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NOTES ON THE DISTRIBUTION OF *HELICHRYSUM MELITENSE*, *HYOSERIS FRUTESCENS* AND *MATTHIOLA INCANA MELITENSIS* IN THE MALTESE ISLANDS

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ABSTRACT

Considerations are made on the historical distribution of *Helichrysum melitense*, *Hyoseris frutescens* and *Matthiola incana* subsp. *melitensis*, three floral species endemic to the Maltese Islands, whilst new records for the three species are also reported. A new variety of *Matthiola incana* subsp. *melitensis* is also recorded, whilst biogeographical aspects are also discussed for the three species.

Keywords: *Helichrysum melitense, Hyoseris frutescens, Matthiola incana* subsp. *melitensis*, endemic, Maltese Islands

INTRODUCTION

Both *Helichrysum melitense* and *Hyoseris frutescens* are members of the daisy family (Asteraceae), both are rare and endemic to the Maltese islands, both occur in similar habitats such as cliffs and coastal garrigues, and both occur mainly in Gozo. *Matthiola incana* subsp. *melitensis* belongs to the cabbage family (Brassicaceae). It is also an endemic, but at the subspecies level. It frequently co-occurs with *H. melitense* and *H. frutescens*. Despite sharing a seemingly similar distribution, *Helichrysum melitense* and *Hyoseris frutescens* exhibit differences in population densities and distributions, while *Matthiola incana* subsp. *melitensis* is similar to *Hyoseris frutescens* in these factors.

In the wild, *Helichrysum melitense* is confined to the western cliffs of Gozo, with the species also being cultivated in some public gardens in Malta. *Hyoseris frutescens* only occurs as a wild species, since it has no or little ornamental value. The species is relatively frequent in Gozo and very rare in Malta. *Helichrysum melitense* can be considered as the rarer of the two, and its distribution, especially along cliff areas, has retracted over recent years (Red Data Book of the Maltese islands). A number of factors could have potentially contributed to such a decrease, namely habitat loss, competition from alien species such as *Ficus carica*, *Carpobrotus* sp. and potentially also from *Limonium sinuatum*, and possibly consumption of its seeds by lepidopteran larvae. The conservation status of *Matthiola incana* subsp. *melitensis* is similar to that of *Hyoseris frutescens*, but unlike the latter, its abundance locally is bolstered through cultivation for ornamental purposes.

Notes on *Helichrysum melitense*

Helichrysum melitense is currently only known from Dwejra and Fungus Rock. In the early 20th century, *Helichrysum melitense* was recorded from Wied Babu, Malta as *Helichrysum ruprestre* (Borg 1927), and by Haslam

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et al. (1977, quoting Borg, 1927)**.** Since 1927, there have been no further recorded locations from the island of Malta. Two assumptions can be made about the putative disappearance of this population on the island of Malta: (1) that it still persists along inaccessible cliff locations at Wied Babu or (2) that it is extinct in the wild from Malta. The cultivated plants in Malta originated from Gozitan stock and from stock generated recently through micro-propagation. (Lanfranco personal communication, January 2009).

A floristic survey in May 2007 indicated that *Helichrysum melitense* was not restricted to Dwejra and Fungus Rock, Gozo, but was relatively widespread. The authors visited the northwestern and northern cliffs of Gozo, walking from Wied il- Mielah to 500m west of this valley at Hekka point, where the first sighting of the species took place, to Wied ir - Raheb where it apparently does not occur, to Ras San Dimitri, and further in the proximity of Maxwell hill, which constitutes a new record for the species, at the southernmost part of San Dimitri plateau. This is where the species was last encountered prior to reaching the Qawra plateau of Dwejra. The occurrence of *Helicrysum melitense* at this new site is continuous (not scattered). No present records exist in literature of this newly-reported distribution of *Helichrysum melitense*. Moreover, this northernmost record for *Helichrysum melitense* in Gozo is important because it is spatially isolated from the Dwejra and Wardija point populations, and thus may hold certain different morphological or genetic characteristics.

In all, there are five distinctly-separated populations. The largest population is the one adjacent to Fungus Rock at il-Port (Figure 1), the second largest is the one surrounding the subsidence structure at il- Qawra (Figure 1), the third largest is the newly discovered northern population (Figure 1), the fourth in size is the Wardija population (Figure 1), and the smallest is that on Fungus Rock.

The northern population is very different from the strictly western ones in terms of population density. Unlike the western population, almost all individual plants occur along the sheer vertical cliff faces, with only a few scattered individuals on the over-cliff areas. Interestingly, the vertical width distribution (on the faces of the sheer cliffs), which is the distance from the edge of the cliff down to sea level, of the northern population, is only 15m on average. The density of the species seems to be rather low here, because of the narrow width, compared to the western ones. So the northern population is narrow and stretches for up to 3-5km, following the cliff's boundary in this part of Gozo.

The western populations of *Helichrysum melitense* show the highest density of over-cliff (plateau) individuals of all five populations. On the other hand, the il-Port population, the largest population, has the highest density of cliff individuals. This is because the width of the vertical distribution of this species is very wide, extending from the top of the cliff to within 4m or less above sea level, and this constitutes the closest sea record of any local endemic cliff shrub. Such a distribution might be attributed to the vertical area being sheltered from sea sprays and high winds, unlike other populations which are more exposed.

The Wardija population is made up of two sub-populations and the number of individual plants and their density on the plateau area is similar to that of the cliff area.

The Fungus Rock population is somewhat scattered and evenly distributed, and is composed of no more than 50 individuals. Other much smaller populations, which include just a few individuals which are isolated from the main populations, include the one recorded along the cliffs, which might constitute remnants of a previously much larger population. One can only assume that all the different populations of *Helichrysum melitense* were actually one single, unfragmented population, which was subsequently fragmented into separate populations, presumably as a result of human activities in the area.

Figure 1: Present and past distribution of *Helichrysum melitense* in Gozo. Legend: 1) Yellow marking represents the Il –Port population; 2) Red marking represents the newly described and discovered sites of the species in Gozo by the authors. This is the northwest population; 3) Green marking represents the Qawra or Inland sea population; 4) Violet marking represents the Wardija population.

Notes on *Hyoseris frutescens*

Hyoseris frutescens has a wider distribution in Gozo compared to *Helichrysum melitense* but exhibits a markedly lower population density (Figure 3). It is distributed along roughly half the coastline on the western side of Gozo, from Mgarr ix Xini to Marsalforn, including Ta' Cenc, Xlendi, and Dwejra, San Dimitri, and Wied il-Mielah. This extent is roughly 33.5km long. This species is generally encountered near the sea at different altitudes above sea level. The inland-most record of this species was made close to Ta'Sarraflu freshwater pool, more than 1km inland from the sea. The largest populations of this species were recorded along the Wied il- Mielah-San Dimitri stretch, and at Dwejra, mainly on the Qattara rocky slope. Coastal stretches at Xlendi and Ta' Cenc were less densely populated by this species**.**

In Malta, the situation is different, with the species being much rarer than in Gozo. In fact, *Hyoseris frutescens* was first recorded in Gozo, and was originally considered to be restricted solely to this island, until it was later discovered in Malta, in the boulder screes of Qammieh, at the northwestern-most part of the island. Interesting to note is that the habitat of *H.frutescens* in Qammieh is very different from that in Gozo, where the species does not occur along boulder screes.

In a floristic survey conducted during January 2008, the authors recorded a population of over 100 individual plants of the species, along the almost vertical Lizard Flake cliff near il- Xaqquqa/Xaqqa, on the way to Ghar Lapsi, in

association with *Cheirolophus crassifolius*. Due to the inaccessibility of the cliffs, the entire location could not be sampled and thus it can be assumed that more individuals of this species could be present. The recording of *H. frutescens* at this location augments the species' known distribution in the Maltese islands and constitutes the southern-most and most isolated population for the species in the islands. The newly discovered site presents a very similar habitat to that found at Dwejra (Qattara) in Gozo. In October 2008, 20 *H. frutescens* individuals were also encountered on the northwestern area of Saint Paul's island.

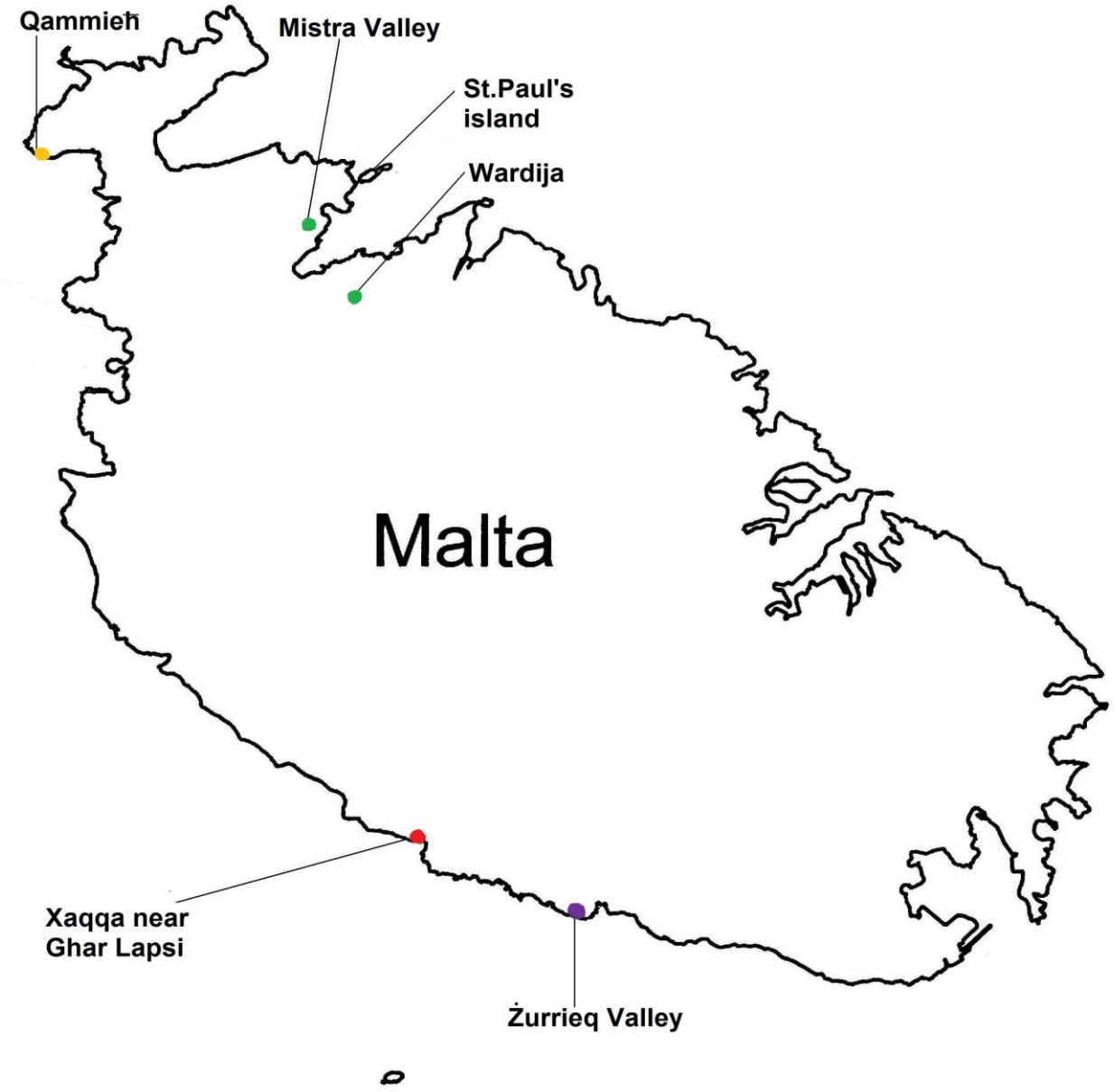

Figure 2: Present and past distribution of *Hyoseris frutescens* in Gozo. Legend: **1)** Yellow markings represent the conventional site of *Hyoseris frutescens* in Malta**;** 2) Red markings represent the newly discovered and described site of *Hyoseris frutescens* in Malta by the authors**;** 3) Violet markings: represents the small distribution of *Helichrysum melitense*, in Malta, formerly known as *Helichrysum ruprestre*, as last recorded by Haslam et al. (1977); 4) Green markings represent the small distribution of *Matthiola incana* subsp. *melitensis* in Malta, one at Selmun, and the other at Wardija

One can conclude that the species occurs in five different habitat types,: boulder screes (Qammieh); planar(meaning flat on the surface of the plateau) on the edge of the cliff or further inland, either on Globigerina Limestone (San Dimitri) or on Upper Coralline Limestone (near Wied il -Mielah); vertical sheer cliffs (Ta' Cenc), less steep sloping cliff (Qattara and Lizard flake cliff) ; coastal valleys (Ta' Cenc Valley near Mgar ix-Xini) and low-lying coastal areas (Xlendi, Qbajjar and on the inland sea plateau next to the local chapel). Man-made habitats, such as rubble walls, also host this species, though in smaller numbers (near Ta'Sarraflu freshwater pool and at Xlendi).

Figure 3: Present distribution of *Hyoseris frutescens* and *Matthiola incana* subsp. *melitensis* in Gozo. Legend: 1)Blue markings represent the entire distribution of *Hyoseris frutescens* and *Matthiolia incana* subsp. *melitensis* in Gozo; 2)Brown markings, including Fungus Rock, represent patches of *Matthiola incana* subsp. *melitensis* where *Hyoseris frutescens* is not present.

Notes on *Matthiola incana* subsp. *melitensis*

The distribution of *Matthiola incana* subsp. *melitensis* in Gozo is similar to that of *Hyoseris frutescens*, and also occurs on the same terrain. However, along the northern coast of Gozo, this species extends to inland cliffs, close to San Blas bay. On the island of Malta, like *Hyoseris frutescens*, *Matthiola incana* subsp. *melitensis* is also very rare, but its distribution is very different from that of *Hyoseris frutescens*. *Matthiola incana* subsp. *melitensis* in fact occurs along the eastern side of the island, mainly at Selmun and near Wardija. Floristic surveys conducted in October 2008 and September 2009 indicated that this species also occurs within the western half of St.Paul's island, where two immature specimens were found. Small populations of the species, of *c*. 30 and 5 individuals, were also recorded from the islet of ta' Taht il-Mazz (situated near the western cliffs of tal-Mazz of Comino) and from the tal-Mazz cliffs on Comino, respectively.

Another interesting find concerning *Matthiola incana* ssp *meiltensis* is constituted by the two individuals, recorded in January 2003, exhibiting white flowers, growing in a valley at Xlendi. The specimens are morphologically identical to *Matthiola incana* subsp. *meiltensis*, even the flowers, except that they were white and not the customary lilac. No

additional *Matthiola incana ssp incana* individuals were observed in the vicinity, to suggest a possible hybridization between the two subspecies. This is the first record of *Matthiola incana* subsp. *meiltensis* exhibiting white flowers.

Figure 4: Map of Comino and surrounding islets, showing location of sites where *Matthiola incana* subsp. *melitensis* was recorded.

Figure 5: A white flowering specimen of *Matthiola incana* subsp. *melitensis* at Xlendi, 1/i/ 2003. (Photo credit-A.Sciberras)

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