

The genus *Justitia* Holthuis, 1946, with the description
of *J. chani* and *J. vericeli* spp. nov.
(Crustacea: Decapoda: Palinuridea)

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The genus *Justitia* Holthuis, 1946,
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摘要

Joseph Poupin 正龍蝦屬之研究及記述兩新種 臺灣省立博物館半年刊 47(1):37-56

以從法屬波里尼西亞所採集的標本，與其他印度—西太平洋及大西洋西部的標本，對正龍蝦屬 (*Justitia*) 作一分類檢討，此屬共可區分四個種：即分布於大西洋西部、印度洋和太平洋的長臂正龍蝦 (*J. longimanus* (H. Milne Edwards, 1837))，印度洋及太平洋產的日本龍蝦 (*J. japonica* (Kubo, 1955))，產於日本、台灣的新喀里多尼亞的新命名種陳氏正龍蝦 (*J. chani* sp. nov.)，和僅發現於土木土群島的另一新命名種窩氏正龍蝦 (*J. vericeli* sp. nov.)，後三種的外部形態特徵十分相近，可歸為一日本正龍蝦集群 (*J. japonica* group)。本報告亦有提供此屬的檢索以利各種的鑑別。

關鍵詞：龍蝦、正龍蝦屬、印度—西太平洋、大西洋西部新種。

Abstract

A collection of lobsters, of the genus *Justitia*, from French Polynesia, has been studied and compared with other specimens from the Indo-Pacific and West Atlantic. The diagnosis of *Justitia* is revised and a key to the species is given. Four species are recognized: *J. longimanus* (H. Milne Edwards, 1837), from the Western Atlantic and Indo-Pacific; *J. japonica* (Kubo, 1955), from the Indo-Pacific; *J. chani* sp. nov. from Japan, Taiwan and New Caledonia; and *J. vericeli* sp. nov. from the Tuamotu. Within the genus, *J. japonica*, *J. chani*, and *J. vericeli* form a group of three closely related species, referred to here as the *J. japonica* group.

Key words: Lobsters, *Justitia*, Indo-Pacific, West Atlantic, new species.

Introduction

The genus *Justitia* was proposed in 1946 by Holthuis to include the species formerly known as *Palinurus longimanus* H. Milne Edwards, 1837, and its variety *P. longimanus mauritanus* Miers, 1882. In 1955 Kubo des-

cribed a lobster new to Japan to which he gave the name *Nupalirus japonicus* n.g. and sp., stating also its close affinities with *Justitia longimanus*. A specimen from Mauritius, in the collection of the British Museum, was later attributed to Kubo's species by Gordon (1960). However according to Gordon, *N. japonicus*

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and *J. longimanus* "are referable to one and the same genus in spite of the marked difference in the size and form of the first pair of pereopods". She introduced a slight alteration to the original definition of *Justitia* and included *N. japonicus* in the genus *Justitia*. The genus then consisted of two species *J. longimanus* and *J. japonica*. The Indo-Pacific specimens of *J. longimanus* were sometimes referred to a third species, *J. mauritiana* (Georges and Main, 1967; Holthuis, 1984, 1991).

Collections of lobsters made between 1986 and 1991 by the Service Mixte de Contrôle Biologique (SMCB), have initiated the present study. The collections were obtained aboard the F.R.V. *Marara*, which has been carrying out a biological survey throughout French Polynesia in the past years. In the process of collecting, traps were set on the outer slopes of the islands at depths ranging from 100 to 1,000 m. Details of the gear operations are given in Poupin *et al.* (1990). The main catches were of pandalid shrimps and geryonid crabs, but about thirty lobsters were also collected: a single specimen was first referred to "*japonica*" while the others were identified as *J. longimanus*.

Closer examination of the unique specimen and its comparison with Indo-West-Pacific specimens of *J. japonica* in the collections of the Paris Museum revealed, however, that it belongs to a new species, described here as *J. vericeli* sp. nov. A second new species, also close to *J. japonica*, was recognised in the MUSORSTOM 6 collections, made in 1989 around New Caledonia, and was subsequently identified in the Taiwanese and Japanese material of "*J. japonica*" obtained through the kindness of Drs. T. Y. Chan, K. Baba, and K. I. Hayashi. It is described here as *J. chani* sp. nov.

J. japonica, *J. chani*, and *J. vericeli* form a group of three closely related species, referred to here as the *J. japonica* group. They can, however, be readily distinguished from each other by the spinulation of the distal article of the antennal peduncle, by the number of transversal striae on the abdominal tergites, and by the very distinct coloration patterns. The polynesian material of *J. longimanus* confirms

the presence of the species in this area, which was previously surmised from larval records (Johnson and Robertson, 1970). No significant differences were found between these specimens and the Indo-Pacific and West Atlantic specimens, thus confirming the worldwide distribution of *J. longimanus* already concluded by Chan *et al.* (1991).

Terminology

Abbreviations used in text are: BM, Natural History Museum, London; MNHN, Muséum national d'Histoire naturelle, Paris; NTOU, National Taiwan Ocean University, Taiwan; ORSTOM, Institut Français de Recherche Scientifique pour le Développement en Coopération; RMNH, National Natuurhistorisch Museum, Leiden; SMCB, Service Mixte de Contrôle Biologique des armées; SMF, Senckenberg Museum, Frankfurt; SMP, Sabiura Marine Park, Research Station, Japan; SUF, Shimonoseki University of Fisheries, Japan.

Measurements given in the text are of carapace length (c.l.), from the base of the rostral spine to the posterodorsal margin of the carapace, to within 0.1 mm; and body length (b.l.) from the tip of the supraorbital horns to distal end of the telson, to within 1 mm. c.w. stands for maximum carapace width.

The terminology used is derived from the original description of Miers (1882) and from the work of Gordon (1960); it is summarized in Fig. 1.

The antennal flagella are positioned laterally for the observation of the antennal peduncle; in this position the dorsal surface of the flattened distal segment is directed upward.

Following Gordon (1960), two distinct portions were recognized on the abdominal segment for the enumeration of the transverse striae: the anterior or articulate portion which disappears when the abdomen is fully extended; and the posterior part called the non-articulate portion. On somite 1 the two portions are separated by a deep depression; the stria lo-

cated just behind the anterior margin of the posterior part is considered as the first stria of the non-articulate portion. On somites 2 to 5, the articulate and non-articulate portions are continuous, separated only by a well marked stria; this stria, which does not disappear when the abdomen is fully extended, is counted as the first stria of the non-articulate portion.

Justitia Holthuis, 1946

Justitia Holthuis, 1946: 113, 115.

Palinurus (in part) H. Milne Edwards, 1837: 294.

Nupalirus Kubo, 1955: 185.

Justitia, Gordon, 1960: 296.

Justitia, Holthuis, 1991: 107.

Type species:

Palinurus longimanus H. Milne Edwards, 1837, by original designation.

Diagnosis:

Antennular peduncle slender, three-segmented terminated by two short, slightly unequal flagella. A well developed stridulating apparatus present, formed by the antennular somite and the basal segment of the antennal peduncle. Eyestalks overlapped by two strong supraorbital horns, dorsally serrated with 2 or 3 teeth. Anterior margin of carapace with a median rostral spine, with or without spines between the rostral spine and the supraorbital horns. A strong infraorbital spine present, with a much smaller spine a short distance behind. Carapace with heavy squamiform sculpturing, some of the scales ending in spines. Cervical groove well marked; a distinct lateral groove running backwards from the orbit to the cervical groove and a little beyond it. Abdominal segments each with several transverse striae, never with squamiform sculpturing. Abdominal pleura 2 to 5 ending in a strong sickle-like spine, directed obliquely backwards.

Sexual dimorphism:

The sexual dimorphism is well marked

within the genus and was first outlined by Monod and Postel (1968). However these authors examined only 3 females of *J. longimanus*, whereas females specimens of *J. longimanus*, *J. japonica*, and *J. chani* were available for the present study (*J. vericeli* is known only from the male holotype); the following secondary sexual characters were recognized in adult specimens.

Female fifth pereopod shorter than in male and chelate; this appendage not chelate in male and bearing a coxal tube. Male posterior margin of last thoracic sternite bearing a pair of median spines, reduced in female, and a lateral spine (simple or bifurcated), absent in female. Spinulation of posterior margin of abdominal sternites 1 to 6 well marked in male: a pair of acute submedian spines, a strong tooth or a moderate lateral tubercle on somite 1; a pair of acute and widely separated submedian spines on somites 2 to 5; and 5 spines on somite 6 (2 in front, alternating with 3 behind). This spinulation is absent or reduced to indistinct tubercles in female (but see remarks about juveniles under *J. japonica*). Male with pleopod I absent, but whip-shaped in the female. Male pleopods 2 to 5 simple, leaf-like. Female pleopods 2 to 5 with a large leaf-like exopodite and a bifurcated endopodite; outer extension of endopodite leaf-like on pleopod 2 but simple on pleopods 3–5; inner extension of endopodites 2 to 5 protracted into a styliform process.

A strong sexual dimorphism is observed in the male first pereopod of *J. longimanus*, and is described under that species. This character is not observed within the *japonica* group, except for a slight sexual dimorphism in *J. japonica*.

Key to the Species of the Genus *Justitia*

The colour patterns of the species are distinct, and very helpful in recognizing the three closely related species of the *J. japonica* group. These characters are included in the key, together with the morphological characters.

1. Dorsal surface of the abdomen (including telson) with 6 transversal red bands. Lateral surface of the carapace not divided into several areas by coloured lines or grooves.
Antennular peduncle similar in length to the antennal peduncle. Anterior margin of the carapace without spines between the rostral spine and the supraorbital horns. At most, a single postcervical spine at the angle between dorsum and side of the carapace. First pereopod short in both sexes, reaching at most half of the median antennal article
. 2 (*J. japonica* group species)
- Abdomen evenly orange-red in colour, without transversal bands. Lateral surface of carapace divided into 5–6 areas by colored lines or grooves.
Antennular peduncle long, exceeding the antennal peduncle by its distal article. Anterior margin of the carapace with several spines between the rostral spine and the supraorbital horns. Four pairs of postcervical spines. First pereopod long, with a marked sexual dimorphism: male P1 subchelate, usually exceeding the antennal peduncle by the propodus; female P1 simple, exceeding the antennal peduncle by only half the dactylus.
. *J. longimanus*
2. Red transverse bands of the abdomen located on the posterior margin of tergites 1 to 6; no red band on telson.
A dorsal spine present on the distal antennal segment, in front of the articular condyle of the posterior margin. Supraorbital horns usually with 2 dorsal teeth. Intermediate striae, usually interrupted and poorly defined, present between the main striae of abdominal segments.
. *J. chani* sp. nov.
- Red transverse bands of abdomen located on anterior margin of tergites 2 to 6 and on the anterior margin of telson; no red band on tergite 1.
Distal antennal segment without dorsal spine. Supraorbital horns usually with 3 dorsal teeth. Abdominal striae simple without intermediate, less marked, striae 3
3. Carapace without lateral coloured patches. Posterior groove and posterior margin of the carapace usually red.
Distal outer spine of distal antennal segment 1.5 to 4 times longer than the distal inner spine. Seven striae on the non-articulate portion of abdominal somites 3 to 5 *J. japonica*
- Two red patches on the lateral surface of the carapace. A long, transversal scale in front of the posterior groove of the carapace is red, but the posterior groove and the posterior margin of the carapace are not coloured.
Distal outer and inner spines of the distal antennal segment of similar length. Five striae on the non-articulate portion of abdominal somites 3 to 5.
. *J. vericeli* sp. nov.

Species of the *J. japonica* group

Justitia japonica, *J. chani*, and *J. vericeli* have the following characters in common:

Whole antennular peduncle comparable in size to the antennal peduncle, either slightly shorter or longer. Rostral spine minute, triangular, not reaching anterior margin of ocular segment. Anterior margin of carapace without spines between rostral spine and supraorbital horns. Supraorbital horn with 2–3 upper teeth and an isolated basal spine; at most a single poorly defined gastric lateral spine may be present just behind basal spine of supraorbital horn. One to 4 pairs of gastric median spines. Cervical groove narrow, with a single postcervical spine at the angle between dorsum and lateral side of carapace. Cardiac area regularly convex; dorsal scales on posterior part of carapace more or less elongated, as illustrated in plate 2a–c. Posterolateral angle of carapace rounded. Pleurite of first abdominal segment short, not pointed. Median longitudinal tubercles of thoracic sternites, elongated but blunt; sternal area between the coxae 4–5 tuberculate, especially in large specimens.

No spine on the male coxal tube (P5). Male lateral spine on posterior margin of last thoracic sternite bifurcated. A strong male lateral tooth, simple, with a small inner process or slightly bifurcated, present on ventral margin of first abdominal segment. Endopodite of maxilliped III only slightly longer than flagella of exopodite, exceeding anterior margin of epistome only by distal segment. Pereiopods 1 to 5 thick and short; sexual dimorphism of male P1 either absent or weak; P2 reaching furthest forwards than others when fully extended, at most as far as the anterior margin of second antennal segment.

Justitia chani sp. nov.
(Fig. 2a–e; pl. 1a, 2a)

Justitia japonica:

- Matsuzawa, 1977: *Pro parte*, pl. 73-Fig. 3.
- Baba, 1986: 154, 155, 282, Fig. 105.
- Holthuis, 1991: 108, *pro parte*, Fig. 203.
- Chan and Yu, 1993: 115, *pro parte*, bottom photograph, small specimen. [Not *Nupalirus japonicus* Kubo, 1955].

Etymology:

Named in honour of T. Y. Chan, of the National Taiwan Ocean University.

Type material:

One male, c.l. 34.4 mm, b.l. 110 mm, from New Caledonia, Loyalty islands, 20°47, 32' S – 167°04, 6' E, 340 m, is the holotype (MNHN Pa 1411). The other specimens examined are the paratypes.

Material examined:

Japan – Keisuke Matsuzawa leg., off Muroto city, Kōchi Prefecture, net for *Ibacus ciliatus*, 150–200 m, 14.03.1970, 1♂ c.l. 44 mm, b.l. 134 mm (SUF without Cat No.). – coll. O. Tabeta, Kyushu-Palau ridge, 26°43.8' N – 135°20' E, 320 m, 30.01.1978, 1♂ c.l. 39.5 mm, b.l. 126 mm, 1♀ c.l. 48 mm, b.l. 155 mm (SUF, Cat No. 530-2-977).

Taiwan, coll. T. Y. Chan, Tai-Tung, Eastern Taiwan, January 1992, 1♂ c.l. 37.5 mm, b.l. 122

mm (NTOU 1992-01). – *Ibid.* February 1992, 1♂ c.l. 41 mm, b.l. 129 mm (NTOU 1992-02).

New Caledonia, coll. ORSTOM (B. Richer de Forges), MUSORSTOM 6 cruise, st. DW 392, Loyalty islands, 20°47, 32' S – 167°04, 6' E, dredge, 340 m, 13.02.1989, 1♂ c.l. 34.4 mm, b.l. 110 mm (Holotype MNHN Pa 1411).

One specimen, not examined, was also identified as this new species by T. Y. Chan in the collections of the RMNH (registeren as No. 31996).

Description:

Whole antennular peduncle slightly longer than the antennal peduncle. A single spine, not bifurcated, on the anterior margin of the basal antennal segment, above the stridulating process. Median antennal segment with 2 oblique rows of dorsal spines; outer row with 3–5 (usually 4) spines, inner row with 3 (rarely 4) spines; 2 spines of similar size at the distal angles of anterior margin; only on the largest specimen (♀ c.l. 48 mm, Japan) and to a lesser extent on the male holotype (Fig. 2a), a third spine is observed between the inner distal spine and the articular condyle of the anterior margin. Distal antennal segment flattened with a small dorsal spine in front of the articular condyle of the posterior margin; inner lateral margin armed with 3–4 spines; distal angles of anterior margin protruded into 2 spines, similar in size.

Carapace not very much elongated, mean c.l./c.w. 1.45 (1.41–1.50). Supraorbital horns usually armed with 2 (rarely 3) teeth on upper edge and one basal spine. Internal and external faces of horns squamous; external face lacking median longitudinal groove. Postrostral carina bearing 2 main spines, occasionally with additional intercalated spinules. One or two pairs of weak gastric median spines just behind the last postrostral spine; a third stronger pair of more widely separated spines situated between the bases of the supraorbital horns. Hepatic spines usually arranged in one main row of 3–5 longitudinal spines, an upper and parallel row of smaller, scale-like spines, and a single acute spine underneath, just behind the orbit.

The arrangement of the transversal striae on the abdominal segments is illustrated in Fig. 2b, and compared with the other species of the genus in Table 1. Intermediate striae are present between the main transversal striae of the abdomen. Somite 1 with 2–3 striae on articulate portion, and 3 striae on the non-articulate portion, the third weaker, often medially interrupted, and sometimes followed by the lateral outline of a fourth stria. Two articular striae on somite 2; 1–2 on somite 3; 1 on somite 4; and none, or an interrupted faint stria, on somite 5. Non-articulate portion of somites 2 to 4 with 6 main striae and 5 intermediate, faint striae disposed as illustrated on Fig. 2b. Non-articulate portion of somite 5 with only 5 main, and 4–5 intermediate striae. Although the intermediate striae are usually poorly defined, they are almost as strong as the main striae on two specimens (♂ c.l. 41 mm, Taiwan and ♂ c.l. 44 mm, Japan).

Posterolateral angle of somite 6 bearing a short spine never observed in the other two species of the group (Fig. 2c).

Male lateral spines on the posterior margin of thoracic sternite 8 flattened, with a large lamelliferous base moderately bifurcated into an acute and a blunt spine (Fig. 2d). Male lateral tooth of posterior margin of sternite 1 either simple or with a small inner process (Fig. 2e).

Sexual dimorphism absent on male first pereopod; ventral edges of merus and propodus lined with setae, without denticulations; ventral surface of propodus lacking median spine on the distal one third. Outer surface of the carpus of pereopods 1 to 5 with a few faint squamae, indistinct on the last pereopods.

Coloration:

Body yellowish-orange; the following parts are red: the squamae of the antennal peduncle; the lateral ridges of the antennular plate (*pars stridens*); the postrostral spines; the squamae of the gastric region; a row of 3–4 cardiac squamae just behind the cervical groove; and the posterior margin of the carapace. Abdomen with 6 transversal red bands located on the posterior margin of somites 1 to 6; the red

bands on somites 1 to 5 are laterally extended, although slightly attenuated, on the anterior margin of pleurites 2 to 6. The anterior margin of the telson is not coloured.

Dimensions:

c.l. 34.4–48 mm; b.l. 110–115 mm.

Distribution:

West Pacific, from Japan, Taiwan to New Caledonia, between 150–340 m.

Remarks:

Justitia chani was previously confused with *J. japonica*, and was only recognized recently by Chan and Yu (1993) in their work on Taiwanese lobsters. In a collection of *J. japonica*, they mentioned two forms: a larger one representing the real *J. japonica*, and a smaller one that they attributed to a new species, which is described in this work as *J. chani*.

Justitia chani and *J. japonica* colonized similar deep-water coral grounds. Although very close to each other, they can be easily recognised by the coloration patterns and by the different development of the distal outer spine of the distal antennal segment. Moreover, *J. chani* is smaller than *J. japonica*: the biggest specimen has c.l. 48 mm, whereas c.l. greater than 60 mm are common in *J. japonica*.

Justitia japonica (Kubo, 1955) (Fig. 2c'; 3a–j; pl. 1b, 2b)

Nupalirus japonicus Kubo, 1955: 185, pl. 12–13.

Justitia japonica:

- Gordon, 1960: 296, Fig. 1–6.
- Johnson and Robertson, 1970: 288, Fig. 14–24.
- Crosnier and Jouannic, 1973: 13, pl. 4-Fig. 4.
- Crosnier, 1977: 237, Fig. 5.
- Miyake, 1975: 109.
- Matsuzawa, 1977: *pro parte*, p. 73-Fig. 2.

- Miyake, 1982: 79, pl. 27.
- Holthuis, 1984: unnumbered page, PALIN Just 1 (*verso*).
- Holthuis, 1991: 108, text only.
- Cnan and Yu, 1993: 115, *pro parter*: upper photograph, large specimen.

Not *Justitia japonica* = *J. chani* sp. nov.:

- Matsuzawa, 1977: pl. 73-Fig. 3.
- Baba, 1986: 154, 155, 282, Fig. 105.
- Holthuis, 1991: Fig. 203.
- Chan and Yu, 1993: 115 (lower photograph, small specimen).

Not *Justitia japonica* = *J. vericeli* sp. nov.:

- Poupin et. al., 1990: 16.

Type material:

One male, c.l. 83.6 mm, b.l. 268 mm, deposited in the Biological Museum of Kôchi Prefecture women's University, Japan. Type locality: about 8 miles off Shimokawaguchi (Shimizu city), Kôchi pref., Japan.

Material examined:

- Japan, F. Iwase leg., off Kushimoto, Wakayama Prefecture, lobster gill net, 29.10.1991: 1♂, c.l. 40 mm, b.l. 121 mm (SMP 466).
- K. Matsuzawa leg., off Muroto city, Kôchi Prefecture, net for *Ibacus ciliatus*, 200 m, 14.03.1970, 1♀ c.l. 61 mm, b.l. 192 mm (SUF without number).
- K. Matsuzawa leg., Shikoku, Kôchi-Ken, Muroto-shi, Mitsu, 33°16,7' N–134°10,4' E, 150 m, 14.03.1970, 1♂ c.l. 82 mm, b.l. 252 mm (SMF 9150).
- Taiwan, coll. T. Y. Chan, fish market, Tai-Shi, Ilan County, North Eastern Taiwan, gill net, 140 m, 5.07.1991, 1♂ c.l. 76 mm, b.l. 241 mm (NTOU 1991-07-05).
- New Caledonia, F.R.V. *Alis*, coll. ORSTOM (B. Richer de Forges), MUSORSTOM 6 cruise, st. DW 474, Loyalty islands, 21°08,8' S–167°55,5' E, dredge, 260 m, 22.02.1989, 1♂ c.l. 47 mm, b.l. 149 mm (MNHN Pa 1407).
- BATHUS 1 cruise, st. CP 712, 21°44,3' S–166°35,3' E, trawl, 210 m, 19.03.1993, 1♂ c.l. 16.4 mm, b.l. 50 mm, 1 juv. c.l. 9.4 mm, b.l. 29 mm (MNHN Pa 1412).

Chesterfields islands, coll. ORSTOM (A. Intès), long island channel, 20°58' S–158°18' E, 160 m, 15.08.1978, 1♂ c.l. 71 mm, b.l. 227 mm (MNHN Pa 1408).

La Réunion, coll. P. Guézé, Le Port, trap, 200–340 m, March 1973, 1♂ ov. c.l. 65.6 mm, b.l. 215 mm (MNHN, Pa 828).

Madagascar, coll. ORSTOM (A. Crosnier), st. 53, North West of Majunga, 15°21,7' S–46°12,6' E, trawl, 90–130 m, 8.11.1972, 1♂ c.l. 23 mm, b.l. 73 mm (MNHN Pa 1409).

Mauritius, 1889, without any precision, 1♂ c.l. 56 mm, b.l. 175 mm (BM 1889.9.6.1).

Description:

Antennular peduncle equal to or slightly shorter than the antennal peduncle, especially in the largest specimens. Dorsal spine on the anterior margin of the basal antennal segment often bifurcated with a main spine and a smaller, secondary, inner spine, sometimes blunt or missing. Dorsal surface of median antennal peduncle armed with 3–4 spines: an inner oblique row of 2 spines and either an outer parallel row of 2 spines or a single outer posterior spine; spine of the anterior margin, between the articular condyle and the distal inner spine, stronger than that in *J. chani*, only slightly smaller than the distal inner spine. Dorsal surface of distal antennal segment unarmed; inner lateral edge usually with 4 spines (sometimes 3); large depressed spine of distal outer angle 1.5–2 times as long as the distal inner spine in juveniles (c.l. \leq 23 mm), and up to 4 times as long as this spine in the adults.

Carapace elongated, mean c.l./c.w. 1.55 (1.44–1.64). Upper edge of supraorbital horns with 3 teeth (one tooth missing unilaterally on two adults specimens, and third tooth is reduced or even absent in the smallest specimens) and a basal spine; a single gastric lateral spine sometimes present just behind the basal spine of the supraorbital horn. Internal face of horns squamous on the proximal two thirds only; external face with a median longitudinal groove on the proximal two thirds, this groove being lined with squamae. Postrostral carina bearing 3 spines of similar size (4 on the

small ♂ c.l. 16.4 mm). Gastric median spines arranged in 1–4 pairs: 1–2 pairs of small spines just behind the third postrostral spine; 1 median pair of more widely separated spines, between the bases of the supraorbital horns; and 1 posterior pair of spines between the median pair and the cervical groove (2 anterior and last posterior pairs of spines sometimes reduced to tuberculated spines). A median, longitudinal row of 4–5 (rarely 6) hepatic spines of unequal size, the penultimate posterior one being the strongest; 4–7 spines above the anterior part of this row and 1–3 (usually 2) small spines situated underneath, behind the orbit. Above the postcervical spine of the angle between dorsum and side, 1–2 squamae of the posterior margin of the cervical groove are sometimes more or less spinulose.

Articulate portions of abdominal somites with: 2–3 striae, sometimes discontinuous, on somite 1; 1–2 striae on somite 2; 1 stria, and sometimes a poorly defined second stria on somites 3 and 4; none on somite 5. Non-articulate portions with 3 striae on somite 1; 6 striae on somite 2; and 7 striae on somites 3 to 5 (the sixth stria is not extended laterally, and the posterior stria of somite 5 is sometimes weak and discontinuous). No intermediate striae present between the main striae as observed in *J. chani*.

Male lateral spine on posterior margin of thoracic sternite 8 bifurcated into 2 long, well separated spines with a limited common base (Fig. 3c). Male lateral tooth of posterior margin of sternite 1 usually simple (Fig. 3d), the small inner process common in *J. chani* only being observed on one specimen (♂ c.l. 76 mm, Taiwan).

Ventral denticulation of first pereopod varying according to size and sex. In the largest males (c.l. >60 mm), ventral edges of the merus strongly denticulate; ventral inner edge of carpus with 2–5 denticles; outer edge and proximal portion of inner edge of propodus, denticulate; a strong median denticle situated on the distal third of the ventral surface of the propodus, followed by a line of smaller denticles, decreasing in size posteriorly. In females and small male specimens, ventral

denticulation of first pereopod reduced or even almost absent; female median ventral denticulation of the propodus observed only on the largest specimen (♀ 65.6 mm, La Réunion), and limited to a single median denticle, without subsequent smaller denticles (Fig. 3f).

Outer uropods of adults remarkably elongated with a corneous outer margin; distal angle sharper than in the other two related species.

Coloration:

General coloration orange-red. squamae of antennal peduncle and lateral edge of antennular plate red. External face of supraorbital horns red between median longitudinal groove and upper edge; upper edge red only in front of the basal spine. Coloration of carapace more pronounced dorsally than on lateral faces. Rostral spine red; coloration of cardiac area sometimes more pronounced; posterior groove and posterior margin of carapace red. No colour patches on lateral surface of carapace. Abdomen with 6 transversal red bands: 5 on the first stria of the non-articulate portion of somites 2 to 6, extended laterally on the anterior margin of the corresponding pleurites, and 1 on the anterior margin of the telson. First abdominal segment without red band.

Dimensions:

c.l. 9.4–83.6 mm; b.l. 29–268 mm.

Distribution:

Indo-West-Pacific: Japan, Taiwan, New Caledonia, Chesterfields islands, Mauritius, La Réunion, Madagascar; between 90–340 m.

Remarks:

The sexual characters of the adults, mentioned under the genus, can be supplemented by the following observations made on the three smallest specimens (c.l. ≤ 23 mm). In these three specimens, the ventral spines

of the posterior margin of the sternite 8, and the spines of the strongly calcified sternal parts of abdominal somites 1 to 6 are always long and acute; in particular these spines are not reduced to small tubercles on the ♀ c.l. 23 mm (Madagascar) as observed on the adult females. For this young female, the first whip-shaped pleopod is already present, as are the bifurcated endopodites on pleopods 2 to 5, but the pincer of the fifth pereopod is not yet developed, the distal extension of the propodus being too short to form the lower finger observed on the adult females. The first pleopod is absent on the ♂ c.l. 16.4 mm (New Caledonia), and P12 to P15 lack the bifurcated endopodite; however, on the fifth pereopod the coxal tube is missing. In the juvenile c.l. 9.4 mm (New Caledonia) neither pincer nor coxal tube are seen on P5, but the bifurcated endopodites are present on P12 to P15 which indicate that this specimen is probably a young female.

Justitia japonica was previously thought to be a rare species. However Sekiguchi and Okubo (1986), after compiling available information scattered among a variety of papers published in Japan, mentioned more than 200 specimens caught between 1973 and 1985 in Japanese waters. As the two species were previously confused, these data probably also concern *J. chani*.

Lutjanidae fishes are among the predators of *J. japonica* since we have obtained remains of one *J. japonica* from the stomach of an *Etelis* sp. (coll. ORSTOM, P. Fourmanoir, New Caledonia, 1♀ c.l. 46 mm).

The size of *J. japonica* is the largest of the genus and considerably larger than the other two closely related species *J. chani* and *J. vericeli*.

Justitia vericeli sp. nov.
(Fig. 4a–d; pl. 1c, 2c)

Justitia japonica:

Poupin *et al.*, 1990: 16. [Not *Nupalirus japonicus* Kubo, 1955].

Etymology:

Dedicated to General P. Véricel, head of the Direction des Centres d'Expérimentations Nucléaires, who has always supported the investigations on deep sea crustacea fauna in French Polynesia.

Type Material:

Holotype male, c.l. 57.3 mm, b.l. 178 mm (MNHN Pa 1410). Coll. SMCB (J. Poupin), F.R.V. *Marara*, French Polynesia, Tuamotu archipelago, st. 158, Mururoa, 21°48.5' S, 138°47.7' W, 21.06.1989, trap 320 m.

Material examined:

Holotype male.

Two other specimens, not retrieved, were also mentioned on the fishing log of the F.R.V. *Marara*. Colour pictures of this lost material show that it is undoubtedly referable to *J. vericeli*. The locality details for this material from Tuamotu are: Tenarunga, SMCB st. 201, 21°21' S, 136°32' W, 19.11.1989, 160 m; and Makemo, SMCB st. 308, 16°34.5' S, 143°39.9' W, 07.10.1990, 280 m.

Description:

Dorsal spine on anterior margin of basal antennal segment bifurcated, with a strong main spine and a smaller inner spine. Median antennal segment with 2 oblique rows of dorsal spines; outer row with 4 spines of unequal size: anteriormost spine almost reduced to a squamae, second well-marked, third small, and posteriormost spine being the strongest; inner row with 2 main spines and a much smaller proximal spine; dorsal spine of anterior margin almost as strong as spine of distal inner angle, bifurcated on left only (Fig. 4a); distal outer spine strong, flattened; ventral outer longitudinal edge with 3 distinct spines (reduced to squamae in the other two related species). Distal antennal segment with 6 spines on its inner lateral margin, the anteriormost being the biggest; distal spines of inner and outer angles similar in size.

Carapace as elongated as in *J. japonica* (c.l./c.w. 1.59). Supraorbital horns with 3 upper teeth on the right and only 2 on left;

internal and external faces smooth without squamiform sculpture; median longitudinal groove of external face marked only on the proximal half, not lined with squamae. Rostral spine more acute than in the other two related species, with base slightly narrower. Postrostral carina with a single marked median spine and 2 minute anterior and posterior spines. Only one pair of gastric median spines located between the bases of the supraorbital horns. A median longitudinal line of 4 unequal hepatic spines: anteriormost small and acute, second small and bifurcated, third slightly stronger than the posterior most one; 2 spines present above the anterior part of this line, and a single spine underneath, behind the orbit. Two or 3 spiniferous squamae on the posterior margin of the cervical groove, above the postcervical spine of the angle between dorsum and side. Behind the cervical groove, the dorsal scales of the carapace are lengthened crosswise in a very distinct pattern, illustrated on pl. 2c. Posterior groove of carapace deep, with a small median tubercle.

Abdominal striae simple, without intermediate, less marked, striae. A single stria on articulate portion of somites 1 and 2, none on articular portion of somites 3 to 5. Non-articulate portion of somite 1 with 3 striae, the third being defined only laterally; 5 striae on the non-articulate portion of somites 2 to 5: second stria with a small dorsolateral interruption, third without lateral extension, and fifth with a small median gap; lateral outlines of a sixth stria are present behind the posterior stria, on the second somite only.

Indentation of bifurcated spine on posterior margin of thoracic sternite 8 small, the two terminal spines being shorter than in *J. japonica* (Fig. 4c). Lateral tooth of first abdominal somite very thick, slightly bifurcated at tip (Fig. 4d).

First pereopod with denticulations on ventral edges of the merus; 2–3 proximal denticules on inner edge of carpus; lateral and median ventral denticulation of propodus absent on this nevertheless large male. In comparison, the median ventral denticulation of the propodus is fully developed on the

J. japonica male of similar size from Mauritius (♂ c.l. 56 mm – cf. Gordon 1960: 300, Fig. 6).

Coloration:

General coloration white. Antennal squamae and lateral ridges of the antennular somite orange. Basal part of supraorbital horn, rostral spine, and main postrostral spine, red. Tip of squamae on the anterior portion of the carapace slightly orange. Dorsal squamae just behind the cervical groove red. A long transversal squamae, situated in front of the posterior groove of the carapace is red, but the posterior groove and the posterior margin are not coloured. Two patches on lateral surface of the carapace: one located at the crossing of the cervical and lateral grooves, the other above the lateral gutter at midlength. Abdomen striped with 6 red bands disposed as in *J. japonica*: 5 on anterior margin of somites 2 to 6, extending to anterior margins of corresponding pleurites; and 1 on the anterior margin of the telson. First abdominal segment without red band; the anterior margin, however, is slightly orange on the sides.

Distribution:

French Polynesia, Tuamotu: Makemo, Mururoa, Tenarunga, 160–320 m.

Remarks:

In French Polynesia *Justitia vericeli* is trapped on deep, hard coral ground, together with *J. longimanus*. It seems less common than the latter species since from a fishing effort of 2,000 trap set between 50 and 400 m, only 3 specimens of *J. vericeli* were caught, compared with almost 30 specimens of *J. longimanus*. *J. japonica* and *J. chani*, which were never trapped despite this intensive sampling, could be absent from French Polynesia.

Justitia longimanus (H. Milne Edwards, 1837)
(Fig. 3e'; pl. 1d, 2d)

The references cited here are limited to

important and recent works. Additional, older references are given by Monod and Postel (1968: 178).

Palinurus longimanus H. Milne Edwards, 1837: 294.

- Ortmann, 1891: 20.
- Bouvier, 1925: 442, pl. 8-Fig. 1.

***Justitia longimana*:**

- Holthuis, 1946: 115.
- Edmonson, 1951: 194, Fig. 5-6.
- Kubo, 1955: 185.
- George and Main, 1967: 811.
- Monod and Postel, 1968: 178, Fig. 1-9, pl. 1.
- Crosnier, 1977: 237, Fig. 5d-f.
- Sekiguchi and Okubo, 1986: 19.
- Poupin *et al.*, 1990: 16.

***Justitia longimanus*:**

- Tinker, 1965: 34, Fig. 5.
- Manning, 1978: PALIN Just 1, unnumbered pages and figures.
- Chan *et al.*, 1991: 251, pl. 1c-d.
- Holthuis, 1991: 109, Fig. 205.
- Chan and Yu, 1993: 112, unnumbered photographs.
- Human, 1993: 157, unnumbered photographs.
- Paulmier, 1993: 21, pl. 23, Fig. 1-3.

***Justitia longimanus longimanus*:**

- Johnson and Robertson, 1970: 291, Table 2.

***Palinurus longimanus mauritanus*:**

- Miers, 1882: 540, pl. 36-Fig. 1.
- Bouvier, 1915: 187 [10].

***Justitia longimana mauritiana*:**

- Holthuis, 1946: 115.
- Gordon, 1960: 301, Fig. 7-9.
- Sekiguchi and Okubo, 1986: 19.

***Justitia mauritiana*:**

- George and Main, 1967: 811.
- Holthuis, 1984: PALIN Just 1, unnumbered pages and figures; 1991: 110, Fig. 207.

***Justitia longimanus mauritiana*:**

- Johnson and Robertson, 1970: 286, Fig. 1-13, Table 2.

Type material:

Holotype male, c.l. 33 mm, b.l. 100 mm (MNH Pa 421). Type locality, Antilles, without precision.

Material examined:

Antilles - without precision, 1♂ c.l. 33 mm, b.l. 100 mm, (Holotype, MNHN Pa 421).
 - Martinique, coll. Chaffanjon 1868-1884, 2♂ c.l. 42 and 45.5 mm, b.l. 135 and 155 mm, (MNHN Pa 98), 2♂ c.l. 31 and 43 mm, b.l. 97 and 135 mm, (MNHN Pa 96); coll. Chaffanjon 102-1883, 1♂ c.l. 40.5 mm, b.l. 130 mm; (MNHN Pa 95); coll. Bellanger 107-1859, 1♂ c.l. 44, b.l. 135 mm, (MNHN Pa 94); coll. A. Milne Edwards 1903, 1♂ c.l. 47.5 mm, b.l. 145 mm (MNHN Pa 97).

Society islands, Bora-Bora, coll. SMCB (J. Poupin), F.R.V. *Marara*, st. 269, 16°28' S - 151°47.2' W, trap, 90 m, 23.06.1990, 2♂ c.l. 38.5 and 41.2 mm, b.l. 125 and 130 mm, (MNHN Pa 1398). - Tahiti, coll. SMCB (B. Richer de Forges), F.R.V. *Tainui*, trap, 11.10.1978, 1♀ c.l. 45 mm, b.l. 138 mm, (MNHN Pa 831); coll. ORSTOM (P. Laboute), scuba diving, 62 m, 28.03.1985, 1♂ c.l. 39.6 mm, b.l. 126 mm, (MNHN Pa 1397).

Tuamotu, Tenarunga coll. SMCB (J. Poupin), F.R.V. *Marara*, st. 201, 21°21' S - 136°32' W, trap, 160 m, 19.11.1989, 2♀ ov., c.l. 38.1 and 38.5 mm, b.l. 124 and 128 mm, (MNHN Pa 1400).

Tubai islands, Rurutu, coll. SMCB (J. Poupin), F.R.V. *Marara*, st. 423, 22°29.3' S - 151°21.6' W, trap, 80 m, 10.08.1991, 3♂ c.l. 364., 46.6 and 55 mm, b.l. 118, 152 and 170 mm, 2♀ ov. c.l. 30 and 41.2 mm, b.l. 94 and 139 mm, (MNHN Pa 1399).

Japan, Hachijou island, Izu Islands, Tokyo, 1♂ c.l. 52 mm, b.l. 180 mm (SUF without number).

Taiwan, Tai-Tung, Eastern Taiwan, May 1990, gill net, 60 m, 1♂ c.l. 46 mm, b.l. 149 mm (NTOU 1990-05).

Mauritius, coll. P. Carié, Port Louis, 1♂ c.l. 51 mm, b.l. 166 mm, (MNHN Pa 99).

La Réunion, coll. P. Guézé, Pointe des galets, 60 to 80 m, January 1965, 1♂ ov., c.l. 39 mm, b.l. 129 mm, (MNHN Pa 91); coll. P. Guézé, Possession bay, net, 80–100 m, November 1965, 2♂ c.l. 49 and 51.5 mm, b.l. 162 and 166 mm, (MNHN Pa 100), 1♂ c.l. 49 mm, b.l. 158 mm, (MNHN Pa 93), 1♀ ov. c.l. 39.5 mm, b.l. 134 mm, (MNHN Pa 92); coll. P. Guézé, Le Port, trap and net, 100–150 m, December 1972, 1♂ c.l. 38 mm, b.l. 122 mm, 1♀ ov. c.l. 47 mm, b.l. 163 mm, (MNHN Pa 829), 1♂ c.l. 45 mm, b.l. 139 mm, (MNHN Pa 830). # No locality indicated, probably Japan, 1♂ c.l. 46 mm, b.l. 145 mm, (SMF 8744).

Description:

Antennular peduncle long, exceeding antennal peduncle by half the median segment. Carapace rather large, mean c.l./c.w. 1.38 (1.21–1.46). Rostral spine long, acute, exceeding the ocular segment. Anterior margin of carapace with 1–5 spines between rostral spine and supraorbital horns. Supraorbital horn with 2 teeth on upper edge, followed by a longitudinal series of 3 gastric lateral spines. Two postrostral spines present (anterior one being the strongest), sometimes with a third faint anterior spine. Pair of gastric median spines absent. Cervical groove very large, with 2 dorsal and 1 lateral pair of postcervical spines; 1–3 additional postcervical spinules sometimes present laterally. Cardiac area flat, with tuberculate squamae. A shallow groove is situated between the main (deeper) posterior groove and the posterior margin of the carapace. Two hepatic spines parallel and above the lateral groove, the anterior one being the strongest, and usually a third hepatic spine (occasionally 2 or 3) in front of, and above, the strong anterior spine. Lateral margin of the carapace indented at the junction with the cervical groove. Posterolateral angle of the carapace right-angled, not rounded. Pleurite of first abdominal segment pointed. Articulate portion of abdominal segments without striae. Non-articulate portion of somite 1 with 2 striae, the posterior one being interrupted

medially; 5 striae on the non-articulate portion of somite 2, the third not extended laterally and the last interrupted medially; 4 striae on the non-articulate portion of somites 3 to 5, the second without a lateral extension and the posteriormost interrupted medially. On the third somite there is the lateral outline of a supplementary stria in front of the first one. Median longitudinal tubercles on the thoracic sternites pointed, not elongated; sternal area between coxae of pereopods 4–5 not tuberculate, even on the largest specimens. A spine present on male coxal tube (P5). Male lateral spine on the posterior margin of the last thoracic sternite simple, not bifurcated. The strong male lateral tooth on the ventral margin of the first abdominal segment, observed in the species of the *japonica* group, is limited to a blunt tubercle. Endopodite of Pmx3 far longer than the flagella of the expodite (Fig. 3e'), exceeding the anterior margin of the epistome by the propodus. Pereiopods 1 to 5 long, thinner than those of the *japonica* group. Ventral edges of the merus of the first pereopod not denticulated; male P1 very long, reaching beyond the antennal peduncle by the propodus (or even the carpus, when fully developed), subchelate, the propodus ending in a short projection against which the base of the curved dactylus articulates; female P1 shorter, not subchelate, exceeding the antennal peduncle by only half the dactylus. Apart from male P1, P2, exceeding the antennal peduncle by its dactylus in both sexes.

Coloration:

General coloration red. Antennular flagella orange, with white transversal bands and patches. Antennal flagella alternated with red and orange. *Pars stridens* of the antennular plate red only on its proximal portion. Spines of the antennal peduncle dark red. Supraorbital horns orange, striped with white patches. Spines of the carapace dark red. Cervical groove reddish-purple, with white interruptions. On the lateral surface of the carapace, 5–6 areas are defined by a network of reddish-purple lines located on the following places: postorbital ridge; anterolateral margin of the

carapace; lateral and cervical grooves; and lateral gutter. Abdomen orange-red with short, longitudinal, white patches mainly on the posterior margins of each segment. Merus of male first pereiopod red on its inner surface, except for the distal portion, white/orange on the outer surface, with a single red patch on the distal half; carpus white/orange slightly colored only on the anterior margin; propodus red, except for a median white/orange area. Dactylus white, red only at its base. Female P1 orange, alternating with white. Posterior pereiopods orange, scattered with white spots. Anterior margin of the epistome with three red spines. Mandible orange. Thoracic sternites orange on lateral margins, median longitudinal tubercles, and spines of the last sternite. Calcified margins of abdominal segment orange. Non-calcified part of tail-fan and pleopods red, with white margins.

Dimensions:

c.l. 30–55 mm, b.l. 94–170 mm. A very large specimen, c.l. 70 mm, is mentioned in the collection of the Smithsonian Institution of Washington (Chan *et al.*, 1991: 253).

Distribution:

Western Atlantic: French Antilles (Martinique and Guadeloupe); Bermuda; Cuba; Santa Cruz; Dominica; Florida keys; Jamaica. Indo-Pacific: Madagascar; La Réunion; Mauritius; Taiwan; Japan; Hawaii; French Polynesia. Between 23–454 m, mostly between 50–150 m.

Remarks:

The ratio of male P1 total length to c.l. (LP1/c.l.) is between 2.53 to 3.81 within the 31–55 mm c.l. range, without evidence of allometric growth of the cheliped. However, for two unusual specimens, c.l. 36.4 and 38 mm, P1 is not fully developed, the ratios LP1/c.l. being only 2.05 and 2.14. In these cases the chelipeds could be regenerates; it is also possible that the development of male P1 is linked to a molt of puberty occurring at a somewhat different size for each individual. More observations on small males would be

useful for studying this question.

In the past and even recently the Indo-Pacific material has sometimes been separated from the West Atlantic material of *J. longimanus* as a separate subspecies or species, with the name *mauritiana*. However, we did not find any convincing characters to separate the two forms; this difficulty as already been stated by several authors (Miers, 1882, Bouvier, 1915, Holthuis, 1946, Edmonson, 1951, Monod and Postel, 1968, and Chan *et al.*, 1991).

The greatest variations of the spinulation patterns are observed within the polynesian material. These variations concerned: the number and disposition of the spines of the anterior margin of the carapace, on each side of the rostral spine; the presence of additional postcervical lateral spines; 1–2 supplementary hepatic spines near the anteriormost hepatic spine; 1–3 additional acute spines on the margin of male abdominal sternite 1, between the median pair of spines and the lateral tubercule; and the number of tubercles on the dorsal edges of the merus (2–5), and propodus (9–13), of male first pereiopod. These variations, even observed sometimes between specimens caught inside the same trap, can hardly be considered specific in nature and encompass those observed between the Atlantic and Indo-Pacific specimens.

Slight variation of the striation of the abdominal segment is observed for the Taiwanese and Japanese specimens. In this material there is an additional anterior stria on somites 3 to 5, which thus have 5 striae rather than 4. On the other specimens this stria is only perceptible laterally on the third somite. This particularity has already been mentioned in Chan *et al.* (1991); we agree with the conclusions of these authors that it represents only a geographical variation.

Acknowledgements:

We wish to thank the head of SMCB, and the marine staff aboard the F.R.V. *Marara*, for providing the abundant polynesian material. The material from New Caledonia and surrounding areas was collected during the

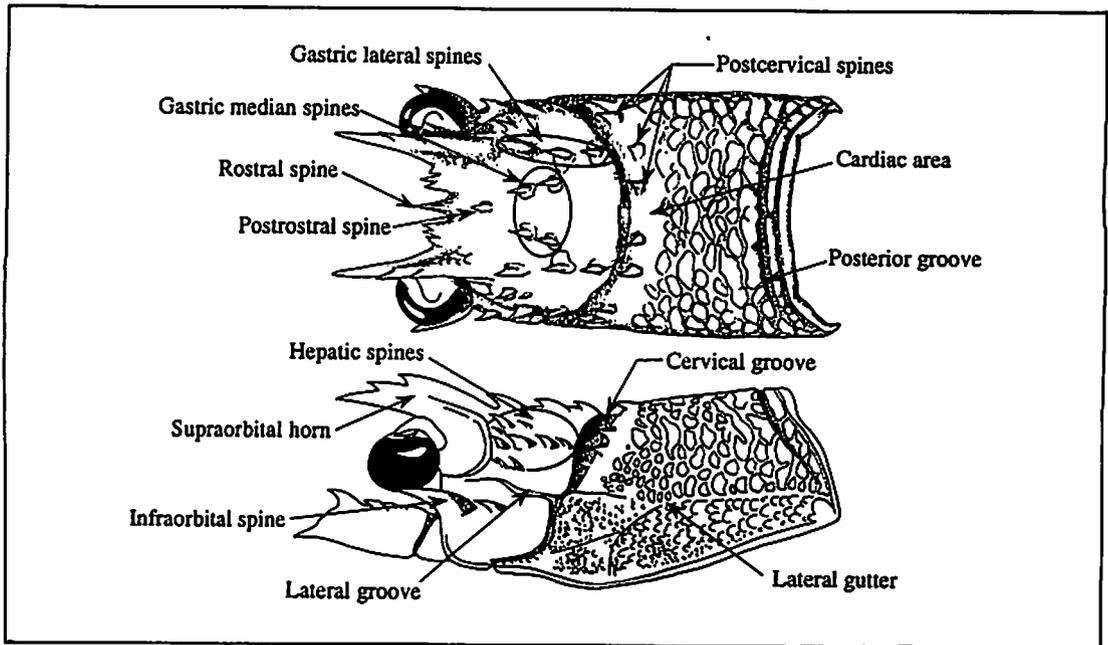


Fig. 1. Schematic drawings of the carapace of *Justitia*, showing the nomenclature used in this work.

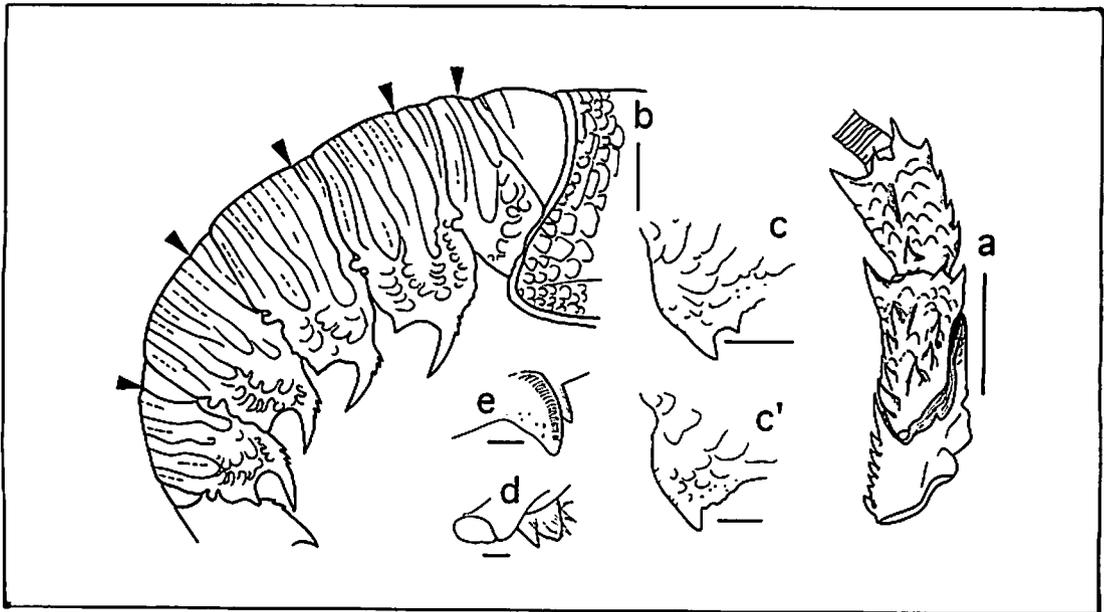


Fig. 2. *Justitia chani* sp. nov. (except for c'):

Holotype ♂ c.l. 34.4 mm, New Caledonia — a. left antennal peduncle; b. lateral face of the abdomen (weak, intermediate striae, drawn in dashed line, and arrows indicating the first stria of the non-articulate portion of segments 1 to 5; d. left coxal tube (P5), with the lateral spine of the posterior margin of thoracic sternite 8; e. right lateral tooth of the posterior margin of abdominal sternite 1.

♂ c.l. 44 mm Japan. c. left pleurite of abdominal segment 6; c', same formation in *J. japonica* for comparison (♂ c.l. 71 mm, Chesterfields).

Scales: a—c, 5 mm; d—e, 1 mm.

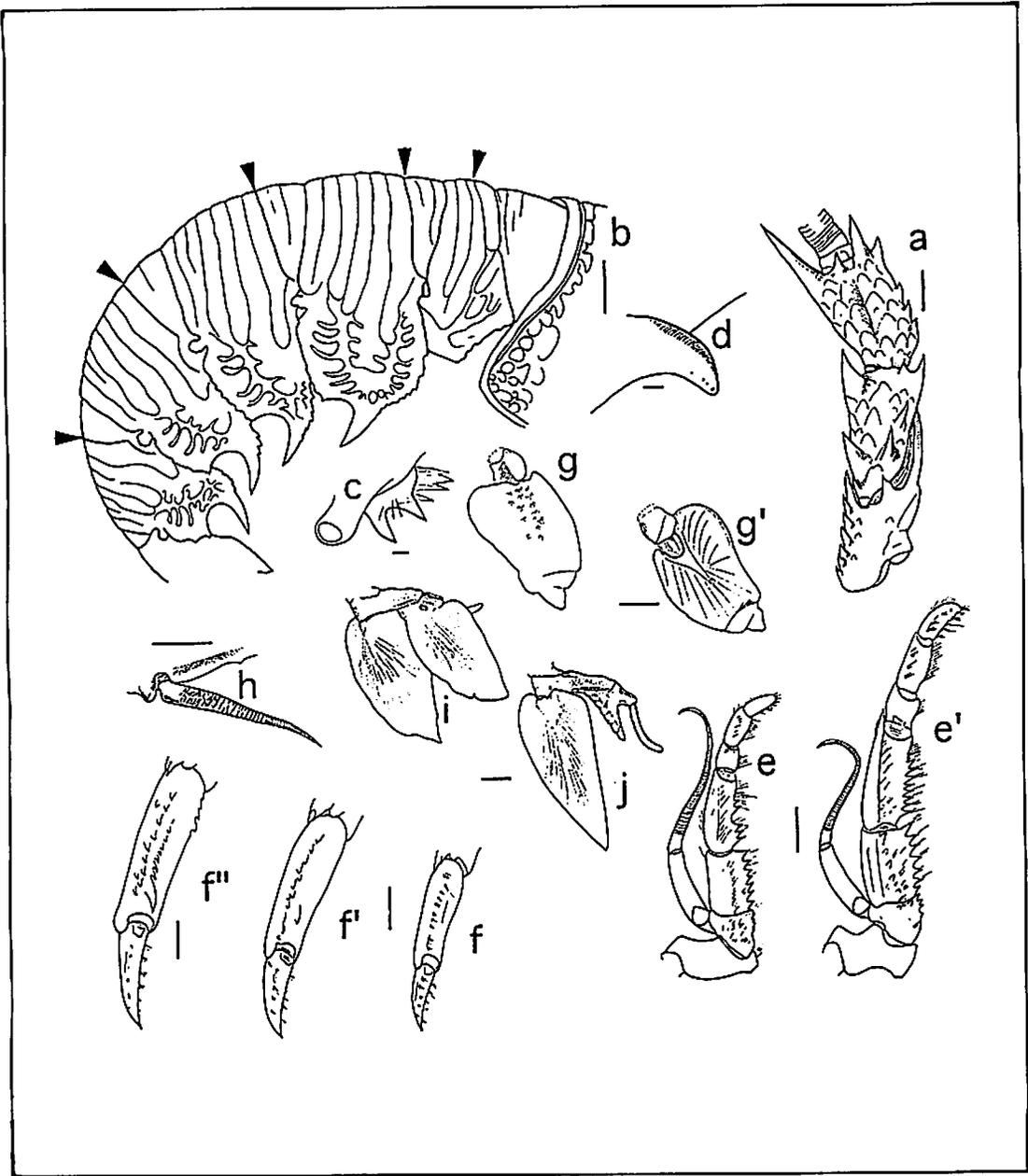


Fig. 3. *Justitia japonica* (Kubo, 1955) (except for e'):

♂ c.l. 47 mm, New Caledonia – a. left antennal peduncle; b. lateral face of the abdomen (arrows indicating the first stria of the non-articulate portion of segments 1 to 5; c. left coxal tube (P5), with the lateral spine of the posterior margin of thoracic sternite 8; e. right Pmx 3; e'. same appendage in *J. longimanus* (♂ c.l. 46.6 mm, Tubuai islands) for comparison; f. left propodus and dactylus of first pereopod.

♂ c.l. 71 mm, Chesterfields – d. right lateral tooth of the posterior margin of abdominal sternite 1; f', left propodus and dactylus of first pereopod.

♀ c.l. 65.6 mm, La Réunion – f', left propodus and dactylus of first pereopod; h. right first pleopod; i–j. right second and third pleopods (after Crosnier, 1977).

♂ c.l. 56 mm, Mauritius – g–g', right second pleopod outer and inner aspect (after Gordon, 1960).

Scales: a–b, e–J, 5 mm; c–d, 1 mm.

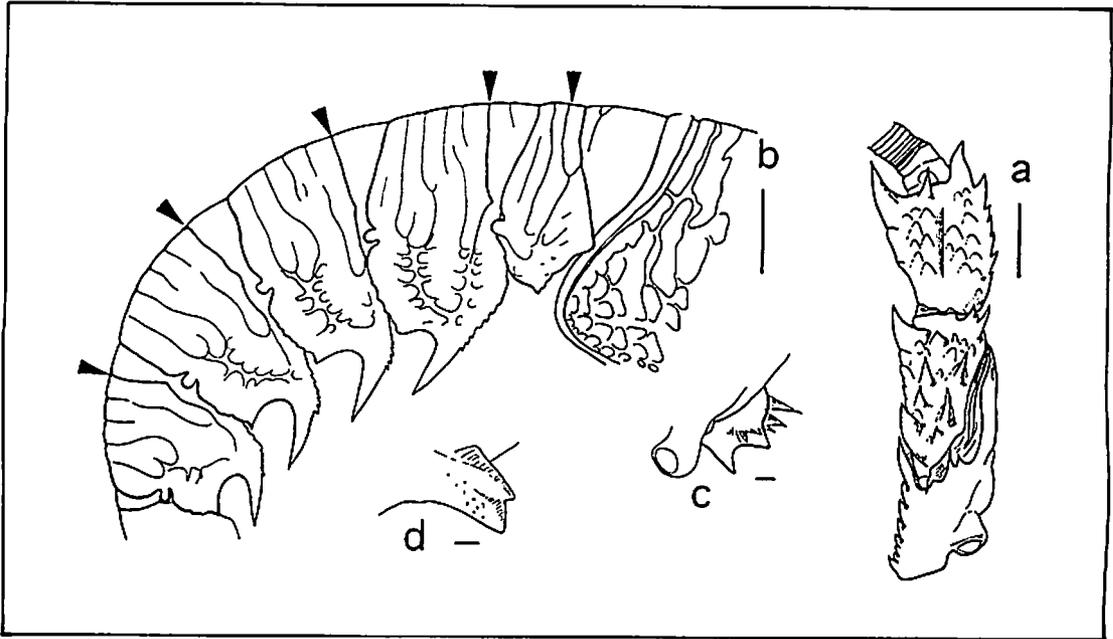


Fig. 4. *Justitia vericeli* sp. nov.:

♂ holotype c.l. 57.3 mm, Tuamotu – a. left antennal peduncle; b. lateral face of the abdomen (arrows indicating the first stria of the non-articulate portion of segments 1 to 5); c. left coxal tube (P5), with the lateral spine of the posterior margin of thoracic sternite 8; d. right lateral tooth of the posterior margin of abdominal sternite 1.

Scales: a–b, 5 mm; c–d, 1 mm.

Table 1. Arrangement of the striae on the abdominal segments within the genus *Justitia*. Striae of the articulate portion in *italics*, striae of the non-articulate portion in **bold**; for *J. chani* the usually less defined, intermediate striae, are indicated separately after the '&'.

	<i>J. chani</i>	<i>J. japonica</i>	<i>J. vericeli</i>	<i>J. longimanus</i>
Somite 1	2–3 / 3	2–3 / 3	1 / 3	0 / 2
Somite 2	2 / 6 & 6	1–2 / 6	1 / 5	0 / 5
Somite 3	1–2 / 6 & 6	1–2 / 7	0 / 5	0 / 4 (5*)
Somite 4	1 / 6 & 6	1–2 / 7	0 / 5	0 / 4 (5*)
Somite 5	0–1 / 5 & 4–5	0 / 7	0 / 5	0 / 4 (5*)

Note: * Japanese and Taiwanese specimens only.

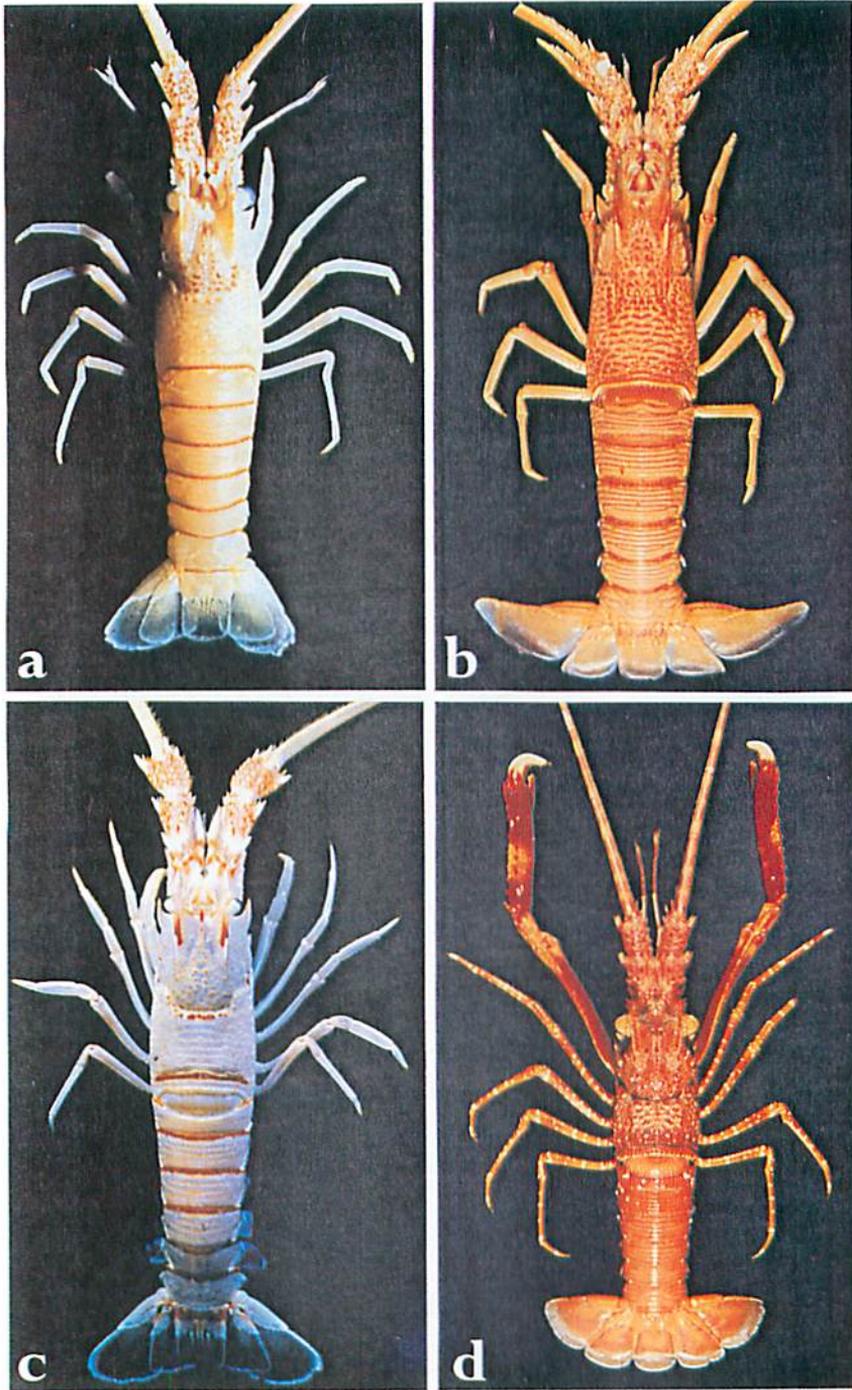


Plate 1. Dorsal view: a. *Justitia chani* sp. nov., ♂ holotype c.l. 34.4 mm, b.l. 110 mm, New Caledonia (MNHN Pa 1411, Photo P. Laboute); b. *Justitia japonica* (Kubo, 1955), ♂ c.l. 76 mm, b.l. 241 mm, Taiwan (NTOU 1991-07-05, Photo T. Y. Chan); c. *Justitia vericelli* sp. nov., ♂ holotype c.l. 57.3 mm, b.l. 178 mm, Tuamotu (MNHN Pa 1410, Photo J. Poupin); d. *Justitia longimanus* (H. Milne Edwards, 1837), ♂ c.l. 46 mm, b.l. 166 mm, Taiwan (NTOU 1990-05, PHoto T. Y. Chan). (Photographs b and d, extracted from Chan & Yu, 1993).

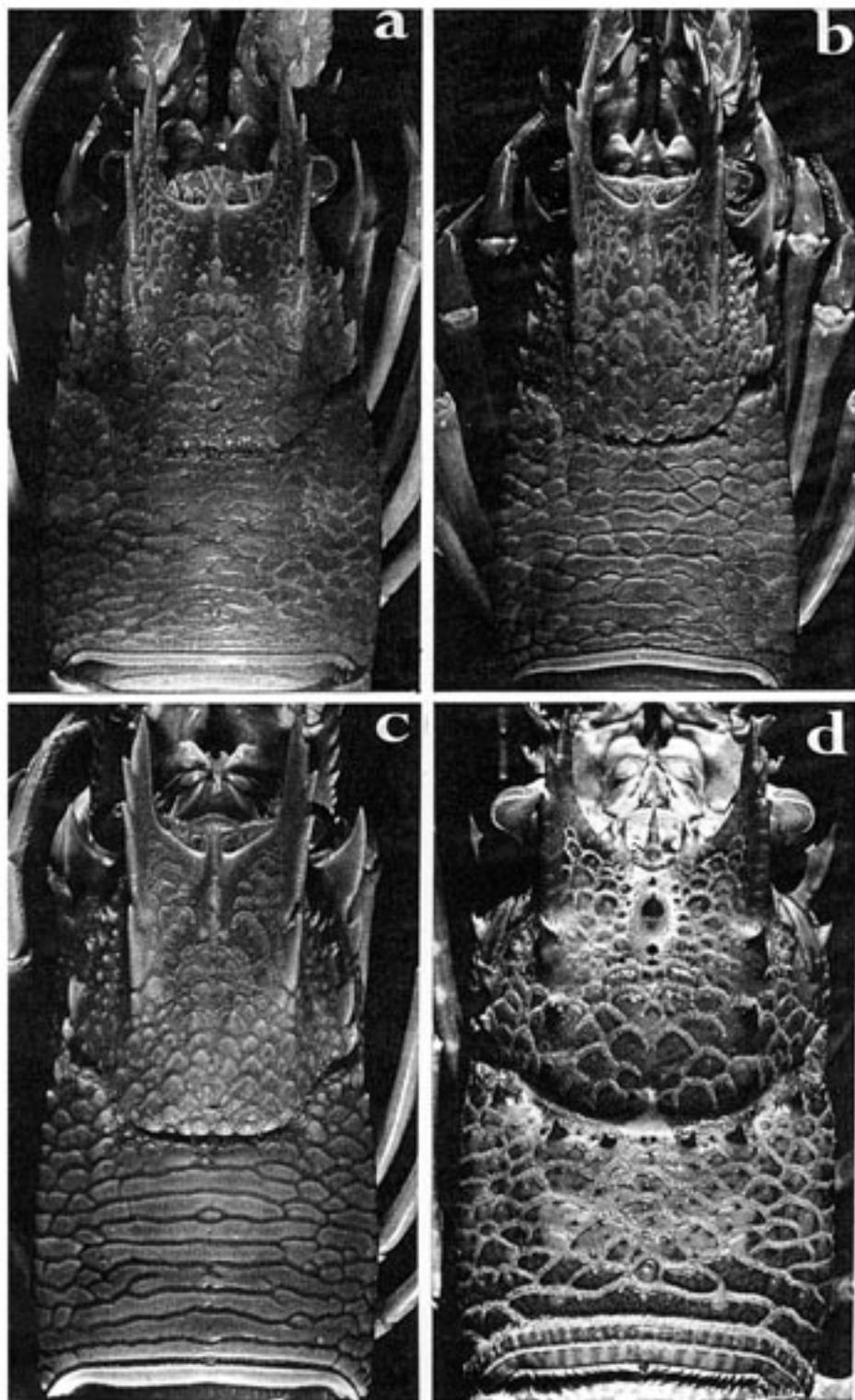


Plate 2. Carapace, dorsal view: a. *Justitia chari* sp. nov., ♂ holotype c.l. 34.4 mm, New Caledonia (MNHN Pa 1411); b. *Justitia japonica* (Kubo, 1955), ♂ c.l. 71 mm, Chesterfields (MNHN Pa 1408); c. *Justitia vericelli* sp. nov., ♂ holotype c.l. 57.3 mm, Tuamotu (MNHN Pa 1410); d. *Justitia longimanus* (H. Milne Edwards, 1837), ♂ c.l. 55 mm, Tubuai islands (MNHN Pa 1399).

MUSORSOM 6 and BATHUS 1 cruises, organised by B. Richer de Forges of ORSTOM. Additional material was obtained through the courtesy of T. Y. Chan (Taiwan), K. Baba and K. I. Hayashi (Japan), P. Clark (Great Britain) and M. Türkay (Germany). J. Rebière, of the Laboratoire de Zoologie (Arthropodes) helped with the processing of black and white photographs.

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