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Research Article

A NEW SPECIES CHLOROGONIUM EHRENBERG (HAEMATOCOCCACEAE, CHLOROPHYTA) FROM BULGARIA

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ABSTRACT

The species of genus *Chlorogonium* are unicellular with spindle-shaped or strongly elongated along flagella axis. Based on distinctive morphological characters we describe a new species *Chlorogonium marii* sp. nov. from fishponds in Plovdiv - Bulgaria. Description and comparison with related taxa are given.

Keywords: *Chlorogonium*, Chlorophyta, new taxa

INTRODUCTION

Chlorogonium is widespread in freshwater. Habitats of these algae include soil, temporary pools, and eutrophic lakes. The species of genus *Chlorogonium* are unicellular with spindle-shaped or strongly elongated along flagella axis. *Chlorogonium* is a distinctive assemblage of freshwater species characterized by several unusual features including retention of motility, multiple contractile vacuoles, and transverse cell division. There are over 30 species names in the database at present, of which 15 have been flagged as currently accepted taxonomically¹.

MATERIAL AND METHODS

During the summer months from July to September of 2012 in fishponds Plovdiv, Bulgaria (42° 11'073" N 24° 45'124" E) we came across of an interesting species of the genus *Chlorogonium*. The study of the material collected was performed with a microscope "Olympus C X 31" in the department "Biology and Aquaculture" in Trakia

University. Morphological characters were recorded from this alga material and the relevant literature sources^{2,3}.

RESULTS AND DISCUSSION

Of the species belonging to the genus^{4,5} near to this described below is *Chlorogonium metamorphum* Skuja. The species found in the fishpond Plovdiv, Bulgaria is distinguished from *C. metamorphum* in several important taxonomic marks (Table 1): 1. Location of the nucleus – while in *C. metamorphum* it is in the middle part of the cell, in our species the nucleus is in the posterior third of the cell; 2. The chloroplast in *C. metamorphum* occupies a small portion of the cell, whereas in our species fills it; 3. The pyrenoid and eyespot in our species are located in the middle or rear half of the cell, while in *C. metamorphum* they are in the front half of the cell; 4. Length of the flagella - in *C. marii* they are longer than 1/2 of the cell, and in *C. metamorphum* are equal of 1/3 до 1/2 from the length of the cell^{5,6}.

Table 1: A comparison between *Chlorogonium metamorphum* Skuja and *Chlorogonium marii* sp. nov.

	<i>C. metamorphum</i> Skuja	<i>C. marii</i> sp. nov.
Cell shape	spindle-shaped	spindle-shaped
Cell wall	thin	thin
Flagella	= 1/3 - 1/2 from the length of the cell	with 1/2 longer than the cell
Chloroplast	parietal a greatly reduced	parietal, takes up the whole cell
Pyrenoid	located in front of the cell	located in rear part of the cell
Eyespot	small in the front third of the cell	in the middle or at the rear of the cell
Nucleus	centrally located	in the posterior third of the cell
Contractile vacuole	two, apical	two, apical
Size		
Length	20 - 48 µm	25 - 40 µm
Width	1.6 - 8.0 µm	3.2 - 5.0 µm

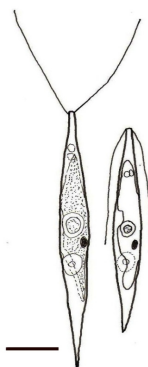


Figure 1: *Chlorogonium marii* vegetative cells (scale 10 μm)

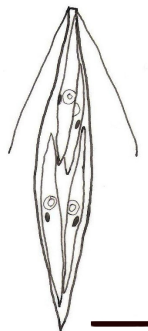


Figure 2: *Chlorogonium marii* cell with gametes (scale 10 μm)

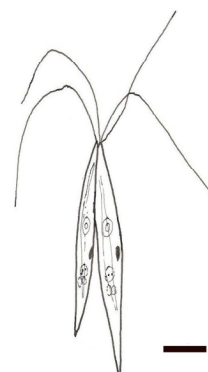


Figure 3: *Chlorogonium marii* conjugation cells (scale 10 μm)

***Chlorogonium marii* sp. nov.* (Figure 1-3)**

Description

The cells closely spindle, widest in the middle part, the front pole is blunt without papilla and a rear as spike extended, 25 - 40 μm length and 3.2 - 5.0 μm width. The flagella are longer than $\frac{1}{2}$ from the length cell. The cell wall is thin and colorless. The chloroplast occupies a large part of the cell (but does not reach the peaks). The pyrenoid is one, located in the central part of the chloroplast (the middle of the cell). The stigma is small, located slightly behind the middle of the cell, close to a pyrenoid. The contractile vacuoles are two - in the front end of the cell. The nucleus is large - lying in the rear half of the cell (Figure 1).

Reproduction

We traced the reproduction of the species. We observed a sexual reproduction, which takes place in the dark - before dawn. In the cell are form a four gametes (Figure 3). The sexual process is heterogamy. The macro gametes have sizes 17.6/3.0 μm , micro gametes - 13.7/2.8 μm (Figure 2-3).

Type locality

Fishpond in Plovdiv, Bulgaria (locus classicus) during the summer months - from July to September of 2012; as accompanying species found: another two species from a genus *Chlorogonium* - *C. minimum* Playfair⁷ and *C. acutiforme* Bourr.⁸, representatives of Chlorophyta (mainly from the order Chlamydomonadales and Chlorococcales) and planktonic species of Cyanoprocarvota.

Diagnosis

Cellulae fusiformes, polo anterioro attenuato, polo extremo truncato; membrana tenui, levi et acroa, sine papilla; flagellis duobus, circiter $\frac{1}{3}$ - $\frac{1}{2}$ cellulae maturae longitudinis; chloroplasto parietali; stimate rubro claro in parte centrali; pyrenoido uno, magno, centrali; stimate; binis vacuolis contractilibus apicalibus; nucleo in parte basali in excavatione chloroplasto sito.

Dimensiones

cellulae 25 - 40 μm
longae 3.2 - 5.0 μm latae.
Macro gamete 17.6/3.0 μm longae,
micro gametae 13.7/2.8 μm longae

Propagatio

sexualis fit heterogametis

Iconotypus

Figura nostra 1-3

Habitatio

In piscine finem Plovdiv - Bulgaria (locus classicus).
Cellulae libere natantes, VII - IX. 2012

*The species name is dedicated to the daughter of prof. dbS Ivan Kirjakov - Maria.

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