

## 山东和浙江沿岸唇口类(苔藓虫)三新种\*

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1985—1986 年作者在中国水产科学院黄海水产研究所投放于胶州湾灵山岛的人工鱼礁上获得许多苔藓虫标本,从中发现了唇口目(Cheilostomata)三个新种,本文为其描述。其中刺轴缘孔苔虫(新种) *Smittina spinigera* sp. nov. 也发现于山东半岛北岸和浙江沿岸水域。新种的模式标本保存于中国科学院海洋研究所。

### 1. 似纤毛茎苔虫(新种) *Caulibugula ciliatoidea* sp. nov. (图 1)

**正模标本** 标本号: 86BBY010, 1986 年 10 月 25 日采自青岛胶州湾灵山岛人工鱼礁,一群体附于美丽管孔苔虫 *Tubulipora pulchra* 上,水深 20m 左右。

**其他标本** 标本号: 86BBY011, 1986 年 10 月 25 日采自青岛胶州湾灵山岛人工鱼礁,许多群体附于多育假缘孔苔虫 *Parasmittina prolifera* 上,或与水螅、刚毛藻等丛生在一起。

**特征描述** 群体直立,由双列个虫交互排列而成的双歧分枝和单列空个虫构成的长茎组成。分枝部分小,呈掌状;构成分枝的所有个虫都处于同一平面。分枝始端第一个虫呈棒形,始端狭,末端宽,两侧有钙质加厚。在棒形第一个虫的末端有一圆形或卵圆形的膜质区,即前膜;包裹此膜质区的墙缘厚而隆起,周缘有基部具关节的边缘刺 6—9 根,常指向末端。前膜区有半圆形(宽大于长)的口盖,但未发现虫体。因此,分枝始端第一个虫系介于自个虫和空个虫之间的中间形态。分枝个虫细长,草苔虫型,始端较末端稍狭,末端两隅呈角形,端刺刺式为 2—1(轴个虫刺式为 1—1),皆细长,基部均具关节,通常斜向外侧或指向末端,但末端一根外刺常斜向枝背。口盖半圆形,宽大于长,室口面向个虫前区。前膜细长,末端宽,始端狭,约占个虫前区 3/4。有柄鸟头体细长形,位于始端裸壁外侧,附于细柱形突起上;鸟头稍突,吻端强钩状,颞骨长三角形。卵胞口上型,圆球状,以细狭的短柄附于受孕个虫的末端背面中央,胞口指向始端。分枝方式属于 Harmer 的模式 4。构成长茎的空个虫细而长,两端稍膨大,两侧具钙质加厚。不同群体长茎长度不一;构成长茎的空个虫有时在其末端分出小枝,形成支茎,主茎和支茎借一圆锥形构造相连接。每一支茎的末端都有一掌状分枝,但支茎间从不接合成网状。未发现泡状体。群体借其始端的空个虫分出的纤细附根附着在基质上。

**附记** 作者(1984, 1985)曾报道 12 种茎苔虫,这一新种是第 13 种。本新种由于端刺细长,群体外形与纤毛茎苔虫 *Caulibugula ciliata* (Robertson, 1905) 相似,但后者端刺有 4—6 根,分枝始端第一个虫边缘刺(6—10 根)系刺状突起,基部无关节,分枝个虫属双胞苔虫型;而新种端刺少(2—3 根),分枝始端第一个虫边缘刺(6—9 根)基部具关节,分枝个虫属草苔虫型。新种个虫形态,尤其是细长而

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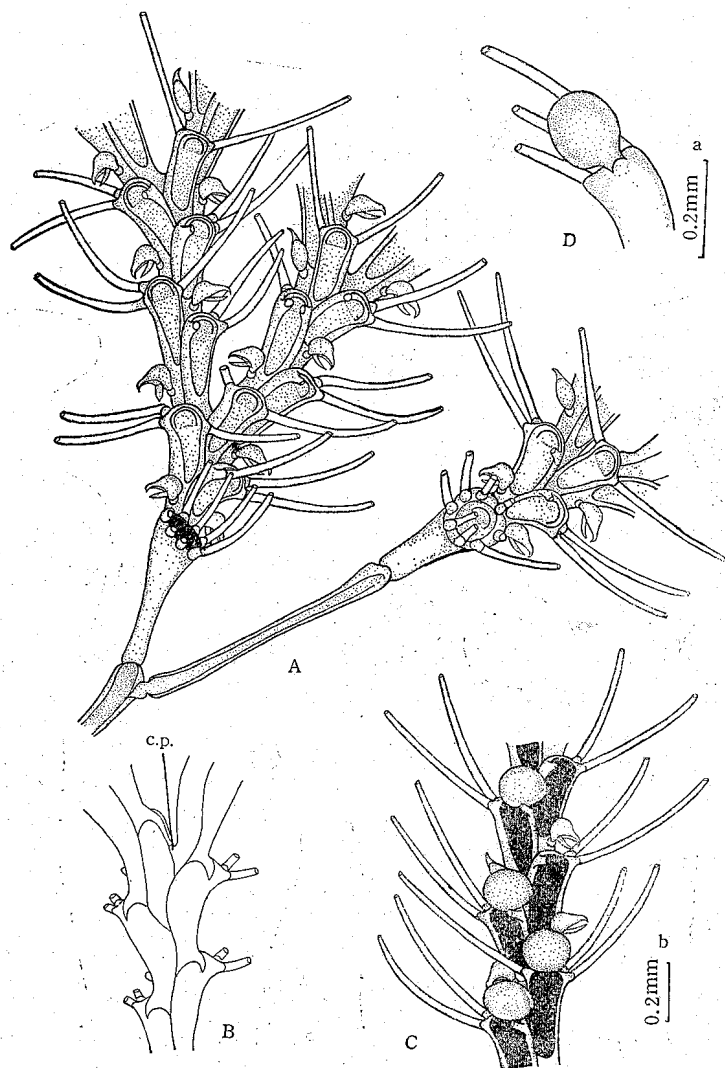


图1 似纤毛茎苔虫(新种) *Caulibugula ciliatoidea* sp. nov.

A. 部分分枝前面观; B. 分枝分枝处基面观; C. 受孕分枝前面观; D. 一受孕个虫末端基面观 (A—C 比例尺为 a, D 比例尺为 b, c. p. 为连接突起)

基部具关节的端刺,与加州茎苔虫 *Caulibugula californica* (Robertson, 1905) 很相似,但加州茎苔虫的第一个虫短而粗,前膜狭长,几乎伸至始端,仅有2根基部无关节的刺状突起;而新种的第一个虫前膜卵圆形或圆形,位于个虫末端,刺多达6—9根,基部均有关节。新种与加州茎苔虫的另一相似处在于两者的卵胞皆有柄,但加州茎苔虫的卵胞柄附于个虫末端内侧,新种的卵胞柄则附于个虫末端背面中央。新种群体借其始端的空个虫分出的附根附于基质上,加州茎苔虫群体由附根形成的特殊的附着基盘附着在基质上。

## 2. 刺轴缘孔苔虫(新种) *Smittina spinigera* sp. nov. (图2: A—D)

*Smittina reticulata*, Wang & Cai, 1977:21, 27, fig. 34 (not of MacGillivray 1842)。

**正模标本** 标本号: 86BBY009, 1986年6月15日采自青岛胶州湾灵山岛人工鱼礁,一个群体附于水螅上,水深约20m。

**其他标本** 标本号：88BTE010，1988年6月14日采自浙江大陈岛潮间带，一群体附于贝壳上；84BTY090，1984年7月15日采自山东北隍城岛潮间带，一群体附于贝壳上；59BTY100，1959年3月25日采自山东烟台芝罘湾潮间带，一群体附于贝壳上。

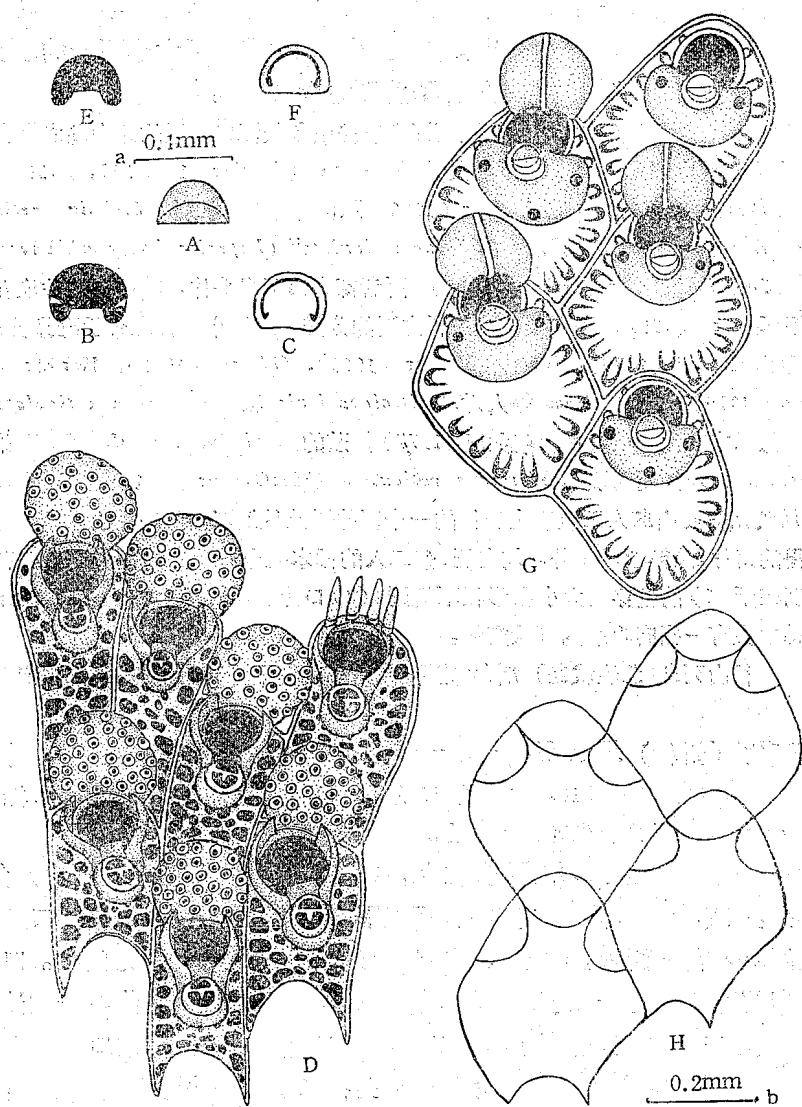


图2 A—D 刺轴缘孔苔虫(新种) *Smittina spinigera* sp. nov.

A. 颌骨； B. 初生室口； C. 口盖； D. 部分群体前面观

G—H 圆吻孔苔虫(新种) *Porella rotundirostris* sp. nov.

E. 初生室口； F. 口盖； G. 部分群体前面观； H. 基孔室

(A 比例尺为 a, 0.1mm; B—H 比例尺为 b, 0.2mm)

**特征描述** 群体亚圆形，单层，淡黄色，被覆在贝壳、水螅等基质上。个虫长方形，放射状排列，相邻个虫以隆起的室间脊相间隔，个虫界限分明。初生室口亚圆形，始端中央有一发达的中央齿，始端两隅各有一侧窦，中央齿自由缘平截，无侧尖，两侧与中央齿平行

处各有一小齿突。口盖半圆形,宽大于长,近边缘有一半圆形几丁质硬缘,硬缘始端两侧各有一弯向内侧的齿状突起。口围厚而隆起,末端有3—4根口围刺,刺常脱落,但刺痕清晰可辨。前壁平坦,饰有大小与形状不规则的穿孔。鸟头体位于室口始端中央,吻的躯轴(颞骨铰合轴)完整,中央有一指向吻端(个虫始端)的齿状突起,颞骨半圆形,指向始端。卵胞口上型,球状,长大于宽,几乎全埋于末端个虫内,表面有许多大小不一的小孔,孔缘隆起。侧壁单孔型壁孔室小,8个,横壁单孔型壁孔室大,单一。

**附记** 王复振、蔡如星(1977)曾报道浙江省普陀山和长江口附近的佘山岛浅海有一种缘孔苔虫,鉴定为“*Smittina reticulata*”。他们引用的文献是“Canu & Bassler, 1929:337, pl.39, figs. 8—9”。根据 Harmer (1957: 919), Canu 和 Bassler (1929) 取自菲律宾地区的“*Smittina reticulata*”应为“*Smittina levis* (Kirkpatrick, 1890)”。“*Smittina reticulata*” (*Lepralia* in MacGillivray, 1842) 和“*Smittina levis* (*Smittia* in Kirkpatrick, 1890) 两者都有口下鸟头体,其前壁除边缘孔外无其他穿孔。因此,根据 Osburn (1952) 关于缘孔苔虫科内属的分类,这两个种都应归于准缘孔苔虫属 *Smittoidea*。作者根据 Hincks (1880), Canu & Bassler (1929), Osburn (1952), Harmer (1957), Hayward & Ryland (1979), Liu & Wass 等人对 *Smittoidea levis* 和 *Smittoidea reticulata* 的描述,对照这两个种的东海标本,发现王复振、蔡如星(1977)报道的 *Smittina reticulata* 既不是 *Smittoidea levis* (Kirkpatrick, 1890), 也不是 *Smittoidea reticulata* (MacGillivray, 1842), 而是缘孔苔虫属的一成员。作者从胶州湾灵山岛人工鱼礁上获得的一个群体以及从浙江大陈岛、山东北隍城岛和烟台芝罘湾潮间带获得的群体,除颜色不同外,均与王、蔡二人的标本完全一致。本新种与缘孔苔虫属现有已知种的明显区别在于(1)前壁穿孔大小和形状不规则;(2)口上卵胞几乎全埋于末端个虫内;(3)口下鸟头体吻之躯轴中央有一指向吻端的刺状突起。

**地理分布** 长山列岛(北隍城岛)、烟台(芝罘湾)、青岛(胶州湾)、佘山岛(长江口附近)、普陀岛、大陈岛。

### 3. 圆吻孔苔虫(新种) *Porella rotundirostris* sp. nov. (图 2: E—H)

**正模标本** 标本号: 85BBY010, 1985年12月14日采自青岛胶州湾灵山岛人工鱼礁,附于星形小盘贝 *Discinisca stella* (无关节类腕足动物)上。

**特征描述** 群体亚圆形,单层,黄白色,被覆在腕足类外壳上。个虫六角形或卵圆形,放射状排列,相邻个虫以隆起的室间脊相间隔,个虫界限清楚。初生室口亚半圆形,宽大于长,始端两隅各有一侧窦,无齿突,中央齿发达,其自由缘平截,无侧尖。口盖半圆形,宽大于长,沿半圆形弧缘有一几丁质硬缘。前壁光滑,中央鼓凸,边缘有一列边缘孔,孔间有稍隆起的细稜。口围细狭,稍隆起。无口刺。室口始端有一很大的口下疣突,其两翼各有一圆形小孔,有时此疣突始端中央另有一小孔。小型鸟头体位于疣突中央,颞骨半圆形,指向始端。卵胞口上型,球状,前表面光滑而鼓凸,在中线处有一细狭的纵肋。侧壁具2个壁孔室,横壁具1个壁孔室,皆单孔型。垂壁基面具3个基孔室:1个端孔室和2个侧孔室,皆单孔型。

**附记** 新种鸟头体位于口下疣突上,与 *Porella aculirostris* Smitt, 1867 十分相似,但新种口下疣突具2—3个圆形小孔,鸟头体颞骨半圆形,宽大于长,个虫六角形或卵圆形,卵胞表面具一纵肋;而 *Porella aculirostris* 口下疣突无孔,鸟头体颞骨虽呈半圆形,但长大于宽,个虫椭圆形或长方形,卵胞表面无纵肋。

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## THREE NEW CHEILOSTOME BRYOZOANS FROM THE COASTS OF SHANDONG AND ZHEJIANG PROVINCES\*

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### ABSTRACT

The paper presents descriptions of three new species of cheilostome bryozoans collected from the coasts of Shandong and Zhejiang Provinces. The holotypes of the new species are deposited at the Institute of Oceanology, Academia Sinica. The descriptions are given below.

#### 1. *Caulibugula ciliatoidea* sp. nov. (figs. 1A—1D)

The colony consists of dichotomous branches alternatively arranged by two rows of zooids and a long stem formed by a single row of kenozooids. The branches are small, palm-shaped and placed in the same zooidal plane. The primary zooid of the extremely proximal end of a branch is stick-like, slightly narrower proximally than distally, with a circular or oval membranous area (frontal membrane) taking its upmost position at the zooid, and with a raised, thick mural rim surrounded by 6—9 slender spines jointed at their base and directed usually to the distal end. On the frontal membrane of the primary zooid is a semicircular (wider than long) operculum and no polypide is found in that zooid. Therefore, the primary zooid is of an intermediate type between an autozooid and a kenozooid. The branch-zooids are elongate,

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*bugula*-type, involved inwards laterally, slightly narrower proximally than distally, slightly angular distally. Three (two outer and one inner) distal spines are very elongate, jointed at their base and directed usually outwards or distally (the upmost outer spine directs commonly to the basal side of the branch). The operculum is semicircular, wider than long, and the orifice faces frontally. The frontal membrane is elongate, broader distally than proximally, occupying about three quarters of the frontal area of a zooid. The pendicular avicularia with a strongly hooked rostrum and an elongate-triangular mandible are of an elongate type, situated on a columella-like tubercle of the outer side of the proximal gymnocyst; their head is slightly convex. The ovicells with an oopore directed proximally are hyperstomial, globose, and attached on the middle of the distobasal end in a fertilized zooid by a short stalk. The mode of bifurcation is of Harmer's type 4. The kenozooids of which consists the long stem varies in length, slightly expanded at both ends and strengthened by their lateral calcareous thickenings. As a rule, some kenozooids give rise to accessory stems which are also consisting of kenozooids. A conical connecting structure is present between the main stem and the accessory stem. On the top of every accessory stem is placed a palm-like branch. No vesicles are found. All the colonies are attached to the substrata by the rhizoids sprung off from the proximal kenozooids of the main stem.

In appearance of its colony, this new species is somewhat similar to *Caulibugula ciliata* (Robertson, 1905) in its zooids having very long distal spines. In that species there are 4—6 distal spines, the primary zooid in the extremely proximal end of a branch has 6—10 spine-like processes without joints at their base, its branch-zooids are of *Bicellarielle*-type, the new species has only three distal spines, the primary zooid in the extremely proximal end of a branch has 6—9 elongate spines jointed at their base and its branch-zooids are of *Bugula*-type. This new form bears a resemblance to *Caulibugula californica* (Robertson, 1905) in the shape of its zooids, especially in its three elongate distal spines jointed at their base. However, in that species the first zooid in the extremely proximal end of a branch is shorter and thicker, the frontal membrane of the first zooid is narrow and reaching nearly the proximal end of the zooid and have only two spine-like processes without joints at their base, but in the new species the first zooid is elongate, the frontal membrane of the first zooid is in the upmost position of the zooid and surrounded by 6—9 elongate marginal spines jointed at their base. The similarity of the new species to *Caulibugula californica* is in its having ovicells being pendicular, but the stalk of the new species is attached to the middle of the disto-basal end instead of the inner side of a fertilized zooid. According to the primitive descriptions of *Caulibugula californica* given by Robertson (1905), its "rootlets spring from lower segments of the branches of the stalk, passing downward close to stalk and attaching themselves to basal disk." (Robertson 1905: 282). However, the rootlets (rhizoids) of the new species never form such an attachment disk and the colonies are directly fixed on substrata by the rhizoids given off from the kenozooids of the stem.

## 2. *Smittina spinigera* sp. nov. (figs. 2A—2D)

The colony is encrusting, subcircular, unilaminar, yellowish in colour. The zooids are rectangular, arranged in radial lines, distinct, separated by raised ridges. The primary orifice is semicircular, with a well-developed lyrule truncated along its free edge and without lateral spikes, with a small triangular lateral condyle at the position nearly parallel to the free margin

of the lyrule, and with a lateral sinus at every proximal corner. The operculum is semicircular, wider than long, with a chitinous sclerite along its submarginal border. The peristome is thick, raised and marked with 3—4 peristomial distal spines which are often evanescent. The frontal walls are flattened, perforated by pores irregular in size and shape. Immediately below the orifice is present a small avicularium with a semicircular mandible directed proximally. A median spinous process directed proximally is present on the complete bar of the rostrum which distal margin is obtusely ovoid. The Ovicells are globose, longer than wide, nearly embedded in the distal zooid, and provided with the small pores which are variable in size and raised at their periphery. There are 8 small uniporous porechambers on each of the two lateral walls and 1 large uniporous porechambers on the transverse wall.

Wang & Cai (1977: 21, 27, fig. 34) reported a smittinid from the shallow waters off Putuo Island off province zhejiang and sheshan Island near the estuary of Changjiang River. It was recognized as "*Smittina reticulata*". The recognition was known to be depending on the paper about bryozoans from the Philippine region published by Canu & Bassler (1929). According to Harmer (1957: 917), "*Smittina reticulata*" reported by Canu & Bassler from the Philippine region was said to be "*Smittina levis* (Kirkpatrick, 1890)". On the basis of the fact that both in "*Smittina reticulata*" and in "*Smittina levis*" is present a suboral avicularium and no perforations except for the marginal pores are found on their frontal walls, their mandible being directed proximally, the two smittinids should be members of the genus *Smittoidea* Osburn 1950. From the notices on *Smittoidea reticulata* by Hincks (1880), Canu & Bassler (1929), Osburn (1952), Harmer (1957), Hayward & Ryland (1979) and Liu & Wass (in press) and from the remarks on *Smittoidea levis* by Harmer (1957) and Liu & Wass (in press), the smittinid recorded by Wang & Cai from the coastal waters off Province Zhejiang is neither *Smittoidea reticulata* nor *Smittoidea levis*, but a member of the genus *Smittina* Norman 1903 because it has a median suboral avicularium and its frontal wall is uniformly perforated by large pores. The colonies obtained respectively from the coast of the Shandong Peninsula (Beihuangcheng Island, Zhifu Bay off Yantai Harbour, Lingshan Island located in Jiaozhou Bay off Qingdao Harbour, and Dachen Island located at Province Zhejiang) are just the same as the colonies collected from the coastal waters off Province Zhejiang by Wang & Cai (1977) except for their orange-red—our colonies being yellowish.

This species is the first new member of the genus *Smittina* recorded from the Chinese seas. It is easily distinguished from the known species of the genus by the following features: (1) its frontal wall uniformly perforated by pores irregular in size and shape; (2) its hyperstomial ovicells nearly imbeded in the distal zooid; and (3) its avicularia having a complete rostral bar with a median spinous process directed proximally.

### 3. *Porella rotundirostris* sp. nov. (figs. 2E—2H)

The colony is encrusting, subcircular, unilaminar, yellowish-white in colour. The zooids are hexangular or oval, arranged in radial lines, distinct, separated by raised ridges. The primary orifice is subcircular, wider than long, with a well-developed lyrule truncated in its distal border and without condyles. The operculum is semicircular, wider than long, with a chitinous sclerite along its submarginal edge. A convex umbo is present below the orifice of every zooid, marked with two lateral pores. Sometimes a third pore is situated on the proximal end

of the umbo. A small avicularium is found on the umbo, with a semicircular mandible (wider than long) directed proximally. The ovicells are hyperstomial, globose, usually have a fine longitudinal rib at their median line. Two mural porechambers on each of the lateral walls, one porechamber on the transverse wall, both uniporous. There are three basal porechambers: one being distal and two being lateral.

This new species is similar to *Porella acurlirostris* Smitt, 1867 in its avicularia being located on the suboral umbones, but the new species has two or three pores on its umbon, its mandible is semicircular (wider than long), its zooids are hexangular or oval and its ovicells have a longitudinal rib on their median line; *P. acurlirostris* has no pore on its umbon, its mandible is semicircular (longer than wide), its zooids are elliptical or rectangular, and its ovicells have no longitudinal rib on their frontal surface.