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REDISCOVERY OF *EROPHILA VERNA* (L.) CHEVALLIER (BRASSICACEAE), *PTERIDIUM AQUILINUM* (L.) KUHN (DENNSTAEDTIACEAE), AND *CRATAEGUS AZAROLUS* L. (ROSACEAE) ON THE ISLAND OF MALTA (CENTRAL MEDITERRANEAN).

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ABSTRACT

The rediscovery of *Erophila verna, Crataegus azarolus* and *Pteridium aquilinum* on the island of Malta is reported reconfirming the presence of these species in the Maltese islands after they had not been seen for many years.

Keywords: *Erophila verna, Pteridium aquilinum, Crataegus azarolus,* Maltese Islands, Flora

Erophila verna

Erophila verna (L.) Chevallier, the common Nail-Wort, is found throughout Europe except the arctic, northwards to 66° in Norway (Tutin *et al.* 1964) as well as in most warm and temperate areas of Asia and in the entire Mediterranean. The species is naturalized in North America. It grows on disturbed ground, in sparsely vegetated grasslands, in fields, along paths and on walls, usually in dry, loose, humose, quite nitrogen rich soils, on clay, sand or gravel in association with other small annuals. The aggregate *E. verna* has been divided into numerous species, subspecies, races and forms by various authors. Since self-pollination is normal in *E. verna* those varieties are quite stable and some occur throughout the entire range of the species (Hegi 1963). The plant was first described as *Draba verna* by Linnaeus, than moved into a separate genus *Erophila* by Chevallier. Recent molecular studies (Koch & Al-Shehbaz 2002) suggest that the genus *Erophila* has to be transferred back into *Draba*.

In the Maltese islands *Erophila verna* has been historically recorded from Malta, Gozo and Cominotto. In Gozo Gulia (1875) records it as '*Draba verna* Lin. = *Erophila vulgaris* D.C.' from limestone hills without giving any specific location. The record of *Erophila verna* var. *Krockeri* from ledges on the cliffs of Cominotto (Duthie 1874) results probably from a confusion with *Hutchinsia procumbens* L. (Sommier & Caruana Gatto 1915). On the island of Malta the species is recorded from Hagar Qim, Wied Babu and Wied Dalam by Duthie (1874). Sommier & Caruana Gatto (1915) describe it under the name *Draba verna* L. as 'non comune' and record it from Il Hauli, Imghriet, Wied Babu, Hagar Qim and Wied Dalam. In the Argotti Herbarium some specimens collected from Hagar Qim in February 1917 are preserved. Borg (1927) records it under the name of *Draba verna* L. from Casal Luca, Nghieret, near Addolorata Cemetery, Wied Babu, Hagar Qim and Wied Dalam.

However, no records of the species exist from the last 79 years. Lanfranco, G. (1969) describes *Erophila verna* as growing in E. and S.E. Malta but he never saw the species himself (G. Lanfranco, personal communication). It is included in a list of 'Plants which have not been recorded for a considerable time and may be presumed to be

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extinct or on the verge of extinction' (Lanfranco, E. 1976). Haslam *et al.* (1977) cite only the old records for the species. Lanfranco, E. (1989) lists it as not been recorded for several decades.

Figure 1. Stunted specimen of *Erophila verna* with old Maltese 1 c. coin for scale. Wied ta'Kandia

In February 2006 a population of roughly 80 individuals of *Erophila verna* was encountered by one of the authors (SVL) at the bottom of Wied ta' Kandia E of Zebbug (Malta). The plants grew among flat Globigerina rocks in pockets of soil covered with moss. Some other accompanying species were *Oxalis pes-caprae* L., *Hypochoeris achyrophorus* L., *Asphodelus aestivus* Brotero, *Sedum caespitosum* (Cavanilles) DC,*Teucrium flavum* L., *Asparagus aphyllus* L., *Hyparrhenia hirta* (L.) Stapf, *Teucrium fruticans* L., *Pistacia lentiscus* L., *Urginea pancration* (Steinheil) Philippe, *Briza maxima* L., *Asperula aristata* L. f. ssp. *scabra* (J.&C. Presl.) Nyman, *Lonicera implexa* Aiton, *Phagnalon graecum* Boissier & Heldreich ssp. *ginzbergeri* Pignatti, *Lagurus ovatus* L., *Centaurium erythrea* Rafn., *Scarbiosa maritima* L. and *Rostraria cristata* (L.) Tzvelev. Throughout the area wild rabbit (*Oryctolagus cuniculus* L.) droppings and traces of burrowing were observed. Although some individuals of *Erophila verna* were destroyed by this disturbance the species seems to occur in larger numbers on the disturbed ground created by the rabbits.

In March 2007 only 12 specimens were encountered in the same location. While most *Erophila* individuals measured between 8 and 10 cm in 2006 the maximum size of the plants in 2007 was 4 cm due to the extremely dry and warm winter.

The new population is well inside the historically recorded range of *E. verna* in Malta. Because of the remote location a recent reintroduction of the species can be excluded, it seems more probable that the plants have been overlooked due to their small size and inconspicuous flowers. A survey of the locations where *E. verna* has been previously recorded might reveal that some of those populations are still in existence.

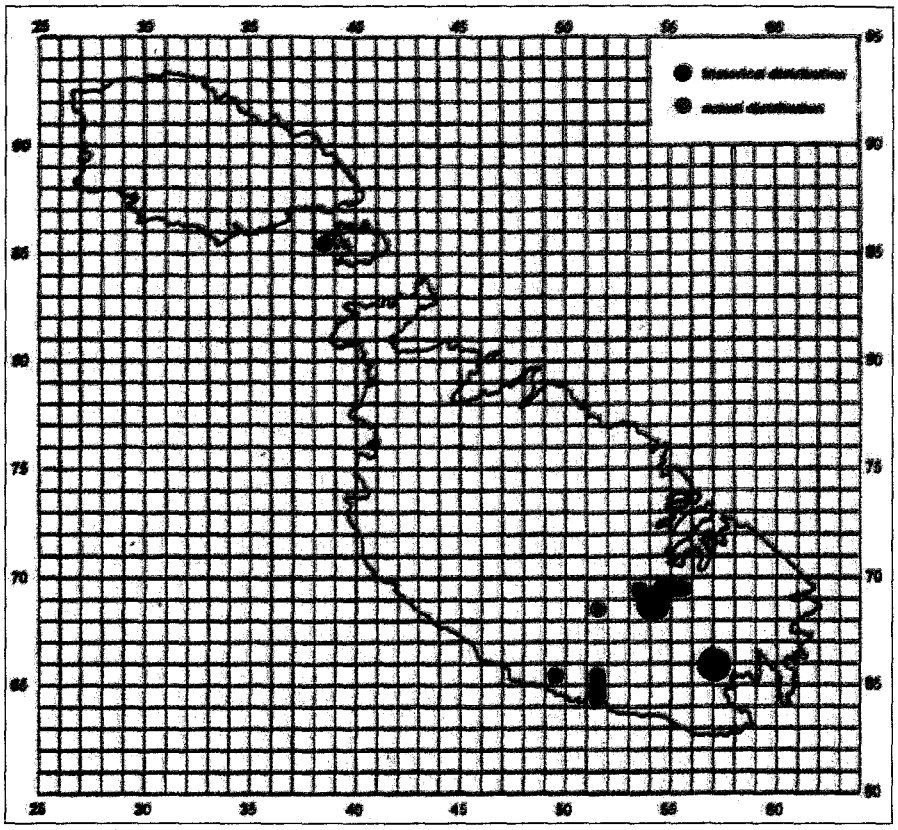

Figure 2. Distribution of *Erophila verna* in the Maltese islands (UTM, zone 33S, 1 km x 1 km grid)

Pteridium aquilinum

Pteridium aquilinum (L.) Kuhn, the bracken, is a cosmopolitan species (Tutin *et al.* 1964) which is absent only from temperate South America and from polar, desert and steppe regions (Fiori 1969). In southern Europe it grows mainly in mountain areas (Tutin *et al.* 1964), usually on humose, often acidic clayey or sandy soils poor in lime (Sebald *et al.* 1993). While the species is present in shady and protected places in forests of Sicily (Tornabene 1887) it seems to be absent from the Pelagic islands and Pantelleria (Sommier 1908). Over 100 varieties of *P. aquilinum* have been described worldwide but according to Dostàl in Sebald *et al.* (1993) only the ssp. *aquilinum* (L.) Kuhn occurs in Europe.

In the Maltese islands *P. aquilinum* is mentioned for the first time from San Blas in Gozo by Gulia (1874). Caruana Gatto (1893) and Gulia fil. (1909) record it from Rdum il-Kbir in Gozo. Sommier & Caruana-Gatto (1915) record the species from Rdum il-Kbir and San Blas and mention that it is being persecuted by the farmers because it tends to invade and take over their fields. A certain confusion arises from the use of the name "Rdum il-Kbir" (the big scree) since in different maps this toponym is being used both for the clay slopes west of San Blas and for the clay slopes and boulder screes east of San Blas. The last published records for those locations are by Borg (1927) but around 1970 old farmers in the area still remembered the plant (EL).

In Malta *P. auilinum* appeared in a private garden at Sliema in 1976 while in 1990, also at Sliema, it appeared on a demolition site where there is now the Plaza shopping centre (EL). In both cases it is highly unlikely that those populations resulted from native stock but rather through accidental introduction. During the last decade it also appeared in a glasshouse at the Government Experimental Farm at Ghamieri (Joseph Borg in personal communication with Darrin T. Stevens).

In February 2006 the species was found by SVL in a private orchard at Gnien il-Far in the Buskett valley. This population consisted of a dense leaf cluster less than 2 m^2 in size and of several singular leaves in the vicinity.

Timothy Tabone, who found the population in 2008 and interviewed the owner of the land, reported that the plants grew from the gizzard contents of a Turtle Dove (*Streptopelia turtur* L.).

Figure 3. *Pteridium aquilinum* Wied il-Luq

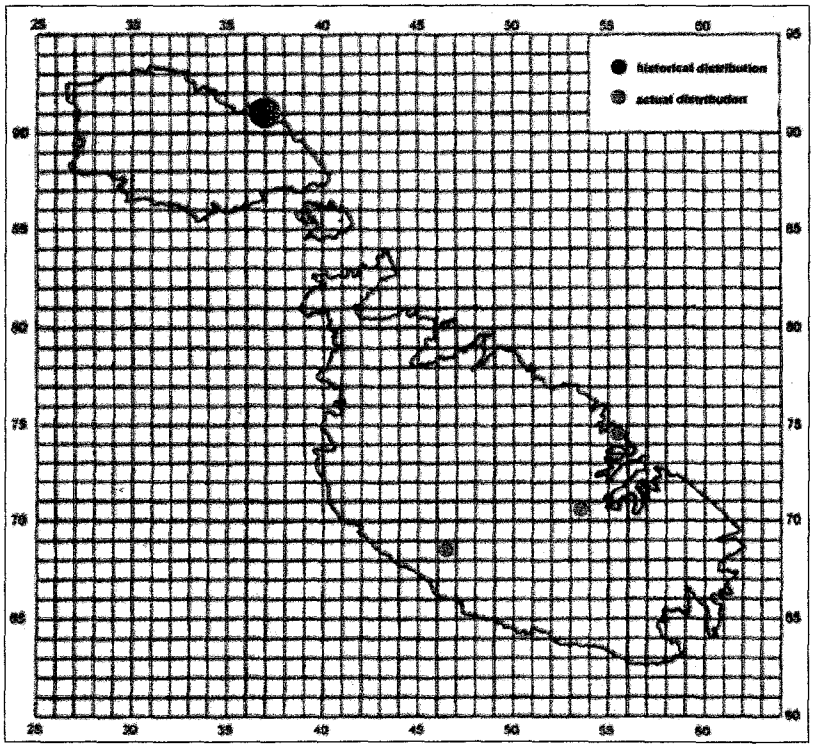

Figure 4. Distribution of *Pteridium aquilinum* in the Maltese islands (UTM, zone 33S, 1 km x 1 km grid)

Despite several surveys by both authors the *P. aquilinum* populations at Rdum il-Kbir and San Blas could not be reconfirmed and it can be assumed that the plant has become extinct in Gozo. The populations in Sliema where the plant was only a casual have disappeared, too. Thus the only remaining population in the Maltese islands seems to be the small clump near Buskett. However, considering the repeated sightings during the last decades, new cases of introduction of the species as well as the discovery of already established populations in other parts of the country are possible.

A voucher specimen of *Pteridium aquilinum* from the population at Wied il-Luq was deposited in the private herbarium of SVL.

Crataegus azarolus

Crataegus azarolus L., the azarole or Crete hawthorn, is a species of the Mediterranean, its range extending from Spain to North Africa, southern Russia and western Asia (Fiori 1969). The species has been cultivated since antiquity for its edible fruit and it is suspected that that only the populations in Crete (var. *aronia* L.) are native and that all other wild populations originated from cultivated plants (Tutin *et al.* 1968). In Sicily it is mentioned under the name of *Mespilus azarolus* Poir. in yellow and red fruited varieties (var. *fructo rubro* & var. *fructo flavo*) from the foothills of the Aetna (Tornabene 1887) but seems to be absent from the Pelagic islands of Lampedusa, Linosa and Lampione and also from Pantelleria (Sommier 1908).

The first record of *C. azarolus* from the Maltese islands is by Zerafa (1831) who does not specify whether the species is cultivated or found in the wild. Grech Delicata (1853) records it from sunny places at Wied Babu and Wied Balluta without providing a description. Gulia (1855-6) records it as naturalized in sunny places. Later the same author cites Wied Babu and Wied Balluta in Malta and Wied il-Lunziata in Gozo as locations (Gulia 1872). From a description of the fruit (Gulia 1872) it is obvious that he had seen *C. azarolus* and not *C. x ruscinonensis* Gren et Blanc. Duthie (1875) records *C. azarolus* from Wied ix-Xlendi in Gozo. Sommier & Caruana Gatto (1915) report that the wild plants found in valleys in Malta and Gozo are certainly *C. ruscinonensis* Gren. et Blanc. (*C. x ruscinonensis* Gren et Blanc.), which can be regarded as a subspecies of *C. azarolus* according to them.

Sommier & Caruana Gatto (1915) are also the first to record *C. x ruscinonensis* in the Maltese islands. Under *C. azarolus* Borg (1927) states that the typical form is not met with (in the wild) but he gives several locations for the var. *ruscinonensis* Gren (*C. x ruscinonensis*). Wolseley in Haslam *et al.* (1977) records *C. azarolus* populations from Wied Anglu in Malta and from Xlendi in Gozo. Since in Haslam *et al.* (1977) no distinction is made between *C. azarolus* and *C. x ruscinonensis* (which is not mentioned at all) and since we have surveyed the locations cited by Wolseley and found only *C. x ruscinonensis* there we believe that Wolseley did not encounter true *C. azarolus*. A reference: "Xlendi (Kramer & Westra;" in Haslam *et al.* (1977) is probably an error since Kramer *et al.* (1972) do not mention *Crataegus*. Baldaccino & Stevens (2000) feature photographs of *C. azarolus* without providing a location but in our opinion those show *C. x ruscinonensis*. Although *C. azarolus* used to be frequently cultivated in the Maltese islands until the Second World War it seems that the last reliable published record from the wild is that of Duthie (1875) from Wied ix-Xlendi in Gozo.

Tabone, M. (1997), in an unpublished dissertation, records one single old specimen of *C. azarolus* from Wied Ghomor near St. Julians. In 2006 *C. azarolus*-populations were recorded by SVL at Wied il-Kbir near Qormi, at il-Palma (Wardija) at Wied Babu and at Wied Znuber. Single old trees were found by the same author near Wied Maqbul (2006) and at Mistra Valley (2007).
The population at Wied il-Kbir grew on a vertical cliff facing west and used to consist of ten trees, seven of them quite old but one of the old trees succumbed during the winter 2006/7. One single old tree grew in the vicinity of that population on a flat rock surrounded by cultivated fields. The population at il-Palma grew in a maquis environment at the base of a south-facing cliff and consisted of roughly 15 plants, two of them quite old. The population at Wied Babu consisted of two trees, one of them quite old on a stretch of flat rock surrounded by abandoned fields, of seven young plants in the upper parts of the valley and of one tree near the road to Blue Grotto. The population at Wied Znuber was the largest, consisting of over 30, usually quite large (up to 3 m) trees in the valley and on rocks among the surrounding fields. The old tree near Wied Maqbul grew between sparsely vegetated ababdoned fields while the old tree in Mistra valley grew on former agricultural land in a habitat dominated by *Ceratonia siliqua* L.,*Rubus ulmifolius* Schott. and *Acanthus mollis* L.

Figure 5. *C. azarolus* fruit, il-Palma

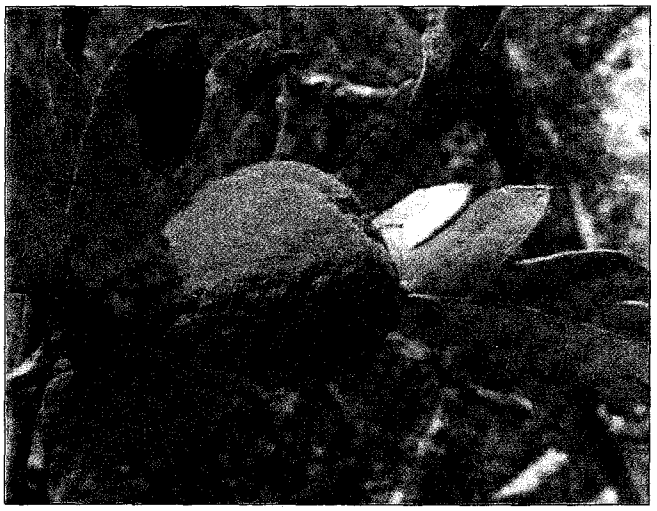

Figure 6. *C. azarolus* fruit, Wied il-Kbir

Figure 7. *C. azarolus* fruit, il-Palma

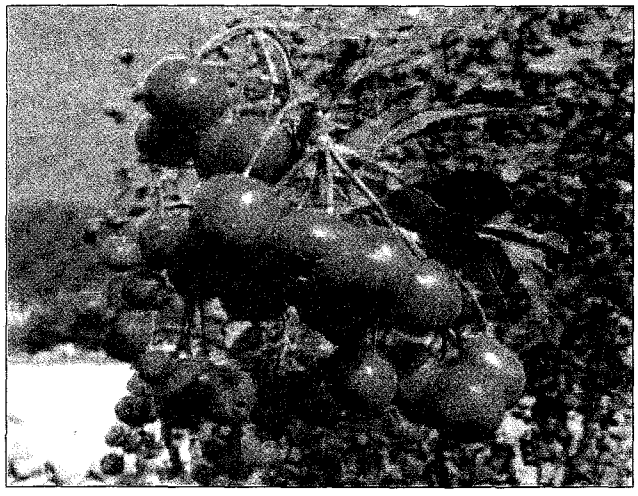

Figure 8. *C. x ruscinunensis* fruit, Selmun

All populations produced an ample amount of fruit in 2006 but due to the late autumn 2006 survey of the sites (end of September) intact fruit were encountered only at Wied il-Kbir and at il-Palma. The fruit from Wied il-Kbir were comparatively soft, red and of slightly irregular shape, the fruit from il-Palma were round, with the shape, colour, consistence and taste of a tiny apple. Although the two fruiting trees at il-Palma grew close together forming a single clump, one of them supplied reddish, the other yellowish fruit thus suggesting that the naturalized *C. azarolus* in Malta may belong to different varieties or cultivars (Fig. 3-5). According to Borg (1922) three cultivars of *C. azarolus* were occasionally grown in Malta: **Carvieri,** with fruit which is first yellow and then turns deep red; **Capitata**, like the wild form (*C. x ruscinonensis*) but with larger blossoms; **Francois Rigaud**, with yellow, rather small fruit.

Figure 9. ***C. azarolus*** **flowers with several stigmata, il-Palma**

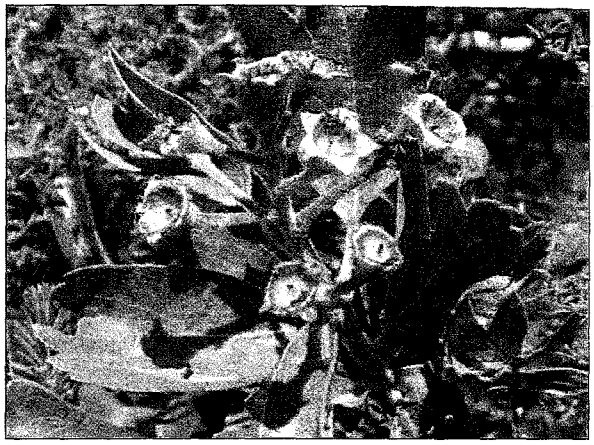

Figure 10. Densely tomentose hypanthium and pedicels in ***C. azarolus***

C. azarolus can be easily distinguished from the two other Maltese *Crataegus* (*C. monogyna* and *C. x ruscinonensis*) by the densely tomentose young twigs, leaves, hypanthium and pedicels, by the large (20-25 mm) orange-red or yellow fruit which contains (1) -3 seeds (Tutin et al 1968), by the coriaceous leaves and by the flowers which usually have 2-5 styles (Fiori 1969) (Fig. 3-8). In our opinion, using the leaf shape for identification of *Crataegus* in Malta does not seem feasible, since in all three entities almost entire to strongly lobed leaves can occur on the same plant, even on the same twig.

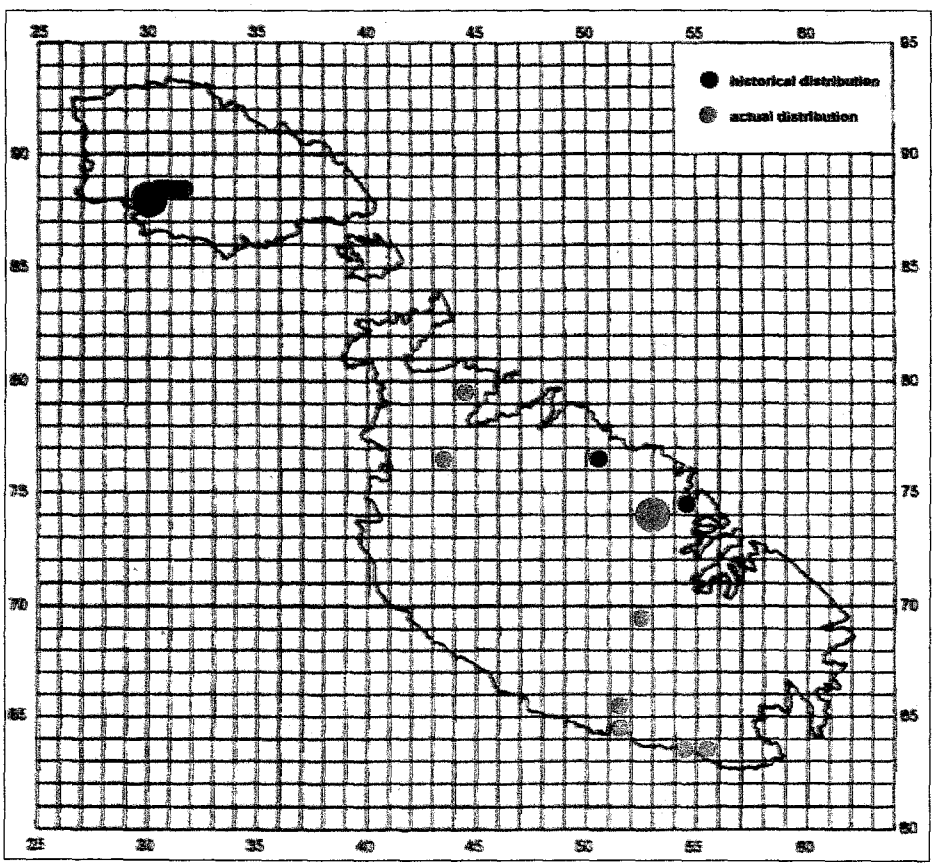

Figure 11. Distribution of *Crataegus azarolus* in the Maltese islands (UTM, zone 33S, 1 km x 1 km grid)

C. azarolus material in fruit from il-Palma was deposited in the private herbaria of both authors while *C. azarolus* material in flower from Wied il-Kbir was deposited in the Argotti herbarium of Malta.

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