



United Nations Environment Programme



Distr.
RESTRICTED

UNEP/WG.6/INF.7
25 November 1976

Original: ENGLISH

Expert Consultation on
Mediterranean Marine
Parks and Wetlands
Tunis, 12-14 January 1977

Note by the Executive Director

The attached document, which was prepared by the International Union for Conservation of Nature and Natural Resources, is submitted to those participating in the Consultation for their information.

INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES

Expert Consultation on Mediterranean Marine Parks and Wetlands
Hammamet, Tunisia, 12-14 January 1977

Endangered Species of the Mediterranean Ecosystem

The IUCN Secretariat was requested to prepare a list of threatened species for the marine and coastal areas of the Mediterranean for the Consultation.

This information is provided in two separate papers that are attached to this note and that cover the higher animals (vertebrates)* and plants (angiosperms and gymnosperms)** in the Mediterranean ecosystem as a whole, or in the European sector only.

* Threatened Vertebrates in the Marine and Coastal Areas of the Mediterranean (C.W. Holloway)

** Preliminary Notes towards a List of Rare and Threatened Plants for the European Coast of the Mediterranean (S.M. Walters and A.H.M. Synge).

THREATENED VERTEBRATES IN THE MARINE AND COASTAL ENVIRONMENTS
OF THE MEDITERRANEAN

by C.W. Holloway, Ecologist, IUCN

Scope and Definitions

This paper lists the mammals, birds, amphibians and reptiles that occur, either seasonally or throughout the year, within the marine or coastal environments of the Mediterranean and that are considered to be under some threat of extinction, either throughout their world range or within their European range, only (ref. Annex 1). It also provides some indication of the main causes of the decline of animal populations, conservation measures already taken and the type of measures needed in the future.

Information on the world threatened species and subspecies is taken from the appropriate volumes of the IUCN Red Data Book and subsequent revisions (Goodwin & Holloway, 1972; Vincent, 1966; Honegger, 1975), including the new edition of the Aves volume, which is to be published in 1977 (King, in prep.). Data on the European lists is taken from the Council of Europe publications on threatened species (Smit & van Wijngaarden, 1976; Parslow, 1974) and includes data from the projected publication in this series on amphibians and reptiles, also to be published in 1977 (Honegger, in prep.).

The European lists are based on the status of the species in Europe only, although many of these species occur also in north Africa and west Asia. Annex 1 shows the distribution of the species, by countries, throughout the Mediterranean. Bird species occur in some countries only as migrants and so, for the birds, the list also indicates in which countries the species are known to breed. (Heinzel et al., 1972).

The term threatened is used as a collective expression for the categories endangered, vulnerable, rare and indeterminate, which are used in the IUCN Red Data Book to indicate grades of vulnerability to extinction. Definitions of these categories are provided in Annex 2.

A precise definition of what constitutes a coastal species is not easy. The animals included in this paper frequently have habitats within a few kilometres of the coast, others are inland species that visit coastal areas seasonally, and others are species generally associated with inland habitats but which are also known to occur, often year-round, in coastal areas.

Causes of Population Decline

The two major causes of depletion of wild animal populations are over-exploitation and modification of the species' environment.

Over-exploitation of many wild vertebrate populations in the Mediterranean region has been common practice. It has included uncontrolled hunting for animal products (meat, skins, hides, oil, shells, eggs and tourist souvenirs) and has been responsible, at least in part, for the depletion of populations of cetaceans (Viale, 1976), seals, mammalian predators, ungulates, many species of birds especially wildfowl, and sea turtles. It has involved the capture of significant numbers of live animals for the pet trade (e.g. tortoises, lizards, and some other reptiles), for falconry (raptors) and for museum collections and laboratory work (several amphibians and reptiles). It has also involved attempts to reduce or exterminate certain species that compete with man by posing a threat to human life (e.g. leopards, poisonous snakes), to livestock (e.g. wolves and raptors) or to other wildlife, such as game birds or fish that are hunted by man (e.g. seals, otters, raptors, fresh-water turtles). Even uncontrolled hunting for sport, including underwater fishing, has made serious inroads into the populations of a number of threatened vertebrates.

Modification of the environment occurs in a wide variety of forms. A major problem of particular relevance to the Mediterranean is pollution, both in the sea, through oil spills, the dumping of heavy metal wastes and sewage, (Holt, 1973; Ress, 1975) and on land, through the use of pesticides particularly to control malaria and boost agricultural yields. The western Mediterranean basin has provided one of the few documented cases, to date, of deaths among pelagic mammals resulting directly from pollution (i.e. deaths among fin whales following the dumping of metal refinery wastes, Anon. 1976). The widespread use of pesticides in this region is considered to be a major cause of population decline in many bats, amphibians and reptiles (through reduction in the insects on which they prey) and among raptors, through the concentration of organochlorine residues in their systems, resulting in reproductive failure. Widespread tourist development, especially in coastal areas, is another type of environmental modification that is of considerable significance in the Mediterranean. Vast areas of natural wildlife habitat have been destroyed and the disturbance created by influxes of visitors poses a continuing threat to oceanic island, inshore and other coastal species, such as the monk seal, nesting sea birds and several species of lizards and tortoises. Further forms of habitat degradation of major concern to threatened species in this region are reclamation of wetlands for agriculture (eliminating habitat for wetland birds and many amphibians and reptiles), and reed burning and forest fires (affecting nesting birds and a variety of other woodland species). In the recent past, random introductions of exotic lizards into endemic lizard populations on oceanic islands in the Mediterranean has threatened the genetic integrity of several subspecies. Crosses with feral domestic stock has similarly affected some populations of wild goat.

Conservation Measures Taken

Many of the threatened vertebrates still lack full, or even partial protection by law in Mediterranean countries; and, even where legal

protection exists, it is not always enforced adequately. A proportion of these species occur in one or more reserves within their Mediterranean range but there is still very considerable scope and an urgent need for additional reserves in the relatively undisturbed areas that remain, before increasing development ruins them for nature conservation purposes.

Several international conventions are of relevance to the conservation of threatened species in the Mediterranean region. The African Convention (Addis Ababa, 1968)*1 and the Endangered Species Convention (Washington, 1973)*2 are designed to restrict utilization and international trade in wild species in need of protection. The Wetlands Convention (Ramsar, 1971)*3 is designed to conserve wetland habitats.

Among the Mediterranean countries, however, no north African nation has ratified the African Convention; only Cyprus, Morocco and Tunisia have, to date, ratified the Endangered Species Convention; and only Greece has ratified the Wetlands Convention.

On the other hand, nearly all of the Mediterranean nations are now committed to international cooperation in the control of pollution within the Mediterranean basin. Following conferences convened by UNEP in Barcelona, in 1975 and 1976, a series of pilot studies on the sources, dispersion and effects of pollutants has been initiated and the texts of an international convention and two protocols to restrict pollution in the Mediterranean have been approved. The legal instruments are expected to come into force in 1978.

Conservation Measures Required

All species and subspecies listed in Annex 1 should have national legislation to provide total protection for endangered animals and, at least, adequate regulation of use of animals in the remaining threatened categories to prevent further decline and promote recuperation of populations. All Mediterranean governments should become parties to the international conventions designed to restrict trade in these species. This proposal is of particular relevance to several of the amphibians and reptiles listed in Annex 1, which are presently being captured in thousands and, in some cases, tens of thousands for the pet trade. Wildfowl are under particular pressure in this region and all Mediterranean governments should become parties to the Wetlands Convention.

*1 African Convention on the Conservation of Nature and Natural Resources

*2 Convention on International Trade in Endangered Species of Wild Fauna and Flora

*3 Convention on Wetlands of International Importance, especially as Waterfowl Habitat

On broader environmental issues, greater vigilance is required among all the Mediterranean nations to restrict pollution, especially in some of the industrialized nations to the north of the basin and oil producing countries to the south. Replacement of the persistent, organochlorine pesticides by less harmful substitutes is of particular importance. Better planning of tourism and other forms of development and the initiation of conservation education programmes for local people and visitors could do much to reduce environmental degradation within the coastal and marine regions as a whole. These subjects are receiving attention in a long-term planning exercise, which is currently being formulated by UNEP in consultation with the Mediterranean governments.

In the immediate future, however, the most urgent need is to create additional reserves, with adequate provision for their protection, especially on oceanic islands and stretches of mainland coast that harbour threatened species and that are still relatively undisturbed by development. Sites used by breeding colonies of birds, islands that have rare, endemic species, and sea turtle beaches are among the priorities for attention.

Conservation of marine turtles is a case in point. All the sea turtle species that occur in the Mediterranean are considered to be threatened throughout their world range. Whilst precise data are lacking, in the eastern sector of the basin sea turtles still use a series of nesting beaches on the Aegean and Mediterranean coasts of Turkey and a further area in Corfu. In the west, however, they appear to be close to extinction. Nesting beaches are reported to exist, still, in Italy (in the Toscana, Lazio, and Puglia districts), in Sicily (in the Macconi di Gela area) and in Sardinia (Sines, Gulf of Oristano, and Zone Rio Piscinas); it is essential that these beaches be protected with all speed (R.E. Honegger, 1976, pers. comm.)

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ANNEX 1

THREATENED VERTEBRATES IN MARINE AND COASTAL AREAS OF THE MEDITERRANEAN WORLD AND EUROPEAN LISTS OF THREATENED TAXA

N.B. The following lists follow systematic order and show, for each animal, its status category (E: endangered; V: vulnerable; R: rare; I: indeterminate), the total number of countries in which it occurs (figure in parenthesis; for world lists only), the Mediterranean countries* in which it is believed to occur (Alb: Albania; Alg: Algeria; Cy: Cyprus; Eg: Egypt; Fr: France; Gr: Greece; Is: Israel; It: Italy; Leb: Lebanon; Lib: Libya; Mal: Malta; Mon: Monaco; Mor: Morocco; Spa: Spain; Syr: Syria; Tun: Tunisia; Tur: Turkey; and Yu: Yugoslavia) and a brief description of its habitats.

1. VERTEBRATES CONSIDERED TO BE THREATENED THROUGHOUT THEIR WORLD RANGE

1.1 MAMMALS

- | | | |
|------|---|--|
| 1. V | <u>Balaenoptera physalus</u>
fin whale | pelagic |
| 2. V | <u>Canis lupus</u>
wolf (34) | tundra, forests, open plains,
from 3,000 m altitude to the
seashore |
| | Alb: Gr: Is: It: Leb: Spa: Syr: Tur: Yu: | |
| 3. E | <u>Panthera pardus tulliana</u>
Anatolian leopard (6) | woodland and scrub in mountains;
recorded in coastal scrub in
Turkey |
| | Is: Leb: Syr: Tur: | |
| 4. E | <u>Monachus monachus</u>
Mediterranean monk seal (9) | caves, on isolated rocky island
and mainland coasts |
| | Alg: Cyp: Fr: Gr: It: Leb: Lib: Mor: Spa: Tun: Tur: Yu: | |
| 5. E | <u>Gazella dorcas massaesyla</u>
Moroccan dorcas gazelle (3) | prefers high plateaux, but occurs
in lower reaches of Moulouya river
valley |
| | Alg: Mor: Tun: | |
| 6. E | <u>Gazella gazella arabica</u>
Arabian gazelle (6) | coastal plains, often in association
with <i>Acacia</i> spp.; highland gravel
plains |
| | Eg: Is: | |

* Mediterranean islands are included in the countries within whose jurisdiction they fall.

1.2 BIRDS I.

1. E Larus audouinii nests on coastal islets
Audouin's gull (9)

Cy*: Fr*: Gr*: It*: Leb*: Tur*:

1.3 AMPHIBIANS AND REPTILES

1. V Testudo graeca graeca dry, sunny areas
Mediterranean spur-thighed
tortoise (5)

Alg: Lib: Mor: Spa: Tun:

2. V Caretta caretta marine littoral; nests on surf-
loggerhead turtle swept beaches

It: Gr: Tur:**

3. E Chelonia mydas feeds in deep sea areas; nests
green turtle on surf-swept beaches

Tur:**

4. E Eretmochelys imbricata reefs and hard bottom inshore
hawksbill turtle waters; nests on mainland and
island beaches

Tur:**

5. E Dermochelys coriacea oceanic; nests on surf-swept
leathery turtle beaches

It:

6. R Lacerta filfolensis filfolensis small, flat-topped oceanic islands
Filfol lizard (1)

Mal:

7. V Vipera lebetina schweizeri dry river beds and adjacent
Schweizer's Lebetina viper (1) vegetation including rocky outcrops

Gr:

1.4 FRESHWATER FISHES

No coastal species of freshwater fishes in the Mediterranean region
are recorded in Red Data Book Volume 4.

(* species breeds in these countries)

(** Geldiay, R. & Basoglu, M. (1976): Population Study and Conservation of Marine
Turtles living along the Aegean and Mediterranean Coast of Turkey. IUCN/WWF
grant application)

2. VERTEBRATES CONSIDERED TO BE THREATENED WITHIN
THEIR EUROPEAN RANGE

2.1 MAMMALS

1. V Rhinolophus ferrumequinum hibernate in caves, ruins and tunnels;
greater horseshoe bat relatively sedentary
Alb: Alg: Cy: Fr: Gr: Is: It: Leb: Mor: Spa: Syr: Tur: Yu:
2. V Phocoena phocoena shallow coastal waters and inland
common porpoise bays
Mor: Spa:
3. E Lutra lutra mainly inland waterways and marshes
common otter but also coastal areas (brackish or
salt water)
Alb: Alg: Fr: Gr: Is: It: Mor: Spa: Tun: Tur: Yu:
4. R Genetta genetta rocky wooded areas; has mainland
European genet and island habitats
Alg: Fr: Is: Lib: Mor: Spa: Tun:
5. R Felis sylvestris forested hills and mountain moorlands
European wild cat but also lowland forest
Alb: Eg: Fr: Gr: Is: It: Lib: Mor: Spa: Tun: Tur: Yu:
6. R Capra aegagrus maquis in mountainous areas, migrate
wild goat to lowlands in winter, occur on
numerous islands
Gr: It: Leb: Syr: Tur:

2.2 BIRDS

1. R Calonectris diomedea pelagic; breeds on rocky islands
Cory's shearwater
Alb: Alg: Cy*: Eg: Fr*: Gr*: Is: It*: Leb: Lib: Mal*: Mor*: Spa*:
Syr: Tun*: Tur*: Yu:
2. E Pelecanus onocrotalus lakes, delta regions
white pelican
Alb*: Eg: Gr*: Is: Leb: Syr*: Tur*: Yu*:
3. E Pelecanus crispus lakes, delta regions
Dalmatian pelican
Alb*: Eg: Gr*: Is: Leb: Syr: Tur*: Yu*:

(* breeds in these countries)

4. R Phalacrocorax pygmaeus fresh and brackish water lakes
pygmy cormorant
Alb*: Gr*: Tur*: Yu*:
5. E Egretta alba lakes, delta regions
great white egret
Cy: Eg: Gr*: Is: It: Leb: Syr: Tur*: Yu*:
6. R Platalea leucorodia shallow, fresh and brackish lakes
spoonbill
Alb: Alg: Cy: Eg: Fr: Gr*: Is: Leb: Mor: Spa*: Syr: Tun: Tur*: Yu*:
7. R Plegadis falcinellus lakes, delta regions
glossy ibis
Alb: Alg: Cy: Eg*: Fr: Gr*: Is: It*: Leb: Mor: Tun: Tur*:
8. E Phoenicopterus ruber : shallow lakes in delta regions
greater flamingo
Alg: Cy: Eg: Fr*: Is: Leb: Mor: Spa*: Syr: Tun: Tur*:
9. E Anas angustirostris shallow fresh and brackish lakes
marbled teal and marshes
Alg: Eg*: Fr*: Gr*: Is*: Leb*: Lib: Mor*: Spa*: Syr*: Tun*: Tur*:
10. E Oxyura leucocephala shallow lakes
white-headed duck
Alg*: Alb*: Fr*: It*: Mor*: Spa*: Tun*: Tur*: Yu:
11. E Aquila heliaca lowland forests, low open country
imperial eagle
Alb*: Cy: Eg: Gr*: Is: Leb: Mor: Spa*: Syr: Tur: Yu*:
12. E Haliaeetus albicilla rocky coasts, large lakes
white-tailed eagle
Alb*: Cy: Gr*: It: Tur*: Yu*:
13. E Falco peregrinus open country, forests, sea cliffs
peregrine
Alb*: Alg*: Cy*: Eg: Fr*: Gr*: Is: It*: Mor*: Spa*: Syr: Tun*: Tur*: Yu*:
14. R Falco eleonora rocky islands, sea cliffs
Eleonora's falcon
Alg*: Cy*: Gr*: It*: Spa*: Tun*: Tur*:
15. E Porphyrio porphyrio marshes
purple gallinule
Alg: Eg: Gr: It: Leb: Mor*: Spa*: Syr*: Tun*:

(* breeds in these countries)

16. E Fulica cristata shallow lakes
crested coot
Mor*: Spa*:
17. R Vanellus spinosus open country near water
spur-winged plover
Eg*: Gr*: Is: Leb*: Syr*: Tur*:
18. E Larus genei coastal lagoons
slender-billed gull
Alg: Cy: Fr*: It: Is: Leb: Mor: Spa*: Syr: Tun*: Tur*:
19. R Gelochelidon nilotica flat, low coasts
gull-billed tern
Alb*: Alg: Cy: Fr*: Gr*: Is: It*: Leb: Mor: Spa*: Syr: Tun*: Tur*: Yu:

2.3 AMPHIBIANS AND REPTILES

1. I Alytes obstetricans gravel pits and other water systems
midwife toad
Fr: Spa:
2. I Pelobates cultripes sandy soils; various types of
European spadefoot toad water bodies
Fr: Spa:
3. I Bufo calamita considerable adaptability: swampy
natterjack toad areas, prefers gravel pits
Fr: Spa:
4. I Bufo viridis swamps, gravel pits; normally
green toad remains in vicinity of breeding
ponds
Alg: Cy: Fr: Mor: Tun:
5. I Hyla meridionalis clean shallow water with dense
Mediterranean tree frog aquatic vegetation, normally in
vicinity of deciduous forest
Fr: It: Mor: Spa:
6. I Mauremys caspica rivulata fresh and brackish water with
Caspian turtle dense vegetation
Alb: Cy: Gr: Is: Syr: Tur: Yu:
7. I Mauremys caspica leprosa fresh and brackish water with
Spanish turtle dense vegetation
Alg: Eg: Is: Lib: Mor: Spa: Tun:

(* breeds in these countries)

PRELIMINARY NOTES TOWARDS A LIST OF RARE AND THREATENED PLANTS
FOR THE EUROPEAN COAST OF THE MEDITERRANEAN

by S.M. Walters¹ and A.H.M. Syngé²

Introduction

The lists below are derived from the 'List of Rare, Threatened and Endemic Plants for the Countries of Europe', produced by the IUCN Threatened Plants Committee under contract to the Council of Europe and shortly to be published. The work is based on information generously supplied by botanists throughout the continent. The IUCN Red Data Categories, defined in Section 5 below, are used as criteria for inclusion, with only species rare or threatened on a European (continental) scale being covered.

The lists presented here are of a very provisional nature for the following reasons:

1. There are about 1,000 species still under consideration for inclusion in the full European List (out of a total of c. 7,000 species screened).
2. In the time limits available for this paper it has not been possible for the TPC to contact correspondents as to deciding which of the species on the List are truly coastal and maritime. Instead the TPC Secretariat has made a selection, working from Flora Europaea and country Floras. It has not been possible in many cases to determine the habitat accurately enough from the available published literature and only species about which accurate information is available have been included. The short notes on habitat and distribution are taken from these works. The section of Spain is particularly thin. For the Balearic Islands a full list of rare and threatened endemic species is given (as Section 3) since it is not realistic to separate coastal from other species for islands of this size. The flora of Greece presents special problems which are discussed in Section 4.

The whole aspect of habitats and distributions will become much clearer as the TPC Red Data Bulletins become available for each country. Correspondents are being asked to prepare detailed paragraphs on each listed species, giving information on habitat, distribution, threats and if possible some indication of population size for each species. Such bulletins are at present being put together for the Balearic Islands, the Canary Islands and Crete as well as numerous areas outside the Mediterranean.

3. At this stage only single country endemic species have been included.

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This paper does not attempt to give a detailed ecological analysis of the data presented but a few general remarks can usefully be made. It is well known that the narrowly endemic species of Europe are overwhelmingly concentrated in the countries of southern Europe bordering on the Mediterranean. For example Greece has over 670 endemic species of plants compared with 15 in the United Kingdom. These narrowly endemic species comprise the largest section of the List and must be the primary concern of any programme of floristic conservation. However, the majority of these endemics are chasmophytes (plants adapted to growing on cliffs or steep rocky surfaces) or mountain plants, if not both, whose habitats are not in general so urgently or widely threatened as the lowland and coastal habitats. Most of the coastal species in the Mediterranean are not narrowly endemic and many occur in both North Africa and Europe. However, most of the relatively few endemics that are coastal must be considered as threatened, the main exception being those on maritime cliffs, although in many cases these cliff plants have extremely low populations and their survival must be considered at risk if not in immediate danger. Species growing in maritime sands or on coastal rocks are particularly threatened. An example would be Liyosotis ruscinonensis which grew in grass or coastal sands on the south coast of France. It is now believed extinct.

The List is preceded by the TPC 'threat list' which it is felt might be helpful in this regard. At the end of the list are given a few detailed case histories on threatened coastal plants of the Mediterranean. These perhaps give a much better indication of the threats and the situations which have arisen. These sheets will be included in the IUCN Red Data Book for plants which it is hoped will be published in 1977-78 covering about 250-300 case histories on a representative selection of threatened plants from around the world. The sheets show clearly the unique threats and situations facing such species and demonstrate the need for a case by case approach. Each situation will need to be treated differently.

It is regretted that the TPC does not at present have similar data at the list level for North Africa and the Middle East. Such a project is only now just under way, in collaboration with the newly formed Organization for the Phytotaxonomic Investigation of the Mediterranean Area (OPTIMA), but at the present time the project still lacks adequate funding.

1. 'THREAT-LIST'

1. Agriculture

- 1.1 Drainage (with associated loss of the wetland habitat and lowering of the water-table).
- 1.2 Ploughing of old grassland.
- 1.3 Over-grazing (e.g. from goats, sheep, rabbits).
- 1.4 Under-grazing, resulting in scrub regeneration.
- 1.5 Introduction of heavy machinery (compaction of soil).
- 1.6 Spraying (insecticides, herbicides).
- 1.7 Changes in fertiliser practice.
- 1.8 Monocultures.

2. Traditional rural practices and peasant agriculture

(either in or out of equilibrium)

3. Forestry

- 3.1 Plantation monocultures.
- 3.2 Felling (selective or total).

4. Industrialization and Urbanization

- 4.1 Mining and quarrying.
- 4.2 Dams for power and water (with associated flooding).
- 4.3 Infilling (e.g. of wetland areas).
- 4.4 Road building.
- 4.5 Building of houses and factories.

5. Pollution

- 5.1 Air.
- 5.2 Water (e.g. causing turbidity, eutrophication).
- 5.3 Soil (e.g. by heavy metals).

6. Tourism and Tourist Developments
 - 6.1 Coastal.
 - 6.2 Inland.
7. Introduced plant species

(lack of predators)
8. Disease
9. Collectors
 - 9.1 Botanical.
 - 9.2 Horticultural.
10. Natural causes

(e.g. critically low populations)

2. PROVISIONAL LIST OF RARE AND THREATENED SINGLE-COUNTRY ENDEMIC SPECIES
OF THE MEDITERRANEAN COAST OF EUROPE

	<u>Category</u>	<u>Habitat & Distribution</u>
1. <u>BALEARIC ISLANDS</u>		
See below:		
2. <u>CORSICA</u>		
PLUMBAGINACEAE		
<u>Armeria solcirolii</u> (Duby) Godron	T	Maritime rocks or sands, nr. Calvi
3. <u>FRANCE</u>		
BORAGINACEAE		
<u>Myosotis ruscinonensis</u> Rouy		On coastal sand dunes, Albères
CARYOPHYLLACEAE		
<u>Arenaria provincialis</u> Chater and Halliday	V	Rocky and sandy places, nr. Marseille and Toulon
COMPOSITAE		
<u>Centaurea corymbosa</u> Pourret	V	Maritime rocks, nr. Narbonne
4. <u>GIBRALTAR</u>		
PLUMBAGINACEAE		
<u>Limonium emarginatum</u> (Willd.) Kuntze	R	Rocks near the sea
5. <u>GREECE</u>		
See below:		

For species marked by an asterisk, a departure from Flora Europaea is involved, either in nomenclature, taxonomy or distributional data. Further information on individual cases can be given by the TPC Secretariat at Kew on request.

For species marked by a cross only part of the population is coastal. In these cases, the category refers to the country (and world) status but the habitat and distributional data refers to coastal populations only.

6. ITALY

Category Habitat & Distribution

CAMPANULACEAE

<u>Campanula isophylla</u> Moretti	R	Limestone rock-crevices, coast S.W. of Savona
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CHENOPODIACEAE

<u>Kochia saxicola</u> Guss.	E	Maritime rocks and cliffs; Islands of Ischia, Capri and Stromboli
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* <u>Salicornia veneta</u> Pignatti and Lausi	E	Laguna di Venezia
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COMPOSITAE

<u>Calendula suffruticosa</u> Vahl ssp. <u>maritima</u> (Guss.) Meikle	E	Maritime sands and gravels, W. Sicilia
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CRUCIFERAE

<u>Brassica macrocarpa</u> Guss.	E	Maritime rocks, Isole Egadi
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<u>Iberis semperflorens</u> L.	R	Rock-crevices on maritime cliffs, Sicilia and W. coast of Italy; cultivated elsewhere and rarely escaping
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DIPSACACEAE

X <u>Scabiosa limonifolia</u> Vahl		Isla Marettimo
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IRIDACEAE

<u>Crocus otuscus</u> Parl.	R	Archipelago Toscana and adjoining mainland
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LEGUMINOSAE

<u>Cytisus abolicus</u> Guss. ex Lindl.		Isole Eolie
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LILIACEAE

<u>Muscari gussonei</u> (Parl.) Tod.	E	Maritime sands, Sicilia and Calabria
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PLUMBAGINACEAE

<u>Limonium inarimense</u> (Guss.) Pignatti ssp. <u>inarimense</u>	V	Maritime rocks and cliffs, Golfo di Napoli
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<u>Limonium johannis</u> Pignatti	V	Volcanic maritime cliffs, S.W. Italy and Sicilia
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<u>Limonium pancrimitanum</u> (Tod.) Pignatti	V	Maritime cliffs, nr. Palermo
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	<u>Category</u>	<u>Habitat & Distribution</u>
<u>Limonium parvifolium</u> (Tineo) Pignatti	V	Pantelleria
<u>Limonium remotispiculum</u> (Lacaita) Pignatti	V	Maritime cliffs, S.W. Italy, (39°40'-40°40'N.)
<u>Limonium tenoreanum</u> (Guss.) Pignatti	V	Maritime cliffs, nr. Castellammare
PRIMULACEAE		
<u>Primula palinuri</u> Petagna	R	See Red Data Sheet
RUBIACEAE		
X <u>Asperula rupestris</u> Tineo	R	Isole Egadi
<u>Galium litorale</u> Guss.	E	Maritime sands, W. Sicilia
UMBELLIFERAE		
<u>Bupleurum dianthifolium</u> Guss.	V	Calcareous rocks, N. side of island of Marettimo
7. <u>MALTA</u>		
COMPOSITAE		
<u>Palaeocyanus crassifolius</u> (Bertol.) Dostál	R	Maritime cliffs, Malta and Gozo
8. <u>SARDINIA</u>		
CAMPANULACEAE		
X <u>Campanula forsythii</u> (Arcang.) Podlech	V	Island of Tavolara
COMPOSITAE		
<u>Buphthalmum inuloides</u> Moris	V	Extreme N. of Sardinia and adjacent islets
<u>Centaurea horrida</u> Badaro	E	Maritime rocks, islets of Asinara and Tavolara
<u>Hyoseris taurina</u> (Pampan.) Martinoli	R	Rocks, crevices, Isola il Toro
LEGUMINOSAE		
* <u>Astragalus maritimus</u> Moris	E	
* <u>Astragalus verrucosus</u> Moris	E	Coastal meadows

	<u>Category</u>	<u>Habitat & Distribution</u>
PLUMBAGINACEAE		
<u>Limonium hermaeum</u> (Pignatti) Pignatti	R	Island of Tavolara
<u>Limonium lactum</u> (Nyman) Pignatti	V	W. coast
<u>Limonium lausianum</u> Pignatti	R	Slopes near the sea, nr. Oristano
9. <u>SPAIN</u>		
COMPOSITAE		
<u>Anacyclus alboranensis</u> Esteve and Vara	E	Island of Alborán
<u>Atractylis tutinii</u> Franco		Dry calcareous stony slopes, 20-50 m. Cabo de Gata
<u>Senecio alboranicus</u> Maire	E	Island of Alborán
CRUCIFERAE		
<u>Diploaxis siettiana</u> Maire	E	Island of Alborán
X <u>Guiraoa arvensis</u> Coss.	V	Disturbed habitats in the tourist zone nr. Alicante
GENTIANACEAE		
<u>Centaurea rigualii</u> Esteve Chueca	R	Dry grassland a few km. from coast, Murcia province
GERANIACEAE		
<u>Erodium sanguis-christi</u> Sennen	R	Dry limestone rocks near the sea, E. Spain
LABIATAE		
<u>Teucrium charidemi</u> Sandwith	R	Cabo de Gata
<u>Teucrium intricatum</u> Lange	R	Maritime rocks, Sierra de Gáder
PLUMBAGINACEAE		
<u>Limonium calaminare</u> Pignatti ex Pignatti	R	Zinc-rich soils nr. Cartagena
<u>Limonium gibertii</u> (Sennen) Sennen	R	Calcareous cliffs nr. Tarragona

	<u>Category</u>	<u>Habitat & Distribution</u>
<u>Limonium lucentinum</u> Pignatti and Freitag	R	Maritime salt-marshes nr. Alicante
<u>Limonium parvibracteatum</u> Pignatti	R	Calcareous slopes near the sea, nr. Calpe
PRIMULACEAE		
<u>Coris hispanica</u> Lange	V	Clay soils and maritime rocks, S. of Vera.
SCROPHULARIACEAE		
<u>Antirrhinum charidemi</u> Lange	E	100-200 m. Sierra de Cabo de Gata
<u>Lafuentea rotundifolia</u> Lag.	R	Rock-crevices and under overhanging rocks, along the littoral from Malaga to Orihuela
<u>Linaria nigricans</u> Lange	R	Sandy places, Cabo de Gata
10. <u>YUGOSLAVIA</u>		
ASPLENIACEAE (Pteridophyta)		
<u>Phyllitis hybrida</u> (Milde) Christensen	R	Islands of N.W. Yugoslavia
COMPOSITAE		
<u>Centaurea crithmifolia</u> Vis.	R	
<u>Centaurea dalmatica</u> A. Kerner	R	Maritime rocks, N.W. Yugoslavia
<u>Centaurea friderici</u> Vis.	R	Islands of C. Adriatic
* <u>Centaurea spinosociliata</u> Seenus	R	Maritime rocks
PLUMBAGINACEAE		
<u>Limonium vestitum</u> (C.E. Salmon) C.E. Salmon	R	Adriatic Islands of Jabuka (Pomo) and Kamik (W.S.W. of Split)
RUBIACEAE		
<u>Asperula baldacii</u> (Halácsy) Ehrendorfer	R	Rock-crevices, calcicole, coastal mountains of S. Crna Gora (nr. Bär)
<u>Asperula staliana</u> Vis.	R	Islands off coast of N.W. Yugoslavia

3. LIST OF RARE AND THREATENED SPECIES ENDEMIC TO THE BALEARIC ISLANDS

(including non-coastal species)

COMPOSITAE

Launaea corviconis (Boiss.) Font Quer and Rothm. R

CRUCIFERAE

Brassica balearica Pers. R

EUPHORBIACEAE

Euphorbia maresii Knoch R

GUTTIFERAE

* Hypericum hircinum L. ssp. cambessedesii (Coss. ex Marès and Vigineix) Sauvage V

LEGUMINOSAE

Astragalus balearicus Chater R

Genista dorycnifolia Font Quer R

Vicia bifoliolata J.D. Rodriguez ? Ex

PAEONIACEAE

Paeonia cambessedesii (Willk.) Willk. V

PLUMBAGINACEAE

Limonium biflorum (Pignatti) Pignatti R

Limonium majoricum Pignatti R

Limonium oleifolium Miller ssp. pseudodictyocladum (Pignatti) Pignatti R

PRIMULACEAE

Lysimachia minoricensis J.D. Rodriguez Ex

Primula vulgaris Huds. ssp. balearica (Willk.) W.W. Smith and Forrest V

RANUNCULACEAE

* Helleborus lividus Aiton V

Ranunculus weyeri Marès E

SELANGINACEAE

Globularia cambessedesii Willk. R

THYMELAEACEAE

Daphne rodriguezii Texidor (See Red Data Sheet) R

UMBELLIFERAE

<u>Bupleurum barceloi</u> Coss. ex Willk.	R.
<u>Ligusticum lucidum</u> Miller ssp. <u>huteri</u> (P. Porta and G. Rigo) O. Boles	R
<u>Naufraga balearica</u> Constance and Cannon (See Red Data Sheet)	R
<u>Pimpinella bicknellii</u> Briq.	V

VIOLACEAE

<u>Viola jaubertiana</u> Marès and Vigineix	E
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4. GREECE

No attempt has been made at this stage to produce a list of rare and threatened species for the coasts of Kriti and mainland Greece because there is no up-to-date Flora and because of the very large number of species involved. The following examples for this area may however prove useful:- for Kriti, Anthemis filicaulis (Boiss. and Heldr.) Greuter (Rare), Hypericum aciferum (Greuter) N.K.B. Robson (Endangered) and Phoenix theophrasti Greuter (Vulnerable, see Red Data Sheet); for the mainland of Greece, Centaurea heldreichii Halacsy (Endangered) and Goniolimon sarterii Boiss. (Rare).

For most islands, there is no easy distinction between coastal and other species. Thus the list below for the Greek Islands (excluding Kriti and Evvoia) includes all the rare and threatened species endemic to Greece that occur in this area. Species also occurring in mainland Greece, Evvoia and Kriti are marked by a cross; in these cases the category refers to the country (and world) status.

It is stressed that this list is only very provisional and like the other sections of this paper is likely to be considerably modified in the light of further experience.

BORAGINACEAE

<u>Anchusa sarterii</u> Heldr. ex Guşul.	R
<u>Anchusa spruneri</u> Boiss.	T
<u>Procopiana insularis</u> Pawl.	R
<u>Symphytum cycladense</u> Pawl.	E
<u>Symphytum davisii</u> Wickens	R
<u>Symphytum icaricum</u> Pawl.	R
<u>Symphytum naxicola</u> Pawl.	R

CAMPANULACEAE

<u>Asyneuma giganteum</u> (Boiss.) Bornm.	V
<u>Campanula carpatha</u> Halacsy	R
<u>Campanula hagiella</u> Boiss.	R
* <u>Campanula heterophylla</u> L.	R
<u>Campanula merxmülleri</u> Phitos	T
<u>Campanula rechingeri</u> Phitos	R
<u>Campanula roiseri</u> Halacsy	E
<u>Campanula sarterii</u> Boiss. and Heldr.	R
<u>Campanula sciathia</u> Phitos	R
<u>Campanula scopelia</u> Phitos	R
<u>Campanula sporadum</u> Fear	R
* <u>Symphyandra samothracica</u> (Degen) Halacsy	V
* <u>Symphyandra sporadum</u> Halacsy	R

CARYOPHYLLACEAE

* <u>Arenaria litoralis</u> Phitos	T
<u>Cerastium runemarkii</u> Müschl and Rech.f.	T
* <u>Dianthus fruticosus</u> L.	R
X <u>Silene ammophila</u> Boiss. and Heldr.	R
<u>Silene cythnia</u> (Halacsy) Walters	R
* <u>Silene holzmännii</u> Heldr. ex Boiss. (Sec Red Data Sheet)	V
<u>Silene insularis</u> Barbey	R
X <u>Silene pentelica</u> Boiss.	R

COMPOSITAE

<u>Anthemis glaberrima</u> (Rech.f.) Greuter	E
<u>Anthemis rhodensis</u> Boiss.	T
<u>Anthemis wernerii</u> Stoy. and Acht.	T
<u>Carlina diac</u> (Rech.f.) Meusel and Kästner	V
<u>Centaurea cytherea</u> Rech.f.	T
<u>Centaurea ipsaria</u> Stoy. and Kit.	R
<u>Centaurea lactucifolia</u> Boiss.	R
<u>Centaurea oliverana</u> DC.	R
<u>Centaurea rechingeri</u> Phitos	R
<u>Centaurea xylobasis</u> Rech.f.	R
X <u>Crepis tybakiensis</u> Vierh.	R
<u>Helichrysum amorginum</u> Boiss. and Orph.	R
<u>Onopordum rhodense</u> Boiss. ex Rech.f.	T
<u>Scorzonera scyria</u> M. Gustafsson and Snogerup	R
X * <u>Senecio gnaphalodes</u> Sieber	R
<u>Stachelina fruticosa</u> (L.) L.	R

CRUCIFERAE

* <u>Aethionema retsina</u> Phitos and Snogerup	R
<u>Alyssum lesbiacum</u> (Candargy) Rech.f.	R
X * <u>Alyssum tenium</u> Halácsy	R
<u>Aubrieta scyria</u> Halácsy	R
X * <u>Erysimum candicum</u> Snogerup	R
* <u>Erysimum naxense</u> Snogerup	R
<u>Erysimum rechingeri</u> S. Jávorka	T
<u>Iberis arbuscula</u> Runemark	E
<u>Ricotia isatoides</u> (Barbey) B.L. Burtt	R
<u>Rorippa icarica</u> Rech.f.	R
X * <u>Thlaspi bulbosum</u> Spruner ex Boiss.	R

GRAMINEAE

<u>Festuca pseudosupina</u> Vetter	R
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GUTTIFERAE

X <u>Hypericum athoum</u> Boiss. and Orph.	R
X <u>Hypericum delphicum</u> Boiss. and Heldr.	R

LABIATAE

<u>Nepeta scordotis</u> L.	R
X <u>Origanum tournefortii</u> Aiton	R
<u>Origanum vetteri</u> Briq. and Barbey	R
* <u>Phlomis pichleri</u> Vierh.	R
<u>Stachys spreitzenhoferi</u> Helder.	R

LEGUMINOSAE

X <u>Anthyllis aegaea</u> Turrill	R
<u>Astragalus austraegaeus</u> Rech.f.	R
<u>Colutea insularis</u> Browicz	T
* <u>Genista melia</u> Boiss.	? Ex
X * <u>Genista parnassica</u> Halácsy	R
<u>Lotus aduncus</u> (Griseb.) Nyman	R
* <u>Medicago heymaniana</u> Greuter	T
? X <u>Trigonella rechingeri</u> Sirj.	R

LILIACEAE

<u>Allium luteolum</u> Halácsy	R
<u>Colchicum rhenium</u> Helder.	T
<u>Fritillaria rhodia</u> Hansen	T
<u>Fritillaria rhodocanakis</u> Orph. ex Baker	R
<u>Fritillaria tuntasia</u> Helder. ex Halácsy	R
X <u>Muscari dionysicum</u> Rech.f.	R
X <u>Tulipa goulinskyi</u> Scaly and Turrill	T

LINACEAE

* <u>Linum gyaricum</u> Vierh.	R
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ORCHIDACEAE

X <u>Ophrys angelica</u> Fleischm.	R
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PAEONIAEAE

<u>Paeonia rhodia</u> W.T. Stearn	V
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PAPAVERACEAE

? X * <u>Papaver nigrotinctum</u> Fedde	R
<u>Papaver stipitatum</u> Fedde	T

PLUMBAGINACEAE

X <u>Goniolimon sartorii</u> Boiss.	R
<u>Limonium carpathum</u> (Rech.f.) Rech.f.	R
? X <u>Limonium frederici</u> (Barbey) Rech.f.	R

POLYGONACEAE

Polygonum leavicum Rech.f.

R

RANUNCULACEAE

Consolida samia P.H. Davis

E

Delphinium hirschfeldianum Heldr. and Holzm.

T

Myosurus heldreichii H. Lév.

? Ex

* Nigella carpatha Strid

R

Nigella icarica Strid

R

X * Nigella stricta Strid

R

X Ranunculus creticus L.

R

X Ranunculus subhemophyllus (Halácsy) Vierh.

R

* Ranunculus thasius Halácsy

R

ROSACEAE

* Crataegus acigeica Pojark.

R

RUBIACEAE

Asperula abbreviata (Halácsy) Rech.f.

R

X Asperula taygetea Boiss. and Heldr.

R

X Asperula tournefortii Sieber ex Sprengel

R

Galium reiseri Halácsy

R

SANTALACEAE

Thesium coarctiflorum Hendrych

R

SCROPHULARIACEAE

X Digitalis leucophaea Sibth. and Smith

R

Scrophularia spinulescens Degen and Hausskn.

T

Verbascum adeliae Heldr. ex Boiss.

R

Verbascum cylindrocarpum Griseb.

T

Verbascum ikaricum Murb.

R

Verbascum syriacum Schrader

V

UMBELLIFERAE

Bupleurum aira Snogerup

R

? X * Eryngium amarginum Rech.f.

R

Ferulago insularis H. Wolff

T

X Ferulago sartorii Boiss.

R

* Pimpinella pretenderis (Heldr.) Orph. ex Halácsy

R

? X * Scaligeria halophila (Rech.f.) Rech.f.

R

X * Scaligeria moreana Engstrand

R

5. DEFINITIONS OF THE IUCN RED DATA CATEGORIES

Extinct (Ex)

Possibly or Presumed Extinct (? Ex)

Endangered (E)

Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating.

Included are taxa whose numbers have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Vulnerable (V)

Taxa believed likely to move into the endangered category in the near future if the causal factors continue operating.

Included are taxa of which most or all the populations are decreasing because of over-exploitation, extensive destruction of habitat or other environmental disturbance; taxa with populations that have been seriously depleted and whose ultimate security is not yet assured; and taxa with populations that are still abundant but are under threat from serious adverse factors throughout their range.

Rare (R)

Taxa with small world populations that are not at present endangered or vulnerable, but are at risk.

These taxa are usually localized within restricted geographical areas or habitats or are thinly scattered over a more extensive range.

Threatened (T)

Threatened is used in the conservation context for species which are in one of the three categories, Endangered, Vulnerable or Rare. Species are marked as Threatened where it is known that they are Endangered, Vulnerable or Rare, but there is not enough information to say which of the three categories is appropriate.

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Silene holzmannii Heldr. ex Boiss.

CARYOPHYLLACEAE

STATUS Vulnerable; as an annual confined to minute islands in the E. Mediterranean, it is very susceptible to short-term grazing. A few goats left on such an island for a short time can totally destroy the flora. It is likely that Silene holzmannii has been obliterated on several islands, particularly where grazing animals have been introduced.

DISTRIBUTION Greece; it is only known from 13 scattered localities in the Aegean from Attica to Crete, though it has never been found either on Crete itself or on the mainland of Greece. (2, 4)

HABITAT AND ECOLOGY It only occurs on very small islands. The best known site is a reef consisting of 2 rocks c. 150 m. long, close to the Cretan coast. Here it grows in a precisely balanced but very diverse community of 14 Angiosperm species, made up of 4 elements:- halophytes such as Mesembryanthemum nodiflorum L.; members of the phrygana such as the shrubby Pistacia lentiscus L.; rupicolous elements such as Scorzonera cretica Willd.; and the characteristic small island element, the Silene and Salsola carpatha P.H. Davis. Thus the vegetation is surprisingly dissimilar to that of the Cretan coast. This delicate and unusual community is now becoming vulnerable to tourist pressures since it is within easy swimming distance of one of the most popular beaches on Crete. (2) The flora of a similar island described in 1895 (3) had been completely obliterated by 3 goats when visited by Greuter in 1963. (2).

CONSERVATION MEASURES TAKEN None. A detailed survey (2) of this species, in particular of its ecology as summarized above, was made by Greuter.

CONSERVATION MEASURES PROPOSED Care should be taken that none of the islands on which it occurs are used for short-term grazing. It would be advisable for several of them to be declared as reserves.

BIOLOGY AND POTENTIAL VALUE It is a very interesting plant as it appears to be one of the few survivors of a "sublittoral" flora, most of which has disappeared. Its distributional history has been the subject of speculation (2, 4) and it is one of the examples on which Runemark based the theory of Reproductive Drift, in which the risk of random extinctions of a small population can be estimated by evaluating the significance of numerical deviations in population size over successive generations. (4). Random extinctions may well be a major factor in its strangely disjunct distribution. Silene holzmannii is also interesting as it is the only species of the genus with hard, indehiscent fruits, preadapted to floating and impermeable to salt water. The seeds, thus protected, can drift on the sea for up to 40 days without losing their viability. (2)

BOTANY Hairless annual up to 20 cm. or more high bearing lance-shaped leaves 2-3 cm. long in pairs up the stout single stem. At the top are several small overlapping flowers on short stalks, arranged in a dichasium (the central ones opening first). Calyx green, somewhat inflated at flowering time, later papery and appressed to the fruit; petals 5, small, dull-coloured, bilobed. Capsule ovoid, indehiscent, 10-12 mm. long, containing black seeds with parallel-sided spines. The differences between this species and its close relatives, S. behen L. and S. reinholdii Heldr., are given in (2).

The type specimen is Heldreich No. 31 from Arpedhoni reef in the strait between Attica and Salamis, gathered by Th. de Heldreich and J. Holzmann in May 1877.

For a line drawing see (2).

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Phoenix theophrasti Greuter

Cretan Date Palm

PALMAE

STATUS Vulnerable; a many-stemmed Mediterranean palm known only from five coastal localities. In much the largest locality at Vai it is threatened by tourists, by people camping under the trees and by cars driven into the centre of the grove, all of which prevents regeneration. It is also at risk from drainage schemes. In the other four localities it only occurs in very small numbers; in one of these it was evidently declining in 1967 (3) and consisted only of some sparse, low scrub; in 1973 there was evidence of a little regeneration.

DISTRIBUTION Crete; the main locality is near Vai on the N.E. tip of the island and is a major tourist attraction. Here the palms cover the bottom of a small valley for about 1 km., leading to a sandy and sheltered beach. Of the four other localities, three are scattered along the S. coast; the other one, mentioned above, is on the north coast W. of Iraklion. There are also occasional specimens on the N. coast. It is uncertain whether it ever extended beyond Crete, but in the past it must have been more widespread on the island for it is pictured on Roman coins minted in Ierapetra where it no longer occurs. Obviously the palm thickets existing today are the result of the degradation of natural groves which have been cut or burnt by man and have sprouted from the base. (3)

Out of 150 species known to be endemic to Crete, 97 are believed to be rare or threatened. Fortunately 79 of these fall into the "Rare" category, reflecting their very localised distribution and, in many cases, their inaccessibility in the mountains, especially in crevices of vertical rock faces protected from grazing. Much of the endemic flora is of horticultural merit and includes species of Campanula, Colchicum, Crocus, Dianthus, Ebenus (Giant Clover), Helichrysum, Paeonia, Stachelina, Tulipa and the monotypic genus Petromarula of the Campanulaceae.

HABITAT AND ECOLOGY Usually on sandy alluvial sites close to the sea. It is always associated with a high water table and so any drainage of the area at Vai could result in the death of the palms. The same applies to any lowering of the water table by pumping to provide fresh water for local enterprises.

The Cretan Date Palm produces more than one stem from the base and thus in the wild can regenerate vegetatively as well as from seed. At Vai the dry lower fronds have been cut away to reduce the risk of fire. This has tended to prevent regeneration both because of the damage to the offshoots themselves and because of the constant movement of people between the trees which damages the seedlings. In the past the lower suckers around the main stems, with their spiny fronds, made much of the grove impenetrable. Fires lit by campers have also been a problem at Vai but these have now been prohibited.

CONSERVATION MEASURES TAKEN None.

CONSERVATION MEASURES PROPOSED (a) At Vai a management study is needed to ascertain how the survival of the palm grove can be reconciled with the pressures from the tourism it attracts. One possibility is fencing off an inner sanctum as a strict reserve. The situation of the water table should be carefully studied. (b) Consideration should be given to declaring one or more of the other sites as a strict reserve.

BIOLOGY AND POTENTIAL VALUE The Cretan Date Palm is undoubtedly the most unusual and striking member of the island's endemic flora. The spectacular grove at Vai is a major tourist attraction and has been used as a set for film-making. It is unique in Europe. The species has featured in botanical literature since the days of Theophrastus and is of considerable botanical importance as a close relative of the cultivated date palm, Phoenix dactylifera L. It could prove invaluable in the future for breeding new hybrid cultivars, e.g. with resistance to cold or to some pests and diseases.

CULTIVATION It is said to be easily grown from wild-collected seeds. (3)

BOTANY Palm up to about 10 m. high, each stem with several shorter side-shoots from the base, forming dense thickets or a mound with the dense foliage on the side-shoots hiding the main trunk. Each stem carries a dense head of slender, pinnate leaves 3-5 m. long, at first erect, then horizontal and pendent. The middle and upper pinnae are mostly 20-50 cm. long, each folded down the middle with a pungent tip; the lower pinnae, along the petiole, are transformed into hard spines. Male and female flowers on separate trees, both in large, much-branched panicles which in fruit are upright, enclosed by the leaf bases and have vivid yellow branches. Fruits ellipsoid, 14-16 mm. long, inedible, scarcely fleshy and yellowish-brown. The main differences from the cultivated date palm are the upright fruit clusters and the small inedible fruits.

The type specimen is Greuter 7650 from Vai, 2 October 1966.

For illustrations see (1), (2), (3) and (4).

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The TPC is most grateful to Sir Colville Barclay for help in producing this sheet.

Primula palinuri Petagna var.

Primula di Capo Palinuro, Primavera di Palinuro

PRIMULACEAE

STATUS Rare; although it is confined to a relatively small length of Mediterranean coast, it mostly grows on vertical rocks near the sea and is thus at present apparently safe from tourist developments. Nevertheless threats may well arise in future from the increasing use of the coast for tourism.

DISTRIBUTION Italy; it is confined to scattered localities on the coast of Campania, Lucania and Calabria between Cape Palinuro and Cape Scalea from 39°45' to 40°05'N. Most of the localities are in the vicinity of Cape Palinuro. There is a dot map of its exact distribution in (7). Some of the early records given in (8) are believed to be erroneous.

HABITAT AND ECOLOGY On vertical, N.-, N.W.- and W-facing rocks of sandstone and limestone, always near the sea. Associated species include Asplenium trichomanes L., Dianthus rupicola Biv., Iberis semperflorens L., Prasium majus L., Reichardia picroides L. Roth and Secura dasyphyllum L. The species tends to grow on the vertical sections whereas the larger shrubs such as Lonicera implexa Aiton with grasses such as Brachypodium grow on the ledges. Pizzolongo gives a detailed account of its ecology in (5) from which the above is taken. To some extent he distinguishes different communities on the sandstone and on the limestone. According to Pizzolongo, the open nature of the habitat, partly caused by landslips of the soft sandstone, is important for the survival of Primula palinuri and the species does not flower when shaded by other plants.

CONSERVATION MEASURES TAKEN There is a "Vincola idrogeologica" (literally translated "hydrogeological bond") on Cape Palinuro. The species is in cultivation.

CONSERVATION MEASURES PROPOSED Primula palinuri is included in a proposed list of species from Campania needing complete protection by law. The Nature Conservation Working Group of the Italian Botanical Society have proposed complete protection for c. 175 ha. of the Palinuri Promontory as a "Vincola paesaggistico" and acquisition by the Azienda di Stato per le Foreste Demaniali (ASFD). (1)

BIOLOGY AND POTENTIAL VALUE It is presumably pollinated by the larger bees and by Lepidoptera (Butterflies and Moths) as are its relatives. Individuals have either long or short styles which ensures cross pollination between them (heterostyly). It is a beautiful and fragrant species for the garden; it resembles a luxuriant plant of Aeonium (Sempervivum) arborescens and "this circumstance, together with the bright yellow corollas, almost pure white mealy calyces, pedicel, and involucre, and the seasons of its blossoming (March) render it a most desirable acquisition". (3)

CULTIVATION It can be raised easily from seed and is said to be vigorous and to increase rapidly, spreading by underground rhizomes. (3). In warm and dry climates some shade is needed.

BOTANY Rhizomatous perennial, with a rosette of leaves raised on a stout stem up to 7 cm. high, scarred with old leaf bases. Leaves more or less obovate, about 4-16 cm. long, pale green and toothed in the upper half. From the rosette emerges a scape (stalk) 3-20 cm. high carrying an umbel of about 5-25 sweet-scented, nodding, yellow flowers. Calyx 5-8 mm. long, cup-shaped, split into 5 triangular lobes and densely covered with a white, mealy deposit (as are the flower stalks and bracts). From it emerges the intense golden yellow, funnel shaped corolla consisting of a slender tube about 12-15 mm. long with a deep yellow ring inside and 5 rounded lobes at the tip. Capsule brown, more or less pear-shaped, 5-7 mm. long, enclosed in the calyx.

For illustrations see (2) and (9).

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The TPC is most grateful to the Nature Conservation Working Group of the Italian Botanical Society and in particular their Co-ordinator, Professor S. Filipello of the Istituto di Botanica, University of Pavia, for help in producing this sheet.

Daphne rodriguezii Texidor

THYMELAEACEAE

STATUS Rare possibly Endangered; all or nearly all the population restricted to a small inshore island of about 70 hectares and hence at risk. The adjacent coastline has been highly developed in recent years and is a major tourist attraction.

DISTRIBUTION Balearic Islands; it grows in some abundance on La Isla Colom off Menorca. It has also been recorded from a few coastal localities on Menorca itself, but it has not been seen there recently, despite extensive searches by Money-Coutts and Lesouëff and others, and the localities from which it was recorded have been greatly affected by tourist developments. (1)

The Balearics have an endemic flora of 50 Angiosperms of which 20 are believed to be rare or threatened and 2 Extinct. They tend to be plants of the high mountains, often very rare but not necessarily under any threat, or plants of the lowland maquis communities, threatened by intensified land use and tourist developments. It is remarkable how many of the endemics are attractive garden plants.

HABITAT AND ECOLOGY La Isla Colom is "stony and bare, swept by salt spray in winter and baked dry in summer". The species grows in dry, rocky ground and is abundant on much of the island among windswept shrubs of lentisk (Pistacia lentiscus L.), Cistus and heather (Erica). (1)

CONSERVATION MEASURES TAKEN It is being grown at the Hortus Balearicus Nursery, Mallorca and is being distributed to other gardens.

CONSERVATION MEASURES PROPOSED Care should be taken that La Isla Colom remains undisturbed and that no developments take place that would threaten its survival.

BIOLOGY AND POTENTIAL VALUE Daphne species make good garden plants and this species would be suitable for the rockery or alpine garden.

CULTIVATION "(It) seems to be thriving in the company of a clump of D. collina ... and D. jasminica" in the Hortus Balearicus, Mallorca, so is presumably not difficult to grow. (1)

BOTANY Small, dense, woody shrublet up to 60 cm. high with more or less smooth, greyish bark. Leaves narrowly obovate, 6-15 mm. long, dark green above, lighter beneath, with short, fine hairs (cilia) protruding from the margins. Flowers small and slightly fragrant, in clusters of 1 to 4; corolla a greenish tube c. 5 mm. long with 4 spreading, creamy-white lobes each c. 3 mm. long.

The type specimen was found by Rodriguez in 1866.

REFERENCE 1. Money-Coutts, H. (1968). Daphne rodriguezii Texidor. Jl. R. hort. Soc. 93(7): 300-301.

The type description by M.J. Texidor in 'Apuntas para la flora de Espana' has not been seen.

The TPC is most grateful to Mrs. L.F. Ferguson who provided the information for this species.

Naufraga balearica Constance and Cannon

UMBELLIFERAE

STATUS Rare; first discovered on Mallorca in 1962 but then not seen again for 7 years, despite extensive searches by several botanists. It was refound in 1969 growing "in profusion" in one, almost inaccessible locality on the coast. "(It) may well be more widespread on shaded, precipitous maritime cliffs on the N.W. of the island; but attempts to study the cliff faces from land were abortive and approach from the sea seems to be the only practical way of investigating these areas successfully". (2) It is apparently restricted to areas inaccessible to goats.

DISTRIBUTION Balearic Islands; it is confined to one or possibly more localities on the coastal cliffs of Mallorca. Its former distribution is unknown.

The Balearics have an endemic flora of 50 Angiosperms of which 20 are believed to be rare or threatened and 2 Extinct. They tend to be plants of the high mountains, often very rare but not necessarily under any threat, or plants of the lowland maquis communities, threatened by intensified land use and tourist developments. It is remarkable how many of the endemics are attractive garden plants.

HABITAT AND ECOLOGY On steep, damp limestone cliffs by the sea, facing north and permanently in shade. It forms dense communities on the upper slopes and in 'wind' erosion holes, generally growing on its own and not persisting with other species.

CONSERVATION MEASURES TAKEN It is in cultivation.

CONSERVATION MEASURES PROPOSED A coastal reserve is needed to preserve the vegetation of the cliff slopes.

BIOLOGY AND POTENTIAL VALUE Nothing is recorded of its biology, but pollination is probably by beetles and flies (Diptera). Seed set is probably adequate and the plants also spread to form small mats by means of short stolons.

It is of great phytogeographical and taxonomic interest. It is one of a small number of plants from the Balearics with their closest relatives in Australia, New Zealand or Chile, a startling phenomena first noticed by Knoche. (3) Such species are now thought to be probably Cretaceous relicts preserved by isolation. It is the only species in the genus and is probably most closely related to Schizeilema and Hydrocotyle of New Zealand and South America, but its relationships are still obscure. It is remarkable among the Umbelliferae for its mericarps (fruit lobes) suspended almost free from the flower-stalk and for its well-developed stipules. (1)

CULTIVATION It can be propagated from seed or from lateral shoots which root readily at the nodes.

BOTANY Small, delicate, tufted perennial herb, 2½-4 cm. high forming mats of rosettes of long-stalked leaves, each with 3 or 5 diminutive, ovate or oblong-ovate leaflets 1½-5 mm. long. Stems with a whorl of 2-4 leaves 5-10 mm. long of 3 leaflets, having papery, white stipules, and bearing in their axils slender stems 5-10 mm. long ending in simple umbels of 1-8 minute, white flowers, the petals 0.3 mm. long. Lobes of the fruit laterally flattened, truncate and hanging like a pair of saddle-bags from the top of the stalk. (1)

The type specimen is J. Duvigneaud 62 E 365 from Mallorca on 22 July 1962. For an illustration see (1).

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The TPC is most grateful to Mrs. L.F. Ferguson who provided the information for this species.