ACTA BOT. ISL. 7: 27-30, 1984.

Tribonema viride (Xanthophyta) on cultivated grassland during winter and spring

BJARNI E. GUÐLEIFSSON

Tilraunastöðin á Möðruvöllum,
601 Akureyri, Iceland

ABSTRACT: A yellow-green alga, *Tribonema viride* Pascher, has been detected on several grass fields in N-Iceland after the meltwater runoff. When the fields dry out, the filaments are left white and bleached, entangled with the grass leaves. Four species of saprophytic fungi are reported, isolated from the samples of the alga.

While studying the causes of winter damages on grasslands in Iceland, the author has repeatedly observed a tight, white network adhering to the grasses after the meltwater runoff in spring. This was originally believed to be mycelium of different fungi (KRISTINSSON & GUÐLEIFSSON 1976, p. 55-56), perhaps pathogenic low temperature fungi (snow mould).

In 1980 the author got one dried sample of this paper-like mat for examination. The sample was collected by agricultural adviser Óttar Geirsson on June 16th from grassland at the farm Melar, Árneshreppur, Strandasýsla, NW-Iceland. The grasslands in this area have often severely suffered by winter damages, and that raised the question whether snow mould could be partly or totally responsible for this.

In June 1982 the same type of mat was detected by the author on many cultivated grasslands in Vesturdalur, Lýtingsstaðahreppur, Skagafjörður, N-Iceland. Samples were collected at the farms Goðdalir, Hof and Bjarnastaðarhlíð. This time living samples of the organism were available.

MATERIALS AND METHODS

The dried sample from Melar was treated as fungus. Pieces of the white web were transferred to potato-dextrose agar. The plates were incubated at 17.5°C and at constant day-light fluorescent tube illumination. Cultures were isolated on potato-dextrose agar and sent to Biosystematics Research Institute, Ottawa, and Research Station, Saskatoon for identification. Samples of the original mat

were also sent to different mycologists for identification.

The samples from Vesturdalur were divided into three parts, dried sample of the white web, a sample of the living organism conserved in 4% formalin, and another in 70% isopropanol. After microscopic examination these samples were sent to The University og Alberta (Department of Botany) and British Museum (Natural History) for identification. Samples were deposited in Akureyri Museum of Natural History.

RESULTS

In appearance the white web was suspiciously similar to the mycelial stage of a snow mould, compressed by the snow to a tight, paper-like mat. Microscopic examination of the "hyphae" on the sample from Melar, indicated that they were unbranched, 3-6 µm in diameter and the cells 13-15 µm long. Inside the cells a structure reminding on protoplasm was visible (Fig. 1a, 1b, and 1c). From this sample 7 different fungi were isolated and 4 of them were identified in Biosystematics Research Institute. These are *Chaetomium cochliodes* Palliser, *Cladosporium cladosporoides* (Fresen) de Vries, *Cylindrocarpon tenue* Bugn and *Paecilomyces liliacinus* (Thom) Samson. Although some of these fungi are moderate pathogens to grasses (ÅRSVOLL 1975) none of them is known as an ordinary snow mould, and microscopically none of them looked similar to the original, white web.

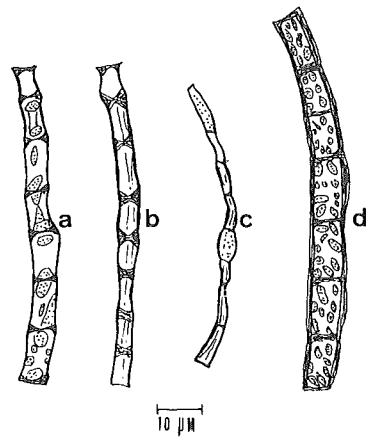

Fig. 1.
Filaments of *Tribonema viride*, a, b and c: Filaments from dried sample. d: Filaments from living sample conserved in 70% isopropanol.

Samples of the white mat were sent to some mycologists working with snow moulds. They all came to the conclusion, that this sample was quite distinct from all known snow moulds. One sample was forwarded to James A. Traquair, Research Station, Lethbridge, Alberta. He concluded that this sample was not a fungus, but a mixture of some filamentous, bleached algae. The desiccation made identification impossible.

In 1982 the new samples from the three farms in Vesturdalur were treated as algae. The white web often had yellow-green colour on the edge, and living samples were taken from that part. The identification showed that we were dealing with a yellow-green alga (Xanthophyta), *Tribonema viride* Pascher (*T. bombycinum* (Agardh) Derbes & Solier). The filaments were 8-10 µm in diameter (Fig. 1d), which is narrower than often cited in the literature (10-15 µm).

Fig. 2. *Tribonema viride* of grassland after the meltwater runoff (June 10th). Top: Dead and living leaves of Tuffed Hairgrass (*Deschampsia caespitosa*). Bottom: bleached tissue of *Tribonema viride*.

DISCUSSION

Tribonema viride lives in wet locations, often on the sides of pools or on the bed of recently flooded streams, especially if the water flow is sluggish. Standing or flowing water on grassland is often sluggish, especially if the field has been manured lately. *Tribonema viride* seems to develope in standing or running water on grassland during the winter or spring, and when the fields dry out, the filaments are left bleached and entangled with the grass leaves as a paper-like mat (Fig. 2). In appearance this reminds on snow mould. *Tribonema viride* in not pathogenic, but in some cases it is accompanied by grasses that are killed by suffocation under ice or water.

Tribonema viride has been reported several times in Iceland under different names (HARIOT 1893 as *Conferva bombycina*, BÖRGESEN 1899 as *T. bombycina*, PETERSEN 1928 as *T. bombycinum* and BROADY 1978 as *T. vulgare*). It is interesting to note that in 1783, HALLDÓRSSON (p. 128-129) mentions a green or yellow water-cotton on the ground after thaw in the spring. He calls this "leysingarslý", (thaw-water cotton), which most likely refers to *T. viride*.

ACKNOWLEDGEMENTS

The author wishes to thank E. Schneider, Chemistry and Biology Research Institute, Ottawa, for help in isolating fungi, G.P. White,

Biosystematics Research Institute, Ottawa and J.Drew Smith, Research Station, Saskatoon for identification of the fungi. Furthermore the author is indebted to J.A. Traquair, Research Station Lethbridge, Alberta, D. Allen, The University of Alberta, Edmonton and D.M. John, British Museum (Natural History), London, for identification of the alga.

REFERENCES

ÅRSVOLL, K. 1975. Fungi causing winter damage on cultivated grasses in Norway. Meld. Norg. Landbr. Högsk. 54,9: 1-49.

BÖRGESEN, P.A. 1899. Nogle Ferskvandsalger fra Island. Bot. Tidsskr. 22: 131-138.

BROADY, P.A. 1978. The terrestrial algae of Glerárdalur Akureyri, Iceland. Acta Bot. Isl. 5: 3-60.

HALLDÓRSSON, Björn. 1783. Grasnytjar. Copenhagen, 1783. 238 pp.

HARIOT, P. 1893. Contribution a l'etude des algues d'eau douce D'Islande. Journales de Botanique 7: 313-318.

KRISTINSSON, Hörður & Bjarni E. GUÐLEIFSSON. 1976. The activity of low-temperature fungi under the snow cover in Iceland. Acta Bot. Isl. 4: 44-57.

PASCHER, H. 1939. Heterokonten. In Kryptogamen-Flora von Deutschland, Österreich und der Schweiz, Bd. 11. Rabenhorst, L. ed., Akad. Verlagsgesellschaft, Leipzig, 1092 pp.

PETERSEN, J.B. 1928. The aërial algae of Iceland. Bot. Icel. 2,8:325-447.

Received Sept. 1983