

中国近海仿对虾属的研究*

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提要 仿对虾属 (*Parapenaeopsis*) 是暖水性的中小型虾类, 全世界共报告18种。在我国只分布于山东半岛以南浅海区。本文根据我所自50年代以来在中国沿海所搜集的材料, 共发现7种, 其中有2个新种, 除对新种作了较详细的描述和比较外, 对存在混淆的种作了区分, 对其它种的特征也作了简要的记述。新种模式标本均保存于中国科学院海洋研究所。

仿对虾属 (*Parapenaeopsis*) (甲壳纲、十足目、对虾科) 是热带亚热带浅海近岸区最常见的中小型对虾类。主要分布于印度-西太平洋区, 已发现17种; 大西洋仅有1种; 共报告18种。我国近岸海域共发现7种, 以南海为最多, 有7种; 东海有5种; 黄海南部有3种, 山东半岛南岸仅1种——细巧仿对虾 *P. tenella*; 渤海尚未发现本属的代表。仿对虾属全部种都具经济价值, 其中有些种产量很大, 在捕虾渔业中占一定地位。如哈氏仿对虾 *P. hardwickii* 即是我国重要的经济种。

作者在研究中国对虾类中发现2个新种, 外形皆似角突仿对虾, 分别命名为中华仿对虾 (*P. sinica* Liu et Wang, sp. nov.) 和缺刻仿对虾 (*P. incisa* Wang et Liu, sp. nov.)。本文除新种描述外, 对鉴定存在混淆的种也作了澄清。

仿对虾属 Genus *Parapenaeopsis* Alcock, 1901

Parapeneopsis Alcock, 1901: 14; 1906: 34. —Burkenroad, 1934: 58. —De Bruin, 1965: 94.

Parapenaeopsis De Man, 1911: 92. —Balss, 1914: 14; 1925: 229. —Kubo, 1949: 368. —Barnard, 1950: 604. —Liu, 1955: 16. —Dall, 1957: 213. —Hall, 1962: 180. —Racek & Dall, 1965: 96. —George, 1969: 12. —Lee & Yu, 1977: 84. —Motoh & Buri, 1984: 100.

本属的种可分为两组: 一组的种第1, 2步足不具上肢, 有 *P. tenella* (Bate), *P. venusta* De Man, *P. acclivirostris* (Alcock), *P. arafurica* Racek et Dall 和 *P. hungerfordi* Alcock; 另一组的种第1, 2步足具有上肢, 两个类群的区别显著。本属中有4个种不具胃上刺, 即 *P. tenella* (Bate), *P. acclivirostris* (Alcock), *P. arafurica* Racek et Dall 和 *P. gracillima* Nobili。

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本文插图大部由俞丽韵、屈柯柯同志绘制。本属研究过程中承日本东京水产大学大森信博士惠借东京水产大学久保伊津男教授鉴定的 *P. cornuta* (Kishinouye) 及 *P. maxillipedo* Alcock 标本, 谨此志谢。

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本属中有几个种长期以来在鉴定上存在混淆,如 *P. cultrirostris* Alcock 曾被列为 *P. sculptilis* (Heller) 和 *P. hardwickii* (Miers) 的亚种或其异名。由于 *P. cultrirostris* 雄、雌性的额角不同,雄性额角似 *P. sculptilis* 而雌性额角以至交接器外形均与 *P. hardwickii* 极为相似;再如 *P. cornuta* 与 *P. maxillipedo* Alcock 外形十分近似,因而常将它们互相混淆。本文对这两组近似种的区分提出了一些详细材料。

细巧仿对虾 *Parapenaeopsis tenella* (Bate, 1888) (图 1)

Penaeus tenellus Bate, 1888: 270. —Kishinouye, 1900: 22, pl. 6, fig. 3; pl. 7, fig. 8.

Penaeus curcifer Ortmann, 1890: 451, pl. 36, fig. 5a, b.

Penaeus (Parapenaeopsis) tenellus, De Man, 1907: 435, 454.

Parapenaeopsis tenella, De Man, 1911: 9, 92. —Balss, 1914: 11. —Kubo, 1936: 58. —

Yoshida, 1941: 15, text-fig. 8; pl. 3, figs. 2-2'. —Hall, 1961: 89; 1962: 26, fig. 100-100b. —De Bruin, 1965: 98. —George, 1969: 17, 36. —Starobogatov, 1972: 370, pl. 7, fig. 85. —Holthuis, 1980: 33. —Motoh & Buri, 1984: 105, figs. 74, 75.

Parapenaeopsis tenellus, Kubo, 1949: 371, text-figs. —Liu, 1955: 16, pl. 4, fig. 2; pl. 5, figs. 6-9. —Dall, 1957: 221, fig. 29a-g. —Tung et al. 1959: 389 (list). —Racek & Dall, 1965: 108, pl. 8, fig. 10; pl. 13, fig. 8.

体形纤细,体长一般在 65 mm 以下。南海标本多小于 55 mm。黄海及东海标本额角短而直,仅伸至第 1 触角柄第 2 节中部附近;上缘基部微凸,齿数 6-8 个。南海标本的额角形状有一定变化,共有三种类型:一类额角短而直,与黄、东海标本相似;另一类额角长,伸至第 1 触角柄第 3 节末部,末端上扬,锯齿 7-8 个;再一类额角平直但较细,伸至第一触角柄第 3 节中部,齿数 7-9 个。头胸甲不具胃上刺,为本种特点。

采集地点: 山东半岛南岸以及江苏、浙江、福建、广东、广西。

分布区水深在 60 m 以内,多在 10 m 或更浅的水中栖息,能适应各种不同的底质。对温、盐度的适应范围较广。本种体形虽小,但为重要的经济种,以广东省产量较大。

地理分布: 广泛分布于印度西太平洋热带区,西自红海、印度,东到马来西亚、印尼,北到我国黄海和日本,南到澳大利亚北部。

角突仿对虾 *Parapenaeopsis cornuta* (Kishinouye, 1900) (图 2)

Penaeus cornutus Kishinouye, 1900: 23, pl. 7, fig. 9.

Parapenaeopsis cornuta, De Man, 1911: 93. —Racek, 1959: 10. —Lee & Yu, 1977: 87, fig. 59c (part). —Holthuis, 1980: 30. —Motoh & Buri, 1984: 100, figs. 69, 70, 73A.

Parapeneopsis cornutus, Maki & Tsuchiya, 1923: 43, pl. 4, fig. 1.

Parapeneopsis cornuta, De Bruin, 1965: 95.

Parapenaeopsis cornutus, Kubo, 1949: 374, figs. —Dall, 1957: 215, fig. 26a, f.

Parapenaeopsis cornuta cornuta, Racek & Dall, 1965: 98, pl. 8, fig. 2; pl. 13, fig. 3.

(not) *Parapenaeopsis cornutus*, Parisi, 1919: 64, pl. 5, figs. 1, 12.

体形较粗壮,甲壳厚,成虾体长 45-97 mm。雄虾最大体长为 85 mm,体长为 40 mm

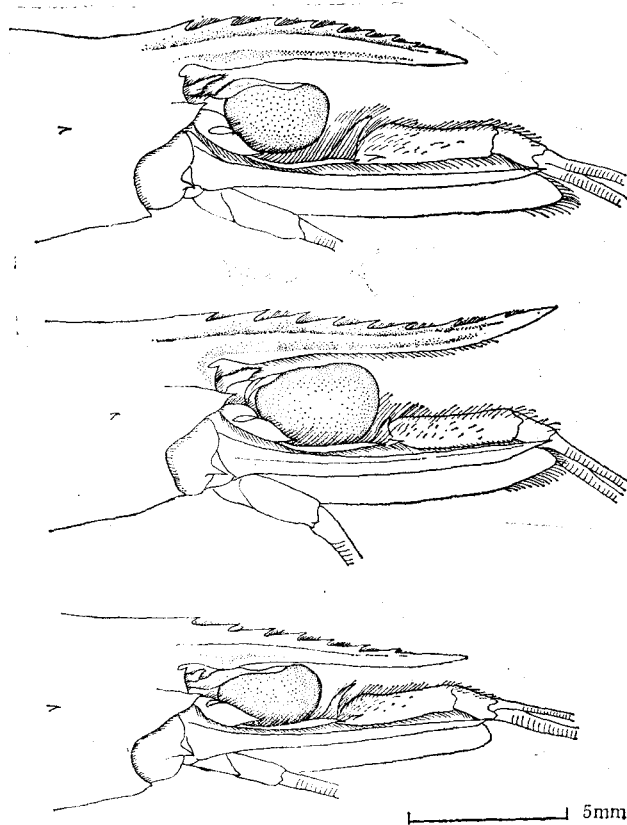


图1 细巧仿对虾 *Parapenaeopsis tenella* (Bate)
额角形状的变异(南海标本)

Fig. 1 *Parapenaeopsis tenella* (Bate)

variation in shape of rostrum (specimens collected from South China Sea)

者其交接器左右分开,说明尚未长成。

采集地点: 福建、广东、广西。以雷州半岛东岸数量较多。生活于水深 20m 以内的近岸浅海。

地理分布: 日本,中国东海、南海,印尼(爪哇),澳大利亚,斯里兰卡。

本种与钳突仿对虾 (*P. maxillipedo* Alcock) 形态十分近似,其不同点如表 1。

Racek and Dall (1965) 将上述 2 个近似种作为同一种的亚种处理,其理由就是形态差异太小。他们也认为这两种没有分布上的界限 (*P. maxillipedo* 的分布区为: 印度,斯里兰卡,马来西亚,菲律宾,伊里安岛,澳大利亚)。比较两种的分布区可以看出,在很大范围内为重叠分布。两个种形态区别清楚,没有明显的过渡或居间类型,因此应是独立的种而非地理亚种。有关这两个种的分类地位,在尚未进一步弄清其形态变化及分布上的特点之前就把它们作为相同的种合并,或仅作为一个种内的地理亚种处理,都欠妥当。

缺刻仿对虾(新种) *Parapenaeopsis incisa* Wang et Liu, sp. nov. (图 3)

? *Parapenaeopsis cornuta*, Lee & Yu, 1977: 87, fig. 59 A, B. (part)

正模标本: ♀ 1, 标本号 55-K363A, 王永良于 1955 年 6 月 16 日采自广东徐闻外罗。BL. 69.0mm, CL. 20.8mm, 额角齿式 7+1/0。

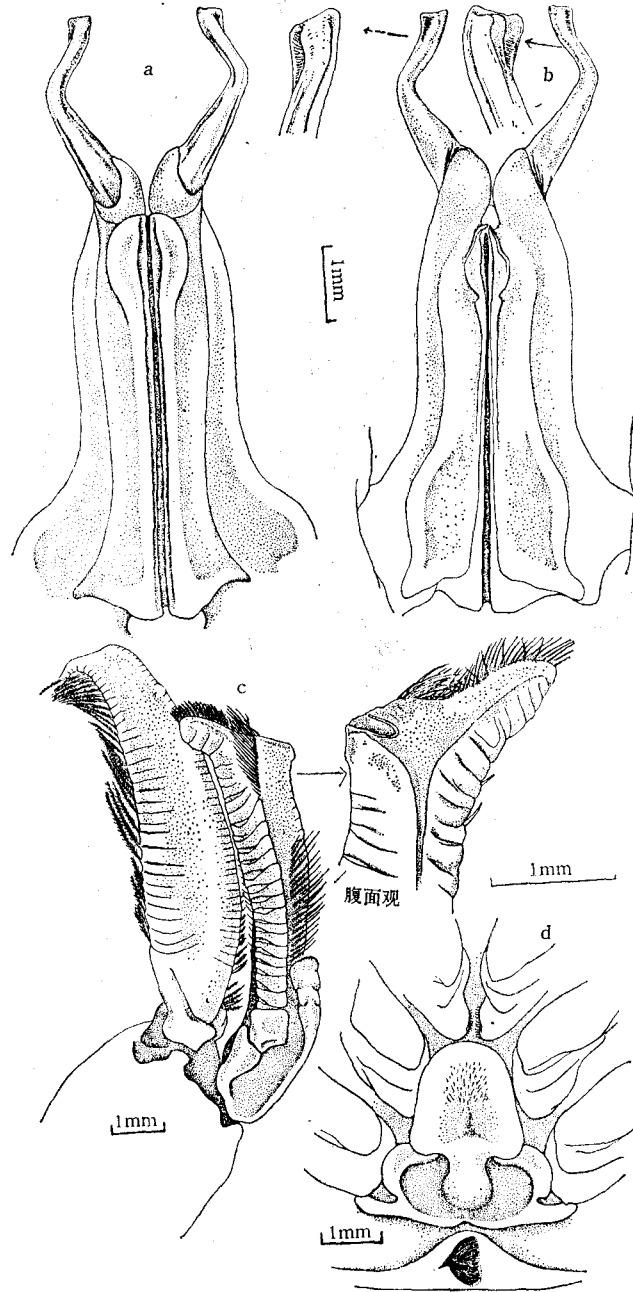


图2 角突仿对虾 *Parapenaeopsis cornuta* (Kishinouye)

Fig. 2 *Parapenaeopsis cornuta* (Kishinouye)

a, b. 分别为雄性交接器背面与腹面; c. 雄性第2腹肢内肢及附肢; d. 雌性交接器。

副模标本: ♂1, ♀1, 标本号 55-K252B, 王永良于1955年4月14日采自海南岛三亚。BL. ♂54.0 mm, CL. 14.3mm; ♀64.4mm, CL. 18.7mm, 额角齿式 7+1/0。

其它标本: ♂144, ♀200, 1954—1962 采自阳江, 闸坡, 湛江, 徐闻外罗, 硃洲岛, 海南岛清澜、三亚、

表 1

Tab. 1

	角突仿对虾 <i>P. cornuta</i>	钳突仿对虾 <i>P. maxillipedo</i>
额 角	齿式 6—8+1, 基部 2/3 向下弯	齿式 8—10+1, 基部 2/3 平直
额角后脊	伸至头胸甲 4/5—5/6 处, 中部小段平坦处向后变宽变低, 并逐渐不明显。	直达头胸甲后缘, 中部小段平坦处向后无显著变化
雌性第 3 步足	不具基节刺	有基节刺
喷 门 板	32—36 小刺 ^[12] 46—49 小刺 ^[12]	56—59 ^[12]

莺歌海, 北海。BL. 30—74mm。本新种分布范围限于珠江口以西的海域至北部湾内。常与角突仿对虾等虾相混杂。

体形较粗, 甲壳厚。体长 35—75 mm, 雌大雄小。

额角基部平, 末端尖而上弯, 上缘 6—8 齿, 多为 7 齿(不包括胃上刺), 仅基部第 1 齿在头胸甲上。额角后脊达头胸甲后缘, 脊的宽度前后无显著变化, 自中部向后有小段较平坦, 但不凹下成沟, 大形个体有时具一凹点。头胸甲心鳃沟以前的部分遍布密毛, 以眼眶触角沟中的毛较长。肝沟后半部较直, 与颈沟接近平行, 肝刺以前部分斜向前下方。无颊刺。纵缝长度不及头胸甲的 1/2, 后部有时不清, 其清晰可见部分不足头胸甲的 1/3; 横缝短。

腹部仅 4—6 节具背脊, 第 6 节背脊末端具刺。

眼较大, 角膜长轴约为头胸甲长的 1/4 左右。第 1 步足指节最少有 1/2 伸出头胸甲颊角。第 3 步足最长, 其掌节甚至长节末端 1/5 伸出第 2 触角柄腕。第 1, 2 步足具基节刺和肢鳃, 第 3 步足两性皆无基节刺。

雄性交接器, 钳状突起的末端向腹前方伸, 末端细, 其两侧无任何突起, 中部具明显的缺刻。

雄性第 2 腹肢内肢硬化变形, 呈长靴状, 其末缘(即靴底部分)中部向外突出, 并具长的刺毛丛; 雄性附肢由 3 节组成, 末节膨大。

雌性交接器, 前板窄长, 前端弧形, 两侧缘中部内凹, 基部向左右两侧伸出, 呈翼状, 小形个体中此翼状突较小。前板腹面中央凹下, 与后板相连处微突, 向后即为横的后板。后板两侧为近三角形侧伸的片状板。后板后方腹甲上具一束长丛毛, 其基部着生处呈半椭圆形, 后缘略平直。

本新种外形与 *P. sinica* 及 *P. cornuta* 十分近似, 其主要区别见表 2。

生活于水深 30m 以内砂泥底质浅海。雄虾最大体长为 63mm, 体长 36 mm 的雄虾交接器左右两半已合并。

中华仿对虾(新种) *Parapenaeopsis sinica* Liu et Wang, sp. nov. (图 4)

? *Parapenaeopsis cornutus*, Parisi, 1919: 64, pl. 5, figs. 1, 12.

? *Parapenaeopsis cornuta*, Lee & Yu, 1977: 87, fig. 59 D (part).

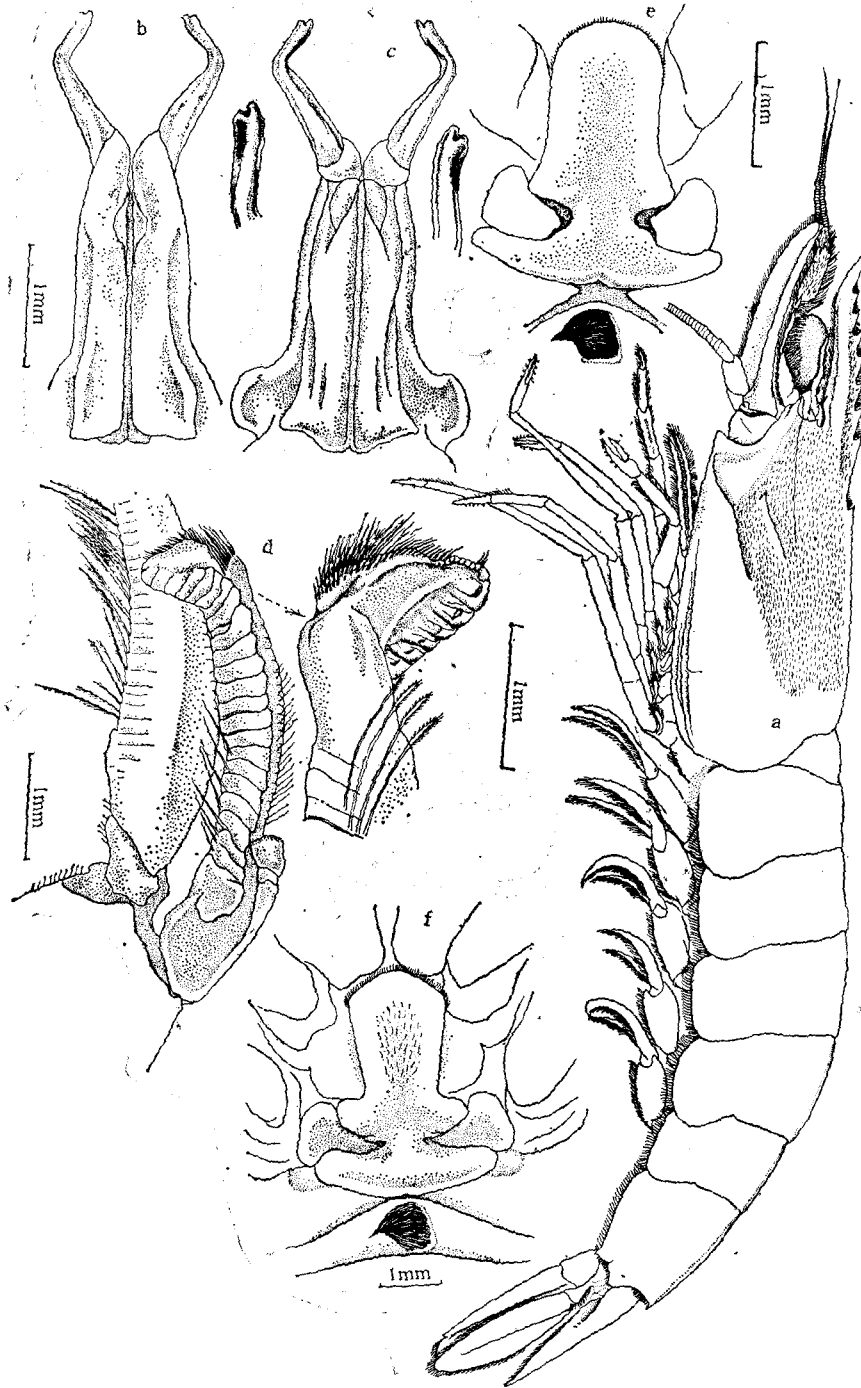


图3 缺刻仿对虾(新种) *Parapenaopsis incisa* Wang et Liu, sp. nov.

Fig. 3 *Parapenaopsis incisa* Wang et Liu, sp. nov.

a. 雌虾侧面; b, c. 分别为雄性交接器腹面与背面; d. 雄性第2腹肢, 示变形内肢及附肢; e. 雌性交接器(幼小个体); f. 雌性交接器(成体)。

(not) *Parapenaeopsis cornutus* (Kishinouye, 1900).

正模标本：♀1，标本号 55-K363B，王永良于 1955 年 6 月 16 日采自广东徐闻外罗。BL. 85.2 mm, CL. 26.5mm; 额角齿式 8+1/0。

副模标本：♂1, ♀1, 标本号 55-K444A, 刘瑞玉于 1955 年 12 月 7 日采自海南岛莺歌海。BL. ♂ 76.1mm, CL. 23.6mm; ♀ BL. 87.6mm, CL. 27.6mm; 额角齿式, ♂ 8+1/0, ♀ 9+1/0。

其它标本：♂ 205, ♀ 248, 1954—1976 年分别采自南澳岛, 海门, 珠江口, 闸坡, 湛江, 碇洲岛, 外罗, 海口, 莺歌海, 临高, 北海。BL. 35.7—94.5mm。本种分布范围自台湾经广东沿海进入北部湾内。

额角基部平直, 末端微向上弯, 上缘 7—10 齿, 多数 8 齿(不包括胃上刺), 末端尖。胃上刺小, 尖端向前平伸。额角后脊不达头胸甲后缘, 脊的中部向后有短而浅的中央沟, 沟前的脊窄, 沟后的脊宽。肝沟在肝刺以前部分斜伸向前下方, 肝刺以后部分较直, 与颈沟接近平行。具心鳃沟, 内生短毛。触角刺上方纵缝的长度小于头胸甲的 1/2。鳃区中部具短的横缝。腹部第 4—6 节具背脊。

眼较大, 第 1 触角柄内侧附肢不达角膜前缘。第 1 步足指节的 1/2 或更少的部分伸出头胸甲颊角。第 3 步足最长, 至少掌节的 1/2 伸过第 2 触角柄腕, 指节的 1/2—1/3 超出第 3 颚足。5 对步足皆具外肢, 第 1, 2 步足具基节刺和肢鳃, 第 3 步足两性皆不具基节刺。

雄性交接器, 钳状突起较粗壮, 其顶端向腹面伸, 顶端的两侧各具片状的小突起, 外侧的突起稍大, 似锄头状, 与 *P. incisa* 和 *P. cornuta* 显著不同。(表 2)

雄性第 2 腹肢内肢形状正常, 不变形。雄性附肢由 3 节组成, 末节膨大, 顶端表面不平, 并向腹面伸出突起。

雌性交接器, 前板似球拍状, 基部狭窄, 形成两条脊, 两脊间为中央纵沟。后板短, 后

表 2

Tab. 2

	中华仿对虾(新种) <i>P. sinica</i> Liu et Wang, sp. nov.	缺刻仿对虾(新种) <i>P. incisa</i> Wang et Liu, sp. nov.	角突仿对虾 <i>P. cornuta</i> (Kishinouye)
雄性交接器	钳状突起粗壮, 顶端膨大, 两侧各具片状突, 顶缘凸呈锄头状	钳状突起纤细, 顶端不膨大, 两侧无突起, 顶缘中央有明显的缺刻	钳状突起较细, 末端微膨大, 顶缘平截或微凹, 无显著缺刻, 外末角突出
雄性第 2 腹肢内肢	形状正常, 不变形	变形, 呈长靴状, 其顶缘中部凸, 有长刺毛丛突出	变形, 呈长靴状, 其顶缘中部凹下, 具刚毛
雌性交接器	前板球拍状, 有明显的中央纵沟, 两侧不特殊扩大, 后板中央无圆突	前板长, 基部两侧具侧突起。后板宽短, 中央无圆突	前板方圆形, 略呈舌形, 较宽短, 基部无明显的侧突起。后板中央具一圆形突起
最末胸节腹甲	具一横排疏短毛	具一丛密长毛, 毛的基部着生处呈卵圆形	具一丛密长毛, 毛的基部着生处呈半椭圆形。生活时毛为蓝色
额角齿(不计胃上刺)及额角后脊	7—10, 多数 8 齿。额角后脊上有短中央沟, 沟后脊较宽, 后端不达头胸甲后缘	6—8, 多数 7 齿。额角后脊无中央沟, 最多具一凹点, 脊后部不变宽, 后端达头胸甲后缘	7—8, 多数 7 齿。额角后脊仅大形标本有很短中央沟, 沟后部分脊变宽, 变低和逐渐不明显, 后端不到头胸甲后缘
头胸甲心鳃沟	明显, 沟内有短毛	不明显, 无短毛	不明显, 无短毛
在我国的分布区及水深	台湾西南部到北部湾内, 水深在 50m 以内	珠江口以西到北部湾内, 水深在 30m 以内	福建沿海到北部湾内, 水深在 20m 以内

缘脊状,两侧向前形成两个大半圆形突起,抱于前板窄柄的两侧。后板后方腹甲上具横排的一行疏短毛。

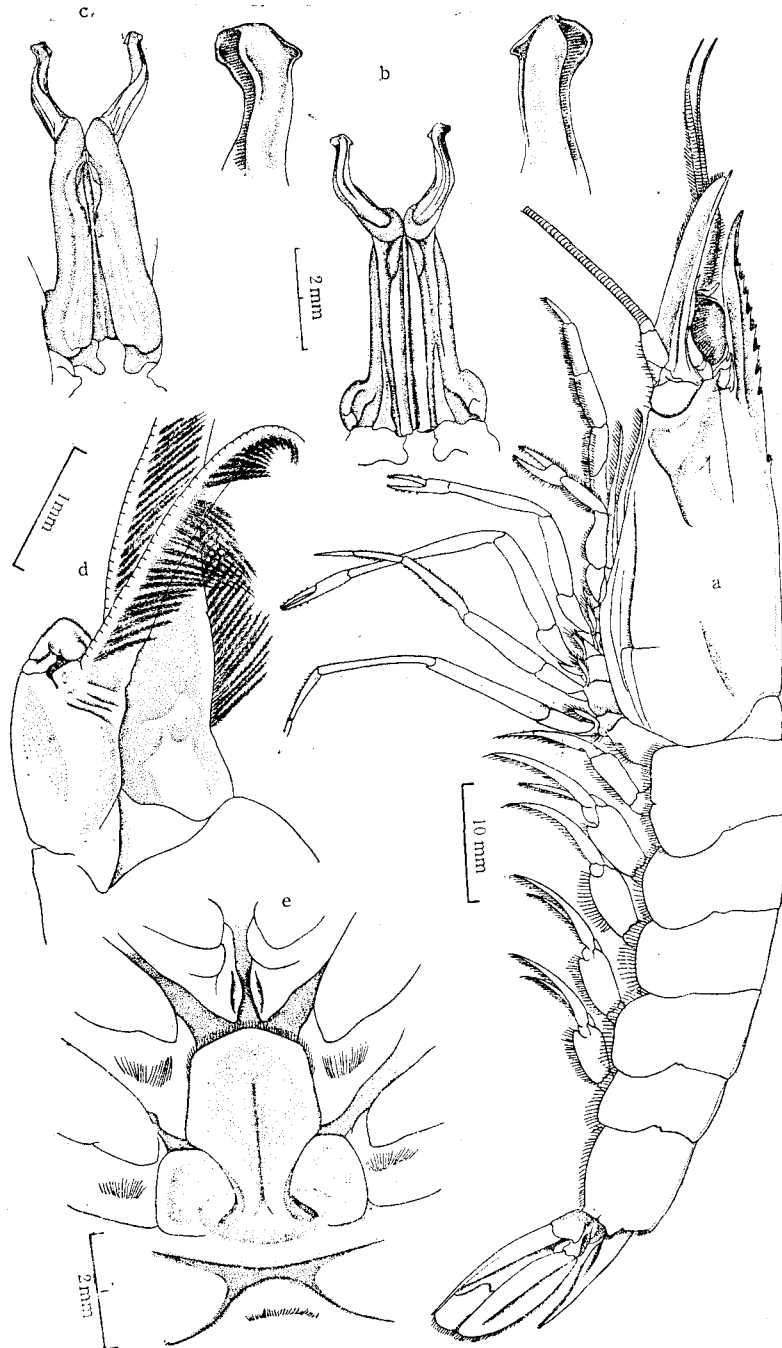


图4 中华仿对虾(新种) *Parapenaeopsis sinica* Liu et Wang, sp. nov.

Fig. 4 *Parapenaeopsis sinica* Liu et Wang, sp. nov.

a. 雌虾侧面; b, c. 分别为雄性交接器背面与腹面; d. 雄性附肢; e. 雌性交接器。

本种雌虾大于雄虾,雄虾体长一般在 80mm 以内,雌虾体长可达 95mm。体长 40mm 的雄虾其交接器左右分离,即尚未长成。三种近似种 *Parapenaeopsis sinica*, *P. incisa*, *P. cornuta* 的特征比较见表 2。

生活于各种砂底的浅海,水深一般在 50 m 以内,渔业生产中常与 *P. cornuta*, *P. incisa*, *P. hardwickii* 及 *P. cultrirostris* 相混杂,有一定产量。

哈氏仿对虾 *Parapenaeopsis hardwickii* (Miers, 1878) (图 5)

Penaeus hardwickii Miers, 1878: 300, pl. 17, fig. 1.

Penaeus sculptilis, Henderson, 1893: 448 (part).

Parapeneopsis sculptilis var. *hardwickii*, Alcock, 1906: 39.

Parapeneopsis hardwickii, Burkenroad, 1934: 60, figs. 15, 16.

Parapenaeopsis hardwickii, Yu, 1935: 165. —Kubo, 1949: 385, figs. —Tung et al., 1959: 390, fig. 3. —Cheung, 1960: 65. —Racek & Dall, 1965: 101, pl. 13, fig. 4(part). —George, 1969: 17, 36. —Starobogatov, 1972: 370, pl. 7, fig. 80. —Tirmizi, 1972: 189, fig. 18. —Shen and Liu, 1976: 46 (part). —Lee & Yu, 1977: 84, figs. 56, 57. —Holthuis, 1980: 31. —Ahmed and Moazzam, 1982: 102, fig. 1A (part).

体粗壮,体长在 100 mm 以内,雌大于雄。

生活于沿岸水深 70 m 以内,可栖息于各种不同底质的海底。我国自江苏省以南海区均有分布,以广东雷州半岛及北部湾中产量较大,是重要经济种。

采集地点: 江苏、浙江、福建、广东、广西。

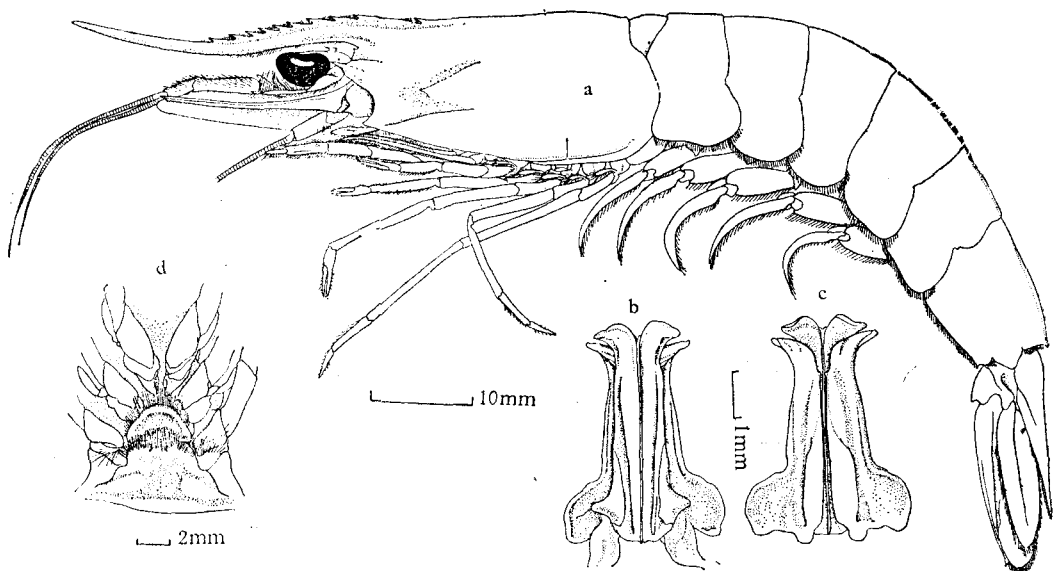


图 5 哈氏仿对虾 *Parapenaeopsis hardwickii* (Miers)

Fig. 5 *Parapenaeopsis hardwickii* (Miers)

a. 雌虾侧面; b, c. 分别为雄性交接器背面与腹面; d. 雌性交接器。

地理分布: 巴基斯坦,印度,新加坡,印尼,马来西亚,中国近海(南黄海、东海、南海)。

刀额仿对虾 *Parapenaeopsis cultrirostris* Alcock (图 6)

Parapenaeopsis sculptilis var. *cultrirostris* Alcock, 1906: 39, pl. 7, fig. 23.

Parapenaeopsis cultrirostris, Yu, 1935: 116. —Kubo, 1949: 378, figs. —Tung et al., 1959: 392, fig. 4. —Lee & Yu, 1977: 89, figs. 60, 61.

Parapenaeopsis hardwickii, Hall, 1962: 26, fig. 104—104c. —Racek & Dall, 1965: 101, pl. 8, fig. 4 (part). —Ahmed and Moazzam, 1982: 103, fig. 1B (part).

体粗壮,体长一般在 105mm 以内,雌大于雄。

额角两性形状不同: 雄者匕首形,显著短,伸至第 1 触角柄第 2 节中部,上缘微凸,末部微下弯,全长具 7—9 齿(不包括胃上刺)。雌性额角颇长,末端上扬,与哈氏仿对虾相似,但长度一般短于头胸甲。

本种雌性个体外形与哈氏仿对虾极为相似,几乎难以区别,幼小个体更难区分。两种雌虾成体比较见表 3。

生活于沿岸浅水区,黄东海分布区水深为 16—61 m,南海在 45m 以内。

采集地点: 江苏、浙江、福建、广东、广西。以雷州半岛东西两岸产量较大。

地理分布: 印度,马来西亚,中国近海。

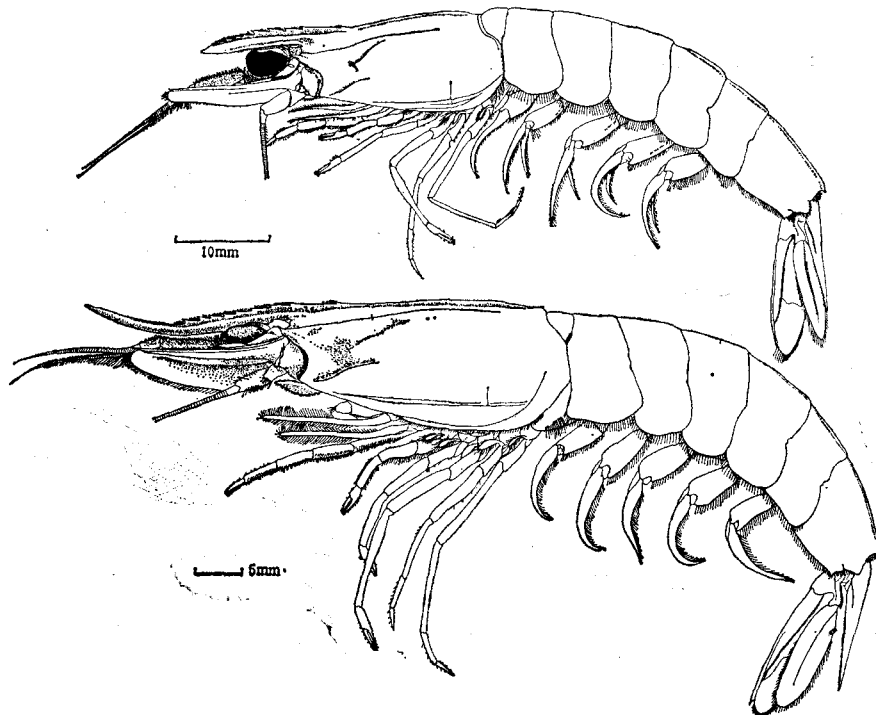


图 6 刀额仿对虾 *Parapenaeopsis cultrirostris* Alcock

Fig. 6 *Parapenaeopsis cultrirostris* Alcock

雌虾侧面; (下图) 雄虾侧面 (上图)。

在我们的标本中，哈氏仿对虾的额角没有两性的差异(不论幼虾或成虾)，而刀额仿对虾的额角雄、雌有明显不同。然而 Hall (1962) 误将 *P. hardwickii* 与 *P. cultrirostris* 鉴定为同一种，他认为 *P. hardwickii* 的额角是雌、雄异形，雄性的额角为刀形。其实 Hall (1962) 的图 104a, 104c 明显地是刀额仿对虾的雄性，其雄性交接器的两侧缘微呈弧形，与两侧缘直的哈氏仿对虾不同。同样 Racek and Dall (1965) 的雄性标本 (pl. 8, fig. 4) 也是刀额仿对虾。Holthuis (1980: 32) 将本种列为 *P. sculptilis* (Heller) 的同物异名，显然有误，因后者主要分布于印度至马来西亚间，不见于中国沿海。Ahmed and Moazzam (1982) 认为 *P. hardwickii* 的雄性个体有二种类型，除额角形状不同外，交接器及雄性附肢的外形皆有不同。实际上那是二个完全不同的种，即图 1A 是 *P. hardwickii*，而图 1B 为 *P. cultrirostris*。

本种在过去有关文献中，只记载雄性标本而无雌性，主要是由于两性额角形状不同，雌性额角及体形与哈氏仿对虾极为相似，因此各作者将二者混淆，都鉴定为哈氏仿对虾。

表 3

Tab. 3

	哈氏仿对虾(雌) <i>P. hardwickii</i>	刀额仿对虾(雌) <i>P. cultrirostris</i>
额 角	皆长于头胸甲	一般短于头胸甲，少数略长于头胸甲
第 1 步足	指节的 1/2—1/4 超出头胸甲颊角	指节不到头胸甲颊角
第 3 步足	指节最少有 2/3 超出第二触角柄末端	指节最多有 1/2 超出第 2 触角柄末端
第 4 步足	掌节至少有 1/3 伸过头胸甲颊角	指节的一部分或全部伸过颊角
第 5 步足	至少指节全部(一般还有部分掌节)超出第 2 触角柄末	最多指节的 1/3 超出第 2 触角柄末，一般指节末端不及第 2 触角柄末

亨氏仿对虾 *Parapenaeopsis hungerfordi* Alcock (图 7)

Parapenaeopsis hungerfordi Alcock, 1905: 530. —Burkenroad, 1934: 67, figs. 18—24. —Hall, 1961: 91; 1962: 26, fig. 102—102b.

Parapenaeopsis hungerfordi, Balss, 1924: 44. —Yu, 1935: 166. —Kübo, 1949: 381, figs. —Cheung, 1960: 65. —Racek & Dall, 1965: 106, pl. 8, fig. 5; pl. 13, fig. 7. —Starobogatov, 1972: 370, pl. 7, fig. 81. —Holthuis, 1980: 31.

体粗壮，体长 40—95mm，雄性小于 80 mm。额角长，超出第 1 触角柄末端，一般雌性者较长，上缘 6—7 齿，有 2 齿在头胸甲上(不计胃上刺)。额角后脊伸至头胸甲后缘附近。第 1, 2 对步足具基节刺，不具肢鳃。5 对步足皆具外肢。

生活于近岸泥砂底或泥底的浅海，一般栖息于 20m 以内，分布区水深可达 45m。

采集地点：福建、广东、广西沿海。

地理分布：马来西亚，印尼及中国东海、南海。

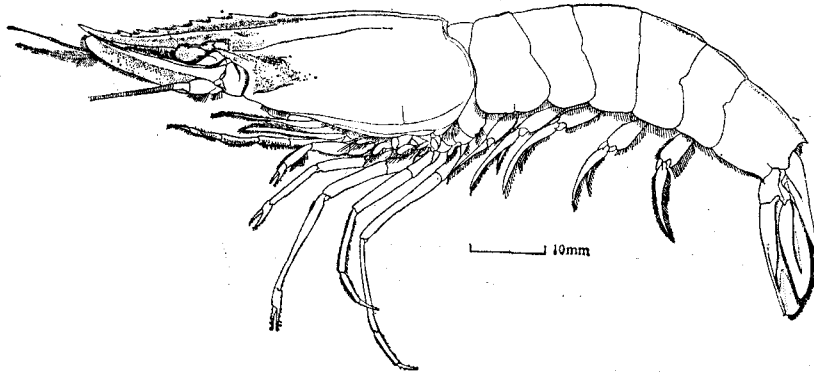


图7 亨氏仿对虾 *Parapenaeopsis hungerfordi* Alcock
(雌虾侧面)

Fig. 7 *Parapenaeopsis hungerfordi* Alcock (female)

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STUDIES ON CHINESE SPECIES OF THE GENUS *PARAPENAEOPSIS* (DECAPODA, CRUSTACEA)*

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ABSTRACT

In the course of studying the Chinese penaeoid shrimps the present authors recognized the necessity of dealing separately with the species belonging to each one of several genera which are of economic and taxonomic importance. The present article is the first of a series of papers dealing with those genera belonging to Penaeoidea.

In this paper the Chinese species of the genus *Parapenaeopsis* (Decapoda, Crustacea) were reported, among the 7 identified species, 2 are described as new to science. The genus *Parapenaeopsis* is one of the natural group of small sized shrimps inhabiting mainly shallow coastal areas of tropical and subtropical seas in the Indo-West Pacific. Some species are morphologically similar and are difficult to be distinguished such as *P. cornuta* (Kishinouye), *P. incisa* Wang et Liu, sp. nov. and *P. sinica* Liu et Wang, sp. nov.. Detailed illustrations of the pectasma, thelycum and appendix masculina of those morphologically similar species are given for comparison. The type materials of the new species are deposited in the Institute of Oceanology, Academia Sinica at Qingdao.

The authors are much indebted to Dr. M. Omori of The Tokyo University of Fisheries,

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	<i>Parapenaeopsis sinica</i> Liu et Wang, sp. nov.	<i>P. incisa</i> Wang et Liu, sp. nov.	<i>P. cornuta</i> (Kishinouye)
Petasma	Caliper-shaped process thicker, distal end laterally produced into plates, apical margin convex, plough-shaped	Caliper-shaped process thinner, distal end not produced laterally; apex with small incision	Caliper-shaped process slender, distal end slightly produced laterally; apex without incision, slightly produced on outer margin
Endopod of male pleopod 2	normal in shape, not corneous and never modified into firm boot-shaped process	Modified into a firm boot-shaped process. Apical margin produced at middle, with tuft of long bristles	Modified into boot-shaped process. Apical margin slightly concave, with tuft of short bristles
Thelycum	Anterior plate rounded racket-shaped, with longitudinal median groove, basal portion not laterally produced. Posterior plate with median round tubercle	Anterior plate oblong and rounded, laterally produced at base. Posterior plate short and broad, without round tubercle at middle	Anterior plate quadra-oblong, slightly shorter and broader, without lateral process. Posterior plate with a round tubercle at middle
Rostral teeth and post-rostral carina	7-10/0, mostly 8/0. Post-rostral carina broad, not reaching posterior margin of carapace, with median groove	6-8/0, mostly 7/0. Median groove on post-rostral carina indistinct, at most a pit; posterior half of carina narrower, reaching posterior margin of carapace	7-8/0, mostly 7/0. Median groove presents only in larger individuals, posterior part of carina narrower, lower and gradually diminished, not reaching posterior margin of carapace
Branchio-cardiac sulcus	Distinct, with short hairs	Indistinct, without short hairs	Indistinct, without hairs
Sternite of last thoracic somite	With a transverse row of scattered hairs	With an oblong tuft of long and dense hairs	With a tuft of long and dense hairs
Distribution in China	From South-western Taiwan to Gulf of Tonkin, in waters not more than 50 m deep	From west of Pearl River to Gulf of Tonkin, less than 30 m deep	From Taiwan Strait to Gulf of Tonkin, less than 20 m deep (coastal waters)

Japan for the loan of materials identified by the late Prof. I. Kubo for comparison.

***Parapenaeopsis incisa* Wang et Liu, sp. nov. (fig. 3)**

Body robust, integument moderately thick. Body length of adult 35—75 mm.

Rostrum horizontal in proximal half or $2/3$, upturned distally, acute at tip, reaching end of second, or middle of third segment of antennular peduncle, rarely to end of third segment; with 6—8 teeth (mostly 7) on upper border (excluding epigastric tooth), the first tooth posterior to orbital margin. Post-rostral carina reaches posterior margin of carapace, evenly broad throughout its length, with certain flatten area (small pit in larger individual) on posterior half, but never sulcated (or grooved). Densely hirsuted on area before branchio-cardiac sulcus, hairs in orbito-antennal sulcus longer. Hepatic sulcus straight in posterior portion, sub-parallel with cervical sulcus, anterior portion obliquely inclined to pterygostomian angle which is acute, though not spined. Longitudinal suture less than $1/2$ length of carapace, posterior portion indistinct. Transverse suture short.

Abdomen longitudinally carinated from somites 4 to 6. Telson without fixed or movable marginal teeth.

Eyes rather large. Cornea $1/4$ as long as carapace. Antennular peduncle with stylocerite reaching distal extremity of cornea, prosartema not reaching distal end of cornea. Antennule scale reaching distal end of antennular peduncle.

Maxillar palp unsegmented. Maxilliped 1 with 5-segmented endopod. Maxilliped 3 thin, reaches distal end of 1st segment of antennular peduncle, with ultimate segment surpassing distal end of carapocerite. Pereiopod 1 with at least distal half of adactylus surpassing pterygostomian angle. Pereiopod 2 with distal half or entire dactylus surpassing carapocerite. Pereiopod 3 longest, with propodus or even $1/5$ of merus surpassing carapocerite. Pereiopod 5 with $3/4$ or whole dactylus (rarely $1/3$ propodus) surpassing pterygostomian angles. Basial spines and epipodites present on pereiopod 1 and 2. Pereiopod 3 without basial spine in both sexes.

Petasma. Distal end of lateral process caliper-shaped, directed antero-inferiorly, distal end thinner, without lateral expansions or processes, but with a small apical incision. (fig. 3). Appendix masculina 3-articulated, with inflated distal article. Endopod of pleopod 2 modified in male, forming a corneous boot-shaped process, distal margin convex at middle, with a tuft of long spine-shaped setae.

Thelycum. Anterior plate longer and comparatively narrower, anterior margin arcuated, lateral margins slightly concave at middle and produced laterally at base, forming a wing-like process, which is small in young individuals. Middle portion of ventral surface of anterior plate concave, slightly produced at its posterior end, behind it is the transversely produced posterior plate, with a sub-triangular plate on each sides of it. Behind it is a tuft of long hairs, its posterior margin being straight.

The present new species is similar to *P. cornuta* (Kishinouye) and *P. sinica* sp. nov. but different in the structure of petasma and thelycum, and the pattern of hirsute area on carapace. The differences between them are shown in Table 1. This new species lives in inshore area of shallow coastal waters in South China Sea, which is less than 30 meters deep, with sandy mud bottom.

Holotype: adult female. No. 55-K363 A, Wailuo, Xuwen County, Guangdong, 1955.
16. Wang Yongliang coll. BL. 69.0 mm (CL. 20.8 mm).

Paratypes: 1♂, 1♀, No. 55-K25B, Sanya, Hainan Is., Guangdong, 1955. 4. 14. Wang Yongliang coll. ♂ BL. 54.0 mm, CL. 14.3 mm; ♀ BL. 64.4 mm, CL. 18.7 mm.

Other materials: ♂ 144, ♀ 200, collected from various localities along the coast of Guangdong and Guangxi, ranging from Pearl River Estuary west to Gulf of Tonkin. It is found commonly in catches of local shrimp trawlers.

***Parapenaopsis sinica* Liu et Wang, sp. nov. (fig. 4)**

Rostrum straight in proximal two thirds, acute and slightly turned upward at tip, reaching distal end of second segment (rarely to middle of 3rd segment) of antennular peduncle, armed with 7—10 (mostly 8) teeth on upper margin, excluding the epigastric tooth which is small, with its tip directed anteriorly. Post-rostral carina does not reach posterior margin of carapace, narrower in front of the median groove, and broader posterior to it, with short and shallow median groove after middle of carapace. Hepatic groove with the anterior part before hepatic spine inclined downwards to pterygostomian angle, its posterior portion straight and almost parallel with cervical groove. Branchio-cardiac sulcus with short hairs; pterygostomian angle acute. Longitudinal suture less than 1/2 length of carapace; transverse suture short, at middle of branchial region. Ratio of carapace to body length are 0.24—0.30 (♂), and 0.30—0.32 (♀) respectively.

Abdominal somite 4—6 with dorsal longitudinal carina, posterior end of carina with a distal spine. Telson without subapical spines on lateral margin.

Cornea large. Prosartema does not reach anterior border of cornea. Maxilliped 3 reaches distal extremity of first segment of antennular peduncle. Dactylus of pereopod 1 with distal half surpassing pterygostomian angle. Pereopod 2 with dactylus reaching or surpassing distal end of carpocerite. Pereopod 3 longest, at least with distal half of propodus surpassing carpocerite, 1/3—1/2 of dactylus surpassing maxilliped 3. Pereopod 5 with distal 1/2 or the whole length of dactylus surpassing carpocerite. Pereopod 1—5 with exopods. Basial spines and epipods present on pereopod 1 and 2. Basial spine absent on pereopod 3 in both sexes.

Petasma. The caliper-shaped arms more thicker and with lamellae on both sides of its apex which is ventrally directed, the outer one is larger. Appendix masculina 3 segmented, distal one inflated, apex not smooth, with ventrally directed process.

Endopod of pleopod 2 in male normal, does not modified to form a hard, boot-shaped process.

Thelycum. Anterior plate spatulate; basal portion narrow, forming 2 parallel longitudinal ridges, between them is a longitudinal median groove; posterior plate short, ridged on posterior margin, lateral portion directed anteriorly, forming 2 large semicircular processes on both sides of the narrow peduncle of anterior plate, behind the posterior plate is a tuft of setae (shorter and more scattered).

The present new species is similar to *P. incisa* sp. nov. and *P. cornuta* but differs from them in the male pleopod 2 being normal, never modified to form a boot-shaped process.

Holotype: adult female, No. 55-K363B, Wailuo, Xuwen County, Guangdong, 1955. 6. 16. Wang Yongliang coll. BL. 85.2 mm CL. 26.5 mm.

Paratypes: ♂ 1, ♀ 1, No. 55-K444A, Yinggehai, Hainan Island, Guangdong, 1955. 12. 7. Liu Ruiyu coll. ♂ BL. 76.1 mm, CL. 23.6 mm; ♀ BL. 87.6 mm, CL. 27.6 mm.

The present new species lives in shallow coastal waters less than 50 m deep, with muddy

sand, silt, fine sand, middle sand and coarse sand bottom, usually associated with *P. cornuta*, *P. incisa*, *P. hardwickii* and *P. cultrirostris*, common in catches of shrimp trawls and fixing nets. Maximum body length of male, up to 80 mm., of female, 95 mm.

Comparisons of *Parapenaeopsis incisa* Wang et Liu, sp. nov., *Parapenaeopsis sinica* Liu et Wang, sp. nov., and their allies, *P. cornuta* (Kishinouye) are given in table.
