CONTENTS

What this book contains

This guide to the flowers of Ordesa and Monte Perdido National Park —a World Heritage Site— can be considered the first introduction to the flora of this outstanding natural reserve which harbours —the National Park and its peripheral area altogether— more than 1,400 plants, 146 of which have been treated in this guide. If you would like to enlarge your information on this subject, you will find a concise bibliography at the end of this book.

Our aim is to bring the reader some of the most striking and distinctive plants that exist in this National Park by using a clear, accessible language. The species are arranged in different environments (forests and scrubs, clearings and megaphorbs, pastures, meadows, humid sites, rocks, screes and high mountains), although they might also be found in other plant communities. Representative plants in each ecosystem have been chosen, both common and rare, the latter having their prime and sometimes single populations within the Park, so they endow our flora with singularity.

The plants are classified alphabetically within each habitat according to their scientific name. Each species is illustrated with a large image and very often with others so as to enhance various features. The plant profile also includes the Latin name, along with that of the botanical family it belongs to; as a complementary information synonyms are added in small print, followed by a selection of vernacular names, the English ones in red type, French ones in blue type, the Spanish ones in rounded characters and the *Aragonese ones in italic type*. Not all the species have a vernacular name while others just have one among the three languages. An index can be consulted at the end of the book.

Afterwards, the occurrence of each plant in different sectors of the Park is stated, ordered from west to east, by using the following codification: B: Bujaruelo valley; T: Torla and its surroundings; O: Ordesa valley; V: Vió valley; A: Añisclo valley; E: Escuaín valley; P: Pineta valley; C: Chisagüés valley. Later on, comes the altitudinal range where the species has been recorded (in brackets for an extreme or unusual altitude). Next is a series of abbreviations that provide some details about the species growth form and its geographical range (chorology) as well.

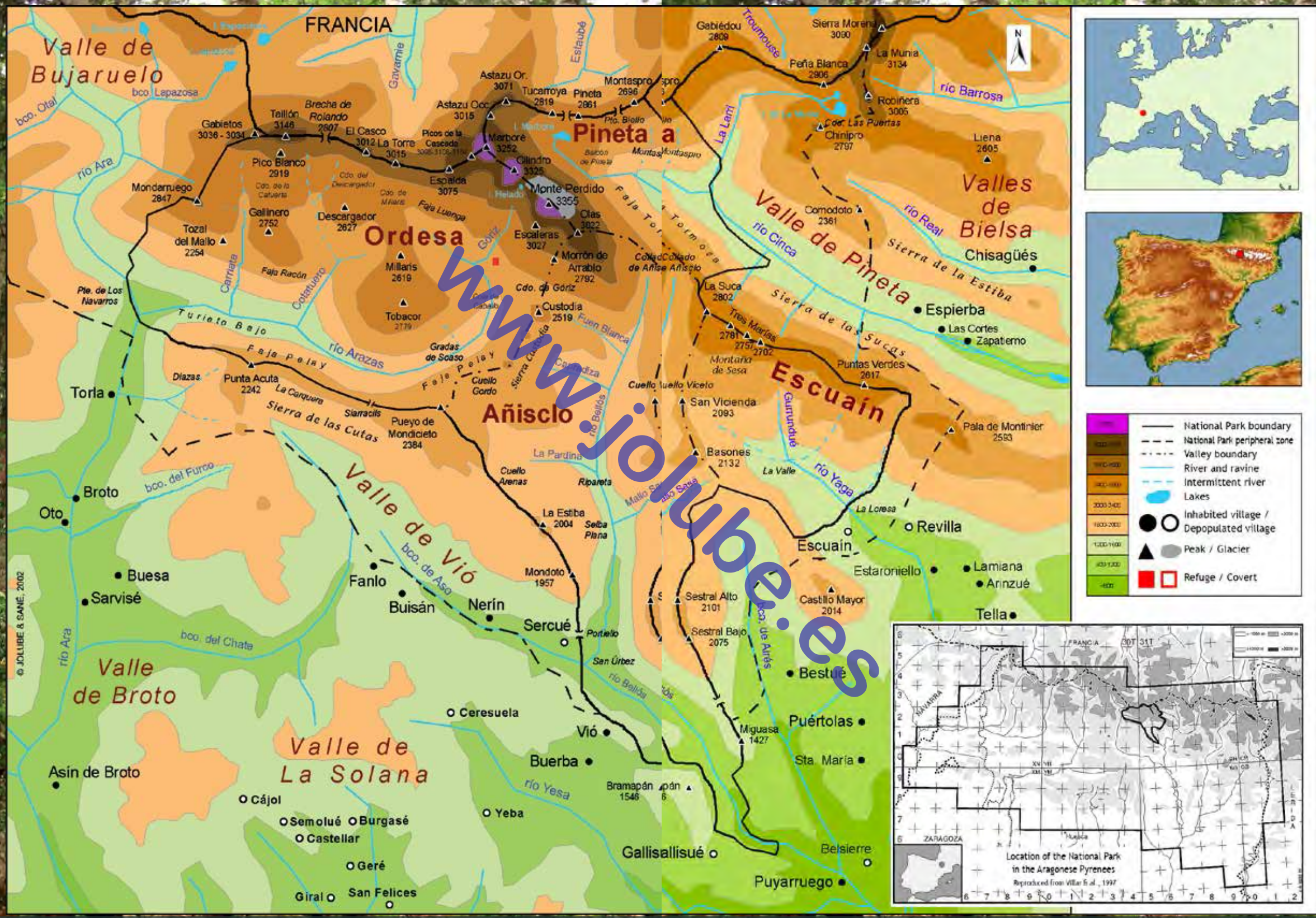
Plant life-forms
This is a classification regarding the way plants spend the unfavourable season.
Ch: Chamaephyte. Small shrub.
Ep: Epiphyte. Climbing plant.
G: Geophyte. Bulbous or rhizomatous plant.
H: Hemicryptophyte. Plant whose leaves grow at ground level.
MP: Megaphanerophyte. Tree.
NP: Nanophanerophyte. Bush or shrub.
P: Phanerophyte. Tree or bush.
Th: Therophyte. Annual herb, with a short vital cycle.
dec.: Deciduous, losing its leaves annually.
everg.: Evergreen, having green leaves throughout the year.

Distribution
In many cases, the plants which occur in the Park can also be found in other parts of the world. Scientists have divided our planet into different regions depending on their climatic and ecological affinities.
Alp.: Alpine, from the alpine-type mountains in Europe.
Arct.: Arctic.
Atl.: Atlantic, from the areas near the Atlantic ocean.
Bor.-alp.: Boreal-alpine, from the Boreal zone and the alpine-type mountains.
Ceven.: Cevennian, from the Cevennes mountains in France.
Circumb.: Circumboreal, from all over the Northern hemisphere.
Eur.: Euro-Siberian, from central and east Europe.
Iber.-Pen.: from the Iberian Peninsula.
Late: prefix meaning "in the broad sense", that is to say it goes well beyond the region considered.
Med.: Mediterranean, from the coastal and inland areas that surround the Mediterranean Sea.
Mount.: from the mountains.
Pyr.: occurring exclusively in the Pyrenees.
Pyr.-Cant.: occurring exclusively in the Pyrenees and the Cantabrian Mountains.
Plurireg.: Pluri-regional, that occurs in many regions on the Earth.
Submed.: Sub-mediterranean, that is the transitional zone between Mediterranean and central European climates, in this case mainly located in the Pre-Pyrenees and adjacent zones climatically similar.
C: Central. **E:** East. **N:** North. **S:** South. **W:** West.
Finally the abundance of each plant within this territory is assessed by means of 7 categories: very rare **(RR)**, having less than four locations; rare **(R)**; scarce **(E)**; frequent **(F)**; common **(C)**; very common **(CC)**; and general **(CCC)** for those landscape-forming species.

Translation from Spanish by José Vicente Ferrández Palacio. Special thanks to Amanda Tyson for her help in improving the final English version of this book.

Introduction

Ordesa and Monte Perdido National Park (PNOMP in its Spanish acronym) is located in the central Pyrenees of Huesca (Aragón, Spain), in northwestern Sobrarbe and bordering the French Pyrenees National Park to the north. It was founded in 1912, when 2,200 hectares corresponding to the forests of Ordesa valley were protected. In 1982 its surface area was enlarged until the current 15,608 hectares that include four valleys besides Monte Perdido, the highest calcareous massif in Europe. From west to east we find: Ordesa (Arazas river), Añisclo (Bellós river), Escuaín (Yaga river) and the uppermost Pineta valley (Cinca river), all of them located within the Cinca basin. The peripheral area surrounding the Park is made up of Bujaruelo valley (upper Ara river), the southern mountainside of Vió valley, the right bank of Airés ravine in Puértolas-Bestué valley, the middle section of Pineta valley and finally the entire La Larri basin up to La Munia Peaks.
Ordesa and Monte Perdido was the second National Park to be created in Spain, after Covadonga. It was also declared a Biosphere Reserve-MAB by the UNESCO in 1977, a World Heritage Site in 1997, and a Site of Communitary Importance by the European Union in 2004.
Among the Spanish National Parks, PNOMP has the widest altitudinal range, 2,655 metres, its lowest point being at 700 metres in Añisclo, while its highest point, Monte Perdido, rises to 3,355 metres, the third highest elevation in the Pyrenees.
The climate of this territory is ruled by two major features: on one hand, an equinoctial rainfall pattern characterized by the highest amount registered in autumn and spring, while the lowest is had in winter, with great irregularities throughout the years; on the other hand, a marked continentality because of the distance from the seas, along with important mountains that obstruct the progress of fronts. Some areas of well-marked Mediterranean character, such as Añisclo, co-exist with others that are more humid and remind us of Central Europe; and finally, we have the alpine nature on the summits.
All this means that practically a sample of every plant community occurring on limestone in the southern side of central Pyrenees can be found within the Park, ranging from lowland Mediterranean to high-mountain alpine types. This wide altitudinal range allows different sorts of vegetation to be distinguished, corresponding to different geobotanical belts or zones. The Mediterranean and continental submediterranean zones appear in the most sheltered parts of Añisclo and Escuaín gorges, with just a few winter frosts and a certain summer drought, where holm oak and *Quercus subpyrenaica* woods occur. The continental montane zone, ranging between 1,000 and 1,700 metres is quite cool, with temperature inversion and strong contrasts from south to north-facing slopes, and contains montane forests such as pine, beech, silver fir and mixed woods. The Mediterranean mountain zone (oro-Mediterranean) is peculiar to sunny slopes up to 2,200 metres, where summer low atmospheric humidity combines with high mountain cold, and gives shelter to pinewoods, hedgehog heaths (spiny cushion-like scrubs) and open stony pastures. Finally we find the treeless alpine zone, which is cold, sunny in winter and cool in summer, allowing just a short growth period, with some areas of perpetual snow.


FRANCIA
Valle de Bujaruelo
bco. Lapazosa
bco. Otal
río Ara
Gavarnie
Estaubé
Astazu Or.
3071
Tucarroya
2819
Pineta
2861
Montaspro
2696
Astazu Occ.
3015
Brecha de Rolando
2807
Taillón
3146
Gabietos
3036 - 3031
El Casco
3012
La Torre
3015
Picos de la Cascada
Marboré
3252
Cilindro
3325
Monte Perdido
3355
Pico Blanco
2919
Mondarruego
2847
Espalda
3075
Gallinero
2752
Descargador
2627
Ordesa
Tozal del Mallo
2254
Millaris
2619
Escaleras
3027
Otas
3022
Morrón de Arrablo
2792
Tobacor
2779
Custodia
2519
Pte. de Los Navarros
Turieto Bajo
Faja Pelay
río Arazas
Gradas de Soaso
Punta Acuta
2242
Diazas
La Carquera
Sierra de las Cutas
Sarrancils
Pueyo de Mondicieto
2384
Torla
Añisclo
Cuello Gordo
Cuello Arenas
Riparota
La Pardina
La Estiba
2004
Selva Plana
Mondoto
1957
Broto
Oto
bco. del Furco
Valle de Vió
bco. de Asa
Fanlo
Buisán
Nerín
Sercué
Portiello
San Úrbez
río Bellida
Buesa
Sarvisé
bco. del Chate
Valle de Broto
Ceresuela
Vió
Buerba
Valle de La Solana
Asín de Broto
Cájol
Semolué
Burgasé
Castellar
Geré
Giral
San Felices
río Yesa
Bramapán
1546
Yeba
Gallisallisué
Puyarruego
Belsierre
Gabiédou
2809
Troumouse
Sierra Morena
3080
Peña Blanca
2906
La Munia
3134
río Barrosa
Robiñera
3005
Coder Las Puertas
Chinipro
2797
Liena
2605
Valles de Bielsa
La Lami
Comodoto
2361
río Real
Valle de Pineta
río Cinca
Sierra de la Estiba
Chisagüés
La Suca
2802
Sierra de las Sucas
Espierba
Las Cortes
Zapatierno
Tres Marías
2781
2757
2702
Montaña de Sesa
Puntas Verdes
2617
Escuaín
Cuello Vicelo
San Vicienda
2093
Pala de Montinier
2593
Basones
2132
La Valle
Gurrundué
río Yaga
La Loresa
Revilla
Escuain
Estaroniello
Lamiana
Arinzué
Sestral Alto
2101
Castillo Mayor
2014
Sestral Bajo
2075
Tella
Bestué
Puértolas
Miguasa
1427
Sta. María
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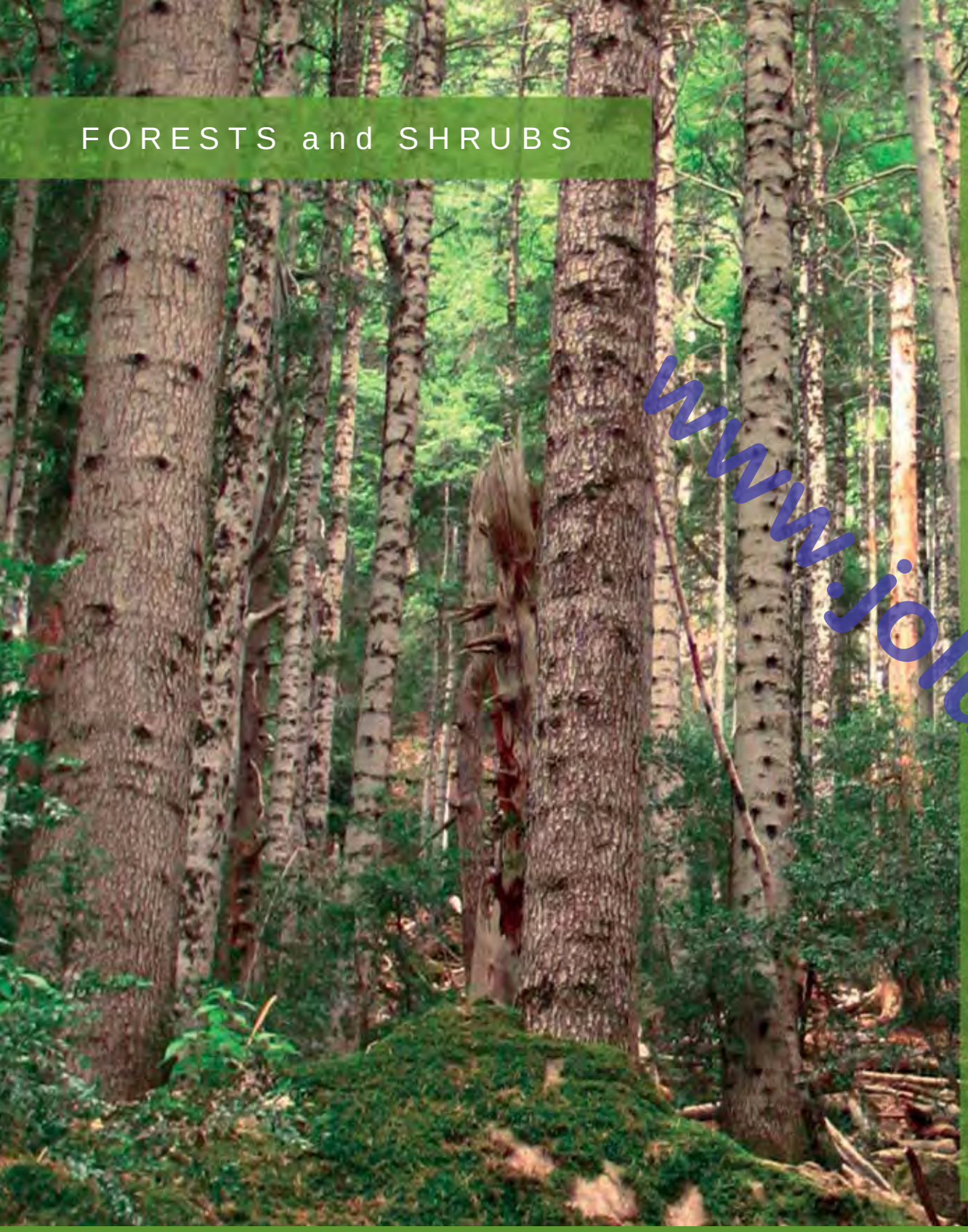
National Park boundary
National Park peripheral zone
Valley boundary
River and ravine
Intermittent river
Lakes
Inhabited village / Depopulated village
Peak / Glacier
Refuge / Covert
FRANCIA
30T
31T
NAVARRA
ZARAGOZA
HUESCA
LERIDA
Location of the National Park in the Aragonese Pyrenees
Reproduced from Villar fi al., 1997

FORESTS and SHRUBS



The first impression one gets when entering Ordesa and Monte Perdido is that it is forest-cloaked. However, only 21 % of its territory is actually covered by forests, which form some masses distributed all along the four valleys: Ordesa to the W, Añisclo to the S, Escuaín to the ESE and Pineta to the NE. Practically all the forests typical of the calcareous southern Pyrenees are found within this protected area, with the exception of the Pyrenean black pine woods (*Pinus nigra* subsp. *salzmannii*) that almost reach the Park southernmost limits and the pedunculate oak woods (*Quercus robur*) typical of the Atlantic foothill zone.

Within the PNOMP both beechwoods and beech-silver fir mixed woods are dominant, representing more than one third of all forest masses, with Scots pine woods immediately behind them. Further apart, with just 10%, are the mountain pine subalpine woods (*Pinus uncinata*), with about the same area being occupied by holm oak woods. The rest corresponds to hazel-mixed woods (c. 7%); *Quercus subpyrenaica* woods (4,5%) and willow thickets (> 1%). As for the local distribution of the various types of forests in each valley there are strong dissimilarities because of their different positions.

Ordesa faces West and, along with Añisclo, is the most forested valley. The lowest parts of its southern slopes are covered with extensive Scots pine woods, while most north-facing mountainsides are covered with beechwoods, silver fir woods and mossy pinewoods that catch humidity from the oceanic fronts. However, all three types of forests also reach the south-facing slopes from the middle zone up to Soaso, as the narrowness of the valley causes a blockage of cold air in the bottom and the subsequent condensation of humidity, a phenomenon called “temperature inversion”. The main interest of the Ordesa forests lies in the fact that they have not been exploited for 100 years.

Unfortunately **Pineta** valley only gets a little protected area within the Park, despite its strongly forested nature. Two-thirds of the protected forests in Pineta are beechwoods or beech-silver fir mixed woods. From among all four valleys this is the broadest one so river verge communities are well-developed, with the rare Violet Willow, *Salix daphnoides*. Without a doubt, the most remarkable feature is the occurrence of the largest best-preserved mixed wood growing on alluvial terraces in the entire Aragonese Pyrenees.

Escuaín is a relatively short valley where the landscape is greatly intervened by man, so much is this the case that it lacks mountain pine woods. It is also the most continental and sub-mediterranean of all four, as it gives shelter to nearly all *Quercus subpyrenaica* woods in the Park and 65% of its forests are Scots pine woods, while wet forests have little importance. Finally, some dry spurs hold remarkable holm oak thickets on their northernmost European distribution limit.

Añisclo gathers the largest diversity and contrasts in terms of vegetation for various reasons: it is the longest valley -more than 20 km–, and descends zigzagging from North to South; it has got some short transverse valleys as well, and it also displays a wide altitudinal range from 700 to 3,000 metres, containing all of the geobotanical belts in the Park, from the Mediterranean foothill zone to the alpine layer. All these characteristics, along with the narrowness of this canyon, result in the alteration of the vegetation zones because of temperature inversion. As for woodlands, more than one-third are beech-silver fir mixed woods while one-fourth corresponds to holm oak woods. However, what stands out is that it gives shelter to both the hazel-mixed woods and nearly all the holm oak woods in the Park.

FORESTS and SHRUBS

1 Amelanchier ovalis Medik. (Rosaceae)

Snowy Mespilus. Amélanchier. Guillomo. *Senera, griñolera*

A. rotundifolia (Lam.) Dum.-Courset, **A. vulgaris** Moench

SECT.: B O T A E P C. ALT.: 650 – 2000 m. NP dec. Submed. **C**

In spring, when this sub-mediterranean bush is in full blossom, the warmest areas in the Park such as the slopes of Andecastieto, at the entrance of Ordesa, are covered with a display of white. The name of the genus refers to the sweet honeyed taste of its ripe fruit, whilst that of the species has to do with the oval leaf shape.

Eco.: It is a characteristic plant of *Quercus* forests (*Q. subpyrenaica* and holm oak) and scrubs dominated by boxwood, bearberry or *Echinospartum horridum*, mainly on calcareous and loamy soils.

Loc.: Cardal ravine, Otal (B); Los Navarro bridge, Gradas de Soaso (O); Bordas ("barns") de Aso, Mondoto (A); Escuaín pueblo, Revilla (E); Parador, Zapatierno (P).

2 Arctostaphylos uva-ursi (L.) Spreng. (Ericaceae)

Bearberry. Busserole, raisin-d'ours commun. Gayuba. *Bucharet-ta, bucheta, manzanetas de pastor*

SECT.: B O T V A E P C. ALT.: 950 – 2300 m. Ch. Plurireg. (Bor.-alp. y Med. Mount.) **F**

Procumbent evergreen shrub. Curiously, both the genus name, *Arctostaphylos*, and that of the species, *uva-ursi*, have the same meaning, that is bear-berry, the former coming from Greek while the latter is its latinized form.

Another plant in the same genus, the alpine bearberry, ***A. alpinus***, with leaves withering in autumn and black ripe fruit (small image), occurs in Bujaruelo valley.

Eco.: It carpets mountainsides, ridges and various types of open luminous woodlands on stony soil, both in montane and subalpine zones.

Loc.: Turbón, Lapazosa ravine (B); Andecastieto, Cotatuero (O); San Úrbez, la Miguasa Pass (A); La Loresa, toward los Mallos bridge (E); Espierba southern slope, La Larri (P).

3 Buxus sempervirens L. (Buxaceae)

Box, Boxwood. Buis. Boj. *Bucho, buxaco*

SECT.: B O T V A E P C. ALT.: 700 – 1900 m. MP everg. Submed. **CCC**

The box or *bucho* is an evergreen shrub, as its specific name states, although its leaves become reddish orange in winter as they accumulate pigments called anthocyanids that protect them from cold. Its hard wood is used to make some decorative craft utensils. It is also employed for hedges as it is highly tolerant of close shearing and produces newly emerging shoots easily. It has been used in popular medicine to reduce fever or as a hair loss treatment, also as a purgative, etc., although it is quite toxic, even fatal, as it contains some alkaloids. Some local place-names such as Buchaco or Bujaruelo, show that it grows in large quantity there.

Eco.: It is either the most abundant or the most ecologically adaptable shrub in the Pyrenees as it thrives in various types of forests such as holm oak and *Quercus subpyrenaica* woodland, mixed woods, pinewoods, beechwoods and silver fir woods ranging from the lowlands to the upper montane zone on stony calcareous soils. It makes up large extents of successional shrub communities (box scrub or *bujedos*), either on its own or mixed with *Echinospartum horridum* and other shrubs. It also forms the scrubby permanent vegetation in barren spots.

Loc.: Oncins bridge, Otal (B); Andecastieto, La Canal ravine, Turieto (O); Fanlo-Nerín southern slope, San Úrbez, La Pardina (A); La Valle, Castillo Mayor, Revilla (E); Tormosa ravine, La Larri, Parador (P).

4 Cardamine heptaphylla (Vill.) O.E. Schulz (Brassicaceae)

Toothwort. Cardamine à sept folioles, dentaire pennée. Dentaria

Dentaria pinnata Lam.

SECT.: B O A E P. ALT.: 750 – 1770 m. G. Eur. S **E**

Perennial herbaceous plant with palm-like (hand-shaped) leaves made up of 7 leaflets, as the name of the species indicates, with white or pinkish flowers that bloom in early spring, before the trees put forth new leaves.

Eco.: This is species characteristic of fresh shady spots with humus-rich soil, growing at the bottom of ravines or in wet woods, particularly in beechwoods and hazel thickets.

Loc.: Oncins bridge, Ordiso (B); Bosque de las Hayas, Senda de Cazadores (O); Las Cambras gorge, La Pardina ravine (A); Airés ravine (E); bottom of Pineta valley (P).

FORESTS CLEARINGS and MEGAPHORBS

When a clearing is torn within a forest because of an avalanche or an occasional tree fall, forest disruption and the ensuing light gap activate a natural regeneration process launched by sun-loving, colonizing, opportunistic species.

On the other hand, at the foot of humid cliffs or in forest clearings cut by ravines, usually rich in organic matter, tall large-leaved herbaceous species, known as megaphorbs, proliferate.

FOREST CLEARINGS & MEGAPHORBS

25 Aconitum anthora L. (Ranunculaceae)

Anthora, Yellow Monkshood, Healing Woolfsbane. Aconit anthore. Acónito amarillo. *Tora*

SECT.: B O A E P. ALT.: (1300)1500 - 2020 m. H. Alp. **R**

It is a rhyzomatous herbaceous plant which bears racemes of yellow flowers shaped like a helmet. It is very toxic and causes poisoning to both animals and people.

Eco.: It can be found at the foot of fresh limestone cliffs and in moist pastures as well.

Loc.: Picamartillo, Salto del Pich (B); Faja Racón (O); La Pardina ravine, Capradiza ravine (A); Castillo Mayor (E); Tormosa ravine, El Felqueral (P).

26 Aconitum napellus L. subsp. **vulgare** Rouy & Foucaud (Ranunculaceae)

Aconite, Monkshood, Wolfsbane. Aconit commun. Acónito, verdegambre. *Toara*

SECT.: O P. ALT.: 1225 - 2120 m. H. Alp. **E**

This tall stout plant up to 2 metres high has got blue helmet-shaped flowers gathered in racemes. The Latin surname shows that its root, actually its rhizome, is shaped like a turnip. It is also a very toxic plant which causes death by cardio-respiratory collapse and which was used to commit murder.

Eco.: It grows in wet pastures together with other tall herbs (megaphorbs), where livestock or cattle stay for a rest and therefore organic matter accumulates, that is to say nitrogen-rich spots.

Loc.: Near La Pradera (O); Faja Tormosa, las Inglatas, Estiba de Espierba (P).

27 Atropa belladonna L. (Solanaceae)

Bella Donna, Deadly Nightshade. Belladone. Belladona. *Pech*

SECT.: B O T E P. ALT.: 1100 - 1750 m. H. Eur. **E**

This is a very toxic plant which affects the heart rate and accordingly one of its active ingredients, atropine, is an essential ingredient in some medicines. *Atropa* means "cruel or inexorable" in Greek, and refers to the deadly properties of this plant. Roman women used it to dilate their pupils as they believed that by doing so they would become more desirable at men's eyes.

Eco.: It shows up in nitrified clearings opened by avalanches or falling trees within moist forests.

Loc.: Santa Elena bridge, Oncins bridge (B); Turieto Alto, Cotatuero (O); Yaga gorge, Tabacoy (E); Parador, Estiba de Espierba (P).

28 Chenopodium bonus-henricus L. (Chenopodiaceae)

Lincolnshire Spinach. Chénopode Bon-Henri. Zurrón. *Sarrión*

Blitum bonus-henricus (L.) C.A. Mey.

SECT.: B O V A E P. ALT.: (1300)1500 - 2550 m. H. Eur. **F**

A very well-known plant to the locals of these mountains as it is consumed by both livestock and people. The leaves are also employed to make a poultice to cure injuries. The Latin name refers to the shape of a goose foot (*chenos* in Greek) of the leaves in some of the species of this genus. This particular species is dedicated to King Henry IV.

Eco.: The Perennial Goosefoot abounds in sheepfolds with nitrogen-rich soil, where it is sometimes the main species.

Loc.: Cardal ravine, Plana Cuasta Pass (B); Góriz refuge, Gradas de Soaso (O); Cuello Arenas, Cave of Pájaro Muerto (A); Cueva Foratata, Chasm of La Bufona (E), Faja Tormosa, El Felqueral (P).

PASTURES

A long-time interaction between both wild and domestic herbivores and vegetation has given rise to the evolution of a series of biological types and plant communities specifically adapted to grazing. Four types of livestock —cows, sheep, horses and goats—, together with the Pyrenean ibex and chamois, have been grazing traditionally in our mountains, each one showing different preferences to pasture. All these, together with geological, microclimatic and topographic variations (elevation, slope exposure, inclination) cause the pastures to be the most diverse plant communities in our landscape.

Thus, we have Mediterranean pastures in lower Añisclo valley, rich in woody, aromatic species, and looking already green at the end of the winter but quickly withering in midsummer; besides fresh montane pastures used by stock in spring and finally high-mountain pastures or “estivas” that are grazed only during the short Pyrenean summertime. The latter show large dissimilarities in their floristic compositions depending on the substratum (calcareous or siliceous), soil depth, stony nature, topographic position (southern or northern slopes, hollows), snow or ice melting patterns, etc.

37 Achillea millefolium L. (Asteraceae)

Common Yarrow. Achillée millefeuille. Milenrama. *Mermasangre*

SECT.: B O T V A E P C. ALT.: 940 - 2230(2350) m. H. Eur. C

This herbaceous plant takes its Latin surname from its much-divided, almost feathery leaves, which are also very aromatic. The name of the genus refers to the Greek hero Achilles, that succeeded in healing Telephus' wounds by using the yarrow. In fact it has been used to cure both human and livestock ailments and also for folk remedies.

Eco.: It thrives in fresh meadows and mesophilous pastures of the montane and subalpine zone.

Loc.: Turbón, El Cebollar ravine (B); Casa Bergés, Gradas de Soaso (O); Cuello Arenas, Las Traviesas spring (A); Foratata cave, Tozal de San Vicenda (E); Faja Tormosa, track to La Larri (P).

38 Antennaria dioica (L.) Gaertn. (Asteraceae)

Mountain Everlasting, Castfoot, Cudweed. Antennaire dioïque. Pie de gato. *Cola de fuina*

SECT.: B O T V A E P C. ALT.: (1280)1500 - 2450(2710) m. Ch. Latebor.-alp. C

A lay person may mistake this species for the edelweiss (*Leontopodium alpinum*), as its flower heads are also white but much smaller. The name of the genus, *Antennaria*, alludes to the hairs of the male capitula which are thickened above like the insect antennae. Its surname states that some specimens are male while others in contrast are female. It has been used to heal some respiratory ailments and as an anti-inflammatory remedy.

Eco.: It grows in acidophilous pastures, mainly in the subalpine and alpine belts.

Loc.: Lapazosa ravine, Espelunz (B); Faja Pelay, Monte Perdido (O); Sierra Custodia, Plana Canal (A); Foratarruego, Montaña de Sesa (E); trail to Añisclo Pass, Estiba de Espierba (P).

39 Aphyllanthes monspeliensis L. (Liliaceae)

Oeillet bleu de Montpellier. Junquillo. *Chunqueta*

SECT.: B O A E P. ALT.: 690 - 1470 m. H. Med. W (Submed). E

Its Spanish vernacular names are very accurate indeed as this plant resembles a small rush ("junco"). Its leaves are reduced to sheaths that wrap the hollow, slender stems topped with pretty blue flowers bearing six petals and six stamens. The Latin epithet, *monspeliensis*, refers to the city of Montpellier, from where the species was first described. It is eaten by livestock in spring, when it is still tender. It has been used in popular medicine to improve circulation.

Eco.: A very characteristic plant of dry, sunny, sub-Mediterranean pastures on limestone (called "junquillares"), within rosemary or box scrub.

Loc.: Santa Elena gorge (B); La Ereta bridge, La Canal ravine (O); Bordas ("barns") de Aso, Gallisué (A); La Loresa, La Consusa ravine (E).

40 Asphodelus albus Mill. subsp. **delphinensis** (Gren. & Godr.) Z. Díaz & Valdés (Liliaceae)

White Asphodel. Asphodèle du Dauphiné. Gamón. *Abozos*, *albezones*

A. delphinensis Gren. & Godr., **A. pyrenaicus** Jord

SECT.: B O A E P. ALT.: 1080 - 2000(2200) m. G. Alp. F

SThis plant bears a single stem topped with a raceme of white flowers bearing showy stamens that jut out from them. The *abozos* (its Aragonese name) were harvested formerly in Soaso and Bujaruelo to feed swine. It has also been used in popular medicine and cosmetics, but its swollen roots are toxic.

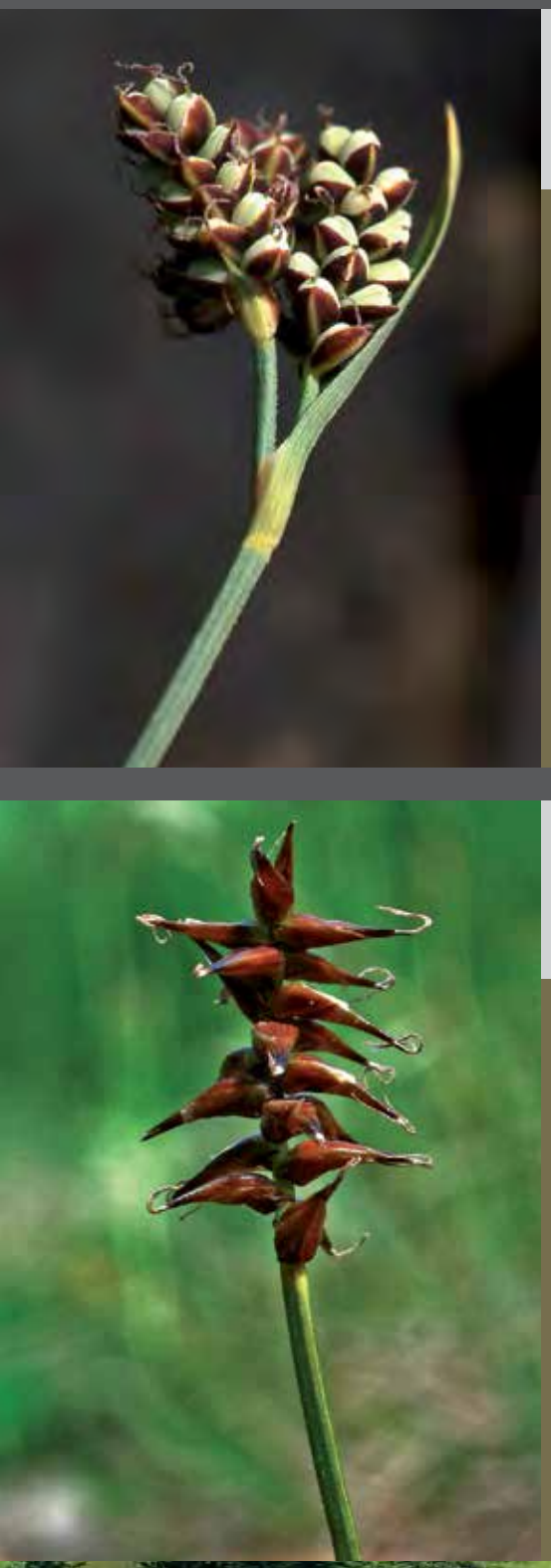
Eco.: It abounds in heavily grazed hay meadows and pastures growing on nitrogen-rich, deep soils, as well as in box scrub, on rocky hillsides repeatedly set on fire, etc.

Loc.: Ordiso, Salto del Pich (B); Salarons, Gradas de Soaso (O); Bordas ("barns") de Aso, Capradiza ravine (A); trail to Surgencia del Yaga (E); Faixa Castiecho, Montaspro (P).

WETLANDS

The rocky substratum in the Park is mostly calcareous in origin, so the rocks are very permeable and therefore the formation of wetlands is unlikely. In Ordesa and Monte Perdido such places are rare and highly localised, chiefly in drains and in the so-called «aguastuertas» or «catuartas» (meandering streams) and in springs whose presence indicates a geological contact of different permeability.

The true central-European peatlands with *Sphagnum* are not really formed here, but hygroturbous pastures whose waters have a neutral-alkaline pH. This singularity has enabled the Park to house a plant community unique and endemic to this central section of our mountain range, a relative of those to be found in the Alps, which might have entered the Pyrenees during the last ice ages. Outside the Park limits, at the source of the Ara river where the substratum is granite or schist, true peatlands exist.



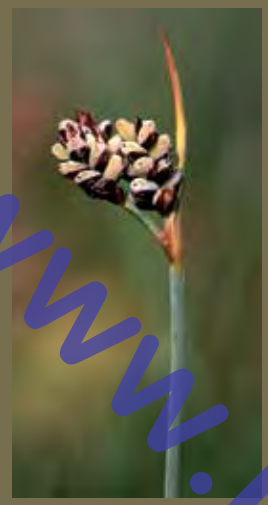
77 Carex bicolor All. (Cyperaceae)

Two-colour Sedge. Laiche bicolore. Cárice bicolor.

SECT.: O A. ALT.: 2155 – 2430 m. H. Bor.-alp. **R**

This is a tiny herb, very rare in the Pyrenees, having most of its populations within the Park.

Its name refers to the two coloured trait of the ripe spikes, with a contrast between the bluish-green of the utricles and the brownish-grey of the bracts.



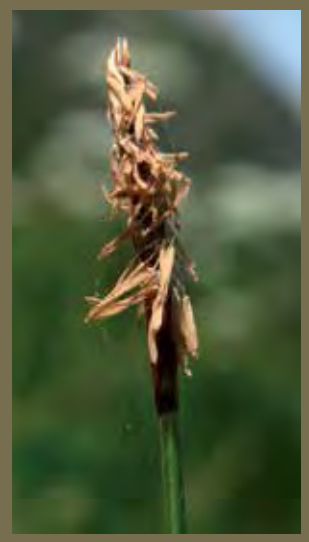
Eco.: It grows in the alpine belt, in damp spots on limestone substrate with a little incline which generate hygroturbous grasslands unique to the central Pyrenees.

Loc.: Faja Luenga, Faja Millaris and Aguas Tuertas at Salarons (O); Morrón de Arrablo (A).

78 Carex davalliana Sm. (Cyperaceae)

Davall's Sedge. Laiche de Davall. Cárice de Davall

SECT.: B O T A E P. ALT.: (1260)1645 – 2330(2680) m. H. Eur. **E**



An easily recognizable sedge when it flowers and bears fruit as it is a dioecious plant which produces two types of turfs, some male (right image), some female (left image).

It is dedicated to the English botanist Edmund Davall, who worked in Switzerland during the 18th century.

Eco.: This herbaceous plant forms tussocks in springs and wetlands that grow on calcareous soil in the upper montane and subalpine belts, the so-called hygroturbous meadows.

Loc.: Oncins spring, Batanes ravine (B); Briet and Soaso springs (O) Sierra Custodia, Fuen Blanca (A); Faja Monesma (E); Las Inglatas, Faja Tormosa (P).

79 Cirsium monspessulanum (L.) Hill subsp. monspessulanum (Asteraceae)

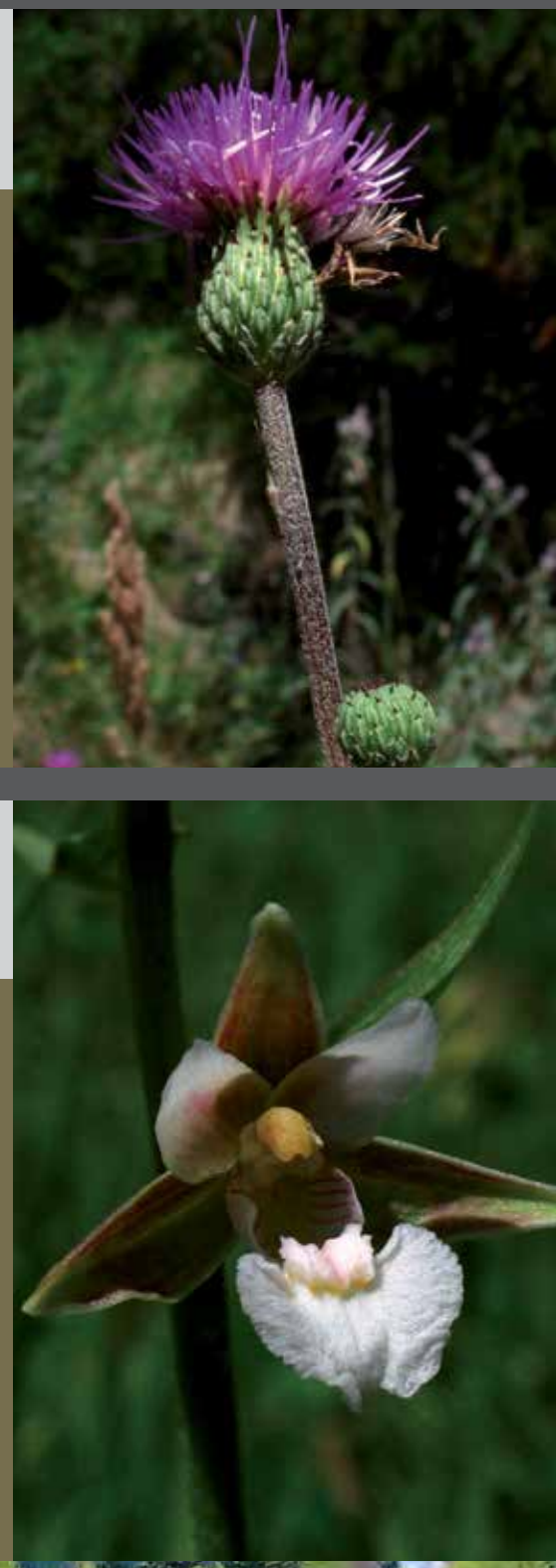
Cirse de Montpellier. Cardo de Montpellier

SECT.: B O T A E. ALT.: (600)1000 – 1650(1800) m. H. Med. W **E**

This fairly tall thistle that flowers in midsummer has slightly fleshy leaves –the cauline ones embracing the stem- and soft slender spines. The name refers to the region of Montpellier, in France, the place of origin of the plants that served to its original description.

Eco.: It is a characteristic species of the rush areas that grow on tufa springs, wet meadows, etc.

Loc.: Springs of Santa Elena and El Azute (B); La Canal ravine, Diazas (O); San Úrbez, Puyarruego (A); ravines of La Consusa and Angonés (E).



80 Epipactis palustris (L.) Crantz (Orchidaceae)

Marsh Helleborine. Épipactis à longues feuilles. Epipactis de fuentes

SECT.: O A E P. ALT.: 600 – 1300 m. G. Lateeur. **R**

This orchid differs from the rest of its fellow relatives in its large white labellum and the greenish-purple sepals. It is pollinated either by ants or bumblebees.

Eco.: It grows in wetlands, calcareous springs or by the rivulets of the lower montane zone, hence its *surname*.

Loc.: We can enjoy its beautiful bloom at the end of June in the marshes close to Casa Oliván (O), also in Añisclo gorge or in the wet meadows opposite the former Sanatorio de Pineta, as well as near Escuaín.

ROCKY GROUND

Massive cliffs are one the main features of this National Park where the highest limestone massif in Europe is located, with the Monte Perdido standing as its emblem. It has the broadest altitudinal range in the Pyrenees, as well as a variety of rock faces from the foothills at 700 m to the subnival zone, above 3,000 metres.

These are inhospitable habitats, only suitable for those species adapted to very restrictive conditions of soil and water, places that challenge their adaptive capacity and which, together with the screes, originate most of the plants endemic to our mountains, as we will see next.

ROCKY GROUND

89 Adiantum capillus-veneris L. (Adiantaceae)

Southern Maidenhair Fern, Black Maidenhair Fern, Venus Hair Fern. Capillaire. Culantrillo de pozo. *Yerba meadera*

SECT.: T A E. ALT.: 720 - 1240 m. H. Latemed. **R**

The name of this fern means "not wet", as the particular arrangement of its fronds lets the water drip without soaking them up, hence its vernacular Aragonese name "hierba meadera" (peeing herb). The name of the species, *capillus-veneris*, means Venus' hair, because the rachis of the leaflets resemble the goddess's hair. In the Alto Aragón (province of Huesca) it has been used in folk medicine either as a diuretic or abortive.

Eco.: This plant carpets warm cliff seeps and shady crevices in the lower montane zone, just where limestone travertine is formed due to carbonate precipitation.

Loc.: Within the Park, the black maiden fern is only found in the warmest valleys, Añisclo and Escuaín: San Úrbez cave, Fuente del Baño (A); Yaga gorge(E).

90 Androsace cylindrica DC. subsp. **cylindrica** (Primulaceae)

Rock-Jasmine. Androsace cylindrique. Androsace columnar

SECT.: O A E. ALT.: (1500)1700 - 2385 m. Ch. Pyr. **E**

In the older specimens of this cushion-forming perennial we can see the short, tightly packed, columnar little stems —that retain the remains of dead leaves— overlapping, hence the name of this species.

Eco.: It is a specialist in growing in the fissures of limestone rock faces, either vertical or overhanging, both sunny and shady, of the subalpine and lower alpine belts.

Loc.: It is endemic to the Aragonese Pyrenees, its westernmost limit being Ordesa, where, in addition, its largest populations are found. Solana del Gallinero, Fajas Blanquera and de Las Flores, Faja Pelay (O); In the Escuaín section it is only found at Castillo Mayor.

There is another very similar plant in the Park, also endemic to the Pyrenees, the Pyrenean Rock-Jasmine, ***A. pyrenaica*** Lam. (small image). Within the Park it has only been found at Sestrales (Añisclo) where it grows on quartzite (a siliceous rock) and has there its westernmost population.

91 Antirrhinum sempervirens Lapeyr. subsp. **sempervirens** (Scrophulariaceae)

Silver Snapdragon. Muflier sempervirent. Boca de dragón siempreverde

SECT.: O V A P C. ALT.: 980 - 2350(2500) m. Ch. Pyr. **F**

It is an evergreen perennial, as its scientific name implies, whose stems are woody at the base. This plant has a dull green colour because of being covered with a smooth fur. Its flowers are white, tinged with yellow or purple.

Eco.: It can be spotted, in the form of shrubs or isolated specimens, growing on limestone rocks, particularly those facing south.

Loc.: Another plant endemic to the Pyrenees, with its best populations located in Huesca. Faja Racón, Carriata (O); Mondoto, Betosa ravine (A); Faja Tormosa, trail to Balcón de Pineta (P).

92 Campanula cochleariifolia Lam. (Campanulaceae)

Fairies' Thimbles. Campanule à feuilles de cochléaire. Campanillas. *Campanetas*

C. pusilla Haenke

SECT.: B O V A E P C. ALT.: (1140)1400 - 2850(3071) m. H. Alp. **C**

The blooms of this bellflower, quite large as compared to the plant size, are light blue and shaped like the megaphone of a phonograph. Its basal leaves resemble a teaspoon, hence its Latin name, and unlike other species of the same genus, it still keeps them at flowering time.

Eco.: It takes root in screes and rock crevices, often moist, at times in stony pastureland as well, preferably on calcareous substratum.

Loc.: San Nicolás de Bujaruelo, Otal (B); Faja Pelay, Góriz ravine (O); Capradiza ravine, Liana Mala (A); Angonés ravine, Pleta de los Faixins (E); Cinca waterfalls, Eastern Oriental (P).

Also we found in Pineta Valley (small image) another endemic plant to the Pyrenees, ***C. jaubertiana*** Timb.-Lagr. (= *C. andorrana* Braun-Blanq.).

SCREES

Screes are formed as a consequence of the wearing down of ridges and cliffs. Wide temperature fluctuations taking place between day and night provoke the frost/thaw phenomena that manage to break the rocks. These places set harsh conditions for plant life, such as the sliding movement of the substratum and the falling of stones from the adjacent cliffs, which break the plants.

All this acts as an evolutionary trigger so accordingly a number of species are endemic to this type of environment, as it also occurs on rocky ground.

105 Arabis alpina L. (Brassicaceae)

Alpine Rock-Cress. Arabette des Alpes. *Carchesia*

SECT.: B O T A E P C. ALT.: (990)1435 - 3165 m. Ch. Latebor.-alp. F

This is a rather hairy herb with pale green, toothed leaves, those of the rosette having a stalk while the others embrace the stem, which can grow up to 40 cm. Its white flowers are fairly large. This species takes on a wide variety of shapes, ranging from the slender to the robust.

Eco.: It lives on scree slopes, chiefly of limestone, from the montane to the subnival zone.

Loc.: It has its uppermost location in Spain, 3,165 m, at Pico Oriental de la Cascada. San Nicolás de Bujaruelo (B); Brecha de Rolando, Cotatuero, Mondarruego, Pico de la Cascada (O); Capradiza ravine (A); Añisclo Pass, Cirque of Pineta (P); Mountain Refuge of La Estiva (C).

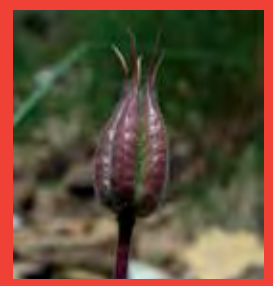
106 Aquilegia pyrenaica DC. subsp. **pyrenaica** (Ranunculaceae)

Pyrenean Columbine. Ancolie des Pyrénées. Aguileña del Pirineo. *Palometas de puerto*

A. aragonensis Willk.

SECT.: B O A P. ALT.: (1040)1550 - 2400 m. H. Pyr.-Cant. E

The name comes from the hooked spurs of its petals, shaped like the talons of an eagle. However, this species differs from the common columbine, also present in the Pak, that it bears large flowers compared to the size of its leaves and also its straight or slightly curved spurs, never strongly hooked. It has been used as an aphrodisiac and its seeds, soaked in olive oil, were applied to battle head lice.



Eco.: This plant is an endemism to the Pyrenees and the Cantabrian Mountains that colonises scree, rock crags and stony pastureland on calcareous soil.

Loc.: Col d'Oulettes, Lapazosa ravine (B); Cotatuero (O); Sierra Custodia, San Úrbez (A); Balcón de Pineta, track towards La Estiva (P).

107 Borderea pyrenaica Bubani & Bordère ex Miégev. (Dioscoreaceae)

Dioscorée des Pyrénées. Borderea del Pirineo

Dioscorea pyrenaica Bubani & Bordère ex Gren.

SECT.: B O V A E P C. ALT.: (1320)1550 - 2410(2500) m. G. Pyr. C. F

This one is, along with its relative B. chouardii, the herbaceous plant with the most longevity in Europe, with a lifetime of 300 plus years, much more than some trees. Its age has been calculated by means of the scar that the yearly stem leaves on the xylopodium or yam, a woody tuber. The stems bear heart-shaped, dull green leaves. Moreover, it is the only European plant pollinated by ants, these being capable of distinguishing the fertile pollen from the sterile. In this plant both sexes occur in different specimens. This genus is unique to the Pyrenees, its closest relatives living in Africa and America, where yam is consumed as food.

Eco.: It takes root on the unstable limestone screes in the subalpine and alpine zone of the Central Pyrenees.

Loc.: This plant has some of its best populations within the Park and its vicinity. Bujaruelo Pass (B); Faja Canariellos, Cirque of Soaso (O); Sierra Custodia, Liana Mala (A); Montaña de Sesa, Angonés ravine (E); Montaspro, Estiba de Espierba (P).

108 Campanula speciosa Pourr. subsp. **speciosa** (Campanulaceae)

Showy Harebell. Campanule à belles fleurs. Campanillas

SECT.: B O V A E P. ALT.: 1000 - 1900(2100) m. H. LatePyr. E

Doubtless, the most attractive and beautiful harebell in our flora as its Latin name states, bearing plenty of bell-shaped, pale blue flowers. This species has linear-lanceolate leaves and can reach one metre in height.

Eco.: It thrives on limestone scree and loamy slopes of the montane zone along with *Ligusticum lucidum* and *Stipa calamagrostis*, among other species.

Loc.: Its geographical range goes beyond the Pyrenees. Lapazosa ravine, Gabieto ravine (B); Senda de Cazadores, Faja Canariellos (O); Betosa ravine (A); Angonés ravine (E); Estiba de Espierba, track to La Larri (P).

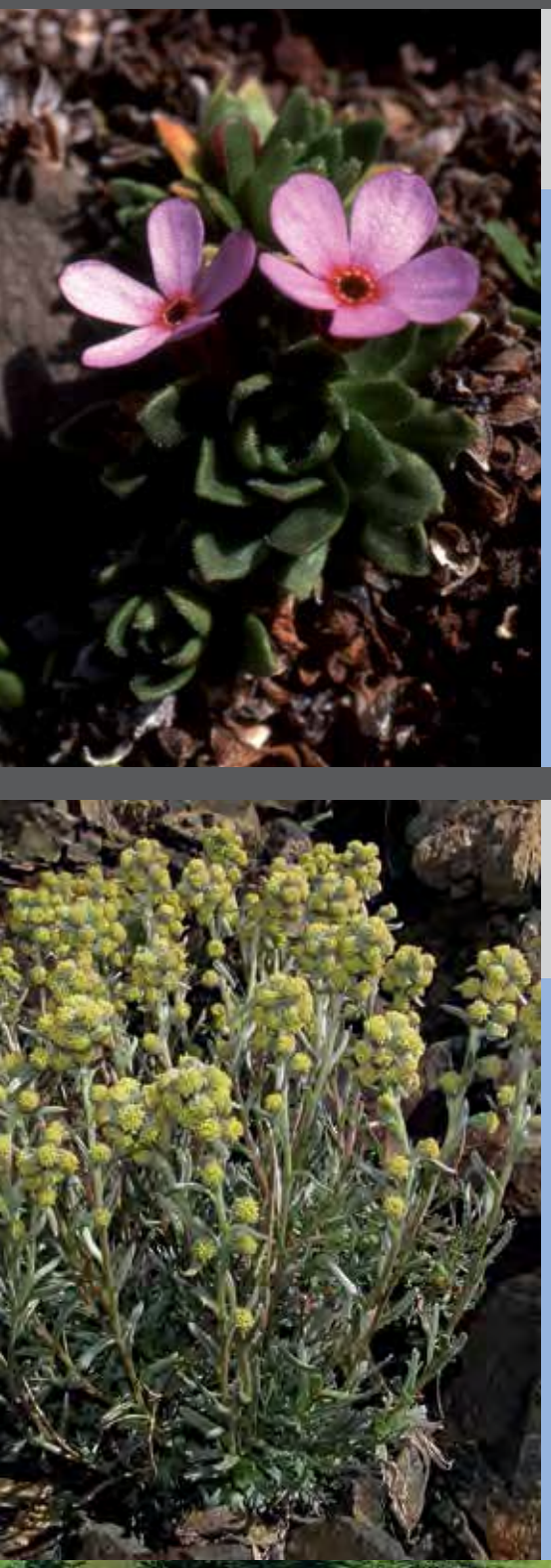
HIGH MOUNTAIN

Above 3,000 metres and as a consequence of prolonged snow cover and freezing soil, that shorten the vegetative period of plants, environmental conditions become extremely harsh. As compensation, the snow cover both insulates from the cold and retains heat, moreover supplying water, essential for life, after thawing. Wind sweeps the snow off of the ridges and erodes and dries the soil. Strong temperature variations cause rock breakage, cryoturbation and landslides. Powerful ultraviolet radiation can cause mutations while pollination through insects is very restricted, its activity being reduced or null because of cold and strong winds. However, a handful of plants is capable of enduring the harsh high mountain climate. As for the Pyrenees, from amongst the more than 3,500 species living there, only around 150 can achieve this feat; more specifically, 95 of them are found on the 34 summits above 3,000 metres of Ordesa and Monte Perdido National Park and its peripheral zone.

High mountains are not the appropriate place for opportunistic plants, those with a short or annual life-cycle, putting all of their eggs quite literally in one basket. Accordingly, their first strategies to survive are either longevity or vegetative propagation. Bright-coloured flowers allow them to attract the few pollinating insects that can reach such elevations, and this is the case of purple colour in *Linaria alpina* subsp. *alpina* and *Saxifraga oppositifolia*, or the pink in *Silene acaulis*. If insects are so scarce that the aforementioned *Saxifraga* can not be pollinated, then it is capable of self-pollinating.

Most of these plants fight cold and drought by means of cushion-like structures that reduce the surface area exposed to heat and humidity loss, as it occurs with *Silene acaulis* or *Minuartia sedoides*. Also, other species such as *Saxifraga pubescens* or *Androsace ciliata* possess white hairs that allow them to retain warm air and humidity and also serve to protect themselves against ultraviolet radiation, as is the case with *Cerastium alpinum* or *Leucanthemopsis alpina*. Soil motion is minimized by having long, deep roots.

HIGH MOUNTAIN



117 Androsace ciliata DC. (Primulaceae)

Androsace ciliée. Androsace ciliada

SECT.: B O A E P C. ALT.: (2180)2400 - 3330 m. Ch. Pyr. F

A gorgeous plant endemic to the Pyrenees forming dome-shaped cushions decked out with pink flowers. Its name refers to the fine hairs (cilia) on the tip of its leaves.

Eco.: It inhabits ridges, summits and rather stable screes on the highest peaks (alpine and subnival belts), no matter their geological nature, together with *Saxifraga pubescens* or *Minuartia cerastiifolia* in these extreme environments.

Loc.: Headwaters of the Ara, Bernatuara Peak (B); Casco, Faja de las Flores; Mondarruego, Punta de las Escaleras (O); Tres Marías (E); Lake Marboré, La Munia lakes (P).

118 Artemisia umbelliformis L. (Asteraceae)

White Genepi. Genépi blanc. Artemisa de montaña

SECT.: B O A E P C. ALT.: (2180)2400 - 3330 m. Ch. Alp. E

Cushion-like perennial, densely covered with white or greyish silky hairs. The yellow flower heads are usually grouped to form an umbel, hence its surname. This species belongs to the alpine genepis used in the distillation of digestive liqueurs such as «Chartreuse» or «Benedictine».

Eco.: It grows on initial cryoturbated soils of the fissures and ledges of the Park summits, being indifferent to the substrate.

Loc.: Headwaters of the Ara, Bernatuara Peak (B); Casco, Faja de las Flores; Mondarruego, Punta de las Escaleras (O); Tres Marías (E); Lake Marboré, La Munia lakes (P).

119 Cerastium alpinum L. (Caryophyllaceae)

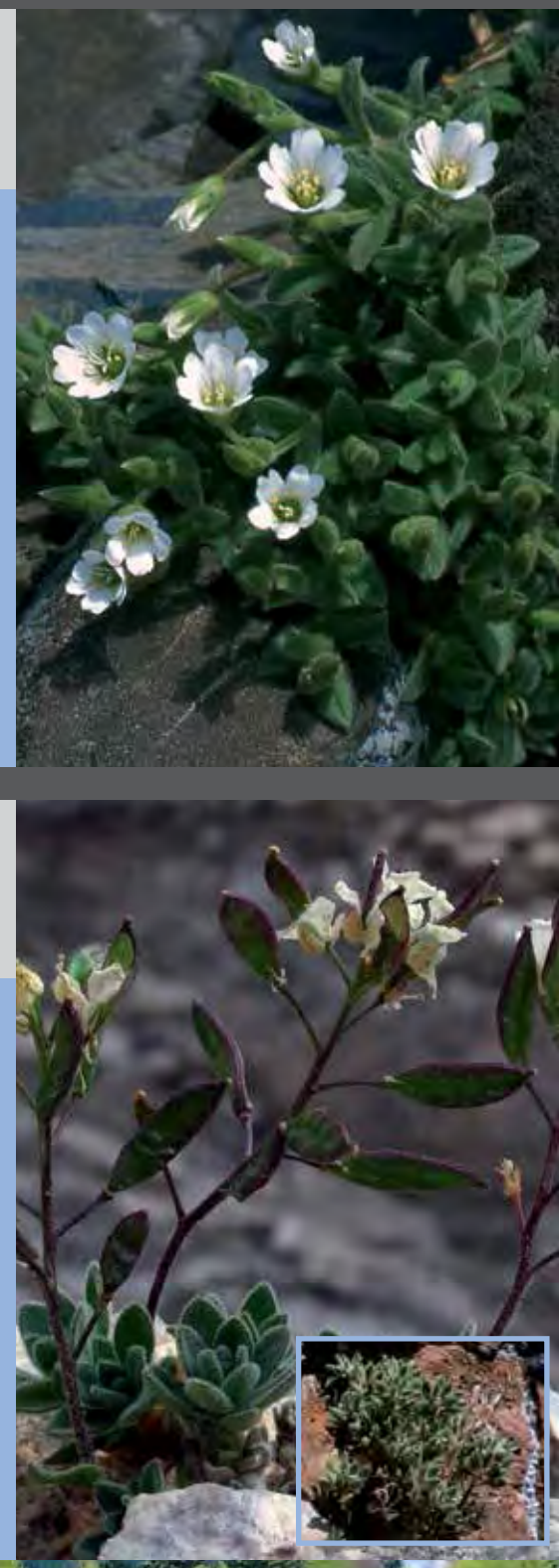
Alpine Mouse-Ear Chickweed, Alpine Chickweed. Céraiste des Alpes. Melosilla, oreja de ratón

SECT.: B O A E P C. ALT.: 1740 - 3210 m. Ch. Bor.-alp. E

In this genus the seeds are kept inside a fruit called a capsule, crowned with little horns or teeth, hence the name Cerastium, which comes from Greek, meaning horned. This species is a perennial forb whose hairiness may vary to a certain extent, being sometimes lanate (woolly).

Eco.: It lives on the screes and wind-blasted ridges of the high mountains, together with *Arenaria moehringioides* or *Kobresia myosuroides*.

Loc.: Bernatuara summer pastureland, Bujaruelo Pass (B); Gabietos, Mondarruego (O); Punta Navarro, Fuen Blanca ravine (A); Tres Marías (E); Robiñera, La Munia (P).



120 Draba dubia Suter subsp. laevipes (DC.) Braun-Blanq. (Brassicaceae)

Drave à pédicelle glabre

D. **laevipes** DC., **D. tomentosa** Clairv. var. **frigida** (Saut.) Gren & Godr.

SECT.: B O V A E P C. ALT.: 1650 - 3200 m. Ch. Med. Mount.-Alp. F

Small perennial forming several rosettes in turf and a proportionally big silicula (the fruit). The epithet *laevipes* means smooth, referring to the base of the fruit, which is hairless.

Eco.: It colonises rock fissures, preferably on limestone but sometimes also on schists, of high mountain sunny spots, whilst it is found in the shade at low-lying locations.

Loc.: CCol d'Arratille, Plana de Alba Pass (B); Brecha de Rolando, Lago Helado, Mondarruego, Senda de Cazadores (O); Sestrales (A); Balcón de Pineta (P); La Valle (E); Montaña de Ruego (C).

Some other species of *Draba* are also found within the Park: thus, in the higher mountains live ***D. aizoides*** subsp. ***aizoides*** (yellow-flowered, small image), or *D. siliquosa* subsp. *carinthiaca* and D. *tomentosa* subsp. *ciliigera*, the two latter especially at the siliceous peripheral zone. Finally, ***D. hispanica*** subsp. ***hispanica***, reaches its northernmost distribution limit on some rock crags of the subalpine belt at Ordesa (small image in bottom right corner).

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