

Charles Darwin Research Station Fact Sheet

Opuntia cactus (Multiple *Opuntia* species)

Commonly known as prickly pear cacti, *Opuntia* species are a common feature in the arid lowlands of Galapagos. Some species are rarer than others, and their restoration is a priority project supported by the Charles Darwin Foundation (CDF).

Unique to Galapagos

All *Opuntia* cacti have flat pads with spines in groups. The flowers are mainly yellow, and the 'prickly pear' fruits are greenish in color.

Six species of *Opuntia* cacti are found in Galapagos, having diverged from two ancestors into a total of fourteen types:

- Some species have evolved into trees with trunks that are spiny when young and have reddish-brown bark when older. On Santa Cruz Island, *O. echios* var. *gigantea* can grow to 12 meters in height. On Santa Fé, *O. echios* var. *barringtonensis* has a trunk up to 1.25 meters in diameter.
- Other species, such as *O. echios* var. *zacana* on North Seymour, form sprawling shrubs. Some, like *O. helleri* on Genovesa, have "spines" as soft as hair.
- Their evolution is thought to have been influenced by competition for light with surrounding vegetation, and predation by iguanas and tortoises. Sprawling species and soft spines tend to be found where large reptiles are absent.

Opuntias are a primary source of nutrition in lowland ecosystems. The pads are consumed by tortoises and land iguanas. Fruits are eaten by iguanas, doves and mockingbirds. Several species of Darwin's finches, including the two cactus finches (*Geospiza scandens* and *G. conirostris*) eat the flowers, fruits and seeds, and get water by pecking the pads. These animals disperse the seeds ensuring the propagation of the cacti. The flowers also provide nectar for insects.

Vulnerability

Three threats have affected *Opuntia* populations:

- Human activities such as farming and urbanization
- Introduced plants competing for space, light and nutrients
- Introduced herbivores, such as goats, donkeys, pigs, and cattle

Introduced herbivores have had the greatest impact on *Opuntias*. Large populations of these animals cause severe damage to vegetation. Small *Opuntia* plants are trampled, while the animals eat into the trunks of older, less spiny plants to get water, which can girdle or destabilize trees. If trees are knocked down and eaten, no vegetative reproduction can occur. Only larger plants can flower.

CDF FOCUS: RESTORATION



Key Facts

Species: Six species including *Opuntia megasperma*, var. *megasperma*, and *Opuntia saxicola*

Common name: Prickly pear cactus

Class: Endemic

Size: Trees up to 12m high (*O. echios* var. *gigantea*), trunk up to 1.25m in diameter (*O. echios* var. *barringtonensis*)

Habitat: Arid lowlands

Range: Extensive, varying between islands

Status: *Opuntia saxicola* is Critically Endangered; other species are Vulnerable / Endangered

Threatened by: Invasive herbivores, introduced plants, farming and urbanization

O. saxicola is listed as Critically Endangered by IUCN. It is a trunked variety found only on Volcan Cerro Azul on Isabela Island. Populations have been damaged by goats and cattle present on southern Isabela and may have declined, although recent information is lacking.

O. megasperma var. *megasperma* and *O. megasperma* var. *orientalis* are listed as Endangered. Many other *Opuntia* species are vulnerable or endangered.

O. megasperma var. *megasperma* is found on Floreana Island and on its offshore islets. Large populations of goats have existed on Floreana for over a century, causing significant damage to vegetation. Populations of *O. megasperma* var. *megasperma* are rare on the main island. This loss of nesting sites may have contributed to the extinction of the Floreana mockingbird on Floreana. The mockingbird and a Darwin's finch, *Geospiza magnirostris* which is extinct from Floreana, were two of the main seed dispersers.

O. megasperma var. *orientalis* inhabits Española and San Cristóbal Islands. *O. megasperma* var. *orientalis* is now locally extinct in many areas which once contained large populations of this subspecies.

CDRS research activities

Galapagos vegetation is resilient, and if the pressures on it are reduced, most native species regenerate fast. However, sometimes individual species do not recover and need extra help.

In 2001, Española became the first major island to have its vegetation completely surveyed by CDF scientists. Population size and age of *Opuntias* were evaluated to help plan for their restoration. The goat population on Española was eradicated in 1978; however *O. megasperma* var. *orientalis* has been slow to recover.

Scientists at the Charles Darwin Research Station germinated young *O. megasperma orientalis* cacti in the lab, planted them out on Española and followed their survival. They found that many young seedlings are killed by birds or reptiles. Future work will examine the interactions between the cacti and finches, mockingbirds, lava lizards, iguanas and giant tortoises, working towards *O. megasperma orientalis* regeneration.

Similar methods must be applied to other islands and rare *Opuntia* species. Detailed surveys of populations will determine the current status and vulnerability of each type of *Opuntia*. This will help CDF scientists to decide on appropriate conservation actions such as feral herbivore control, or restoration projects for Galapagos's endemic *Opuntias*.