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ZANNICHELLIA MAJOR BOENN. EX RCHB. – A FIRST RECORD OF A NON-ENDEMIC SPECIES OF *ZANNICHELLIA* L. (FAM. ZANNICHELLIACEAE DUM.) FROM THE MALTESE ISLANDS

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ABSTRACT

The first record of *Zannichellia major* Boenn. ex Rchb. is reported from the Maltese islands. Detailed morphological comparison of this population with the endemic and frequent *Zannichellia melitensis* Brullo, Giusso & Lanfranco and other monoecious Zannichellia species is given. Distribution of this species is discussed.

Keywords: *Zannichellia major*, *Zannichellia palustis*, *Zannichellia melitensis*, Maltese islands, Wetlands, Aquatic flora, Mediterranean region

INTRODUCTION

Zannichellia L. - the horned pondweed - consists of aquatic species of sweet to brackish waters widely distributed in most of the world mainly in the Northern hemisphere and the Mediterranean region. (Talavera *et al*., 1986). A rather frequent species of *Zannichellia* that occurs in small rock pools, temporary filled by rainwater have been known from Malta since the 19th century. Initially this species was recorded by Gulia (1874), Duthie (1975), Sommier & Caruana Gatto (1915), Borg (1927) and Haslam *et al*. (1977) as *Z. palustris* L., *Z. dentata* Willd. and *Z. pedunculata* Reichenb (syn. *Z. palustris* var. *pedicellata* Fries). Sommier & Caruana Gatto (1915) had already highlighted that the Maltese specimens vary from the Linnean description of *Z. palustris* L. and they postulated that at least the populations from Comino with filiform leaves and slightly smaller fruit should correspond to a different form. Brullo *et al*. (2001), have solved this by describing it as a new *Zannichellia* species endemic for the Maltese islands, that is, *Z. melitensis* Brullo, Giusso & Lanfranco. The old records hence refer to this rock-pool species *Z. melitensis*.

***Zannichellia major* Boenninghausen ex Reichenbach from Malta.**

On the 28th of Feb 2008, the author found a species of *Zannichellia* that differed in habit and habitat from that of *Z. melitensis*. It had a subaquatic shrubby growth residing in a deep pond located along the Wied il-Fiddien valley, limits of Rabat in mainland Malta (Figure 1). On studying its morphological features the species was identified as *Z. major* [syn. *Z. dentata* Willd. subsp. *major* (Boenn. ex. Reichenb.) Steinheil]. The complete morphological analysis is given in table 1 which gives morphological characters of the monoecious *Zannichellia* species (*Z. palustris, Z. pedunculata and Z. major*) adapted from Talavera's *et al.* (1986), *Z. melitensis* adapted from Brullo *et al.* (2001) and characters from the population at Fiddien. Apart from its bulky habit, the most important features to distinguish *Z. major* from *Z. melitensis* are its wider leaves (1-2mm) and its slightly larger fruit (4.2-4.7mm).

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Although as shown in table 1, many characters match perfectly with *Z. major*, the specimens at Fiddien have remarkable longer stamens and on average, slightly shorter fruiting bodies than those given in Talavera *et al.* (1986), which however should be considered within tolerable variation of the species.

The pond that *Z. major* was found in had a depth of 1 to 1.25m in April and formed part of the water course where it was visibly flowing during (Oct)Nov-May(Jun), and to a much less extent (almost appearing stagnant) during the Summer months. Local farmers confirmed that the pond is constantly filled with water all year round, even during the summer months. On the 12th September 2009, the water level of the pond was reduced to a depth of just 40cm. *Zannichellia major* was present during that site visit.

The fact that this pond bears water all year round favours the perennial life-cycle of *Z. major* (Talavera *et al.,* 1986). In winter, the submerged population sub-dominated the bottom of the pond (Figure 1) and later in Spring, it shared the water surface with *Lemna minor* L. Due to the considerable depth of water in the pond, many hydrophytes were restricted to the sides where the water was more shallow. Accompanying plants were *Alisma plantago-aquatica* L., *Scirpoides holoschoenus* (L.) Soják, *Arundo donax* L., and *Veronica anagallis-aquatica* L. In late spring the water was moderately polluted by eutrophication.

Z. major is found principally in the North-East and Central-North part of Europe, where it is specifically reported from Germany (Reese 1961), Romania, Poland (Talavera *et al*., 1986), Sweden, Finland (Talavera *et al.*, 1986; GBIF), Denmark (Personal communication Yo Ito, June 2009) and Ukraine (RAMSAR). It is also recorded from South East part of Europe, hence in Istanbul, Turkey (Talavera *et al.*, 1986). *Z. major* is given from Italy by Pignatti (1982) and Conti *et al.* (2005), as a synonym of *Zannichellia palustris L. ssp. polycarpa* (Nolte) Reichter. Pignatti (1982) distinguishes it from the other Zannichellia species reported in Italy by having leaves 1-2mm wide and 2 to 4 fruit which their body is 2 times as long as the style - characters which match perfectly with specimens of the Maltese population.

Talavera *et al.* (1986) consider *Z. palustris* ssp. polycarpa different from *Z. major,* describe it to have leaves up to 1mm wide and consider it as a synonym of *Z. palustris* s.str. According to their identification keys the species of Zannichellia with leaves being 1-2mm wide from Italy would be classified as *Z. major* not *Z. palustris* ssp. *polycarpa* (sensu Pignatti). Further pan-European studies are required to draw any definite conclusions about the distribution and origin of *Z. major* in South Europe and the Maltese station gives further data to science for such research.

Table 1: Characters of the monoecious species of *Zannichellia* and specimens from Fiddien, Malta. [(1)] Adapted from Talavera *et al.* (1986); [(2)] Adapted from Brullo *et al.* (2001); (n/a = data not available)

Character	*Z. palustris*[(1)]	*Z. pedunculata*[(1)]	*Z. melitensis*[(2)]	*Z. major*[(1)]	Fiddien specimens
Cariology (2n=)	24,28,34,36	36	n/a	32	n/a
Life form	Annual	Annual	Annual	Perennial	Perennial
Habit	n/a	n/a	Delicate, slender, floating plant.	n/a	Shrub-like, robust multibranched plant (Fig 1)
Plant Length	n/a	n/a	6-15cm	n/a	150cm
Internode distance	long	long	long	long (up to 2cm)	long (up to 3.5cm)
Leaf width (mm)	1.0	0.8	0.25-0.30	1-2	1-2 (Fig 2a)
Leaf apex	acute	acute	obtuse	acute	acute (Fig 2b)
Length of stamen filament (mm)	0.7-10	1.5-4 (7)	5-10	2-10	4-12 (16)
Legth of stamen anther (mm)	0.3-1.7	0.3-0.8	1.3-1.4	1.2-1.8	1.6-2.0 (2.2)
No. loculi of the anther	2-4	2	4	2	2
Flower sexuality in the nodes	monoecious	monoecious	monoecious	monoecious	monoecious
No. carpels of female flower	(2) 4 (8)	2-4 (6)	3-4(5)	(2) 3-5	3-4(5) (Fig 2c)
Stigma shape	infundibular, lanceolate	linguiform, lanceolate	linguiform, lanceolate	linguiform, lanceolate	linguiform, lanceolate
Stigma surface	alveolate	alveolate	alveolate	alveolate	alveolate
Stigma margin	irregularly dentate	entire	entire	entire	entire
Fruit length excl. podocarp (mm)	1.7-4.2	3.1-4.7	4.2-4.7	4.7-6.2	4.7-5.3 (Fig 2d)
Achene podocarp (mm)	0.2-0.9	0.8-2.0	0-0.2	n/a	0.2-0.9 (Fig 2d)
Achene corpus (mm)	1.6-2.8	1.8-2.7	3-3.2	3.2-4.5	3.2-3.6 (Fig 2d)
Achene beak (mm)	0.1-1.4	1.3-2.0	1.2-1.5	1.5-1.7	1.5-1.7 (Fig 2d)
Habitat	lakes or streams with fresh or brackish waters	lakes or streams with fresh or brackish waters	temporary small pools on calcareous rocks with fresh waters	salt-marshes with sandy soils	Water course, nitrophilous water in a deep pond with silty soil
Fruiting period in Malta	n/a - Species not recorded from Malta	n/a - Species not recorded from Malta	Jan-Apr	Apr-Jun	Apr-Jun

FIGURES:

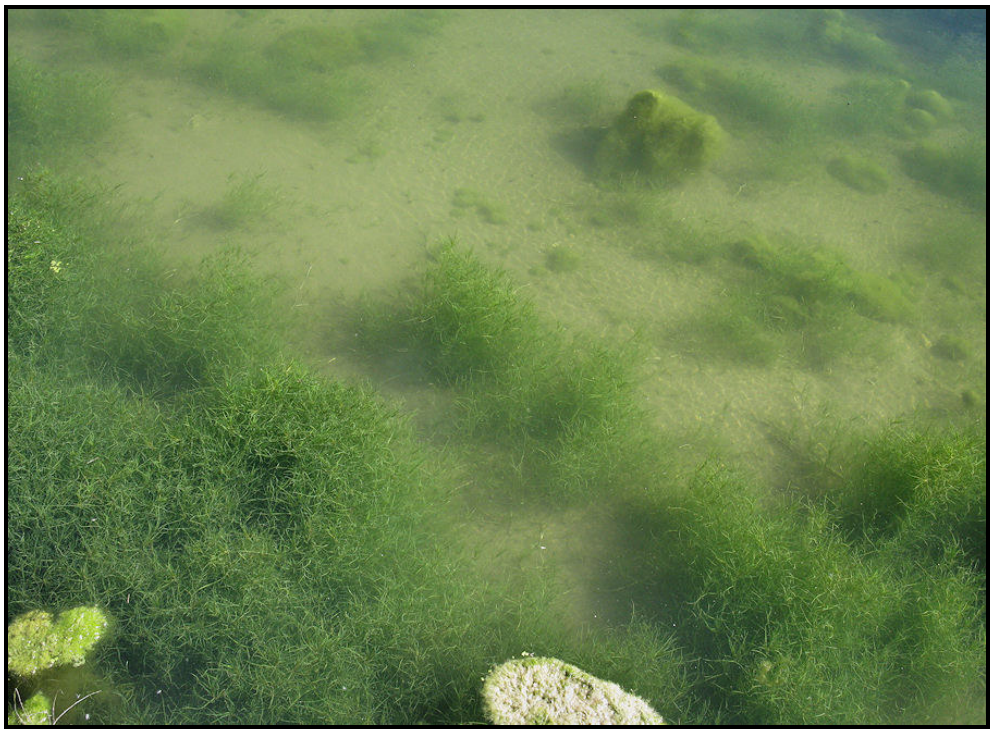

Figure 1: Habit and habitat of *Zannichellia* major submerged in pond at Fiddien, Malta (28 Feb 2008.)

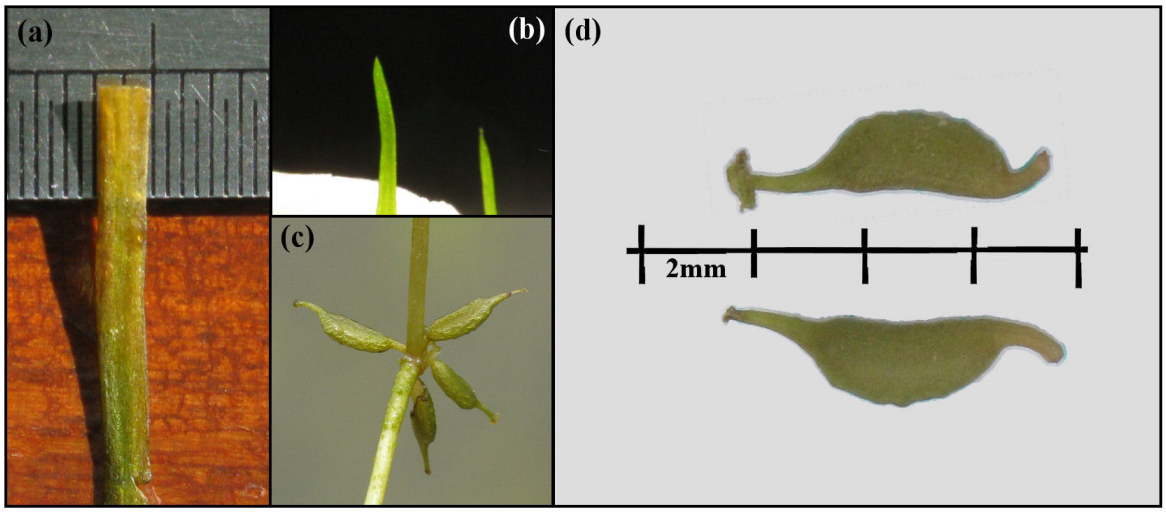

Figure 2: Distinctive morphological characters of *Zannichellia major*

Figure 3: Upper part of *Zannichellia major* showing its wide leaves

All photographs in this article were taken by the author himself.

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REFERENCES:

i) References from published literature

Borg, J. (1927). *Descriptive flora of the Maltese Islands.* Malta: Government Printing Office, 846pp.

Brullo S., Giusso del Galdo G. & Lanfranco E. (2001). *A new species of Zannichellia L.(Zannichelliaceae)from Malta.* FI. Medit. 1 1 : 379-384. 2001. ISSN 1120-4052.

Conti F., Abbate G., Alessandrini A. & Blasi C. (eds.) (2005). *An Annotated Checklist of the Italian Vascular Flora*, Palombi Editori, Roma Italy.

Duthie J. F. (1875). *On the bolany of the Maltese islands in 1874* - Parte 1\ The Journal of Botany British and foreign 1874, p. 321-326. Parte 5" Ibid. 1875, p. 36-42. London 1874 e 1875.

Gulia G. (1874). *Maltese Botany*. Il Barth, vol. I, 1871-74.

Haslam, S.M., Sell, P.D. & Wolseley, P.A. (1977). *A Flora of the Maltese Islands*. Malta: Malta University Press, lxxi + 560pp.

Pignatti, S. (1982)**.** *Flora d'Italia:*. Bologna: Edagricole, 732pp.

Reese G. (1961) in A. Love & D. Love (eds.) Chromosome numbers of Central and North European plants species. *Opera Bot. (Lund)* 5: 1-581.

Sommier, S. & Caruana Gatto, A. (1915). *Flora Melitensis Nova*. Firenze: Stabilimento Pellas, viii + 502pp.

Talavera, S., García Murillo, P. & Smit, H. (1986). *Sobre el genero Zannichellia L. (Zannichelliaceae).* – Lagascalia 14:241-271.

ii) References from Online Sources

GBIF, Global Biodiversity Information Facility website - Last accessed 18 Jun 2009. http://data.gbif.org/species/13759878

RAMSAR – The Ramsar Convention on Wetlands - Last accessed 15 Jun 2009. http://www.ramsar.org/wn/w.n.ukraine_eleven.htm