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It is well known that many species of the brown algal genus *Sargassum* form seaweed beds (underwater forests) which offer fishes and invertebrates spawning grounds and/or habitats. In Japan, floating fragments of some *Sargassum* species are of ecological and commercial interest as they are accompanied by juveniles of several fishes (Uchida and Shojima 1958). Such juveniles (particularly of the yellow tail, *Seriola quinqueradiata*) are a source of stock for mariculture. In many Asiatic countries some species of *Sargassum* have been used for food, for alginic extraction or for manure (Chapman 1970, Michanek 1975, Lu and Tseng 1983).

In Vietnam, *Sargassum* is one of the biggest natural seaweed resources and has been harvested and used for food (boiling with fish), for medicine (making some iodine-based drugs), for manufacturing alginates and for manure (sweet potatoes, tobacco, onions and others). In coastal provinces of southern to central Vietnam, Khanh Hoa, Quang Nam, Quang Ngai, Binh Dinh and others, dried material of *Sargassum* is used for medical tea and offered for sale together with dried *Porphyra*, agarophytes and carrageenophytes in local markets. The prices per 1 kg of these dried seaweeds were as follows at the Nha Trang Market, Khanh Hoa Province, in early March, 1992: 1) *Sargassum* species (Fig.

1)=US\$ 0.5, 2) *Porphyra* sheets=US\$ 5, 3) *Gracilaria eucheumoides* Harvey=US\$ 4.5, 4) *G. tenuistipitata* Chang et Xia=US\$ 1.5, 5) *G. edulis* (S. G. Gmelin) P. C. Silva (= *Polycavernosa fastigiata* Zhang et Xia)=US\$ 1, 6) *Eucheuma gelatinum* (Esper) J. Agardh=US\$ 3, and 7) *Gelidiella adnata* Dawson=US\$ 5.

Some 40 species of *Sargassum* have been reported from southern to central Vietnamese waters (Pham 1967, 1969). *Sargassum* tea has been traditionally used in Vietnam as a source of iodine. The iodine content in *Sargassum* species is 0.05–0.16% of dry weight, varying according to the growing season and species. Although many species are harvested from March to May, at present the most common species, *Sargassum mcclurei* Setchell (Fig. 2) is chiefly used. Samples collected by local gatherers are washed in fresh water, dried, and packed for sale in the markets (Fig. 1). Preparation of the tea is as follows: dried material is boiled with fresh water and filtered. This tea has a yellowish brown color. For drinking some sugar can be added.

On the basis of materials collected at Nha Trang, the morphological features of *Sargassum mcclurei* (Fig. 2) are as follows. Thalli are yellowish brown in color, arising from a depressed scutate holdfast, and attain 70 cm or more. Stems are smooth in surface, 2.5–5.0 mm long, terete, 2.5–4.0 mm in diameter, bearing several primary branches. The primary branches are terete near the stem and slightly compressed at their middle to distal

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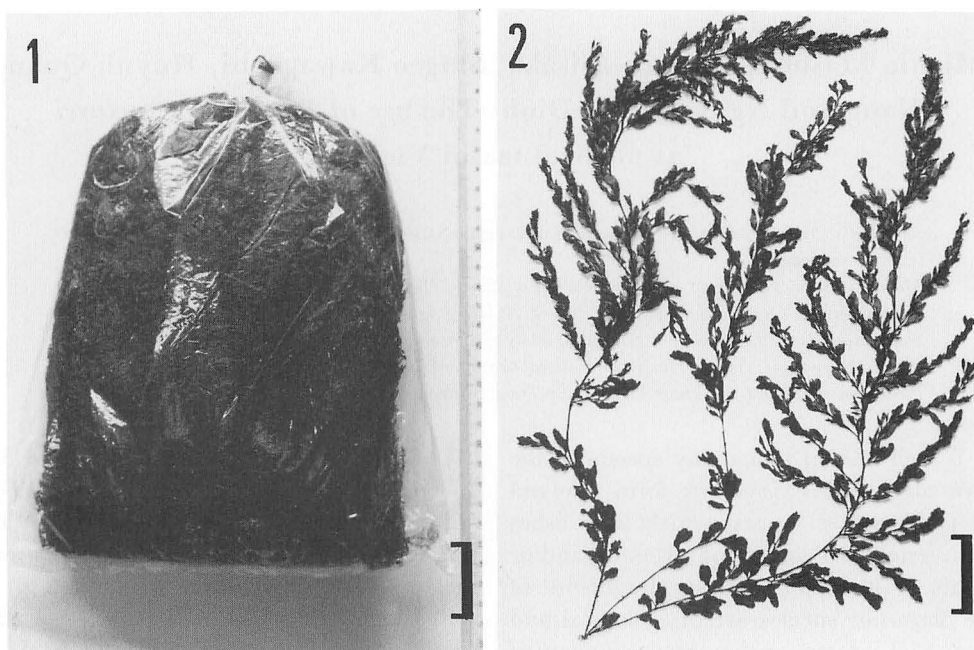


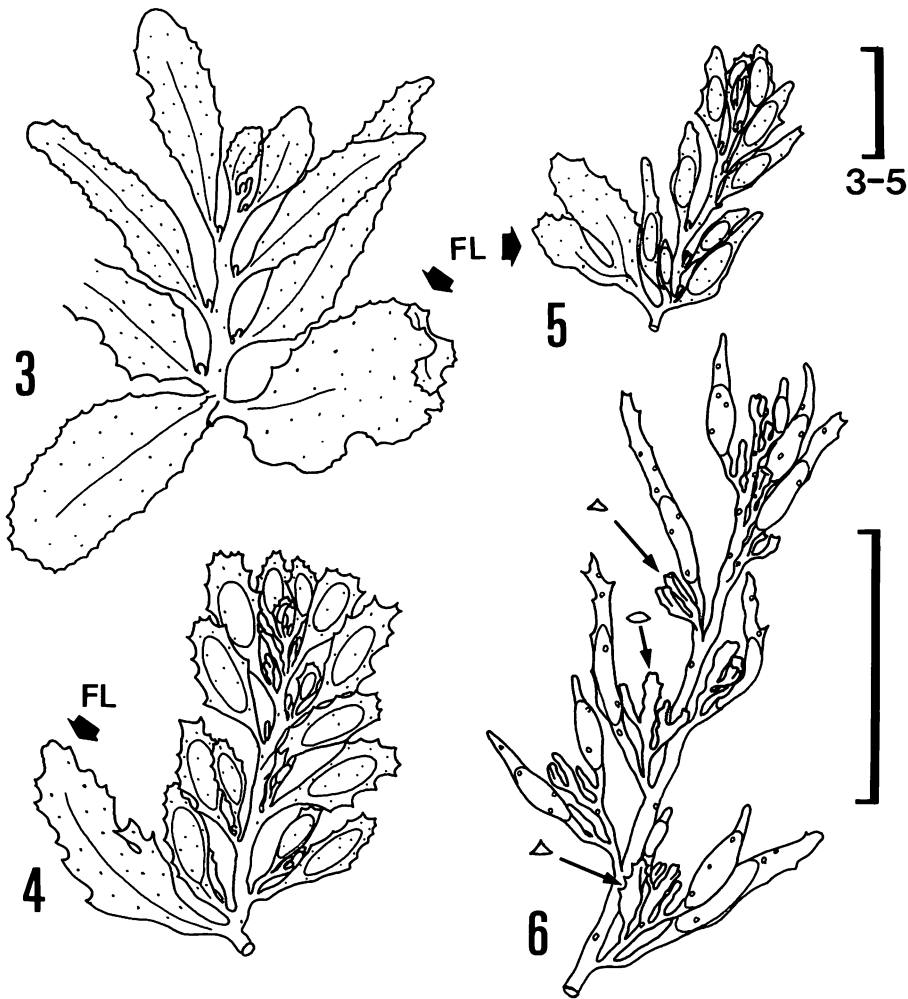
Fig. 1. Package of *Sargassum* sold in Nha Trang Market, Khanh Hoa Province in Vietnam. Scale=4 cm.
 Fig. 2. Herbarium specimen of *Sargassum mcclurei* Setchell collected at Nha Trang on 5 March 1992 and deposited in the Herbarium, Faculty of Agriculture, Kyoto University. Scale=5 cm.

portions, up to 3.0 mm wide and 2.5 mm thick, having smooth surfaces. Secondary branches are spirally arranged at intervals of 1.5–2.0 cm and are 5–14 cm long. Leaves of primary and secondary branches on the proximal portion of the thallus are obovate to elliptic, asymmetrical to markedly unequal, with cuneate bases, obtuse apices and denticulate or entire margins. They are sometimes conduplicate (folded on themselves) at the apex. Midribs are faintly discernible and vanish near the apex of the leaves (Fig. 3). Cryptostomata are prominent and are scattered all over the leaf surfaces. Leaves of primary and secondary branches on the middle to distal portions of the thallus are smaller and more slender than the proximal leaves, rarely forked, decidedly asymmetrical, with acute apices and faintly discernible evanescent midribs and usually with denticulate margins. The central portions of these upper leaves are swollen into vesicles (Figs. 4, 5), which are termed phyllocysts by Tseng and Lu (1979). Each phyllocystic vesicle is com-

posed of a more or less flattened cyst (bladder) embedded in a leaf. Phyllocystic vesicles on the tertiary branches are crowned with long apical prolongations, and without wings (Fig. 6).

Plants are dioecious. Receptacles are borne on tertiary branches. Female receptacles are simple or once to thrice branched racemously. Mature receptacles are compressed to triquetrous (Fig. 6), 2–3 mm long, 0.5–1.0 mm wide, and sometimes toothed. Male receptacles are terete and slightly warty; spines are absent (Pham 1967).

The following four species of *Sargassum* subgenus *Bactrophycus* are grouped in the section *Phyllocystae* Tseng (1985) on the basis of the presence of characteristic phyllocysts (Tseng *et al.* 1985): *S. phyllocystum* Tseng et Lu (1979), the type species, *S. emarginatum* Tseng et Lu (1978), *S. herklotsii* Setchell (1933) and *S. mcclurei* Setchell (1933). These species have been reported from several localities along the coast of the South China Sea, ranging from Hong Kong to Vietnam (Lu and



Figs. 3-6. *Sargassum mcclurei* Setchell. 3-5: secondary branches on the proximal (3), middle (4) and distal (5) portions of the thallus. FL, first leaf. 6: phyllocystic vesicles and female receptacles on a tertiary branch, with transverse sections. Each scale=1 cm.

Tseng 1983). Judging from the descriptions and illustrations of the species of *Sargassum* section *Phyllocystae* (Setchell 1933, Tseng and Lu 1978, 1979, Lu and Tseng 1983, Tseng *et al.* 1985), some species are clearly closely related and distinctions between them are unclear. For example, *Sargassum emarginatum* has occasionally conduplicate leaves (Tseng and Lu 1978) as does *S. mcclurei* in Vietnam, although the latter leaves are conduplicate only at the apex. *Sargassum herklotsii*, described from only a single collection and growing with *S. mcclurei* in Hong Kong, has been distinguished from the latter species by subtle differ-

ences in leaves, vesicles and receptacles: 1) elongated, fairly equal upper leaves, 2) elongated, non-winged upper vesicles with long apical prolongations, and 3) flat (rather than triquetrous), dentate female receptacles (Setchell 1933). These features, however, can be also found in single individuals of Vietnamese *S. mcclurei*. Further critical studies of these species are needed to clarify their status.

Most of the *Sargassum* tea sold in the Nha Trang Market can be identified with *Sargassum mcclurei* on the basis of the present circumscription of this species, notably the presence of toothed, triquetrous female receptacles.

Two other species of *Sargassum* may also be included in individual packages (Fig. 1): *S. polycystum* C. Agardh and *S. crassifolium* J. Agardh, both of which belong to *Sargassum* subgenus *Sargassum*.

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増田道夫*・鯨坂哲朗**・川口栄男***・Huynh Quang Nang****・Nguyen Huu Dinh**** :

ベトナムにおける *Sargassum mcclurei* の薬用茶としての利用

ベトナムでは褐藻ホンダワラ属を食用、薬用、アルギン酸工業、肥料など多方面に利用している。南部から中部にかけての海岸沿いの地方では、乾燥したホンダワラ属材料を煎じて、沃素を補給するための薬用茶として飲用しており、乾燥材料が紅藻オゴノリ属やキリンサイ属などの他の食用海藻とともにマーケットで販売されている。ホンダワラ茶の原料にはさまざまな種が用いられているが、上記の地方の沿岸に最も多産する *Sargassum mcclurei* Setchell が一般的に利用されている。本種の形態的特徴について記述し、近縁種との分類学的問題を指摘した。(*060 札幌市北区北10条西8丁目 北海道大学理学部植物学教室；**606 京都市左京区北白川追分町 京都大学農学研究科熱帯農学専攻；***812 福岡市東区箱崎6丁目 九州大学農学部水産学第二教室；**** National Center for Scientific Research of Vietnam, Center for Science—Production of Seaweed, 2A Hung Vuong, Nha Trang, Vietnam)