

many instances immediate conjugation was observed between the gametes. He further found that the zoospores which failed to conjugate immediately after being set free from the sporangium, very soon entered on the resting condition, and in this state were incapable of being fertilized.

This fact leads us to inquire if, when the zoospores from the plurilocular sporangia fail to conjugate—assuming for the moment that in all cases they are true gametes—they perish; or are they capable of germinating parthenogenetically and giving rise to healthy plants? Sauvageau has been enabled to settle this question, and to prove that in *Ectocarpus virescens*, at any rate, these zoospores are not obligatory gametes, in the sense that they must conjugate or else perish; for after escaping from the plurilocular sporangia they move about for some time, and then become fixed, and later on germinate 'with the greatest ease and regularity.'

The researches of Berthold, Sauvageau, and Kuckuck, would seem to place beyond all doubt the true sexual nature of the conjugating gametes of *Ectocarpus siliculosus* and *Scytosiphon lomentarius*; but, in other cases, not yet fully examined, it is impossible to say definitely whether we have to deal with asexual zoospores, or with zoospores possessing a potential sexuality, on account of the great variability of their behaviour after they are set free from the sporangium.

Having regard to the great similarity between the antherozoids of *Ectocarpus siliculosus* and those of *Fucus*, and to the resemblance between the modes of the sexual process in these plants, there seems to be no reason why the Phaeophyceae should be divided into the two series, Phaeosporae and Phaeogamae.

My best thanks are due to Professor Johnson, who suggested to me some time ago to examine material of *Petrospongium* for plurilocular sporangia, *P. Berkeleyi* being found plentifully at low water at some points on the Irish coast.

H. HANNA.

Royal College of Science, Dublin.

SOME REMARKABLE MARINE MONOCOTYLEDONS IN JAPAN.—A discovery of unusual interest to Japanese botanists was made in the Luchuan Islands. On my botanical tour in the Yaya-yama Archipelago, situated close to Formosa, I found a remarkable

marine Monocotyledon, growing abundantly in the shallow sea between the islands of Irumuti and Uchibanari. Many specimens bearing ripe fruit at the apex of the spirally-wound peduncle, were secured. These proved on examination to be *Enhalus acoroides*, Steud. (*E. Koenigii*, Rich.), a peculiar genus of Hydrocharideae, found in Malayan seas, and extending to Africa in the west, the Pacific Ocean in the east, and to Australia in the south. The linear dark-green leaves of this plant, which attain the size of more than 60 cm. by 1-1½ cm., afford sufficient food to the Dugongs (*Halicorne Dugong*), which frequent the shallow sea of the Luchuan Islands. Some of the specimens of *Enhalus* in my collection have the leaves partly bitten off by the herbivorous mammal, the skulls and teeth of which I brought home for identification, and the flesh of which I tasted and found delicious. The Luchuan name of *Enhalus* is 'Sūsanuha.'

In the same sea, growing together with *Enhalus*, I also found *Halophila ovata*, Gaudich. (*H. ovalis*, Hook. f.), in abundance. This plant is now known to extend to the Pacific coasts of the principal island (Hondō) of Japan; and I collected it myself in 1896 at a depth of between eight and eighteen fathoms in the Bay of Kagoshima, in Kiusiu in Southern Japan.

There is a specimen, collected by me in the sea of Miyako-jima, of another marine Monocotyledon, which, I think, might possibly be referred to *Thalassia stipulacea*, Koen.

TOKUTARO ITO, Tokyo.

RHIZOPHOREAE IN JAPAN.—Having paid attention to this subject for the last six years, I think it well to put on record three species of Mangroves now ascertained to be indigenous to Japan. They are *Kandelia Rheedii*, Wight et Arn., *Bruguiera gymnorrhiza*, Lam., and *Rhizophora mucronata*, Lam. In the island of Kiusiu in Southern Japan, only the first of these species is to be found; in Amami Ōshima, we have the first two species; while, in Uchinā (Okinawa or Great Luchu) and in the Yayeyama Archipelago, all the three species are to be found together in luxuriance. Thus the northern limit of Mangroves in Japan might be attributed to the coast of Kiiré in the Bay of Kagoshima in Kiusiu, and extending through Amami Ōshima and Uchinā to the Yayeyama Archipelago, where I found them as flourishing as those on the Malayan coasts.



Ito, Tokutaro. 1899. "Some remarkable marine monocotyledons in Japan."
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