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## Palms on the Maltese Islands

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The Maltese Archipelago is situated 90 km south of Sicily. It consists of the islands of Malta (250 km<sup>2</sup>), Gozo (70 km<sup>2</sup>) and Comino (3 km<sup>2</sup>) plus a few smaller islets. They have a sunny Mediterranean climate, with hot, dry summers and cool, wet winters. The rocky land may appear to be barren to visitors who arrive during the dry summer months. However, the wild flora is relatively abundant considering the small size of the islands. Most of these plants grow during the winter months, when rain keeps the ground moist and temperatures rarely fall to 0° C. During the summer there is an almost complete absence of rain and ground temperatures are frequently raised over 40° C by the hot desiccating sun. Most of the smaller plants that make up the ground-cover dry up during the summer months and survive as seeds or as underground organs (bulbs, tubers, etc.). They leave behind an arid looking landscape that only turns green again when the autumn rains arrive. Trees, bushes and shrubs survive this drought because their long, penetrating roots are capable of taking up deep underground water. Some plants that live on the coast can utilize salty ground water. Other plants are succulent or have special features like small or hairy leaves, which reduce water loss through transpiration. Most cultivated plants grown during the summer survive the drought only if irrigated.

Quite a number of palm species are capable of living outdoors in Malta. In winter they are able to tolerate our cold weather because freezing temperatures which damage palms in northern European countries do not occur here. They survive the summer drought in different ways. Some species have long roots which can tap natural reservoirs. Those growing near the coast are capable of utilizing salty ground water. Their leaves have to be capable of withstanding both hot summer and cold winter winds. Others survive only if irrigated and protected in gardens. All of them must also like or tolerate the Maltese soils which are calcareous and alkaline in nature. The following is a discussion of the hardier palm species growing

here and their relationships with the Maltese Islands.

### *Chamaerops humilis*

The Mediterranean Dwarf Palm (in Maltese 'Ġummar') is the only palm that has been described as a true native of the Maltese Islands. Unfortunately the wild population appears to have become extinct sometime during the turn of the century, mainly as a result of over-collection for horticulture. Apparently the last known wild plants were collected and planted in public gardens (Borg 1927). Today *C. humilis* is a commonly cultivated plant and although new varieties have been imported, the descendants of the native stock probably still adorn many Maltese gardens.

Goats, bird hunting, and a large human population density must have also contributed to the wild palms' decline even though the literature I could find (Borg 1927) blames only collectors. Goats and sheep were formerly the main milk producing animals. Large herds were left to graze on our rocky Mediterranean terrain, to which they are highly adapted, and left to eat anything (including any young palms and seedlings) that they could find. Furthermore bird hunting was such an excessively popular 'sport' in Malta and Gozo that many bird populations were drastically reduced. This meant that plants using birds to disperse their seeds lost much of their potential to recolonize distant ground. The human population density on the island is one of the highest in the world with about 1,060 people/km<sup>2</sup> land. Much of the land is either cultivated or covered with buildings, leaving little space for the remaining wildlife. For palms such as *C. humilis*, the advantage of being good ornamental plants is that they always find a place in the many public and private gardens that arise with urban expansion. However, this is never the same as living in the wild countryside.

Fortunately for our endangered flora most of the goat and sheep population have now been

replaced by cows which are more efficient in producing milk. These are rarely allowed to graze outside and so do not present a danger to wild plants. The new strict hunting laws that have lately come into effect should also allow some birds to recontinue dispersing seed. This means that now *C. humilis* may have a better chance to 'escape' back to what remains of the wild. There is for example a small individual growing in Balluta valley, N.E. Malta (E. Lanfranco), which may be such a 'fugitive.' Individuals of *C. humilis* have also recently been reintroduced to the wild by members of 'Arbor', a local environmental group. Let's hope the palms remain unmolested in their native habitat.

### Phoenix dactylifera

The Date palm must have been the first palm to be introduced to Malta by man. Since the first prehistoric settlers arrived ca. 5000 BC, the Maltese Islands have been invaded and colonized by various other peoples and nations. The large natural harbors and the central Mediterranean location of Malta interested the sea-faring Phoenicians who set up a colony here about 2,700 years ago. *Phoenix* was an important food plant for these people in their Middle-Eastern homeland. They also planted it in their new North African colonies such as at Carthage (Hyams 1971). Later the Carthaginians themselves became a powerful nation and it was their turn to take over Malta. The date-palm was also an important food plant for these people and so one can easily assume that dates were eaten in Malta during both the Phoenician and Carthaginian occupations. Date palms were probably also grown here, as ornamental if not for fruit and maybe to remind the colonies of their homeland scenes. The Romans took over Malta in 218 BC after defeating Carthage. The story of the date palm in Malta must have continued when the Arabs invaded and occupied Malta and much of southern Europe during the 9th Century AD. They planted groves of their favorite tree, the date-palm, in much of their new territory (Hyams 1971). While they occupied Malta much of the Arabic language and culture was adopted by the Maltese and in fact today the Maltese name for dates is 'Tamar' which is exactly the same as in Arabic. A succession of Christian-European Nations followed the Arabs and after 1530 the islands were governed by the Knights of the Order of St. John. The first record of *Phoenix dactylifera* in

Malta appears to have been written in 1536 by Quintinus, a French monk who described orchards in Malta where 'Palm-trees' were grown and cultivated (Quintin D'Autum 1980). Napoleon's French displaced the knights in 1798. Two years later they were defeated by the British. The islands finally became independent in 1964. Today *P. dactylifera* can still be seen decorating quite a number of old farms and buildings. They can also be seen growing in some cultivated valleys, in gardens, groves, and streets. There are many old place names that include the word 'palma' such as 'Tal-Palma' and 'Triq il-Palma'. They probably refer to date palm(s) which used to grow or are still growing in those areas.

Date production on our islands has never had any significant commercial value. This is not because the trees do not grow well here if properly irrigated, but because their fruit rarely attains complete maturity. Our summers are hot which is good for date production but they usually end abruptly with heavy autumn rains and cold weather, conditions which are very detrimental to date production, and the fruit are only given a chance to develop when it does not rain during early autumn. I have found their taste to be quite good but not as sweet as imported commercial dates. Our dates may be used in sweets and pastries to which sugar may be added (Borġ 1922). Good examples must be the local traditional snacks, 'Mqaret' that are small fried pastries with date filling. The eating value of Maltese dates may be increased in other ways. For example Haslam et al. (1977) state that the fruit ripen completely if the infructescences are covered with polythene bags and Borġ (1922) suggests using an early fruiting variety such as the 'Rhars' of Northern Tunis (to avoid the onset of the autumn rains).

Perhaps the most interesting and mysterious of the palms found in Malta are the *Phoenix* palms growing wild in some coastal regions of Malta and Gozo. They can be found growing on clay slopes which overlook the sea (Fig. 1) and on the sides of valleys that lead down to the sea. A good layer of soil formed on these slopes so that in many cases they have been transformed into a network of terraced fields. The palms are found on both cultivated and wild slopes. On the cultivated slopes, they can be seen growing at the field edges, sometimes right out of the rubble walls which mark the boundaries and hold the terraced fields in place. The palms growing on wild slopes are frequently found near clumps of reed (*Arundo donax* or

*Phragmitis australis*). Although their distribution at first appears to be haphazard their location can always be correlated with moisture in the ground: The fact that they can be found growing on soil which lies on top of a clay substratum is important. This clay layer is impermeable to water showing that rain water is not lost by draining down into deeper layers of rock. In fact the occurrence of reeds which are water-loving plants shows that there is underground water below them, and if found in a row directed towards the coast they indicate the position of an underground stream. The Arabs have a saying for the date-palm of their homeland; "The king of the oasis bathes his feet in water and his head in heaven's fire". In many cases this saying also applies to the palms growing here, which apparently like our summer sun yet still need sufficient amounts of ground water. They are found next to the reeds also using the water below, and on the edges of fields, where they probably utilize 'lost' water seeping away from irrigation points.

The clay soil found on these slopes is able to retain a lot of water and does not dry up as quickly as other Maltese soils, when the drought begins during the spring. The clay soils continue to hold a considerable amount of water which is very important for any date stones that may have found themselves in this soil, for they can only germinate if provided with both heat and water. Only during late spring are temperatures high enough and soil moisture still available to allow germination of these date seeds to take place. Once germinated, the seedlings of *Phoenix* palms quickly produce long penetrating roots that have to search for water in deeper soil before the summer-sun dries up and cracks the surface layers. I have seen many seedlings from date-stones in a non-clay region dry up and wither away by midsummer, obviously not having found enough moisture to survive. The moisture retaining ability of the soil must be a limiting factor for the germination and survival of the young palms, and is probably one of the main reasons why the palms can be found growing wild mainly in clay regions.

Which species do these *Phoenix* palms belong to? The trunks of wild palms growing on the clay slopes are usually short and frequently obscured by a large number of surrounding suckers giving these palms a bush like appearance rather than that of a tree. Their blue-green new leaves distinguish them from *P. canariensis* which have a brighter green color. Their short, bushy stature

resembles that of *P. theophrasti*. Cretan date palms also live in similarly exposed locations on the nearby island of Crete. But our *Phoenix* apparently do not fruit in such exposed locations. The size of the leaflets is also larger than those of the Cretan date palms.

The size, shape and color of the leaves indicate *P. dactylifera*. But in such a case why do their flowers dry up and fall instead of developing into fruit? And why are the trunks usually short? Not far from these slopes, in the bottom of valleys such as at Pwales and Ghadira there are *P. dactylifera* which have 'normal' long trunks, and fruit and seed quite well. There are differences between these two habitats: The coastal slopes are very exposed to sea borne winds and in summer probably contain less ground water than in the valley bottoms. The flowers of coastal plants probably do not continue to the fruiting stage because they are damaged by the moisture and salt laden winds. The lack of ground water may make matters worse.

Trunks are usually short probably because strong winds, which are frequent in Malta, would topple tall exposed trunks. The surrounding suckers take over and give the palms the bushy shapes as observed. These short rounded shapes provide less resistance to the wind and so the plants are not as prone to toppling. When the trunks of the new suckers grow too high they will again be prone to toppling. Such a threat to tall trunks can be observed on the road to Xaghra, in Gozo, where a tall cultivated date-palm, supported by cables, was toppled last January by a strong wind.

Why are the 'wild' palms concentrated along the coast and not inland? And if they are not reproducing, where do the seeds come from? There are four possible sources from where the seeds could have originated:

1. People like palms as ornamental plants and may have planted the seeds or young plants.
2. The fruit (with viable seeds) of local inland palms were carried by some animal vector to the coast (e.g., rodents, birds).
3. People (e.g., hikers, hunters, farmers) could have eaten (imported) dates and discarded the viable stones randomly. These discarded seeds could have then been washed down to places inaccessible to people by rain water, before germinating.
4. Large birds ate the fruit of palms in coastal N. Africa and during migration northwards could have stopped here and deposited the seeds.



1. *Phoenix* along the coast, Malta. 2. Wild *Phoenix canariensis* in the foreground with possible parents in the background as seen below Mdina, Malta.

The first possibility is unlikely since many of the 'wild' palms grow in haphazard locations not characteristic of cultivation; some of the coastal palms can only be reached by climbing up or down steep jagged rocks. Others are found on cliff edges or in the middle of a thick group of reeds. The second possibility is also unlikely because the local fauna is too small to carry the large seeds for any considerable distances, even though I have noted that sparrows eat the fruit. In many cases the third is a likely explanation, but still does not explain why the palms' distribution is concentrated coastally. The last hypothesis is the most interesting as it would explain the coastal distribution. For example Herring gulls are known to eat practically anything and later on regurgitate any large indigestible material. In the Mediterranean they are known to eat olives, which are not much smaller than dates. Is it inconceivable that such birds could have eaten fallen dates of some coastal North African palms and flown less than 200 miles to the Maltese coast before releasing the stones? I have noted that in some cases the palms grow immediately near large boulders, which could have served as landing points for the birds. But of course this may just be a coincidence.

### Phoenix canariensis

The Canary Island Date Palm is extensively used as a street and garden plant, and is probably the most popular outdoor palm on the Maltese Islands. It is well adapted to our climate. Several thousand seeds are produced by the local palms each year. These are very easily germinated and the seedlings grow into beautiful statuesque trees ideal for both formal and informal landscaping designs. Once their deep-running roots are established the palms do not require watering and manage very well by themselves. Like *P. dactylifera*, *Chamaerops humilis*, and *Washingtonia* palms they are able to tolerate salt laden winds, a very important advantage here because much of the land is coastal. They must also tolerate some degree of salt in ground water because one can find all these palms growing less than 4 meters away from the sea at Marsascalea (on the south coast of Malta). Individuals of *P. canariensis* also appear to be growing very well at Salina's salt marsh.

*P. canariensis* can be considered to be an economically important plant in Malta for it has its place in the tourist and fishing industries. It also has a number of other uses.

Tourism is the most important money-maker on the islands with most tourists coming from north and central Europe during the summer months. Palms for many people are associated with sunshine and holidays. This pretension must serve the many hotels and holiday resorts on the islands well, for most of them have palms on their premises, and frequently use them in their advertisement photographs.

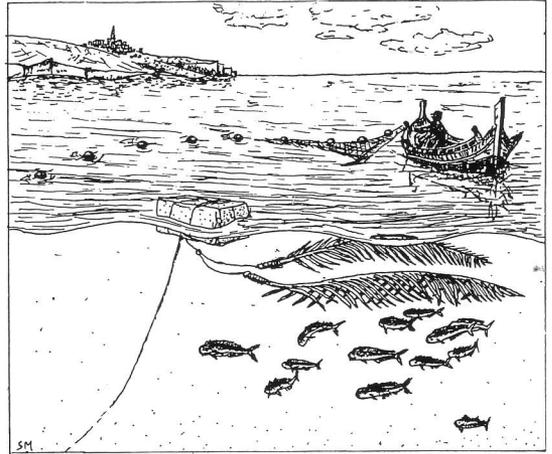
The sea is an important source of food for communities living on small islands such as ours. Between August and January Maltese fishermen concentrate their efforts on catching just two species of pelagic fish which pass round the archipelago during this period. The fish are namely the Dorado or Dolphin Fish, *Coryphaena hippuris* (in Maltese 'Lampuki') and the Pilot Fish, *Naucrates ductor* (in Maltese 'Fanfri'). At this time the 'lampuki' principally and to a lesser extent the 'fanfri' constitute an important and relatively inexpensive fresh food for the Maltese population, so the method used to catch these fish has to be efficient in order to satisfy the islanders' needs.

It has long been known that these fish congregate under floating objects. Until the early 1970's the principal method of catching these fish was to lay floats made of cork known as 'kannizzati' out in the open sea. These were each anchored to the sea bottom so that they would not move with the current and left there to attract any passing 'lampuki'. After a while the fishing boat caught the fish below each float by surrounding them with a purse net. Why these fish should want to remain under floating objects in the first place has not yet been explained properly, but it seems likely that after having migrated for long periods of time, the fish would prefer to rest in a safe place, which in the open sea may be very hard to come by. Small 'lampuki' would be safe from attacks by sea-birds below a large floating object. Larger individuals may also be safe from any large predatory fish that passes below and fails to register them as single fishes. Their usually easy-to-spot streamlined silhouettes would be overshadowed by the larger silhouette of the object floating above them, so that the predator would notice the large shadow but not the 'lampuki' beneath it. The 'lampuki' rest under the floats even at night, since the moon would still illuminate the surface and so outline their silhouettes. It is ironical that such a defensive behavior which must have evolved to protect the fish in the first place has now allowed man to catch them so easily.

But what has *P. canariensis* got to do with all this? In the early 1970's Maltese fishermen realized that their leaves can be used in their 'kannizzati' (Fig. 3). They float, are durable, and are broad with closely spaced leaflets which offer the fish a large natural looking shelter. Above all they are inexpensive and easily replaced. Each 'kannizzata' was made by two or three large leaves attached to a polystyrene or cork float, that in turn was anchored to the sea bottom. The popularity of this technique grew and in the early days of their use for fishing some street palms were stripped of their foliage. The government realized that the palms were in danger and so introduced a new law with heavy penalties for anybody caught cutting off palm leaves without authorization. At the start of the fishing season, i.e., in August, the lower leaves of palms in street and public gardens were cut off by government employees and sold at a fair price to the fishermen. The government thus saved the palms and at the same time provided the fishermen with a new service. The popularity of *P. canariensis* has rapidly increased since then as witnessed by the many young palms used as street trees and may partly be explained by its value to the fishing industry.

In Gozo one can still find hats and baskets made from palm leaflets woven together. Their durability can be judged from my own hat which has lasted for five years surviving sea water, hot sun, and my sitting on it several times! Today the leaflets used to weave such items are those of *P. canariensis* but before the introduction of this palm to Malta those of the native *C. humilis* were used. Palm leaflets are also used to make crosses for Palm Sunday. The Christian symbolism of the palm can again be seen during the summer 'festas' when palm leaves on tall columns are used to decorate the streets through which the religious processions pass.

The ecological aspect of *P. canariensis* is also interesting. As previously mentioned it is well adapted to our calcareous soil and climate. The fruit of *P. canariensis* ripen early during the summer, then fall on dry ground. The seeds germinate during the following spring when the ground is both warm and moist. However most die during the summer since their roots are not able to find enough water to last them through the drought. Seedlings have relatively short roots and cannot tap the deep water supply which their much larger parents can reach. The few seedlings that do find the necessary moisture face more dangers; those



3. A Maltese 'Luzzu' circles a shoal of 'Lampuki' gathered below a 'kannizzata'.

that germinate on cultivated ground are ploughed up. Others which germinate on roadsides risk hover-mowers and trampling. The shape of the first leaves resembles those of grasses so it is no surprise that they are treated as weeds. Very few of the seedlings thus survive. On the slopes below Mdina (Fig. 2) and Rabat (in central Malta) there are small 'wild' communities of *P. canariensis* ranging from seedlings to 2 meter tall plants. They are obviously the progeny of nearby cultivated adult trees. They are growing on the banks of terraced fields where they are spared being ploughed up. They must also use water trickling away from the crops' irrigation points. I have not yet come across any 'wild' *P. canariensis* on the coastal slopes as with *P. dactylifera*, but this may be due to their relatively recent introduction to Malta. Only time can tell whether the distribution of 'escaped' *P. canariensis* will spread or not.

### **Washingtonia robusta and W. filifera**

These palms are rapidly gaining in popularity as can be noted from the many new *Washingtonia* in streets and gardens. One can also see large numbers of *Washingtonia* palms growing in exotic plant nurseries in Malta and Gozo. This popularity is probably due to their effortless cultivation, their rapid growth and above all to their impressive palmate foliage, which contrasts well with the now familiar pinnate foliage of *Phoenix* species. Being very hardy palms many have been planted by the sea and in some cases actually in beach sand.

Large quantities of small black fruit are produced late in summer. Many of the fallen seeds germinate the following spring but then the seedlings face the same problems as with those of *P. canariensis* (see above). The problem with drought appears to be even more serious for the smaller *Washingtonia* seedlings since they have shorter roots than *P. dactylifera* and *P. canariensis*. Although they are desert palms and prefer hot dry climates they also like to have a lot of ground water much like *P. dactylifera* as seen in San Anton Gardens where there are two large *W. robusta* actually growing in a pond.

### Other Palms

I have identified the following palms growing well exposed to the climate in various Maltese gardens: *Brahea armata*\*, *Livistona chinensis*\*, *L. australis*\*, *Trachycarpus fortunei*\*, *Sabal mauritiformis*\*, *Phoenix reclinata*, *Syagrus romanzoffiana*, *Butia capitata*, and *Howea forsterana*\*. The following are found in slightly more sheltered areas: *Phoenix roebelenii*\*, *Chamaedorea elegans*\*, *Chamaedorea seifritzii*, and *Rhapis excelsa*. Those marked with an \* include individuals which produce viable seeds each year. The rest are either solitary individuals, single sexes or still too young to produce viable seed.

Although the list is quite short I have no doubt that I have not come across all the species growing outdoors here. In any case more species will probably be introduced in the future. They should hopefully find the Maltese environment to their liking.

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