

The genus *Vaucheria* (Xanthophyceae) in Iceland. I. Marine and brackish water species from West Iceland

KARL GUNNARSSON

Marine Research Institute,
Reykjavík

ABSTRACT: Six marine and brackish water species of *Vaucheria* have been found in Iceland. These are *V. synandra* Woronin, *V. coronata* Nordstedt, *V. litorea* Hofman, *V. sescuplicaria* Christensen, *V. subsimplex* Crouan frat. and *V. velutina* C. Agardh. The last five species were found in West Iceland during the present study. There is a large overlap in the salinity range of the sites at which the five species were found growing, with salinity ranging from 6 to 30‰.

Species of the genus *Vaucheria* have irregularly branched siphonous threads. Marine representatives commonly grow in extensive, darkgreen, dense mats on mudflats at the heads of fjords or intermingled amongst phanerogams in brackish pans, some species grow on littoral meadows in between the vegetation.

Very little information is available on the genus *Vaucheria* in Iceland. The genus was first recorded here by BÖRGESEN (1898) who found *V. pachyderma* Walz. var. *islandica* Børgesen in fresh water samples collected near Akureyri, N-Iceland. Helgi JÓNSSON (1913) records *V. subsimplex* Crouan frat. (as *V. spaerospora* Norstedt) from littoral mudflats in West-Iceland as the first marine representative of the genus. In his survey of the aerial algae of Iceland, PETERSEN (1928) found another marine species, *Vaucheria synandra* Woronin growing in a cave in a bird cliff, 20 m above sea level on the Westman Islands, S-Iceland.

It was of much interest to study further samples of marine *Vaucheria* from Iceland, since it was to be expected that more species were to be found here, when one compared the Icelandic *Vaucheria* flora with the flora of the neighbouring countries (cf. KNUTZEN 1973).

This paper presents studies on the genus *Vaucheria* in brackish pans in Mýrar, W-Iceland (fig.1). Observations from Breiðifjörður are also included. In the Mýrar area there are numerous small pans with *Vaucheria* growing amongst *Ruppia maritima* or other (mostly blue-green) algae. The salinity differs from pan to pan, rang-

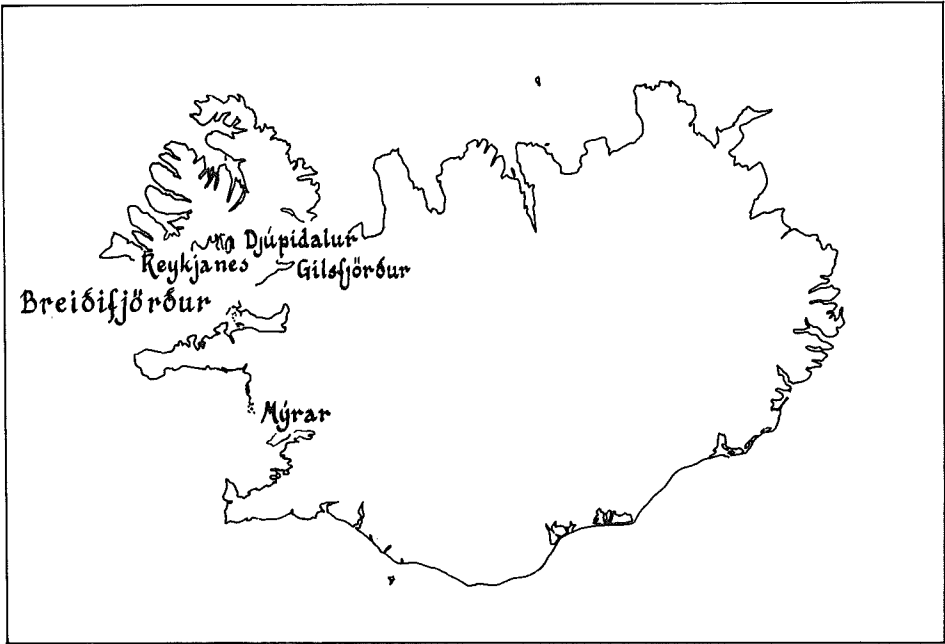


Fig. 1. Sampling localities on the west coast of Iceland.

ing from almost fresh water to 30‰ salinity. The sampling in the Mýrar area was made in August 1977. In Breiðifjörður the samples were collected from mudflats in the North-eastern part of the fjord during the autumn of 1981.

MATERIALS AND METHODS

The collections were preserved in 5% formalin mixed with the water in which the plants were growing. For identification and drawing of the species, glycerol-vaselin preparations were made of fertile specimens on glass slides. All the figures are drawn with the aid of a camera lucida and are reproduced to the same scale. Some cultures were established from samples of algal mats from mudflats in Breiðifjörður. Unialgal cultures were obtained by letting the algae grow through an agar medium, after which they were grown to fertility in 10‰ ES-enriched seawater medium.

A slide preparation of each of the species reported here has been deposited in the herbarium of the Icelandic Museum of Natural History in Reykjavík.

OBSERVATIONS AND DISCUSSION

Altogether five species of marine and brackish water *Vaucheria* were found during the present study. In the following presentation the species are arranged in an alphabetical order.

VAUCHERIA CORONATA Nordstedt 1879. Fig. 2.

The vegetative filaments are 40-50 μ in diameter. The plants are monoecious. The antheridium is terminal on a fruiting branch and separated from it with a sterile cell. The antheridia are cylindrical about 70 μ long and 30 μ in diameter opening through a lateral papilla. The oogonia are borne laterally on the fruiting branches and are about 120 μ long and 100 μ broad. The oospore is spherical about 90 μ in diameter. A particular feature of the oogonium is an apical or subapical corona of 3-6 radiating papillae opening at their tips.

In the Mýrar area *V. coronata* was found in only one pan with 21,2% salinity. In the Breiðifjörður area this species was found on mudflats in Gilsfjörður and Reykjanes.

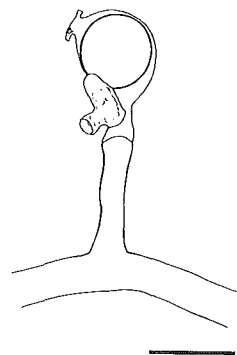


Fig. 2.
Vaucheria coronata Nordstedt, scale = 100 μ .

VAUCHERIA LITOREA Hofman ex C. Agardh 1823. Fig. 4.

The vegetative filaments are 60-100 μ in diameter. The plants are dioecious. The oogonium is terminal on the filaments but often becoming lateral by sympodial growth. The oogonium is separated from the filament by an empty part of the tube which is often recurved. When ripe the oogonium is 150 μ long and 250 μ broad and contains an oospore and a spherical or ovoid cytoplasmic mass which is situated at the base of the oogonium. The antheridia are terminal but often becoming lateral in the same way as the oogonium and are separated by an empty space as well. The antheridia are 70-90 μ broad and 700-950 μ long, cylindrical and tapering to the apex. They have an apical pore and several lateral papillae that open at their tips.

Vaucheria litorea was found in the Mýrar area in pans with salinity between 11 and 30‰.

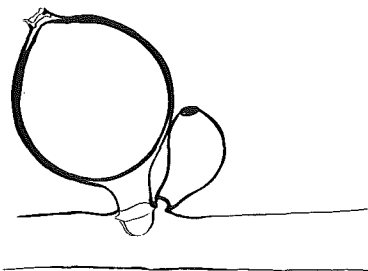
VAUCHERIA SESCUPLICARIA Christensen 1952. Fig. 3.

Fig. 3. *Vaucheria sescuplicaria*
Christensen, scale = 100 μ .

Vegetative filaments are 50-90 μ in diameter. The plants are monoecious. Antheridia and oogonia sit in pairs directly on the filaments. The oogonia are 180-225 μ broad and 210-300 μ long, obovoid or elongate with an apical opening. The oospore is spherical 180-210 μ in diameter, and does not fill the oogonium. The antheridium is clubshaped 90-130 μ long and 60-70 μ broad and has one apical pore.

V. sescuplicaria was found in Mýrar growing in pans with salinity between 6 and 30‰ and was the most widespread *Vaucheria* in the area.

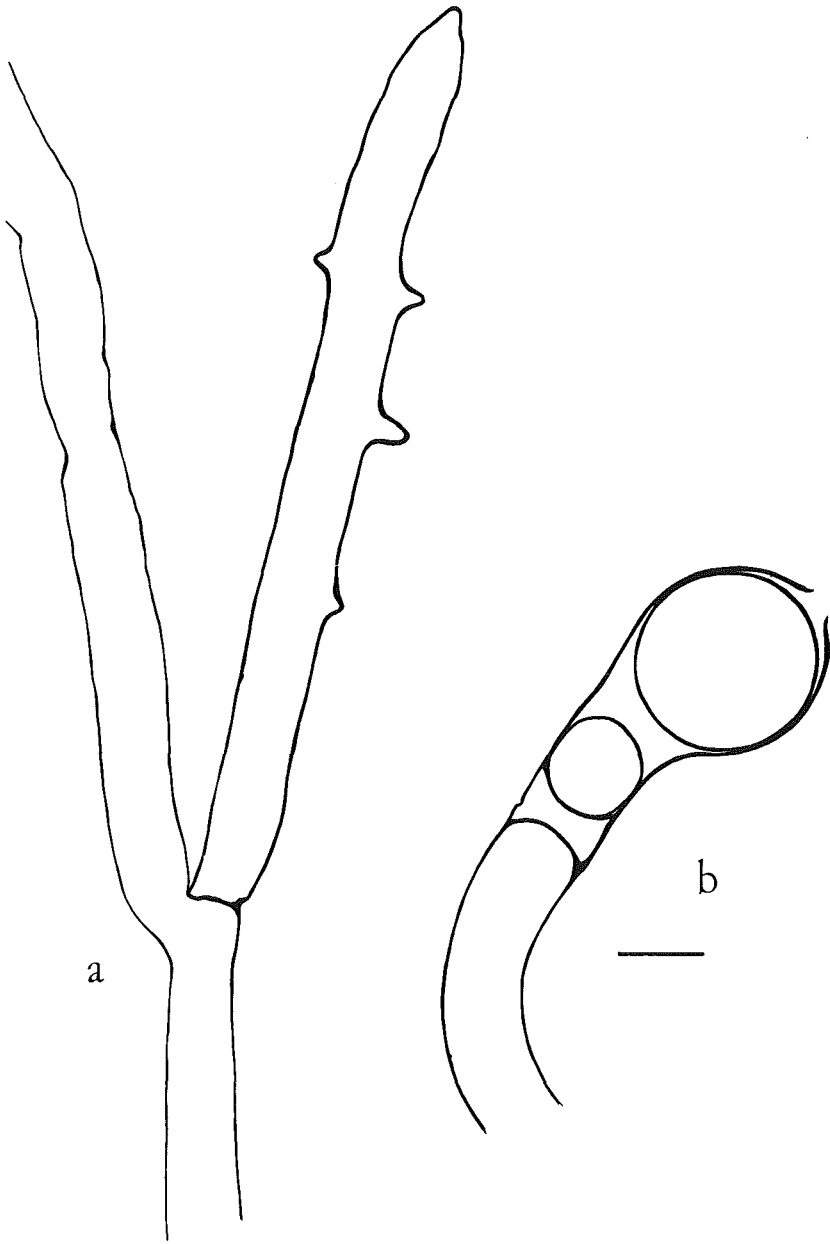


Fig. 4. *Vaucheria litorea* Hofman ex C.Agardh, a: antheridium, b: oogonium, scale = 100 μ .

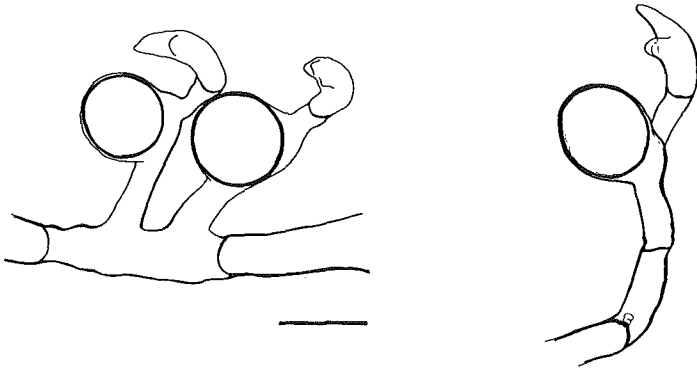


Fig. 5. *Vaucheria subsimplex* Crouan frat., scale = 100 μ .

VAUCHERIA SUBSIMPLEX Crouan frat. 1867.

Syn. *V. spaerospora* Nordstedt, H. JÓNSSON 1913 (cf. CHRISTENSEN 1973). Fig. 5.

The vegetative filaments are 30-60 μ in diameter. The plants are monoecious. The oogonia and antheridia form terminal pairs on the vegetative filaments, with an empty space between the apical antheridium and subapical oogonium. The swollen upper part of the oogonium contains the oospore which is spherical, 85-120 μ in diameter. The antheridium is a little flattened 90-160 μ long and 60-80 μ broad and has two to four conical papillae opening at their tips.

V. subsimplex grows in pans where the salinity ranges from 9 to 30‰. The species was also found growing on tidal mudflats in Reykjanes and Gilsfjörður in Breiðfjörður. Helgi JÓNSSON (1913) found this species growing on littoral mudflats in Borgarfjörður near Mýrar.

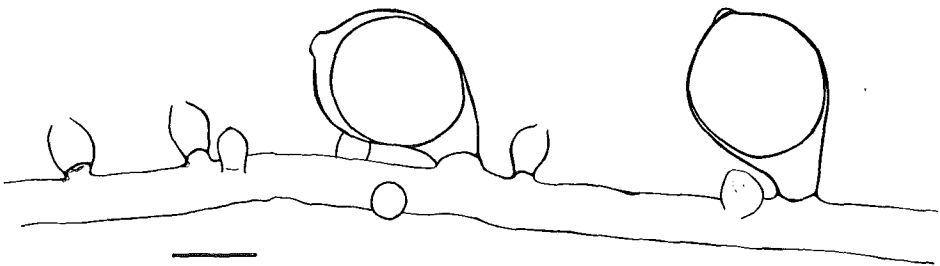


Fig. 6. *Vaucheria velutina* C. Agardh, scale = 100 μ .

VAUCHERIA VELUTINA C. Agardh 1824.

Syn. *V. thuretii* Woronin (cf. CHRISTENSEN 1973). Fig. 6.

The diameter of the vegetative filaments are 40-50 μ . The plants are monoecious. Oogonium is sessile and most often inclined, 190-230 μ in diameter. The antheridia are sessile and borne in groups in the vicinity of the oogonium. The antheridia are erect or inclined, ovoid in shape, 50-60 μ long and 35-50 μ broad.

This species was found in cultures established from a littoral meadow in Djúpídalur, Breiðifjörður.

All the six species of marine and brackish water *Vaucheria* hitherto found in Iceland are common species in Northern Europe. All except one, *V. sescuplicaria*, are also found in North America (BLUM 1972, PECORA 1976). Nor has this species been found in Norway (KNUTZEN 1973), a fact that is difficult to explain in view of its distribution in Europe (CHRISTENSEN 1952 and 1957) and abundance in Iceland. The species *V. intermedia* Nordstedt has wide distribution in the North Atlantic. It has been found a.o. in Greenland (ROSENVINGE 1893), Norway (KNUTZEN 1973), Denmark and the British Isles (CHRISTENSEN 1952). It has not yet been found in Iceland, but probably that is only a matter of time.

V. coronata is a rare species in the Mýrar pans but in Breiðifjörður it is found frequently, often growing together with *V. subsimplex*. In the Mýrar area about half the pans in which *V. subsimplex* was found growing, also contained *V. sescuplicaria*. The same relationship existed between *V. sescuplicaria* and *V. litorea* whereas *V. litorea* and *V. subsimplex* were rarely found growing together in the same pan.

There is a large overlap in the salinity range of the four species found in the Mýrar pans. *V. coronata* was only found in one pan with 21.2‰ salinity. The other three species *V. sescuplicaria*, *V. subsimplex* and *V. litorea* have their upper salinity limit at 30‰ and their lower limit at 6.9 and 11‰ respectively.

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