

STUDYING THE LICHENS OF THE MALTESE ISLANDS

Jennifer FIORENTINO

Department of Biology, University of Malta Junior College, Msida, MALTA

jennifer.fiorentino@um.edu.mt

La conoscenza della flora lichenica delle isole maltesi risulta ormai datata, il contributo più recente risulta essere quello di Jatta del 1915. Con il presente studio, l'autrice riferisce sulle sue preliminari ricerche che consistono, per ora, nel ritrovamento di settantasei specie licheniche. La volontà dell'autrice è quella di contribuire a colmare la lacuna riguardante la biodiversità di queste isole, attraverso la compilazione di una lista floristica aggiornata. Tale progetto si scontra con diverse difficoltà, dovute all'isolamento dell'autrice stessa, forse l'unica, attualmente, ad occuparsi della lichenologia maltese. I contatti avuti con soci della Società Lichenologica Italiana fanno ben sperare in future collaborazioni utili per superare le iniziali difficoltà.

INTRODUCTION

Located in the Mediterranean Sea, 93 km from Sicily and 288 km from Tunisia, the Maltese archipelago consists of three main islands: Malta, Gozo and Comino with a total area of 316 km² and a coastline of around 180 km (DOI, 2008). The islands have a population of 407.810 (Eurostat, 2008) giving a density of about 1.290 persons per km², one of the highest in the world, and considerably higher than the EU average of 118 persons per km². The average winter temperature is 12°C. There are really only two seasons: the dry summer season and the mild winter season. The average rainfall is 558,2 mm. Rain rarely, if ever, falls during the summer months (DOI, 2008). Geologically, the islands are composed almost entirely of marine sedimentary rocks, mainly limestone of Oligo-Miocene age (30 – 5 million years BP). Five main types of rock are found arranged in a simple layered-cake sequence namely (in order of decreasing age): Lower Coralline Limestone, Globigerina Limestone, Blue Clay, Greensand and Upper Coralline Limestone. There are also some Quaternary deposits of Pleistocene age which indicate a brief period of connection with the Sicilian/Italian mainland. Soils, being calcareous, are basic and are of three main types: Terra (Red Mediterranean) which develop on karstland; Xerorendzinas which develop on weathered Globigerina limestone and Carbonate Raw soils found over Quaternary sandstones, Greensand, lower beds of Upper Coralline Limestone, Blue Clay and Globigerina Limestone (Schembri, 1997).

Almost half of Malta's land area (47%) is predominantly agricultural, while forests make up only 0,9%. Natural vegetation accounts for 22% of land, most of which is in coastal areas, while urban fabric covers 23% (EEA, 2004). The islands have no mountains, the highest point is at 253 m a.s.l. in the SW of the island of Malta. There are no lakes, rivers or streams but only minor springs (Schembri, 1997).

From the point of view of vegetation, Malta's most characteristic community is the sclerophyll series which is a dynamic system consisting of four main vegetation types of which the highest expression is the evergreen wood dominated by trees such as Evergreen Oak (*Quercus ilex*) and Aleppo Pine (*Pinus halepensis*). This particular community has practically disappeared from Malta. The second stage of the series is the maquis which is dominated by a variety of small trees and large shrubs such as the Olive (*Olea europaea*), the Carob (*Ceratonia siliqua*) and the Lentisk (*Pistacia lentiscus*).

Most of the maquis includes trees which were introduced in antiquity because of their usefulness (Lanfranco, 2005).

The third stage of the sclerophyll series is the garrigue (or garigue) which is the most characteristic of the Maltese natural communities. This typically thrives on coralline limestone plateaux and slopes and is dominated by a variety of low small-leaved shrubs such as the Mediterranean Thyme (*Thymra capitata*), Mediterranean Heath (*Erica multiflora*) and the endemic Maltese Spurge (*Euphorbia melitensis*). Garrigue hosts about 500 species of flowering plants which is over half of the total number of indigenous species in the Maltese Islands. The fourth stage is represented by the steppes which typically lack woody species but which nevertheless support a very high species diversity. It should be noted that the four stages of the sclerophyll series community form a dynamic system and each stage can change into another stage depending on the factors affecting the habitat. Thus, much abandoned agricultural land has become transformed into maquis (Lanfranco, 2005).

THE LICHENS OF THE MALTESE ISLANDS

The earliest mention to local lichens I have come across so far is in Repertorio di Storia Naturale (1858-59) by the Maltese naturalist Gavino Gulia who describes about 11 lichens briefly (Gulia, 1858-59). In 1906 and 1907 Stefano Sommier, traveller, collector and once-director of the Istituto Botanico, University of Firenze visited the Maltese Islands in order to explore the local vegetation. On his second visit he was accompanied by Antonino Riccobono from the Botanical Gardens of Palermo. On both occasions Alfredo Caruana Gatto, local lawyer and naturalist, accompanied them on their excursions to the different islands where amongst other specimens they collected lichens. In 1915 Stefano Sommier and Alfredo Caruana Gatto included a list of 183 local lichens in the second volume of their publication Flora Melitensis Nova (Sommier and Caruana Gatto, 1915). The listed lichens had been sent to Antonio Jatta for identification, as revealed in the footnote that accompanies their checklist:

"I licheni raccolti quasi tutti da uno di noi (CG.), sono stati determinati dal compianto Dott. A. Jatta, ed una parte di essi si trova citata sia in «Materiali per un censimento generale dei Licheni Italiani» sia nella «Flora Italica Cryptogama Pars III (Lichenes)» dello stesso Jatta. Abbiamo seguito la nomenclatura e l'ordine adottati da Jatta nella Flora Italica Cryptogama, ed abbiamo citato i suddetti lavori per le specie delle quali vi è detto che si trovano nelle Isole Maltesi." (Sommier & Caruana Gatto, 1915).

Thus, indications of the lichen species found growing in the Maltese islands in the early 20th century were given in Flora Italica Cryptogama (Jatta, 1911) which predates the checklist of Sommier and Caruana Gatto by four years.

The Herbarium Jatta at the University of Naples still contains a good number of lichens from Malta which had been originally sent for identification (Grazia Aprile, Università di Napoli Federico II - personal communication). A duplicate collection is housed at the Argotti Herbarium in Floriana – Malta, but unfortunately many of the labels in this collection have gone lost or been misplaced. There is also a second collection of local lichens at the Natural History Museum in Mdina which is very well preserved with most labels in place. Although a note found with this collection says that the lichens had been collected by Surgeon Rear Admiral Sir Reginald Bankart in 1927 and identified by the lichenologist Annie Lorrain Smith one needs to examine the labels further in order to clarify whether all specimens were truly collected and identified in the late twenties as in the accompanying note or whether the collection is actually a replica of the Argotti Herbarium's collection and hence also identified by Jatta.

MY INTEREST IN LICHENS

Sommier and Caruana Gatto's publication (Sommier & Caruana Gatto, 1915) represents the only extensive checklist of local lichens that exists as nobody has undertaken any serious lichenological survey since then.

My involvement with lichens goes back to 2002 knowing that a lacuna existed in the study of local lichens. I started by reviewing all the names in the checklist and changing them with contemporary synonyms (Fiorentino, 2002). In September 2003 I attended a short course on lichens run by Pat Wolseley and Peter W. James and came back determined to embark on a mission to start compiling a new checklist of lichens of the Maltese Islands. I started collecting lichens from all over the islands and using whatever identification texts I could get hold of, I started compiling a checklist

I am employed as a full-time lecturer in Biology at the University Junior College and my tight work schedule does not leave me much time to dedicate to lichen identification. Consequently most of my work has to be done in my free time. Initially I used to shuttle a compound and stereo microscope from my department to my house and back again, on weekends and holidays. Eventually I realised that this arrangement was not giving satisfactory results. So I bought the necessary equipment including my own microscopes and digital camera and set up a mini lab at home!

Besides identifying lichens I also make it a point to photograph every specimen together with its spores when these are present. Hence I have managed to twin my interest in lichens with my love for photography which has always been a passion of mine since my teenage years. Digital photography has made possible the immediate checking of photos which is very convenient. If I am not satisfied with the quality of the spore photographs I can always repeat my spore preparation and try again.

I have, so far, identified and photographed 76 lichens from different parts of the islands. Forty nine of these lichens are saxicolous, eighteen are corticolous, eight are terricolous and one is parasitic. My intention is to eventually publish an updated checklist of the lichens of the Maltese islands once I will identify my first hundred lichens. Some of these lichens have to be revisited as in my initial phase I did not possess a microscope adapter to make possible the taking of photographs of spores. My favourite lichens are terricolous species; tree lichens follow closely. I still recall the joy I felt when

I found my first *Cladonia* species - later identified as *Cladonia convoluta* (Lam.) Anders - growing amongst moss on the garigue in the North West of Malta. The same area also gave me another interesting species which baffled me for a number of weeks. Thanks to Domenico Puntillo (Università della Calabria) the lichen was eventually identified as *Diploschistes scruposus* (Schreb.) Norman.

Being the only person studying local lichens has many disadvantages. I miss not being able to discuss my problems and findings with colleagues or friends. I must confess that "The Information System on Italian Lichens" (Nimis & Martellos, 2008) has been quite a good tool for my identification work. I also use various texts which describe amongst other things, the size of spores and any chemical changes. Ever since I joined the Italian Lichenological Society I have managed to make some useful contacts with other members. The first time I attended an annual meeting of the Society was in September 2007 in Siena. This event also gave me the opportunity to meet some of the lichenologists I knew from earlier correspondence as well as to get to know others.

I have published two works on lichens (Fiorentino, 2002; Fiorentino, 2007) in the Central Mediterranean Naturalist, a Maltese peer reviewed scientific journal which has been published annually for over 40 years, and which provides local biologists with the opportunity to publish works of a local and/or regional interest.

This year commenced with the discovery of two halophilic lichens, *Pyrenocollema halodytes* (Nyl.) R.C. Harris and *Verrucaria maura* Wahlenb. I had been hoping to find these two species for some time. The marine species *Pyrenocollema halodytes* is often quoted as also growing on the shells of

gastropod molluscs and on barnacles. In January 2008 I came across a bed of barnacles of species *Chthamalus stellatus* from the mediolittoral zone with something like blackish perithecia on their calcareous plates. Further examination revealed that these structures were indeed perithecia containing colourless 1-septate spores typical of *P. halodytes*. Finding *Verrucaria maura* was trickier. I kept examining the black encrustations along a number of rocky shores but kept finding either tar or cyanobacteria. The much quoted maritime *Verrucaria* I was looking for did not turn up. During the 2007 S.L.I. Siena meeting I observed that the poster presented by Domenico Ottonello's team showed the results of a lichen survey from a coastal region in Sicily. The list of lichens included *Verrucaria maura*. I asked Domenico whether it would be possible for him to send me a specimen of *V. maura* which would help me in my search for this species in Malta. I received two specimens collected from two different sites in Sicily. I therefore started my hunt again. In April 2008 I was on the island of Gozo and spotted a *Verrucaria* thallus growing on a coralline limestone wall along a flight of steps leading to the sea. This was definitely neither tar nor cyanobacteria. And if it was a *Verrucaria* it was so close to the water that it would have to be halophilic. When I compared my sample with the *V. maura* sample Domenico had sent me I was almost sure I had finally found what I was looking for. On examining the perithecia and spores I could safely conclude that this was indeed the *Verrucaria maura* I had been looking for.

CONCLUSION

In the coming months I hope to add more lichens to my checklist of lichens of the Maltese Islands to finally reach the hundred mark. I am aware that what is taking me years to compile would take an experienced lichenologist a mere couple of weeks. This however does not discourage me as I thoroughly enjoy the work I am doing with lichens.

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