第18卷 第6期 海 洋 与 湖 沼 Vol. 18, No. 6
1987 年 11 月 OCEANOLOGIA ET LIMNOLOGIA SINICA Nov., 1987

南海马尾藻三新种*

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提要 本文报道产于香港和广东硇洲岛的三种新马尾藻。它们是(1)产于香港的松弛马尾藻 *Sargassum laxifolium*; (2) 产于硇洲岛的长托马尾藻 *S. longifructum* sp. nov.; (3) 产于硇洲岛的硇洲马尾藻 *S. naozhouense* sp. nov.。它们都直接从生殖托上长出藻叶或气囊,具有叶托混生的特点,因此,在 J. Agardh 的分类系统中属于马尾藻亚属 subgenus *Sargassum* J. Ag. 叶托混生组 Zygocarpicae J. Ag.。本文对新种的特征都进行了描述,并与它们的近缘种进行了比较。新种的模式标本保存于中国科学院海洋研究所植物标本室。

马尾藻属的种类很多,全世界约 400 多种,主要分布在印度西太平洋热带海域和澳大利亚。中国是马尾藻主要产地之一,种数多,资源丰富。近几年来,我们对中国科学院海洋研究所植物标本室收藏的采自中国沿岸的马尾藻属标本进行了系统整理。在研究过程中,发现三个产于香港和广东省硇洲岛的标本,其藻叶或气囊从生殖托上长出,具有叶托混生的特点,按 J. Agardh 的分类系统,它们应属于马尾藻亚属 *Sargassum* J. Ag. 叶托混生组 Zygocarpicae J. Ag.。我们将这些标本与该组的其它种类进行了比较,它们之间都有明显的不同,因此,命名为松弛马尾藻 *Sargassum laxifolium* sp. nov.、长托马尾藻 *S. longifructum* sp. nov. 和硇洲马尾藻 *S. naozhouense* sp. nov.。

新种的模式标本保存于中国科学院海洋研究所植物标本室。

1. 松弛马尾藻(新种) *Sargassum laxifolium* sp. nov. (图 1,图版 I:1)

Frons lutea—bruunea, gracilis; ramis primariis cylindrica, laevibus, 70—75 cm alt., 1mm diam., foliis ellipticis vel obovatis, ca. 2—3 cm longa, 1—1.5 cm alta, plerumque partibus superis latioribus, marginibus dentatis, apicibus rotundatis, basibus obliquis, costis sub mediis vel 1/3 foliorum evanidis, glandulis conspicuis; foliis parvis superis, 1.5—2 cm longis, 0.5—1 cm latis, ellipticis, sine costis vel obscuris, glandulis conspicuis; vesiculis sphaericis vel ovatis, 4—5 mm diam., cum apicibus mucronatis. Plantae dioeciae, receptaculis femineis, comolanatis—triquetris, furcais ad 2—3 mm longas, 1—1.5 mm latas, dentibus acutis sub marginibus. Holozygocarpicis, sine plantis maribus.

Holotypus Tseng 2782(♀), ad Saiwan, Hong Kong, 14, V, 1940.

藻体黄褐色,比较细长,我们现有的两个标本都不完整,只是一部分主枝,没有固着器

* 中国科学院海洋研究所调查研究报告第 1396 号。
收稿日期: 1986 年 12 月 29 日。

和主干。主枝圆柱形，光滑，具有黑色的腺点，高达 70—75 cm，直径为 1 mm。分枝从主枝叶腋间长出，形态和主枝相似，但较主枝细，通常为 15—25 cm 长。小枝较短，具有藻叶、气囊和生殖托，有黑色的腺点。主枝和分枝上的藻叶，长椭圆形，顶端半圆形，较宽；长 2—3 cm，宽 1—1.5 cm；通常上部比下部略宽，边缘具有锯齿；基部不对称，外侧大于内侧；具有圆柱形短柄；叶脉不明显，常常消失在叶的中部或 1/3 处；毛窠清楚，分散在叶的表面。小枝上的叶与主枝上的叶形态相似；长 1.5—2 cm，宽 0.5—1 cm；柄较短；没有叶脉或叶脉不明显；毛窠清楚。气囊，球形或卵圆形，顶端常常具有细尖，有的边缘有翅，有的没有；直径为 4—5 mm；基部具有一个短柄，长度和气囊的直径相似。雌雄异株。雌托，扁平或三棱形，边缘和顶端都具有锯齿；具有 1—2 次分枝；长 2—3 mm，宽 1—1.5 mm；并由 2—3 个组成简单托聚，着生在藻叶或囊柄的基部。小叶或气囊常常直接从生殖托上长出来，具有叶托混生的特点，但是多数托聚并不表现出上述典型的特征。雄植物体没有发现。

模式标本 Tseng (Zeng) 2782，雌植物体，1940 年 5 月 14 日曾呈奎在香港的柴湾采自漂来的标本。

主要特征 (1)藻叶长椭圆形，顶端半圆形；上部比下部略宽；边缘和顶端都具有锯齿；基部不对称，呈斜楔形，外侧大于内侧；叶脉不明显，或无叶脉，通常消失在叶的中部。(2)雌托扁平或三棱形，具有锯齿；有时不育的小叶或气囊直接从生殖托上长出来，表现出典型的叶托混生特点。(3)主枝、分枝和小枝上都具有黑色腺点。

根据松弛马尾藻生殖托上长小叶或气囊的特点，它属于马尾藻亚属 *Sargassum* J. Ag. 叶托混生组 Zygocarpicae，它的主枝圆柱形；藻叶基部明显倾斜；气囊球形，顶端常常具有细尖；生殖托扁平或三棱形，边缘具有锯齿等。这些特征都比较接近斜基马尾藻 *S. assimile* Harv.，但是，新种的藻叶为椭圆形或倒卵形，长 2—3 cm，宽 1—1.5 cm；顶端半圆形，上部比下部略宽；叶脉不明显，小枝上的叶无叶脉；囊柄圆柱形，上部不扁平。这些特征都明显地不同于斜基马尾藻，因此，它们之间是容易区分的。

2. 长托马尾藻(新种) *Sargassum longifructum* sp. nov. (图 2，图版 I:2)

Frons lutea—bruunea, ca. 45 cm alt., haptero destituto, axilla principalis cylindrica, laevis, ca. 6 mm alt., 1.5 mm diam.; ramis lateralibus primariis cylindricis, laevibus, 44 cm alt., ca. 1 mm diam.; foliis basalibus lanceolatis cum integeris vel aliquantum marginibus undulatis, 5—6 cm longis, 6—7mm latis, apicibus acuminatis, basibus asymmetricis obliquis, percurrente costis, glandulis obscuris; foliis supra ramos et ramulos, angustis lanceolatis, cum marginibus denticulates, 2—3 cm longis, 1—2 mm latis, costis percurrente, glandulis conspicuis; vesiculis sphaericis, 1—2 mm diam.. Plantae dioeciae, receptaculis maribus cylindricis, laevis, plerumque furcais, 3—4 cm longis, 1mm diam.. Holozygocarpicis, sine plantis femineis.

Holotypus AST 551767 (♂) ad Naozhou Island, Guangdong Province, 10, IV, 1955.

藻体黄褐色，中等大小，高达 45 cm，没有固着器。主干较短，圆柱形，光滑，高约 6 mm，直径为 1.5 mm。主枝从主干顶端生出，圆柱形，光滑，高约 44 cm，直径为 1 mm。

分枝较细，形状和主枝相似，但较短，长约 10 cm。小分枝丝状，着生藻叶、气囊和生殖托。基部藻叶膜质，披针形；长 5—6 cm，宽 6—7 mm；边缘全缘或波状缺刻，顶端尖；基部不对称，外侧大，内侧小，通常为斜楔形；叶脉到顶；毛窠不明显，具有短柄。分枝和小枝上的藻叶，较薄，长披针形；长 2—3 cm，宽 1—2 mm；边缘具有细锯齿，顶端尖，基部斜楔形；叶脉贯顶或消失在顶端之下；具有毛窠，分散在叶脉两侧；叶柄丝状。气囊球形或卵圆形，大多数顶端圆形，少数具有小的突起；直径为 1—2 mm；具有毛窠；囊柄多数丝状，少数扁平，叶状，长 3—4 mm。雌雄异株。雄托细长，圆柱形，光滑，没有锯齿；具有 1—2 次分枝；长 3—4 cm，直径为 1 mm；单生或 2—3 个构成简单托聚，总状排列，着生在小枝叶柄基部。真正的叶托混生，生殖托上常常长有气囊或小叶。没有发现雌植物体。

模式标本　AST551767，雄植物体，1955 年 4 月 10 日，张峻甫、徐法礼在广东省硇洲岛津前乡采自漂来的标本。

主要特征　(1)基部藻叶较大而且厚，边缘全缘；上部藻叶薄，细长，边缘有锯齿。(2)生殖托特别细长，圆柱形，光滑，没有齿，具有 1—2 次分枝；气囊球形或卵圆形，大多数顶端光滑，没有细尖。(3)真正的叶托混生，生殖托上常常长有气囊或小叶。

根据长托马尾藻生殖托上常常长有小叶或气囊的特征，它属于马尾藻亚属 *Sargassum* J. Ag. 叶托混生组 Zygocarpicae。它的近缘种是果叶马尾藻 *S. carpophyllum* J. Ag.。根据 J. Agardh (1848:304) 的描述，果叶马尾藻的茎丝状，光滑；藻叶披针形、线形；长 5 cm，宽 6 mm，这些特征，本种都比较接近。但是本新种的生殖托特别细长，长达 3—4 cm，直径 1 mm，这一特征在叶托混生组种中，从未见过，因此，它们之间是容易区分的。

3. 硇洲马尾藻(新种) *Sargassum naozhouense* sp. nov. (图 3，图版 II:1—2)

Frons gracillis, ca. 60 cm alt., haptero discoido; axilla principalis cylindrica, laevis, 5 mm alt., 2 mm diam.; ramis primariis cylindricis, laevibus, 60 cm alt., 1—1.5 mm diam.; ramis secundriis brevior, 10—20 cm alt.; foliis basibus lanceolatis angustis, marginibus integeris, apicibus obscuris, 2—3 cm longis, 2—3 mm latis, costis obscuris, sub mediis evanidis, glandulis raro; foliis super ramis linearibus, marginibus integeris, sine costis, 1—1.5cm longis, 1—2 mm latis, glandulis raro; vesiculis sphaericis vel ovatis, 1—2 mm diam., apicibus rotundatis. Plantae dioeciae, receptaculis femineis et maribus cylindricis, laevis, singularibus vel furcatis, receptaculis maribus 4—5 mm longis, 0.2—0.4 mm diam.; receptaculis femineis 3—4 mm longis, 0.3—0.5 mm diam..

Holotypus　AST 73536 (♀) ad Naozhou Island, Guangdong Province 15, V. 1973.

藻体灰褐色，中等大小，高约 6 cm，固着器圆盘状。主干较短，圆柱形，光滑，高约 5 mm，直径为 2 mm。主枝数条，从主干顶部长出，圆柱形，光滑；高约 60 cm，直径为 1—1.5 mm；具有黑色腺点，新鲜标本比较清楚，干标本不明显。分枝从主枝的叶腋间长出，形状和主枝相似，但比较短，高为 10—20 cm。小枝从分枝的叶腋中长出，密生藻叶、气囊和生殖托，小枝上有黑色的腺点。基部藻叶较厚，长披针形、线形；长 2—3 cm，宽 2—3 mm；边缘全缘，顶端钝；基部为长楔形；叶脉不贯顶，新鲜标本还能分辨，干标本不清楚；毛窠少

量，不规则分散在叶各处，基部具有圆柱形短柄。分枝和小枝上的叶，线形或丝状，边缘全缘；长 1—1.5 cm，宽 1—2 mm；基部长楔形；柄丝状；没有叶脉；具少量毛窠。气囊球形，或卵圆形；表面光滑；直径 1—2 mm；顶端圆形，大多数无细尖；没有毛窠；囊柄丝状，长约 1 mm。雌雄异株。雌生殖托和雄生殖托都是圆柱形，表面光滑；没有锯齿；基部具有圆柱形柄；单个或具有分枝；大多数单生或 2—3 个组成简单托聚，总状排列，着生在小枝叶腋间。雄托长 4—5mm，直径为 0.2—0.4mm；雌托长 3—4mm，直径为 0.3—0.5 mm。叶托混生，生殖托上常常生出气囊或小叶，尤其是雌托，较为普遍。

模式标本 AST73536，雌植物体，生长在低潮带岩石上。1973 年 5 月 15 日陆保仁采自广东省硇洲岛北港。同号标本中，有两个雄植物体。

主要特征 (1)藻叶较厚，边缘全缘。基部藻叶长披针形、线形，叶脉不贯顶；上部藻叶线形或丝状，没有叶脉。(2)雌雄异株；生殖托圆柱形，光滑；没有锯齿；单个或有时分叉。(3)叶托混生，生殖托上常常长出小叶或气囊。(4)主枝、分枝和小枝上都有黑色腺点。

根据叶、托混生的特征，本新种属于马尾藻亚属 *Sargassum* J. Ag.，叶托混生组 Zygocarpicae。它的近缘种是果叶马尾藻 *S. carpophyllum* J. Ag.。它们的茎都是圆柱形，光滑，具有黑色腺点；生殖托圆柱形，光滑，有时分叉，常常长有小叶或气囊。但是它们之间的区别在于，硇洲马尾藻的藻叶较厚，细长，边缘全缘；除了基部藻叶之外，上部藻叶

图 1 松弛马尾藻

Fig. 1 *S. laxifolium* sp. nov.

a. 藻叶；b. 气囊；c. 生殖托。

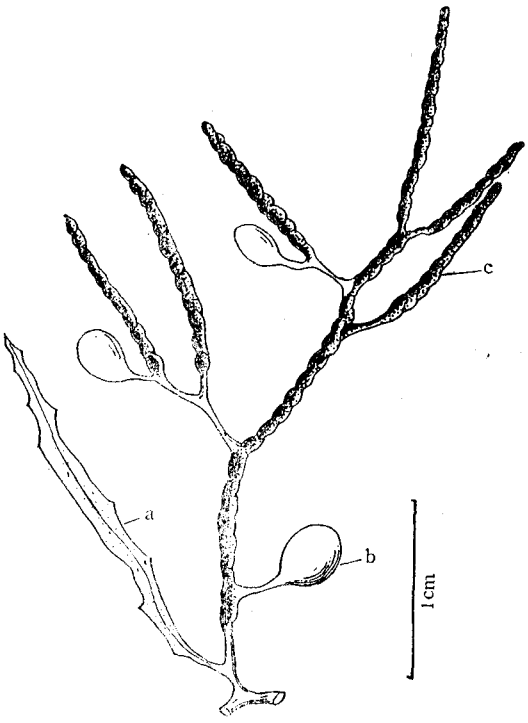

图 2 长托马尾藻

Fig. 2 *S. longifructum* sp. nov.

a. 藻叶；b. 气囊；c. 生殖托。

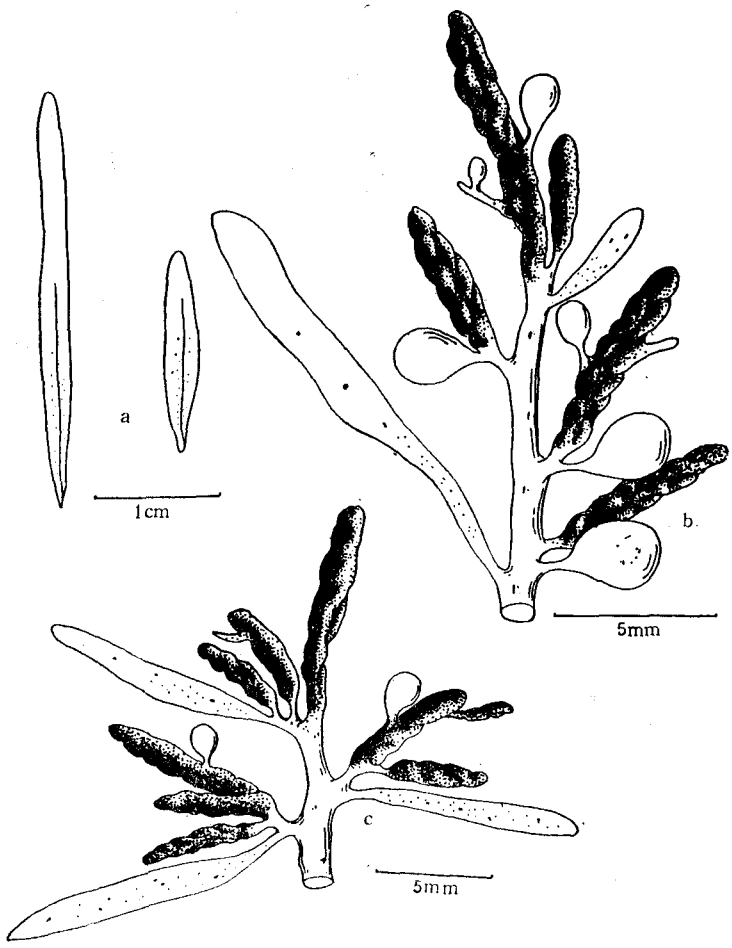

图 3　硇洲马尾藻

Fig. 3　*S. naozhouense* sp. nov.

a. 基部藻叶；　b. 雌生殖托小枝；　c. 雄生殖托小枝。

都没有叶脉，叶的顶部多数钝；气囊顶端大多数圆形，光滑。因此，它们之间是容易区分的。

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THREE NEW SPECIES OF *SARGASSUM* (FUCALES, PHAEOPHYTA) FROM SOUTH CHINA SEA*

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ABSTRACT

In the present paper, three new species of *Sargassum* are reported, namely, (1) *Sargassum laxifolium* sp. nov., (2) *S. longifructum* sp. nov., (3) *S. naozhouense* sp. nov. All of these are zygocarpic, with leaves or vesicles immediately arising from the receptacles, Specimens studied were collected from Hong Kong and Naozhou Island, Guangdong Province, China. Holotypes are deposited in the Herbarium of Institute of Oceanology, Academia Sinica, Qingdao, China.

1. *Sargassum laxifolium* sp. nov. (fig. 1, pl. I: 1)

Frond slender, yellowish brown, primary lateral branches smooth, cylindrical, about 70—75 cm high, 1 mm diam.. Secondary branches similar to the primary branches in habit, about 15—25 cm high, less than 1 mm diam., with fructiferous glandulous branchlets. Leaves on primary and secondary branches elliptic or obovate, about 2—3 cm long, 1.0—1.5 cm broad, obtuse at the apex and oblique and asymmetrical at the base, dentate at the margni, with short stipe and indistinct midrib, usually vanishing below the middle parts or 1/3 of the leaves and conspicuous cryptostomata, scattered on the surface of the leaves. Leaves on the branchlets very similar to the ones on the primary branches in habit, elliptic, about 1.5—2 cm long, 5—10 mm broad, rounded at apices, dentate at margin, with a very oblique, asymmetrical base, without midrib or obscure, and with conspicuous cryptostomata scattered on the surface of the leaves. Vesicles spherical or ovate, 4—5 mm diam. with mucronate apex, some with wings at margin, with short stipes. Plant dioecious. Female receptacles flattened to triquetrous, 2—3 mm long, 1—1.5 mm broad, usually branched once or twice, with sharp teeth at the margin and apices, two or three arranged in short racemes on the basal part of foliar stipe or vesicle, small leaves or vesicles immediately arising from them, showing holozygocarpic character.

Holotype Tseng 2782 (♀) collected from the drift in Saiwan, Hong Kong by C. K. Tseng, May 14, 1940.

The new species, a member of the subsection Holozygocarpic of the subgenus *Sargassum*,

* Contribution No. 1396 from the Institute of Oceanology, Academia Sinica.

is characterized by its leaf or vesicle immediately arising from the receptacle. It is closely related to *Sargassum assimile* Harv., differing in its elliptic or obovate leaves, its midrib vanishing below the middle part, its vesicle with cylindrical stipe. In *S. assimile* its leaves are oblong-spathulate, narrower upward to apices, midrib vanishing below the apices, stipe of the vesicle compressed upwards.

2. *S. longifructum* sp. nov. (fig. 2, pl. I: 2)

Frond medium size, yellowwish brown, lacking holdfast, main axis shorter, cylindrical, smooth, about 6 mm high, 1.5 mm diam. Primary lateral branches arising from the distal part of the axis, cylindrical smooth, 39 cm high, about 1 mm diam. Secondary branches slender and shorter, about 10 cm high, similar to primary branches in habit, beset with small filiform fructiferous branchlets with dense leaves, vesicles and receptacles. Basal leave membranous in texture, lanceolate with entire or somewhat undulate margin, 5—6 cm long, 6—7 mm broad, acuminate at the apex, with oblique asymmetrical base, percurrent midrib and obscure cryptostomata. Leaves on branches and branchlets thinner, narrow lanceolate, with denticulate margin, 2—3 cm long, 1—2 mm broad, acuminate at the apex, oblique cuneate at the base, with a filiform short stipe, midrib percurrent, vanishing below the apex, cryptostomata scattered on both side of the midrib. Vesicle spherical or ovate, 1—2 mm diam. rounded or apiculate at the apex, with cryptostomata and a stipe filiform, 3—4 mm long, but a few vesicles with flat foliaceous stipes. Plant dioecious ,male receptacle terete, slender, smooth, without any teeth or spines, usually branched once or twice, about 3—4 cm long, 1 mm diam., solitary or in two or three short racemes in axil of the leaflets. Holozygocarpic, leaf or vesicle immediately arising from the receptacle. Female plant not found.

Holotype　AST 551767 (♂) collected from the drift in Naozhou Island, Guangdong Province on April 10, 1955 by Zhang Junfu and Xu Fali.

The new species, a member of the subsection Holozygocarpicae of the subgenus *Sargassum*, is most closely related to *S. carpophyllum* J. Ag. The present new species is characterized by its slender, branched and elongated receptacle, 3—4 cm long and 1 mm diam. Such elongated receptacle is rather unique in the section zygocarpicae.

3. *S. naozhouense* sp. nov. (fig. 3, pl. II)

Frond medium size, gray brown, about 60 cm high, arising from a discoid holdfast. Main axis short, cylindrical, smooth about 5 mm high, 2 mm diam. Primary lateral branches cylindrical, smooth, about 60 cm high, 1—1.5 mm diam. Secondary branches shorter, 10—20 cm high, beset with small fructiferous branchlets with dense leaves, vesicles and receptacles. Some dark glandular dots on branches and branchlets, easily visible in fresh specimens. Basal leaves membranaceous, narrow laceolate, entire margin, obtuse at apices, 2—3 cm long, 2—3 mm broad, base of the leaves cuneate at the base, with a cylindrical stipe, and obscure midrib, vanishing below the middle of the leaves. Cryptostomata rare, irregularly scattered on surface of the leaves. Leaves on both branches and branchlets linear, entire margin, without midrib, 1.0—1.5 cm long, 1—2 mm broad, with a filiform short stipe, and a few cryptostomata scattered on the surface of the leaves. Vesicles small, spherical or ovate, about 1—2 mm diam., rounded at apices, smooth, without cryptostomata, with a cylindrical stipe, about 1 mm long. Plant dioecious. Female and male receptacles terete, smooth, with short stipes tapering towards the

apices, single or branched once or twice, solitary or in two or three short racemes in axils of leaves, the whole inflorescence forming a panicle; male receptacles 4—5 mm long, 0.2—0.4 mm diam., female ones 3—4 mm long, 0.3—0.5mm diam. Zygocarpic, the leaflets or vesicle immediately arising from the receptacles, this characteristic is more common in the female plant than in the male.

Holotype AST 73536 (♀) by Lu Baoren, on rocks in the lower intertidal to subtidal zone, Naozhou Island, Guangdong Province, on May 15, 1973, other specimens are male plants in the same number.

The new species is holozygocarpic and most closely related to *S. carpophyllum* J. Ag. differing in its thicker, smaller, narrow lanceolate leaves with entire margin, without midrib except some of the basal leaves and obtuse at the apices, and in its vesicles rounded at apicies. *S. carpophyllum* has thinner, dentate leaves,with distinct midrib and spherical vesicles very often narrowly margined and mucronate at apices.

图版 I　松弛马尾藻 *S. laxifolium* sp. nov. 和长托马尾藻 *S. longifructum* sp. nov.
1.松弛马尾藻 *S. laxifolium*（type）模式标本外形；
2.长托马尾藻 *S. longifructum*（type）模式标本外形。

图版II 碉洲马尾藻*S. naozhouense* sp.nov.

1. 碉洲马尾藻*S. naozhouense* (typt)（♀）　2. 碉洲马尾藻 *S. naozhouense*（♂）