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The charophyte flora of Greece, I

Abstract

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12 taxa of charophytes belonging to the genera *Chara*, *Lamprothamnium*, *Nitella*, *Nitellopsis* and *Tolypella* were found in 22 aquatic stands. *Nitella gracilis* and *N. mucronata* are recorded as new for Greece. The presence of 5 taxa in Greece is confirmed. Comments are also given for the found taxa, all having few previous records from Greece.

Introduction

Our present knowledge of the Greek charophyte flora is poor. The study of this particular flora was much neglected during the past. There are not exclusive publications on the charophyte flora of Greece. Some records may be found in studies devoted to other aquatic plant groups from individual localities (Anagnostidis 1968, Anagnostidis & Economou-Amilli 1980, Dawkins 1949, Koumpli-Sovantzi 1983, Koussouris 1978, Koussouris & Diapoulis 1982, 1985, Papastergiadou 1990, Papastergiadou & Babalonas 1993, Petkoff 1910, Rechinger 1943, Stephanides 1940, 1948, Toel & Rohlena 1902, Tsagridis 1982, Vilhelm 1908). It must be noticed that some published records (Corillion 1957, Wood & Imahori etc.) draw from the De Heldreich Herbarium Graecum normale.

Material and methods

The plant list is mainly based on author's collections (25 specimens) and the vouchers are deposited in her herbarium which is kept in ATHU, duplicates in BM. The collector's name, abbreviated by the letters K.S., is followed by the collecting numbers appearing on the list after the localities and the corresponding collecting dates. The distribution of some taxa within Greece is also given on the base of the hitherto seen literature records.

In addition to the above mentioned collections, a small one (8 specimens) by the author's co-workers Ioannis Bazos, Irini Vallianatou, Artemios Yannitsaros and Maria Sarika-Hatzinikolaou has been used in this study. This collection is kept in herb. L.

Koumpli-Sovantzi; in the plant list the collectors of these specimens are cited under the abbreviations B., V., Y., S.H. respectively, each followed by herb. K. S.

The plant specimens were collected from 22 aquatic stands (Table 1), in the years 1975-1994. It must be noticed that 14 of these stands were covered by recent floristic works (Koumpli-Sovantzi 1983, 1989, 1995, 1993, Koumpli-Sovantzi & Vallianatou 1994, Koumpli-Sovantzi & al. 1997, Sarika-Hatzinikolaou & al. 1997, Yannitsaros & Koumpli-Sovantzi 1991).

The nomenclature used here is similar to that found in Moore (1986) and the identifications were mainly made according to Wood & Imahori (1965).

Eight of the listed taxa (*Chara aspera* var. *aspera*, *C. braunii*, *C. canescens*, *C. globularis* var. *globularis*, *Lamprothamnium papulosum*, *Nitella gracilis*, *N. hyalina*, *Nitellopsis obtusa*) have been recently presented by the author (1992) in the 12th Congress of the Hellenic Society of Biological Sciences, Mytilini, April 1990. The present work does not include the large taxa *Chara vulgaris* and *C. hispida* as they present a great variability and will be published in next papers.

Table 1. Localities and their topographical data.

Localities	Nomos	latitude	longitude	altitude m	surface or length
Drakolimni Tymfis (lake)	Ioanninon	39° 59'	20° 46'	2050	8000 m ²
Loutsia Rompozi (pond)	"	39° 58'	20° 46'	1900	7000 m ²
Viros (lakedoline)	"	39° 24'	20° 52'	700	7000 m ²
Logarou (lagoon)	Artas	39° 03'	20° 55'	0	28 km ²
Trichonis (lake)	Aitolias & Akarnanias	38° 34'	21° 30'	18	96.5 km ²
Kirra (coastal pool)	Fokidos	38° 25'	22° 27'	0.3	20 m ²
Oropos (" ")	Attikis	38° 20'	23° 46'	0.3	150 m ²
Schinias (coastal marsh)	"	38° 09'	24° 01'	3	1.5 km ²
Alyki Aigiou (lagoon)	Achaïas	38° 15'	22° 06'	0	7000 m ²
Aroanios (river springs)	"	37° 56'	22° 14'	60	57 km
Stymfalia (lake)	Korinthias	37° 52'	22° 28'	590	5 km ²
Tragos (tributary)	Arkadias - Achaïas	37° 48'	22° 10'	480	15 km
Erasinos (river springs)	Argolidos	37° 35'	22° 41'	40	7 km
Takka (lake)	Arkadias	37° 26'	22° 23'	670	1.6 km ²
Kapi (pond)	Lesvou	39° 20'	26° 18'	350	3000 m ²
Mantamados (vernal pool)	"	39° 18'	26° 24'	20	20 m ²
Charamida (coastal marsh)	"	39° 01'	26° 32'	0	9000 m ²
Chora Androu (coastal pool)	Kykladon	37° 50'	34° 56'	0.3	20 m ²
Agios Georgios (lagoon)	"	37° 05'	25° 21'	0	0.5 km ²
Agios Prokopios (coastal pool)	"	37° 05'	25° 20'	0.7	300 m ²
Kournas (lake)	Chanion	35° 20'	24° 16'	100	0.6 km ²
Omalos (vernal pool)	"	34° 21'	23° 54'	1100	100 m ²

List of Charophytes

Chara aspera Deth. ex Willd. var. *aspera*, Lake of Kournas, S. E. of Georgioupolis, island of Kriti, 21 Sep 1985, *K. S.* 3090a; marsh of Schinias, S. E. of Kato Soulion, 26 May 1988, *K. S.* 3527; ibidem 20 Apr 1991, *K. S.* 4232; coastal marsh, Charamida, 5 km S. of Loutra, island of Lesvos, 22 Apr 1994, *B. herb. K. S.* 4750. Two old specimens, deposited in De Heldreich Herbarium Graecum normale and kept in ATHU, were also determined as *C. aspera* var. *aspera*. These are:

no. 995, *Chara crinita* Wallr. forma b. *pachysperma* Al. Br. "in aquis salsuginosis stagnantibus ad Phalerum, Attica Legimus foem. 16 Mai et marem 19 Mai 1886".

no. 996b, *Chara crinita* Wallr. forma *brachyphylla*, *dasyantha* Al. Br. "pr. Eleusin, Attica".

Our gatherings confirm *C. aspera* var. *aspera* presence in Greece reported by old records in literature (Groves & Bullock-Webster 1924, Olsen 1944, Corillion 1957, Wood & Imahori 1965).

Chara braunii Gmelin, vernal pool on a karstic depression, Omalos, Kriti, 17 Aug 1985, *Y. herb. K. S.* 4047.

It is mentioned as occurring in Greece by Groves & Bullock-Webster (1924) and Corillion (1957).

Chara canescens Desv. & Lois., marsh of Schinias, S. E. of Kato Soulion, 26 May 1988, *K. S.* 3528; coastal marsh, Charamida, 5 km S. of Loutra, island of Lesvos, 22 Apr 1994, *B. herb. K. S.* 4751.

It is recorded as *C. crinita* Wallr. from the Ionian island of Kerkyra (Stephanides 1940) and as *C. canescens* Loiseleur. from Faliro, Attiki (Corillion 1957), but this last record is erroneous; Corillion is referring to the specimen no. 995 De Heldreich Graecum normale which, as mentioned above, has been determined as *C. aspera* var. *aspera*. It must be noted that this specimen is correctly recorded by Wood & Imahori (1965) under the name *C. globularis* Thuill. var. *aspera* (Deth. ex Willd.) R. D. W. f. *aspera* which is a synonym of *C. aspera* var. *aspera*. *C. canescens* is also recorded for Greece in Groves & Bullock-Webster (1924) and Olsen (1944).

Chara globularis Thuill. var. *globularis*, Lake Takka, S. of Tripolis, 16 May 1988, *K. S.* 3501; Lakedoline Viros, 16 Sep 1989, *S. H. herb. K. S.* 4022; vernal pool, 9 km E. of Mantamados, island of Lesvos, 21 Oct 1991, *B. herb. K. S.* 4463; semi-artificial pond used for drinking by cattle on a grazing ground, 0.5 km of Kapi, island of Lesvos, 21 Oct 1991, *B. herb. K. S.* 4464.

In Greece previously reported as *C. fragilis* Desv. from the Ionian island of Kerkyra (Stephanides 1940), Makedonia, Ipiros, Central Greece (Stephanides 1948) and as *C. globularis* from the Edessa waterfalls (Anagnostidis 1968).

Lamprothamnium papulosum (Wallr.) J. Groves, coastal hyperhaline hydrobiotope, Agios Prokopios, S. W. of Chora, island of Naxos, 10 Jul 1984, *K. S.* 2076; lagoon, bay of Agios Georgios, S. of Chora, island of Naxos, 10 Jul 1984, *K. S.* 2095b; *ibidem*, 25 Jul 1991, *K. S.* 4433; Logarou lagoon, S. W. of Arta, 10 May 1992, *K. S.* 4491; alyki Aigiou, lagoon, near Aigion, 2 Nov 1993, *K. S.* 4686; coastal pool, near Chora, island of Andros, 4 Nov 1993, *K. S.* 4687.

The first record of this taxon from Greece was from Peloponnisos, viz. Meligou lagoon (Koussouris 1978). Some years later Koumpli-Sovantzi (1995) added two records from the island of Naxos (Agios Prokopios and Agios Georgios).

Nitella flexilis (L.) Agardh var. ***flexilis***, Tragos river, a tributary of Ladon river, between Pankration and Theoktiston, 14 Sep 1992, *K. S.* 4572; springs of Aroanios river, near Kleitoria, 21 Mar 1993, *V. herb. K. S.* 4690.

The species was found in Greece only recently. It was first reported as *N. opaca* Ag. from Lake Trichonis by Koussouris & Diapoulis (1982, 1985). *N. flexilis* has since been mentioned also from the artificial Lake Agra (Papastergiadou 1990) and also from the same locality but with a question mark (Papastergiadou & Babalonas 1993).

Nitella gracilis (Smith) Agardh, Loutsas Rompozi, pond, 24 Sep 1989, *K. S.* 4035; Drakolimni Tymfis, lake, 24 Sep 1989, *K. S.* 4043.

New for Greece. *Nitella gracilis* is a cosmopolitan species which is widespread in Europe, but only locally abundant.

Nitella hyalina (DC.) Agardh, Lake of Kournas, S. E. of Georgiopolis, island of Kriti, 22 Sep 1985, *K. S.* 3089.

Stagnant water near the old fish pond of Richios river is the only seen published locality from Greece (Papastergiadou 1990). The species was recorded from this locality also later, but with a question mark (Papastergiadou & Babalonas 1993).

Nitella mucronata (A. Braun) Miquel, Erasinos river springs, Kefalari Argous, 10 Oct 1991, *V. herb. K. S.* 4485.

Apparently new for Greece. The species is widely distributed, but not particularly common, in Europe.

Nitella tenuissima (Desv.) Kütz., N. C. part of Lake Trichonis, near Ntougri and Pantanassa, 4 Mar 1976, *K. S.* 1461a; *ibidem*, 2 Sep 1976, *K. S.* 1516a; N. W. part of Lake Trichonis, near Kainourgion, depth = 5.5 m, 6. Nov 1993, *K. S.* 4691.

It is reported for Greece in Groves & Bullock-Webster (1920), Corillion (1957), Damska (1964), Corillion & Guerlesquin (1972).

Nitellopsis obtusa (Desv.) J. Groves, S. C. part of Lake Trichonis, near Agia Triada (Trichonion), 17 Jun 1975, *K. S.* 1387; *ibidem*, 7 Oct 1977, *K. S.* 1624; N. C. part of Lake Trichonis, near Ntougri and Pantanassa, 2 Sep 1976, *K. S.* 1521; *ibidem*, 7 Oct 1977, *K. S.* 1635; Lake Stymfalia, 7 Aug 1986, *K. S.* 3275.

Our collections confirm the records from Lake Trichonis by Koussouris & Diapoulis (1982, 1985) and add a second locality to the species distribution in Greece.

Tolypella nidifica (O. Müll.) Leonh. var. *glomerata* (Desv.) R. D. Wood, coastal vernal pool near a rivulet, c. 15 m from the sea, near Kirra, 5 May 1991, *K. S.* 4343; coastal pool, near Oropos, 27 Apr 1992, *K. S.* 4489. An old specimen, deposited in De Heldreich Herbarium Graecum normale and kept in ATHU, was also determined as *T. nidifica* var. *glomerata*. This is : no. 998, *Tolypella prolifera* Ziz forma typica, "18 April 1886, in aquis salsuginosis stagnantibus, ad radices m. Kerata, prope Eleusin, Attica".

These collections confirm the presence of this taxon in Greece. It must be noticed that Heldreich's specimen is correctly listed in Corillion (1957) under the species *T. hispanica* Nordstedt which is a synonym of *T. nidifica* var. *glomerata*.

Discussion

The present study, based on material collected from 22 aquatic stands, lists 12 taxa of the genera *Chara* (4), *Lamprothamnium* (1), *Nitella* (5), *Nitellopsis* (1), *Tolypella* (1) and contributes to the knowledge of the Greek charophyte flora.

From this work we can underline the following points:

1. Two species (*Nitella gracilis* and *N. mucronata*) are recorded for the first time from Greece; all the rest have few (1-4) previous records from Greece.
2. The presence of 5 taxa (*Chara aspera* var. *aspera*, *C. braunii*, *C. canescens*, *C. globularis* var. *globularis*, *Tolypella nidifica* var. *glomerata*) in Greece, only known by old records, is confirmed.
3. Eight taxa (*Chara braunii*, *C. globularis* var. *globularis*, *Nitellopsis obtusa*, *Nitella gracilis*, *N. hyalina*, *N. tenuissima*, *N. flexilis* var. *flexilis*, *N. mucronata*) are found growing in fresh water ecosystems; the last two occurring in running and the rest in stagnant waters.
4. Four taxa (*Chara aspera* var. *aspera*, *C. canescens*, *Tolypella nidifica* var. *glomerata* and *Lamprothamnium papulosum*) are found growing in estuarine ecosystems (coastal marshes, pools or lagoons).
5. Two species were found occurring in aquatic stands situated at high altitudes. These are: *Chara braunii* (alt. 1100 m) and *Nitella gracilis* (alt. 1900 m and 2050 m).

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