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OCCURRENCE OF THE GENUS *CHARA* (CHAROPHYTA) IN SHEIKHUPURA DISTRICT OF PAKISTAN

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Abstract

Two species of the stonewort alga, *Chara* Linnaeus have been collected during September 2004 from an area between Mureedke and Narang Mundi in Sheikhupura District of the Punjab Province of Pakistan. They were taxonomically investigated and determined as *C. aspera* Detharding *ex* Willdenow and *C. globularis* Thuillier. They are being described for the first time from their area of collection.

Introduction

Chara Linnaeus has been observed to grow in all the four provinces of Pakistan (Grove, 1923; Faridi, 1955, 1956; Pal *et al.*, 1962; Sarim, 1991; Aisha & Shameel, 1995; Leghari *et al.*, 1999, 2000, 2001, 2002, 2003, 2005; Jahangir *et al.*, 2000; Langangen & Leghari, 2001; Shameel, 2002, 2005, Ghazala *et al.*, 2004). During these studies, it was collected from different freshwater and brackish water habitats. A large survey for the collection of green algae was started in December 2003 from various areas of NWFP and Punjab, during which some species of *Chara* were obtained. They were taxonomically determined and described for the first time from their area of collection. This is an addition to the Charophyte flora of Pakistan.

Materials and Methods

The specimens were collected by hand-picking from road-side puddles between Mureedke and Narang Mundi in the Sheikhupura District of the Punjab Province of Pakistan during September 2004. They were preserved in 5 % formalin solution, brought to the labouratory at Karachi University and investigated as described previously (Zarina *et al.*, 2005, 2006). The material was identified with the help of authentic literature (Børgesen, 1901; Prescott, 1962; Imahori, 1964; Wood, 1965; Pankow, 1971; Krause, 1997). The voucher specimens are kept in the Phycology & Phycochemistry Lab., MAH Qadri Biological Research Centre, University of Karachi, where this research work was carried out.

Results and Discussion

Two species of the stonewort genus *Chara* (phylum Charophyta, class Charophyceae, order Charales, family Characeae; *fide* Shameel, 2001) have been identified. Their taxonomic enumerations are as follows:

***Chara* Linnaeus 1753: 1156**

Stem and branchlets corticate or ecorticate; stipulodes present, though sometimes rudimentary; branchlets of 4 or more segments; bract cells 4 or more at the node; nucules and globules produced one above the other from periphery of branchlet nodes, globule below the nucule, oospore terete. This genus is chiefly distinguished from the other allied genera by relative position of its sex organs. The nature of the cortex, whether haplostichous, diplostichous or triplostichous and the stipulodes, whether in a single or double row are characters used for its further division. The following two species were collected which may be distinguished as follows:

1. Stem slender, 375-500 µm in diameter ...……...……...……. *C. aspera* (1)
   Stem stout, 1,000- 1,400 µm in diameter ...…...…….. *C. globularis* (2)

1. *C. aspera* Detharding *ex* Willdenow 1809: 298
(Faridi, 1955: 79; Pankow, 1971: 140; Krause, 1997: 95)

Taxonomic synonymies: *C. delicatula* Desvaux *in* Loiseleur-Deslongchamps 1810: 137; *C. intertexta* Desvaux 1810; *C. fallax* C. A. Agardh 1824; *C. galioides* C. A. Agardh 1824, *nom. illeg.*; *C. pulchella* var. *aspera* (Willdenow) Wallroth 1833; *C. pulchella* var. *delicutala* (Desvaux) Wallroth 1833; *C. curta* Nolte *ex* Kützing 1857; *C. globularis* var. *aspera* (Willdenow) R. D. Wood 1962; *C. globularis* var. *curta* (Nolte *ex* Kützing) R. D. Wood 1962.

Morphological characters: Thallus monoecious, up to 15 cm long, incrusted with lime (Fig. 1); stem slender, 375-500 µm in diameter; internode as long or twice as long as the branchlets; stipulodes in a double whorl, those of the upper whorl tough, short, better developed than those of the usually rudimentary, lower whorl; branchlets 7-8 in whorl, usually curved, composed of 8-11 segements of which the upper 1-3 are ecorticate, the other diplostichous, corticate; bracteoles somewhat longer than the oogonium.

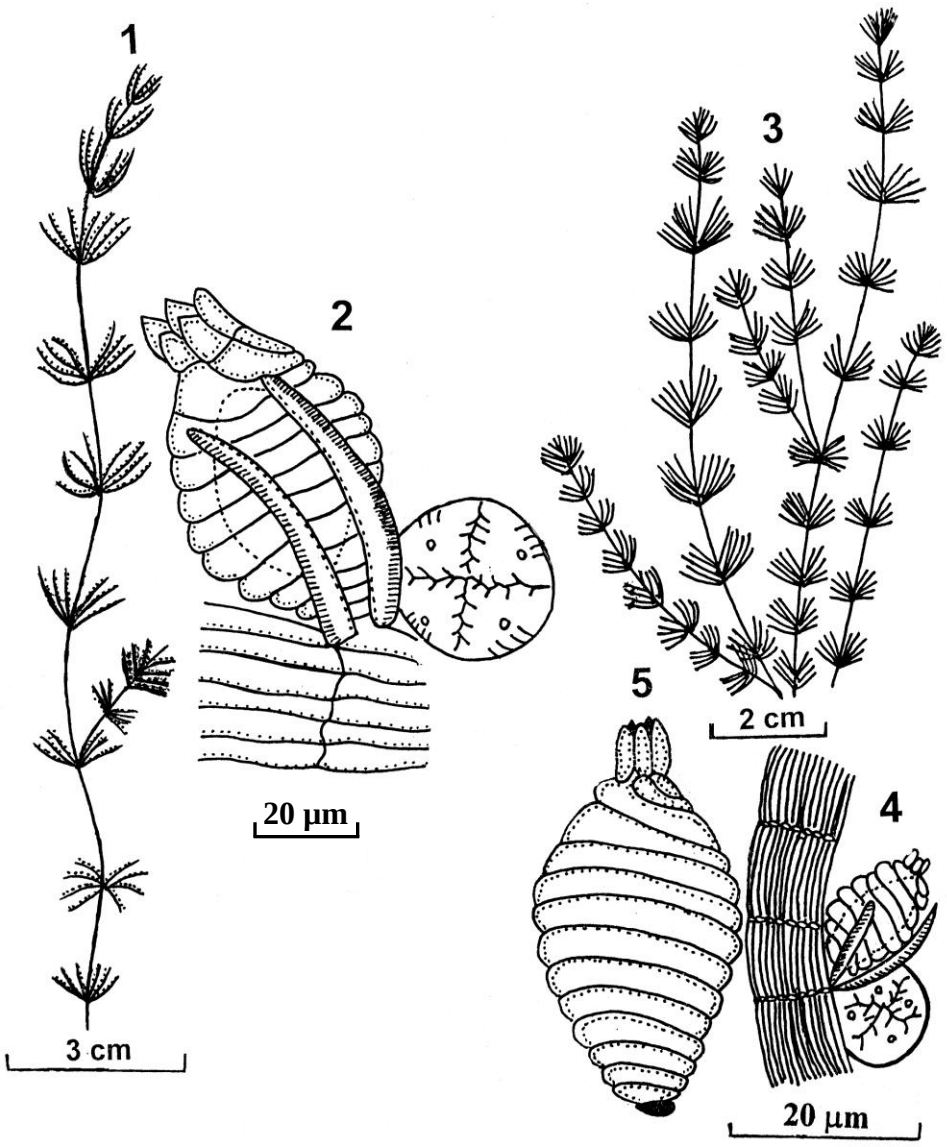
Anatomical features: Stem cortex triplostichous, primary cortical cells broader than the secondry ones; spine cells usually minute, papiliform; bract cells 5-7, anterior pair only developed, anterior ones 0.5-1 time the length of oogonium.

Reproductive structures: Antheridia and oogonia together at the three lower branchlets; node solitary; antheridia 350-560 µm in diameter; oogonia 750-1,000 µm long, 500-700 µm wide (Fig. 2); spiral cells showing 14-15 convolutions, coronula 100-240 µm high, 180-260 µm wide at the base; individual cells convent; oospore black, 625-670 µm long, 340-550 µm wide with 12-14 thin ridges, terminating in basal claws.

Locality: Sheikhupura District: between Mureedke and Narang Mundi (12-9-2004).

Geographical distribution: India: Varanasi (U.P.); Pakistan: Lahore, Nurpur (Pal *et al.*, 1962).

Remarks: The collection was made during autumn from paddy fields. The ecological conditions were not favourable for its growth, therefore, it occurred in low quantity.



Figs. 1-5. Species of the genus *Chara:* 1. *C. aspera,* a vegetative branch, 2. *C. aspera,* a part of branchlet with antheridium and oogonium, 3. *C. globularis,* a bunch of vegetative thalli, 4. *C. globularis,* branchlet with antheridium and oogonium, 5. *C. globularis,* single oogonium.

2. *C. globularis* Thuillier 1799: 472
(Børgesen, 1901: 256; Faridi, 1955: 80; Prescott, 1962: 339; Pankow, 1971: 140; Krause, 1997: 87; Langangen & Leghari, 2001: 78)

Taxonomic synonymy: *Chara fragilis* Desvaux *in* Loiseleur-Deslongchamps 1810; *C. fragilis* var. *subverrucosa* A. Braun; *C. leptosperma* A. Braun.

Morphological characters: Thallus monoecious, incrusted, up to 60 cm high (Fig. 3); stem stout, 1,000-1,400 µm in diameter; internodes 1-2 times the length of the branchlets; irregular, multicellular bulbils sometimes present; stipulodes in double whorls, rudimentary, greatly reduced and inconspicuous branchlets, 7-8 in a whorl, straight, very long, consisting of 8-11 segements of which the upper 1-3 are ecorticate; bracteoles somewhat developed, shorter than or as long as the oogonium.

Anatomical features: Cortex triplostichous, regular; cells of primary and secondry series of equal width; spine cells rudimentary, visible only in very young internodes; cortical cells of branchlets twice as numerous as the bract cell; bract cells usally 7, varying in length, equal or somewhat shorter than the oogonium; only one anterior pair developed, posterior cell rudiments at fertile nodes, at sterile nodes frequently absent.

Reproductive structures: Antheridia and oogonia solitary (Fig. 4), at the lowest branchlet nodes (Fig. 4); antheridia 300-450 µm in diameter; oogonia 800-1,100 µm long, and 350-450 µm wide, 11-14 well pronounced ridges prolong downward (Fig. 5).

Locality: Sheikhupura District: between Mureedke and Narang Mundi (12-9-2004).

Geographical distribution: India, Pakistan: Lahore (Pal *et al.*, 1962).

Remarks: Material was collected during autumn from rice fields. It occurred in limited quantity due to the unfavourable conditions, but was found in vegetative as well as reproductive states.

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