

Short communication

Records of adventive marine algae in New Zealand: *Antithamnionella ternifolia*, *Polysiphonia senticulosa* (Ceramiales, Rhodophyta), and *Striaria attenuata* (Dictyosiphonales, Phaeophyta)

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Abstract Three species of introduced marine macroalgae are reported for Wellington Harbour (North Island, New Zealand). One of these, *Polysiphonia senticulosa* (Ceramiales, Rhodophyta) is illustrated from New Zealand for the first time, and the known distributional ranges of two species, *Striaria attenuata* (Dictyosiphonales, Phaeophyta) and *Antithamnionella ternifolia* (Ceramiales, Rhodophyta), are extended to the North Island.

Keywords adventive algae; introduced seaweeds; *Antithamnionella ternifolia* (Hook.f. et Harv.) Lyle; *Polysiphonia senticulosa* Harv.; *Striaria attenuata* Grev.; New Zealand

INTRODUCTION

Adventive marine macroalgae have been recorded in New Zealand from several harbours and mooring areas, both those in modern usage and others which were used during whaling and sealing operations of the last century and are now visited infrequently by foreign shipping traffic (Adams 1983). Three marine algae believed not to belong to the native algal flora have been found recently in Wellington

Harbour, in the vicinity of the Evans Bay wharf and the slipway at Greta Point, where both commercial and pleasure craft dock. This is the first illustrated report of *Polysiphonia senticulosa* Harv. (Ceramiales, Rhodophyta) for the New Zealand region. The other two records represent extensions of known species ranges within New Zealand: *Striaria attenuata* Grev. (Dictyosiphonales, Phaeophyta) has been previously reported as an adventive in southern New Zealand whereas *Antithamnionella ternifolia* (Hook.f. et Harv.) Lyle (Ceramiales, Rhodophyta) has been reported (as *A. sarniensis* Lyle) from Timaru Port, South Island (Adams 1983).

SPECIES RECORDS

Polysiphonia senticulosa Harv. 1862: 169

P. pungens Hollenb. 1942:774 Fig. 1, 2A-C

Polysiphonia senticulosa (Fig. 1) is ecorticate with 4 pericentral cells, urceolate cystocarps (Fig. 2A), spermatangial branchlets terminated by a sterile cell filament (Fig. 2B), and tetrasporangia forming straight series in the ultimate branchlets (Fig. 2C). The distinctive features of this species are the acutely pointed apices, the virtual absence of trichoblasts in vegetative parts, and the sterile cell filament terminating the spermatangial branch. Although it resembles *P. subtilissima* Mont. in these characters, the two species may be distinguished by the width of upper axes (100–150 µm diam. in *P. senticulosa*, 40–60 µm diam. in *P. subtilissima*) (Womersley 1979), and by the apical cell (acutely pointed in the former, dome-shaped in the latter).

This species was first recognised in a collection from Greta Point, Evans Bay (mentioned in Adams (1994: 325) as *P. pungens*). It has been subsequently observed in collections made earlier in other parts of Wellington Harbour and from Picton. It has been found growing both epiphytically and epilithically,

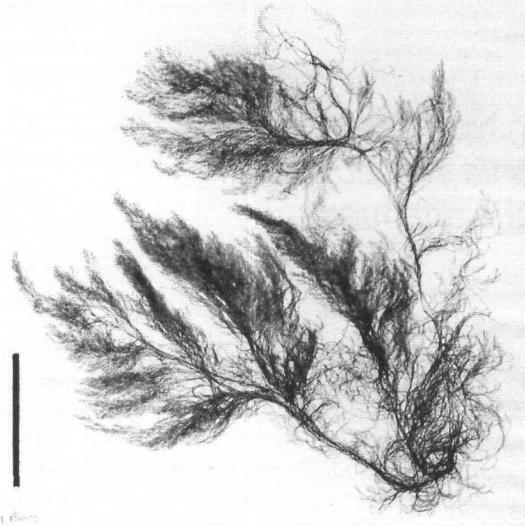


Fig. 1 *Polysiphonia senticulosa* (WELT A21126). Scale bar = 5 cm.

and is particularly abundant in late winter/early spring (August-October). In the field it has a distinctive red to brownish purple colour.

Polysiphonia senticulosa was first described from Orcas Island in Washington, USA, and has been reported from both the north-eastern and north-western Pacific. *Polysiphonia pungens* Hollenb. has been reported from south-eastern Alaska to southern British Columbia (Hollenberg 1942; Scagel et al. 1989), and from Victoria, Australia (Womersley 1979). Kudo & Masuda (1988) reduced *P. pungens* to synonymy with *P. senticulosa* and discussed the relationship of *P. senticulosa* with the Japanese species, *P. morrowii* Harv. The presence of endogenously derived indeterminate axillary branches in *P. senticulosa* and *P. morrowii* led Kylin (1941) to establish a new genus, *Orcasia*, for these two species. Although a further species, *O. pulla*, was described by Simons (1970) from South Africa, this genus has not been accepted by most other authors (e.g., Hollenberg 1942; Segi 1951; Scagel

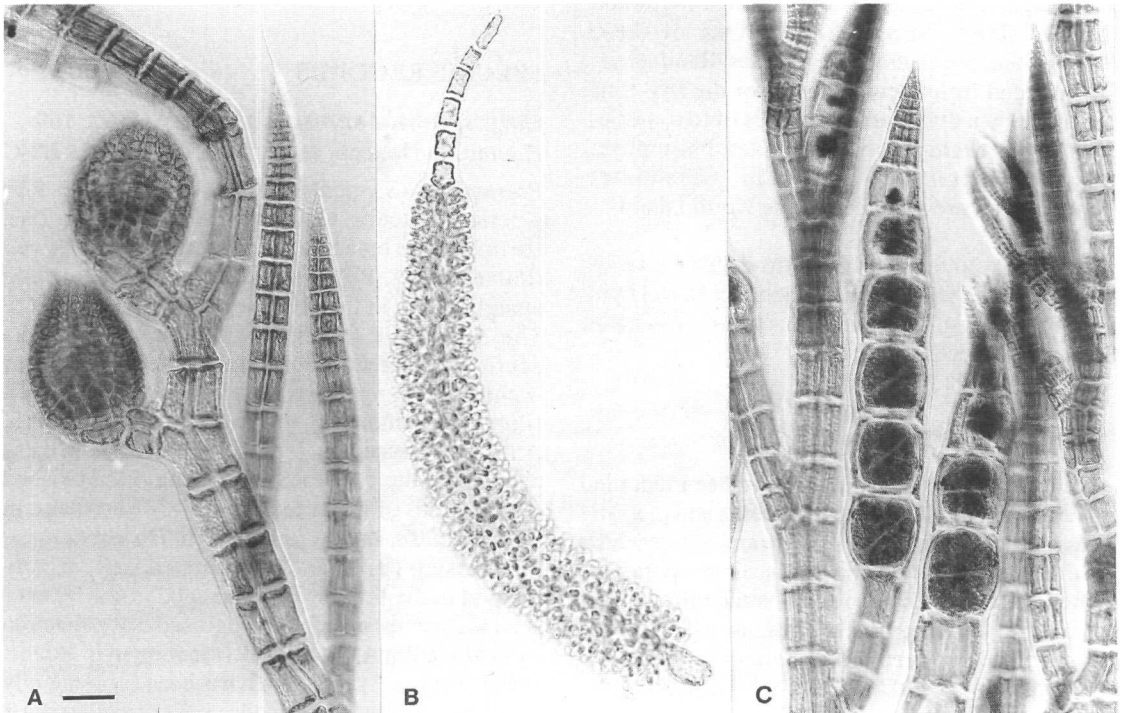


Fig. 2 *Polysiphonia senticulosa*. A, immature cystocarps—note pointed tips of vegetative branches; B, spermatangial branchlet with terminal sterile cell filament; C, tetrasporangia in straight rows. Scale bar = 150 μ m.

et al. 1989) who have interpreted the genus *Polysiphonia* more broadly than Kylin (1941, 1956).

Womersley (1979), when reporting the presence of the northern Pacific species, *P. pungens*, in Australia, commented that “the disparate distribution and the occurrence in Australia in a harbour (Port Phillip) raises the possibility of spread by shipping”. The record of *P. senticulosa* brings to five the number of presumed adventive species of *Polysiphonia* present in New Zealand waters (previously *P. brodiaei* (Dillwyn) Sprengel, *P. constricta* Womersley, *P. sertularioides* (Gratel.) J. Agardh, *P. subtilissima* Mont.—see Adams 1991).

Voucher specimen: WELT A21126 (Oriental Bay, Wellington Harbour, C.H.Hay, 25 Aug 1989).

Striaria attenuata Grev. 1828: synop. 44.

Fig. 3

This brown alga is considered to be native to the North Atlantic (type locality: Isle of Bute, Scotland) but it is now also found in southern Australia, Japan, South America (Chiloe, Chile, and Argentina), as well as in New Zealand where it is known from Otago Harbour and Stewart Island (Lindauer 1957; Womersley 1987; Peters 1991). It was found growing subtidally next to the site of the old ship slipway at Greta Point. This extension of the known range for this species may represent transport within New Zealand from sites where it has been established for decades, or may be an introduction from another part of either its native or adventive range. In an examination of the temperature responses of several brown algae with disjunct distributions, Peters & Breeman (1992) recorded that *Striaria attenuata* tolerated the highest temperatures of all taxa tested. They therefore agreed with the conclusions of Adams (1983) and Skinner & Womersley (1983), based on observations in New Zealand and Australia, respectively, that this species is very likely to have been introduced.

Voucher specimen: WELT A21240 (Evans Bay slipway, Wellington Harbour, P. Clark & W. Nelson, 26 Sep 1993).

Antithamnionella ternifolia (Hook. f. et Harv.) Lyle 1922: 350

Fig. 4A-D

Antithamnionella ternifolia was found at Greta Point, Evans Bay, growing epiphytically on

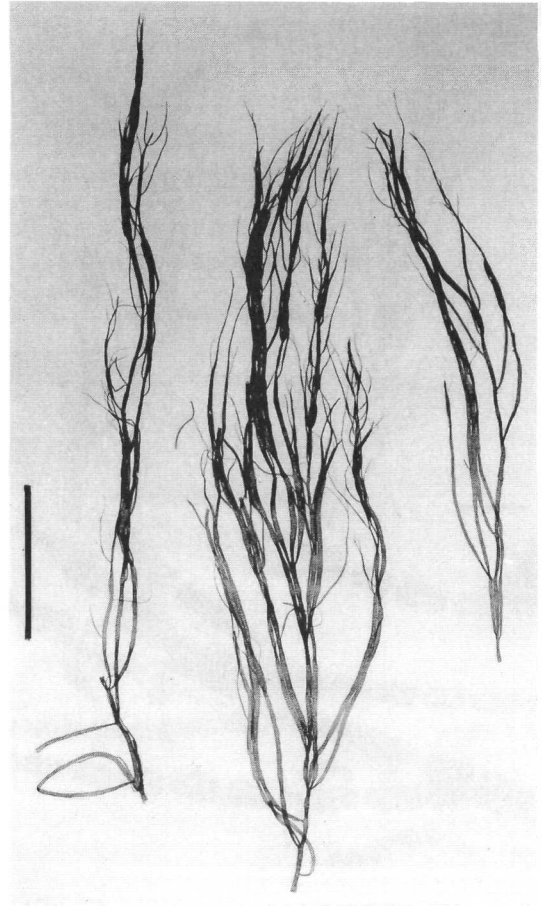


Fig. 3 *Striaria attenuata* from Evans' Bay, Wellington (WELT A21240). Scale bar = 5 cm.

Polysiphonia senticulosa, *Corallina* sp., and *Ulva* sp. in the lower intertidal zone. Thalli (Fig. 4A) were up to 5 mm long attached by rhizoids in prostrate portions (Fig. 4B) in which mature axial cells were 40–50 μm in diameter and 3–6 diameters in length. Each axial cell (Fig. 4C) bore 2–4 whorl-branches, 10–12 cells long, with pointed apical cells and isodiametric basal cells. The abundant gland cells (Fig. 4D) were equal in size or slightly larger than the bearing cells. All material was non-reproductive. This species reproduces rapidly by vegetative means and thus may be expected to spread further.

Antithamnionella ternifolia, originally described from Cape Horn (Maggs & Hommersand 1993), was described again from the Channel Islands as *A. sarniensis* Lyle and is closely similar to *A. adnata* (J. Agardh) N. Adams from New Zealand (Adams

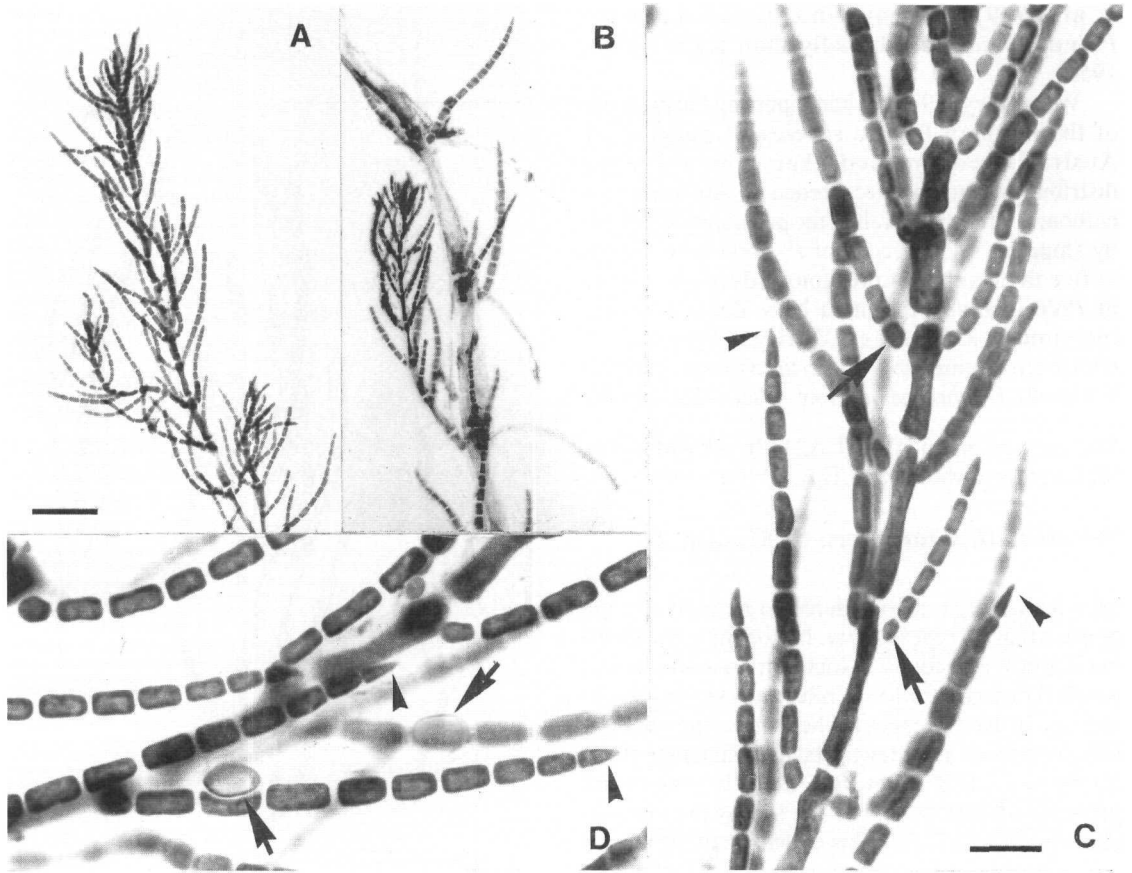


Fig. 4 *Antithamnionella ternifolia* (WELT A21367). **A**, tip of young axis with whorl-branches and laterals of unlimited growth; **B**, mature prostrate axis with rhizoids and a young branch; **C**, detail of young axis showing simple whorl-branches with isodiametric basal cells (arrows) and pointed apical cells (arrowheads); **D**, whorl-branches with gland cells (arrows: upper gland cell in face view) and pointed apical cells (arrowheads). Scale bar A, B = 100 μm , C, D = 25 μm .

1994). The Wellington Harbour material is virtually identical to populations in the British Isles and Australia in all morphological features. It differs from *A. adnata* in having 4 rather than 2 or 3 whorl branches per axial cell. In New Zealand, *A. ternifolia* has previously been found only at the North Mole, Timaru Port (Adams 1983, as *A. sarniensis*) where it was considered to be adventive. Adams (1972) recorded *Antithamnionella ternifolia* from the Wellington region, stating that "this plant seems to be the same as *Antithamnion adnatum* which is clearly an *Antithamnionella*". Adams et al. (1974) and South & Adams (1976) also include *A. adnata* in *A. ternifolia*. Adams (1994) reverted to the use of

A. adnata for New Zealand plants until "authentic plants have been compared". Further study is required to clarify the relationship between *A. ternifolia* and *A. adnata*.

Voucher specimen: WELT A21367 (Greta Point, Evans Bay, Wellington Harbour, W.Nelson, 23 May 1993).

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