Note on the occurrence of a rare palaemonid prawn, *Palaemon sewelli* (Kemp, 1925) in South Vietnam, with its description (Decapoda: Caridea)

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Key words: Crustacea; Decapoda; Caridea; Palaemonidae; *Palaemon sewelli*; South Vietnam.
A rare palaemonid prawn *Palaemon sewelli* (Kemp, 1925) was found in abundance in a shallow and flat coastal region of southeastern Vietnam, at a depth of 4-9 m. This is the first record of the species from Vietnam. A description of the two colour morphs of the freshly collected specimens and notes on habitat, fishery, and economic importance are provided.

Introduction

For a long time *Palaemon sewelli* was only known from India, but recently it has been reported from the coast of East Thailand and China. The present record of this species from the far south-east of Asia narrows the gap that existed in its known range. The Vietnamese specimens are described (including colour-illustrations of the freshly collected specimens depicting two morphs), and notes on habitat, fishery, and economic importance are provided.

The abbreviation tl. is used for total length, measured from the tip of the rostrum to that of the telson in the fully stretched specimen; cl. is used for carapace length. The material discussed here is deposited in the collection of the National Museum of Natural History (RMNH) in Leiden, The Netherlands.

Descriptive part

Palaemon sewelli (Kemp, 1925)
(figs 1-35)

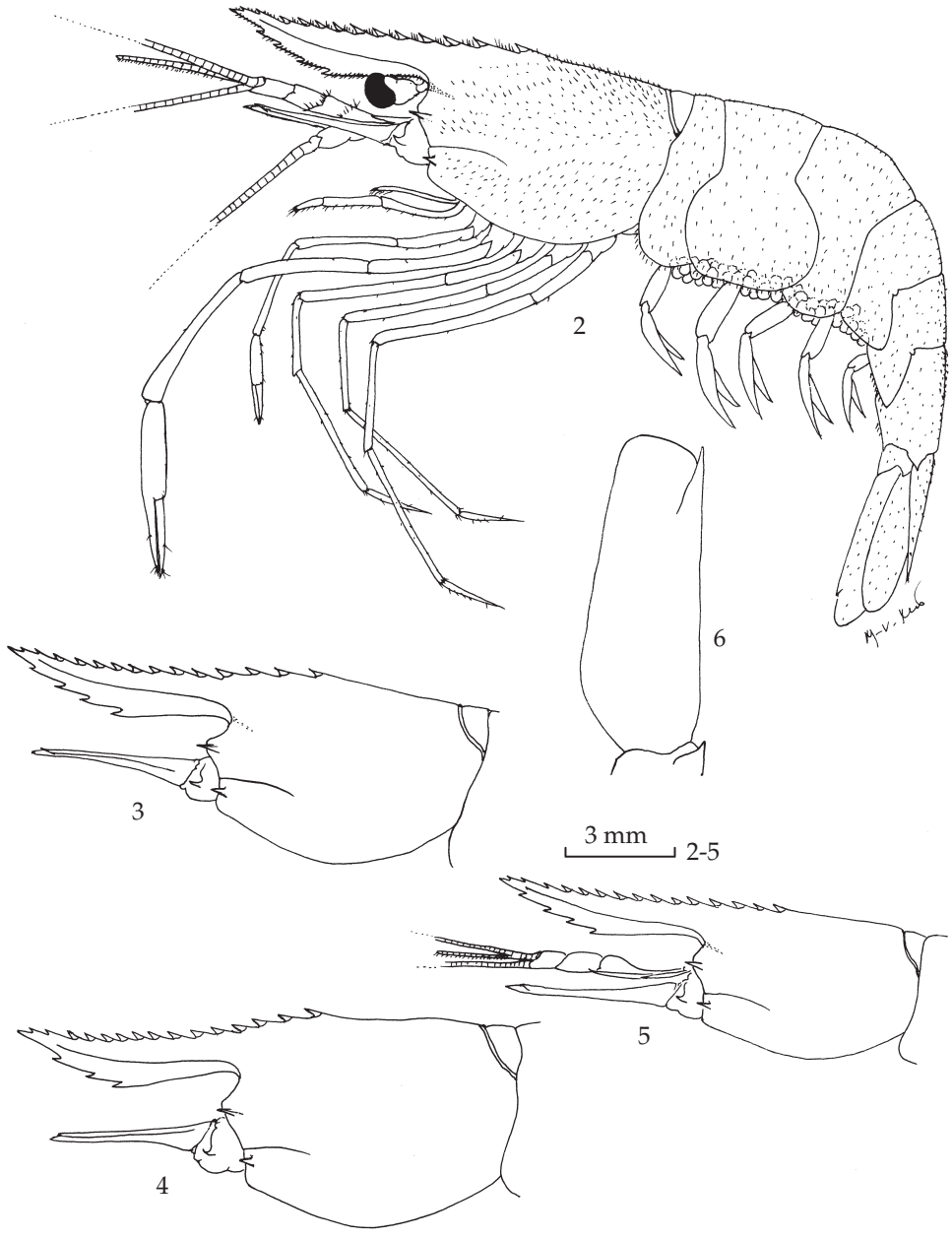
Leander sewelli Kemp, 1925: 299, fig. 9.
Palaemon (Palaemon) sewelli; Holthuis, 1950: 8.
Palaemon sewelli; Dutt & Ravindranath, 1974: 1214; Liu, Liang & Yan, 1990: 240, fig. 32; Naiyanetr, 1998:34.

Material.— Three males (tl. 22-26 mm), 10 ovigerous females (tl. 28-32 mm) (RMNH D 47994): Can Thanh, a coastal commune of Can Gio district, 10 km NW of Vung Tau (= Cap St. Jacques), 10°22'N 106°53'E, South Vietnam; in mangroves near an area with four large confluent rivers, taken with conical set nets at a depth of 6-9 m, 3.i.1991. – 30 males (tl. 19-26 mm), 2 young females (tl. 24-28 mm), 37 ovigerous females (tl. 23-32 mm), 1 post-ovigerous female (tl. 27 mm), (RMNH D 47995): Dong Hoa, a coastal commune of Can Gio district, 21 km NW of Vung Tau; in mangroves, 7 km inland from the coast, in an estuarine region formed by the confluence of two large rivers, taken with conical set nets at a depth of 4-8 m, 28.viii.1998.

Fig. 1, colour pattern of *Palaemon sewelli* (Kemp, 1925), white tailed ovigerous old female.

Description.— Rostrum (figs 2-5) well developed. Generally straight; upper margin slightly concave in basal part, slightly or more strongly curved upward in distal half. Curvature in females usually more distinct than in males; rostrum fairly concave in some old females (fig. 4). Rostrum usually less directed down and tip somewhat turned up in males (fig. 5). Rostrum equal to (in males) or slightly shorter than carapace (in ovigerous females), reaching 0.20-0.25 (in males) and 0.10-0.25 (in females) of its length beyond end of scaphocerite. Dorsal margin with 13-15 teeth (rarely 17) of which three or four (sometimes five) placed on carapace behind orbital margin. Dorsal teeth semi-movable except for two or three distals; first tooth in ovigerous females usually somewhat more remote from second than second from third. Four or five proximal teeth more widely spaced than distals, subapical tooth close to apex, interval between second and third distal tooth larger than that between middle teeth; single row of setae between dorsal teeth. Ventral margin with three or four (rarely five) teeth obscured by a double row of setae.

Body covered by setae, except for lateral surface of rostrum; setae on dorsal surface of carapace and proximal dorsal area of telson stronger than others. Carapace armed with branchiostegal and antennal spines; branchiostegal spine placed slightly behind anterior margin of carapace; somewhat stronger than antennal spine. Branchiostegal groove reaches upper base of branchiostegal spine in specimens of the "dark-tailed colour morph" (figs 31', 34-35), and the body is less setose (fig. 33), or anterior margin of carapace a short distance above branchiostegal spine (at 0.20-0.25



Figs 2-6, *Palaemon sewelli* (Kemp, 1925). 2, ovigerous female, cl. 6.7 mm, lateral view; 3, carapace and antenna of ovigerous female, cl. 6.4 mm; 4, carapace and antenna of old ovigerous female, cl. 7 mm, the setae are not presented; 5, anterior part of male, cl. 6 mm, the setae on the carapace are not presented; 6, scaphocerite.

of the distance between branchiostegal and antennal spines) (fig. 32); in specimens of the "white-tailed colour morph" (fig. 1), and the body is covered with dense setae (fig. 2). Shallow oblique postorbital groove present.

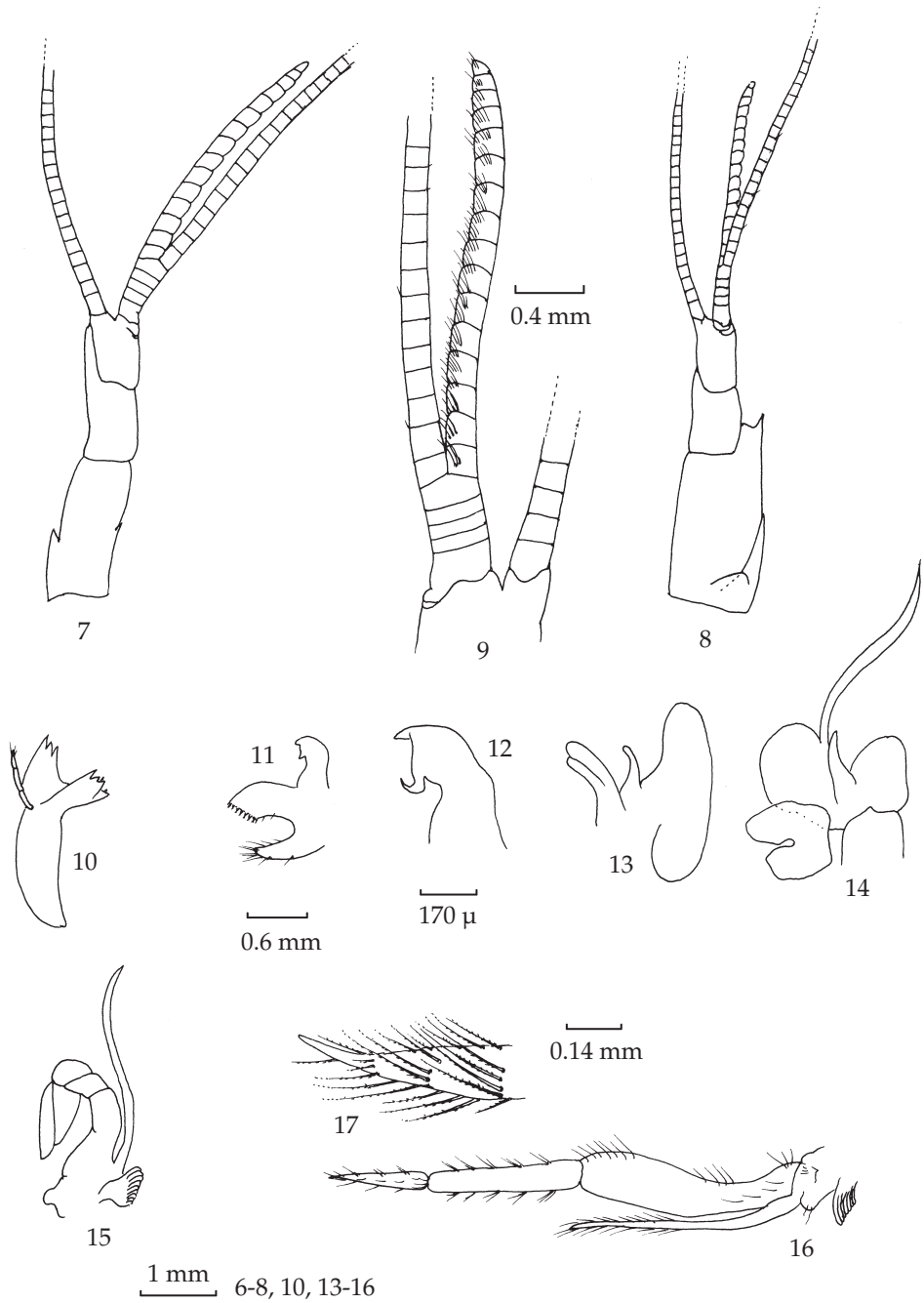
Eyes well pigmented, failing to reach end of basal segment of antennular peduncle. Antennule (figs 7-9) with basal segment about equal in length to second and third segments together; ventral inner margin of basal segment with spine in basal half. Stylocerite pointed, reaching middle of basal segment; carina present on upper surface of stylocerite; outer margin of basal segment somewhat sigmoid, ending in strong acute anterolateral tooth which extends as far as or beyond rounded antero-external margin of segment. Rami of upper antennular flagellum fused for 4-7 (usually six) segments; fused part about 0.7-0.9 mm; free part of shorter ramus with sinuous outer margin (fig. 7), somewhat depressed, with 16-22 segments, 2.3-3.4 mm long, as wide (in ovigerous females) or wider (in males, 1.2-1.4 times) than longer ramus; lower surface of free part with longitudinal rows of groups of aesthetascs; no aesthetascs on fused portion in females, in males aesthetascs present in distal half of fused portion of upper flagellum; aesthetascs more dense and longer in males than in females (fig. 9). Scaphocerite (fig. 6) overreaches distal margin of antennular peduncle slightly, 2.42-2.68 times as long as broad; upper surface covered with setae. Outer margin straight in ovigerous females, slightly concave in young males; tip of lamella slightly overreaching laterodistal tooth. Lamella with inner antero-lateral angle somewhat rounded. Setae along dorsal and lateral surface of outer margin arranged in rows.

Oral parts quite typical for the genus. Mandible (fig. 10) with molar and incisor processes well developed; palp three-segmented. Maxillula (figs 11, 12) and maxilla (fig. 13) of usual shape. Epipod of first maxilliped (fig. 14) divided into two rounded lobes. Second maxilliped (fig. 15) of usual shape. Third maxilliped (figs 16, 17) reaches as far as, or slightly beyond (in some young males) second segment of antennular peduncle; antepenultimate segment somewhat shorter than last two segments together; penultimate segment about 1.5 times as long as ultimate segment.

First pereiopods (fig. 18) in males reach with half to entire dactylus beyond scaphocerite. First pereiopods in ovigerous females reach with dactylus to two-thirds length of palm beyond scaphocerite. Dactylus as long as to very slightly longer than palm. Carpus 2.40-2.88 times as long as palm, slightly shorter than merus, slightly broadening distally.

Second pair of pereiopods (figs 19, 20) stout and of equal length; 0.20-0.33 of carpus reaches beyond scaphocerite in males; less than 0.50-0.75 of carpus reaches beyond scaphocerite in ovigerous females. Dactyli slightly directed inward, equal to or longer than palm. Carpus slender, widening distally, 1.60-1.85 times length of palm, equal to, slightly shorter, or slightly longer (in some ovigerous females) than merus. Fingers, when closed, touch each other over full length except for tips which are curved inward and crossing. Cutting-edges entire, in old specimens with two small teeth near base of movable finger. Palm somewhat depressed. All segments unarmed.

Last three pereiopods long and slender. Third pereiopod (fig. 21) reaches with 0.2-0.33 (in males) and less than 0.50 to about 0.66 (in females) of the length of propodus beyond scaphocerite. Propodus 1.70-2.36 times as long as dactylus; longer than carpus, shorter than merus. Posterior margin of propodus provided with four inconspicuous spinules.



Figs 7-17, *Palaemon sewelli* (Kemp, 1925). 7, antennula, lateral view; 8, antennula, dorsal view; 9, free portion of upper antennular flagellum of female, ventral view; 10, mandible; 11, maxillula; 12, maxillula, detail of palp; 13, maxilla; 14, first maxilliped; 15, second maxilliped; 16, third maxilliped; 17, apex of third maxilliped.

Fourth pereiopod (fig. 22) in males reaches with 0.1-0.2 of the length of the propodus beyond the scaphocerite. In females this leg overreaches the scaphocerite with half the dactyl to half the propodus. Propodus 1.8-2.4 times as long as dactylus, longer than carpus, slightly shorter than merus. Posterior margin of propodus provided with four inconspicuous spinules.

Fifth pereiopod (fig. 23) in male overreaches scaphocerite by length of dactylus; in ovigerous females about 1/10th to less than half of propodus reaching beyond scaphocerite. Propodus 1.90-2.41 times as long as dactylus; longer than carpus but about equal to (sometimes somewhat longer or shorter) merus. Posterior margin of propodus provided with four inconspicuous spinules. Posterior margin of propodus in male with usual transverse rows of setae in distal part (fig. 24).

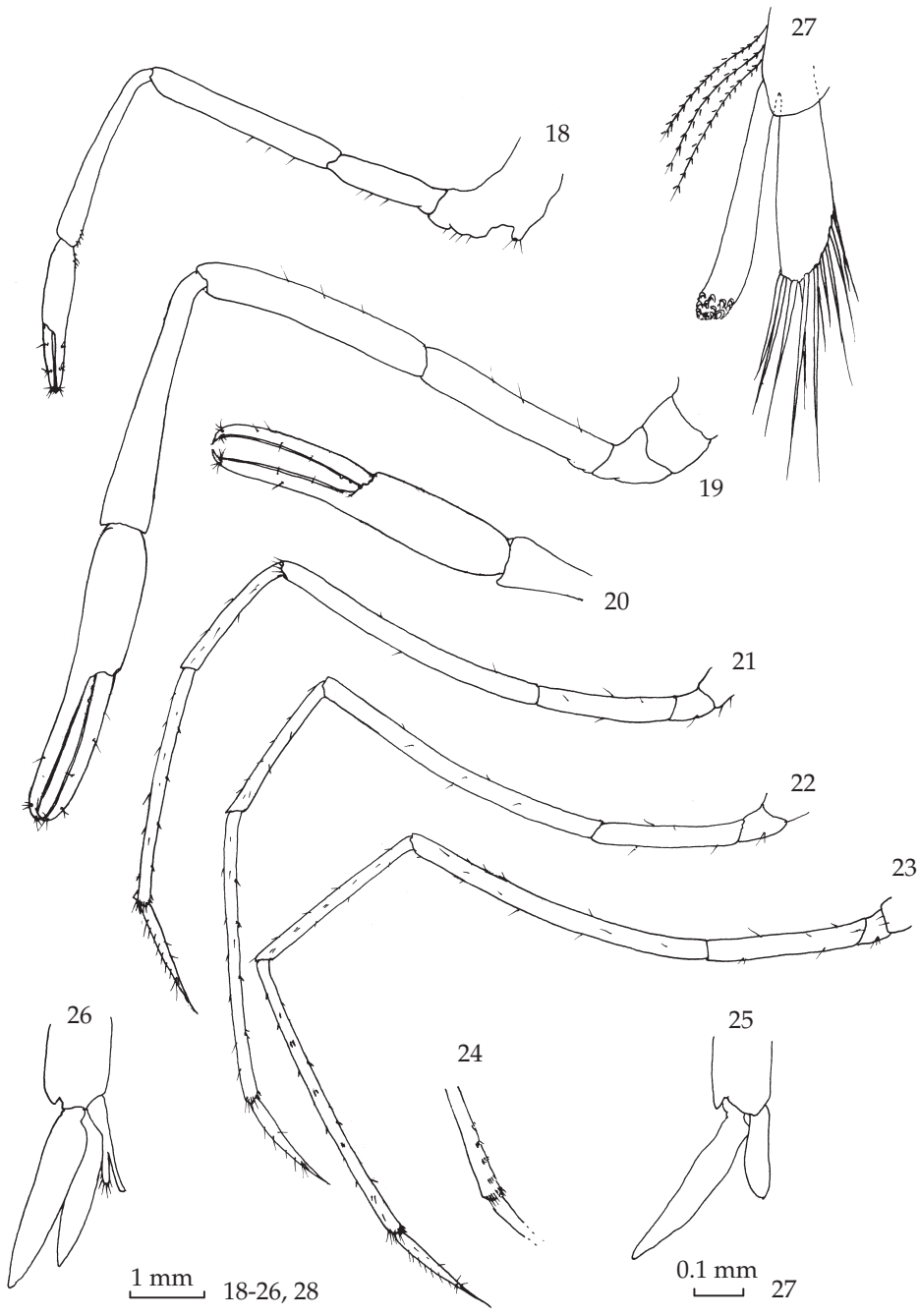
Thoracic sternum in both sexes with respectively a median spine at bases of first pereiopods, a median boss between bases of third pereiopods, a median subspheric process between those of fourth pereiopods and specifically in males a median peach-like process (triangular shaped boss) between bases of fifth pereiopods. This process is larger than those between bases of third and fourth pereiopods. Median spine on first abdominal sternite only present in males.

First male pleopod (fig. 25) without appendix interna; endopod ovate. Second male pleopod (fig. 26) with appendix masculina (fig. 27) fairly strong, shorter than appendix interna. Uropods (fig. 28) normal in shape, extending beyond tip of telson. Outer border of exopod slightly convex or straight ending in acute distal tooth; adjacent to this tooth a slender spine extending beyond tooth (fig. 29) by one-third of its length.

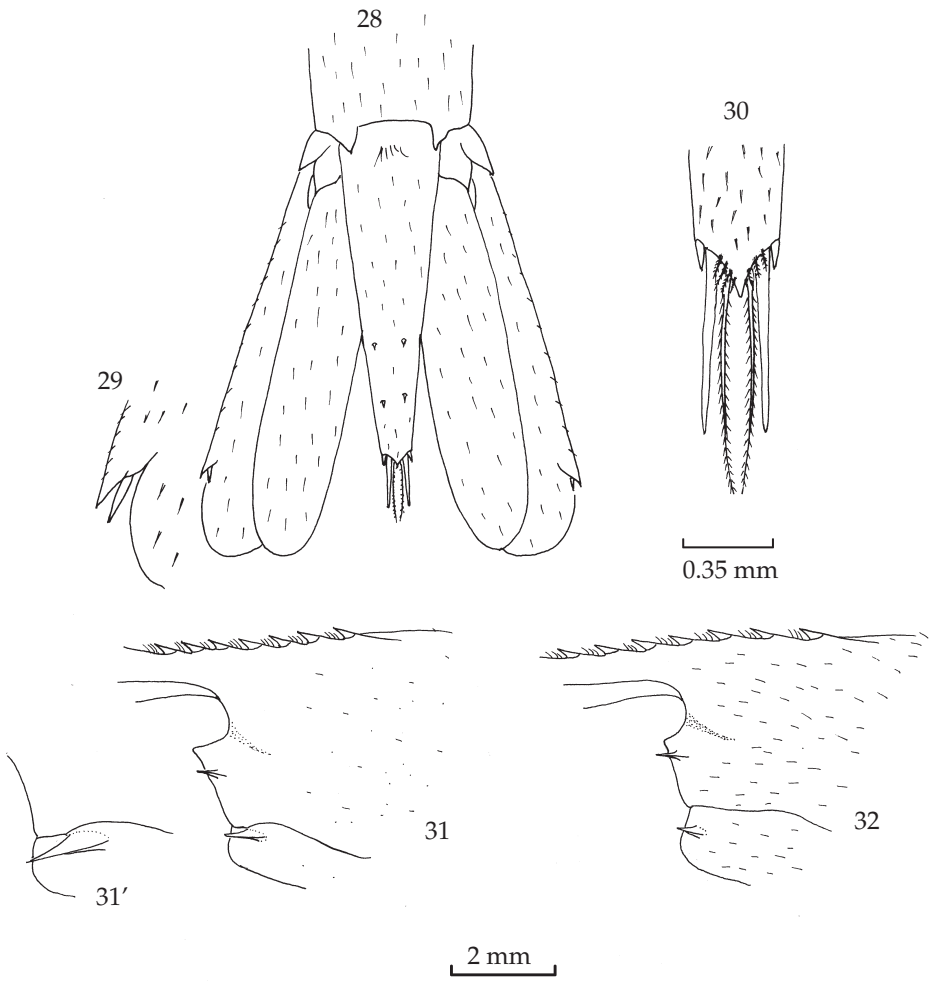
Abdomen normal in shape. Sixth abdominal somite 1.3-1.5 times as long as fifth. Pleura of fifth and sixth abdominal somites acutely pointed posteriorly. Telson (figs 28, 30) 1.33-1.56 times as long as sixth abdominal somite, elongate, provided with two pairs of dorsal spinules; proximal pair placed just slightly distally of middle of telson, distal pair between proximal pair and distal margin of telson; distal spinules usually not at same level. Posterior margin of telson with usual two pairs of spines and two feathered setae; outer pair of spines not overreaching posterior median tip of telson; inner pair long, about four to five times length of outer pair, measuring 0.6-0.7 mm; two terminal feathered setae longer than inner spines; lateral margins of posterior tip of telson with four plumose setae, sometimes with four on one side and three on the other side (fig. 30).

Size.— The maximal total length of males is 26 mm, of females 35 mm. Ovigerous females have tl. of 29-35 mm. The eggs are numerous; the ripe (brown) eggs are 0.6-0.8 mm in diameter.

Habitat.— The species seems to flourish in areas where the wide estuaries of large rivers merge. The depth at which the species occurs is 4-9 m. The nearby coast is flat, shallow and sandy with mud. The salinity of the water during some days of the period of heavy rains (from June to September) may drop temporary to 16-18 promille. The species does not migrate far inland: its presence in ponds used for shrimp culture in the mangroves has not been recorded. It is rather abundant all year round. It was found together with the penaeid shrimp *Parapenaeopsis sculptilis* (Heller, 1862), *P. hardwickii* (Miers, 1878), *Penaeus silasi* Muthu & Motoh, 1979, *P. merguiensis* De Man, 1888, *Metapenaeus brevicornis* (H. Milne Edwards, 1837), and *M. lysianassa* (De Man, 1888), the sergestid shrimps *Acetes indicus* H. Milne Edwards, 1830, and *A. japonicus*



Figs 18-27, *Palaemon sewelli* (Kemp, 1925). 18. First pereiopod; 19, second pereiopod; 20, palm of second pereiopod; 21, third pereiopod; 22, fourth pereiopod; 23, fifth pereiopod; 24, distal part of fifth pereiopod; 25, first male pleopod; 26, second male pleopod; 27, right appendix masculina and appendix interna.



Figs 28-32, *Palaemon sewelli* (Kemp, 1925). 28, telson and uropods; 29, outer margin of uropodal exopod; 30, posterior margin of telson; 31, dark-tailed colour-morph, anterior part of carapace with antennal and branchiostegal spines; 31', branchiostegal spine enlarged; 32, white-tailed colour-morph, anterior part of carapace with antennal and branchiostegal spines.

Kishinouye, 1905, the carideans *Macrobrachium equidens* (Dana, 1852), *Macrobrachium* spec., *Exopalaemon vietnamicus* Nguyen Van Xuan, 1992, *Palaemon curvirostris* Nguyen Van Xuan, 1992, *Periclimenes grandis* (Stimpson, 1860), *Leptochela (Leptochela) gracilis* Stimpson, 1860, *Alpheus crassimanus* Heller, 1865, *Alpheus* spec., *Lysmata vittata* (Stimpson, 1860), *Latreutes anoplonyx* Kemp, 1914, the stomatopod *Cloridopsis scorpio* (Latreille, 1802), and the horseshoe crabs *Trachypleus gigas* (O.F. Müller, 1785), *Carcinoscorpius rotundicauda* (Latreille, 1825) as well as numerous species of brackish water fishes like *Plotosius canius* Hamilton, 1822, *Lates calcarifer* (Bloch, 1790), and *Scatophagus argus* (Linnaeus, 1766). Kemp (1925: 301) reported the species from depths between 1.5-9.5 fathoms (= 2.7-17.4 m).

Economic importance.— Due to its small size, *Palaemon sewelli*, together with other small shrimps, is used as feed for ducks and groupers (*Epinephelus* spec.) in pond culture. Among the fishery-products caugth by three conical set nets placed close together, with a total collecting surface of about 72 m^2, the yield for this species on 29 August 1998 after 6 hours of fishing was: 21 males (1 specimen, tl. 17 mm; 20 specimens, 20-24 mm), 3 juvenile females (2 specimens, tl. 22 mm; 1 specimen, tl. 26 mm), 14 ovigerous females (3 specimens, tl. 25 mm; 10 specimens, tl. 26-30 mm; 1 specimen, tl. 31 mm), 12 post-ovigerous females (2 specimens, tl. 23-24 mm; 8 specimens, tl. 26-30 mm; 2 specimens, tl. 31-32 mm). With the same fishing gear, on 23 November 1998, the yield was: 3 males (1 specimen, tl. 23 mm; 1 specimen, tl. 24 mm; 1 specimen, tl. 26 mm), 94 ovigerous females (14 specimens, tl. 21-25 mm; 72 specimens, tl. 26-30 mm; 8 specimens, tl. 31-35 mm), 8 post-ovigerous females (2 specimens, tl. 21-25 mm; 5 specimens, tl. 26-30 mm; 1 specimen, tl. 31 mm).

Colour pattern (figs 1, 33-35).— In the present material two distinct colour morphs were found. These colour morphs occurred together in the yields of a single set conical net. The first of these morphs (fig.1) is easily recognized among the fishery yield by the whitish colour of the posterior end of the abdomen (sixth abdominal somite, telson and uropods) and that of the distal third of the rostrum which contrasts strongly with the rest of the body which is predominantly dark. Some variation in the intensity and shades of its colour may be present, but this may be due to the age of the specimen or the micro-environment in which it was collected. The proximal half of the rostrum (including the teeth) and gastro-cardiac region of the carapace are dark (black or bluish or brownish black). An obtuse V-shaped black stripe is seen on the hepato-antennal region of the carapace, a black spot on the region behind the branchiostegal spine, two-thirds of the branchial region is also very dark (almost black); in these dark areas there are two pale brownish areas respectively on the hepato-antennal region juxtaposed to the upper and the lower part of the V-stripe and another brownish area at the lower end of the branchial region. The first abdominal somite is black with an irregular transverse yellowish band on the anterior part of the tergum. The second abdominal somite is black with a pale brownish spot on the middle of the pleura. The third abdominal somite is black with a transverse pale brownish yellow stripe at the posterior end. The fourth abdominal somite is black with a pale whitish stripe at the anterior and posterior ends. The fifth abdominal somite is also black with a pale U-shaped stripe on the tergum. Usually in old females a short black line is present on the postero-lateral border of the sixth abdominal somite; the posterior end of the telson and the endopods of the uropods are black.

Two-thirds of the basal segment of the antennular peduncle is black. The antennular flagella are light brown. The outer margin of the scaphocerite is brown and the antennal flagellum light brown. The third maxilliped is dark brown. The propodus, carpus, and merus of the first pereiopod are dark brown with a light brown colour at the ends of each segment. In the second pereiopod, the dactyl is light brown with a brown spot at the proximal end, the palm is light brown with dark grey stripes on the upper and outer surfaces, the carpus and merus are grey with a light brown colour at both ends, the basis is dark grey. In the last three pereiopods the dactyl is transparent white with a brown spot near the proximal end, the propodus, carpus and merus are dark grey in the middle with a light brown colour at each end. The pleopods are light brown

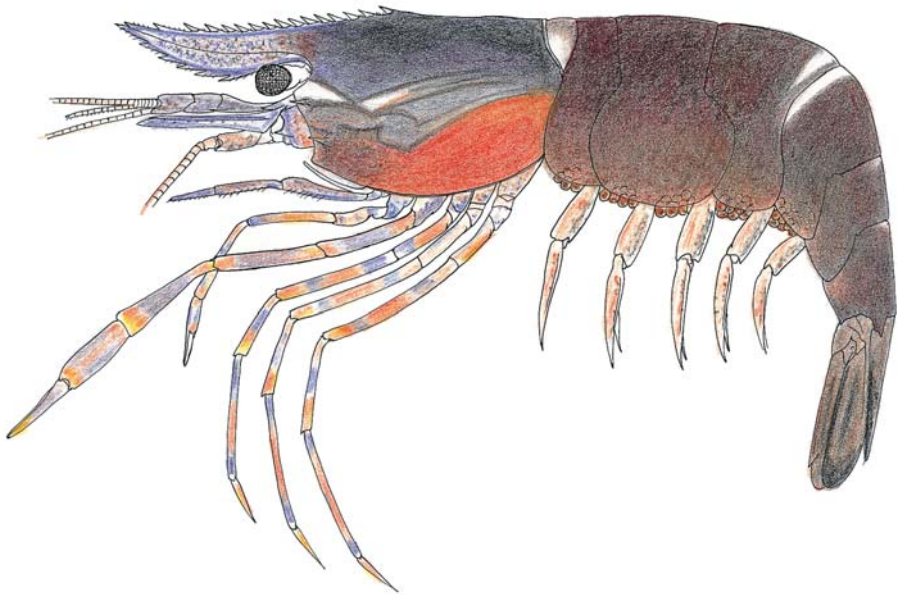
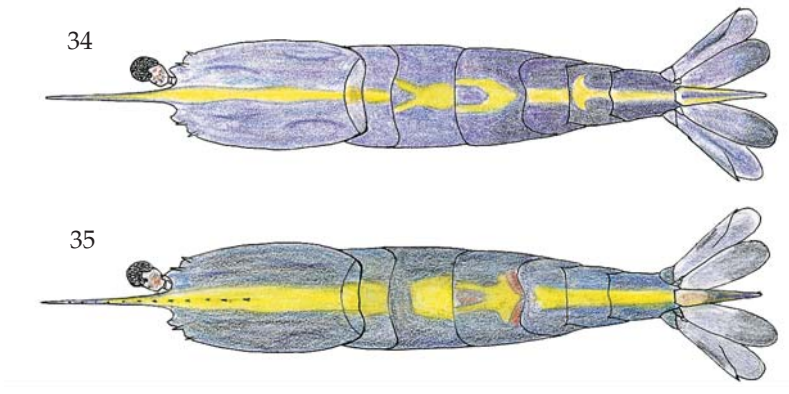


Fig. 33, *Palaemon sewelli* (Kemp, 1925), dark-tailed ovigerous female.

with the outer margin dark grey. The eggs are light brown (young) to dark (old).

The second colour morph is predominantly dark all over and shows some variation in the intensity and shades of its colour (figs 33-35). The upper teeth of the rostrum are transparent whitish and the plumose setae between them are white. The rostrum has the upper and the lower margin dark violet the rest is densely spotted with black and violet chromatophores. The frontal region of the carapace is dull brownish; the gastro-cardiac regions are dark violet to blackish. An obtuse V-shaped black stripe is seen in the orbital area, extending toward the lower gastro-cardiac region. Another obtuse V-shaped black stripe starts from the antennal spine, goes through



Figs 34, 35, *Palaemon sewelli* (Kemp, 1925), dark-tailed colour-morphs with yellow dorsal stripe.

the antenno-hepatic region and extends toward the end of the upper branchial region. These two black stripes meet at one point and delimit two white triangular areas:one in the orbital and the other in the hepatic region. A third dark stripe, also V-shaped, joins the base of the second V-shaped stripe and runs over the branchial region. Finally, a zigzag-shaped brownish black stripe divides the lateral surface of the carapace into two main contrastingly coloured regions:the upper two-thirds is predominantly black or blackish violet and the lower third (from the branchiostegal spine through the entire branchial region)is dull orange.

The first two abdominal somites are reddish black but the pleura are somewhat lighter in colour. The third abdominal somite is reddish black with a transverse whitish band near the posterior margin of the tergum. The fourth abdominal somite is likewise reddish black, but has a transverse whitish band on the anterior part of the tergum. The fifth and sixth somites are also reddish black. The telson is black with the outer margins darker in colour. The uropods are brownish black: the outer margin and the upper distal part of the endopod are darker; the upper surface of the endopod shows also a median longitudinal black stripe. The marginal plumose setae of the uropods are whitish. The antennular peduncle is densely spotted with brownish black chromatophores. The scaphocerite is also brownish black. The third maxilliped is brownish violet.

In the first pereiopod the dactyl is light orange, the palm and carpus are violet with orange at both ends of each segment, the merus is violet in the distal portion and orange in the proximal part. In the second pereiopod the dactyl is light yellow in the distal part and violet in the proximal; the palm, carpus, merus and ischium are violet with orange at either end of each segment. In the last three pereiopods the dactyl is light orange; the propodus is light orange with light violet at either end; the carpus is light violet with orange at either end; the merus and ischium show alternate rings of orange and violet. The pleopods are orange with the outer margin spotted with black and brown.

Occasionally, in old ovigerous females, the median dorsal face presents a light yellow longitudinal stripe extending from the apex of the rostrum to the end of the telson (figs 34, 35). This median longitudinal stripe is formed as follows:(1) a somewhat sinuous stripe extends from the tip of the rostrum to the posterior end of the carapace, (2) there is a longitudinal stripe on the tergum of the first abdominal somite, (3) the tergum of the second abdominal somite has a large spot which is bifurcated in its anterior part, (4) the tergum of the third abdominal somite is provided with a V-shaped stripe which is elongate at its base, (5) a longitudinal stripe is present on the tergum of the fourth and sixth abdominal somites, (6) the yellow stripe on the fifth abdominal somite is T-shaped, (7) the dorsal surface of the telson bears two thin parallel stripes at either side of a median longitudinal violet stripe. In this case the colour of the dorsal surface of the animal is dull violet, which is accentuated on the last four abdominal somites. A slightly different pattern is observed in the specimen figured on fig. 35.

Kemp (1925: 301) remarked that "specimens obtained in Portuguese India [= Goa] were usually deeply pigmented when alive and dull reddish in colour. Occasionally they exhibited pale dorsal blotches on the abdominal somites and very rarely there was a broad pale dorsal stripe extending from the base of the rostrum to the tip of the telson." The figure by Liu et al (1990: 240, fig. 32) shows such a wide pale dorsal

stripe over the abdominal somites. Kemp (1925: 301) furthermore reported upon a specimen from the Ganjam coast of India, which was "uniform jet black [found] on black mud."

Distribution.— The type locality is "Off Betim Point, opposite Nova Goa, Portuguese India" (= Goa, India; Kemp, 1925). Kemp reported the species also from two other localities in the Goa area: "Junction of Mandavi and Mapusa Rivers, Nova Goa", and "Above Cortalim, Mormugao Bay". The rest of Kemp's type material came from Hainze Basin, Tavoy, Burma and 1 mile E of Pundi Beacon, Ganjam coast, Bay of Bengal, India. Liu et al. (1990: 240) mentioned the species from brackish water of low salinity in Yangjiang County, Guangdong province and Hepu County, Guanxi province, China. Naiyanetr (1998: 34) listed the species from Chon Buri, East Thailand.

Remarks.— In trying to find out whether there are any morphological differences between the two colour morphs, the specimens were subjected to a careful examination. No differences what ever could be found, except perhaps in the position of the branchiostegal spine in relation to the branchiostegal groove. The difference was not too distinct, but probably deserves further study; figs 31 and 32 show the situation in the dark-tailed and white-tailed forms respectively. Also, the white-tailed form seems to have the body more setose than the form with the dark tail. A detailed study of the two forms and their variations might lead to interesting results.

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