

PLANTS AND PLANTING IN MEDITERRANEAN LANDSCAPES (VOLUME 1)

Editors

Juan José Galán Vivas
Vicente Caballer Mellado



EVERGREEN TREES

DECIDUOUS TREES

SHRUBS

CONIFERS

PALM TREES

MEDICINAL AND AROMATIC

GROUNDCOVERS

HEDGES

CLIMBERS



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MEDICINAL AND AROMATIC PLANTS

Chapter 8

MEDICINAL AND AROMATIC PLANTS

- Subchapter 8.1** Introduction
- Subchapter 8.2** Species
- Subchapter 8.3** Commercialization, use and planting
- Subchapter 8.4** Maintenance

Subchapter 8.1

Introduction

INTEREST IN MEDICINAL PLANTS

In Spain there are more than 1,000 endemic plants compared to the more than 8,000 species of plants present in our territory, which, at a European level, is an exceptional case. This is a result of the great variety of environmental conditions (climate, soil) that can be found in the Iberian Peninsula. Interestingly, many of such endemic plants are considered medicinal, however, many of them are barely known. This enormous wealth deserves great attention from the point of view of the conservation, recovery, and increased knowledge of these plant species.

The combination of botanical, medicinal, environmental, agricultural and ornamental factors make the *Lamiaceae* botanical family the most represented in the group of medicinal plant species of interest. The *Asteraceae* and *Apiaceae* families are also well represented.

Medicinal plants are aptly named since they contain or produce products called “active substances”. Such substances exert effects, beneficial or harmful, on living beings. They can be classified into:

- **Aromatic plants** are medicinal plants whose active principles are volatile substances or essential oils.
- **Condiment plants** are medicinal plants used for their organoleptic properties.
- **Medicinal plants** have pharmacological properties, acting by themselves or being able to form part of the composition of medicines.
- **Beekeeping or melliferous plants** are plants that attract bees, from which the elaborated honey is subsequently used.
- **Biocidal plants** contain active ingredients with a repellent and/or have a toxic effect against larger organisms (plants, animals).
- **Natural dye plants** present usable substances to color fabrics or other objects.

Medicinal plants are essential in addressing three major areas in the environmental sphere:

- **Reforestation and re-vegetation.** These plants have great adaptability and hardiness. As a result, they are excellent species to “colonize” areas in the first phases of the regeneration of mountains (lavender, rosemary, thyme, santolina...), especially after fires. They are also useful to prevent erosion and soil degradation in slopes and free surfaces generated after public works.
- **Active substances.** Of pharmacological, aromatic or condiment nature, these plants can be consumed or used by humans. They are an ideal species to reintroduce a profitable agricultural activity in poor areas as they can be cultivated for the industrial sector (production of essential oils for perfumes, condiments, liqueurs, etc. all of them open to extensive trade and exports).
- **Ornamental plants.** Excellent species due to their ease of handling and low environmental requirements. Since they have not been exposed to breeding and genetic improvement, they

are generally not affected by pests and diseases. As a result, they are adaptable, resistant, and tolerant against adverse factors, both environmental and health related. This makes them a group of plants with enormous potential in Mediterranean areas, where the prevailing environmental conditions (low average annual rainfall, high summer temperatures...) combined with the growing problems of water availability (both concerning quantity and quality), and the edaphic characteristics of the soils, limit the durable and feasible introduction of other species. In addition, the selection of attractive medicinal and aromatic species and the development of new, more showy varieties, will help us increase the botanic palette in Mediterranean gardens and offer new alternatives to classical or conventional gardens. Furthermore, we should not forget that the gardens that use medicinal and aromatic plants can fulfill an excellent educational mission (knowledge of their applications, aromatic gardens for disabled people, etc.).

Along with the points considered above, medicinal and aromatic plants have at least two other factors in their favor:

- Many of them can be cultivated or kept in a garden for multi-annual periods.
- Due to the adaptation of many medicinal plants to Mediterranean environmental conditions, they are not prone to pests and diseases.

HISTORICAL POINTS

Humans have learned since prehistoric times to take advantage of the properties that plants had to offer, both from a nutritional point of view and from a medicinal perspective (heal wounds, cure ailments...). For this, the observation of animal behavior was essential. It is conceivable, therefore, that the learning process has been slow and costly, transmitting knowledge from generation to generation.

For centuries, different civilizations have taken advantage of the benefits of medicinal plants and have gathered an enormous amount of information on them. The Chinese for example, already knew about the properties of pomegranate, the opium poppy, the rhubarb (2000 BC); the Egyptians knew numerous medicinal plants, from which they also obtained cosmetic products, ointments, distilled essences... (3000 - 4000 BC); In India (1300 B.C.) a medicinal culture was developed that still exists today (the "Ayurveda" medicine) and that is based on the use of plants. Many of the examples cited are well-grounded even today.

It was the Greeks who amalgamated Eastern and Western knowledge, expanding it, and creating many of the foundations of current medicine. The knowledge in this regard of Hippocrates (who described the properties of about 200 plants), Theophrastus (about 350 plants) and Dioscorides (about 700 plants) stand out. This advance in knowledge had its continuation in the Roman Empire, highlighting the works of Galen and Pliny the Elder.

During the Middle Ages, the obscurantism and scientific stagnation relegated, like so many other branches of science, this knowledge to oblivion, preserving most of it in monasteries, along with the teachings of the Arabs, great connoisseurs in the management of essential oils.

The time of the geographical discoveries of the fifteenth and sixteenth centuries held great importance. The introduction of American and African plants in therapeutics, as well as the invention of the printing press, represented a great advance in the dissemination of medicinal knowledge as well as a great expansion of it. In the sixteenth century the Western pharmacopoeias were already very extensive.

The subsequent centuries witnessed the advancement of sciences such as Chemistry, Physics and Botany, as well as an enormous development of Phyto pharmacy and phytotherapy. At the beginning of the 20th

century, this trend was broken with the development of chemotherapy to the detriment of phytotherapy. In the mid-1950s, the toxicities, secondary effects, intolerances, attributable to the chemical compounds used in chemotherapy were of concern. With the advances in Chemistry and Pharmacy, it was possible in the mid-1960s to identify many compounds with pharmacological effects on plants, with similar or identical efficacy to chemical products, awakening, once again, interest in medicinal plants. The new techniques allow the rapid and simple extraction of such components, being able to dose and formulate compounds with a similar action or, at least, complementary to the chemical or synthetic ones.

Similar evolution occurred with the condiment plants. Its knowledge has been widely spread since the time of discoveries. Perhaps it has been the improvement of communications, especially in this century, which has allowed and accelerated transfer of knowledge from one geographical area to another. The benefits of condiment plants have not only been extended to the gastronomic field (and, therefore, seasoning) itself, but also to the associated medicinal field. It should be highlighted that a large part of seasoning properties is coupled with medicinal properties, which are not always well known. It is conceivable that such properties are what confer the beneficial nature of a certain diet in a specific geographical area.

The higher standard of living is leading, increasingly, to the knowledge and use of condiment plants seeking, in many cases, either to counteract the harmful effects of an unbalanced diet, or to diversify gastronomic habits.

Aromatic plants have been known since ancient times. Many of the well-known ancient civilizations took advantage of essences based on plant extracts. This has always been a sign of distinction, in many cases with beneficial effects such as relaxing. Even today, some medicinal techniques rely on the use of aromas (aromatherapy), especially in the treatment of chronic conditions.

MEDICINAL PLANTS IN THE GARDEN

For as long as we can remember medicinal plants have been associated with rites and cults. Many of the aspects that help to “fit” or “justify” the use of these plants in gardens (in addition to those described above for environmental reasons) are based on religious knowledge and traditions inherited from the Egyptians, Christians, and Arabs. Thus, Islamic gardens assumed the close link between housing and cultivation/use of plants. They were enclosed gardens with shadows, fresh water, flowers, and exquisite fruits. Roses, jasmine, lilies were present along with trees such as apricot trees, almond trees, pomegranate trees and myrtle hedges.

Christian monasteries inherited the geometric and formal style of Roman gardens. Rosemary, laurel, myrtle, and ornamental hedges were common. Monastic gardening, adopting ancient Egyptian, Syrian and Persian trends, associated these plants with other “useful” ones that were fenced in to prevent the access of animals and take advantage of their fruits and shade.

The cultivation of plants and the creation of gardens in the monasteries reached such a significance in Italy that, by the middle of the sixth century, only prayer was more important than gardening and the cultivation of plants. The cultivation of vegetables, fruit trees, vines, herbs, dyeing and aromatic plants for incense was regulated. In the monasteries, self-sufficiency was achieved in many cases, emphasizing the cultivation of herbs to obtain remedies to cure the sick. Flavoring and condiment plants were selected to give flavor to vegetarian stews, an excellent knowledge of the techniques of making beers, wines, and spirits, as well as cosmetics (based on the use of lemon balm) was achieved.

During the 13th century, the popularity of plants for medicinal use increased, spreading their plantation to the gardens of important families and the orchards of family houses, sharing cultivation with vegetables and flower plants.

Starting in the 16th century, medicinal plant gardens began to be designed in universities to teach botany and medicine, areas of knowledge closely linked until then. The first of these “medicinal gardens” in Padua (Italy) created in 1545 is of special importance.

As knowledge (both botanical and medical) increased and explorers and navigators brought new exotic species, gardens of herbs and medicinal plants grew in variety and relevance, being the forerunners of today’s botanical gardens. There are references of important facts of medicinal plants and their cultivation from the Aztec culture through the Spanish conquerors. Hernán Cortés alluded to Moctezuma’s fabulous gardens in Huaxtepec (now Oaxtepec).

From the 17th and 18th centuries, famous gardens were created that combined classical ornamental plants with medicinal plants, following both a formal style based on lines, symmetries and geometric compositions, as well as a more informal style, with country and rural overtones.

Nowadays, thanks to the availability of more showy varieties, with longer flowering periods and more intense aromas, medicinal plants have been successfully incorporated into the list of plants suitable for contemporary gardens and are considered beyond their purely “medicinal” aspect.

This aspect is especially striking in Mediterranean areas since many of these plants (as indicated above) are very well adapted to typically Mediterranean environmental conditions. This leads to their frequent use in gardening in both private and public spaces (parks and gardens, highway and motorway medians, service areas, revegetation of slopes, roundabouts, etc.).

With the current trends of urbanization of coastal and mountainous areas (chalets, second homes, apartments, leisure areas, sea promenades, etc.) we are increasingly using plant species adapted to the conditions of each site and learning to give special attention to medicinal plants (fundamentally from the subgroup of aromatic plants).

Subchapter 8.2 Species

This chapter outlines **30 species of medicinal and aromatic plants** used in landscape design. They have been selected primarily for their ornamental use, botanical interest, or other characteristics. As a result, an in-depth analysis is carried out in this subchapter.

Firstly, a table shows the different parameters and values that have been used to describe each species in its specific botanic datasheet.

Each botanic datasheet gathers the information of a species and describes its botanical and ecological aspects, uses, cultivation, and other characteristics of interest, including its commercialization. This information is complemented by photographic information, which shows the general appearance of the described species and different morphological details.

PARAMETERS AND VALUES USED FOR THE BOTANIC DATASHEET	
TAXONOMY	
TAXONOMIC RANKS	DIVISION, SUBDIVISION, TYPE, ORDER, FAMILY
VARIETIES	VARIETIES OF INTEREST
STRUCTURE	
SHAPE	GLOBE-SHAPED/ROUND, OVAL, COLUMNAR, CONE, EXTENDED, IRREGULAR, PARASOL, FAN-SHAPED, HORIZONTAL, PALMIFORM, PENDULAR, WEEPING,
HEIGHT	AS APPROPRIATE- IN METERS OR CENTIMETERS
DIAMETER	AS APPROPRIATE -IN METERS OR CENTIMETERS
TEXTURE	TEXTURE: LEAVES>10CM= COARSE. LEAVES OR LEAFLETS BETWEEN 2-10CM= MEDIUM. LEAVES OR LEAFLETS <2CM= FINE
SHADE	LIGHT, MEDIUM, DENSE,
ROOT	TAPROOT, FASCICULATE, OBLIQUE, HORIZONTAL, AERIAL, ADVENTITIOUS
MORPHOLOGY	
TRUNK	
BARK	SMOOTH, VERTICAL FISSURES, LONGITUDINAL FISSURES, DIAGONAL FISSURES; ROUGH, SCALY, CORKY WITH PLATES
COLOR OF BARK	GREYS; GREENISH GREY OR BLUISH GREY. SILVER, LIGHT GREEN, YELLOWISH, LIGHT BROWN, DARK, GREEN, RED, PURPLE, YELLOW, BLACK, MARBLED, TWO-TONED, THREE-TONED, LIGHT GREY, DARK GREY;
FOLIAGE	
LEAF TYPE	EVERGREEN, DECIDUOUS, SEMI-DECIDUOUS OR SEMI-EVERGREEN
LEAF SIZE	LENGTH (cm)
SIZE OF LEAFLET	LENGTH (cm)
COLOR OF UPPER SIDE (US)	PALE GREEN, LIGHT GREEN, DARK GREEN, BLUE/GREEN, GREY, PURPLE; PALE; YELLOW; VARIEGATED
COLOR OF LOWER SIDE (LS)	PALE GREEN, LIGHT GREEN, DARK GREEN, BLUE/GREEN, GREY PURPLE, PALE, YELLOW, VARIEGATED, RUST COLORED, SILVER
TEXTURE OF UPPER SIDE (US)	GLOSSY, ROUGH, GLABROUS, TOMENTOSE, HAIRY, ROUGH, SCALY, VISCOSE
TEXTURE OF LOWER SIDE (LS)	GLOSSY, ROUGH, GLABROUS, TOMENTOSE, HAIRY, ROUGH, SCALY, VISCOSE
COMPOUND LEAF	NO COMPOUND LEAVES YES. IMPARIPINNATE, PARIPINNATE, TRIFOLIATE, PALMATE, PALMIFORM, PALM, PINNATE, BIPINNATE
HARDNESS	CORIACEOUS, SOFT, SUCCULENT, HARD
ARRANGEMENT	OPPOSITE, ALTERNATE, WHORLED, ROSETTE
VENATION	PINNATE, PALMATE, PARALLEL, RETICULATE, ARCUATE, A3 MAIN VEINS
LEAF SHAPE	ROUNDED, LINEAR, LANCEOLATE, FALCATE, OVAL, OBLONG, ELLIPTIC, DELTOID, RHOMBOID, SPATULATE, ACICULAR GROUPS OF 2, ACICULAR GROUPS OF 3, ACICULAR GROUPS OF 5, ACICULAR GROUPS, ACICULAR IN 1 PLANE, ACICULAR IN SPIRAL, SCALE, PALMATE 7 LOBES, PALMATE 5 LOBES- PALMATE 3 LOBES, POLYMORPHIC, PANDURIFORM, PINNATIFIDA, SAGITATE, RENIFORM, CORDATE, ORBICULAR, OBOVATE, OBLANCEOLATE, LIRATE, HASTATE, RUNCINATE
LEAF MARGIN	ENTIRE, CILIATE, DENTATE, CRENATE, SERRATE, DOUBLY SERRATE, LOBED, DOUBLE LOBED
APEX	ACUTE, CUSPIDATE, OBTUSE, RETUSE, MUCRONATE
LEAF BASE	ATTENUATE, CORDATE, ROUNDED, CUNEATE, OBLIQUE, SAGITATE, AURICULATE, HASTATE, ASYMMETRIC
PETIOLE	LONG, SHORT, SESSILE, WIDE
FLOWER	
SIZE	HERMAPHRODITE (OR MALE/FEMALE FLOWERS): CM OR MM

TYPE	UNISEX, HERMAPHRODITE
REPRODUCTION	MONOECIOUS, DIOECIOUS, HERMAPHRODITE, POLYGAMY, SYNOICIOUS, STERILE
FLOWER TYPE	SOLITARY, INFLORESCENCE IN CORYMB, IN CYMOSE, IN RACEME, IN SPIKE, IN UMBEL, IN CATKIN, IN SPADIX, IN FLORET OR CAPITULUM, IN PANICLE (+ INFLORESCENCE SIZE (IN CM OR MM))
FRAGRANCE	YES, NO, UNPLEASANT
FRUIT	
SIZE	IN CM OR MM
TYPE	FOLLICLE, PLURIFOLLICLE, LEGUME, LOMENT, SAMARA, DOUBLE SAMARA, PLURISAMARA, CAPSULE, ACHENE, TETRACHENE, POLYACHENE, NUT, ACORN, SYCONIUM, HESPERIDIUM, SOROSIS, BERRY, RACEME, POME, BALAUSTA, DRUPE, STROBILUS, PSEUDO STROBILUS, CONE
EDIBLE FRUIT	YES, NO
COLOR	RED, GREEN, YELLOW, BROWN, BLACK, PALE, WHITE, PURPLE
FRUITING SEASON	INTERVAL OF MONTHS: JAN, FEB, MAR, APR, MAY, JUN, JUL, AGO, SEP, OCT, NOV, DEC
DEVELOPMENT	
GROWTH	VERY SLOW, SLOW, MEDIUM, FAST, VERY FAST
LONGEVITY	<25 YEARS, 25 YEARS, 50 YEARS, 75 YEARS, 100 YEARS, 150 YEARS, 200 YEARS, 250 YEARS, 300 YEARS, >300 YEARS
ECOLOGY	
CLIMATE	
ALTITUDE	INTERVAL OF ALTITUDE / ELEVATION ABOVE SEA LEVEL
IRRIGATION	++HIGH, MODERATE, LOW; ++LOW (very low/low < 350 mm. Very high/high > 750 mm)
MINIMUM TEMPERATURE AND INTERNATIONAL CLASSIFICATION	<p>MINIMUM TEMPERATURES: DEGREES CELSIUS</p> <p>CLASSIFICATION ACCORDING TO EUROPEAN REGULATION: (SEE MAP) G2 ___ HOT GREENHOUSES IN SOUTHERN EUROPE G1 ___ COLD GREENHOUSES IN SOUTHERN EUROPE H5 ___ THE PLANT SUPPORTS MINIMUM TEMPERATURES FROM 0°C TO -5°C H4 ___ THE PLANT SUPPORTS MINIMUM TEMPERATURES FROM -5°C TO -10°C H3 ___ THE PLANT SUPPORTS MINIMUM TEMPERATURES FROM -10°C TO -15°C H2 ___ THE PLANT SUPPORTS MINIMUM TEMPERATURES FROM -15°C TO -20°C H1 ___ THE PLANT SUPPORTS MINIMUM TEMPERATURES FROM -20°C</p> <p>CLASSIFICATION INTERNATIONAL REGULATIONS. ACCORDING TO MINIMUM TEMPERATURE RANGES Z1 ___ SUPPORT MINIMUM TEMPERATURES OF -50°C Z2 ___ SUPPORT MINIMUM TEMPERATURES OF -50°C TO -40°C Z3 ___ SUPPORT MINIMUM TEMPERATURES OF -40°C TO -30°C Z4 ___ SUPPORT MINIMUM TEMPERATURES OF -30°C TO -20°C Z5 ___ SUPPORT MINIMUM TEMPERATURES OF -20°C TO -10°C Z6 ___ SUPPORT MINIMUM TEMPERATURES OF -10°C TO -0°C Z7 ___ SUPPORT MINIMUM TEMPERATURES OF -0°C TO 10°C Z8 ___ SUPPORT MINIMUM TEMPERATURES OF 10°C TO 20°C Z9 ___ SUPPORT MINIMUM TEMPERATURES OF 20°C TO 30°C Z10 ___ SUPPORT MINIMUM TEMPERATURES OF 30°C TO 40°C Z11 ___ SUPPORT MINIMUM TEMPERATURES OF MORE THAN 40°C</p>
EXPOSURE TO SUNLIGHT	FULL SUN, FULL-SHADE; PART SHADE, SHADE
DROUGHT RESISTANCE	YES, NO, MODERATE
RESISTANCE TO FROST	YES, NO, MODERATE
SOIL	
OPTIMUM PH	ALL TYPES: NEUTRAL, ACIDIC, BASIC OR ALKALINE (OR INTERVAL OF PH)
FERTILITY LEVEL	FERTILE, MODERATE, POOR
TEXTURE OF SOIL	SANDY, SILT OR LOAMY, CLAYEY, SANDY/LOAMY, CLAYEY/LOAMY, ALL TYPES

DRAINAGE	HIGH, MODERATE, LOW
RESISTANCE TO SALT	YES, NO, MODERATE
RESISTANCE TO LIME	YES, NO, MODERATE
USES	
RESISTANCES	
COASTAL	1 st LINE; 2 nd LINE, NO, MODERATE
POLLUTION	HIGH, MODERATE, LOW
WIND	HIGH, MODERATE LOW
USE	
IN SLOPES IN LINES ON RIVERBANKS AS WIND BREAKERS IN HEDGES IN FIELD BORDERS IN GROUPS ISOLATED	YES, NO
SPACING	
SPACING	MINIMUM RECOMMENDED DISTANCE BETWEEN PLANTS: METERS; CENTIMETERS
PLANTING AND PLANT HEALTH	
PLANTING AND PLANT HEALTH	
CALENDAR	
CHROMATIC CALENDAR	FOLIAGE, FLOWERING, FRUITING SEASON: the color white represented with grey or black cell
CULTIVATION CALENDAR	SOWING, PLANTING, PRUNING
TREATMENTS CALENDAR	FUNGICIDES, PESTICIDES, FERTILIZERS, HERBICIDES
COMMERCIALIZATION	
PRESENTATION	RD (BARE ROOT), CT (CONTAINER or POT (in liters), CE (ROOT BALL), CEY (ROOT BALL IN GYPSUM), ROOT BALL IN MESH
STEM GIRTH (TREES)	CENTIMETERS (usually measured at 1 meter above ground) or years
HEIGHT	CENTIMETERS, METERS

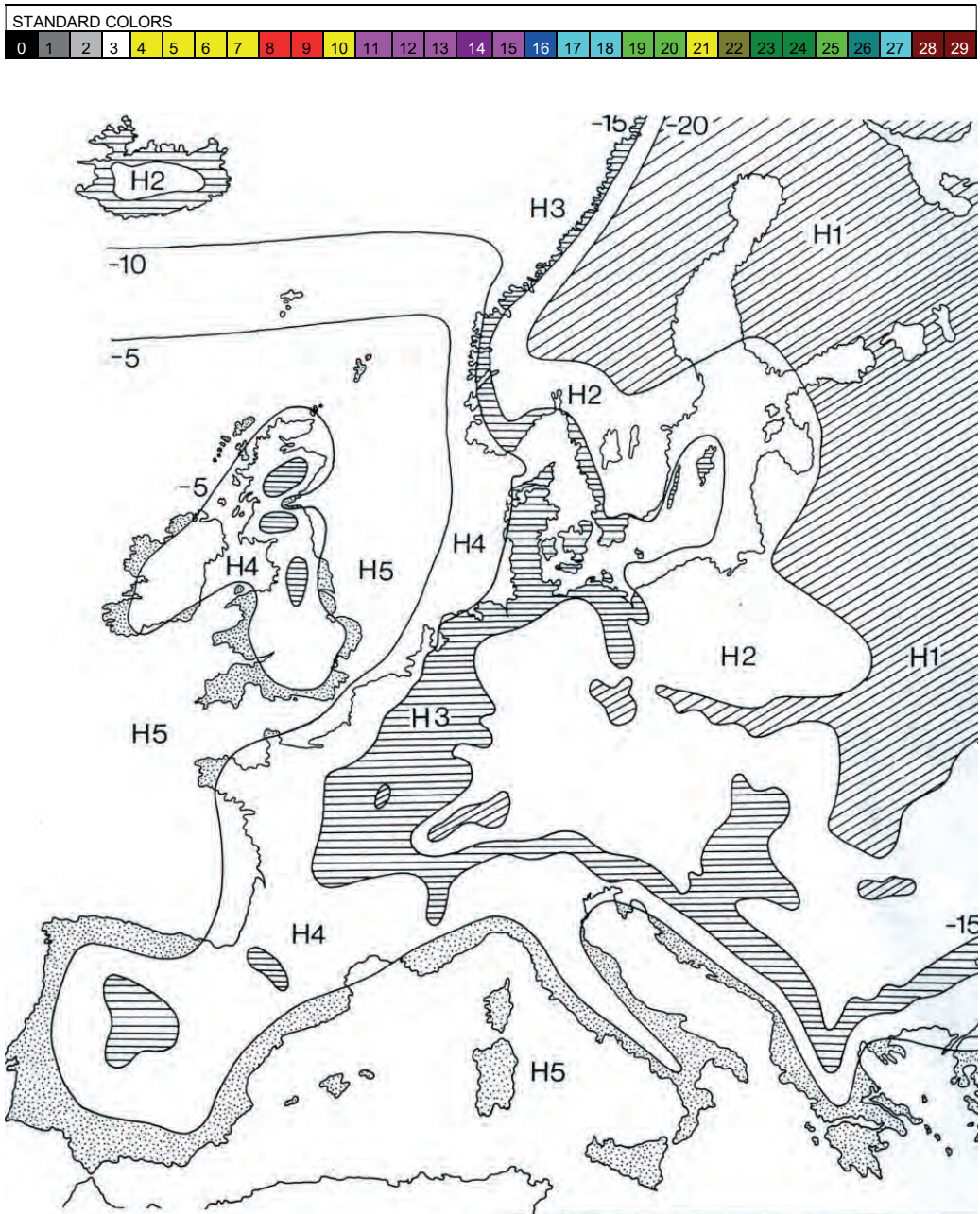


Figure 8.2.1: Thermal classification map according to European regulations

LIST OF MEDICINAL AND AROMATIC SPECIES DESCRIBED

1. *Acanthus mollis*
2. *Artemisia absinthium*
3. *Chamomilla recutita*
4. *Helichrysum stoechas*
5. *Hyssopus officinalis*
6. *Lavandula angustifolia*
7. *Lavandula dentata*
8. *Lavandula hybrida*
9. *Lavandula latifolia*
10. *Lavandula stoechas*
11. *Lippia thriphylla*
12. *Melissa officinalis*
13. *Mentha piperita*
14. *Mentha pulegium*
15. *Mentha spicata*
16. *Micromeria fruticosa*
17. *Nepeta cataria*
18. *Origanum majorana*
19. *Origanum vulgare*
20. *Ricinus communis*
21. *Rosmarinus officinalis*
22. *Ruta graveolens*
23. *Salvia microphylla*
24. *Salvia officinalis*
25. *Salvia sclarea*
26. *Sambucus nigra*
27. *Santolina chamaecyparissus*
28. *Satureja montana*
29. *Sideritis angustifolia*
30. *Thymus vulgaris*

ACANTHUS

Acanthus mollis L.

MEDICINAL AND AROMATIC

ACANTO
SPANISH

CARNERA, ACANT
VALENCIAN

BEAR'S BREECH(ES) ENGLISH
BRANCHE URSINE, PIED D'OURS
FRENCH

STRUCTURE		
Shape EXTENDED	Height 40-120 CM	Diameter Up to 200 CM
Texture THICK	Shade FULL	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	SCROPHULARIALES
FAMILY:	ACANTACEAE

VARIETIES
OAKLEAF
FIELDING GOLD
NEW ZEALAND GOLD
RUE LENDAN, HOLLARD'S GOLD

MORPHOLOGY		
Stem	Bark	Color GREEN
Leaf	COMPOUND: NO HARDNESS: SOFT ARRANGEMENT: ROSETTE BASAL VENATION: PINNATE SHAPE: PINNATE/LOBED MARGIN: INCISE-DENTATE APEX: ACUTE LEAF BASE: ATTENUATE PETIOLE: LONG 20-60 CM	
EVERGREEN SIZE: 20-100 CM COLOR: DARK GREEN TEXTURE: GLOSSY		
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE: 3.5-5 CM	Flowering SPIKE (30 CM+)	Fragrant NO
Fruit	Type CAPSULE	Color
SIZE: 2-3.5 CM	Edible	Fruiting season
Growth	Rate FAST	Longevity



ECOLOGY		
Climate	Temperature -6°C; H4; Z5	Drought resistant YES
ALTITUDE: 0-700 IRRIGATION: HIGH	Sun exposure SUN/PARTIAL SHADE	Frost resistant Up to -15°C
Soil	Texture ALL TYPES	Salt resistant —
pH: INDIFFERENT FERTILITY: HIGH	Drainage MODERATE	Lime resistant —

USES	
Resistances	Applications
COASTAL: — POLLUTION: HIGH WIND: MODERATE	SLOPES: NO HEDGE ROWS: NO RIVERBANKS: YES BORDERS: YES GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Akanthos" (Greek) = thorn; "Mollis" (Latin) = soft; motif of the Corinthian capitals created by the Greek sculptor Callimachus.
Origin/distribution: Mediterranean Europe / shady and humid places, rich soils with a high N content / **Active substances:** essential oil (variable: rich in resins, tannins and organic acids), mucilages, ... / **Uses:** Medicinal (astringent , vulnerary , choleric, antidiarrheal, expectorant,...)

SPACING: 200 CM

PLANTING AND PLANT HEALTH

Propagation: by seed or by dividing the bush.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars representing seasonal activity]											

Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Grid for cultivation activities]											
Sowing		Planting									

Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Grid for treatment applications]											
Fungicides				Pesticides				Fertilizers			

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary Shape
11TA (0.6)	10-20	No
CT14 (1.6)	30-40	
CT17 (2.8)	30-40/40-60	
CT20 (5)	40-50	

ARTEMISIA

Artemisia absinthium L.

MEDICINAL AND AROMATIC

AJENJO
SPANISH

ENCENS
VALENCIAN

ABSINTH, WORMWOOD
ENGLISH

GRANDE ABSINTHE
FRENCH

STRUCTURE		
Shape ROUND	Height 30-125 CM	Diameter 60-90 CM
Texture MEDIUM	Shade PARTIAL	Root TAP ROOT

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	ASTERALES
FAMILY:	ASTERACEAE

VARIETIES
LAMBROOK SILVER

MORPHOLOGY		
Stem	Bark	Color LIGHT GREEN
Leaf	COMPOUND: BI-TRIPINNATISECT HARDNESS: SOFT ARRANGEMENT: ALTERNATE VENATION: PINNATE SHAPE: OVAL MARGIN: LOBED APEX: ACUTE LEAF BASE: ATTENUATE PETIOLE: LONG	
EVERGREEN SIZE: COLOR: US: LIGHT GREEN LS: LIGHT GREEN TEXTURE: TOMENTOSE		
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE: 2-3 MM CAPSULE/PANICLE 3-4.5MM	Flowering	Fragrance YES
Fruit	Type ACHENE	Color GRAY
SIZE:	Edible NO	Fruiting season
Growth	Rate FAST	Longevity 20 YEARS



ECOLOGY		
Climate	Temperature -6°C, H4, Z6	Drought resistant YES
ALTITUDE: 0-2300 IRRIGATION: LOW	Sun exposure SUN PARTIAL SHADE	Frost resistant Up to -5°C
Soil	Texture LOAMY	Salt resistant
pH: INDIFFERENT FERTILITY: MODERATE	Drainage HIGH	Lime resistant YES

USES	
Resistances	Applications
COASTAL:	SLOPES: NO HEDGEROWS: YES
POLLUTION:	RIVERBANKS: NO BORDERS: YES
WIND: MODERATE	GROUP: YES ISOLATED: YES

POINTS OF INTEREST

"Artemisia" = name of the goddess to whom the plant was dedicated; "ab/sinthium" = without/sweetness = bitter
Origin/distribution: Orient / in most of Europe, Western Asia and Northern Africa; in non-cultivated nitrified media; all types of soils / **Active substances:** essential oil (variable: thujones (toxic), thiol, linalool, absintin, absinthe, pinene, flavonoids, tannins,...); content: 0.5-2% (on dry matter) / **Uses:** officinal (tonic, vermifuge or anthelmintic, digestive, stomach...), liquor (vermouths and aperitifs with extracts with a low level of thujone)
 Very hardy plant. **Toxic.**

SPACING: 40-50 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting, division of the bush. Number of seeds in 1 g = 9,700-11,500 seeds. Germination in 15-30 days, germination power: 2-4 years. **Pests/diseases:** aphids (biological control, do not cause apparent damage to the plant), *Puccinia absinthii*, *Phacopsora compositarum*, *Armillaria mellea*. Weed control with diuron, propizamide.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC

Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Sowing			Planting								Pruning

Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Fungicides											
Pesticides											
Fertilizers											

COMMERCIALIZATION

Presentation	Height(cm)	Topiary shapes
C 1L		No

HELICHRYSUM***Helichrysum stoechas* (L.) Moench.****MEDICINAL AND AROMATIC**SIEMPREVIVA, PERPETUA
SPANISHSEMPREVIVA BORDA
VALENCIANCURRY PLANT
ENGLISHIMMORTELLE DES SABLES
FRENCH

STRUCTURE		
Shape EXTENDED	Height 10-80 CM	Diameter
Texture FINE	Shade LIGHT	Root

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:	MAGNOLIOPSIDA	
ORDER:	ASTERALES	
FAMILY:	ASTERACEAE	

MORPHOLOGY		
Stem	Bark	Color
Leaf EVERGREEN SIZE: 20-30 MM COLOR: US:GR/GRAY LS:LIGHT GREEN TEXTURE: TOMENTOSE	COMPOUND: NO HARDNESS: SOFT ARRANGEMENT: VENATION: SHAPE: LINEAR MARGIN: ENTIRE APEX: ACCUMINATE LEAF BASE: PETIOLE: SESSILE	
Flower SIZE:	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
	Flowering FLORET (0.8-1.2 CM)	Aromatic YES
Fruit SIZE:	Type ACHENE	Color GRAY
	Edible NO	Fruiting season
Growth	Rate FAST	Longevity



ECOLOGY		
Climate ALTITUDE: 0-1200 IRRIGATION: LOW	Temperature -12°C,H3,Z5 Sun exposure FULL SUN	Drought resistant YES Frost resistant Up to -5°C
Soil pH: INDIFFERENT FERTILITY: MODERATE	Texture LOAMY Drainage HIGH	Salt resistant Lime resistant YES

USES		
Resistances COASTAL: MODERATE POLLUTION: — WIND: MODERATE	Applications SLOPES: YES RIVERBANKS: NO GROUPS: YES	HEDGEROWS: NO BORDERS: YES ISOLATED: YES

POINTS OF INTEREST

"Helios" (Greek) = sun; "Chrysos" (greek) = golden (alludes to the color of the inflorescence).

Origin/distribution: Southern and western Europe, north to France / on dry, bare ground, sandy areas, coasts, scrublands. **Active substances:** essential oil (variable composition): thujones (toxic), thiol, linalool, absinthol, pinene, flavonoids, tannins,... content: 2% (on dry matter.). **Uses:** officinal (anti-inflammatory, antiseptic, expectorant...)

When the leaves are crushed, it has a strong smell of curry.

SPACING :

PLANTING AND PLANT HEALTH

Propagation: by seed, division of bushes; germination in 14-21 days. **Pests/diseases:** Very sensitive to excess moisture in the soil (radical suffocation and fungal attacks on the stem of the plant).

CHROMATIC CALENDAR**Foliage, Flowering and Fruiting season**

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC

Cultivation Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Sowing			Planting								

Treatment Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Fungicides											
Pesticides											
Fertilizers											

COMMERCIALIZATION

Presentation	Height (cm)	Topiary shapes
13TA (1L)	10-20	NO

HYSSOPUS

Hyssopus officinalis L.

MEDICINAL AND AROMATIC

HISOPO
SPANISH

HISOP
VALENCIAN

HYSSOP
ENGLISH

HYSSOPE
FRENCH

STRUCTURE		
Shape IRREGULAR	Height 30-40 CM	Diameter 60-90 CM
Texture MEDIUM	Shade PARTIAL	Root TAP ROOT

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES
ALBUS (WHITE FLOWER)
ROSEUS (RED FLOWER)
SSP. ARISTATUS (SMALLER AND MORE COMPACT INFLORESCENCE)

MORPHOLOGY		
Stem	Bark	Color
Leaf	COMPOUND: NO HARDNESS: CORIAECOUS ARRANGEMENT: OPPOSITE VENATION: SHAPED: ELLIPTICAL MARGIN: ENTIRE APEX: OBTUSE/ACUMINATE LEAF BASE: ATTENUATE PETIOLE: SESSILE	
EVERGREEN SIZE: 10-50 MM COLOR: US MID GREEN LS MID GREEN TEXTURE: SMOOTH		
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE: 7-12 MM	Flowering VERTICILLASTER (MX)	Fragrance YES
Fruit	Type TETRA-ACHENES	Color BLACK
SIZE: Up to 2 MM	Edible NO	Fruiting season
Growth	Rate	Longevity 4-5 YEARS



ECOLOGY		
Climate	Temperature -12°C,H3,Z5	Drought resistant YES
ALTITUDE: 0-2000 IRRIGATION: LOW	Sun exposure FULL SUN	Frost resistant UP TO -15°C
Soil	Texture LOAMY/SANDY	Salt resistant ---
pH: BASIC FERTILITY: MODERATE	Drainage HIGH	Lime resistant YES

USES	
Resistances	Applications
COASTAL: YES POLLUTION: YES WIND: YES	SLOPES: NO HEDGE ROWS: YES RIVERBANKS: NO BORDERS: YES GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Hyssōpos" (Greek); "Ezob" (Hebrew) = Holy grass
Origin/geographical distribution: Southern Europe, Mediterranean region / Southern and Central Europe, Mediterranean area, Near East, North Africa; on calcareous slopes and hills.
 Active substances: essential oil: thujone, pinocamphone, flavonic derivatives (diosmin) and bitter substances (marrubini...); content in essence: 0.3-1% / **Uses:** Medicinal (expectorant, digestive disorders,...), perfumery, cosmetics, seasoning, liquor, honey.
Toxic: excessive consumption can cause epileptic disorders.

SPACING: 30-40 CM

PLANTING AND PLANT HEALTH

Polymorphous plant: pink and even white flowering is possible (all or part of the plant). Wild plants are more fragrant than cultivated ones.
Propagation: by seed, cutting, division of the bush; seeds in 1g: 850-1260; germination in: 15-20 days; germinating power: 3 years. **Pests/diseases:** mites, nematodes, cicada, ant, spider mites.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating seasonal activity]											

Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Grid for cultivation activities]											
Sowing	Planting	Pruning									

Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Grid for treatment applications]											
Fungicides	Pesticides	Fertilizers	Herbicides								

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
CT 11 (1)	40-50	NO

LAVANDULA

Lavandula angustifolia Miller (sin.: *L. officinalis* L., *L. vera* D.C., *L. spica* L.)

MEDICINAL AND AROMATIC

LAVANDA, ESPLIEGO SPANISH ESPIGOL, FEMELLA VALENCIAN LAVENDER ENGLISH LAVANDE, LAVANDE VRAIE FRENCH

STRUCTURE		
Shape ROUND	Height 20-150 CM	Diameter 30-120 CM
Texture MEDIUM	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:	MAGNOLIOPSIDA	FINA BLANCA
ORDER:	LAMIALES	BARREME
FAMILY:	LAMIACEAE	MAILLETTE
		MATEROONE, FRITZ SAULT, VESUBIE.....

MORPHOLOGY		
Stem	Bark	Color
Leaf EVERGREEN SIZE: 20-40 MM COLOR: US:GR./GRAY LS: MID GREEN TEXTURE: TOMENTOSE	COMPOUND: NO HARDNESS: HARD ARRANGEMENT: OPPOSITE VENATION: LINEAR-LANCEOLATE SHAPE: LINEAR-LANCEOLATE MARGIN: ENTIRE APEX: ACUTE LEAF BASE: ATTENUATE PETIOLE: SESSILE	
Flower SIZE: 10-12 MM	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
	Flowering VERTICILLASTER (MX)	Fragrant YES
Fruit SIZE:	Type TETRAACHENE	Color GRAY
	Edible NO	Fruiting season
Growth	Rate FAST	Longevity > 20 YEARS



ECOLOGY		
Climate ALTITUDE: 0-2000 IRRIGATION: LOW	Temperature -12°C,H3,Z5 Sun exposure FULL SUN	Drought resistant YES Frost resistant UP TO -15°C
Soil pH: 7-8.5 FERTILITY: MODERATE	Texture LOAMY/SANDY Drainage MODERATE	Salt resistant Lime resistant HIGH

USES	
Resistances COASTAL: YES POLLUTION: WIND:	Applications SLOPES: YES HEDGE ROWS: YES RIVERBANKS: NO BORDERS: YES GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Lavare" (Latin) = wash, purify; "Anguish", "Folia" (Latin) = narrow leaf.
Origin/distribution: Southern Europe, Mediterranean area, Asia Minor / Mediterranean region; on arid and stony slopes and hills, generally dry and sunny. **Active substances:** essential oil (linalool acetate, limonene, pinene, geraniol,...) rich in esters, unlike lavender and lavandins; content in essence: 0.3-0.7% (on dry matter).
Uses: Medicinal (diuretic, sedative, healing, antiseptic, antispasmodic,...), perfumery, cosmetics, honey...
 It supports high rainfall (up to about 1000 mm per year) nevertheless the soil must have adequate drainage.

SPACING: 50 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting. **Pests/diseases:** *Chrisolina americana* / Rosemary beetle (can be controlled with chlorpyrifos) and *Thomasiniana lavandulae* (gall midge) larvae and butterfly caterpillars / root rot due to excess moisture in the soil (*Septoria lavandulae*/*Septoria black spot*), *Phoma lavandulae*/*Phomopsis lavandulae*, *Armillaria mellea*/Honey fungus) attack the inflorescences; it is controlled by removing the affected plants. **Weeds:** control with dichlobenil, chlorthiamid

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating seasonal activity]											

Cultivation Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for Sowing, Planting, Pruning]											
Sowing			Planting			Pruning	x				

Treatment Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for Fungicides, Pesticides, Fertilizers]											
Fungicides				Pesticides				Fertilizers			

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary Shapes
CT11 (1)	15-25	
CT14 (1,5)	20-30	
CT20 (5)	30-40	
CT30 (17)		

LAVANDULA

Lavandula dentata L.

MEDICINAL AND AROMATIC

LAVANDA DENTADA, CANTUESO RIZADO
SPANISH

GALLANDA DENTATE LAVENDER, FRENCH LAVENDER
VALENCIAN ENGLISH

LAVANDE DENTELEE
FRENCH

STRUCTURE		
Shape ROUND	Height Up to 100 CM	Diameter 60-90 CM
Texture MEDIUM	Shade PARTIAL	Root FIBROUS

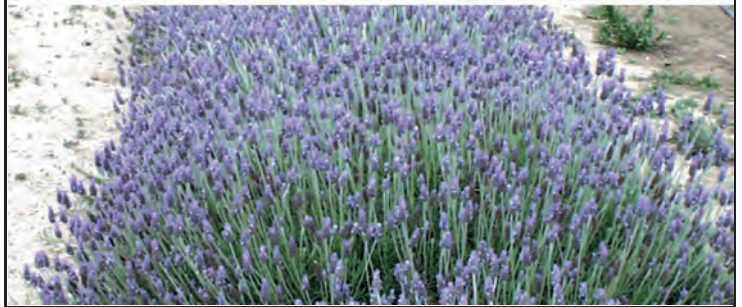
DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES
var. <i>CANDICANS</i>
<i>EDELWEISS</i> (WHITE INFLORESCENCE)
<i>DUSKY MAIDEN</i>
<i>PLOUGHMAN'S BLUE</i>

MORPHOLOGY		
Stem	Bark	Color
Leaf	COMPOUND: NO HARDNESS: SOFT ARRANGEMENT: OPPOSITE VENATION: LINEAR SHAPE: DENTATE MARGIN: ACUTE-ROUNDED APEX: CUNEATE LEAF BASE: SESSILE PETIOLE:	
EVERGREEN SIZE: 1.5-3.5 CM COLOR: US: GR.,GRAY LS: GR.,GRAY TEXTURE: TOMENLOSE		
Flower	Type	Reproduction
SIZE: 8 MM	HERMAPHRODITE	HERMAPHRODITE
	Flowering	Fragrant
	SPIKE	YES
Fruit	Type	Color
	TETRA-ACHENE	BLACK
SIZE:	Edible	Fruiting season
	NO	
Growth	Rate	Longevity
	FAST	5-10 YEARS



ECOLOGY		
Climate	Temperature	Drought resistant
	-12°C,H3,Z5	YES
ALTITUDE:	Sun exposure	Frost resistant
IRRIGATION: LOW	FULL SUN	NO
Soil	Texture	Salt resistant
	LOAMY/SANDY	---
pH: BASIC	Drainage	Lime resistant
FERTILITY: MODERATE	HIGH	MODERATE



USES	
Resistances	Applications
COASTAL: YES	SLOPES: YES HEDGE ROWS: YES
POLLUTION: ---	RIVERBANKS: NO BORDERS: YES
WIND: ---	GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Lavare" (lat) = wash, purify; "Dentata" (lat) = toothed or dentate.
Origin/Distribution: Mediterranean / Southern Europe, North Africa; arid, dry, stony, sunny areas. It prefers limestone soils in thinned forests. **Active substances:** essential oil (1-8 cineol,...);content in essence: up to 2% (wet matter). **Uses:** ornamental

SPACING: 60 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting. **Pests/diseases:** *Chrosolina americana* (the Rosemary beetle) can be controlled with chlorpyrifos. *Thomasiana lavandulae* (gall midge) larvae and butterfly caterpillars / root rot due to excess moisture in the soil *Septoria lavandulae* (*Septoria* black spot), *Phoma lavandulae* (*Phomopsis* *lavandulae*), *Amillaria mellea* (Honey fungus) attack the inflorescences; it is controlled by removing the affected plants. **Weeds:** control with dichlobenil, chlorthiamide.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for foliage, flowering, and fruiting]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for sowing, planting, and pruning]											
Sowing											
	Planting										
						Pruning					
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for fungicides, pesticides, and fertilizers]											
Fungicides											
	Pesticides										
							Fertilizers				

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
Containers		
CT 8 (0.2)	10-15	1 year
CT 11 (1)	10-20	
SEED TRAYS (0.2L per cell)		

LAVANDULA

***Lavandula x hybrida* (sin.: *L. x intermedia*)**

MEDICINAL AND AROMATIC

STRUCTURE		
Shape ROUND	Height 40-120 CM	Diameter 40-150 CM
Texture MEDIUM	Shade PARTIAL	Foot FIBROUS

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

LAVANDIN SPANISH		ESPIGOLINA VALENCIAN		LAVANDIN ENGLISH		LAVANDIN FRENCH	
VARIETIES				ABRIAL			
				GROSSO			
				SUPER			
				MAIME, SUMEINS, LADY, HIDCOTE WHITE, PROVANCE, ...			

MORPHOLOGY		
Stem	Bark	Color
Leaf	COMPOUND: NO	HARDNESS: HARD
EVERGREEN	ARRANGEMENT: OPPOSITE	SHAPE: LINEAR
SIZE: 10-40 MM	VENATION:	MARGIN: ENTIRE
COLOR: US: GR. GRAY	SHAPE: LINEAR	APEX: ROUNDED
LS: GR. GRAY	MARGIN: ENTIRE	LEAF MARGIN: ATTENUATE
TEXTURE: TOMENTOSE	PETIOLE: SESSILE	
Flower	Type STERILE	Reproduction
SIZE: 6-8 MM	Flowering	Fragrant
VERTICILLASTER (m) 3-4 CM	Flowering	YES
Fruit	Type	Color
SIZE:	Edible	Fruiting Season
Growth	Rate MODERATE	Longevity 15 YEARS



ECOLOGY		
Climate	Temperature -12°C, H3, Z5	Drought resistant YES
ALTITUDE: 0-1800	Sun exposure FULL SUN	Frost resistant MODERATE
IRRIGATION: LOW	Texture LOAMY/SANDY	Salt resistant
Soil	Drainage HIGH	Lime resistant MODERATE
pH: 7-8		
FERTILITY: LOW		

USES		
Resistances	Applications	
COASTAL: —	SLOPES: YES	HEDGE ROWS: NO
POLLUTION: —	RIVERBANKS: NO	BORDERS: YES
WIND: —	GROUPS: YES	ISOLATED: YES

POINTS OF INTEREST

"Lavare" (lat) = wash, purify.
Origin/Distribution: Mediterranean / Southern Europe, North Africa; arid, dry, stony, sunny areas. in general prefers dry and sunny areas. **Active substances:** essential oil (linalool acetate, limonene, eucalyptol, camphor, linalool, geraniol, borneol,...); content in essence: 1-3% (wet matter). **Uses:** Medicinal (diuretic, sedative, healing, antiseptic, germicide,...), perfumery, cosmetics, honey, veterinary. It can support high rainfall (up to about 1000 mm per year) if the soil has adequate drainage.

SPACING: 60 CM

PLANTING AND PLANT HEALTH

Hybrids between *L. angustifolia* and *L. latifolia*.
Propagation: cutting. **Pests/diseases:** *Chrosoloma americana* (the Rosemary beetle) can be controlled with chlorpyrifos. *Thomasiniana lavandulae* (gall midge) larvae and butterfly caterpillars / root rot due to excess moisture in the soil *Septoria lavandulae* (*Septoria* black spot), *Phoma lavandulae* (*Phomopsis lavandulae*), *Armillaria mellea* (Honey fungus) attack the inflorescences; it is controlled by removing the affected plants. **Weeds:** control with dichlobenil, chlorthiamide.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating seasonal activity]											

Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating cultivation activities]											
Sowing	<input type="checkbox"/>	Planting	<input checked="" type="checkbox"/>	Pruning	<input checked="" type="checkbox"/>						

Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating treatment periods]											
Fungicides	<input type="checkbox"/>	Pesticides	<input type="checkbox"/>	Fertilizers	<input checked="" type="checkbox"/>						

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary forms
CT 11 (1)		No
C18 (2.5)		
C22 (5)		
C32 (11.5)		
C40 (25)		

LAVANDULA

Lavandula latifolia Medicus (sin.: L. spica D.C.)

MEDICINAL AND AROMATIC

ESPLIEGO, ALHUCEMA SPANISH ESPIGOL, MASCLE VALENCIAN SPIKE LAVENDER ENGLISH ASPIC, LAVANDE MÂLE FRENCH

STRUCTURE		
Shape IRREGULAR	Height Up to 100 CM	Diameter Up to 100 CM
Texture MEDIUM	Shade PARTIAL	Root TAPROOT

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:	MAGNOLIOPSIDA	
ORDER:	LAMIALES	
FAMILY:	LAMIACEAE	

MORPHOLOGY		
Stem	Bark	Color LIGHT GREEN
Leaf EVERGREEN SIZE: 30-60 MM COLOR: US. GR. GRAY LS. GR. GRAY TEXTURE: TOMENLOSE	COMPOUND: NO	HARDNESS: CORIACEOUS
	ARRANGEMENT: OPPOSITE	VENATION: OBLONG-SPATULATE
	SHAPE: OBLONG-SPATULATE	MARGIN: ENTIRE
	APEX: ACUTE	LEAF BASE: ATTENUATE
	PETIOLE: SESSILE	
Flower SIZE: 8-10 MM	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
	Flowering VERTICILLASTER (MX)	Fragrant YES
Fruit SIZE: 2 MM	Type ACHENE	Color GRAY
	Edible NO	Fruiting season
Growth	Rate MEDIUM	Longevity > 10 YEARS



ECOLOGY		
Climate ALTITUDE: 0-1700 IRRIGATION: LOW	Temperature -12°C,H3,Z5	Drought resistant YES
	Sun exposure FULL SUN	Frost resistant YES
Soil pH: 7-8.5 FERTILITY: MODERATE	Texture LOAMY/SANDY	Salt resistant ---
	Drainage HIGH	Lime resistant MODERATE

USES		
Resistances	Applications	
COASTAL: YES	SLOPES: YES	HEDGE ROWS: NO
POLLUTION: MODERATE	RIVERBANKS: NO	BORDERS: YES
WIND: MODERATE	GROUPS: YES	ISOLATED: YES

POINTS OF INTEREST

"Lavare" (lat) = wash, purify; "Lato", "Folia" = broad leaf
Origin/Distribution: Mediterranean / Southern Europe, North Africa; arid, dry, stony, sunny area. It prefers limestone soils; in cleared forests. **Active substances:** essential oil (monoterpene hydrocarbons, camphene, borneol, geraniol, p-cymene, cineole, camphor,...); content in essence: up to 2% (wet matter). **Uses:** Medicinal (stimulant, antiseptic, bactericide, healing, antitussive,...), perfumery, cosmetics, honey, veterinary...
 Colonizing plant in mountainous areas.

SPACING: 50 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting or division of plant; 1 g = 800-1300 seeds; germination in 40 days. Plagues/diseases: *Chrosolina americana* (the Rosemary beetle) can be controlled with chlorpyrifos. *Thomasiniana lavandulae* (gall midge) larvae and butterfly caterpillars / root rot due to excess moisture in the soil *Septoria lavandulae* (Septoria black spot), *Phoma lavandulae* (Phomopsis lavandulae), *Armillaria mellea* (Honey fungus) attack the inflorescences; it is controlled by removing the affected plants. **Weeds:** control with dichlobenil, chlorthiamide.

CHROMATIC CALENDAR

COMMERCIALIZATION

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for foliage, flowering, and fruiting]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for sowing, planting, and pruning]											
Sowing		Planting		Pruning	X						
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for fungicides, pesticides, and fertilizers]											
Fungicides				Pesticides				Fertilizers			

Presentation (L)	Height(cm)	Topiary shapes
Containers		
CT8 (0.2)	10-15	1 year
9 (036)	20-30	
CT10 (0.45)	10-20	2 years
CT13		
CT12 (1.1)		
CT14 (1.6)		
Seed trays (0.2 L per cell)		

LAVANDULA

Lavandula stoechas L.

MEDICINAL AND AROMATIC

CANTUESO SPANISH TOMANI, CAPS D'ASE VALENCIAN SPANISH LAVENDER ENGLISH LAVANDE STÉCHADE FRENCH

STRUCTURE		
Shape IRREGULAR	Height Up to 100 CM	Diameter 30-90 CM
Texture MEDIUM	Shade PARTIAL	Root FIBROUS

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:	MAGNOLIOPSIDA	ssp. <i>PEDUNCULATA</i>
ORDER:	LAMIALES	<i>LEUCANTHA SHAPE (WHITE FLOWER)</i>
FAMILY:	LAMIACEAE	<i>KEW RED</i>
		<i>DEVONSHIRE, SNOWMAN, MADRID PINK, MADRID PURPLE ...</i>

MORPHOLOGY		
Stem	Bark	Color
Leaf EVERGREEN SIZE: 10-40 MM COLOR: US: LIGHT GRN LS: LIGHT GRN TEXTURE: TOMENLOSE	COMPOUND: NO HARDNESS: SOFT ARRANGEMENT: OPPOSITE VENATION: PINNATE SHAPE: LINEAR MARGIN: ENTIRE APEX: ROUNDED LEAF BASE: ATTENUATE PETIOLE: SESSILE	
Flower SIZE: 6-8 MM	Type HERMAPHRODITE Flowering VERTICILLASTER	Reproduction HERMAPHRODITE Fragrant YES
Fruit SIZE:	Type TETRA-ACHENE Edible NO	Color BLACK Fruiting season
Growth	Rate MODERATE	Longevity 5-10 YEARS



ECOLOGY		
Climate ALTITUDE: 0-500 M IRRIGATION: LOW	Temperature -12°C.H3.Z5 Sun exposure FULL SUN	Drought resistant YES Frost resistant Up to -5°C
Soil pH: ACIDIC FERTILITY:	Texture LOAMY/SANDY Drainage HIGH	Salt resistant Lime resistant LOW

USES	
Resistances COASTAL: YES POLLUTION: WIND:	Applications SLOPES: YES HEDGE ROWS: NO RIVERBANKS: NO BORDERS: YES GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

Floral spikes topped by very showy purple ovoid bracts. Origin/distribution: Mediterranean region / Mediterranean scrubland, non-calcareous soils. Active substances: essential oil (camphor, fenchone, borneol, terpineol,...), tannins,...; content in essence: 0.5-0.7% (dry matter). Uses: Medicinal (stimulant, antiseptic, antirheumatic,...), liquor, insect repellent,...

SPACING: 60 CM

PLANTING AND PLANT HEALTH

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for foliage, flowering, and fruiting]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for cultivation activities]											
Sowing	Planting	Pruning									
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for treatments]											
Fungicides		Pesticides		Fertilizers							

COMMERCIALIZATION		
Presentation (L)	Height (cm)	Topiary shapes
Containers		No
CT13 (1)	10-20	
CT (1.5)	20-30	
CT20 (5)		
CT30 (17)		
Seed tray (0.2 L per cell)		

MELISSA**MEDICINAL AND AROMATIC****Melissa officinalis L.**MELISA, TORONJIL
SPANISHMELISSA, TARONGINA
VALENCIANBALMINT, LEMON BALM
ENGLISHMÉLISSE, CÍDRONELLE
FRENCH

STRUCTURE		
Shape EXTENDED	Height Up to 100 CM	Diameter 30-80 CM
Texture MEDIUM	Shade DENSE	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIESAUREA
ALL GOLD

MORPHOLOGY		
Stem	Bark	Color GREEN
Leaf EVERGREEN SIZE: 20-90 MM COLOR: US:DK. GREEN LS:MID GREEN TEXTURE: US:ROUGH LS:TOMENTOSE	COMPOUND: NO HARDNESS: CORIACEOUS ARRANGEMENT: OPPOSITE VENATION: PINNATE SHAPE: OVAL MARGIN: CRENATE APEX: ACUTE LEAF BASE: ROUNDED PETIOLE: SHORT	
Flower SIZE: 8-15 MM	Type HERMAPHRODITE Flowering VERTICILLASTER	Reproduction HERMAPHRODITE Fragrant YES Color
Fruit SIZE: 1.5-2 MM	Type TETRA-ACHENE Edible NO	Fruiting season
Growth	Rate FAST	Longevity 5-10 YEARS



ECOLOGY		
Climate ALTITUDE: 0-1200 IRRIGATION: HIGH	Temperature - Sun exposure SUN/PARTIAL SHADE	Drought resistant NO Frost resistant UP TO -15°C
Soil pH: 6.6-7.5 FERTILITY: HIGH	Texture LOAMY Drainage HIGH	Salt resistant NO Lime resistant YES

USES	
Resistances COASTAL: POLLUTION: WIND: NO	Applications SLOPES: NO HEDGE ROWS: NO RIVERBANKS: YES BORDERS: YES GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Melissa" (Greek) = bee, alludes to its honey nature

Origin/distribution: Near Eastern, Southern Europe and Mediterranean Basin / Central Europe, North America, North Africa; temperate climatic zones; in cool and shady places, banks, orchards, streams,... / **Active substances:** essential oil (pinene, limonene, geraniol, linalool, citral, citronellal, rosmarinic acid, bitter substances,...); content in essence: 0.05-0.25% (wet matter). **Uses:** Medicinal ("Carmen water") (antispasm, choleric, treatment of digestive disorders,...), condiment, liquor store, aromas, herbalism, confectionery, perfumery, honey / [Citrus aroma](#).

SPACING: 35-40 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting, division of the bush; 1 g = 1950-2000 seeds, germination in 15-35 days, germination power 4-7 years. **Pests/diseases:** snails and slugs, powdery mildew, *Septoria melissae* (leaf spot), *Chrysolina americana* (Rosemary beetle), *Cryptocephalus ocellatus* (Leaf beetle), *Ocenus pellucens* (Italian tree cricket). **Weeds:** control with diuron, terbacillus.

CHROMATIC CALENDAR**Foliage, Flowering and Fruiting Season**

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC

Cultivation Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Sowing		Planting		Pruning							

Treatment Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Fungicides											
Pesticides											
Fertilizers											
Herbicides											

COMMERCIALIZATION

Presentation(L)	Height (cm)	Topiary shapes
Container 13CT (1L) Seed trays (0.2L per cell)	20-40	

MENTHA

***Mentha x piperita* L.**

MEDICINAL AND AROMATIC

MENTA PIPERITA
SPANISH

MENTA PEBRERA
VALENCIAN

PEPPERMINT
ENGLISH

MENTHE POIVREE
FRENCH

STRUCTURE		
Shade EXTENDED	Height 30-90 CM	Diameter UNDEFINED
Texture FINE	Shade DENSE	Root FIBROUS

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:	MAGNOLIOPSIDA	var. <i>OFFICINALIS</i> or <i>PALLESCENES</i> (WHITE PEPPERMINT)
ORDER:	LAMIALES	var. <i>VULGARIS</i> or <i>RUBESCENCE</i> (BLACK PEPPERMINT)
FAMILY:	LAMIACEAE	var. <i>CITRATA</i> (LEMON or ORANGE PEPPERMINT)
		<i>MITCHAM, MAINE ET LOIRE, ...</i>

MORPHOLOGY		
Stem	Bark	Color REDDISH
Leaf	COMPOUND: NO	
EVERGREEN	HARDNESS: CORIACEOUS	
SIZE: 40-90 MM	ARRANGEMENT: OPPOSITE	
COLOR: US: DK. GREEN	VENATION: PINNATE	
LS: MD GREEN	SHAPE: LANCEOLATE	
TEXTURE: ROUGH	MARGIN: SERRATE	
	APEX: ACUTE	
	LEAF BASE: ROUNDED	
	PETIOLE: SHORT	
Flower	Type STERILE	Reproduction STERILE
SIZE: 3.5-6 MM	Flowering VERTICILLASTER	Fragrant YES
Fruit	Type	Color
SIZE:	Edible	Fruiting season
Growth	Rate FAST	Longevity



ECOLOGY		
Climate	Temperature -6°C, H4, Z6	Drought resistant NO
ALTITUDE: 0-2100 M	Sun exposure SUN/PARTIAL SHADE	Frost resistant Up to -15 °C
IRRIGATION: HIGH	Texture LOAMY	Salt resistant NO
Soil	Drainage HIGH	Lime resistant YES
pH: 6-7.5	FERTILITY: HIGH	

USES	
Resistances	Applications
COASTAL: NO	SLOPES: NO HEDGE ROWS: NO
POLLUTION: NO	RIVERBANKS: YES BORDERS: YES
WIND: NO	GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Mintha" Greek nymph transformed into a plant by the goddess Persephone; "piper" (Latin) = pepper, alludes to the strong and spicy smell and taste
Origin/distribution: Southern Europe and North Africa / cultivated in Southwestern Europe, the United States and Asia; in temperate zones, cosmopolitan; in cool, moist areas. **Active substances:** essential oil (45-86% menthol, menthone, pinene, cineole, rosmarinic acid, caffeic acid, flavonoids,...); content in essence: 0.8-3% (dry matter) **Uses:** Phytotherapy (antispasmodic, antiseptic, antigastric, antifungal,...), condiment, liquors, aromas, herbalism, confectionery, perfumery. The essence can cause **allergic reactions**.

PLANTING AND PLANT HEALTH

Hybrid of *M. aquatica* L. (water sandalwood or curly mint) and *M. spicata* L. (spearmint)
Propagation: by cutting, stolon, division of the bush. **Pests/diseases:** *Spodoptera littoralis* (African cotton leafworm), aphids, cicada, nematodes, *Puccinia menthae* causes rust spot or blight on the leaves, *Phyllosticta menthae* (a type of fungi), *Chrysolina americana* (Rosemary Beetle). **Weeds:** control with terbacillus. It forms showy stolons runners.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for foliage, flowering, and fruiting]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for sowing, planting, and pruning]											
Sowing	[Orange]	Planting	[Light Orange]	Pruning	[X]						
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for fungicides, pesticides, fertilizers, and herbicides]											
Fungicides	[White]	Pesticides	[Light Blue]	Fertilizers	[Blue]	Herbicides	[Green]				

COMMERCIALIZATION

Presentations (L)	Height (cm)	Topiary shapes
13CT (1)	10-20	No

MENTHA

***Mentha pulegium* L.**

MEDICINAL AND AROMATIC

POLEO
SPANISH

POIOLI
VALENCIAN

PENNY-ROYAL
ENGLISH

POULIOT
FRENCH

STRUCTURE		
Shape EXTENDED	Height 10-60 CM	Diameter UNDEFINED
Texture FINE	Shade LIGHT	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES	CUNNINGHAM MINT
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MORPHOLOGY		
Stem	Bark	Color GREEN
Leaf EVERGREEN SIZE: 8-30 MM COLOR: US: MID GREEN LS: MID GREEN TEXTURE: US: SMOOTH LS: TOMENTOSE	COMPOUND: NO HARDNESS: SOFT ARRANGEMENT: OPPOSITE VENATION: PINNATE SHAPE: OVAL-OBLONG MARGIN: ENTIRE APEX: ROUNDED LEAF BASE: ATTENUATE PETIOLE: SHORT	
Flower SIZE: 4.5-6 MM	Type HERMAPHRODITE Flowering VERTICILLASTER	Reproduction HERMAPHRODITE Fragrant YES
Fruit SIZE: 0.75 MM	Type TETRA-ACHENE Edible NO	Color BROWN Fruiting season
Growth	Rate FAST	Longevity 1-3 YEARS



ECOLOGY		
Climate ALTITUDE: 0-1500 IRRIGATION: HIGH	Temperature -6°C, H4, Z6 Sun exposure SUN	Drought resistant NO Frost resistant UP TO -15°C
Soil pH: FERTILITY: HIGH	Texture LOAMY Drainage MODERATE	Salt resistant Lime resistant YES

USES		
Resistances COASTAL: POLLUTION: WIND: NO	Applications SLOPES: NO HEDGE ROWS: NO RIVERBANKS: YES BORDERS: YES GROUPS: YES ISOLATED: YES	

POINTS OF INTEREST

"Mintha" - Greek nymph transformed into a plant by the goddess Persephone; "Pulex" (Latin) = flea (repels fleas)
Origin/distribution: Native to Spain, Central and Southern Europe, the Middle East, North Africa, the Americas / cosmopolitan; in humid areas, even waterlogged. Ideal for cool somewhat shady areas. It prefers acidic soils. **Active substances:** essential oil (82-90% mixture of pulegone and piperitone (very toxic), menthone, menthol, thymol, carvacrol, tannins,...); content in essence: 1.5-1.75% (dry matter). **Uses:** Medicinal (treatment of gastric disorders, digestive, spasms, antiseptic,...), insect repellent, refreshing, seasoning, liquor store, aromas, herbalism. Very polymorphous plant. (toxic essential oil).

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting, stolon, division of the bush. 19,000 seeds per g; germination at 15-30 days. **Pests/diseases:** aphids, field flea, mealybug, nematodes. *Puccinia menthae* causes rust or blight on the leaves. **Weeds:** control with terbacillus, diuron, metribuzin. The plant will root through the nodes of the creeping stems.

CHROMATIC CALENDAR											
Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for foliage, flowering, and fruiting seasons]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for sowing, planting, and pruning activities]											
Sowing	Planting	Pruning									
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for fungicides, pesticides, fertilizers, and herbicides treatments]											
Fungicides	Pesticides	Fertilizers	Herbicides								

COMMERCIALIZATION		
Presentation (L)	Height (cm)	Topiary shapes
Pot		No
CT 13 (1)		
Seed tray (0.2L per cell)		

MENTHA

Mentha spicata L. (sin.: *M. viridis* L.)

MEDICINAL AND AROMATIC

HERBABUENA
SPANISH

HERBA SANA
VALENCIAN

SPEARMINT
ENGLISH

MENTHE VERTE
FRENCH

STRUCTURE		
Shape EXTENDED	Height 30-100 CM	Diameter UNDEFINED
Texture FINE	Shade DENSE	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES
var. <i>CRISPA</i>

MORPHOLOGY		
Stem	Bark	Color GREEN
Leaf EVERGREEN SIZE: 30-90 MM COLOR: US:MD GREEN LS:MD GREEN TEXTURE: SMOOTHROUGH	COMPOUND: NO	HARDNESS: SOFT
	ARRANGEMENT: OPPOSITE	VENATION: PINNATE
	SHAPE: LANCEOLATE	MARGIN: SERRATE
	APEX: ACUTE	LEAF BASE: ROUNDED
	PETIOLE: SHORT	
Flower SIZE: 3.5-6 MM	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
	Flowering VERTICILLASTER	Fragrant YES
Fruit	Type TETRA-ACHENE	Color
	Edible NO	Fruiting season
Growth	Rate FAST	Longevity



ECOLOGY		
Climate ALTITUDE: 0-2100 IRRIGATION: HIGH	Temperature	Drought resistant NO
	Sun exposure FULL SUN	Frost resistant UP TO -15°C
Soil pH: 6.6-7.5 FERTILITY: HIGH	Texture LOAMY	Salt resistant NO
	Drainage HIGH	Lime resistant YES

USES	
Resistances	Applications
COASTAL: NO	SLOPES: NO HEDGE ROWS: NO
POLLUTION: NO	RIVERBANKS: YES BORDERS: YES
WIND: NO	GROUPS: YES ISOLATED: YES

POINTS OF INTEREST
Origin/distribution: Southern and Eastern Europe / in humid places, naturalized from cultivation in large parts of Europe. **Active substances:** essential oil (carvone, limonene, rosmarinic acid,...),... **Uses:** Medicinal (estrigent, carminative (digestion), calming, febrifuge, stomach,...), seasoning, liquor store, aromas, herbalism, confectionery, perfumery.

PLANTING AND PLANT HEALTH
Propagation: by cutting, stolon, division of the bush. **Pests/diseases:** Spodoptera littoralis (African cotton leafworm), aphids, cicada, nematodes, *Puccinia menthae* causes rust spot or blight on the leaves, Phyllosticta menthae (a type of fungi) *Chrysolina americana* (Rosemary Beetle).

CHROMATIC CALENDAR											
Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for each month]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for each month]											
Sowing	[Orange]	Planting	[Orange]	Pruning	[White]						
Treatments Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for each month]											
Fungicides	[White]	Pesticides	[White]	Fertilizers	[Blue]						

COMMERCIALIZATION		
Presentation (L)	Height (cm)	Topiary Shape
CT13 (1)		No

MICROMERIA

Micromeria fruticosa (L.) Druce

MEDICINAL AND AROMATIC

POLEO BLANCO
SPANISH

POLIOL MENTA
VALENCIAN

HYSSOP TEA
ENGLISH

THYM DU LIBAN
FRENCH

STRUCTURE		
Shape IRREGULAR	Height 10-50 CM	Diameter
Texture FINE	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISIN:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES

MORPHOLOGY		
Stem	Bark	Color LIGHT GREEN
Leaf EVERGREEN SIZE: UP TO 20MM COLOR: US:GR. GRAY LS: GR. GRAY TEXTURE: TOMENTOSE	COMPOUND: NO	HARDNESS: CORIACEOUS
	ARRANGEMENT: OPPOSITE	VENATION: OVAL-LANCEOLATE
	SHAPE: OVAL-LANCEOLATE	MARGIN: ENTIRE
	APEX: ROUNDED	LEAF BASE: SHORT
Flower SIZE: 5-10 MM	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
	Flowering RACEMES	Fragrant YES
Fruit SIZE:	Type TETRA-ACHENE	Color BLACK
	Edible NO	Fruiting season
Growth	Rate FAST	Longevity



ECOLOGY		
Climate ALTITUDE: 0-1200 IRRIGATION: LOW	Temperature	Drought resistant YES
	Sun exposure FULL SUN	Frost resistant
Soil pH: FERTILITY: LOW	Texture LOAMY	Salt resistant
	Drainage HIGH	Lime resistant YES

USES	
Resistances	Applications
COASTAL:	SLOPES: YES HEDGE ROWS: NO
POLLUTION:	RIVERBANKS: NO BORDERS: YES
WIND:	GROUP: YES ISOLATED: YES

POINTS OF INTEREST
Active substances: essential oil (pulegone, rosmarinic acid, caffeic acid,...). Uses: Medicinal (digestive tonic, carminative, stomach, antiseptic, expectorant,...), refreshing,...
SPACING: 50 CM

PLANTING AND PLANT HEALTH
Propagation: by <u>seed</u> , cutting

CHROMATIC CALENDAR											
Foliage, Flowering at Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded calendar grid]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Calendar grid with icons for Sowing, Planting, Pruning]											
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Calendar grid with icons for Fungicides, Pesticides, Fertilizers]											

COMMERCIALIZATION		
Presentation (L)	Height (cm)	Topiary shapes
CT13(1)	10-20	NO

NEPETA

***Nepeta cataria* L.**

MEDICINAL AND AROMATIC

HIERBA GATERA, NEBEDA
SPANISH

NEPTA
VALENCIAN

CATNIP, CATMINT
ENGLISH

HERBE AUX CHATS, CATARE
FRENCH

STRUCTURE		
Shape IRREGULAR	Height 30-100 CM	Diameter 20-60 CM
Texture FINE	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES
ssp. <i>CITRIODORA</i>

MORPHOLOGY		
Stem	Bark	Color GREEN/GRAY
Leaf	COMPOUND: NO	HARDNESS: SOFT
EVERGREEN	ARRANGEMENT: OPPOSITE	VENATION: PINNATE
SIZE:	SHAPE: OVAL	MARGIN: DENTATE
COLOR: US. GR. GRAY	APEX: ACUTE	LEAF BASE: CORDATE
LS. GR. GRAY	PETIOLE: SHORT	
TEXTURE: TOMENLOSE		
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE:	Flowering VERTICILLASTER	Fragrant YES
Fruit	Type TETRA-ACHENE	Color BLACK
SIZE:	Edible NO	Fruiting season
Growth	Rate FAST	Longevity



ECOLOGY		
Climate	Temperature -6°C,H4,Z6	Drought resistant YES
ALTITUDE: 0-1200	Sun exposure SUN/PARTIAL SHADE	Frost resistant Up to -15°C
IRRIGATION: LOW	Texture LOAMY	Salt resistant
Soil	Drainage HIGH	Lime resistant YES
pH: BASIC		
FERTILITY: LOW		

USES	
Resistances	Applications
COASTAL: —	SLOPES: NO HEDGE ROWS: NO
POLLUTION: —	RIVERBANKS: NO BORDERS: YES
WIND: —	GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Catus" (Latin) = cat
Origin/Distribution: Eastern Mediterranean / Europe; dump sites, roadsides. **Active substances:** fatty acids, essential oil (carvacrol, thymol, lactones, nepetalactone,...), phenolic acids (rosmarinic acid, caffeic acid,...), content in essence: 0.3-1% (dry matter of inflorescences). **Uses:** Medicinal (calming, digestive, treatment of gastric and respiratory problems,...), seasoning, insecticide, insect repellent,...

SPACING: 30 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting; germination in 7-21 days.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating foliage, flowering, and fruiting periods]											

Cultivation calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for sowing, planting, and pruning]											
Sowing	Planting	Pruning									

Treatment calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for fungicides, pesticides, and fertilizers]											
Fungicides	Pesticides	Fertilizers									

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
CT13 (1)	10-20	No

ORIGANUM

***Origanum majorana* L. (sin.: *Majorana hortensis* Moench.)**

MEDICINAL AND AROMATIC

MEJORANA
SPANISH

MARJOLAI
VALENCIAN

SWEET MARJORAM
ENGLISH

MARJOLAINE
FRENCH

STRUCTURE		
Shape ROUND	Height 60 CM	Diameter 45 CM
Texture FINE	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES
VARIEGATA

MORFOLOGY		
Stem	Bark	Color LIGHT BROWN
Leaf	COMPOUND: NO HARDNESS: SOFT ARRANGEMENT: OPPOSITE VENATION: PINNATE SHAPE: OVAL MARGIN: ENTIRE APEX: ACUTE LEAF BASE: ATTENUATE PETIOLE: SHORT	NO SOFT OPPOSITE PINNATE OVAL ENTIRE ACUTE ATTENUATE SHORT
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE: 4-7 MM	Flowering SPIKE	Fragrant YES
Fruit	Type ACHENE	Color DARK BROWN
SIZE:	Edible NO	Fruiting season
Growth	Rate FAST	Longevity 8-10 YEARS



ECOLOGY		
Climate	Temperature -15,H2,Z5	Drought resistant YES
ALTITUDE: 0-1200	Sun exposure FULL SUN	Frost resistant UP TO -5°C
IRRIGATION: MODERATE	Texture LOAMY	Salt resistant
Soil	pH: NEUTRAL	Drainage HIGH
FERTILITY: FERTILE		Lime resistant YES

USES	
Resistances	Applications
COASTAL:	SLOPES: NO HEDGE ROWS: NO
POLLUTION:	RIVERBANKS: NO BORDERS: YES
WIND:	GROUPS: YES ISOLATED: NO

POINTS OF INTEREST

"Oros" = mountain; "Ganos" = ornament; alludes to its decorative character in mountainous areas; Also. "Origanon" (Greek) = bitter herb; "Amaraco" (Greek) = bitter, alludes to the taste of the leaves. **Origin/distribution:** Middle East and Arabia / Mediterranean area, North Africa and America; also cultivated, feral. **Active substances:** essential oil (carvacrol, thymol, linalool, terpinene, rosmarinic acid, caffeic acid, flavonoids...); content in essence: 0.7-3%. **Uses:** Medicinal (antispasmodic, antiseptic, stomach, antioxidant, diuretic,...), condiment, preservative, liquors, herbalism, perfumery, confectionery (seeds). Toxic (essential oil).

SPACING: 20 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting, division of the bush; 1 g = 4000-4500 seeds; germination in 10-15 days; Germinating power: 3-7 years. **Pests/diseases:** cicadas, mites, aphids and *Puccinia origani* (fungus/white rust) **Weeds:** control with Lenacil.

CHROMATIC CALENDAR											
Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for foliage, flowering, and fruiting seasons]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for sowing, planting, and pruning activities]											
Sowing	Planting	Pruning									
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for fungicides, pesticides, and fertilizers treatments]											
Fungicides	Pesticides	Fertilizers									

COMMERCIALIZATION		
Presentation (L)	Height (cm)	Topiary shapes
Pot		No
CT13 (1)	20-30	
Seed tray (0.2L per cell)		

ORIGANUM

Origanum vulgare L.

MEDICINAL AND AROMATIC

OREGANO SPANISH

ORENGA VALENCIAN

WILD MARJORAM ENGLISH

MARJOLAINE SAUVAGE FRENCH

STRUCTURE		
Shape ROUND	Height 20-80 CM	Diameter 20-60 CM
Texture FINE	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:	MAGNOLIOPSIDA	ssp. <i>VIRENS</i> (GREEN OREGANO, WHITE FLOWER)
ORDER:	LAMIALES	ssp. <i>VULGARE</i> (RED OREGANO, RED FLOWER)
FAMILY:	LAMIACEAE	<i>AUREUM CRISPUM</i>
		<i>COMPACTUM, AUREUM, HEIDEROS, THUMBLE'S VARIETY, ...</i>

MORFOLOGY		
Stem	Bark	Color BROWN
Leaf EVERGREEN SIZE: 10-40 MM COLOR: US:DK. GREEN LS: MID GREEN TEXTURE: US:TOMENTOSE	COMPOUND:	NO
	HARDNESS:	SOFT
	ARRANGEMENT:	OPPOSITE
	VENATION:	PINNATE
	SHAPE:	OVAL
	MARGIN:	ENTIRE
	APEX:	ACUTE
	LEAF BASE:	ROUNDED
	PETIOLE:	SHORT
Flower	Type	Reproduction
	HERMAPHRODITE	HERMAPHRODITE
SIZE: 4-7 MM	Flowering	Fragrant
	SPIKE	YES
Fruit	Type	Color
	ACHENE	
	Edible	Fruiting season
SIZE:	NO	
Growth	Rate	Longevity
	FAST	8-10 YEARS



ECOLOGY		
Climate	Temperature	Drought resistant
	-15°C,H2,Z5	YES
ALTITUDE: 0-3000	Sun exposure	Frost resistant
IRRIGATION: MODERATE	FULL SUN	Up to -15°C
Soil	Texture	Salt resistant
	LOAMY	
	Drainage	Lime resistant
pH: 7-8.5	HIGH	YES
FERTILITY: MODERATE		



USES	
Resistances	Applications
COASTAL:	SLOPES: NO HEDGE ROWS: NO
POLLUTION:	RIVERBANKS: NO BORDERS: YES
WIND:	GROUPS: YES ISOLATED: NO

POINTS OF INTEREST

"Oros" = mountain; "Ganos" = ornament; alludes to its decorative character in mountainous areas; also "origanon" (Greek) = bitter herb
Origin/distribution: Mediterranean area and in a large part of Europe, reaching Asia / very adaptable to different habitats. Active substances: essential oil (carvacrol, thymol, linalool, terpinene, rosmarinic acid, caffeic acid, flavonoids,...). Content in essence: 0.4%. **Uses:** Medicinal (antispasmodic, antiseptic, stomach, antiasthmatic, healing,...), condiment, preservative, liquors, herbalism, perfumery, cosmetics, honey.
 Very variable in terms of color and size of the inflorescences. Polymorphous plant. The stems root at their base.

SPACING: 35 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting, division of the bush; 1 g = 20,000-30,000 seeds; germination in 25 days; germinating power: 5 years. **Pests/diseases:** cicadas, aphids, *Puccinia origani* (fungus/white rust). **Weeds:** control with Lenacil, Terbacil.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating seasonal activity]											

Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for Sowing, Planting, Pruning]											
Sowing [] Planting [] Pruning [X]											

Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for Fungicides, Pesticides, Fertilizers]											
Fungicides [] Pesticides [] Fertilizers []											

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
Pot		No
CT13(1)	20-30	
Seed tray (0.2L per cell)		

RICINUS***Ricinus communis* L.****MEDICINAL AND AROMATIC**RICINO
SPANISHRICI, FIGUERA BORDA
VALENCIANCASTOR BEAN, CASTOR OIL PLANT
ENGLISHRICIN
FRENCH

STRUCTURE		
Shape IRREGULAR	Height 2-4 M	Diameter 1-4 M
Texture COARSE	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	EUPHORBIALES
FAMILY:	EUPHORBIACEAE

VARIETIES
NIGRA
CARMENCICK
IMPALA

MORPHOLOGY		
Trunk	Bark SMOOTH	Color DARK RED
Leaf	COMPOUND: HARDNESS: ARRANGEMENT: VENATION: SHAPE: MARGIN: APEX: LEAF BASE: PETIOLE:	PALMATE — ALTERNATE PALMATE PALMATE 5-11 LOBES DENTATE ACCUMINATE LONG (10-20 CM)
Flower	Type UNISEXUAL	Reproduction MONOECIOUS
SIZE: ♂/♀ 15-30MM	Flowering PANICLE	Fragrant NO
Fruit	Type CAPSULE	Color RED
SIZE: 15-20 MM	Edible NO	Fruiting season SUMMER/AUTUMN
Growth	Rate FAST	Longevity >= 1 YEAR



ECOLOGY		
Climate	Temperature -1°C.H5.Z6	Drought resistant MODERATE
ALTITUDE: 0-500	Sun exposure SUN	Frost resistant NO
IRRIGATION: LOW	Texture LOAMY/SANDY	Salt resistant NO
Soil	Drainage HIGH	Lime resistant NO
pH: 4.5-8	FERTILITY: HIGH	

USES	
Resistances	Applications
COASTAL: NO	SLOPES: NO HEDGE ROWS: NO
POLLUTION: NO	RIVERBANKS: NO BORDERS: NO
WIND: NO	GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Ricinus" (Latin) = tick, alludes to the resemblance of the seeds to ticks (Pliny).

Origin/distribution: Tropical Africa / in the Mediterranean area; in vacant lots, adapted to many types of soil. It has been cultivated and naturalized. **Active substances:** Oil (ricinoleic acid, alkaloids, ricin (toxic), stearin, toxystearic acid,...). **Uses:** Medicinal (purgative "castor or castor oil" nowadays in disuse, anthelmintic,...), industrial (as a high-grade lubricant). Monoecious plant. Its characteristic seeds (1.5 x 1 cm) are shiny, ellipsoid, smooth and marbled. Toxic (ricin albumin).

SPACING: 1-1.5M

PLANTING AND PLANT HEALTH

Propagation: by seed; 1 g = 2.5 seeds; germination in 15 days (t>12°C); Germinating power: 2-3 years. **Pests/diseases:** Gray mold (*Botrytis* sp.), leaf spots (*Cercosporina* sp.), castor bean caterpillar (*Achoeta* sp., attacks young plants). Disinfect seeds before sowing.

CHROMATIC CALENDAR**Foliage, Flowering and Fruiting season**

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC

Cultivation Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC

Sowing Planting Pruning

Treatment Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC

Fungicides Pesticides Fertilizers

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
CT17 (2.8)	60-80	No

ROSMARINUS

Rosmarinus officinalis L.

MEDICINAL AND AROMATIC

ROMERO SPANISH ROMANI VALENCIAN ROSEMARY, ROSMARINE ENGLISH ROMARIN FRENCH

STRUCTURE		
Shape IRREGULAR	Height 50-150 CM	Diameter 50-100 CM
Texture MEDIUM	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:	MAGNOLIOPSIDA	BARBACUE HOJA FINA
ORDER:	LAMIALES	MOZART, ALBUS, ARP, BENENDES BLUE, CORSICAN BLUE, ...
FAMILY:	LAMIACEAE	PROSTRATUS (Creeping group)

MORPHOLOGY		
Stem	Bark	Color GRAY
Leaf	COMPOUND: NO HARDNESS: CORIACEOUS ARRANGEMENT: OPPOSITE VENATION: SHAPE: LINEAR MARGIN: ENTIRE APEX: ROUNDED LEAF BASE: ATTENUATE PETIOLE: SESSILE	
EVERGREEN SIZE: 15-35 MM COLOR: US:DK. GREEN LS:GR./GRAY TEXTURE: US:GLOSSY LS:TOMENTOSE		
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE: 10-12 MM	Flowering RACEMES	Fragrant YES
Fruit	Type TERTA-ACHENE	Color BLACK
SIZE:	Edible NO	Fruiting season
Growth	Rate MODERATE	Longevity 10-12 YEARS



ECOLOGY		
Climate	Temperature -18,H2,Z5	Drought resistant YES
ALTITUDE: 0-1400 IRRIGATION: LOW	Sun exposure FULL SUN	Frost resistant Up to -5°C
Soil	Texture LOAMY/SANDY	Salt resistant
pH: BASIC FERTILITY: MODERATE	Drainage HIGH	Lime resistant YES

USES	
Resistances	Applications
COASTAL: YES POLLUTION: NO WIND: NO	SLOPES: YES HEDGE ROWS: YES RIVERBANKS: NO BORDERS: YES GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Ros" (Latin) = dew, bush, rosy; "marinus" (Latin) = maritime, alludes to its aroma and habitat close to the coast / "Rhos" (Greek) = shrub; "myrinos" (Greek) = aromatic.
Origin/distribution: Southern Europe, the Mediterranean basin and Southwest Asia. Found in most places in Spain but scarce/disappearing in the north-northwest. This shrub prefers low altitudes. Common on limestone substrates. **Active substances:** Essential oil (camphor, cineol, pinene, camphene, rosmarinic acid, flavonoids, phenolic acids...); content in essence: 0.5% (dry matter.) **Uses:** Medicinal (analgesic, anti-asthmatic, anti-flu, cardiotonic, digestive, febrifuge, sedative, scalp stimulant,...), gastronomy (leaves, pungent flavor), honey, liquor, herbalism, aromatherapy,... Colonizing plant.

SPACING: 50 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting, division of the bush; 1 g = 950-1000 seeds; slow and poor germination (50%); germinating power: 4 years. **Pests/diseases:** *Chrosolina americana*, attacks stems and leaves (effectively combated with chlorpyrifos), fungal attack problems (soil fungi) in case of excess soil moisture. **Weeds:** control with Linuron, Terbacillus.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating seasonal activity]											

Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating cultivation activities]											
Sowing	Planting	Pruning									

Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating treatment periods]											
Fungicides		Pesticides		Fertilizers							

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
Pots		
CT9 (0.33)	10-20/20-30	1-2 years
CT10(0.45)		
CT13 (1)	10-20/20-30	normal/creeping
CT12 (1.1)		
15TC (1.3)	30-40	
CT17 (2.8)		
CT20 (5)		normal/creeping
CT (7.5)		creeping/pyramidal
CT25 (10)		ball
CT40 (25)		
Seed tray (0.35L per cell)		

RUTA***Ruta graveolens* L.****MEDICINAL AND AROMATIC**RUTA
SPANISHRUTA
VALENCIANHERB OF GRACE
ENGLISHRUE FETIDE
FRENCH

STRUCTURE		
Shape IRREGULAR	Height Up to 150 CM	Diameter 45 CM
Texture MEDIUM	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	SAPINDALES
FAMILY:	RUTACEAE

VARIETIES
JACKMAN'S BLUE VARIEGATA

MORPHOLOGY		
Stem	Bark	Color
Leaf EVERGREEN SIZE: LEAF: 7-12CM LEAFLET: 8-12 MM COLOR: US:BLUE/GREEN LS:BLUE/GREEN TEXTURE: SMOOTH	COMPOUND: HARDNESS: ARRANGEMENT: VENATION: SHAPE: MARGIN: APEX: LEAF BASE: PETIOLE:	IMPARIPINNATE CORIACEOUS ALTERNATE PINNATE OVAL LEAFLET ENTIRE ACUTE ATTENUATE LONG
Flower SIZE: 1.5-2 CM	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
	Flowering CORYMB	Fragrant UNPLEASANT
Fruit SIZE:	Type CAPSULE	Color BLACK
	Edible NO	Fruiting season
Growth	Rate SLOW	Longevity >10 YEARS



ECOLOGY		
Climate ALTITUDE: 0-1200 IRRIGATION: LOW	Temperature -12°C; H4; Z6 Sun exposure FULL SUN	Drought resistant YES Frost resistant Up to -15°C
Soil pH: BASIC FERTILITY: MODERATE	Texture LOAMY/SANDY Drainage HIGH	Salt resistant Lime resistant YES

USES	
Resistances	Applications
COASTAL: <input type="checkbox"/>	SLOPES: <input type="checkbox"/> HEDGE ROW: <input type="checkbox"/>
POLLUTION: <input type="checkbox"/>	RIVERBANKS: <input type="checkbox"/> BORDERS: <input type="checkbox"/>
WIND: <input type="checkbox"/>	GROUPS: <input type="checkbox"/> ISOLATED: <input type="checkbox"/>

POINTS OF INTEREST

"Rhtos" (Greek) = shielded, alludes to its long history as an antidote. **Origin/distribution:** Southern Europe, Mediterranean area, Balkans. Cosmopolitan in the Mediterranean area, on sunny plains in coastal areas, wastelands and arid. **Active substances:** Essential oil (methyl salicylate, limonene, pinene, furocumanine, tannins,...). **Uses:** Medicinal (antiepileptic, ophthalmic, vermifuge, carminative, anthelmintic,...). Gastronomy (flavoring), liquors (flavoring). Toxic if swallowed. May cause allergic reactions upon contact with the plant. Pungent aroma, sometimes unpleasant. Ornamental plant from the Middle Ages.

SPACING: 45 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting; 1g = 250-440 seeds; germinates in 10-15 days; Germinating power: 2-5 years.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating seasonal activity]											

Cultivation Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	
[Color-coded bars for cultivation activities]												
Sowing	<input type="checkbox"/>	Planting	<input type="checkbox"/>	Pruning	<input checked="" type="checkbox"/>							

Treatment Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	
[Color-coded bars for treatment activities]												
Fungicides	<input type="checkbox"/>	Pesticides	<input type="checkbox"/>	Fertilizers	<input checked="" type="checkbox"/>							

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
CT13 (1)		No

SALVIA

Salvia officinalis L.

MEDICINAL AND AROMATIC

SALVIA COMÚN
SPANISH

SALVIA, SÁLVIA
VALENCIAN

SAGE
ENGLISH

SAUGIE OFFICINALE
FRENCH

STRUCTURE		
Shape IRREGULAR	Height 60-80 CM	Diameter Up to 100 CM
Texture MEDIUM	Shade PARTIAL	Root FUSIFORM

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES
ALBA or ALBIFLORA (WHITE FLOWER)
ICTERINA
BERGGARTEN (DWARF PLANT)
PURPURESCENS GROUP

MORPHOLOGY		
Stem	Bark	Color LIGHT GREEN
Leaf	COMPOUND: NO HARDNESS: SOFT ARRANGEMENT: OPPOSITE VENATION: OVAL/LANCEOLATE SHAPE: OVAL/LANCEOLATE MARGIN: CRENATE APEX: ACUTE LEAF BASE: ROUNDED PETIOLE: LONG	
EVERGREEN SIZE: Up to 5 CM COLOR: US.GR. GRAY LS.GR. GRAY TEXTURE: TOMEN TOSE		
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE: <35 MM	Flowering VERTICILLASTER	Fragrant YES
Fruit	Type TETRA-ACHENE	Color BROWN/BLACK
SIZE:	Edible NO	Fruiting season JUL-AUG
Growth	Rate FAST	Longevity 4-5 YEARS



ECOLOGY		
Climate	Temperature -12°C,H3,Z6	Drought resistant YES
ALTITUDE: 0-1800 IRRIGATION: LOW	Sun exposure FULL SUN	Frost resistant Up to -15°C
Soil	Texture LOAMY/SANDY	Salt resistant
pH: 5-9 FERTILITY: POOR	Drainage HIGH	Lime resistant YES

USES	
Resistances	Applications
COASTAL: YES POLLUTION: YES WIND: YES	SLOPES: YES HEDGE ROWS: YES RIVERBANKS: NO BORDERS: YES GROUPS: YES ISOLATED: YES

POINTS OF INTEREST

"Salvare" (lat) = to save, alludes to its healing properties
Origin/distribution: Southern Europe (Spain, France and the Balkan Peninsula). It has been naturalized in much of Europe, Russia and the United States; in dry and arid areas, very rustic, it prefers limestone soils. **Active substances:** Essential oil (pinene, salviane, thujone, cineol, borneol, camphene,...), mucilage, tannins, resins,...; content in essence: 1-2.5% (dry matter).
Uses: Medicinal (digestive, antiperspirant, cholagogue, antisthmatic, carminative, antiseptic, antioxidant, antibacterial, ...), liquor, cosmetics, perfumery, seasoning, flavoring. Its essential oil is toxic.

SPACING: 20-40 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, bush division, cutting; seeds in 1g: 160-250, germination in 14-21 days, germination power: 3-7 years. **Trimming/pruning:** as soon as flowering stems are distinguished. This will stimulate foliage. **Pests/diseases:** various insects (*Chrosolona sp.*) (control with chlorpyrifos); different fungi (*Cercospora salviicola* (a type of fungi), *Puccinia sp.* (rust), *Erysiphe sp* (fungi), *Sclerotinia* (fungi/white mold) *Peronospora* (mildew disease), *Fusarium* (fungi) *Rhizoctonia* (fungi) *Armillaria mellea* (honey fungus). **Weeds:** control with Linuron (before sprouting), norflurazon, bentazon, dicamba. Simazine is phytotoxic for Salvia.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for foliage, flowering, and fruiting seasons]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for sowing, planting, and pruning activities]											
Sowing [] Planting [] Pruning [x]											

COMMERCIALIZATION

Presentation (L)	Height(cm)	Topiary shapes
Pots		No
CT11 (0.6)	10-20	
CT13 (1)	20-30	
Seed tray (0.02L per cell)		
Seed tray (0.35L per cell)	2 Years	

Treatment Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for fungicide, pesticide, and fertilizer treatments]											
Fungicides [] Pesticides [] Fertilizers []											

SALVIA

Salvia sclarea L.

MEDICINAL AND AROMATIC

SALVIA ROMANA, AMARO SPANISH SALVIA ROMANA VALENCIAN CLARY, CLARY SAGE ENGLISH SCLARÉE, SAUGE SCLARÉE FRENCH

STRUCTURE		
Shape IRREGULAR	Height 40-150 CM	Diameter 60 CM
Texture COARSE	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:	MAGNOLIOPSIDA	var. <i>TURKESTANCIA</i>
ORDER:	LAMIALES	<i>ARGENTEA</i>
FAMILY:	LAMIACEAE	

MORPHOLOGY		
Stem	Bark	Color MID GREEN
Leaf	COMPOUND: NO HARDNESS: SOFT ARRANGEMENT: OPPOSITE VENATION: PINNATE SHAPE: CORDATE MARGIN: CRENATE APEX: ACUTE LEAF BASE: ROUNDED PETIOLE: LONG	
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
	Flowering PANICLE	Fragrant YES
Fruit	Type TETRA-ACHENE	Color BROWN
	Edible NO	Fruiting season
Growth	Rate MODERATE	Longevity 5 YEARS



ECOLOGY		
Climate	Temperature -12°C.H3.Z6	Drought resistant NO
ALTITUDE: 0-1200 IRRIGATION: HIGH	Sun exposure FULL SUN	Frost resistant UP TO -15°C
Soil	Texture LOAMY/SANDY	Salt resistant
pH: 6.5-8.5 FERTILITY: MODERATE	Drainage HIGH	Lime resistant YES

USES	
Resistances	Applications
COASTAL	SLOPES: NO HEDGE ROWS: NO
POLLUTION:	RIVERBANKS: NO BORDERS: YES
WIND:	GROUP: YES ISOLATED: YES

POINTS OF INTEREST

"Salvare" (Latin) = to save, alludes to its healing properties.

Origin/distribution: Southern Europe, Central Asia, Near East and in America. Dry and sunny areas but also on humid slopes, understory of poplars and elm groves. It prefers somewhat humid and nitrified environments and limestone and stony soils. **Active substances:** Essential oil (sclareol, linalool, linalyl acetate, bitter substances, tannins,...); content in essence: 0.1-0.4% (dry matter). **Uses:** Medicinal (antispasmodic, sedative, relief of digestive disorders, antiseptic,...), perfumery, herbalism, cosmetics, soap.

SPACING: 50 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, division of bushes; 1 g = 260-350 seeds; germination in 7-21 days. **Weeds:** control with Linuron, Lenacil, Methobromuron. It is demanding in fertilization.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating foliage, flowering, and fruiting periods]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for Sowing, Planting, Pruning]											
Sowing		Planting		Pruning	X						
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for Fungicides, Pesticides, Fertilizers]											
Fungicides		Pesticides		Fertilizers							

COMMERCIALIZATION

Presentation	Height (cm)	Topiary shapes
		No

SAMBUCUS***Sambucus nigra* L.****MEDICINAL AND AROMATIC**SAUCO
SPANISHSAUC, SAUQUER
VALENCIANELDER, BOURTREE
ENGLISHSUREAU
FRENCH

STRUCTURE		
Shape OVOID	Height 4-5 (10) M	Diameter 2-3 M
Texture MEDIUM	Shade PARTIAL	Root FASCICULATE

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:		PURPUREA
TYPE:	MAGNOLIOPSIDA	BLACK BEAUTY
ORDER:	DIPSACALES	MADONNA
FAMILY:	CAPRIFOLIACEAE	AUREA, GUINCHO PURPLE, MARGINATA, LACINIATA FORM...

MORPHOLOGY		
Stem	Bark FURROWED	Color LIGHT/DARK GRAY
Leaf	COMPOUND: HARDNESS: ARRANGEMENT: VENATION:	IMPARIPINNATE CORIACEOUS OPPOSITE PINNATE
DECIDUOUS SIZE: Leaf: 15 CM Leaflet: 3-8 CM COLOR: US: MID GREEN LS: MID GREEN TEXTURE: SMOOTH	SHAPE: MARGIN: APEX: LEAF BASE: PETIOLE:	LANCEOLATE DENTATE ACCUMINATE ROUNDED LONG
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE: 4-5 MM	Flowering CORYMB (10-20 CM)	Fragrant UNPLEASANT
Fruit	Type BERRY	Color BLACK
SIZE: 6-8 MM	Edible	Fruiting Season END OF SUMMER
Growth	Rate FAST	Longevity



ECOLOGY		
Climate	Temperature	Drought resistant NO
ALTITUDE: 0-1600 IRRIGATION: HIGH	Sun exposure SUN/PARTIAL SHADE	Frost resistant YES
Soil	Texture LOAMY/CLAYEY	Salt resistant NO
pH: 5.5-8.5 FERTILITY: FERTILE	Drainage INDIFFERENT	Lime resistant MODERATE

USES		
Resistances	Applications	
COASTAL: 1ST LINE POLLUTION: YES WIND: YES	SLOPES: NO RIVERBANKS: YES GROUPS: YES	HEDGE ROWS: NO BORDERS: NO ISOLATED: YES

POINTS OF INTEREST

"Sambuke" (Greek) = musical flute that was made with elder shoots; "Nigra" (Latin) = black, refers to the color of its ripe fruit.

Origin/Distribution: Europe, North Africa, North Asia. In any humid and fertile soil. Can be found in valleys, stream banks, clear forests, slopes. Active substances: Essential oil (flavonoids, phenolic acids (chlorogenic and caffeic), triterpenes, ursolic acid, sambunigraside,...), sugars, tannins, mucilages, potassium salts. **Uses:** Medicinal (anti-inflammatory, diuretic, laxative, contributes in slimming regimens,...), veterinary (laxative), liquor, cosmetics ("elderwater"), flavoring food, insecticide, dye wool and fabrics, fruits are used in jams, juices, wood as fuel. **Toxic** (fresh fruits, roots, stems); the leaves and berries can cause dermatitis.

SPACING: 1-1.5M

PLANTING AND PLANT HEALTH

Propagation: by seed (somewhat complicated), stake or regrowth with root; 1 g = 245 seeds, germination in 5-7 months. **Pests/diseases:** attacks by aphids, moderate resistance to *Armillaria mellea* (honey fungus).
Complicated planting (necessary stratification is necessary). Plantation of cuttings: tender (summer), withered (autumn), hard (winter). Rooted renewals in March.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for foliage, flowering, and fruiting seasons]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for cultivation activities]											
Sowing	Planting	Pruning	Division of bush								
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for treatment activities]											
Fungicides	Pesticides	Fertilizers									

COMMERCIALIZATION

Presentation	Height (cm)	Topiary shapes
Pots		No
	30-40	
	40-50	
	50-60	
	60-80	

SANTOLINA

Santolina chamaecyparissus ssp. chamaecyparissus L.

MEDICINAL AND AROMATIC

MANZANILLA AMARGA, ABRÓTANO HEMBRA
SPANISH

CAMAMILLA DE MUNTANYA
VALENCIAN

LAVENDER COTTON
ENGLISH

SANTOLINE LAVANDE CASH
FRENCH

STRUCTURE		
Shape ROUND	Height 20-70 CM	Diameter 60 CM
Texture MEDIUM	Shade PARTIAL	Root

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	ASTERALES
FAMILY:	ASTERACEAE

VARIETIES
LEMON QUEEN (DWARF CREAM-COLORED FLOWER)
PRETTY CAROL (COMPACT)
NANA (H and Ø 15 CM)
PRETTY PINK

MORPHOLOGY		
Stem	Bark GRAY	Color GRAY
Leaf	COMPOUND: PINNATE HARDNESS: SOFT ARRANGEMENT: ALTERNATE VENATION: — SHAPE: LINEAR MARGIN: SERRATE APEX: — LEAF BASE: — PETIOLE: SESSILE	
Flower	Type: HERMAPHRODITE Flowering: YES FLORET (6-15 MM)	Reproduction: HERMAPHRODITE Fragrant: YES Color
Fruit	Type: ACHENE Edible: NO	Fructing season
Growth	Rate: MODERATE	Longevity: 5-10 YEARS



ECOLOGY		
Climate	Temperature: -12°C,H3,Z4	Drought resistant: YES
ALTITUDE: 0-2000 IRRIGATION: LOW	Sun exposure: FULL SUN	Frost resistant: UPTO -15°C
Soil	Texture: LOAMY/SANDY	Salt resistant
pH: BASIC FERTILITY: POOR	Drainage: HIGH	Lime resistant: YES

USES	
Resistances	Applications
COASTAL: YES POLLUTION: — WIND: —	SLOPES: YES RIVERBANKS: NO GROUPS: YES
	HEDGE ROWS: YES BORDERS: YES ISOLATED: YES

POINTS OF INTEREST

"Xanthos" (Greek) = yellow; "sanctum linum" (Latin) = sacred linen
Origin/distribution: Western Mediterranean / warm European regions, especially in the Mediterranean area. **Active substances:** Essential oil (azulene, flavonoids, phenolic acids,...), resins, tannins,...; content in essence: 0.7-1% (dry matter). **Uses:** Medicinal (anti-inflammatory, antiseptic, antispasmodic, vermifuge, vulnerary, healing,...), perfumery, insecticide.
 Colonizing plant.

SPACING: 50 CM

PLANTING AND PLANT HEALTH

Pruning: deadhead after flowering. Thorough pruning is recommended every 2-3 years in April. Propagation can take place in the summer by means of 8 cm cuttings in a seed box.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Sowing											
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Fungicides											
Pesticides											
Fertilizers											

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
Pots		
8C (0.2)	10-15	1 year
CT9 (0.33)	10-20	
CT10 (0.45)		round
CT13 (1)	10-20/15-25	round
CT12 (1.1)		round
CT14 (1.6)		round
CT17 (2-8)		round
CT20 (5)		round
CT22 (6)		round
C32 (11-5)		round
Seed tray (0.35L per cell)		

SATUREJA

Satureja montana L.

MEDICINAL AND AROMATIC

AJEDREA, MORQUERA SPANISH SABORJJA, HERBA D'OLIVES VALENCIAN WINTER SAVORY ENGLISH SARRIETTE VIVAGE FRENCH

STRUCTURE		
Shape EXTENDED	Height 10-40 CM	Diameter 20-60 CM
Texture FINE	Shade	Root TAP ROOT

DIVISION:	MAGNOLIOPHYTA
SUBDIVISION:	MAGNOLIOPSIDA
ORDER:	LAMIALES
FAMILY:	LAMIACEAE

VARIETIES	
NANA	

MORPHOLOGY		
Stem	Bark	Color REDDISH
Leaf EVERGREEN SIZE: 5-30 MM COLOR: US: MID GREEN LS: MID GREEN TEXTURE: GLOSSY	COMPOUND: NO HARDNESS: CORIACEOUS ARRANGEMENT: OPPOSITE VENATION: SHAPE: LINEAR-LANCEOLATE MARGIN: CILIATE APEX: ACUTE LEAF BASE: CUNEATE PETIOLE: SESSILE	
Flower SIZE: 6-12 MM	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
	Flowering VERTICILLASTER	Fragrant YES
Fruit SIZE:	Type TETRA-ACHENE	Color BLACK
	Edible NO	Fruiting season
Growth	Rate FAST	Longevity 5-10 YEARS



ECOLOGY		
Climate ALTITUDE: 0-1800 M IRRIGATION: LOW	Temperature -6°C, H4, Z6 Sun exposure FULL SUN	Drought resistant YES Frost resistant Up to -15°C
Soil Ph: 7-8.5 FERTILITY: MODERATE	Texture LOAMY/SANDY Drainage HIGH	Salt resistant Lime resistant YES

USES		
Resistances COASTAL: POLLUTION: WIND:	Applications SLOPES: YES HEDGE ROWS: NO RIVERBANKS: NO BORDERS: YES GROUPS: YES ISOLATED: YES	

POINTS OF INTEREST

"Satura" (Latin) = stew, alludes to its application as a seasoning.
Origin/distribution: Southern Europe and Northern Africa, Mediterranean, Southern Asia. It tolerates limestone, wasteland, stony, poor soils of much of the Iberian Peninsula. **Active substances:** Essential oil (carvacrol, linalool, thymol, terpineol, cymene, rosmarinic acid...); content in essence: approx. 1.7% (up to 3% dry matter). **Uses:** Medicinal (digestive, carminative, tonic, antispasmodic, germicidal, antioxidant,...), seasoning and food preservative (germicidal, fungicidal), herbalism, liquor, melliferous,... The peripheral branches take root easily.

SPACING: 30-35 CM

PLANTING AND PLANT HEALTH

Propagation: by seed, cutting, division of the bush; 1 g = 1300-1500 seeds, germination in 20-25 days, germination power: 2-7 years. **Pests/diseases:** This species of plant is prone to fungal attacks from the soil in situations of excess humidity, but, in general, there are few conditions due to the high content of carvacrol. **Weeds:** It presents allelopathies against weeds; control with terbacil (controls a wider range of weeds and with greater persistence), lenacil. Complicated direct sowing (March-April). Nursery plant planting (with a minimum height of 10 cm) in May, approx. The bush can be divided towards March.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars indicating seasonal activity]											

Cultivation Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	
[Color-coded bars for cultivation activities]												
Sowing	Planting	Pruning	Dividing of bush									

Treatment Calendar

JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars for treatments]											
Fungicides	Pesticides	Fertilizers									

COMMERCIALIZATION

Presentation(L)	Height (cm)	Topiary shapes
Pots		No
CT13 (1)		
Seed tray (0.2L per cell)		

SIDERITIS

Sideritis angustifolia L.

MEDICINAL AND AROMATIC

RABO DE GATO
SPANISH

CUA DE GAT
VALENCIAN

IRONWORT, MOUNTAIN TEA
ENGLISH

HERBE DE REFLUX
FRENCH

STRUCTURE		
Shape IRREGULAR	Height 30-60 CM	Diameter
Texture MEDIUM	Shade LIGHT	Root TAP ROOT

DIVISION:	MAGNOLIOPHYTA	VARIETIES
SUBDIVISION:		
TYPE:	MAGNOLIOPSIDA	
ORDER:	LAMIALES	
FAMILY:	LAMIACEAE	

MORPHOLOGY		
Stem	Bark	Color GREEN
Leaf	COMPOUND: NO HARDNESS: CORIACEOUS ARRANGEMENT: OPPOSITE VENATION: LINEAR SHAPE: LINEAR MARGIN: ENTIRE APEX: OBTUSE/ACUMINATE LEAF BASE: ATTENUATE PETIOLE: SESSILE	
EVERGREEN SIZE: 7-8 MM COLOR: US: MID GREEN LS: MID GREEN TEXTURE: TOMENTOSE		
Flower	Type HERMAPHRODITE	Reproduction HERMAPHRODITE
SIZE: 7-12 MM Flowering VERTICILLASTER		Fragrant YES
Fruit	Type TETRA-ACHENE	Color BLACK
SIZE: Up to 2 MM Edible NO		Fruiting season
Growth	Rate MODERATE	Longevity 4-5 YEARS



ECOLOGY		
Climate	Temperature —	Drought resistant YES
ALTITUDE: 0-1000 M IRRIGATION: LOW	Sun exposure FULL SUN	Frost resistant
Soil	Texture LOAMY/SANDY	Salt resistant
pH: BASIC FERTILITY: POOR	Drainage HIGH	Lime resistant YES

USES	
Resistances	Applications
COASTAL: POLLUTION: WIND:	SLOPES: NO HEDGE ROWS: YES RIVERBANKS: NO BORDERS: YES GROUPS: YES ISOLATED: NO

POINTS OF INTEREST

Origin/geographical distribution: Southern and Central Europe, Mediterranean region, Near East, North Africa. Shrub found on slopes and calcareous hills. **Active substances:** Essential oil (pinene, sabinene, cineole, fenchone, bisabolol,...). **Uses:** Medicinal (vulnerary, digestive, antirheumatic,...). This shrub is also used by herbalists.

SPACING: 20CMS

PLANTING AND PLANT HEALTH

It stands out among the other species of its family (*Lamiaceae*) for its yellow inflorescences.
 Propagation: by seed, cutting.

CHROMATIC CALENDAR

Foliage, Flowering and Fruiting Season											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Color-coded bars representing seasonal activity]											
Cultivation Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Grid for cultivation activities]											
Sowing	[Orange]	Planting	[Orange]	Pruning	[X]						
Treatment Calendar											
JAN	FEB	MAR	ABR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
[Grid for treatment activities]											
Fungicides	[White]	Pesticides	[White]	Fertilizers	[Blue]						

COMMERCIALIZATION

Presentation (L)	Height (cm)	Topiary shapes
CT13 (1)		No

Subchapter 8.3 Commercialization, use and planting

THE SECTOR OF MEDICINAL AND AROMATIC PLANTS IN VALENCIA

The garden sector in Valencia is in continuous expansion. Although producers and crops undergo periodic changes, they adapt both to the growing demands of the local and international markets. Spain and, more specifically, the Valencian Region, have the adequate starting material and environmental conditions to produce medicinal and aromatic plants.

In addition, plant producers (nurseries) have been diversifying the supply of plants, considering both the needs of aromatic plants for landscape revegetation or regeneration, as well as those necessary for public and private gardens and parks. It is not surprising therefore the considerable interest on the part of the consumer (administrations, companies, and individuals) in these plants, which necessarily must obtain a response from nurseries, "garden centers", florists, events (contests, fairs...).

COMMERCIALIZATION

There is no national or international standard regarding marketing regulations for medicinal and aromatic plants. Some regions in Spain and other organizations are working on the development of minimum guidelines that set the quality standards and regulate the marketing for these species. It should be noted that the Technological Standards for Gardening and Landscaping, prepared by the Official Chamber of Agricultural Technical Engineers and Agricultural Experts of Catalonia, are currently disseminated but not mandatory. A homogenization of present and future regulations would be desirable, based on valid criteria on both a national and international level.

In order to elaborate this chapter on medicinal and aromatic plant species the following frameworks have been considered: Technological Standards for Gardening and Landscaping (NTJ 07) and the Quality Regulations for Ornamental Plants for their distinction with the "CV" 8 (Community of Valencia) quality mark published by the Ministry of Agriculture, Fisheries and Food of the Valencian Community (DOGV 4782, 2004) on June 24, 2004.

The technical regulations applicable to medicinal and aromatic plants is divided between NTJ 07F (shrubs), NTJ 07G (bushes and sub-shrubs) and NTJ 07J (ground cover plants).

Shrubs (NTJ 07F)

Shrubs are classified according to their structure as indicated in the following Figure 8.3.1.

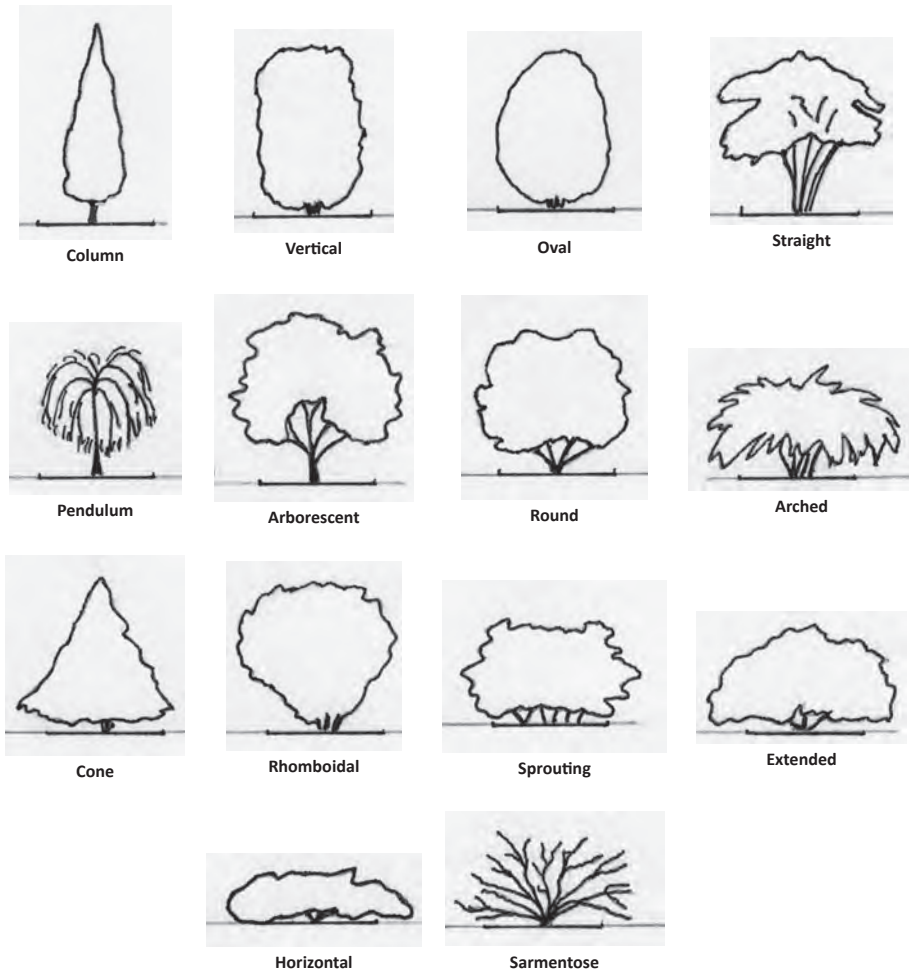


Figure 8.3.1. Shrub structure (NTJ 07F)

Quality Specifications

Shrubs must be supplied with identification and proof of purity level in relation to the genus, the species and where applicable, the cultivar.

They may be grown on field conditions or in containers, considering the specific needs of the species-cultivar, age, and location.

They will be subjected to pruning and/or formative pruning if necessary.

Open Field cultivation

They will be supplied in bare root or root ball form. Likewise, they can be cultivated in the field to later be potted in a container or vice versa; in the latter case, they must remain in the container for a minimum period of one cycle to form a suitable root ball system.

The planting framework (spacing) in the field will be determined by the needs derived from the species-cultivar, mechanization system, soil texture, irrigation system and age of the plant when it is uprooted.

If the plant is supplied with a root ball, it will be formed exclusively with the soil adhered to the roots after extraction, without adding any other soil or substrate.

Container cultivation

When cultivating plants in containers, the spiraling of roots should be carefully avoided. Therefore, depending on the growth rate of the plant, it should be repotted to progressively larger containers every two or three years, except in the case of very slow-growing shrubs.

The substrate used must be of a quality adapted to the characteristics of the species-cultivar, destination of the plant, type of crop, climate of the area, etc., allowing the development of the root system in all its volume. Undesirable residues should be removed in the final plantation.

Dimensions and sizes

The number of branches or main stems influences the quality of the bush. These must sprout from the lower third of the plant, be regularly distributed and present a thickness and length in accordance with the proportions of the rest of the plant.

Shrub aerial dimensions will be based on height (ground level to top) and average crown diameter. The minimum dimension of the root system will be determined by the height of the shrub (in the case of supplying bare root plants). The measurements used for the classification will be those indicated in Tables 8.3.1. and 8.3.2.

Height in cm	Width of root system In cm (minimum)*
10-20	
20-40	20
40-60	20/25
60-80	25
80-100	30
100-125	35
125-150	40
150-175	45
175-200	50
200-225	
225-250	

* Refers to bareroot plants

Table 8.3.1: Minimum size of the root system in relation to shrub height (NTJ07F)

Average crown diameter in cm
10-20
20-40
40-60
60-80
80-100

Table 8.3.2: Size categories of shrubs according to the diameter of their crown (NTJ07F)

For medicinal and aromatic plants supplied in root ball or container formats, the following dimensions will apply:

Root ball plant			Container plant		
Height(cm)	Minimum diameter of root ball (cm)	Minimum depth of root ball (cm)	Height (cm)	Minimum volume of container (L)	Upper and lower minimum diameter of container (cm)
20-40	20	15	20-40	1.5-2	15-16
40-60	20-25	15-20	40-60	2	16
60-80	25	20	60-80	3	18
80-100	25-30	20-25	80-100	3-5	18-22
100-125	30-35	25-30	100-125	5	22
125-150	35-40	30	125-150	7.5	24
150-175	40-45	30	150-175	10	26
175-200	45-50	35			
200-225	50-55	35			
225-250	55-60	40			

Table 8.3.3: Minimum Root ball and Container dimensions (NTJ07F)

Bushes and subshrubs (NTJ 07G)

Bushes and subshrubs can be classified according to:

- Size of the plant
- Degree of lignification
- Location of resistance shoots and buds
- Persistence of foliage

Therefore, the following groups in table 8.3.4. are considered

Group		Size (cm)
Bushes (small shrubs)	Woody plants	50-100
Soft wood shrubs	Plants whose stems are not completely lignified	> 50
Large sub shrubs	Plants that are only woody at their base	> 50
Chamaephyte	Small bushes and subshrubs	< 50

Table 8.3.4: Classification of bushes and subshrubs

Quality Specifications

Bushes and subshrubs must be supplied with identification and level of purity in relation to the genus, the species and where applicable, the cultivar.

They are usually grown in containers, considering the specific needs of the species-cultivar, age and location. In some cases, they are first grown under field conditions and later potted. Some large plants are marketed in bare-rooted or in root ball form.

They will be subjected to pruning and/or staking if necessary.

Plants cultivated in containers

Containers that prevent a root spiraling must be used. In relation to the growth of the plant, they should be repotted to bigger containers.

Types of containers:

- Container
- Truncate cone pot
- Truncated pyramid pot
- Seed plug tray (for seedlings and rooted cuttings)

A containerized medicinal or aromatic plant should have been transplanted and grown long enough for new roots to develop in such a way that the root ball will hold its shape inside the container and remain compact when the container is removed.

Roots should not show symptoms of spiraling and should not protrude significantly through drainage holes.

The substrate must be of a quality adapted to the characteristics of the species-cultivar, destination of the plant, type of crop, climate of the area, etc., allowing the development of the root system in its entire volume. Undesirable residues in the final plantation should be avoided.

In the nursery, the containers must be sufficiently separated to ensure that all the plants receive enough light and avoid signs of etiolation.

The dimensions of bushes and subshrubs cultivated in containers must be related to the size of the container used. A guideline is outlined in Table 8.3.5.

Volume of recipient (liters)	Diameter of recipient (cm)	Minimum width of plant (cm)
0.5	10-11	10
0.5-1	11-13	12
1-1.5 or 2	13-15	14

Table 8.3.5: Relation between container size and width of plants

For the classification of bushes and subshrubs, the scale of plant height or width is usually followed using these three ranges: 5/10, 10/20 and 20/30 cm.

There must be an appropriate balance between the aerial part of the plant and its underground part (roots and root ball). The aerial part must cover, as a minimum, the surface of the container.

Groundcover plants (NTJ 07J)

Ground cover plants can be classified according to:

- Bearing or shape of the plant
- Extension system or floor covering
- Persistence of foliage

Quality Specifications

Groundcover plants must be supplied with identification and level of purity in relation to the genus, the species and where applicable, the cultivar.

They can be grown in the field or in a container, considering the needs of the species-cultivar, age and location. In some cases, they are first grown under field conditions and later potted.

They will be pruned, trimmed, grafted and or repotted if necessary.

Cultivation in containers

Containers that prevent root spiraling must be used. As plants grow, they should be repotted to bigger containers.

Types of containers:

- Container
- Truncate cone pot
- Truncated pyramid pot
- Seed plug tray (for seedlings and rooted cuttings)

A containerized plant should have been grown long enough for new roots to develop in such a way that the root ball will hold its shape inside the container and remain compact when the container is removed.

Roots should not show symptoms of spiraling and should not protrude significantly through drainage holes.

The substrate must be of a quality adapted to the characteristics of the species-cultivar, destination of the plant, type of crop, climate of the area, etc., allowing the development of the root system in its entire volume. It must not leave undesirable residues in the final plantation.

Size and proportions

The dimensions of the aerial part of the ground cover plants are based on the width of the plant and, additionally where appropriate, on the length of the stems and their number. These all depending on the species, the volume of the root ball or the recipient/container.

Plant width (cm)	Number of stems
5-10	1
10-20	2
20-30	3-4
30-40	5-7
40-60	8-12
60-80	
80-100	

Table 8.3.6: Measurements to classify ground cover plants (aerial part)

The root ball of the underground part of groundcover plants must be proportional to the type of growth of the species or the cultivar, the development of the plant, and the soil conditions. Therefore, for

containerized plants, the relationship between the width of the plant and the volume of the container should be considered, as shown in the following Table 8.3.7.

Plant width (cm)	Min. volume of container (liters)
5-10	0.5
10-20	0.5-1
20-30	1-1.5
30-40	1.5-2
40-60	2-2.5
60-80	3-5
80-100	5-7.5

Table 8.3.7: Minimum volume of container in relation to plant width

General considerations

Supply

The plants considered in this chapter may only be supplied by authorized suppliers and following quality criteria that will refer to both the aerial and underground parts. They must be healthy, well-formed, and sufficiently hardened off to ensure their survival in their final placement.

Where appropriate, plants must be marketed with a label, clearly indicating the cultivar (following international naming standards), as well as the description of the cultivar, its most important distinguishing characteristics, the propagation technique that was carried out, and the main indications for plant conservation.

In the case of a plant with a single stem supplied in a container, the stem must be centered.

Plants supplied in containers must have a volume of substrate and roots equivalent to 90-95% of the total volume of the container. They must not show cut roots with a diameter greater than 2 cm.

Plants supplied bare root must come from areas with environmental conditions (especially regarding temperature regime) similar to the final planting area.

Plant Health

Plants must not show any signs of disease or be affected by pests or diseases in their leaves, stems and trunks. The branches and foliage should be turgid, as well as the roots. They must not show deterioration or dryness and the roots cannot present symptoms of rot.

The substrate must be in all cases (plants supplied in plugs and containers) free of weeds, mosses, and lichens.

There should be no harmful organisms as a result of quarantine.

Species	Foliage	Basic shape	Plant height (cm)	Plant width (cm)	Min. stems	Container volume (L)	Interest	Presentation	Observations
SHRUBS (NTJ 07F)									
<i>Lavandula dentata</i> L.	Evergreen	Round	20 min.		3	1.5	Flower/leaf	Container	Aromatic/hedge
<i>Ricinus communis</i> L.	Evergreen	Round/bush	40 min.		1+	5	Flower/leaf	Container	
<i>Rosmarinus officinalis</i> L.	Evergreen	Round	20 min.		3	1.5	Flower/leaf	Container	Aromatic/hedge
<i>Salvia microphylla</i> Kunth.	Evergreen	Round	30 min.		3	1.5	Flower	Container	
<i>Sambucus nigra</i> L.	Deciduous	Round/bush	50 min.		3	3	Flower/fruit	Container /bare root.	Hedge
BUSHES AND SUB SHRUBS (NTJ 07G)									
<i>Artemisia absinthium</i> L.	Semi-dec.	Subshrub	30-90	30-60			Leaf		Aromatic
<i>Helichrysum stoechas</i> (L.) Moench.	Evergreen	Chamaephyte	40-50	60-90			Flower/leaf		Aromatic
<i>Hyssopus officinalis</i> L.	Semi-dec	Chamaephyte	20-60	60-100			Flower		Aromatic
<i>Lavandula angustifolia</i> Miller	Evergreen	Bush	50-100				Flower/leaf		Aromatic
<i>L. dentata</i> L.	Evergreen	Bush	60-100				Flower/leaf		Aromatic
<i>L. latifolia</i> Medicus	Evergreen	Chamaephyte	30-80				Flower/leaf		Aromatic
<i>L. stoechas</i> L.	Evergreen	Bush	30-100				Flower/leaf		Aromatic
<i>Micromeria fruticosa</i> (L.) Druce	Evergreen	Chamaephyte	20-60				Flower/leaf		Aromatic
<i>Origanum majorana</i> L.	Evergreen	Subshrub	60-80	30-45			Leaf		Aromatic
<i>Ruta graveolens</i> L.	Evergreen	Subshrub	60-100	50-75			Leaf		Aromatic.
<i>Salvia officinalis</i> L.	Evergreen	Bush	50-80	60-90			Flower		Aromatic
<i>Santolina chamaecyparissus</i> L.	Evergreen	Chamaephyte	40-60	60-100			Flower/leaf		Aromatic
<i>Satureja montana</i> L.	Evergreen	Chamaephyte	10-40	10-20			Flower		Aromatic
<i>Thymus vulgaris</i> L.	Evergreen	Chamaephyte	10-30	40-60			Flower		Aromatic
GROUND COVER PLANTS (NTJ 07J)									
<i>Helichrysum stoechas</i> (L.) Moench.	Evergreen	Subshrub	40-50	60-90			Flower/leaf	Container	Aromatic
<i>Mentha x piperita</i> L.		Vigorous	30-50	70-100			Leaf	Container	Arom./Rhizome plant
<i>M. pulegium</i> L.		Vigorous	2-10	50-90			Flower	Container	Arom./ not walkable
<i>Rosmarinus officinalis</i> L. 'Prostratus'	Evergreen	Shrub creeper	10-15	100-150			Flower/leaf	Container	Aromatic
<i>Santolina chamaecyparissus</i> L.	Evergreen	Bush	40-60	60-100			Flower/leaf	Container	Aromatic
<i>Thymus vulgaris</i> L.	Evergreen	Subshrub	25-30	40-60			Flower	Container	Aromatic

semi-dec = semi deciduous; arom. = aromatic

Table 8.3.8: Measurements to classify ground cover plants (aerial part)

Regulation of Quality of Ornamental Plants for its distinction with the quality mark "CV"

The commercialization of ornamental plants under the "CV" quality mark must fulfill the following requirements:

- Origin of the plants from an authorized nursery, which meets the legal requirements, especially the provisions of the regulation.
- Compliance with the characteristics listed in Table 8.3.9.

- Presentation of optimal phytosanitary conditions and absence of pests and diseases showing the plants typical development of the variety, healthy and clean appearance, absence of dry flowers, absence of wounds other than those of the crop, absence of chlorosis symptoms, well developed root system and balanced with the aerial part.
- A minimum tolerance is admitted when batches of plants destined for commercialization are evaluated.

The Regulation also refers to the minimum conditions that farms must meet:

- The cultivation techniques and the management of the facilities must meet minimum criteria in terms of environmental respect: maximum energy savings, rational use of resources (water, nutrients, phytosanitary products, recyclable materials, proper waste management), and monitoring of standards of recognized environmental management.
- If plant material from other farms is used, they must be duly authorized and registered, where appropriate, in the Register of Nursery Plant Producers, accompanied by the material with its corresponding phytosanitary certificate.
- The farm staff must be properly trained, especially in technical management and the application of phytosanitary products.
- A register must be kept and the control of other records (maintenance of facilities and equipment, inputs, and outputs of phytosanitary products...).

Regarding the marketing conditions, the following must be considered:

- Presentation, considering the general aspects indicated above.
- Labeling of each unit of sale to the public (name of the plant, trademarks, in addition to what has been established by current legislation).
- Transport that guarantees adequate conditions for its subsequent planting and that preserves the integrity of the plant during the journey and handling process.

Species				Plant height (cm)	Plant width (cm)	Diameter of container (cm)
<i>Rosmarinus officinalis</i>	<i>R. officinalis</i> 'Prostrata' / <i>Lavandula officinalis</i>	<i>Santolina chamaecyparissus</i>	<i>Thymus vulgaris</i> 'Compacta' and 'Aureus'			
x				15-25	15-20	12-14
x				20-35	20-30	18
x				30-45	25-35	23
	x			15-25	15-20	12-14
	x			25-35	20-30	18
	x			20-30	25-40	23
		x	x	15-20	15-20	12-14
		x		20-30	20-30	18
		x		30-40	30-40	23
			x	15-30	20-30	18
			x	25-40	30-40	23

Table 8.3.9: Dimensions of commercialized plants (DOGV, 2004)

Subchapter 8.4

Maintenance

Medicinal and aromatic plants, especially Mediterranean varieties adapted to harsh environmental conditions (poor soils, low water supply, extreme temperatures...), require low maintenance. On many occasions, plant replacement is low as many species can be maintained for several years in their location.

For maintenance purposes, medicinal and aromatic plants can be grouped according to their water needs:

- medicinal plants for “non arable land” (rainfed)
- medicinal plants for “arable land”

The first group of medicinal plants for non-arable land (rainfed) include:

- *Artemisia absinthium* L. (Grand wormwood)
- *Helichrysum stoechas* (L.) Moench. (Mediterranean strawflower)
- *Artemisia absinthium* L. (Grand wormwood)
- *Lavandula angustifolia* Miller (True lavender/English Lavender)
- *Lavandula dentata* L. (Fringed lavender/French lavender)
- *Lavandula dentata* (Fringed lavender/French lavender)
- *Lavandula latifolia* Medicus (Broadleaved lavender/Spiked Lavender)
- *Lavandula stoechas* L. (Spanish lavender/topped lavender)
- *Micromeria fruticosa* (L.) Druce (whiteleaved savory)
- *Nepeta cataria* L. (Catnip)
- *Origanum majorana* L. (Marjoram)
- *Origanum vulgare* L. (Oregano)
- *Rosmarinus officinalis* L. (Rosemary)
- *Ruta graveolens* L. (Rue/Common rue/ Herb-of-grace)
- *Salvia microphylla* Kunth. (Baby sage/blackcurrant sage)
- *Salvia officinalis* L. (Common sage)
- *Salvia sclarea* L. (Clary sage)
- *Santolinachamaecyparissus* ssp. *chamaecyparissus* L. (Cotton lavender)
- *Satureja montana* L. (Winter Savory/mountain Savory)
- *Sideritis angustifolia* L. (Ironwort/Mountain tea)
- *Thymus vulgaris* L. (Thyme)

The second group of medicinal plants for arable land include:

- *Acanthus mollis* L. (Bear’s breeches/sea dock/sea holly/oyster plant)
- *Chamomilla recutita* (L.) Rauschert sweet chamomile)
- *Lippia triphylla* (L’Hér.) O.Kuntze (Lippia)
- *Melissa officinalis* L. (Lemon balm)
- *Mentha x piperita* L. (Peppermint)
- *Mentha pulegium* L. (Pennyroyal/ Pennyrile/mosquito plant)
- *Mentha spicata* L. (Spearmint)
- *Ricinus communis* L. (Castor oil plant)
- *Sambucus nigra* L. (Elder/elderberry/European black elderberry)

It is essential to consider these two groups when deciding on irrigation needs, nutritional needs (fertilization), pruning, mowing, cutting and phytosanitary protection, etc.

MEDICINAL PLANTS FOR IRRIGATED LAND

The plants considered for arable land have similar needs to other ornamental plants with high water demands: higher nutrient supply (fertilization) due, logically, to their higher growth rate; greater control of pests and diseases (more intensive control, for example by using phytosanitary products); and greater control of aerial development through pruning or cutting back, due to the more intense rate of leaf development.

Pruning or mowing

Special care must be taken with the group of plants belonging to the genus *Mentha*. Due to their creeping growth habit (main – pennyroyal- or secondary – mint and spearmint) their extension must be limited in the garden area. Otherwise, they compete with other ornamental plants or become “weeds” due to their ease for forming rhizomes and stolons and, therefore, of vegetative propagation. The pruning of these plants can be severe (mowing). This implies cutting a few centimeters from the ground and repeat several times a year if necessary. In addition, mowing after the end of the flowering period is always recommended.

As for the *Lippia* genus, it is important to observe the dimensions of the bush it forms. Its long shoots can give the plant an ungainly appearance. It is easy to prune and allows, in ornamentally appropriate cases, the formation of small trees.

Fertilizing

Very little information is available regarding specific fertilization guidelines for medicinal and aromatic plants when they are used for ornamental purposes. However, the recommendations that are available when these plants are cultivated for agricultural purposes (for instance to produce leaves, flowers or essential oils) can be somehow of interest also in the garden. In any case, medicinal and aromatic plants adapt well to what is already established for other ornamental plants that can be found in the garden, logically depending on the environmental characteristics (soil, water, climate).

Irrigation

The species of plants outlined in this section need a regular supply of water. They adapt well to any irrigation system; however, drip irrigation is preferred as it saves water. It also deters weed development, reduces the appearance of spots on the leaves (caused by a sprinkler irrigation system) and the settling of dust (quite common to the area) or pollution in urban areas (with the subsequent damage on the leaves and the whole appearance of the garden). However, if used correctly, a sprinkler irrigation system for this group of plants is acceptable but paying special attention to the flowering period. If care is not taken possible rotting of inflorescences, higher incidence of phytosanitary problems due to the humidity-heat combination can occur.

Likewise, and as a general rule (already established for other plants), it is interesting to avoid sprinkler irrigation when the sun is at its highest point (it may cause burns on the leaves). Watering in strong winds should also be avoided (less irrigation effectiveness). Poor quality water for irrigation is not recommended, especially in situations of handling water with a high salt content.

Phytosanitary protection

These plants do not present excessive phytosanitary problems. As ornamental plants, they present us with even greater ease in their handling. However, its application (used to obtain better quality leaves or essences) is limited due to possible repercussions in human health and residues.

A substrate that does not provide good drainage can provoke soil fungi. To avoid this pathology, the soil must not get waterlogged. The use of fungicides is acceptable as long as it is viable (technically and economically).

Since these plants are considered for irrigated land (greater leaf volume, tender leaves, intense sprouting...) they are more prone to attacks by aphids and beetles (*Chrisolina sp.*) among other pests. They can be controlled with well-known and widely used phytosanitary products, both in garden and crop conditions. This is also supported by information provided in the first paragraph regarding their limitations due to possible residues.

PLANTS FOR NON-ARABLE LAND (RAINFED PLANTS)

Rainfed medicinal and aromatic plants require less maintenance than those described in the previous section:

- Lower contribution of nutrients (fertilization) due, logically, to its lower rate of growth.
- Less control of pests and diseases.
- Less need for pruning or mowing, due to their low rate of leaf development.

Pruning or mowing

The pruning of these plants can be severe (mowing). This implies cutting a few centimeters from the ground as long as the main wood is not too old (the plants can be kept for several years in the garden) and the basal buds show signs of sprouting. Mowing that is carried out on ornamental plants prevents the appearance of a woody bush with excessively dry and lignified areas. Care must be taken with those species that allow the formation of roundish aerial part (*Origanum sp.*, *Santolina sp.*; *Thymus sp.*...). Mowing at the end of the flowering period is always recommended.

In the case of wormwood, mowing or pruning can impede it from invading nearby areas of the garden due to its exuberant development under suitable conditions. The fringed lavender and the *Lavandula semidentata* (semi-fringed lavender) have similar characteristics as the wormwood, pruning being especially important in the latter case because the stem becomes lignified rather quickly and the vegetative buds lose vigor. Mowing or pruning should also be carried out with the rosemary of the *Prostrata* group, which stands out for its ability to create a creeping carpet effect.

Fertilizing

As mentioned above, very little information is available regarding fertilization for medicinal and aromatic plants when they are used for ornamental purposes. However, information from their agricultural use can be of partial interest when they are planted in a garden.

In any case, they are relatively undemanding plants in terms of nutrients, which, in most cases adapt well to what is established for the maintenance of other ornamental plants. However, if there is an excess of

fertilization, a reinforcement of the vegetative activity can occur to the detriment of the flowering patterns. The influence of the richness of the soil in certain elements (fundamentally trace elements) on the coloration of the flowers is also well known since they participate in the composition of the pigments.

Irrigation

Plants in this group do not need a regular supply of water. However, they adapt well to sprinkler or drip irrigation, as long as proper drainage is ensured to avoid waterlogging in the soil. Great care must be taken as these plants are sensitive to fungal attacks from the soil, especially in conditions of high humidity. The fungi that affect the stems of the plant are very aggressive.

Regarding special recommendations for these irrigation systems, it is advisable to refer to previous paragraphs.

In the revegetation and restoration of slopes, it is interesting to provide the plants used (generally rainfed species) with a support irrigation (e.g., drip) to facilitate their initial establishment and maintenance. The special characteristics of slopes (gradient, poor soil, etc.) make it difficult for these plants to survive and therefore, it is recommended to fix or stabilize the soil (for instance with biodegradable meshes) and to keep the humidity of the soil (for instance by adding a mulch).

These plants are also ideal for the composition of non-irrigated gardens (dry gardening), combined with other herbaceous and/or woody species.

Phytosanitary protection

In addition to what has been established for arable plants, it should be mentioned that medicinal and aromatic plants in general (some more than others) are capable of limiting the development of some pests and diseases by storing certain active substances in their roots and aerial parts. In some cases, the insecticidal, anti-mite, fungicidal or anti-nematodes properties, of some species (wormwood, rosemary, sage...) is known. Some even limit the development of weeds due to allelopathic effects (wormwood); an interesting factor when designing and considering the maintenance of a garden.

The appearance of symptoms due to fungal attack (sudden deaths or drying of plants) that affect the stems of plants, or the root system are quite prominent. The most practical way to combat these problems is to eliminate the affected plant and the neighboring ones, disinfect the soil and replant with other species (varying the family and growth habit, if possible).

Care must be taken when planting on land where woody species affected by fungi have grown (e.g., *Armillaria*), as medicinal and aromatic may be affected.