

# THE ELM (*Ulmus minor* Mill.) IN MINORCA: AN APPROACH TO THE KNOWLEDGE OF ITS CONSERVATION STATUS

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## INTRODUCTION

The island of Minorca has remained free from the Dutch elm disease, so the *Ulmus* populations of the island are like a reserve for the European elms. But as the elm tree is considered as an introduced plant very little is known about any aspect of it in the island. With the aims of filling this lack of knowledge and in order to set future protection measures, started this investigation project one year ago. In this poster are presented some of the preliminary observations and results of this work.

## THE *Ulmus* IN MINORCA: ORIGIN AND USES

The origin of the *Ulmus* in Minorca is not clear. Some authors consider it as an introduced plant (Rodríguez, 1904; Bolòs & Vigo, 1990), while other consider it as a native plant (Duvigneaud, 1979; Plat *et al.*, 1992). At the same time pollinic studies have shown the *Ulmus* existence in Minorca in prehistoric times (Pérez-Obiol *et al.*, 2001). In fact, most of its populations are located in places where human activity is dated from old times.

Nowadays there is not any specific use of it. The oral tradition (Camps i Mercadal, 1918) says that its function was supporting climbing grape vines (*Vitis vinifera* L.), a use that is also noted by muslim agronomists (Abu L-Jayr, c. 1069-1091), even at present it is not uncommon to find old European grape vines associated to *Ulmus* stands. Other uses given were medicinals (Cursach, 1790) and the wood was quite appreciated for different uses.



Figure 1. Most *Ulmus* populations are related to irrigated orchards



Figure 2. *Ulmus* and *Vitis vinifera*

## DISTRIBUTION

In Minorca are recorded 43 *Ulmus* populations (fig. 1) some of them with several groups or subpopulations. The populations are distributed all over the island but with a major concentration where water availability remains constant.

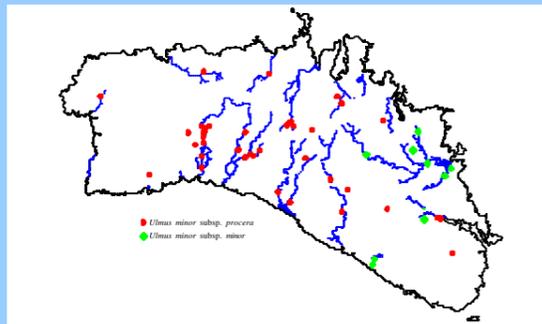


Figure 3. Distribution of *Ulmus* populations in Minorca.

## TAXONOMY

One of the first results of this work is that the *Ulmus* populations of the island belong to two taxa: *Ulmus minor* subsp. *minor* Mill. and *U. minor* subsp. *procera* (Salisb.) Franco.

The separation in between the taxa in the island seems quite clear, due to the fact that most populations could be of a clonal origin.

As shows in figure 1, the distribution of the two taxa is not equitative throughout the island. While subsp. *procera* is scattered all over the island, subsp. *minor* is restricted to the eastern part. To some degree it seems that subsp. *procera* is more related to sites with human activity from ancient times.



Figure 4. *Ulmus minor* subsp. *procera* Figure 5. *Ulmus minor* subsp. *minor*

## ECOLOGY

As shows figure 1, the distribution pattern of *Ulmus* in Minorca is closely related to streams, so more than a half of the population grows along those habitats (diagram 1), following in decreasing importance wells and springs.

Habitats like coastal wetlands hold just one elm population, although this sites assure constant moisture all the year, they can suffer water level fluctuations of high amplitude and can become easily salty.

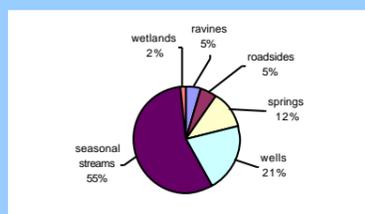


Diagram 1. Distribution of *Ulmus* populations respect to different habitats



Figure 6. On the unprotected and heavy siliceous clay soils of the northern part of the island even the mature trees are always smaller and dwarfer.

The most important streams of the island are carved in the southern chalky platform, so there are more populations located inside gullies (58%) and on basic chalky soils (63%). These sites also offer protection from the wind and have loose soils that allow the roots to go deeper instead of the compact and impermeable siliceous soils of the northern part of the island.

The growth pattern of the trees also shows differences between the populations on chalky and siliceous soils (figures 1 and 6).

A first floristic survey of the *Ulmus* populations have shown which are the plants that are mostly associated with it (table 1). Must be noted the high frequency of the alien invasive *Oxalis pes-caprae* L.

More than 200 taxa have been found to grow associated with *Ulmus*. Among them there are some endemics like *Viola stolonifera* J.J. Rodr. or *Cyclamen balearicum* Willk.. *Ulmus* seems to be a more sociable tree compared with others present in the island like *Quercus ilex* L. or *Pinus halepensis* Mill.

In mature populations the plants community more regularly associated with *Ulmus* can be classified as *Vinco-difformis-Populetum albae* O. Bolòs 1962. Anyway there is a penetration of nitrophilous plants (*Urtica*, *Parietaria*) and other taxa more specific of the humid sites in the tirrenian area (i.e. *Leucosium aestivum* subsp. *pulchellum* (Salisb.) Briq., *Ranunculus macrophyllus* Desf.).

Taxon	Frequency (%)
<i>Arum italicum</i>	95.2
<i>Oxalis pes-caprae</i>	93.0
<i>Rubus ulmifolius</i>	93.0
<i>Rubia perigrina</i> subsp. <i>longifolia</i>	90.4
<i>Olea europaea</i> var. <i>sylvestris</i>	71.4
<i>Allium triquetrum</i>	59.5
<i>Brachypodium sylvaticum</i>	52.3
<i>Carex divulsa</i>	52.3
<i>Clematis cirrhosa</i>	52.3
<i>Geranium purpureum</i>	52.3
<i>Rhamnus alaternus</i>	52.3

Table 1. The ten commonest vascular plant taxa associated to *Ulmus* populations in Minorca.

## CONSERVATION STATUS

The *Ulmus* populations in Minorca are getting benefit from the ceasing of agricultural activity. So they are all in a young stage, in many cases is still possible to see the mother plants from which are they originated. The older trees were usually a few in each group (usually less than 5) and were usually located along the cultivated fields, sometimes in the border-line between two properties.

Due to the young condition most stands have trees of every age. From the surveyed, 9 of them have no reproductive plants. These are likely to be new plants regenerated from old trees now disappeared. Those with the higher number of mature trees are mainly located in the gullies of the south of the island.



Figure 7. Most populations keep the old trees that have originated them.



Figure 8. A row of young trees in the border of a cultivated field.

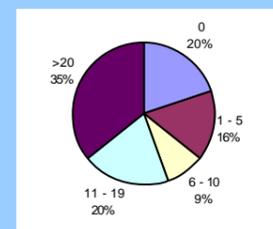


Diagram 2. Populations classification according to the number of sexual reproductive plants.

All the populations show some degree of expansion growing, but this is limited by:

- The limited area of their suitable habitat.
- The use of the land or the agricultural activities.

From this situation is possible to know their dynamism and to determine the minimum areas needed for their development and stability. This information is important in order to settle protection tools in the future.

Among the 45 populations surveyed 16 have mature trees with dying back tops. It seems that this pathology is related to the fall of the aquiferous level, caused by an increasing of water extraction in the last years to supply the rising human population of the island.

This problem affects more subsp. *minor* populations (89%) than subsp. *procera* (22%). But this may be caused to that most of subsp. *minor* populations grow on clay siliceous soils which are more sensitive to droughts.



Figure 9. Mature trees with dying back tops.

## THREATS

Although at present times the *Ulmus* populations are quite healthy, this situation could change in a short time. All the islands, by itself, are highly vulnerable and sensitive ecosystems to any perturbation of the environment. The *Ulmus* of Minorca, whatever its their origin, are now integrated in the island environment and will suffer from any aggression to it.

Obviously the worst threat comes from outside the island and is the introduction of the Dutch elm disease.

There is no any official restriction to the importation of elm trees, alive or dead. There is not either any inspection service to the entry of *Ulmus* plants from outside the island.

In the island there are also some threats that can affect their conservation. The identification of these threats is also an aim of this work.

The preliminary examination of the populations have shown the existence of three main types that are common to most populations.

Threat	Freq.	%
Agricultural activity	25	56
Streams cleaning	9	20
Aquiferous level fall	6	13
Urbanization	3	6.7
Road enlargement	1	2.2
Increase of salinity	1	2.2

Table 2. Main threats on *Ulmus* populations

As shows table 2 the first threat, the agricultural activity, is the commonest of them on the *Ulmus* populations. Due to its high vegetative expansion power the elm tree is seen by the farmers as a nuisance that needs constant control.

The second threat, streams cleaning, is responsibility of the public authorities and can be easily cleared by using more sustainable methods.

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