

TWO NEW RECORDS OF HETEROCYSTUS CYANOBACTERIA (NOSTOCACEAE) FROM PADDY FIELDS OF GOLESTAN PROVINCE

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Nostoc ellipsosporum and *Nostoc muscorum* are recorded for the first time from Iran. These species are collected from paddy fields of Golestan province in North of Iran. Morphological characters are used for identification of the species.

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Key words. *Nostoc ellipsosporum*, *Nostoc muscorum*, Golestan province, paddy fields, new records, Iran.

گزارش دو گونه از سیانوباکتریهای هتروسیست دار (Nostocaceae) از استان
گلستان

بهاره نوروزی و علی احمدی مقدم

گونه‌های *Nostoc muscorum* و *Nostoc ellipsosporum* برای اولین بار از ایران گزارش
می‌شوند. این گونه‌ها از شالیزارهای استان گلستان جمع‌آوری شده‌اند. در این بررسی از
خصوصیات مورفولوژیک برای شناسایی گونه‌ها استفاده شده است.

Introduction

In spite of broad paddy fields in Iran, there is little studies on ecology and taxonomy of heterocystus cyanobacteria. Cyanobacteria are one of the largest and most important groups of bacteria on the earth. Despite the name, blue-green, they usually observed in different color from green to yellow or red. Therefore color is not a good taxonomic character for identification. As there is no complete information from stable morphological characters of this group, there is no plenary classification of them.

At present two basic approaches are used for classifying of Cyanobacteria.

1. The Botanical taxonomy, focused on the reproductive structures and morphology of plant. These approaches also are used for classifying of cyanobacteria. We used this approach in our study.

2. The Bacteriological taxonomy, typically concentrated on genetic sequences.

Materials and Methods

Soil samples were collected from five paddy fields (Sorkhan kola, Glin, Hashem Abad, Ozineh, and Yampi) in Golestan province in autumn 2003. Rangaswamy (1966) method was used for soil sampling. All samples were transferred to sterile petri dishes and adequate quantities of liquid media. TCC Medium 616 BG-11 (Rippka & al. 1979) without NaNO_3 was added and the pH fixed in 7.1 after sterilization. The Petri dishes were placed in a culture chamber in 28°C continuous artificial illumination. (1500-2000 lux) for 2 weeks. The grown colonies were cultured on agar plates for purification. The new colonies again were incubated to solid agar culture tubes with 1000 lux light intensity (Kashic 1989). The morphology of isolated cyanobacteria were isolated and identified according to Desikhachary (1959), Prescott (1962), and Anagnostidis and Komarek (1999) by prepared semiperennial slides. The specimens are preserved in Kerman Algae Herbarium (KAH).

New records

Nostoc ellipsosporum Rabenhorst ex Bornet & Flahault

Plant mass gelatinous, expanded, attach to substratum, brownish to dark in color, cells uniform, cylindrical, 3.5-4 μ wide, 7-11 μ long, light blue-green or olive, heterocysts spherical or oblong, 5-6.5 μ wide, 6-12.5 μ long, spores ellipsoidal to oblong, 5-5.5 μ wide, 10-12 μ long (figs. 1, 3 and 4).

Nostoc muscorum C. Agardh ex Bornet & Flahault

Thallus gelatinous, filaments densely entangled, irregularly expanded, attached to substratum, dull olive, cells spherical or slightly cylindrical, 4-5 μ wide, 5.5-7 μ long, olive in color, heterocysts semiglobose, 4.5-7 μ wide, and 4-8.5 μ long. Spores oblong, moniliform, 5-6 μ wide and 6.5-11 μ long (figs. 2, 5 and 6).

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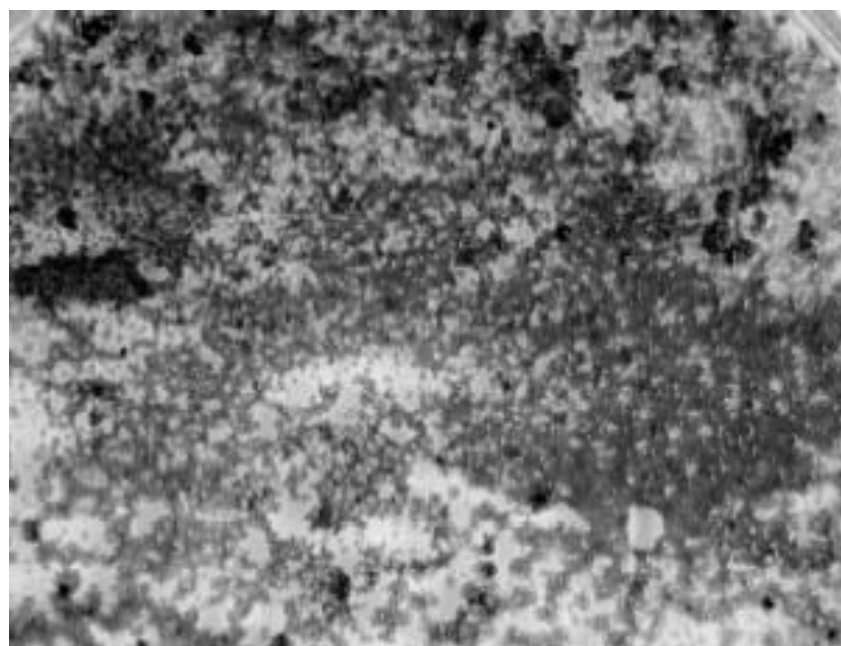
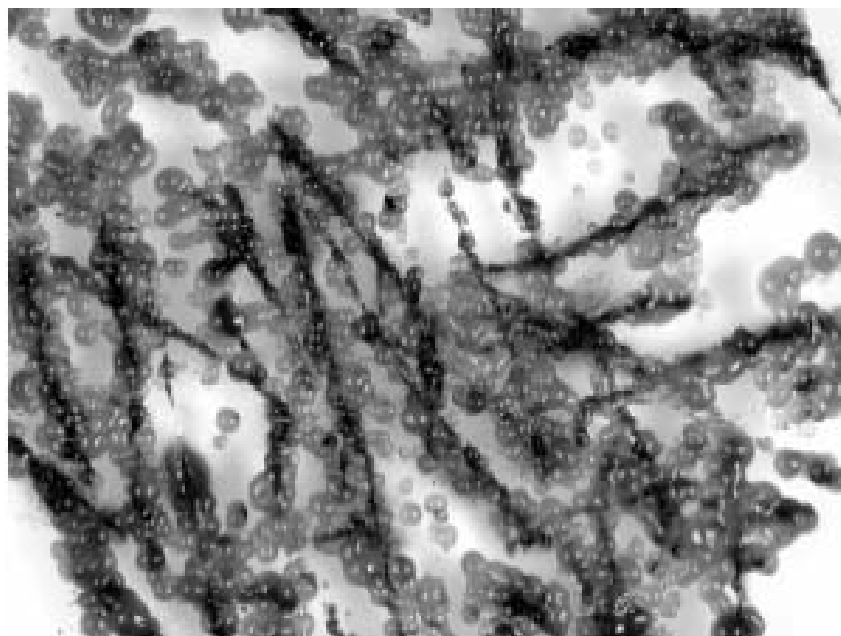


Fig. 1. Colonies of *Nostoc ellipsoforum* grown on solid media BG-11 (above). – Fig. 2. Colonies of *Nostoc muscorum* grown on solid media GB-11. (below).

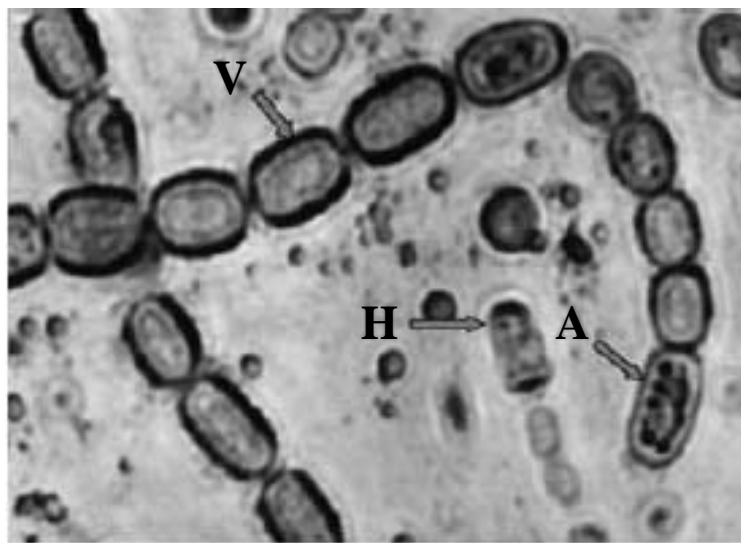
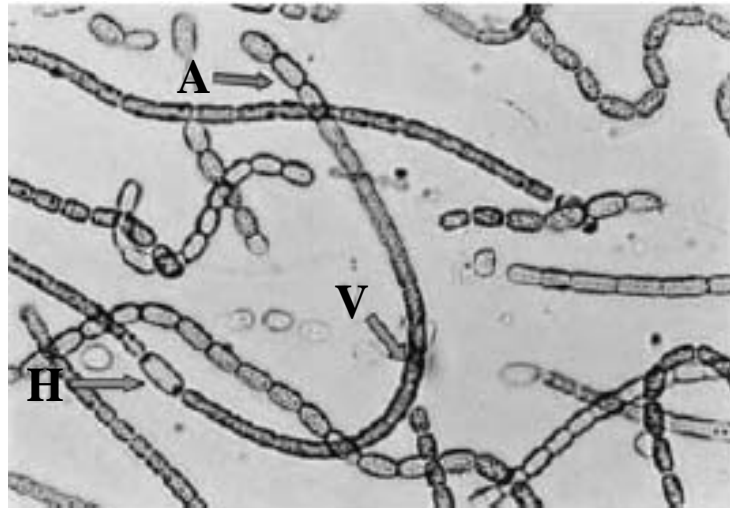


Fig. 3. *Nostoc ellipsosporum* observed under optic microscope (290 x). V= Vegetative cell, H=Heterocyst, A=Akinete. -Fig. 4. *Nostoc ellipsosporum* observed under optic microscope (700x). V= Vegetative cell, H=Heterocyst, A=Akinete (below).

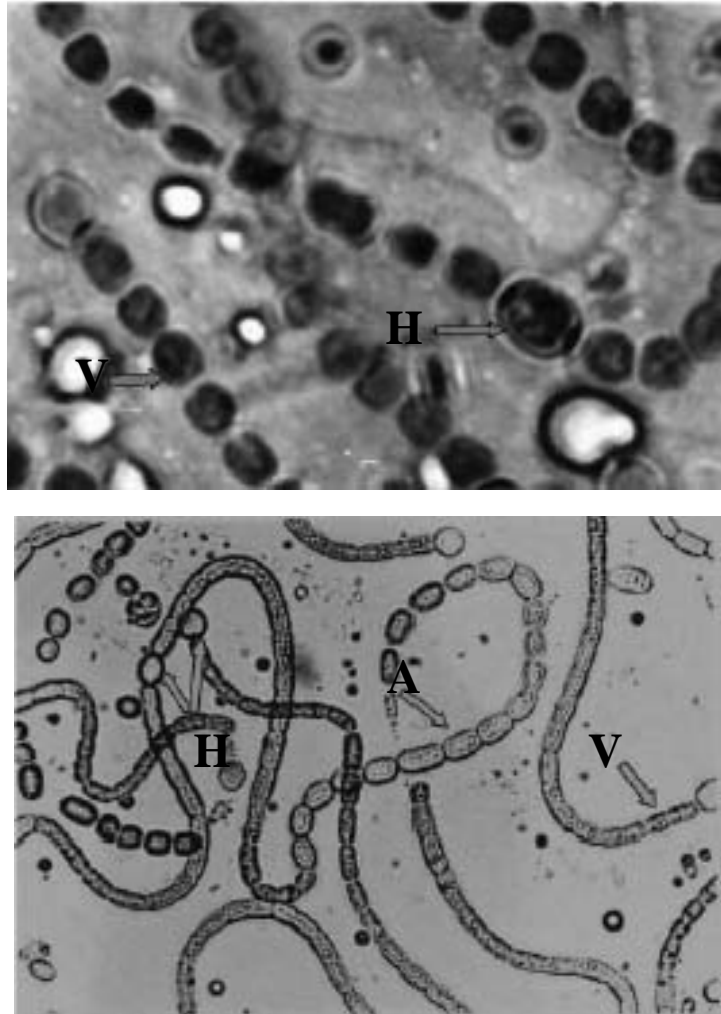


Fig. 5. *Nostoc muscorum* observed under optic microscope (700x). V=Vegetative cell, H=Heterocyst, A=Akinete (above). –Fig. 6. *Nostoc muscorum* observed under optic microscope (290x). V=Vegetative cell, H=Heterocyst, A=Akinete (below).