

中国近海的蔓足类*

II. 笠藤壶科

任先秋 刘瑞玉

(中国科学院海洋研究所)

本文是中国近海蔓足类研究报告的第二部分, 根据的材料是中国科学院海洋研究所历年采集收藏的标本。共记述笠藤壶科 *Tetraclitidae* 的9种, 分隶于2亚科4属, 其中有一新属——星笠藤壶属 *Astroclita* gen. nov., 2新种, 另有1种为我国首次记录。新种的模式标本保存在中国科学院海洋研究所。

笠藤壶在我国主要分布于长江口以南的亚热带和热带海区, 是潮间带岩岸生物群落组成中的主要种类, 特别是大型的鳞笠藤壶 *Tetraclita squamosa squamosa* (Bruguière) 和日本笠藤壶 *Tetraclita japonica* Pilsbry 等也可以附着于浮标、船底或码头上, 有一定的危害。

Darwin (1854) 和 Pilsbry (1916) 都将 *Tetraclita* Schumacher (1817) 归于藤壶科的藤壶亚科 *Balaninae*; Gruvel 于1903年建立了笠藤壶亚科 *Tetraclitines*, 并将它与 *Chamoesiphonés* 亚科并列于 *Tétramérides* 科中 (Gruvel, 1905, pp. 282, 284)。Nilsson-Cantell (1921) 将 *Tetraclitinae* 作为藤壶科 (*Balanidae*) 的亚科。直到1968年, Ross 才将它提升到科级单元, 并于1969年作了全面修订。他将 *Tetraclita* 属中原有的3个亚属 *Tetraclita*, *Tetraclitella* 和 *Tesseropora* 提升为属, 同时另建立了 *Tesseroplax* 和 *Newmanella* 两个新属。1970年, Ross 又建立一新属——*Epopella*。最近, Newman & Ross (1976) 在全面修订藤壶亚目的分类系统时, 将原隶于藤壶科的 *Austrobalanus* 属转入 *Tetraclitidae* [Ross 1971年曾指出 *Balanus* (*Austrobalanus*) *imperator* Darwin 实际上是笠藤壶科的成员], 并将这一科分为 *Austrobalaninae*, *Tetraclitellinae* 和 *Tetraclitinae* 三个亚科。加上本文描述的新属 *Astroclita* gen. nov., 本科共有8属。

笠藤壶科国内过去缺乏系统研究, 国外对我国海区的种仅有个别报道, 但有的种在鉴定上尚有一定的问题。本文对一些亚种进行了必要的修订。

笠藤壶科 Family TETRACLITIDAE Gruvel, 1903

Tetraclitines Gruvel, 1903, p. 160.

Tetraclitines (*Tetraclitinae*) Gruvel, 1905, p. 284.

Tetraclitinae Nilsson-Cantell, 1921, p. 357.

Tetraclitidae Ross, 1968, p. 6; 1969, p. 238; Newman & Ross, 1976, p. 46.

壳壁4片或6片, 结合松散或石灰化牢固; 壁内有多排或一排纵管, 或无管而只具长

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短不同的隔片或粗糙的肋；幅部发达或退化，基底膜质或石灰质。大颚下角呈栉状或粗锯齿状。上唇不膨鼓。第 2 和 3 蔓足有特化(羽状或其他形状)刚毛。无尾附肢(Caudal appendage)；交接器无背突。第 3 蔓足两分枝或一分枝正常或为触角型。主要栖息于热带和亚热带潮间带和潮下带。

亚科和属的检索表

1. 壁板内无纵管，但有长短不同的纵隔片或基缘有不规则的脊或尖突…… [Austrobalaninae Newman & Ross]。
 2. 壳壁板 6 片，内面基缘有不规则尖突或脊…… Genus *Austrobalanus*
 - 2' 壳壁板 4 片，内面有长短不同的纵隔片…… Genus *Epopella*
- 1' 壁板内有纵管。
 2. 壁板幅部有横管…… [Tetraclitellinae Newman & Ross]。
 3. 幅部顶缘水平，关节缘无齿；楯板横延，无压肌脊…… Genus *Tetraclitella*
 - 3' 幅部顶缘斜，关节缘有齿；楯板三角形，有压肌脊…… Genus *Newmanella*
 - 2' 幅部坚实，无横管…… [Tetraclitinae Gruvel]。
 3. 壁板仅有一排纵管。
 4. 板管无横隔片，楯板有压肌脊…… Genus *Tesseropora*
 - 4' 板管有横隔片，楯板无压肌脊…… Genus *Tesseroplax*
 - 3' 板管多于 2 排。
 4. 大型种，壁板结合牢固，外表无强肋；楯板外表较平，内面有压肌脊…… Genus *Tetraclita*
 - 4' 小型种，壁板结合松散，有强纵肋；楯板外表起皱成齿，内面无压肌脊…… Genus *Astroclita* nov.

笠藤壶亚科 Subfamily Tetraclitinae Gruvel, 1903

笠藤壶属 Genus *Tetraclita* Schumacher, 1817

Tetraclita Schumacher, Essai sur le Nouveau, Syst. & C., 1817, p. 91; Nilsson-Cantell, 1921, p. 358; Hiro, 1939, p. 270; Ross, 1968, p. 8; Newman & Ross, 1976, p. 47.

壳陡圆锥形，有时压低，一般色浓暗，幅部较窄或全缺，无管，顶缘斜，关节缘多数有齿；壁板内有多排不规则的纵管；楯板长大于宽，有清楚的压肌脊；背板窄长，距发达；大颚 4 齿，下角栉状。栖息于潮间带，附着于岩石和碎壳上。

种的检索

1. 幅部宽阔，楯板闭壳肌脊与关节脊间形成深窝；背板宽，距短…… 兰笠藤壶 *Tetraclita coerulea*
- 1' 幅部很窄或全缺，楯板闭壳肌脊与关节脊间隔以浅沟；背板窄，距长而尖。
 2. 壳口小，表面纵肋细密，蓝绿色；楯板开闭缘有 9—14 个小斜齿；第 3 蔓足无双锯齿刚毛…… 鳞笠藤壶 *Tetraclita squamosa squamosa*
 - 2' 壳口较大，表面纵肋粗糙，灰紫色；楯板开闭缘有 2—5 个大齿；第 3 蔓足有双锯齿刚毛…… 日本笠藤壶 *Tetraclita japonica*

鳞笠藤壶 *Tetraclita squamosa squamosa* (Bruguière, 1789)

(图版 I: 1—11)

- Balanus squamosus* Bruguière. Encyclop. Method., 1789, p. 170.
Lepas porosa Gmelin. Syst. Naturae, 1791, 13, ed. p. 3212.
Tetraclita porosa var. (3) *viridis* Darwin, 1854, p. 329, Gruvel, 1905, p. 228.
Tetraclita porosa var. *viridis*: Krüger, 1911, p. 61, pl. 4, fig. 41b.
Tetraclita squamosa squamosa: Pilsbry, 1916, p. 251; Utinomi, 1968, p. 178.
Tetraclita porosa viridis: Nilsson-Cantell, 1921, p. 364; 1930, p. 17; 1931, p. 115; 1934a, p. 71; 1934b, p. 61; 1938, p. 76.

Tetraclita squamosa forma *viridis*: Broch, 1922, p. 337; 1931, p. 116.

Tetraclita porosa perfecta Nilsson-Cantell, 1931, p. 133, fig. 8, pl. II.

Tetraclita squamosa viridis: Hiro, 1937a, p. 463; 1937b, p. 66, fig. 15a, b; Utinomi, 1954, p. 23; 1958, p. 304; Zevina & Tarasov, 1963, p. 95.

标本采集地 浙江省嵊山、青浜、舟山, 福建省三沙、南屿、崇屿、平潭、崇武、厦门、东山, 广东省海门、遮浪、平海、上川岛、碇洲岛、三门岛、外罗、琼州海峡、海南岛沿岸、西沙群岛石岛, 广西壮族自治区北海、涠洲岛。

本种是东海和南海中国沿岸常见的大型种。它栖息于潮间带和潮下带, 常附着于岩石、码头或浮标上, 同 *Tetraclita japonica* Pilsbry, *Balanus albicostatus* Pilsbry, *Chthamalus withersi* Pilsbry 等种混栖。最大标本峰吻径为 51.9 mm。

本种学名使用较为混乱, 列于 *T. squamosa* 种下的有不少亚种, 都应作进一步整理研究, 澄清其分类地位。

在福建、广东等地采到的大量标本中, 年轻个体外壳未被腐蚀, 壁板具外膜和纵肋, 有带角质刺的生长线; 壁板的幅部清楚; 背板距窄而长。而年老的标本则壳多被腐蚀, 裸露蓝绿色纵肋, 幅部全无; 同时即使是外壳腐蚀较重的标本中, 闭壳肌脊上部与关节脊相愈合的特征也明显。这种情况说明 Nilsson-Cantell (1931) 报告在我国福建三都澳所采的 *Tetraclita porosa perfecta* 标本, 实际是 *Tetraclita squamosa squamosa* 较年轻的个体, 前者应为后者的同物异名。

地理分布 东海、南海(中国近岸), 日本, 马来群岛, 澳大利亚, 印度洋, 大西洋(西非, 巴西)。

日本笠藤壶 *Tetraclita japonica* Pilsbry, 1916

(图 1; 图版 I: 12—20)

Tetraclita porosa var. *nigrescens* Krüger, 1911, p. 61, fig. 41e. (not Darwin).

Tetraclita squamosa japonica Pilsbry, 1916, p. 252, pl. 58, figs. 1—3a; Hiro, 1932, p. 551; 1937a, p. 469; 1939a, p. 214; Utinomi, 1949a, p. 23; 1958, p. 304; 1970, p. 347; 董聿茂、毛节荣, 1956, p. 291, fig. 9; Tarasov & Zevina, 1957, p. 236, fig. 94; Zevina & Tarasov, 1963, p. 95.

Tetraclita porosa japonica Nilsson-Cantell, 1927, p. 786; 1931, p. 115; 1932, p. 27, fig. 11.

Tetraclita squamosa formosana Hiro, 1939, p. 271, fig. 13; Utinomi, 1949, p. 23; 1954, p. 23; 沈嘉瑞等, 1962, p. 67, fig.; 董聿茂、翁芷芬, 1965, p. 127.

标本采集地 浙江省嵊山、泗礁、青浜、奶山、普陀山、舟山、洞头、台山列岛, 福建省三沙、南屿、平潭、崇武、深沪、东山, 广东省南澳岛、海门、遮浪、海丰、汕尾、平海、惠阳、三门岛、龟灵岛、上川岛、闸坡、碇洲岛、琼州海峡。

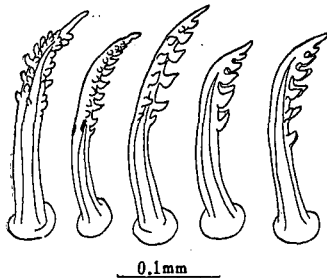


图 1 日本笠藤壶 *Tetraclita japonica* 第 3 蔓足的锯齿刚毛

壳陡圆锥形, 表面鼠灰到灰紫色, 肋较粗糙, 盖板较宽阔, 开闭缘有大齿 2—5 个, 个别可达 6—7 个。软体部分似 *T. squamosa squamosa*, 但第 3 蔓足两支的内侧面有特化的双锯齿刚毛(图 1)。

本种是东海和南海(我国近海)藤壶的主要种, 常同 *Tetraclita squamosa squamosa* 一起附着于潮间带和潮下带岩石或浮标等。最大标本峰吻径 42.0 mm, 高 23.2 mm。

本种与前种在壳板、盖板及第 3 蔓足两分支内侧面刚毛的形态特征差异明显, 有时它们出现于同一地点, 又相互附着混栖, 过去将它们作为一个种下的两个亚种, 显然不妥, 因此我们将 *Tetraclita squamosa japonica* Pilsbry 提升为独立

的种,即 *Tetraclita japonica* Pilsbry。

Hiro (1939) 根据我国台湾的标本建立新亚种 *Tetraclita squamosa formosana* Hiro, 并指出它与 *Tetraclita squamosa japonica* (即 *T. japonica*) 的主要差异是壳与盖板颜色较亮,为紫红色,楯板的开闭缘有 2—3 个大齿。从东海和南海(我国近海)获得的大量标本来看,他所列出的形态特征的差别,都不超出种内个体变异的范围。外壳的颜色往往从鼠灰、灰紫到紫红色,即使是在同一组标本中,各种类型都存在,年轻的个体颜色鲜艳,鞘和楯板多为紫红色,而年老腐蚀严重的标本,楯板多为蓝紫到灰紫色;开闭缘的齿数也有类似的情况,同一组标本中齿数 2—5 个,最多可达 7 齿,而往往年幼者齿数多于年老者。例如采自海门的标本,栖于浪击猛烈地点的个体,壳发亮,青紫到紫红色,低圆锥形,开闭缘齿可达 6 个,而隐蔽于石缝中的个体壳为鼠灰色,有的个体楯板开闭缘齿数仅为 3 个,这都说明上述形态特征变异是连续的,因此我们认为应将 *Tetraclita squamosa formosana* Hiro 作为本种 (*T. japonica*) 的同物异名。

地理分布 本种分布范围较窄,仅发现于东海和南海(我国近海)、朝鲜和日本。在南海海南岛以南海域尚未发现。

兰笠藤壶 *Tetraclita coerulea* (Spengler, 1790)

(图 2; 图版 II: 1—12)

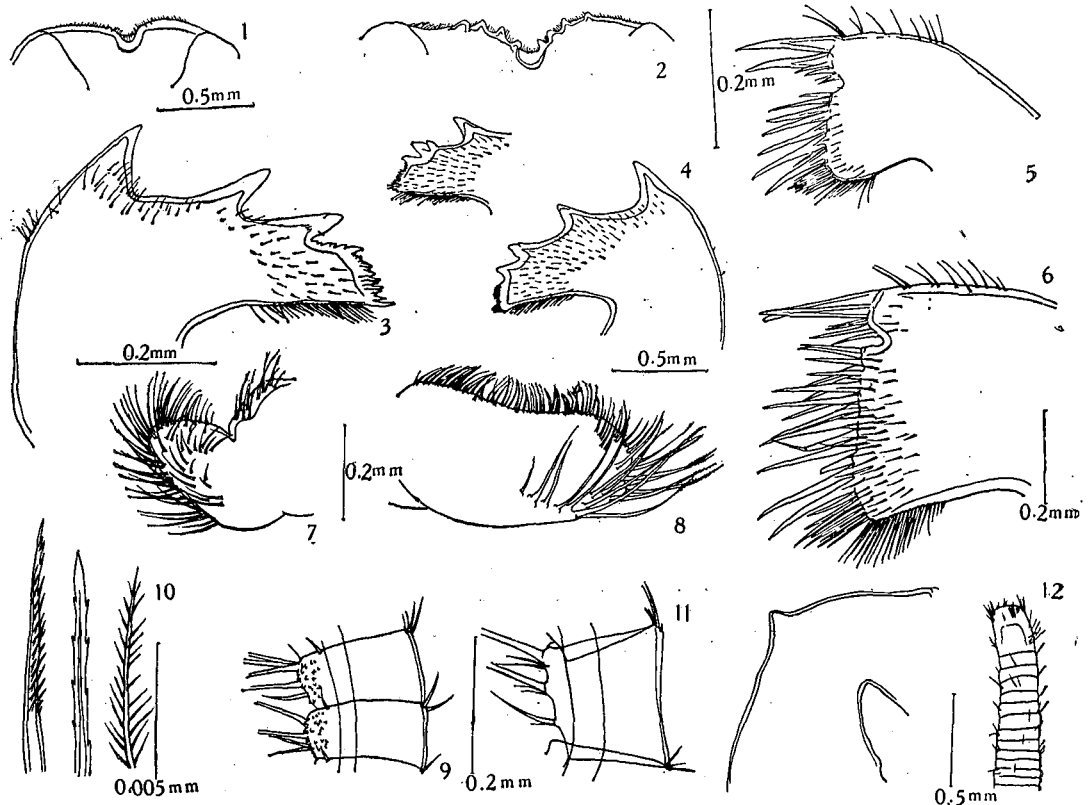


图 2 兰笠藤壶 *Tetraclita coerulea* (Spengler, 1790)

1, 2. 上唇; 3, 4. 大瓣; 5, 6. 小瓣; 7. 第 2 小瓣; 8. 触须; 9. 第 3 蔓足外肢 5—6 节; 10. 第 3 蔓足之刚毛; 11. 第 6 蔓足中部节; 12. 交接器。

Lepas coeruleoens Spengler, 1790, *Skrivter of Selskabet* vol. 1, p. 191. (not seen).

Tetraclita coeruleoens (Spengler). Darwin, 1854, p. 342, pl. 11, figs. 4a—4d; Hoek, 1883, p. 161, pl. 13, fig. 34; 1913, p. 257; Weltner, 1897, p. 257; Gruvel, 1905, p. 291, fig. 315; Pilsbry, 1916, p. 259; Broch, 1931, p. 116, fig. 39; Hiro, 1937b, p. 67, fig. 13e, f; Nilsson-Cantell, 1938, p. 77.

标本采集地 广东省琼州海峡、海南新英、崖县西洲岛、西沙群岛金银岛, 广西壮族自治区涠洲岛。

壳低圆锥形, 壳口菱形到五角形, 壳表有细纵肋, 上部蓝绿色, 下部浅黄色。幅部宽阔, 有横脊, 顶缘斜, 关节缘呈齿状。楯板厚而宽阔, 生长脊波状; 关节脊宽阔突出, 与闭壳肌脊接合, 形成一个小深窝。软体部分如图 2 所示。

栖息于潮间带和潮下带, 附着于岩石和浮标, 最大标本峰吻径为 30 mm。

标本盖板的形状有变化, 海南新英的小标本楯板基缘短于背缘, 而在琼州海峡的标本中, 有的则长于背缘; 涠洲岛标本背板三角形顶叶完全被磨损, 但上述其他基本特征相同。Darwin 对软体部分没有描述, Broch (1931) 卡伊群岛的标本上唇无齿, 但我们采自新英和琼州海峡的标本, 上唇中央缺刻每侧有 4 齿, 而涠洲岛的标本则每侧仅有 1 齿, 说明上唇齿数变化较大。本种在我国为首次记录。

地理分布 南海(中国近海), 菲律宾, 帛琉群岛, 新加坡, 印度尼西亚, 澳大利亚, 孟加拉湾, 丹老群岛。

星笠藤壶属(新属) *Genus Astroclita* nov.

壳小, 低圆锥形, 有突出的粗肋, 显著伸出基缘外, 呈星状放射, 壁板结合松散, 板内充满多排纵管道; 幅部很窄, 有时与壁板间无明显界限, 无横管, 顶缘斜, 关节缘有钝齿。基底石灰质, 无管。楯板高宽几乎相等, 内面光滑, 无压肌脊。背板较窄, 距突短而宽, 与基楯角明显分开, 小颚切缘缺刻以下的刺大小几乎相等。

模式种: 长肋星笠藤壶 *Astroclita longicostata* sp. nov.

新属的壁板内有多排纵管, 幅部窄而无横管等特征, 颇似 *Tetraclita* 属, 但其个体很小, 壳壁外面有规则的粗纵肋; 楯板长宽几乎相等, 决无压肌脊; 背板距短而宽等特征很易与 *Tetraclita* 属相区别。本新属个体较小, 壳表有强肋, 楯板长宽几乎相等, 内面雕刻不明显等特征和背板的形状更似 *Tetraclitella* 属, 然而后者(还有 *Newmanella* 属)最显著的特征是幅部宽阔, 且有横管, 这与本新属显著不同。

长肋星笠藤壶(新种) *Astroclita longicostata* sp. nov.

(图 3; 图版 II: 13—16; 图版 III: 1—4)

正模式标本 C 80631-1, 峰吻径 7.5 mm, 侧径 5.5 mm, 高 3.4 mm, 采自广东省西沙群岛永兴岛潮间带珊瑚礁上。1958.6.12—13, 采集者: 范振刚、许界善。

副模式标本 C 80631-2, 峰吻径 11.0 mm, 侧径 8.0 mm, 高 3.0 mm (同正模式标本)。C 80632-1, 峰吻径 7.9 mm, 侧径 5.8 mm, 高 3.2 mm, 采集地和采集者同正模式标本, 1958.5.15。C 80633, 峰吻径 5.4 mm, 侧径 4.8 mm, 高 2.1 mm, 采集地同正模式标本, 1958.4.13。

其他材料 C 80632-2, 一个破碎的标本, 采集地同副模式标本 C 80632-1。

壳低圆锥形，白色，水平生长纹清楚；有角质毛，壳板结合很不牢固，有显著突出的 14 条粗纵肋（吻板 5 条；其他每板 3 条），肋下端明显伸出基缘外。幅部很窄，有时与壁板间无明显界限，顶缘斜，无横管，但关节缘有钝齿。翼部薄，顶缘斜。鞘部占壁板的上半，有横生长纹，鞘以下光滑，近基底有小肋。壁板内有多排纵管，排列不规则（幼小个体只有一排管）。基底为石灰质薄层，无管，可见有环形生长线。

盖板白色。楯板三角形，基缘与背缘约等长，或基缘稍长，两端翘起，生长脊波状褶起形成小齿突，在开闭缘成钝齿；外面近背侧有 2 条宽而深的纵沟，有的下部分叉；内面关节脊直而突出于背缘外，为背缘长的 $\frac{3}{4}$ ，关节沟窄，闭壳肌脊弱，靠近基缘，闭壳肌窝不清楚，无吻压肌脊和侧压肌脊。背板略窄，薄而脆，外表生长脊清楚，在楯缘成齿（有时被磨损），无中央沟；内面关节脊低，关节沟宽而浅，侧压肌脊一般为 7 条；距宽而短，其宽约为基缘的 $\frac{1}{2}$ ，与基楯角不明显分开，末端钝圆。

上唇中间稍凹，不形成缺刻，每侧有钝齿 3—4 个。大颚 5 齿，第 2—5 齿有附加齿，下角梯状，最末一刺较长。小颚切缘有小的缺刻，上对大刺之下有 3 个小刺，缺刻之下有几乎等长的 8 刺，下角小刺成丛。第 2 小颚以浅的缺刻分为上下两叶。触须较窄长。



图 3 长肋星笠藤壶（新种）*Astroclita longicostata* sp. nov.

1. 上唇； 2. 大颚； 3. 小颚； 4. 第 2 小颚； 5. 触须； 6. 第 3 蔓足外肢第 5 节； 7. 第 3 蔓足末端刚毛； 8. 第 6 蔓足中部节； 9. 交接器。

各蔓足外、内肢的节数如下：

1	2	3	4	5	6
13	10	8	8	8	7
16	18	18	19	20	20

第 1 蔓足外肢为内肢长的 2 倍。第 2 蔓足两支长度几乎相等, 各节宽大于长, 末节顶端有 3 根较粗壮的刚毛, 第 3 蔓足末节也有同样刚毛(图 3:6, 7)。第 4—6 对蔓足中部节前缘有 3—4 对刚毛。

交接器短于第 6 蔓足, 无背突, 末端稍膨大。

标本附着于潮间带的珊瑚上。

方孔藤壶属 Genus *Tesseropora* Pilsbry, 1916

Tesseropora Pilsbry, 1916, p. 260; Nilsson-Cantell, 1921, p. 365; Zullo, 1968, p. 272; Ross, 1969, p. 240; Newman & Ross, 1976, p. 47; 1977, p. 208.

壳陡圆锥形, 幅部窄, 壁板内仅有一排方形管, 管内无横隔片, 但基部有时再分为次级和三级管, 管的外壁片常有向管内突出的次级纵隔片; 楯板三角形, 有压肌脊; 背板多较长。

本属迄今已知有 4 种, 除化石种 *Tesseropora isseli* (de Alessandri, 1895) 发现于意大利渐新世 (Oligocene) 仅知壳板外, 现存种有 Darwin (1854) 详细描述过的 *Tesseropora rosea* (Krauss, 1848) 以及 *Tesseropora wireni* (Nilsson-Cantell, 1921)、*Tesseropora atlantica* Newman & Ross, 1977 [采自大西洋的百慕大和亚绍尔 (Azores)]。我们这里描述的是本属的第 5 个种。

白方孔藤壶 (新种) *Tesseropora alba* sp. nov.

(图 4; 图版 IV: 10—18)

正模式标本 C 80634-1, 峰吻径 5.0 mm, 侧径 4.9 mm, 高 3.5 mm, 采自广东西沙群岛高尖石, 附着于西沙藤壶 *Megabalanus xishaensis* 壳上, 1975.4.11, 采集者: 王存信。

副模式标本 (采集地同正模式标本):

	峰吻径 (mm)	侧径 (mm)	高 (mm)
C80634-2:	5.6	5.7	2.1
C80634-3:	6.5	6.3	2.7
C80634-4:	5.4	5.3	5.5
C80634-5:	4.4	4.6	3.0

其他材料 C 80634-6, 23 个生活小标本采集地同正模式标本。

壳低圆锥到陡圆锥形, 白色, 有低的放射肋和带细短毛的生长线, 或完全被腐蚀。幅部窄或缺乏, 顶缘斜, 无清楚的关节缘齿。翼部窄。壳口五角形到菱形。内壁白色, 鞘占壁板上半, 有横生长纹, 近基部有低纵肋。壁板有单排方形或近方形的纵管, 管数恰与壳外表的纵肋相吻合。管内有淡紫褐色的柔软物质, 使壳外表有时为粉紫色, 板管的外壁内面光滑或有很低的小纵肋, 但决不加厚形成突出的隔片或次级管, 管的侧壁和内壁的基部呈圆齿状。基底为石灰质薄片, 无管。

盖板的口缘膜为紫褐色。楯板白色, 基缘弧形, 稍长于背缘, 外面生长脊不很清楚, 在开闭缘呈小斜齿状; 内面关节脊低, 超过背缘长度的 3/5, 下端钝圆, 关节沟窄而浅, 闭壳肌窝深, 闭壳肌脊发达, 其上端与关节脊末端几乎成一直线, 下端达到基缘; 侧压肌窝有明

显的 2 条压肌脊,有吻压肌脊 3—4 条。背板稍窄,顶端略成喙,外面平坦,无中央沟,生长脊模糊;内面关节脊低、关节沟浅而宽,压肌脊一般为 6 条;距稍长,末端钝圆,与基楯角不明显分开。

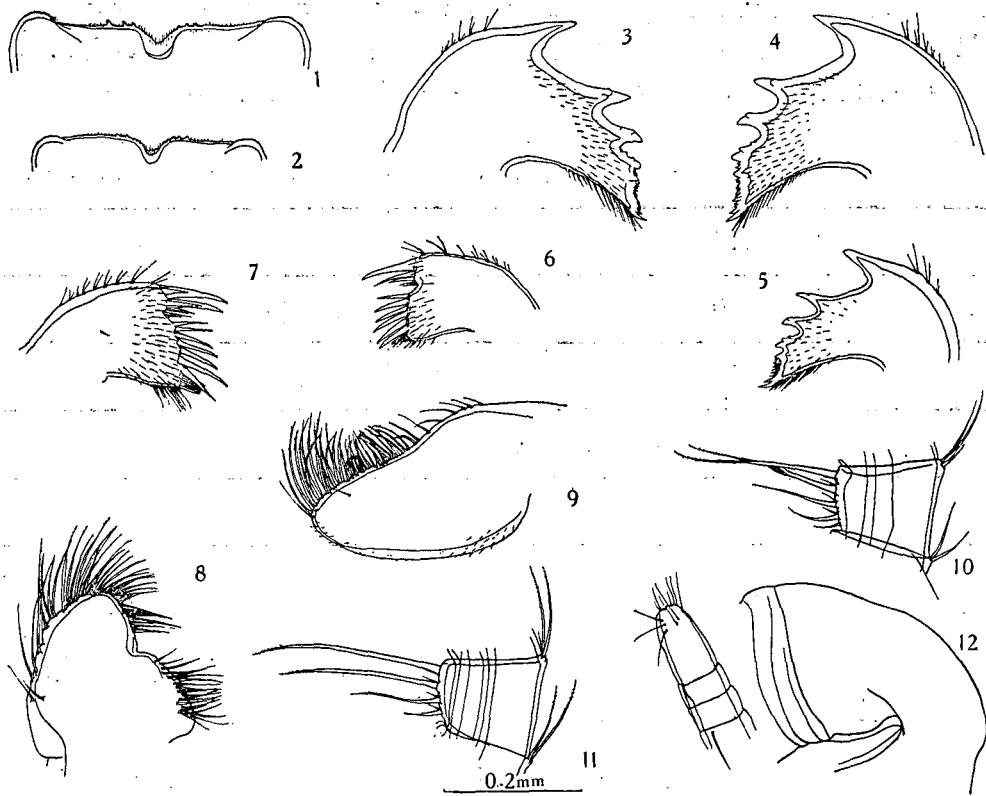


图 4 白方孔藤壶(新种) *Tesseropora alba* sp. nov.

1, 2. 上唇; 3—5. 大颚; 6, 7. 小颚; 8. 第 2 小颚;
9. 触须; 10, 11. 第 6 蔓足中部节; 12. 交接器。

上唇中央缺刻较浅,每侧有 3—4 个小钝齿,间有细短毛。大颚 4 个尖齿,第 2—4 齿有附加齿,第 4 齿之下栉状,下角两刺较大。小颚切缘略斜,上对大刺基部有几个小刺,小缺刻下之有 6—8 个几乎同等大小的刺,低角有小刺丛。第 2 小颚两叶的缺刻处无刚毛。触须稍长,上缘略凹。

各蔓足外、内肢的节数如下:

	1		2		3		4		5		6	
标本 I:	11	7	7	7	7	8	13	15	16	17	18	19
标本 II:	10	6	6	7	6	6	9	15	15	18	17	18

第 1 蔓足外肢为内肢长的 2 倍;第 2 蔓足最短,两支等长,中部节呈方形;第 3 蔓足中部节呈倒梯形,原肢节为羽状刚毛,末端 1—2 节有双栉齿刚毛,其他为多齿刚毛;第 4—6 对蔓

足中部各节前缘有 4—5 对刚毛；成对刚毛之间仅有一根很短的刚毛。

交接器有环纹和分散的细毛，末端有毛环；无背突。

本种为小型藤壶，栖于潮间带和潮下带。

本种个体很小，壁板内纵管单排，管的外壁内面光滑或有很低的肋，楯板闭壳肌脊和关节脊的末端几乎成一直线等特征与北大西洋种 *Tesseropora atlantica* Newman & Ross 相似，但后者幅部适度发育，上唇无清楚的齿，与本种显著不同。本种的壳形、幅部、口器等很似印度西太平洋种 *Tesseropora wireni* Nilsson-Cantell，它们的主要区别如下：

	<i>Tesseropora alba</i> sp. nov.	<i>Tesseropora wireni</i> Nilsson-Cantell
大小	小型种，直径仅达 7 mm	大型种，直径达 40 mm
颜色	全白色	鞘暗红色
壁板管	仅一排管，管外壁内面光滑或成低肋，不形成次级管	管基部分为次级和三级管
楯板	闭壳肌脊与关节脊几乎成一直线	闭壳肌脊与关节脊重叠
第 3 蔓足	有双栉状刚毛	无双栉状刚毛
第 6 蔓足中部分节	每节有 4—5 对刚毛，成对刚毛之间有一短刚毛	每节有 3 对刚毛，成对刚毛之下有短刚毛组

Newman and Ross 报告 (1977, P. 212) 中提到与 *T. wireni* 不同的夏威夷标本与本新种颇为相似。

小笠藤壶亚科 Subfamily Tetracitellinae Newman & Ross, 1976

小笠藤壶属 Genus *Tetracitella* Hiro, 1939

Tetracitella Hiro, 1939, p. 273; Ross, 1961, p. 209; 1971, p. 215; Newman & Ross, 1976, p. 46.

壳径通常小于 20 mm，白色或淡紫色，低扁有肋，壳板结合松散；壁板纵管多于 2 排；幅部通常宽阔，内有横管，顶缘平行于基底；翼部无管；基底膜质或石灰质；楯板横向延长，无压肌脊；背板距短而宽。大颚 5 齿，下角栉状；小颚切缘缺刻之下有 6—8 刺。本属已知共 9 种，主要栖息于热带、亚热带海域的潮间带和潮下带，附着于石块和其他动物壳上。

种的检索

1. 幅部与翼部合成三角形面高出壳表，楯板有成排洞穴……………突角小笠藤壶 *Tetracitella darwini*
- 1' 幅部和翼部不高出壳表，楯板外表无洞穴。
 2. 壳壁板下部形成 6 个洞或缺刻；楯板开闭缘呈脊状，高出板面，基缘有明显缺刻……………中华小笠藤壶 *Tetracitella chinensis*
 - 2' 壳壁板无洞或缺刻；楯板开闭缘不高于板面，基缘无缺刻。
 3. 壳壁具有很多纵肋，并有附加肋；背板窄，距钝圆，近基嘴角……………多肋小笠藤壶 *Tetracitella multicostata*
 - 3' 壳有 12 条纵肋；背板宽阔而短，距钝尖，远离基嘴角……………间隔小笠藤壶 *Tetracitella divisa*

中华小笠藤壶 *Tetraclitella chinensis* (Nilsson-Cantell, 1921)

(图版 III: 5—9)

Tetraclitella purpurascens chinensis Nilsson-Cantell, 1921, p. 359, fig. 81, pl. 3, fig. 12; Hiro, 1939b, p. 273; fig. 14.

Tetraclitella purpurascens nipponensis Hiro, 1931, p. 155, fig. 10, pl. 14, figs. 3-3d; 1937, p. 469.

Tetraclitella (*Tetraclitella*) *chinensis* Nilsson-Cantell. Utinomi, 1949, p. 36; 1954, p. 23; 1962, p. 231. (not Zevina & Tarasov, 1963, p. 97, fig. 14).

Tetraclitella chinensis (Nilsson-Cantell, 1921). Utinomi, 1970, p. 347; 1972, p. 307; Ross, 1971, p. 217; Rosell, 1975a, p. 96; 1975b, p. 114; Newman & Ross, 1976, p. 46.

标本采集地 福建省东澳, 广东省遮浪。

仅一个生活标本(峰吻径 8.4 mm)附着于 *Megabalanus volcano* 壳上, 一个不完整标本附着于 *Tetraclitella squamosa squamosa* 壳上。标本栖息于潮间带和潮下带, 附着于石块下和其他藤壶壳上。

地理分布 东海和南海(我国近海), 日本。

间隔小笠藤壶 *Tetraclitella divisa* (Nilsson-Cantell, 1921)

(图版 III: 10—15)

Tetraclitella divisa Nilsson-Cantell, 1921, p. 362, fig. 83, pl. 3, fig. 11; Hiro, 1939, p. 275, fig. 15; Zevina & Tarasov, 1963, p. 96, fig. 13; Stubbings, 1967, p. 291, fig. 21; Ross, 1968, p. 13.

Tetraclitella divisa (Nilsson-Cantell). Ross, 1971, p. 217; 1972, p. 307; Foster, 1974, p. 45, figs. 6e-f, 7e-f; Rosell, 1975a, p. 96; 1975b, p. 114.

标本采集地 广东省琼州海峡、海南岛崖县西洲岛。

共 6 个生活标本(最大峰吻径 7.3 mm)和一个死壳分别附着于潮间带栖息的龟足 *Pollicipes mitella* 和采自浮标的 *Megabalanus tintinnabulum* 壳上。

地理分布 南海(中国近海), 苏门答腊, 爪哇, 斐济, 夏威夷, 印度洋的阿尔达布拉群岛, 西非加纳, 加勒比海。

突角小笠藤壶 *Tetraclitella darwini* (Pilsbry, 1928)

(图版 III: 16—18; 图版 IV: 1—2)

Tetraclitella darwini Pilsbry, 1928, p. 314, fig. 4, pl. 25, figs. 1—3a; Nilsson-Cantell, 1931, p. 136; Hiro, 1937a, p. 469; 1939a, p. 214; 1939b, p. 277; Utinomi, 1949, p. 24; 1962, p. 237.

Tetraclitella darwini (Pilsbry). Utinomi, 1970, p. 348; Ross, 1971, p. 217.

标本采集地 广东省碇洲岛。

共 3 个标本(最大标本峰吻径 12.6 mm)附着于杂色鲍 (*Haliotis diversicolor*) 壳上, 采自潮下带。

地理分布 南海(中国近海), 日本。

多肋小笠藤壶 *Tetraclitella multicostata* (Nilsson-Cantell, 1930)

(图版 IV: 3—9)

Tetraclitella purpurascens var. *multicostata* Nilsson-Cantell, 1930, p. 18, fig. 5.

Tetraclitella multicostata Nilsson-Cantell, Utinomi, 1962, p. 231, figs. 9—10.

Tetraclita chinensis Nilsson-Cantell. Zevina et Tarasov, 1963, p. 97, fig. 14 (not Nilsson-Cantell, 1921).

Tetraclitella multicosata (Nilsson-Cantell). Ross, 1971, p. 217; Rosell, 1975a, p. 96; 1975b, p. 114; Newman & Ross, 1976, p. 47.

标本采集地 广东省海南岛新村, 榆林。

标本采自潮下带珊瑚礁, 附着在 *Megabalanus tintinnabulum* 壳上, 共 10 个标本(最大标本峰吻径 14.4 mm), 一个空壳。

Nilsson-Cantell (1930) 最早对印尼密索尔群岛的 *Tetraclita purpurascens multicosata* 的描述相当简略, Utinomi (1962) 根据采自日本鹿儿岛的标本作了详细的补充描述, 但他的标本个体较小, 壳板有 3—4 条主肋, 与我们的标本略有不同。Zevina et Tarasov (1963) 作为 *Tetraclita (Tetraclitella) chinensis* (Nilsson-Cantell) 报告的标本, 多肋、壁板无洞和缺刻, 实际是 *Tetraclitella multicosata* (Nilsson-Cantell)。

地理分布 南海(中国近海), 日本, 菲律宾, 印尼, 斐济。

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STUDIES ON CHINESE CIRRIPEDIA (CRUSTACEA)

II. FAMILY TETRACLITIDAE*

Ren Xianqiu and Liu Ruiyu

(Institute of Oceanology, Academia Sinica)

ABSTRACT

In the present paper — the second part of a systematic study of the cirripedian fauna of Chinese waters, an account of nine species of thoracic Cirripedia belonging to four genera of the family Tetraclitidae is given. One genus and two species are described as new, and one species is recorded for the first time from Chinese seas. The materials based upon are the same as those mentioned in the first part of this study. The type specimens of new species are deposited in the Institute of Oceanology, Academia Sinica at Tsingtao.

The species identified are listed below:

Family TETRACLITIDAE Gruvel, 1903

Subfamily TETRACLITINAE Gruvel, 1903

Genus *Tetraclita* Schumacher, 1817

1. *Tetraclita squamosa squamosa* (Bruguère, 1789) s.s.
2. *Tetraclita japonica* Pilsbry, 1916

3. *Tetraclita coerulescens* (Spengler, 1790)†
Genus *Astriclita* nov.
4. *Astroclita longicostata* sp. nov.
Genus *Tesseropora* Pilsbry, 1916
5. *Tesseropora alba* sp. nov.

Subfamily TETRACLITELLINAE Newman & Ross, 1976

Genus *Tetraclitella* Hiro, 1939

6. *Tetraclitella chinensis* (Nilsson-Cantell, 1921)
 7. *Tetraclitella divisa* (Nilsson-Cantell, 1921)
 8. *Tetraclitella darwini* (Pilsbry, 1928)
 9. *Tetraclitella multicosata* (Nilsson-Cantell, 1930)
- † is recorded for the first time in Chinese waters)

Astroclita gen. nov.

Shell small, low conic. Compartments discrete, with strong longitudinal ribs extending well beyond the basal margin. Parietes with more than two rows of longitudinal tubes. Radii very narrow or obsolete, without transverse tubes, summits oblique, articular margin with blunt teeth. Sheath adpressed. Basis calcareous, without tubes. Scutum almost as long as wide, lacking depressor crests. Tergum rather narrow, spur short and broad, not distinctly separated from the basi-scutal angle. Maxilla with spines almost subequal in length below subapical notch of cutting edge.

Type species: *Astroclita longicostata* sp. nov. (South China Sea).

The present new genus belongs to the subfamily Tetraclitinae (Tesseroporan group of Ross). It resembles *Tetraclita* in having more than two rows of parietal tubes and in having narrow and non-tubiferous radii, but differs from the latter in its small size and strongly ribbed shell, and in its scutum lacking of depressor crests. *Astroclita* gen. nov. is also very similar to *Tetraclitella* in general appearance, especially in the small size and strongly ribbed shell, and in the comparatively smooth inner surface of the scutum, but in the latter genus (as well as Genus *Newmanella*) the radii are broad and transversely tubed, and the growth of the shell is diametric.

Astroclita longicostata sp. nov.

(Text-fig. 3; Pl. II: 13—16; Pl. III: 1—4)

Holotype: C80631-1 (10AC), diameter 7.5 mm Yongxingdao, Xisha Is., Guangdong Province. Intertidal, coral reef. Z. C. Fan & J. S. Xu coll. 1958. VI, 12.

Paratypes: C80631-2; C80632-1; C80633. Locality same as holotype. 1958. III—V.

Shell white, low conic, transverse growth lines well developed and hirsute. Compartments discrete, with a total of 14 prominent longitudinal ribs, 5 on rostrum, 3 on carina and each of the laterals, extending well beyond the basal margin. Radii narrow or obsolete, non-tubiferous, with oblique summits and bluntly toothed articular margins. Alae thin, summits oblique. Sheath white, with transverse growth lines, lower margin

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adpressed; region below sheath smooth, with short ribs on basal portion in larger individuals. Parietes with more than 2 rows of irregularly shaped longitudinal tubes (only one single row in smaller ones). Basis calcareous, thin, without tubes, but rings of growth lines are visible.

Opercular valves white. Scutum triangular, growth ridges distinct with hood-shaped projections, ocludent margin obtusely denticulated; outer surface with two broad longitudinal depressions, basal margin of scutum about as long as tergal margin, or slightly longer, articular ridge straight and prominent, $\frac{3}{4}$ as long as the tergal margin, articular groove narrow, adductor ridge feebly developed, reaching almost to the basal margin, adductor pit indistinct, crests for rostral and lateral depressor muscles wanting. Tergum rather narrow, thin, and fragile, with distinct growth ridges, denticulated at scutal margin, without median groove, lateral depressor crests generally 7 in number; spur short and broad, about $\frac{1}{2}$ as broad as basal margin, bluntly rounded distally, indistinctly separated from the basi-scutal angle.

Labrum slightly concave medially, with 3 or 4 blunt teeth on each side. Mandible with 4 teeth, 2nd to 5th with additional teeth, lower angle pectinated, with 1 long spine. Maxilla I with 3 small teeth above the shallow notch, 8 teeth (subequal in length) below the notch.

Exopod of 1st cirrus twice as long as endopod. Distal segment of 2nd and 3rd cirri with 3 stout apical setae (text-fig. 3). Intermediate segments of 4th to 6th cirri with 3 or 4 pairs of setae on anterior border, and 1 small seta between each pair of setae.

Penis shorter than 6th cirrus, without dorsal process.

Tesseropora alba sp. nov.

(Text-fig. 4; Pl. IV: 10—18)

Holotype: C80634-1. Diameter 5.0 mm, Gaojianshi, Xisha Is., Guangdong Province. Intertidal, on *Megabalanus xishaensis* (Ren & Liu). Wang Cunxin coll., 1975. IV. 11.

Paratypes: C80634-2, 3, 4, 5. 4 individuals. Diameter 4.4—6.5 mm, locality same as holotype. other materials examined: 23 living individuals. Locality same as holotype.

Shell white, low or high conic, with low longitudinal ribs and hirsute transverse growth lines, sometimes eroded. Compartments with very narrow solid radii, summits oblique, articular margin without dentation. Alae narrow. Aperture of shell pentagonal or subrhomboidal. Sheath white, adpressed, continuous with the internal surface of parietes, region below sheath smooth or with low ribs at basal portion. Compartments with a single row of subquadrate longitudinal tubes, equal to the number of longitudinal ribs, filled with soft materials of light purplish brown colour. Inner surface of outer lamina smooth or with low ribs.

Scutum white, basal margin arcuate, slightly longer than tergal margin; outer surface with feebly developed growth ridges, obliquely denticulated at the ocludent margins; articular ridge low, more than $\frac{3}{5}$ the length of tergal margin; with the lower end obliquely rounded; articular groove narrow and shallow, adductor pit deep, adductor ridge well developed, its upper end being in line and nearly continuous with articular ridge, lower end reaching to the basal margin. Lateral depressor pit with 2 clear cut crests, rostral depressor crests 3 or 4 in number. Tergum rather narrow, with beak-

shaped tip, outer surface flattened, without median groove, growth ridges indistinct; articular ridge low, articular groove shallow and broad; depressor crests generally 6. Spur rather long, obtusely rounded at end, not distinctly separated from the basiscutal angle.

Labrum with 3 or 4 blunt teeth on each side of the shallow median notch. Mandible with 4 sharp teeth, 2nd to 4th teeth with additional teeth, lower angle pectinate, the last 1 or 2 spines the largest.

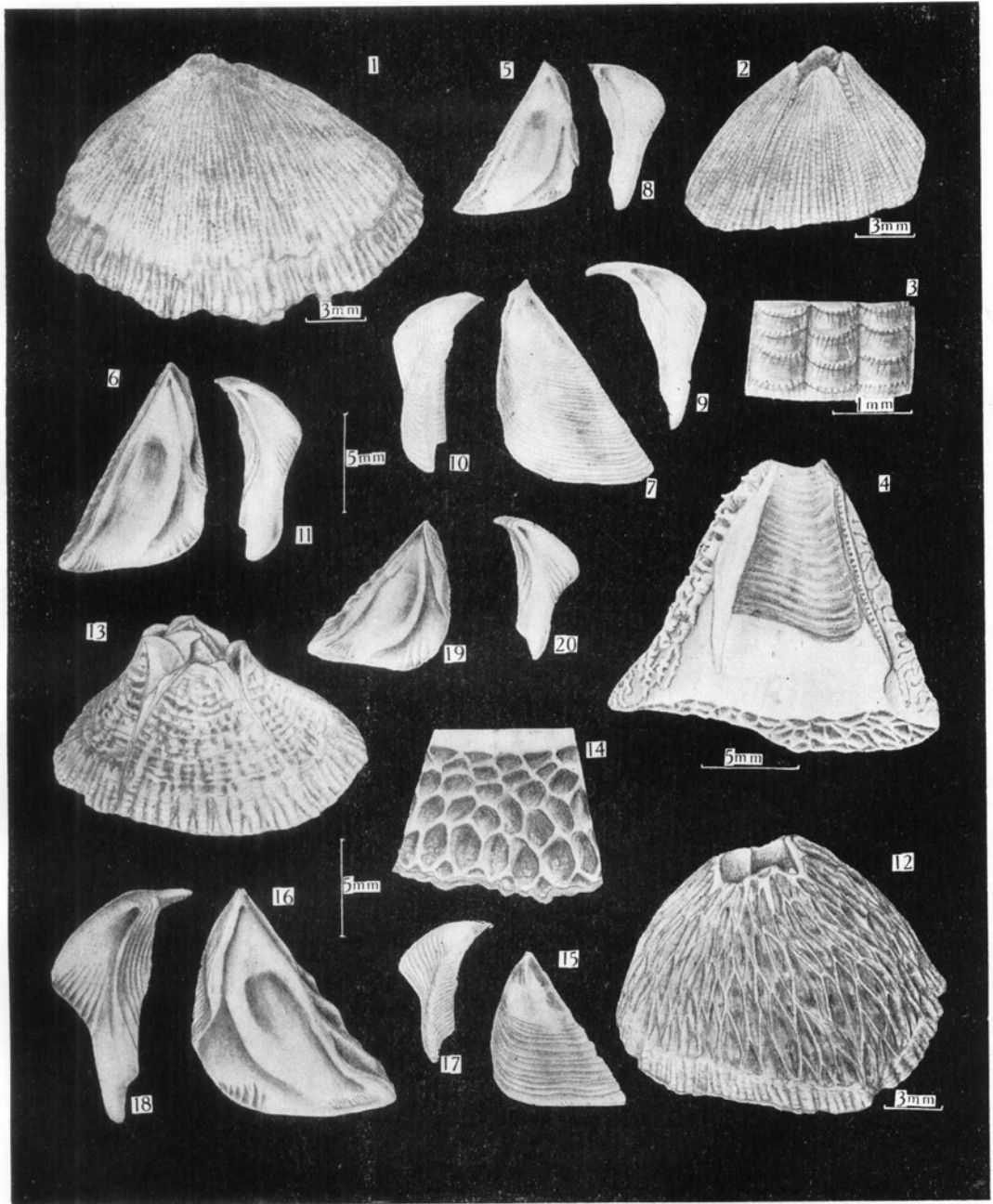
Cirrus III with bipectinate setae on distal 1 or 2 segments. Cirri IV and V with 4—5 pairs of setae per article, and 1 short seta between paired setae.

This new species is a small tetraclitid inhabiting the intertidal or sublittoral zone. It resembles the Atlantic *Tesseropora atlantica* Newman & Ross in the small size, the compartments being permeated with a single row of parietal tubes, the inner surface of outer lamina being smooth or with low ribs, the upper end of adductor ridge being in line and nearly continuous with the articular ridge; but the latter species has moderately well developed radii with distinct transverse ridges, and has no conspicuous teeth on the labrum.

This new species is also very similar to *T. wireni* Nilsson-Cantell reported from the Indo-West-Pacific. They differ however in the following features:

	<i>Tesseropora alba</i> sp. nov.	<i>T. wireni</i> Nilsson-Cantell
Size	Small, diameter up to 7 mm.	Large, diameter up to 40 mm.
Colour of sheath	White	dark reddish brown
Parietal tubes	with a single row of tubes, inner surface of outer lamina smooth or low-ribbed, never forming secondary tubes.	basal portion of outer lamina with secondary and tertiary tubes.
Scutum	adductor ridge in line with articular ridge.	adductor ridge overlapping articular ridge.
Cirrus 3	armed with bipectinate setae.	armed with bipinnate setae.
Cirrus 6	with 4—5 pairs of setae per article, 1 short seta between paired setae.	with 3 pairs of setae per article, with a few short setae in groups below 2 major pairs.

The Hawaiian specimens mentioned by Newman and Ross (1977, p. 212) are very similar to the present new species.



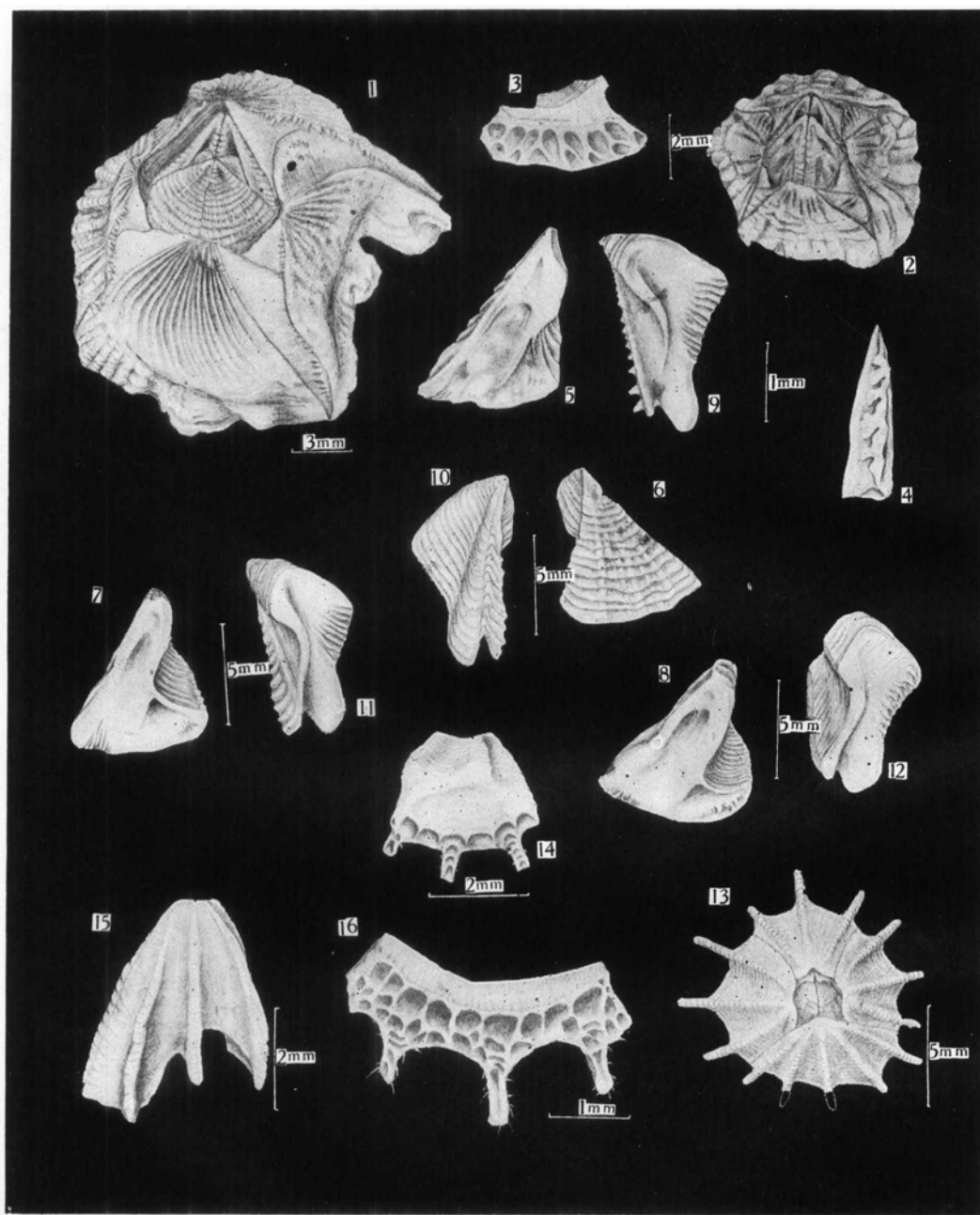
图版 (Plate) I

鳞笠藤壶 *Tetraclita squamosa squamosa* (Bruguière):

1, 2, 外形(2. 为年轻个体); 3. 年轻个体外表的肋和生长线上的刺; 4. 侧板内面观; 5-7. 瓣板; 8-11. 背板。

日本笠藤壶 *Tetraclita japonica* Pilsbry:

12, 13. 外形(13. 为年幼个体); 14. 壳板底面观; 15, 16, 19. 瓣板; 17, 18, 20. 背板。



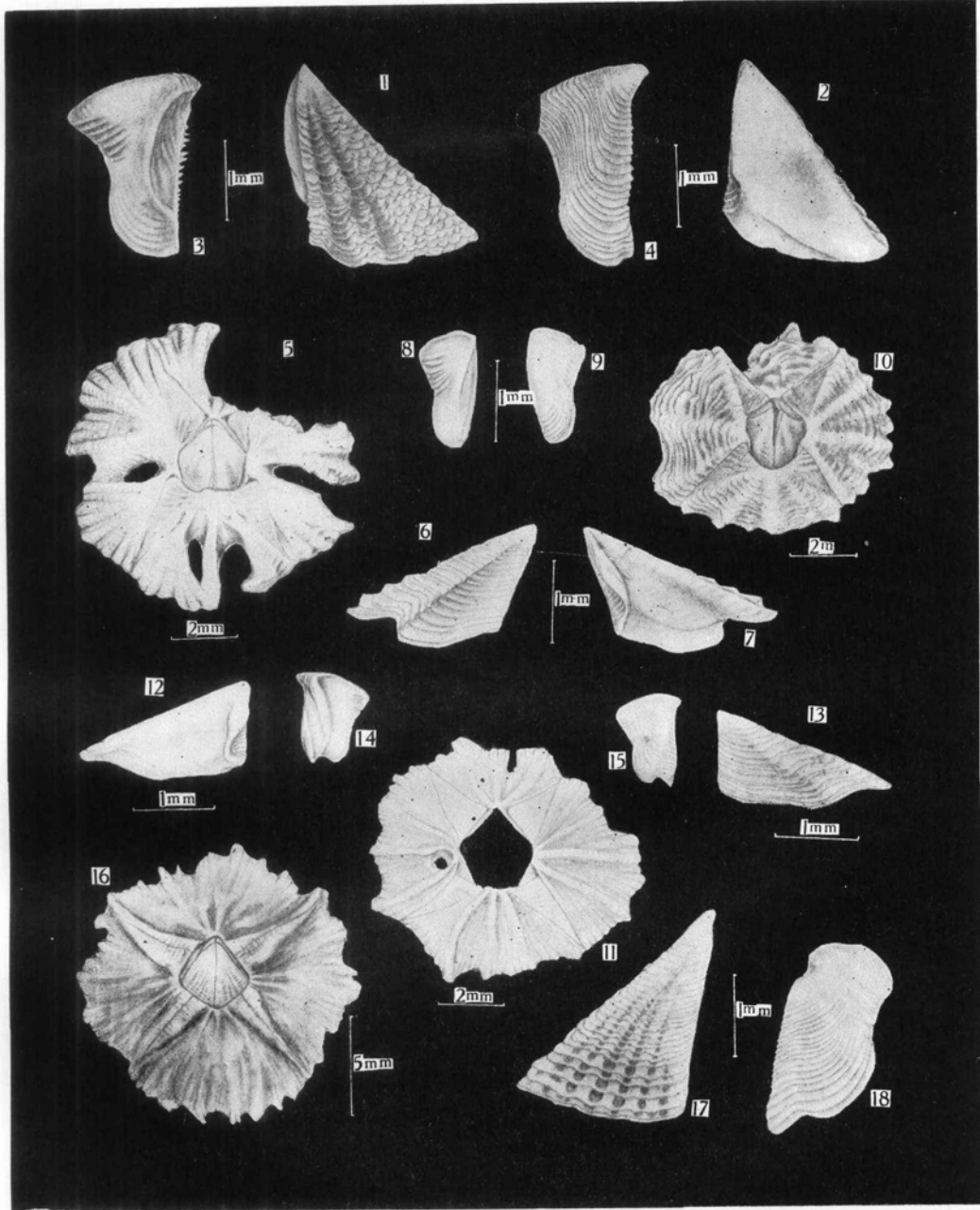
图版 (Plate) II

蓝笠藤壶 *Tetraclita coerulecens* (Spengler):

1, 2. 外形; 3. 侧板; 4. 幅部侧缘齿; 5—8. 隔板; 9—12. 背板。

长肋星笠藤壶(新种) *Astroclita longicostata* sp. nov.:

13. 外形; 14. 年幼个体的侧板内面; 15. 侧板外面; 16. 侧板底面观。



图版 (Plate) III

长形星笠藤壶(新种) *Astroclita longicostata* sp. nov.:

1, 2. 瓣板; 3, 4. 背板。

中华小笠藤壶 *Tetraclitella chinensis* (Nilsson-Cantell):

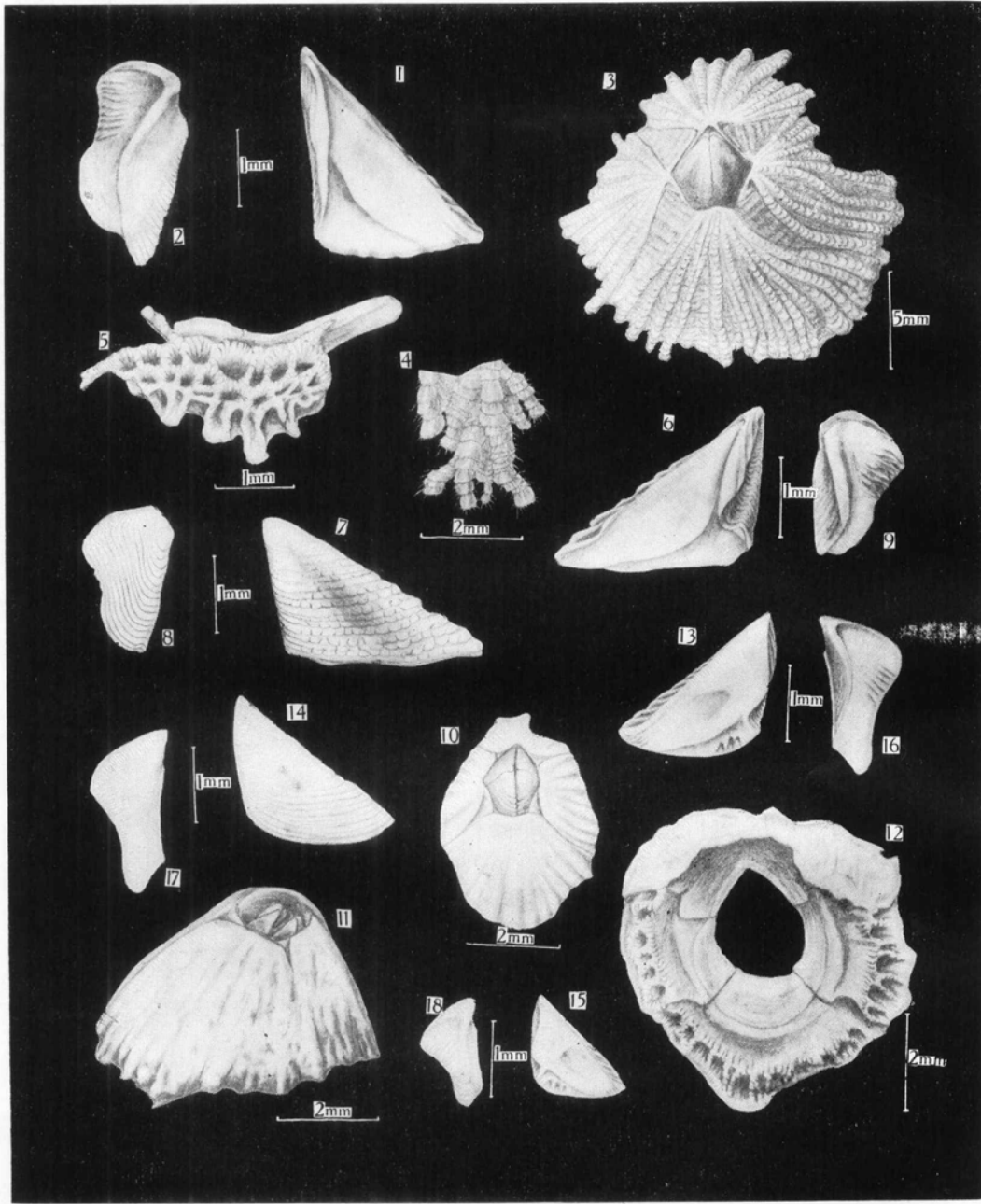
5. 外形; 6, 7. 瓣板; 8, 9. 背板。

河南小笠藤壶 *Tetraclitella divisa* (Nilsson-Cantell):

10, 11. 外形; 12, 13. 瓣板; 14, 15. 背板。

莫角小笠藤壶 *Tetraclitella darwini* (Pilsbry):

16. 外形; 17. 瓣板; 18. 背板。



图版 (Plate) IV

突角小穿藤壶 *acanthopora darwini* (Pilsbry)

1. 瓣板; 2. 背板。

多肋小穿藤壶 *acanthopora multicostata* (Nilsson-Cantell):

3. 外形; 4. 肋的末端; 5. 瓣板底面观; 6, 7. 瓣板; 8, 9. 背板。

白方孔藤壶(新种) *acanthopora alba* sp. nov.:

10, 11. 外形; 12. 壳板底面观; 13—15. 瓣板; 16—18. 背板。