G2.5a South-Aegean Phoenix grove

Summary

The tertiary relict *Phoenix theophrasti* woods of Crete and south-western Anatolia are restricted to damp, mostly sandy coastal valleys below 250 m, either on the banks of fresh or brackish waters, or in seasonally or episodically flooded coastal valleys. The most significant threat is from manipulation of ground-water for irrigation of horticulture and there is some pressure by domestic animals and tourism. The naturalness of the *Phoenix* stands can also be affected by planted *Eucalyptus* and too frequent fires can be damaging. Control of all these threats is required for conservation.

Synthesis

The habitat, although having a very restricted range and area, is assessed at the Least Concern status, because no decline has been recorded to the extent and the quality characteristics of the habitat over the last 50 years and no threats are foreseen for the near future.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Least Concern	-	Least Concern	-

Sub-habitat types that may require further examination

All the Aegean palm groves with *Phoenix theophrasti* have been assigned to the *Nerio-Tamaricetea* vegetation and are restricted to semiarid climate (generally with 400-600 mm annual precipitation). The habitat might be differentiated in two ecological subtypes: a) a riparian subtype (with the palm forming temporarily inundated gallery forest along permanent fresh or brackish waters), b) a subtype occuring on seasonally or episodically flooded coastal valleys. In the latter, the palm trees are generally more scattered, and they may be restricted to rocky low slopes. Underground water level is high and sufficiently permanent to control habitat ecology and species combination.

Habitat Type

Code and name

G2.5a South-Aegean Phoenix grove

Interior view of the *Phoenix theophrasti* forest of Vai, Crete (Photo: Panayotis Dimopoulos).

A wider view of the surrounding vegetation and the *Phoenix theophrasti* forest of Vai, Crete (Photo: Panayotis Dimopoulos).

Habitat description

This habitat includes woods, in contact with the underground water table, often riparian, formed by the palm tree *Phoenix theophrasti*, found on the island of Crete and south-western Anatolia. The majority of occurrences of *Phoenix theophrasti* in Crete, and all existing records made outside Crete and southwest Turkey, are represented only by scattered or isolated trees. Within the EU, Crete holds the only palm groves that are representative for the habitat type. Only two sites are known in Crete with several hundreds of trees: Vai and Preveli, the former is the most extensive (ca. 20 ha). The tertiary relict *Phoenix theophrasti* woods of Crete and south-western Anatolia (Datça peninsula) are restricted to damp, mostly sandy coastal valleys below 250 m; here are included: a) the most extensive grove in Crete, the forest of Vai in the east of the island, characterized by the luxuriant palm growth, accompanied by a thick shrubby undergrowth rich in *Nerium oleander*, and b) a few other smaller coastal groves, notably on the south coast of the prefecture of Rethimnon. The westernmost occurrence is in southwest Crete, on coastal plains south of the monastery of Chrisoskalitissa. *Phoenix theophrasti* trees are known also from some Greek islands (Crete, Karpathos, Kos, Rodhos, Thira, Nisyros, Amorgos) and from the Turkish southeast Aegean sites of Datça and Kumluca-Karaöz, with additional populations in Bodrum-Gölköy, all in southwest Anatolia. In the Aegean palm groves, *Phoenix theophrasti* is a rather rare constituent of the Aegean *Nerio-Tamaricetea* vegetation and is restricted to semiarid climate (generally with 400-600 mm annual precipitation). The habitat may be either riparian (with the palm forming temporarily inundated gallery forest along permanent fresh or brackish waters), or related to seasonally or episodically flooded coastal valleys. In the latter, the palm trees are generally more scattered, and they may be restricted to rocky low slopes. Underground water level is high and sufficiently permanent to control habitat ecology and species combination. The soils are frequently sandy but the habitat type does not include mobile dunes. The vegetation belongs to the alliance *Rubo sancti-Nerion oleandri* but more isolated trees or clusters are surrounded by *Pistacio-Rhamnetalia* or *Cisto-Micromerietalia* vegetation. Associated of *Phoenix theophrasti* are species of wet or semiwet habitats, as well as species with a wider ecological range (see the list of characteristic species below).

Indicators of quality:

- No forest exploitations in the majority of the area covered by the habitat
- Intact natural hydrology
- Natural composition of canopy
- Structural diversity/ complexity with (semi)natural age structure or completeness of layers
- Typical flora and fauna composition of the region
- Presence of old trees and a variety of dead wood (lying or standing) and the associated flora, fauna and fungi
- Presence of natural disturbance such as treefall openings with natural regeneration
- Long historical continuity (ancient woodland) with high species diversity
- Absence of non-native species in all layers (flora & fauna)
- No signs of eutrophication or pollution

The indicators of good quality are primarily related to the maintenance of the natural structure of the *Phoenix theophrasti* woods. The presence of rejuvenation of *Phoenix theophrasti* in all sites of its occurrence, as well as the undisturbed soil (no significant trampling or erosion), the natural relief, the stratified stands (tree, shrub, herb layer present), the closed canopy of *Phoenix theophrasti* woods ≥25% and *Phoenix* individuals mostly higher than 3 m are indicators that the structure and functions of the habitat are in favourable conservation status to a significant part of its distribution. Its adjacency to, or its interdigitation with Mediterranean salt meadows of the *Juncetalia maritimi* (1410 - Annex I of the Dir. 92/43/EEC), and/or Mediterranean tall humid herb grasslands of the *Molinio-Holoschoenion* (6420 -Annex I of the Dir. 92/43/EEC) are also considered as indicators related to the long-term conservation of the habitat.

Characteristic species:

Phoenix theophrasti, Aristolochia cretica, Juncus heldreichianus, Myrtus communis, Erica manipuliflora, Nerium oleander, Narcissus tazetta, Rubia peregrina, Schoenus nigricans, Scirpoides holoschoenus, Pistacia lentiscus, Smilax aspera.

Classification

This habitat may be equivalent to, or broader than, or narrower than the habitats or ecosystems in the following typologies.

EUNIS:

G2.5 *Phoenix* groves

EuroVegChecklist:

Rubo sancti - Nerion oleandri Brullo et al. 2004

Annex 1:

9370 Palm groves of *Phoenix*

Emerald:

G2 Broadleaved evergreen woodland

MAES-2:

Woodland and Forest

IUCN: 1.4

Temperate Forest

Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?

Yes

Regions
Mediterranean

Justification
Within the EU, Crete holds the only palm groves that are representative for the habitat type. Only two sites are known in Crete with several hundreds of trees: Vai and Preveli, the former is the most extensive (ca. 20 ha), but both remarkable from an ecological point of view.

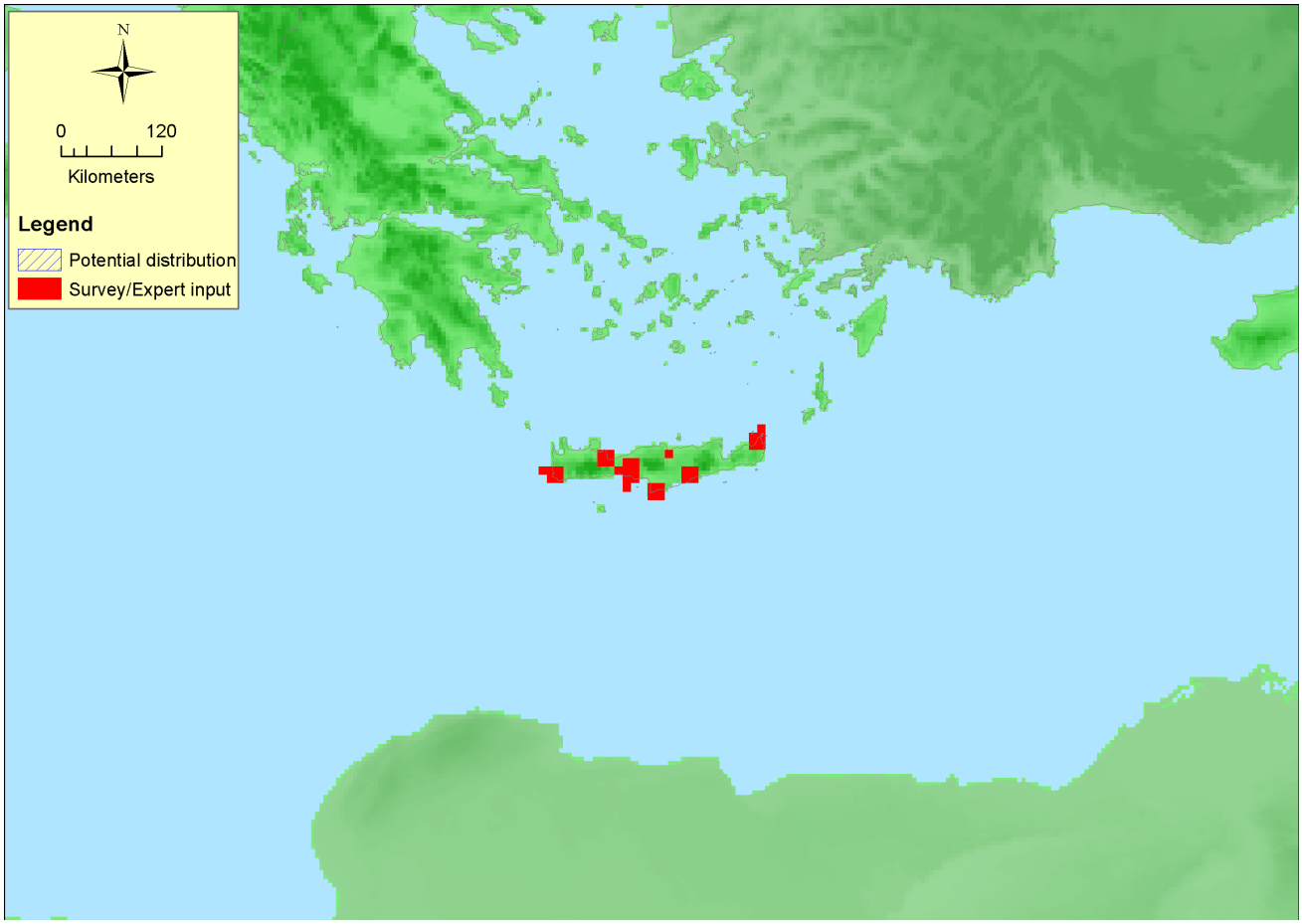
Geographic occurrence and trends

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Greece	Crete: Present	1.3 Km^2	Stable	Stable

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	13600 Km^2	31	1.3 Km^2	
EU 28+	13600 Km^2	31	1.3 Km^2	

Distribution map



The distribution of this habitat is restricted to ithe island of Crete and south-western Anatolia. The majority of occurrences of *Phoenix theophrasti* in Crete, and all existing records made outside Crete and southwest Turkey, are represented only by scattered or isolated presences. The map is complete. Data sources: Art17, EVA.

How much of the current distribution of the habitat type lies within the EU 28?

More than 90% of the current distribution of the habitat type lies within the EU 28 (we estimate that almost 10% of its total extent is present in SW Anatolia).

Trends in quantity

Repeated measures on the population size of *Phoenix theophrasti* and of the extension of the habitat type have not been performed in any of its distribution sites. From what is known, no recent decline has been observed, although in a few sites land-use in the vicinity has undergone change, which might result in decreasing numbers of trees and size area. Overall, the trend in quantity is considered stable. After the fire of 2005 that burnt part of the second more extensive spot with *Phoenix theophrasti* woods (Preveli area), the forest has completely and naturally restored (based on monitoring data from 2010).

- Average current trend in quantity (extent)
  EU 28: Stable
  EU 28+: Stable
- Does the habitat type have a small natural range following regression?
  No
  Justification
  The EOO of the South-Aegean Phoenix theophrasti woods is < 50,000 Km^2, but no decline has been recorded during the last 50 years at the *Phoenix theophrasti* woodlands in the island of Crete.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?

Yes

Justification

Phoenix theophrasti is known to be a tertiary relict, now restricted to the south Aegean and the Anatolian coast. This relict habitat with *Phoenix theophrasti* woods in Crete and south-western Anatolia (Datça peninsula) covers small areas restricted to damp, mostly sandy coastal valleys below 250 m.

Trends in quality

The existence of *Phoenix theophrasti* rejuvenation in all the sites of its occurrence, as well as the undisturbed soil (no significant trampling or erosion), the natural relief, the stratified stands (tree, shrub, herb layer present), the closed canopy of *Phoenix theophrasti* woods ≥25% and *Phoenix* individuals mostly higher than 3m are indicators that the structure and functions of the habitat are in favourable conservation status to a significant part of its distribution. The quality is stable and partly could be considered as increasing due to conservation measures taken at the Vai forest.

- Average current trend in quality
  EU 28: Stable
  EU 28+: Stable

Pressures and threats

The Aegean *Phoenix theophrasti* groves could be considered as potentially vulnerable due to future changes in land-use; the most significant threat is due to potential manipulation of ground-water for irrigation purposes. Green houses have been constructed near some of the sites. There is still some pressure by domestic animals. In Preveli, the touristic impact on the stand is high, with numerous foot paths dissected, occasional illegal camping and fire-making (after the fire of 2005, there are strict rules and control of all these activities within the *Phoenix* woodlands in Prevel). The naturalness of the Preveli Palm stands is affected by some planted *Eucalyptus* which may, moreover, be fatal to the water and nutrient balance of the palm grove. Although to some degree fire-tolerant, too frequent or too intensive fires represent a potential threat to the palm trees. In Vai, efficient measures have been applied to control tourism (fencing).

List of pressures and threats

Sylviculture, forestry

Grazing in forests/ woodland

Human intrusions and disturbances

Trampling, overuse

Natural System modifications

Burning down
Groundwater abstractions for agriculture

Conservation and management

No specific conservation measures are performed. The core area of the largest Greek *Phoenix* population at Vai was fenced in 1983; monitoring using permanent plots was established recently within the forest area of Vai and Chrysoskalitissa. Permanently high ground-water level has to be assured in all sites but, first of all, ground-water level measures need to be taken as part of the regular monitoring. In the most important sites of the present habitat type, Vai and Preveli, which are frequented by a considerable, and increasing, number of tourists, more environmental and biological information should be offered. Fencing against grazing domestic animals should be more effective. *Eucalyptus* trees are to be removed; wild

camping in the stand and defecation has to be controlled. Some palms in Preveli and elsewhere show traces of fire. Manipulation of groundwater should be prohibited in all sites. Monitoring is required both for the control of vitality and seedling and juvenile establishment, and of ground-water level. Reliable and reproducible data on the size of the area and the population size need to be taken as baseline information for monitoring. The population area and its vicinity require regular monitoring. Annual surveys are indispensable and possible factors that may press and threat the populations need to be documented.

List of conservation and management needs

Measures related to forests and wooded habitats

Restoring/Improving forest habitats

Measures related to wetland, freshwater and coastal habitats

Managing water abstraction

Measures related to spatial planning

Legal protection of habitats and species

Measures related to special resouce use

Regulating/Management exploitation of natural resources on land

Conservation status

9370: MED U1 (source: data for Greece where the part of this habitat type with *Phoenix theoprasti* woods is present; unpublished data not yet uploaded to the EIONET for the reporting period 2007-2012).

When severely damaged, does the habitat retain the capacity to recover its typical character and functionality?

After fire: the natural regeneration of the *Phoenix theophrasti* woodland stands at the Preveli site (fire in 2005), is a clear evidence on the sucess of the species to natural regeneration; currently the forest stands are completely restored 10 years after the fire. In any case, although to some degree *Phoenix theophrasti* is fire-tolerant, the frequent or too intensive fires represent a potential threat to the palm trees. Water abstraction: We have no evidence on the recovering capacity of *Phoenix theophrasti*, after high water abstraction for irrigation purposes, since the manipulation of ground-water for irrigation purposes is the most significant potential threat for this habitat type. The period given for regeneration is related only to the fire. Longer periods would be necessary after water abstraction and through intervention.

Effort required

10 years
Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	0 %	<5 %	<5 %	Unknown %
EU 28+	0 %	<5 %	<5 %	Unknown %

No decline has been recorded to the extent of the habitat over the last 50 years. In the period before 1957, an area of 9 ha (of the 130 ha that is currently the total cover of the habitat) that was covered by *Phoenix theophrasti* wood, was cleared for agricultural use. Currently, the abandoned cultivation land (with a high

frequency of natural regeneration) in combination with the performed restoration actions in the frame of a LIFE project (15 years ago), resulted in the almost complete recovery of the *Phoenix* woodland in the more extensive palm forest of Crete in the site of Vai. The estimation of the A2a and A2b Criteria is based on expert judgement taking into consideration the current state and the conservation management actions planned and/or implemented.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	13600 Km^2	No	No	unknown	31	No	No	unknown	Unknown
EU 28+	13600 Km^2	No	No	unknown	31	No	No	unknown	unknown

The EOO and AOO are both smaller than the thresholds for criteria b1 and B2, respectively, however there is no continuing decline in quantity or quality or future threat.

Criterion C and D: Reduction in abiotic and/or biotic quality

Criteria C/D	C/D1		C/D2		C/D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	<1 %	15 %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	<5 %	15 %	Unknown %	Unknown %	Unknown %	Unknown %

Criterion C	C1		C2		C3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %

Criterion D	D1		D2		D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	Unknown %	Unknown%	Unknown %	Unknown%	Unknown %	Unknown%
EU 28+	Unknown %	Unknown%	Unknown %	Unknown%	Unknown %	Unknown%

Both biotic and abiotic quality of the habitat have not substantially reduced the last 50 years; only at certain spots of limited extent, some signs of structural changes of the *Phoenix* woodland have been recorded due to human pressures such as grazing and paths (before the Vai forest was fenced). The percentage of the reduction in quality is based on the scientific record on the cleared *Phoenix* woodland (for agricultural purposes) almost 60 years ago, which now have been managed and are in the direction of complete restoration.

Criterion E: Quantitative analysis to evaluate risk of habitat collapse

Criterion E	Probability of collapse
EU 28	unknown
EU 28+	unknown

There is no quantitative analysis available that estimates the probability of collapse of this habitat.

Overall assessment "Balance sheet" for EU 28 and EU 28+

	A1	A2a	A2b	A3	B1	B2	B3	C/D1	C/D2	C/D3	C1	C2	C3	D1	D2	D3	E
EU28	LC	LC	LC	DD	LC	LC	DD	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	LC	LC	DD	LC	LC	DD	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Least Concern	-	Least Concern	-

Confidence in the assessment
High (mainly based on quantitative data sources and/or scientific literature)

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Date of assessment
20/12/2015

Date of review
25/04/2016

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