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Occurrence of a new freshwater species of the genus *Acrochaetium*, Rhodophyta, in Japan

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A new freshwater species, *Acrochaetium amahatanum* sp. nov. belonging to the Acrochaetiaceae, is collected and described in details. This is the first record of the genus from Japanese freshwaters.

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The first freshwater species of the genus *Acrochaetium*, *A. indica* was describeded by RAIKWAR (1962), then two species of the genus, *A. sarmaii* KHAN (1970) and *A. godwardense* PATEL (1970) were reported from India. In Japan many marine species of the genus have been worked out by NAGAI (1941) and NAKAMURA (1941, 1944), however, no freshwater species of the genus has been recorded.

Recently an acrochaetioid alga was found growing in a small stream of the Okusawa-dani, one of the branches of the Amahata-gawa, Yamanashi Prefecture in Japan. The specimen found was microscopic and growing in running waters on submerged moss mixed wixed with a freshwater red alga, *Bangia atropurpurea*. After a carefull observation of the specimen, it became clear that this acrochaetioid alga was an undescribed species of the genus *Acrochaetium*.

A description of the new species is as follows :

Acrochaetium amahatanum sp. nov. (Figs. 1-8).

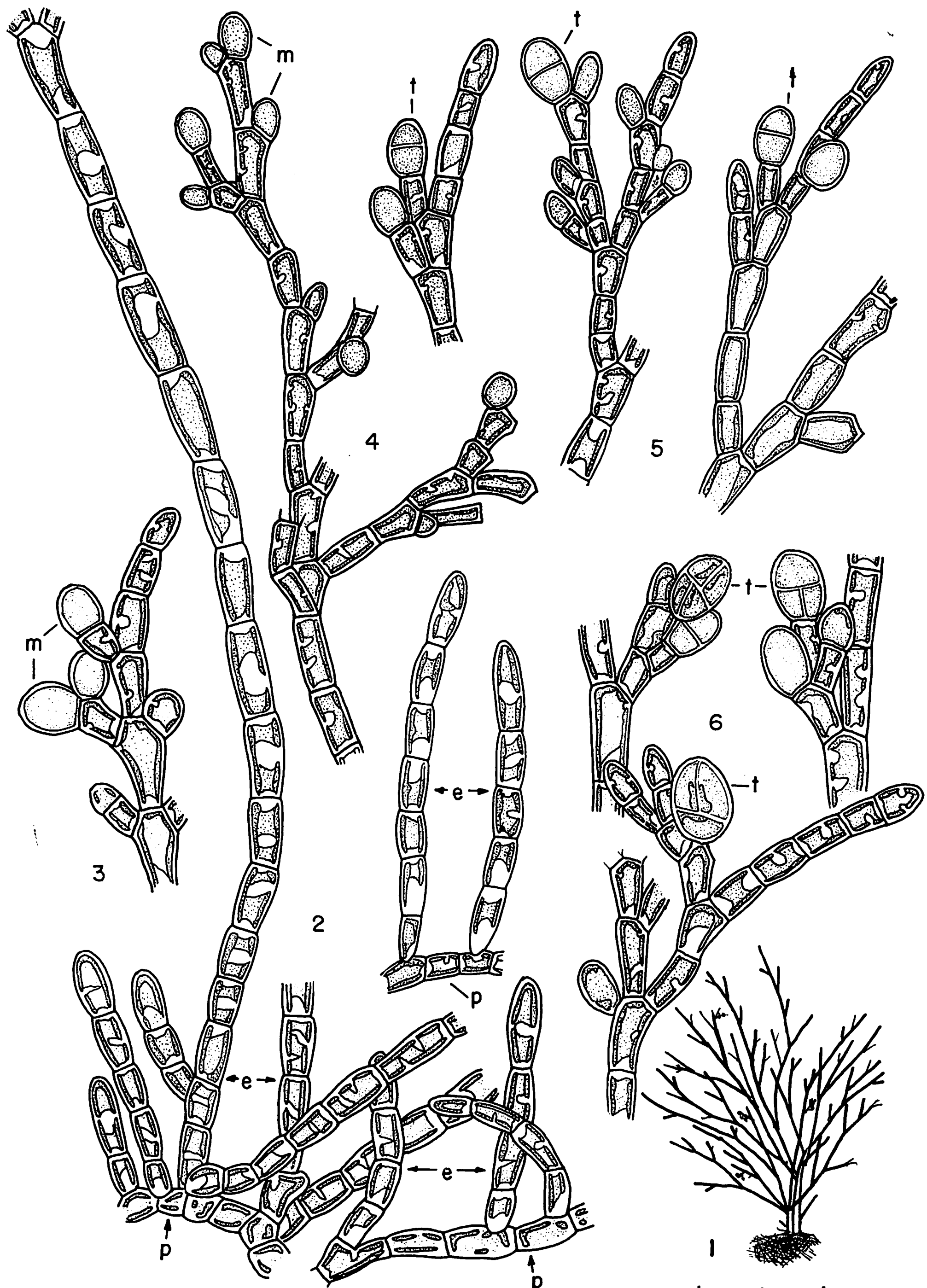
Frons heterotricha, minuta, ad 500 μm alta, substrato affixa per systema prostrata; cellulae filamentorum prostratorum fusiformes, 4-6 μm crassae, 5-12 μm longae; cellulae filamentorum erectorum cylindricae, 4-7 μm crassae, 5-15 μm longae. Chromatophorum singulum, parietale, irregulariter lobatum, sine pyrenoide. Rami alterni raro scundi; pili nuli. Reproductio per monosporas tetrasporasque ; monosporangia singula aut aggregata in ramis brevibus lateralibus filamentorum erectorum, oblonga, 5-8 μm diametro, 7-10 μm longa; tetrasporangia singular aut aggregata in ramis brevibus lateralibus, cum monosporangiis interdum intermixta, cruciatim divisa, oblonga, 7-9 μm diametro, 11-14 μm longa. Reproductio sexualis ignota.

Holotype : Okusawa-dani, Amahata, Yamanashi Prefecture in Japan (S. KUMANO, 1 December 1973, in the Herbarium of Faculty of Science, Kobe University).

Habitat : This species grows mixed with *Bangia atropurpurea* (ROTH) AG. on submerged moss in a small stream of Okusawa-dani, one of the branches of the Amahata-gawa.

Distribution : known from the type locality only.

The generic classification of the acrochaetioid algae, *Acrochaetium* Naegeli, *Rhodochorton* Naegeli, *Audouinella* Bory and *Kylinia* Rosenvinge, has a long time puzzled many phycologists. DREW (1928, 1933, 1936) merged the *Acrochaetium* and *Rhodochorton* in one emended genus *Rhodochorton* (Naeg.) DREW, because both of them have many common characters. PAPENFUSS (1945, 1947) recognized the above mentioned four genera and proposed a new and much more natural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classification considering the structure of chromatophores as the more distinctive character. According to Papenfuss, the acrochaetioid algae resolved themselves into four comparatively clearcut genera; 1) *Rhodochorton* with a few to many small discoid chromatophores, 2) *Acrochaetium* with a single parietal, laminate or irregularly lobed chromatophore with or without pyrenoid, 3) *Auduinella* with one or a few spiral chromatophores lacking pyrenoid and 4) *Kylinia* with one or more stellate chromatophores often with pyrenoid. KYLIN (1944, 1956) also proposed another classification of the acrochaetioid algae based upon morphological characters as those used by Papenfuss. Although FRITSCH (1945) remarked that there appeared to be no adequate ground for separation, freshwater species of the acrochaetioid algae were sometimes refered to a separate genus *Audouinella* Bory by many authors such as SMITH (1950) and FELDMANN (1962). FELDMANN (1962) proposed a new classification establishing a new family Audouinellaceae considering the mode of development of the gonimoblast addition to the characters of the chromatophores. Later, WOELKERLING (1971) recognized only two genera; *Audouinella* including *Rhodochorton, Acrochaetium, Balbiania, Chromastrum* and *Grania* for species with sexual reproduction; and *Colaconema* for species unknown in sexual state, because the shapes and number of chromatophores were unreliable for distinguishing genera and the presence or absence of pyrenoid did not have a generic significance. The present author follows the circumscription propose by PAPENFUSS (1945, 1947) and KYLIN (1944, 1956), because Feldmann and Woelkerling were carrying things too far.

The acrochaetioid algae are represented in freshwaters by five species of *Audouinella* (KYLIN 1956), two species of *Rhodochorton* (SWALE & BELCHER 1963, D'LACOSTE & GANESAN 1972), one of which was placed under *Audouinella* by KYLIN, D'LACOSTE and GANESAN, and three species of *Acrochaetium* (RAIKWAR 1962, PATEL 1970 and KHAN 1970). From the already mentioned description, it is clear that the Japanese specimen belong to the genus *Acrochaetium* Naegeli on account of mainly 1) the presence of heterotrichous habit in which the prostrate system being represented by creeping filaments and 2) the presence of a single irregularly lobed parietal chromatophore in each cell.

The Japanese acrochaetioid alga agrees with two freshwater species, *Acrochaetium indica* RAIKWAR and *A. sarmaii* KHAN in some respects, 1) the heterotrichous habit, 2) the lateral branches arising from the top of the parent cells, 3) the single parietal chromatophore without pyrenoid, 4) the sporangia borne on lateral branches of limited growth and 5) the absence of hairs. However, it differs from the above two species in 1) the cell size of the erect and prostrate systems and 2) the reproduction by monospore and tetraspore. It also differs from *A. godwardense* PATEL in the size of thallus and the absence of pyrenoid in addition to the above two characters. The Japanese specimen approaches a marine species of *A. proskaueri* WEST (1972) on 1) the size of thallus, 2) the heterotrichous habit, 3) the cell diameter of the erect filaments, 4) the single lobed chromatophore and 5) the reproduction by monospore and tetraspore, however, it differs 1) the cell length of the erect filaments, 2) the absence

Figs. 1-8. *Acrochaetium amahatanum* sp. nov.
Fig. 1. Heterotrichous habit of plant. Fig. 2. Prostrate and erect systems, each cell of which containing a single parietal, irregularly lobed chromatophore. Fig. 3 and 4. Monosporangia. Fig. 5. Young tetrasporangia on short lateral branches of erect filaments, the first division of tetraspore already occurrs. Fig. 6. Mature tetraspore cruciately divided, the second division of tetraspore is perpendicular to the first. Each spore contains a single parietal chromatophore. p: prostrate system, e: erect system, m: monosporangium, t: tetrasporangium.

of hairs and 4) the freshwater habitat. Thus, the Japanese specimen of the acrochaetioid alga is a new species of the genus *Acrochaetium* Naegeli and named as *A. amahatanum.*

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熊野　茂：日本淡水産紅藻アクロケチウム属の1新種

山梨県雨畑川の1支流奥沢谷より得た試料を検討した結果，アクロケチウム属の未記載の種であると思われるので Acrochaetium amahatanum sp. nov. として報告する。本種はタニウシケノリと混生し，単胞子又は四分胞子によって増殖する。

色素体は1コ，不規則に裂け偏在性，ピレノイドはない。本報告は日本における本属の最初の報告である。(657 神戸市灘区六甲台町 1-1. 神戸大学理学部生物学教室)