

VOLUME 52
PART 2

MEMOIRS
OF THE
QUEENSLAND MUSEUM

BRISBANE
30 APRIL 2008

© Queensland Museum

PO Box 3300, South Brisbane 4101, Australia
Phone 06 7 3840 7555
Fax 06 7 3846 1226
Email qmlib@qm.qld.gov.au
Website www.qm.qld.gov.au

National Library of Australia card number
ISSN 0079-8835

NOTE

Papers published in this volume and in all previous volumes of the *Memoirs of the Queensland Museum* may be reproduced for scientific research, individual study or other educational purposes. Properly acknowledged quotations may be made but queries regarding the republication of any papers should be addressed to the Editor in Chief. Copies of the journal can be purchased from the Queensland Museum Shop.

A Guide to Authors is displayed at the Queensland Museum web site
www.qm.qld.gov.au/organisation/publications/memoirs/guidetoauthors.pdf

A Queensland Government Project
Typeset at the Queensland Museum

A NEW SPECIES OF FRESHWATER CRAYFISH (CRUSTACEA:
DECAPODA: PARASTACIDAE) FROM THE FLY RIVER DRAINAGE,
WESTERN PROVINCE, PAPUA NEW GUINEA

CHRISTIAN LUKHAUP AND BRETT HERBERT

Lukhaup, C. & Herbert, B. 2008 04 30. A new species of crayfish (Crustacea: Decapoda: Parastacidae) from the Fly River Drainage, Western Province, Papua New Guinea. *Memoirs of the Queensland Museum* 52(2): 213–219. Brisbane. ISSN 0079-8835.

A new species of crayfish *Cherax (Cherax) peknyi* is described from the Fly River drainage, in the western province region of Papua New Guinea. This species differs from all others in its subgenus by the shape of the rostrum, and chelae, and in colouration. □ *Cherax*, new species, freshwater, crayfish, Fly River, Papua New Guinea, Indonesia.

Christian Lukhaup, Gotenstrasse 16, 71336 Bittenfeld, Germany (email: Chris@crusta10.de). Brett Herbert, Animal Biosecurity (Aquatics); Biosecurity Australia, GPO Box 858, ACT 2601, Australia (email: Brett.Herbert@biosecurity.gov.au); 19 December 2007.

Crayfish were collected at various locations in the Fly River catchment in 2005–2006, as part of a project aimed at developing techniques for aquaculture of indigenous species of *Cherax*. Techniques for sustainable aquaculture of Red-claw crayfish (*Cherax quadricarinatus*) were developed in Queensland in the 1990s, and it was hoped to adapt such techniques for similar species in Papua New Guinea. Crayfish are known to be present in the Fly River floodplain, and in the foothills of the mountains near the provincial capital of Kiunga. They are collected and eaten in all regions, particularly when the water level has receded during the dry season. The people knew of a crayfish with a soft red patch on the claws of the males (as has *Cherax quadricarinatus*), but when we went collecting with them, they caught several species including the undescribed *Cherax peknyi*. Specimens were forwarded to Queensland Museum to ensure their presence was documented — particularly important as some species are disappearing from the Fly River floodplain following the introduction of exotic predators such as the fish *Anabas testudineus* and *Channa* sp.

Specimens collected in Tamu Creek (a tributary of the Fly River in the Western Province of PNG) in 2006, were tentatively assigned as *Cherax* sp. “*papuana*” by BH. We realised that these specimens perfectly matched the species from the Merauke region introduced onto the German pet market as *Cherax* sp. “tiger” and *Cherax* sp. “zebra” in the year 2000, and which the senior author believed to be a new species. New Guinea has been the source for a highly lucrative trade in native fish from West Papua to Europe, in particular a number of rainbowfish species. The pretty colour patterns of this crayfish, and the ease with which it

can be transported, makes it of particular interest to the aquarium trade. Crayfish collected from wild populations are supplied by wholesalers to the European, Japanese and USA pet markets. We here describe this distinctive crayfish as a new species, *Cherax peknyi*.

The project is an ACIAR and Ok Tedi Mining Limited funded QDPI&F, Ok Tedi Mining Limited, Western Province Government and National Fisheries Authority project.

Abbreviations. cl. = carapace length; OCL = orbital carapace length. QM = Queensland Museum, Brisbane; RMNH = Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands; tot. l. = total length of carapace and abdomen.

TAXONOMY

PARASTACIDAE Huxley, 1879

***Cherax (Cherax) peknyi* sp. nov.**
(Figs 1–3, Table 1)

MATERIAL EXAMINED. HOLOTYPE, QMW28267, ♂ (cl. 44mm), Tamu Creek, Fly River Drainage, Western Province, PNG, 7°34' S, 141°03' E, altitude 200m, 12.10.2006, Brett Herbert.

PARATYPES: RMNH-D51760, 1♂ (CL. 42mm) same data as holotype. QMW28384, allotype ♀ (cl. 35mm), High School Creek, Fly River Drainage, Western Province, PNG, Oct. 2006, Brett Herbert. QMW28385, 4 ♂♂ (tot. l. 48–87mm), 6 ♀♀ (tot. l. 56–79mm), same data as holotype.

DESCRIPTION. (Based on holotype.) Body subovate, slightly compressed laterally. Pleon narrower than cephalothorax (c. 0.9). Cervical

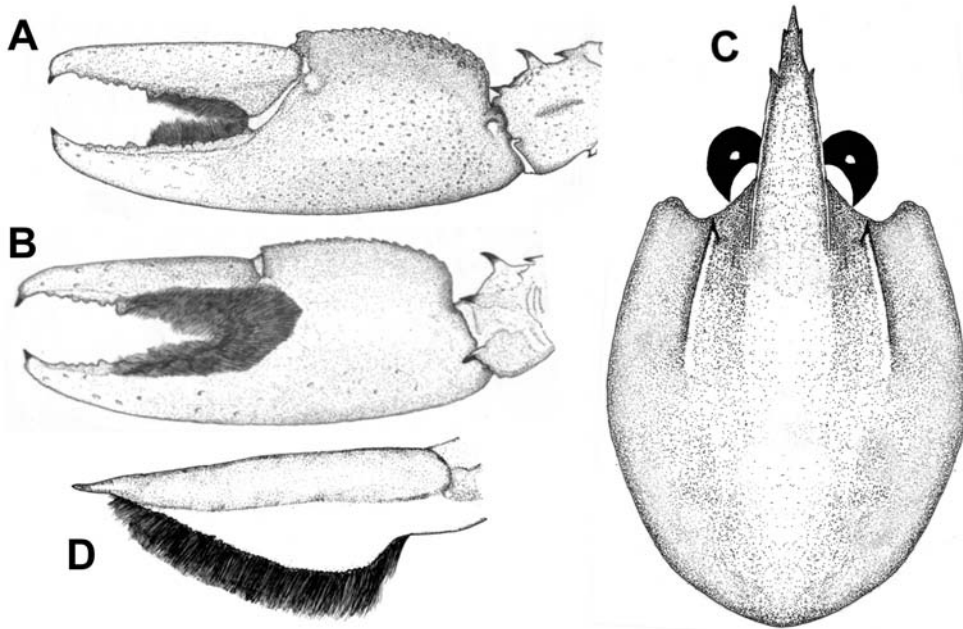


FIG. 1. *Cherax (Cherax) peknyi* sp. nov. male holotype. A, dorsal view left chela; B, ventral view left chela; C, dorsal view of carapace; D, scaphocerite.

TABLE 1. Measurements (mm) of holotype and paratype specimens of *Cherax (C.) peknyi* sp. nov.

	Carapace	Pleon	Total length	Chela height	Chela length	Chela width
Holotype male	44	48	92	9	41	16
Male 2	42	45	87	8	38	14
Male 3	—	—	55	—	—	—
Male 4	—	—	48	—	—	—
Male 5	—	—	48	—	—	—
Allotype Female	35	39	74	6	28	11
Female 2	34	38	72	6	27	11
Female 3	32	36	67	6	23	10
Female 4	—	—	79	—	—	—
Female 5	—	—	72	—	—	—
Female 6	—	—	61	—	—	—
Female 7	—	—	56	—	—	—

groove distinct. Carapace smooth anterior to cervical groove; 3–4 anteriorly directed spines placed together just behind cervical groove laterally at about level of antenna; some short scattered setae present in cervical groove adjacent to lateral spines. Areola c. 2.4 times longer than breadth at narrowest point; and occupying about one-third of total carapace length. Rostrum slender, reaching to about end of ultimate antennular peduncle, and about twice as long as wide at base; upper surface smooth; lateral margins almost straight basally, distally tapering quickly near apex; margins elevated, ending in carapace rostral carinae; lateral margins bearing 2 prominent teeth; distal half of outer margins bearing a few short setae. Rostral teeth point dorsally at about 45° angle. Rostral carinae extending as slight elevation over anterior half of carapace, then fading posteriorly. Postorbital ridges well developed, terminating in slightly upturned corneous spines anteriorly; fading after 2/3 of OCL posteriorly. Scaphocerite broadest medially, convex over distal part, becoming narrower basally; thickened lateral margin terminating in large corneous spine; c. 3.7 times longer than broad. Antennules and antennae of typical shape. Eyes relatively large; cornea globular, darkly pigmented, about as long as eyestalk; eyestalk slightly narrower than cornea. Epistome broadly triangular, becoming lance-

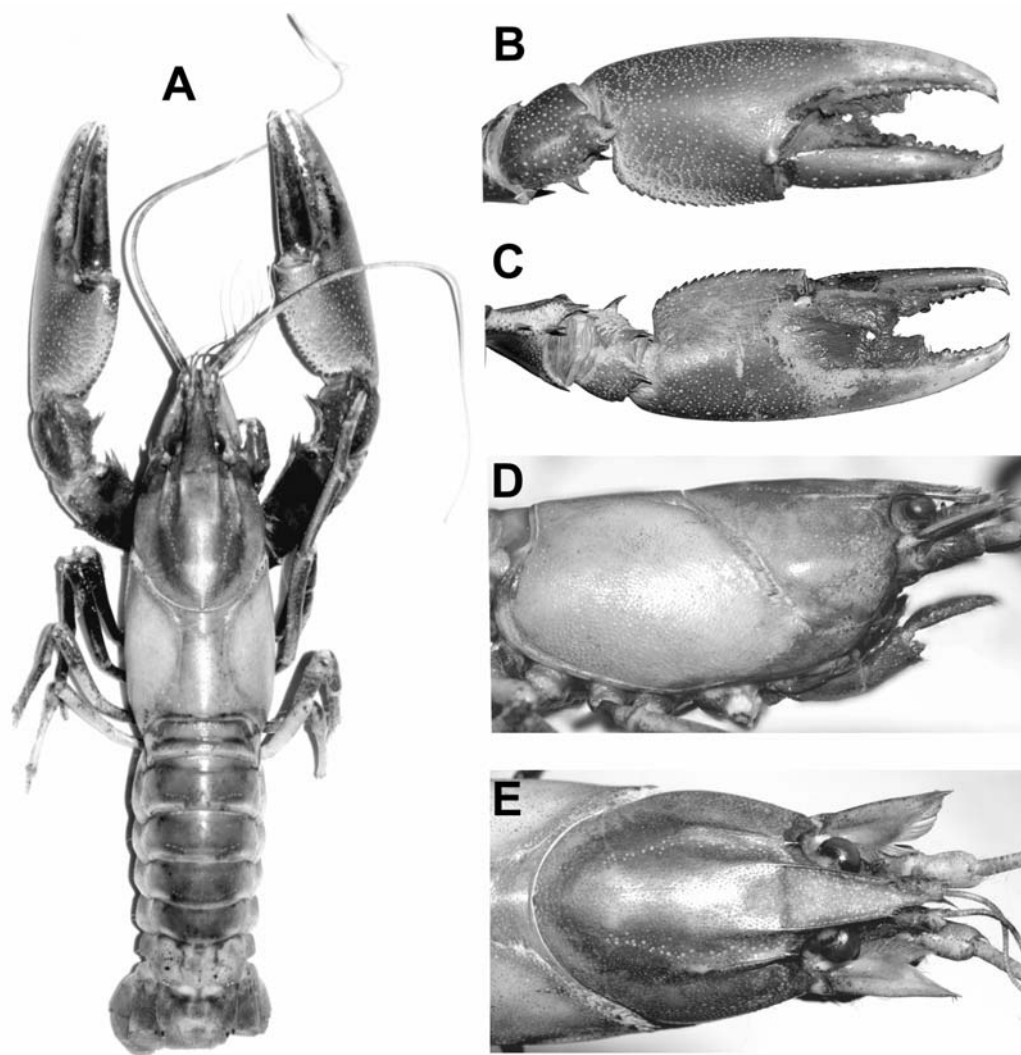


FIG. 2. *Cherax (Cherax) peknyi* sp. nov. male holotype. A, dorsal view; B, right first chela, dorsal view; C, ventral view; D, lateral view of the carapace; E, dorsal view of cephalon and rostrum.

shaped anteriorly; lateral surface with many small tubercles; central part smooth, excavate.

Holotype male with chelipeds equal in form and size. Chela c. 4.5 times longer than high; c. 2.6 times longer than deep, strongly compressed. Fingers longer than palm, slightly gaping. Dactylus broad at the base, tapering slightly towards tip; tip with sharp, hooked tooth pointing outwards at 45° angle; cutting edge with 11 relatively small granular teeth, and one slightly bigger tooth medially; ventral and dorsal surface with scattered pits. Propodus triangular; fixed finger termin-

ating in sharp, corneous, hooked tooth, standing almost perpendicular to axis. Upper surface of palm smooth, slightly pitted, more densely pitted at margins. Ventrally with dense setae present at base of moveable finger, covering anterior third of propodus and extending about half way along the gape becoming increasingly scattered and shorter anteriorly. Carpus with mesiolateral part slightly elevated to form slender serrated ridge with row of 16 small blunt spines; some small tubercles present along this ridge becoming increasingly scattered anteriorly; ventral surface

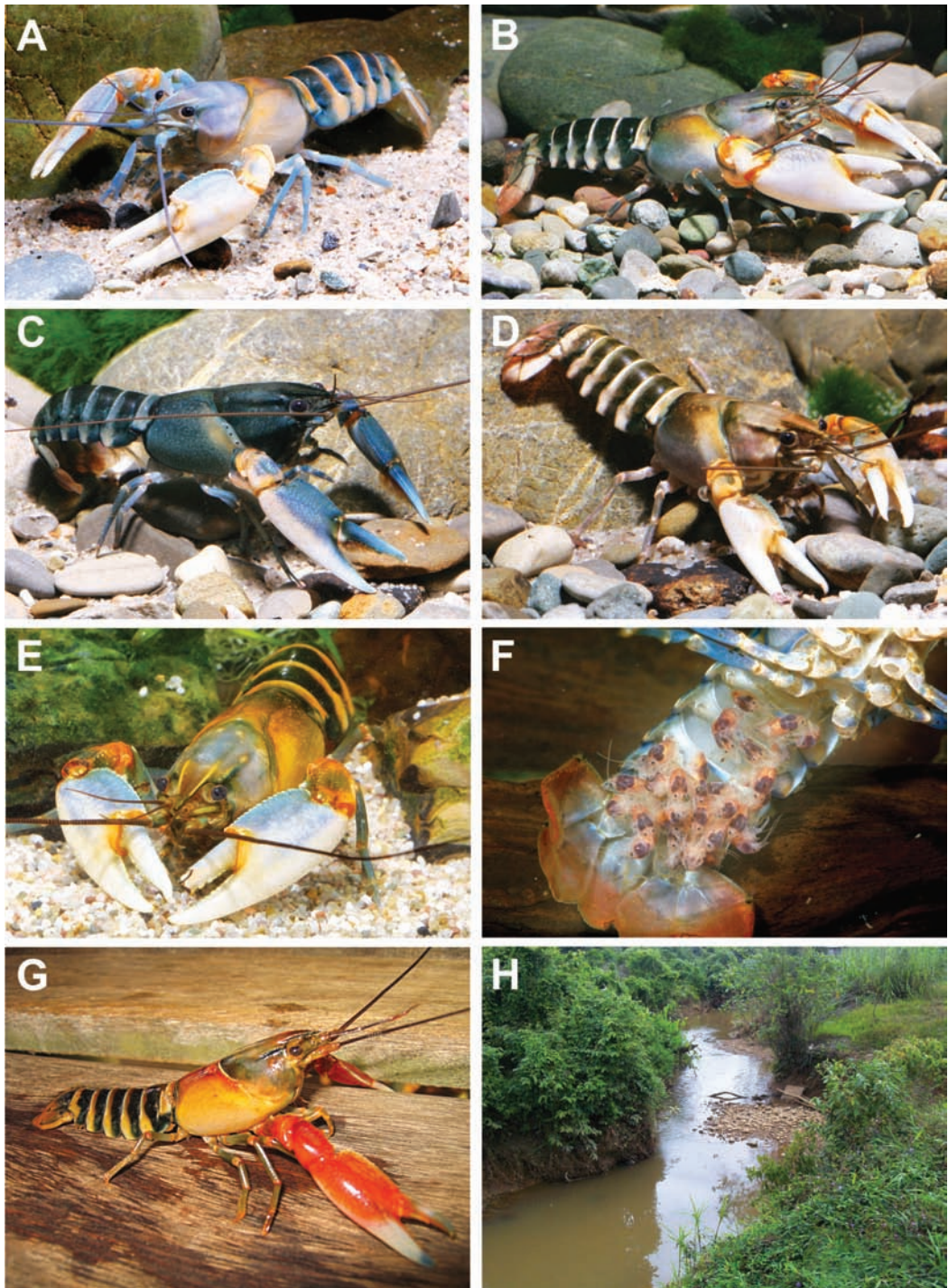


FIG. 3. *Cherax peknyi* sp. nov. A–E, specimens from aquarium shops; F, female with larvae; G, wild-caught specimen from Fly River catchment; H, creek close to Kiunga showing typical habitat.

smooth, pitted, with median portion elevated to form low, broad ridge. Merus with dorsal surface smooth, densely pitted, with a slight excavation medially; 1 small spine present mesiolaterally; 1 acute corneous spine also present dorsolaterally; ventral surface with two large corneous spines; some small granules at ventrolateral margin. Ischium smooth with single spine on dorsal surface; row of three spines on ventral surface and row of 10–12 small granules on ventrolateral margin; base with single spine on ventrolateral margin.

Second leg reaching to about end of scaphocerite; fingers slightly longer than palm; carpus c. twice length of palm; merus c. 1.4 times longer than carpus; ischium about half as long as merus. Third legs reaching farther than second; fingers shorter than palm. Fourth legs slightly shorter than second; dactylus ending in corneous tip; short setae on ventral side of propodus; propodus about twice length of dactylus and slightly longer than carpus, somewhat flattened, and carrying many bristles on lower margin; merus longer than propodus. Fifth legs similar to fourth; shorter and more slender.

Dorsal surface of abdomen smooth medially; pleura smooth, pitted. Telson with two spines at caudolateral corners. First uropod with two well defined spines; distal spine on mesial lobe; with prominent median rib ending in spine; exopod divided horizontally by row of small spines ending in distal spine on mesial lobe.

Allotypic female with chelipeds equal (right cheliped damaged), more than 2.5 times as long as broad; mesiolateral part of carpus slightly elevated to form slender serrated ridge with row of 17 small spines; cutting edge of dactylus with relatively small granular teeth in posterior part, and one slightly larger tooth at about middle of cutting edge; cutting edge of fixed finger bearing small granules, two being slightly larger; low short setae visible along ventral cutting edge of fixed and moveable fingers, thicker posteriorly. Cervical groove distinct, non setose; carapace smooth anterior to groove; 1 weakly developed, anteriorly directed spine present closely behind groove laterally at level of antenna. Abdomen slightly narrower than cephalothorax. Chelipeds of young males resemble those of females, or slightly broader.

Colouration. Body colour variable (Fig. 3). The crayfish of the type series collected in Tamu creek (Fig. 3G) and High School creek are coloured (in life) as follows: chelae red to orange fading

to pinkish white anteriorly; distal tip bluish grey. Legs (except for first pair) greenish grey with orange joints. Cephalic region greenish gray fading to a yellowish green laterally; dorsal thoracic region brown-orange fading to yellow laterally and becoming cream ventrolaterally. Pleon green with broad yellow bands. Telson green, becoming yellow to orange mesolaterally. Distal margin of tail-fan pale orange.

Size. Largest males examined reached 92mm total length; largest female 79mm total length.

SYSTEMATIC POSITION

The modern use of subgenera within *Cherax*, seems to have started with Holthuis (1996) who used *Cherax (Astaconephrops)* for a new species from New Guinea. This *Astaconephrops* group is used for all *Cherax* species that have a soft decalcified section on the outer distal margin of male claws. This is a distinctive morphological apomorphy, and its usefulness as a character to split the genus has been supported by a recent molecular study by Munasinghe et al. (2004), who found a very well supported monophyletic lineage for this group, that is sister to all other species of *Cherax sensu stricto*. We therefore support the concept of two subgenera within *Cherax* and use this here. The New Guinea species of *Cherax (Cherax)* so far number ten, viz: *Cherax boschmai* (Holthuis, 1949); *Cherax buitendijkae* (Holthuis, 1949); *Cherax communis* (Holthuis, 1949); *Cherax longipes* (Holthuis, 1949); *Cherax murido* (Holthuis, 1949); *Cherax pallidus* (Holthuis, 1949); *Cherax panaicus* (Holthuis, 1949); *Cherax papuanus* (Holthuis, 1949); *Cherax solus* (Holthuis, 1949); *Cherax holthuisi* (Lukhaup & Pekny, 2006). *Cherax peknyi* sp. nov. can be separated from all other Papua New Guinea species within the subgenus by the shape of the rostrum, and chelae, and in colouration (see Table 2). In particular, the patch of dense setae in the proximal half of the gape of the chela, and the presence of 3–4 cervical spines are diagnostic of this species. Also only two other species have only two lateral rostral teeth, *C. pallidus* and *C. papuanus*, and these are easily separated from *C. peknyi* sp. nov. using the aforementioned characters.

HABITAT AND LIFE HISTORY. The crayfish were usually found in slow flowing, still water, in parts of southern New Guinea with pronounced wet and dry seasonality. The villagers traditionally collect these animals when the water levels are low

TABLE 2. Comparison of characters useful for separating *Cherax (Cherax) peknyi* sp. nov. from other related species occurring in Papua New Guinea.

	Rostral teeth	Chelae	Carapace	Other
<i>C. peknyi</i>	2	dense setae on posterior part of cutting edges; fingers 3.3 x longer than broad	smooth, 3–4 cervical spines present	yellow or pale stripes on the pleon
<i>C. boschmai</i>	5–7	more slender; fingers c. 1.5 x longer than palm	covered with small tubercles	small eyes; scaphocerite broad
<i>C. buitendijkae</i>	4–6	more slender; fingers c. 1.4–1.5 x longer than palm	covered with tubercles	large eyes; scaphocerite broad
<i>C. communis</i>	5–7	broader, few setae on ventral cutting edge	covered with small tubercles	larger eyes; scaphocerite broad
<i>C. longipes</i>	3–5	4 x longer than broad	numerous tubercles	small eyes; legs extremely long and slender
<i>C. murido</i>	4–6	3 x longer than broad	covered in tubercles	large, globular eyes
<i>C. pallidus</i>	2–4 (mostly 2–3)	6.5–8 x longer than broad; fingers 1.7 x longer than palm, extremely slender, tips crossing	densely covered in tubercles	eyes extremely large and globular
<i>C. panaicus</i>	5–8	more slender (3.5–4 x longer than broad); fingers 1.5 x longer than palm	covered with small tubercles	known only from Panai Lake, West Papua
<i>C. papuanus</i>	2	2.5 x longer than broad; fingers 2.5 x longer than broad	smooth and pitted, no cervical spines	endemic in Lake Kutubu, at 800m elevation;
<i>C. solus</i>	3–4	slender	covered with tubercles	endemic in Tigi Lake, West Papua
<i>C. holthuisi</i>	2 indentations, no spines	few short setae on cutting edges of chelae	smooth	small eyes, described from Aitinjo Lake, West Papua

during the dry season, as in most places the water flow is too fast in the wet season. Clarity of the water depends on the level of flooding and time. The Tamu River (near the West Papua border) is muddy during the flood season, becoming clear after the initial floods, and then becoming stagnant, with dark (tannin stained) water full of rotting leaves, and almost anaerobic ($DO < 1 \text{ mg/L}$) in the dry season. The crayfish live under logs and in crevices and holes in submerged timber. They also live in burrows in the clay in the banks of the river. Even when the water is very low in dissolved oxygen they live in all water depths and in their holes. No berried females were collected in the dry season suggesting that breeding is in the wet season.

Generally the habitat is in monsoon gallery forest, however they persist where habitat modification has been severe (clearing and siltation), and breed and maintain populations in small creeks around Kiunga (e.g. near the Kiunga school). These modified creeks have moderate flow throughout the year, and are highly turbid (secchi $< 50 \text{ mm}$), and $DO > 4 \text{ mg/L}$. Water temperature in small streams around Kiunga gets as low as 18°C , and up to 29°C . A few of the creeks in which they occur dry out completely, so they probably are

able to survive in moist conditions for a couple of months, in burrows or moist logs.

We did not collect crayfish in the swamps, and the villagers only fish for crayfish in rivers in the forest behind the swamps. No crayfish have been collected in the main Fly River channel which is heavily populated by *Macrobrachium rosenbergii*. In the streams *Cherax peknyi* was sympatric with *C. albertisii* and *C. quadricarinatus*, which are also collected for food by the local people during the dry season.

ETYMOLOGY. Named after Mr Reinhard Pekny, for his untiring efforts in protecting freshwater crayfish, and his contribution to our knowledge of the breeding and behaviour of New Guinea crayfish.

ACKNOWLEDGEMENTS

We wish to thank Peter Davie, Senior Curator, Crustacea, of the Queensland Museum, for his support, and for reviewing this manuscript. Graham Weston is acknowledged for his habitat picture and useful comments. We would like to thank Prof. P.B. Mather for his support, and Aquarium Glaser who brought this crayfish to our attention. We also thank the local people of the Fly River catchment for their assistance in collecting crayfish and sharing their local knowledge.

LITERATURE CITED

- BOESEMANN, M., 1963. Notes on the fishes of Western New Guinea. Zoologische Mededelingen Leiden 38(14): 221–242, figs 1–8, pls 1–8.
- CALMAN, W.T., 1911. Note on a crayfish from New Guinea. Annals and Magazine of Natural History (Ser. 8) 8(45): 366–368.
- HOLTHUIS, L.B., 1949. Decapoda Macrura with a revision of the New Guinea Parastacidae. Zoological results of the Dutch New Guinea Expedition 1939. No. 3. Nova Guinea (n. ser.) 5: 289–330, pls 2–9.
1956. Native fisheries of freshwater Crustacea in Netherlands New Guinea. Contributions to New Guinea Carcinology. I. Nova Guinea (n. ser.) 7(2): 123–137, figs 1–3, pls 1–8.
1958. Freshwater Crayfish in Netherlands New Guinea Mountains. South Pacific Commission Quarterly Bulletin 8(2): 36–39, 7 figs.
1982. Freshwater Crustacea Decapoda of New Guinea, in, Gressitt, J.L. (Ed.), Biogeography and ecology of New Guinea, vol. 2. Monographiae Biologicae 42: 603–619, figs 1–5.
1986. The freshwater crayfish of New Guinea. Freshwater Crayfish 6: 48–58, figs 1–8.
1996. *Cherax (Astaconephrops) minor* new species, a parastacid from the mountains of Irian Jaya (W. New Guinea) Indonesia (Crustacea: Decapoda: Parastacidae). Zoologische Mededeelingen. Leiden 70(24): 361–366, figs 1–2.
- HUXLEY, T.H. 1879. On the classification and the distribution of the crayfishes. Proc. Zool. Soc. Lond. 1878: 752–788.
- LUKHAUP, C. & PEKNY, R. 2004. Flusskrebse in der Aquaristik; Dähne Verlag GmbH Ettlingen-Sonderheft Wirbellose-Garnelen, Krebse, Krabben & Co.
- 2006a. *Cherax (Cherax) holthuisi*, a new species of crayfish (Crustacea: Decapoda: Parastacidae) from the centre of the Vogelkop Peninsula in Irian Jaya (West New Guinea), Indonesia. Zoologische Mededeelingen. Leiden 80-1(7): figs 1–4.
- 2006b. Krebse wie aus dem Paradies – Bekannte und unbekannte Formen der Gattung *Cherax* von Neuguinea; Dähne Verlag GmbH Ettlingen-Sonderheft Wirbellose-Garnelen, Krebse, Krabben & Co.
- MUNASINGHE, D.H.N., BURRIDGE, C.P. & AUSTIN, C.M., 2004. The systematics of freshwater crayfish of the genus *Cherax* Erichson (Decapoda: Parastacidae) in eastern Australia re-examined using nucleotide sequences from 12S rRNA and 16S rRNA genes. Invertebrate Systematics 18: 215–225.
- ROUX, J., 1911. Nouvelles espèces de Décapodes d'eau douce provenant de Papouasie. Notes from the Leyden Museum. Leyden 33: 81–106, 5 figs.
1914. Über das Vorkommen der Gattung *Cheraps* auf der Insel Misool. Zoologischer Anzeiger, Leiden 44: 97–9.

