

**THE HERMIT CRABS (CRUSTACEA: DECAPODA:
COENOBITIDAE, DIOGENIDAE, PAGURIDAE) OF CHRISTMAS
AND COCOS (KEELING) ISLANDS, INDIAN OCEAN, WITH
DESCRIPTION OF A NEW SPECIES OF *PAGURISTES***

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ABSTRACT.- The hermit crabs of Christmas Island and the Cocos (Keeling) Islands are recorded from recent collections and the literature. A total of 43 species is noted, 25 from Christmas Island and 42 from Cocos (Keeling). Twenty-four species are common to both localities. A new species of *Paguristes* is described. The hermit crab faunas of the two island systems are compared in terms of available habitats.

INTRODUCTION

Christmas Island and Cocos (Keeling) Islands are isolated landmasses in the Indian Ocean. Christmas Island lies between 10° 25' and 10° 34'S, 105° 34' and 105° 46'E, approximately 350 km from Java and 1400 km from Australia. The Cocos (Keeling) Islands lie between 11° 49' and 12° 13'S, 96° 49' and 96° 56'E, about 1100 km from Java and 2000 km from Australia. The two localities are separated by 900 km. Both are territories of Australia.

The physical and general biological environments of Christmas Island have been described by Wharton (1888), Andrews (1900), Gibson-Hill (1947a, b), Jongsma (1976) and Gray (1981); those of Cocos (Keeling) Islands by Gibson-Hill (1950a, b), Colin (1977) and Bunce (1988).

Several authors have made brief mention of hermit crabs, particularly the terrestrial coenobitids, on Christmas Island (Pocock, 1887; Andrews, 1900, 1909; Andrews *et al.*, 1900; Calman, 1909; Gordon, 1935; Gibson-Hill, 1947a, 1947b; George, 1978; Hicks *et al.*, 1984). The hermit crabs of Cocos (Keeling) Islands have received less attention (Forest, 1956). Morgan (1991) included specimens from both localities in a revision of Australian species of *Calcinus*.

The two localities were intensively sampled for hermit crabs by the author; Christmas Island during two weeks in February 1987 and Cocos (Keeling) Islands during three weeks in February 1989. Specimens were collected intertidally and subtidally to 37 m using SCUBA. All evident habitats were sampled.

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This paper lists the species collected at the two localities together with records from the literature. A new species of *Paguristes* is described. The hermit crab faunas are compared in terms of the island habitats. Specimens are deposited in the Western Australian Museum (WAM), Perth, and the Muséum national D'Histoire naturelle (MNHN), Paris.

RESULTS

Table 1 lists the hermit crabs collected by the author from Christmas and Cocos (Keeling) Islands, with an indication of the relative abundance of each species, together with records from the literature. Most of the species, especially the coenobitids and diogenids, are well known and widespread and their occurrences at these localities are not surprising. The *Calcinus* species were discussed in detail by Morgan (1991). However two new species of diogenid and several pagurids, indicated in Table 1, require some comment.

Table 1. Species of hermit crabs reported from Christmas Island (Indian Ocean) (CI(IO)) and Cocos (Keeling) Islands (C(K)Is). Species collected in 1987 and 1989 indicated by: C (common), P (present) and U (uncommon). Additional species reported in the literature indicated by *. Species addressed in Results indicated by #.

Species	CI(IO)	C(K)Is
Coenobitidae		
<i>Birgus latro</i> (Linnaeus, 1767)	C	U
<i>Coenobita brevimanus</i> Dana, 1852	P	P
<i>Coenobita perlatus</i> H. Milne Edwards, 1837	C	C
<i>Coenobita rugosus</i> H. Milne Edwards, 1837	C	C
Diogenidae		
<i>Aniculus retipes</i> Lewinsohn, 1982	P	P
<i>Aniculus ursus</i> (Olivier, 1811)	P	P
<i>Aniculus</i> sp. nov.#	-	U
<i>Calcinus argus</i> Wooster, 1984	-	U
<i>Calcinus elegans</i> (H. Milne Edwards, 1836)	C	C
<i>Calcinus gaimardii</i> (H. Milne Edwards, 1848)	C	C
<i>Calcinus guamensis</i> Wooster, 1984	C	U
<i>Calcinus haigae</i> Wooster, 1984	-	U
<i>Calcinus laevimanus</i> (Randall, 1839)	P	C
<i>Calcinus latens</i> (Randall, 1839)	C	C
<i>Calcinus lineapropodus</i> Morgan & Forest, 1991	C	C
<i>Calcinus minutus</i> Buitendijk, 1937	C	C
<i>Calcinus pulcher</i> Forest, 1958	-	P
<i>Calcinus seurati</i> Forest, 1951	U	P
<i>Clibanarius corallinus</i> (H. Milne Edwards, 1848)	*	P
<i>Clibanarius eurysternus</i> Hilgendorf, 1878	-	*
<i>Clibanarius humilis</i> Dana, 1852	-	U
<i>Clibanarius laevimanus</i> Buitendijk, 1937	-	U
<i>Clibanarius longitarsus</i> (De Haan, 1849)	-	P

<i>?Clibanarius merguiensis</i> De Man, 1888#	-	*
<i>Clibanarius striolatus</i> Dana, 1852	-	*
<i>Dardanus crassimanus</i> (H. Milne Edwards, 1848)	P	C
<i>Dardanus deformatus</i> (H. Milne Edwards, 1836)	-	U
<i>Dardanus gemmatus</i> (H. Milne Edwards, 1848)	P	P
<i>Dardanus guttatus</i> (Olivier, 1811)	U	P
<i>Dardanus lagopodes</i> (Forskål, 1775)	C	C
<i>Dardanus megistos</i> (Herbst, 1804)	-	C
<i>Dardanus scutellatus</i> (H. Milne Edwards, 1848)	-	P
<i>Diogenes pallescens</i> Whitelegge, 1897	-	P
<i>Paguristes jalur</i> , new species#	U	P
<i>Trizopagurus strigatus</i> (Herbst, 1804)	C	P
Paguridae		
<i>Micropagurus vexatus</i> Haig & Ball, 1988	-	C
<i>Nematopagurus</i> cf. <i>muricatus</i> (Henderson, 1896)#	-	U
<i>Paguritta harmsi</i> (Gordon, 1935)	U	-
<i>Pagurixus anceps</i> (Forest, 1954)#	-	C
<i>Pagurixus tweediei</i> (Forest, 1956)#	C	C
<i>Pagurixus</i> cf. <i>maorus</i> (Nobili, 1906)#	U	U
<i>Pagurixus</i> cf. <i>boninensis</i> (Melin, 1939)#	-	U
<i>Pylopaguropsis keijii</i> McLaughlin & Haig, 1989#	C	C

***Aniculus*, new species**

Material.- Female (SL 21.9 mm) (MNHN), West Island, Cocos (Keeling) Islands, ocean platform, 8.ii.1989.

Remarks.- This specimen was bright red in life, with multispinose ocular acicles, stout ocular peduncles and three ridges on the ventral surface of the coxae of chelipeds. It was recognised as an undescribed species and has been sent to and is currently being described by Professor J. Forest of the Muséum National d'Histoire Naturelle, Paris.

***Clibanarius* species**

Remarks.- Several records of indeterminate validity occur in previous publications. In addition to the species noted in Table 1, Gibson-Hill (1947a) mentioned two unidentified species of *Clibanarius* from Christmas Island. No species of *Clibanarius* were collected at Christmas Island in 1987. The record of *?C. merguiensis* from Cocos (Keeling) Islands (Forest, 1956) was based upon a single small specimen with certain colour and morphological differences from that species.

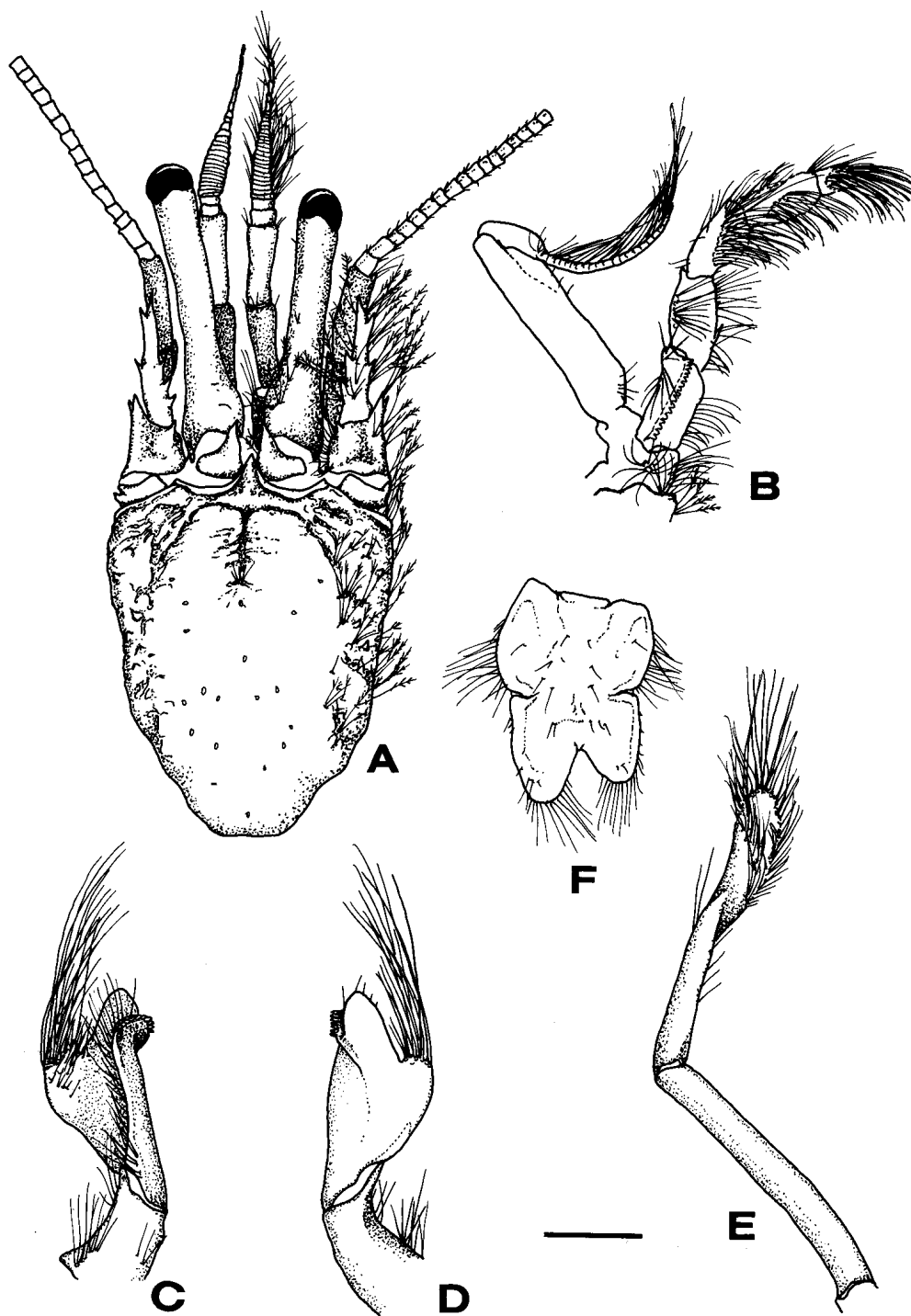


Fig. 1. *Paguristes jalur*, new species. Holotype male. A, shield and cephalic appendages, dorsal view (setae omitted left side); B, left third maxilliped, mesial view; C, left first pleopod of male, mesial view; D, left first pleopod of male, lateral view; E, left second pleopod of male, ventral view; F, telson, dorsal view. Scale = 1.3 mm (A), 1.0 mm (B,F), 0.5 mm (C,D,E).

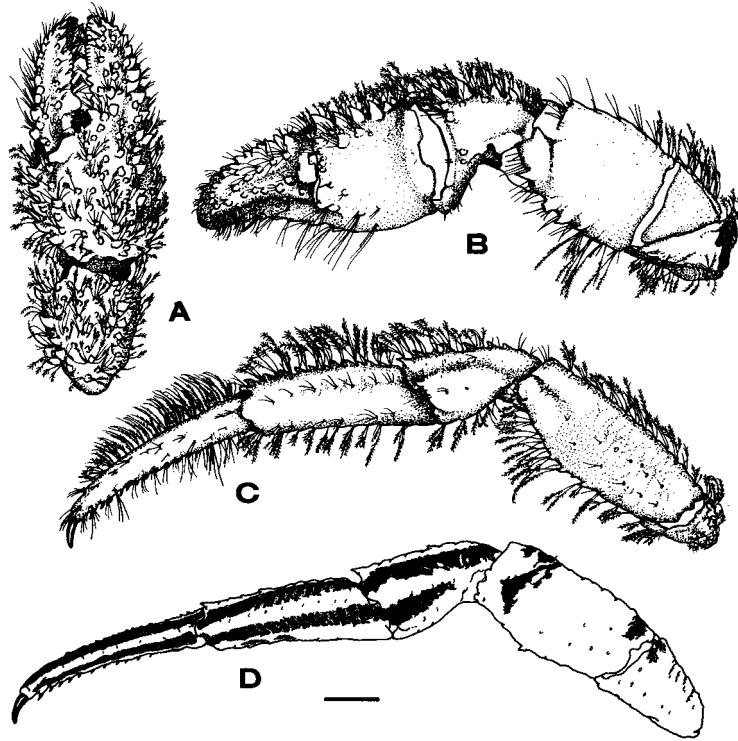


Fig. 2. *Paguristes jalur*, new species. Holotype male. A, right cheliped, dorsal view; B, right cheliped, mesial view; C, left second pereopod, lateral view; D, left third pereopod, lateral view showing colour pattern (setae omitted). Scale = 1.0 mm.

Paguristes jalur, new species

(Figs. 1, 2)

Material.- Holotype- Male (SL 4.8 mm) (WAM 459-89), Horsburgh Island, Cocos (Keeling) Islands, to 37 m, 9.ii.1989.

Paratypes.- 2 females (SL 3.2 mm, 2.5 mm) (WAM 406-92), type locality; 2 males (SL 3.5 mm, 3.1 mm), female (SL 3.1 mm) (WAM 484-89), northwest enZ, to 30 m, 21.ii.1989.

Other material.- Female, Ethel Beach, Christmas Island (Indian Ocean), 20 m, 20.ii.1987, lost.

Description: Shield (Fig. 1A) longer than broad; anterior margins shallowly concave, almost straight; posterior margin truncate; dorsolateral surfaces with scattered small spines, often large spine midlaterally; long plumose setae laterally. Rostrum long and moderately slender, exceeding lateral projections, terminating in spinule. Lateral projections broadly triangular, with apical spinule.

Ocular peduncles slender, almost as long as shield; inflated basally; dorsal surface with several long setae proximally. Ocular acicles with mesial margin slightly sinuous; terminating

in strong spine; separated basally by half the acicle width.

Antennular peduncles almost as long as ocular peduncles; ultimate and penultimate segments unarmed; basal segment with strong dorsolateral spine.

Antennal peduncles reaching distal half to one-third of ocular peduncles; fifth segment unarmed; fourth with dorsodistal spine; third with ventromesial distal angle produced, terminating in strong spine; second with dorsolateral distal angle produced, terminating in bifid spine, dorsomesial distal angle usually with small spine; first segment unarmed or with small lateral spinule. Antennal acicle reaching beyond half length of ultimate peduncular segment, terminating in strong spine; lateral margin with 2 spines, mesial margin with 2 or 3 spines. All segments and acicle with long, lightly plumose setae. Antennal flagella overreaching chelipeds and longer than carapace; articles with several very short setae.

Third maxillipeds (Fig. 1B) with basis and ischium distinctly separate; basis with 2 or 3 small spines; ischium with well developed crista dentata and strong distoventral spine; merus with 2 or 3 ventral spines; carpus usually with small dorsodistal and ventrodistal spines.

Chelipeds (Fig. 2A,B) subequal or right larger, similar in form. Dactylus slightly longer than palm; cutting edge with calcareous teeth proximally, corneous teeth for distal 1/3; terminating in blunt corneous claw; dorsal surface with row of blunt spines or acute tubercles slightly mesial of midline; dorsomesial margin with row of strong spines decreasing in size distally; mesial face and ventromesial margin with row of small spines, some scattered tubercles on ventral face; surfaces with tufts of simple setae, most numerous mesially. Fixed finger slightly broader than dactylus; cutting edge with calcareous teeth leaving proximal gap with dactylus; terminating in corneous claw; dorsal surface with row of blunt spines mesial to midline, this row extending posteriorly to palm, numerous similar spines over dorsal surface of fixed finger, these forming irregular row(s); dorsolateral margin with row of stronger spines decreasing in size distally; irregular row of smaller spines on lateral face ventral to dorsolateral row; ventral face with some spines and tufts of simple setae, these more numerous distally. Palm similar length to or slightly shorter than carpus; dorsomesial margin with 4 or 5 strong conical spines; dorsal surface with irregular longitudinal rows of conical spines, row along midline best developed, and with numerous short plumose setae; dorsolateral margin moderately defined by enlarged spines extending from fixed finger; lateral face with irregular row of small spines or tubercles, these extending from fixed finger; ventral surface with few tubercles and tufts of long simple setae. Carpus much shorter than merus; dorsomesial margin with 4-6 strong spines, largest distally; dorsal surface with median row of smaller spines; dorsolateral margin with row of moderately strong spines; some scattered small tubercles between rows; mesial and ventral faces nearly smooth; lateral face with scattered tubercles and small spines; dorsal surface with long plumose setae, other surfaces with tufts of long simple setae. Merus laterally compressed, with row of crenulations dorsally, small spines dorsodistally; ventrolateral and ventromesial margins each with row of spines; lateral and mesial faces unarmed; scattered setae especially on dorsal and ventral margins.

Second pereopods (Fig. 2C) with slender, very weakly curved dactylus, slightly longer than propodus; terminating in curved corneous claw; dorsal surface with row of small spines, largest proximally; lateral and mesial faces nearly smooth, mesial face with broad dorsoproximal sulcus; ventral margin with row of corneous spines, largest distally. Propodus about 3 times as long as broad, distinctly longer than carpus; dorsal margin with row of strong spines; lateral and

mesial faces nearly smooth; 1 or more spinules on ventrodistal margin; ventral margin unarmed or with minute spinules at setal bases. Carpus much shorter than merus; dorsal margin with row of very large spines, these slightly offset mesially; additional large spine at distodorsal angle; lateral face with shallow longitudinal sulcus, usually spine on distal margin midlaterally; mesial and ventral faces smooth. Merus laterally compressed; dorsal margin unarmed or with row of minute spinules at setal bases; lateral and mesial faces smooth; some spines at distolateral angle; ventral margin with irregular row of spines, largest distally. All segments with long setae, especially along dorsal and ventral margins, mesially on propodus and ventromesially on dactylus; most setae plumose, those on propodus and dactylus more finely so than on carpus and merus.

Third pereopods (Fig. 2D) with dactylus similar to that of second pereopods; dorsal spines rather smaller. Propodus more distinctly tapering in width distally; dorsal surface unarmed except for 1 or 2 distal spines; distal margin with several spinules ventrally; ventral margin unarmed or with row of minute spinules. Carpus similar to second pereopod except dorsal spines much smaller or absent, distal midlateral spine very small or absent. Merus less compressed than in second pereopod; usually spine at dorsodistal angle; ventral margin crenulate with fewer spines distally. Setation similar to that of second pereopods.

First (Fig. 1C,D) and second (Fig. 1E) pleopods and gonopores of males paired. Female first pleopods and gonopores paired. Brood pouch subquadrate, distal margin scalloped and fringed by fine setae.

Telson (Fig. 1F) with left posterior lobe larger than right; lobes unarmed, separated by deep median cleft; posterior margins with long setae, shorter setae on lateral margins.

Colour in life.- Shield and posterior carapace cream or white. Ocular peduncles and acicles white; corneas black. Antennular peduncles white, flagella often tinged with pink. Antennal peduncles white, ultimate segment sometimes with maroon tinge; flagella clear proximally, becoming more maroon distally. Chelipeds cream or pale orange with deep maroon longitudinal stripes. Dactylus with broad mesial and dorsal maroon stripes; thinner lines dorsally and ventrally near cutting edge. Propodus with broad median dorsal stripe along finger and onto palm; thin line dorsally near cutting edge; broad extension of stripe from dactylus posteriorly on palm, this sometimes reticulating with more lateral stripe on palm; broad stripes mesially, ventrolaterally and an irregular band ventrally on palm. Carpus with 2 dorsal stripes and 1 lateral stripe, most of mesial surface maroon. Merus with broad irregular maroon annulus subdistally, often smaller maroon patches proximally. Cheliped spines usually cream. Second and third pereopods (Fig. 2D) cream or pale orange striped with maroon; dactylus, propodus and carpus with dorsolateral, ventrolateral, dorsomesial and ventromesial maroon stripes; merus with broad maroon annulus subdistally and small patches proximally.

Etymology.- Named from Bahasa Malay, "jalur" meaning stripe. It is used as a noun.

Distribution.- The species is known only from Cocos (Keeling) and Christmas Islands; coral reefs.

Remarks.- *Paguristes jalur* most closely resembles *P. runyanae* Haig & Ball, described from Indonesia (Haig & Ball, 1988). Both species display antennal flagella longer than the carapace

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and ocular peduncles longer than antennular peduncles. Posterior telsonal lobes are unarmed. As noted by Haig & Ball (1988), these features key the species in Alcock (1905) and Miyake (1978) to the group including *P. acanthomerus* Ortmann, *P. balanophilus* Alcock, *P. ciliatus* Heller, *P. mundus* Alcock and *P. seminudus* Stimpson. All of the differences from those species noted by Haig & Ball (1988: 176) for *P. runyanae* also apply to *P. jalur*. In addition to the differences recorded by those authors, *P. mundus* has a short rostrum and stout ocular peduncles and *P. seminudus* is very poorly setose, with the left chela usually larger than the right.

Paguristes jalur and *P. runyanae* are very similar morphologically. In particular, the shape and ornamentation of the chelipeds, pereopods and telson are similar as is the form of the male first and second pleopods. Both species have distinctively striped legs. In *P. jalur*, the ocular peduncles are shorter than in *P. runyanae*, only just exceeding the antennular peduncles. In *P. jalur*, there are no median spinules on the mesial face of the dactyli of second and third pereopods and the setation of chelipeds and pereopods is heavier, with more numerous plumose setae than in *P. runyanae*. Although superficially similar, the colours in life of the two species are very different with *P. runyanae* displaying orange stripes on its purple shield, purple ocular, antennular and antennal peduncles and purple and orange striped legs (with longitudinal stripes on the merus of second and third pereopods).

All type material is from Cocos (Keeling) Islands. The specimen from Christmas Island has been lost but detailed live colour notes leave no doubt that it was this species.

Nematopagurus cf. muricatus (Henderson, 1896)

Material.- Male (SL 2.8 mm) (WAM 669-89), southeast of Horsburgh Island, Cocos (Keeling) Islands, to 35 m, 20.ii.1989.

Remarks.- The long, coiled sexual tube on the coxa of the right fifth pereopod and the short tube on the left and 11 pairs of phyllobranchiae confirm this as a specimen of *Nematopagurus* (Miyake, 1978). The specimen agrees quite well with the descriptions of *N. muricatus* in Alcock (1905) and Miyake (1978) with the following exceptions. The ocular peduncles are only slightly shorter than the antennular peduncles on this specimen, similar to the illustration by Alcock (1905: pl. 12, fig. 5) but longer than the ocular peduncles shown by Miyake (1978: fig. 51). The carpus of the right cheliped does not bear 4 to 5 granular rows dorsally, instead being rather smooth between the dorsolateral and dorsomesial margins and with a metallic sheen. The male right sexual tube is more coiled than illustrated by Alcock (1905: pl. 12, fig. 5a).

Pagurixus anceps (Forest, 1954)

Material.- 54 specimens (SL 2.6-1.1 mm) (WAM 407-89, 470-89, 475-89, 485-89, 486-89, 613-89, 679-89, 681-89, 684-89, 689-89), Cocos (Keeling) Islands, shallow subtidal, ii.1989.

Remarks.- *Pagurixus anceps* is widespread in the Indo-West Pacific (McLaughlin & Haig, 1984) and it is not surprising to find it at the Cocos (Keeling) Islands. Only one species of *Pagurixus*, *P. tweediei* (Forest), had previously been recorded from that locality.

***Pagurixus cf. boninensis* (Melin, 1939)**

Material.- Male (SL 2.0 mm), 2 females (SL both 2.0 mm) (WAM 685-89) southeast of main jetty, West Island, Cocos (Keeling) Islands, to 12 m, 21.ii.1989; female (SL 2.0 mm) (WAM 405-89), Turk Reef, Cocos (Keeling) Islands, 13.ii.1989.

Remarks.- These specimens key to *P. boninensis* in McLaughlin & Haig (1984). The dactyli of second and third pereopods are very elongate, nearly as long as propodi and bear 9-11 ventral spines. The right cheliped of males is very granular, much more so than on Allan Hancock Foundation specimens of *P. boninensis* from the Marshall Islands or as illustrated by McLaughlin & Haig (1984). The degree of granulation is similar to that of a new species of *Pagurixus* from southwestern Australia but that species lacks a setal row on the ventral margin of the antennular peduncles (Morgan, in press). It cannot be stated with certainty whether or not these four small specimens, two of which are in poor condition, represent variation within *P. boninensis* or are specifically different.

***Pagurixus cf. maorus* (Nobili, 1906)**

Material.- Male (SL 3.1 mm) (WAM 407-92), Waterfall, Christmas Island, shallow sublittoral, 13.ii.1987; Male (SL 2.3 mm), 2 females (SL 3.5 mm, 1.9 mm) (WAM 469-89), West Island, Cocos (Keeling) Islands, ocean platform, 8.ii.1989.

Remarks.- These specimens agree in most respects with the redescription of *P. maorus* of McLaughlin & Haig (1984). In particular, the lateral face of the carpus of the left cheliped is strongly sloping and bears a longitudinal row of spinules or granules. This has been regarded as a unique character of *P. maorus*, previously recorded from Polynesia and the Marshall Islands (McLaughlin & Haig, 1984). However the dactyli of second and third pereopods, while relatively elongate, are shorter than the propodi and the male right cheliped is much less elongate than that illustrated for *P. maorus* by McLaughlin & Haig (1984).

***Pagurixus tweediei* (Forest, 1956)**

Material.- 52 specimens (SL 2.1-1.0 mm) (WAM 463-87, 424-92 to 435-92), Christmas Island, shallow subtidal, ii.1987; 6 males (SL 2.5-1.2 mm), 6 females (SL 2.2-1.1 mm) (WAM 670-89, 675-89, 680-89, 682-89, 687-89, 688-89), Cocos (Keeling) Islands, ii.1989.

Remarks.- This species was described from Cocos (Keeling) Islands on the basis of three specimens (Forest, 1956). Forest's description was augmented by McLaughlin & Haig (1984) on the basis of one specimen from the Philippines. The species is common not only at Cocos (Keeling) but also at Christmas Island. Neither Forest (1956) nor McLaughlin & Haig (1984) recorded the condition of female gonopores which is variable in this genus. The females examined here have only a left gonopore.

***Pylopaguropsis keijii* McLaughlin & Haig, 1989**

Material.- 26 specimens (SL 2.5-1.4 mm) (WAM 415-92 to 423-92), Christmas Island, subtidal to 30 m, coral and rubble, ii.1987; 19 specimens (SL 3.3-1.2 mm) (WAM 395-89, 506-89, 564-89, 572-89), Cocos (Keeling) Islands, habitat as above, ii.1989.

Remarks.- The specimens agree well in morphology and colour with the description and figures of McLaughlin & Haig (1989) with the exception that the telsons frequently have a larger left posterior lobe than illustrated, approaching the condition of *P. laevispinosa* McLaughlin & Haig, 1989 (their figs 13d, j). The species was common at both localities.

DISCUSSION

The hermit crab fauna of Christmas and Cocos (Keeling) Islands comprises mainly species with widespread distributions in the Indo-West Pacific region. This is to be expected given the location and geographic isolation of the two island systems.

Christmas and Cocos (Keeling) Islands share the same species of coenobitids. At both localities, *Coenobita brevimanus* is somewhat less common than *C. perlatus* and *C. rugosus*. *Birgus latro* is common, especially in areas of rainforest, at Christmas Island but is rare at Cocos (Keeling) with reports of a few specimens on West and North Keeling Islands. None was seen at the latter locality in 1989 and it would appear that *B. latro* is close to extinction there. It is uncertain if this is due to human exploitation for food or if the species has always been uncommon.

The more diverse diogenid assemblage at Cocos (Keeling) Islands than at Christmas Island can be attributed largely to the greater diversity of habitat types at the former locality. The island systems share intertidal and subtidal limestone platforms and subtidal coral reefs but Christmas Island has few areas of intertidal or inshore subtidal soft sediment. The apparent absence of *Clibanarius* species from that locality in 1987 reflects the preference of most *Clibanarius* species for soft substrata.

Calcinus species are the dominant hermit crabs in coral reef habitats (Morgan, 1991). At both Christmas and Cocos (Keeling) Islands, in 1987 and 1989 respectively, live coral cover was limited at many sites. The possible causal agents of this are past outbreaks of *Acanthaster planci* (Linnaeus, 1758) and a severe El Nino Southern Oscillation effect in 1982-83 (Blake & Blake, 1983; Berry, 1988; Veron, 1990). As a result, the populations of *Calcinus* species were lower than I have observed in areas of richer coral growth, such as near Madang, Papua New Guinea. Nonetheless, diversity of *Calcinus* was high. Common species at both localities were *C. gaimardii*, *C. lineapropodus* and *C. minutus*; *C. guamensis* at Christmas Island (surprisingly uncommon at Cocos); and *C. latens* at Cocos (Keeling) (present but less common at Christmas).

The genus *Dardanus* is also diverse in areas of coral reefs. Interestingly, *D. megistos*, a rather common reef inhabitant including at Cocos (Keeling) Islands, was not collected at Christmas Island. *Dardanus scutellatus* prefers areas of fine sediment and also was not found at Christmas. *Dardanus lagopodes* was abundant at both localities.

Trizopagurus strigatus is a common coral reef species and was notably more abundant at Christmas Island. Species of *Aniculus* are also associated with, but never common on, coral reefs

(pers. obs.). *Aniculus retipes* and *A. ursus* occurred at both island systems.

Tropical pagurids are frequently very small and can be easily overlooked by collectors. A significant difference between the two localities was the frequent occurrence of *Micropagurus vexatus* and *Pagurixus anceps* at Cocos (Keeling) Islands, both apparently absent at Christmas Island. At both sites, *Pagurixus* species comprise a major part of the pagurid fauna.

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