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Hiroshi YABU: On the aplanospore formation of *Halichoryne wrightii* HARVEY (Chlorophyceae)

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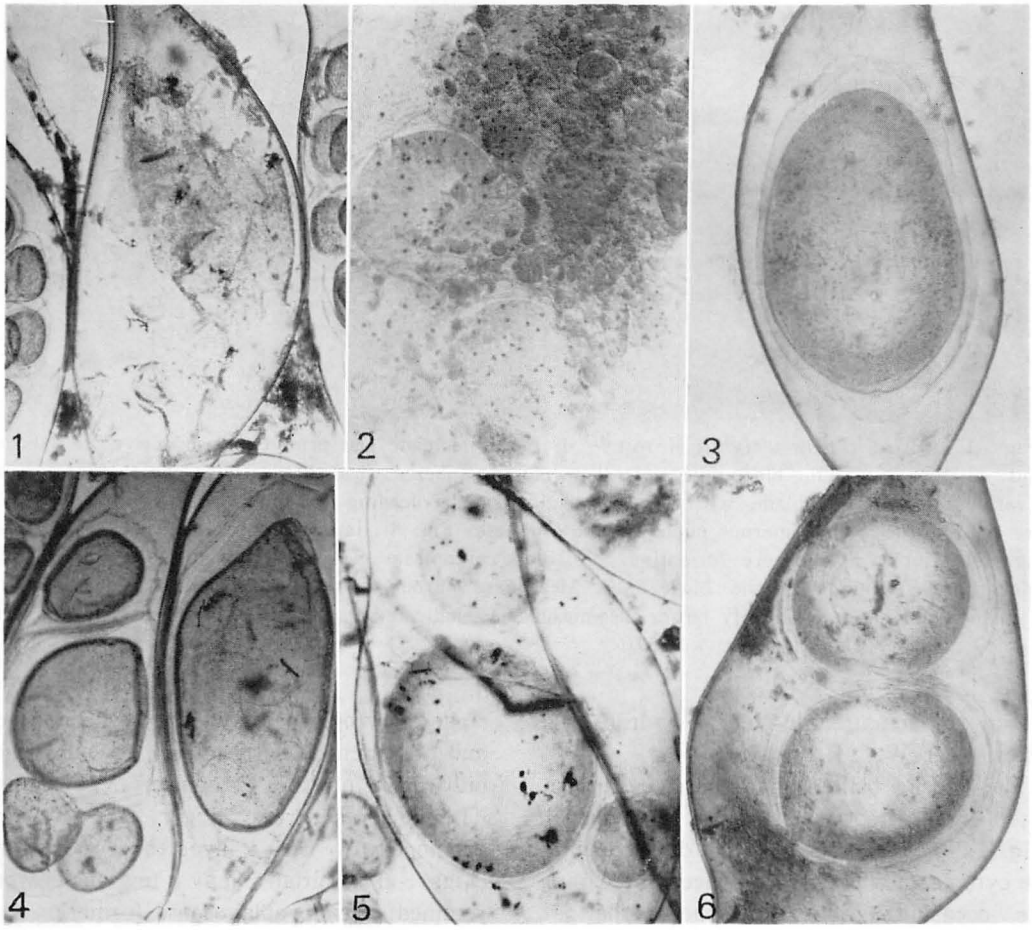
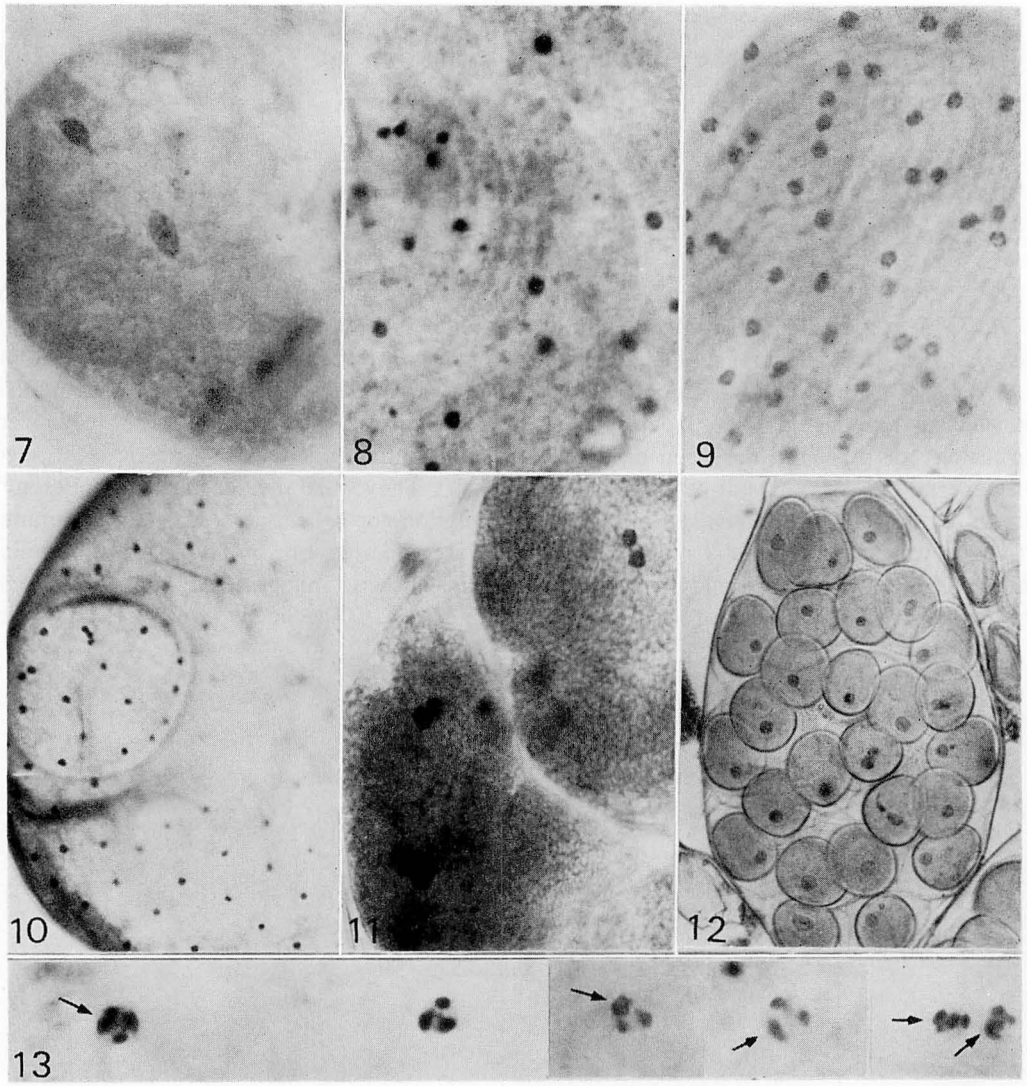
The calcareous green alga, *Halicoryne wrightii* HARVEY, a member of the family Dasycladaceae, is a common species attached to rocks at the high tide level on Ryukyu and Ogasawara Islands in Japan. The morphology of this alga has been described by CRAMER (1895), SOLMS-LAUBACH (1895) and OKAMURA (1909). Recently the nuclear cytology was investigated by fluorescent staining of DNA by LIDDLE and HORI (1983). The process of aplanospore formation has not been described nor have chromosome numbers been reported for *H. wrightii*.

H. wrightii specimens were collected 1 and 2 March, 1982, at Iyukihama, Hamajima in the Ogasawara Islands. Mature blades were immediately fixed in 1:3 acetic acid: alcohol. They were then decalcified in Pereny's solution for 6-9 hr. and washed in running water for ca 1 hr. To enhance staining blades were immersed in 45% acetic acid for 5 min. Specimens were stained with





Figs. 1-13. *Halicoryne wrightii* HARVEY. 1. A sterile blade just prior to reproductive cell development. 2. Part of a young blade with several developing spheres. 3-6. Blades with one to four spheres in various sizes. 7. A blade with several original nuclei leading to aplanospore formation. 8-10. Part of a blade with numerous nuclei at mid-prophase (Fig. 8), late prophase (Fig. 9) and telophase (Fig. 10) prior to aplanospore formation. 11. Blade cytoplasm cleaving to form aplanospores. 12. Aplanospores within a fertile blade. 13. Metaphase chromosomes in a fertile blade leading to aplanospore formation. Slightly larger chromosomes are indicated by arrows. Magnification : 1, 3-6 and 12, ×80; 2 and 7-11, ×450; 13, ×1,360.

aceto-iron-haematoxylin-chloral hydrate solution after WITTMANN (1965).

The sterile blade had a coarse, granular cytoplasm dotted with 1.2 μm dia. nuclei (Fig. 1). After inception of development, the cytoplasm was usually concentrated into one, occasionally several, spheres the peripheral cytoplasm of which was condensed and homogeneous (Figs. 2-6). In some cases only part of the cytoplasm degenerated. The spheres grew larger and became enveloped by a 1-4 layer thick membrane (Figs. 3-6). Initially, only a few nuclei were retained during aplanospore formation and

the others omitted (Fig. 7). The retained nuclei increased in size and took a darker stain. These nuclei divided into ovoid or ellipsoid daughter nuclei each with a small, conspicuous nucleolus in the center. The nuclei then continued to stain more darkly and the nucleoli became obscure. Generally, nuclear division was synchronous (Figs. 8-10). If two or more spheres were produced in the same blade, they fused. The spheres increased in size before the cytoplasm began to cleave to produce aplanospores (Fig. 11). The newly formed nuclei were slightly smaller. Three chromosomes were readily observed at metaphase. One of the chromosomes was somewhat larger than the other two (Fig. 13). Each fertile blade produced ca. 2000 nuclei as reported by LIDDLE and HORI (1983). The number of aplanospores was no more than ca. 40 (Fig. 12). Apparently many of the nuclei are not segregated into the aplanospores.

In the Dacycladaceae, the chromosome number had been reported for 4 species as follows; 2n=20 (SCHULZE, 1939) for 2n=8-10 (PUISEUX-DAO, 1966) for *Acetabularia mediterranea*, n(?)=ca. 20 (YABU & SHIHIRA-ISHIKAWA, 1981) for *A. ryukyuensis*, 2n=14 (WERZ, 1953) for Cymopolia barbata. Compared with these data, *Halicoryne wrightii* is remarkable in having the extremely low chromosome number of n=3.

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References

CRAMER, C. 1895. Ueber *Halicoryne Wrightii* HARVEY. Vierteljahrschr. Naturf. Ges. Zurich. **40**: 265-277.

LIDDLE, L. and HORI, T. 1983. The use of fluorescence staining to study nucleus development in the multinucleate dasycladalean green algae. Jap. J. Phycol. **31**: 173-179.

OKAMURA, K. 1909. Icones of Japanese Algae. Vol. 1. Tokyo.

PUISEUX-DAO, S. 1966. Siphonales and Siphonocladales. In M. B. E. Godward (ed.) Chromosomes of algae. Arnold. London. pp. 52-77.

SCHLZE, K. L. 1939. Cytologische Untersuchungen an *Acetabularia mediterranea* und *Acetabularia wettsternii*. Arch. Protistenk. **92**: 179-225.

SOLMS-LAUBACH, H. 1895. Monograph of Acetabulariae. Trans. Linn. Soc. London Bot. **115**: 1-39.

WERZ, G. 1953. Ueber die Kernverhältnisse der Dasycladacee, besonders von *Cympolia barbata* (L.) Harv. Arch. Protistenknde **99**: 198-255.

WITTMANN, W. 1965. Aceto-iron-haematoxylin-chloral hydrate for chromosome staining. Stain Tech. **40**: 161-164.

YABU, H. and SHIHIRA-ISHIKAWA, I. 1981. A long chromosome in the cyst of *Acetabularia ryukyuensis* OKAMURA et YAMADA. Jap. J. Phycol. **29**: 259-260.

鍛　冨：緑藻イソスギナの不動胞子形成について

小笠原諸島の父島で採集した緑藻イソスギナの成実枝内における不動胞子の形成経過を観察した。その際の核分裂で染色体数は n=3 で，そのうちの1個の染色体は他の2個の染色体よりも幾分大きいことを確かめた。

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