Species of the algal genus Vaucheria on the Faroes

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Úrtak

Sløg av taraættini *Vaucheria* (Tribophyceae) ímynda tunt tægrateppi ofta við røturnar á blómuplantum. Tey eru at finna eitt nú við áarbakkar á smáløkum, í veitum við vegjaðarar og í síðlendi. Vertir úr sovorðnum støðum vórðu savnaðir í Eysturoynni, á Streymoynni, í Suðuroy og á Viðoynni fyrru helvt av juli 1994.

Higartil eru bert fá *Vaucheria*-sløg fráboðað úr Føroyum. Nýggjar fráboðanir hiðani av oyggjunum í hesi kanning eru: *V. aversa, V. canalicularis, V. frigida, V. medusa, V. prona* og eitt slag, sum verður roknað upp í *V. geminata*-heildina, er líkt *V. trigemina*.

Í greinini eru eisini viðmerkingar um *V. coronata* og um *V. dillwynii* og *V. hamata*, sum áður hava verið fráboðað sum ávikvist *V. pachyderma* var. *islandica* og *V. uncinata*.

Harafturat er komið fram á tríggjar *Vaucheria*-snultarar: 'rotatorin' *Proales werneckii*, 'plasmodioforalin' *Woronina glomerata* og 'sytridin' *Zygorhizidium vaucheriae*.

Abstract

Species of the algal genus *Vaucheria* (Tribophyceae) form mats of thin filaments on the ground often at the base of flowering plants. They can be found at places like sides of brooklets, on roadside ditches, and in salt marshes. Samples from such places were collected on Eysturoy, Streymoy, Suðuroy and Viðoy in the first half of July 1994.

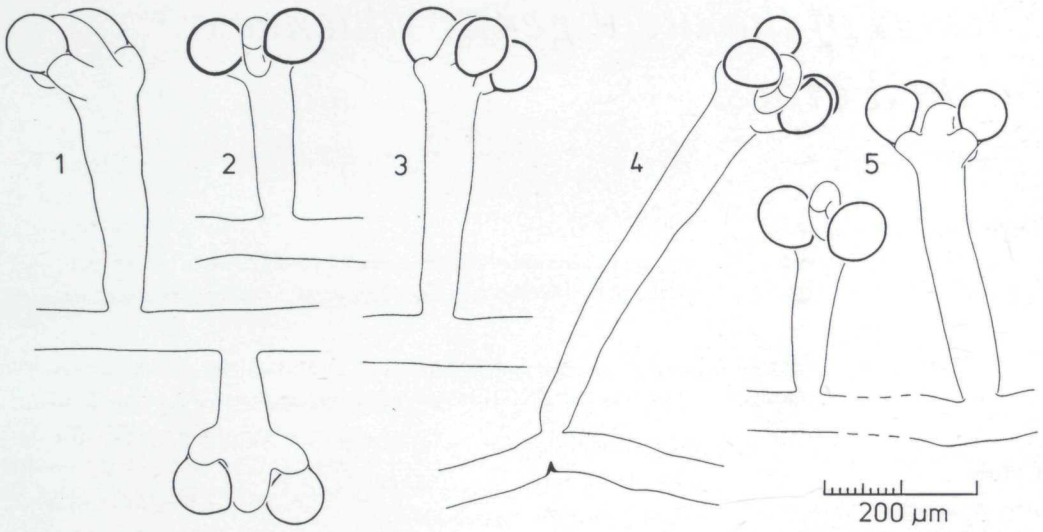
Only a few *Vaucheria* species have hitherto been reported from the Faroe Islands. New records for the archipelago reported in this study are: *V. aversa, V. canalicularis, V. frigida, V. medusa, V. prona,* and a species referred to the *V. geminata* complex being *V. trigemina*-like.

The paper also includes comments to *V. coronata* and to *V. dillwynii* and V. hamata *earlier reported as* V. pachyderma *var.* islandica *and* V. uncinata *respectively*.

In addition three *Vaucheria* parasites have been encountered: the rotatorian *Proales werneckii,* the plasmodiophoralean *Woronina glomerata,* and the chytrid *Zygorhizidium* vaucheriae.

Introduction

The algae of the Faroe Islands were very well accounted for by Børgesen, both those found in fresh water (Børgesen, 1901) and those of the sea (Børgesen, 1902; 1904). Still his mode of working did not permit full coverage of all groups. The genus *Vaucheria* was one of those poorly covered. Its species are too small to be recognized by the naked eye and too large to form part of the mixed samples and, in addition, representatives of this genus are often sterile when found and then must be grown in culture before identification. For these reasons only three species of *Vaucheria* were recorded by Børgesen, one listed as *V. coronata* Nordst., one as an alga close to *V.*



Figs. 1-5. *The representative of the* ***V. geminata*** *complex commonly found along Faroese streams and ditches. 1: from sample 3. 2: sample 6. 3: sample 16. 4: sample 6, the only four-spored fruiting branch seen. Material preserved in nature. 5: sample 8. The two fruiting branches are on the same filament but rather far apart.*

pachyderma Walz var. *islandica* Børgesen but smaller, and one as *V. hamata* (Vauch.) Lyngb. The two species last mentioned are discussed below under *V. dillwynii* and *V. uncinata*, respectively.

In the first half of July 1994 I had the opportunity to work at the BIOFAR Laboratory in Kaldbak north of Tórshavn. Dr. Arne Nørrevang, head of the laboratory, and Ruth Nielsen, Botanical Museum of Copenhagen, then undertook a tentative semiquantitative investigation of plant and animal communities around the islands in collaboration with their diving colleagues Dr. Karl Gunnarsson, University of Reykjavík, and Kim Lundshøj, Copenhagen. I was permitted to go with this working group to selected localities on the islands and thus could collect *Vaucheria* samples in distant parts of the archipelago. I am very grateful to my colleagues for this opportunity and for the help received during the stay. The following is an account of what I found. Undoubtedly the list of species is still incomplete, but it fills some phytogeographical gaps as it is.

Materials

The samples were taken in the following stations, listed with geographical coordinates in kilometres according to the UTM system:

Eysturoy
1. 29 E 606.5 N 6912.4. In a narrow, shaded channel leading water from a brooklet down to the steam that runs through the village of Gjógv.

2. 29 E 606.7 N 6912.5. On the shaded, drizzling vertical side of the gorge at Gjógv.

Streymoy
3. 29 E 607.4 N 6887.1. On the side of the smaller stream of the two flowing into the head of Kollafjørður.

4. 29 E 607.5 N 6887.1. In the salt marsh at the head of Kollafjørður.

5. 29 E 609.1 N 6883.4. In ditches in grassland at the head of Kaldbaksfjørður.

6. 29 E 613.5 N 6882.9. On the dry bottom of a roadside ditch in Kaldbak.

7. 29 E 613.7 N 6882.9. On the side of a brooklet in Kaldbak.

8. 29 E 613.7 N 6883.1. In a roadside ditch in Kaldbak.

Suðuroy
9. 29 E 608.0 N 6832.1. On the steep side of a brook in Hvalba.

10. 29 E 608.8 N 6831.5. On moist sand along a brooklet in Hvalba.

11. 29 E 609.4 N 6830.5. On a low cliff between the grassland and the sheltered bay inside the barrier southwest of Nes.

12. 29 E 614.4 N 6827.2. On the side of the stream Stóra at Trongisvágur.

13, 14 and 15. 29 E 614.7 and 614.8 N 6827.2 and 6827.4. In the salt marsh at Trongisvágur.

Viðoy
16. 29 E 628.6 N 6916.4. On concrete irrigated by water from a brooklet at the head of Eiðsvík.

Results and discussion

The following species of *Vaucheria* are represented in the material:

Vaucheria aversa Hassall 1843 has been found in the samples 3 and 4.

V. canalicularis (L. 1753) T.A. Chr. 1968 occurred in sample 10.

V. coronata Nordst. 1879 constitutes sample 11. The same species has been recorded by Børgesen (1901) from Miðvágur, Vágar, UTM about 29 E 595 N 6881 and by Irvine (1982) from near Hvalvík, Streymoy, about UTM 29 E 603 N 6897.

V. dillwynii (Weber & Mohr 1803) C. Ag. 1812 was recorded from the Faroe Islands by Lyngbye (1819). Børgesen (1899), describing material from Iceland, took up the later name *V. pachyderma* Walz 1866 finding identity between the two species uncertain. His Icelandic alga had larger oospores than that described by Walz and also differed somewhat as to the shape of the antheridium, so he established a separate var. *islandica* for it, and this has later been elevated to the rank of species by Cedergren (1933). The identity between *V. dillwynii* and *V. pachyderma* was confirmed eight years later, cf. Christensen (1973), so that *V. pachyderma* must now be regarded as a later synonym of *V. dillwynii*. In recording the species from the Faroe Islands Børgesen stated (Børgesen, 1901) that the oospores in this material were smaller than in *V. pachyderma* var. *islandica*, but he did not compare with typical *pachyderma*. In

Vaucheria dillwynii *forming a green mat on the rock, the gorge at Gjógv, May 1996. Photo R. Nielsen.*

the material from 1994 twenty oospores from sample 1 gave an average length of 164 μm (inclusive of the oogonium wall opposite to the opening). Sample 2 gave 162 μm but sample 16 only 135 μm. Thus there is a marked clonal difference between samples 1 and 2 on one side and sample 16 on the other. In other characters, such as the shape and dissolution of the antheridium and the pattern of the oogonium wall, there is little difference between the three clones, and not too much by comparison with material from continental Europe. So the samples are just listed together under the earliest specific name.

V. frigida (Roth 1797) C. Ag. 1824 has been found in the samples 2, 5 and 12.

A representative of the *V. geminata* complex (figs 1-5) is particularly frequent in the material. It has no name of its own, nor have its rather similar two-spored allies as found in other regions including Denmark proper, the whole group being perhaps too vaguely distinct within the many-formed *geminata* complex. It is stouter than typical *V. geminata*, with longer fruiting branches, and sometimes it has three oogonia on one fruiting branch, exceptionally even four. Where there are more than two the fruiting

branch often increases markedly and evenly upwards, and the oogonia become relatively short-stalked, crowding subterminally around the terminal antheridium like in the alga named *V. trigemina* by Kützing (1856). Where there are only two oogonia their orientation varies considerably. They may be almost upright, or they may bend horizontally as is also often seen in *V. geminata* s. str., or they may even be pendent much like in *V. prona*. One and the same filament may carry an almost straight fruiting branch with two or three oogonia together with a bent fruiting branch with two pendent oogonia. As a result, identification of scanty *prona*-like filaments in samples not studied in culture must be regarded as uncertain, and such filaments have been left unmentioned here. Good material of the *trigemina*-like alga has been found in the samples 3, 5, 6, 8, 9 and 16, five of them being studied in unialgal culture.

V. medusa T. A. Chr. 1952 has been found in the samples 13, 14 and 15, all from the same salt marsh, collected in places only little influenced by sea water.

V. prona T. A. Chr. 1970 forms abundant fruiting branches as well as asexual spores in sample 10. All the oogonia seen are aborted, however, perhaps suggesting that the alga is close to its geographical boundary. Many of the asexual spores are smaller than typical and less regular in shape, again suggesting environmental stress, but they germinate all right irrespective of such irregularities.

V. uncinata Kütz. 1856 has been found in the samples 5 and 7. The sample listed by Børgesen (1901) as *V. hamata*, collected at Nes on Eysturoy, UTM about 29 E 619 N 6885, represents the same species, which was poorly known until the taxonomy was cleared up by Blum (1953. *V. uncinata* shows considerable variation as to oospore dimensions. A histogram for Børgesen's material has been published previously (Christensen, 1986). The two samples from 1994 differ little from it, 25 spores from sample 7 showing an average width of 138 μm and an avarage length of 126 μm.

Three parasites have been encountered in the *Vaucheria* material:

A single gall of the kind produced by the rotatorian *Proales werneckii* (Ehrb. 1834) was observed in a young crude culture based on sample 3. The culture was left untouched in order that filaments might later be found with galls and sexual organs together, permitting a specific determination of the algal host, but later search for galls was unsuccessful.

The plasmodiophoralean *Woronina glomerata* (Cornu 1872) Fischer 1892 was present in a crude culture of the *V. geminata* ally based on sample 16.

The chytrid *Zygorhizidium vaucheriae* Rieth 1967 has been found on *V. canalicularis* in sample 10.

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