Nerocila lomatia* which attaches in the gill cavity cannot be confused with genera such as *Lironeca* or *Mothocya*.

Methods

Methods used follows Bruce (1987a), with the notable exceptions that no new material was obtained by personal collecting and that no specimen (other than *N. lomatia*) was examined in association with its host. Many of the isopods examined here are from trawled or netted fish. *Nerocila* species (and many other cymothoids) detach readily when the host is removed from water, and the possibility exists that some host records may be erroneous. Repeated records from the same host are regarded as good evidence of actual host use. No host identifications were made by the Australian Museum fish section, and are presumed to have been made by the collectors. All host names have been confirmed by the Australian Museum fish section.

All isopod length measurements are in millimetres.

Abbreviations

AM	Australian Museum, Sydney, NSW, Australia
BMNH	British Museum (Natural History), London
MCZ	Museum of Comparative Zoology, Harvard University, Massachusetts, USA
MNHN	Muséum National d'Histoire Naturelle, Paris, France
NMV	Museum of Victoria, Melbourne, Australia

NRS	Naturhistoriska Riskmuseet, Stockholm, Sweden
NMW	Naturhistorisches Museum, Vienna
NSW	New South Wales, Australia
NSW SF	New South Wales State Fisheries
NT	Northern Territory, Australia
NTM	Northern Territory Museum, Darwin, Australia
Qld	Queensland, Australia
QM	Queensland Museum, Brisbane, Australia
SA	South Australia
SAM	South Australian Museum, Adelaide, Australia
Tas	Tasmania, Australia
USNM	Smithsonian Institution (Natural History), Washington, D.C., USA
Vic	Victoria, Australia
WA	Western Australia
WAFRI	West African Fisheries Research Institute
WAM	Western Australian Museum, Perth, Australia
ZMA	Zoologisch Museum, University of Amsterdam, Netherlands
ZMB	Zoologisches Museum der Humboldt-Universität zu Berlin, Deutsche Demokratische Republic
ZMC	Zoologisk Museum, Copenhagen, Denmark.

Host Preferences of *Nerocila* and *Creniola*

The host records for Australian *Nerocila* are summarised in Table 1. From this and the accounts of Brusca (1981) and Trilles (1975b) it can be seen that *Nerocila* species show little preference to a particular host family or genus. This contrasts strongly with the available data for *Anilocra* (Bruce, 1987a; Williams & Williams, 1981) and *Renocila* (Bruce, 1987b; Williams & Williams, 1980). *Nerocila monodi* is here recorded from five host families (seven species in seven genera), and *Nerocila orbignyi* from 11 host families (ten species in ten genera). In contrast only three species of *Anilocra* were found on two host families, the other three occurring only on one family (Bruce, 1987a).

The closest approximation to specificity is that in certain areas a particular host may be more commonly used. In southern Western Australia *Nerocila orbignyi* is most frequently recorded from *Pseudocaranx dentex*. In Queensland *Nerocila monodi* is most often recorded from species of Sparidae. Similarly Bowman and Tareen (1983) found that *Nerocila phaiopleura* occurs most often on species of Clupeoidea. The two Australian species of *Creniola* both utilise benthic hosts associated with soft bottom habitats.

Position on the host has not been widely recorded, but is most commonly the caudal peduncle (a position

occasionally used by some *Anilocra* species) or attached to the base of pectoral or dorsal fin. Table 1 presents a list of known hosts of Australian species of *Creniola* and *Nerocila*.

Distribution

The distribution of Australian *Nerocila* species is shown in Figs 29 and 30, and that of *Creniola* in Fig. 31. Two species have an extensive southern distribution: *Nerocila orbignyi* and *Creniola laticauda*, both extending from southern Western Australia to central New South Wales. *Creniola laticauda* is endemic to southern Australia. *Nerocila orbignyi* occurs from New Zealand and southern Australia to South Africa, and along the eastern Atlantic north to Holland and east into the Mediterranean.

All of the remaining species occur north of about 30°S. Of these, three are known only from Australia: *N. barramundae*, *N. lomatia* and *N. monodi*. All three have wide distribution within Australia. *Creniola saurida*, *Nerocila congener* and *N. phaiopleura* are

widely distributed Indo-West Pacific species.

Latitudinally the greatest diversity is found within the tropics, as is also shown by the genera *Anilocra* and *Renocila*. The genus *Nerocila* is more successful in colonising temperate waters than other anilocrine genera, and in Australia is the only genus with representatives occurring south of about 27°S.

Taxonomy

Anilocrinae Schiödte & Meinert, 1881

Diagnosis. Cephalon not deeply immersed in pereonite 1. Pleonite 1 always as wide as pleonite 2. Pleonites ventrally extended. Antennule basal articles (1–3) distinctly wider than remaining articles. Maxilla medial lobe partly fused to lateral lobe. Pereopods with basis never expanded, articles never dilated. Brood pouch formed of two major oostegites arising from coxae 6 (other oostegites small) and posterior pocket. Pleopod 5 endopod with 2 or 3 complexly folded lobes, distal margin indented.

Type genus. The genus *Anilocra* Leach, 1818, is the type genus for the subfamily.

Table 1. Australian species of *Nerocila* and *Creniola* and their associated hosts. (* = isopod specimens not seen; + name not confirmed).

ISOPOD	HOSTS	LOCALITIES
<i>Creniola laticauda</i>	Platycephalidae	<i>Platycephalus richardsoni</i> *
		<i>Platycephalus</i> sp.
	Zeidae	<i>Zeus</i> sp.
	Rajidae	<i>Raja australis</i> *+
<i>Creniola saurida</i>	Synodidae	<i>Saurida tumbil</i>
	Scorpaenidae	<i>Hypodytes carinatus</i>
	Tetraodontidae	<i>Spheroides multistriatus</i>
	Triglidae	<i>Satyrichthyes welchi</i>
<i>Nerocila barramundae</i>	Latidae	<i>Lates calcarifer</i>
	Lobotidae	<i>Lobotes surinamensis</i>
<i>Nerocila lomatia</i>	Clupeidae	<i>Pellona ditchella</i>
	Mugilidae	<i>Mugil georgii</i>
<i>Nerocila monodi</i>	Carangidae	<i>Carangoides humerosus</i>
	Lutjanidae	<i>Lutjanus</i> sp.
	Nemipteridae	<i>Nemipterus hexodon</i>
	Pomadasiidae	<i>Pomadasyus hasta</i>
	Priacanthidae	<i>Priacanthus macracanthus</i>
	Sparidae	<i>Acanthopagrus australis</i>
		<i>Chrysophrys auratus</i>
		<i>Rhabdosargus sarba</i>
<i>Nerocila orbignyi</i>	Callorhynchidae	<i>Callorhynchus milii</i>
	Carangidae	<i>Pseudocaranx dentex</i>
	Dactylopenidae	<i>Dactylopena orientalis</i>
	Kyphosidae	<i>Girella tricuspidata</i> *
	Molidae	<i>Mola mola</i>
	Mugillidae sp.	
<i>Nerocila phaiopleura</i>	Platycephalidae sp.	
	Pomatomidae	<i>Pomatomus saltatrix</i>
	Silliganidae	<i>Sillago bassensis</i>
	Sparidae	<i>Acanthopagrus butcheri</i>
		<i>Chrysophrys auratus</i>
		<i>Chelidonichthys kumu</i>
		<i>Liza argentea</i>
		<i>Engraulis australis</i>
	<i>Cnidoglanus macrocephalus</i>	
		Off Coffs Harbour, NSW (Hooper, 1983)
		Off Montague Island, NSW
		Off Kiama, NSW
		Port Willunga, S.A. (Hale, 1926)
		Moreton Bay, Qld.
		Arafura Sea, NT
		North Qld.
		Qld Coral Sea
		Gulf of Carpentaria
		Rockhampton, Qld.
		Townsville, Qld.
		Moreton Bay, Qld.
		Arafura Sea, NT
		Palm Group, Qld.
		Arafura Sea
		Townsville, Qld.
		Moreton Bay, Qld.
		Southeast Qld.
		Southeast Qld.
		Tin Can Bay, Qld.
		Bass Strait
		Southern WA
		South Coast, Tas.
		Lake Illawarra, NSW
		(O'Connor, 1978)
		Off NSW
		Port Hacking, NSW
		Victoria
		Nornalup, WA
		Tasmania
		The Coorong, SA
		Sydney area, NSW
		Off Eden, NSW
		Proserpine, Qld.
		Swan River, WA
		Swan River, WA

Remarks. Brood pouch morphology has been ignored by taxonomic workers. Only one report (Trilles, 1973b) compares the brood pouch of different genera, and other than in Bruce (1986) it remains undescribed and unfigured for all species. This is in contrast to the Sphaeromatidae where brood pouch morphology is a major generic character (Harrison, 1984).

Within the Cymothoidae there are two types of brood pouch. The Anilocrinae have a brood pouch formed from overlapping pairs of oostegites arising from coxae 1–4 and 6, those of coxae 6 being very large, and forming the part of the marsupium which contains the developing embryos. The remaining oostegites are very much smaller, and those of coxae 1–3 do not enclose embryos in *Anilocra* and *Nerocila*.

The posterior of the brood pouch is enclosed by a laminar posterior pocket formed from the posterior of sternite 7. This flap occupies the full width at the posterior and extends anteriorly beneath the oostegites. The flap is considerably thicker than the oostegites. Figures 1A–C illustrates its shape in three anilocrine genera.

In the other marine genera the brood pouch is formed by paired oostegites arising from coxae 1–4 and 6, 1–5 or 2–5, but all oostegites form part of the marsupium. There is no posterior pocket, and the oostegites of coxae 6 curve under to enclose the marsupium. Such a brood pouch occurs in *Mothocya* (figured by Bruce, 1986), *Cterissa* (Trilles & Paperna, 1980), *Lironeca* (Fig. 1E) and *Ceratothoa* (Fig. 1D, and photographs of Trilles, 1973a), *Cymothoa*

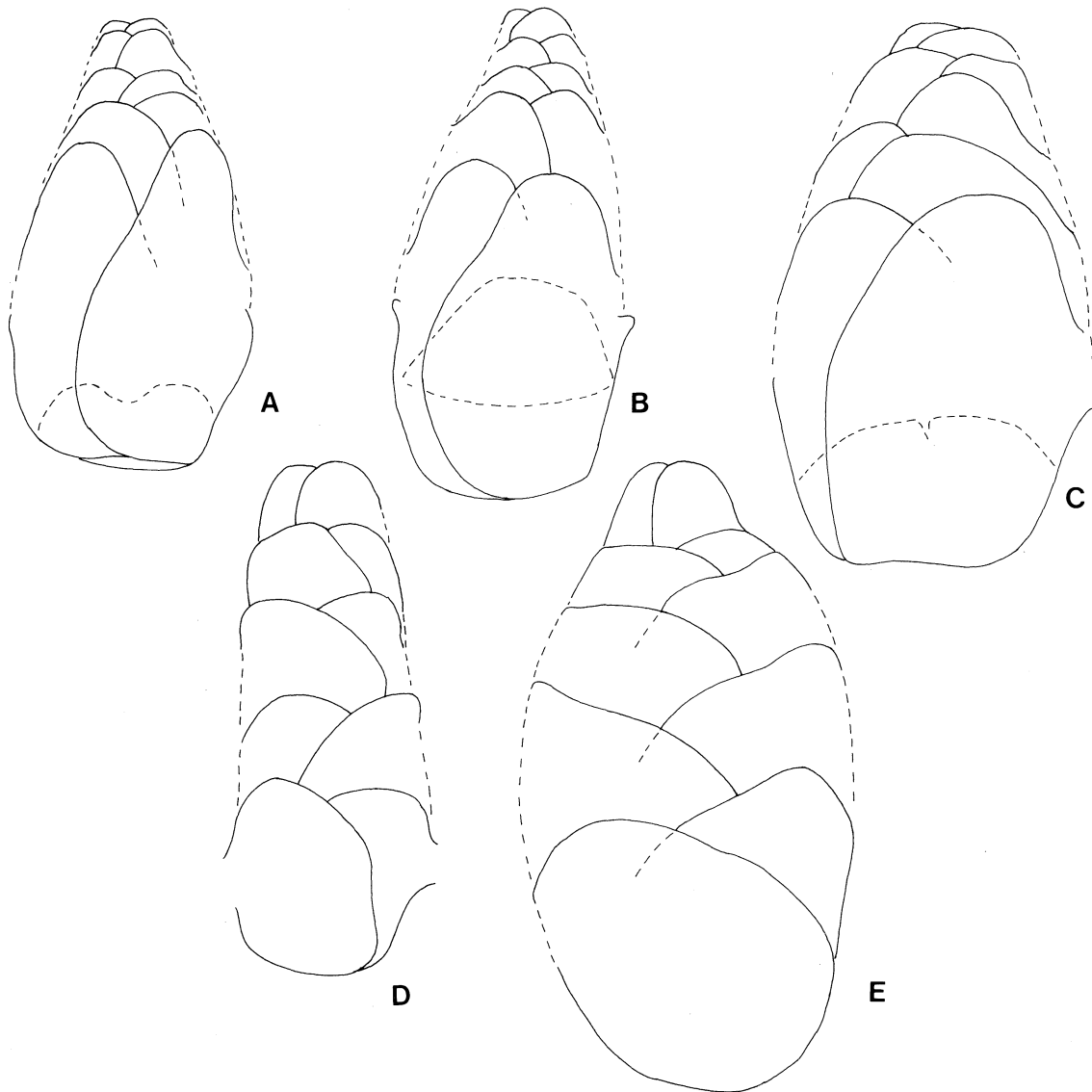


Fig. 1. Brood pouches: **A**, *Anilocra nemipteri* Bruce (AM P37824); **B**, *Nerocila orbigny* (AM P37149, female #2); **C**, *Nerocila ovata* Miers (WAM 611-85); **D**, *Ceratothoa trigonocephalon* (Leach, 1818) (AM P37262); **E**, *Lironeca raynaudii* Edwards (AM P37780).

(photographs of Trilles, 1975c).

Coupled with the differences in brood pouch morphology are the differences in pleon and pleopod morphology (Fig. 2). Anilocrinae have pleon lateral margins extending, partly concealing the pleopod peduncles in lateral view. No Anilocrinae has narrow pleonites 1 or 2, a common condition in other genera. The genera *Anilocra*, *Nerocila* and *Creniola* have lobes on the posterior surface of the endopods of pleopods 3 and 4, and the endopod of pleopod 5 complexly folded; pleopods 3–5 have the endopod

proximomedial lobe folded (these pleopod characters are less developed in *Pleopodias* and *Renocila*). In contrast the pleopods of *Mothocya* (see Bruce, 1986), *Lironeca* (most species), *Ceratothoa*, and *Cymothoa* (there are virtually no figures available for *Cymothoa* pleopods except those of Brusca, 1981) are all essentially laminar.

At present there is insufficient descriptive data on many cymothoid genera, and it is probable that as other genera are revised, some will be found to belong to the Anilocrinae. *Lironeca convexa* (see Brusca,

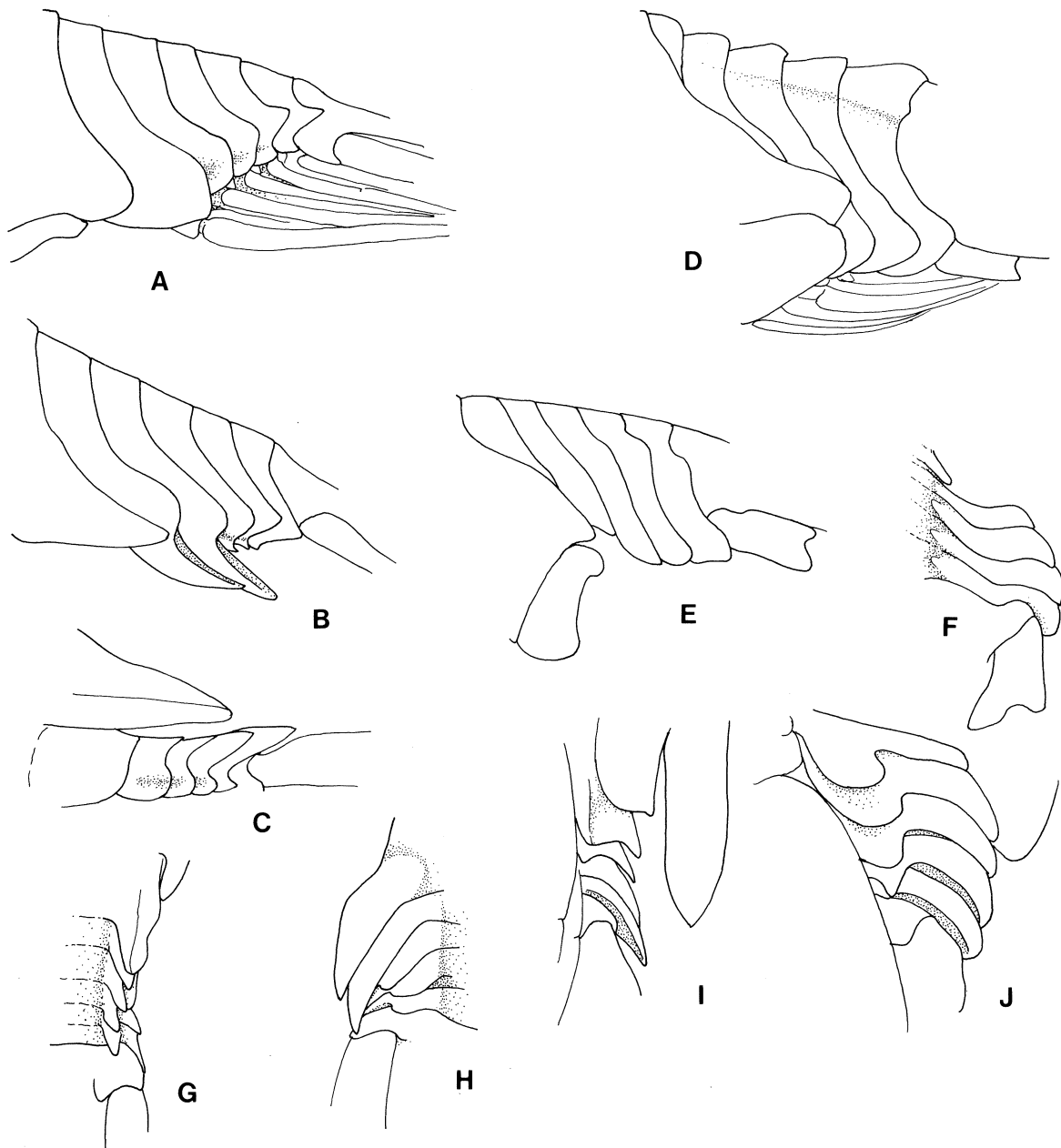


Fig. 2. Pleon morphology: A–E, lateral view; F–J, ventral view. A, *Anilocra nemipteri* (AM P37824); B, *Nerocila orbignyi* (AM P37149, female #2); C, *Renocila ovata*, ventrolateral view (WAM 611-85); D, *Lironeca raynaudii* (AM P37780); E, *Ceratothoa trigonocephalon* (AM P37262); F, *Ceratothoa trigonocephalon*; G, *Anilocra nemipteri*; H, *Nerocila orbignyi*; I, *Renocila ovata*; J, *Lironeca raynaudii*.

1981) has a pleopod and pleon morphology that suggests it would be better placed in the Anilocrinae. I examined the type material of *Enispa irregularis* (Bleeker) which similarly has a brood pouch, pleonal, pereopodal and pleopod morphology that conforms to the Anilocrinae. *Enispa* needs to be fully rediagnosed before it can formally be transferred to the Anilocrinae.

The division of the Cymothoidae into three "lineages" has been suggested by Brusca (1981). The lineages are essentially externally attaching genera, the gill-buccal genera and the paraphyletic (Brusca 1981) flesh burrowing genera. Although it is possible to unambiguously define the Anilocrinae, substantial revisionary work is required before the gill-buccal

and flesh burrowing lineages can be diagnosed and their status assessed.

Although few data are available on character state polarity within the Cymothoidae, certain characters given in the diagnosis above can be recognised as apomorphic and unique to the Anilocrinae: brood pouch with the anterior oosategites reduced and with a posterior pocket; maxilla medial lobe fused to lateral; pleopod 5 with massively folded endopod.

Figures of the brood pouch are given for *Nerocila* and *Renocila*, and for the genera *Lironeca* and *Ceratothoa* (Fig. 1). Pleon morphologies for the anilocrine genera, and the genera *Lironeca*, *Ceratothoa* are given in (Fig. 2).

Key to the Indo-Pacific Genera of Anilocrinae

1. Cephalon posterior margin trisinate; coxae 5–7 as long as, or longer than respective pereonite (except *N. lomatia*). 2
 —Cephalon posterior margin not trisinate; coxae 5–7 manifestly shorter than respective pereonite. 5
2. Pleonites 1 and 2 ventrolateral margins produced. *Nerocila*
 —Pleonites 1 and 2 ventrolateral margins not produced. 3
3. Body dorsal surface strongly vaulted; coxae 5–7 ventrally directed; pleonites strongly produced ventrally. *Plotor*
 —Body dorsal surface weakly vaulted; coxae 5–7 posteriorly directed; pleonites not strongly produce ventrally. 4
4. Uropod rami long, extending well beyond posterior of pleotelson; coxae conspicuous in dorsal view. *Amblycephalon*
 —Uropod rami short, not extending beyond posterior of pleotelson; coxae inconspicuous in dorsal view. *Creniola*
5. Cephalon without rostrum, or rostrum not projecting between antennule bases; antennule as long as, or longer than antenna; posterolateral margins of pereonites 5–7 produced; coxae 5–7 posteriorly acute. *Renocila*
 —Rostrum folded under, projecting between antennule bases; antennule shorter than antenna; posterolateral margins of pereonites 5–7 not produced; coxae posteriorly rounded. 6
6. Mandible palp article 3 shorter than article 2; maxilla with 2 short spines each on medial and lateral lobe, medial lobe partly fused to lateral; antennule articles 4–8 short; pleonites 3–5 or 4–5 about 0.7 width of pereon. *Anilocra*
 —Mandible palp article 3 longer than article 2; maxilla with 2 large nodular spines each on medial and lateral lobe, medial lobe distinct; antennule articles 4–8 elongate; pleonites 3–5 or 4–5 about 0.45 width of pereon. *Pleopodias*

Indo-Pacific Genera of Anilocrinae

Only two Indo-Pacific genera of the subfamily have not been recorded from Australian waters. *Rosca* (included in the key given by Bruce, 1987a) was synonymised with *Renocila* by Bruce (1987b).

Amblycephalon Pillai, 1954. The genus has a trilobed posterior margin to the cephalon which places it, in the key, among the genera allied to *Nerocila*. *Nerocila schadleri* Nierstrasz, 1915 agrees well with Pillai's (1963) diagnosis and is here transferred to *Amblycephalon*. Both *A. indicus* Pillai,

1954 and *A. schadleri* are in need of redescription before their status can be ascertained. Additional figures of the type of *Amblycephalon schadleri* n. comb. are given here (Fig. 3).

Plotor Schiödte & Meinert, 1881. Additional figures from the types are given here (Fig. 4). Known only from the type locality. The antennule of this species is longer and more robust than the antenna.

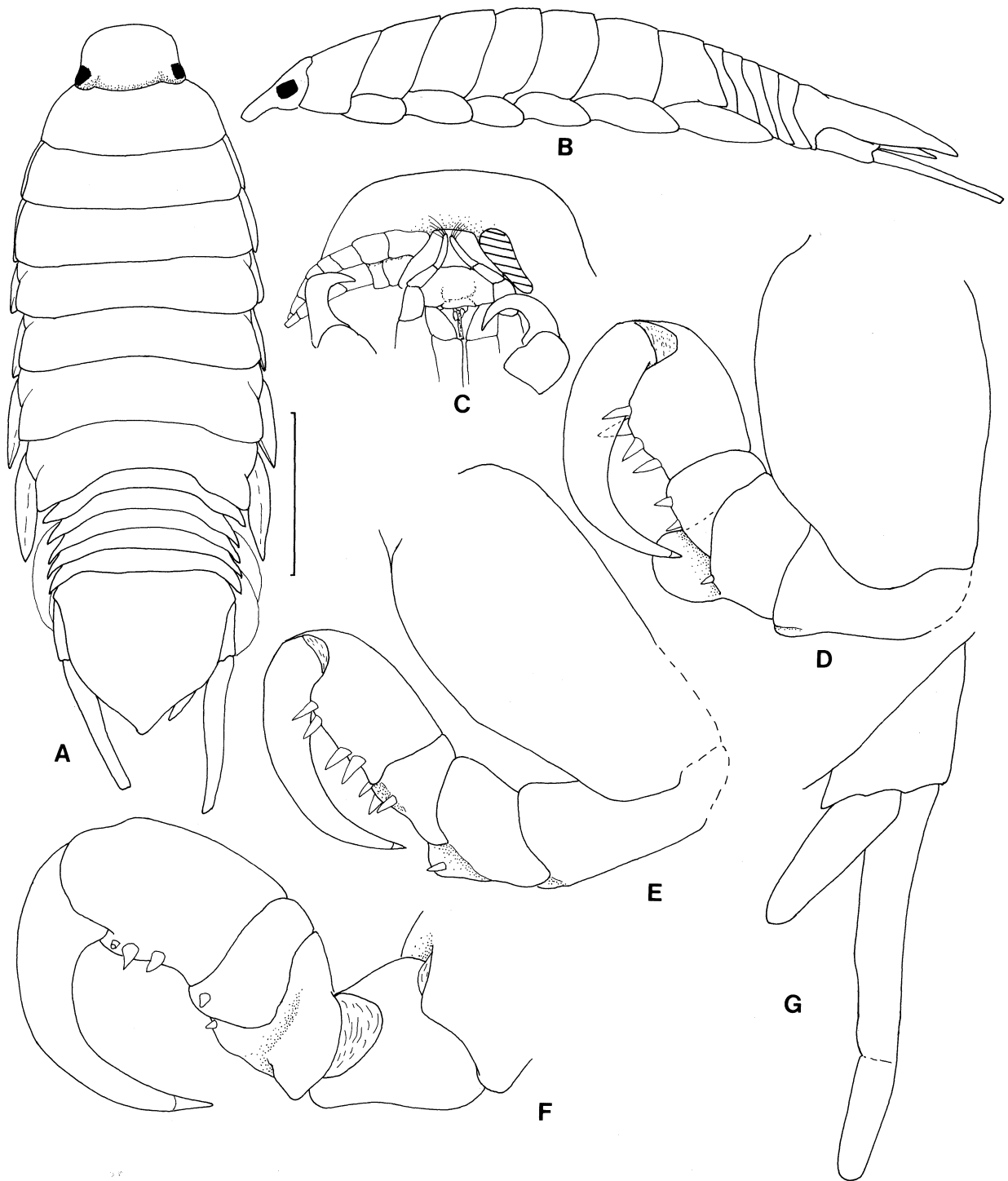


Fig. 3. *Amblycephalon schadleri* (Nierstrasz). Holotype (RMNH 8), Kisser, Irian Jaya, Indonesia, 1898, coll. H. Schadler. A, dorsal view; B, lateral view; C, frons; D, pereopod 6; E, pereopod 7; F, pereopod 3; G, uropod. All appendages drawn in situ. Scale line 4.0 mm.

***Nerocila* Leach**

Nerocila Leach 1818: 351.—Desmarest, 1825: 307; Edwards, 1840: 250; Dana, 1853: 747; Schiödte & Meinert, 1881: 4; Gerstaecker, 1882: 231; Richardson, 1905: 219; Hale, 1926: 202; Monod, 1931: 5; Van Name, 1936: 431; Barnard, 1936: 163; Brian & Darteville, 1949: 135; Szidat, 1955: 216; Kensley, 1978: 82; Kussakin, 1979: 275; Brusca, 1981: 150; Menzies & Kruczynski, 1983: 55; Brusca & Iverson, 1985: 45.

Ichthyophilus Latreille, 1802: 133.

Emphyilia Koelbel, 1879: 413

Pterisopodus Boone, 1918: 596.

Nerocila (*Emphyilia*).—Miers, 1880: 4; Bowman, 1978: 34.

Diagnosis of female. Body 2–3 times as long as wide, dorsoventrally flattened. Cephalon anterior margin wide, not rostrate, not folded back; posterior margin distinctly trilobed. Pleon manifestly narrower than pereon (0.6–0.7); ventrolateral margins of pleonites 1 and 2 produced. Mandible palp slender, elongate, article 1 longest; article 3 as long as, or longer than 2, with setae on distolateral margin. Pleopods 1–5 peduncles with lateral lobe; endopods of pleopods 1–5 with accessory lamella on proximomedial margin, becoming large and folded on pleopods 3–5; pleopod 5 endopod with 2 or 3 large folded lobes.

Additional characters. Body widest at pereonite 6. Eyes may be obscured. Coxae well developed, usually as long as, or longer than respective pereonite, visible in dorsal view. Posterolateral margins of pereonites 5–7 usually produced. Pleotelson flat.

Antennule with 8 articles, articles 1 and 2 conspicuously larger than 3–8. Antenna slender, longer than antennule, with 9–11 articles. Maxillule with 3–5 terminal spines. Maxilla medial lobe partly fused to lateral, 2 curved spines on each lobe. Maxilliped article 3 with 3–5 spines. Pereopods 1–5 basis increasing slightly in length towards posterior. Pereopods 6 and 7 longer than 5; pereopod 7 with or without spines. Brood pouch made up of 5 pairs of oostegites arising from pereonites 1, 2, 3, 4 and 6, and posterior pocket; last pair of oostegites extend over pleopods. Endopods of pleopods 3 and 4 each with single small fold. Pleopod 2 retains appendix masculina. Uropod exopod longer than endopod; both rami extend beyond posterior margin of pleotelson.

Male. Body narrower than female, but otherwise similar except that coxae, pereonite posterolateral margins and pleonites 1 and 2 have not yet developed the full female form.

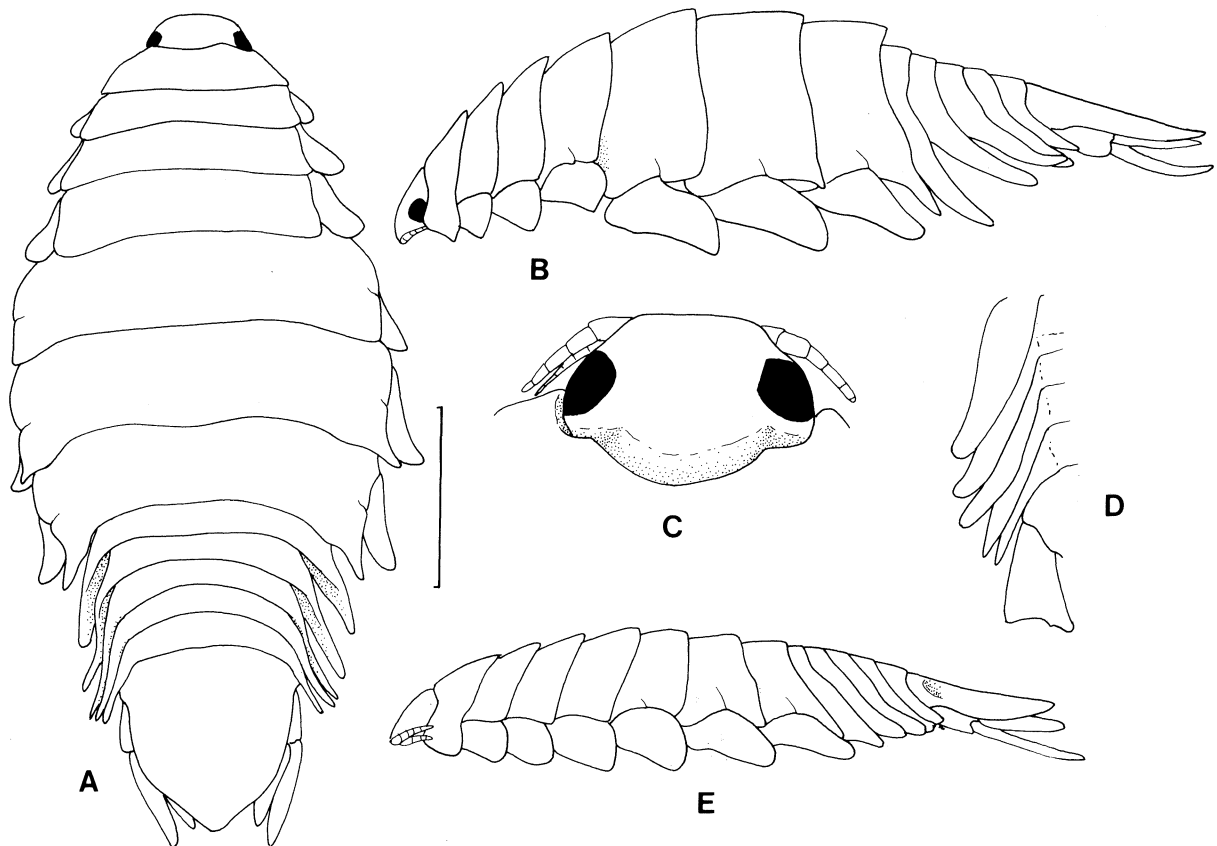


Fig. 4. *Plotor indus* Schiödte & Meinert. Female lectotype 13.5 mm, paralectotypes 11.0, 7.5 mm, 4°30'S, 37°0'E, 8 Jan 1875, Casparsen, ZMC. A–C, lectotype. A, dorsal view; B, lateral view; C, cephalon, dorsal view; D, paralectotype, 11 mm, ventral view of right pleonites; E, paralectotype, lateral view. Scale line 3.0 mm.

Type species. Leach (1818) clearly indicated *Nerocila blainvillii* as the single species he was placing in the genus. He also listed *Cymothoa falcata* Fabricius, 1787 but the identity of that species is not known. *Nerocila blainvillii* is apparently an unjustified replacement name for *N. falcata* (G.C.B. Poore and H. Lew Ton, in litt.). Leach's material is held at the British Museum (BMNH 1979: 400:2), but has never been fully described. Material currently being identified as *Nerocila bivittata* (Risso, 1816) (see Trilles, 1975b) appears conspecific with *N. blainvillii*.

Remarks. *Nerocila* is readily identified by the anterior margin of the cephalon lacking a rostrum, posterior margin of cephalon strongly trilobed, large coxae that are usually conspicuous in dorsal view, ventrolateral processes on pleonites 1 and 2, and uropods that always project well beyond the posterior of the pleotelson. *Creniola* is separated by lacking large ventrolateral extensions on pleonites 1 and 2, uropods that do not project beyond the pleotelson, and coxal plates not visible in dorsal view.

Up to this work about 62 species of *Nerocila* had been named. With the synonymies listed here, and with those species placed into *nomen dubium* and *nomen nudum*, this total is reduced to 28 species. Of these 28 species a further eight have to be considered of doubtful validity because of poor description, lack of types, or probability that they are junior synonyms. A list of all *Nerocila* species is given, with comments on their current status.

Bowman (1978) revived *Emphyilia* Koelbel, 1879, as a subgenus of *Nerocila*. The usefulness of subgenera within the family is questionable, and could lead to yet further complexity of synonymies.

The subgenus is not clearly separated from *Nerocila* as some of the characters utilised intergrade. Initially, the antennule bases being set close together prompted Koelbel (1879) to establish a genus for the species *Emphyilia ctenophora*. This was later found to be a synonym of *Nerocila sundaica* and redescribed by Bowman (1978), who recognised *Emphyilia* as a subgenus. This character no longer seems to be useful as two species that belong to the *Emphyilia* group, *Nerocila sigani* and *N. monodi*, have antennule bases set clearly apart. Considering the major characters that currently separate the genera *Anilocra*, *Creniola*, *Pleopodias*, *Renocila* and *Nerocila*, it can be seen that two suites of characters separate genera: mouthpart differences, and coxal and pleonal differences. *Emphyilia* has an identical mouthpart, coxae and pleonal morphology to *Nerocila*.

I propose to recognise two species groups within *Nerocila*, to define them, but not to give them formal nomenclatural status. These are the *Nerocila* group and the *Emphyilia* group. This will provide the same phyletic information as subgenera, but simplify citation and synonymies. I have two reasons for such action. Firstly, if these subgenera are maintained, it sets a precedent for creation of yet further subgenera within *Nerocila* (such as for *N. lomatia*, and for *N. excisa* and *N. trichiura*), and also in other cymothoid genera. In a family where genera provide problems in discrimination, and generic boundaries are not clearly established, the proliferation of subgenera is not to be encouraged. Secondly, omitting subgenera will simplify citation and non-specialists will not be confused by changes in subgeneric nomenclature and quadrimomials (e.g. *Nerocila (Nerocila) acuminata* f. *aster* in Brusca, 1981).

Key to Australian Species of *Nerocila*

1. Coxae 5–7 posteriorly rounded, shorter than respective segment. *N. lomatia* n. sp.
 —Coxae 5–7 posteriorly acute, as long or longer than respective segment. 2
2. Pereopod 7 manifestly longer than 6; uropod endopod with serrate margin(s)
 (*Emphyilia* group). 3
 —Pereopod 7 subequal in length to 6; uropodal rami not serrate (*Nerocila* group).
 4
3. Both margins of uropod endopod serrate. *N. monodi*
 —Only lateral margin of uropod endopod serrate. *N. serra*
4. Pleonites 1 and 2 with ventrolateral processes very large, laterally directed;
 anterior margins convex. *N. congener*
 —Pleonites 1 and 2 ventrolateral process narrow, posterolaterally directed;
 anterior margins straight or weakly convex. 5
5. Uropod exopod straight, elongate about 8 times longer than proximal width. *N.*
phaiopleura
 —Uropod exopod curved, less than 3.5 times longer than proximal width. 6

6. Uropod exopod about twice as long as endopod; endopod distal margin deeply indented. *Nerocila* sp.
 —Uropod exopod slightly longer (1.2–1.5) than endopod; distal margin not deeply indented. 7
7. Uropod endopod lateral and medial margin subparallel; distal margin obliquely truncate, with distomedial tooth. *N. orbigny*
 —Uropod endopod lateral and medial margins diverging; distal margin concave, without prominent distomedial tooth. *N. barramundae*

Nerocila Group

Diagnosis of female. Antennule and antenna basal articles widely separate; cephalon anterior margin strongly produced; pereopods 1–6 without spines; pereopod 7 subequal to, or slightly longer than 6, feebly spinose or without spines.

Remarks. Included are all species currently placed in the genus except for those placed in the *Emphyllia* group. *Nerocila trichiura*, *Nerocila exocoeti*, *Nerocila exisa* and *N. lomatia* form a group of species characterised by short, weakly acute or posteriorly rounded coxae, not having the posterolateral angles of the pereonites produced, and having small ventrolateral processes on pleonite 1 and 2. *Nerocila lomatia* is the only species of the genus which has the posterior coxae shorter than the respective pereonite, and the species should at present, be regarded as *incerta sedis*.

Emphyllia Group

Diagnosis of female. Antennule and antenna basal articles set closer together than *Nerocila* group, or in contact; anterior margin of cephalon not strongly produced; pereopods 3, 6 and 7, or 6 and 7 with prominent spines; pereopod 7 manifestly longer than pereopod 6.

Remarks. The only Australian representatives are *Nerocila monodi* and *N. serra*. Other species are *Nerocila sundaica* Bleeker, *Nerocila arres* Bowman & Tareen, *Nerocila kisra* Bowman & Tareen, *Nerocila sigani* Bowman & Tareen, *Nerocila longispina* Miers, and *Nerocila serra* Schiödte & Meinert.

Nerocila sp.

Fig. 5

Material examined. Female (ovig 15.5), NNW of Port Hedland, WA, 18°53'S, 117°47'E, 20 May 1978, depth 135–138m, coll. B. Hutchings on *Courageous* (WAM 604-85).

Remarks. The uropod morphology of this specimen is unique. Comparison with illustrations of *Nerocila* species and to types of most Indo-Pacific *Nerocila* species resulted in the conclusion that the specimen represents a new species. It shows some

similarity to *Nerocila phaiopleura* but differs in having the posterolateral margins of pereonites 5–7 produced, and distinct uropod and pereopod morphology.

Several species of *Nerocila* have widely variable morphologies (e.g. *Nerocila acuminata*, see Brusca, 1981; *Nerocila sundaica*, see Bowman, 1978; *Nerocila orbigny*). Other species present a far more uniform appearance (e.g. *Nerocila monodi*, the related *Creniola saurida*, *Creniola laticauda*). A single specimen gives no indication of the potential variation, and establishing a species on a single specimen would be imprudent.

Figures are given here to enable new material to be identified when encountered.

Nerocila barramundae n. sp.

Figs 6, 7

Material examined. HOLOTYPE, female (ovig 31.0), Broad Sound, Rockhampton, Apr 1981, on dorsal fin of *Lates calcarifer*, coll. J. Peady (QM W11008). PARATYPE, female (ovig 29.0), Karumba, Queensland, ca. 1982, on base of pelvic fin of *Lobotes surinamensis*, coll. E. Grant (QM W10257).

Type locality. Broad Sound, Rockhampton, Queensland.

Description of female. Body 2.3–2.6 times as long as wide. Cephalon anterior margin subquadrate to rounded; eyes with facets indistinct. Posterolateral margins of pereonites not produced; coxae 3 and 4 with posterior margins truncate, coxae 4–7 becoming progressively more acute, not extending beyond posterior of respective segments. Pleonites 1 and 2 with ventrolateral process posteriorly directed; lateral margins of pleonites 3–5 not extended; pleonite 5 about 0.73 width of pereonite 6. Pleotelson about as long as wide, posterior margin broad.

Antennules separated by slightly more than width of article 1 (0.25 width of cephalon); antenna with setae on posterior margin of article 4.

Mandible palp article 3 with long setae on distolateral margin. Maxilliped article 3 with 2 small and 3 prominent spines.

Pereopod 1 with large, smoothly curved, very robust dactylus; pereopods 2–4 with dactylus increasing in length; decreasing in length from 5–7;

pereopod 7 with small spines along posterior margin of merus, carpus and propodus.

Pleopod 2 appendix masculina about 0.5 length of endopod. Pleopods 3 and 4 endopod with single lobe, proximomedial lobe slightly folded. Pleopod 5 endopod with 2 large folded lobes.

Uropod exopod slightly longer (1.16) than endopod, straight, margins converging to narrowly rounded point; endopod with medial margin convex, distal margin subtruncate or concave; distomedial angle of peduncle bluntly rounded.

Male. Not known.

Colour. Dark grey, with pale clear band along posterior of pereonites.

Size. Up to 31.0 mm.

Remarks. The combination of short subtruncate uropodal endopod, with short coxae and lack of posterolateral pereonal processes serves to distinguish *N. barramundae* from others of the genus. Other characters to note are the large stout pereopod dactylus on all pereopods, the short pleotelson and the ventrolateral process of pleonites 1 and 2 being posteriorly directed.

Southwell (1915) described *Rocinela latis*, parasitic on *Lates calcarifer*, near Calcutta. This species

appears to be a juvenile *Nerocila*. At present males and juveniles of many cymothoid genera (e.g. *Mothocya* — Bruce, 1986; *Anilocra* — Williams & Williams, 1981, Bruce, 1987a, and discussion for *Nerocila orbignyi*) are not possible to identify to species level unless they are associated with an adult female. As the whereabouts of the types of *N. latis* is not known, and their identity is obscure, I regard it as *species inquirenda*. Rather than risk incorrect usage of that name, the adult specimens from Australia are described as a new species.

Hosts. *Lates calcarifer* and *Lobotes surinamensis*, both euryhaline fishes.

Distribution. Karumba, Gulf of Carpentaria and Broad Sound, Rockhampton, Queensland.

Etymology. The epithet is derived from barramundi, the Aboriginal name for *Lates calcarifer*.

***Nerocila congener* Miers**

Figs 8, 9

Nerocila congener White, 1847: 108, nomen nudum.

Nerocila congener Miers, 1880: 468.—Nierstrasz, 1931: 125; Ellis, 1981: 124.

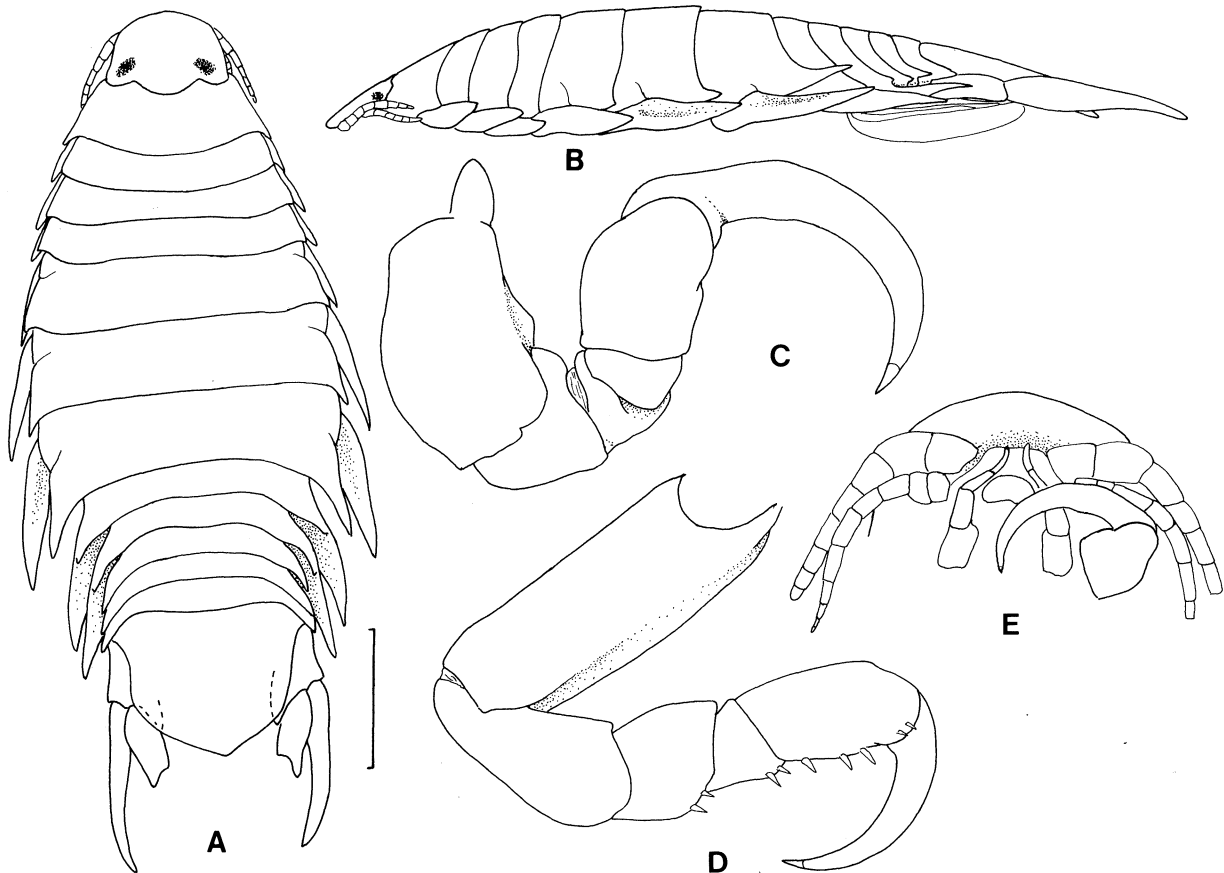


Fig. 5. *Nerocila* sp., WAM 604-85. A, dorsal view; B, lateral view; C, pereopod 1; D, pereopod 7; E, buccal area. Scale line 3.0 mm.

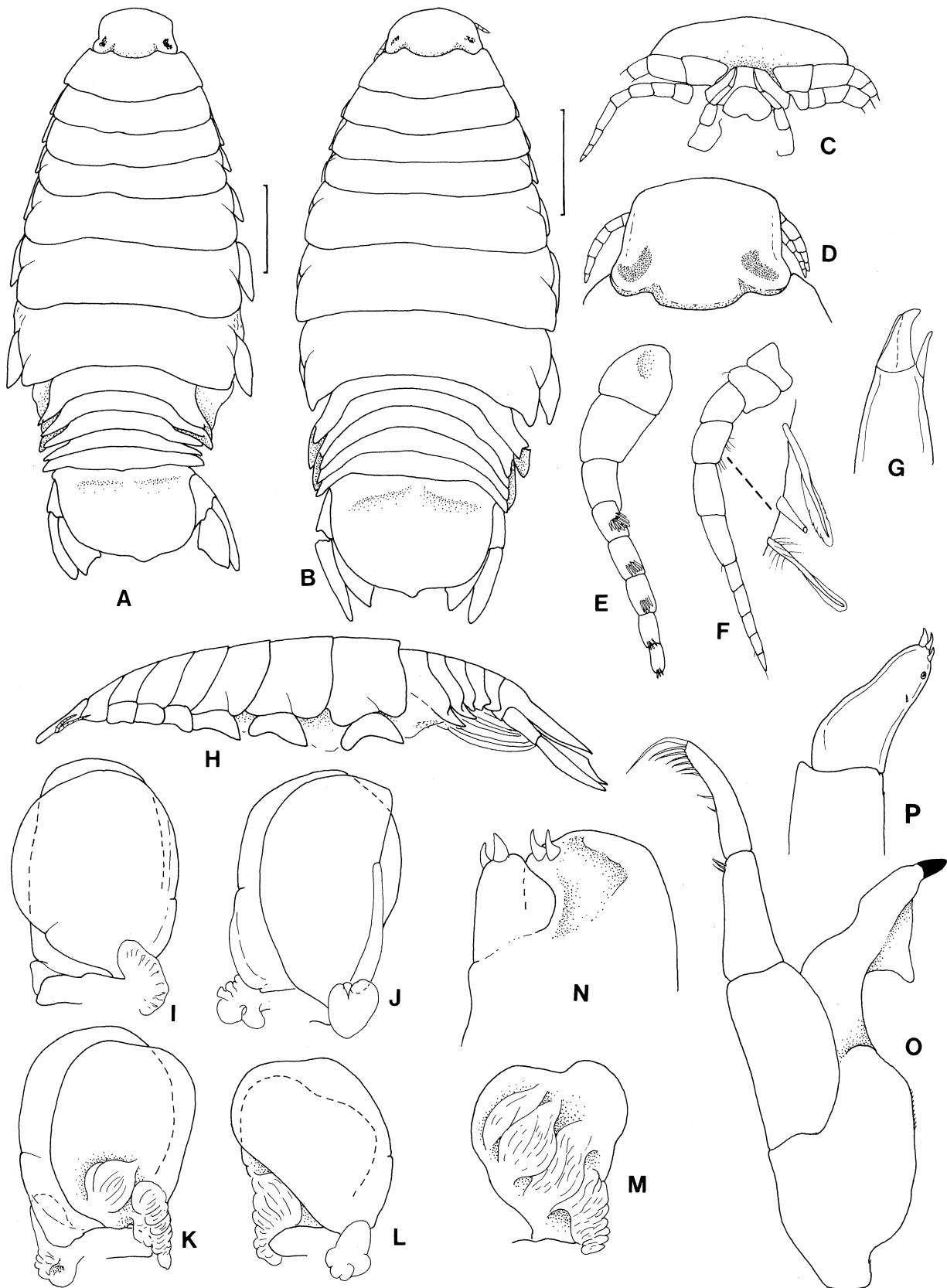


Fig. 6. *Nerocila barramundae* n. sp. Figs A, C, D, H, holotype, remainder paratype. A, dorsal view; B, dorsal view; C, frons; D, cephalon, dorsal view; E, antennule; F, antenna; G, maxillule apex; H, lateral view; I-L, pleopods 1-3, 5; M, pleopod 5, posterior view; N, maxilla apex; O, mandible; P, maxilliped article 3. Scale line 5.0 mm.

Nerocila Cebuana Schiödte & Meinert, 1881: 11, pl. 1, figs 4, 5.

Nerocila philippinensis Bovallius, 1887: 3, pl. 1, figs 1—12.—Nierstrasz, 1931: 125.

Nerocila cebuana.—Nierstrasz, 1931: 125.

Not *Nerocila cebuana*.—Nierstrasz, 1915: 73 (= *Nerocila* sp.?).

Material examined. HOLOTYPE, female (ca. 28.0). Philippine Islands, (No. 637a), coll. Mr. Cumming (BMNH 1979:337.1). Female (ovig 28.5), Arafura Sea, N.T., 11°26'S, 133°09'E, 16 Nov 1980, 30 m depth, trawl (AM P37155).

Types. The holotype is held at the British Museum

(Natural History). I was not able to locate type specimens of *N. cebuana* or *N. philippinensis*.

Type locality. Philippines (Miers, 1880).

Description of female. Body to 2.6—2.8 times as long as wide. Cephalon anterior margin wide; eyes with facets indistinct. Posterolateral angles of pereonites 1—6 not produced, those of pereonite 7 weakly so. Coxa 2 with posterior margins rounded, coxae 3—7 becoming progressively more acute towards posterior; those of pereonites 6 and 7 extending slightly posterior to their respective segments.

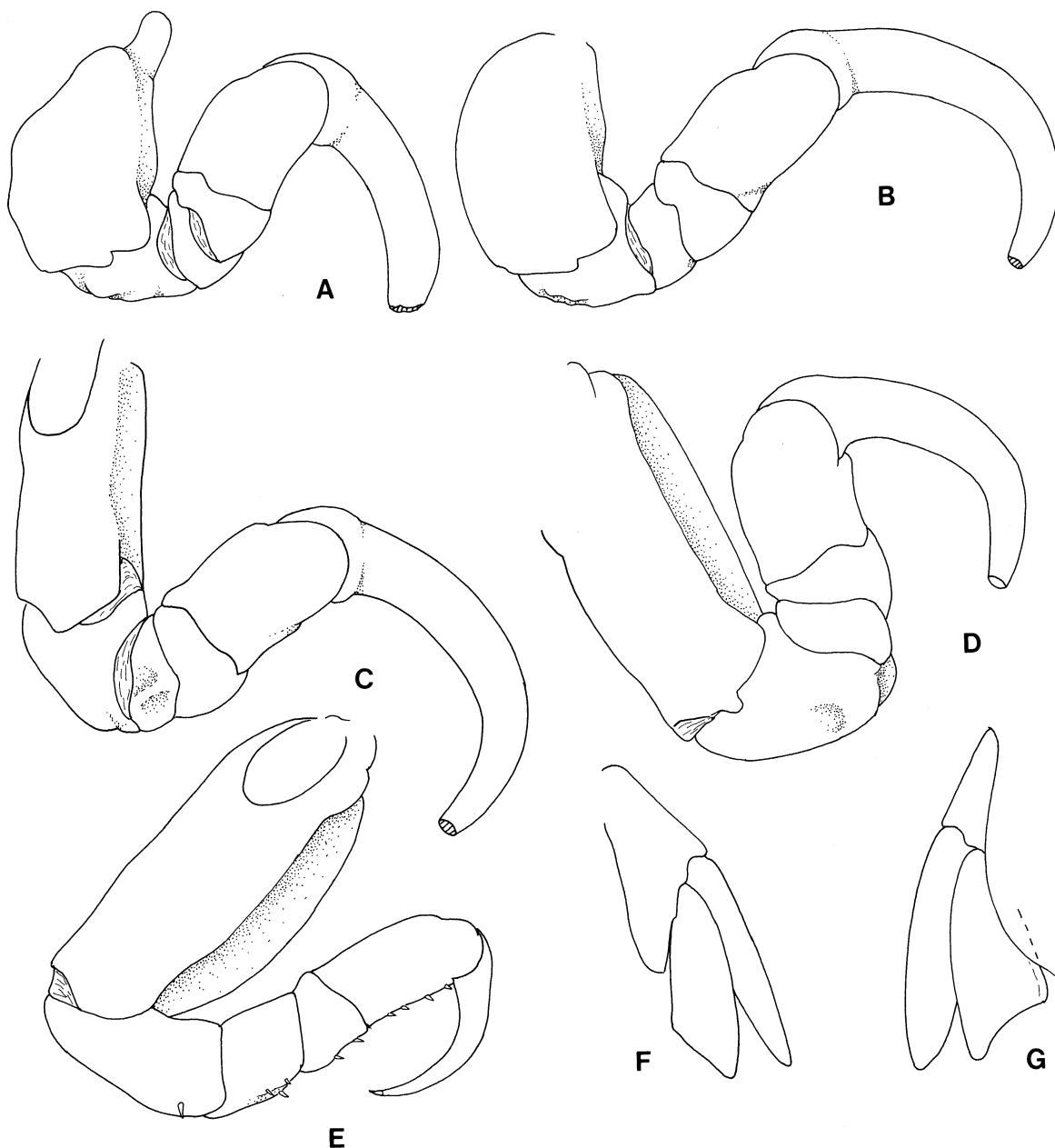


Fig. 7. *Nerocila barramundae* n. sp. G, holotype, remainder paratype. A—E, pereopods 1, 2, 4, 6, 7; F, uropod; G, uropod.

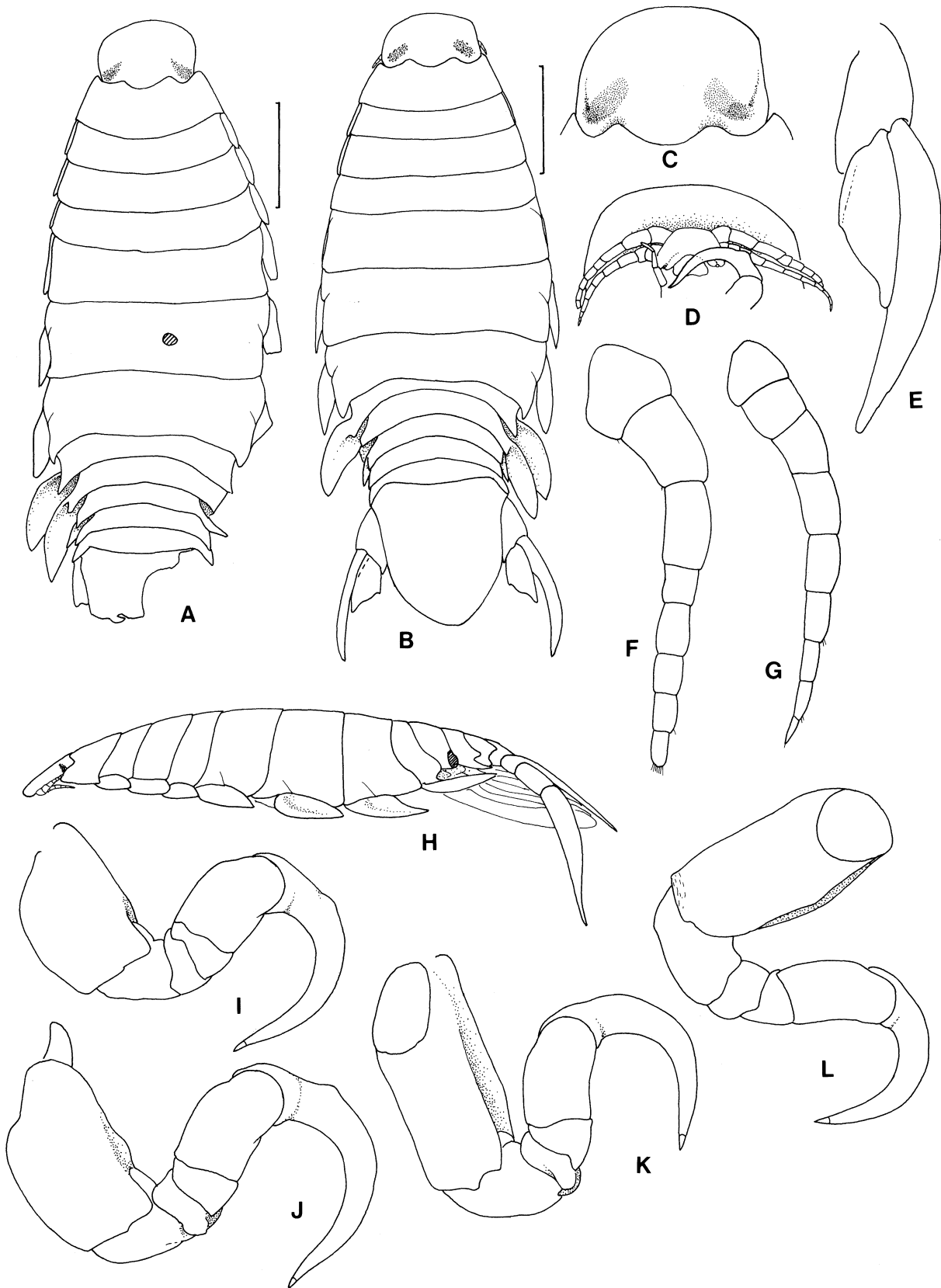


Fig. 8. *Nerocila congener*. All female, NWS, AM P37155, except A. A, holotype; B, dorsal view; C, cephalon; D, frons; E, uropod; F, antennule; G, antenna; H, lateral view; I–L, pereopods 1, 2, 6, 7 respectively. Scale lines 5.0 mm.

Pleonites 1 and 2 with ventrolateral processes greatly expanded, extending laterally to width of pereon; pleonites 3–5 lateral margins not strongly produced; pleonite 5 about 0.6 width of pereonite 6. Pleotelson about 1.2 times as long as wide, linguiform, margins of posterior half thin.

Antennule bases separated by length of peduncular articles 1 and 2. Mandible palp article 3 with short spatulate setae on distolateral margin. Maxilliped article 3 with 2 curved spines.

Pereopod 1 dactylus with nodule on anterior margin; dactylus apex reflexed outwards. Pereopod 2 similar to 1, but basis longer; pereopods 5–7 with shorter dactylus, without nodule.

Pleopods 3 and 4 with endopod lobes moderately developed; those of pleopod 5 highly developed. Uropod exopod twice as long as endopod, curving smoothly to narrow apex; endopod with narrow distolateral projection, sinuate posterior margin.

Male. Not known.

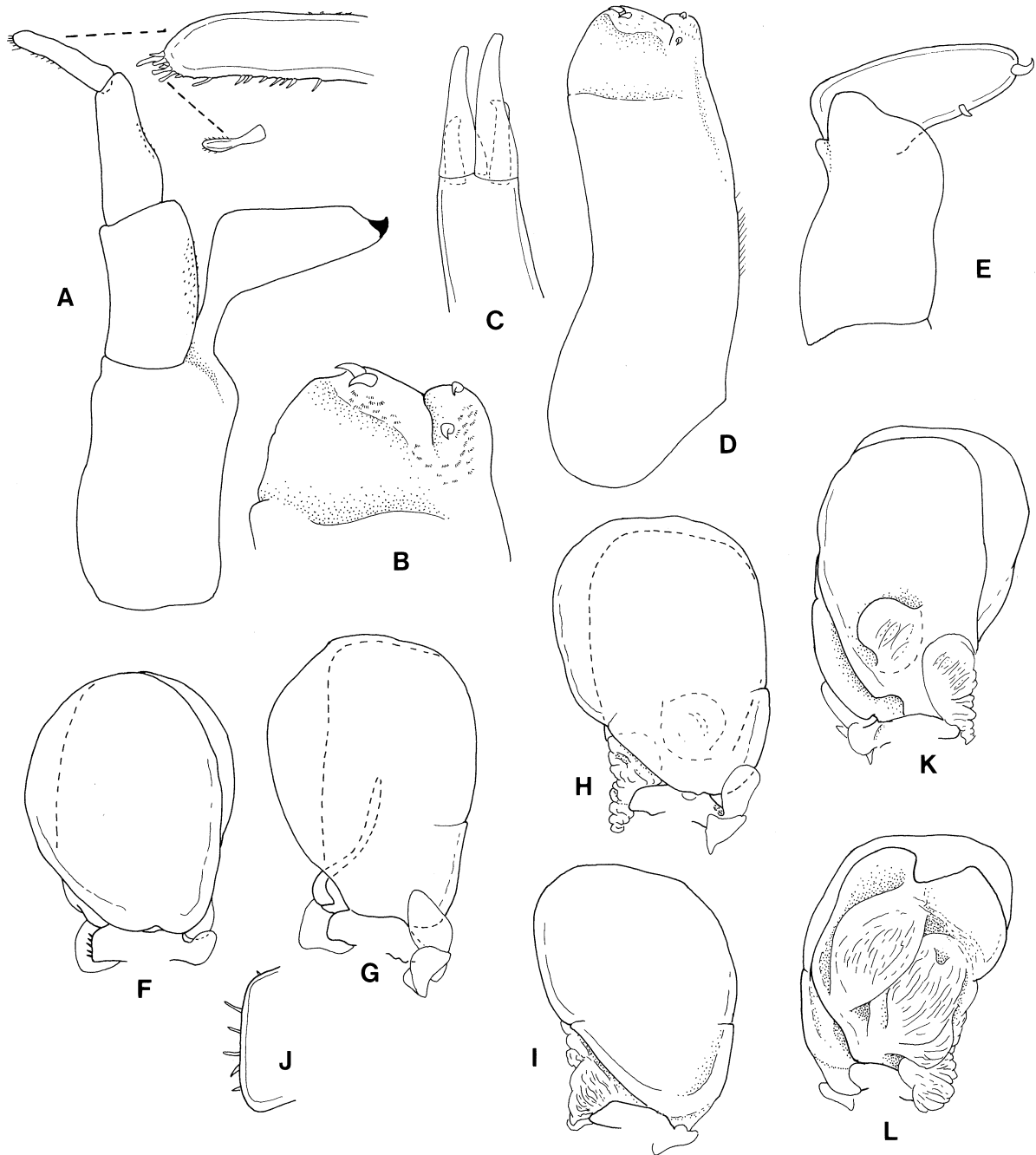


Fig. 9. *Nerocila congener*. All female, NWS, AMP37155. **A**, mandible; **B**, maxilla apex; **C**, maxillule apex; **D**, maxilla; **E**, maxilliped articles 2 and 3; **F**–**I**, pleopods 1–3, 5 respectively; **J**, pleopod 1, peduncle medial margin; **K**, pleopod 3, posterior view; **L**, pleopod 5, posterior view.

Colour. Pale tan in alcohol.

Size. Up to 28.5 mm.

Remarks. This distinctive species is easily recognised by the relatively narrow body, lack of posterolateral extensions to the pereonites, broad cephalon, very large and broad ventrolateral processes on pleonites 1 and 2, and the uropod morphology.

Although I was not able to examine the type specimens of *Nerocila cebuana* and *Nerocila philippensis* the illustrations given by Schiödte & Meinert (1881) and Bovallius (1887) readily allow their species to be recognised as synonyms of *Nerocila congener*.

Hosts. Not known.

Distribution. Northern Australia; previous records are Philippines (Miers, 1880; Bovallius, 1887), Cebu Island, Philippines (Schiödte & Meinert, 1881).

Nerocila lomatia n. sp.

Figs 10, 11

Material examined. HOLOTYPE, female (ovig 16.0), 4 km north of Jones' Shoal, Cobourg Peninsula, NT, 10° 53' S, 132° 14' E, 12 Sept 1975, coll. M.V. *Gemeni* (NTM Cr2302). PARATYPES: 3 females (ovig 8.5, 8.5, 8.5, 7.0), King Creek, Shoal Bay, NT, 12° 21' S, 131° 00.5' E, 11 Dec 1974, salinity 23.3‰, coll. N.T. Fisheries Division (NTM Cr773). Female (ovig 11.0), Cameron's Beach, Darwin, NT, 12° 21' S, 131° 00' E, 14 Aug 1975, salinity 35.3‰, coll. NT Fisheries Division (NTM Cr772). Female (ovig 10.0), AIMS Harbour, Cape Ferguson, Queensland, 4 Feb 1979 on gills of *Pellona ditchella*, coll. AIMS-AM (AMP37258). Female (ovig 9.0), Serpentine Creek, Brisbane, Qld, 17 Feb 1975, on *Mugil georgii*, coll. R. Harrison (QM W4823). Male (6.5), Redland Bay, Moreton Bay, Qld, 6 Mar 1973, coll. CSIRO (WAM 609-85). Female (ovig 7.5), Deception Bay, Moreton Bay, Qld, no date, coll. CSIRO (WAM 610-85).

Type locality. Off Cobourg Peninsula, N.T., Australia, 10° 53' S 132° 14' E.

Description of female. Body about twice as long as wide. Cephalon anterior margin subtruncate, gently convex; eyes prominent, occupying 0.4 width of cephalon. Pereonite posterolateral margins not produced, rounded; coxae 2–4 as long as segment; coxae 5–7 shorter than segment; with posterior margins broadly rounded. Pleon slightly skew to pereon, about 0.5 width of pereon; pleonites 1 and 2 with ventrolateral processes posteriorly directed, weakly produced; lateral margins of pleonites 3–5 rounded, not produced. Pleotelson shield shaped, lateral margins curving to medial point.

Antennule extending to pereonite 1; antenna with 10 articles slightly longer than antennule.

Mandible palp articles 2 and 3 subequal in length; article 3 without setae. Maxilliped article 3 with 2 large terminal spines and small midlateral spine.

Pereopods without spines, dactylus without

nodules; pereopod 1 dactylus about 2.0 times longer than propodus; that of pereopod 2 about 2.3, and pereopod 7 about 1.9.

Pleopod 1 endopod proximomedial lobe small. Pleopod 2 appendix masculina about 0.5 length of endopod. Pleopods 3 and 4 with single small fold on endopod. Pleopod 5 with 2 large folds. Uropod exopod tapering evenly to rounded apex, about 1.6 times longer than endopod.

Male. About 2.7 times as long as wide; pleon about 0.6 width of pereon. Appendages similar to those of female, but maxilliped article 3 with larger spines, mandible palp with 2 terminal setae, and pereopod 7 with 5 small spines on propodal palm, 3 small spines on posterior margin of merus.

Colour. Present material pale tan or brick red, with chromatophores along posterior of pereon and pleon segments, and lateral margin of uropod peduncle.

Size. Oviparous females 7.0–16.0 mm (average 9.6 mm).

Variation. All specimens present a constant appearance; the degree that the pleon is twisted in relation to the pereon varies. The uropod exopod varies from 1.5–2.0 times longer than the endopod.

Remarks. This species is very similar to *Nerocila excisa* Richardson. Richardson's figures (1901, 1914) do not allow for comparison. Trilles (1972) account is far more detailed but does not give enough detail of the adult female. Examination of the type specimen of *Nerocila excisa* Richardson, 1914 (not *Aegathoa excisa* Richardson, 1901) shows that the coxae of the two species differ, with those of *N. lomatia* being much shorter and rounded posteriorly. Additionally the two species mature at different size ranges: *Nerocila excisa* females measure 17–20 mm while the Australian females measure 7–16 mm. The two species also occupy different habitats: *Nerocila excisa* is pelagic and oceanic (Brusca, 1981; Trilles, 1972) while *Nerocila lomatia* is estuarine and inshore. *Nerocila lomatia* is the first species of the genus to be recorded as a branchial parasite.

Nerocila lomatia forms one of the group of *Nerocila* species characterised by having the posterolateral margin of the posterior pereonites very weakly, or not all produced, short coxae, short ventrolateral extensions of pleonites 1 and 2, and elongate uropodal rami. The other species of this group are *Nerocila trichiura*, *Nerocila exocoeti* and *Nerocila excisa*. *Nerocila lomatia* differs from these species by its posteriorly rounded coxae and dorsoventrally flattened body shape. Its position within the genus is regarded as *incerta sedis*.

Distribution. Northern Territory, and Moreton Bay, Queensland; in estuarine waters with recorded salinities of 23.3 and 35.3‰.

Hosts. *Mugil georgii* and from the branchial chamber of *Pellona ditchella*.

Etymology. The epithet is derived from the Greek

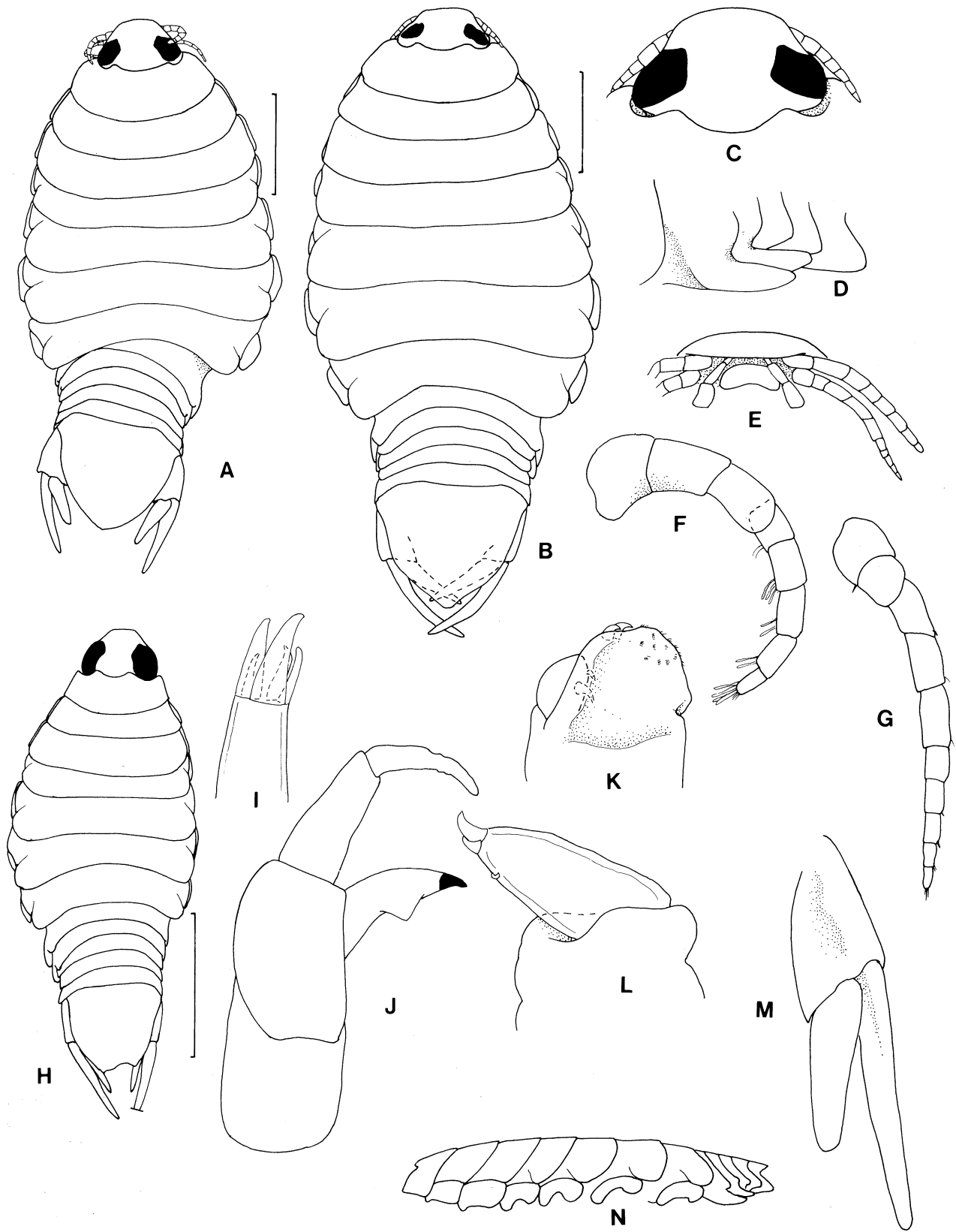


Fig. 10. *Nerocila lomatia* n. sp. B–E, holotype, H, female QM W4823, remainder paratype NTM Cr772. A, dorsal view; B, dorsal view; C, cephalon; D, pleon, lateral view; E, frons; F, antennule; G, antenna; H, dorsal view; I, maxillule apex; J, mandible; K, maxilla apex; L, maxilliped article 3; M, uropod; N, pereon and pleon. Scale lines 3.0 mm.

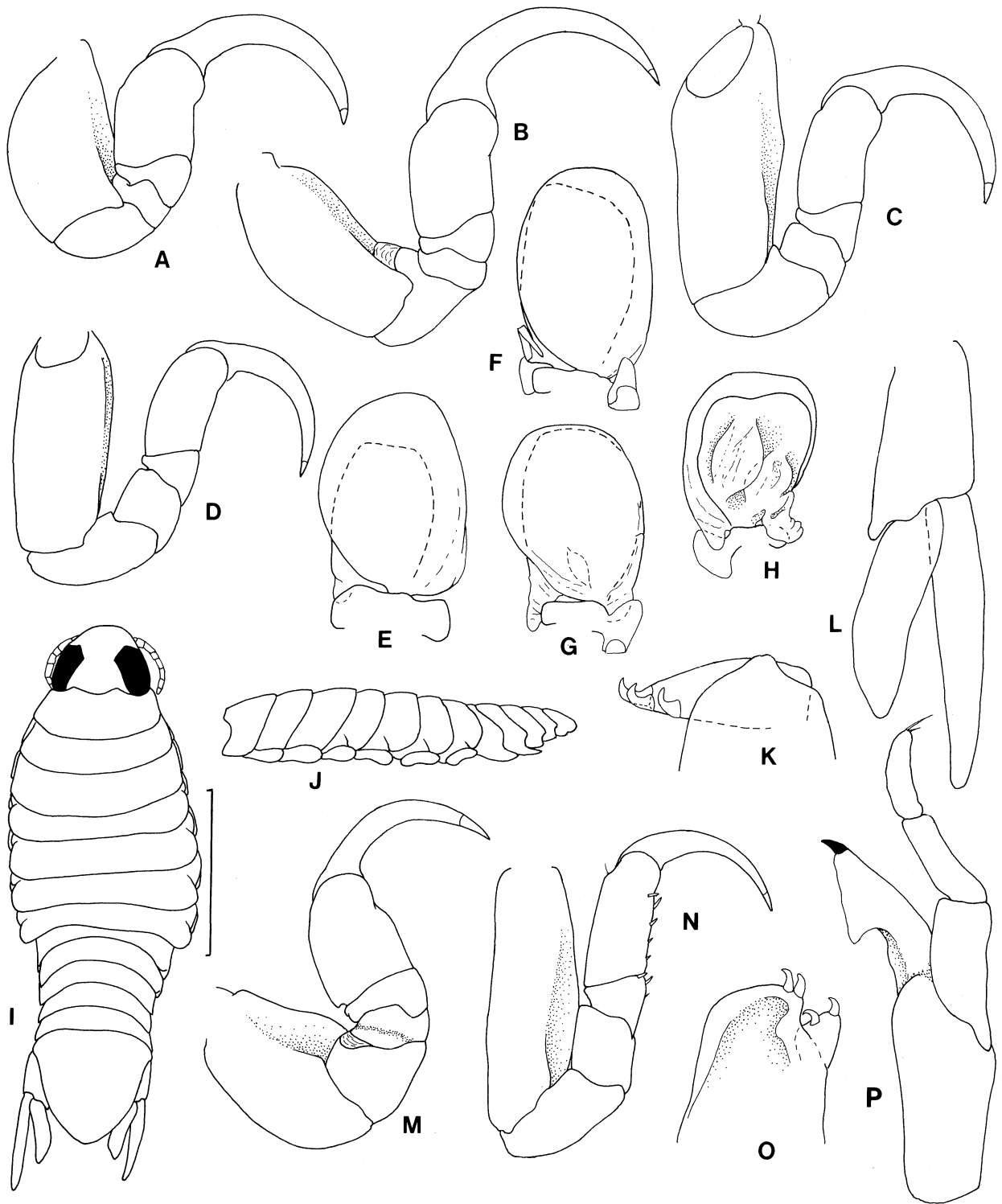


Fig. 11. *Nerocila lomatia* n. sp. A–H, female paratype NTM Cr772; I–P, male paratype WAM 609-85. A–D, pereopods 1, 2, 6, 7; E–G, pleopods 1, 2, 4; H, pleopod 5; posterior view; I, dorsal view; J, pereon and pleon, lateral view; K, maxilliped article 3; L, uropod; M, pereopod 1; N, pereopod 7; O, maxilla apex; P, mandible. Scale line 2.0 mm.

word *lomatia*, meaning border or coast and alludes to the species' distribution.

Nerocila orbigny (Guérin-Méneville)

Figs 12–17

- Ichthyophilus orbigny* Guérin-Méneville, 1832: 47.—1835, pl. 29, figs 3–3e.
- Nerocila orbigny*.—Lucas, 1846: 76; Carus, 1885: 440; Nierstrasz, 1915: 73; Monod, 1931: 10, figs 5–11; Barnard, 1940: 403; Hale, 1940: 301; Dollfus, 1946: 73; Brian & Darteville, 1949: 140, fig. 122; Hurley, 1961: 268, 284; Trilles, 1962: 102, figs 6, 7; 1963: 609; 1964a: 5989; 1964b: 6545; 1964c: 2, 4; 1964d: 109; 1964e: 365, 367; 1964f: 128; 1968: 103, photo. 22–24, pls 30–34; 1969: 434; 1973b: 1271, figs 5–10, 15; 1975b: 363, figs 157–206, pl. 1, figs 4, 5; 1977: 14; 1986: 621; Wunder, 1962: 140, photo. 1–12; Scott, 1964: 23; Berner, 1969: 93; Day, Field & Penrith, 1970: 48; Mann, 1970: 188; Hewitt & Hine, 1972: 79, 100, 108; Lincoln, 1971, photo. 2, opp. p. 186; Trilles & Raibut, 1971: 81; 1973: 279; Romestand, Trilles & Lagarrigue, 1971: 447; Fryer & Iles, 1972: 257; Reichenbach-Klinke, Heinz-Hermann & Landott, 1973: 321; Romestand & Trilles, 1975: 2171, pl. 1; Dollfus & Trilles, 1976: 827; Romestand, Janicot & Trilles, 1977: 172; Kensley, 1978: 81, fig. 33C; Moreira & Sadowsky, 1978: 100, 110, 117; Romestand, 1979: 425, pl. 1, fig. 7; Thuet & Romestand, 1981: 33; O'Riordan, 1982: 551; Bragoni, Romestand & Trilles, 1983: 594; Rockicki, 1984: 96, figs 23.
- Nerocila maculata* Milne Edwards, 1840: 253.—Heller, 1866: 740; Bullar, 1876: 118; Stalio, 1877: 233; Stossich, 1880: 223; Schiödte & Meinert, 1881: 50, pl. 3, figs 7–11; Gerstaecker, 1882: 255; Chevreux, 1884: 519; Carus, 1885: 440; Bonnier, 1887: 370; Bolivar, 1892: 132; Acloque, 1899: 19; Nierstrasz, 1915: 74; Gibert i Olivé, 1920: 86; Monod, 1923a: 86; 1923b: 15; Popov, 1933: 194; Montalenti, 1948: 75; Balcells, 1953: 550, fig. 10; Trilles, 1962: 102; 1968: 158, photo. 19, 53, 56; 1975a: 326, pl. 3, fig. 22; 1975b: 367, figs 207–248, pl. 1, figs 6–9; 1977: 13; 1986: 621; Berner, 1969: 94; Lagarrigue & Trilles, 1969: 117, photo. 1; Romestand, Trilles & Lagarrigue, 1971: 447, fig. 2; Romestand & Trilles, 1975: 271, pl. 1; Dollfus & Trilles, 1976: 826; Huwae, 1977: 16, figs 23, 24B; Holthuis, 1978: 29, fig. 1b, pl. 1; Moreira & Sadowsky, 1978: 100, 110, 113; Romestand, 1979: 425, pl. 1, fig. 8; Rockicki, 1984: 92, figs 22, 52c.
- Nerocila affinis* Milne Edwards, 1840: 253.—Duvernoy & Lereboullet, 1841: 218, 221–224; Gerstaecker, 1882: 256; Chevreux, 1884: 519; Bolivar, 1892: 133; Carvalho, 1944: 8; Trilles, 1973b: 1270.
- Cilonera MacLeayi* White & Doubleday, 1843: 268, *nomen nudum*.
- Nerocila Mac Leayi*.—White, 1847: 108.
- Nerocila vittata* Lucas, 1846: 77, pl. 8, figs 2a–d.—Gerstaecker, 1882: 263.
- Nerocila bivittata*.—Van Beneden, 1861: 143; Pelseneer, 1886: 218; Preud'homme de Borre, 1886: lxxxiv; Gourret, 1907: 89; Euzet, 1949: 30; Montalenti, 1948: 72, figs 30, 31, pl. 8, figs 4, 6; Amar, 1951: 530; Balcells, 1953: 550.
- Livoneca sciaenae* Beneden, 1871: 32, *nomen nudum*.
- Nerocila imbricata*.—White, 1847: 108; Miers, 1876: 107.
- Nerocila Australasiae* Schiödte & Meinert, 1881: 35, pl. 6, figs 7, 8.—Gerstaecker, 1882: 262.
- Nerocila Neapolitana* Schiödte & Meinert, 1881: 41, pl. 2, figs 9, 16.—Gerstaecker, 1882: 256; Carus, 1885: 439.
- Nerocila Adriatica* Schiödte & Meinert, 1881: 45, pl. 3, figs 1–4.—Gerstaecker, 1882: 255; Carus, 1885: 440; Popov, 1933: 194; Montalenti, 1948: 75; Trilles, 1962: 102.
- Nerocila Orbigny*.—Schiödte & Meinert, 1881: 55, pl. 5, figs 1–5; Montalenti, 1948: 75; Szidat, 1955: 217, fig. 7, pls 1a–f, 2, 7c.
- Nerocila cephalotes* Schiödte & Meinert, 1881: 60, pl. 4, figs 16, 18.—Gerstaecker, 1882: 259; Stebbing, 1902: 55; 1910: 423; Barnard, 1936: 165; Van Name, 1920: 43, 53, figs 6–9; Monod, 1924: 436, figs A, B, p. 437, C, D, p. 441; Szidat, 1955: 215; Dollfus & Trilles, 1976: 826; Trilles, 1975a: 327, pl. 3, fig. 24; 1977: 14; 1979: 250; 1986: 620; Bowman, 1978: 35; Rockicki, 1981: 88; 1984: 26, figs 5–8, 52a, b, 54–59.
- Nerocila Novae-Zelandiae* Schiödte & Meinert, 1881: 70, pl. 5, figs 10, 11.
- Nerocila Novae Zelandiae*.—Gerstaecker, 1882: 262.
- Nerocila (Ichthyophilus) Orbigny*.—Gerstaecker, 1882: 257.
- Nerocila macleayi* Miers, 1884: 301.—Thomson & Chilton, 1886: 154; Thomson, 1889: 263.
- Nerocila macleayii*.—Chilton, 1891: 68, pl. 11; 1911: 568; Hutton, 1904: 263; Hale, 1926: 206, figs 1, 4, 5; 1929: fig. 256.
- Nerocila trailli* Filhol, 1885: 451.—Hutton, 1904: 263; Nierstrasz, 1931: 126.
- Nerocila laticeps* Bovallius, 1887: 10, pl. 2, figs 22–26, pl. 3, figs 27, 28.—Stebbing, 1922: 2; Trilles, 1986: 621, fig. 1A.
- Nerocila neapolitana*.—Tattersall, 1905: 85; Norman & Scott, 1906: 39; Zirwas, 1911: 106; Monod, 1923b: 87; Endre, 1931: 83; Popov, 1933: 194; Montalenti, 1948: 75; Anon, 1957: 195; Trilles, 1962: 102.
- Nerocila rhabdota*.—Barnard, 1914: 371.
- Nerocila macleayi*.—Nierstrasz, 1915: 75; 1931: 125; Dollfus, 1946: 73; Ellis, 1981: 124.
- Nerocila armatus*.—Stebbing, 1921: 23.
- Rosca rogans* Stebbing, 1924: 10, pl. 15.—Barnard, 1936: 165.
- Nerocila armata*.—Barnard, 1925: 390; Trilles, 1973c: 257, pl. 1, fig. 4.
- Nerocila australasiae*.—Hale, 1926: 208; Nierstrasz, 1931: 125.
- Nerocila neapolatena*.—Dudich, 1931: 18 (lapsus).
- Nerocila novae zeelandiae*.—Nierstrasz, 1931: 126 (lapsus?).
- Nerocila orbigny*.—Popov, 1933: 194 (lapsus?).
- Nerocila orbigny maculata*.—Schuurmans Steckhoven, 1936: 26, figs 19–22.
- Nerocila orbigny orbigny*.—Ringuelet, 1947: 95, figs 1–3, pl. 1.
- Nerocila d'Orbigny*.—Szidat, 1956: 129, fig. 2a; Trilles, 1961: 689, pls 1–3.
- Nerocila novae zelandiae*.—Trilles, 1975a: 323, pl. 3, fig. 19.
- Nerocila fluviatilis*.—Trilles, 1975a: 331, pl. 3, fig. 26.
- ?*Nerocila armata*.—Trilles, 1977: 15.

Material examined. Female (non-ovig 28.0), Hobbartown, Neue Hollande, coll. W. Robertson (holotype of *Nerocila australasiae*, MCZ 1139). Syntypes of

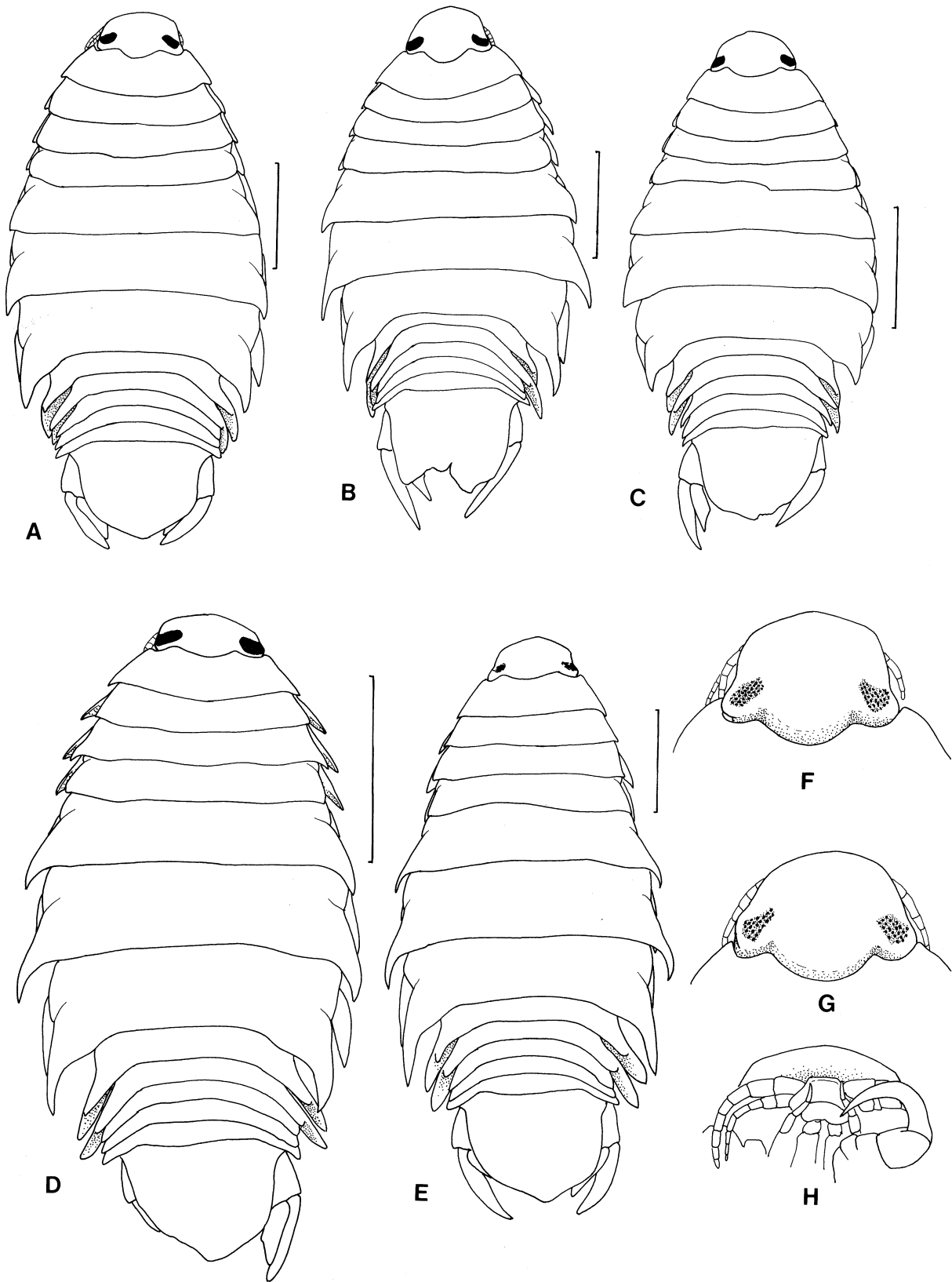


Fig. 12. *Nerocila orbignyi*. All from Walpole, WA (AM P37149), except where indicated. **A**, dorsal view, female #1; **B**, female #2; **C**, female #5; **D**, female #3; **E**, female, Mordialloc, Vic, NMV J11567; **F**, female #1, cephalon; **G**, female #5, cephalon; **H**, female #1, frons. Scale lines 5.0 mm.

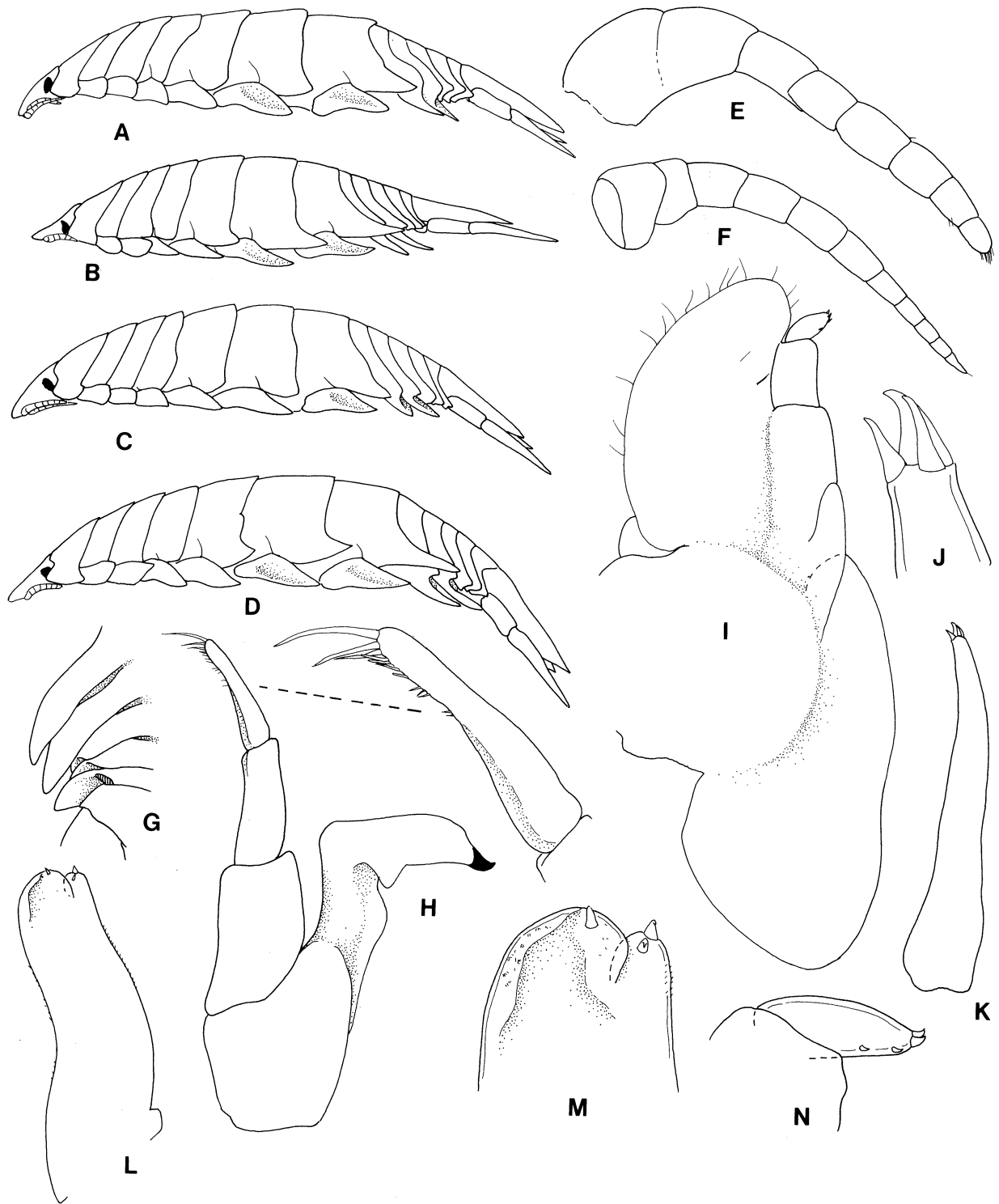


Fig. 13. *Nerocila orbigny*. All female #1, Walpole, WA (AMP 37149), except where indicated. A, lateral view; B, female #2; C, female #5; D, female, Mordialloc, Vic, NMV J11567; E, antennule; F, antenna; G, right pleonites, ventral view; H, mandible; I, maxilliped; J, maxillule apex; K, maxillule; L, maxilla; M, maxilla apex; N, maxilliped article 3.

Nerocila macleayii Miers: female (ovig 26.5), New Zealand, taken out of the mouth of a fish, coll. A. Sinclair (BMNH 1979:415:1); female (19.0, uropods missing), New Zealand, coll. A. Sinclair, No. 6366 (BMNH 1845:30); female (24.0) New Zealand, No. 211a (BMNH 1842:55); female (23.0) no data (BMNH 1979:414:1); female (ovig 24.5), Africa, No. 211a, W.E. Leach collection (BMNH 1979:417:1); male (12.5), west coast, America, coll. Capt. Kellett and Lieutenant Wood (BMNH 1850:12, = *N. acuminata*). Male

(16.0), Nouvelle Zelande, Filhol 1832-75 (MNHN Is. 553, holotype of *Nerocila trailli*). Males (17.0, 15.5), Quoy et Gaimard, 918 (MNHN Is. 265) and male (NMW 5277), syntypes of *Nerocila novaehollandiae*. Also examined: holotype of *Nerocila japonica* (NRS Is. 4975, see Fig. 34G-J), holotype of *Nerocila maculata* (MNHN, Paris Is. 637, nothing but fragments and debris in tube), and holotype of *Nerocila falklandica* (female, non-ovig 21.0), taken on fish in Falkland Sound (BMNH 1985:266:1).

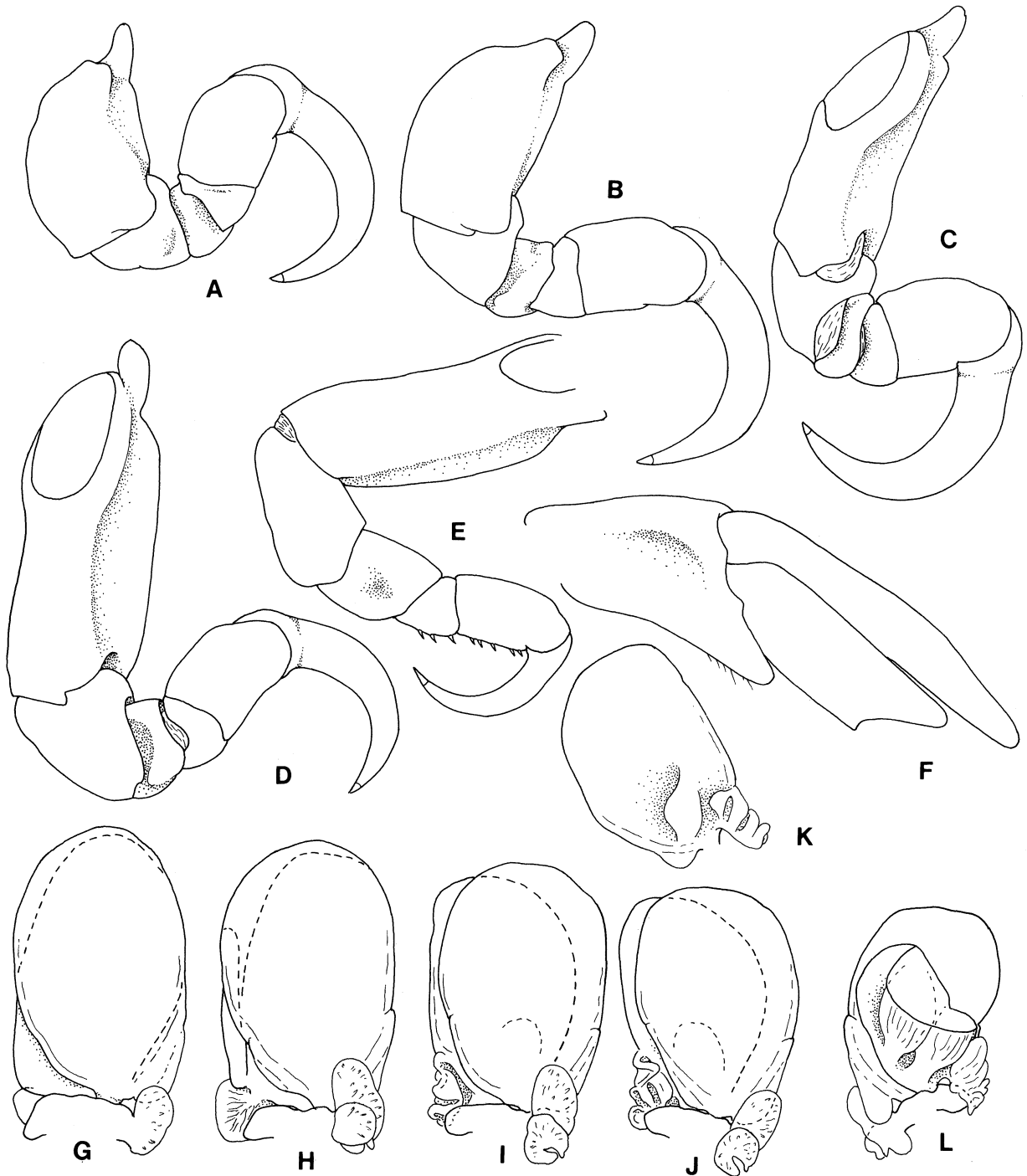


Fig. 14. *Nerocila orbigny*. All female #1, Walpole, WA (AM P37149). A–E, pereopods 1, 2, 4, 6, 7 respectively; F, uropod; G–J, pleopods 1–4 respectively; K, pleopod 3, endopod, posterior view; L, pleopod 5, posterior view.

Non-type. Females (ovig 20.5), De Mak, Lightship *Texel*, Waddenzee, Netherlands, 22 Sep 1975, on *Crenimugil labrosus* (Risso), coll. C. Sweeney (RMNH 5141). 2 females (ovig 18.0, 19.0), Golfe du Lyon, France, on fin of Mugilidae, no other data (identified by Trilles in 1975) (MNHN Is. 531). Females (ovig #1 31.0, 29.0, #2 27.5, 27.0), Bay of Naples, Italy, purchased by Dr. Dohrn, April 1882 (AM P37158). Female (ovig 30.5, from a series of 20 females, 1 male and 4 broken or dissected specimens), Naples, ca. 1956, donated by University College of London (BMNH unreg). Other RMNH numbers: 5471-5474 (Holland; Split, Yugoslavia); 5, 1324 (Middellandse Zee, Holland); 32 (Cadiz, Spain). Female (ovig 31.5), Bay of Eilat, Israel, 19 Oct 1962, on carangid, coll. Paperna (USNM acc. #305345). Female (24.0), Cap Blanc, Mauritania, West Africa, coll. Theo Monod (BMNH 1924.5.30.11-15). Female, Oamaru, New Zealand, leg. H. Suter (reported on by Nierstrasz, 1915 (RMNH 4)). Female (ovig 26.0), west coast of South Island, New Zealand, between Butler and Grey Rivers, 29 Nov 1936, coll. Captain C.W. Osterfeld (AM P10821).

Australian specimens. New South Wales: female (ovig 30.0), Palm Beach, Broken Bay, Nov 1926, caudal peduncle of *Pagrosomus auritus*, coll. M. Ward (AM P8753). Female (26.0), Port Jackson, 11 Oct 1959, caudal peduncle of Luderick, coll. E. de Villa (AM P37150). Female (ovig 20.5), male intermoult (14.0), Wallega Lakes, 19 Dec 1981 on 'bream', coll. C. Keenan (QM W10269). 2 females (ovig ca. 25.0, non-ovig 23.0), Nadgee Beach, 24 Nov 1973, on black bream (AM P20254). Victoria: 2 females (ovig 26.5, 26.0), Mordialloc, Port Phillip Bay, 13 Dec 1979, from 'snapper', coll. Hans Tusreil (NMV J11567). 3 females (ovig 34.0, 33.5, 29.0), Bass Strait, 39°52.5'S, 144°48.0'E, 3 Feb 1981, trawled, 49 m, on *Callorhynchus milii* (NMV J11566). South Australia: female (ovig 21.0), Anxious Bay, 25 Feb 1981, 55 m, trawled, coll. P. Halsey (SAM C4067). Western Australia: 7 females (ovig 24.5 #1, 23.0 #2, 21.0 #4, 21.0, 20.0 #5, 17.0 #3, non-ovig 18.0), male (16.0), aegathoid (13.0), off Walpole, 3 Mar 1986, on pectoral or caudal fins of *Pseudocaranx dentex*, coll. A. William (AM P37149).

Additional material. New South Wales: 1. Old collection. 4 females, Port Jackson (AM P5622). 2 females, Port Hacking, 1907 (AM P4907). Female, Port Hacking, 13 Apr 1935, gill opening of *Pagrosoma*, coll. L. Abrahams (AM P10642). Female, Shoalhaven, coll. C. Hedley (AM P9596). Male, Eden, on fin of flying gurnard, coll. A. Cameron (AM P3940). Female, from sunfish (AM P9589).

2. Recent collection. 2 females, off Port Stephens, 22-23 Jan 1963, off stingray, 73-82 m, coll. J.C. Yaldwyn, D.J. McMichael (AM P37151). Female (ovig 24.5), southwest arm, Port Hacking, 13 Mar 1975, pectoral fin of mullet, coll. CSIRO (WAM 1250-85). Female (ovig 25.0), Little Jerusalem Bay, Hawkesbury River, 9 June 1986, on pectoral fin of *Pagrosomus auritus*, coll. S. Keable (AM P37152). Female, Tuross Head, 20 Sept 1974, off kyphosids, coll. D. Hoese, I. Briggs and N. Carrick (AM P37153). Victoria: female, Mornington, 7 Aug 1977, parasite on flathead, coll. John van Leeuwin (NMV J11568). 2 females, Black Rock, 6 Dec 1979, on flathead (NMV J11570). 2 females, 2 males, Victoria (SAM C288). Female, no data (NMV J11569). Female, Port Phillip, no data, coll. Miss J. Allen (AM P11425). Tasmania: female, Frederick Henry Bay, Storm Bay, 42°55'S, 147°37'E, 21 July 1973, on *Sillago bassensis*, coll. P. Last on *Allanwood*

(AM P37260). Female, Storm Bay, 12 Dec 1977, on Red Gurnard, 59 m, coll. *Craigmin* (QM W11014). 3 females, Storm Bay (AM E5677). 2 females, Storm Bay, 16 July 1909, on elephant shark (AM E4848). Female, off Nutgrove Beach, Derwent Estuary, Hobart, 24 Jan 1977, on dorsal fin of *Callorhynchus milii*, coll. P. Last — CSIRO (AM P37259). 3 females, 1 aegathoid, Frederick Henry Bay, Storm Bay, 1984, body of *Callorhynchus milii*, coll. CSIRO (AM P37261). Female, off Tasmanian coast (AM E6745). South Australia: 3 females, 2 males, no data (SAM C4086). Female, Anxious Bay, 25 Feb 1981, 55 m, coll. P. Halsey (SAM C4087). Female, The Coorong, ca. 35°45'S, 139°13'E, 1982, on *Acanthopagus butcheri*, coll. T. Byrnes (AM P37159). Western Australia: 4 females, Albany, from Skipjack (WAM 589-86). 6 females, aegathoid, Albany, with #13410/13415, from skipjack (WAM 587-86). Female, male, Wilson Inlet, 35°00'S, 117°20'E, 7-15 July 1971, coll. R. Lenanton (WAM 600-85). 2 females, Frankland River, from sea trout and whiting (WAM 591-86). Female, Nornalup Inlet, on tail of skipjack (WAM 588-86). Male, Nornalup, on tail of *Pomatopus saltatrix* (WAM 47-36). Female, Broke Inlet, 34°56'S, 116°27'E, 20 Oct 1976, on fish (WAM 1261-85). Female, Fremantle, 7 Nov 1957, coll. R.P. McMillan (WAM 585-86). 2 females without data (WAM 337-30, 65-33).

Types. The whereabouts of the types of *Nerocila orbignyi* is unknown.

Type locality. Modon, Greece, 36°49'N, 21°42'E (Guérin-Méneville, 1832).

Description of female. Body about 2.0 times as long as wide. Cephalon anterior margin with indistinct medial point; eyes small, about 0.3 width of cephalon. Pereonites 1-4 posterolateral angles not produced; pereonites 4-7 or 5-7 posterolateral angles produced, acute. Coxae of pereonites 2-4 with posterior margins rounded, coxae of pereonites 5-7 with posterior margins acute. Pleonite 1 longest; ventrolateral margins of pleonites 1 and 2 posteriorly directed, extending to, or beyond pleonite 5; pleonites 3-5 lateral margins weakly produced, narrowly rounded. Pleotelson lateral margins angled, then converging to caudomedial point.

Antennule articles 1 and 2 partly fused; antenna with 11 articles.

Mandible palp article 1 longest, 2 and 3 subequal in length; article 3 with about 4 small and 6 long setae on distolateral margin. Maxilliped article 3 with 4 recurved spines.

Pereopod dactyli without nodules. Pereopod 1 dactylus robust, about 2.2 times as long as propodus. Pereopods 6 and 7 subequal in size, each with carina on mediolateral margin; pereopod 7 with 3 spines on posterior margin of carpus, 5 spines on propodal palm.

Pleopod 2 appendix masculina about 0.5 length of endopod; pleopod 5 endopod with 2 large folds. Uropod exopod curving medially, about 1.6 times as long as endopod; endopod straight, distal margin obliquely truncate, with distomedial point.

Male. About 2.4 times as long as wide; coxae and posterolateral margins of pereonites not as produced

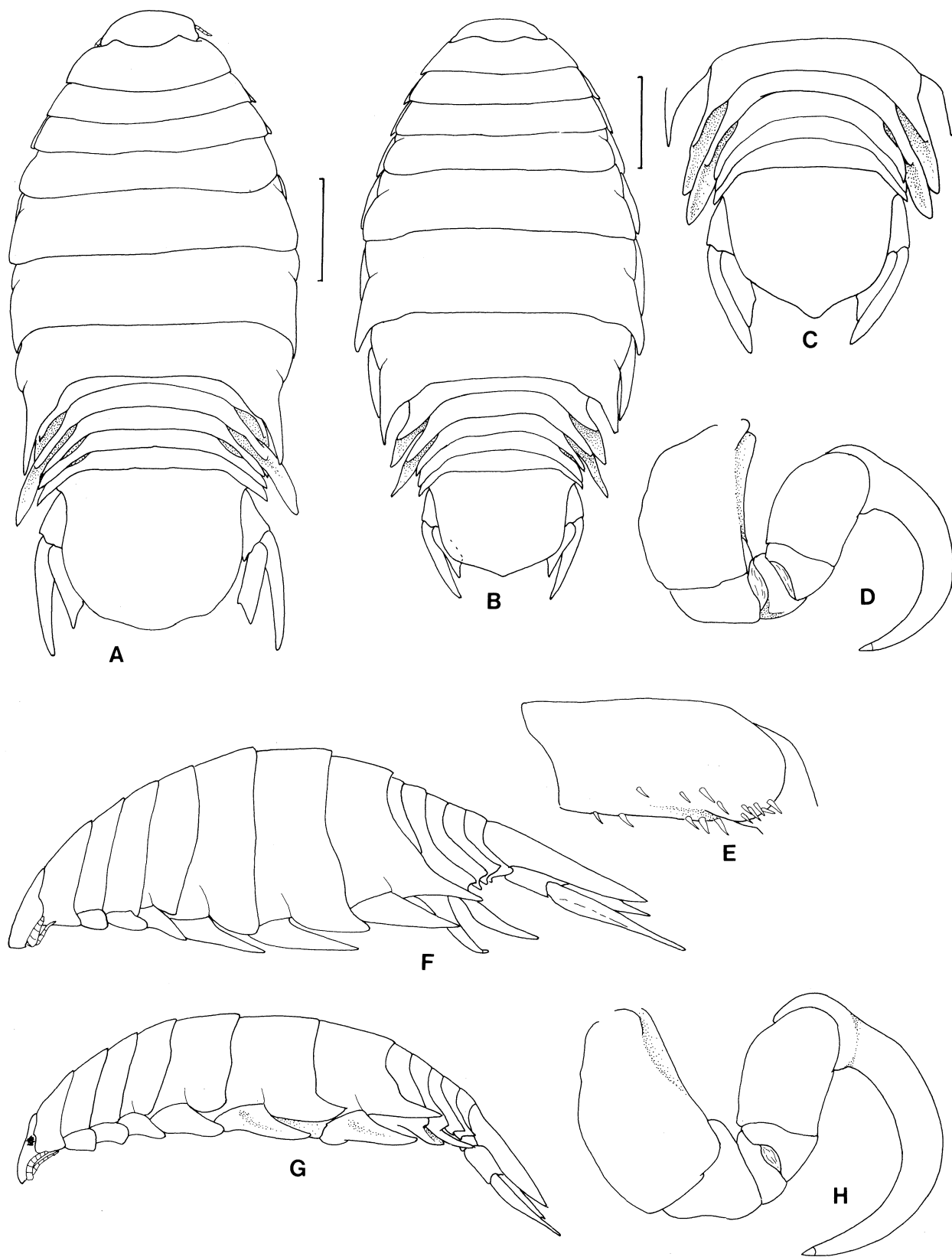


Fig. 15. *Nerocila orbignyi*. **A**, female, Palm Beach, NSW, AM P8752; **B**, female 31.0 mm, Naples, AM P37158; **C**, female 27.5 mm, Naples, AM P37158; **D**, pereopod 1, Palm Beach, AM P8752; **E**, pereopod 7, propodus, Palm Beach, AM P8752; **F**, lateral view, female, Palm Beach; **G**, female 31.0 mm, Naples; **H**, pereopod 1, female #1, Naples. Scale lines 5.0 mm.

as in female; ventrolateral margins of pleonites 1 and 2 weakly developed. Appendages similar to female except: antenna with 9 articles; mandible palp article 3 more setose; pereopods 6 and 7 more spinose; appendix masculina 0.7 length of endopod.

Colour. Specimens from Walpole, WA, black with 2 faint submedian pale longitudinal bands on pleotelson; posterior margin of pereonites and pleonites with thin clear band (this pattern corresponds exactly to that figured for North Atlantic

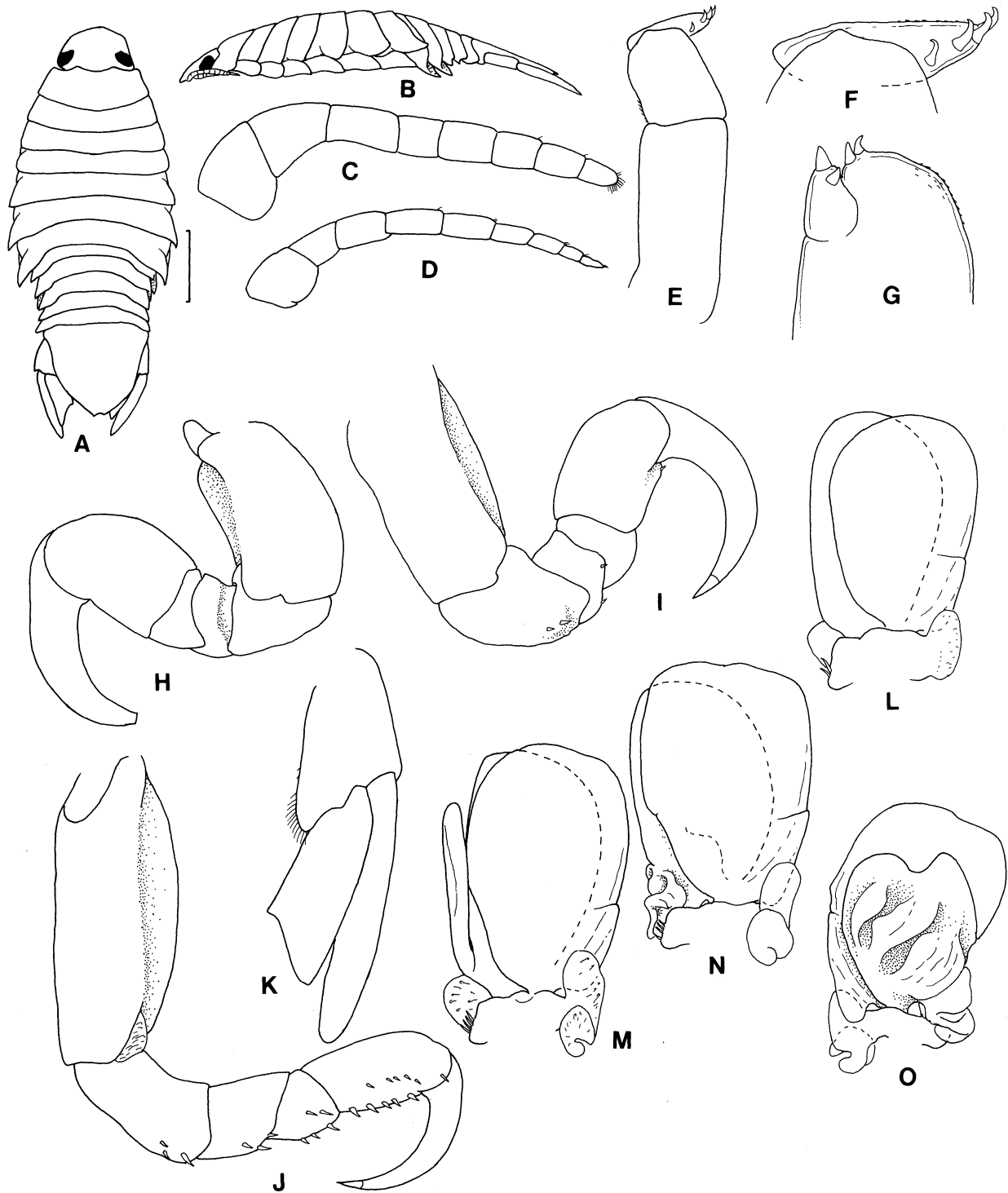


Fig. 16. *Nerocila orbigny*. All male, Walpole, WA, AMP37149. A, dorsal view; B, lateral view; C, antennule; D, antenna; E, maxilliped; F, maxilliped article 3; G, maxilla apex; H, pereopod 1; I, pereopod 2; J, pereopod 7; K, uropod; L-O, pleopods 1-3, 5 respectively. Scale line 3.0 mm.

material by Holthuis, 1978). Most specimens pale tan, probably due to fading with age, except one female from Walpole, WA, which is pale with sparse chromatophores.

Size. Ovigerous females 18.0–34.0 mm, mean 26.2 mm (n=38); non-ovigerous females 18.0–31.0 mm, mean 22.6 mm (n=9); males 12.0–19.0 mm, mean 16.3 mm (n=6). Specimens from Tasmania and the Bass Strait were consistently larger than those from other areas, with a mean length of 32.2 mm (n=6), while the remainder (Bass Strait and Tasmania excluded) average 22.1 mm (n=32).

Variation. There is considerable variation in the degree of prolongation of the posterolateral angles of pereonites 5–7, in coxal shape, and in pleonite morphology. This variation can be found within a sample from a single host species from a single locality, and is figured for the sample from Walpole, WA, all taken from *Pseudocaranx dentex*. The posterolateral angles of the posterior pereonites may be weakly developed (Fig. 6C), strongly developed (Fig. 6B), or curved medially (Fig. 6D). The ventrolateral processes of pleonites 1 and 2 may project away from the pleon (Fig. 6D), and extend posteriorly to pleonite 4 (Fig. 6A), or beyond pleonite 5 (Fig. 6B). The posterior coxae may have concave posterior margins (Fig. 7C), convex (Fig. 7A) or straight (Fig. 7D). The uropod endopod may have a prominent distomedial point (Fig. 8F), or not (Fig. 11E); the angle of the oblique distal margin to the lateral margin may also vary. In occasional specimens, pereopod 7 has spines on the extreme distolateral surface (Fig. 9E).

In Australian material the length of pereopod 1 dactylus varies from 2.2 times longer than the propodus (Fig. 8A, Walpole, AM P37149) to 2.4 times longer than propodus (Fig. 9D, Palm Beach, AM P8752, also Bass Strait, NMV J11566). Material from Naples, Italy has pereopod 1 dactylus 2.9 times longer than the propodus (Fig. 9H, AM P37158), and this is the only apparent morphological difference between European and Australian material. Until variability in European populations can be accurately assessed, this character cannot be considered as of specific significance. The large European synonymy for this species attests to its variability.

Remarks. The history and nomenclature for this species are complex, and need full discussion. Various species have at various times been placed in synonymy with each other, frequently without recourse to illustrating or describing the material at hand. Many names involved are based on descriptions that simply cannot be restricted to a species. In the absence of type material and locality data, these names must be regarded as *nomina dubia*.

Initially I concentrated on resolving the identity and correct name for Australian and New Zealand material, which clearly involved *Nerocila macleayii* Miers, *Nerocila trailli* Filhol, *Nerocila australasiae*

Schiödte & Meinert, *Nerocila novaezealandiae* Schiödte & Meinert, and *Nerocila falklandica* Cunningham. Of these, *N. trailli* and *N. novaezealandiae* were males, and although certain identification to species is not possible, they did not differ from males of Australian material. *Nerocila macleayii* Miers is a repeat of the *nomen nudum* of White & Doubleday (1843). Miers' name is predated by *Nerocila australasiae*, which also has page precedence over *Nerocila novaezealandiae*. All the species mentioned here are one species, except for those specimens of Miers from the USA and 'Africa'.

The name *Nerocila falklandica* has precedence (1871) over that of *N. australasiae* (1881), and also introduced a distributional problem. While the male type did not appear to differ from Australian material, it could not be separated from the South Atlantic species *Nerocila fluviatilis* or the species described by Dana (1853). This then linked the identified Australian material to that of South Atlantic species, and inevitably to *Nerocila orbigny*.

The second stage lay in resolving the identity of *Nerocila orbigny* and the species that had been placed in synonymy with it. Both Barnard (1940) and Hale (1940) separately came to the same conclusion: that material that they had at hand was *Nerocila orbigny*. Earlier, Monod (1931) concluded much the same, but maintained that *Nerocila armata* was distinct. This finding was later supported by Brian & Dartevelle (1949). The principal species involved in this synonymy were *N. maculata*, *N. fluviatilis*, *N. cephalotes*, *N. rhabdota*, and *N. armata*. Most of Schiödte & Meinert's (1881) Mediterranean species had been, along with *N. affinis* Milne Edwards, synonymised with *N. maculata*. Trilles (1975a) treated all of Dana's (1853) species as valid, and also regarded *N. orbigny* and *N. maculata* as distinct species (Trilles, 1975b). Trilles (1975a, 1975b) gave no discussion on the characters by which these species could be separated, nor how he came to make his determinations. There was no discussion on the synonymies given by Barnard (1940), Hale (1940), and Monod (1931), although these authors clearly questioned the validity of those species involved. Trilles (1975b) discussed how to distinguish *N. orbigny* from *N. bivittata*, but not from *N. maculata*. *Nerocila cephalotes* had at various times been synonymised with *N. armata* or *N. rhabdota*.

Monod (1931) gave an excellent and very useful series of whole animal drawings which were of two species: *Nerocila armata* Dana and *Nerocila orbigny* (Guérin-Méneville). Monod's figures for *N. orbigny* correspond exactly to Australian material. Monod pointed out that the three species *N. orbigny*, *N. maculata*, and *N. cephalotes* were all separated by the degree of prolongation of the posterolateral margins of pereonites 5–7. He (Monod, 1931) concluded that such variation could not be regarded as species specific and this is also clearly demonstrated by the sample from Walpole, WA (AM P37149).

Examination of the figures given by Trilles (1975b) and material in the collections of the USNM, BMNH and RMNH failed to reveal any characters by which *N. orbigny* can be separated from *N. maculata*, and *N. maculata* is here placed in synonymy with *N. orbigny*.

Other unresolved species involved in this wealth of names are those of Dana (1853), the Mediterranean

species *Nerocila brongnartii* (Risso, 1816), *Nerocila burtiasi* Belloc, 1929, and *Nerocila cuspidata* Costa, 1851, and *Nerocila tartatowski* Popov, 1933 from the Black Sea. None of Dana's (1853) species can be confidently identified from his drawings (Dana, 1855). There are no types (most of Dana's collection was lost when the sloop *Peacock* sank off the mouth of the Columbia River, USA), and no accurate locality

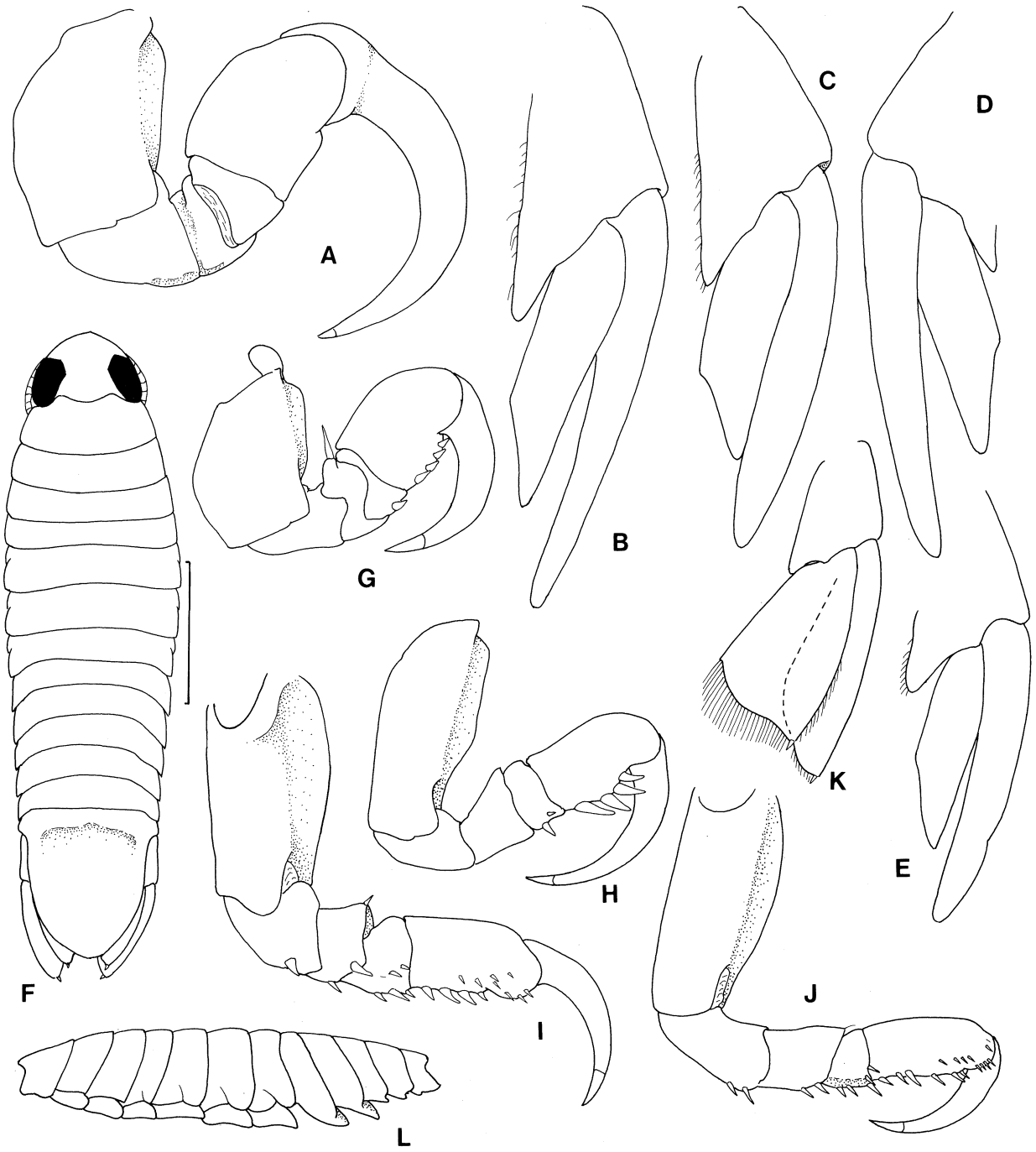


Fig. 17. *Nerocila orbigny*. F—L, aegathoid, Walpole, WA, AM P37149; remainder as indicated. A, pereopod 1, female 34.0 mm, NMV J11566; B, uropod, female 31.0 mm, Naples; C, uropod, female #1, Walpole; D, uropod, in situ, female #2, Walpole; E, uropod, in situ, female #5, Walpole; F, dorsal view; G—J, pereopods 1, 3, 6, 7, respectively; K, uropod; L, lateral view. Scale line 3.0 mm.

or host data. With the exception of *N. armata*, these species are here all regarded as *nomen dubia*. Of the Mediterranean species *N. brongnartii* (transferred to *Nerocila* by Costa, 1851) and *N. cuspidata* are similarly bereft of data or types and are also relegated to *nomina dubia*. The name *Nerocila armata* Dana is conserved since it is the only one of Dana's species that has been recently characterised (Monod, 1931; Brian & Darteville, 1949).

The number of valid species is now reduced to three: *Nerocila armata*, *Nerocila fluviatilis* and *Nerocila orbignyi* (see Table 2). These species are distinguished by differences in coxa, pereonite and uropod morphology. *Nerocila armata* (Fig. 33D–K) has coxae of pereonites 2–4 and the posterolateral margins of pereonites 1–4 acute, and has longer uropods (exopod 0.9–1.1 length of pleotelson, derived from Monod, 1931, figs 1–3) with more slender rami, and an acutely pointed endopod. Australian material always has coxae 2–3 posteriorly rounded, posterolateral margins of pereonites 1–4 scarcely or not at all produced, and shorter uropods (exopod 0.6–0.9 length of pleotelson, mean 0.7). *Nerocila armata* is apparently restricted to tropical West Africa.

Nerocila fluviatilis (Fig. 35E–I) is easily distinguished from the other two species by its strongly notched uropod endopod with a distinctive sinuate lateral margin. This Atlantic species occurs along the coasts of Uruguay, Argentina, and probably Brazil, but is apparently absent from the Caribbean.

Two other species are similar to *Nerocila orbignyi*: *Nerocila acuminata* Schiödte & Meinert, 1881 and *Nerocila japonica* Schiödte & Meinert, 1881. *Nerocila acuminata* is easily distinguished by the uropod endopod with both margins sinuate, forming an extended acute point (Fig. 33A–C, and Brusca, 1981, figs. 11A,B, 13E). *Nerocila japonica* (Fig. 34G–J) is distinguished by the uropod endopod with straight margins which converge to an acute apex, acute lateral margins on pleonites 3–5, acute posterolateral margins of pereonites 1–4, and acute coxae of pereonites 2–4.

Hosts. Trilles (1975a, 1975b) has summarised the known hosts for the totality of this species. In Australia it is recorded from *Callorhynchus milii*, *Acanthopagrus australis*, *Chrysophrys auratus*, *Pseudocaranx dentex* (WA specimens usually identified as “skipjack”), *Mola mola*, *Sillago bassensis*, *Pomatomus saltatrix*, and unidentified Mugilidae, Kyphosidae, and Platycephalidae. O'Connor (1978, unpublished) recorded this species from *Girella tricuspidata*. Two common names of hosts can be related to scientific names: red gurnard = *Chelidonichthys kumu*; flying gurnard = *Dactylopera orientalis*.

Distribution. Australian coasts from central New South Wales, southeastern Tasmania, Victoria, South Australia, and Western Australia to Fremantle. Widely distributed in the Mediterranean, tropical and southern Atlantic, South Africa and New

Table 2. Names involved in the synonymy of *Nerocila armata*, *Nerocila fluviatilis* and *Nerocila orbignyi*, and their current status (S & M = Schiödte & Meinert, 1881; all nomina nuda are also synonyms of *N. orbignyi*).

NAME	STATUS	SOURCE
<i>N. orbignyi</i> (Guerin-Meneville)	valid	priority specimens
<i>N. maculata</i> Edwards	<i>N. orbignyi</i>	literature
<i>N. affinis</i> Edwards	<i>N. orbignyi</i>	this work
<i>N. Mac Leaii</i> White & Doubleday	nomen nudum	literature
<i>N. vittata</i> Lucas	<i>N. orbignyi</i>	literature
<i>N. brongnartii</i> (Risso)	nomen dubium	literature
<i>N. cuspidata</i> Costa	nomen dubium	literature
<i>N. aculeata</i> Edwards	nomen dubium	literature
<i>N. aculeata</i> Dana	nomen dubium	literature
<i>N. armata</i> Dana	valid	specimens
<i>N. brasiliensis</i> Dana	nomen dubium	literature
<i>N. latiuscula</i> Dana	nomen dubium	literature
<i>N. tenuipes</i> Dana	nomen dubium	literature
<i>Livoneca scianae</i> Beneden	nomen nudum	Holthuis, 1978
<i>N. falklandica</i> Cunningham	nomen dubium	holotype
<i>N. rhabdota</i> Koelbel	<i>N. armata</i>	literature
<i>N. adriatica</i> S & M	<i>N. orbignyi</i>	literature
<i>N. australasiae</i> S & M	<i>N. orbignyi</i>	holotype
<i>N. cephalotes</i> S & M	<i>N. orbignyi</i>	specimens
<i>N. fluviatilis</i> S & M	valid	specimens
<i>N. neapolitana</i> S & M	<i>N. orbignyi</i>	literature
<i>N. novaezelandiae</i> S & M	<i>N. orbignyi</i>	types
<i>N. macleayii</i> Miers, et auct.	<i>N. orbignyi</i>	types
<i>N. trailli</i> Filhol	<i>N. orbignyi</i>	holotype
<i>N. laticeps</i> Bovallius	<i>N. orbignyi</i>	literature
<i>Rosca rogans</i> Stebbing	<i>N. orbignyi</i>	types
<i>N. burtiasi</i> Belloc	uncertain	literature
<i>N. tartatowski</i> Popov	<i>N. orbignyi</i>	literature

Zealand. Apparently absent from the tropical Indo-Pacific (except for one specimen from Eilat), North Pacific, East Pacific and western North Atlantic.

Nerocila phaiopleura Bleeker

Figs 18, 19

Nerocila phaiopleura Bleeker, 1857: 25, pl. 1, fig. 3.—
Monod, 1976: 857; Trilles, 1979: 253, pl. 1, fig. 3.

Nerocila phaeopleura.—Miers, 1880: 467; Schiödte & Meinert, 1881: 13, pl. 1, figs 6, 7; Gerstaecker, 1882: 260; Nierstrasz, 1915: 75, pl. 3, figs 1, 2; 1918: 113, pl. 9, figs 6, 7; 1931: 124; Barnard, 1925: 392; 1936: 164, figs 6a—c; Chilton, 1926: 180, figs 3a—b; Monod, 1934: 12; Serène, 1937: 69; Morton, 1974: 143, pl. 1; Kensley, 1978: 82; fig 33D,G.

Nerocila (Nerocila) phaeopleura.—Bruce, 1982: 316, fig 1, 4a—c.

Nerocila (Nerocila) phaiopleura.—Bowman & Tareen, 1983: 5, fig. 5.

Nerocila sp. Monod, 1976: 857, figs 14, 15.

Material examined. Two females (ovig 13.7, 14.0), Batavia, Java, Indonesia, on *Stolephorus indicus*, one still attached anterior to caudal peduncle of host (RMNH 1322). Female (ovig 15.5), Java Zee, Indonesia, coll. P. Buitendijk (RMNH 11). Female (non-ovig 21.0), Conway Beach, near Proserpine, Qld, Nov 1971, on caudal peduncle of *Liza argentea*, coll. R. Harrison (QM W4824). Female (ovig 13.5), aegathoid (12.5), Swan River, WA, 1984, on *Cnidoglanus macrocephalus*, coll. A. Williams (AM P37160). 2 females (ovig 13.5, 15.0), middle estuary, Swan River, WA, Dec 1984, on *Engraulis australis*, coll. A. Williams (AM P37161). Female (non-ovig 11.5), Swan River, WA, ca. 1986, on base of ventral fin of *Engraulis australis*, coll. A. Williams (WAM 2330—86).

Types. The types are held at the Rijksmuseum van Natuurlijke Historie, Leiden.

Type locality. Batavia Bay (= Jakarta), Indonesia (Bleeker, 1857).

Descriptive notes. Eyes large, about 0.5 width of cephalon. Pleonites 1 and 2 with ventrolateral margins weakly produced. Mandible palp article 1.5 times longer than article 2. Lateral margin with about 22 stout setae. Maxilliped article 3 with 4 recurved spines. Pereopods 1—5 with weak swelling on anteroproximal margin of dactylus; pereopod 7 with 2 spines on posterior margin of propodus. Uropod slender, tapering exopod, 1.7—2.1 times longer than endopod; endopod apex narrowly rounded or obliquely truncate.

Male. Not known.

Aegathoid. The specimen figured in Fig. 19 is at the “aegathoid” stage.

Variation. The female from Proserpine is an intermoult which exaggerates the apparent width. This specimen differs from others in having the uropod endopod with an obliquely truncate apex. However the other appendages all correspond exactly to those of specimens from Hong Kong (Bruce, 1982)

and Kuwait (Bowman & Tareen, 1983). Swan River specimens, when compared to other material, all have a narrower body shape, shorter cephalon, cephalon anterior margin bent ventrally and posteriorly, short posteriorly round coxae, pereonite posterolateral angles not extended, and large eyes with distinct ocelli.

Remarks. *Nerocila phaiopleura* is a widely distributed and variable species. It can be recognised by the large eyes (or traces of), lack of posterolateral processes on the pereonites, pleotelson curving smoothly to a distinct point, narrow and straight uropod rami, and the distinctive pereopod morphology.

Hosts. In Australia: *Liza argentea*, *Cnidoglanus macrocephalus* and *Engraulis australis*. Previous records are given by Bowman & Tareen (1983), and hosts are all from the families Engraulidae and Clupeidae. Barnard's (1936) record from *Xiphias gladius* (swordfish) is surely in error, the isopod probably having come from swordfish prey.

Distribution. Proserpine, Queensland, and the Swan River estuary, Western Australia; also widely recorded from South Africa and Kuwait to Hong Kong (Bowman & Tareen, 1983).

Emphyllia group species

Nerocila monodi Hale

Figs 20—22

Nerocila serra.—Hale, 1926: 208, fig. 6.

Nerocila monodi Hale, 1940: 301, fig. 8.—Bowman & Tareen, 1983: 7; Roubal, Armitage & Rhode, 1983: 3.

Material examined. HOLOTYPE, female (ovig 17.7), Great Palm Island, Queensland, no date, on *Lutjanus*, coll. Dr. W.E.J. Paradise on HMAS *Geranium* (SAM C290). NON-TYPE. Female (ovig 22.5), Arafura Sea, N.T., 10°02.55'S, 136°46.45'E, 7 Feb 1986, depth 53 m, on *Carangoides humerosus*, coll. J.B. (NTM Cr3623). Female (ovig 22.0), north of Smith Point, NT, 11°07'S, 132°08'E, 18 Oct 1981, depth 27 m, coll. H.K. Larsen (NTM Cr737). Female (ovig 18.0), Fake Creek, Shoal Bay, Darwin, NT, 4 Apr, 1975, coll. N.T. Div. Fish (NTM Cr771). Female (non-ovig 21.0), Talle Breakwater, northern Qld, 25 Feb 1983, on “red bream”, coll. D. Baldwin (AM P37157). Female (ovig 22.0), Tin Can Bay, southeastern Qld, 10 Dec 1973, from *Rhabdosargus sarba*, coll. R. Harrison (QM W4827). 4 females (ovig 27.0, non-ovig 19.5, 22.0, ca 26.0), Weiba Creek, Noosa, southeastern Qld, 16 Mar 1975, on *Acanthopagrus australis*, coll. R. Harrison (QM W4825). 2 females (ovig 21.5, non-ovig 19.5), Moreton Bay, Qld, 13 May 1982, one on each side of tail of *Priacanthus macracanthus*, coll. S.M. Wilson (QM W11007). 2 females (ovig 21.5, 22.5), Brisbane River, Qld, 5 May 1952, one on each side of tail of “perch”, don. A.C. Gardiner (QM 9485). Female (non-ovig 26.0), male (14.0), Victoria Point, Moreton Bay, Qld, 31 Mar 1975, on *Acanthopagrus australis*, coll. R. Monroe (QM W4826). Female (ovig 21.5), 2 males (14.0, 15.0), Jacobs Well, Southport, Qld, 22 May 1975, on tail of “bream”, coll. H. Linton (QM 4814).

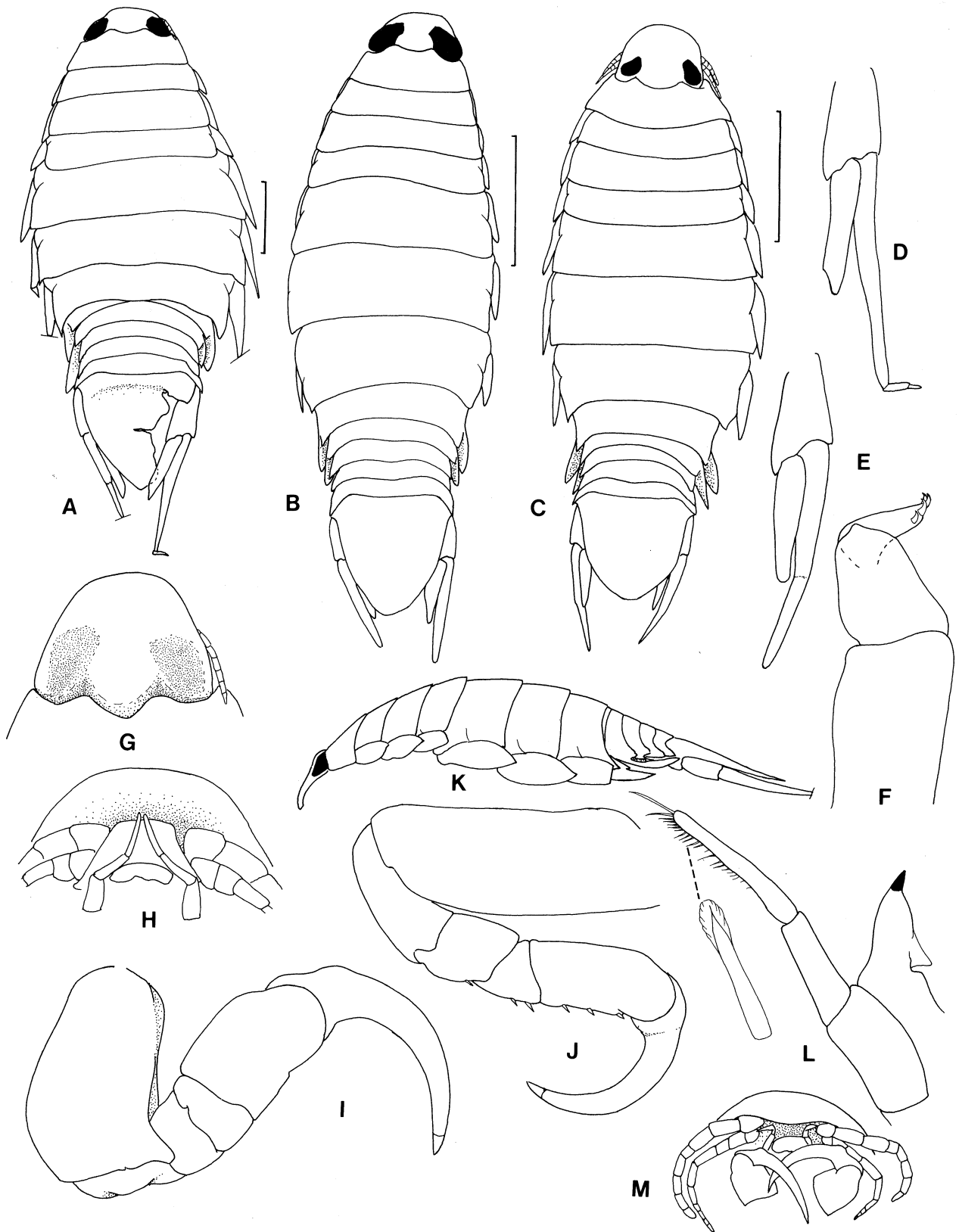


Fig. 18. *Nerocila phaiopleura*. Female, Qld, QM W4824, except where indicated. **A**, dorsal view; **B**, female 15.0 mm, Swan River; **C**, female 14.0 mm, RMNH 1322; **D**, uropod; **E**, uropod, RMNH 1322; **F**, maxilliped; **G**, cephalon; **H**, frons; **I**, pereopod 1; **J**, pereopod 7; **K**, lateral view; **L**, mandible palp; **M**, buccal area, female, Swan River. Scale lines 3.0 mm.

Additional material. Female, North West Shelf, WA, 19°27.1'S, 118°58.4'E, 8 Dec 1982, 36m, coll. C.C. Lu (NMV J11572). Female, Arafura Sea, 12°58.0'S, 132°10.0'E (NTM Cr736). Female, Arafura Sea, 10°56'S, 133°34'E, 18 Sep 1986, ca. 50 m, on *Nemipterus hexadon*, coll. fisheries observer on Thai trawler (NTM Cr4560). Female, Arafura Sea, 10°15'S, 136°40'E, 20 Feb 1986, 55–60 m, fisheries observer on Taiwanese trawler (NTM Cr4559). Female, Cleveland Bay, Townsville, Qld, 4 Dec 1986 on *Pomadasys hasta* coll. B. Ingram, (AM P37156). 2 females, Running Creek, Fraser Island, Qld, 2 July 1975 on "bream", coll. P. Shanco (QM W5741). Female, Noosa River, above Lake Cooribah, on bream (QM W8763). Female, Bribie Island, Moreton Bay, Qld, on *Acanthopagrus australis* (QM W10266). Female,

Burpengary Creek, Moreton Bay, Qld, 1899, coll. Dr. Bancroft (QM W5750). Female, Redcliffe, Moreton Bay, Qld, on "snapper", don. R.L. Cribb (QM G13/241). Female, Redcliffe, Moreton Bay, Qld, don. L.D. McIntosh (QM W9484). Female, St. Helena Island, Moreton Bay, Qld, 19 May 1982, coll. A. Bradshaw (QM W10267). 2 females, Wellington Point, Moreton Bay, Qld, 28 Mar 1974, on "black bream", coll. H. Sommerfeldt (QM W4875). Female, male, Victoria Point, Moreton Bay, on *Acanthopagrus australis* (QM W4826). Female, Brisbane River, Qld, 9 Jan 1893, don. J.P. Bichard (QM W5751). Female, Brisbane River, Qld, on tail of "perch" (QM W9486). Female, Brisbane River, Qld, on tail of "bream", coll. Mrs. M. Kubo, (AM P37162). Female, Moreton Bay, on bream (QM W5762). Female, Southport, southeastern

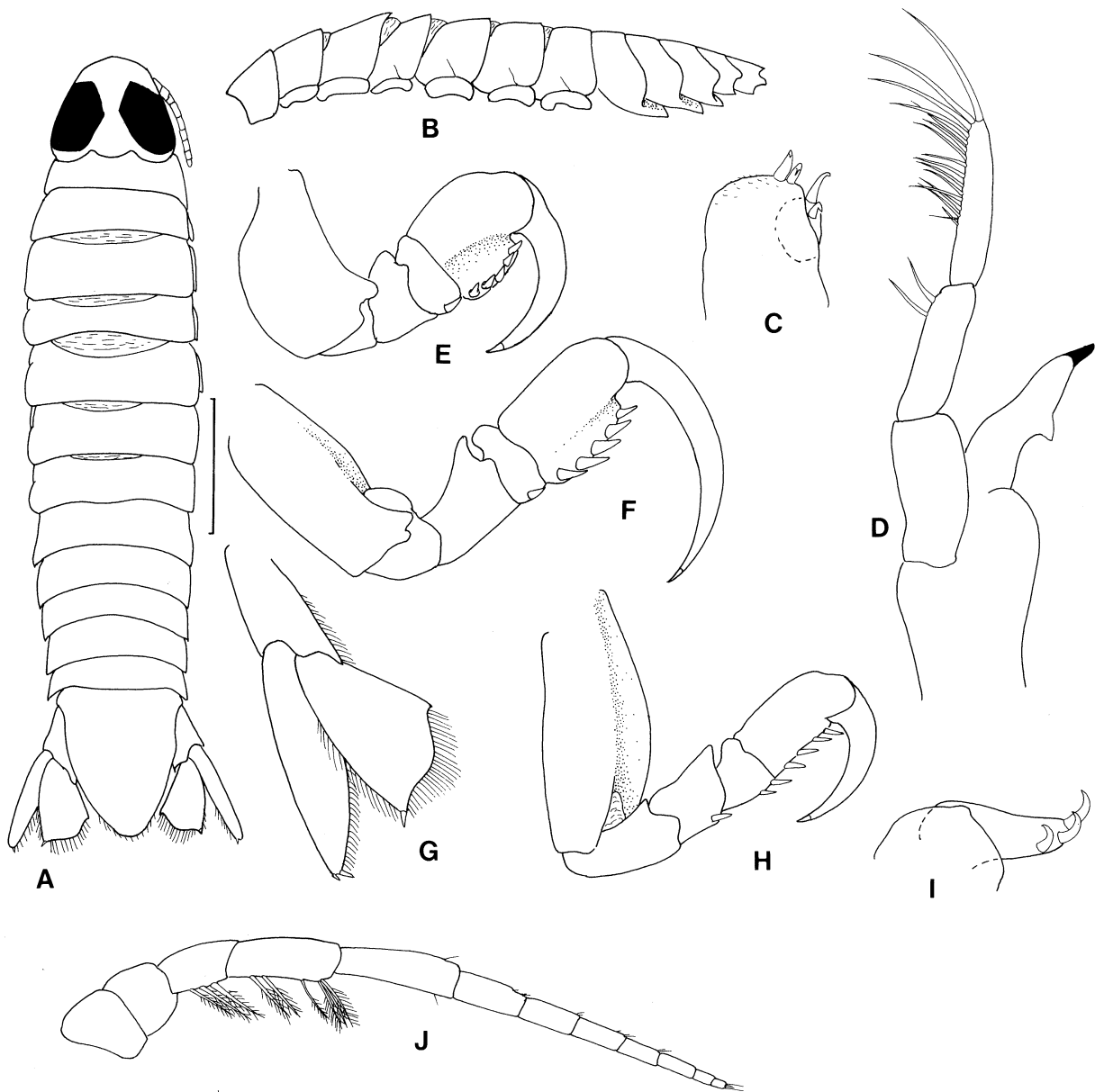


Fig. 19. *Nerocila phaiopleura*. All aegathoid, Swan River, WA, AMP37160. A, dorsal view; B, lateral view, pereon, pleon; C, maxilla apex; D, mandible; E, pereopod 1; F, pereopod 3; G, uropod; H, pereopod 7; I, maxilliped apex; J, antenna. Scale line 2.0 mm.

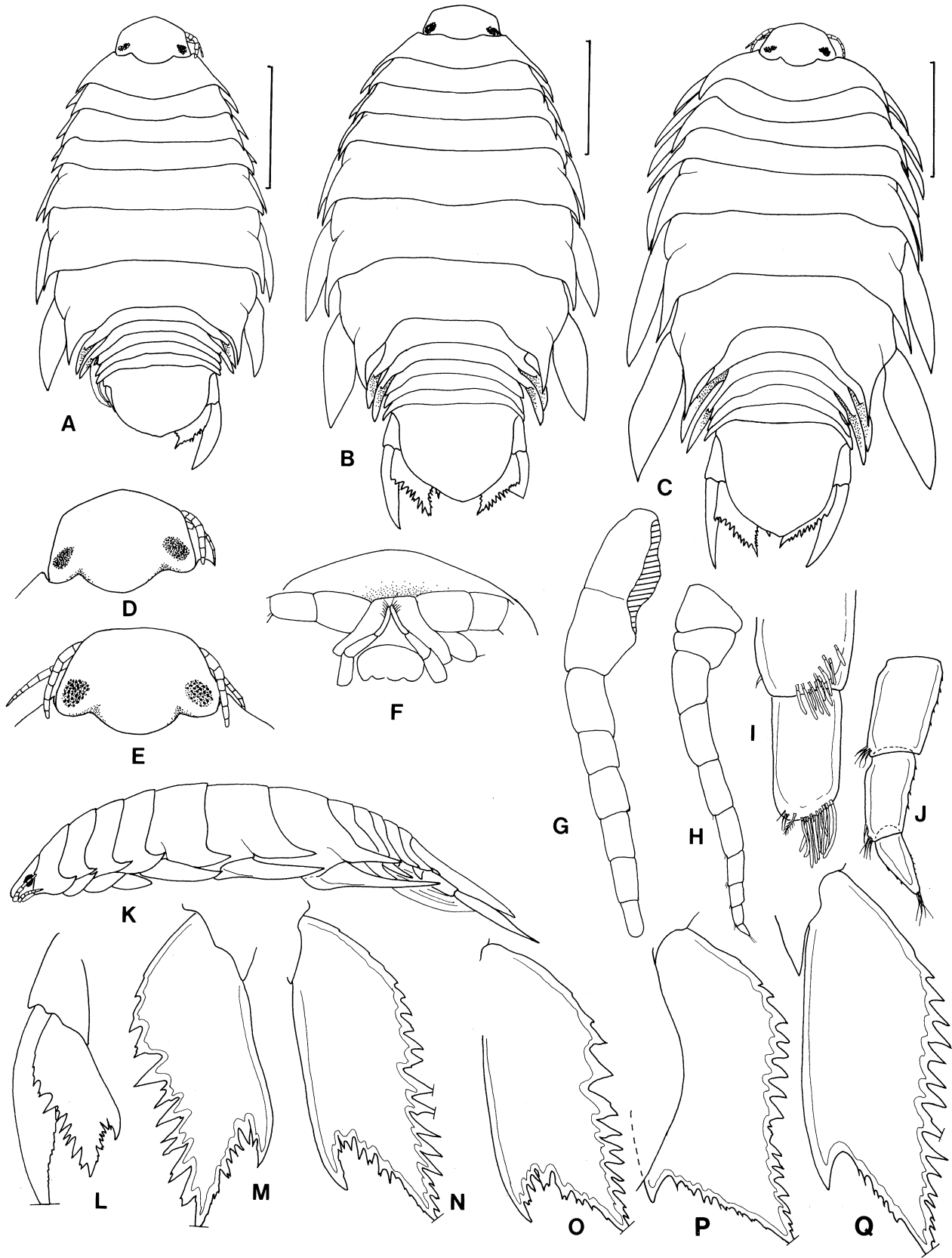


Fig. 20. *Nerocila monodi*. All female 21.5 mm, Moreton Bay (QM W11007), except where indicated. **A**, holotype; **B**, dorsal view; **C**, female, NT (NTM Cr737); **D**, cephalon, holotype; **E**, cephalon; **F**, frons, holotype; **G**, antennule; **H**, antenna; **I**, antennule, distal articles; **J**, antenna, distal articles; **K**, lateral view; **L**, left uropod; **M**, left uropod, endopod; **N**, right uropod, endopod; **O**, right uropod endopod, female non-ovig QM W11007; **P**, right uropod endopod, female 27.0 mm, QM W4825; **Q**, right uropod endopod, female 22.0 mm, QM W4825. Scale lines 5.0 mm.

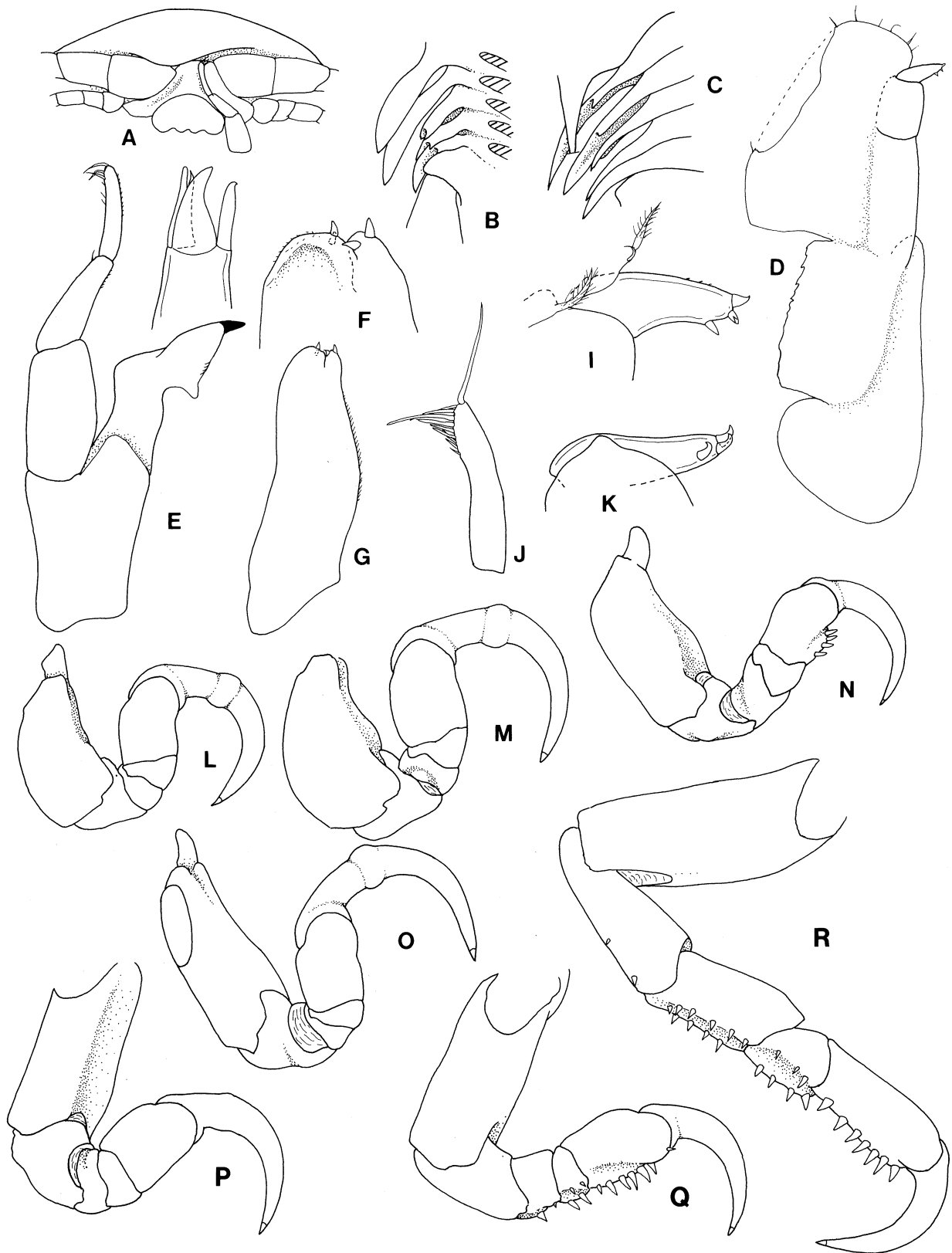


Fig. 21. *Nerocila monodi*. Figs of female ovig, Moreton Bay (QM W11007), except where indicated. **A**, frons, non-ovig female, QM W11007; **B**, ventral view, right pleonites, non-ovig female, QM W11007; **C**, left pleonites, female, NTM Cr3623; **D**, maxilliped; **E**, mandible; **F**, maxilla apex; **G**, maxilla; **H**, maxillule apex; **I**, maxilliped article 3; **J**, mandible palp article 3; **K**, maxilliped article 3, non-ovig female, QM W11007; **L–R**, pereopods 1–7 respectively.

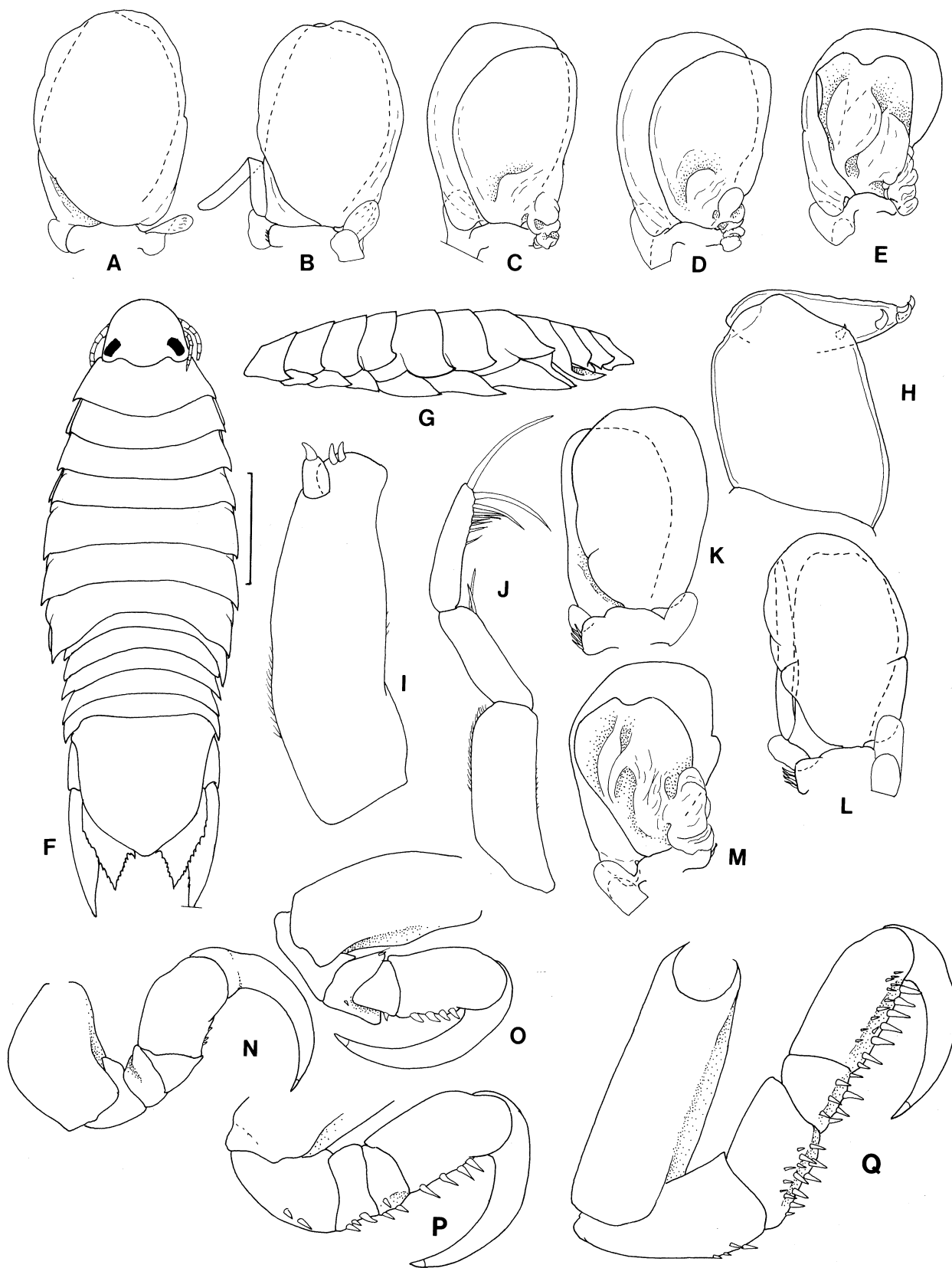


Fig. 22. *Nerocila monodi*. A-E, pleopods 1-5 respectively (3-5 in posterior view); remainder male 15.0 mm, Jacob's Well (QM W4814); F, dorsal view; G, lateral view, pereon, pleon; H, maxilliped apex; I, maxilla; J, mandible palp; K-M, pleopods 1, 2, 5; N-Q, pereopods 1, 3, 6, 7 respectively. Scale line represents 3.0 mm.

Qld, from "squire", coll. E. Pohlman (QM 9482). 2 females, Tuggerah Lakes, NSW, Mar 1957, on tail of bream, coll. A.A. Racek (AM P13147).

Types. Hale (1940) only designated a holotype but there is another specimen labelled paratype (SAM C289). The whereabouts of other material he examined is uncertain.

Type locality. Great Palm Island, Queensland.

Description of female. Body about 2.0 times as long as wide. Cephalon anterior margin subtruncate, eyes small, about 0.3 width of cephalon. Posterolateral margins of all pereonites produced, acute, not bent dorsally. Coxae all posteriorly acute, those of pereonites 2–4 not longer than segment, those of 6 and 7 longer than segment. Pleonite 1 longest; ventrolateral margins of pleonites 1 and 2 produced as far as pleonite 5, curving posteriorly; pleonites 3–5 lateral margins acute. Pleotelson 0.8 as long as wide, lateral margins convex, converging to indistinct apical point.

Antennule extending to pereonite 1, articles 1 and 2 appearing fused, much wider than article 3; antenna with 10 articles.

Mandible palp article 1 longest; article 3 with about 7 setae on distolateral margin. Maxilliped article 3 with 3 slender hooked spines.

Pereopods 1, 2, 4 and 5, without spines, dactylus with swelling about 0.3 along its length; pereopods 3, 5 and 7 dactylus without swelling, with spines. Pereopods 1 and 2 dactylus about 2.6 times longer than propodus. Pereopod 7 dactylus about 1.2 times longer than propodus. Pereopod 3 with propodal palm weakly lobate, with 4 spines. Pereopod 6 with 2 spines on posterior margin of merus, carpus with 4 spines in 2 rows, and propodal palm with 6 spines. Pereopod 7 with 2 spines on posterior margin of ischium, merus with 2 rows of 6 and 4 spines, merus with 2 rows of 3 and 4 spines, propodus with 7 large conical spines.

Pleopod 2 appendix masculina about 0.7 length of endopod. Pleopods 3 and 4 endopod with single weak lobe. Pleopod 5 with 2 large folds. Uropod exopod lanceolate, apex acute, about 1.4 times longer than endopod; medial margin finely serrate. Endopod lateral margin strongly serrate; distal margin excavate and serrate, with distomedial point; lateral margin straight.

Male. About 3 times as long as wide. Cephalon anterior margin rounded. Coxae and postolateral angles of pereonites less strongly produced than in females. Appendages similar to those of female but for: mandible palp articles 2 and 3 with more and larger setae; maxilliped article 3 with 4 large spines; pereopods without nodules, and all with spines; pleopod 2 appendix masculina as long as endopod. Uropod endopod with serration less developed.

Colour. Deep red to pale tan, often with 3 distinct longitudinal bands.

Size. Oviparous females 18.0–28.0 mm (mean 22.8, n=20); non-oviparous females 16.0–25.0 mm

(mean 19.8, n=8); males 14.0–15.5 mm (mean 14.8 mm, n=3).

Variation. Most of the variation shown by this species is covered by the illustrations given here. Serration of the uropods is never identical, not even between the left and right uropods of a single specimen. The length of the coxae and posterolateral pereonite extensions also varies, but not greatly. A notable variation is that specimens from the Northern Territory consistently had the anterior pereonites (1 to 4) wider than in material from eastern Australia.

Remarks. This species is easily recognised, being the only Australian species with both margins of the uropod endopod serrate. Bowman & Tareen (1983) gave a key to all species of *Nerocila* with serrate endopods, and *N. monodi* is easily distinguished by being the only one with a serrate distal margin.

Hosts. Recorded from a variety of fish families, but occurs most commonly on Sparidae: *Acanthopagrus australis*, *Rhabdosargus serba*, and *Chrysophrys auratus* (recorded as "snapper" or "squire"). Also recorded from *Carangoides humerosus*, *Nemipterus hexadon*, *Priacanthus macracanthus*, *Pomadasys hasta* and, by Hale (1940), *Lutjanus* sp.

Distribution. Recorded commonly along the Queensland coast from Southport to Cairns (Hale, 1940); also Northern Territory, North West Shelf; two records from New South Wales: Port Stephens (Roubal et al., 1983) and Tuggerah Lakes.

Nerocila serra Schiödte & Meinert

Nerocila Serra Schiödte & Meinert, 1881: 17, pl. 1, figs 12–14.

Nerocila serra.—Gerstaecker, 1882: 260; Stebbing, 1893: 352; Nobili, 1903: 39; Nierstrasz, 1915: 74; 1931: 124; Barnard, 1925: 392; 1936: 163; Pillai, 1954: 12; Kensley, 1978: 81, fig. 33E; Bowman, 1978: 35; Bowman & Tareen, 1983: 12, fig. 13.

Nerocila trivittata.—Trilles, 1979: 254, pl. 1, fig. 4.

Material examined. Female, collected pre-1891, unlocalised northwestern Australia (BMNH unreg.).

Remarks. The specimen examined was in a jar containing three other cymothoids: *Creniola saurida* (data: — N.W. Australia); *Ceratothoa* sp. (data: — Roebuck Bay, WA, BMNH 91.6 20.25); *Lironeca raynaudii* (data: — Van Deimen's Land). It is therefore not unreasonable that the specimen of *N. serra* did come from Western Australia.

The species is not redescribed as there is no material in good condition from Australia. The reader is referred to Bowman & Tareen (1983) for figures and comments.

Creniola n. gen.

Diagnosis of female. Body 2.0–2.5 times as long

as wide, dorsally vaulted. Cephalon anterior margin wide, not rostrate, not folded under; posterior margin distinctly trilobed. Pleonites all subequal in width, pleon usually as wide as pereon, occasionally slightly (0.65) narrower; ventrolateral margins of pleonites 1 and 2 not produced; ventrolateral margin of all pleonites with small process. Mandible palp slender, elongate, article 1 longest, article 3 with setae on distolateral margin. Pleopods as for *Nerocila*.

Additional characters. Body widest between pereonites 4–6. Coxae not extending beyond posterior of pereonites, scarcely or not visible in dorsal view. Pleotelson short. Antennule 8 articulated; antenna with up to 11 articles. Maxillule with 4 terminal spines. Maxilla with medial lobe partly fused to lateral, 2 spines on each lobe. Maxilliped article 3 with 3 recurved spines. Pereopods 1–6 gradually increasing in length; pereopod 7 subequal in length to pereopod 6. Brood pouch made of 5 pairs of oostegites arising from coxae 1, 2, 3, 4, and 6, and posterior pocket; last pair of oostegites extending posteriorly over pleopods. Pleopods as for *Nerocila* but endopod of pleopods 1 and 2 smaller than exopod; pleopod 1 exopod much larger than 2, rami of pleopods 2–5 decreasing in size. Uropods short, not extending posterior to pleotelson.

Type species. *Nerocila laticauda* Schiödte & Meinert, 1881, by original designation. Holotype held at the MNHN, Is. 623.

Composition. *Crenolia saurida* (Avdeev, 1977) **n. comb**, *Crenolia breviceps* (Schiödte & Meinert, 1881), **n. comb**, *Crenolia laticauda* (Schiödte & Meinert), **n. comb**.

Etymology. The name continues Leach's tradition of using anagrams based on Caroline. Gender is feminine.

Remarks. The genus is immediately distinguished from *Nerocila* by the wide pleon, and lack of extended ventrolateral processes on pleonites 1 and 2. Other differences are: pleopod 1 much larger than 2 (subequal in *Nerocila*); coxae concealed in dorsal view (visible in *Nerocila*); uropods not extending beyond pleotelson (always extend beyond pleotelson in *Nerocila*).

It should be emphasised that the difference in pleonal morphology between *Creniola* and *Nerocila* is substantial. Comparison of morphologies of related genera such as *Anilocra* (see Bruce, 1987a, Williams & Williams, 1981), and *Renocila* (see Bruce, 1987b, Williams & Williams, 1980), show that pleon morphology is constant within a genus. *Anilocra*, *Pleopodias* and *Renocila* all have substantial differences in mandible palp morphology as well. Lack of mouthpart differences between *Nerocila* and *Creniola* merely indicate that these two genera are closely allied, as are *Pleopodias* and *Anilocra*.

Key to Australian Species of *Creniola*

1. Posterolateral margins of pereonites 5–7 not produced; pereopods without processes. *C. saurida*
- Posterolateral margins of pereonites 5–7 produced; pereopods 6 and 7 ischium posterodistal margin produced. *C. laticauda*

Creniola laticauda (Schiödte & Meinert)

Figs 23–25

Nerocila Blainvillei.—Schiödte & Meinert, 1881: 78, pl. VI, figs 11, 12 (not *N. blainvillii* Leach, 1818).

Nerocila Blainvillii.—Schiödte & Meinert, 1881, figs 11, 12 (lapsus).

Nerocila laticauda Schiödte & Meinert, 1881: 81, pl. VI, figs 14, 15.—Gerstaecker, 1882: 262; Whitelegge, 1902: 235; Hale, 1926: 203, figs 1g, 2, 3; 1929: 259, figs 254, 257, 258; 1940: 300; Nierstrasz, 1931: 125; Trilles, 1975a: 319, pl. II, fig. 14; Moreira & Sadowsky, 1978: 100, 113, 122, 134; Beumer et al., 1982: 32; Hooper, 1983: 42.

Material examined. HOLOTYPE: female (non-ovig 20.5), Neue Hollande, Quoy et Gaimard, 11-2-1829 (MNHN Is. 263). NON-TYPE: Female (non-ovig 19.0), La Perouse, NSW, ca. 1898, don. J.D. Ogilvy (AM G1799). Female (non-ovig 23.0), Jervis Bay, NSW, 22–23 May 1973, trawled, coll. NSW SF (AM P19583). Female (ovig 21.0), Portsea, Vic., 10 Feb 1976, parasite on fish (NMV J11571). Female (ovig 26.0), male (11.0), Port Willunga, SA, no other data, coll. S. Howe (SAM C286). Female (non-ovig 34.0), 8.7 km off Venus Bay, SA, 11 Apr 1982, in prawn trawl, coll. K. Paul, D. Craig on *Cavalier* (SAM TC4481). Female (ovig 36.0), 110 km southeast of Eyre, WA, 33°04'S, 127°12'E, 1 Aug 1981, depth 91 m, coll. CSIRO *Soela* (SAM TC4483).

Additional material. New South Wales: female, between Newcastle and Port Stephens, Sept 1926, 146 m, coll. trawler *Gunner* (AM P8752). Female, 11 km east of Cape Three Points, 33°32'S, 151°35'E, 25 Feb 1898, sticky mud and shell, 82 m, coll. HMCS *Thetis* (AM G2203). Female, Port Jackson, Dec 1908 (AM P5621). Male, east of Port Hacking, 34°05'S, 151°15'E, 11 Mar 1898, mud, 92 m, coll. HMCS *Thetis* (AM G2401). Female, 6 km east of Jibbon, 34°16'S, 151°04'E, 18 Mar 1898, sand, mud, rock, 100 m, coll. HMCS *Thetis* (AM P1563). Female, 11 km east of Kiama, Mar 1927, on John Dory, *Zeus* sp. 73–91 m, coll. trawler *Bar-ear-mul* (AM P8819). 2 females, 16 km northwest of Montague Island, 5 Sept 1926, 55–73 m, coll. W. Boardman on trawler *Gunner* (AM P10681). 3 females, 29 km south of Montague Island, Mar 1927, 91–110 m, on *Platycephalus* sp., coll. trawler *Bar-ear-mul* (AM P8817). Female, north of Montague Island, Apr 1927, from *Platycephalus* sp., coll. trawler *Bar-ear-mul* (AM P8826). 3 females, east of Wattamolla, 34°12.5'S, 151°13'E, 13 Mar 1898, 133 m, coarse sand, shell, coll. HMCS *Thetis* (AM P3329). Victoria: Female, Port Phillip, Aug 1922, coll. J.B. Wilson (AM P5823). Female, Portsea, Port Phillip Bay, 10 Feb 1976, parasite on fish (NMV J11571). South Australia: Female (+ 2 broken specimens), Kingston, no other data

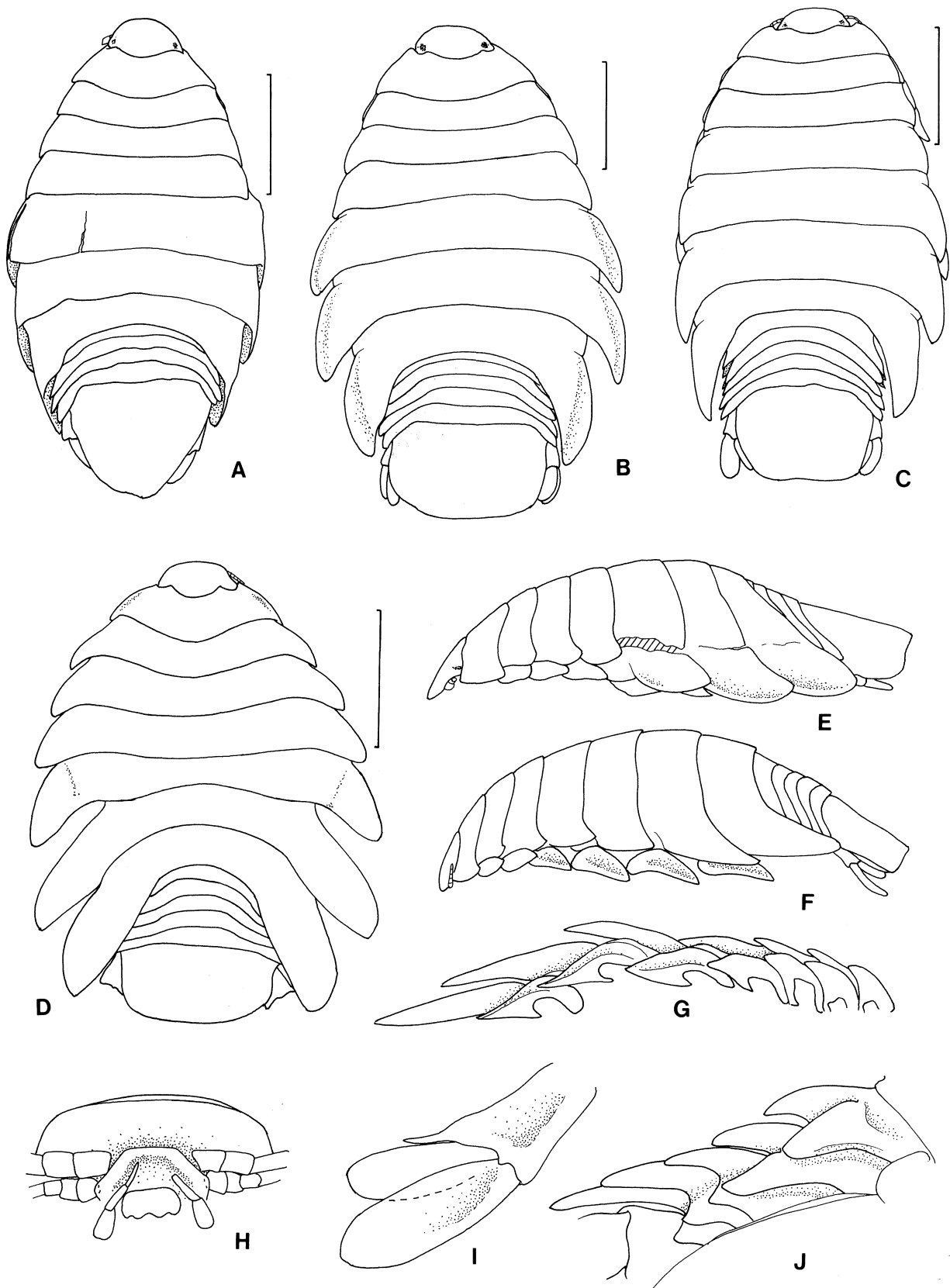


Fig. 23. *Creniola laticauda*. **A**, holotype; **B**, female, AM P19583; **C**, female, NMV J11571; **D**, female, AM G1799; **E**, holotype, lateral view; **F**, lateral view, NMV J11571; **G**, right coxae ventral view, SAM TC4481; **H**, frons NMV J11571; **I**, uropod, SAM TC4481; **J**, right pleonite, AM P19583. Scale lines 5.0 mm.

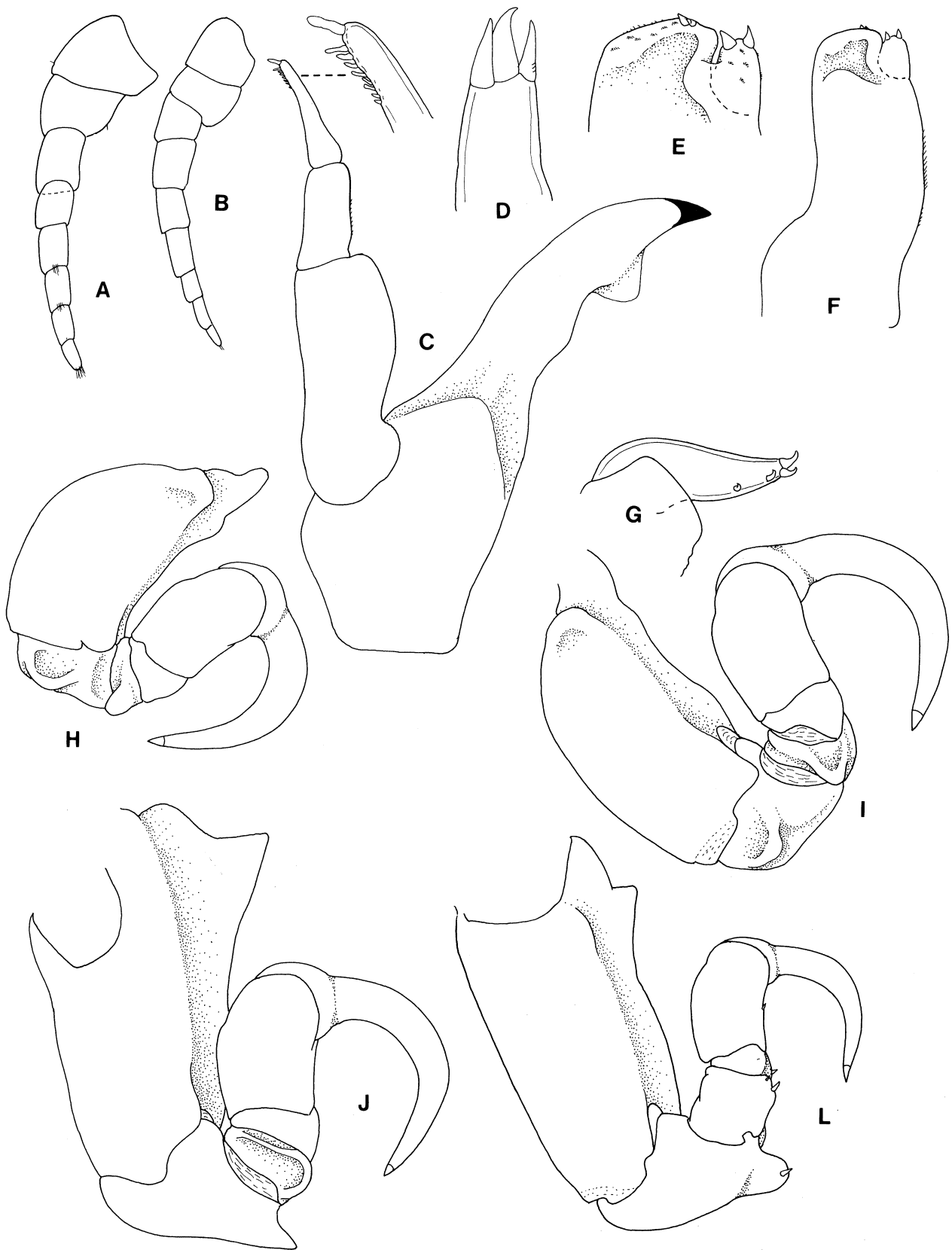


Fig. 24. *Creniola laticauda*. All SAM TC4481, except where indicated. **A**, antennule, female AM P19583; **B**, antenna, AM P19583; **C**, mandible; **D**, maxilule apex; **E**, maxilla apex; **F**, maxilla; **G**, maxilliped article 3; **H–K**, pereopods 1, 2, 6, 7.

(SAM C285). Female, Kingston, no other data (SAM 284). Female, 80 km south of Cape Wiles, registered 1930, 137 m (AM E6758). Female, St Vincent Gulf, no data (SAM C1994). Female, off Venus Bay, SA, June 1982, 33–46 m, coll. S. Doyle (SAM TC4480). Western Australia: female, 110 km southeast of Eyre, 33°04'S, 127°12'E, 1 Aug 1981, depth 96 m, coll. CSIRO, FRV *Soela* (SAM TC4483). Female, Albany, 10 Mar 1923, on fish (WAM 590-86).

Male, Albany, no date, on stingray, with label WAM 836-39 (WAM 1263-85). Female, Esperance Bay, 9 Sept 1978, 55 m (WAM 1259-85). Male, Torbay, near Albany, 9–13 June 1959, 36–56 m, in craypot, coll. B.K. Beaver on *Bluefin* (WAM 599-85).

Types. Holotype held at Museum National d'Histoire Naturelle, Paris, MNHN Is. 263.

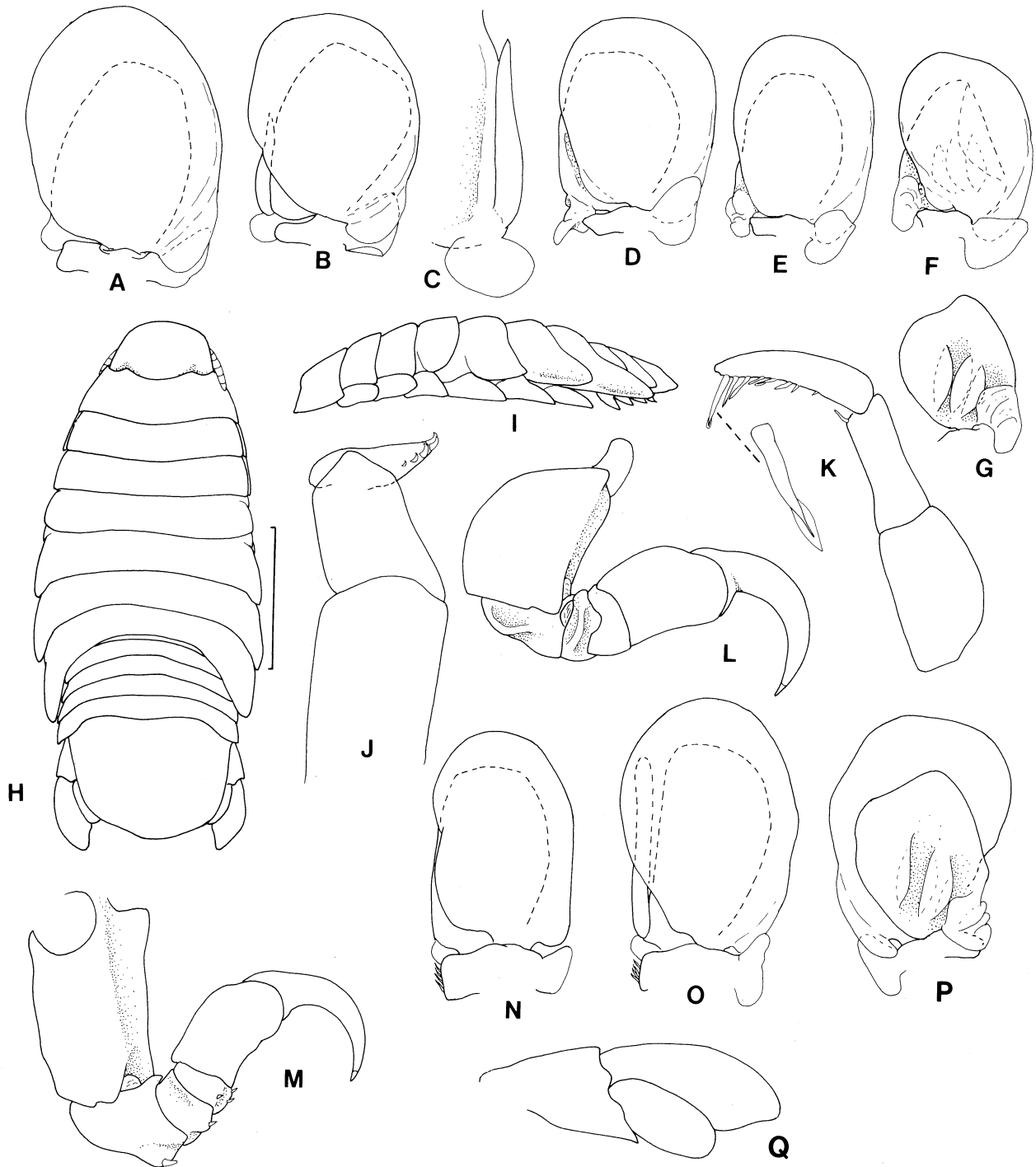


Fig. 25. *Creniola laticauda*. A–G, female SAM TC4481, remainder male, SAM C286. A, pleopod 1; B, pleopod 2; C, pleopod 2 endopod, proximomedial angle and appendix masculina; D, pleopod 3; E, pleopod 4; F, pleopod 5; G, pleopod 5 endopod, posterior view; H, dorsal view; I, pereon, pleon, lateral view; J, maxilliped; K, mandible palp; L, pereopod 1, M, pereopod 7; N–P, pleopods 1, 2, 5; Q, uropod. Scale line 3.0 mm.

Type locality. The label with the holotype gives only "Neue Hollande", but Schiödte & Meinert (1881) gave the locality as Westermann, Novae-Hollandiae. There is no such locality listed in Australian atlases or gazeteers. The type locality is therefore southeastern Australia as all of Schiödte & Meinert's (1881–1884) Australian material came from localities between Adelaide, Hobart and Sydney.

Description of female. Body about 1.7 times as long as wide. Cephalon anterior margin subtruncate. Coxae posteriorly acute, not extending beyond posterior of segment; posterolateral angles of all pereonites posteriorly produced, those of pereonites 1–5 weakly so, 5 and 6 strongly produced. Pleonites all visible in dorsal view, all equal in width. Pleotelson short, subquadrate, about 0.67–0.73 as long as wide; posterior margin weakly rounded to medially indented.

Antennule and antenna extending to pereonite 1.

Mandible palp article 3 with 9 peg like spines along distolateral margin. Maxilliped article 3 with 4 recurved spines.

Pereopod 1 robust; merus with proximally directed boss; ischium with posterolateral ridge; dactylus without nodules. Pereopods 2 and 3 similar to pereopod 1. Pereopod 6 basis with prominent anterolateral carina, proximal angle of which is acute; basis with posterodistal angle produced; merus with anteromedial margin with ridge; no spines present. Pereopod 7 basis with anterolateral carina; ischium posterodistal angle lobed, with single spine; merus with 2 spines on posterodistal margin; posterior margins of carpus and propodus each with single spine.

Pleopod 1 largely concealing pleopods 2–5; pleopod 2 appendix masculina with narrowing to point. Uropod exopod longer than endopod, both rami bluntly rounded; peduncle distomedial margin with narrowly produced process.

Male. Body about 2.3 times longer than wide. Appendages generally similar to female, but pleopod 1 not covering pleopods 2–5, appendix masculina longer; uropod exopod proportionally longer, extending beyond posterior of pleotelson.

Colour. In preserved specimen varies from pale tan to nearly black; always with 2 pale submedian longitudinal stripes running entire length of animal. Stripes may be wide, or so reduced as to be scarcely discernable.

Size. Ovigerous females 21.0–36.0 mm (mean 27.6, n=20); non-ovigerous females 18.0–25.0 mm (mean 18.4, n=7); males 11.5–15.5 (n=4, 2 male/female intermoult). The length/width for ovigerous females 1.44–2.08 mm (mean 1.70, n=19).

Variation. This species varies in the extent to which the posterolateral margins of the pereonites are produced, and to what extent the pleon is laterally overlapped by pereonite 7. The posterior margin of the pleotelson may be medially indented, straight or weakly rounded. One specimen (AM G1799) has the

pereonites far more strongly expressed laterally than any other specimen. Pereopods and pleopods show little variation.

Remarks. The sculpture of the pereopods and shape of pereonite posterolateral margins readily identify this species. Data suggest that this is a sublittoral species occurring on fish that are associated with silty habitats.

Hosts. *Platycephalus* sp., *Zeus* sp., and "stingray". Hale (1926) recorded *Raja australis*; Hooper (1983) recorded a specimen from the head of *Platycephalus richardsonae*.

Distribution. At depths between 33 and 146 metres; Hooper (1983) recorded it from 300 metres. Southern coasts from Coffs Harbour, NSW, to Adelaide, SA (but no records from Tasmania), westward to Albany, WA.

Creniola saurida (Avdeev)

Figs 26–28

Nerocila saurida Avdeev, 1977: 139, fig. 1.

Material examined. Western Australia. North West Shelf, CSIRO F.R.V. *Soela* series: female (ovig 25.0), 19°30'S, 116°30'E, 12 May 1982, on *Spheroides*, depth 53 m, coll. NT Fisheries (NTM Cr2297); female (non-ovig 23.0), 20°00'S, 116°31'E, 4 Dec 1982, 55 m (NTM Cr4250); ?female (14.5), 19°03.5'S, 119°03.6'E, 28 Apr 1983, 80 m, coll. NTM (NTM Cr4530); female (ovig 27.0), 20°07'S, 116°47.8'E, 10 June 1983, depth 42–44 m, shelly sand, coll. G.C.B. Poore and H.M. Lew Ton (NMV J1183); female (ovig 21.0), 19°59.0'S, 117°51.7'E, 27 Aug 1983, coll. T. Ward (WAM 2328-86); female (ovig 23.5), 19°04.0'S, 118°48.5'E, 28 Aug 1983, 84 m, coll. T. Ward (WAM 2329-86). Northern Territory: 2 females (ovig 25.0, non-ovig 20.0), Arafura Sea, 19 Oct 1981, 27 m, mud bottom, coll. H.K. Larsen (NTM Cr2288). Female (ovig 22.0), Arafura Sea, 19 Oct 1981, on *Hypodytes carinatus*, coll. A.J. Bruce (NTM Cr175). Queensland: female (ovig 25.5), Princess Charlotte Bay, Northern Qld, 23 Feb 1979, on *Spheroides multistriatus*, coll. AIMS, AM, QM (QM W8959). Female (ovig 24.5), southeast of Saint Helena Island, Moreton Bay, 24 Nov 1981, depth 18–22 m, coll. R.C. Willan (QM W10411). Female (ovig 19.0 mm); Moreton Bay, 31 Mar 1975, on "goatfish" (QM W12196). Female (ovig 30.5), Moreton Bay, Nov 1981, on *Saurida tumbil*, coll. Ebenezer Adjei (QM W10268). New South Wales: female (21.0), Sandon River, 12 Dec 1980, on stingray, coll. B. Ingram (AM P37163). 5 females (ovig ca. 18.0, 18.0, 22.5, 29.0, non-ovig 22.5) northeast of Yamba, 29°21'S, 153°29'E, 21 Mar 1985, 50 m, coll. FRV *Kapala*, (AM P37154).

Additional material. Female, North West Shelf, 19°30'S, 116°30'E, 12 May 1982, 53 m, coll. L. Bullard (NTM Cr2297). Female, Arafura Sea, 10°28'S, 132°10'E, 19 Oct 1981, 27 m, coll. H.K. Larson on FV *Anson* (NTM Cr2288). Female, east of Tully, Qld., 18°05'S, 147°03'E, 18 Jan 1986, on *Satyrichthyes welchi*, 220 m, coll. H.K. Larson on FRV *Soela* (NTM Cr3624). Female, off Malabar, Sydney, 20 Nov 1973, 65 m, coll. A.M. Shelf Benthic Survey (AM P37164).

Types. Institute of Oceanography, Vladivostok, U.S.S.R. Catalogue numbers 75050 and 75051 (Avdeev, 1977).

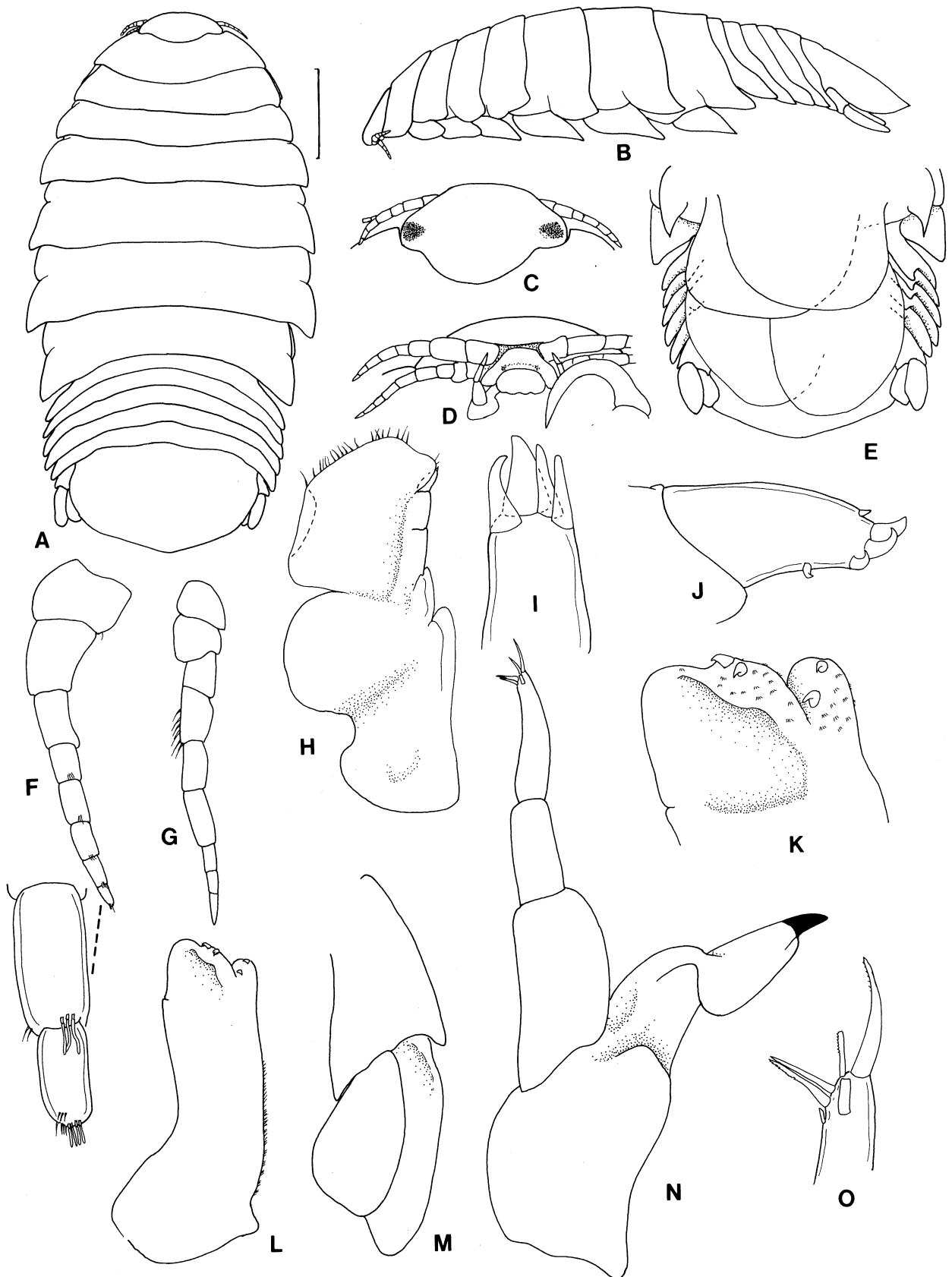


Fig. 26. *Creniola saurida*. All female QM W10268. A, dorsal view; B, lateral view; C, cephalon; D, frons; E, pleon, ventral view; F, antennule; G, antenna; H, maxilliped; I, maxillule apex; J, maxilliped article 3; K, maxilla apex; L, maxilla; M, uropods; N, mandible; O, mandible palp, apex. Scale line 5.0 mm.

Type locality. Northwestern coast of Australia (Avdeev, 1977).

Description of female. Body about 2.0 times as long as wide. Cephalon anterior margin rounded; eyes with facets indistinct. Coxae scarcely visible in dorsal view, becoming progressively more acute towards posterior; never extending posterior to segment. Posterolateral angles of pereonites 5–7 weakly produced. Pleonites all visible, pleon 0.87 width of pereonite 6. Pleotelson very short, 0.58–0.68 as long as wide; posterior margin wide, shallowly angled to obscure median point.

Antennule and antenna both extending to pereonite 1.

Mandible palp article 3 with 6 terminal setae. Maxilliped article 3 with 3 long recurved spines and 2 small spines.

Pereopod 1 dactylus strongly curved; pereopod 2, 3 and 4 similar to 1, but becoming progressively longer. Pereopod 6 with one single spine on merus, carpus and propodus. Pereopod 7 with prominent spines on posterior margins of ischium to propodus.

Pleopod 2 endopod with faint fold.

Uropod rami not extending to posterior of pleotelson, exopod longer than endopod, apex broadly rounded; endopod broadest distally, distinct angles rounded.

Male. Not Known.

Colour. In life, salmon pink; in alcohol pale tan to pink.

Size. Ovigerous females 18.0–30.5 mm (mean 21.8, n=14); non-ovigerous females 14.5–23.0 mm (mean 20.0, n=4).

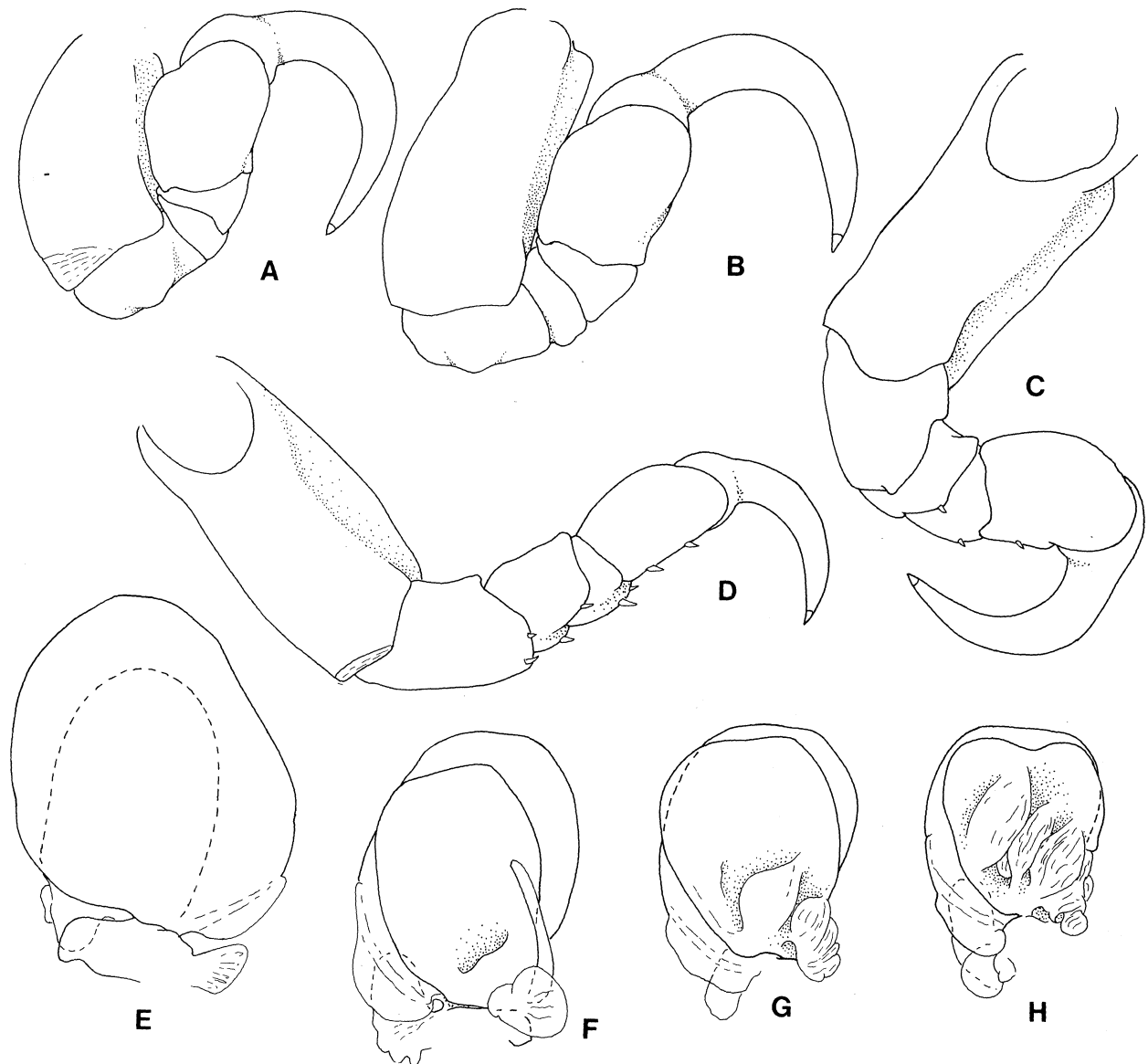


Fig. 27. *Creniola saurida*. All female QM W10268. A–D, pereopods 1, 2, 6, 7; E–H, pleopods 1, 2, 4, 5.

Variation. The smallest specimen had longer spines on pereopod 7 and maxilliped article 3, and a slightly longer appendix masculina, but did not otherwise differ from females. The shape of the posterior margin of the pleotelson varies from subtruncate (Fig. 28F) to weakly produced (Fig. 26A).

Remarks. This species is easily recognised by the short coxae, lack of pereonite extensions and the very short pleotelson. The types of *Crenolia saurida* were not made available for study. It is possible to identify the present material from Avdeev's (1977)

illustrations, the short coxae and wide pleon being unique to this species.

Crenolia saurida occurs commonly in trawl catches, and occurs on fish that are sedentary soft bottom dwellers.

Hosts. *Saurida tumbil*, *Hypodytes carinatus*, *Spheroides multistriatus*, *Satyrichthyes welchi*.

Distribution. North West Shelf, WA; Northern Territory; Princes Charlotte Bay, Moreton Bay, Qld; off Yamba, to depth of 220 m, and off Sydney, NSW.

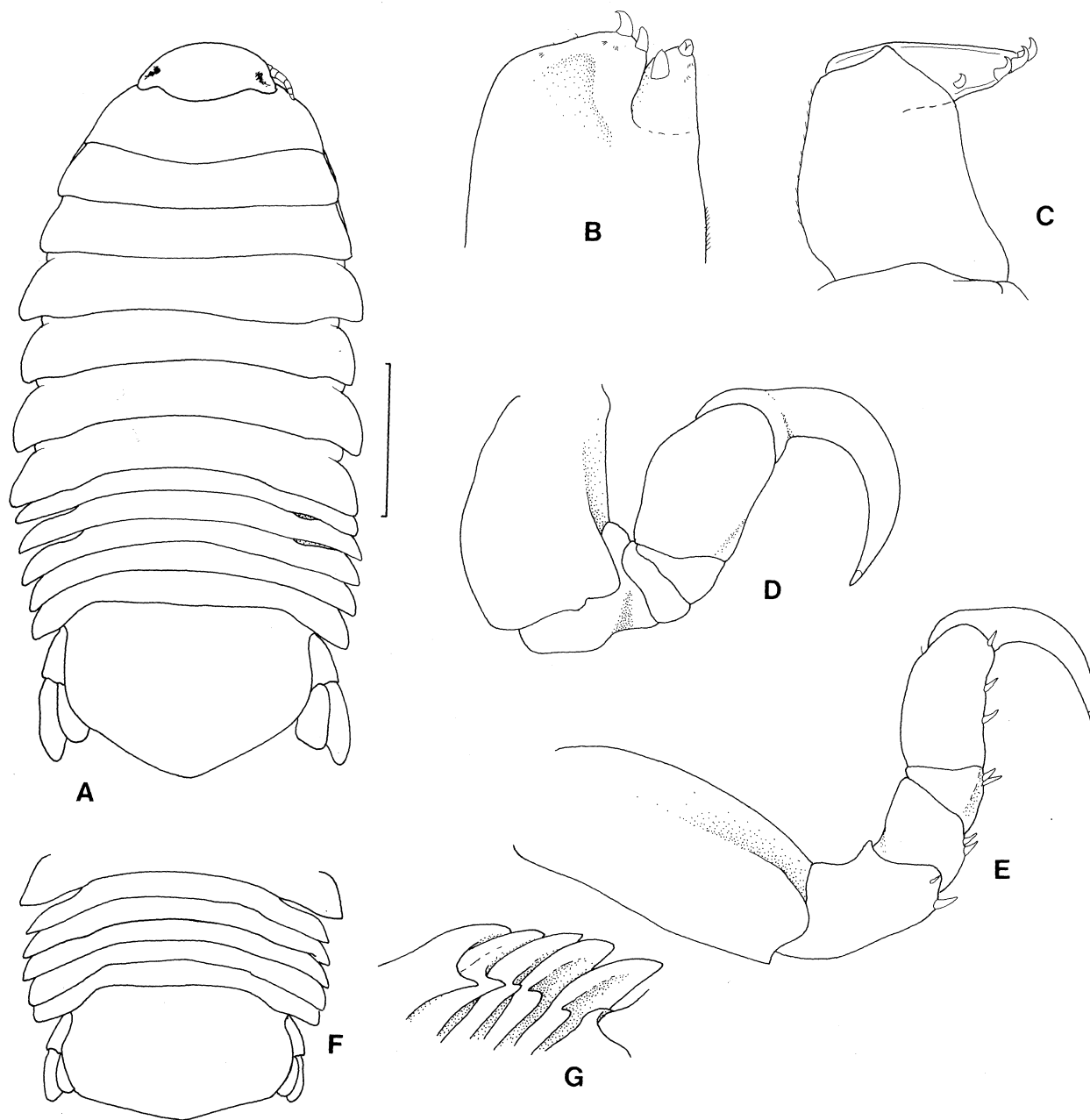


Fig. 28. *Crenolia saurida*. A–F, ?male, 14.5 mm, NTM Cr4530. A, dorsal view; B, maxilla apex; C, maxilliped article 3; D, pereopod 1; E, pereopod 7; F, female (non-ovig 22.5), off Yamba, NSW (AM P37154); G, female (ovig 29.0), off Yamba (AM P37154), ventral view of left pleonites. Scale line 3.0 mm.

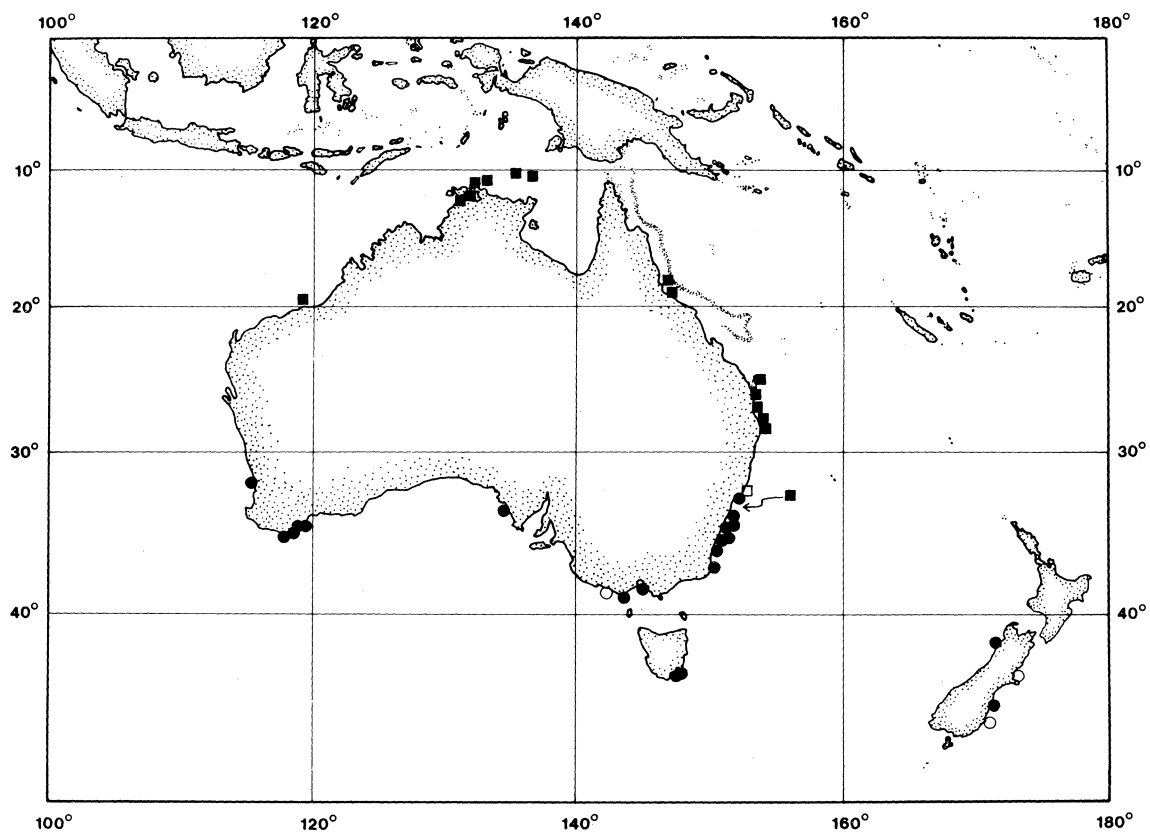


Fig. 29. Australian distribution of *Nerocila orbignyi* (●) and *Nerocila monodi* (■). Open symbol denotes literature record.

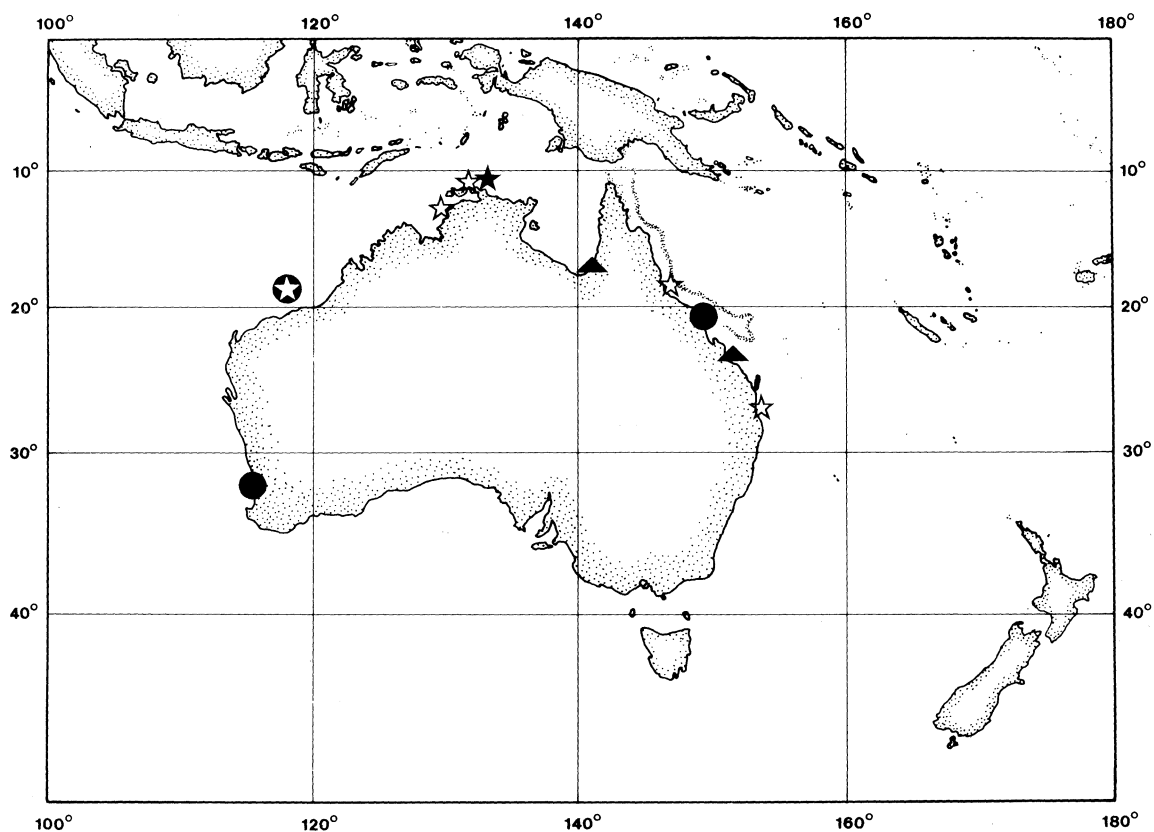


Fig. 30. Australian distribution of *Nerocila* sp. (⊕), *Nerocila congener* (★), *Nerocila phaiopleura* (●), *Nerocila barramundae* (▲), *Nerocila lomatia* (☆).

Annotated list of names within *Nerocila*

This list gives the original description, the most recent publication giving a full synonymy and, in some instances, a full synonymy. Comments are given on the current status of the name, and on the need of redescription. Of the following four species formerly placed in *Nerocila*, *N. laticauda*, *N. breviceps* and *N. saurida* are now placed in *Creniola* and *N. schadleri* Nierstrasz is transferred to *Amblycephalon* Pillai, 1954 (Pillai, 1967). Unless otherwise indicated, assessments have been made from the literature. Where type specimens have been examined, the catalogue number is given. (* Indicates species unrecognisable from existing descriptions.)

1. **N. aculeata* Dana, 1853. *Nomen dubium*, present study.
2. **N. aculeata* Milne Edwards, 1840. *Nomen dubium*. The locality for this specimen is the Indian Ocean, and the type specimen is held at MNHN (Is. 237). Unfortunately nothing but fragments and debris remain, and the identity of this species can never be established.
3. *N. acuminata* Schiödte & Meinert, 1881. Specimens examined at the USNM and BMNH. An East Pacific and Caribbean species (Brusca, 1981), it belongs to the *N. orbigny* group of species. In some

specimens the uropod shape (Fig. 33A–C) approaches that of *N. orbigny*. Nunomura's (1981) record from Japan is probably of *Nerocila japonica*.

4. *N. adriatica* Schiödte & Meinert, 1881. Synonym of *N. orbigny*, present study.
5. *N. affinis* Milne Edwards, 1840. Synonym of *N. orbigny*, present study.
6. *N. armata* Dana, 1853. Synonymy: *Nerocila armata* Dana, 1853: 761, pl. 50, figs 10a–d.—Gerstaecker, 1882: 274; Monod, 1931: 6, figs 2, 4; 1937: 465; Nierstrasz, 1931: 125; Van Name, 1940: 123, 135; Brian & Darteville, 1949: 136, figs 11, 12; 1975a: 330, pl. 3, figs 23, 25; Moreira & Sadowsky, 1978: 100, 110, 116; Rockiki, 1984: 106, figs 26; Trilles, 1986: 620 (citation).

Nerocila rhabdota Koelbel, 1879: 409, pl. 2, figs 2a–c.—Schiödte & Meinert, 1881: 39, pl. 2, figs 5, 6; Gerstaecker, 1882: 182; Monod, 1924: 79, fig. C, p. 76, Figs A,B, p. 80; Van Name, 1920: 43, 57, figs 10, 11; Trilles & Raibut, 1971: 71, 81, pl. 3, photo. 1; 1973: 273, 276, 280; Rockiki, 1984: 100, figs 24, 25; Trilles, 1986: 620.

Uncertain identity: Szidat, 1948: 46; 1955: 216.

Material examined. 4 females (ovig 21.5, 16.0, 15.5, 14.0), Birakiri, Bonny River, Nigeria, 4° 34.2'N, 7° 08.0'E, 15–20 Dec 1985, 15 km N.N.W. of Bonny Town, no host, coll. C.B. Powell and B. Olaobesikan (USNM 231175). Female (ovig 25.0), Sierra Leone

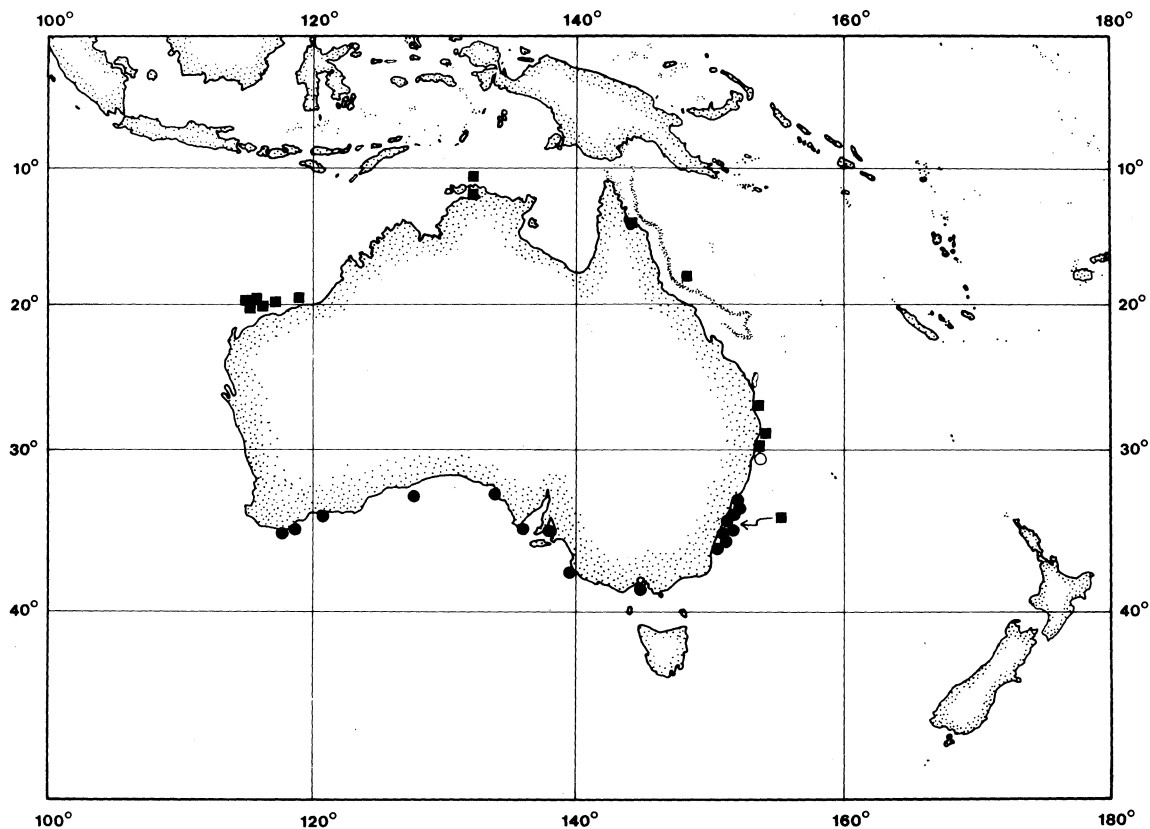


Fig. 31. Australian distribution of *Crenolia laticauda* (●) and *Crenolia saurida* (■). Open symbol denotes literature record.

River, 6 June 1953, on tail of *Otolithus macrognathus*, coll. WAFRI (BMNH 1963:3:10:6). Female (ovig 15.0) Bagru River, West Africa, 29 Dec 1952, coll. WAFRI (BMNH 1963:3:10:26).

Accepted as valid, although Dana (1853) recorded the species only from Rio de Janeiro. First revised by Monod (1931), material that corresponds to Monod's *N. armata* originates solely from West Africa, and it is unclear whether Monod's material is the same as that recorded by Dana. Dana's specimens are not extant, and it is unlikely that this problem can be resolved. Additional figures provided here (Fig. 33D–K); the species is best recognised by acute coxae 2 and 3 and the long uropods.

Trilles' (1973c) record of *N. armata* is not that species, but *N. orbigny*. Trilles' figure (pl. 3, fig. 4) is of a specimen from Cameroon later identified and figured by Trilles (1975a) as *N. fluviatilis*. Trilles (1977) recorded *N. armata* from the Canary Islands. These specimens (RMNH 3980) are not *N. armata* sensu Monod (1931) as used here, but appear closest

to *N. acuminata* or *N. orbigny*.

7. *N. australasiae* Schiödte & Meinert, 1881 (MCZ 1139). Synonym of *N. orbigny*, present study.

8. *N. bartschii* (Boone, 1918). Synonym of *N. acuminata*.

9. *N. bivittata* (Risso, 1816). Widely distributed Mediterranean species (Trilles, 1975b, 1977).

10. *N. blainvillii* Leach, 1818. Type species of the genus, which has never been fully described or figured. Examination of the types (BMNH 1979:400:2) show that it appears not to differ from *N. bivittata*. Additional figures provided (Fig. 34A–D).

11. **N. brasiliensis* Dana, 1853. *Nomen dubium*, present study.

12. *N. breviceps* Schiödte & Meinert, 1881. Here transferred to *Creniola*. Additional figures of the holotype (MCZ 1079) are provided (Fig. 32).

13. **N. brongnarti* (Risso, 1816). *Nomen dubium*, the description allows no assessment to be made of the species or genus.

14. **N. burtiasi* Belloc, 1929. Belloc (1929) provides a

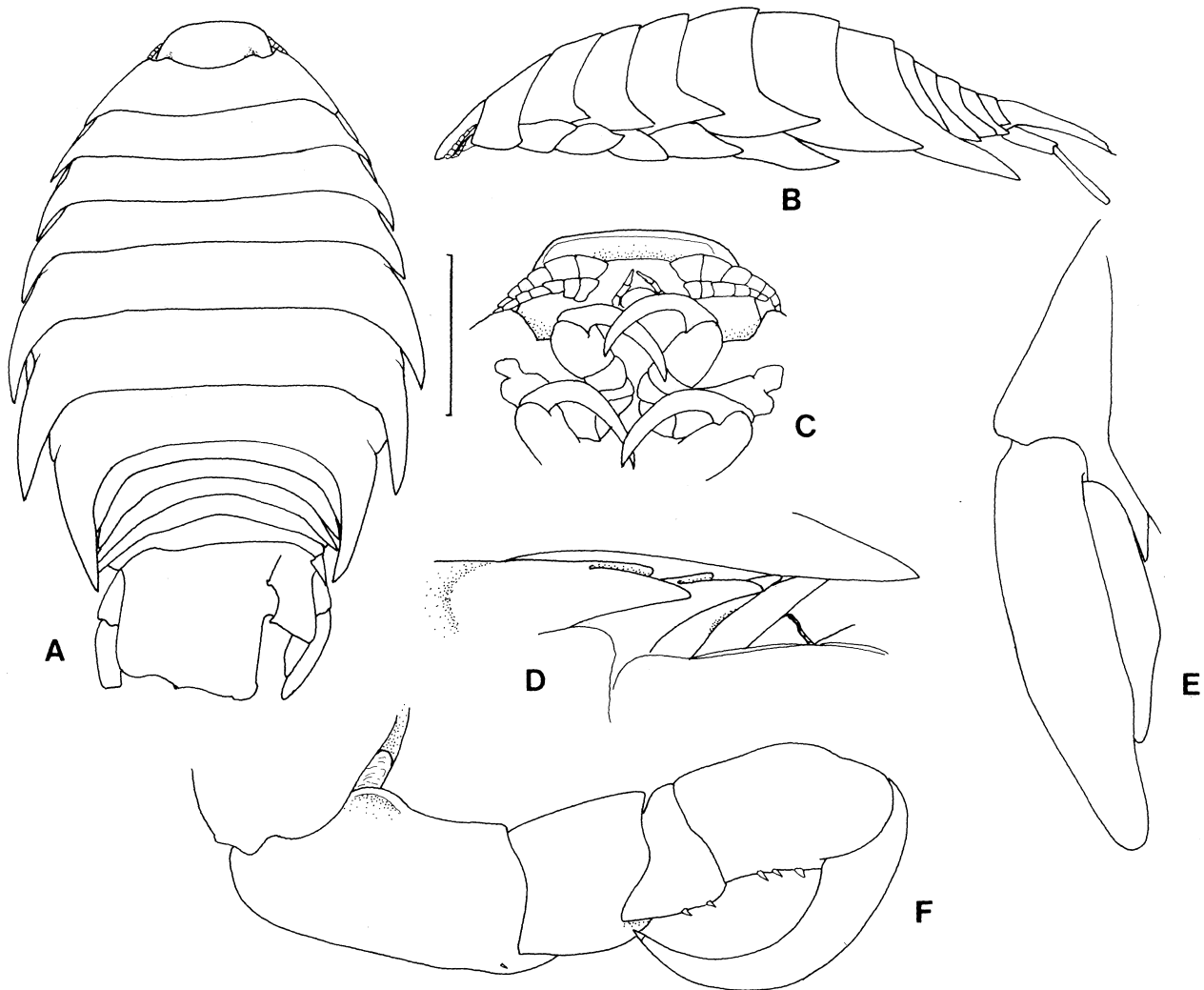


Fig. 32. *Creniola breviceps*. All figs of holotype (MCZ 1079). A, dorsal view; B, lateral view; C, ventral view, cephalon; D, ventral view, left pleonites; E, uropod; F, pereopod 7. Scale line 5.0 mm.

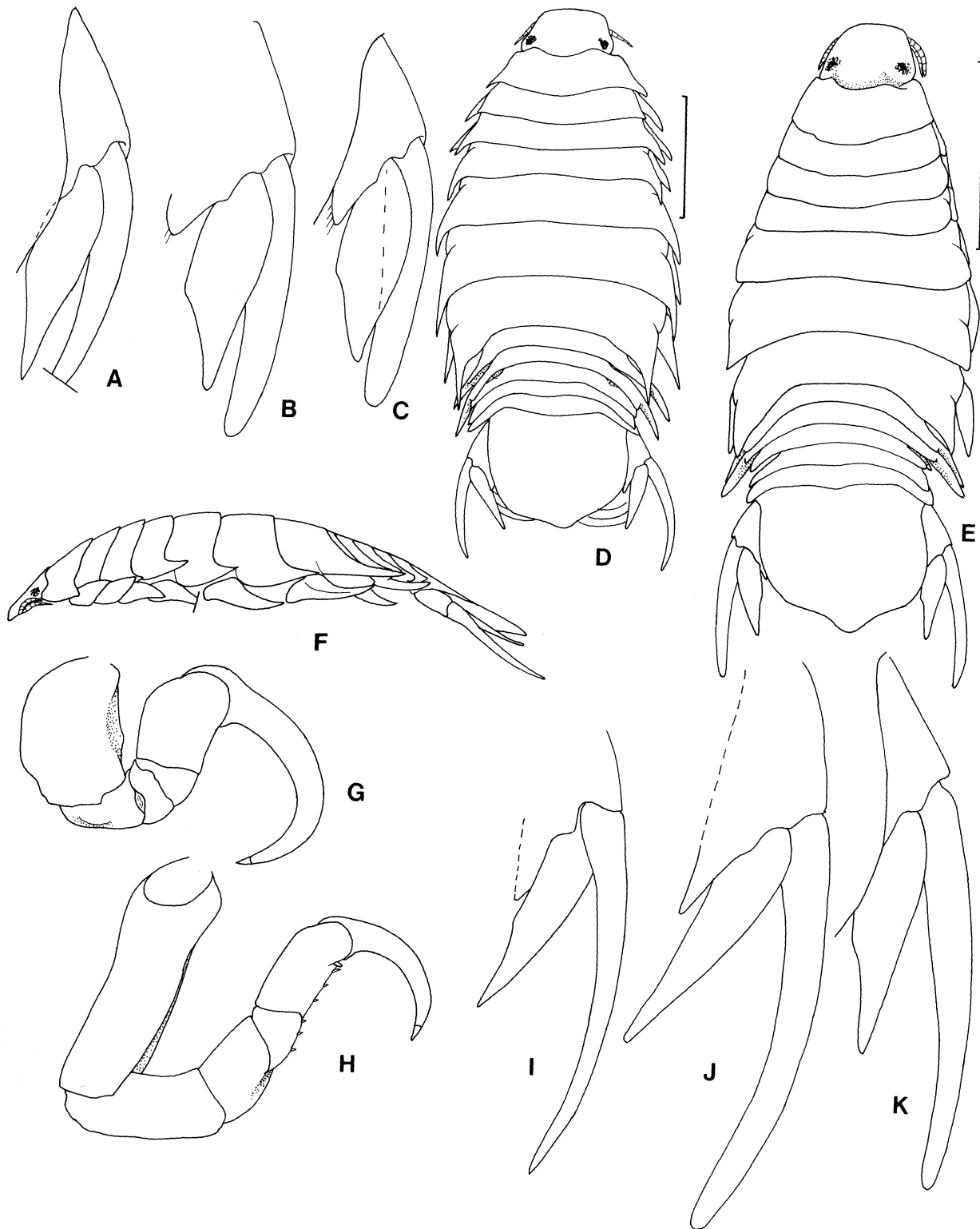


Fig. 33. *Nerocila acuminata*: **A**, right uropod, female (ovig 22.0) and **B**, right uropod, female (non-ovig 19.0), Pacific Panama (USNM 86436); **C**, right uropod, female (18.0), Louisiana, Gulf of Mexico (USNM 187036). *Nerocila armata*, all Bonny River, Nigeria (USNM 231175) except where indicated: **D**, dorsal view, female #1, 21.0; **E**, dorsal view, female #2, 16.0; **F**, female #1, lateral view; **G**, pereopod 1, female #1; **H**, pereopod 7, female #1; **I**, left uropod, ventral view (BMNH 1963.3.10.6); **J**, right uropod, female #1; **K**, right uropod, female #2. Scale lines 5.0 mm.

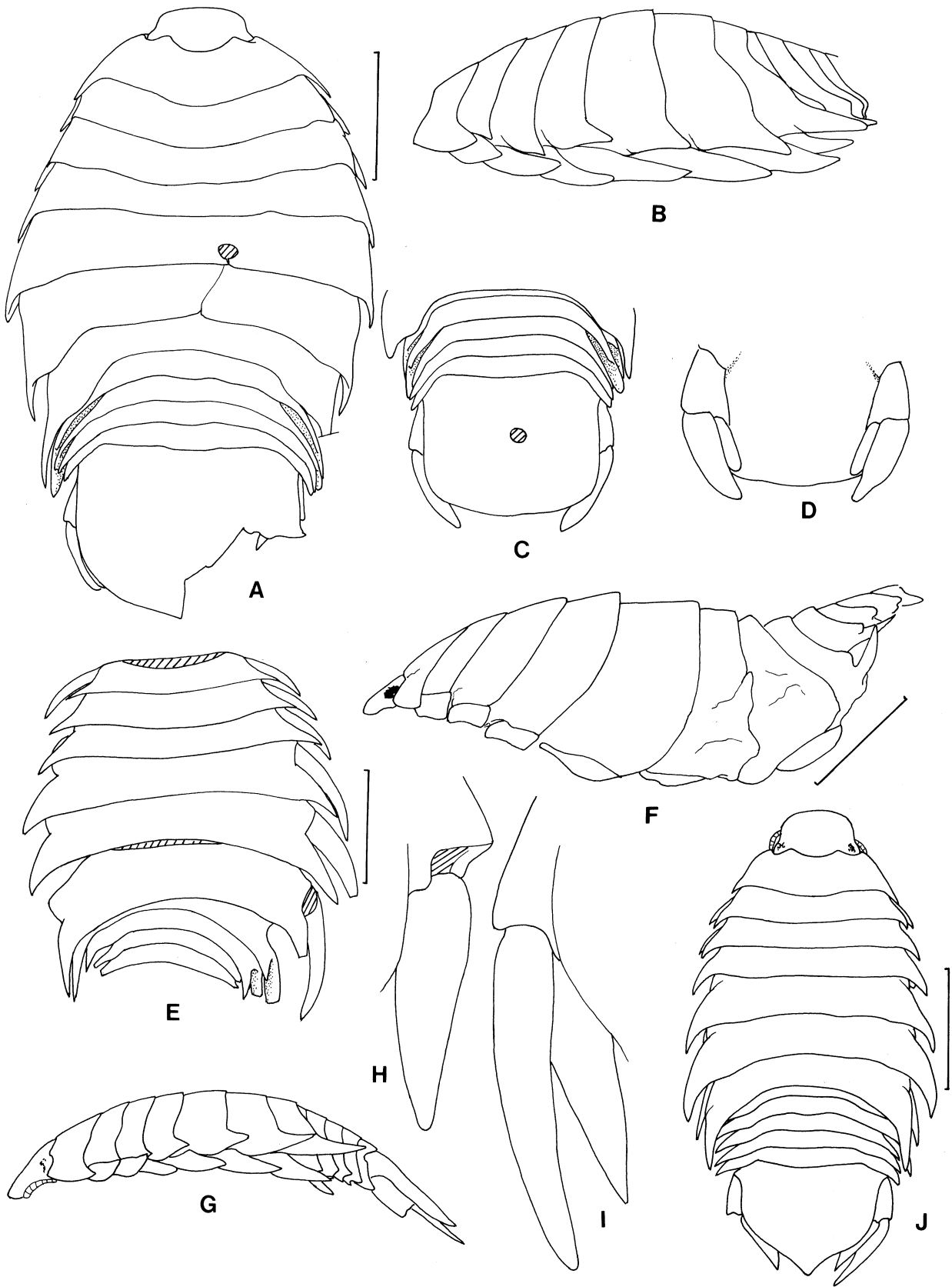


Fig. 34. *Nerocila blainvilli*, syntypes: A, dorsal view; B, pereon and pleon, lateral view; C, pleon and pleotelson, broken syntype; D, ventral view of uropods, broken syntype. *Nerocila depressa*: E, holotype. *Nerocila excisa*: F, holotype. *Nerocila japonica*, holotype: G, lateral view; H, right uropod, ventral view; I, left uropod, ventral view; J, dorsal view. Scale lines 5.0 mm.

figure which he attributes to Acloque (1899). Validity of the species is uncertain.

15. *N. californica* Schiödte & Meinert, 1881. Synonym of *N. acuminata*.

16. *N. cebuana* Schiödte & Meinert, 1881. Synonym of *N. congener*, present study.

17. *N. cephalotes* Schiödte & Meinert, 1881. Synonym of *N. orbignyi*, present study.

18. *N. congener* Miers, 1880. Australia and Philippines, present study.

19. *N. ctenophora* (Koelbel, 1879). Synonym of *N. sundaica* (see Bowman, 1978).

20.**N. cuspidata* Costa, 1851. *Nomen dubium*.

21. *N. depressa* Milne Edwards, 1840. Philippines, Indo-China to Bombay, India (Trilles, 1975a, 1979). The type locality is not known. The specimen at the MNHN (Is. 508), believed to be the type specimen (Fig. 34E), is in very poor condition.

22. *N. dolichostylis* Koelbel, 1879. Synonym of *N. depressa*; examination of the holotype (NMW 5279).

23. *N. excisa* (Richardson, 1901). Holotype (Fig. 34F) USNM 46435. Parasitic on pelagic fishes in the central and East Pacific (Trilles, 1972; Brusca, 1981).

24.**N. exocoeti* Pillai, 1954. No adequate description exists for this species. Known only from India.

25.**N. falcata* (Fabricius, 1787). No adequate data exists for this species. See comments under 'Type species' for *Nerocila*.

26. *N. falklandica* Cuninghame, 1871. The type specimen is immature and cannot be related to adults of the *N. orbignyi* complex of species. Here regarded as *species inquirenda*. Holotype BMNH 1985:266:1.

27. *N. fluviatilis* Schiödte & Meinert, 1881. Synonymy: *Nerocila fluviatilis* Schiödte & Meinert, 1881: 66, pl. 5, figs 6–9.—Gerstaecker, 1882: 474; Van Name, 1936: 31, 431, fig. 267; Cordero, 1937: 3, 4, figs 1–8, photo. 1a, b; Szidat, 1948: 45; 1955: 216; 1965: 84; 1966: 3; Teodoro, 1972: 141; Moreira & Sadowsky, 1978: 100, 110, 117; Bowman, 1978: 35.

Uncertain identity: Behre, 1950: 371.

Material examined. Female (ovig 21.0), male (15.0), St. Antonio, Angola, Aug 1915, coll. Land and Chaplin (part of material reported on by Van Name, 1920) (USNM 63640). Female (ovig 25.0) Rio de la Plata, Banco Ingles, Argentina, 29 Dec 1925, on *Lagenichthyes ancylooom*, no other data (USNM 233396). Female, River Plata, South America (BMNH 1928:12:1:907). Female (ovig 28.0), Punta del Diablo, Uruguay, Feb 1971, from "pejerry" (Atherinidae) (USNM 231181); female (30.0), male (16.0), as previous, but 17 Jan 1971, on "neck" of *Pontoporia blainvillei* (USNM 231179); all coll. R.L. Brownell Jr. Also the following material from Uruguay: USNM numbers: 42182 (Montevideo); 42383 (Mar del Plata); 57125; 61438; 61447; 65782 (Grand Island); 86440 (coast of Maldravado). BMNH numbers: 1956:10:10:39 (Montevideo); 1903:9:30:4 (Montevideo, harbour).

Recorded along the coasts of Argentina and

Uruguay with one specimen examined here from Angola, Africa. Additional figures are provided here (Fig. 35E–I). The species can be recognised by the sinuate uropodal endopod with a prominent medial tooth. Van Name (1936) gives evidence that the species is primarily marine. Syntypes are held at the MCZ and the ZMC (Schiödte & Meinert, 1881). Trilles' (1975a) record of this species is of *N. orbignyi*, the uropods of his specimen readily identify the species.

28.**N. heterozota* Ahmed, 1970. Arabian Gulf. The figures and description are inadequate, and do not allow assessment of the species.

29. *N. japonica* Schiödte & Meinert, 1881. Japanese waters. Additional figures of the holotype (NRM 4975) are provided (Fig. 34G–J); the species can be recognised by the acute, smoothly tapered uropodal endopod.

30. *N. kusra* Bowman & Tareen, 1983. Kuwait.

31. *N. laevinota* Miers, 1880. Examination of types (BMNH 1880:6) show this to be a synonym of *N. sundaica*.

32.**N. lanceolata* (Say, 1818). Georgia, U.S.A. (Richardson, 1905), inadequately known.

33.**N. lata* Dana, 1853. These were probably lost with the sinking of the sloop *Peacock*. As the figures are inadequate, this species is best regarded as *nomen dubium*.

34. *N. laticauda* Schiödte & Meinert, 1881. Transferred to *Creniola*, present study.

35. *N. laticeps* Bovallius, 1887. Synonym of *N. orbignyi*, present study.

36.**N. latiuscula* Dana, 1853. *Nomen dubium*, present study.

37.**N. livida* Budde-Lund, 1908. Zanzibar, inadequately described and of uncertain identity; I have not located the type material.

38. *N. longispina* Miers, 1880. Malaysia; has never been figured, and figures of the holotype given here (Fig. 35A–D). *Nerocila longispina* belongs to the *Emphyllia* group of species, and is the only species of that group, other than *N. sundaica*, that has the anterior margin of the cephalon narrowly rounded and the antennule bases close set. It differs from *N. sundaica* in having the uropod endopod lateral margin finely serrate, and the posterior coxae more strongly angled away from the body.

39. *N. loveni* Bovallius, 1887. Indonesia (Trilles, 1979); I have not located the type material.

40. *N. macleayii* Miers, 1884. Synonym of *N. orbignyi*, present study.

41.**N. madrasensis* Ramaskrishna & Venkata Rao, 1978. Possibly related to *N. trichiura*, the description precludes assessment of the status of this species. Known only from India.

42. *N. maculata* Milne Edwards, 1840. Synonym of *N. orbignyi*, present study.

43. *N. monodi* Hale, 1940, present study.

44.**N. munda* Harger, 1878. Inadequately known, and of uncertain identity. Specimens in the USNM

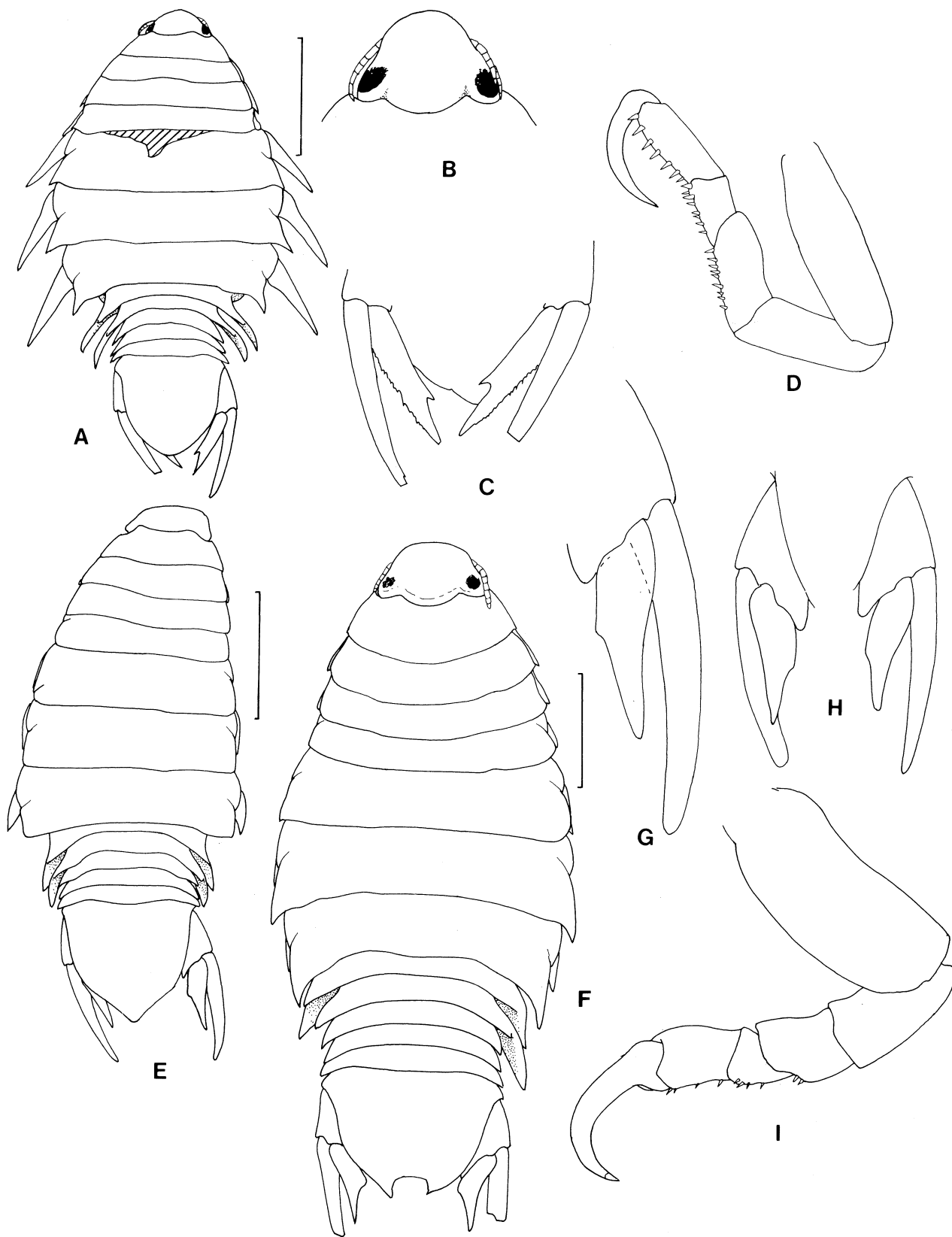


Fig. 35. *Nerocila longispina*, holotype: **A**, dorsal view; **B**, cephalon; **C**, uropods, ventral view; **D**, pereopod 7. *Nerocila fluviatilis*: **E**, female (ovig 21.0), Angola (USNM 63640); **F**, female #1, Uruguay (USNM 231181); **G**, right uropod, Angola female; **H**, right and left uropod; female (26.0), Uruguay (USNM 42383); **I**, pereopod 7, Angola female. Scale lines 5.0 mm.

identified as *N. munda* are a species of *Lironeca*. Reported from the Atlantic coasts of the U.S.A.

45. *N. neapolitana* Schiödte & Meinert, 1881. Synonym of *N. orbignyi*, present study.

46. *N. novaezealandiae* Schiödte & Meinert, 1881. Synonym of *N. orbignyi*, present study.

47. *N. saurida* Avdeev, 1977. Transferred to *Creniola*, present study.

48. *N. schadleri* Nierstrasz, 1915. Transferred to *Amblycephalon*, present study.

49. *N. sundaica* Bleeker, 1857. Widely distributed Indo-Pacific species (Bowman, 1978).

50. *N. phaiopleura* Bleeker, 1857. Present study.

51. *N. philippinensis* Bovallius, 1887. Synonym of *N. congener*, present study.

52.**N. pigmentata* Bal & Joshi, 1959. Synonymised with *N. depressa* by Trilles (1975a).

53.**N. pulcatensis* Jayadev Babu & Sanjeera Raj, 1980. Quoted in Parimala (1984); I have not been able to obtain a copy of the original description.

54. *N. recurvispina* Schiödte & Meinert, 1881. Recorded from Calcutta, India (holotype ZMB 3389).

55. *N. rogans* (Stebbing, 1924). Synonym of *N. orbignyi*.

56. *N. rhabdota* Koelbel, 1879. Synonym of *N. armata*, Trilles, (1975a), and present study.

57. *N. serra* Schiödte & Meinert, 1881. Widespread Indo-Pacific species, but not well known. One syntype (NRM 4974) refigured by Bowman & Tareen (1983).

58. *N. sigani* Bowman & Tareen, 1983. Kuwait.

59.**N. tartowskii* Popov, 1933. Black Sea, status uncertain; Popov's figures show no differences from *N. orbignyi*, and the species is included in the synonymy for *N. orbignyi*.

60.**N. tenuipes* Dana, 1853. *Nomen dubium*, present study.

61. *N. trailli* Filhol, 1887. Synonym of *N. orbignyi*, present study (holotype MNHN Is. 553).

62. *N. trichiura* (Miers, 1877). Holotype BMNH 1846:104. Parasitic on flying fishes. Atlantic and Indian Oceans (Trilles, 1975a).

63. *N. trivittata* Milne Edwards, 1840. The status of this species is currently in question. Trilles (1979) believes it to be the senior synonym of *N. serra*, but Bowman & Tareen (1983) do not accept that opinion. I believe that *N. trivittata* is best regarded as *nomen dubium*.

64. *N. vittata* Lucas, 1849. Synonym of *N. orbignyi*, present study.

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