

THREATS

All native orchids are protected by Greek Presidential Decree 67/1981 while some important habitats, e.g. phrygana vegetation, are protected by the EU Habitats Directive 92/43/EEC. However, the protection of orchids remains incomplete either because the provisions of the Decree are not known by the general public or are not being followed, or because the threats are not known.

The main threats are:

- Uncontrolled grazing everywhere, even within the Ainos-Roudi National Park where it is expressly prohibited. Testimonies mention phrygana habitats, formerly very rich in orchids, which have almost disappeared in the last 25 years due to excessive grazing, such as in the village of Farsa and elsewhere. The picture shows a group of *Epipactis helleborine* in the fir forest of Ainos eaten by animals [picture 36].
- The degradation of habitats through conventional agriculture, tilling the soil, use of agrochemicals, or even their permanent loss through urbanization and touristic development: the available untouched natural ground is thus continually reduced or even concreted over.
- The unnecessary opening or widening of forest roads and small dirt tracks fragments undisturbed areas and destroys the orchids on their fringes [picture 37].
- Illegal collection and trade in orchids: massive illegal collection is carried out in certain parts of Greece, mainly for the production and trade of the traditional 'salepi' drink. But there are also some researchers, usually from central Europe, who cut or uproot orchids for their collections.
- The general degradation of the terrestrial environment with uncontrolled dumping of garbage, recurrent fires, erosion, etc. reduces the overall biodiversity, allowing only few species to eventually survive [picture 38].
- Climate change may also reduce or even eliminate many species of orchids due to changes in the soil characteristics and the climate of their habitats.
- Finally, ignorance regarding the value of the native flora and the loss of the traditional knowledge constitute one more threat for the protection and survival of native orchids.



PROTECTION: WHAT CAN WE DO

- We should not collect orchids from the wild for our vases - which will wither in 2-3 days anyway. By cutting them we are not letting them seed! The flowers on the plant will decorate the landscape for a long time and will also let the plant reproduce [picture 39].
- We should not uproot whole plants for our garden: orchids are very difficult to transplant and all we will achieve is to destroy the plant [picture 40].
- It is advisable to avoid pesticides, chemical fertilizers, etc. wherever possible: not only for the good of the orchids but for the benefit of nature as a whole - including our own, of course.
- It goes without saying that we should not leave garbage here and there.
- And let's leave a piece of our garden, field, vineyard or olive grove uninterfered by ploughing, fertilizing and grass trimming: this will preserve parts of the natural environment as 'micro-habitats' for the orchids, which can also enrich the environment with their light seeds that travel far away with the wind [picture 41].



FURTHERMORE...

Stunning lakes, majestic mountains, unspoilt coasts - the view takes our breath away. On the other hand, we all want to have our comforts everywhere. How can our coasts and mountains be protected from being overbuilt?

Each individual, and also society as a whole, should consider the following: if we want to preserve pristine forests, rivers with pure, crystalline waters, birds, meadows, butterflies and orchids, we should limit our demands and allow some areas to remain in their natural state - over and above laws and conventions which are often broken or may even change.

WHY ORCHIDS, ACTUALLY?

In addition to their beauty, their scientific interest and the need to protect them, we have taken special interest in orchids also because their existence is a sensitive indicator of a balanced ecosystem in a good state as a whole: they live in symbiosis with terrestrial fungi to germinate and grow their seeds and depend on various insects for pollination and reproduction. If something goes wrong with any part of ecosystem, this has a direct and visible effect on the orchids.



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DEAR FRIENDS

The «ORCHIDCULTURE» project is implemented by the «Archipelagos - environment and development» NGO in collaboration with the Laboratory for Soil Science of the Department of Food Science and Technology of the Ionian University.

We hope that this brochure will contribute to the conservation, promotion and sustainable utilization of the vast natural wealth of Kefalonia and Ithaca as an important heritage and as an attraction, for the benefit of both their residents and the numerous visitors.

It depends on us to preserve and wisely exploit this beautiful wealth that nature so generously provides.

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NATIVE ORCHIDS OF KEFALONIA AND ITHACA



NATIVE ORCHIDS OF KEFALONIA AND ITHACA

Orchids: we have all seen them at the florist's with their spectacular flowers. Many of us have a pot at home or in the office. But many people don't know that these orchids originate from the tropics and are cultivated species - they are not native (picture 1).

Greece brings together an unusual wealth of flora species. The complex geomorphology with mountains, plains and islands and the climate which varies depending on the region, form habitats, (i.e. areas with suitable living conditions) for a multitude of different species.

With around 6.500 species, Greece is the country with the richest flora per surface area in Europe. Among these we find about 225 native species and subspecies of orchids. Their name refers to the shape of the root of many orchids, which have two underground tubers (picture 2).

Most of Greece's native orchids flower from January to June, with only one species flowering in autumn.



In summer the leaves dry out and the plants disappear, only to sprout again after the autumn rains. The flowers often mimic their pollinating insect: the insect is attracted to mate and thus pollinates the flowers (picture 3). Other orchid species attract pollinators through their intensive scent (picture 4).

Orchids' seeds are tiny and have no food reserves. For this reason, orchids have developed symbiotic partnerships with certain fungi whose role is to provide them with water and nutrients.

Kefalonia and Ithaca have a wide variety of different habitats at different altitudes: from the fir forest on Mt. Ainos to the sand dunes on the beaches, from dense macchia to wetlands, cypress forests or abandoned olive groves - the variety of orchid species is similarly wide. The

two islands have a total of about 50 different species and subspecies of orchids recorded, some of them rare.

In collaboration with the Ionian University, we are recording in detail the wealth of the native orchids in Kefalonia and Ithaca, aiming to cover as many areas as possible, confirming old observations seen as the most complete survey was made 30 years ago, and recording new discoveries. In the following pages we present the main habitats with their typical species of orchids.



FIR FOREST

The fir forest in the Ainos-Roudi National Park is certainly an extraordinary ecosystem: it is unique for the Ionian Islands and very rare for an island area in general. Ainos, with an altitude of 1,628 metres, is covered by snow, sometimes until late spring. Both mountains, Ainos and Roudi, are covered from 600-800 meters and above by a dense forest of Greek fir (*Abies cephalonica*). This species is endemic to southern and central Greece and does not exist anywhere else in the world [picture 5]. In fact, it is precisely for this reason that the National Park was established in 1962. In Kefalonia, we find the purest form of the species without hybridization with other species of fir, as is often the case in mainland Greece.

The ecosystem here is almost alpine with very low temperatures in the cold months, and the orchids do not bloom before May-June. The following species of orchids thrive in the dense and humid shade of the fir trees:

Cephalanthera rubra which stands out with its large stem and bright purple flowers [picture 6], and its close relative *Cephalanthera damasonium*, with similar flowers in white [picture 7].



Epipactis helleborine with small white-green-pink flowers and a furry stem. *Epipactis microphylla*, a close relative, is less frequent here.

Neottia nidus-avis with its beige-brown flowers and with a tangled rootstock resembling a bird's nest, hence its Latin name 'nidus-avis'. It is an orchid that depends exclusively on its root fungus for nutrients and so has no green leaves for photosynthesis.

The striking species *Limodorum abortivum* with its purple flowers and purple young shoots which also has no green leaves and depends on its root fungus for nutrients [picture 8].

The white-yellowish *Orchis pauciflora* is rather rare in the fir forest - it prefers the macchia vegetation and the low shrub vegetation called «phrygana» [picture 9].

Of course, the uncontrolled grazing of herds in the forest which eat the firs and don't let them grow also affects the orchids, which are often found eaten too.



MEDITERRANEAN SHRUBS OR MACCHIA

Mediterranean shrubs, the type of vegetation called «macchia», together with the «phrygana»-vegetation, are the most common type of vegetation in Greece at low altitude. Of course, as is invariably the case in nature, the boundaries between them are not clear, with islands of one zone within the other.

The «macchia» is vegetation with evergreen, usually leather-leaved, dense shrubs 3-4 metres tall that can withstand the summer drought, such as strawberry trees, holm oaks, myrtles, Kermes oaks and mastic trees which form an almost impenetrable green wall that often extends as far as the seashore. Such bushes have replaced the forests that covered the coasts of the Mediterranean region a few thousand years ago, before human impact on the land through agriculture, extensive grazing, fires and more recently property development.

Native orchids, being light loving or 'photophilic' plants, generally avoid the deep shade in the bushes and prefer small clearings or margins, *Neotinea lactea* [picture 10] and *Ophrys bombyliflora* [picture 11], for instance. There are, however, a few species which prefer deep shade, such as the tiny *Neotinea maculata* [picture 12] and *Limodorum abortivum* [picture 13].



CYPRESS FORESTS

In Kefalonia and Ithaca, some of the last remaining cypress forests in Greece still exist. Pine trees have been introduced by man to the two islands relatively recently.

In the cypress forests or on their margins we often find *Orchis anthropophora*, with its anthropomorphic flowers [picture 14] and *Ophrys tenthredinifera* with striking flowers in soft colours [picture 15]. *Anacamptis papilionacea* with intense purple flowers and petals similar to a butterfly [picture 16] and *Ophrys scolopax* with flowers with a peculiar shape are also common here [picture 17].



PHRYGANA

Where human activity is more recent or still occurs periodically, the vegetation is limited to low, spiny or aromatic shrubs up to 50cm tall called «phrygana»: thyme, sage, rockrose, heather and spiny broom but also Kermes oaks and mastic trees eaten by goats [picture 18]. Where the land has recently been abandoned, not even phrygana can grow again: the vegetation consists of only thorny burnet bushes (*Sarcopoterium spinosum*) and the landscape almost resembles a steppe [picture 19].

The phrygana vegetation is among the richest habitats for orchids. Here we find many species of the genus *Serapias*, all brown: at first glance one would not imagine that they too belong to the orchid family. *Serapias lingua* is common in almost all of Greece [picture 20] while *Serapias vomeracea* is less frequent [picture 21].

Orchis quadripunctata with purple flowers and leaves with purple spots is a very common species here [picture 22], as is *Ophrys phryganae* with bright yellow flowers and a brown centre, as its name suggests [picture 23]. *Ophrys umbilicata*, which imitates its pollinating insect as an aid to reproduction, also thrives here [picture 24].

From late August, *Spiranthes spiralis*, the only orchid that blooms in autumn, emerges in many places. Its name refers to the spiral arrangement of its small white flowers around the stem [picture 25].



WETLANDS

Native orchids are also found in other types of habitat such as wetlands with waterlogged vegetation, flooded with water. Typical species here are *Anacamptis laxiflora* [picture 26] but also the -extremely rare- subspecies *Anacamptis palustris robusta* [picture 27]. The latter is a North African species: on the European coast it has been recorded in just three places, in Crete, Mallorca and Kefalonia.



ANTHROPOGENIC HABITATS



Over the thousands of years of human presence, what are known as 'man-made' or 'anthropogenic habitats' have been created, with conditions that differ from those in the wild. These are fields and olive groves which are cultivated or meadows grazed by animals. The main difference between these and natural areas is that they are subject to anthropogenic interventions such as regular ploughing, application of agrochemicals, etc. Nevertheless, most of the orchids found in macchia and phrygana grow here too, especially along their margins where there are fewer interventions.

Roadside verges, slopes and ditches are also a man-made habitat protected from ploughing and pesticides which hosts orchids. They should not be cleared of grass, so that the orchids do have time to produce seeds. Several orchids normally growing in phrygana vegetation thrive here too, such as the brightly scented *Anacamptis coriophora* [picture 28], the pale pink *Orchis italica* [picture 29] and *Himantoglossum robertianum*, the 'moscholios' as it is locally known [picture 30]. At up to 80 cm tall, the latter is the largest orchid species along with *Limodorum abortivum* and the first to bloom in the year - its fragrant flowers can be seen as early as January.



RARE ORCHIDS IN THE REGION

Among the many orchids of Kefalonia and Ithaca are some which are quite rare and/or endemic to the Ionian region:

The subspecies *gottfriediana* of *Ophrys ferrum-equinum* is endemic to the Ionian coast and is found on the Ionian Islands and the western coast of mainland Greece [picture 31]. The subspecies *cephalonica* of *Ophrys sphegodes*, often encountered in Kefalonia, is also endemic to central and southern Greece [picture 32].

Ophrys lutea, subspecies *melena* is considered endemic to western and central Greece and the Peloponnese and is quite rare in Kefalonia and Ithaca [picture 33].

Neotinea ustulata is a relatively uncommon species on the two islands, as is the exceptional *Ophrys helenae* [picture 34]. But *Ophrys reinholdii* is also quite rare although it is common in mainland Greece: it has been found only in two or three sites in Kefalonia and two sites in Ithaca [picture 35].

And, of course, the very rare *Anacamptis palustris robusta*, mentioned in the «Wetlands» section.



ARCHIPELAGOS

The NGO «Archipelagos - environment and development», based in the village of Lourdata in Kefalonia, is a non-governmental organization active in environmental planning and the preservation and management of the natural environment. The issue of an information leaflet on the native orchids of Kefalonia and Ithaca is a part of a wider attempt to protect the beautiful, unspoilt natural environment of the islands within the framework of a sustainable development strategy where nature conservation, the prudent use of natural resources, local culture and the economy complement each other.

Other activities of Archipelagos include on-going projects for the protection of the endangered Mediterranean monk seal, the recording of bird fauna and fish resources, the issue of guides for ecologically valuable areas and information programmes, to name but a few.

Our philosophy is best reflected in our slogan:

*Destroying the environment is easy.
Protecting it is difficult and expensive
- but worth the effort.
Its rehabilitation tomorrow might be impossible.*

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THE LABORATORY FOR SOIL SCIENCE OF THE DEPARTMENT OF FOOD SCIENCE AND TECHNOLOGY OF THE IONIAN UNIVERSITY



The Laboratory for Soil Science of the Department of Food Science and Technology of the Ionian University, based in Argostoli, Kefalonia, is dedicated to the utilization and management of soil resources and other natural resources, always aiming at the promotion of their value and the protection of the environment in general.

Within this framework, the Laboratory for Soil Science is implementing the subtask of the present project that aims at the pilot reproduction of native orchids from seeds in the lab (*in vitro*), in order to create a genetic reserve of orchids and study their soil preferences for their settlement and further growth.