

Restoration and improvement of Priority Habitat 9370* "Palm groves of Phoenix"

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INTRODUCTION

The LIFE PHOENIX project brings together different public and private entities, scientific institutions and non-governmental organizations from Spain and Greece with the aim of advancing knowledge, methodologies and procedures aimed at improving the conservation status of the endemic palm groves of Europe, formed by the Canarian palm tree in the Canary Islands and the Cretan palm tree in Greece. These plant formations are included among the priority habitats to be conserved by the European Union, under the habitat designation 9370° "Palm groves of *Phoenix*".

Endemic palm groves in Europe of genus Phoenix create important natural and semi-natural ecosystems with an outstanding ecological and socio-economical value that are only present in Spain (with *Phoenix canariensis* in the Canary Islands) and Greece (with P. theophrasti in Crete). Their uniqueness justify the inclusion in Annex I of the EU Directive 92/43 and the designation as Priority Habitat 9370* "Palm groves of Phoenix", with a total of only 53 Natura 2000 (N2K) sites designated for its conservation at the EU

Both species, and the habitat they configure, face similar conservation problems in both regions. The main shared threats are related to climate change effects, pests and invasive plant species. Other important issues are more directly linked to human activities, with different level of importance depending on the region: in Gran Canaria, hybridization with P. dactylifera due to past bad practices; in Crete, overgrazing and tourist visitor pressure.

The project's areas of intervention are included within Special Areas of Conservation (SAC) of the Natura 2000 Network, which were designated with the aim of protecting habitat 9370*. In Gran Canaria, two natural palm groves have been selected in the SAC ES7010008 "Güigüi" (considered among the most important from a genetic point of view due to their isolation) and another two in the SAC ES7010025 "Fataga" (more affected by hybridization and pests as they are integrated in the rural matrix). In Crete the areas of action include the 6 remaining natural palm groves on the island, protected by the following SACs: GR4310004 "Martsalos", GR4310005 "Agios Nikitas", GR4320006 "Vai", GR432003 "Preveil", GR4340012 "Souda-Plakias" and GR4340015 "Chrisoskalitissa". The project covers a total surface of 72.3 ha, with an inter-island distribution of 45 ha on Gran Canaria and 27.3 ha on Crete.



HARITATS 9370° IN CRETE

Chrysoskalitissa - Aspri Limni (GR4340015). Located near Chrysoskalitissa Monastery, this site is in its ecologic boundaries and marks the westernmost population.

Souda Plakias (GR4340012). A transitional landscape, where palms coexist with olive groves and human settlements, reflecting both natural and anthropogenic influences.

Preveil Palm Forest (GR4330003). A popular tourist destination, where grow in dense clusters along a riverbed, creating a lush, semiaquatic environment.

Martsalo Gorge (GR4310004). A small site with naturally occurring palms in difficult-to-access terrain, with strong erosion problems.

Agios Nikitas Palm Forest (GR4310005). Hosts one of the densest and most isolated palm colonies, providing a unique, less-disturbed ecosystem.

Vai Palm Forest (GR4320006). The largest and most iconic palm grove in

Crete. P. theophrasti forms dense, expansive populations.

MAJOR THREADS

Regardless of the protection Natura 2000 areas provide, this priority habitat still faces the following threats, which are considered as the important:

Overgrazing: Unregulated and poorly managed livestock grazing in Crete has caused significant damage to the palm groves of P. theophrasti and other associated endemic plant species, necessitating the establishment of a monitoring system, to prevent severe degradation.

Visitors pressure: Tourism poses a significant threat to the palm groves. visitors pressure: rounsin poses a significant threat to the paint groves, particularly in the two most prominent areas, Vai and Preveli, which attract over 100,000 visitors annually that strongly affect natural regeneration. None of these sites have a visitor management plan, leaving them vulnerable to the impacts of unregulated and expanding tourism.

Pests and invasive alien species (IAS): The Rhynchophorus ferrugineus beetle has caused widespread damage to palm trees across Europe and is particularly harmful due to the difficulty of detecting infestations in their early stages. Recently it is detected to affect P. theophrasti too.

Climate change: A serious problem in Crete is the occurrence of intended fires as a grazing method and the wildfires. Additionally, reduced rainfalls lead to the drop of groundwater availability and repeated, more frequent and longer droughts. Rainfall phenomena are much more severe, resulting in landslides and soil drift.

RESTORATION AND PROTECTION ACTIONS

Reduction of direct anthropic impacts. These threats will be addressed through the installation of new fencing to protect palm stands from grazing and anthropogenic pressures, particularly from tourism. In parallel, efforts will be made to raise public awareness regarding the ecological importance

Climate Change. Its mitigation is based on increasing soil moisture, improving soil condition and preventing forest fires. In this sense, the following concrete actions are proposed: a) Removal of dead wood and invasive vegetation, as they constitute fire propagation corridors along ravines and b) Preventive grazing, in coordination with local farmers and shepherds.

Hybridization control. Despite the absence of hybridization in the populations analyzed, there are significant anthropogenic pressures that pose a potential threat to the genetic integrity. In almost all areas, high tourism activity and overgrazing exert considerable environmental stress. Likewise, many hotels in the region plant non-native Phoenix species, as ornamental plants. Moreover, a plant nursery located near the largest palm forest actively cultivates these non-native Phoenix species, incre-likelihood of future hybridization.

Pest control and eradication (Rhynchophorus ferrugineus). Until 2024, no infestations of Phoenix theophrasti by the red palm weevil (R. ferrugineus) had been reported. The first major outbreak occurred that year in Vai. In response, the Lasithi Forest Service implemented an Integrated Pest Management (IPM) plan including: a) Isolation and Monitoring of the Forest; 10 km exclusion zone, monitoring of nearby nurseries, removal of other Phoenix species, b) Suppression of the Weevil Population Within the Forest, c) 5 Km buffer zone with Pheromone Traps, d) Systematic Inspection and Surveillance for new infestation sites and e) Public Awareness and Community Engagement.

Control and eradication of invasive vegetation. Complete removal of the invasive species Eucalyptus sp., as major competitors to P. Theophrasti, especially in water absorption.

Erosion control. Construction of dry-stone walls and gabion structures will be implemented to mitigate streambed erosion and enhance habitat stability.

Vital space enhancement. Removal of surrounding vegetation within a 4m radius will be carried out to facilitate P. theophrasti regeneration, as resprouting via root suckers and basal shoots is a key component of its natural reproduction.

Ex-situ conservation. Establishment of seed banks and production of 2,500 seedlings in Public Nursery of Chania that will s reforestation efforts and habitat enhancement initiatives. support

Chrysoskalitissa - Aspri Limni (GR4340015)

Habitat expansion based on Phoenix presence, enrich population with new plants (T2.2) Hand notlination

Fencing / grazing protection (T2.2 & T3.2) Dead wood removal (T2.2 & T3.2)



Souda Plakias (GR4340012)

No fencing as P. theophrastii clusters are into ravines & properties

No water network needed due to local olive trees' irrigation system

reveli Palm Forest (GR4330003

Fencing for proper touristic pressure control (T2.2 & T3.2) Track modifications for adequate touristic pressure of

removal of Eucalyptus spp. 2 individuals (T3.3)



Martsalo Gorge (GR4310004)

Habitat expansion based on Phoenix presence, enrich population with new plants (T2.2)

Dry wall construction for erosion protection and natural water reservoirs prevention (T3.6)

removal of Eucalyptus sp. 2 individu



Fencing 8 new areas (T2.2)

Habitat expansion based Phoenix presence (T2.2)

Enrich population with new plants





Vai Palm Forest (GR4320006)

Fencing (T2.2 & T3.3)

Water tank installation (T3.2)

The LIFE PHOENIX project will run for 60 months, between July 2023 and June 2028. Its total budget amounts to €3,901,577.38 and is 75% funded by the European Commission

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