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Morphological study on *Sauvageaugloia ikomae* (NARITA) INAGAKI (Phaeophyta, Chordariaceae) from the Oki Islands, Shimane Prefecture[1]

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Results of the present writer's observations on the morphology of the sporophyte of *Sauvageaugloia ikomae* (NARITA) INAGAKI (Phaeophyta, Chordariaceae) and the development of gametophyte are described herein. Unilocular sporangia and gametopyte are newly reported for this alga. Unilocular sporangia arise from the basal cell of the assimilatory filaments, ellipsoidal to obovate, 45–70 μm long, 25–40 μm broad and sessile or stipitate. Swarmers discharged from plurilocular sporangia germinate according to the immediate filamentous pattern.

Key Index Words: *morphological study,* Sauvageaugloia ikomae, *Phaeophyta, Chordariaceae.*

Introduction

Sauvageaugloia ikomae (INAGAKI 1954, 1958) has been known only from its type locality, Oh-haneo, Tottori Prefecture since its basionym *Castagnea ikomae* NARITA (1936) was newly reported and unilocular sporangia as well as gametophyte have not been reported for this alga up to date.

The present writer fortunately could collect many mature specimens of the sporophyte of this alga growing on rocky bottom at the depth of 1.5 m at Inugu in the Oki Islands, Shimane Prefecture on July 17 in 1978. The present writer could observe unilocular sporangia in the sporophyte and also could study on the development of gametophyte of this species in culture.

Materials and Methods

Mature specimens of sporophyte used for this study were collected by the present writer at the depth of 1.5 m at Inugu in the Oki Islands on July 17, 1978. Fresh specimens as well as specimens preserved in formalin-seawater were used for the study of sporophyte. For the morphological study of sporophyte, hand sections were made and squash technique was also used. Small pieces of the frond were cut

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with a razor blade under a stereo microscope and stained with a 1% aqueous solution of aniline blue to which acetic acid had been added in the volumetric ratio of 1–5. After remaining in this solution for 1–5 minutes the stained pieces were also squashed. The sections and squashed materials were mounted in a 50% aqueous solution of rice syrup to which was added acetic acid in the volumetric ratio of about 1 to 33.

Material used for cultures was also collected from the same locality on the same date as the ones mentioned above. Swarmers discharged from plurilocular sporangia were isolated by standard techniques (CHAPMAN 1975) and cultured at 25°C (corresponding to the mean water temperature at surface in the vicinity of the Oki Islands in summer according to the Japan Oceanographic Data Center 1973) and 4200 lux continuous illumination. The culture medium (Erdschreiber) was used.

Observations and Discussion

Sporophyte

Vegetative structure

Thallus is attached on stones by a small discoid holdfast, cylindrical, solid or

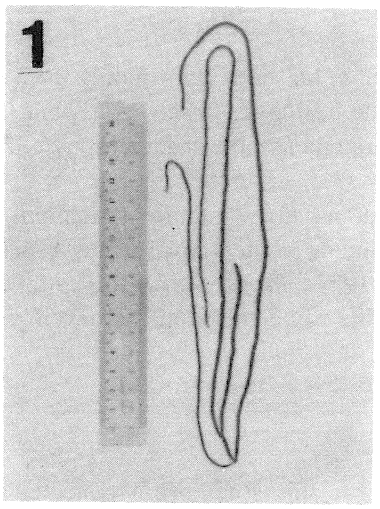
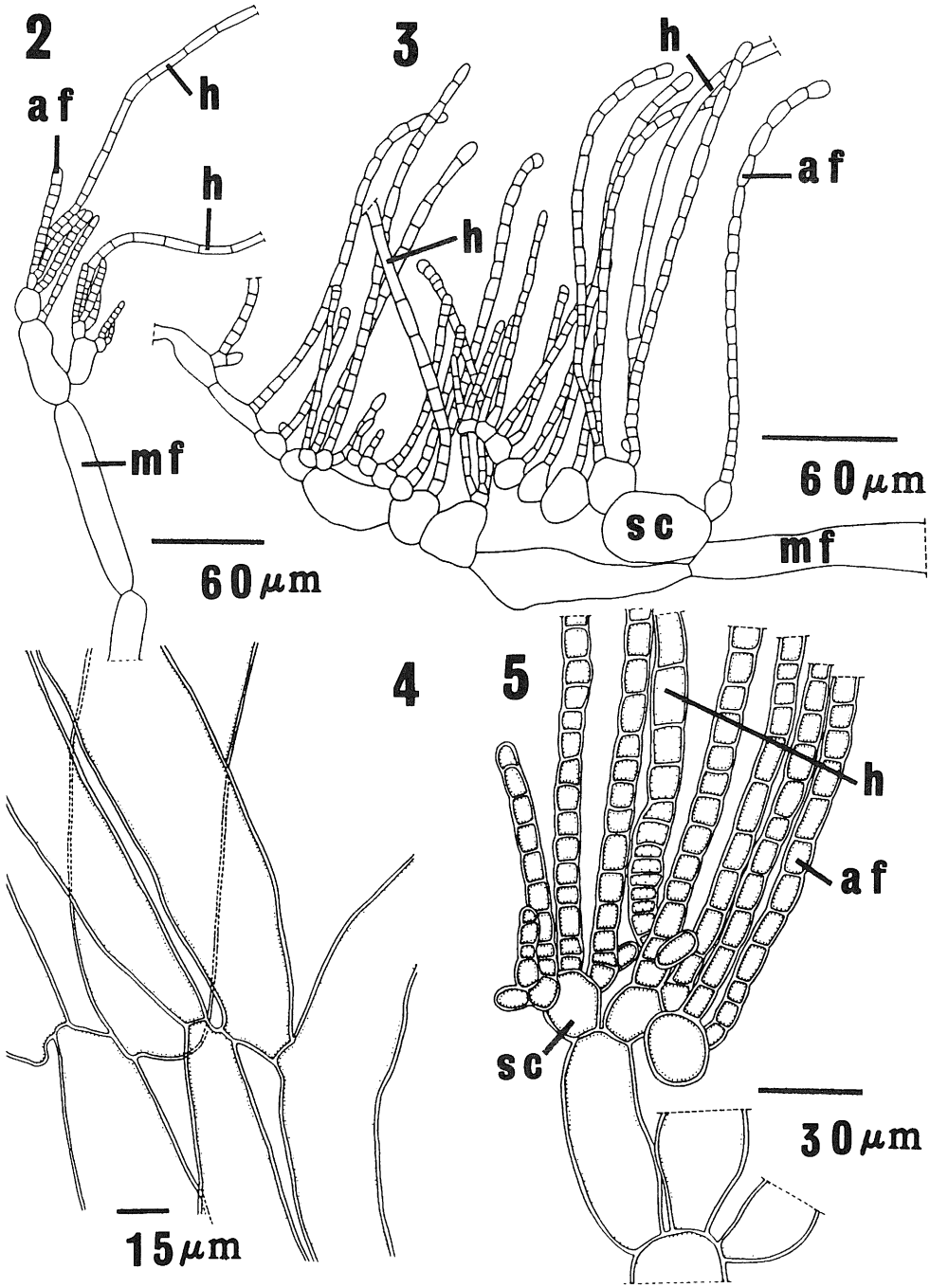


Fig. 1. *Sauvageaugloia ikomae* (NARITA) INAGAKI. Habit of a fresh mature specimen of sporophyte collected by the present writer at 1.5 m depth at Inugu, the Oki Islands on July 17, 1978.

Figs 2–5. *Sauvageaugloia ikomae* (NARITA) INAGAKI.
Fig. 2. Part of a sporophyte showing terminal structure of a medullary filament with cortex.
Fig. 3. Part of a sporophyte showing the cortical structure.
Fig. 4. Part of a sporophyte showing medullary filaments.
Fig. 5. Part of a sporophyte showing the basal structure of assimilatory filaments and a hair arising from subcortical cells.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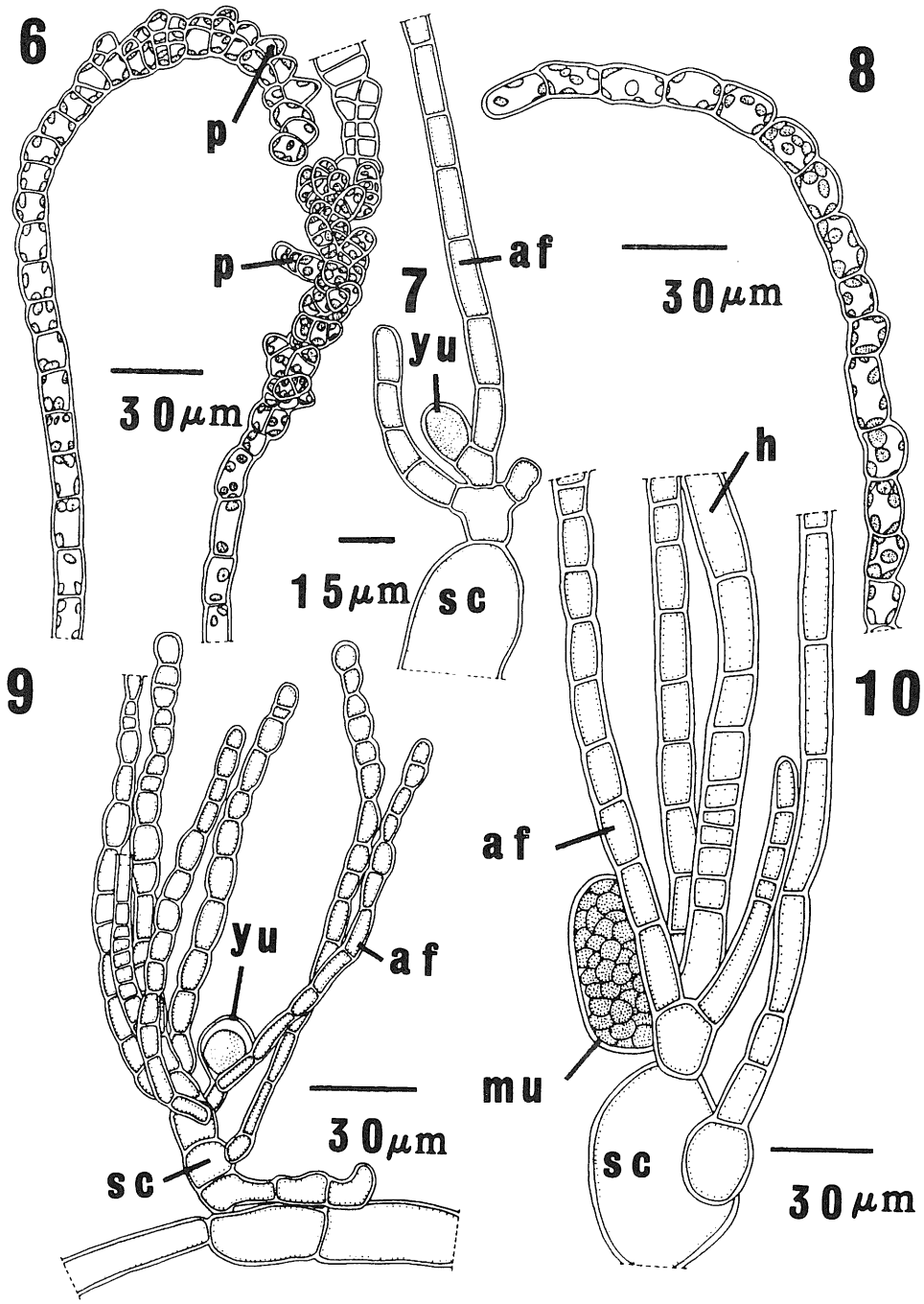
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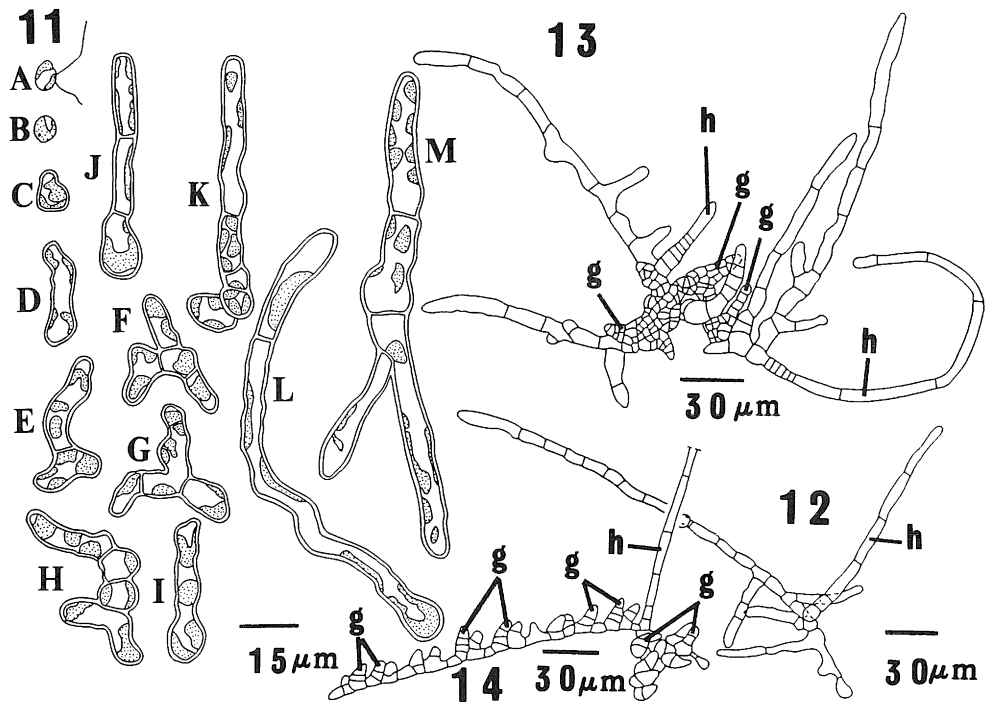

Figs 11–14. *Sauvageaugloia ikomae* (NARITA) INAGAKI.

Fig. 11. Germination of the swarmers discharged from plurilocular sporangia.

Fig. 12. A sterile gametophyte.

Fig. 13. A mature gametophyte.

Fig. 14. A mature gametophyte with many short gametangia.

Abbreviations used in Figures

af	assimilatory filament
g	gametangium
h	hair
mf	medullary filament
mu	mature unilocular sporangium
p	plurilocular sporangium
sc	subcortical cell
yu	young unilocular sporangium

Figs 6–10. *Sauvageaugloia ikomae* (NARITA) INAGAKI.

Fig. 6. Part of a mature sporophyte showing plurilocular sporangia.

Fig. 7. Part of a mature sporophyte showing a young unilocular sporangium.

Fig. 8. Part of a sporophyte showing the structure of upper part of an assimilatory filament.

Fig. 9. Part of a mature sporophyte showing a young unilocular sporangium.

Fig. 10. Part of a sporophyte showing a mature unilocular sporangium.

locally tubular, gelatinous, up to 30 cm high, 1.5–2 mm thick, simple or sparsely branched dichotomously mostly in the lower portion (Fig. 1), greenish brown in color. Medullary cells (Figs 3–4) are 20–30 μm in diameter, 3–30 times as long as diameter. Assimilatory filaments (Figs 2–3, 5, 7–10) are subsimple, 120–210 μm long, curved frequently in the upper portion, 15–20 cells long, lower cells are cylindrical, 3–10 μm in diameter, 1.5–2 times as long as diameter, upper cells are asymmetrically swollen, 6–10 μm in diameter, 1–2.5 times as long as diameter (Fig. 8). Hairs are colorless, multicellular, simple, 10 μm thick, 1–1.5 mm long without sheath at the base (Figs 2–3, 5, 10).

Reproductive structures

Unilocular sporangia (Figs 7, 9–10) are present or absent but plurilocular sporangia (Fig. 6) are present commonly, converted from upper portion of the assimilatory filaments and irregularly aggregated at maturity. Unilocular sporangia if present, arise from the basal cell of the assimilatory filaments, are ellipsoidal to obovate, 45–70 μm long, 25–70 μm broad and sessile or stipitate. Sporophyte fruites in June to July. Discharged swarmers are pyriform (Fig. 11A), about 4–5 μm, 5–8 μm in diameter and length respectively, provided with two lateral flagella of unequal length, a single chromatophore and one stigma.

The sporophyte of this alga resembles 14 other known taxa of Chordariales in the formational position of unilocular sporangia such as *Leathesia monilicellulata* TAKAMATSU (INAGAKI 1958), *Leathesia sphaerocephala* YAMADA (1932), *Leathesia pulvinata* TAKAMATSU (1939), *Leathesia crassipilosa* TAKAMATSU (1939), PAPENFUSSIELLA KUROMO (YENDO) INAGAKI f. *kuromo* INAGAKI (1958), *Cladosiphon okamuranus* TOKIDA (1942), *Myriocladia capensis* J. AGARDH (KYLIN 1940), *Myriogloia chorda* (J. AGARDH) KUCKUCK (KYLIN 1940), *Myriogloia sciurus* (HARVEY) KUCKUCK (KYLIN 1940), *Papenfussiella gracilis* KYLIN (1940), *Sphaerotrichia divaricata* (AGARDH) KYLIN (1940), *Acrothrix gracilis* KYLIN (1940), *Nemacystus flexuosus* (AGARDH) KYLIN (1940). *Nemacystus decipiens* (SURINGAR) KUCKUCK (1929).

Gametophyte

Gametophyte (Figs 11–14) is prostrate, filamentous, laterally branched, about 5 μm, 300 μm in diameter and length respectively bears colorless hairs and gametangia produce isogametes. Swarmers discharged from plurilocular sporangia germinate according to the immediate filamentous pattern (INOH 1947) (Fig. 11) and gametophyte of this alga resembles 4 other known taxa of Chordariales in the structure of thallus such as *Sphaerotrichia divaricata* (AGARDH) KYLIN (AJISAKA and UMEZAKI 1978), *Acrothrix pacifica* OKAMURA et YAMADA (AJISAKA 1979), *Acrothrix gracilis* KYLIN (AJISAKA and KAWAI 1986) and *Leathesia japonica* INAGAKI (AJISAKA 1984). Gametes and their fusion (PETERS and MÜLLER 1986) are not studied for this alga this time.

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