

Taxonomy of *Janczewskia* (Rhodomelaceae, Rhodophyta): Morphology and Reproduction of *J. gardneri* from California

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Introduction

Janczewskia (Rhodomelaceae, Rhodophyta), the parasitic red algal genus, was established by Solms-Laubach (1877). This genus is characterized by wart-like thallus with coalescent branches, which form a solid tissue. Some species have conspicuously projected branches, but others have not this kind of branches. In the species, the branches rarely project beyond the surface of the nodule-like body. As in *Laurencia* Lamouroux, *Chondrophycus* (Tokida et Saito) Garbary et Harper and *Osmundea* Stackhouse, apical growing cell is situated at the base of a pit in branchlets. This genus is host specific parasitic on members of Rhodomelaceae, particularly *Laurencia* complex and *Chondria* C. Agardh.

Species of *Janczewskia* have been divided into three sections based on branch development. The type section *Janczewskia* includes species essentially devoid of free branches and consisting only of a nodule-like mass (Setchell 1914). By the contrast, *Heterojanczewskia* (Setchell 1914) involves species with simple free branches projecting from a nodule-like base. In third section *Stipitijanczewskia* (Chang & Xia 1978), the species with radiating compound free branches without a distinct basal nodule are included. However, this taxonomic scheme for the genus should be reconsidered, because the distinguishing features are somewhat variable and the host plants were taxonomically revised based on fundamental vegetative and reproductive structures (Nam et al. 1994; Nam 1999).

In this study, morphology and reproduction of *Janczewskia gardneri* Setchell et Guernsey on *Osmundea spectabilis* (Postels et Ruprecht) Nam from California are examined, and a possible separation from *Janczewskia* as a new genus is suggested

based on the features.

Materials and Methods

Data for this study were obtained from liquid-preserved and herbarium specimens collected from California. Liquid-preserved material was stored in a 10% solution of formalin/seawater. For anatomical observations the material was cleared in 5-10% NaOH in distilled water for 2-7 days, then rinsed in distilled water. Branchlets dissected from the cleared material were longitudinally hand sectioned along the central axis, transferred to a slide with a drop of distilled water, and mounted in pure glycerin. For permanent slides, the glycerin was exchanged with 50% Karo® corn syrup. Transverse section (TS) of branchlets 50-200 μm or more thick, depending on the degree of clearing, were also used to observe the development of vegetative, female and tetrasporangial structures. Axial development was studied in sections mounted in reverse on the slide. This was effective for the examination of pericentral cells in an axial segment. Measurements were given as length x diameter. Voucher specimens have been deposited in Herbarium of Department of Marine Biology, Pukyong National University (formerly National Fisheries University of Busan), Korea.

Results and Discussion

Thallus is globular wart-like, 3.5-4.5 mm in diameter, parasitic on *Osmundea spectabilis*. Coalesced branches arise from a solid tissue with short protuberance.

Apical growing cell is located in apical pit of branchlets, and cuts off axial cell successively. Each axial cell produces two pericentral cells giving rise to determinate growing filaments. Epidermal cells lacks secondary pit connections between them, and show non-palisade like arrangement in transverse section of branches. Their size in ultimate branchlets is 10-23 x 18-33 μm . Lenticular thickenings are present in medullary cells of male plants, but rarely observed in other sexual plants.

Pocket-shaped apex of male branches is 690-890 x 790-980 μm , with numerous spermatangial filaments derived from epidermal cells. Spermatangial filaments are terminated in a vesicular sterile cell of relatively small size of 8 x 10 μm . Spermatangia are produced from the filaments (Filament type), 8-10 x 4-5 μm ,

with single apical nucleus.

In female plants, apical pit of branchlets contains young procarp derived from trichoblasts. Central cell of young procarp has five pericentral cells. Cystocarps are ovoid, 440-490 × 540-690 μm, without rostrated ostiole. Mature carpospores are clavate, 20-25 × 70-75 μm.

Stichidial branchlets are cylindrical, 640-740 μm in diameter. Tetrasporangia are produced from random epidermal cells, with two presporangial cover cells arranged parallelly to stichidial axis and one postsporangial cover cell, and tetrahedrally divided. They show parallel arrangement in the stichidial branches, and 86-100 μm in diameter.

In most species of *Janczewskia* including the type species *J. verrucaeformis* Solms-Laubach, spermatangia are produced from trichoblast in apical pit of branches (Trichoblast type). Tetrasporangia are also derived from pericentral cells (Nam, personal observations). The species with these spermatangial and tetraspermatangial features are parasitic on *Laurencia*, *Chondrophyucus*, or *Chondria* rather than *Osmundea*. However, *J. gardneri* very differs from those species in the reproductive features. As its host *O. spectabilis* (Nam et al. 1994), *J. gardneri* has male structure of filament type rather than trichoblast type, and tetrasporangial origin of epidermal cells rather than pericentral cells. This strongly suggests that *J. gardneri* should be separated from the genus *Janczewskia*.

References

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