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 a widespread in freshwater. Habitats of these algae include soil, temporary pools, and eutrophic lakes. The species of genus Chlorogonium are a 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 taxonomically.

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.

RESULTS AND DISCUSSION
Of the species belonging to the genus 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 mark (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 then ½ of the cell, and in C. metamorphum are equal of 1/3 to 1/2 from the length of the cell.

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

<table>
<thead>
<tr>
<th>Character</th>
<th>C. metamorphum Skuja</th>
<th>C. marii sp. nov.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell shape</td>
<td>spindle-shaped</td>
<td>spindle-shaped</td>
</tr>
<tr>
<td>Cell wall</td>
<td>thin</td>
<td>thin</td>
</tr>
<tr>
<td>Flagella</td>
<td>= 1/3 - 1/2 from the length of the cell</td>
<td>with 1/2 longer than the cell</td>
</tr>
<tr>
<td>Chloroplast</td>
<td>parietal a greatly reduced</td>
<td>parietal, takes up the whole cell</td>
</tr>
<tr>
<td>Pyrenoid</td>
<td>located in front of the cell</td>
<td>located in rare part of the cell</td>
</tr>
<tr>
<td>Eyespot</td>
<td>small in the front third of the cell</td>
<td>in the middle or at the rare of the cell</td>
</tr>
<tr>
<td>Nucleus</td>
<td>centrally located</td>
<td>in the posterior third of the cell</td>
</tr>
<tr>
<td>Contractile vacuoles</td>
<td>two, apical</td>
<td>two, apical</td>
</tr>
<tr>
<td>Size</td>
<td>20 - 48 µm</td>
<td>25 - 40 µm</td>
</tr>
<tr>
<td>Length</td>
<td>1.6 – 8.0 µm</td>
<td>5.2 – 5.0 µm</td>
</tr>
</tbody>
</table>
**Chlorogonium marii** sp. nov.* (Figure 1-3)

**Description**
The cells closely spindly, 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 then ½ 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* Playfair and *C. acutiforme* Bourr., representatives of Chlorophyta (mainly from the order Chlamydomonadales and Chlorococcales) and planktonic species of Cyanoprocaryota.

**Diagnosis**
Cellulæ fusiformes, polo anteioro attenuato, polo extremo truncato; membrana tenui, levi et acroa, sine papilla; flagellis duobus, circiter 1/3 - 1/2 cellulæ maturæ longitudinis; chloroplasto parietali; stimate rubro claro in parte centrali; pyrenido uno, magno, centrali; stigmate; binis vacuolis contractilibus apicalibus; nucleo in parte basali in excavatone chloroplasto sito.

**Dimensions**
cellulæ 25 - 40 µm longæ 3.2 – 5.0 µm latae.
Macro gamete 17.6/3.0 µm longæ, micro gametae 13.7/2.8 µm longæ

**Propagatio**
sexualis fit heterogametis

**Iconotypus**
Figura nostra 1-3

**Habitatio**
In piscine finem Plovdiv - Bulgaria (locus classicus). Cellulæ libere natantes, VII – IX. 2012

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

**REFERENCES**

Cite this article as: