

SHORT COMMUNICATION

SARSIA



ARTHROCLADIA VILLOSA (HUDSON) DUBY AND *SPOROCHNUS PEDUNCULATUS* (HUDSON) C. AGARDH (PHAEOPHYCEAE) IN SCANDINAVIA.

TOR EILIV LEIN

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Specimens of *Arthrocladia villosa* and *Sporochnus pedunculatus* were collected at Utvær, western Norway (61°02.10' N, 4°30.50' E), at 18-22 m depth on shell/gravel bottom with few other common macroalgae. These records represent the first record of *Arthrocladia villosa* and the second record of *Sporochnus pedunculatus* in Norway. Both species are rare in Scandinavia. The new records from Utvær expand the geographical distribution further north for both species.

Tor Eiliv Lein, Department of Fisheries and Marine Biology, University of Bergen, Bergen High Technology Center, N-5020 Bergen, Norway.

KEYWORDS: *Arthrocladia villosa*; *Sporochnus pedunculatus*; benthic algae; geographical distribution;

The brown algae *Arthrocladia villosa* (HUDSON) DUBY and *Sporochnus pedunculatus* (HUDSON) C. AGARDH are highly characteristic, macroscopic seaweeds which cannot easily be overlooked. The species are distributed on both sides of the North Atlantic, but are rather rare in northern Ireland (MORTON 1994), along the North Sea coasts of the British Isles (FLETCHER 1987) and in Scandinavia (KARLSSON & al. 1992; NIELSEN & KRISTIANSEN 1994). Known locations in Scandinavia are given in Fig. 1.

Arthrocladia villosa has not until now been found in Norway, but was recorded in 1991 at two localities in the Koster area in Sweden, close to the Norwegian boarder (KARLSSON & al. 1992). *Sporochnus pedunculatus* is earlier recorded only once at Grimstad, Aust-Agder on the southern coast of Norway (PRINTZ 1952), but has been found during several years in the Koster archipelago (KARLSSON & al. 1992). The new records from western Norway reported in this study expand the geographical distribution further north for both species.

Specimens of both algae were dredged from a shell-bottom at a depth of 18-22 m at Utvær (61°02.10' N, 4°30.50' E) on a survey in August 1995 to the outer part of Sognefjorden, western Norway. The one haul taken from the locality contained four and seven specimens,

respectively, of *A. villosa* and *S. pedunculatus*, together with several fragments of both species.

Arthrocladia villosa was forming erect thalli 11-15 cm long on gravel and shell fragments. The main axis was 0.2-0.4 mm wide, branching opposite or rarely irregular with no more than one order of branching. Surface cells of thalli were rectangular or with pointed ends, 30-35 x 10-15 µm. All axes with whorls of uniseriate, branched or unbranched filaments, 3-4 mm. Chains of up to 31 unilocular sporangia were found in the lower region of the filaments. Individual sporangia, 8-14 x 18-23 µm, were often observed to be empty with a lateral pore. The Norwegian plants correspond well with the description of *A. villosa* from Sweden (KYLIN 1947, fig. 24; KARLSSON & al. 1992) being smaller and less branched than reported from the British Isles (FLETCHER 1987, fig. 78). Unilocular sporangia are larger than normally reported (ROSENVIINGE & LUND 1943; FLETCHER 1987), but smaller than reported in the Mediterranean material (MÜLLER & MEEL 1982, fig. 13).

Sporochnus pedunculatus from Utvær was often observed attached to the same piece of gravel and shell as *Arthrocladia villosa*. Thalli were 8-20 cm long with main axes 0.3-0.4 mm wide. Main axes were often unbranched.

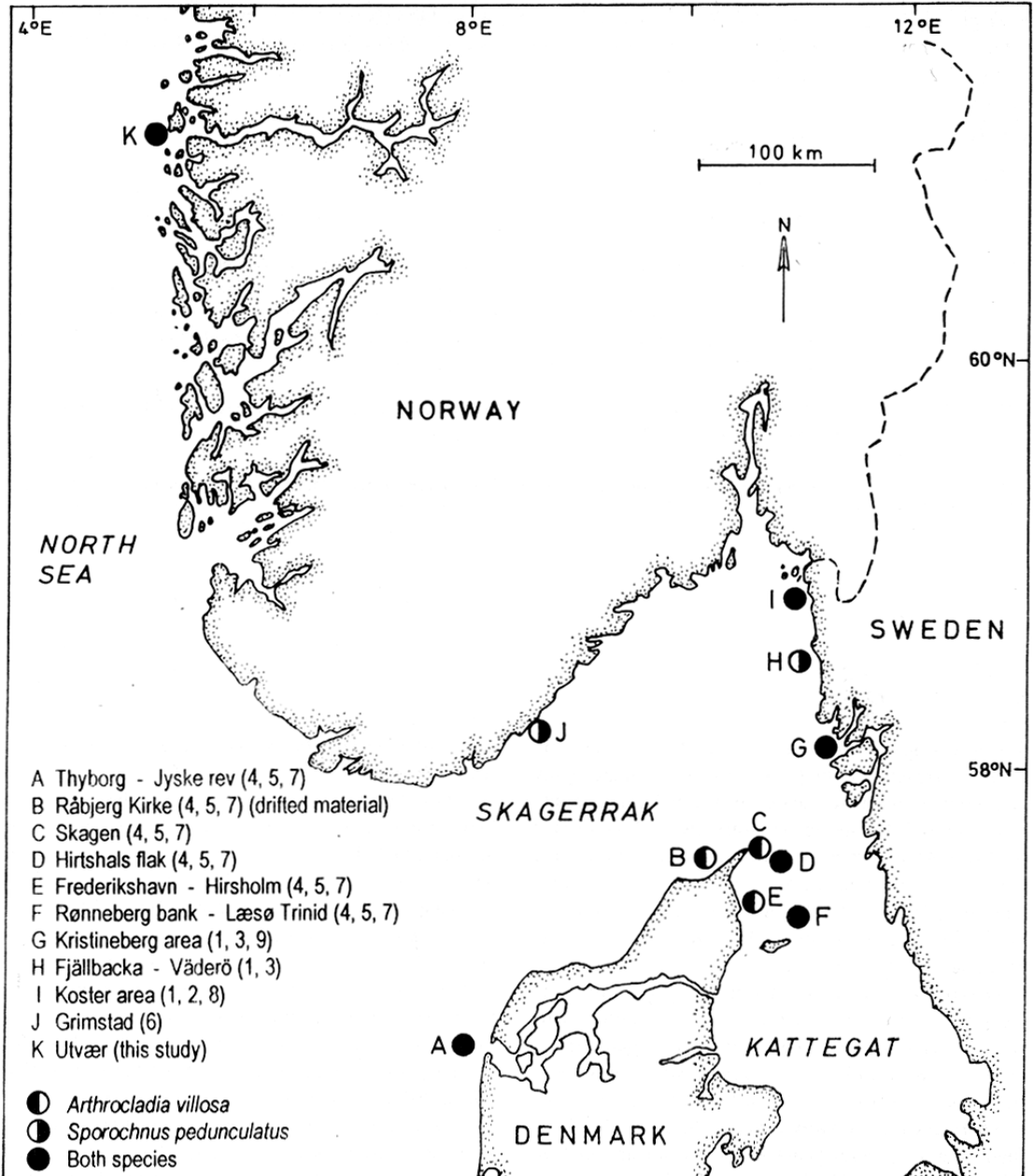


Fig. 1. Records of *Arthrocladia villosa* and *Sporochnus pedunculatus* in Scandinavia. In each area (A-K) the species may have been recorded at one or more localities and at one or more occasions according to: 1) KARLSSON & al. (1992), 2) J. Karlsson, pers. comm, 3) KYLIN (1947), 4) NIELSEN & KRISTIANSEN (1994), 5) R. Nielsen, pers. comm, 6) PRINTZ (1952), 7) ROSENVINGE & LUND (1943), 8) I. Wallentinus, pers. comm, 9) WÆRN (1958).

Only one specimen with one order of shorter branching up to 12 mm long were found. All axes had lateral short branches of limited growth (pedicels) 0.8-1.7 mm long, with terminal tufts of filaments (hair), 1-5 mm long. Surface cells of main axes were 50-70 x 10-12 µm. Unilocular sporangia (25-43 x 11-18 µm) in sori (receptacles), 0.8-1.0 mm long, covered the whole or only the outer part of the pedicels.

The key to the species of *Sporochnus* is primarily based on the length or shape of pedicels, receptacles and hairs (BROSTOFF 1984). However, these structure may be rather variable even on the same frond, and many authors imply reservation in using these criteria to delimitate the species (see BROSTOFF 1984). *S. pedunculatus* and *S. gaertnera* are reported from the eastern side of the North Atlantic (SOUTH & TITTELY 1986), but only the former is reported from the British Isles (FLETCHER 1987). The plants of *S. pedunculatus* found at Utvær are smaller and less branched than the only specimen found at Grimstad (PRINTZ 1952) and well-developed plants from Denmark (ROSENVINGE & LUND 1943), Sweden (KARLSSON & al. 1992) and the British Isles (FLETCHER 1987). However, the pedicels, receptacles and hairs correspond well with the description of *S. pedunculatus* (FLETCHER 1987).

In *Sporochnus pedunculatus* the photosynthesis is saturated at low light intensity compared to many other seaweeds (MATHIESON & DAWES 1986). In Scandinavia it has only been found in deeper water from 8-38 m depth (ROSENVINGE & LUND 1943; KARLSSON & al. 1992). *S. pedunculatus* is often found in association with *Arthrocladia villosa* at the British Isles (FLETCHER 1987), and in Scandinavia (WÆRN 1958). Deep shell and gravel bottoms are the characteristic habitat for both species. These firm and rather cartilaginous algae may profit from growing on a shell-bottom, which offers an unstable substrate preventing the establishment of a dense cover of large kelps and animals. WÆRN (1958) has characterized shell-bottoms as our reservations for weakly competitive species, living on the fringe of their distribution range. In the dredge-haul from Utvær, western Norway, the detached coralline alga *Lithothamnion corallioides* (P. & H. CROUAN) P. & H. CROUAN was the only common macroalgae associated with *A. villosa* and *S. pedunculatus*, giving little competition for space and light.

The survey at Utvær in 1995 is part of a phycological reinvestigation of the localities visited by BOYE (1896) in 1894. Specimens of *Arthrocladia villosa* and *Sporochnus pedunculatus* have been deposited in the Herbarium of Bergen and in the collections of the author.

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