

***Rosenvingiella polyrhiza* (Rosenvinge) P.C. Silva 1957: 41**

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**Basionym:**

*Gayella polyrhiza* Rosenvinge 1893: 937

**Type Locality:**

Godthaab, Greenland.

**Habitat:**

On rocks, at high water mark; may occur mixed with species of *Prasiola*.

**Northeast Pacific Distribution:**

Aleutian Islands, Alaska, to northern Washington.

**Vegetative morphology:**

The thallus is essentially filamentous. Early stages of development consist of a uniseriate filament, initially attached by an individual rhizoid from the original germling (**Fig. 1**). Adult specimens consist of a limited system of uniseriate prostrate axes, from which pluriseriate erect axes are produced. The prostrate parts are 9-20 µm wide and are formed by cells two to six times as wide as long (mostly three to five). They adhere to the substratum by unicellular rhizoids, which issue as protrusions of vegetative cells (**Fig. 2**); the rhizoids may occur singly or in pairs, or be produced in a series on up to six adjacent cells. The erect axes have a pseudoparenchymatous habit and are produced by anticlinal divisions of the original axial cells (**Figs 3, 4**). In mature specimens, axes are up to 80 µm in diameter, sometimes constricted at intervals, and appear irregularly rounded or polygonal in cross section (**Fig. 5**).

**Reproductive morphology and Life History:**

It is generally believed that in mature *Rosenvingiella* species the erect pluriseriate axes become gametangia and release gametes. Kornmann & Sahling (1974) found that in Atlantic populations of this species the plants are haploid, and the zygote is the only diploid phase in the life history. Meiosis was not seen, but equal numbers of male and female plants arose from zygotes, four filaments from each zygote. For Alaskan populations, there is evidence that male and female gametes are produced on the same thalli (Rindi *et al.* 2004). At maturity, cells producing gametes of different sexes can be recognized in surface view. Cells producing female gametes, which appear to be much more numerous, are larger (5-10 µm on a side) than the male cells (2-3 µm on a side) (**Fig. 6**). Gametes are released by disintegration of the common wall (**Fig. 7**). After release, female gametes are spherical, 8-9 µm in diameter (**Fig. 8**). Male gametes have been observed mixed with female gametes; they are globular, 4-5 µm in diameter, with two very long flagella (**Fig. 9**). Sexual reproduction by oogamy is presumed to take place, but fusion of gametes has not been observed directly. In culture, germlings

obtained by discharge of gametes from an individual specimen are capable of growing and producing new plants; this suggests that either self-fertilization or parthenogenesis may take place in this species.

**References:**

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- Rosenvinge, L.K., 1893. Grønlands Havalger. Meddelelser om Grønland 3: 763-981.
- Silva, P.C., 1957. Notes on Pacific marine algae. Madroño 14: 41-51.