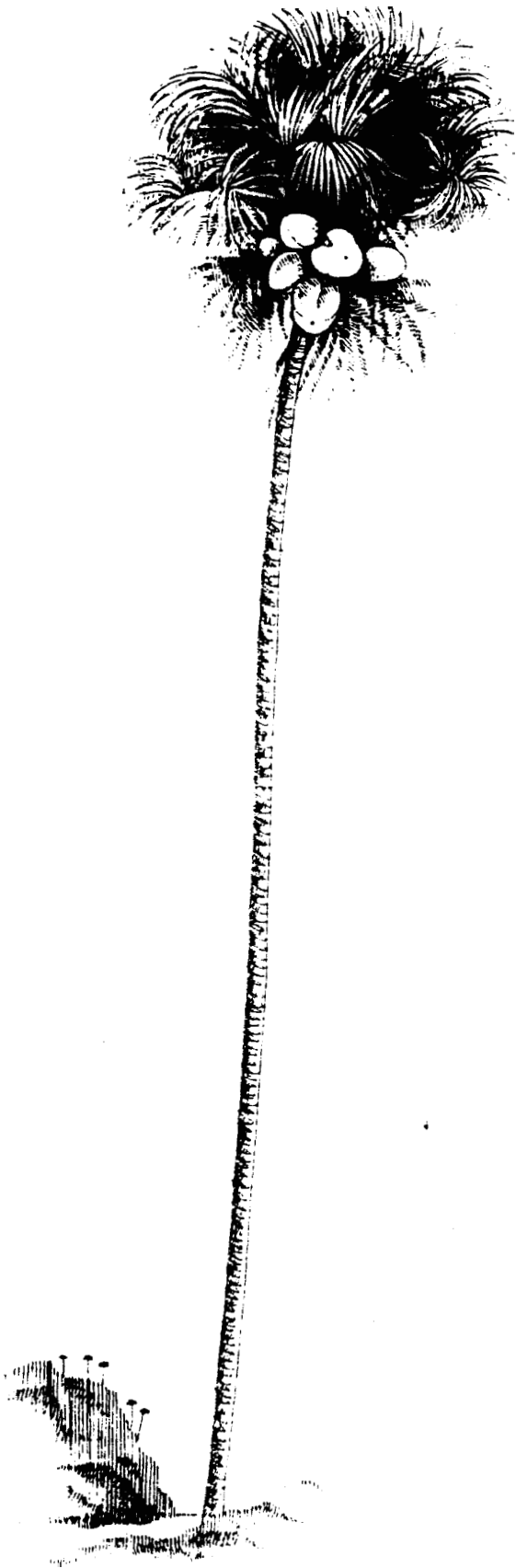


P. Romero

How to use  
the IUCN  
Red Data Book  
Categories



*Coco de Mer*

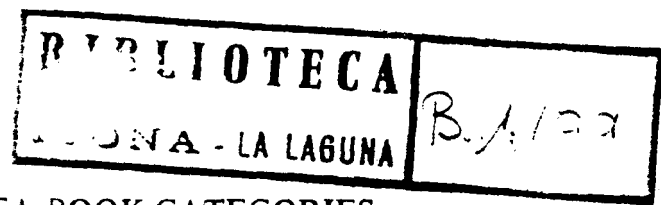
Threatened Plants Committee Secretariat,  
International Union for Conservation of Nature  
and Natural Resources.

c/o The Herbarium,  
Royal Botanic Gardens.

Kew,

Richmond.

Surrey TW9 3AB. England.



## THE RED DATA BOOK CATEGORIES

The Red Data Book Categories are used by IUCN to indicate the degree of threat to individual species in their wild habitats. They are used for both flora and fauna. Below are given formal definitions of the categories together with additional information and examples to clarify and interpret them for use by botanists.

### EXTINCT (Ex)

This category is only used for species which are no longer known to exist in the wild after repeated searches of the type localities and other known or likely places. As interpreted by IUCN, this includes species that are extinct in the wild but surviving in cultivation. Our interpretation follows that of the Smithsonian Institution in their "Report on Endangered and Threatened Plant Species of the United States" (1975).

### 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."

This is interpreted to mean including species with populations so critically low that a breeding collapse due to lack of genetic diversity becomes a possibility, whether or not they are threatened by man. An example would be a perennial reduced to 100 specimens occurring on one inaccessible cliff where no man-made threats are likely, but where a land-slide could remove the whole population.

### 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."

The categories 'Rare' and 'Vulnerable' have often been confused in the past or thought to be simply stages on a linear scale of increasing degrees of threat to species in danger. This is not the case because they represent the state of plants in fundamentally different situations, both of which can lead to the 'Endangered' category.

The 'Rare' species has a small world population but is under no known or immediate threat. It is not endangered but is simply at risk because of the size of its population. It may have a very restricted distribution, e.g. it may be endemic to a small island or a single mountain. Alternatively it may have a wider distribution but may be severely restricted by its habitat. The difference between risk and threat is best illustrated by an example: *Cyclamen mirabile* is only known at present from areas near Mugla and Isparta in southern Turkey and was not thought to be particularly in danger. Thus, it would have been classified as 'Rare'. However 50,000 corms were recently offered for sale, dug up by local collectors who mistook it for *C. neapolitanum*, a widespread and much cultivated species. No one could have predicted this unlikely fate, but it happened! To use another example, in Brazil there occur two species of plants, *Salvia saxicola* and a new species of *Tripogandra*, which are restricted to a small limestone outcropping near Brasília. Although under no immediate threat, they could be wiped out by an unusually bad fire or by such development activities as quarrying. The keynote of the 'Rare' species is that they may not need active protection but they do need monitoring to ensure their continued survival.

The borderline between 'Rare' and 'neither rare nor threatened' ('nt' - see below) is a difficult one. Considering the following factors may be helpful:

(1) Area of distribution. *Bidens hendersonensis*, which is endemic to Henderson Island (about 30 sq. km) in the Pacific, is 'Rare'. The plant is scattered over the island and there is little threat to its survival. On the other hand *Cyclamen creticum*, which is widespread and common on Crete (about 250 km long), and *Crocus cambessedesii*, which is very abundant on the Balearic Islands (one about 90 km long, the other about 40 km long), are 'nt'. None of these three species are greatly depleted.

When considering the area of distribution, the density of the population must also be borne in mind. The *Bidens* is 'Rare'; however, if there was a single endemic tree or shrub species which dominated Henderson Island, providing most of the ground-cover, that species would be considered 'nt' since it would be too numerous to be 'Rare' and of course neither depleted ('Vulnerable') nor in immediate danger of extinction ('Endangered'). There could be literally millions of individuals of a dominant species on an island of 30 sq. km, and this is a much bigger population than that of many species which occur over a wider area but are definitely not considered 'Rare' or 'Vulnerable'. Many of the European orchids are good examples of this form of distribution. Nevertheless, a plant which is restricted to a small area is obviously more at risk than one of a similar population which is more widely spread, and this should be taken into account.

In conclusion, most of the 'Rare' species will not only be endemic to a single mountain range or island but will also be either confined to one part of that area or not be very common throughout their range, unless the island is extremely small. An example would be Lundy Island (4 sq. km) off Great Britain where any endemic plant that was not under any immediate threat would be classified as 'Rare', however common or dominant it might be. It is easy to forget how large some islands are - for example Isabela in the Galapagos Islands is nearly 130 km long. When assigning Red Data Book Categories to lists of island endemics, 'Rare' should only

be used for those species that have *very restricted* distributions and/or *low* population densities, and of course that are under no immediate or known threat to their survival.

(2) **Population Size.** It was once considered that any species with less than 20,000 individuals should be considered 'Rare'. The figure is perhaps in the correct order of magnitude and as such is a useful guide. However, there can be no hard and fast rule since some species have a much greater reproductive capacity than others. The situation is complex and each case must be decided on its own merits.

When a species of such a limited distribution comes under threat and starts to become depleted, it should be transferred to the 'Vulnerable' category if threatened over part of its range, or to the 'Endangered' category if all the population is under threat.

In contrast the 'Vulnerable' species is one that is (or was) more widespread but has become *depleted*. The critical difference between a 'Rare' species and a 'Vulnerable' one is that the former has a relatively stable population while the latter is on the decline. At one extreme of the category 'Vulnerable' are species which have a very wide range but have become massively depleted. They may have been common previously, but will probably have had scattered distributions, usually occurring in small colonies (e.g. wetland species) or as occasional single specimens (e.g. many rain forest trees). At the other extreme are species which have moderately small distributions (e.g. are restricted to an island the size of Crete or Tasmania). *Crocus cambessedesii* was cited above as an example falling into the 'nt' rather than the 'Rare' category. If it becomes depleted, it should then be transferred to the 'Vulnerable' category.

#### **INDETERMINATE (I)**

**"Taxa known to be Extinct, Endangered, Vulnerable or Rare but where there is not enough information to say which of the four categories is appropriate."**

This category is used for species reported as "? Extinct" or "possibly Extinct" or "probably Extinct" on the assumption that they are either 'Extinct' or 'Endangered'.

#### **INSUFFICIENTLY KNOWN (K)**

**"Taxa that are suspected but not definitely known to belong to any of the above categories because of the lack of information."**

The key word here is *suspected*. An 'Insufficiently Known' species does not have to be *proved* to be in any of the three categories — 'Endangered', 'Vulnerable' or 'Rare'. Examples of such plants include relict species of limited but uncertain distribution (e.g. Example 25, below) or small annuals known only from a few records but which could be more widespread as they are easily overlooked in the field (e.g. Example 26, below). Also considered as 'Insufficiently Known' may be species of a complex genus, much of which is thought to be in some danger and whose members are not easily distinguished by field characters. An 'Insufficiently Known' species can always be transferred to another category when further information becomes available. It is hoped that listing a species as 'Insufficiently Known' will stimulate others to find out its true status.

The importance of the 'Insufficiently Known' category is that it enables categories to be applied to whole endemic floras where the majority of species are given a more precise category but where a few species are very little known in the field. It is wrong to list 'Insufficiently Known' species as 'Rare' or even 'Indeterminate' simply to be on the safe side. Overestimating the danger often does more harm than good. At present, the Threatened Plants Committee estimates that some 25,000–30,000 species (about 10 per cent of the world's flora) will fall into one of the first four categories.

### OUT OF DANGER (O)

"Taxa formerly included in one of the above categories, but which are now considered relatively secure because effective conservation measures have been taken or the previous threat to their survival has been removed.

"In practice, Endangered and Vulnerable categories may include, temporarily, taxa whose populations are beginning to recover as a result of remedial action, but whose recovery is insufficient to justify their transfer to another category."

Rescued species are put into the 'Rare' category if the threat has been completely averted, or the 'Vulnerable' category if the species is still partly under threat. When deciding on the category, it may be helpful to consider the following:

- 1) Is the plant conserved throughout its range or only in one part?
- 2) How well is it protected in that part?
- 3) What is the status of the reserve in which it occurs?
- 4) How permanent is its protection likely to be?

If only a few specimens survive, the species should still be considered 'Endangered'. Some species will in due course recolonize their former habitats and become common, so they will no longer remain 'Rare' or 'Vulnerable'. The category '**Out of Danger**' should then be used. Good examples of rescued species in the categories 'Endangered', 'Vulnerable' and 'Rare' are given below (28–30).

"For species **which** are neither rare nor threatened, the symbol 'nt' is used."

Only species in the categories 'Extinct', 'Endangered', 'Vulnerable', 'Rare' or 'Indeterminate' are included in the Red Data Book and on lists of rare and threatened species. (The categories 'Insufficiently Known' and 'nt' are required where full lists of endemic species are given).

### SPECIES ONLY KNOWN FROM OLD RECORDS

These fall into only 3 categories:

- 1) 'Extinct'. As mentioned above, this is only used for plants not found in the wild after thorough and recent searches of their likely habitat.

(2) 'Indeterminate' is the category used for species known only from small areas (e.g. mountain localities) where they have not been recorded for a long time, but where the area has not been thoroughly botanised. However, the area has been botanised to an extent that if the species was re-found, it would definitely fall into one of the 3 categories: 'Endangered', 'Vulnerable', or 'Rare'. In these cases one must be certain that it could not be abundant and widespread enough to be 'nt'. One cannot of course apply the categories 'Endangered', 'Vulnerable' or 'Rare' themselves since the species could turn out to be any one of them, or 'Extinct'.

(3) 'Insufficiently Known' is used when the area from which the plant was recorded has been worked in detail to such a small extent that it is a possibility that the species is 'nt'. Some examples of this situation are given below. Often these areas are under considerable threat (e.g. the Amazon basin) and so it is hoped that more information on the individual species will become available in the near future.

Where full screenings of floras for rare and threatened species are being undertaken, it is felt that 'Insufficiently Known' is the best category for those species that are taxonomically uncertain or whose exact delineation is uncertain. Many of these will be species known only from type collections in which it is uncertain whether or not they are good species. It is best to include such taxa on country lists until they have been definitely shown to be not specifically distinct. However, taxonomically clear species only **known** from *dubious* records in the country concerned (but obviously occurring elsewhere) are best omitted from such lists as are species predicted to occur in the country but not yet actually found there.

## EXAMPLES

### EXTINCT

1. *FRANKLINIA ALATAMAHA*. This beautiful, Camellia-like shrub has not been seen in its original habitat in Georgia, U.S.A., since 1803 and is presumed to be extinct in the wild. Fortunately it is successfully cultivated on both sides of the Atlantic but *this* does not alter the Red Data Book Category which applies to the *wild* population only.

### ENDANGERED

2. *ECHIUM PININANA*. The Giant Echiums are one of the glories of the Canary Islands - this one is reduced to virtually a single population in the cloud zone on La Palma. It is threatened by goats and by collecting for horticulture. It will obviously not survive unless action is taken to protect it.

3. *PERSEA THEOBROMIFOLIA*. Once an important source of timber, this member of the Lauraceae is now known only from a highly vulnerable and isolated 0.8 sq. km area of lowland forest at the Río Palenque Biological Center in Los Ríos Province, Ecuador. In the decade between 1960, when a new road was opened, and 1970, most of the plant's habitat was

converted to plantations of banana and oil palm. Although the species regenerates readily, the known population is probably no more than twelve reproducing individuals.

4. *CALYPTRONOMA RIVALIS*, a palm from Puerto Rico, is reduced to a few individuals and could be eliminated by fire or by wood cutting. In 1970 only 20 individuals were seen.

5. *EUPHORBIA ABDELKURI*. An extraordinary succulent which forms forest-like clumps of erect, thornless stems up to 3 m high. Only 3 such clumps remain, on the barren island of Abd al Kuri in the Socotran Archipelago (Indian Ocean). There appears to be little threat since it is poisonous. However, since the numbers are so low, it must be considered 'Endangered'.

6. *VEPRIS GLANDULOSA* is a small understorey tree from the Muguga Forest in Kenya where it survives in a 15.5 ha reserve. Only 8 trees and a few seedlings are known, and so it is considered 'Endangered' until the population is significantly larger.

7. *NEOVEITCHIA STORCKII*. In 1972-3 this Fijian palm was reduced to a single population of 150-200 mature trees, occupying an area of less than 2 ha. Since then it has declined further due to additional felling and clearing of the habitat for banana cultivation.

8. *IRIS WINOGRADOWII* is much uprooted by gardeners and amateur botanists. Only a few hundred individuals remain in its wild habitat on a single mountain in Georgia, U.S.S.R., but it is not yet protected by law.

9. *ARECA CONCINNA*. The only known population of this Sri Lankan palm consists of about 1000 individuals and is confined to a swamp of 2-4 ha where it is at great risk from drainage and subsequent fire.

#### VULNERABLE

10. *LYCASTE SUA VEOLENS*. This rarely found orchid is largely confined to the middle altitudes of volcanic slopes in El Salvador where large areas of the forest have been cleared for coffee plantations. It is an easy and favourite target for orchid collectors and is likely to become 'Endangered' in the near future if protection is not forthcoming.

11. *JOHANNESTEIJSMANNIA ALTIFRONS*. A delicate undergrowth palm scattered in a few parts of Malaysia and Indonesia, only occurring locally. It is confined to primary rain forest. It does not survive clear-felling and is becoming depleted by destruction and exploitation of the habitat for timber.

12. *MYOSOTIDIUM HORTENSIA*. The Chatham Islands Forget-me-not is a spectacular giant herb formerly abundant along the coasts of the Chatham Islands but now seriously depleted by grazing from introduced animals. It occurs only scattered around parts of the coasts. Whereas most of the less common, coastal endemics from New Zealand (and the Mediterranean) are turning out to be 'Vulnerable', most of the mountain and cliff endemics are 'Rare'.

13. *CLADRASTIS LUTEA*. American Yellowweed. A beautiful small tree with a sporadic distribution in ten states of the eastern U.S.A. It is always rare in its localities and some of the sites are threatened by flooding following dam-construction. In other sites saplings of the species are uprooted for use as nursery stock.

14. *SOPHORA FERNANDEZIANA*. Although originally scattered through the lower montane forests which covered Isla Robinson Crusoe (formerly *Más á Tierra* in the Juan Fernández Group), this species was found to be very infrequent in 1954–55. Although the island has been declared a National Park, the forests are still being destroyed by goats, sheep, cattle and even horses, as well as being over-run by introduced plants such as *Rubus ulmifolius*, the South European Blackberry, and *Aristotelia chilensis*, the Chilean 'maqui'. Whereas *Cladrastis lutea* is at the lower, less threatened end of the 'Vulnerable' category, this species is at the top, nearly qualifying as 'Endangered'.

15. *SAXIFRAGA FLORULENTA*. This spectacular endemic to cliffs in the Maritime Alps (France and Italy) has become depleted, partly due to collectors and partly due to natural causes. It is particularly susceptible because it grows very slowly taking at least 10–12 years to flower, and because of its monocarpic habit.

16. *LODOICEA MALDIVICA*. The famous Coco de Mer has the largest seeds in the plant kingdom and is endemic to the Seychelles. It is now scattered on Praslin and Curieuse Islands. It is partly protected on Praslin but there is always the threat of tourists destroying the habitat and local people collecting the seeds to sell to visitors.

17. *SILENE DICLINIS*. A dioecious annual known from one locality in Spain where in 1974 it was reduced to about 500 specimens with little signs of regeneration. Its survival is due to its association with the agricultural system prevailing in the locality, a system which is very different from that of the surrounding area.

This species falls at the borderline of 'Endangered', 'Vulnerable' and 'Rare'. It is not known to be declining but it is likely that the population greatly fluctuates. Because of this, because of its dependence on man-made systems for survival, and because of its dioecious habit, 'Vulnerable' is preferred to 'Rare'; more active conservation measures than monitoring its population are obviously necessary to ensure survival. 'Endangered' is not used since it is suspected that the species may have been in this condition for a long time and so it cannot be said to be in imminent danger of extinction.

## RARE

18. *CUPRESSUS MACROCARPA*, the Monterey Cypress, is restricted in the wild to two wind-swept sites along the coast of California. The trees occur in a belt 100–200 m wide along the coast, the larger of the two groves being c. 4 km long. Both are effectively protected. (The species is common in cultivation but this does not affect its Red Data Book category).

19. *SAXIFRAGA BITERMINATA*. A species only known from 2 small, mountainous localities in Spain. It is at some risk in one of them from visitors who use the area as a picnic spot, but



there is no evidence that the *Saxifraga* is declining. It is still reported to be abundant in both localities. Most of the 'Rare' species are in a position very similar to this one.

30. *EUPHRASIA CAMPBELLIAE* is only known with certainty from about nine island localities, difficult of access, in the Outer Hebrides (UK), occurring in maritime grassland. There is no reason to believe these populations are under threat.

31. *LILIUM RHODOPAEUM* is restricted to several mountainous localities on the Bulgarian/Greek border. Its most lovely lemon yellow flowers make it a tempting target for horticulturists but so far it does not appear to be on the decline or under great collecting pressure.

32. *DIONYSIA MIRA* is confined to north-facing high limestone cliffs in mountains of Oman. It tends to occur in low numbers and only in the limited areas of suitable habitat but does extend for around 300 km of mountain range.

#### INDETERMINATE

23. *ANTHEMIS WERNERI* is only known from one locality on one small island of the Aegean (Greece). It must be either 'Rare', 'Endangered' or 'Extinct' but since, to our knowledge, no botanists have visited the island recently to study the species in the wild, it must be considered as 'Indeterminate' for the time being.

24. *PAPHIOPEDILUM DRURYI* is endemic to a single locality in southern India. Excessive collecting and forest fires have virtually exterminated the species and no plants have been seen in the wild since 1972. However it is possible that rhizomes or seedlings still remain. Since it is therefore either 'Endangered' or 'Extinct', the summary category is 'Indeterminate'.

#### INSUFFICIENTLY KNOWN

25. *DUCKEODENDRON CESTROIDES*. This plant is only known from two or three records in the Amazon Basin. It probably has a relictual distribution so one *suspects* it may be rare or threatened.

36. *HALOPHYTUM AMEGHINOI* from Argentina has been found only a few times, but as it is a small, weedy plant, it may have been overlooked and may be more common than existing records indicate.

27. *ERIOPE XAVANTIUM* is only known from one gathering in the northern Mato Grosso of Brazil. The area has recently been opened up by a new road and much of the forest has been destroyed.

## RESCUED SPECIES

28. *TECOMANTHE SPECIOSA*, the Three Kings Trumpet flower. This attractive liane is reduced to one plant on Great Island of the Three Kings Group (off New Zealand). The island's goats were destroyed in 1946 and the area is now a reserve, but there is still only one plant so it must be considered as 'Endangered'.

29. *OROTHAMNUS ZEYHERI*, the famous Marsh Rose of South Africa, is 'Vulnerable' as although rescue measures have increased the population substantially, reaching 1940 individuals in 1977, the species is still partly under threat from low seed set, damage by introduced fungi and native rats, and accidental fire, as well as from habitat destruction at some of its localities.

30. *CORDYLINE KASPAR*, the Three Kings Cabbage Tree, is 'Rare'. It is another example from the small Three Kings Group. The goat population was eliminated in 1946 when the islands were declared a reserve, and the tree is recovering well and regenerating from seed.