Distribution—From Rottnest I., W.A., around southern Australia to Peterborough, V.I., and on the north coast (at least) of Tasmania. This species is found mainly on coasts of moderate wave action, or in bays; when growing on very exposed rocks or in deep water pools algalized or juvenile plants only may be found.

J. Agardh distinguished S. heteromorphum and his later-described S. halitrichium almost entirely on the basal parts, which he considered to be simply plane, with oblong and obtuse lobes in the former, and bipinnatifid with subincised and acuminate lobes in the latter. He recognized only minor differences in the receptacles and vesicles. In Herbarium Agardh, Lund, under S. heteromorphum are three sheets of Gunn’s specimens from Tasmania, together with one other sheet. No plants have basal and upper parts actually attached, and J. Agardh’s figure of basal parts is taken from one of two specimens on sheet 2067. The most suitable specimen to select as type, however, is No. 2626, where upper and lower parts are on one sheet.

Under S. halitrichium in Herbarium Agardh is only one specimen with basal and upper parts (No. 2625), which J. Agardh figured, and this is taken as the type. Areschoug’s specimens comprise only upper parts and might belong to other species. The specimen shown in Plate 2, Figure 2, is identical with, but better developed than, the type of S. halitrichium. There appear to be no real differences between S. heteromorphum and S. halitrichium. The form of the basal parts depends largely on the age of the plant and probably also on the habitat. Young basal parts are less divided and have rounded lobes; as the plant develops these become more branched and often bipinnatifid, with subaculeate apices. Considerable variation may be found on one specimen. The upper parts are similar in both cases, and also very similar to those in S. sonderi and S. decipiens.

S. angularis Kützing (1846, Plate 24) was described from Herbarium Sonder (now in Melbourne National Herbarium), but this specimen could not be located. J. Agardh and Grunow doubtedly placed it under S. halitrichium, but as the figure shows only upper parts the name is best rejected as a nomen dubium.

Sargassum sonderi (J. Agardh) J. Agardh, Acta Univ. Lund. 9: 59 (1872); E. Svenska Vetensk.Akad. Handl. 23 (5): 64, pl. 14, figs. 1-2 (1885); De Toni, Syll. Algaeae 31: 10 (1885).

Fig. 1d; Plate 3, Figs. 1 and 2
S. homalothrixana sensu J. Agardh, Acta Univ. Lund. 9: 97 (1872); E. Svenska Vetensk.Akad. Handl. 23 (5): 64, pl. 14, fig. 9 (1885); Grunow, Verh. zool.-bot. Ges. Wien 60: 305 (1912); Lütken, Sarswarda S. Ant. 4: 6 b (1908).
S. homalothrixana sensu in Lehman, Fl. Preissianæ 2: 154 (1866); Lemaire 251: 468 (1823); Lemaire 26: 41 (1832); which are largely S. decipiens (see below), except for the type of S. sonderi. Grunow’s (1816, p. 338) description probably applies to S. decipiens.
Holdfast discoid, producing 1 to several stout, compressed stems to 10 cm (or more) high and 2-6 mm across, bare below except for prominent branch scars. Upper part of stem bearing several much divided main branches; axes of main branchlets angular but not flattened, bearing below pinnate linear lateral branches to 5-6 cm long, with segments 1-3 mm long and 2-4 (-5) mm broad. When mature, main branches developing further; bearing above crowded, much divided, uniform ramuli, with ciliated, petiolate vesicles 1-2 (-3) mm diameter, or with or without a slender apical macro. Receptacles on upper ramuli, racemose, shortly lanceolate, terete, and smooth, 1-3 mm long and about 1 mm broad (possibly larger when fully mature).

Type locality.—Western Australia (Preiss), probably near Fremantle.

Type.—Herbarium Agardh, Lund, No. 2043.

Distribution.—From south-west Western Australia (Preiss) along southern Australia to Wilson’s Promontory, Vic., and in Tasmania. On Kangaroo I. plants with mature upper parts are only found in the drift, while those in rock pools on reefs consist only of the immature basal parts. It appears to be a mainly saline species of rough, moderately exposed coasts.

J. Agardh’s original description (1888, p. 247) mentions specimens of Preiss from Western Australia and of Arasbough from Port Phillip. The latter specimen is not in Herbarium Agardh, and the Preiss specimen (No. 2043) is selected as the type. It consists of three pieces, two of upper parts and one lower part of a plant, which agree well with J. Agardh’s concept and that expressed above. However, under S. sonderi J. Agardh placed some specimens of S. depunciata.

S. sonderi is based on one of Sonder’s specimens from Preiss which he had named S. fasciculatum. All the Preiss material in Lund (excluding No. 2043) and in Melbourne National Herbarium, however, is S. depunciata, so that J. Agardh apparently had the only distinct specimen in this collection for his type of S. sonderi.

J. Agardh’s concept and specimens of S. linearifolium are also S. sonderi, though mainly the juvenile or basal state. This is further checked under S. linearifolium.

The upper mature parts of S. sonderi are very similar to those of S. depunciata, and these species are virtually indistinguishable without the lower parts. The receptacles of S. sonderi may be smaller, and there appear to be many fewer cryptostoma (often none) than in S. depunciata, but these are variable factors.

Harvey’s specimen (No. 15 Algae Aus. Exsic.) and his figure (1888, Plate 245) show only the upper fertile parts, and cannot be identified with certainty. They might equally well be S. depunciata, but these are variable characters.

Grunow’s description (1915, p. 392) seems to apply to S. depunciata; what his var. inermis (from Rockingham, Qld.) is must remain doubtful, but it is probably not a form of S. sonderi or S. depunciata.

Fig. 1A, f; Plate 4, Fig. 1


The following references apply in part (see discussion below):

Cystosphaera desicium (R. Br.) C. Agardh, Sp. Algarum 1: 76 (1850); Sylloge Algarum 296 (1854).


Sargassum megacephalum Sars, P.M. Frøslevsk. 2: 164 (1844).

Cystophyllum videhulm Sund, Linnaea 25: 665 (1852); 36: 51 (1853).

Holfast discoid, producing 1 to a few stolts, strongly compressed aceta, to several centimetres in length and 3-6 mm broad, with prominent branch scars. Upper part of stem with several main branches to 40 cm long, bearing simple or branched laterals on all sides below, and mostly divided above; lower laterals flattened to almost terete, 1-4 cm long and 1-2 mm broad, simple or once or twice divided, densely clustered and often with prominent cryptostomata; upper parts much divided into siphons, tetrate ramuli 1-3 cm long with numerous cryptostomata. Vesicles developing in adult plants in late winter, 1-2 (3) mm in diameter, spherical to slightly ovate, peltate, and with a small mouth. Receptacles racemose, peltate, ovate to lanceolate, smooth to somewhat verrucose.

Type locality.—Port Darwin (Tasmania, Tasmania). Tas.

Type.—British Museum (N.H.).

Distrubution.—From Western Australia (Coffin Bay) around southern Australia to Pensborough, Vic., and in Tasmania. Common on rocks at an upper additional level or in rock pools in South Australia, as rough and moderately exposed coast.

The seasonal development of S. desicium has been discussed previously (Womersley 1948, p. 155, as S. urvilleanum). During summer, the plants are short (no over 12 cm high) and appear stunted, the branch axes being very densely covered with terete or slightly compressed laterals. Further growth commences in March or early April, and during winter the fertile fronds develop, bearing vesicles and receptacles in late winter and reaching a height of 40 cm. In November or early December the fertile fronds disintegrate, leaving only the old branch axes, which may persist for a few months.
The type of "Fucus decipiens" is in the British Museum (N.H.). Brown placed two specimens, actually different species, on the one sheet. The one on the left Turner described and figured as adult F. decipiens, and as he clearly based his concept of the species on this specimen, it must be taken as the type. The right-hand specimen ("b" in Turner's plate) he regarded as a juvenile plant, with much broader basal leaves than the adult. J. Agarth, however, retained the name decipiens for the "juvenile" plant, referring the adult specimen to S. turneri (a variety of S. trichon-philum). Much confusion has arisen from this error, as J. Agarth has been followed by most subsequent authors. All J. Agarth’s specimens under S. decipiens in Linn, and his descriptions of this species, are, or apply to, S. varicus Sonder, while he redescribed the summer state of S. decipiens as S. muralcium.

Sargassum howeanum Lucas, Proc. Linn. Soc. N.S.W. 60: 397, pl. 5, fig. 2 (1935)

Holdfast discoid. Stem short (about 1 cm long), torose and nodulose, producing 1 to several main branches up to 40 cm long. No distinct basal laterals developed. Main branches with angular axes, much divided into crowded, filiform, pinnate ramuli on all sides, bearing apical-tellate, peltate, mutic vesicles 1-3 (4) mm in diameter. Receptacles "tenuiform, 2-3 mm long, stipitato, smooth, simple or branched" (after Lucas).

Type locality.—Lord Howe I.

Type.—Lucas Herbarium, C.S.I.R.O., Canberra. Isotype in Adelaide University Herbarium.

Distribution.—Lord Howe I, where it is common on the lower shore (Lucas).

Lucas compared this species to S. sondzeri; it is, however, closer to S. decipiens, differing from the latter in having a torose stem, in the apparent absence of any distinct lower laterals, and in the mutic vesicles.


Fig. 19, h, Plate 4, Fig. 2 S. decipiens anna. J. Agarth, Acta Univ. Lund. 9: 63 (1872); E. Svenna, Vetenska. Akad. Handl. 23 (3): 51, pl. 15, fig. 3 (1880); Grunow, Verh. zool-bot. Ges. Wien 65: 556 (1915).

Holdfast discoid, with (usually) a single compressed stem to 6 cm high and 2-4 mm broad, with prominent lateral, alternate branch scars. Upper part of stem with 1 to several main branches up to 40 cm in length. Axes of main branches simply compressed below, producing simple linear
lateralis which soon develop into reflexed pinnate laterals, arising from near the edge of the branch axis; pinnate laterals 3-4 cm long, segments 2-4 mm broad, with rounded or acute apices and usually with cryptostomata. Lower laterals changing suddenly or gradually to the upper, filiform, pinnate ramuli, bearing petiolate, spherical vesicles 2-6 mm in diameter, male or with a small and slender to longer and compressed more (to 2 cm long and 2 mm broad). Receptacles crowded, each in the axil of a simple or furcate ramulus, ovate to lanceolate, smooth, tenate, from sessile to shortly petiolate, 1.8 mm long and 1-1 mm broad. Discoid, the female receptacles being somewhat shorter and in denser clusters than the male.

Type locality—Western Australia (Perth) — probably near Fremantle.

Type.—Melbourne National Herbarium (see Plate 4, Fig. 2).

Distribution.—From Tossil, W.A., to Wilson’s Promontory, Vic., and in Tasmania (north east and probably elsewhere). Often common in the drift from deep water or rough to moderately exposed shores, occasionally found in rock pools.

The distinctive features of S. variegatum are the large vesicles (found also in S. verruculosum), the 5 th lower branch axes producing retrofract pinnate laterals, and the compressed stem. The latter (rare in particular) distinguishes it from S. verruculosum.

J. Agardh's concept of S. decipiens applies to S. variegatum as it is discussed under the former species. In a few specimens from Yallingup and Point D'Entrecasteaux, W.A., the main branches of young plants were unusually well developed, reaching 28 cm in length yet with simple linear laterals to 3 cm long and 2-3 mm wide. This gave the main branches a simply pinnate appearance; later, however, branching occurred, and vesicles arose in the axils of the laterals.


Figs. 16, 17; Plate 5, Figs. 1 and 2.


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Holofaet discord. Stem terete, but with prominent branch scars, produced from near the apex I to several long, usually slender and much divided main branches primarily distichous but sometimes tending to appear almost radial. Branch axes suppressed below, with irregular pinnate branches up to 4.5 cm long, and segments 1-2 mm broad; cryptostomata usually present; bases of branches usually retroflex. Lower branches frequently lost in old plants, leaving a bare fleshy trunk to the main branches. Upper ramuli dilute, dense, from rigidly pinnate to loosely pinaceous to dichotomous in older plants, with or without prominent cryptostomata, bearing numerous large, prominent venesicles of varying sizes up to 1 mm diameter, mutic or with a slender, usually short mesocaulon (but up to 3 mm long, bearing cryptostomata when long). Receptacles borne on upper ramuli, 3-5 mm long and about 1 mm broad, lanceolate and slightly terete, subsessile to sessile, occasionally branched or with short sterile projections from the receptacle.

Type locality—Western Australia.

Distribution.—From Western Australia (probably the south-west) around southern Australia to tasmania, N.S.W., and around Tasmanian New Zealand. Mostly on rough coasts but extending to relatively calm habitats, where the largest plants occur. Mature plants are usually found in bogs from the subalpine to alpine zones on rocks or in damp, mossy places near the juvenile or basal parts only.

S. verralucosum is a very variable species, distinguished by the tenea (though with prominent branch scars) stem, the very large abundant venesicles, and the flattened lower axis of the main branches, together with the lower retroflex lateral and flexuose appearance of the old branch axes.

The general form of the plant, its size, abundance and prominence of cryptostomata, and abundance of venesicles are all variable factors, mainly due to habitat and age. Plants from rock pools are generally small and relatively stout, with prominent cryptostomata, often without venesicles, and may consist only of the branches and lower laters (Plate 5, Fig. 1). Deeper-water plants (and ones during winter) are larger, more branched with finer ramuli, with few cryptostomata and large abundant venesicles. These latter plants correspond to Hooker and Harvey's S. capitilum.

S. trichophyllum has usually been separated from S. verralucosum, but the distinction cannot be maintained. 2. Agerat recognised two varieties of S. trichophyllum—var. turneri, which was based on Turner's
S. decipiens, though his figures may be of S. verruculosum; and var. corymbosum, the type of which (Herb. Agardh, No. 2767) is certainly only a form of S. verruculosum.

Species excluded from Phylotrichia

Sargassum linearifolium (Turner) C. Agardh, Sp. Algmarum 1: 24 (1821); Syst. Algmarum 308 (1824); Kützing, Sp. Algmarum 612 (1849); Tab. Phycol. II: pl. 18 (1831).


This species has generally been included in Phylotrichia. Turner gave the locality of the type specimen (in New Herbarium) as “western coast of New Holland”, but on the type sheet is “South Sea. Mozambique 1788.”

The type sheet consists of three specimens, the upper one being figured by Turner. They represent only the upper branches of plants, without basal parts. The main branches bear 2 rows of tufted leaves and receptacles; the leaves are linear, up to 4 cm long, and only 0.1 mm wide. The receptacles are densely clustered in the leaf axils, simple or forked (usually once forked, sometimes twice), erect, and smooth except for the swollen sori. Stems are absent.

Plants which are almost certainly identical with the type material on parts of the South Australian coast. These show distinct basal leaves, broader (to 4-5 mm) and longer than the upper ones, and often branched. During summer (December to March) only the basal parts are present, with leaves normally introduced two to four times. Preliminary observations indicate that the basal leaves are lost before the upper fertile fronds (which have only simple leaves) develop during winter. The receptacles in fully developed plants are densely clustered and up to four or five times dichotomous, while vesicles may develop on old fronds. The two rows of “leaf tufts” in the type are more marked than in most specimens.

Although the branched basal leaves in the young or summer state of S. linearifolium point to affinity with Phylotrichia, the always simple and flattened upper leaves, the branched receptacles, and the general aspect of the plant are distinctly those of Arthrophycus. While further study is needed, it seems best to class S. linearifolium as a species of Arthrophycus which is unusual in having branching basal leaves during summer.

Almost every specimen J. Agardh referred to S. linearifolium (in Herbarium Agardh) belongs to S. sonderi, being mostly the basal parts of this species. The only true S. linearifolium in Herbarium Agardh is a fragment of Manzoni’s original collection. J. Agardh’s figures (1889, Plate 14, Figs. 3-7; also clearly refer to S. sonderi. C. Agardh’s descriptions (1821, p. 34; 1824, p. 300) probably apply to the type; J. Agardh’s (1844, p. 266) where he placed it in Arthrophycus does not, but his
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1872 (p. 57) and 1889 (p. 45) descriptions are incorrect. Kützing's description and figures are probably based on Turner's and are reliable, but May's (1889, p. 292) description is incorrect.

2. *Hyalocladia* probably occurs generally along southern Australia, from the south-west to New South Wales. It is common in rock pools on parts of the South Australian coast.

Acknowledgment

Acknowledgment is made to the directors of the Herbarium, Royal Botanic Gardens, Kew; the British Museum (Natural History), London; the Botanical Museum, Lund; and the Laboratoire de Cryptogamie, Muséum d'Histoire Naturelle, Paris, for facilities and permission to examine algal types, and also to the directors of the various Australian herbaria (listed in the introduction) for the loan of specimens of *Sargassum*.

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Womersley

AUSTRALIAN SPECIES OF PHYLLOTRICHIA

Plate 1

Fig. 1—S. jovisii, a mature fertile branch.

Fig. 2—S. jovisii, a young plant.

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Fig. 1.—S. clavata: a mature fertile plant.

Fig. 2.—S. heteromorpha: a mature plant on the left, with a young roothold form on the right.

Fig. 1.—S. rousetii: a juvenile plant with well-developed main branches only.

Fig. 2.—S. antheridi: a mature plant.
Fig. 1.—S. decipiens: a mature, fertile, vesiculate plant.

Fig. 2.—S. enrius: the type sheet of Sander.