Initially form a rosette at the base of the plant. Along the stem the leaves are smaller and the divisions narrower. With sufficient rain between December and April, the plant produces numerous yellow, 4-petalled flowers. The fruits contain many seeds and are up to 3 cm long, ripening between February and May.

Interesting facts
This species is the only representative of the mustard family in the poor flora of Alborán (10 species). The island has long been inhabited, first by lighthouse keepers and later by the military which built the helicopter platform, widened the former small harbour, and constructed some temporary dwellings near the lighthouse.

Why is it threatened?
This species has been categorized CR (Critically Endangered) according to IUCN Red List Criteria B1ac(iv)+2ac(iv). This means that the plant grows in a very small area and population numbers fluctuate greatly. Irrigation of the area with sea water where the plant was originally found, in order to reduce dust for helicopter landings, was the direct cause of extinction of this species. The island’s fragile habitat has been largely modified by humans who recently introduced some domestic animals, causing further soil erosion and nitrification. Germination, flowering and fruiting are dependent on rainfall. An observation in 1970 referred to possibly hundreds of adult individuals, although only 150 were recorded in 1974, and none afterwards. In 1999, 48 plants were re-introduced but scientists are not sure that the population is self-sustaining. No dispersal to other parts of the island has taken place.

What conservation actions are needed?
This species should be added to the Spanish National Catalogue of Threatened Species, listed in the highest category (Endangered). Ideally the island should be designated as a strict Nature Reserve. If this is impossible, habitat restoration and on-going management still needs to be carried out indefinitely, including alien species eradication, monitoring, and no new construction of infrastructure. Periodic reinforcement campaigns in order to maintain the population might be necessary. The fact that Diplotaxis siettiana seems to prefer semi-disturbed habitat and competes poorly with dominant species must always be taken into account.

Scientific coordination
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Professor Juan Francisco Mota Poveda, Universidad de Almería, Spain.
Professor César Gómez-Campo, Universidad Politécnica de Madrid, Spain.

Latin name: Diplotaxis siettiana Maire
Common name: Jaramago de Alborán (Spanish)
Family: Cruciferae (mustard family)
Status: CRITICALLY ENDANGERED (CR)

Where is it found?
Endemic to the Spanish island of Alborán, this species was last seen in 1974, when seeds were fortunately collected before the species disappeared from the island. A re-introduction in 1999 appears successful, although given extreme population fluctuations each year, more time is needed to ensure that the re-introduced population is self-sustaining.

Alborán is the top of a volcanic platform situated between Spain and Morocco, around 50 km from the nearest continent. This small island (600 m x 200 m) resembles an aircraft carrier due to its flat surface, reaching 10 m above sea level and surrounded by steep, almost vertical cliffs. The island has a lighthouse and is now used as a military base.

In 1974 the plant was found growing in a tiny area around the helicopter platform. The weedy nature of Diplotaxis siettiana makes it fairly tolerant to human disturbance. In fact it does not grow in the more stable vegetation dominated by Frankenia pulverulenta and Mesembryanthemum nodiflorum, both apparently tolerant to high concentrations of salt and/or nitrogen. Rainfall is very low, with less than 100 mm per year.

How to recognise it
This annual spreading herb is 10-40 cm tall and has sparse hairs. The deeply-lobed leaves are somewhat fleshy, 5-15 cm long, and...
Apium bermejoi

Latin name: *Apium bermejoi* L. Llorens
Common name: Apid den Bermejo (Catalan)
Family: Umbelliferae (celery family)
Status: CRITICALLY ENDANGERED (CR)

Where is it found?
This species is endemic to the Balearic Islands, and occurs in the eastern part of the island of Minorca. Here it is only found in two small areas separated by a rocky zone about 200 m wide. The total population numbers less than 100 individuals and covers an area of just a few dozen square metres. *Apium bermejoi* grows in stream beds that dry out in summer and occasionally during dry winters. It grows on acidic soil which accumulates in small rock depressions, and requires only moderate sun exposure.

How to recognise it
This herbaceous plant creeps over the ground. Its hollow stem is equipped with narrow grooves that secrete aromatic oils, giving the plant a celery smell. Its leaves are compound, with about 10 toothed leaflets. The flowers are white and arranged in small umbrella-shaped inflorescences. *Apium bermejoi* usually flowers between April and May, but may flower at other times of the year depending on the weather.

Interesting facts
This perennial plant reproduces from seeds but can also reproduce vegetatively from stolons, which are horizontal stems creeping just above the ground having the capacity to take root and form new plants. There is evidence that the two populations on either side of the rocky zone are genetically different, but the importance of this for the long-term maintenance of the entire population has yet to be assessed. This species benefits from nitrogen provided in seabird droppings.

Why is it threatened?
This species has been categorized CR (Critically Endangered) according to IUCN Red List Criteria B1ab(iii)+2ab(iii); C2a(i); D, meaning that it only occurs in a single site and the total number of individuals is very small and fluctuates in number. The most recent census counted 98 individuals, although many were young plants which never reached reproductive age. In other years the total population numbered less than 60 individuals, again not all reaching maturity. Given the threats facing this species, a continued decline in number of individuals is predicted.

The species is threatened both directly and indirectly. Its habitat is extremely unstable with available water and nutrients varying greatly from year to year. *Apium bermejoi* does not support competition from other species very well, including competition from native carpet-forming species as well as introduced alien species such as *Carpobrotus edulis*. It is directly threatened by trampling by fishermen and hikers, as well as from motorbikes on the beach.

Climate change may cause changes in its habitat. For example, several consecutive dry years will weaken this species and favour the development of opportunistic, more competitive species. Any wild collection of *Apium bermejoi* represents a potential threat.

What conservation actions are needed?
It is essential that the small area where this species grows be protected from trampling and motorbikes. To make conservation actions more effective, studies on population dynamics (recruitment and mortality) and reproductive biology of this species are needed. (Re-)introduction of this species to suitable habitats to increase its number of populations and its survival chances is needed.

Scientific coordination
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The Top 50 Mediterranean Island Plants

Arenaria bolosii

Latin name: Arenaria bolosii (Cañig.) L. Sáez & Rosselló
Common name: none
Family: Caryophyllaceae (carnation family)
Status: CRITICALLY ENDANGERED (CR)

Where is it found?
This species is only known from a single site on the island of Majorca in the central part of the Tramuntana mountain range. Less than 200 individuals grow in an area covering approximately one hectare. The species is very sensitive to competition from other species and therefore grows in open areas with little soil cover. It is found above an altitude of 900 m on north-facing slopes.

How to recognise it
This herbaceous perennial grows in loose clumps, reaching a height of 5-10 cm. Several stems covered by short hairs branch out from its base. The leaves are arranged in pairs and are green, occasionally tinged with pink or grey. Its small white flowers have five petals and develop at the tips of the stems. This species flowers and fruits between June and July.

Interesting facts
Little is known about the biology of this plant, and there is even disagreement over its taxonomic status. While Flora Iberica treats it as a subspecies (Arenaria grandiflora L. subsp. bolosii (Cañig.) Küpferr), others consider it a full species and it is listed in the Spanish Red Book as such. The plant is present throughout the year, even in winter. Its small size and buds close to the ground protect it from the wind and make it more tolerant of dry conditions. Note that the closely-related species Arenaria grandiflora grows in the mountains of southern and central Europe where it has not been recorded as threatened.

Why is it threatened?
Arenaria bolosii has been categorized CR (Critically Endangered) according to IUCN Red List Criteria B1ab(iii,v)+2ab(iii,v); C2a(ii). This means that the area where it is found and the number of individuals are very small, it is known from a single site, and the habitat where it grows as well as the number of mature individuals continues to decline.

Plant collectors seeking botanical rarities directly threaten this species. In addition, it seems to hybridize with a closely related species, Arenaria grandiflora subsp. glabrescens. Other threats include hikers trampling the plant, fires, and habitat modification as more people use the area for hiking and camping.

What is being done to protect it?
Legally: This plant’s habitat is protected by Law 1/1991 of the Parliament of the Balearic Islands as a Natural Site of Special Interest. It is listed as Critically Endangered in the Red List of the Spanish vascular flora (Lista Roja de la flora vascular española) as well as in the Spanish Red Book (Atlas y Libro Rojo de la flora vascular amenazada de España), although this does not confer any specific legal protection.

In situ: No measures taken yet.
Ex situ: Seeds of this plant are stored in the seedbank of the Botanical Garden of Sóller, but it is possible that these are hybrids with Arenaria grandiflora subsp. glabrescens.

What conservation actions are needed?
This species merits increased legal protection, such as inclusion in the Annexes of the Bern Convention and the EC Habitats Directive. Public access to the site must be controlled. Urgent conservation measures must be taken which include reinforcing the number of plants that remain at this last site and reintroducing the species into other areas where it was previously known.

If the seeds stored in seedbanks are found to be hybrids, any re-introduction campaign using this material will be detrimental to conservation. Genetic studies are therefore needed, and seeds should be collected only when it has been established that they belong to this species.

Scientific coordination
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The Top 50 Mediterranean Island Plants

Brimeura duvigneaudii

Latin name: Brimeura duvigneaudii (L. Llorens) Rosselló, Mus & Mayol
Common name: none
Family: Hyacinthaceae (hyacinth family)
Status: CRITICALLY ENDANGERED (CR)

Where is it found?
Endemic to Majorca, this species only occurs in very small numbers at three localities. It grows in limestone rock crevices and slopes near the sea at an altitude of approximately 150-250 m. It thrives in hot, sunny places.

How to recognise it
This plant is small and inconspicuous, not exceeding 10 cm in height. Its grass-like, ribbed, linear leaves are about 3 mm wide and triangular in cross-section. The one-sided inflorescences are composed of two to five (rarely seven) flowers with pink corollas (never blue like those of its close relative Brimeura amethystina). The best way to tell this species apart from the closely related Brimeura fastigiata is that the lobes of the flower are shorter than its tube.

Interesting facts
The above-ground parts of the plant die back in summer when it is hottest and driest. Only one population has so far been observed producing seeds; all others seem to reproduce asexually by bulb division. Brimeura duvigneaudii is considered to be a relict species, a remainder from a once larger group that, in the course of climatic change, has nearly disappeared over the millennia. These remnant populations may have difficulties coping with today’s climate.

Why is it threatened?
This species has been categorized CR (Critically Endangered) according to IUCN Red List Criteria B1ab(i,v)+2ab(i,v); C2a(i). This means that it only occurs in three fragmented localities, and that the populations are small, declining, and are estimated to have no more than 50 mature individuals each (although estimates are difficult given the plant’s inconspicuous habit). One population has nearly disappeared. The area of occurrence of 7.5 km² is small enough to make this species vulnerable even to extreme natural events, such as fires. The species also faces recruitment problems, possibly due to climate.

What is being done to protect it?
Legally: On a regional level, the habitat is protected as a Natural Site of Special Interest by law 1/1991 of the Parliament of the Balearic Islands. It is listed in the Red List of the Spanish vascular flora (Lista Roja de la flora vascular española) as well as in the Spanish Red Book (Atlas y Libro Rojo de la flora vascular amenazada de España), although this does not confer any specific legal protection. The species itself is listed in the catalogue of threatened species of the Balearic Islands (Catálogo Nacional de especies amenazadas, CNEA).

In situ: No measures taken yet.
Ex situ: No measures taken yet.

What conservation actions are needed?
It is necessary to undertake a careful search for other populations of Brimeura duvigneaudii, which may be easily overlooked due to its minute size. A substantial increase in monitoring is needed to understand the population dynamics and reproductive behaviour of this species. Agricultural fires that are set to provide grazing for sheep should not be allowed in the area where Brimeura grows. Cultivation of this species in a botanical garden would be useful.

Scientific coordination
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The Top 50 Mediterranean Island Plants

Euphorbia margalidiana

How to recognise it
This shrub or small tree has succulent stems which are swollen with water, allowing the plant to tolerate periods of extended drought. Its leaves are light bluish-green, and mostly drop off at the end of spring, growing again in autumn, which is an adaptation to summer droughts. The flowers appear between March and April and are arranged in umbrella-like inflorescences. The fruits consist of three valves fused together which burst open when dry, projecting tiny seeds far away from the parent plant from June to July.

Interesting facts
Euphorbia margalidiana is a perennial plant that requires good light and high temperatures. Two other species of Euphorbia are endemic to the Balearic Islands: Euphorbia maresii (which is divided into two subspecies, maresii and balearica) is not threatened; however Euphorbia fontqueriana is Critically Endangered and only found on the island of Majorca.

Why is it threatened?
This species has been categorized CR (Critically Endangered) according to IUCN Red List Criteria B1ab(v)+2ab(v). This means that the plant is only known from one small locality and the number of individuals is declining.

The unique population covers a very small area of about eight hectares and consists of no more than 200 individuals. An increasingly dry environment and the risk of collapse of the cliffs where this plant occurs also present a threat. Monitoring of this species is difficult because the cliffs are unstable and dangerous.

What is being done to protect it?
Legally: This species is listed in Annex II of the Ministerial Decree 22112 (1984) as a species of special national interest to be protected in the Balearic Islands. It is illegal to undertake any activity that could damage this plant. Euphorbia margalidiana is listed in Annex I (in danger of extinction) of Decree 439/90, which guarantees it protection in its native habitat. It is also listed in the Spanish Red Book (Atlas y Libro Rojo de la flora vascular amenazada de España). Internationally, it is included in Appendix I of the Bern Convention and as a priority species in Annexes II and IV of the EC Habitats Directive.

In situ: No measures taken yet.

Ex situ: This species is in cultivation in several places including the botanical gardens of Sóller (Majorca) and Marimurtra (Barcelona) in Spain. Seeds are also being conserved in seedbanks. Currently studies on the genetic variability of material held ex situ are being undertaken.

What conservation actions are needed?
Access to the site where Euphorbia margalidiana grows should be prohibited. The Government of the Balearic Islands is currently conducting a feasibility study to introduce this species to another islet, but to date there is insufficient data to make recommendations for benign introductions to other sites.

Scientific coordination
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**Femeniasia balearica**

**Latin name:** Femeniasia balearica (J.J. Rodr.) Susanna

**Synonym:** Centaurea balearica J.J. Rodr.

**Common name:** Soccarrell bord (Catalan)

**Family:** Compositae (daisy family)

**Status:** CRITICALLY ENDANGERED (CR)

**Where is it found?**

Endemic to the Balearic Islands, Femeniasia balearica now occurs only in six sites in the north of the island of Minorca. It is a typical seashore species that grows in dry sunny places on sandy soils.

**How to recognise it**

Femeniasia balearica is a small shrub or tree about 150 cm in height, covered by numerous sharp spines about 1 cm long, arranged in groups of three. It has two different types of leaves; those produced in spring are linear and entire, whereas the summer leaves are divided. The flowers are gathered together in yellow heads, surrounded by spines, and open between May and July, with fruits ripening at the end of summer and beginning of autumn.

**Interesting facts**

This woody perennial reproduces from seed. Its spines protect it from herbivores and trampling, but unfortunately not from motor vehicles. In some specialist literature the genus Femeniasia is considered to be synonymous with Centaurea. This means that some lists of protected species cite this plant under the name of Centaurea balearica, demonstrating both the practical as well as legal problems that changes of nomenclature can cause.

**Why is it threatened?**

This species has been categorized CR (Critically Endangered) according to IUCN Red List Criteria B1ab(iii,v)+2ab(iii,v). This means that the area where this species is found covers less than 100 km², the extent and/or quality of habitat is declining, its total population is extremely fragmented, and number of individuals is declining.

Femeniasia balearica covers a very small area and fewer than 2,200 mature individuals are found in six subpopulations. It is threatened by building and road construction, although these activities may also create opportunities for colonization. This species is often removed from beach paths because of its spines. Several individuals disappeared when a land owner planted pines (Pinus halepensis) in one of its subpopulations. It has been observed that in some years the activities of wood-eating beetles (Oxythrea funesta and Tropinota hirta) seem to reduce seed germination.

**What is being done to protect it?**

**Legally:**

This species is listed in Annex I (in danger of extinction) of the Spanish Royal Decree 439/1990 that guarantees it protection in its natural habitat. Internationally, Femeniasia balearica is included in Appendix I of the Bern Convention and as a priority species in Annexes II and IV of the EC Habitats Directive (in both cases under the name Centaurea balearica). Under the Birds Directive, the European Union protects the habitat of this species as an Important Bird Area.

**In situ:** A re-establishment plan for Femeniasia balearica is currently being drafted at the University of the Balearic Islands.

**Ex situ:** Seeds are being stored and individuals are cultivated at the Botanical Garden of Sóller (Majorca).

**What conservation actions are needed?**

Research is needed to understand this species’ population dynamics (births and deaths per year or per generation) and the effect of competition and herbivory on young plant survival. The re-establishment plan that is being drafted needs to be completed and implemented. It is extremely important that motorized vehicles be prohibited from driving in the area containing this species.

**Scientific coordination**

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Interesting facts
The biology of this plant is not well known. The parts above ground disappear during winter and grow up from the base between April and June. The plant only flowers abundantly after several years of favourable conditions. This initial period is probably necessary for the accumulation of energy reserves. Ligusticum huteri reproduces from seed only.

Why is it threatened?
This species has been categorized CR (Critically Endangered) according to IUCN Red List Criteria B1ab(v)+2ab(v); C2a(ii). This means that it only occurs in one locality over a very small area (0.5 km²), and that the total number of individuals is small and in decline. At least 50% of the population has disappeared over the past 10 years due to drought and increased grazing pressure from wild goats. Bush fires started by sheep breeders also pose a threat.

What is being done to protect it?
Legally: At a regional level, Ligusticum huteri is included as a species sensitive to habitat changes in the catalogue of threatened species of the Balearic Islands (Catálogo Nacional de especies amenazadas, CNEA), which grants it protection in its natural habitat. Its habitat is protected as a Natural Site of Special Interest by Law 1/1991 of the Parliament of the Balearic Islands, and the species occurs in a military zone with limited access. At a national level this species is listed in the Spanish Red Book (Atlas y Libro Rojo de la flora vascular amenazada de España), and at an international level the site is listed as an Important Bird Area in the EU Birds Directive.

In situ: In 1998 a five-year plan was put into action by the Botanical Garden of Sóller to re-establish the plant in its natural habitat, of which some aspects are still in development. The Government of the Balearic Islands protects part of its population with fencing.

Ex situ: Seeds are stored in a seedbank at the Botanical Garden of Sóller and some plants are maintained in culture.

What conservation actions are needed?
It is imperative to control the goat population on the site and ensure that there is no botanical collection. Sheep breeders should be prevented from setting bush fires. Possibilities of introducing this species to other mountainous regions of the island should be investigated.

Scientific coordination
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The Top 50 Mediterranean Island Plants

### Lysimachia minoricensis

- **Latin name:** *Lysimachia minoricensis* J.J. Rodr.
- **Common name:** none
- **Family:** Primulaceae (primrose family)
- **Status:** EXTINCT IN THE WILD (EW)

#### Where is it found?
Endemic to Minorca in the Balearic Islands, *Lysimachia minoricensis* was only known from a single location (Barranc de Sa Vall), where it disappeared between 1926 and 1950. Fortunately, seeds had been collected, and the species was cultivated from 1926 in the Botanical Garden of Barcelona. Although *Lysimachia minoricensis* was believed to be lost when the garden was abandoned during the Civil War, a colony was later rediscovered, growing in the shelter of a bushy thicket. The only notes made by its discoverer recorded that the species grew in cool, shady places.

#### How to recognise it
This herbaceous biennial species varies between 25-80 cm in height. Its stem is upright, simple or branching from the base, with small glands in its upper parts. Its oval green leaves have almost no or a very short stalk, and are covered by whitish nerves on the upper side and purple beneath, a feature that is common in some other Balearic plants. The small flowers are arranged in a loose, terminal bunch with leafy bracts. They are yellowish-green with a red-violet throat, and are 4 mm long (just a little longer than the calyx). The calyx is deeply divided with obtuse teeth. Flowering from May to July, its fruits, 3.5-5 mm long, contain numerous black, 1 mm long, rough, laterally compressed seeds.

#### Interesting facts
This species seems able to produce seeds without pollinators. The number of seeds produced per individual is very high, reaching up to 3,300. Experiments have shown that germination rates are very high, and germination can occur over a wide range of temperature, light, and soil salinity conditions. The leaves emit a strong odour that may be an adaptation to protect the plant from herbivores.

#### Why is it threatened?
This species has been categorized EW (Extinct in the Wild) according to the IUCN Red List Criteria. This means that the species is now only found in cultivation and seedbanks. Note that while the species has recently been re-introduced to the wild, it has not yet formed self-sustaining populations. The reasons for its disappearance in the wild are unknown. It is possible that over-collection and the impact of human activities (such as fire and changes in agricultural practices) may have caused its extinction. On the other hand, it is possible that this species might have benefited from agricultural activities practised in the past, and that the cessation of these practices may have caused the disappearance of habitat favourable to this species. The most successful re-introduction attempts, where plants survived for up to five years, were in areas previously disturbed by fire, cattle or goats.

#### What is being done to protect it?

- **Legally:** This species is included in Appendix I of the Bern Convention and listed in the national catalogue of threatened species (Catálogo Nacional de especies amenazadas, CNEA). The natural area where it was known and where re-introduction attempts have been made (Son Bou i Barranc de Sa Vall) is designated as a Site of Special Natural Interest by the Law 1/1991 of the Parliament of the Balearic Islands. It is also included in the European Natura 2000 network.
- **In situ:** Attempts to re-introduce the species into its native habitat have been undertaken since 1959 but have been unsuccessful. The most recent attempts have re-introduced this species with mycorrhizal fungi in the gorges of Sa Vall, Trebaluger, and Algendar. However, the seeds from these individuals have failed to germinate, so this species is still considered to be Extinct in the Wild.
- **Ex situ:** Seeds of this species are conserved in numerous seedbanks. It is also cultivated in several botanical gardens using seeds produced by the original specimens.

#### What conservation actions are needed?
Most urgently, it is important to understand the reproductive biology of this species, especially the factors that inhibit the germination of seeds in the wild. Second, re-introduction attempts need to be continued. Finally a management plan needs to be developed for the areas where the species has been re-introduced so that the re-introduced populations become self-sustaining.

#### Scientific coordination
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Mr Pere Fraga Arguimbau, Consell Insular de Menorca, Spain.
individuals vegetatively from its lateral shoots. The flowers have been shown to be pollinated by ants, which is very rare in the plant kingdom. By having tiny flowers grouped close together and near the ground means that ants can quickly visit them to seek nectar, and thus transfer pollen from one flower to another.

Why is it threatened?
This species has been categorized CR (Critically Endangered) according to IUCN Red List Criteria B1ab(iii)+2ab(iii). This means that its range is very limited, the population is fragmented, and the number of mature individuals is in decline.

Small, isolated subpopulations cover an area of less than 1,000 m², which makes this species very vulnerable to extinction. *Naufraga balearica* is sensitive to droughts, mainly in spring. Repeated droughts over the last 20 years have resulted in a continuous decline in the numbers of individuals. With climate change, a scenario of a warmer, drier regime puts this species at risk. Some other species living alongside *Naufraga balearica* are more drought-resistant, thus have benefited from drier conditions and provide increased competition.

*Naufraga balearica* is also threatened by intensive trampling by goats, although grazing may also reduce competition from other species. In the 1980s plants were removed by collectors, which may explain the decline in the original population.

What is being done to protect it?
Legally: This species is listed in Annex I (in danger of extinction) of the Spanish Royal Decree 439/1990, which grants it protection in its natural habitat. Internationally *Naufraga balearica* is included in two legal documents: Appendix I of the Bern Convention and Annexes II and IV of the EC Habitats Directive as a priority species.

In situ: In 1997 within the framework of a EU LIFE project entitled “Conservation of natural habitats and plant species in Corsica”, several projects were undertaken which included habitat protection, land acquisition, and restoration work for this species. A re-introduction attempt on Corsica using material from the Geneva Botanical Garden was unsuccessful. On the Balearic Islands, a conservation programme undertaken by the Universitat de les Illes Balears and financed by the MAVA Foundation was launched in 2003.

Ex situ: Material collected from the Balearic Islands is being cultivated in the Botanical Garden of Sóller on Majorca (Spain). Corsican material (all of the same provenance) has been cultivated in the botanical gardens of Geneva, Brest and Porquerolles since 1981, the year when the population on Corsica was discovered.

What conservation actions are needed?
Research is needed to understand the reproductive biology and environmental constraints for this species in order to undertake better management. Permanent plots are needed to monitor population numbers over time and the effect of climate change. Research will also help guide re-introduction attempts to Corsica, where ideally Corsican material should be used. In addition, the management and ownership issues of the sites where it either grows or once grew need to be resolved to guarantee the long-term survival of this species.

Scientific coordination
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Dr Juan Rita Larrucea, Dep. Biologia, Universitat de les Illes Balears, Palma de Mallorca, Spain.
**Medicago citrina**

**Latin name:** Medicago citrina (Font Quer) Greuter  
**Common names:** Alfalfa arbórea (Spanish); Alfals arbori (Catalan); Moon Trefoil, Tree Medic (English)  
**Family:** Papilionaceae (legume family)  
**Status:** CRITICALLY ENDANGERED (CR)

**Where is it found?**
This species only grows in small, fragmented populations on the rocky slopes of some Balearic Islands, the Columbretes archipelago (province of Castellón), and on one small islet (the ‘Illet de la Mona’ or ‘Escull del Cap de Sant Antoni’) situated just off the coast of the Cape of St Antoni (province of Alicante). There are no known populations on the large Balearic Islands (Ibiza, Cabrera and Majorca) themselves, only on the islets surrounding Ibiza and Cabrera. Plants have been introduced onto one islet of Majorca.

**How to recognise it**
*Medicago citrina* is a shrub or small tree reaching 2 m in height, with an erect trunk. It has alternate, compound leaves composed of three rounded leaflets. Flowers are bright yellow in colour, initially forming dense bunches but becoming more spread out as the fruits start to mature. The plant flowers during the spring and the fruits form spiral-shaped pods.

**Interesting facts**
The plant grows on several small islands, and is thought to be dispersed by seabirds or other animals. It seems that seed germination improves after passing through an animal’s digestive tract.

**Why is it threatened?**
This species has been categorized as CR (Critically Endangered) according to IUCN Red List Criteria B1ab(iii, v)+2ab(iii, v). Reasons include a total growing area of less than 10 km², a very fragmented global population, and a decline in number of mature individuals as well as quality of habitat. In 1997, the population on the Columbretes decreased by 40% due to an attack of scale insects (*Icerya purchasi*) native to Australia; the same insects were detected on the Balearic Islands in 2001. Other threats include introduced rabbits, alien species such as *Opuntia maxima*, and periodic, severe attacks of the parasitic plant *Cuscuta*. Invasive species may be more tolerant of drought than *Medicago citrina*, which has a considerably reduced fruit set under dry conditions.

**What is being done to protect it?**

**Legally:** The species is presently listed in Annex I of the Spanish Royal Decree 439/1990, as ‘sensitive to the disturbance of its habitat’, which guarantees protection of its natural habitat. Since 1985 it has been strictly protected within the region of Valencia by a regional government decree.

**In situ:** On the Columbretes, *Medicago citrina* occurs within a federally owned nature reserve. Access to populations on the islands Ferrera and Foradada is strictly prohibited apart from scientific expeditions. These two islands have now been designated as micro-reserves, with a management plan developed in 1993. The species has been re-introduced to the island of Grossa where it was eradicated by rabbits brought to the island in the 18th and 19th centuries. The rabbits were eliminated by 1987.

On ‘Illet de la Mona’, approximately 25 plants grow within a plant micro-reserve, itself within the boundaries of El Montgó Nature Park. An action plan for the micro-reserve has recently been approved.

On the Balearic Islands most of the populations occur within the National Park of Cabrera. The Botanical Garden of Sóller has a programme for the islets around Cabrera, including reintroduction and monitoring. It is intended that these measures will also be applied to the islets of Ibiza. All the small Balearic Islands are protected as Natural Areas of Special Interest under the Parliament of the Balearic Islands Law 1/1991.

**Ex situ:** This plant is cultivated and seeds stored in the Botanical Garden of Valencia. It is also cultivated in the Botanical Garden of Sóller and IMIDA (Instituto Murciano de Investigación y Desarrollo Agropecuario) of Murcia.

**What conservation actions are needed?**
The priority is to control attacks by the scale insect. It has been noted that the scale insect is a problem in citrus farms on the Spanish mainland, since farmers spray their citrus trees to kill a leaf miner, and in doing so kill a ladybird which is the main predator of the scale insect. If correct, measures are needed to maintain ladybirds in the areas where Medicago grows. A method of controlling *Cuscuta* also needs to be identified, and invasive alien species (e.g. *Opuntia maxima*) need to be managed. In general, conservation efforts require more information about the population trends of *Medicago citrina* over a prolonged period. Re-introduction work needs to be continued.

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