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REDISCOVERY OF *ASPLENIUM SAGITTATUM* AND *A. MARINUM* (PTERIDOPHYTA: ASPLENIACEAE) IN THE MALTESE ISLANDS (CENTRAL MEDITERRANEAN)

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ABSTRACT

The rediscovery of *Asplenium sagittatum* and *A. marinum* on the islands of Malta and Gozo is reported reconfirming the presence of both species 81 years after the last historical records. The worldwide distribution is reported and historical records from the Maltese islands are cited. Habitat requirements in the Maltese islands are discussed. A short overview of Maltese Pteridopsida is given.

Keywords: *Asplenium sagittatum*; *A. marinum*; Pteridophyta; Maltese islands; Flora

INTRODUCTION

Nine presumably native species of Pteridopsida have been recorded from the Maltese islands. Of those only *Adiantum capillus-veneris* L. is fairly common in moist shady places in wells, caves and valleys. *Anogramma leptophylla* (L.) Link is an infrequent species of shady rocks and little caves, often found growing in patches of moss or green algae. *Asplenium ceterach* L. is a very rare species of old rubble walls and rocks in valleys. Five other species: (*Pteridium aquilinum* (L.) Kuhn; *Salvinia natans* (L.) All.; *Asplenium trichomanes* L.; *A. scolopendrium* L.; *A. sagittatum* (DC.) A. J. Bange and *A. marinum* L.) had been recorded from different locations in Malta and Gozo by Gulia (1909), by Sommer & Caruana-Gatto (1915) and by Borg (1927) but their presence could not be reconfirmed during the second part of the 20th century. *A. trichomanes* was recently rediscovered in Gozo (Tabone 2007). Recently several populations of *P. aquilinum* were found in Malta (Vesselinov Lalov & Lanfranco 2008). The single record of *Salvinia natans* published by Gulia fil. (1909) is based on a note from his father and is not substantiated. The records of *Asplenium scolopendrium* by Gulia (1909) and Borg (1927) which were not substantiated resulted maybe from confusion with *A. sagittatum* (Sommer & Caruana Gatto 1915). *A. sagittatum* and *A. marinum* were recorded for the last time by Borg (1927) in several locations both in Malta and Gozo but were assumed to be extinct by more recent authors (Lanfranco 1989; Tabone 2007).

During April 2008 the authors of the present paper carried out numerous surveys of areas with moist, shady rocks and caves in search for rare Pteridophyta. As a result of those surveys the presumably extinct *A. sagittatum* and *A. marinum* were found at several sites both in Malta and in Gozo and a population of the very rare *A. trichomanes* was found at Mistra Rocks in Gozo where the species had not been recorded before.

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Asplenium sagittatum

A. sagittatum is a species of the Mediterranean (Tutin *et al.* 1993) growing in Spain, including the Balearic islands, France, including Corse, Italy, including Sardinia and Sicily, Malta, Croatia, Greece, Lebanon, Syria, Israel, Jordan, Lybia, Algeria, Tunisia and Morocco (Greuter *et al.* 1984). The species is infrequent to rare in Italy, Sardinia, Sicily and the Balearic islands and very rare in France, Spain and the Balkans. Its typical habitat consists of moist, shady, calcereous rocks (Tutin *et al.* 1993).

In the Maltese Islands Duthie (1872) records the species under the name of *Scolopendrium hemionitis* Sin. from coastal rocks near Nadur (probably Mistra rocks = Rdum il-Kbir). Caruana Gatto (1893) records it under the same name from Mellieha in Malta and Rdum il-Kbir in Gozo. Gulia (1909) records it under the same name from Dwejra, the valleys of Nadur, Xlendi valley and Ras il Kala (Qala) in Gozo and Mellieha in Malta while he records the similar *Scolopendrium vulgare* (*Asplenium scolopendrium*) from moist rocks at Wied Babu and Wied Ghomor in Malta. Sommier & Caruana Gatto (1915) record *S. hemionitis* from Mellieha, Rdum il-Kbir, Xlendi, Nadur, Dweira and Qala.

Borg (1927) records it from Mellieha, Ghajn Tuffieha and from many wells in Mosta, Lija and Birkirkara in Malta and from Rdum il-Kbir, Ghajnsliem, Qala, Dwejra and Xlendi in Gozo. He records *S. vulgare* from Wied Babu, Wied Ghomor and Wied il-Ghasel in Malta (*ibidem*). According to Sommier & Caruana-Gatto (1915) the records of *S. vulgare* from Malta might be the result from confusion with *S. hemionitis*. According to Lanfranco (1989) and Tabone (2007) the records of *A. scolopendrium* (*S. vulgare*) from the Maltese islands are unsubstantiated. No recent records of *A. sagittatum* are available from the Maltese islands. Haslam *et al.* (1977) cite only old records. Lanfranco (1989) states that the species might be already extinct. Tabone (2007) regards it as extinct.

On the 3th April 2008 two of us (SVL & JS) found three small populations of *A. sagittatum* consisting of 20 specimens in dark, moist caves under large boulders in the eastern part of the Mistra Rocks scree (Rdum il-Kbir) in northeastern Gozo. In addition three specimens of the very rare *A. trichomanes* were found growing near one of the *A. sagittatum* populations. On the 6th April five specimens were found in two caves of the nearby scree Rdum San Filip by SVL. On the 7th April a population with 22 individuals was found by the same author on a shady little cliff at the scree Rdum il-Qawwi on the Marfa Peninsula in western Malta while two solitary specimens were found in nearby caves.

On the 9th April the same author found a population consisting of 25 specimens in a cave in the western part of Mistra Rocks near San Blas. On the 27th April AS & SVL found single specimens in 4 different locations in the eastern and central parts of Mistra Rocks. The species was not found during surveys of areas with moist rocks and caves at Dwejra, Xlendi, Qala, Wied Babu, Wied Ghomor, Ghajn Tuffieha or Birkirkara from where it had been recorded in older publications.

While Borg (1927) records *A. sagittatum* from moist and shaded rocks, wells and caves in urban areas, valleys and screes all recent sightings have been from coastal screes where the species grows in shady (light to) dark (to very dark) places, mainly in caves but sometimes in moist, north facing cliffs or in small holes in the coralline limestone. In most locations no other vascular plant species were found in the vicinity but in some cases *A. leptophylla*, *A. trichomanes*, *Parietaria lusitanica* L. and *Tamus communis* L. as well as some moss and green algae grew in the same caves.



Figure 1. *Asplenium sagittatum*, Rdum il-Kbir, Gozo

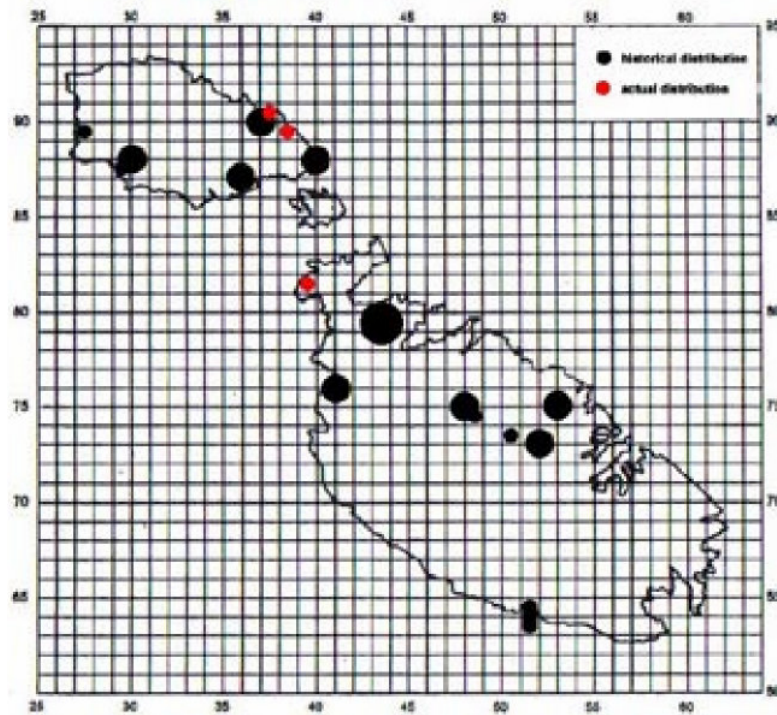


Figure 2. Distribution of *Asplenium sagittatum* in the Maltese islands (UTM, zone 33S, 1 km x 1 km grid).

Asplenium marinum

A. marinum is a species of Western Europe, extending eastwards very locally to southern Italy (Tutin *et al.* 1993). Its range includes Portugal, Spain including the Balearic islands, France including Corse, Malta, Algeria, Morocco, Italy, including Sicily, Sardinia (Greuter *et al.* 1984) and Pantelleria, the Azores, Madeira, the British isles and western Norway. While the species is relatively common along the coasts of the British isles and of Brittany it is very rare in Italy. Its typical habitat is on rocks and walls exposed to sea-spray (Tutin *et al.* 1993).

In the Maltese islands the plant was first recorded under the name *Asplenium lucidum* by Boccone (1697) who states that it was found in Gozo by Signor Narduccio Murmuro. Duthie (1875) records it from rocks on the coast near Nadur (probably Mistra rocks = Rđum il-Kbir). It was recorded from Xlendi and Rđum il-Kbir in Gozo by Caruana Gatto (1893). Gulia (1909) records it from Xlendi, Rđum il-Kbir and Dwejra. Sommer & Caruana Gatto (1915) record it from Wied il-Ghasel and Wied iz-Zurrieq in Malta and Xlendi, Rđum il-Kbir, Mgarr ix-Xini and Dwejra in Gozo. Borg (1927) records it from Wied il-Ghasel, Wied iz-Zurrieq and Mellieha in Malta and from Xlendi, Rđum il-Kbir, Mgarr ix-Xini and Dwejra in Gozo.

As in the case of *A. sagittatum* no recent records of *A. marinum* are available from the Maltese islands. Lanfranco (1969) mentions that the plant is rare but he did not encounter it in the wild (Edwin Lanfranco personal information). Haslam *et al.* (1977) cites only old records. Lanfranco (1989) states that the species was not recorded for at least 50 years while Tabone (2007) regards it as extinct.

On the 18th April one of the authors (SVL) found a population of *A. marinum* consisting of 8 mature individuals and numerous immature specimens in a deep rock crevice in the area of Ras il-Griebeg near Mellieha in northern Malta. On the 27th April AS & SVL found a single mature specimen of *A. marinum* in a rock crevice in the western part of Mistra Rocks in Gozo. The species could not be found during surveys of areas with similar habitat at Dwejra, Xlendi, Wied il-Ghasel or Wied Zurrieq from where it had been recorded in older publications.



Figure 3. *Asplenium marinum*, Ras il-Griebeg, Malta.

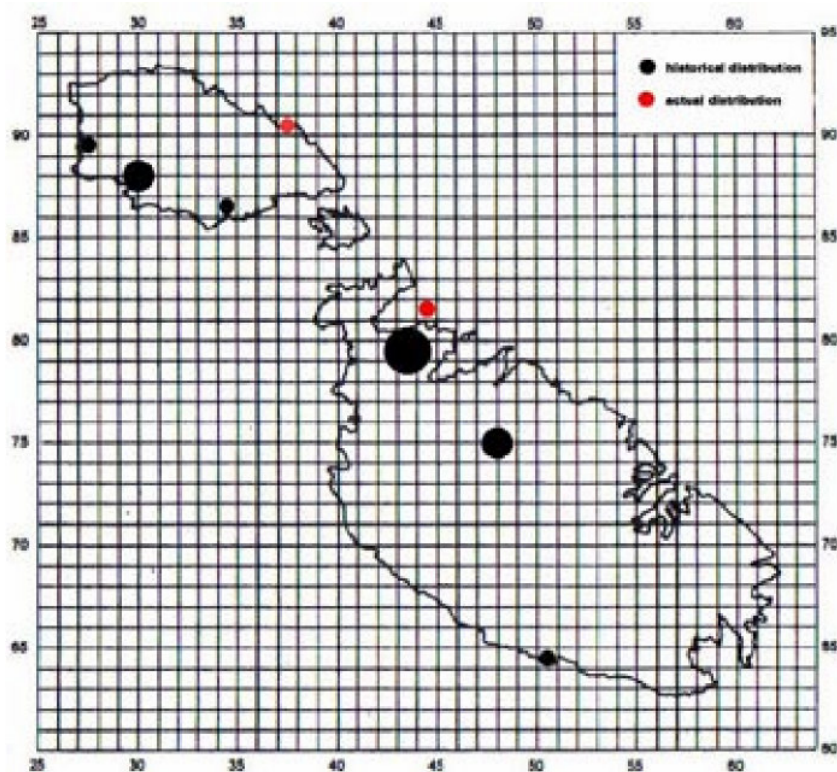


Figure 4. Distribution of *Asplenium marinum* in the Maltese Islands (UTM, zone 33S, 1 km x 1 km grid).

Although the data from only two locations seems insufficient to determine the habitat requirements of the species in the Maltese islands both recent sightings are from shady, moist, light to very dark crevices in coralline limestone screes less than 30 m from the sea. In both cases no other vascular plant species were found nearby but some moss, lichen and green algae grew in the vicinity.

DISCUSSION

While both species were recorded from various locations in Malta and Gozo before 1927 no records exist from the time between 1927 and 2008. Although fluctuations in population size due to climatic or other factors cannot be excluded we believe that the existing populations have been overlooked during the last 81 years. All areas where both species were recorded recently consist of giant screes with boulders up to 50 m in size and are almost inaccessible without experience in rock-climbing. All populations are very small and localized. The plants usually grow in dark caves which are rarely surveyed by botanists. Furthermore at a casual glance mature specimens of *A. sagittatum* can be easily confused with *Arum italicum* Mill. or *Arisarum vulgare* (Targ.) Toz., which occur in the same places, while very young specimens of both species resemble young specimens of *Adiantum capillus-veneris*. We assume that both species can be found in other screes and maybe even in valleys or wells in the Maltese islands.

While pollution, depletion of the aquifer, climate change or even harvesting by plant collectors might pose some threat to those populations the biggest possible danger arises from destruction of the habitat. To protect one of the most beautiful and spectacular landscapes in the Maltese islands we strongly recommend that the unique screes in the Mistra rocks (Rdum il-Kbir) area, together with the surrounding clay slopes, valleys, coastal cliffs and garrigue communities are declared a Natura 2000 site.



Figure 5. Rđum il-Kbir, typical habitat of *Asplenium sagittatum* and *A.*

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