

***Acacia nilotica* (L.) Del.**
Fabaceae (Leguminosae)



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■ **Morphological Description**

Small tree, 2.5-14 m tall with glabrous or tomentose branches, quite variable in many aspects; bark thin, rough, fissured, deep red brown; branchlets purple-brown, shortly or densely gray-pubescent, with lenticels; spines gray-pubescent, slightly recurved, up to 3 cm long; leaves often with 1-2 petiolar glands and other glands between all or only the uppermost pinnae; pinnae 2-11 (-17) pairs; leaflets 7-25 (-30) pairs, 1.5-7 mm long, 0.5-1.5 mm wide, glabrous or pubescent, apex obtuse; peduncles clustered at nodes of leafy and leafless branchlets; flowers bright yellow, in axillary heads 6-15 mm in diam.; involucrel from near the base to about half-way up the peduncle, rarely higher; calyx 1-2 mm long, subglabrous to pubescent; corolla 2.5-3.5 mm long, glabrous or pubescent outside; pods especially variable, linear, indehiscent, 8-17 (-24) cm long, 1.3-2.2 cm broad, straight or curved, glabrous or gray-velvety, turgid, blackish, about 12-seeded; seeds deep blackish brown, smooth, subcircular, compressed, areole 6-7 mm long, 4.5-5 mm wide. Fl. Oct.-Dec.; fr. Mar.- June.

■ **Geographical Distribution**

Local: The Nile Delta, Nile Valley, Oases, Sinai and Western Desert.

***Acacia nilotica* (L.)**

Del., Descr. Egypte, Hist. Nat. 79 (1814)
Mimosa nilotica, *Acacia arabica* (Lam.) Willd.,
Acacia adansonii Guill. & Perr., *Acacia adstringens*
(Schumach.) Berhaut

Names

Arabic: Sant سنط

English: Prickly acacia, black thorn, Egyptian thorn, Nile acacia, gum arabic tree.

French: Acacia à gomme, Acacia d'Égypte.

Regional: Egypt.

Global: Egypt, Sudan and some Nile basin countries. South of Mozambique and Natal; apparently introduced to Zanzibar, Pemba and India; Arabia

■ **Ecology**

The plant grows on the banks of canals crossing the Delta and the Nile Valley. It was cultivated in the past, though cultivation has stopped. The relicts of this species are occasionally seen along the canals near the Nile River.

■ **Status**

Acacia groves growing in the Nile region in Egypt were replaced centuries ago by the date palm groves. Despite this, the tree was reputed for its value as a source for agricultural tools such as the hoe, plough, etc. With the mechanisation of agriculture, the plant was neglected. Additionally, the need of the land occupied by the trees, caused them to be removed. Nowadays, the tree is not as common as before. It could be considered as endangered, especially due to its geographical scarcity.

■ **Part(s) Used**

The fruit, the bark and the leaves.

■ **Collection**

In flowering and fruiting stages.

■ **Preparations**

Infusion, decoction and powder.

■ Use

Oral.

■ Constituents

The fruit: contains a high percentage of phenolic constituents consisting of m-digallic acid, gallic acid, its methyl and ethyl esters, protocatechuic and ellagic acids, leucocyanidin, m-digallic dimer 3,4,5,7-tetrahydroxy flavan-3-ol, oligomer 3,4,7-trihydroxy flavan 3,4-diol and 3,4,5,7-tetrahydroxy flavan-3-ol and (-) epicatechol. Fruit also contains mucilage and saponins.

The bark: is rich in phenolics consisting of condensed tannins and phlobetannin, gallic acid, protocatechuic acid pyrocatechol, (+) – catechin, (-) epigallocatechin-5,7-digallate.

The leaf: contains apigenin, 6-8-bis-D-glucoside, and rutin.

■ Pharmacological Action and Toxicity

Fruit and bark extracts showed molluscicidal activity against the two snail hosts of *Schistosoma*. Also, antihyperglycemic activity was observed. The plant extract showed stimulation of a rat's uterus at different stages of sex cycle, antimicrobial activity, blocking platelet aggregation in a dose-dependent manner using different agents mainly due to blockage of Ca²⁺ channels, and an inhibitory effect on carrageenan induced paw edema and yeast-induced pyrexia. It also produced a significant increase in the hot plate reaction time in mice. Analgesic and antipyretic activities may be attributed to the phenolic constituents present.

■ Pharmacopoeia

Not available

■ Phytopharmaceutical Products

Not available

■ Traditional Medicine and Indigenous Knowledge

History: The pods were used by the ancient Egyptians. Young pods produce a very pale tint in leather, notably goat hides. The fruit was given to combat diarrhoea, haemorrhage, as a sedative in labour, and as a cure for sore gums and loose teeth. Egyptian Nubians believe that diabetics may eat

unlimited carbohydrates as long as they also take a teaspoonful of powdered pods before breakfast. The leaves were chewed to stop nausea.

■ Traditional Medicinal Uses

- Anti-cancer and anti tumours
- Antiscorbutic
- Astringent
- Diuretic
- Intestinal pains and diarrhoea
- Nerve stimulant
- The plant is also known to be used for colds, congestion, coughs, dysentery, fever, gallbladders, hemorrhages, leucorrhoea, ophthalmia, sclerosis, smallpox and tuberculosis.

Other uses of the plant: The plant has an economic importance due to its high content of polyphenolics. The plant is used for tanning and dyeing leather black, tooth brushes (chewsticks), trees tapped for arabic gum. Because of its resins, it repels insects and water.

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***Acacia tortilis* (Forsk.) Hayne**
Leguminosae (Mimosoidae)



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■ Morphological Description

Medium umbrella-shaped tree 4-15 m tall, often with several trunks, reduced to a small wiry shrub less than 1 m tall under extremely arid conditions. Two types of thorns: straight and white, or small, hooked and brownish. Leaves up to 2.5 cm long with 4-10 pairs of pinnae, each with ca 15 pairs of minute leaflets. Flowers white, aromatic, in small clusters. Pods flat, glabrous, coiled into a spring-like array. Flower initiation in May-June, fruit in July, but ripening from November through to February.

■ Geographical Distribution

Local: The Nile Delta, Nile Valley, Oases, Sinai and Western Desert.

Regional: Middle East and Egypt.

Global: Native to much of Africa and the Middle East.

■ Ecology

This species ranges from subtropical desert to dry through tropical desert to very dry forest life zones. The umbrella tree is reported to tolerate annual precipitation of 10-100 mm, an estimated annual temperature of 18-28 °C and pH of 6.5-8.5. This species tolerates hot, arid climates with temperatures as high as 50 °C. It is best adapted to the lowlands. It thrives where rainfall is up to 1,000 mm. It is also extremely drought resistant and can survive in climates with less than 100 mm annual rainfall with long, erratic dry seasons. The tree favours alkaline soils. It grows fairly well in shallow

Two subspecies occur in Egypt:

***Acacia tortilis* (Forsk.)**

Hayne, Getreue Darstell. Gew. 10, t. 31 (1827).

Syn. *Mimosa tortilis* Forssk., Fl. Aegypt.- Arab. 176 (1775).

***Acacia raddiana* (Savi)**

Brenan, Kew Bull. 12:87 (1957).

Syn. *Acacia raddiana* Savi, Alc. Acacie Egiz. 1 (1830).

Names

Arabic: Sayaal سيال, Talh طلع Samor سمر

English: Umbrella Thorn, Israeli Babool

soil, less than 0.25 m deep, though it develops long lateral roots. In shallow soil, the plants remain shrubby and must be widely spaced to allow for their lateral root growth.

■ Status

The fruit is collected upon complete ripening.

Storage: fruit is packed in large sacs of guts or cotton and ranked onto wooden tables in dry and dark places. The place should have a good ventilation system and must be away from insects and rodents.

■ Part(s) Used

The pods, bark and wood.

■ Collection

In all stages.

■ Preparations

Infusion, decoction and dust.

■ Use

Oral.

■ Constituents

It is reported that pods contain close to 19 % protein, 2.5 % fats, 46.5 % carbohydrates, 5.1 % minerals and 20.1 % crude fibre. Leaves contain flavonol glycosides, ellagitannin and galloyl

glucoses.

■ Pharmacological Action and Toxicity

The plant showed powerful molluscidal and algicidal activities.

■ Pharmacopoeia

Not available

■ Phytopharmaceutical Products

Not available

■ Traditional Medicinal Uses

- Anthelmintic
- Antidiarrhoea
- Asthma diseases
- Pulmonary diseases
- Vermifuge and dusted onto skin ailments.

Other uses of the plant: the timber is used for fenceposts, firewood, furniture and wagonwheels. The prolific pods made good fodder for desert grazers and the foliage is also palatable. The gum, said to be edible, was used as a poor man's gum arabic. The tree has been recommended for reclaiming dunes. The thorny branches can be used to erect temporary cages and pens. The bark is a good source of tannin and used in tanning.

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***Alhagi graecorum* Boiss**
Fabaceae



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■ Morphological Description

It is a deep rooted, rhizomatous, perennial shrub, with roots that can extend six to seven feet into the ground. The spiny, intricately-branched shrub reaches 1.5 to 4 feet in height. The plant, which is greyish green and hairless, has simple, entire leaves that are alternately arranged. The leaf shape is oval to lance-shaped. The small pea-like flowers are pinkish purple to maroon and are borne on short, spine-tipped branches that arise from the leaf axils. The reddish-brown to tan fruits are considered between the seeds, with a short narrow beak at the end.

■ Geographical Distribution

Local: Common in all the phytogeographical regions of the country.

Regional: Algeria, Egypt, Libya, Niger and Suddan.

Global: Native to North Africa, Middle East and South East Europe. It is also found in Russia, Iran, Iraq and Saudi Arabia.

■ Ecology

It occurs mainly in deep moist soil, but also in dry, rocky or saline soils. The plant is abundant along river banks, canals and irrigation ditches, and it sometimes spreads into cultivated fields.

■ Status

It is unpalatable and injurious to some animals.

***Alhagi graecorum* Boiss,**

Alhagi mannifera Jaub. & Spach, *Alhagi maurorum* sensu auct. , *Alhagi toumefortii* Helder. (Medic)

Names

Arabic: Aqool عاقول- شوك الجمال

English: Cernel thorn, Manna tree, Persian manna plant.

■ Part(s) Used

All plant parts including the roots

■ Preparations:

Decoction

■ Use

Oral, ointment

■ Constituents

The plant contains carbohydrates, flavonoides, sterols, resin, anthraquinones and saponines. All plant parts contain volatile oil except for the roots.

■ Pharmacological Action and Toxicity

The plant grown in wet soil lacks the cardio tonic activity characteristic of the same plant grown in very dry sandy soil. Plant tincture increases the amplitude of beat and the cardiac output is augmented in spite of any slowing that may occur. Injection into a dog lowered the blood pressure.

■ Pharmacopoeia

Not available

■ Phytopharmaceutical Products

Not available

■ Traditional Medicinal Uses

- Analgesic
- Anti-tussive
- Anti haemorrhoides
- Anti-rheumatic
- Aphrodisiac
- Diuretic
- Laxative

Other uses of the plant: Not available

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***Ammi majus* L.**
Apiaceae (Umbelliferae)



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■ Morphological Description

Glabrous annual plant with much branched stem, erect, ridged, 30-100 cm in height. Leaves are greenish-glaucous, triangular ovate or ovate-oblong with long petioles, basal leaves grow in rosette, umbels 8-50 rays with small white flowers with indented petals, involucre with numerous pinnatifid bracts very elongated towards the tip. Fruit is 105 mm, small, oblong, prominently ribbed, ovoid achenes of 1.5-2 mm, laterally compressed, forming 2 small sized mericarps surrounded by a disk shaped stylopod and 2 divergent curved styles, persisting carpophore on inflorescence after fruit fall.

■ Geographical Distribution

Local: Fields of winter crops in the Nile Delta and Valley, also in the Oases and the Mediterranean region.

Regional: North Africa; all over the countries of the region.

Global: Middle East, Europe and North Africa.

■ Ecology

The plant grows as a weed in the fields of winter crop cereals like wheat and barley. It is considered a bad weed in these fields and affects the crop's yield.

■ Status

The plant is fairly common in the Delta Valley fields. The plant is an annual winter weed growing mainly

***Ammi majus* L.**

Ammi majus L. Sp. Pl. ed. 1,246 (1753).

Apium ammi Crantz, Strip. Austr 3: 109 (1767).

Names

Arabic: Khillah خلة .

Killah shaytani خلة شيطاني

Berber: Athrilal, Thalilen, Lattilel, Akhella

English: Bishop's weed

French: Ammi commun

in wheat and barley fields. It is considered a menace to cultivated fields due to its invasive action. However, due to its importance in the pharmaceutical industry, it has been cultivated. The companies using the drug import Ammi fruits from Morocco.

■ Part(s) Used

The small ovoid fruit and leaves.

■ Collection

The tiny fruits containing the seeds are picked in late summer before they have fully ripened.

■ Preparations

Infusion, decoction and powder

■ Use:

Oral, external and creams.

■ Constituents

Coumarins and coumarin glycosides. The fruit yields not less than 0.5% of ammoidin (xanthotoxin), 0.3% ammidin (imperatorin), and 0.01% of majudin (bergapten). Furanocoumarins have also been produced by cell suspension cultures of *Ammi majus*.

■ Pharmacological Action and Toxicity

The drug should be used cautiously, since photo-toxic dermatitis (cellular damage) following its use for vitiligo has been reported.

■ Pharmacopoeia

Egyptian Pharmacopoeia 1984.

British Pharmacopoeias 1968, 1973.

■ Phytopharmaceutical Products

Meladinine (Memphis)

Neo-Meladinine (Memphis)

■ Traditional Medicine and Indigenous Knowledge

History: As early as 2000 B.C. in Egypt, the juice of *Ammi majus*, which grows throughout the Nile River valley as a weed, is reported to have been rubbed on patches of vitiligo and patients encouraged to lie in the sun afterwards. Even today, Egyptian herbalists sell a yellowish brown powder made from *Ammi majus* seeds for the treatment of leukoderma. In 1946, a technician from a medicinal research laboratory developed a kidney problem and treated himself with a Middle Eastern herbal remedy, Khella. The technician also had angina, which improved dramatically while he was taking the herb.

It was an Egyptian, Professor Abdel Monem El Mofty, of the Cairo University Medical School Department of Dermatology, who studied Egyptian folk medicine plants and began the development of modern photochemotherapy (PUVA) for vitiligo and psoriasis. In the 1940s, he used crystalline methoxsalen (8-MoP, xanthotoxin) followed by sunlight exposure to treat vitiligo.

■ Traditional Medicinal Uses

- Anti asthmatic.
- Anti-hypoglycemic
- Antispasmodic
- Carminative
- Digestive problems
- Diuretic
- Skin diseases (vitiligo and psoriasis)

Other uses of the plant: The plant is used as a preservative and against Snakebites.

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Anastatica hierochuntica L.



Compiled by Dr. Salima Benhouhou

■ Morphological description

A small annual, between 5 and 10 cm., with a rosette of branches and leaves. The plant, inconspicuous when green and flowering, is more commonly observed in the dry season after it has taken its characteristic woody globose form. The plant curls inward after maturity to form a tight woody ball during drought. The size is variable from 8 to 12 cm. across with some individuals reaching 25 to 30 cm. after a good rainy spell.

The leaves are lanceolate to obovate, covered with dense hairs, roughly toothed, 3 cm. long and 2 cm. wide, falling rapidly.

The tiny flowers are white, sessile, with four petals. The fruit is a hairy, ovoid silicula with two wings. The fruiting plants are hygroscopic, expanding their branches easily when immersed in water.

The flowering takes place in early spring for the northern Algerian Sahara; it can flower at any time after rain in the central Algerian Sahara.

■ Geographical distribution

Local: Common in the Algerian Sahara.

Regional: North Africa.

Global: It is common throughout the Sahara and across Iran and Pakistan.

■ Ecology

A small annual plant that thrives in desert conditions with an average 100 mm. rainfall a year.

Anastatica hierochuntica shows a wide ecological

Anastatica hierochuntica L.

Anastatica: From the Greek anastasis (resurrection), referring to the plant's ability to revive on application of water

Arabic: keff Meriem, schajrat Meriem, schajrat el talk, keff lala Fatma, yedd Fatma, keff el adhra, bint Ennabi, el kemcha, kerchoud

Berber tamkelt

Targui: akaraba

English: St. Mary's flower, resurrection plant, rose of Jericho

French: main de Fatma, rose de Jéricho

soil range: found in sandy-loamy depressions, in non-saline wadi beds, on gravelly-sandy soils, it has also been observed in stony plateaux (regs).

■ Status

According to the IUCN criteria, this saharo-sindian species falls into the "C" category.

Although no problems are reported for the species, human collection near settlements may be a threat in the long term.

As an annual the best conservation method is collecting the seeds and sowing them in nurseries.

■ Part used

The whole plant dried, leaves and seeds. It is picked in the spring and prepared as an infusion, or macerated in water. It is taken internally.

■ Constituents

The whole plant contains flavonoids: luteolin-7-glucoside, isovitexin, kaempferol 7-glucoside, kaempferol 3-rhamnoglucoside, quercetin and lutein. It also contains glucosinolates: glucoiberin and glucocheirolin. Sterols. The fruits contain glucose, galactose, fructose, sucrose, raffinose and stachyose.

■ Pharmacological action and toxicity

Anti-diabetic activity.

The plant is not reported as toxic by nomads and the Tuareg.

■ Pharmacopeias

Not relevant for this species.

■ Pharmaceutical products

Not relevant for this species.

■ Traditional medicine and local knowledge

It is used for colds; reduces the pain of and facilitates childbirth; acts as a pain-killer, an emmenagogue, and for epilepsy.

In Morocco, *Anastatica hierochuntica* is used to ease pain during childbirth. After maceration, the liquid is given to the woman just before giving birth. The plant is considered as bringing good luck.

In the Dra, the plant is used for colds and is taken either as an infusion or as a powder mixed with honey and olive oil.

In Tissint, drops from the sap of the fresh leaves are given to cure various ophthalmic problems like conjunctivitis. An infusion of the plant is said to combat sterility.

In the past, the plant was used for epilepsy.

In Egypt, the dried plant crushed with sugar is taken as a violent purge for jaundice, followed by a milk diet. Use as a pain killer in childbirth is reported in Egypt.

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Relevant to the plant and its uses

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***Anvillea garcinii* ssp. *radiata* Coss. et Dur.**
Compositae (Asteraceae)



Compiled by Dr. Salima Benhouhou

■ **Morphological description**

A small woody shrub, densely branched, 20-50 cm. high. The leaves are green-grey, small, roughly triangular, with a large petiole and strongly toothed limb. The big solitary capitules have a diameter of 3-5 cm., with long ligules. The flowers are all yellow-orange, the outside ones 25 mm. long. The fruit is a non-fleshy; indehiscent prismatic cypsella ('achene' from two carpels). It usually flowers in spring, but can flower throughout the year.

■ **Geographical distribution**

Local: Northern and central Algerian Sahara (mainly the Tassili mountains).

Regional: North Africa.

Global: Endemic of the Sahara.

■ **Ecology**

This long-lived perennial accepts a wide variety of soil conditions and grows on gravelly soils of wadis, on the surrounding regs (rocky plateaux strewn with small pebbles) and in dayas (small sandy-clayey depressions). In the Tassili N'ajjer it is also frequently found on the sandy-clayey soils of small depressions. It thrives in severe climatic conditions with less than 100 mm. rainfall a year.

■ **Status**

According to the IUCN criteria this endemic species falls into the "EN" category. No major threat is reported for this plant. According

***Anvillea garcinii* sp. *radiata* Coss. et Dur.**

Anvillea faurei Gand.

radiata: spreading rays

Arabic: nougd, chadjeret ed dhob

Targui: akadkad

French: anvilléa rayonnante

to the World Conservation Monitoring Centre, several national parks in Morocco and Egypt are contributing to the conservation of *Anvillea radiata*.

■ **Part used**

The capitules, leaves and seeds. The capitules and leaves are collected in early spring; the seeds when ripe, at a later stage.

It is prepared as an infusion taken internally (a teaspoon of dried powder in a glass of water) to treat diabetes, or, in the Djanet area, the young shoots are infused in hot or cold water to treat the same disease. The dried plant, crushed and mixed with either olive oil, honey or crushed dates (to mask the bitterness) is good for colds.

■ **Constituents**

Tannin, oxalate of calcium, saponine, pectine, lactone sesquiterpenic.

Chemical analysis of the aerial parts of *Anvillea radiata* yielded a new germacranolide, 8alpha, 9alpha-epoxyparthenolide, together with two known compounds, 9alpha-hydroxyparthenolide and parthenolid-9-one.

■ **Pharmacological action and toxicity**

No data available in the literature regarding the pharmacological action and toxicity of this plant. It is not considered toxic by nomads in the Algeria Sahara

■ **Pharmacopeia**

Not relevant for this species.

■ **Pharmaceutical products**

Not relevant for this species.

■ Traditional medicine and local knowledge

Taken for colds, diabetes, digestive problems, gastro-intestinal troubles, indigestion, pulmonary affections.

Considered as good pasture, particularly when in flower, it enhances zootechnic performance, favours growth and is regarded by shepherds as tonic and stimulating.

In Morocco, it is taken as an infusion to calm diarrhoea and gastro-intestinal troubles. It is used to treat liver diseases and is taken as a decoction with *Zygophyllum gaetulum*, *Brochia cinerea* and *Warionia saharae*.

The crushed seeds mixed with honey or olive oil are excellent for colds. An infusion of the leaves emulsified in olive oil is used to for rectal injection to treat colds.

Certain herbalists prepare suppositories containing the powdered seeds mixed with nigella, cress and *Maerua crassifolia*. They are good for colds but unsuitable for children and pregnant women.

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***Artemisia herba alba* Asso**
Asters



Compiled by: Dr. Zeineb Ghrabi
Dr. Sand L.R. Al-Rowaily

■ **Morphological description**

The armoise blanche is a perennial, 30-40 cm., with a characteristic smell of thymol, very leafy and with tomentose young branches. The leaves are hairy, silvery, small, deeply bi-pennated, with linear strips. The flowers are all hermaphrodite, packed together in very small capitula, sessile and in bunches. The outside bracts of the involucre are orbicular, hairy and shorter than the inside bracts, which are green on the back, very scarios and glandulous. The fruits are achenes.

The vegetative growth of the armoise blanche takes place in the autumn; the flowering starts in June and basically develops at the end of the summer. Two cytotypes have been discovered in pre-Saharan Tunisia (Ferchichi, 1997): the diploid with the gametic number $n=9$ and the tetraploid with chromosomal number $n=18$. The morphological, biological and ecological features of the two cytotypes highlights differences as to the capitula, corolla and vegetative vigour.

These differences allowed Ferchichi (1997) to consider two varieties for *Artemisia herba alba* in pre-Saharan Tunisia: *Artemisia herba alba* Asso. var. *herba alba* ($n=9$) and *Artemisia herba alba* Asso. var. *desertii* Ferchichi ($N=18$).

■ **Geographical description**

Local: Known from the Tunisian dorsal ridge as far as the deep south.

Regional: North Africa.

Global: The plant is very widely distributed: from

***Artemisia herba alba* Asso.**

Syn. Strip. Arag. 117. 1779 *Artemisia aragonensis* Lam.

Arabic: Chih

French: Armoise blanche

the Canaries and south-eastern Spain in the West as far as Asia, via the whole of North Africa and the Near East.

■ **Ecology**

The armoise blanche develops in bioclimatic stages that range from the upper semi-arid to the lower Saharan. It is found on sandy and silty steppes and on hillsides. It characterises many plant groups in southern Tunisia: the association with *Artemisia herba alba* and *Centaurea acaulis*; the association with *Artemisia herba alba* and *Helianthemum ruficomum*; the association with *Artemisia herba alba* and *Arthrophytum scoparium*.

It has a seasonal dimorphism, losing its wide winter leaves at the beginning of the dry season and replacing them with smaller summer leaves whose anatomical structure is different.

It is fairly dynamic (big production of seeds, high power of regeneration) and a great coloniser (of surfaces left free after the over-exploitation of alfalfa sheets).

■ **Conservation, culture and status**

Widely distributed in Tunisia, it is much sought after for its therapeutic virtues, and is thus subject to frequent, unsupervised picking.

■ **Part used**

The flowery tips, found in herbalists'.

■ **Constituents**

An essential oil of armoise blanche (0.003 to 0.3%) contains santonin, lactones of sesquiterpenic acids, flavonoids, coumarins, pentacyclic triterpens, anthracenoids and tannins.

■ **Traditional medicine**

The armoise blanche is known for its carminative

properties. An infusion of the flowers and leaves is a vermifuge.

Prax (1850, in Le Floc'h, 1983) notes that the armoise blanche mixed with henna and diluted in water can be applied to the head for neuralgia and other pain. He also reports that the plant is used to bandage wounds and for stomach-ache.

Passager et Dorey (1958, in Le Floc'h, 1983) mention that this species is also used for digestive disorders, abdominal pain, colic and liver failure, and to flavour tea.

■ Toxicity

Eating too much armoise blanche has a purgative effect, especially on sheep, and can cause young lambs to die.

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***Asphodelus tenuifolius* Cavan.**
Liliaceae



Compiled by Dr. Salima Benhouhou

■ **Morphological description**

An annual plant, with tubers at the base, from 20 to 30 cm. high. The leaves are not attached to an aerial stem but spring from the underground tuber or bulb, often 15 to 20 cm. long, slightly fleshy, cylindrical, hollow in the middle, glabrous and dark green. The leaves form a circular cluster at the base of the plant. The inflorescence is a simple, raceme, elongated, indeterminate cluster with stalked flowers. The small flowers have six white tepals. The fruits are small capsules with minute black seeds. Flowering takes place in early spring from March to May.

■ **Geographical distributio**

Local: Common in the Algerian Sahara.

Regional: North Africa.

Global: A common plant throughout the whole Sahara.

■ **Ecology**

This small annual plant thrives in desert conditions with an average 100 mm. rainfall a year. It is always found in non-saline wadi beds and has a fairly wide ecological range for soil type, occurring on sand-loamy and on gravelly soils.

■ **Status**

According to the IUCN criteria this saharo-sindian species falls into the "C" category. No conservation problems are reported for this plant which has a high dispersal capacity due to the numerous seeds produced by each individual.

***Asphodelus tenuifolius* Cavan.**

Asphodelus fistulosus L.

Asphodelus: generic name of Asphodel indicating in Latin and Greek several species of Liliaceae, dedicated to the gods of hell and death who were supposed to eat the tubers; *tenuifolius*: narrow-leaved

Arabic: tazia, acheub el ibel, barwaq

Targui: izayan

English: narrow-leaved asphodel

French: asphodèle à petites feuilles

■ **Part used**

The leaves and fruits are collected in spring and prepared by maceration in olive oil; the seeds are crushed. The crushed seeds are taken internally, mixed with honey or olive oil; the liquid obtained from the macerated leaves is used externally as a massage.

■ **Constituents**

Beta-sitosterol, stigmasterol, 1,8-dimethoxynaphthalene, naphthalene and anthraquinone derivatives, linoleic acid.

■ **Pharmacological action and toxicity**

The plant is not reported as toxic by nomads. Eaten in big quantities, it can provoke indigestion.

■ **Pharmacopeias**

Not relevant for this species.

■ **Pharmaceutical products**

Not relevant for this species.

■ **Traditional medicine and local knowledge**

Taken for colds and haemorrhoids (seeds); a febrifuge; used for rheumatic pain.

This small asphodelus is also widely used for various culinary purposes. The leaves are either boiled or cooked in oil, the seeds are crushed and mixed with flour to make bread, and the young shoots are added raw to food to enhance the taste. This plant is little appreciated as pasture.

In Egypt, the seeds are reported to be diuretic and are eaten with yoghurt.

Similar uses as in Algeria are reported for Morocco. It is also used for healing wounds. The seeds are mixed with cereals to make traditional bread and are also eaten as delicacies when mixed with dates. The leaves are fried or boiled and are sometimes put in the sauce for couscous.

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***Calligonum comosum* L'Herit.**
Polygonaceae



Compiled by Dr. Salima Benhouhou

■ Morphological description

A tall woody shrub, reaching 2-3 m. in height, much branched from the base. The branches are dark green, articulate and very quickly lose their small linear leaves. The flowers are found at the base of the nodes and at the ends of the branches. Six small tepals form the perianth with conspicuous red anthers. The fruit is a single circular carpel, not exceeding 1 cm. in diameter and covered with brown-yellow hairs when ripe.

Calligonum comosum produces numerous flowers in the early spring (March, April).

■ Geographical distribution

Local: Well represented in sandy sites in the northern Sahara and rare in the central Algerian Sahara.

Regional: North Africa.

Global: Its general distribution goes from the North African deserts to the desert sands of the Middle East and as far east as the Rajputana desert in western India.

■ Ecology

This hardy shrub grows in arid, sandy ecosystems where the annual rainfall does not exceed 100 mm. A strict psammophil, *Calligonum comosum* thrives on sandy soils, often stabilising the surrounding sand in large hummocks and reaching the water-table with its long taproots.

■ Status

According to the IUCN criteria this saharo-sindian species falls into the "C" category.

***Calligonum comosum* L'Hér. Linn. Soc. i. (1791) 180.** *Calligonum polygonoides* L.

Calligonum: from kallos, beauty, and gonu, a knee-joint (referring to its leafless joint); *comosum*: long-haired

Arabic: ouarach, larta

Targui: aresu

Due to its frequent use, it is threatened, with decreasing populations near settlements. Conservation and propagation measures should be considered for this species.

■ Part used

The young shoots and leaves are picked in spring, prepared as a powder and used externally as an ointment.

■ Constituents

Calligonum comosum is known to be rich in proteins. No other data has been found regarding the active principles of this plant.

Pharmacological action and toxicit

Anti-inflammatory and anti-ulcer action.

■ Pharmacopeias

Not relevant for this species

■ Pharmaceutical products

Not relevant for this species.

■ Traditional medicine and local knowledge

It is used for gastric problems and is frequently used to treat scabies in dromedaries.

The fresh flowers can be eaten. An analysis of its food value has shown the plant to be high in sugar and nitrogenous components. The Tuareg dry the young shoots to prepare a nourishing meal. Its branches make excellent firewood. It is also used for tanning skin.

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Calotropis procera
Asclepiadaceae



Compiled by: Prof. F. M. Hammouda, Prof. S. I. Ismail,
Dr. N. S. Abdel-Azim and Dr. K. A. Shams
Edited by: Prof. K. H. Batanouny

■ Morphological Description

The dried root, freed from its outer cork layer, is called Mudar. It is found in commerce in short quilled pieces about 1/5 to 1/10 of an inch thick and not over 1 1/2 inch wide. Deeply furrowed and reticulated, colour greyish buff, easily separated from periderm. Fracture short and mealy, taste bitter, nauseous, acrid; it has a peculiar smell and is mucilaginous; official in India and the Colonial addendum for the preparation of a tincture. Shrub or small tree with a rough corky bark. Stems producing copious latex when broken. Leaves are glaucous, ± sessile, broad. Flowers purplish pink. Fruits are inflated. Seeds with a pappus of silky hairs. Spreading shrub or small tree to 4 m, exuding copious milky sap when cut or broken; leaves opposite, grey-green, large up to 15 cm long and 10 cm broad, with a pointed tip, two rounded basal lobes and no leaf stalk; flowers waxy white, 5 petals, purple-tipped inside and with a central purplish crown, carried in stalked clusters at the ends of the branches; fruit grey-green, inflated, 8 to 12 cm long, containing numerous seeds with tufts of long silky hairs at one end. (Kleinschmidt and Johnson, 1977)
"Tall herb with sessile, obovate, glaucous leaves less than 2 times longer than broad; bud globular, flowers umbellate, violet; coronal spurs not recurved." (Nicholson, 1991)
"Shrubs, mostly less than 6 ft., but up to 15 ft.; similar to *C. gigantea*, but leaves oblong to elliptic, corolla usually about 1 in. across with

***Calotropis procera* (Aiton)**

W. T. Ait. f.; Hort. Kew. Ed.2,2:68 1811.

Asclepias procera Ait.; Hort. Kew. 1:305, 1789.

Names

Arabic: Oshar عشر – عشر

Berber: Torcha, Touza, Ngeyi

English: French cotton, Mudar plant, calotropis, rubber bush, apple of Sodom, mudar, madar, king's crown, roostertree

French: Calotrope, Fatetone, Pomme de Sodome

German: Wahre Mudarpflanzer, Gomeiner

Italian: Calotrope

Spanish: Algodón extranjero, Cazuela

Turkish: Ipekag

lobes more erect, corona lobes glabrous or pubescent, and follicle 4-5 in. long." (Bailey and Bailey, 1976)

■ Geographical Distribution

Local: Almost all phytogeographical regions of Egypt, except the Mediterranean region.

Regional: Egypt, Libya.

Global: Tropical to dry parts of Africa, Arabia, Palestine, W. Indies, Brazil, Columbia and Venezuela.

■ Ecology

Mediterranean strand vegetation, glycophyte and non-succulent. The plant grows in fine sandy soils. It is widespread in the deserts of the Middle East in areas already occupied by Bedouin settlements. It grows as a secondary vegetation after the eradication of Acacia trees for fuel making.

■ Status

The plant is widespread as a shrub. No fear of extinction.

■ Part(s) Used

Bark, root-bark.

■ Preparations

Tincture of Calotropis, 1/2 to 1 fluid drachm.

Powder, 3 to 12 grains

■ Use

Oral

■ Constituents

A yellow bitter resin; a black acid resin; Madaralbum, a crystalline colourless substance; Madarfluvil, an ambercoloured viscid substance; caoutchouc; and a peculiar principle which gelatinizes on being heated, called Mudarine. Lewin found a neutral principle, Calatropin, a very active poison of the digitalis type. In India the author's husband experimented with it for paper-making, the inner bark yielding a fibre stronger than Russian hemp. The acrid juice hardens into a substance like gutta-percha. It has long been used in India for abortive and suicidal purposes. Mudar root-bark is widely used there as a treatment for elephantiasis and leprosy, and is effective in cases of chronic eczema, as well as for diarrhoea and dysentery. In addition, Cardenolides are present – calotoxin, saponin and choline.

■ Pharmacological Action and Toxicity

1. Calotropis resembles ipecacuanha in its action; small doses are diaphoretic and expectorant, and large doses cause vomiting and diarrhoea..
2. The isolated compounds showed considerable cytotoxic activity.
3. The aqueous extract exhibited significant changes in the electro cardiogram pattern of adult anesthetized dogs and induced arrhythmic manifestations in doses of 2, 4, and 8 ml/kg body weight.
4. Alcoholic extract stimulates rabbits' intestines, the rectus abdominus muscle of frogs and contracts the uterus of virgin female rats.

■ Traditional Medicine and Indigenous Knowledge

History: a decoction is used in veterinary medicine, anti-leprosy. Powdered dried leaves are vermifuge in small doses. They are smoked for asthma. Fresh leaves are used in the form of cataplasm for sun stroke. Leaf extracts are cardiotonic. Roots are emetic, expectorant. Root bark is used for dysentery. Latex causes serious inflammations and may lead to blindness. It is used as a drastic purgative, emmenagogue, for bites and skin diseases. It was used by

ancient Indians as arrow poison due to its slow effect on the heart similar to Digitalis. Poultices made from the leaves were applied to joints to heal rheumatism.

■ Traditional Medicinal Uses

- Asthma
- Cold
- Cough
- Chronic eczema
- Dysentery
- Diarrhoea
- Elephantiasis
- Heart diseases
- Leprosy
- Rheumatism
- Skin diseases

Other uses of the plant: Fruit fibres and seed hairs may be used for filling cushions and for making rope. The woody parts of this plant were burned to make charcoal, which was previously an ingredient for gunpowder. It is used for scabies of camels and goats. The leaves also served as fertilizer - dug into the ground around the roots of an ailing palm tree, they helped to make the tree more vigorous.



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***Capparis spinosa* L.**
Capparidaceae (or Capparaceae)



Compiled by: Dr. Driss Lamnauer
Edited by: Prof. Kamal Batanouny

■ Morphological Descriptio

Caper plants are small shrubs, and may reach about one meter upright. However, uncultivated caper plants are more often seen hanging, draped and sprawling as they scramble over soil and rocks.

Caper stems have tiny thorns, are serpent-like when young, dry and brittle when old. Leaves are variable in texture, orbicular to elliptic, base rounded and apex mucronate. Flowers are born on first-year branches.

The plant flowers only bloom for 24 hours then die. Flowers are white, solitary, axially. Sepals are sub equal, petals are white, and its anther filaments are purple and are longer than the petals. The berry is ellipsoid, ovoid or obovoid and pericarp thin. The seeds are 3-4 mm in diameter, globose, smooth and brown.

Flowering period: June-December

■ Geographical Distribution

Local: *Var. canescens*, *var. rupestris* in the mountains of *Meddle Atlas*, High Atlas, and Rif.

Regional: The species cultivated in the Mediterranean region are *C. spinosa* L. and *C. ovata* Desf. The differences between the two species are mainly related to the shape and dimension of the leaves, the color of the trunk, and the shape of the flower buds. The varieties of *C. spinosa* are *spinosa*, *inermis*, *parviflora*, *aegyptica*, and *pubescence*. Those of *C. ovata* are *ovata*, *sicula*, *herbacea*, *palaestina*, *mycophylla*, *kurdica*.

Capparis sinaica has all the positive attributes of its domesticated relative *Capparis spinosa*.

Global: *Capparis spinosa* is said to be native to the

***Capparis spinosa* L.**

Capparis rupestris

Arabic: l'Kabbar, Kabbar, Àssaf, Lasaf.

الكبر أو كبر - أصف - لصف

Berber: Taylulut, Tailoulout, Amserlih, Ouai loulou.

English: Caper bush, Caperbush, caper, caperberry,

French: Câprier, Caprier commun, Câpres, Fabagelle, tapana

Mediterranean basin, but its range stretches from the Atlantic coasts of the Canary Islands and Morocco to the Black Sea to the Crimea and Armenia, and eastward to the Caspian Sea and into Iran. It grows in North Africa, Europe, West Asia, Afghanistan, and Australia. In India it grows from Punjab and Rajasthan to the Deccan Peninsula.

■ Ecology

Capparis spinosa grow spontaneously in cracks and crevices of rocks and stone walls. Plants grow well in nutrient poor sharply drained gravelly soils.

Mature plants develop large extensive root systems that penetrate deeply into the earth. Capers are salt-tolerant and flourish along shores within sea-spray zones. They are also wind-tolerant. The caper's vegetative canopy covers soil surfaces, which helps to conserve soil water reserves.

Capparis spinosa is cultivated for production of Capers. Even though slow and difficult to germinate it grows in very dry warm climate. Dry heat and intense sunlight make the preferred environment for caper plants to give the best results. Plants are productive in zones having only 200 mm annual precipitation (falling mostly in winter and spring months) and easily survive summertime temperatures higher than 40°C. However, caper is a cold tender plant and has a temperature hardiness range similar to the olive tree (- 8°C).

■ Status

Not IUCN Threatened species

■ Part(s) Used

Capers (flower buds), Caperberries (fruits), leaves, roots, seeds.

The caper plant yields two kinds of fruit - the caper itself, and the caperberry.

Capers are the small buds picked very young, even before they have bloomed. If the caper is not picked, it will soon become a flower. This flower produces a fruit called the caperberry. Caperberries are the mature fruits of the caper bush. They are the same size and color as a small green olive, with a delicate fruity flavor. The caperberry resembles a large grape with white stripes like a small watermelon.

■ Constituents

The crude extract of the flower buds contains 162 volatile constituents of which isothiocyanates, thiocyanates, sulphides and their oxidative products have been identified as the major components. The root contains glucobrassicin, neoglucobrassicin and 4-methoxy-glucobrassicin. The root bark contains stachydrine, rutic acid and a volatile substance with garlic odor. The cortex and leaves contain stachydrine and 3-hydroxystachydrine. The leaves and seeds contain glucocapparin and glucoleomin. The seeds are rich in protein, oil, and fiber. The main fatty acids identified by gas chromatography were palmitic, oleic and linoleic acids. *Capparis spinosa* L. was found to contain the pharmacologically active compound rutin, in all aerial parts. The average content of flavonoid glycosides (quercetin 3-rutinoside, kaempferol 3-rutinoside; and kaempferol 3-rhamnosyl-rutinoside) in commercial capers produced in different Mediterranean countries was 5.18 mg/g fresh weight. A serving of caper (10 g) will provide 65 mg of flavonoid glycosides or the equivalent 40 mg of quercetin as aglycone. The caper is rich in capric acid. This gives a distinctive aromatic flavor enhanced by pickling.

■ Pharmacological Action and Toxicity

Capparis spinosa L. possesses several chemically active constituents, but one of the most important classes of compounds are the flavonoids, in particular rutin - the most abundant flavonoid in the plant. Since ancient times, caper poultices have been used to ease swellings and bruises and this led to the belief that rutin had properties affecting the permeability of the blood capillaries; such as

reducing their fragility though clinical evidence is inconclusive

However the herb was reported to have hepatoprotective and immunosuppressive effects and an anti-tumor activity against human leukemia in vitro. Caper extracts and pulps have been used in cosmetics, but there has been reported contact dermatitis and sensitivity from their use.

■ Traditional Medicine and Indigenous Knowledge

Roots are used as diuretic, astringent, and tonic. Bark root, which has a bitter taste, is used as appetizer, astringent, tonic, antidiarrheic and to treat hemorrhoids, and spleen disease. Bark is also used for gout and rheumatism, as expectorant, and for chest diseases.

Infusion of stems and root bark antidiarrheic, febrifuge.

Fresh fruits sciatica, and dropsy. Dried and powdered fruit combined with honey is used in colds, rheumatism, gout, sciatica and backache. In decoction it is said efficient against gastric pain. Applied on the all body this decoction is said to be good in epilepsy. Seeds are used in feminine sterility and dysmenorrhea. Crushed seeds for ulcers, scrofula, and ganglions. Seeds are used in a mixture of spices called Ras El Hanout, which means the "head of the shop". Flowers in a poultice in eczema.

In the Sahara, the steam of the plant's decoction is said to clean eyes.

Leaves crashed are and applied in a poultice on the front against headache, on the face against toothache. Leaves heated in butter are used against external parasitic disease of camel.

The flower buds (Capers) are pickled and used as condiment or legume.

■ Other Indications

The plant is credited with anti tubercular property. A decoction of the plant is used to treat yeast and vaginal infections such as candidiasis.

The bark is bitter, diuretic and expectorant. It is given in spleen, renal and hepatic complaints.

The root bark is purifying and stops internal bleeding. It is used to treat skin conditions, capillary weakness, and easy bruising, and is also used in cosmetic preparations.

Infusions and decoctions from caper root bark have

been traditionally used for dropsy, anemia, arthritis and gout.

The bruised leaves are applied as a poultice in gout. The unopened flower buds are laxative and, if prepared correctly with vinegar, are thought to ease stomach pain.

Capers are an appetizer and digestive. They are said to reduce flatulence and to be anti-rheumatic. They have reported uses for arteriosclerosis, as diuretics, kidney disinfectants, vermifuges and tonics.

■ Mention in old books and modern treatment

An extract of the plant is one of the constituents of the Ayurvedic preparation administered to treat preliminary cases of acute viral hepatitis and cirrhosis of liver; and has shown encouraging results against viral infection in man.

The plant extract is also a constituent of another drug 'Geriforte' useful in treating senile pruritis, itching and other ailments associated with old age and anxiety neurosis.

In ayurvedic medicine capers (Capers = Himsra) are recorded as hepatic stimulants and protectors, improving liver function.

■ Diseases/Properties

Diseases: spleen disease, sciatica, backache, dropsy, gout, rheumatism, gastric pain, epilepsy, feminine sterility and dysmenorrhea, ulcers, scrofula, hemorrhoids, and parasitic disease of camel

Properties: diuretic, astringent, tonic, appetizer, anti-diarrheic, febrifuge, expectorant, clean eyes.

Other uses of the plant (Ethnobotany)

Roots and bark of the caper plant are used medicinally and in cosmetics.

■ Culinary Uses

Capers of commerce, which have been pickled in vinegar or preserved in granular salt, have a sharp piquant flavor and add pungency, a peculiar aroma and saltiness to comestibles such as pizza, fish, meats and salads. The flavor of caper may be described as being similar to that of mustard and black pepper. In fact, the caper strong flavor comes from mustard oil: methyl isothiocyanate (released from glucocapparin molecules) arising from crushed plant tissues.

Semi-mature fruit (caperberries) and young shoots

with small leaves may also be pickled for use as a condiment. Caperberries are edible, piquant delicacies processed like the buds. Caperberries are some times picked with the stem attached, and are used as a garnish or an appetizer.

Tender young shoots including immature small leaves may also be eaten as a vegetable, or pickled.

In Morocco, given the price of the product, farmers usually prefer to sell them. Some times they are eaten like olives or used as legume in "tajines".

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***Centaurium pulchellum* (Swartz)
Druce**
Gentianaceae



Compiled by: Prof. F. M. Hammouda, Prof. S. I. Ismail,
Dr. N. S. Abdel-Azim and Dr. K. A. Shams
Edited by: Prof. K. H. Batanouny

■ Morphological Description

Erect annual, glabrous herb 5-20cm high, without a basal leaf-rosette. The stem is erect and stiff, usually branched in the lower part. 2-4 cauline internodes. Leaves are rosette, sessile, ovate, lanceolate, acute; basal leaves are obtuse. The upper leaves are ovate, lanceolate, acute and smaller. Flowers are 1-1.2 cm, pink, rarely white, forked, cymose-paniculate, usually long-pedicellate, corolla tube, 1-2 times longer than calyx segments. Lobes are oblong and obtuse. Stamens are inserted at the apex of the corolla-tube. Stigma is oval, the anthers oblong. The fruit is a two-valved many seeded capsule. Seeds are minute and bright brown. Flowers from March to May.

■ Geographical Distribution

Local: Fairly common, grows mainly among cultivated crops by water sides in Fayoom area and the North coast, in Sinai

Regional: Some North African Countries

Global: Eurasia. Western Europe, Eastwards to China

■ Ecology

Moist soils, sheltered mountain crevices of Sinai and around fresh water springs

Centaurium pulchellum (Swartz) Druce,

Fl. Berkshire 342 (1898),
Gentiana pulchella Swartz;
Gentiana ramosissima (Vill.) Pers.;
Erythraea pulchella (Sw) Fr.;
Centaurium ramosissima (Vill.) Druce

Names

Arabic: Qantariuon قنطريون

English: Branching Centaury

French: Centaurea

■ Status

The plant grows in specific moist habitats, which are subjected to changes and drying. The plant is endangered in Egypt.

■ Part(s) Used

The whole flowering and fruiting herb.

■ Collection

flowering and fruiting herb stage from July to September

■ Preparations

infusion, decoction and ointments

■ Use

oral and external

■ Constituents

Coumarins and coumarin glycosides; ammoidin (xantotoxin), ammidin and majudin (bergapten), alkaloid gentianine, a bitter principle kantaurin, oleanolic acid, erythrosterol and xanthones.

■ Pharmacological Action and Toxicity

Not available

■ Pharmacopoeia

Not available

■ Traditional Medicinal Uses

- Anti-diabetic

- Elimination of stones from the kidney and urethra
- Gastric and abdominal pain
- Hypertension
- Healing agent for wounds
- Renal colic
- Rheumatic pains

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***Citrullus colocynthis* L.**
Cucurbitaceae



Compiled by: Prof. F. M. Hammouda, Prof. S. I. Ismail,
Dr. N. S. Abdel-Azim and Dr. K. A. Shams
Edited by: Prof. K. H. Batanouny
Photos by Prof. K. H. Batanouny

■ Morphological Description

Colocynthis is a perennial herbaceous vine, with angular and rough stems. Stems are 0.5-1.5m, procumbent, branched, angular and hirsute. The root is fleshy. Leaves are rough, 3-to 7-lobed, 5-10 cm long, the middle lobe sometimes ovate, sinuses open, flowers monoecious, solitary, peduncled, axillary, corollas 5-lobed; ovary villous. Fruit are nearly globular, 4-10 cm in diameter with somewhat elliptical fissures, about the size of a small orange; variegated green and yellow, becoming yellow when ripe, with hard rind, the pulp light in weight, spongy, easily broken, light yellowish-orange to pale yellow, and intensely bitter. Seeds are numerous, ovoid, compressed, smooth, dark brown to light yellowish-orange, borne on parietal placenta. Flowers in summer. The plant produces 40-60 fruits every year.

■ Geographical Distribution

Local: Almost all the deserts of Egypt. At the Red Sea, near Kosseir, it occurs in large quantities.

Regional: All North African countries.

Global: Semi-deserts and deserts of North Africa, Southern Europe and Asia, from the Canary Islands Eastwards to India.

■ Ecology

Ranging from cool temperature moist through tropical desert to west forest life zones, colocynthis is reported to tolerate annual precipitation of 38 to

***Citrullus colocynthis* L.**, Schrader, Linnaea 12:414.(1838) *Cucumis colocynthis* L., *Colocynthis vulgaris* Schrad.

Names

Arabic: Handal حنظل , Handhal حنظل,
Oorky أوركي , Tator طاتور , Hadag حدج

حنظل

Berber: Tadjellet, Alkat, Taferzizt, Tifersit, Ubruzi.

English: Colocynthis, Bitter apple, Bitter gourd.

French: Coloquinte, Chicotin.

430 mm, and an annual temperature of 14.8 to 27.80C. A highly xerophytic plant, it thrives where the mean annual temperature is from 23-27 oC and annual rainfall ranges from 25-37 cm. It thrives on sandy loam, subdesert soils, and along sandy sea coasts. It appears grouped in depressions receiving runoff water.

The plant is easily cultivated from seed, as it grows rapidly, requiring no attention once fields have been sown.

■ Status

The plant is safe, and is common in all North African countries. However, cultivation of the plant for medical purposes has been recommended. Being a member of the Cucurbitaceae, it could be cultivated in a similar manner to water melons. However, it is more drought-resistant. The plant produces numerous fruits every year, ca 40-60 fruits per plant. In Egypt, the plant is not cultivated but fruit yields from wild plants supply a small amount of yellow pulp.

■ Part(s) Used

The leaves, pulp of the peeled fruit (colocynthis), the seeds and the roots.

■ Collection

Fruits gathered when still unripe but fully developed. Fruit is hand-picked, the thin, hard, gourd-like outer rind (pericarp) removed by peeling, and the inner white spongy pulp filled with seeds. It is dried in the sun or in ovens. Commercial colocynthis occurs in two forms: as a pulp from which most of the seeds

have been removed, and as "bitter apples" or masses of pulp filled with seeds that have been rolled into balls. Both forms are usually shipped in boxes.

■ Preparation

Compound Colocynth tablets, Compound Colocynth extract

■ Use

Oral, external.

■ Constituents

Pulps (colocynth) contains cucurbitacins including elaterinide and cucurbitacine E, cucurbitacine B, other glycosides liberating cucurbitacines I and L, alkanes, aliphatic alcohols, alkaloids and choline base.

Roots contain elaterin, hemtriacontane, and saponins.

Seeds contain about 16% fixed oil, phytosterols, phytosteroline and mucilage.

■ Pharmacological Action and Toxicity

Colocynth is an irritant and cathartic. It acts powerfully, producing copious watery evacuations. Even in moderate doses, it has caused inflammation of the mucous membrane of the intestines, vomiting, severe tormina, and bloody stools. Except in minute doses, it is never used alone but with other laxatives and anodynes such as Aloes and Henbane. The leaves exhibit anti-inflammatory activity and are diuretic. They are recorded as being used in the treatment of asthma and jaundice.

The plant has been used for arterial hypertension and has hypoglycemic, antihyperglycemic and insulinotropic effects. Plant extracts are carcinogenic in mice. It is useful in constipation and in painful menstrual complaints. It shows anti-histaminic, anti-acetylcholine and cardiac depressant activities.

The extract of the dried pulp also has anti-bacterial activity.

Toxic effects after chronic use include hypokalemia, oliguria and oedema, similar to acute nephritis, and symptoms resembling Crohn's disease and Addison's Disease.

In case of poisoning by colocynth, the stomach should be emptied, and opium given orally or as a suppository, followed by stimulants and demulcent

drinks. A considerable number of severe cases of poisoning with this substance have occurred in humans, and a few have proved fatal. It should never be taken by nursing mothers since the active constituents appear in breast milk.

■ Pharmacopeias

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The German Pharmacopoeia of 1872, 1882 and 1890.

The Egyptian Pharmacopoeia (1984).

■ Pharmaceutical Products

No-habit, Lotion, Tri M. Medical.

■ Traditional Medicine and Indigenous Knowledge

History: In Egypt, the Bedouins made a poultice of colocynth with warm cooking oils then placed it on the joints to combat rheumatic pain. The leaves have been used for painful menstruation, and the fruit, broken into small pieces, is used to protect woollen clothing from moths. The leaves are diuretic and used in the treatment of asthma. The root has been used in inflammation of the breasts, amenorrhoea and rheumatism. The fruit is pungent, a cooling purgative, anthelmintic, antipyretic and carminative. The fruit pulp is purgative, diuretic and is used against gonorrhoea.

■ Traditional Medicinal Uses

- Chest diseases (Bronchial Asthma)
- Constipation
- Rheumatic diseases
- Tumour diseases

Other uses of the plant: Roots are used as abortifacient. A decoction of the whole plant, made in juice with fennel, is said to help indurations of the liver. In Morocco, the fruit, broken into small pieces, is used to protect woollen clothing from moths.

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***Cleome arabica* subsp.
amblyocarpa (Barratte et Murb.)
Ozenda
Capparidaceae**



Compiled by: Dr. Zeineb Ghrabi

■ Morphological description

Cleome arabica is a herbaceous, sticky plant with a strong, foul smell and an unpleasant taste. It easily grows to over 50 cm. in a rainy year. Its stems are rigid, erect and branched and bear alternate trifoliate leaves.

The flowers are small, in leafy bunches. The calyx has 5 lobes. The corolla is formed of 4 unequal yellowish petals that are edged with deep purple or entirely purple-black. The androecium is made up of 6 stamens and the ovary is on a short podogyna. The fruit is dry and dehiscent, formed of long, hanging siliqua-shaped capsules that enclose hairy seeds whose hair length differentiates the two subspecies in Tunisia: the subsp. *arabica* Ozenda with its woolly long-haired seeds of equal diameter set in siliqua that taper towards the tip the subsp. *amblyocarpa* (Barr. et Murb.) Ozenda, which differs from the other by having seeds that are covered with very short hairs no more than 1/3 their diameter and siliqua that are rounded at the tip. Only the second subspecies is found in Tunisia, and it is probably synonymous with *Cleome amblyocarpa* Barr. et Murb. Indeed, Greuter et al. (1986) see *Cleome arabica* L. as a non-Tunisian species. The species of this genus that develop in Tunisia are rather *Cleome amblyocarpa* Barratte and Murb.

***Cleome arabica* subsp. *amblyocarpa*
(Barratte et Murb.) Ozenda;** Fl. Sahara: 247.
1958. *Cleome amblyocarpa* Barratte et Murb.; Acta
Univ. Lund. Ser. 2, 1 (4): 25. 1905

Arabic: Mnitna, oum jlajel

French: Cléome d'Arabie

(= *Cleome arabica* subsp. *amblyocarpa* (Barratte et Murb.) Ozenda and *Cleome arabica* Boc. both corresponding to a suspect name that is not accepted, *Cleome arabica*.)

Moreover Boulos (1979) corrected this by stating that the true *Cleome arabica* L. is restricted in area to the Sinai and that for the rest of North Africa (thus, Tunisia) the plant is *Cleome amblyocarpa* Barr. et Murb.

Flowering takes place between January and April.

■ Geographical distribution

Local: Very common in the south; also found in the Kerkennah Islands and Djerba.

Regional: North Africa.

Global: From Morocco to Arabia.

■ Ecology

Cleome amblyocarpa is abundant in sandy environments, and the gravel and stony ground of the desert regions and arid steppes.

■ Status, conservation, culture

Not cultivated; picked for use.

■ Part used

The leaves.

■ Traditional medicine

Used as a bechic and a sedative. Also used mixed with *Juniperus phoenicia* to ease pain, *Hammada scoparium* for headaches, and *Artimisia herba alba* for nausea, gastralgia, vomiting and colic.

■ Toxicity

It is a toxic plant that causes nervous disorders in animals.

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Cornulaca monacantha Del.
Chenopodiaceae



Compiled by Dr. Salima Benhouhou

■ **Morphological description**

A vigorous shrub, strongly ramified from the base, growing to 1 m. high. Greenish, turning yellowish or whitish when dried, glabrous-glaucous, except the leaf axils. The leaves are 4-10 mm., alternate, curved, tapering from a clasping base to a rigid spine, woolly in the axils. The small greenish flowers, located at the base of the leaves (1 to 3), surrounded with a thick layer of white wool, bracts up to 4 mm., are spinescent. Perianth – segments c. 5 mm., linear, subspatulate, obtuse, more or less denticulate at the apex. The fruit is an achene. Flowering takes place in autumn.

■ **Geographical distribution**

Local: Fairly common in the northern Algerian Sahara, common in the central Sahara, absent from the high mountains.

Regional: North Africa.

Global: It is a Saharo-sindian species found in North Africa, Nubia, Arabia, Iran and Pakistan (Baluchistan).

■ **Ecology**

This hardy shrub favours sandy soil, but grows also on regs with a moderate content of gypsum and salt. The long roots help it survive in harsh climatic condition where the rainfall does not exceed 150 mm.

■ **Status**

According to the IUCN criteria this Saharo-sindian

Cornulaca monacantha Del.

monacantha: with one spine

Arabic: had, djouri

Targui: tahara

species falls into the "C" category.

The plant is not threatened and appears on the floristic list of several protected sites listed by the UNEP World Conservation Monitoring Centre.

■ **Part used**

The leaves. A decoction of the leaves is taken on an empty stomach.

■ **Constituents**

Gallotannins : Monacanthin A and B; Tannins (newly identified) and penta-O-galloyl- α -D-glucose and 1,2,3,6-tetra-O-galloyl- α -D-glucose.

Flavonol glycoside : quercetin-4-O- β -D-galactoside.

Flavonoids : luteolin-7-O-rhamnoside, luteolin-7-O-glucoside.

Triterpenoidal saponins.

■ **Pharmacological action and toxicity**

No information was found on the pharmacological action of this plant, while a search on its toxicity appears negative.

■ **Pharmacopeias**

Not relevant for this species.

■ **Pharmaceutical Products**

Not relevant for this species.

■ **Traditional medicine and local knowledge**

It is used for liver problems and jaundice, as a hepatic and a purgative.

It is considered excellent pasture for camels, despite the spines on the leaves; it also has a beneficial purgative effect for camels, as well as helping milk production. It is also used as a remedy for scabies.

In Morocco, the plant is used for the same purpose (for icterus).

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***Cymbopogon schoenanthus*
Spreng. Graminae (Poaceae)**



Compiled by Dr. Salima Benhouhou

■ **Morphological description**

A perennial grass, forming dense tussocks at the base and numerous erect 60-80 cm. stems. The leaves are linear, tough and strongly curved. The inflorescence is contracted at the base, becomes looser towards the end and is protected by a distinctive spathe. Each spike contains a single flower. Between the spikes, several characteristic small whitish hairs appear. The roots have a pleasant aromatic smell. Flowering takes place in the spring, usually March and April.

■ **Geographical distribution**

Local: Well represented in the Algerian Sahara.

Regional: North Africa.

Global: It is widely distributed from the tropical region through North Africa and Asia.

■ **Ecology**

It grows in arid regions with a low rainfall (around 100-150 mm. per year). This plant is found on the gravelly-sandy soils of non-saline wadi beds as well as on the gravelly-stony soils of djebels.

■ **Status**

According to the IUCN criteria this species falls into the "C" category.

The main threat is overgrazing with a negative impact on its regeneration near settlement.

The plant is not threatened and appears on the floristic list of several protected sites listed by the

***Cymbopogon schoenanthus* Spreng.**

Andropogon laniger Desf. , *Andropogonschoenanthus* L.

Cymbopogon: from kymbe, boat, and pogon, beard, referring to the flower spike's appearance;

schoenanthus: from the Greek scheinos, rope, rush-like stems

Arabic: el lemad, idjhir

Berber: tébarém

English: camel's hay, camel grass

French: schoenanthé officinale, herbe à chameau, paille de la Mecque

UNEP World Conservation Monitoring Centre and Man and Biosphere (MAB).

■ **Part used**

The flowers; the stems with leaves on; and the entire plant. It is collected in the spring and prepared as an infusion and a decoction, and taken by mouth.

■ **Constituents**

Essential citrus oil, tannins, glucoside, flavonols, piperitone, limonene.

Pharmacological action and toxicity

Molluscicidal and insecticidal activity.

A search on its toxicity appears negative.

■ **Pharmacopeias**

Not relevant for this species.

■ **Pharmaceutical products**

It is one ingredient of a cream that helps prevent skin problems and protect against environmental damage. The brand is HydraFluid Cream and is sold in the USA.

Oil extract from this plant is an ingredient of Epsom Lemongrass Bath Salts, and Grapefruit Calendula Botanical Bath Salts. These are products of a brand of Botanical Bath Salts by the Splash company.

■ **Traditional medicine and local knowledge**

It is used for anorexia; it is astringent, carminative,

diuretic, emmenagogic, febrifugal, gastralgic, rheumatismal and sudorific.

It is also used as a poultice to cure dromedary wounds.

In the Djanet area, the plant is particularly appreciated for its medicinal values and is well known to bring back the appetite. It is taken as a diuretic (infusion); it cures intestinal troubles and food poisoning (decoction) and helps digestion.

The young leaves are eaten with a salad or cooked with meat. It is also drunk instead of tea. It is a much appreciated pasture. *Cymbopogon schoenanthus* straw was used in the Sahara to fill mattresses. In the Haouz region of Morocco, an infusion of the flowers and the whole plant is febrifugal, diuretic, antirheumatismal and antigastralgic.

In Egypt, similar uses are reported: febrifuge, antirheumatic, poultices for camel wounds. It is also thought to be emmenagogic, astringent, carminative and sudorific.

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***Cynomorium coccineum* L.**
Cynomoriaceae



Compiled by: Dr. Zeineb Ghrabi

■ **Morphological description**

Cynomorium coccineum is a perennial, giving off a strong odour of putrefaction, deep red when young and blackish purple when flowering. It has a very distinctive appearance, much of it being underground, and is a parasite, using suckers to attach itself to *Chenopodiaceae* roots. Its rhizome is branched, scaly, with big fleshy 10-20-cm. stems, not branched, with several scales, ending in a club-shaped inflorescence made up of little rudimentary contracted cymes. The flowers are either male, with a rudimentary ovary, or hermaphrodite, but all have a single stamen and 1-5 perianths over the ovary. The fruits are tiny black achenes with a tough pericarp in a persistent perigone. The plant flowers from March to May.

■ **Geographical distribution**

Local: The north-east, Cap Bon, central Tunisia, southern Tunisia.

Regional: North Africa.

Global: North Africa, the Sinai, Lebanon and Syria, the Balearics, Spain, Portugal, southern Italy,

***Cynomorium coccineum* L.** Sp. Pl.: 970.
1753

Arabic: tarthouth, zib el Turki

French: cynomorium écarlate

English: cynomorium

Sardinia, Sicily, Malta, Crete, Palestine, Iran and the Canaries.

■ **Ecology**

Cynomorium coccineum is a geophyte, living parasitically on *Chenopodiaceae* in Mediterranean countries; it is found on the edges of salty soils and on sands that have been left slightly waste.

■ **Status, conservation and culture**

Cynomorium coccineum is a wild species in Tunisia; it is picked wild.

■ **Part used**

The aerial part.

■ **Constituents**

Anthocyanins, cyanidin 3-glucoside.

■ **Traditional medicine**

There are two known traditional uses of *Cynomorium coccineum*: for haemorrhoids, a decoction of the aerial part; three cups are taken before meals every day. For diarrhoea, a decoction of the aerial part in a litre of water; three glasses are taken before meals every day.

■ **Pharmacological action and toxicity**

The hydroalcoholic extract of the plant is oestrogenic, an antioxidant and stimulates spermatogenesis. The plant has fertilising, aphrodisiac, tonic, astringent, antiulcerous, antihæmorrhoidal and antiemetic properties and is a regulator of menstrual disorders.

■ **Use in herbal medicine**

Hypotensive.

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Cyperus rotundus L.
Cyperaceae



Compiled by: Prof. F. M. Hammouda, Prof. S. I. Ismail,
Dr. N. S. Abdel-Azim and Dr. K. A. Shams
Edited by: Prof. K. H. Batanouny
Photos by K. H. Batanouny

■ **Morphological Description**

Perennial herb with long rhizomes in ellipsoid form; sometimes tuberous; black coloured, with characteristic aromatic odour and taste, up to 60 cm high; leaves are 2-6 mm wide; spikes ovate, on rays to 6 cm long; spikelets linear 1-2 cm long, 12-30 flowered, the rachilla winged; scales are purplish, carinate, obtuse; achene sub-obovoid, trigonal, 1.5 mm long, black, minutely papillate.

■ **Geographical Distribution**

Local: In all phytogeographical regions of the country among cultivated crops and in gardens

Regional: North African countries and South India

Global: Cosmopolitan

■ **Ecology**

It is a major weed near cultivated crops and in gardens. It is encouraged by frequent cultivation and grows best in moist fertile soils. It doesn't grow well in the shade. Prevalent in disturbed areas and lawns. Very persistent once established.

■ **Status**

The plant grows in specific moist habitats, subject to changes and drying. It is therefore considered an endangered plant in Egypt and very common weed in cultivated fields. The species is extremely variable and comprises numerous forms and subspecies.

Cyperus rotundus L.

C. purpuro-variegates Boeckeler, *C. stoloniferum pallidus* Boeckeler, *C. tetrastachyos* Desf., *C. tuberosus* Roxb, *Chlorocyperus rotundus* (L.) Palla

Names

Arabic: Al-So'ad السعد

English: nut grass, nutsedge, purple nutsedge, cocoglass

French: souchet rond, souchet à tubercules, herbe à oignon

■ **Part(s) Used**

Rhizomes, tubers and bulb roots.

■ **Collection**

At fruiting stage.

■ **Preparations**

Decoction and powder

■ **Use**

Oral

■ **Constituents**

1,8- cineole, 4alpha,5alpha-oxidoeudesm-11-en-3alpha-ol, Alkaloids, Alpha-cyperone, Alpha-rotunol, Beta-cyperone, Beta-pinene, Beta-rotunol, Beta-selinene, Camphene, Copaene, Cyperene, Cyperenone, Cyperol, Cyperolone, Cyperotundone, Rotundenol, Linolenic acid, Linoleic acid, Myristic acid, Oleanolic acid, Oleanolic acid-3-O-neohesperidoside, Oleic-acid, D-fructose, D-glucose, Flavonoids and saponins.

■ **Pharmacological Action and Toxicity**

The petroleum ether extract of the roots showed anti-inflammatory activity against carrageenin-induced oedema in albino rats. The active fraction was identified as a triterpenoid. A fraction tested on aconitine-induced writhing in mice showed mild analgesic activity. Antihistaminic and antiemetic activities were shown in experimental studies on dogs. Smooth muscle relaxant activity was demon-

strated on rabbit ileum. Extracts of rhizomes were inhibitory to the growth of fungi depending on species. Antibacterial activity of oil and its fractions have been demonstrated against a number of organisms.

■ Pharmacopoeia

Not available

■ Phytopharmaceutical Products

Not available

■ Traditional Medicine and Indigenous Knowledge

History: The genus name *Cyperus* is from *Cypeiros* which was the ancient Greek name for the genus. *Rotundus* is Latin for round and refers to the tuber.

■ Traditional Medicinal Uses

- Bloody stools, urine, and vomiting blood
- Breast tumours
- Candida
- Colds and flu
- Colic
- Convulsions
- Diarrhoea
- Dysentery
- Dysmenorrhoea
- Fevers
- Gastritis
- Hypotension
- Indigestion
- Malabsorption
- Mental health
- Menopause
- Menstrual disorders
- Parasites
- Palpitation

Other uses of the plant: Tubers are aromatic, used to increase body weight. Fresh tubers are diaphoretic, astringent and have been used to combat scorpion stings.



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***Diplotaxis harra* (Forsk.) Boiss.**
Brassica



Compiled by: Dr. Zeineb Ghrabi

■ **Morphological description**

Diplotaxis harra is an annual or perennial species, hispid at the base at least, rarely glabrescent or glabrous. Its 20-60 cm. stems are erect and branched. The flower-bearing stems have leaves, at the base at least. The flowers are yellow, with a spindly pedicel that is longer than they are. The petals are twice as long as the sepals, which are downy. The fruit is a pendulous siliqua at the tip of a 2-4 mm.-long capillary gynophore. Two sub-species are signalled in Tunisia: the subsp. eu-harra Emb. & Maire and the subsp. *crassifolia* (Rafin.) Maire (= *Diplotaxis crassifolia* Rafin.) DC; = *Sinapis crassifolia* (Rafin.), which is especially distinctive for the number of teeth on the leaf and the length of the gynophore.

■ **Geographical distribution**

Local: The subsp. eu-harra Emb. & Maire is common in Tunisia: dorsal ridge, central and southern Tunisia, Medjerda valley; the subsp. *crassifolia* (Rafin.) Maire is only signalled in central and southern Tunisia.

Regional: North Africa.

***Diplotaxis harra* (Forsk.) Boiss.**

Flore Orient. 1: 388. 1867

Pendulina fontanesii Willk.; *Pendulina harra* (Forsk.) Willk; *Pendulina hispica* Willk; *Sinapis harra* (Forsk.)

Arabic: harra

French: diplotaxis

English: wall rocket

Global: The subsp. eu-harra Emb. & Maire has a distribution area that spreads over North Africa and western Asia; the subsp. *crassifolia* (Rafin.) Maire is a Mediterranean endemic but restricted to Morocco, Algeria, Tunisia and Sicily.

■ **Ecology**

Diplotaxis harra is common in pre-Saharan Tunisia, where it occupies gypseous soils and is a feature of various plant groups, such as the *Artemisia herba alba*, *Eruca vesicaria* and *Diplotaxis harra* group.

■ **Status, conservation and culture**

It is one of the *Cruciferae* that is not cultivated in Tunisia; it is picked wild.

■ **Part used**

The aerial part.

■ **Constituents**

The various *Diplotaxis* contain: a heterosid, sinigrone, which hydrolyses under the action of myrosine, liberating a sulphurated essential oil containing allyl sulfocyanate and allyl sulphide. Glucosinolates (α -thioglucoside-N-hydroxysulphates) precursors of the isothiocyanates. Arachidonic acid, palmitic acid, cholesterol, stigmasterol, B-sitosterol and non-methylated fatty acids.

■ **Traditional medicine**

For constipation: a decoction of the aerial part of the plant; three cups a day before meals. Sugar diabetes without complications: 50 gr. of the aerial part of *Diplotaxis harra* decocted in a litre of water for 30 minutes; one glass a day taken by mouth on an empty stomach. Sunstroke: crush 50 gr. of *Diplotaxis harra* leaves and 50 gr. of *Astragalus*

armatus roots, then mix with olive oil and apply locally to the crown of the head at night for 3 days. *Diploaxis* seeds are prescribed internally to warm up the body and externally as a rubefacient. A decoction of the seeds or leaves of *Diploaxis harra* and *Diploaxis pitardiana* is used as a rub for scab in animals.

■ Pharmacological action and toxicity

The glucosinolates and their derivatives are bactericidal, fungicidal and nematocidal. The non-methylated fatty acids are bactericidal and fungicidal and kill yeasts. An irritating, reddening action has been noticed on the mucous membrane.

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***Farsetia aegyptiaca* Turra**
Cruciferae (Brassicaceae)



Compiled by Dr. Salima Benhouhou

■ **Morphological description**

A low shrub, not exceeding 40 cm. and densely ramified from the base. The stems at the top are very thin and the whole plant is covered with tiny whitish hairs. The leaves are linear, alternate, 4-5 cm. long and also covered with white hairs. The numerous flowers each have 4 white free petals. The fruit is a small siliqua 1 cm. wide. The flowering period is usually between February and April.

■ **Geographical distribution**

Local: Common throughout the Algerian Sahara.

Regional: North Africa.

Global: A Saharo-sindian species common in desert areas of North Africa and Asia.

■ **Ecology**

This long-lived perennial grows on the gravelly soils of wadis, on the stony ground of djebels and in dayas. It grows in severe climatic conditions with under 100 mm. rainfall per year.

■ **Status**

According to the IUCN criteria this Saharo-sindian species falls into the "C" category. The plant is not threatened and appears on the floristic list of several protected sites listed by the UNEP World Conservation Monitoring Centre and Man and Biosphere reserves (MAB).

■ **Part used**

The stems and leaves are collected in the spring

***Farsetia aegyptiaca* Turra**

Farsetia: from Farseti, a Venetian botanist;

aegyptiaca: Egyptian

Arabic: el aoud el abiyad

Targui: timzar

and prepared as a decoction, to be taken by mouth.

■ **Constituents**

No data found on the constituents of this plant.

■ **Pharmacological action and toxicity**

No data available in the literature on the pharmacological action and toxicity of this plant.

■ **Pharmacopeias**

Not relevant for this species.

■ **Pharmaceutical products**

Not relevant for this species.

■ **Traditional medicine and local knowledge**

It is used for toothache and gingivitis, and for sore eyes.

In the Tissint region (Morocco), a decoction of the plant mixed with alum is used as a mouth rinse and for disinfecting.

■ **References**

Relevant to the plant and its uses

Internet source:

<http://www.sahara-nature.com/plantes.php?plante=farsetia%20aegyptiaca>

<http://www.sahara-nature.com/plantes.php?plante=farsetia%20aegyptiaca>

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***Hyoscyamus muticus* L.**
Solanaceae



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Photos by Prof. K. H. Batanouny

■ Morphological Description

Herbaceous plant, 30-60 cm high, perennial, stout, green and fleshy, stem thick, richly branched from the neck, leaves succulent, alternate, long petioled below, sessile above with an acute apex and angled or toothed-lobed margin. The leaf blade is broad, the floral leaf arising on the peduncle oblong lenicular-shaped. Inflorescence in one-sided spike or raceme-like with dense flowers. Flowers are bisexual, homogeneous and slightly zygomorphic, calyx is tubular, corolla funnell-shaped, white or green or purple. Fruits are relatively small, brownish, unarmed capsules with a longitudinal opening and containing numerous seeds. It is included in the persistent calyx.

■ Geographical Distribution

Local: Almost all the phytogeographical regions of the country. It occurs in the desert, Mediterranean Sea, Sinai, Red Sea, Oases, and in certain parts of the Gebel Elba region.

Regional: In the deserts of the Middle East.

Global: In the deserts of the Middle East, Africa, Europe, Asia and South America.

■ Ecology

The soil texture supporting *Hyoscyamus muticus* ranges between gravelly sand, sandy limestone and loam and to sandy clay. Thus, *Hyoscyamus muticus* has a wide range of amplitude in the desert, the most suitable habitat being sandy soil (considerable fine sand fruction) with a low medium carbonate

Hyoscyamus muticus L.,

Mant., 45 (1767).

Names

Arabic: Sakaraan, Sekran سكران,

Semm el-far سم الفار ,

Shagaretes-sakraan

English: Egyptian Henbane

French: Jusquiame d'Egypt

content. The soil reaction must be weakly alkaline (PH 7.4-8.0) or alkaline (PH 8.0-9.0) and low salinity of the magnitude of 0.28%.

Hyoscyamus muticus belongs to the xerophytic plant community, which is characterized by a limited water supply.

■ Status

The economic importance of *H. muticus* is widely increasing since the plant has been spotlighted and an increasing interest is directed towards its cultivation as a source for alkaloid production in pharmaceutical industrialization. Trials to cultivate *H. muticus* in two different locations have been carried out to determine the total alkaloidal contents in addition to other plant growth criteria. The first location was the experimental farm of the Faculty of Pharmacy which represented a clay-loamy soil, and the second one was the 6th October farm in Noubaria (Egypt) which represented sandy soil lands, the latter giving better results.

■ Part(s) Used

Total herb, leaves and flowering tops.

■ Collection

The flowering tops are collected at the mid flowering stage.

■ Preparations

Infusion, decoction and powder.

■ Use

Oral, external and ointment.

■ Constituents

Total tropane alkaloids ranging from 1.38-1.58% during flowering stage. Hyoscyamine represents 90% of the total alkaloids in addition to small amounts of hyoscyne. *H. muticus* is 25 times richer in alkaloid than *H. niger*.

■ Pharmacological Action and Toxicity

Antispasmodic, anodyne, sedative, mydriatic. Principally employed in irritable conditions and nervous affections. It has also been recorded to be used in asthma, whooping cough, as a sedative and as a substitute for opium, where this is inadmissible, such as for children's complaints. The alkaloid hyoscyne is used very widely, as a pre-operative medication, to prevent travel sickness. Hyoscyamus is used mainly for its antispasmodic effect on the digestive and urinary tracts, and to counteract griping due to purgatives.

The plant is toxic due to its high content of tropane alkaloids.

■ Pharmacopoeia

1. Egyptian Pharmacopoeias 1984.
2. British Pharmacopoeias 1809, 1968, 1973.

■ Phytopharmaceutical Products

Hyoscyamus muticus fluid extracts.

Herba Hyoscyamus muticus.

Standardized powder of *Hyoscyamus muticus*.

Tincture of Egyptian *Hyoscyamus*.

Avicenne powder; Kahira, 20g *Hyoscyamus* leaves, 75g.

Buchu and *Hyoscyamus* mixture.

Buscopan,; Buscopan Compositum; Buscopan plus (CID), (Boehringer Ingelheim)

■ Traditional Medicine and Indigenous Knowledge

History: "*Hyoscyamus*" originated from Greek literature, "*Hoys*" meaning a Hog and "*Kyamos*" meaning a bean. It was Dioscorides who, long before the Christian era, gave the plant its name of *Hyoscyamus*, because although poisonous to man and many animals, pigs could apparently eat it

without any harm. He used henbane to produce sleep and allay pain. In the 10th century, it is recorded under the name of *Jusquiasmus*. It fell into disuse until it was again adopted in medicine in 1809 after the recommendation of Baron Storch, who gave it in the extract form in cases of epilepsy and other nervous convulsive diseases.

Greeks and Romans knew it as a painkiller; Babylonians and Egyptians were acquainted with both its good and bad qualities. Brewers in earlier times made use of henbane in beer, probably in order to make it more intoxicating.

The plant is said to relieve painful spasmodic conditions, of the digestive and urinary tracts, and lead colic. It has been used for toothache and whooping cough. The boiled herb has been used as a pain killer during labour. Sakaraan cigarettes have been used to treat asthma.

■ Traditional Medicinal Uses

- Acute mania and delirium, in the treatment of withdrawal symptoms in morphine dependence
- Chronic dementia
- Convulsions
- Epileptic mania
- Functional palpitations
- Gastro-intestinal tract and the gastric or duodenal ulcer
- Mental and maniacal excitement
- Neurologia
- Paralysis agitans
- Spasmodic cough and asthma

Other uses of the plant: In some parts of the world, it is used as a poison.



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***Moringa peregrina* (Forssk.) Fiori**
Moringaceae



Compiled by: Prof. F. M. Hammouda, Prof. S. I. Ismail,
Dr. N. S. Abdel-Azim and Dr. K. A. Shams
Edited by: Prof. K. H. Batanouny
Photo by K. H. Batanouny

■ Morphological Description

Deciduous tree, 3-10 m high, green, glaucous with erect trunk, and white bark. Leaves are 30 cm long, the axes persistent, imparipinnate with early deciduous leaflets. Each leaf is formed of 3 pairs of long, slender junciform pinnae looking like opposite virgate branches. Leaflets are remote, small, oblong. Flowers appear before leaves in May. The pendulous pods ripen in October. The pod is pendulous and contains angled, nut-like white seeds (behen nuts) which are of bitter sweet taste and rich in oil (ben oil). Flowering and fruiting: February-April.

■ Geographical Distribution

Local: Sinai, South Eastern Desert, Red Sea Region and Gebel Elba.

Regional: No records in other North African Countries.

Global: Ethiopia to Somalia, Northwards to the Sudan and Eastwards to Arabia. Also recorded from Palestine and Jordan.

■ Ecology

The plant grows in Sinai and the Red Sea Zone on steep rocky slopes and precipitous cliffs of the mountains. The plant is confined to the base of mountains that are higher than 1300-1500 m above sea level.

■ Status

The plant is vulnerable.

***Moringa peregrina* (Forssk) Fiori,**

Agr. Colon.; 5:59 (1911); *Hyperathera peregrina* Forssk, F1. Aegypt. Arab.; *Moringa aptera* Gaertner, Fruct. Sem. P1.2:315 (1775).

Names

Arabic: Habb Elyasar حب اليسار , Habba ghalia حبة غالية ,baan awayr حب البان , bayreh, terfaal, yayn.

English: Wild drumstick tree, Ben-oil tree, Ben nut (seed), Moringa.

French : Ben blanc, Moringe aptere, Arbre noix de ben..

■ Part(s) Used

Seeds and oil obtained from seeds.

■ Collection

The leaves and flowering tops are collected when the plant is in late flowering stage.

■ Preparations

Infusion, tincture, capsule and cream.

■ Use

Oral.

■ Constituents

The seed oil of *Moringa peregrina* contains a high level of oleic (70.5%), followed by gadoleic (1.5%), while the dominant saturated acids were palmitic (8.9%) and stearic (3.82%).a-g-and d-tocopherols were also detected. B-sitosterol was found as the most predominant component of the sterolic fraction of the oil. Campesterol, stigmasterol, brassicas-terol and cholesterol were also found.

■ Pharmacological Action and Toxicity

The seed oil contains almost all the fatty acids that are also found in olive oil. Moringa wood is reported to be resistant to termites and is therefore popular as a building material.

■ Pharmacopoeia

Not available

■ Phytopharmaceutical Products

Not available

■ Traditional Medicine and Indigenous Knowledge

History: Moringa was well known in the ancient world, but only recently has been "rediscovered" as a multipurpose tree with a wide variety of potential uses. The pleasant-tasting edible oil, which can be extracted from the seeds, was highly valued by the ancient Roman, Greek and Egyptian civilizations for use in making perfume and in protecting skin. The ben oil has been used by the Egyptians since Old and Middle Kingdoms (3000-2000 BC).

■ Traditional Medicinal Uses

- Analgesic
- Abdominal pain
- Burns
- Constipation
- Febrifuge
- Laxative
- Headache

Other Uses of the Plant: The bark of the *Moringa peregrina* tree was used to remove

freckles. The wood is seen as a good source for fire-wood and charcoal.

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***Nerium oleander* L.**
Apocynaceae



Compiled by: Dr. Zeineb Ghrabi

■ Morphological description

Nerium oleander is a perennial shrub that can form clumps 2-4 m. tall with erect stems and branches. The big leaves are in whorls of three, can be 10 cm. long, and are usually drab, evergreen, leathery, simple, entire, lanceolate lengthwise, pointed, with a median vein that is very prominent underneath and a number of parallel secondary veins. The showy flowers have a strong scent and are bunched in terminal corymbs. The calyx is twice or three times as short as the tube of the corolla, the throat of which has 5 multifid scales opposed to the lobes that are spread out in a 3-5 cm.-diameter ring. The stamens are enclosed and inserted in the middle of the corolla. The fruit is cylindrical, composed of two fused, linear, 4-8 cm.-long follicles. There are many seeds, each with a red-haired pappus. Flowering occurs from March to June. Two subspecies are signalled in the Mediterranean: the subsp. *kurdicum* (Asian Turkey) and the subsp. *oleander*, an endemic of the Mediterranean.

■ Geographical distribution

Local: A very widespread species in all of Tunisia, from north to south; absent in the Saharan part.

Regional: Morocco, Algeria, Tunisia and Libya.

Global: The Mediterranean, south-western Asia and North Africa.

■ Ecology

Nerium oleander is a nanophanerophyte or phanerophyte taxon that grows in all bioclimates

***Nerium oleander* L.**

Sp. Pl.: 209. 1753

Arabic: defla

French: laurier rose

English: oleander, rose-bay

falling between the damp and the arid. It always indicates permanent dampness of the soil, but not hydromorphia. Thus it is found in wadi beds and along watercourses, in watering places and damp stony ground. It is especially abundant in the coastal fringe.

■ Status, conservation and culture

The oleander is grown in Tunisia as an ornamental plant; growing it from seed seems difficult but from cuttings is easier: cuttings from young shoots are put into light soil that is kept very damp. Its toxicity is well-known.

■ Part used

The root and leaves.

■ Constituents

The leaves contain about 1.5% of cardenolides, the major element being oleandrone. It is accompanied by close derivatives. There are also weakly active cardenolides (heterosides of uzarigenine) and inactive cardenolides (heteroside of adynergenine, of D-digitalose), triterpenoids, a resin, tannins, glucose, a paraffin, ursolic acid, vitamin C and an essential oil. The seeds contain glucosides (oleandrone, odorosides, adigoside). The bark also contains glucosides (rosaginoside, nerioside, corteneroside). The roots contain steroids.

■ Traditional medicine

For gangrene: pound the leaves of *Nerium oleander* with honey and apply it as a poultice.

For eczema: decoct equal amounts of the leaves of *Nerium oleander* and of *Stipa tenacissima* and use locally as a swab.

Headaches and colds: fumigate with the roots.

Toothache: a mouthwash with a decoction of the leaves.

Scab, lice and hair loss: rub with leaves that have been macerated.

Abortion: an infusion of the leaves alone or associated with harmel seeds is an abortifacient.

Slight skin lesions that do not bleed (bruises, burns, tumours etc.): the local application of crushed leaves.

■ Pharmacological action and toxicity

Oleandrine is antiinflammatory, antitumoral and emollient and potentialises apoptosis. The hydroalcoholic and aqueous extract of the flowers is antinociceptive and cardiotoxic. The leaves and seeds provoke poisoning with nausea, vomiting, mental confusion, bradycardia and ventricular hyperkalaemia that can quickly end in death.

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***Plantago afra* L.**
Plantaginaceae



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Photo by K. H. Batanouny

■ Morphological Description

Annual herb, erect stem, simple or thyrsoid-branched. Leaves grow opposite, linear-lanceolate, entire or with a few teeth, narrowed at both ends, glabrescent. Inflorescence arises from upper axils, scapes 1-5 cm long; spikes are ovate-spherical, glandular hairy. Bracts are ovate-lanceolate to lanceolate, acute or acuminate with wide scarious margin below. Sepals, hairy and glandular, are equal, oblanceolate. Corolla is cream to yellow, lobes narrow ovate, acute. Seeds are narrow-elliptic, reddish-brown, shining.

■ Geographical Distribution

Local: It is rare in the Mediterranean, Arabian Desert, Red Sea, Gebal Elba and Sinai regions.

Regional: North Africa.

Global: Western Asia, Southern Europe, France, Spain and Cuba.

■ Ecology

The plant is rare and grows in particularly sandy habitats.

Plantago afra L., sp. Pl., ed. 2, 168 (1762).
Plantago psyllium L., sp. Pl., ed. 2, 167 (1762),
Non L., sp. Pl., 1, 115 (1753)
Plantago parviflora Desf., Fl. Atlant. 1: 141 (1798).

Names

Arabic: Qatoona قطونة ,
Hashishet el-brageeth حشيشة البراغيت ,
Asludj عسلوج , Merwash مرواش ,
Harmola حرمولة , Umm rwis أم رويس .

English: Flea wort.

French: Herbe aux puces, Puciere, Psyllium.

■ Status

This rare plant is considered endangered, and in need of conservation ex situ, as a result of the threatening of its habitats. It is cultivated and sometimes becomes a weed in fields of cumin in Upper Egypt. It is known by farmers as kammoun dakar (dakara being the Arabic word denoting male).

■ Part(s) Used

Ripe seeds

■ Collection

The plants are cut during the growing season and used fresh, as juice or dried for decoctions. Leaves are cut before flowering and dried.

■ Preparations

Decoction, infusion, liquid extract, tincture, powder.

■ Uses

Oral external.

■ Constituents

Mucilages (only in the epidermis of the seed coat) mainly arabinoxylans.

■ Pharmacological Action and Toxicity

Emolient; in chronic constipation; demulcent and decrease serum cholesterol, LDL cholesterol, and LDL:HDL ratios, and triglycerides, by binding bile

acids, hence increasing faecal excretion while increasing bile salt synthesis from cholesterol. Psyllium seed has laxative properties due to the swelling of its husk in water to form a gelatinous mass, thus keeping the faeces hydrated and soft. The resulting bulk promotes peristalsis and laxation. Adequate fluid should be taken with the seed to ensure that it swells effectively in the stomach. Psyllium husk strongly reduced the colon tumors in rats. An uncontrolled study reported that the use of the fresh leaves prevented itching and the spread of dermatitis in poison ivy-induced dermatitis. Also, it is commonly taken to reduce autotoxicity.

Modern studies on humans have investigated psyllium for treating irritable bowel syndrome and chronic constipation.

Plantago afra is used to treat sluggish or irritable bowels. Its non-irritant nature means that it is safe to use in such conditions as Crohn's disease. It may be applied topically for infections and furunculosis. A preparation of psyllium is also used to assist the production of smooth, solid faecal mass after a colostomy. Ground seeds or husk are used in various dietary supplement formulations for increased fibre, cholesterol reduction and laxative activity e.g., weight loss products.

■ Pharmacopoeias

Egyptian Pharmacopoeia (1984)

Indian Pharmacopoeia (1985)

British Pharmacopoeia (1993)

US Pharmacopoeia (1995)

■ Pharmaceutical Products

Metamucil (Searle)

■ Traditional Medicine and Indigenous Knowledge

History: Decoction of seeds with water overnight is used as a cure for dysentery, gastroduodenal ulcers, diarrhoea, chronic constipation, (especially when the condition is resulting from an over-relaxed bowel), internal haemorrhoids; it is also used as an emollient, and demulcent.

Seeds are crushed and applied in a poultice for furunculosis.

An infusion of the seeds is given for urethritis.

Psyllium husks are soaked in an infusion of calendula making an effective poultice for external use,

drawing out infections for boils, abscesses, and whitlows.

In China, both the seeds and whole herbs of related plantago species are used as a diuretic and to treat diarrhoea, gonorrhoea, urethritis, hemorrhoids, and kidney and bladder problems. Seeds are used to treat hematuria (bloody urine), coughing, high blood pressure (with ca. 50% success in clinical trials) and are often specially treated by frying with saltwater before drying.

The husk mucilage is used as a thickener or stabilizer in certain frozen dairy desserts.

■ Traditional Medicinal Uses

- Blood disorders (high cholesterol, diabetes and high blood pressure).
- Cancer (colon).
- Cough (symptom).
- Crohn's disease.
- Gastro intestinal tract disorders (gastro-duodenal ulcers, dysentery ulcerative colitis, to maintain remission, juvenile ulcerative colitis, constipation, diarrhoea, irritable bowel syndrome).
- Oesophageal varices (internal haemorrhoids).
- Skin disease (furunculosis).
- Urinary tract disorders (kidney, bladder, urethra, hematuria [bloody urine]).
- Venereal disease (gonorrhoea).
- Weight loss and obesity.

Other uses of the plant (Ethnobotany): Fresh leaves are applied topically for poison ivy, insect bites and stings.

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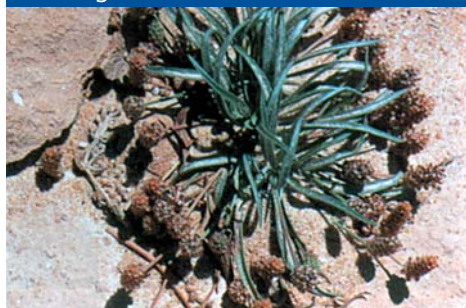
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***Plantago ovata* Forssk.**
Plantaginaceae



Compiled by: Prof. F. M. Hammouda, Prof. S. I. Ismail,
Dr. N. S. Abdel-Azim and Dr. K. A. Shams
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Photo by K. H. Batanouny

■ Morphological Description

Eglandular grey to white-hairy, short stemmed annual, subcaulescent herb. Leaves are in rosettes, narrow linear, obtuse to acute, entire or remotely denticulate, 3-nerved, covered with wooly hairs. Scapes scarcely exceed the leaves; spikes are dense, globular to ovate or oblong. Bracts, rotund-ovate, glabrous, obtuse, midrib herbaceous, margin scarious; sometimes slightly hairy. Sepals are ovate, carinate, obtuse, glabrous. Corolla-tube, lobes ovate or orbicular, glabrous. Stamens exerted. Capsule c.3 mm long. Seeds 2, cymbiform, smooth. Seeds, which are oval and boat-shaped, vary in colour from pale pink to greyish brown and even reddish yellow. Plants bloom about 60 days after planting.

■ Geographical Distribution

Local: It is common in the Mediterranean coastal region, Sinai proper, Isthmus desert and the Arabian desert East of the Nile.

Regional: North Africa.

Global: India, Iran, Pakistan, countries of the Arabian Peninsula.

■ Ecology

The plant is native to the Mediterranean region and cultivated widely throughout the world.

■ Status

The plant grows in the deserts of Arab countries in sandy habitats. Its appearance and prosperity are

***Plantago ovata* Forssk.,**

Fl. Aegypt-Arab, 31 (1775)

Plantago decumbens Forssk., Fl. Aegypt-Arab, 30 (1775).

Names

Arabic: Geneima جنيمة , Qurayta قرية .

English: Spogel Plantain.

French: Ispaghula.

affected by the irregular rainfall. Because of its wide use in the pharmaceutical industry, the plant is cultivated at Rashid (El-Behera Governorate, Egypt). *P. ovata* is a 119 to 130 day crop that responds well to cool, dry weather. It has a moderate water requirement. An environmental requirement of this crop is clear, sunny and dry weather preceding harvest. It grows best on light, well drained, sandy loams.

■ Part(s) Used

Seeds or Ispaghula Husk, which consists of the epidermis and the collapsed adjacent layer removed from the dried ripe seeds of *Plantago ovata* Forssk.

■ Collection

the harvested seed must be dried below 12% moisture to allow for cleaning, milling and storage.

■ Preparation

decoction, infusion, powder.

■ Use

oral, external.

■ Constituents

Constituents include a mucilaginous polysaccharide, consisting of a highly branched acidic arabinoxylan with axylan backbone and branches of arabinose, xylose, and 2-O-(galacturonic acid)-rhmnose residues, about 2.5% fixed oil, linoleic leic, and palmetic acids. Other constituents include aliphatic hydrocarbons and starch.

■ Pharmacological Actions and Toxicity

The main pharmacological actions of *plantago*

ovata can be attributed to the mucilage component. Ispaghula is documented to be used as a bulk laxative. The swelling properties of the mucilage enable it to absorb water in the gastro-intestinal tract, thereby increasing the volume of the faeces and promoting peristalsis. Bulk laxatives are often used for the treatment of chronic constipation. Ispaghula is also known to be used in the treatment of diarrhoea and for adjusting faecal consistency in patients with colostomies and with diverticular disease or irritable bowel syndrome. Soluble fibre intake with mucilage decreases serum cholesterol, mainly LDL. Both the dried seeds and the seeds husk are demulcent, emollient and laxative. They are used in the treatment of dysentery, catarrhal conditions of the genito-urinary tract, and inflamed membranes of the intestinal canal.

An alcoholic extract lowered the blood pressure of anaesthetized cats and dogs, inhibited isolated rabbit and frog hearts, and stimulated rabbit, rat and guinea pig ileum. The extract exhibited cholinergic activity.

A clinical trial of a *Plantago ovata* flour-based solution demonstrated it to be an effective treatment for dehydration due to acute diarrhoeal diseases.

It is used in reducing the number of bleeding episodes among patients with internally bleeding hemorrhoids. Probably due to its soluble-fiber content, Ispaghula has also improved glucose tolerance in some cases of diabetes.

The seeds, when taken with Mesalamine (anti-inflammatory drug), were more effective in treating ulcerative colitis. The use of fresh leaves prevented itching and the spread of dermatitis in poison ivy-induced dermatitis.

The oil in the seed embryo has been used to prevent atherosclerosis. It is also effective in reducing blood cholesterol.

Ispaghula husk is nearly as effective as Simvastatin in improving the lipid profile of hyperlipidemic patient. Psyllium has also been recommended for Crohn's disease.

Using *Plantago ovata* in recommended amounts is generally safe and non toxic.

Unlike some laxatives, Ispaghula husk is not addictive, and can be taken daily.

As Ispaghula supplements may reduce or delay the absorption of certain medications, these should be taken at least one hour before or between two and

four hours after taking Ispaghula.

In common with all bulk laxatives, Ispaghula may temporarily increase flatulence and abdominal distension, and may cause intestinal obstruction. If swallowed dry, Ispaghula may cause oesophageal obstruction.

The drug can be used during pregnancy and breast feeding and is contraindicated in cases of intestinal obstruction.

■ Pharmacopoeia

BPC 1973 (Ispaghula husk)

British pharmacopoeia 1980, 1983, 1990

(Ispaghula husk)

Martindale 30th edition

Pharmacopoeias-U.S. under the title *Plantago Seed*

Ayurvedic pharmacopoeia

French pharmacopoeia

German pharmacopoeia

■ Pharmaceutical Products

Agiolax (Madaus, CID)

Laxiplant (Minapharm)

Biolax (Sekem)

■ Traditional Medicine and Indigenous Knowledge

History: Decoction of Ispaghula has been used either as a cooling demulcent drink, or the seeds mixed with a little sugar and taken dry. In this form they take up water in the intestinal canal, the resulting mucilage acting as a protection to the swollen mucous membranes. The crushed seeds mixed with hot water are used externally as a poultice for rheumatism. Seeds are known to be taken dry or mixed with water in chronic diarrhoea and in atony of the intestine with constipation. Sold in the "Attarin" (traditional herbs' seller shops) in Cairo, they are used as contraceptive vaginal pessary for 7 days.

Seeds or Ispaghula husks tend to swell in contact with water, creating a feeling of "fullness" in the body, which can also help curb appetite. Ground seeds or husks are used as a laxative, and also as an emollient, demulcent and astringent, particularly in chronic colitis. Seeds are used in urinary infections as an ancillary treatment. Seeds are crushed and applied in a poultice for furunculosis. Fresh leaves are applied topically to treat various skin irri-

tations including poison ivy reaction and insect bites and stings as well as haemorrhoids. Spaghula husks seem to help soften stools and reduce the pain associated with haemorrhoids. Spaghula has also been used effectively to treat yeast infections. Psyllium has also been used in traditional herbal systems of China and India to treat haemorrhoids, bladder problems, and high blood pressure. Spaghula may also be used to treat irritable bowel syndrome, and reduce cholesterol and blood sugar levels. Young leaves of this plant are eaten in salads. Ground seeds are added to cereal or yogurt. The husk mucilage is used as a thickener or stabilizer in certain frozen dairy desserts. Spaghula husks can also be incorporated into soups, sauces or smoothies. The dehusked seed that remains after the seed coat is milled off is rich in starch and fatty acids and is used in India as chicken and cattle feed. Technical grade *Plantago ovata* has been used as a hydrocolloidal agent to improve water retention for newly seeded grass areas and to improve transplanting success with woody plants.

■ Traditional Medicinal Uses

- Helps soften stools.
- Laxative, emollient, demulcent and astringent, particularly in chronic colitis.
- Skin infections and insect bites.
- Urinary infections.
- Weight loss and obesity.
- Yeast infections.

Other uses of the plant: Contraceptive, food supplement, thickener or stabilizer in frozen dairy desserts. Also used as a hydrocolloidal agent to improve water retention for newly seeded grass.

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***Ricinus communis* L.**
Euphorbiaceae



Compiled by: Dr. Zeineb Ghrabi

■ Morphological description

Ricinus communis is a perennial remarkable for the size of its leaves and its majestic appearance. It is a shrub or small tree that can grow to 2-4 m., branched, completely glabrous, a glaucous green with yellow parts that are often reddish. The leaves are simple, alternate, downy and with a long petiole bearing shield-like epidermic glands. The limb is palmate-lobed, divided into 7-9 lanceolated, irregularly toothed, glandulous lobes.

The flowers are apetalous, set in several groups to form a wide-paniced inflorescence. The male flowers are found at the base of the bunch; their stamens are undefined, with many pollen loculi, and they hang together in very ramified bushes. The female flowers, set at the top of the bunch, have three red, lengthwise bifid styles.

The fruit is a 2-3 cm. capsule composed of three prickly shells; each loculus contains a shiny seed about the size of a haricot bean, with a caruncle, covered with a very hard yellow/brown marbled integument.

Flowering occurs between March and June.

■ Geographical distribution

Local: A species that was introduced and naturalised in all of Tunisia.

Regional: A species that was introduced and naturalised in North Africa.

Global: A cosmopolitan species, originally from the east (India) and tropical Africa. It is naturalised all over the Mediterranean.

***Ricinus communis* L.** Sp. Pl.: 1007. 1753

Arabic: kharouâa

French: ricin commun

English: castor oil plant

■ Ecology

Ricinus communis is a xenophyte taxon, a cultivated plant that does not grow wild. It develops on rubble, at waysides, near places where people live and in wadi beds.

■ Status, conservation and culture

Ricinus communis is naturalised in Tunisia; it is picked wild. It is thought to be toxic.

■ Part used

The leaves, seeds and oil.

■ Constituents

The seed contains a little water, 15-20% proteins, 40-60% lipids and ricin, a toxic substance.

■ Traditional medicine

For cold and mild respiratory problems: soak the fresh leaves in olive oil and put on the thorax (especially for children and new-born babies). For abortion: eating a seed of *Ricinus communis* will bring on an abortion. As a contraceptive: eating a seed of *Ricinus communis* will inhibit a woman's gestation for a year.

■ Pharmacological action and toxicity

The castor oil plant is antitumoral; the minimum lethal dose is about 0.4 milligrammes per kilo given parenterally in rats. Poisoning from the seed leads to nausea, headache, diarrhoea with blood, dehydration, ECG changes, necrosis of the liver, loss of consciousness, etc. The oil is laxative and purgative.

■ Use in herbal medicine

Oil from the castor oil plant seeds is laxative and purgative.

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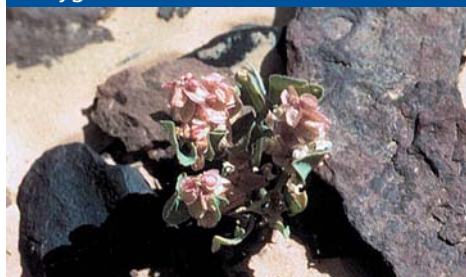
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Rumex vesicarius L.
Polygonaceae



Compiled by Dr. Salima Benhouhou

■ Morphological description

An annual herb, with ramified stems and branching from the base, on average 40-50 cm. but reaching 80 cm. The plant is entirely glabrous and presents at the nodes a membranous sheet. The leaves are big, slightly fleshy and lanceolate/spear-shaped, alternate, with a long petiole.

The flowers are grouped in dense, elongated inflorescences; the perianth has 6 membranous tepals. The flowers are grouped in twos and borne on a tiny red peduncle. When the fruit is ripe, the perianth becomes winged and purplish-red veined. It flowers in spring, from March to April, in the northern Algerian Sahara, and any time after rain in the central Algerian Sahara.

■ Geographical distribution

Local: Very common in the Algerian Sahara.

Regional: North Africa.

Global: It is common throughout the Sahara.

■ Ecology

The plant lives in desert conditions with an average 100 mm. rainfall a year and favours sandy-loamy soils. It usually occurs on non-saline wadi beds, on gravelly-sandy soils. It is also found in djebels and grows on sandy patches between rocks benefiting from water runoff.

■ Status

According to the IUCN criteria this Saharo-sindian species falls into the "C" category. Although no problems are reported for this species, human collection near settlement may be a threat in the long term.

Rumex vesicarius L.

Rumex roseus Desf.

Rumex: from the Latin rumex, plant with spear-like leaves; *vesicarius*: bladder-like

Arabic: houmeidh, hanbeit

Berber: brisse mou, taseumt

Targui: téna smint

English: sorrel, bladder-dock

French: oseille sauvage, oseille vésiculeuse

The best way to conserve this annual is to collect the seeds and sow them in nurseries. So far no data has been reported regarding its propagation and conservation.

■ Part used

The whole plant, particularly the leaves; the seeds. These are collected in the spring and prepared fresh or as a powder for internal use.

■ Constituents

Flavonoids, C-glycosides: vitexin, isovitexin, orientin and iso-orientin and anthraquinones: emdin and chrysophanol, rumicine, lapathine, oxalic acid, tannins, mucilage, mineral salts and vitamin C.

■ Pharmacological action and toxicity

Research has yet to be done to clarify the plant's pharmacological action. A search on its toxicity appears to be negative. When eaten in excess by animals, it causes minor digestive troubles due to the oxalic acid that can lock up other nutrients in the food, especially calcium, thus causing mineral deficiencies.

■ Pharmacopeias

Not relevant for this species.

■ Pharmaceutical products

Not relevant for this species

■ Traditional medicine and local knowledge

It is used as an antiscorbutic, appetiser, astringent, carminative, laxative, stomachic and tonic, and for jaundice.

The leaves are eaten fresh and much appreciated for their acid taste; it can be added to salad. The plant is considered as excellent pasture to fatten up dromedaries and goats.

In Marrakech, the powdered seeds are used to treat liver diseases and also as a laxative. In Tissint the fresh leaves are used for jaundice, liver problems, and constipation. In general, the consumption of raw leaves is known to be tonic.

In Egypt, the plant is known to be a laxative, stomachic, tonic and analgesic.

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***Senna alexandrina* Mill.**
Leguminosae (Fabaceae)



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Edited by: Prof. K. H. Batanouny
Photo by K. H. Batanouny

■ Morphological Description

Flower and Fruit: The flowers are yellow, occasionally white or pink. They are located in axillary or terminal positions on erect racemes. The calyx is deeply divided with a short tube and 5 regular, imbricate sepals. There are 5 layered petals. The 4 to 10 stamens are often irregular and partially sterile. The ovary is sessile or short-stemmed with a short or oblong style. The pod can be cylindrical or flat angular winged and often with horizontal walls between the seeds. The seeds are numerous and either horizontally or vertically compressed.

Leaves, Stem and Root: The genus *Cassia* comprises shrubs, subshrubs, and herbaceous perennials with paired-pinnate leaves. There are axes with stem glands either between the leaflets or on the petiole. The stipules have varying shapes.

■ Geographical Distribution

Local: The South Eastern desert of Egypt, Red Sea region, Sinai and Gebel Elba.

Regional: Egypt, Libya and Algeria.

Global: Central Sahara to Arabia and India, Sudan along the Red Sea coast to Somalia and Southwards to Kenya.

■ Ecology

C. senna is native to tropical Africa and cultivated in Egypt and the Sudan and elsewhere; it is native to India and cultivated mainly in India and Pakistan.

***Senna alexandrina* Mill.,**

Gard. Dict., Ed. 8, no.2 (1768).

Cassia senna L., *Cassia lanceolata* Forssk., *Cassia acutifolia* Delile,

Names

Arabic: Sana سنا, Sana makki سنمكى,
Sana hindi سنا هندی, Sana hegazi سنا حجازى,
Salamekki سلامكى

English: True senna, Alexandria senna

French: Cassia Sen

■ Status

The wild plants are overexploited and collected to be sold in the market for their folk medicinal uses. Cultivation of the plant is important. It could be cultivated with limited water resources.

■ Part(s) Used

Senna leaf and pods

■ Collection

the leaves are gathered by cutting the branches in autumn, commencing in September, exposing them to the sun until they dry.

■ Preparation

infusion, decoction, dried leaflets, dried pods, cold macerate, fluid extract.

■ Use

oral.

■ Constituents

Anthraquinone glycosides; in the leaf; sennosides A and B based on the aglycones sennidin A and sennidin B, sennosides C and D which are glycosides of heterodianthrone of aloe-emodin and rhein. Others include palmidin A, rhein anthrone and aloe-emodin glycosides, some free anthraquinones. In the fruit: sennosides A and B and a closely related glycoside sennoside A1. Naphthalene glycosides; tinnevellin glycoside and 6-hydroxymusizin glycoside, in both leaves and fruits. Miscellaneous; mucilage, flavonoids, volatile oil, sugars, resins.

■ Pharmacological Actions and Toxicity

Senna is a stimulant laxative. Sennosides are cathartic. Sennosides A and C have equal purgative power in mice.

Senna products along with cascara products are generally considered the drugs of choice among anthraquinone cathartics and are also generally considered safe. Excessive or prolonged use of senna may lead to colon damage and other problems. However, when senna is given in doses sufficient to produce a motion of physiological water content, it can be safely administered, even over a long period of time. Senna dose not induce specific lesions in the nerve plexus of the intestinal wall, and when used rationally, does not lead to electrolyte losses or habituation. Chronic abuse can disturb electrolyte balance, leading to potassium deficiency, heart desfunction, and muscular weakness, especially under concomitant use of heart-affecting glycosides, thiazide diuretics, corticoadrenal steroids, and licorice root. Significant inhibitory activity in mice against leukaemia has been documented for aloemodin. For the treatment of constipation, senna is usually administered as tablets, granula or syrup. Senna should not be given to patients with intestinal obstruction or with undiagnosed abdominal symptoms; care should also be taken by patients with inflammatory bowel disease and prolonged use should be avoided.

Non-standardized anthraquinone-containing laxative preparations should not be taken during pregnancy or lactation since their pharmacological action is unpredictable.

■ Pharmacopoeia

- Egyptian pharmacopoeia 1972
- British pharmacopoeia 1980
- BHP 1983.
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- Martindale 30th edition.

■ Pharmaceutical Products

- Sennalax Tablets (purified calcium salt of extract) (Nile).
- Mucinum Tablets (Amriya Pharm. Ind.).
- Laxative tea bags preparation. (Mepaco).
- Intestinal tea bags preparation. (Sekem).
- Eucarbon, (Sedico).

■ Traditional Medicine and Indigenous Knowledge

History: Senna is an Arabian name, and the drug was first brought into use by the Arabian physicians.

■ Traditional Medicinal Uses

Constipation: a stimulant laxative, useful for either habitual constipation or occasional use.

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***Senna italica* Mill**
Leguminosae (Fabacea)



Compiled by: Prof. F. M. Hammouda, Prof. S. I. Ismail,
Dr. N. S. Abdel-Azim and Dr. K. A. Shams
Edited by: Prof. K. H. Batanouny

■ Morphological Description

A perennial herbaceous plant about 60 cm high, with an erect or procumbent, smooth stem, downy at the base. Leaves are alternate, equally pinnate, smooth, with no gland upon the petiole; leaflets in 4 to 6 pairs, opposite, obovate, rounded, mucronate at the apex, unequal at the base, the uppermost gradually the largest; stipules narrowly triangular, rigid, acute, spreading, and persistent. The flowers are pale-yellow, on erect, rather lax, axillary, stalked racemes. The legumes are oblong, falcate, membranous, smooth, rounded at each end, with an elevated ridge upon the valves over each side, so as to have an equally interrupted ridge along the middle, towards which the veins of each legume are directed nearly at right angles; 6 to 8 cordate seeds. Flowers over summer until the autumn.

■ Geographical Distribution

Local: All over the deserts of the country, especially the Eastern desert, Red Sea region, Sinai and Gebel Elba.

Regional: Egypt, Libya and Algeria.

Global: North Africa, from Cape Verde Is. to Egypt, extending south to Nigeria, Sudan and Somalia, also in Arabia to S. Iran and Pakistan.

■ Ecology

The plant grows in habitats sometimes similar to that of *Senna alexandrina*. This species grows in the wild in dry sandy habitats in different African countries.

Senna italica Mill.,

Gard. Dict., Ed. 8, no.2 (1968).

Cassia obovata Collad, *Cassia italica* Mill.

Names

Arabic: Sana mekky سنامكي ,
Sala mekky سلامكي , Ischrik عشرق

English: Senna

French: Senne

■ Status

The plant is fairly common in its habitats. However, the disturbance of its habitat in addition to the collection of the herb have a great effect on the plant.

■ Part(s) Used

Leaves, pods and seeds.

■ Collection

The leaves are gathered by cutting the branches in autumn, commencing in September, exposing them to the sun until they dry.

■ Preparation

Infusion, decoction, dried leaflets, dried pods, cold macerate, fluid extract.

■ Use

Oral.

■ Constituents

The leaves and pods contain anthrone glycosides which by drying (20-50°C) are transformed into sennosides and they contain 6-hydroxymusizin glycoside, while seeds contain pipercolic acid. Ten flavonoids were isolated from the aerial parts including a new compound identified as tamarixetin (3-rutinoside-7-rhamnoside). Moreover, b-sitosterol, stigmasterol, alpha-amyrin, 1,5-dihydroxy-3-methyl anthraquinone and a new anthraquinone were isolated.

■ Pharmacological Action and Toxicity

Plant powder is taken orally for elephantiasis. The

leaflets and pods are well known for their purgative effect. Crushed seeds are used for ophthalmic diseases. It is reported that *Cassia italica* is CNS depressant, manifested as anticonstipation and sedation, and has anti-inflammatory, antipyretic, analgesic, antineoplastic and antiviral activity.

■ Pharmacopoeia

Not available

■ Pharmaceutical products

Not available

■ Traditional Medicine and Indigenous Knowledge

History: *Senna italica* is a plant of Arabian origin. The plant is widely acknowledged in Bahrain as medicinal; as an infusion, its pods and leaves are used as a purgative. *Senna* is apparently not used as a medicine today in the nearby Eastern Province of Saudi Arabia, where some Bedouins regard it as toxic to livestock. However, the seeds are eaten by Bedouins in Central Saudi Arabia, who say they are good for the stomach and as a purgative. A decoction of the crushed seeds is used as a laxative in the United Arab Emirates. In his day, Avicenna prescribed *senna* as a purgative for expelling black bile. In recent times, the leaves have been exported from Egypt to Europe, where they are used as the drug "dog senna".

■ Traditional Medicinal Uses

Constipation: a stimulant laxative, useful for either habitual constipation or occasional use.

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***Tamarix aphylla* (L.) Karst.**
Tamaricaceae



Compiled by Dr. Salima Benhouhou

■ **Morphological description**

Athel tamarisk has a rounded or irregular, spreading crown of many heavy, stout branches and long, drooping twigs. It reaches a height of 10-18 m. and may attain a diameter of 0.8 m. The bark becomes thick, deeply furrowed in long narrow ridges on the trunk and smooth on the branches. It has a deep taproot. The leaves are tiny, grey-green, 1.5 mm.-long scales that overlap closely on the twigs, giving the branches their typical articulate appearance. The small pink flowers are grouped in hairy, dense, spike-like racemes. The fruit is a small capsule with three valves; it matures in late summer. It flowers from spring through the summer.

■ **Geographical distribution**

Local: Common in the Algerian Sahara.

Regional: North Africa.

Global: Common throughout the Sahara and further east in India.

■ **Ecology**

This native tree grows in desert environments in North Africa and the Middle East, with a low rainfall not exceeding 100 mm. a year. It is usually found in wadis on rich clay soil, with a moderate sand accumulation. This drought-resistant tree is tolerant of alkaline and saline soils. A big evergreen, it is often planted along roads to act as a windbreak and give shade in the oases of the Algerian Sahara.

■ **Status**

According to the IUCN criteria this Saharo-sindian

***Tamarix aphylla* (L.) Karst.**

Tamarix articulata Vahl.

Tamarix orientalis Forssk.

Tamarix: according to Bonnier, tamaris refers to a small stream in the Pyrenees; *articulata*: jointed (consisting of segments held together)

Arabic: tlaïa, ethel

Targui: tabrakat

English: athel tamarisk

French: tamarix à galle, tamarix aphyllé

species falls into the "C" category.

There is no immediate threat for this tree, since it grows quickly. However, its use as fuel wood may pose a conservation problem in the long term, particularly in the vicinity of oases.

■ **Part used**

The leaves and young branches; the roots. These are collected in the spring when the new twigs develop, and prepared as a decoction and an infusion. It is taken internally as a decoction, and used externally as a lotion.

■ **Constituents**

Tannin.

■ **Pharmacological action and toxicity**

A search on its toxicity appears negative.

■ **Pharmacopeias**

Not relevant for this species.

■ **Pharmaceutical products**

Not relevant for this species.

■ **Traditional medicine and local knowledge**

It is used for tuberculosis, leprosy, smallpox and all contagious diseases. In these cases, a decoction of the roots is renowned for its efficiency. In the Moroccan and Algerian Sahara, bark from the large branches, boiled in water and mixed with vinegar, is used as a lotion against lice.

Its wood is used in construction (fence posts) and in carpentry (furniture), or as fuel, and makes excellent charcoal. It gives off a fragrant odour when burned. It is relatively unpalatable to most classes of livestock, since its foliage contains phenolic acids. The Tuareg use the gum as a sweetener. In Morocco, the gall was used for its tanning properties.

In the Dra and the Tafilalet, an infusion of the gall, or the powdered plant, is taken as an astringent for enteritis and gastralgia. It is also used as an antialgic for toothache.

A decoction of the leaves and young branches is used for a swollen spleen. When ginger is added to the same decoction it can be used for problems of the uterus.

Tar made from tamarisk wood is used to treat dromedary scabies.

The leaves are used for prophylactic fumigation against epidemics and misfortune.

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***Tribulus terrestris* L.**
Zygophyllaceae



Compiled by Dr. Salima Benhouhou

■ Morphological description

An annual trailing plant up to 25 cm. with prostrate stems. The entire plant is covered with short hairs that give the plant its bright green colour. The leaves are pinnate with 8 to 12 pairs of oblong-oval leaflets. The flowers are yellow, with 5 petals. The fruit is a small 6-7 mm. capsule with spines typically arranged in a cross.

It flowers in the spring in the northern Algerian Sahara, and any time after rain in the central Algerian Sahara.

■ Geographical distribution

Local: Mediterranean-Saharan.

Regional: North Africa.

Global: Cosmopolite in the arid zones of the two hemispheres (southern Europe, Africa, tropical and sub-tropical Asia, North Australia and tropical regions of the new world).

■ Ecology

This annual herb is usually found in wadis on gravelly-sandy soils. It also occurs on sandy-loamy soils in large depressions.

■ Status

According to the IUCN criteria this cosmopolite species falls into the "C" category. Due to its toxicity for animals, the plant does not appear to be threatened in its Saharan habitat.

■ Part used

The fruits; the roots. These are collected in the

***Tribulus terrestris* L.**

Tribulus: from the Greek, referring to the spiny, trap-like fruit; *terrester*: referring to the land

Arabic: adhrass el kilab, hammouss el hamir, hassak

Berber: tadjnouft, tamezlagelt, timgelest

Targui: tagaroft

English: caltrops, land caltrops

French: croix de Malte, chausse trape, tribule

spring or any time of year when the fruits are ripe. They are powdered and taken internally.

■ Constituents

Alkaloids (harman, harmol harmin and other b-carbolines), oligosaccharid (tribulosin), sapogenins (chlorogenin, diosgenin, gitogenin, hecogenin, ruscogenin, tigogenin and 25-D-spirosta-3,5-diene), flavonoids (kaempferol, quercetin) and sterols.

For the fruit the main constituents are linoleic, oleic, palmitic, stearic acids and behemic acid, traces of alkaloids, heterosides, essential oil, resins, proteins, enzymes and nitrates in large quantities.

■ Pharmacological action and toxicity

Its activity is astringent, anti-rhumatismal, anti-asthenic, anti-spasmodic, diuretic and anticancer. It is reported by nomads as toxic for sheep and goats when consumed in great quantities. It produces hepatogenic photosensitivity in livestock. Other types of poisoning are reported (alkaloidic and nitric).

Tribulus terrestris is a herb used around the world for its medicinal effects. Tribulus is extracted from the plant, and used as a natural nutritional supplement.

■ Pharmacopeias

It has been in the Brazilian Pharmacopeia since the 1950s.

German UK and US pharmacopeia.

■ Pharmaceutical products

Tribulus Terrestris Powdered Extract

A Nutritional Supplement Raw Material for Body-building & Libido Enhancement.

■ Traditional medicine and local knowledge

It is used for gravel (small bits of stone-like material in the bladder), for urinary retention, and for colic (fruit). The fruits and roots are usually indicated for gravel and urinary problems.

During periods of famine, women used to collect the fruits, crush them and eat them raw. Nowadays it is still consumed by nomads in the Air and a porridge made from it is much appreciated for its pleasant taste.

In Egypt the plant extract is reported to be antispasmodic. The flowers are used for leprosy. The fruits and seeds have been used in folk medicine for a wide range of conditions such as congestion, headache, hepatitis, kidney problems, impotence, spermatorrhea, neurasthenia, vertigo ophthalmia (vision) and stomatitis. They are also considered to be aphrodisiac, astringent, diuretic, and tonic. They are taken for dysentery and bladder pain.

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