CONSERVATION AND SUSTAINABLE USE OF MEDICINAL PLANTS PROJECT

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1. EXECUTIVE SUMMARY

This is the second part of the final report. A total of **88** wild medicinal plant species were recorded during the recent survey of **82** stands carried out by the research team in the north western coastal region of Egypt. These plants are classified into **5** categories: **7** pharmacopoeial plant species (out of **13**, all over Egypt, mentioned to be of pharmacopoeial uses) are present in the study area, **16** wild plants are used in preparations of industrial drugs in Egypt or abroad, **31** wild plant species are used in folk and traditional medicine, **72** plant species considered of potential medicinal uses and contain active principals and **11** plant species are of restricted uses and confined to the study area.

Plant names, their distributions, ecological status and preferable habitats are provided in this report. Description of vegetation and plant communities associated to medicinal plants are also included in this report.

Successful germination trials of **24** plant species are sited in this report. Of these **2** pharmacopoeial (*Hyocyamus muticus, Plantago ovata*), **6** plant species used in folk medicine (, *Adonis dentata, Asphodelus ramosus, Cyperus capitatus, Peganum harmala, Salvia lanigera, Thymelaea hirsuta*). *In-vitro* propagation of **4** wild medicinal plants (*Peganum harmala, Datura stramunium*, *Alhagi groaecorum, Plantago ovata*) is carried out in this report.

Standing-crop phytomass of **32%** of the wild medicinal plants (**28** plant species) and cover estimation of **48%** of them (**42** plant species) are presented in the current report.

The present volume includes monographs of **29** medicinal plants species in the study area. Referring to these monographs, leaves, flowers and fruits are the most frequent usable parts (**45%**, **38%** and **28%** respectively). Entire plant and bulbs represent the second harvestable part for active constituents (**24%** and **10%** respectively), while roots are the least harvestable organ used in medical treatments.

Four wild medicinal plants Illustrated in the monographs have anticancer and antitumor activities (*Ecballium elaterium, Pancratium maritimum, Reaumuria hirtella and Tribulus terrestris*) and one species (*Solanum nigrum*) contains cancer chemo-preventing materials. Traditional and indigenous knowledge of **22** plant species is briefly described in these monographs.

2. الملخص العربى

يمثل هذا التقرير الجزء الثانى من التقرير النهائى ، وقد قام الفريق البحثى من خلال الزيارات الحقلية برصد **88** نوعاً من النباتات البرية فى **82** موقعاً بمنطقة الساحل الشمالى الغربى بمصر .

تم تصنيف قائمة هذه النباتات إلى **5** مجموعات : المجموعة الأولى تشمل **7** أنواع نباتية تستخدم فى دساتير الأدوية العالمية (خلة – حنضل – سكران – ينم – بصل فرعون – شوك جمل – داتورا) ، والثانية تضم **16** نوعاً نباتياً تستخدم فى المستحضرات الطبية والمنتجات الصيدلانية بمصر والخارج ، وتحتوى المجموعة الثالثة على **31** نوعاً نباتياً تستخدم فى الطب الشعبى بالمنطقة "ويمثل هذا العدد ما يقرب من **56%** من النباتات المستخدمة فى الطب الشعبى بمصر" ، وتضم المجموعة الرابعة من هذا التصنيف الأنواع النباتية التى بها مواد مستخلصة فعالة وعددها **72** نوعاً نباتياً ، أما المجموعة الأخيرة فيقتصر استخدامها على منطقة الساحل الشمالى الغربى وتشتمل على **11** نوعاً نباتياً ذات توزيع ضيق .

يتضمن التقرير كذلك معلومات مفصلة عن الأسماء العلمية للنباتات وتوزيعها وموائلها البيئية المفضلة ، ويشير كذلك إلى تقدير الوضع البيئى والمخاطر التى تتعرض لها هذه النباتات ، كما يشتمل التقرير على تقدير الكتلة الحية لعدد **28** نوعاً نباتياً (**32%** من العدد الكلى للنباتات الطبية بالمنطقة) وكذلك تقدير الغطاء النباتى لعدد **42** نوعاً نباتياً (**48%** من العدد الكلى) .

إشتمل التقرير على محاولات ناجحة لإنبات بذور **24** نوعاً من النباتات الطبية منها نوعان لهما استخدام فى الدساتير العالمية للأدوية (ينم – سكران) ، **6** أنواع تستخدم فى الطب الشعبى (حرمل – أبو العفين – سعد – بردقوش – عنصل – مثنان) ، ويتضمن التقرير كذلك محاولات جيدة لإكثار **4** أنواع نباتية عن طريق زراعة الأنسجة (حرمل – داتورا – شوك جمل – ينم) .

يحتوى هذا التقرير على دراسة مفردة (مونوجراف) لعدد **29** من النباتات الطبية بالمنطقة وتبين منها أن الأوراق (**45%**) ، الأزهار (**38%**) والثمار (**28%**) أكثر الأجزاء المستخدمة لاستخلاص المواد الدوائية بينما يمثل النبات الكامل (**24%**) والأبصال (10%) نسبة أقل ، بينما الجذور هى الأقل استخداماً (**7%**) .

رصد هذا التقرير أيضاً 4 أنواع نباتية بها مواد مضادة للأورام السرطانية (فاقوس الحمار – ضرس العجوز – بصيلة – أم الندى) وكذلك نوعاً نباتياً واحداً (عنب الديب) يحتوى على مواد كيميائية مانعة للسرطان . وتشتمل الدراسة المفردة كذلك على وصف تفصيلى للمعارف التقليدية والإستخدامات الشعبية لعدد **22** نوعاً نباتياً .

3. INTRODUCTION

The medicinal value of drug plants is due to the presence of some chemical substances that have a definite physiological action in the human body. Some of these materials are powerful poisonous, so that the preparation and administrating of the drug plants should be left entirely in the hand of skilled pharmacists and physicians (WHO, 1993).

The great surge of public interest in using plants as medicines have been based on the assumption that plants will be available on the continuing bases. However, no concerned effort has been made to insure this, in the face of the threats posed by increasing demand, a vastly increasing human population and extensive destruction of plant-rich habitat such as wetlands, Mediterranean ecosystems and parts of arid zone (Batanouny, 1999).

It has to be mentioned that several researches projects activities have been implemented in the Mediterranean coastal region. These activities focus on the sustainable development of natural resources and biodiversity conservation in Omayed Biosphere Reserve (OBR) and few areas around it. Little work has been done west of Matruh till Sallum and its plateau. Consequently little data is available about the Mediterranean plants and their status as natural resources for potential use by local inhabitants in this region.

The first part of the final report deals with the relevant environmental issues to the theme of medicinal plants. This volume is the second part of the final report. It includes three sections: the first section contains description of vegetation types and plant communities in which the medicinal plants are main associates, germination tests, *in-vitro* propagation and successful germination trials of some medicinal plants. The standing crop phytomass and size structure of some populations of the medicinal plants are determined as components for reproductive ecology of the study area. The second section includes a list of medicinal plants classified into 5 categories (pharmacopoeial, pharmaceutical products, folk medicinal plant, potential plants with active principals and plants of restricted uses in the area). Plant names with synonyms, distribution (local, national and global) and ecological status of these plants are also provided. The third section includes monographs of some wild medicinal plants in the study area. Each monograph includes the following information: Scientific name and Synonyms, Habitat description, Ecological status, Parts used, Collection, Preparation, Uses, Constituents, Pharmacological action, Pharmaceutical products, Medicinal and Folk medicinal uses.

4. PLANT COMMUNITIES

The distribution of plant communities in the western Mediterranean coast of Egypt is controlled by the topographic location, the origin and nature of plant material, and the degree of degradation influenced by human manipulation. The local distribution of plant communities in different habitats is linked primarily to physiographic variations (Ayyad and Le Floc'h 1983). Based on literature review (see Shaltout, 2002), the number of plant communities identified in this region is 50:- 8 in coastal sand dunes, 4 in non-saline depressions, 3 in rainfed farms, 4 in salt marshes, 8 in saline depressions, 11 in inland ridges, 3 in inland plateau, 3 in inland siliceous deposits and 6 in wadis (Table 1). Description of vegetation structure and the associated medicinal plants in each community is provided in this chapter.

4.1 Habitat

4.1.1 Coastal dunes

The vegetation in the **ecosystem of coastal dunes** is generally distinguished into a community of *Ammophila arenaria* and *Euphorbia paralias* on young mobile dunes, and *Crucianella maritima* and *Ononis vaginalis* on old stabilized dunes (El-Ghonemy & Tadros, 1970.). At the initial stage of formation, the dunes are unstable and overwhelmingly dominated by a community of *Ammophila arenaria*. In more advanced stages of dune stabilization, communities of *Euphorbia paralias, Pancratium maritimum, Elymus farctus, Crucianella maritima, Echinops spinossissimus,* and *Thymelaea hirsuta* become successively more and more common (Ayyad 1973, Ayyad & El-Bayyoumy 1980). Where the coastal ridge is more or less exposed a community of *Gymnocarpos decander, Thymus capitatus, and Globularia arabica* dominate. The most associated medicinal plants in this habitat are surveyed in the present study.

Arthrocnemum macrostachyum
Asparagus stipularis
Asphodelus ramosus
Astragalus spinosus
Atractylis carduus
Atriplex halimus
Bassia muricata
Cakile maritima
Calendula arvensis
Cynodon dactylon
Daucus syrticus
Deverra tortuosa
Echium sericeum
Euphorbia paralias
Filago desertorum
Frankenia revolute
Fumaria parviflora
Gymnocarpos decander
Helianthemum Lippii
Helianthemum stipulatum
Herniaria hirsuta
Hyoseris scabra
Launaea nudicaulis
Limonium pruinosum
Lotus glaber
Lotus polyphyllos
Lycium europaeum
Lygeum spartum
Retama raetam
Matthiola longipetala subsp. *livida*
Nicotiana glauca
Onopordum alexandrinum
Paronychia argentea
Phoenix dactylifera
Plantago albicans
Plantago crypsoides
Polygonum equisetiforme
Reaumuria hirtella
Reichardia tingitana
Saccharum spontaneum
Salsola kali
Salsola longifolia
Salsola tetragona
Salsola tetrandra
Salvia aegyptiaca
Salvia lanigera
Silene villosa
Tamarix aphylla
Teucrium polium
Zygophyllum album

Table 1. Distribution of the plant communities in the micro- and main habitats of the western Mediterranean coast of Egypt (modified from Shaltout, 2002)

Plant community	Micro-habitat	Main habitat	Total community
Ammophila arenaria *Euphorbia paralias*	Young less stabilized dunes	Coastal sand dunes	**2**
Crucianella maritima *Ononis vaginalis* *Pancratium maritimum* *Elymus farctus* *Echinops spinosissimus* *Thymelaea hirsute*	Old stabilized dunes		**6**
Anabasis articulate	Sandy soils with low $CaCO_3$	Non-saline depressions	**1**
Zygophyllum album	Soils with relatively high $CaCO_3$ and salinity		**1**
Plantago albicans	Soils with low salinity		**1**
Asphodelus ramosus-Thymelaea hirsuta	Fine-textured soils		**1**
Chrysanthemum coronarium *Arisarum vulgare*	Barley fields	Rainfed farms	**2**
Launaea resedifolia	More compact and relatively saline soils		**1**
Sarcocorinia fruticosa *Cressa cretica* *Atriplex halimus* *Arthrocnemum macrostachyum*	High salinity and very shallow water table	Salt marshes	**4**
Suaeda vera *Zygophyllum album* *Limoniastrum monopetalum* *Salsola tetrandra* *Aeluropus lagopoides* *Frankenia revolute*	Relatively deep water table and high salinity	Saline depressions	**6**
Atriplex halimus *Anabasis articulate*	relatively deep water table and low salinity		**2**
Thymus capitatus *Globularia Arabica*	The most rocky sites with low moisture availability	Inland ridges	**2**
Asphodelus ramosus *Herniaria hemistemon* *Plantago albicans* *Thymelaea hirsute*	More or less deep soil with high moisture availability		**4**
Noaea mucronata *Echinops spinosissimus* *Helianthemum lippii* *Scorzonera undulata* *Deverra tortuosa*	Intermediate rockiness and moisture availability		**5**
Scorzonera undulata *Anabasis articulata- Thymelaea hirsuta* *Haloxylon scoparium-Artemisia heba alba*	Sandy soil	Inland plateau	**3**
Moltkiopsis ciliata *Artemisia monosperma* *Convolvulus lanatus*	Rocky sites	Inland siliceous deposits	**3**
Capparis orientalis *Phlomus fluccosa* *Ephedra alata*	Upper position of steep slopes	Wadis	**3**
Zilla spinosa- Lycium shawii	Upper slopes		**1**
Atriplex halimus- Salsola tetrandra	Wadi beds		**1**
Convolvulus arvensis	Cultivated wadi beds		**1**

4.1.2 Non-saline depressions

The vegetation of **non-saline depressions** belongs to the Plantagento – Asphodeletum microcarpae association (Kamal, 1988). Four communities are recognized: *Anabasis articulata* community on more or less sandy soils with low contents of $CaCO_3$, *Zygophyllum album* community where the soil content of $CaCO_3$ and salinity become relatively high, *Plantago albicans* community where salinity becomes low, and *Asphodelus ramosus – Thymelaea hirsuta* community on fine-textured soils (Ayyad 1976). Non-saline depressions provide favorable conditions for cultivation of barley, figs and olives. Farming operations stimulate the growth of a considerable number of species, mostly therophytes. The most associated medicinal plants (surveyed in the present study) in this habitat are:

Adonis dentata
Allium roseum var. *tourneuxii*
Anabasis oropediorum
Artemisia monosperma
Astragalus spinosus
Atractylis carduus
Bassia muricata
Brassica tournefortii
Bupleurum semicompositum
Calendula arvensis
Carthamus lanatus
Centaurea calcitrapa
Chrysanthemum coronarium
Convolvulus lanatus
Deverra tortuosa
Echinops spinosissimus
Emex spinosa
Filago desertorum
Gymnocarpos decander
Helianthemum kahiricum
Helianthemum lippii
Herniaria hirsuta
Hippocrepis areolata
Hippocrepis cyclocarpa
Hyoscyamus muticus
Ifloga spicata
Gynandriris sisyrinchium
Launaea nudicaulis
Launaea resedifolia
Lobularia arabica
Lycium europaeum
Lygeum spartum
Malva parviflora
Medicago polymorpha
Pancratium sickenbergeri
Plantago crypsoides
Reichardia tingitana
Rumex vesicarius
Salsola kali
Salvia lanigera
Schismus barbatus
Scorzonera undulata
Silene villosa
Sonchus oleraceus
Trigonella stellata
Urginea undulata
Zilla spinosa

4.1.3 Saline habitats

The **saline habitats (salt marsh and saline depressions)** vegetation belongs to the Salicornion albicans of typical saline and marshy habitats (El-Ghonemy & Tadros, 1970), Salsolion tetrandrae of habitats with soils derived from chalky rocks, marls and rich in gypsum and soluble salts (Zohary, 1973), and Anabasion articulatae arenarium, Hammado – Anabasion articulatae (Zohary, 1973), and Thymelaeion hirsutae (El-Ghonemy & Tadros, 1970) of progressively less saline habitats. These alliances include communities dominated by *Sarcocorinia fruticosa*, *Cressa cretica*, *Atriplex halimus, and Arthrocnemum macrostachyum* in sites of high salinity and very shallow water table (i.e. salt marshes). *Suaeda vera*, *Zygophyllum album*, *Limoniastrum monopetalum*, *Aeluropus lagopoides, Salsola tetrandra* and *Frankenia revoluta* become dominant in sites with relatively deep water table but high salinity, while *Atriplex halimus* and *Anabasis articulata* dominate in sites with deep water table and relatively low salinity (Ayyad & El-Ghareeb 1982). The most

associated medicinal plants (surveyed in the present study) in this habitat are:

Achillea santolina
Allium roseum var. *tourneuxii*
Arthrocnemum macrostachyum
Asphodelus ramosus
Atractylis carduus
Bassia muricata
Cynodon dactylon
Deverra tortuosa
Filago desertorum
Gymnocarpos decander
Halocnemum strobilaceum
Herniaria hirsuta
Hippocrepis areolata
Ifloga spicata
Launaea nudicaulis
Limonium pruinosum
Lycium europaeum
Lycium shawii
Malva parviflora
Matthiola longipetala subsp. *livida*
Moricandia nitens
Onopordum alexandrinum
Plantago albicans
Plantago crypsoides
Reaumuria hirtella
Schismus barbatus
Scorzonera undulata
Sonchus oleraceus
Suaeda pruinosa
Tamarix aphylla
Trigonella stellata
Zygophyllum album

4.1.4 Inland ridges

The vegetation of forms association of *Thymelaea hirsuta* and *Gymnocarpos decander* (El-Ghonemy & Tadros, 1970). The rockiest sites with the lowest moisture availability are dominated by communities of *Thymus capitatus* and *Globularia arabica*, while sites with more or less deep soils and high moisture availability are dominated by communities of *Asphodelus ramosus*, *Herniaria hemistemon*, *Plantago albicans* and *Thymelaea hirsuta*. In sites of intermediate rockiness and moisture availability, *Noaea mucronata*, *Echinops spinosissimus*, *Helianthemum lippii*, *Scorzonera undulata* and *Deverra tortuosa* become more common (Kamal, 1988). The most associated medicinal plants (surveyed in the present study) in this habitat are:

Adonis dentata
Allium roseum var. *tourneuxii*
Anabasis articlata
Anabasis oropediorum
Artemisia herba-alba
Asparagus aphyllus
Asparagus stipularis
Avena fatua
Bupleurum semicompositum
Calendula arvensis
Carrichtera annua
Cynodon dactylon
Daucus syrticus
Ebenus armitgei
Euphorbia hierosolymitana
Filago desertorum
Gymnocarpos decander
Helianthemum kahiricum
Hippocrepis areolata
Ifloga spicata
Gynandriris sisyrinchium
Kickxia aegyptiaca
Launaea nudicaulis
Limonium pruinosum
Lotus glaber
Lycium europaeum
Lycium shawii
Malva parviflora
Matthiola longipetala subsp. *livida*
Ononis serrata
Pancratium sickenbergeri
Phagalon rupestre
Phlomis floccosa
Plantago albicans
Plantago ovata
Prasium majus
Reaumuria hirtella
Salsola tetragona
Salvia lanigera
Schismus barbatus

4.1.5 Inland siliceous sand deposits

It has an association *of Moltkiopsis ciliata*. The characteristic species in this association are: *of Moltkiopsis ciliata, Stipagrostis ciliata, Artemisia monosperma* and *Convolvulus lanatus* (El-Ghonemy & Tadros 1970, Shaltout & Ayyad 1994). The sand formations including inland sand dunes, sand flats, sand deposits and sand hummocks has many associated medicinal plants such as (surveyed in the present study):

Adonis dentata
Allium roseum var. *tourneuxii*
Anabasis oropediorum
Argyrolobium uniflorum
Arisarum vulgare var. *veslingii*
Asparagus stipularis
Asphodelus ramosus
Atractylis carduus
Atriplex halimus
Centaurea glomerata
Centaurea calcitrapa
Cynodon dactylon
Daucus syrticus
Deverra tortuosa
Echinops spinosissimus
Gymnocarpos decander
Helianthemum lippii
Helianthemum stipulatum
Ifloga spicata
Gynandriris sisyrinchium
Launaea nudicaulis
Launaea resedifolia
Lycium shawii
Lygeum spartum
Lygos raetam
Malva parviflora
Marrubium vulgare
Ononis vaginalis
Onopordum alexandrinum
Pancratium maritimum
Peganum harmala
Periploca angustifolia
Plantago albicans
Polygonum equisetiforme
Salvia lanigera
Schismus barbatus
Scorzonera undulata
Silybum marianum
Suaeda pruinosa
Tamarix aphylla
Thymelaea hirsuta
Urginea maritima (red)
Urginea undulata
Zygophyllum album

4.1.6 Inland plateau

The characteristic communities of **inland plateau** are (Shaltout 1983): *Scorzonera undulata, Anabasis articulata- Thymelaea hirsuta* and *Haloxylon scoparium-Artemisia herba alba*. The most associated medicinal plants in this habitat are:

Adonis dentata
Allium roseum var. *tourneuxii*
Anabasis articulata
Anabasis oropediorum
Arisarum vulgare var. *veslingii*
Asphodelus ramosus
Astragalus spinosus
Atractylis carduus
Atriplex halimus
Bassia muricata
Centaurea alexandrina
Citrullus colocynthis
Cleome amblyocarpa
Colchicum ritchii
Deverra tortuosa
Echinops spinosissimus
Fagonia arabica
Filago desertorum
Globularia arabica
Gymnocarpos decander
Hyoscyamus muticus
Ifloga spicata
Gynandriris sisyrinchium
Launaea nudicaulis
Launaea resedifolia
Lycium shawii
Malva parviflora
Peganum harmala
Plantago ovata
Polygonum equisetiforme
Reaumuria hirtella
Rumex dentatus
Rumex pictus
Salsola tetragona
Salsola tetrandra
Salvia lanigera
Schismus barbatus
Suaeda pruinosa
Urginea maritima (red)
Zygophyllum album

4.1.7 Rainfed farms

In this habitat, weeds of barley fields are recognized as Achilleatum santolinae Mareoticum association, with subassociations of Chrysanthemum coronariae and Arisaretosum vulgares (Kamal, 1988). Common annuals in areas of barley fields are *Chrysanthemum coronarium* and *Trigonella maritima*. Where the soil is more compact and relatively saline, *Launaea resedifolia* becomes more common (El-Hadidi & Ayyad 1975), that overlain the cultivated lands support an association *of Chrysanthemum coronarium*. The characteristic species in this association are: *of Chrysanthemum coronarium, Arisarum vulgare and Launea residifolia* (Shaltout, 2002). The most associated medicinal plants (surveyed in the present study) in this habitat are:

Achillea santolina
Adonis dentata
Ajuga iva
Anabasis oropediorum
Anagallis arvensis
Artemisia herba-alba
Asphodelus ramosus
Atractylis carduus
Atriplex halimus
Atriplex semibaccata
Bassia muricata
Brassica tournefortii
Calendula arvensis
Carrichtera annua
Chenopodium murale
Convolvulus althaeoides
Convolvulus arvensis
Deverra tortuosa
Echinops spinosissimus
Echium sericeum
Emex spinosa
Enanthrocarpus strangulates
Eurca sativa
Filago desertorum
Fumaria parviflora
Herniaria hirsuta
Hippocrepis areolata
Hordeum marinum
Launaea nudicaulis
Lycium europaeum
Malva parviflora
Marrubium vulgare
Medicago polymorpha
Moricandia nitens
Plantago albicans
Plantago crypsoides
Polygonum equisetiforme
Salvia lanigera
Schismus barbatus
Scorzonera undulata
Thymelaea hirsuta
Trigonella stellata
Vicia sativa

4.1.8 Wadis

The vegetation of **Wadis** is including wadi bed and slope. Kamal (1988) indicated that the vegetation on the tops and slopes of the wadi sides are similar to that on inland ridges, but the upper positions of the steep slopes support a typical cliff vegetation dominated by *Capparis orientalis, Phlomus fluccosa* and *Ephedra alata*. In the relatively dried wadis, a community of *Zilla spinosa- Lycium shawii* dominates the upper slopes, and a community of *Atriplex halimus- Salsola tetrandra* dominates the wadi bed. The cultivated wadi bed is dominated by *Convolvulus arvensis* with dense cover of weeds. The most associated medicinal species are:

Achillea santolina
Adonis dentata
Aegilops kotschyi
Allium roseum var. *tourneuxii*
Anabasis oropediorum
Anagallis arvensis
Argyrolobium uniflorum
Arisarum vulgare var. *veslingii*
Artemisia herba-alba
Arthrocnemum macrostachyum
Asparagus stipularis
Asphodelus ramosus
Asteriscus pygmaeus
Atractylis carduus
Atriplex halimus
Avena fatua
Bassia muricata
Biscutella didyma
Blepharis ciliaris
Bromus rubens
Bupleurum semicompositum
Calendula arvensis
Capparis spinosa
Carrichtera annua
Carthamus lanatus
Centaurea glomerata
Convolvulus althaeoides
Cotula cinerea
Cressa cretica
Cynodon dactylon
Dactylis glomerata subsp. *hispanica*
Deverra tortuosa
Echinops spinosissimus
Echium sericeum
Emex spinosa
Fumaria densiflora
Gymnocarpos decander
Helianthemum kahiricum
Helianthemum lippii
Helianthemum stipulatum
Herniaria hirsuta
Hippocrepis areolata
Hordeum marinum
Hyoseris scabra
Kickxia aegyptiaca
Launaea nudicaulis
Limonium pruinosum
Lolium multiflorum
Lotus polyphyllos
Lycium europaeum
Lygeum spartum
Malva parviflora
Onopordum alexandrinum
Otanthus maritimus
Papaver rhoeas
Peganum harmala
Phagalon rupestre
Phragmites australis
Plantago albicans
Plantago crypsoides
Plantago ovata
Polygonum equisetiforme
Prasium majus
Rumex dentatus
Rumex pictus
Salsola longifolia
Salvia aegyptiaca
Salvia lanigera
Schismus barbatus
Scorzonera undulata
Silybum marianum
Solanum nigrum
Sonchus oleraceus
Suaeda pruinosa
Suaeda vera
Tamarix aphylla
Thymelaea hirsuta
Thymus capitatus

Centaurea alexandrina
Centaurea calcitrapa
Chenopodium murale
Chrysanthemum coronarium
Cichorium endivia subsp. *pumilum*
Cistanche phelypaea
Marrubium vulgare
Medicago littoralis
Medicago polymorpha
Nicotiana glauca
Ononis serrata
Ononis vaginalis
Trigonella stellata
Varthemia candicans
Verbascum letoumeurii
Vicia sativa

4.2 Plant Cover

The plant cover was estimated quantitatively in the stands that have medicinal plants, using the line intercept method (Canfield 1941). It was indicated that most of the medicinal plants have a low cover in most stands in all habitats (Table 2). On the other hand, some species have a relatively high percentage cover such as *Urginea maritima* (red) in sand formations (97.7%); *Varthemia candicans* along the roadsides (47.5%); *Silybum marianum* in wadis (30.5%); *Zilla spinosa* in wadis (18.0%); *Asphodelus ramosus* in inland plateau (13.5%), *Phlomis floccosa* in inland ridges (13.0%); *Anabasis articulata* in rocky and consolidated dunes (11.7%); *Asphodelus ramosus* in non-saline depressions (9.6%), and in sand formations (8.5%).

Table 2. Cover (%) of some medicinal plants in the western Mediterranean coastal region. The habitats are: CD: coastal sand dunes, RC: consolidated and rocky dunes, SD: saline habitat, ND: non-saline depressions, IR: inland ridges, IP: inland plateau, SF: sand formations, RS: road sides, and WS: wadis.

Species	CD	RC	SD	ND	IR	IP	SF	RS	WS
Achillea santolina			8.9						
Aegilops kotschyi									12.4
Allium roseum			0.8		0.1		0.1		
Anabasis articulata		11.7		5.0					
Anabasis oropediorum		2.4		0.5				1.7	0.4
Arisarum vulgare						0.2	3.2		0.6
Artemisia herba-alba		0.9			5.0				6.5
Arthrocnemum macrostachyum									3.9
Asparagus stipularis							1.2		1.0
Asphodelus ramosus		1.7		9.6	3.6	13.5	8.5	3.5	2.3
Astragalus spinosus			1.8						
Atractylis carduus									0.3
Atriplex halimus									4.0
Bassia muricata			0.2						
Calendula arvensis								0.3	
Capparis spinosa									1.3
Carthamus lanatus									3.5
Centaurea glomerata									0.3
Centaurea alexandrina									0.6
Centaurea calcitrapa									1.6
Colchicum ritchii				3.9	3.1	0.3			0.1
Cotula cinerea									0.4
Cressa cretica									0.4
Crucianella maritima		3.1							
Cynodon dactylon									1.8

Table 2. Cont.

Species	CD	RC	SD	ND	IR	IP	SF	RS	WS
Daucus syrticus							0.4		
Deverra tortuosa		1.9	4.8	0.6	2.4		2.0	2.2	5.0
Echinops spinosissimus					1.3				
Echium sericeum								0.5	
Emex spinosa									13.4
Euphorbia hierosolymitana					0.3				
Filago desertorum		0.5							0.6
Frankenia revoluta									2.2
Globularia arabica		4.6							
Gymnocarpos decandrum		1.5	0.6	0.5	2.8			2.2	1.5
Helianthemum lippii		2.8					3.0		
Helianthemum kahiricum		0.3							0.2
Herniaria hirsuta		1.0	5.4		2.2				
Hordeum marianum									2.9
Hyoseris scabra	0.2								
Ifloga spicata		0.3							
Iris sisyrinchium					0.9				
Kickxia aegyptiaca					0.5				
Launaea capitata			1.5						
Launaea nudicaulis		0.3	2.8		0.9				0.2
Launaea resedifolia	0.2	1.5					0.1		
Limoniastrum monopetalum									0.6
Limonium pruinosum		0.9	7.4						
Lolium multiflorum									2.0
Lycium europaeum		2.9	3.0		1.8				3.8
Lycium shawii		1.0					0.8		
Lygeum spartum		1.5							3.1
Retama raetam		5.2					81.1		
Malva parviflora		0.7							
Matthiola longipetala subsp. livida					0.2				
Medicago polymorpha				0.5					
Moricandia nitens		1.2							
Ononis serrata									0.1
Ononis vaginalis		0.6					0.1		
Onopordum alexandrinum		2.0							
Pancratium maritimum		0.3					0.1		
Pancratium sickenbergeri				0.2					
Papaver rhoeas									6.0
Peganum harmala									8.5
Periploca angustifolia								9.2	
Phagalon rupestre					2.1				0.3
Phlomis floccosa					13.0				4.6
Plantago albicans		1.2	4.5	0.3					
Plantago ovata		2.2			0.5				
Polygonum equisetiforme			11.6						2.2
Prasium majus					7.1				
Reaumuria hirtella		0.5							
Reichardia tingitana									0.8
Salsola kali			0.7						
Salsola longifolia								2.0	6.3
Salsola tetragona					0.3				
Salsola tetrandra			19.0						
Salvia lanigera		1.5			0.5				
Salvia aegyptiaca							0.1		
Scorzonera undulata			1.4	2.6	6.7	0.1	1.2	1.1	
Silybum marianum								1.3	30.5

Table. 2 Cont.

Species	CD	RC	SD	ND	IR	IP	SF	RS	WS
Suaeda pruinosa							1.1		
Suaeda vera			1.2				0.1		0.9
Teucrium polium					1.8				1.5
Thymelaea hirsuta		1.2		1.0	2.0		1.9		3.0
Thymus capitatus		6.8							6.1
Trigonella stellata		0.5							
Urginea maritima (red)						4.9	97.7		
Varthemia candicans								47.5	7.0
Zilla spinosa									18.0
Zygophyllum album		0.1	6.3				1.4		

4.3. Reproductive Ecology

4.3.1. Germination experiments

The previous studies on the seed germination of some medicinal plants in the present work have been collected from the literature (18 plant species). The seeds of some other plants, with no available data (6 Plant species), have been treated to break dormancy by cold incubation, dipping in dilute H_2SO_4 or scarification prior their planting (Table 3). Emergence of radical was taken as the criterion of successful germination. The seeds of some plants have poor germination percentage such as *Deverra tortousa* (41%), *Plantago ovata* (52%), *Kickxia aegyptiaca* (43%) and *Moricandia nitens* (11%). The low germination percentage could be related to the low viability of seed embryos such as *Thymelaea hirsuta* (Shaltout and El-Shourbagy, 1989). On the other hand, some other species such as *Ononis vaginalis, Peganum harmala* and *Hyoscyamus muticus* have germination percentages (≥ 90%). The breaking of seed dormancy of some species needs a simple treatment such as soaking in water (eg. *Ononis vaginalis*, *Astragalus spinosus* and *Plantago ovata*). The highest germination percentages were attained by perennial herbs and trees (84% and 80% respectively), while the lowest (44%) was that attained by the shrubby species (Fig. 1).

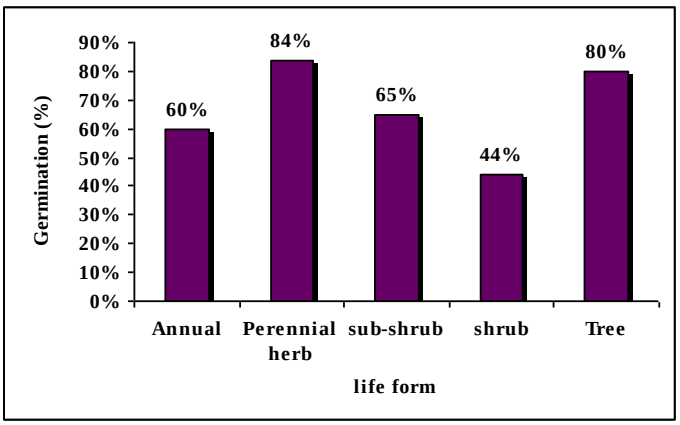

Fig. 1. Germination percentages of some medicinal plants distributed according to their life forms.

Table 3. Treatments applied for breaking dormancy of the seed germination of some medicinal plants in the north western coastal region**.**

Species	Life form	Treatment	Germination (%)	Reference
Hyoscyamus muticus	Perennial herb	cold temperature 3-5 °c for three days	95	Present study
Ononis vaginalis	Sub-shrub	cold temperature 3-5 °c for 48 hrs	97	Present study
		soaking seeds in distilled water	70	
Peganum harmala	Perennial herb	cold temperature 3-5 °c for 24 hrs	98	Present study
Deverra tortousa	Sub-shrub	cold temperature 3-5 °c for a week	41	Present study
Panicum turgidum	Perennial herb	High temperature 25-42	72	Kabiel (2001)
Chenopodium murale	Annual	soaking seeds in distilled water	83	Bidak (2003)
Plantago ovata	Perennial herb	soaking seeds in distilled water for 24 hrs	52	
Astragalus spinosus	Shrubs	soaking seeds in distilled water	84	
Adonis dentata	Annual	soaking seeds in distilled water	83	
Cyperus capitatus	Perennial herb	scarification prior soaking in water	67	
Kickxia aegyptiaca	Sub-shrub	cold temperature 3-5 °c for a week	43	
Salvia lanigera	Sub-shrub	cold temperature 3-5 °c for a week	63	
Lactuca sativa	Perennial herb	1) soaking seeds in 20 ppm Gibberellic acid for 24 hrs.	91.0	Abdel-Salam (1978)
		2) soaking seeds in 10 ppm 2-Naphthoxy acetic acid for 24 hrs.	73.6	
		3) soaking seeds in 1 ppm 2,4-Dichloro phenoxy acetic acid	84.8	
		4) soaking seeds in distilled water for 24 hrs.	80.6	
Brassica arabica *Cakile maritima* *Matthiola livida* *Matthiola longipetala,*	Annual	soaking seeds in gibberellic acid (GA_3) (27 and 29 µM/l)	≤ 15	El-Halawany *et al.* (1991)
Moricandia nitens	Sub-shrub	soaking seeds in indolylacetic acid (IAA) (10^{-8} to 10^{-6} M/l)	≤ 11	
Asphodelus ramosus	Perennial herb	1) temperature ranging from 10 °C to 25 °C	> 90.0	Hilmy (1971)
		2) in light	96.0	
		3) complete darkness	94.0	
		4) cold temperature 3-5 °c for 4 days.	96.0	Present study
Atriplex halimus	Tree	Removing of bracts	89.0	Khadre (1994)
Thymelaea hirsuta	Shrubs	1) treating seeds with 95% H_2SO_4 for 10 min. and GA_3 for 24 hrs.	42.0	Shaltout and El-Shourbagy (1989)
		2) Mechanical scarification then treating seeds with 95% H_2SO_4 for 10 min.	24.0	
		3) treating seeds with 95% H_2SO_4 for 10 min. and seeds subjected to constantly 15°C	24.0	
Retama raetam	Tree	digging micropyle	71.4	
		digging micropyle then cold incubation at 3-5 °C	67	Bidak (2003)
		Cold treatment at 3-5 °C for a weak	53.0	Present study
Prosopis juliflora	Tree	soaking seeds in conc. H_2SO_4 for 15 min.	92.4	Bidak (2003)
Pancratium arabicum	Perennial herb	1) soaking seeds in Gibberellic acid (20 and 60 ppm) for 24 hrs.	90.0	Tolba (1996)
		2) soaking seeds in water for 2 days	80.0	
		3) using stable temperature (25 °C)	80.0	
		4) Using alternating temperature 10/25 °C for 24/24 hrs.	80.0	

Several experiments have been done for germination and *In-vitro* propagation of some plant species collected from the study area. The germination experiments are done using three different plant growth media: Murashige and Skoog (MS) medium, Linsmair and Skoog (LS) medium and Gamborg (B5) medium. Stock tissues of *Peganum harmala*, *Datura stramonium* and *Astragalus hamosus* callus were maintained using MS medium supplemented with different concentrations of oxins and cytokinins growth regluators. The results of these experiments are shown in Figs. 2 – 5.

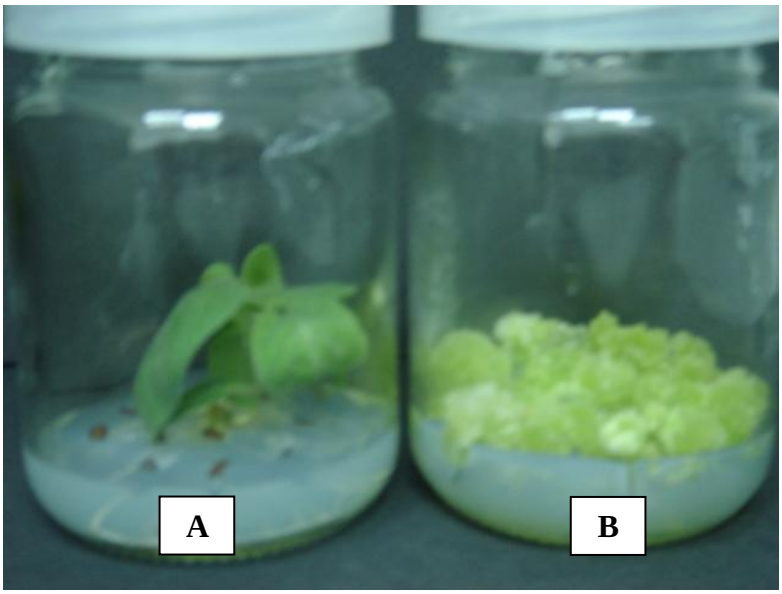

Fig. 2: Germination and callus induction of *Datura stramonium*: A: *Datura* seed are sterilized and germinated on ½ × B5 medium, B: Leave tissues are used to obtain callus stock.

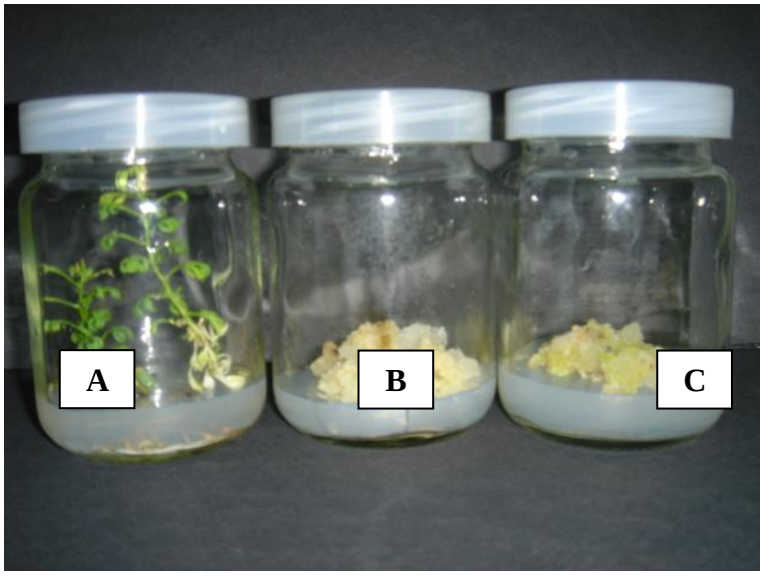

Fig.3 Germination and callus induction of *Peganum harmala*: A: germination of *Peganum* seeds on MS medium, B: callus tissues derived from leaf explants, C: callus tissues derived from leaf explants.

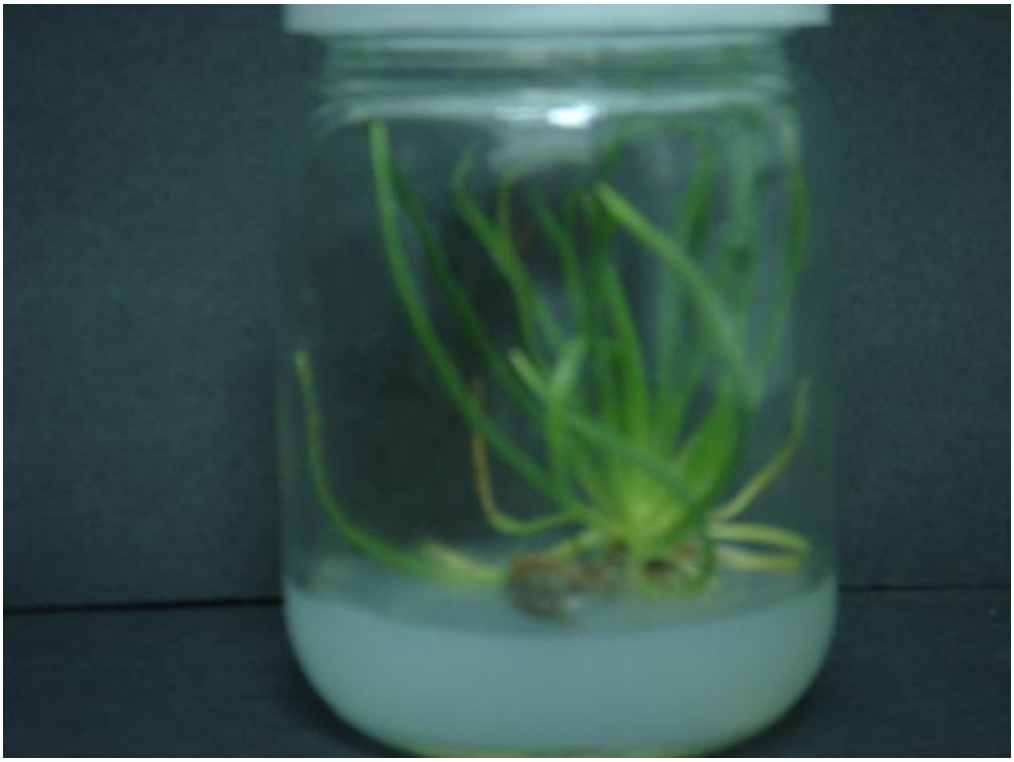

Fig. 4 Germination of *Plantago ovata* seeds on LS medium.

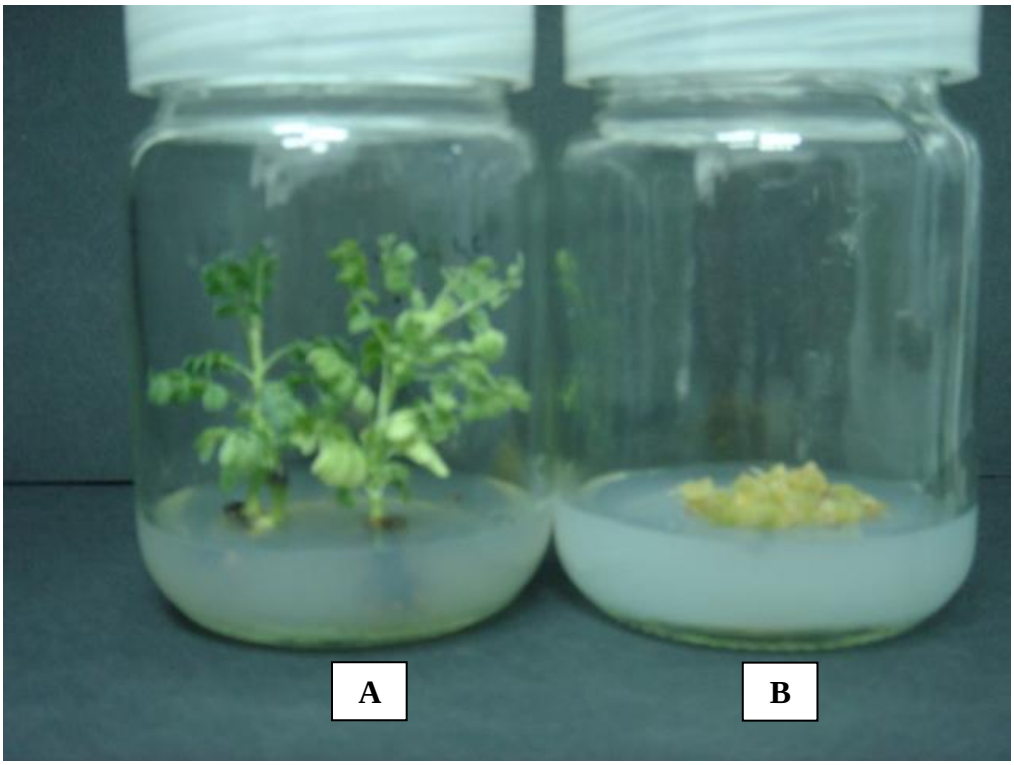

Fig.5 Germination and callus induction of *Astragalus hamosus*: A: Germination of *Astragalus* seeds on MS medium, B: Callus derived from hypocotyle explants

4.3.2. Standing-crop phytomass

Woody species play an essential role in the balance and sustainability of the desert ecosystems in arid and semi-arid territories. This role becomes more important as the dry season extends longer (Le Houérou, 1980 & Heneidy, 2002). Measurement of plant biomass and productivity has been of interest to range workers and ecologists for some times because herbivores depend directly upon plant biomass for their food (Milner and Hughes, 1970). Ecological guidance for land use planning in arid lands should be based on a thorough knowledge of the harvestable biomass and the primary productivity (Abdel-Razik *et al.*, 1996).

Generally, the great variations in the productivity levels in different sites are due to the variations in soil, climate, vegetation types, and human activities (Heneidy, 2003). On the other hand, most perennial species exhibited their greatest vegetative activity during winter and spring, and they were less active or dormant during summer.

Due to the rarity of the phytomass data in the literature, some stands (each 100 m^2) were chosen to estimate the variation in the phytomass of some medicinal species. The direct harvest method (Moore and Chapman, 1986) was applies to determine the standing-crop phytomass of the plant parts that have been used in the common medical treatments.

Table (4) shows the standing crop phytomass (SCP) (kg dry wt. /ha) of some medicinal plant species in the study area. The shrubby species contributed the highest SCP such *Thymelaea hirsuta* (3192 ± 843 kg/ha) and *Periploca angustifolia* (2013 ± 1933 kg/ha). For herbs, *Citrullus colocynthis* had the highest value (4500 ± 1000 kg/ha) followed by *Asphodelus ramosus* (309 ± 88 kg/ha) and *Euphorbia paralias* (48 ± 6 kg/ha) are the most contributed species. Most of the medicinal plants are geophytes such as *Colchicum ritchii* (2000 ± 700 kg/ha), *Scorzonera undulata* (53 ± 28 kg/ha), *Urginea maritima* (22500 ±7576 kg/ha) for the red bulbs and 6394 ± 2153 kg/ha for the white bulbs) and *Arisarum vulgare* (2800 ± 500 kg/ha).

Table 4. Standing-crop phytomass (kg dry matter/ha) of some medicinal plants in the north western coastal region.

Estimated part	Mean ± S.E	Habitat	Reference
a) whole plant			
Plantago ovata	70.6 ± 23.3	Non-saline depressions	Heneidy (1991)
	18.1 ± 6.5	Inland plateaus	Heneidy (2003)
	18.9 ± 2.7	Non-saline depressions	Shaltout & El Ghareeb (1985)
b) under-ground parts			
Arisarum vulgare	2800 ± 500	Wadis	Present study
Artemisia herba-alba	27.3 ± 22.0	Ridges	Heneidy (2003)
	38.1 ± 3.2	Inland plateaus	Heneidy (1991)
Artemisia monosperma	232.0 ± 0.0	Non-saline depressions	Heneidy (1991)
Artiplex halimus	268.9 ± 87.5	Inland plateaus	Heneidy (2003)
	5024 ± 533	Salt marshes	Heneidy & Bidak (1996)
Asphodelus ramosus	308.6 ± 88.3	Ridges	Heneidy (1991)
	247.1 ± 47.1	Non-saline depressions	Shaltout & El Ghareeb (1985)
Centaurea alexandrina	26.6 ± 6.8	Non-saline depressions	Heneidy (2003)
Colchicum ritchii	2000 ± 700	Inland ridges	Present study
Pancratium maritimum	919.0 ± 219.0	Dunes	Present study
Scorzonera undulata	52.6 ± 27.5	Inland plateaus	Heneidy (1991)
Silybum marianum	11000 ± 2000	Wadis & Road sides	Present study
Urginea maritima (red)	22500 ±7576	Inland plateaus (deep sandy soil)	Present study
Urginea maritima (white)	6394.0 ± 2153	Inland plateaus (deep sandy soil)	Present study
c) Above-ground parts			
Astragalus spinosus	6.5 ± 4.6	Ridges	Heneidy (2003)
Carthamus lanatus	118.9 ± 65.9	Inland plateaus	Heneidy (2003)
Citrullus colocynthis	4500 ± 1000	Sandy soil	Present study
Convolvulus lanatus	135.1 ± 10.0	Non-saline depressions	Heneidy (1991)
	282.5 ± 139.3	Non-saline depressions	Duevenbooden (1985)
Euphorbia paralias	47.5 ± 6.0	Dunes	Shaltout *et al*. (1988)
Halocnemum strobliaceum	2538.7 ± 408.9	Salt marshes	Heneidy & Bidak (1996)
Kickxia aegyptiaca	20.8 ± 4.0	Non-saline depressions	Heneidy (2003)
Launaea nudicaulis	6.4 ± 0.9	Non-saline depressions	Heneidy (2003)
Lygeum spartum	20.6 ± 9.6	Dunes	Heneidy (2003)
Ononis vaginalis	75.36 ± 4.1	Dunes	Shaltout *et al*. (1986)
Periploca angustifolia	2012.8 ± 1933.0	Non-saline depressions	Heneidy (2003)
Phlomis floccosa	2650 ± 500	Rocky Ridges	El-Khouly (2001)
Polygonum equisetiforme	13.3 ± 1.5	Non-saline depressions	Heneidy (2003)
Salvia aegyptiaca	38.0 ± 8.6	Non-saline depressions	Heneidy (2003)
Salvia lanigera	25.7 ± 5.1	Dunes	Heneidy (2003)
Teucrium polium	19.2 ± 11.5	Ridges	Heneidy (2003)
Thymelaea hirsuta	3192.0 ± 843.2	Inland plateaus	Heneidy (1991)
	236.1 ± 57.8	Non-saline depressions	Heneidy (2003)
	190.8 ± 20.1	Non-saline depressions	Shaltout & El Ghareeb (1985)

4.3.3. Regeneration Capacity

The structure of a plant population can be described in terms of ages, sizes and forms of the individuals that compose it (Harper & White 1974). Since the fecundity and survival of plants is often much more closely related to size than to age (Harper 1977, Watkinson & White 1985, Caswell 1986, Weiner 1986, Shaltout & Ayyad 1988), it is better to classify the life history of plants by size rather than age which is the most widely used classification for unitary organisms (Werner & Caswell 1977, Kirkpatrick 1984, Caswell 1986). In general, the size distribution of plant populations reflects their regeneration or reproductive capacity. For example, species that have an inverse J-shaped or positively skewed size distributions with the preponderance of the small (i.e. young) individuals may represent rapidly growing populations with high reproductive capacity. Gray (1975) and Shaltout and Ayyad (1988) reported that the positively skewed distribution is indicative of a self-perpetuating species, with markedly more frequency of the smaller (younger) size classes. On the other hand, the J-shaped distribution indicates the dominance of mature individuals over the juvenile ones which characterize the declining populations because they have a large proportion of larger individuals than smaller ones (i.e. limited regeneration capacity).

Size differences may be caused directly or through differences in growth rates due to age differences, genetic variation, heterogeneity of resources, herbivory, and competition (Weiner 1985). The present data includes the size structure of 18 common shrubby species in different habitats in Omayed Biosphere Reserve. The structures of some species were collected from previous studies (Shaltout & Ayyad 1988, Al-Sodany 2003): *Artemisia herba-alba, Artemisia monosperma, Halocnemum strobilaceum, Lycium europaeum, Phlomis floccosa* and *Thymelaea hirsuta*. Some other species were evaluated in the present study (*Lygum spartum* and *Peganum harmala*).

The population structure of the reported species was estimated as follows: the height and mean crown diameter of each individual in the whole stand was measured (based on 2- 4 diameter measurements / ind.). The size index of each individual was calculated as the average of its height (H) and diameter (D) {(H+D)/2}. The size estimations were then used to classify the population into 9 size classes: the first (<1dm^3 for shrubs and < 0.4 dm^3 for shrublets) and the second (1-10 dm^3 for shrubs and 0.4-0.8 dm^3 for shrublets) classes were chosen to represent the seedling and juvenile stages (Fig. 6 a&b). The absolute and relative frequency of individuals and mean height and diameter per individual in each size class were then determined.

The diagrams illustrating the size distribution of the 8 examined species approximate one of the following size distributions (Fig 6 a&b):

1. More or less inverse J-shaped distribution (*Halocnemum strobilaceum*).
2. Positively skewed distribution towards the small (i.e. young) individuals (*Lycium europaeum* and *Anabasis articulata*).
3. More or less J-shaped distribution (*Peganum harmala and Artemisia monosperma*)
4. Approximately symmetrical (i.e. bell shaped) distribution (*Phlomis floccosa* and *Lygum spartum*).
5. Bimodal size distribution (*Thymelaea hirsuta*).
6. More or less stationary size distribution (*Artemisia herba-alba*).

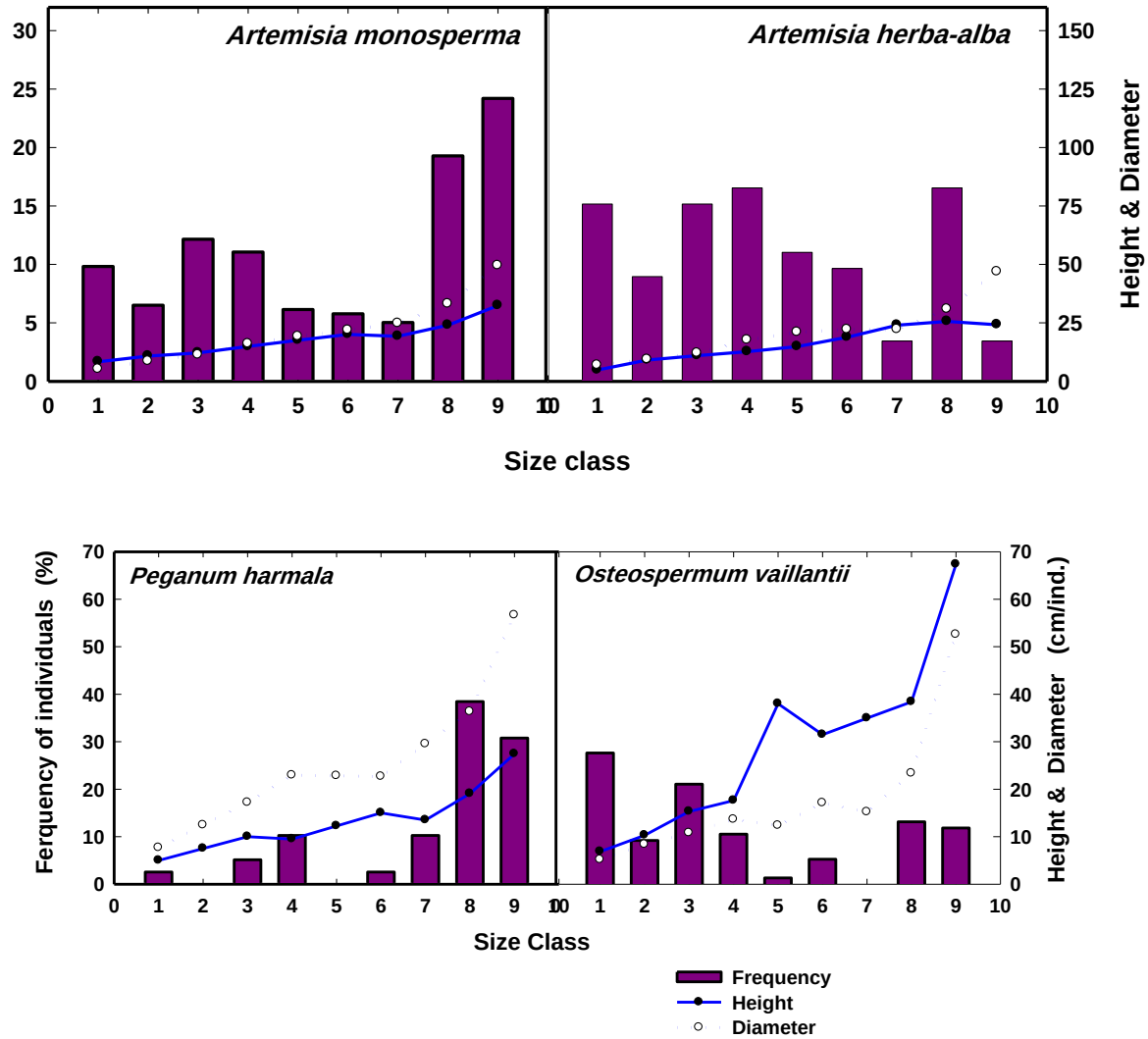

Fig. 6. Size-frequency distribution for the populations of some shrubby species in the western Mediterranean coast. The ranges of size classes are: 1: <0.4, 2: 0.4-0.8, 3: 0.8-2, 4: 2-4, 5: 4-6, 6: 6-8, 7: 8-10, 8: 10-30 and 9: >30 dm^3.

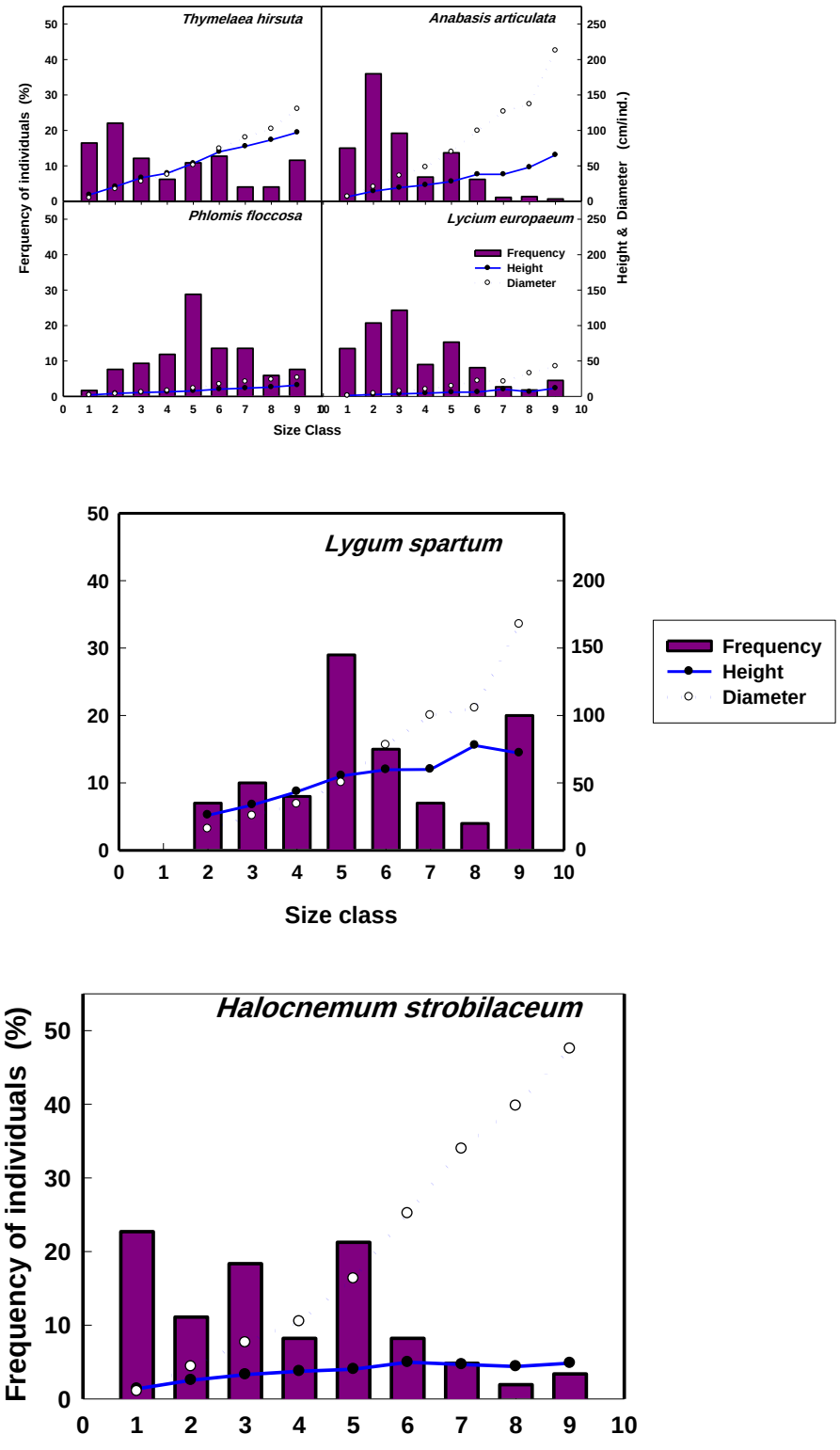

Fig. 6. Cont.

Size-frequency distribution for the populations of some shrubby species in the western Mediterranean coast. The ranges of size classes are: 1: <1, 2: 1-10, 3: 10-30, 4: 30-50, 5: 50-200, 6: 200-400, 7: 400-600, 8: 600-800 and 9: >800 dm^3.

5. MEDICINAL PLANTS

Taking into account the information and results indicated in the three previous reports, 88 plant species were reported to be of actual or potential medicinal uses (through botanical survey, phytochemical screening and social studies: Annex 1). These plants are classified into 5 categories. Plants represent each category are mentioned in details and listed in Tables (5 – 9): Pharmacopoeial plants (7 plant species, Table 5), Plants used in preparation of industrialized drugs (16 plant species, Table 6), Plants used in folk and traditional medicine (31 plant species, Table 7), Plants found to contain active principles (72 plant species, Table 8) and 11 medicinal plants of restricted use confined to the north western coastal region (Table 9).

The plant names with synonyms, their distributions (global, national and local) and main habitat are provided in Annexes (2&3).

Only 5 medicinal species (*Capparis spinosa*, *Prasium majus*, *Solanum nigrum, Zilla spinosa, Ziziphus lotus*) are ranked as threatened species according to IUCN categories (El-Hadidi & Hosni, 2000). However to give a full picture of the ecological status of the medicinal plants reported by the present study, most of the species are ranked according to the local evaluation by the research team based on long term field observation.

The evaluation depending on the level of stress and/or human impact, (for details see the third quarterly report). Description is followed by monographs for 29 medicinal plants.

National distribution key

D all the desert of Egypt except Sinai.
Da Arabian desert.
Di the Isthmic desert, i.e. El-Ti and the region North of Wadi Tumilat.
Dl Libyan desert**.**
GE Gebel Elba.
Ml the Mediterranean coastal strip from the border with Libya.
M the Mediterranean coastal strip from Sallum to Rafah.
Mma The western Mediterranean costal region, including Rosetta (ma. Stands for Marmarica).
Mp eastern Mediterranean coastal region.
N Nile region including delta, valley & Fayum.
Nd the Nile Delta, including Cairo but not further south.
Nf Nile Faiyum**.**
Nv Nile Valley**.**
O Oases of the western desert.
R the Red Sea coastal strip.
S Sinai prope**.**

5.1 Plant Names, Distribution, Status and Habitat

- **Plant name** : ***Achillea santolina* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : North Africa, Sinai, East Mediterranean region, eastwards to Afghanistan and Pakistan.
  - **National** : O, Mma, Mp, Di, Dl, S
  - **Local** : 31º 30´ 0.409"N 28º 07´ 0.364" E
- **Status**
  - **Täckholm** : common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Saline depression

- **Plant name** : ***Adonis dentata* Delile**
- **Synonyms** : ─
- **Distribution**
  - **Global** : North Africa, Sinai, Palestine, Arabia, extending to Cyprus, Turkey and Iran.
  - **National** : Mma, Mp, Di
  - **Local** : 31º 30´ 47.28´´N 26º 13´ 37.80´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : consolidated and rocky dunes, non-saline depressions, inland ridges, inland plateau, sand formations, raod sides, wadis, cultivated land

- **Plant name** : ***Aeluropus lagopoides* (L.) Trin. ex Thwaites**
- **Synonyms** : *Aeluropus repens* (Desf.) Parl.
  Dactylis lagopoides L.
  Aeluropus massauensis sensu Täckh.
  Dactylis brevifolia K.D. Koenig. ex Willd.
  Dactylis repens Desf.
  Calotheca nilotica Spreng.
  Dactylis repens Siber ex Spring.
  Aeluropus villosus Trin. ex C.A. Mey
  Poa massauensis Fresen.
  Aeluropus brevifolius (K.D. Koenig ex Willd.) Nees ex Steud.
  Dactylis massauensis (Fresen.) Steud.
  Aeluropus littoralis (Gouan) Parl. var. repens (Desf.) Coss. & Durieu
- **Distribution**
  - **Global** : Southwest Asia to central Asia, India, Sri Lanka.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, S
  - **Local** : 31º 13′ 55.44′′N 27º 19′ 0.66′′ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : common
- **Main Habitat** : Saline Habitat

- **Plant name** : ***Ajuga iva* (L.) Schreb.**
- **Synonyms** : *Teucrium iva* L.
- **Distribution**
  - **Global** : Mediterranean region, Sinai.
  - **National** : Mma, O
  - **Local** : 31º 03′ 0.409′′N 28º 07′ .364′′ E
- **Status**
  - **Täckholm** : rare
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Inland plateau

- **Plant name** : ***Alhagi graecorum* Boiss.**
- **Synonyms** : *Alhagi mannifera* Jaub. & Spach
- **Distribution**
  - **Global** : East Mediterranean region from Greece to Libya and eastwards to Iran.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, S
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Distributed in many geographical regions

- **Plant name** : ***Ammi visnaga* (L.) Lam.**
- **Synonyms** : *Daucus visnaga* L.
- **Distribution**
  - **Global** : Atlantic Islands, Mediterranean region, Southwest Asia, Ethiopia
  - **National** : Nv, Mma
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Cultivated fields, neglected areas and canal banks close to the field

- **Plant name** : ***Anagallis arvensis* L.**
- **Synonyms** : *Anagallis coerulea* L.
- **Distribution**
  - **Global** : Warm and temperate regions, widespread.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE
  - **Local** : 31º 03´ 2.76´´N 28º 20´ 29.58´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Raod sides, wadis, cultivated land

- **Plant name** : ***Arisarum vulgare*** **Targ. Tozz.**
- **Synonyms** : *Arum arisarum* L.
  Arum incurvatum Lam.
  Arum libani Schott
  Arum vulgare Targ. Tozz. var. veslingii (Schott) Engl. in a. & C. DC.
- **Distribution**
  - **Global** : Mediterranean region, Sinai.
  - **National** : Mma, Mp
  - **Local** : 31º 22´ 24.36´´N 27 º 00´ 14.34´´ E
- **Status**
  - **Täckholm** : cc
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Wadi bed & slope

- **Plant name** : ***Artemisia monosperma*** **Delile**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Libya, Egypt, Palestine, Lebanon, Syria, Iraq, Arabia.
  - **National** : Mma, Mp, Di, Dl, S
  - **Local** : 30º 47´ 37.56´´N 28º 58´ 54.84´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Non-saline depressions

- **Plant name** : ***Asparagus stipularis*** **Forssk.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Mediterranean region, Saharo-Arabian.
  - **National** : O, Mma, Mp, Di, S
  - **Local** : 31º 23´ 38.10´´N 27 º 03´ 39.60´´ E
- **Status**
  - **Täckholm** : common
  - **IUCN** : ─
  - **Current** : common
- **Main Habitat** : Consolidated dunes

- **Plant name** : ***Asphodelus aestivus* Bort.**
- **Synonyms** : *Asphodelus microcarpus* Salzm. & Viv. in Viv.
  Asphodelus ramosus Sibth. & Sm.
  Asphodelus ramosus L. subsp. microcarpus (Viv.) Baker
- **Distribution**
  - **Global** : Atlantic Islands, Portugal, Mediterranean region, Sinai, Iraq.
  - **National** : Mma, Mp, Di, S
  - **Local** : 30 º 46´ 11.64´´N 29º 12´ 13.56´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Non-saline depressions

- **Plant name** : ***Astragalus hamosus* L.**
- **Synonyms** : *Astragalus buceras* Willd.
  Astragalus brachyceras Ledeb.
- **Distribution**
  - **Global** : Mediterranean region, Sinai, extending eastwards to Iran, Atlantic Islands.
  - **National** : Mma, Di
  - **Local** : 31 º 04´ 0.66´´N 28 º 20´ 5.52´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Coastal ridge

- **Plant name** : ***Astragalus spinosus* (Forssk.) Muschl.**
- **Synonyms** : *Colutea spinosa* Forssk.
  Astragalus forsskaolii Boiss.
  Astragalus microthmnus Boiss. & Hausskn. in Boiss.
  Astragalus kneuckeri Freyn
- **Distribution**
  - **Global** : Egypt, Libya, East Mediterranean region, Arabia, Iraq.
  - **National** : Mma, Di, Dl, S
  - **Local** : 30º 52′ 23.04′′N 28º 52′ 37.62′′ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Coastal sand dunes, consolidated and rocky dunes, non-saline depressions, inland plateau, raod sides

- **Plant name** : ***Avena sativa* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Cultivated in most temperate countries
  - **National** : Nd, Nv
  - **Local** : 30º 44′ 40.56′′N 29º 10′ 25.94′′ E
- **Status**
  - **Täckholm** : Very rare
  - **IUCN** : ─
  - **Current** : Very rare
- **Main Habitat** : Wadis and cultivated lands

- **Plant name** : ***Beta vulgaris* L. subsp. *maritima* (L.) Arcang.**
- **Synonyms** : *Beta maritima* L.
  Beta perennis (L.) Halácsy
  Beta vulgaris subsp. *perennis* (L.) Aellen in Hegi
- **Distribution**
  - **Global** : Atlantic Islands, coasts of West Europe, Mediterranean region, West Asia, Sri Lanka.
  - **National** : Nd, Nv, Nf, O, Mma, Di, S
  - **Local** : 31º 30´ 40.74´´N 26º 13´ 25.02´´ E
- **Status**
  - **Täckholm** : common
  - **IUCN** : ─
  - **Current** : Rare
- **Main Habitat** : Sand deposite

- **Plant name** : ***Bryonia cretica* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Libya, Palestine, Lebanon, Syria, Turkey, Crete, Aegeam Islands
  - **National** : Mma
  - **Local** : 31º 22´ 33.72´´N 27º 03´ 55.38´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : Very rare
- **Main Habitat** : Wadis

- **Plant name** : ***Calendula arvensis* L.**
- **Synonyms** : *Calendula aegyptiaca* Pers.
  Calendula bicolor Raf.
  Calendula persica C. A. Mey.
  Calendula cristagalli Viv.
  Calendula ceratosperma Viv.
  Calendula gracilis DC.
  Calendula micrantha Boiss.
- **Distribution**
  - **Global** : Mediterranean region, eastwards to Pakistan, Afghanistan, and India, Introduced to many temperate regions.
  - **National** : Nd(+), Nv(+), Nf(+), O(+), Mma(+), Mp(+), Da(+), Di(+), D1(+), R(+), S(+)
- **Status**
  - **Täckholm** : occurrence uncertain
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Coastal sand dunes, non-saline depressions, inland ridges, wadis, cultivated land

- **Plant name** : ***Capparis spinosa* L. var. *inermis* Turra**
- **Synonyms** : *Capparis orientalis* Duh.
  Capparis rupestris Sibth. & Sm.
  Capparis spinosa L. var. *rupestris* (Sibth. & Sm.) Viv.
  Capparis spinosa L. subsp. *orientalis* (Duh.) Jafri in Ali & Jafr
- **Distribution**
  - **Global** : Mediterranean region, West and Central Asia to India.
  - **National** : O, S
  - **Local** : 31º 22´ 26.40´´N 27 º 00´ 19.98´´ E
- **Status**
  - **Täckholm** : cc
  - **IUCN** : r

- **Current** : under threat

- **Main Habitat** : Wadi bed & slope

- **Plant name** : ***Carrichetera annua* (L.) DC.**
- **Synonyms** : *Vella annua* L.
- **Distribution**
  - **Global** : Macraronesia, Europe, North Africa, East Mediterranean region to Iran.
  - **National** : Nd, Mma, Mp, Da, Di, Dl, S
  - **Local** : 31º 34´ 11.76´´N 25º 09´ 39.72´´ E
- **Status**
  - **Täckholm** : c
  - **IUCN** : ─
  - **Current** : c
- **Main Habitat** : Consolidated and rocky dunes, sallum plaateau, inland ridges, wadis, cultivated land

- **Plant name** : ***Carthamus lanatus* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Mediterranean region, western and central Europe, southern Russia, Caucasus, Arabia, Iraq, Iran, extending to Central Asia.
  - **National** : Nd(r), Nf(r), Mma(r)
  - **Local** : 31º 03´ 41.16´´N 28º 12´ 31.62´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Non-saline depressions, wadis

- **Plant name** : ***Centaurea aegialophila* Wagenitz**
- **Synonyms** : *Aegialophila cretica* Boiss. & Heldr. in Boiss. *Centaurea cretica* (Boiss. & Heldr.) Nyman
- **Distribution**
  - **Global** : Egypt, Palestine, Cyprus, Crete, southern Turkey.
  - **National** : Mma, Mp
  - **Local** : 31º 21´ 46.56´´N 26º 59´ 32.34´´ E
- **Status**
  - **Täckholm** : Very Rare
  - **IUCN** : ─
  - **Current** : Rare

- **Main Habitat** : Sand dunes and wadis
- **Plant name** **: *Centaurea pumilio* L.**
- **Synonyms** : *Aegialophila pumilio* (L.) Boiss.
- **Distribution**
  - **Global** : Libya, Egypt, Palestine, Syria.
  - **National** : Mma
  - **Local** : 31º 03´ 41.16´´N 28º 12´ 31.62´´ E
- **Status**
  - **Täckholm** : common
  - **IUCN** : ─
  - **Current** : common
- **Main Habitat** : Wadis

- **Plant name** **: *Chenopodium murale* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Cosmopolitan
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, GE, S
  - **Local** : 31º 03´ 24.54´´N 28º 07´ 21.84´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Wadis, cultivated land

- **Plant name** **: *Chiliadenus candicans* (Delile) Brullo**
- **Synonyms** : *Chrysocoma candicans* Delile
  Linosyris candicans (Delile) DC
  Varthemia candicans (Delile) Boiss.
  Jasonia candicans (Delile)Botsch.
- **Distribution**
  - **Global** : Libya, Egypt, Arabia
  - **National** : Mma, Mp, Da
  - **Local** : 31º 23´ 35.70´´N 27 º 01´ 42.48´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Wadi bed

- **Plant name** : ***Cistanche tubulosa*** **(schenk) Hook**
- **Synonyms** : *Phelipaea tubulosa* Schenk
  Cistanche lutea Wight
- **Distribution**
  - **Global** : North Africa, Western and Central Asia
  - **National** : Nv(r), Mma(r), Mp(r), Di(r), GE(r), S(r).
  - **Local** : 30º 46´ 11.64´´N 29º 12´ 13.56´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : Rare
- **Main Habitat** : Wadis

- **Plant name** : ***Citrullus colocynthis*** **(L.) Schrad.**
- **Synonyms** : *Cucumis colocynthis* L.
  Colocynthis vulgaris Schrad.
- **Distribution**
  - **Global** : Atlantic Islands, North Africa, Sinai, Sudan, Kenya, Ethiopia, West Asia to Afghanistan and Pakistan.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE, S
  - **Local** : 31º 34´ 11.76´´N 25º 09´ 39.72´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Inland plateau

- **Plant name** : ***Colchicum ritchii*** **R. Br. in Denham & Clapperton**
- **Synonyms** : *Colchicum aegyptiacum* Boiss.
- **Distribution**
  - **Global** : Libya, Egypt, Palestine, Saudi Arabia.
  - **National** : Mma(r), Mp(r), Di(r), Dl(r), S(r).
  - **Local** : 30 º 44´ 40.56´´N 29º 10´ 05.94´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : Common

- **Main Habitat** : Inland ridge

- **Plant name** **: *Convolvulus lanatus* Vahl**
- **Synonyms** : *Convolvulus el–arishensis* Boulos
  Convolvulus forsskaolii Delile
- **Distribution**
  - **Global** : Egypt, Palestine, South Turkey, Arabia.
  - **National** : Mma, Mp, Da, Di, Dl, S
  - **Local** : 30 º 46´ 11.64´´N 29 º 12´ 13.56´´ E
- **Status**
  - **Täckholm** : Very Rare
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : non-saline depressions
- **Plant name** **: *Cyperus rotundus* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Tropical and suntropical regions.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE, S
  - **Local** : 31º 22´ 35.88´´N 26º 09´ 10.50´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Cultivated lands

- **Plant name** **: Datura stramonium L.**
- **Synonyms** : Datura tatula L.
- **Distribution**
  - **Global** : Cosmopolitan
  - **National** : Mma, Nv.
- **Status**
  - **Täckholm** : common
  - **IUCN** : ─
  - **Current** : Rare
- **Main Habitat** : Cultivated lands

- **Plant name** : ***Ecbalium elaterium*** **(L.) A. Rich.**
- **Synonyms** : ─
- **Distribution**
  - **National** : Cultivated in Mma
  - **Local** : 31º 03´ 24.54´´N 28º 07´ 21.84´´ E
- **Status**
  - **Täckholm** Introduced from Libya
  - **IUCN** and cultivated
  - **Current** in Dabaa
- **Main Habitat** : Cultivated lands

- **Plant name** : ***Echium angustifolium*** **Mill. subsp.** ***sericeum*** **(Vahl) Klotz**
- **Synonyms** : *Echium sericeum* Vahl
  Echium distachum Viv.
- **Distribution**
  - **Global** : Tunisia, Libya, Egypt, Arabia.
  - **National** : Mma, Mp, Di, Dl, S
  - **Local** : 31º 04´ .66´´N 28º 20´ 5.52´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : Common
- **Main Habitat** : Coastal sand dunes, consolidated and rocky dunes, wadis, cultivated lands

- **Plant name** : ***Euphorbia paralias*** **L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Atlantic Islands, Mediterranean region, West Europe, Black Sea coasts.
  - **National** : Mma, Mp.
  - **Local** : 30 º 50´ 37.14´´N 28º 55´ 58.44´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─

- **Current** : Under threat
- **Main Habitat** : coastal sand dunes

- **Plant name** : ***Fagonia arabica* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Algeria, Libya, Egypt, Palestine, Arabia
  - **National** : O, Mp, Da, Dl.
  - **Local** : 31 º 29´ 40.08´´ N 25 º 32´ 54.30´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Common
- **Main Habitat** : inland plateau

- **Plant name** : ***Glebionis coronaria* (L.) Tzvelev**
- **Synonyms** : *Chrysanthemum coronarium* L.
- **Distribution**
  - **Global** : Mediterranean region, Sinai, eastwards to Iran.
  - **National** : Nd(r), Nv(r, Mma, Mp
  - **Local** : 31º 22´ 27.00´´N 27 º 03´ 46.50´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Wadi mouth

- **Plant name** : ***Globularia arabica* Jaub. & Spach.**
- **Synonyms** : *Globularia eriocephala* Pomel
  Globularia alypum L. var. *arabica* (Jaub. & Spach) Cavara & Grande
- **Distribution**
  - **Global** : Algeria, Tunisia, Libya, Egypt, Palestine, Lebanon, Arabia, Sudan, Ethiopia, Somalia
  - **National** : Mma, Di(r), S(r).
  - **Local** : 31º 03´ 43.02´´N 28º 12´ 01.92´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : Under threat

- **Main Habitat** : Rocky lands

- **Plant name** : ***Halocnemum strobilaceum*** **(Pall.) M. Bieb.**
- **Synonyms** : *Salicornia strobilacea* Pall.
  Salicornia cruciata Forssk.

- **Distribution**
  - **Global** : Southern Europe, North Africa, Sinai to Central Asia.
  - **National** : Nd, Mma, Mp, Di, R, S
  - **Local** : 30º 53´ 36.36´´N 28º 52´ 47.94´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : saline depressions

- **Plant name** : ***Haloxylon scoparium*** **Pomel.**
- **Synonyms** : *Salsola articulate* Cav.
  Hammada scoparia (Pomel) Iljin
  Haloxylon articulatum (Cav.) Bunge
- **Distribution**
  - **Global** : Spain, North Africa, East Mediterranean region.
  - **National** : Mma, Mp, Di, S
  - **Local** : 31º 30´ 58.86´´N 25º 41´ 58.92´´ E
- **Status**
  - **Täckholm** : common
  - **IUCN** : ─
  - **Current** : Common
- **Main Habitat** : Sand hammocks

- **Plant name** : ***Haplophyllum tuberculatum*** **(Forssk.) Juss.**
- **Synonyms** : *Ruta tuberculata* Forssk.
  Haplophyllum longifolium Boiss.
- **Distribution**
  - **Global** : North Africa, Sinai, East Mediterranean region, Arabia, Iran, Pakistan, Afghanistan, North Sudan.
  - **National** : Nv, Mma, Mp, Da, O, R, S
  - **Local** : 31º 23´ .733´´N 27º 01´ .612´´ E

- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Road Side
- **Plant name** **: *Hyoscyamus muticus* L.**
- **Synonyms** : *Hyoscyamous datora* Forssk.
  Scopolia mutica (L.) Dunal in DC.
  Scopolia datora (Forssk.) Dunal in DC
- **Distribution**
  - **Global** : Libya, Egypt, Sudan, Arabia, Iran to Pakistan and India.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE, S
  - **Local** : 31º 28´ 44.64´´N 25º 16´ 40.20´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Inland plateau

- **Plant name** **: *Ifloga spicata* (Forssk.) Sch. Bip. in Webb & Berthel**
- **Synonyms** : *Chrysocoma spicata* Forssk.
  Chrysocoma spicatum (Forssk.) Vahl
- **Distribution**
  - **Global** : Canary Islands, Mediterranean region, southwest Asia.
  - **National** : Mma(+), Mp(+), Da(+), Di(+), Dl(+), R(+), GE(+), S(+)
  - **Local** : 31º 31´ 39.6´´N 25º 10´ 51.96´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : common
- **Main Habitat** : Consolidated and rocky dunes, saline depressions, non-saline depressions, inland ridges, inland plateau, sand formations

- **Plant name** : ***Kickxia aegyptiaca* (L.) Nàbelek**
- **Synonyms** : *Antirrhinum aegyptiacum* L.
  Linaria aegyptiaca (L.) Dum. Cours.
  Elatinoides aegyptiaca (L.) Wettst. in Engl. & Prantl
- **Distribution**
  - **Global** : Egypt, Palastine.
  - **National** : Mma, Da, Di, Dl, R, S
  - **Local** : 30 º 47′ 37.56′′N 28º 58′ 48.84′′ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Inland ridges, wadis

- **Plant name** : ***Launaea nudicaulis* (L.) Hook. f.**
- **Synonyms** : *Chondrilla nudicaulis* L.
  Lomatolepis nudicaulis (L.) Cass. in Cuvier
  Microrhynchus nudicaulis (L.) Less.
  Zollikoferia nudicaulis (L.) Boiss .
- **Distribution**
  - **Global** : Canary Islands, southern Spain, Mauritania, Morocco, Algeria, Sahara, Tunisia, Libya, Egypt, Palestine, Syria, Iraq, Arabia, Iran.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE, S
  - **Local** : 31º 36′ 33.36′′N 25º 48′ 25.2′′ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : common
- **Main Habitat** : All habitats

- **Plant name** : ***Lotus polyphyllos* E. D. Clarke**
- **Synonyms** : *Lotus argenteus* Webb & Berthel.
- **Distribution**
  - **Global** : North Africa
  - **National** : Mma
  - **Local** : 30 º 53′ 48.42′′N 28º 52′ 55.74′′ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Coastal sand dunes

- **Plant name** : ***Lycium europaeum* L.**
- **Synonyms** : *Lycium mediterraneum* Dunal in DC.
  Lycium barbarum L. var. *brevilobum* Post
- **Distribution**
  - **Global** : Southern Europe, North Africa, southwest Asia.
  - **National** : Nd, Mma, Mp, Da, Di, Dl
  - **Local** : 30 º 49′ 54.18′′N 29º 12′ 11.50′′ E
- **Status**
  - **Täckholm** : Very Common
  - **IUCN** : ─
  - **Current** : Common
- **Main Habitat** : Coastal sand dunes

- **Plant name** : ***Lygeum spartum* Loefl.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Spain, Italy (incl. Sicily, Sardinia), Malta, Crete, Morocco, Algeria, Tunisia, Libya, Egypt, Kashmir.
  - **National** : Mma, Mp(r).
  - **Local** : 31º 14′ 11.16′′N 27 º 51′ 35.64′′ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Coastal sand dunes, consolidated and rocky dunes, sallum plaateau, non-saline depressions, sand formations, raod sides, wadis

- **Plant name** : ***Malva parviflora* L.**
- **Synonyms** : *Malva flexuosa* Hornem.
- **Distribution**
  - **Global** : Europe, North Africa, temperate Asia, naturalized in other temperate regions.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, S
  - **Local** : 31º 21´ 44.82´´N 27 º 59´ 31.02´´ E
- **Status**
  - **Täckholm** : Very Common
  - **IUCN** : ─
  - **Current** : Very Common
- **Main Habitat** : All habitats

- **Plant name** : ***Marrubium vulgare* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Europe, Caucasia, Mediterranean region, Sinai, Arabia, Iraq, Iran, Pakistan, naturalized in North America, South Africa and Australia
  - **National** : Mma, Mp
  - **Local** : 31º 22´ 35.88´´N 26º 09´ 10.50´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Road sides

- **Plant name** : ***Melilotus indicus* (L.) All.**
- **Synonyms** : *Trifolium indicum* L.
  Trifolium melilotus - indica L.
  Melilotus parviflorus Desf.
  Melilotus bonplandii Ten.
  Melilotus tommasinii Jord.
- **Distribution**
  - **Global** : Mediterranean region, Eurasia, introduced and naturalized elsewhere.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, S
  - **Local** : 31º 22´ 27.0´´N 27º 03´ 46.5´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Common
- **Main Habitat** : Wadis

- **Plant name** : ***Moraea sisyrinchium* (L.) Parl.**
- **Synonyms** : *Iris sisyrinchium* L.
  Gynandriris sisyrinchium (L.) Parl.
- **Distribution**
  - **Global** : Mediterranean region, western Asia.
  - **National** : Nd, Nv, Nf, Mma, Mp, Di, Dl, S
  - **Local** : 31º 03´ 43.02´´N 28º 12´ 1.92´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Consolidated and rocky dunes, non-saline depressions, inland ridges, inland plateau, sand formations

- **Plant name** : ***Nicotiana glauca*** **R. C. Graham**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Native to Argentina, naturalized in warm regions
  - **National** : Nv, Mma, Di, Dl, O
  - **Local** : 31º 21´ 23.46´´N 27 º 12´ 57.18´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : Very Common
- **Main Habitat** : Road sides

- **Plant name** : ***Ononis vaginalis*** **Vahl**
- **Synonyms** : Ononis vestita Viv.
- **Distribution**
  - **Global** : East Mediterranean region, North Africa.
  - **National** : Mma, Mp
  - **Local** : 31º 14´ 11.16´´N 27 º 51´ 35.64´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Rocky coastal dunes

- **Plant name** : ***Onopordum alexandrinum*** **Boiss.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Egypt, southern Palestine.
  - **National** : Mma, Mp
  - **Local** : 31º 14´ 58.68´´N 27 º 21´ 48.72´´ E
- **Status**
  - **Täckholm**
  - **IUCN** : ─
  - **Current**
- **Main Habitat** : Coastal sand dunes, consolidated and rocky dunes,saline depressions, sand formations, raod sides, wadis

- **Plant name** : ***Ornithogalum trichophyllum*** **Boiss. & Heldr.in Boiss.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Egypt, southern Palestine.
- **Status**
  - **Täckholm** : Very Common
  - **IUCN** : ─
  - **Current** : Very Common
- **Main Habitat** : Widely distributed in various habitats

- **Plant name** : ***Osteospermum vaillantii*** **(Decne.) Norl.**
- **Synonyms** : *Tripteris vaillantii* Decne.
- **Distribution**
  - **Global** : Egypt, Palestine, Arabia, Socotra, Sudan, Ethiopia, Eritrea, Djibouti, Somalia, Kenya, Uganda, Tanzania.
  - **National** : Da, S
  - **Local** : 31º 21´ 23.46´´N 27º 12´ 57.18´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Raod sides

- **Plant name** : ***Otanthus maritimus*** **(L.) Hoffmanns. & Link**
- **Synonyms** : *Filago maritima* L.
  Athanasia maritima (L.) L.
  Diotis maritima (L.) Desf.
- **Distribution**
  - **Global** : Western Europe northwards to southeast Ireland, Mediterranean region, southwest Asia to Caucasus.
  - **National** : Mma(r), Mp(r)
  - **Local** : 31º 36´ 33.36´´N 25º 48´ 25.20´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : wadis

- **Plant name** : ***Pancratium maritimum* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Atlantic shores of Portugal and France, shores of the Mediterranean, Black and Caspian seas.
  - **National** : Mma, Mp
  - **Local** : 31º 34´ 48.6´´N 25º 48´ 58.8´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Coastal sand dunes, consolidated and rocky dunes, sand formations

- **Plant name** : ***Papaver rhoeas* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : North Africa, Europe, Asia
  - **National** : Nd, Mma, Mp, Di, Dl
  - **Local** : 30 º 53´ 36.36´´N 28º 52´ 47.94´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : wadis

- **Plant name** : ***Peganum harmala* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : North Africa, southern Europe, Southwest Asia to Tibet.
  - **National** : Mma, Mp, Da, Di, S
  - **Local** : 31º 21´ 54.90´´N 27 º 03´ 07.56´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : under threat

- **Main Habitat** : Wadi slope

- **Plant name** : ***Periploca angustifolia*** **Labill.**
- **Synonyms** : *Periploca audiacea* Raeusch
  Periploca rigida Viv.
  Periploca fasciculata Viv. ex Coss.
  Periploca laevigata Aiton var. *angustifolia* (Labill.) Fiori
  Periploca laevigata Aiton var. *angustifolia* (Labill.) Markgraf
- **Distribution**
  - **Global** : Canary Islands, Southeast Spain, North Africa, Crete (Gávdhos), Syria.
  - **National** : Mma
  - **Local** : 31º 28′ 50.22′′N 25º 15′ 57.30′′ E
- **Status**
  - **Täckholm** : Very rare
  - **IUCN** : -
  - **Current** : under threat
- **Main Habitat** : Sand formations, raod sides

- **Plant name** : ***Phlomis floccosa*** **D. Don**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Tunisia, Libya, Egypt, Palestine, Syria, southern Aegean Islands (Karpathos and Kasos), Arabia.
  - **National** : O(r), Mma(r)
  - **Local** : 31º 23′ 14.16′′N 27 º 02′ 39.42′′ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Wadi slope

- **Plant name** : ***Plantago albicans* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Portugal, Mediterranean region, Sinai
  - **National** : Mma, Mp, Di
  - **Local** : 31º 14´ 11.16´´N 27 º 51´ 35.64´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : All habitats

- **Plant name** : ***Plantago ovata* Forssk.**
- **Synonyms** : *Plantago decumbens* Forssk.
- **Distribution**
  - **Global** : Western North America, Atlantic Islands, Mediterranean region, southwest Asia to Pakistan.
  - **National** : Mma, Mp, Da, Di, Dl, S
  - **Local** : 31º 22´ 33.72´´N 27 º 03´ 55.38´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Consolidated and rocky dunes,inland ridges, inland plateau, wadis

- **Plant name** : ***Polygonum equisetiforme* Sm.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Mediterranean region, Southwest Asia.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Di
  - **Local** : 31º 22´ 35.88´´N 26º 09´ 10.50´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Road sides

- **Plant name** : ***Posidonia oceanica* (L.) Delile**
- **Synonyms** : *Zostera oceanica* L.
  Posidonia caulini K. König in König & Sims
- **Distribution**
  - **Global** : Mediterranean coasts.
  - **National** : Mma
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Sea Shore

- **Plant name** : **Prasium majus L.**
- **Synonyms** : -
- **Distribution**
  - **Global** : Mediterranean region
  - **National** : Mma(Very Rare)
- **Status**
  - **Täckholm** : Very Rare
  - **IUCN** : vulnerable
  - **Current** : under threat
- **Main Habitat** : Inland ridges, wadis

- **Plant name** : ***Ranunculus bulbosus* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Mediterranean region, Southwest Asia.
  - **National** : Nv.
  - **Local** : 31º 13´ 50.88´´N 27º 18´ 59.16´´ E
- **Status**
  - **Täckholm** : Very Rare
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Wadis

- **Plant name** : ***Reaumuria hirtella* Jaub. & Spach**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Libya, Egypt, Palestine, Syria, Lebnon.
  - **National** : Mma, Di, Dl, S
  - **Local** : 31º 03′ 43.02′′N 28º 12′ 1.92′′ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Coastal sand dunes, consolidated and rocky dunes, saline depressions, inland ridges inland plateau

- **Plant name** : ***Retama raetam* (Forssk.) Webb & Berthel. subsp. *raetam***
- **Synonyms** : *Genista raetam* Forssk.
  Retama duriaei (Spach) Webb
  Lygos raetam (Forssk.) Heywood
- **Distribution**
  - **Global** : North Africa, East Mediterranean region, Sinai.
  - **National** : Mma, Da, S.
  - **Local** : 31º 36′ 32.76′′N 25º 48′ 29.22′′ E
- **Status**
  - **Täckholm** : Very Rare
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Sand dunes

- **Plant name** : ***Rumex vesicarius* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : North Africa, Southwest Asia (extending to South Greece) eastwards to North India and Afghanistan.
  - **National** : Mma, Da, R, GE, S
  - **Local** : 30º 46′ 11.64′′N 29º 07′ 21.84′′ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─

- **Current** : Very common
- **Main Habitat** : non-saline depressions
- **Plant name** : ***Salvia aegyptiaca* L.**
- **Synonyms** : *Salvia pumila* Benth.
- **Distribution**
  - **Global** : Cape Verde and Canary Islands, North Africa, Sudan, Ethiopia, Arabia, Iraq, Iran, Afghanistan, Pakistan, India
  - **National** : Mma, Mp, Da, Di, R, GE, S
  - **Local** : 31º 22′ 26.64′′N 27º 00′ 19.92′′ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Coastal sand dunes, consolidated and rocky dunes, wadis

- **Plant name** : ***Salvia lanigera* Poir.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Cyprus, North Africa, Sinai, Palestine, Lebanon, Syria, Arabia, Iraq, Iran.
  - **National** : Mma, Mp, Di, Dl, S
  - **Local** : 31º 22′ 26.64′′N 27º 07′ 19.94′′ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : Common
- **Main Habitat** : Plateau

- **Plant name** : ***Scorzonera undulata* Vahl**
- **Synonyms** : *Scorzonera alexandrina* Boiss.
- **Distribution**
  - **Global** : Morocco, Algeria, Tunisia, Libya, Egypt.
  - **National** : Mma, Da(r), Dl(r)
  - **Local** : 31º 31′ 39.60′′N 25º 10′ 21.96′′ E
- **Status**
  - **Täckholm** : Very Common
  - **IUCN** : ─
  - **Current** : Common
- **Main Habitat** : Inland plateau

- **Plant name** : ***Senecio vulgaris* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Europe, North Africa, southwest Asia, introduced to many temperate regions.
  - **National** : Nd, Nv, O, Mma, Di
  - **Local** : 31º 23´ 43.98´´N 27º 01´ 36.72´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Road Sides

- **Plant name** : ***Seriphidium herba-alba* (Asso) Sojàk**
- **Synonyms** : *Artemisia herba-alba* Asso
  Artemisia arragonensis Lam.
  Artemisia inculta Delile
  Artemisia herba-alba Asso var. *tenuiflora* Boiss.
- **Distribution**
  - **Global** : Southern France, Spain, Crete, North Africa, Sinai, Palestine, Syria, Arabia, Iran.
  - **National** : Mma, Di, Dl, R, S
  - **Local** : 30º 44´ 40.56´´N 29º 10´ 5.94´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Consolidated and rocky dunes, sallum plaateau, inland ridges, wadis, cultivated land

- **Plant name** : ***Silybum marianum* (L.) Gaertn.**
- **Synonyms** : *Carduus marianus* L.

- **Distribution**
  - **Global** : Mediterranean region, Sinai, eastwards to Afghanistan, naturalized elsewhere.
  - **National** : Nd, Nv, Nf, O, Mma, Di
  - **Local** : 31º 22´ 33.72´´N 27º 03´ 55.38´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Sand formations, wadis

- **Plant name** : ***Solanum nigrum* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Cosmopolitan
  - **National** : Nd, Mma, Mp, Di, Da, O, R, S
  - **Local** : 31º 32´ 12.30´´N 26º 09´ 00.30´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : indemic
  - **Current** : Common
- **Main Habitat** : wadis

- **Plant name** : ***Sonchus oleraceus* L.**
- **Synonyms** : *Sonchus ciliatus* Lam.
  Sonchus glaber Gilib.
  Sonchus lacerus Willd.
- **Distribution**
  - **Global** : Cosmopolitan
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, S
  - **Local** : 31º 22´ 33.72´´N 27º 03´ 55.18´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Saline depressions, non-saline depressions,

wadis

- **Plant name** : ***Tamarix aphylla* (L.) H. Karst.**
- **Synonyms** : *Thuja aphylla* L.
  Tamarix articulata Vahl
  Tamarix orientalis Forssk.
- **Distribution**
  - **Global** : North Africa, Sinai, Arabia, Iran, Pakistan, Afghanistan, Sudan, Ethiopia, Somalia, Northeast Tropical Africa.
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE, S
  - **Local** : 30º 44´ 54.18´´N 29º 12´ 14.61´´ E
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Coastal sand dunes, consolidated and rocky dunes, saline depressions, sand formations, raod sides, wadis

- **Plant name** : ***Terfezia claveryi* L.**
- **Synonyms** : ─
- **Distribution**
  - **Local** : Omayed, Dabaa, Maktala
- **Status**
  - **Täckholm** : Occasionally
  - **IUCN** : ─
  - **Current** : Occasionally
- **Main Habitat** : Deep sandy places

- **Plant name** : ***Teucrium polium* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Southern Russia, Balkans, Mediterranean region, Sinai, Arabia, Iraq, Iran, Afghanistan, Somalia.
  - **National** : Mma, Dl, R, S
  - **Local** : 31º 23´ 42.48´´N 27 º 01´ 37.08´´ E
- **Status**
  - **Täckholm** : Very Rare
  - **IUCN** : ─
  - **Current** : Very Rare
- **Main Habitat** : Wadi bed

- **Plant name** : ***Thymelaea hirsuta* (L.) Endl.**
- **Synonyms** : *Passerina hirsuta* L.
- **Distribution**
  - **Global** : Mediterranean region, Sinai.
  - **National** : O, Mma, Mp, Dl
  - **Local** : 30 º 49´ 36.47´´N 29º 12´ 00.60´´ E
- **Status**
  - **Täckholm** : Very Common
  - **IUCN** : ─
  - **Current** : Very Common
- **Main Habitat** : Coastal sand dunes

- **Plant name** : ***Thymus capitatus* (L.) Link**
- **Synonyms** : *Satureja capitata* L.
  Coridothymus capitatus (L.) Rchb. f.
- **Distribution**
  - **Global** : Mediterranean region
  - **National** : Mma
  - **Local** : 31º 29´ 59.52´´N 25º 18´ 38.88´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : Under threat
- **Main Habitat** : Rocky coastal ridges

- **Plant name** : ***Tribulus terrestris* L.**
- **Synonyms** : *Tribulus lanuginosus* L.
  Tribulus robustus Boiss. & Noë in Boiss.
- **Distribution**
  - **Global** : Mediterranean region, tropical and subtropical regions.
  - **National** : Nd, Mma, Mp, Da, Dl, R, S
  - **Local** : 31º 03´ 2.76´´N 28º 20´ 29.58´´ E
- **Status**
  - **Täckholm** : Common
  - **IUCN** : ─
  - **Current** : Common

- **Main Habitat** : Cultivated Areas and Fallow fields

- **Plant name** : ***Urginea maritima* (L.) Baker**
- **Synonyms** : *Scilla maritima* L.
  Urginea scilla Steinh.
  Drimia maritima (L.) Stearn,
- **Distribution**
  - **Global** : Atlantic Islands, Portugal, Mediterranean region, Sinai, Saudi Arabia.
  - **National** : Mma, Di,
  - **Local** : 31º 30´ 48.00´´N 26º 12´ 06.66´´ E
- **Status**
  - **Täckholm** : Rare
  - **IUCN** : ─
  - **Current** : under threat
- **Main Habitat** : Sand flats

- **Plant name** : ***Urtica urens* L.**
- **Synonyms** : ─
- **Distribution**
  - **Global** : Temperate regions worldwide
  - **National** : Nd, Nv, Nf, O, Mma, Mp, Da, Di
- **Status**
  - **Täckholm** : Very common
  - **IUCN** : ─
  - **Current** : Very common
- **Main Habitat** : Cultivated Land

- **Plant name** : ***Zilla spinosa* (L.) Prantl in Engl. & Prantl**
- **Synonyms** : *Bunias spinosa* L.
  Zilla microcarpa (DC.) Vis. in Spongia
- **Distribution**
  - **Global** : Northwest Egypt to Morocco.
  - **National** : Di, Da, Dl
  - **Local** : 31º 03´ 41.16´´N 28º 12´ 31.62´´ E
- **Status**
  - **Täckholm** : cc
  - **IUCN** : Vulnerable
  - **Current** : under threat
- **Main Habitat** : Cave mouth

- **Plant name** **: *Ziziphus lotus* (L.) Lam.**
- **Synonyms** : *Rhamnus lotus* L.
- **Distribution**
  - **Global** : Spain, North Africa, East Mediterranean, Arabia, Socatra
  - **Local** : 31º 30´ 58.5´´N 25º 11´ 51.72´´ E
- **Status**
  - **Täckholm** : Very Rare
  - **IUCN** : Endangered
  - **Current** : Under threat
- **Main Habitat** : In land plateau

5.2. Classification of Medicinal plants

5.2.1 Pharmacopoeial plants

Seven species, out of 13 mentioned to be pharmacopoeial plants in Egypt are present in the study area. Detailed monographs of these plants are provided in the current report.

Table 5. Distribution of the wild pharmacopoeial medicinal plants in the north western coastal region and other phytogeographical region of Egypt, and their pharmaceutical extracts (After Batanouny, 1999).

Plant species	Phytogeographical region	Pharmaceutical product
Ammi visnaga	M, Mp	Khellelgon, Khellalgin Glucolynamine, Lynamine Khellin, Khellalgine
Citrullus colocynthis	D,O,N,M,R,GE,S	No habit lotion
Datura stramonium	N, Mma	Buscopan, Buscopan Comopositum, Buscopan plus, Butacid, Farcolexain, Spasmocin, Fortalgine Nospasm
Hyoscyamus muticus	N,O,M,D,R	Avicenne powder Atropine Eye ointment Atropine amp.
Plantago ovata	Nd, M, Di, Dasept, Di, S	Laxiplant, Agiolax Biolax, Regime tablets
Silybum marianum	N,O,Mma, Di,	Legalon tab, Silymarin granules
Urginea maritima	Mma (Sidi Barrani), Mp, Di	Scillaren amp., Scillarin tab, Palmocadil syrup Cosylan syrup, Lobestra syrup, Expectyl Syrup Bronch cough syrup

5.2.2 Plants, though not Pharmcopoeial, but are used in preparation of industrialized drugs (Table 6).

Table 6. Plants used in pharmaceutical preparations in Egypt or abroad.

Plant species	Pharmaceutical preparation
Ammi visnaga	- Ampoules and tablets containing Khellin as single component or in multicomponent pharmaceuticals: e.g. Khellalgon capsules (**Mepaco**), Khellalgin **(Misr)** and Lynamine, Glucolynamine ampoules **(Memphis)**. - Uricol eff. granules **(Pharco).** - Uricol plus eff. granules **(Pharco).**
Avena sativa	- **Avena Sativa Comp,** Welda (UK). - **Sleep Complex,** Brauer (Austral.). - **Vitaglow Smoke Stop,** Vitaglow (Austral.). - **Acidum Phosphoricum med Comp,** Dynamit (Austral.). - **Avena Med Complex,** Richter (Austria). - **Globuli Gegen Schlafstorungen**, Jacoby (Austria). - **Notta**, Bittner (Austria). - **Valerianaheel**, Peithner (Austria). - **Alfalfa Tonic**, Boiron (Canada).

Table 6. Cont.

Plant species	Pharmaceutical preparation
Avena sativa (Cont.)	- **Daily Tension and Strain Relief**, Herbal Concepts (UK). - **Daily Over Work and Mental Fatigue Relief**, Herbal Concepts (UK). - **Sebaveen**, Dermoteca (Port.). - **Acnaveen**, Dermateca (Port.). - **Aderma Dermalibour**, Bio-Merieux and Pierre Fabre (Hong Kong). - **Wxomega**, Ducray (Fr.). - **Esberi-Nervin**, Laves (Ger.). - **Vitaglow Herbal Stress**, Vitaglow (Austral.). - **Oat Milk Treatment Cream**, pierre Fabre (Hong Kong). - **Adema Exomega**, Bio-Merieux and Pierre Fabre (Hong Kong). - **Sabaveen**, Rydelle (Ital.). - **Seboderm**, Sodip (Switz.) - **Gystelium**, Ducray (Fr.). - **Aveendix**, Glaxo Wellcome (Mex.). - **Gonaxine**, motima (Fr.). - **Micaveen**, Dermoteca (Port.). - **Glycyrrhiza Complex**, Blackmores (Austral.). - **Plantival**, Schwabe (Neth.). - **Homeofortin III**, Hochstetter (Chile). - **Dong Quai Complex**, Blackmores (Austral.) - **Mucilar Avena**, Spirig (Switz.). - **Avena Complex**, Blackmores (Austral.).
Capparis spinosa	- **Liverguard**, Pharmadss (UK), Liver disorders. - **Live 52**, Ebi (Switz.), Liver disorders, gastrointestinal disorders and tonic.
Citrullus colocynthis	- No-habit, Lotion (tri M. Medical)
Datura stramonium	- **Nospa** (EPICO) - **Buscopan, Buscopan Compositum: Buscopan plus** (CID), (Boehringer Ingelheim) - **Butacid** (CID) - **Farcorelaxin** (Pharco) - **Spasmoein** (Memphis)
Ecballium elaterium	- **Pulvis Elaterini compositus,** B.P. - **Trituratio Elaterini** U.S.P.
Hyoscyamus muticus	- ***H. muticus* fluid extracts**. - **Herba *H .muticus***. - **Standardized powder of *H. muticus***. - **Tincture of Egyptian *H. muticus***. - ***Avicenne* powder**; Kahira**,** 20g *H.muticus* leaves. 75g. - **Buchu and *H. muticus* mixture**.
Marrubium vulgare	**Single ingredient preparations** - **Angocin,** Bronchial Tropfen (Ger.), Treatment of Catarrh. **Multi-ingredient preparations** - **Catarrh-eeze**, Chefaro (UK), Treatment of Catarrh. - **Herbal Throat,** Jamison (Canada), Respiratory disorders. - **Fucus Compuesto,** Hochstetter (Chile). - **Allens Chesty Cough,** Allens (UK). - **Asthma and Catarrh Relief,** Herbal Concepts (UK)**.** - **Apo-Infect,** Pekana (Ger.). - **Bronchosedina,** FAMA (Italy), Respiratory tract disorders. - **Modern Herbals Cough Mixture,** Lane (UK).

Table 6. Cont.

Plant species	Pharmaceutical preparation
***Marrubium vulgare* (Cont.)**	- **Natusor Bronchopul,** Soria Natural (Spain). - **Asthmatee EF-EM-ES,** Smetana (Austria). - **Hustensaft Weleda,** Weleda (Austria), Herbal and homoeopathic - preparation. - **Herb and Honey Cough Elixir,** Weleda (UK). - **Gallen und Lebertee EF-EM-ES,** Semtana (Austria). - **Tan-Intest,** Genevrier (France), Treatment of diarrhoea. - **Hedrix,** Plan (Switz.). - **Toxorephan,** Repha (Ger.), Tonic. - **Honey and Molasses,** Lane (UK). - **Vegetable Cough Remover,** Potter's (UK). - **Marrubene Codethyline**, Lemoine (France), Respiratory tract congestion. - **Stomasan,** Vicente (Spain). - **Modiflor Tisane Hypotensive,** Monot (France), Hypertensive. - **Elixir Contrela,** Toux Weleda, Weleda (France). - **Tisane Hepatique et Biliaire "H",** Hanseler (Switz.). - **Verbascum Complex,** Blackmores (Australia), Respiratory system disorders. - **Neuners Krautertee Nr.7-Bronchial-und-Lungtee,** Neuners (Austria), Treatment of Catarrh and Cough. - **St. Radegunder Leber-Galle-Tee,** Synpharma (Austria), Gastrointestinal and Bilary tract disorders. - **Iodocafedrina,** Parisis (Spain), Respiratory tract disorders. - **Gastro-Vial,** Klever (Ger.), Gastrointestinal disorders. - **Neuners Krautertee Nr.28-Zur Unterstutzung der Tätigkeit der Galle,** Neuners (Austria), Treatment of bilary disorders. - **Neo-Codion,** Fatol (Ger.), Oral drops for Cough. - **Neo-Codion**, Bounchara (Switz.), Tablets for Cough.
Papaver rhoeas	- **Tisane pectorale et, antitussive**, Sidroga (Switz.), Coughs and Congestion - **Actisane Nervosite**, Dolisos (Fr.), Cardiac disorders - **Presselin stoffwechs-eltee** , Dresselin (Ger.), Constipation - **Astressane**, Dolisos (Fr.), Cardiac irritability - **Bramserene** , Corvi (Ital.), Insomnia - **Normalax**, Herbaline (Ital.), Constipation - **Relaten**, Herbaline (Ital.), Insomnia, anxiety, agitation - **Baune** , Zeller (Switz.), Gastrointestinal disorders - **Melissa Tonic**, Geistlech (Switz.), Agitation, nervousness, sleep disorders - **Tisane antitussive et pectorale**, Hanseler (Switz.), Respiratory-tract disorders
Plantago ovata	- **Agiolax** (Madaus, CID) - **Laxiplant** (Minapharm). - **Biolax** (Sekem).
Silybum marianum	- **Legalon tablets** (CID). - **Silymarin granules "instant"** (SEDECO) . - **Hepanox Capsules** (Technopharma Egypt for National Pharmaceuticals Co. Under License of Tishcon Corporation (USA). - **Hepaticum Capsules** (Medical Union Pharmaceutical Abu-Sultan, Ismailia, Egypt). - **Hepamarin Capsules** (UNI PHARMA – EL Obour City, Cairo – Egypt).

Table 6. Cont.

Plant species	Pharmaceutical preparation
***Silybum marianum* (Cont.)**	- **Hepadox Capsules** (Arab Caps – Alamreya – Alexandria - Egypt) - **Mariagon Capsules** (Alpha Chem Advanced Pharmaceutical Industries Co. – Badr City – Third Industrial Zone – Cairo - Egypt). - **Levatone Capsules** (Under license of Pan Pharmaceuticals Australia for Golden Queen Co.). - **Levanox Capsules** (Tiba Pharmaceutical Industries). - **Liver Albumin Plus Capsules** (Sigma Pharmaceutical Industries). - **Silipex Capsules** (PHARO PHARM pharmaceuticals for EMA pharm). - **Simepar Capsules** (MINAPHARM – Egypt. Under license of Mepha Ltd. Basel, Switzerland Mepha pharma Egypt S.A.E). - **Seralon-E Capsules** (TIBA Pharmaceutical Industries). - **Cyncholine Plaus Capsules** (The Arab Company for Pharmaceuticals and medicinal Plants). - **Mepacure Capsules** (The Arab Company for Pharmaceuticals and medicinal Plants). - **Heba2** (Pharco Pharmaceuticals).
Solanum nigrum	- **Liverguard**, Pharmadass (UK) - **Paravertebral LWS**, Infimarius–Rovit (Ger.), Homoeopathic - **Liv 52**, Ebi (Switz.), Gastrointestinal disorders, Tonic
Thymus capitatus	- **Oregano oil**.
Tribulus terrestris	- **Libeeda**, Nutravite (Canada), Aphrodisiac, Tonic. - **Herbal Support for Men Over 45,** Nutravite (Canada), Aphrodisiac, Tonic - **NSI *Tribulus terrestris* Extract Capsules,** (Nutraceutical sciences Institute). - **Tribestan Tablets,** Bulgarian Pharmaceutical Group BPG. - **Optimum Tribulus, 625 Capsules,** Optimum - **Dymatize Trib-650, Capsules.** - **Higher Power Tribulus Terrestris, 625 Capsules** - **Maximum Nutrients Tribestone, Capsules** - **MRM Tribest, 750 mg Capsules.** - **NOW Tribulus, Capsules.** - **NOW Tribulus, 1000 Tablets.** - **Porfight Tribulus terrestuis, 750 mg Capsules** - **Scifit Tribesterene, 1500 capsules.** - **Solaray Tribulus Fuel Extreme Tablets.** - **Winlab Tribulus Fuel Extreme Tablets.** - **Ultimate Nutrition Tribulus terrestris, 750 mg Capsules.** - **4 Your Health Pro V for Men Tablets.** - **4 Ever Fit Trib 750 mg. Capsules** - **AST Trioxalon 500, Capsules.**
Uriginea maritima	- **Scillaren,** (Sandoz). - **Palmocadil syrup**, (Nile). - **Cosylan syrup** (Park Davis). - **Lobestra syrup** (Nile). - **Expectyl syrup** (Adco). - **Broncho cough syrup** (Mcpaco).

Table 6. Cont.

Plant species	Pharmaceutical preparation
Urtica urens	**Single active ingredients** - **Bazoton,** Scheing – plaugh (Braz.), Anti neoplastic - **Arthrodynat N,** Ziethen (Ger.), Rheumatic disorders - **Vro-Pos,** Croma (Austria), Micturition disorders in males - **Logomed Prostata-Kapseln,** Logomed (Ger.), Micturition disorders associated with prostatic cancer. - **Venustas Shampoo per Capelli Con Forfora elo Grassi,** BPR (Ital.), Seborrhoeic - **Hox Alpha,** Strathmann (Ger.), Rheumatic disorders - **Knepp pflanzen-Dragees Brennessel,** Kneipp (Ger.), Urinary-tract disorders - **Reumaless,** Pharmaton (Ger.), Rheumatism - **Serless,** Truw (Ger.), Bengin prostatic hyperplasia - **Prostaherb N,** Gesra (Ger.), Bengin prostatic hyperplasia - **Urticur,** Bicur (Ger.), Bengin prostatic hyperplasia **Multi active ingredients** - **Befelka-Tinktur,** Befelka (Ger.), Metabolic disorders, circulatory disorders, Skin disorders - **Prostagut Tropfen,** Schwabe (Ger.), Prostatic disorders - **Colehicum-Strath,** Strath-labor (Ger.), Joint disorders - **Rheuma-Tee,** Stada (Ger.), Rheumatic disorders - **Savlon Natural First Aid for Burns,** Novartis Consumer (UK), Burns - **Cough Relief,** Brauer (Australia), Coughs - **Infant Tonic,** Brauer (Australia), Tonic - **Respatona Decongestant Formula,** Brauer (Australia), Coughs and cold symptoms - **Apotheker Hoyers Brennesseltonikum,** St Valentinus Apotheke (Australia), Tonic - **Ehrmann's Entschlackungstee,**Ehrmann (Australia) ,Urinary disorders - **Florissamol,** Andrae (Australia), Soft-tissue disorders, muscle and joint pain, chilblains, scalp disorders - **Bogumil-Tassenfertiger Mider Abfurtee, Enzypharm** (Australia), Dyspepsia, constipation flatulence - **Krauterhaus Mag Kottas Entschlackungstee,** Kottas-heldenberg (Australia), Diuretic - **Mag Doskar's Nieren und Blasentonikum,** Doskar (Australia), Renal and ladder disorders - **Species Carvi Comp,** Weleda (Australia), Gastrointestinal cramp flatulence - **Naturland Rheuma Tee,** Strallhofer (Australia), Inflammation, pain - **Krauterhous Mag kottas Fruhjahrs und Herbstkurtee,** Kottas – Heldenberg (Australia), Tonic - **Salus Rheuma – Tee,** Salushous (Ger.), Rheumatic - **Morera compuesta,** Hochstetter (Chile), Homoeopathic preparation.

5.2.3. Plants used in folk and traditional medicine (Table 7).

Table 7. The famous folk medicinal plants, used parts and diseases.

Plant name		Used part	Diseases
Achillea santolina	بعثران	The entire herb	Cleaning Vagina.
Adonis dentata	أبو العفين	The above-ground fruiting & flowering herb	Preserving strength & youth.
Ajuga iva	جعدة	Leaves	Cough & Asthma.
Artemisia herba-alba	شيح	Green leaves	Cold – renal Colic.
Artemisia monosperma	ليل	Green Leaves	Kidney stones.
Asphodelus ramosus	عنصل	Leaves, Tubers	Joints pains, Boldness, Diabetes, Phlegm.
Capparis spinosa	لصف	Leaves	Snake bite.
Centaurea pumilio	مرير – عكاش	Dried roots	Fattening agent.
Chrysanthemum coronarium	أقحوان	flowers	Hypertension, Worms, Prostate & Ovary pain
Cistanche tubulosa	طرطوث	Flowers	Anemia.
Cyperus rotundus	سعد	Rhizome, in the form of ellipsoid tubers	Aromatic, stomachic, sedative & analgesic.
Ecballium elaterium	فاقوس الحمار	Unripen fruit	Jaundice.
Globularia arabica	زريقة	Leaves	Haemorrage.
Haloxylon scoparium	رمث	Green leaves	Disinfecting circumcise and parturition wounds, Gynocology
Haplophyllum tuberculatum	هب الريح	The whole plant, Seeds	Stomach ulser & puffing, Haemorrhoids, Kidney Stone, Stomach pain hyper tension.
Hyoscyamus muticus	سكران	Leaves	Fever.
Nicotiana glauca	مصيص	Roots	Festers & boils.
Ornithogalum trichophyllum	بصل الحنش	Leaves	Tinea.
Peganum harmala	حرمل	Dried ribe seeds	Kidney stones.
Plantago albicans	ينم	Leaves	For reproduction.
Ploygonum equisetiforme	قرضاب	Green leaves	Kidney stone.
Rumex vesicarius	حميض	The entire plant	Hepatic diseases & bad digestion.
Salvia lanigera	بردقوش	Roots	Diabetes.
Solanum nigrum	عنب الديب	Leaves & green unripen fruits	Diuretic, cervic inflammation, sore throat.
Terfezia claveryi	ترفاس (الكمأة البيضاء)	Fruit body	Glaucoma, Aphrodisiac
Teucrium polium	طعم النصر	Green leaves	intestinal troubles, cold & fever
Thymelaea hirsuta	مثنان	Leaves & flowering branches	Joints pain.
Thymus capitatus	زعتر	Leaves and flowering branches	as refreshing drink & stomach diseases and cough.
Tribulus terrestris	ضرس الشايب	Dried aerial parts	Flower for leprosy; stem for scabious skin diseases & psoriasis; seed for anaemia & coughs.
Urginea maritima	بصل فرعون	Bulbs	Heart failure and Rheumatic pains
Urtica urens	حريق	Aerial parts & leaves	Rheumatism, eczema & diuretic.

5.2.4. Plants studied in the laboratory and found to contain active principles and then can be considered potential medicinal plants (Table 8).

Table 8. Scientific name and the main active constituents reported in the medicinal plants of the north western coastal region of Egypt.

Scientific name	Active constituents
Achillea santolina L.	Volatile oil (azulenes, terpenes, sesquiterpene lactones), choline and glycine.
Adonis dentata Del.	Cardenolide glycosides
Aeluropus lagopoides (L.) Trin. Ex Thwaites	Unsaturated sterols and/or triterpenes, Saponins Flavonoides, Tannins, Carbohydrates and/or glycosides
Ajuga iva (L.) Schreb.	Cyasterone, ecdusterone, dysterone and tannin
Alhagi groaecorum Boiss.	Carbohydrates, flavonoides, sterols, resin, saponines and anthraquinones
Ammi visnaga (L.) Lam.	Furanochromones (khellin, visnagin), Furanochromone glycoside (khellol), visnadin, Pyranocoumarins (xanthotoxin, ammidin), Furanocoumarins (xanthotoxin, ammidin), Flavonoids (quercetin, isorhamntin, kaempferol), Volatile oil (canphor, carvone, terpinen-4-ol, linalol, cis and trans linalol oxides), Fixed oil, protein
Anagallis arvensis L.	Triterpen, saponin, glycosides
Arisarum vulgare Targ.-Tozz. var. *veslingii* (Schott) Engl.	Unsaturated sterols and/or triterpenes, Alkaloids, Carbohydrates and/or glycosides, Flavonoides
Artemisia herba-alba Asso	Volatile oil, santonin, sterols (B-Sitosterol, stigmasterol)
Asphodelus ramosus L.	Fatty acids, Sugars, Anthraquinone glycosides, Essential oils.
Astragalus hamosus L.	Saponin, Tragaconth
Astragalus spinosus (Forssk.) Muschl.	Triterpen glycosides (astragalactoside I, isoastragalactoside I, astragala`ctoside IV, cycloastragenol-6-0, glucosid`e, astragalactoside II)
Avena sativa L.	Minerals (iron, copper, cobalt, calcium, manganese, zinc), Protein, lipids, alkaloids (ergothionein, hordenine, trigonelline) vanilloside, avenin
Beta vulgaris L.	Saponins, betaine, vitamins, asparagin, sugars, raphanol, glucuronide and vanillin
Calendula arvensis L.	Volatile oil, sesqueterpene lactone glycosides, triterpene saponines, saponines
Capparis spinosa L.	Bitterprinciples, alkaloids, (stachydrine) saponin, volatile oil, rutin, glucosinolates, sterols and flavonoide glycosides

Table 8. Cont.

Scientific name	Active constituents
Carrichtera annua (L.) DC.	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycoside, Flavonoides, Tannins
Carthamus lanatus L.	Serotonin derivative, sesquiterpene glycoside (bisabolol-B-D-fuco-pyranoside), flavonoide glycosides, sterols, volatile oil
Chenopodium murale L.	Flavonoid glycosides
Chrysanthemum coronarium L.	Volatile oil, chrysancorin, oxyanthraquinenes, flavonoides, protein
Citrullus colocynthis (L.) Schrad.	Cucurbitacines (elateridine, cucurbitacine E, B, I, L) Saponins fixed oil, phytesterals alkaloids
Colchicum ritchii R. Br.	Alkaloid, colchicine, colchiside, fat, tannin, oil, garlic acid
Convolvulus lanatus Vahl	Pyrrolidine alkaloids, flavonoids, resin, tannin
*Cyperus rotundus*L.	Volatile oil, fixed oil, sesquiterpene alkaloids (rotundines A, B, C), flavonoids, saponin
Datura stramonium L.	Tropane alkaloids (hyoscyamine, hyoscine, atropine)
Ecballium elaterium (L.) A. Rich	Resinous compounds (α-and β-elaterins), cucurbitacins, ecballin, prophetin, ecbalic acid and alkaloids
Echium sericeum Vahl.	Alkaloids echinatine, echimidine and other minor alkaloids
Euphorbia paralias L.	Diterpene polyesters, diterpenoids, Ingenane esters, flavonoids, flavone glycosides, triterpenoids.
Fagonia arabica L.	Diterpenoids, saponins, sterols, triterpenoids, oleanolic acid glycosides, flavonoids
Gynandriris sisyrinchium (L.) Parl.	Volatile oil (irone, α, β and γ- irone triterpene, Isoflavonoids, flavonoids, xanthenes (C- glucosyl- xanthones), strach.
Halocnemum strobilaceum (Pall.) M. Bieb.	Unsaturated sterols and/or triterpene Alkaloids, Carbohydrates and/or glycosides, Flavonoides, Tannins, Saponins
Haloxylon scoparium Pomel	Unsaturated sterols and/or triterpenes, Alkaloids, Carbohydrates and/or glycosides Flavonoides, Tannins
Haplophyllum tuberculatum (Forssk.) Juss.	Alkaloids (r-fragarine, evoxine, skimmianine, dictamine, haplophytine, robustine, haplotubinone, haplotubine, 7-isopentenyloxy-8-fragrine), lignan (polygamain, kusunokinin, justicidin A&B, dyphyllin, tuberculatin and chaerophyllin) and flavon glycosides.
Hyoscyamus muticus L.	Tropane alkaloids (Hyoscyamine, Hyoscine, atropine, cinnamoyl putresine and littorine) tropic acid.

Table 8. Cont.

Scientific name	Active constituents
Ifloga spicata (Forssk.) Sch.-Bip.	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Flavonoides, Tannins
Kickxia aegyptiaca (L.) Nábelek	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Flavonoides Tannins, Iridoids
Launaea nudicaulis (L.) Hook. F.	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Flavonoides
Lotus polyphyllos Clarke	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Flavonoides
Lycium europaeum L.	Unsaturated sterols and/or triterpenes, Alkaloids, Carbohydrates and/or glycosides, Flavonoides, Tannins
Lygeum spartum Loefl. ex L.	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Alkaloids, Flavonoides
Malva parviflora L.	Mucilage, protein, thiamine and thiaminase
Marrubium vulgare L.	Diterpene bitter principle (marrubin,, premarrubin), vlavonoids, volatile oil, tannin, saponin glycosides, sterols, alkaloids (betonicine and stachyderine), caffeic acid drecahves (chlorogenic and eryptochlorogenic acids)
Melilotus indicus (L.) All.	Coumarins, sterols (β-sitosterol and its glucoside)
Nicotiana glauca R. C. Grah.	Alkaloids (anabasine which is a liquid non volatile alkaloid, nornicotine and traces of nicotine), rutin (2%) and scopoletin
Ononis vaginalis Vahl	Petrocarpans (maackain, medicarpin, trifalirhizin, trimeth-oxypetrocarpan), 3-hydrog-4, 9- demethoxy-coumestan, maginaldehyde [2-(4-hydroxy-2-methoxyphenyl)-5, 6- dimethoxy-3-benzofuran-oarboxaldehyde and 5,7,4-tribydroxy-4-styrylcoumarin.
Onopordum alexandrinum Boiss.	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Flavonoides, Tannins
Osteospermum vaillantii (Decne.) Norl.	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycoside
Otanthus maritimus Hoffmgg. Et Link.	Lignan (sesamine-like compound) and flavonoid (acactin-7-0-neo-hesperidoside)
Pancratium maritimum L.	Alkaloids (lycorine, lazettine, ambelline, crinidine, crinine, pomelline, crinamine, and crimelline), caffeoylquinic acid methyl esters.
Papaver rhoeas L.	Isoqinoline alkaloids, (major alkaloids, rhoeadine, isorhoeadine, rhoeagenine, coptisine isocorydine, stylopinc, papaverine…)

Table 8. Cont.

Scientific name	Active constituents
Peganum harmala L.	Indol alkaloids (harmine, harmaline, harmalol and paganine), lipids, β-sitosteral and x-amyrine
Plantago albicans L.	Unsaturated sterols and/or triterpenes, Alkaloids, Carbohydrates and/or glycosides, Flavonoides, Tannins Saponins, Iridoids
Plantago ovata Forssk.	Mucilage located in the epidermis of the testa; It consists of weakly acidic arabinoxylans with small proportion of rhamnose
Polygonum equisetiforme Sibth. & Sm.	Phenolic glycosides, saponins triterpenoids, flavonoids and an insulin like compound
Ranunculus bulbosus L.	Lactene (protoanemonin)
Reaumuria hirtella Jaub. Et sp.	Tannin 15-20%: Elagitannin monomers (remurins A&B), Elagitannin oligomers [dimmers (hirtellins A,B,C,D,E,F and G),Trimers (T1,T2 and T3),Tetramer (hirtellin Q1)]
Retama raetam (Forssk.) Heywood	Alkaloids (retamine and sparteine) Flavonoids, fixed oil, β-Sitosterol
Rumex vesicarius L.	Flavonoid C-glycosides (vitexin, isovitexin, orientin and iso-orientin), anthraquinones (emodin and chrysophanol).
Salvia aegyptiaca L.	Volatile oil, flavonoid glycosides, ursolic acid, tannin, rosmarinic acid, bitter principle (picrosalvin) 6-methyl crypto-acetalide, β-methyl epicryptoacetalide and 6-methyl and cryptotanshinon
Salvia lanigera Poir.	Abietane diterpenes
Scorzonera undulata Vahl	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Flavonoides
Senecio vulgaris L.	Pyrrolizidine alkaloids, (Silvasenecine, senecine, senecionine, seneciphylline, senecifolidine, senecifoline, jaeobine, eaudoline, othosenine, retrosine, platyphylline and fuchsisenecionine)
Silybum marianum (L.) Gaertn.	Flavolignans (silymarins) (silybin, silychristin and silydianin), flavonoids, fixed oils, sterols, bitter principles, tannin, resin polyacetylenes.
Solanum nigrum L.	Glycoalkaloids (solanine, solasonine, solasodine, solanidine, solamagrine and dimissine); Glucose, fructose, vitamin C, sterols
Sonchus oleraceus L.	Leaves contain sterol and vitamin C
Tamarix aphylla (L.) H. Karst.	The tree contains about 10% tannin in the bark, 1% in the wood and 42-56% in the galls

Table 8. Cont.

Scientific name	Active constituents
Teucrium polium L.	Diterpenoids(Picropolin, 6-acetyl picropolin, isopicropolin, 19-acetylgnaphalin, teucrins P_1, P_2 and P_3, montanin and teupolins I-V), iridoid glycosides, flavonoids, sterols, volatile oil
Thymelaea hirsuta (L.) Endl.	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Flavonoides, Tannins
Thymus capitatus (L.) Hoffmgg. et Link	Volatile oil, flavonoids, caffeic acid drevatives
Urginea maritima (L.) Baker (red)	Cardiac glycosides (Bufadienolides) (major glycosides are scillaren A, glucoscillaren A, proscillaridin A and scillarin B), flavonoid, Sterols, mucilage
Varthemia candicans (Delile) Boiss.	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Flavonoides, Tannins
Zilla spinosa (L.) Prantl	Unsaturated sterols and/or triterpenes, Carbohydrates and/or glycosides, Tannins, Flavonoides

5.2.5. Plants of restricted use confined to the area where it grows, but not spread among healers in other areas.

Table 9. Plant confined to the north western coastal region (for habitat description and stands of occurrence, see *Vol. 1* of this report).

Species	Location
Artemisia herba-alba Asso	Sallum, Matruh wadis, Dabaa, Omayed transects
Asparagus stipularis Forssk.	Barrani
Colchicum ritchii R. Br.	Maktala, Matruh wadis, Alamein, Omayed transects
Ecballium elaterium (L.) A. Rich	Dabaa
Posidonia oceanica (L.) Del.	Barrani, Alamein
Terfezia claveryi L.	Barrani, Omayed, Maktala
Teucrium polium L.	Sallum, Matruh wadis, Omayed transects
Thymus capitatus (L.) Hoffmgg. et Link	Sallum, Matruh wadis, Omayed transects
Urginea maritima (L.) Baker (red)	Maktala, Matruh wadis
Varthemia candicans (Delile) Boiss.	Sallum, Matruh wadis
Ziziphus lotus (L.) Lam.	Sallum

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7. MONOGRAPHS

Ajuga iva (L.) Schreb.

Family: Labiatae

Plant name

***Ajuga iva* (L.) Schreb.**

Synonyms

Teucrium iva L.

Distribution

- **Global**: Mediterranean region, Sinai.
- **National**: Mma, O
- **Local** : 31º 03´ 0.409´´N 28º 07´ .364´´ E

Status

- **Täckholm**: rare
- **IUCN** : ─
- **Current**: under threat

Main habitat

Inland plateau

Part used

The aboveground parts.

Collection

Plants are cut in the flowering stage.

Preparation

- Cold and hot infusion.
- dried green plants powder.

Use

Orally.

Chemical Constituents

Plants contain cyasterone, ecdusterone, small amounts of dysterone and tannin. The aerial parts of *Ajuga* plants contain 14 , 15-dihydroajugapitin.

Pharmacology and toxicology

The ethyl acetate extract of the plant has insect mouling activity. Dihydroajugapitin compound has antifeedant activity. The aqueous extract of the plant has vasorelaxant effect in rats, and it has a strong hypoglycaemic effect in diabetic rats. No signs of toxicity were observed in mice treated with *Ajuga* extract.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations containing *Ajuga iva* are available in the Egyptian market.

Traditional medicinal and indigenous knowledge

Cold infusion of the herb antihelmintic, depurative, especially in spring time. Dried green plants powdered and taken against sinusitis and cephalalgia; this powder made into small balls is digested for its useful action against stomach and intestinal pains, the digestive tract and enteritis. Powdered dried plant or its hot infusion taken after meals against diabetes. Infusion of flowering branches antidiarrhoeic, vulnerary, depurative, very effective vermifuge, for feminine sterility, colds, troubles of the digestive tract.

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***Ammi visnaga* (L.) Lam.**
Umbelliferae

Plant name

***Ammi visnaga* (L.) Lam.**

Synonyms

Daucus visnaga L.

Distribution

- **Global:** Atlantic Islands, Mediterranean region, Southwest Asia, Ethiopia
- **National**: Nv, Mma

Status

- **Täckholm**: Common
- **IUCN**: ─
- **Current**: under threat

Main habitat

Cultivated fields, neglected areas and canal banks close to the field

Morphological description

Stout, tall, winter annual, with thick stem and pinnatisect leaves. Umbel rays, dense (*ca* 80/umbel) with very numerous long stiff rays and white flowers. The rays spread in flower and become contracted in fruit. Bracts of the involucre, long, filiform and tripartite. The fruiting pedicels are thick and frutescent. Fruit, ovate, laterally compressed, with thick ribs, brownish with violet tinge and splitting into two mericarps.

Ecology

Ammi visnaga L. grows wild in the Middle East and around the Mediterranean. It is widely cultivated and grown from seed. The tiny fruits containing the seeds are picked in before they have fully ripened. The plant is an element of the mesophytic community of the cultivated fields where it grows among the crops, on canal banks and in neglected areas close to the fields. It is cultivated on a limited scale in the Nile Delta for its fruit and dry umbels.

Status

The plant is easily cultivated as a winter crop in Egypt. Numerous studies have been undertaken as regards the effect of manure and fertilizers on the yield of the plant. However, there is a great need to conserve the good genetic characters in some cultivars. The plant is safe and is not subjected to threatening impacts. .

Parts used

- Fruit
- Toothpicks: at fruiting, the rays become frutescent, curved and used as toothpicks

Collection

The Tiny fruits containing the seeds are picked in late summer before they have fully ripened. *Khella* contains not more than 10.0% of its stalks and dry umbel organic matter, and yields not less than 1.0% of the nonglycosidal furanochromone derivatives as khellin.

Preparation

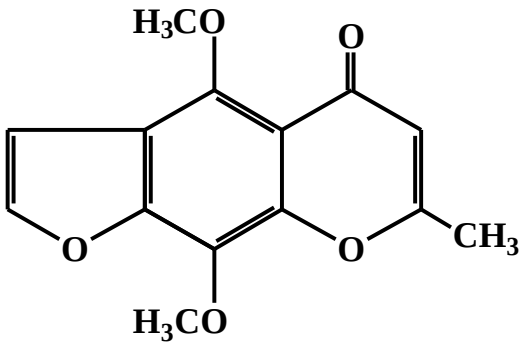
- Infusion
- Decoction.
- Simple.

Use

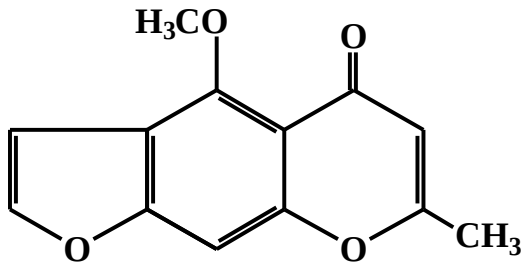
- Orally.
- Infusion: alleviates asthma, bronchitis and kidney stones.

Chemical constituents:

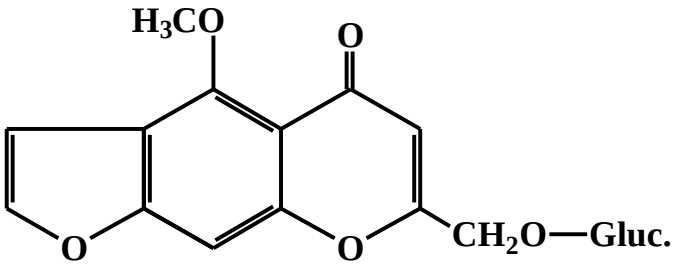
- **Furanochromones** (**pyrones**): 2-4% comprising khellin (0.3-1.2%), visnagin (0.05-0.3), khellol and its glucoside, khellenin, khellinol, ammiol and its glucoside, visammiol, khellinone, visnilginone.
- **Pyranocoumarins:** (visnagans) 0.2-0.5 comprising visnadin, samidin and dihydrosamidin.
- **Furanocoumarins**: traces of xanthotoxin and ammidin.
- **Flavonoids**: 0.02- 0.03% comprising quercetin and isorhamnetin and their 3 sulphates as well as kaempferol.
- **Volatile oils:** containing among other compounds: camphor, carvone, (-tcrpineol, terpinen-4-ol, linalool, *cis* and *trans* linalool oxides.
- **Fixed oil:** 12-18%.
- **Protein:** 14%**.**



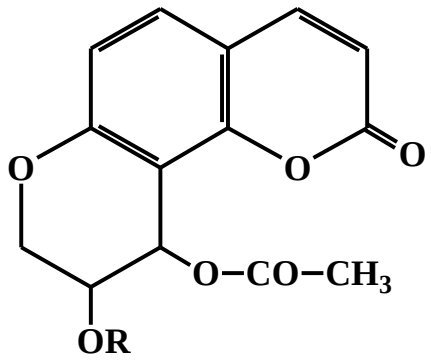
Khellin



Visnagin



Kkellol glucoside



Samidin: R= OC-CH=C(CH$_3$)$_2$

Dihydrosamidin: R= OC-CH$_2$-CH(CH$_3$)$_2$

Visnadin: R= OC-CH(CH$_3$)-CH$_2$-CH$_3$

Pharmacology and toxicology

The drug acts as spasmolytic, especially, on the musculature of the bronchi, gasterointestinal tract, biliary tract, urinogenital system, and the coronary vessels and also as diuretic. Khellin, which is now commercially available in tablets and injection, is a potent selective coronary vasodilator and bronchodilator. It is used in the treatment of coronary insufficiency,

angina pectoris and bronchial asthma. It is used for the treatment of vitiligo and psoriasis, for removal of small bladder and kidney stones. Visnadin exhibits peripheral and coronary vasodilator activities and has been used for the treatment of angina pectoris. The drug is indicated in whooping cough, cramp-like conditions of gasterointestinal tract, biliary colic, painful menstruation, for remova1 of small bladder and kidney stones, and in ingina pectoris and bronchial asthma. Khellin may have a role, to play in the treatment of vitiligo and psoriasis. Phylomedicines containing standardized extracts are included in cardiac remedies, bronchospasmolytics, spasmulytics, urological remedies and coronary remedies.

Pharmacopoeias

Egyptian pharmacopoeia (1972).

Pharmaceutical products

Phytopharmaceuticals in the Egyptian Market:

- Ampoules and tablets containing Khellin as single component or in multicomponent pharmaceuticals: e.g. Khellalgon capsules (**Mepaco**), Khellalgin **(Misr)** and Lynamine, Glucolynamine ampoules **(Memphis)**.
- Uricol eff. granules **(Pharco).**
- Uricol plus eff. granules **(Pharco).**

Traditional medicinal and indigenous knowledge

Fruit, diuretic, appetizer, carminative, stimulant vasodilator, antispasmodic, for urinary disorders, angina pectoris, asthma, and the infusion releases renal stones. It is a traditional Egyptian remedy for kidney stones. It was mentioned in the Ebers papyrus of Egypt (1500 BC) and is still used there to relieve kidney stones. The Arabs discovered centuries ago that the small, grayish, egg-shaped *A.visnaga* could ease a multitude of ailments, including the stabbing pain caused by a reduction in the flow of blood to the heart. Khellin, the substance in fruits that accomplishes this feat, is described by scientists. It is used for the treatment of psoriasis, the ancient Egyptians rubbed red, scaly skin vesicles, presumably psoriasis, with *Ammi visnaga* plant, and then people sit in the sun. *Ammi visnaga* fruits have long been used in Egypt, as a diuretic, for renal colic and ureteric stone, ureteric stone, angina pectoris, the coronary vessels, cardiovascular disorders, asthma. At the end of the 2nd millennium, a new therapeutic product has been duced as a result of an Egyptian discovery (Professors of the Pharmaceutical Science Department, National Research Center, Egypt) for the treatment of vitiligo and psoriasis.

Medicinal uses

- Kidney stones
- Asthma remedy
- Bronchitis
- Lithontripic
- Diuretic
- Whooping cough
- Circulatory problems
- Vasodialator
- **Kidney stones**: by relaxing the muscles of the ureter, *A. visnaga* reduces the pain caused by the trapped stone and helps ease the stone down into the bladder.
- **Asthma remedy**: following research into its antispasmodic properties, *A. visnaga* is now given for asthma and safe even for children to take. Although it does not always relieve acute asthma attacks, it does help to prevent their recurrence.
- **Other respiratory conditions**: *A. visnaga* is an effective remedy for various respiratory problems, including bronchitis, emphysema, and whooping cough.
- **Circulatory system**: to improve the blood apply to the heart muscle and hereby eases angina. *A.visnaga* does not however, reduce blood pressure.

Other uses of the plant

The fruiting pedicel is used as a toothpick while the seeds have been used as a tooth cleaner. Also, the row leaves chewed for their pleasant aromatic flavour.

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***Anagalis arvensis* L.**

Family: Primulaceae

Plant name

***Anagallis arvensis* L.**

Synonyms

Anagallis coerulea L.

Distribution

- **Global** : Warm and temperate regions, widespread.
- **National**: Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE
- **Local**: 31º 03´ 2.76´´N 28º 20´ 29.58´´ E

Status

- **Täckholm**: Very common
- **IUCN** : ─
- **Current**: Very common

Main habitat

Raod sides, wadis, cultivated land

Part used

Aerial parts.

Collection

The herb is harvested in the summer towards the end of its flowering period (June to August).

Preparation

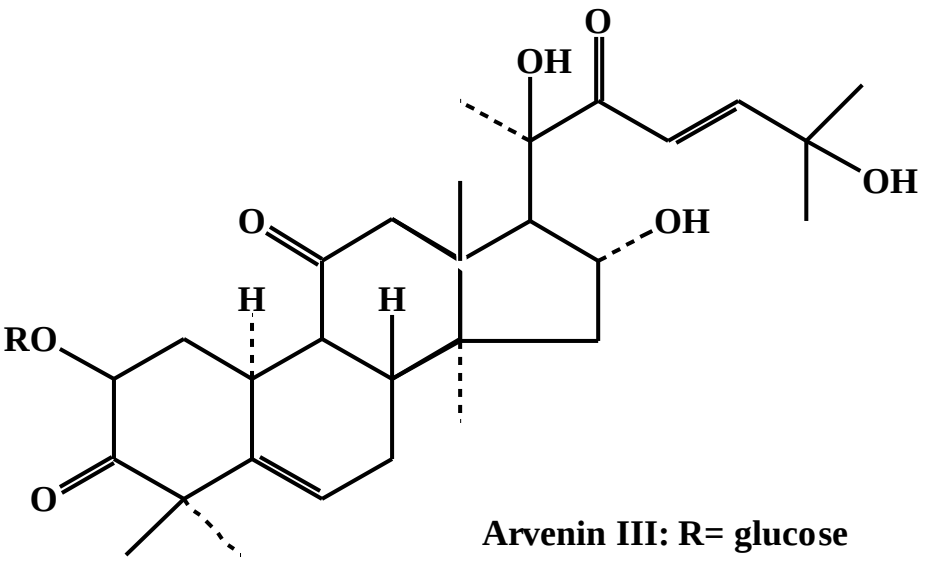
- Fresh herb.
- Infusion.

Use

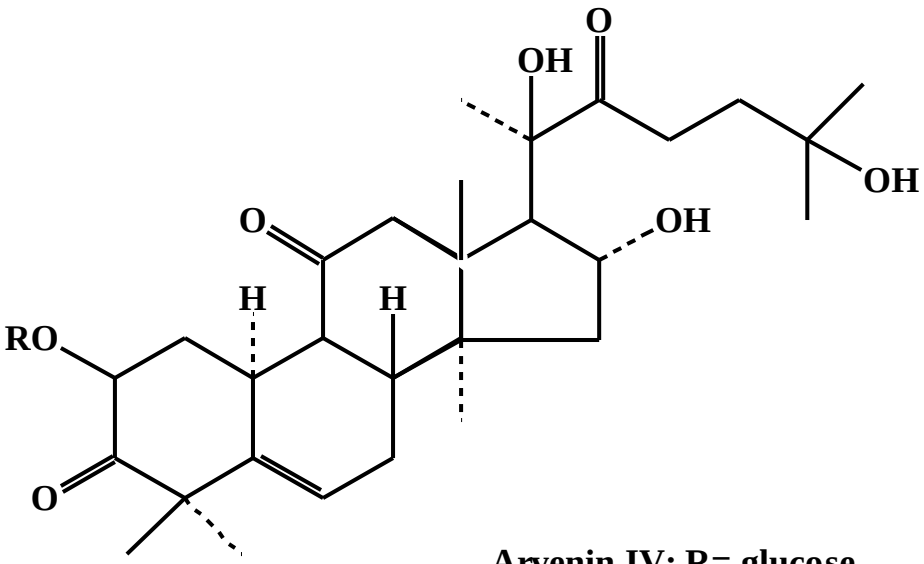
- Orally and Externally.

Chemical constituents

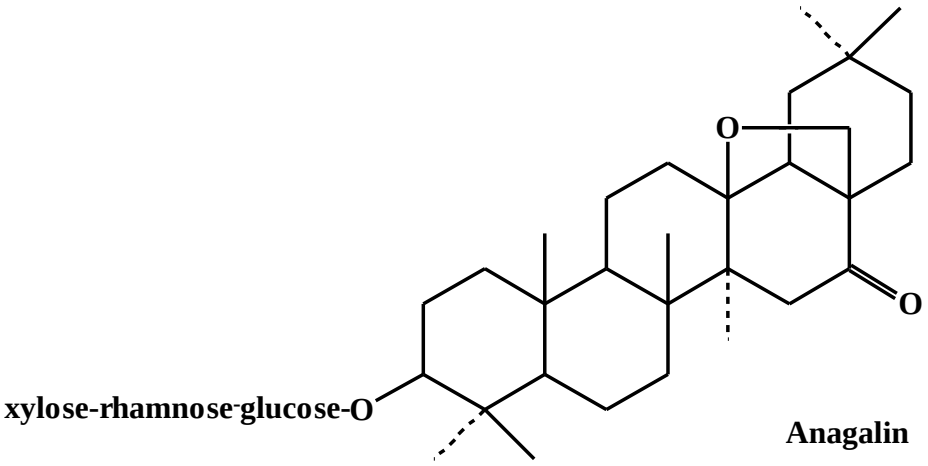
The stems and leaves contain the hetroside saponine (Anagalline) which produces anagalligenone B by acid hydrolysis. The plant contain 6 cucurbitacins (cucurbitacins B, D, E, I, L, R) and 4 cucurbitacin glucosides showing remarkable bitterness, named arvenin I, II, III, IV. The seed oil contains 6 different fatty acids (myristic acid, palmitic acid, oleic acid, linoleic acid, linolenic acid and gadoleic acid). The aerial parts of the plant also contain n-hexacosane, β-amyrin and lacceric acid. β-sitosterol and stigmasterol were identified in the seeds, the flowers and the herb. The flowers contain α-spinasterol-3-glucoside, flavonoide (Rutin, Quercetin, kaempferol, luteonlin, luteolin-7-glucoside, querecetrin and malvidin-3-thamnoside). The roots contain glucoside cyclamine. The plant also contains proteolytic enzyme, triterpene, flavonoids and tannins.



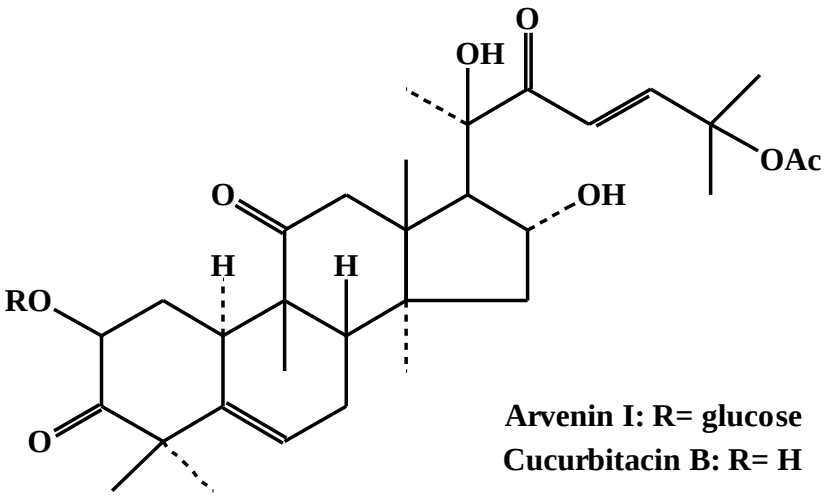
Arvenin III: R= glucose
Cucurbitacin D: R= H



Arvenin IV: R= glucose
Cucurbitacin R: R= H

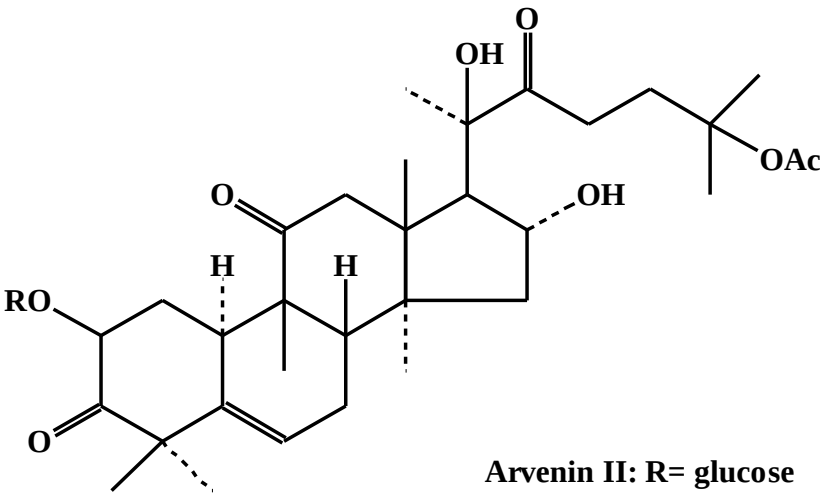


Anagalin



Arvenin I: R= glucose

Cucurbitacin B: R= H



Arvenin II: R= glucose

23,24-Dhyrocucurbitacin B: R= H

Pharmacology and Toxicology

The aqueous extract of the plant has antifungal activity against *Microsporum canis*. Triterpene saponine isolated from plants showed antiviral activity against Herps simplex virus type I and polio virus type 2. Saponins isolated from the plant showed molluscicidal activity against the schistosome intermediate hosts, *Biompholaria glabrata* and *Oncomelonia quadrasi*.The oil produces headache lasts for 24 hours. Fish are sensitive to cyclamin.

The plant is toxic to dogs, rabbits, sheep and cattle, signs of toxicity are depression, thirst and diarrhea. It has irritant properties and the leaves can cause dermatitis. The aqueous extract of the plant exhibits stimulation of the uterus in animal models and in *in-vitro* studies of human uteri. It also displays mild estrogenic properties in-vitro. Because of its oxytoxic effect, the use of the plant during pregnancy is not recommended.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations containing *Anagallis arvensis* are available in the Egyptian market.

Traditional Medicinal and Indigenous knowledge

The plant is sometimes employed as a poultice to treat joint pain. In European folk medicine, it is used to treat gallstones, cirrhosis of the liver, long problems, kidney stones, urinary infections, gout and rheumatism. This pattern of use suggests a detoxifying nature of the plant. As an expectorant, it is used to help recovery from colds and flu. In Chinese medicine, the herb is used for snake bites, dog bites, fish poisoning, joint ailments and edema. In Indian medicine it is used for menstrual disorders. It also used to treat skin rashes, warts, and urinary tract infections.

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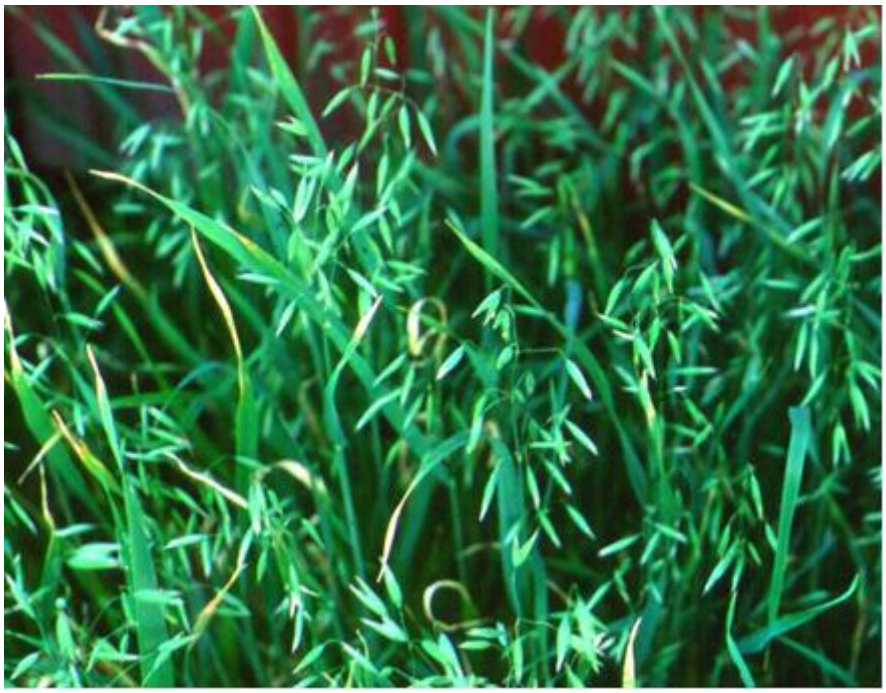
***Avena sativa* L.**
Family: Gramineae



Plant name

***Avena sativa* L.**

Synonyms: ─

Distribution

- **Global**: Cultivated in most temperate countries
- **National**: Nd, Nv
- **Local** : 30º 44´ 40.56´´N 29º 10´ 25.94´´ E

Status

- **Täckholm**: Very rare
- **IUCN**: ─
- **Current**: Very rare

Main habitat:

Wadis and cultivated lands

Part used

- The grains.
- The fresh flowering plant.

Collection

Plants are cut in the flowering stage and seeds are collected when dried.

Preparation

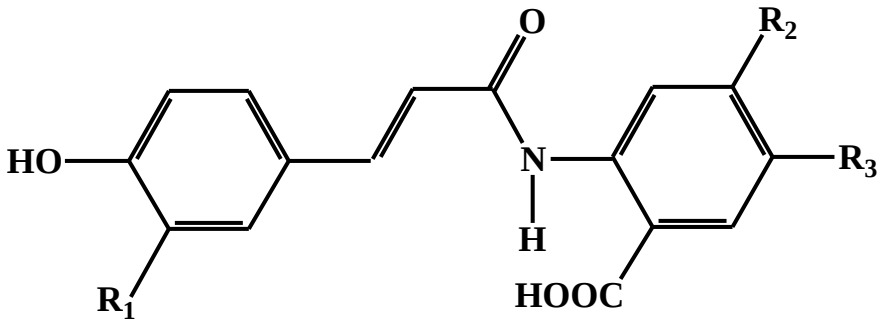
The plant is a good nutrient as cereal food, it also used in the form of tincture.

Use

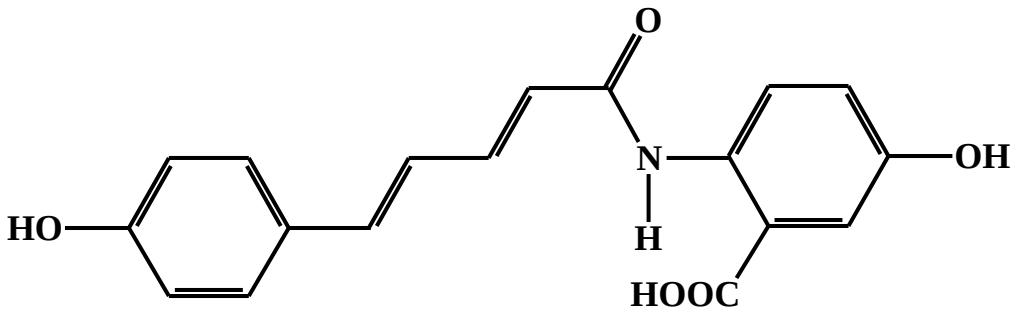
Orally and externally.

Chemical constituents

Grains of *Avena sativa* are rich in calcium and other minerals such as iron, copper, cobalt, manganese, and zinc. They contain starch, lipids, and proteins with good nutritional quality. The plant protein high level of the amino acid lycine and low levels of avenins. The seeds contain the sterols 5- , 6-, and 7-hydroxy-n-hentriacontan-14,16-dione. Plant leaves contain avenacosides A, B (saponins) and flavonoids in the leaves while the roots contain avenacin. Two glycoflavones (apigenin-8-C-rhamnosyl glucoside and apigenin 8-C-arabinosyl hexoside) were obtained from the leaves. Also, the seedlings contain a C-glycosylflavone (O''-rhamnosyl-8-C-D-glucopyranosylgendwanin or O''-rhamnosyl isoswertisin). The plant contains phenolic acid and the polyphenols. Avenan thramide A, B, C. The herb contains three flavonolignans derived from the flavon tricin. The leaves contain amylase enzyme. The plant contains coumarins.



Avenathramide A: R_1= H, R_2= H, R_3= OH
Avenathramide B: R_1= OCH_3, R_2= H, R_3= OH
Avenathramide D: R_1= H, R_2= H, R_3= H
Avenathramide G: R_1= H, R_2= OH, R_3= H



Avenathramide L

Pharmacology and toxicology

Avenanthramide inhibits vascular smooth muscle cell proliferation and increases nitric oxide production by these cells *in-vitro*. The plant has hypoglycaemic activity in type 2-diabetic patients and in horses. The grains decreased the cholesterol levels in hypercholestrolemic patients. The plant has antioxidant activity. Avenanthramides have anti-inflammatory and antiatherogenic activities *in-vitro*. Avenin is harmful to patients with coeliac disease (controversial). .

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations containing *Avena sativa* are available in the Egyptian market.

Many pharmaceutical preparations containing *Avena sativa* are available in the markets abroad.

Pharmaceutical preparations, Company (Country), Indications

- **Avena Sativa Comp,** Welda (UK).
- **Sleep Complex,** Brauer (Austral.).
- **Vitaglow Smoke Stop,** Vitaglow (Austral.).
- **Acidum Phosphoricum med Comp,** Dynamit (Austral.).
- **Avena Med Complex,** Richter (Austria).
- **Globuli Gegen Schlafstorungen**, Jacoby (Austria).
- **Notta**, Bittner (Austria).
- **Valerianaheel**, Peithner (Austria).
- **Alfalfa Tonic**, Boiron (Canada).
- **Daily Tension and Strain Relief**, Herbal Concepts (UK).
- **Daily Over Work and Mental Fatigue Relief**, Herbal Concepts (UK).
- **Sebaveen**, Dermoteca (Port.).
- **Acnaveen**, Dermateca (Port.).
- **Aderma Dermalibour**, Bio-Merieux and Pierre Fabre (Hong Kong).
- **Wxomega**, Ducray (Fr.).
- **Esberi-Nervin**, Laves (Ger.).
- **Vitaglow Herbal Stress**, Vitaglow (Austral.).
- **Oat Milk Treatment Cream**, pierre Fabre (Hong Kong).
- **Adema Exomega**, Bio-Merieux and Pierre Fabre (Hong Kong).
- **Sabaveen**, Rydelle (Ital.).
- **Seboderm**, Sodip (Switz.)
- **Gystelium**, Ducray (Fr.).
- **Aveendix**, Glaxo Wellcome (Mex.).
- **Gonaxine**, motima (Fr.).
- **Micaveen**, Dermoteca (Port.).
- **Glycyrrhiza Complex**, Blackmores (Austral.).
- **Plantival**, Schwabe (Neth.).
- **Homeofortin III**, Hochstetter (Chile).
- **Dong Quai Complex**, Blackmores (Austral.)
- **Mucilar Avena**, Spirig (Switz.).
- **Avena Complex**, Blackmores (Austral.).

Traditional medicinal and indigenous knowledge

Avena is a good nutrient as cereal food especially in cases diabetes and dyspepsia. The tincture is used to cure opium and smoking habits. It shows hypoglycemic activity. It is also nerve tonic and stimulant. Tincture

of fresh flowering plant used in treatment of arthritis, rheumatism, paralyses, liver infections, skin diseases. The plant is diuretic, laxative, calmative and vulnerary.

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***Capparis spinosa* L.**
Family: Capparaceae

Plant name

***Capparis spinosa* L. var. *inermis* Turra**

Synonyms

Capparis orientalis Duh.
Capparis rupestris Sibth. & Sm.
Capparis spinosa L. var. *rupestris* (Sibth. & Sm.) Viv.
Capparis spinosa L. subsp. *orientalis* (Duh.) Jafri in Ali & Jafr

Distribution

- **Global**: Mediterranean region, West and Central Asia to India.
- **National**: O, S
- **Local** : 31º 22´ 26.40´´N 27 º 00´ 19.98´´ E

Status

- **Täckholm**: cc
- **IUCN** : rare
- **Current**: under threat

Main habitat

Wadi bed & slope

Part used

- Herb.
- Bark
- Flowers
- Fruits
- Seeds.

Collection

Plants are cut in the flowering and fruiting stages and seeds are collected when ripe.

Preparation

- Infusion.
- Fresh and dried powder.

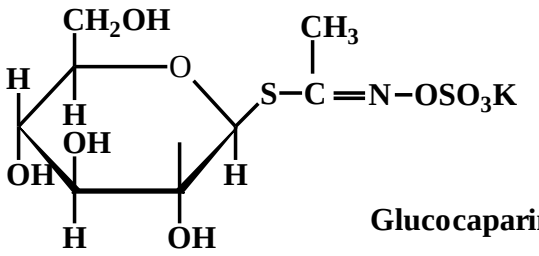
Use

Orally and externally.

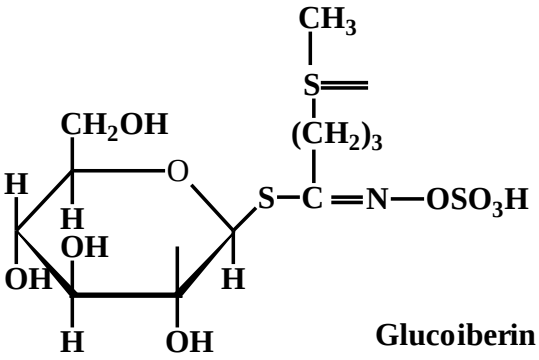
Chemical constituents

The plant contains:

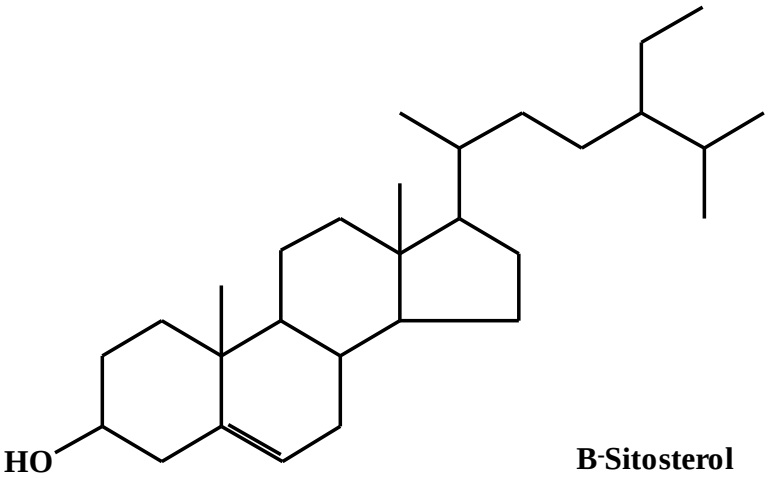
- Glucosinolates: glucocapparin, glucocleomin, glucoiberin, glucocapangulin and sinigrin.
- Flavonoids: rutin and quercetin-7-O-*β*-D-glucopyranoside-*β*-L-rhamnopyranoside.
- Alkaloids: L-stachydrine and choline. The alkaloidal content amounts to 0.02 and 0.074% in the leaves and fruits respectively.
- Mucilage consisting of glucose, arabinose, xylose and glucuronic acid.
- Sterols: *β*-sitosterol and *β*-sitosterol-*β*-D-glucoside.
- Organic acids: citric, tartaric and oxalic.
- Fatty acids: lauric, myristic, palmitic, stearic, oleic, linoleic and linolenic. The plant also conatins coumarins, saponins, tannins, rutic acid, pectic and capric acid. The plant also contains bitter principles, enzyme myronase and volatile compounds with garlic odour.



Glucocaparin



Glucoiberin



B-Sitosterol

Pharmacology and Toxicology

The leaves and the dried powder of the herb showed a molluscicidal activity against the snail of *Bionimphalaria alexanrina*. Aqueous extract of the fruit exhibit a potent anti-hyperglycaemic activity in rats. Methanolic extract of the flowering buds has a significant anti-oxidant activity. Extracts of the aerial parts of the plant have antibacterial activity against both Gram-positive and Gram-negative bacteria and antifungal activity against dermatophytes. The herb has a hepatoprotective effect. It reduced significantly serum transaminases. It has an antitumor activity against human leukemia *in-vito*. It has an immunosuppressive effect.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations containing *capparis spinosa* are available in the Egyptian market.

Some pharmaceutical preparations containing *capparis spinosa* are available in the markets abroad.

Pharmaceutical preparation, company (country), indication(s)

- **Liverguard**, Pharmadss (UK), Liver disorders.
- **Live 52**, Ebi (Switz.), Liver disorders, gastrointestinal disorders and tonic.

Traditional medicinal and indigenous knowledge

Roots are used as tonic, astringent and diuretic. Root bark, appetizer, purgative, anthelmintic, emmenagogue, analgesic and applied externally as cataplasm for spleen troubles. Bark is used for treatment of gout, rheumatism, laxative, expectorant and for chest diseases. Infusion prepared from the stem and root bark for diarrhoea and febrifuge. Flower buds and roots are utilized as renal disinfectants, diuretic, tonic and for arteriosclerosis and chills, as well as compresses for the eyes. Leaves and fruits are carminative and aphrodisiac. Fresh fruits are antiscorbutic, their infusion is used for sciatica. powdered fruits mixed with honey are taken in the morning for sciatica and backache. Flower buds are refreshing, stimulant and slightly diuretic. Seeds for treatment of feminine sterility and dysmenorrhea. They are crushed and applied externally on ulcers, ganglions and scrofula.

Other uses of the plant

The unexpanded floral buds of the plant are pickled in vinegar and also used as spices for fish, pizza and poultry.

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***Citrullus colocynthis* L. Schrad.**
Cucurbitaceae

Plant name

***Citrullus colocynthis* (L.) Schrad.**

Synonyms

Cucumis colocynthis L.
Colocynthis vulgaris Schrad.

Distribution

- **Global**: Atlantic Islands, North Africa, Sinai, Sudan, Kenya, Ethiopia, West Asia to Afghanistan and Pakistan.
- **National**: Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE, S
- **Local**: 31º 34′ 11.76′′N 25º 09′ 39.72′′ E

Status

- **Täckholm**: Very common
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Inland plateau

Morphological description

Colocynth is an annual or perennial herbaceous vine, stems angular and rough. Leaves are rough, 3-to 7-lobed, 5-10 cm long, 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 size of small orange, green and yellow variegated becoming yellow when ripe, with hard rind, pulp light in weight, spongy, easily broken, light yellowish-orange to pale yellow; intensely bitter. Seeds are numerous, ovoid, compressed, smooth, dark brown to light yellowish-orange, borne on parietal placenta. The plant produces every year 40-60 fruit per plant. The plant is very common in sandy places in all the phytogeographical regions. Colocynth presents a curious look with patches here and there in the extensive blazing deserts. The plants are suffering from winter and recovering again in summer. They have wonderful adaptation ability to grow up on the hot sandy soil of summer months.

Ecology

The plant grows in deep sandy habitats. It appears as groups in depressions receiving runoff water.

Status

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

Parts used

Colocynth is the dried unripe, but fully grown fruits. Colocynth contains not more than 5.0 *per cent* of its seeds, and not more than 2.0 per cent of the outer sclerenchyrnatous part of the pericarp.

Preparation

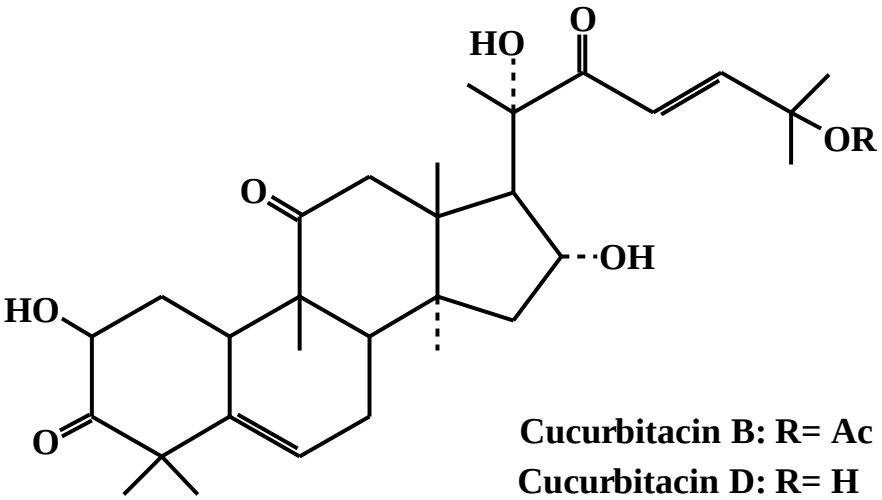
Compound Colocynth tablets, Compound Colocynth extract

Use

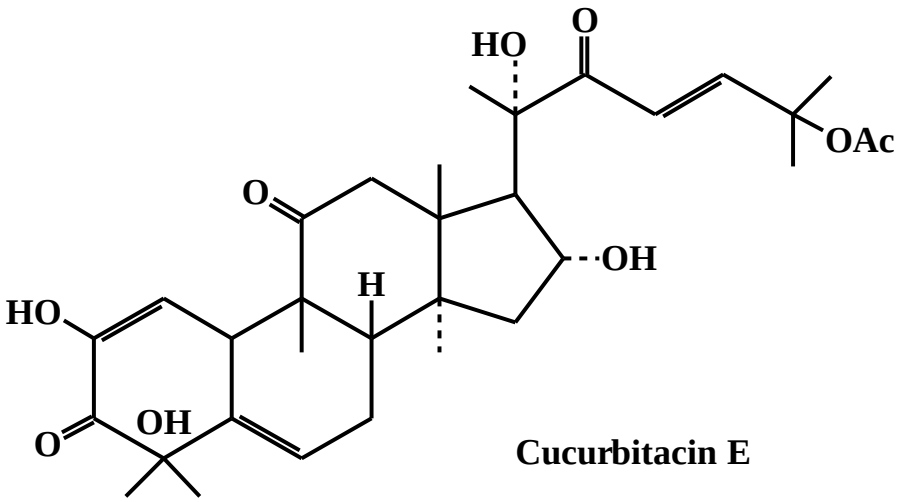
Orally and Externally.

Chemical constituents

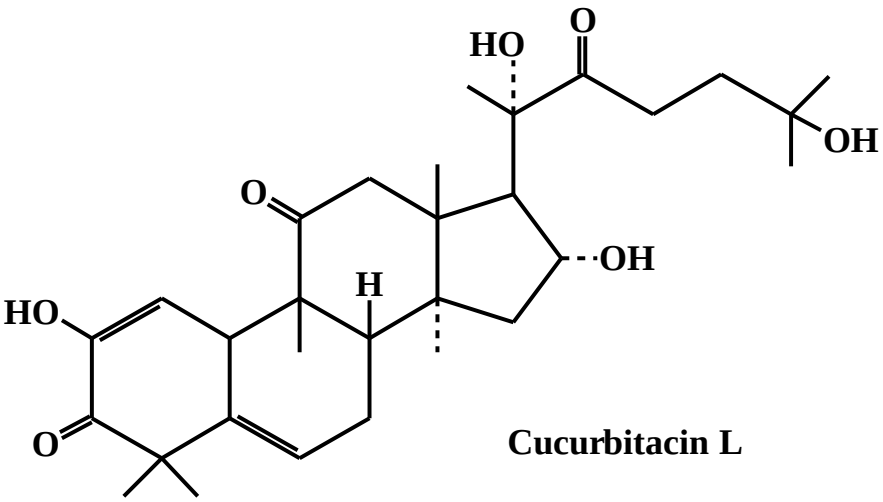
It contains resins, alkaloids, pectin, saponins, colocynthin and colocynthitin which are terms applied to indefinite mixtures of compounds, citrullol alcohol and glycosides which upon hydrolysis give elaterin «A», elatericin «B» and dihydroelatericin «B». Elaterin A is known as cucurbitacin «E», elatericin «B» is known as cucurbitacin «I» and dihydroelatericin «B» is known as cucurbitacin «L». About eleven cucurbitacins have been isolated. The juice contains citrullin, citrulluen and citrullinic acid.



Cucurbitacin B: R= Ac
Cucurbitacin D: R= H



Cucurbitacin E



Cucurbitacin L

Pharmacology and toxicology

Colocynth is irritant and cathartic. It acts very powerfully, producing copious watery evacuations. Even in moderate doses, it has excited inflammation of the mucous membrane of the intestines, vomiting, and 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 antiflammatory activity and are diuretic. They are used in the treatment of asthma and jaundice. The plant is 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 complains. It shows anti-histaminic, anti-acetylcholine and cardiac depressant activities. The extract of the dried pulp has also anti-bacterial activity. Toxic effects after chronic use include hypokalamia, oliguria and oedema, similar to acute nephritis, and symptoms resembling Crohn's disease and Addisions Disease. In case of poisoning by colocynth the stomach should be emptied, opium given by mouth or rectum followed by stimulants and demulcent drinks. A considerable number of severe cases of poisoning with this substance have occurred in the human subject, and a few have proved fatal. It should never be taken by nursing mothers since the active constituents appear in breast milk.

Pharmacopoeias

- The Augustana Pharmacopoeia (1581, 1684).
- Pharmacopoeia francaise 1965.
- Pharmacopoeia of the Massachusette Medical Society, Boston, 1808
- The German Pharmacopoeia of 1872, 1882 and 1890.

Pharmaceutical product

No-habit, Lotion (tri M. Medical)

Traditional medicinal and indigenous knowledge

The leaves are diuretic and used in treatment of jaundice and asthma. The root is useful in inflammation of breasts, amenorrhea, rheumatism, joint pains and is used externally in ophthalmic and uterine pains. The fruit is pungent, cooling purgative, anathematic, antipyretic and carminative. It cures, tumours, leucoderma, ulcers, asthma, bronchitis, urinary discharge, enlargement of spleen, tuberculosis glands of the neck, dyspepsia, constipation, anemia and throat diseases. The fruit pulp is purgative, diuretic, antiepileptic, and is used against gonorrhea. The Bedouin make a polities of colocynth with warm cooking oils then placed on the joints against rheumatic pain and the leaves have been used for painful menstruation and the fruit broken small is used for the purpose of protecting woolen clothing from moths Derived veterinary preparations

which contain colocynth are used for itch. Cataplasm of green or dried plant used as a remedy for leucoderma; cataplasm resolvent, astringent. Hot sap of plant is used to cure skin diseases of camels. In Morocco, it is used as antihypertensive and antidiabetic.

Diseases

- Chest diseases (bronchial asthma).
- Constipation.
- Rheumatic diseases
- Tumor diseases.
- Colocynth is known as a very powerful purgative or hydragogue cathartic, emetic and gastrointestinal irritant. It is usually given with hyoscyamus to prevent gripping. It is not given in case of pregnancy. It stimulates hair growth.

Other uses of 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.

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***Cyperus rotundus* L.**
Family: Cyperaceae

Plant name

***Cyperus rotundus* L.**

Synonyms : ─

Distribution

- **Global** : Tropical and suntropical regions.
- **National**: Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE, S
- **Local**: 31º 22′ 35.88′′N 26º 09′ 10.50′′ E

Status

- **Täckholm**: Very common
- **IUCN** : ─
- **Current**: Very common

Main habitat : Cultivated lands

Part used

- Tubers.
- Rhizomes.
- Bulb roots.

Collection

Plant tubers are harvested and used fresh or in the form of Decoction and Infusion.

Preparation

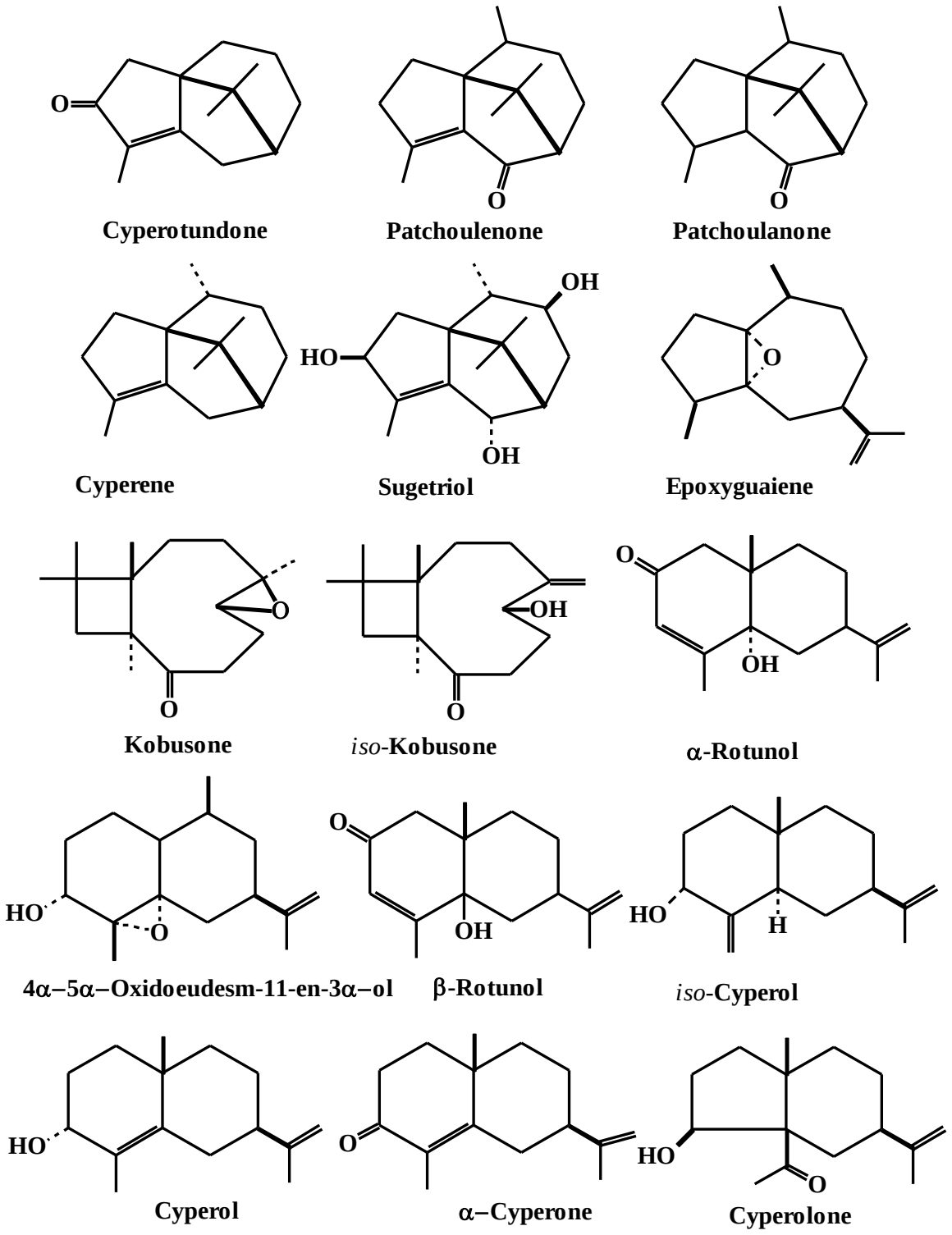
Decoction, Infusion or fresh tubers.

Use

Orally.

Chemical constituents

Tubers conatin 2.7% fixed oil containing wax. They also contain 0.5% volatile oil containing more than 20 sesquiterpene compounds such as: Copadiene, Copaene, Cyperene, Cyperenone, Cyperol, iso-Cyperol, Cyperolone, α-Cyperone, B-Cyperone, Cyperotundone, Epoxyguaiene, Kobusone, iso-Kobusone, Mustakone, 4α , 5α-Oxidoeudesm-11-en-3α-ol, Patchoulenone, Rotundene, Rotundenol, Rotundone, α-Rotunol, B-Rotunol, Selinatriene, B-Selinene, and Sugetriol. The tubers contain triterpenoid acid, Saponin, Sitosterol, glucose, fructose, Starch, Cardiac, glycosides, alkaloids, Tannins, Vitamin C, Linolenic acid, Linoleic acid Myristic acid, Oleanolic acid, Oleanolic acid-3-O- neohesperidoside, Oleic acid, bitter substances, polyphenolic substances and the flavonoid aureusidin.



Pharmacology and toxicology

Decoction of polyherbal formulation contained *Cyperus rotundus*, *Aegle marmeloes*, *Cariandrum sativum* and *Vetiveria zinzanioids* showed significant anti-inflammatory activity against acetic acid induced colitis in mice and indomethacin-induced entrocolitis in rats. The petrolium ether extract of the roots showed anti-inflammatory activity against Carrageenin-induce Oedema in albino rats. Methanol extract of rhizomes showed inhibition of nitric acid and superoxide production by murine macrophage

cell line, RAW 264.7 cells. Sesquiterpenes extracted from tubers showed a strong antimalarial activity. 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 demonstrated on rabbit ileum. Extracts of rhizomes were inhibitory to the growth of fungi. Antibacterial activity of oil and its fractions have been demonstrated against a number of organisms.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations containing *Cyperus rotundus* are available in the Egyptian market.

Traditional medicinal and indigenous knowledge

Tubers are stimulant, tonic demulcent, diuretic, anthelmintic, stomachic, carminative, diaphoretic, emmenagogue, astringent, vermifuge and for scorpion stings. Essential oil used as aromatic stomachic in nervous gastralgia, dyspepsia, diarrhoea, sedative, analgesic in dysmenorrhea, amenorrhea, chronic metritis, diuretic, carminative stimulant, a colic remedy and to remove renal calculi, tonic, aphrodisiac to increase the body weight, anthelmintic, analeptic and condiment. Decoction of tubers diaphoretic, Infusion of tubers used for intestinal pains.

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***Datura stramonium* L.**
Solanaceae

Plant name

***Datura stramonium* L.**

Synonyms

Datura tatula L.

Distribution

- **Global**: Cosmopolitan
- **National**: Mma, Nv.

Status

- **Täckholm**: common
- **IUCN**: ─
- **Current**: Rare

Main habitat

Cultivated lands

Morphological description

Datura stramonium plant is a large and coarse herb, though an annual, branching somewhat freely. It attains a hight of about one meter. On rich soil it may attain a hight of even 2 meters. The root is very long-thick and whitish, giving off many fibres. The stem is stout, erect and leafy, smooth, a pale yellowishgreen in colour. The leaves are large and angular, uneven at the base, with a wavy and coarsely-toothed margin, branching veins very plainly developed. The flowers arc large, and white or violet, handsome, growing singly on short stems springing from the axils of the leaves or at the forking of the branches, The corolla, folded and only half-opened, is funnel-shaped, of a pure white, with six prominent ribs. The flowers are succeeded by large, eggshaped seed capsules of a green colour, and covered with numerous sharp spines. When ripe, this seed-vessel opens at the top, throwing back four valve-like forms, leaving a long, central structure upon which are numerous rough, dark-brown seeds.

Description

The dried leaves are grayish-green in colour, brittle, twisted and often broken. The leaves are variable, 8-25 cm long and 7-17 cm wide, shortly petiolate, ovate or triangular-ovate in Shape; they are acuminate at the apex and have a sinuate dentate margin. The fresh leaf is somewhat dagger-shaped. The flower is white, with streaks of purple colour appearing sometimes on the ribs and tips of the corolla lobes. They are solitary in the axils and point upward. They produce round greenish fruits or capsules that enclose black, flat, reticulated, kidney-shaped seeds. The plant has a bitter,

saline taste with a disagreeable odour when fresh but the dried plant has a bitter, saline taste with a disagreeable odour when fresh but the dried plant has a tea-like odour.

Ecology

Datura stramonium is generally found growing in full sun on grazing land, roadsides or waste ground, Prefer disturbed sites with fertile soils such as stock camps or riverbanks where it can become abundant. *Datura stramonium* is easily cultivated, growing well in an open, sunny situation. It will flourish in most moderately good soils, but will do best in a rich calcareous soil, or in a good sandy loam, with leaf mould added.

Parts used

All parts have medicinal value, but only the leaves and seeds are official.

Collection

Leaves should be gathered when the flowers are full brown carefully dried in the shade. The seed should be gathered when ripe. *D.stramonium* is the dried leaves with or without the flowering tops of *Datura stramonium* collected from the plant in flower.

Preparation

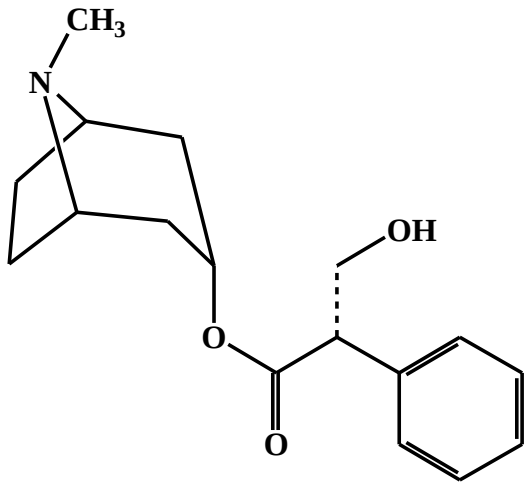
Powered leaves, fluid extract leaves, fluid extract seeds, tincture leaves, powered extract.

Use

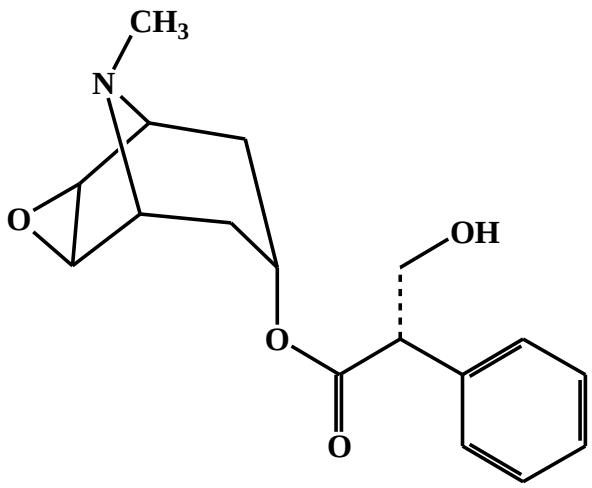
Orally and ointment

Chemical constituents

The plant is a known source of the tropane alkaloids hyoscyamine, atropine and scopolamine. The total alkaloid yield has been estimated to be between 0.06 and 0.50%. The young leaves contain mainly scopolamine, whereas hyoscyamine is the major constituent of the mature leaves. In addition to these alkaloids, the plant contains other minor tropane derivatives, as well as chlorogenec acid and lectins. The seeds contain up to 30% of fixed oil and about 0.2% alkaloids. Withanolides comprising a new 21-hydroxy withanolide were isolated from the leaves. Peudopeptide (gamma-L-glutamyI-L-aspartic acid was also reported. Roots contain ditigloyI and trihydroxytropane. Hydroxycoumarins: including, among others, umbelliferone, scopolin, scopoletin.



Hyoscyamine



Scopolamine

Pharmacological Action and Toxicology

Anticholinergic, antiasthmatic and antispasmolitic effects of the drug are mainly due to the presence of the alkaloids, hyoscyamine and scopolamine. *D. stramonium* has been employed in all the conditions for which belladonna is more commonly used, but acts much more strongly on the respiratory organs, and has acquired special repute as one of the chief remedies for spasmodic asthma, being used far more as the principal ingredient in asthma powders and cigarettes than internally. The beneficial effect is considered due to the presence of atropine, which paralyses the endings of the pulmonary branches, thus relieving the bronchial spasm. The seeds relieve asthma in the same manner as the leaves and are employed as a narcotic and anodyne. Atropine is used to treat nerve gas poisoning, Parkinson's disease, peptic ulcers, diarrhea and bronchial asthma. Scopolamine is used as preanaesthetic medication for treating motion sickness. Applied locally, in ointment, plasters or fomentation. *D.stramonium* will palliate the pain of muscular rheumatism, neuralgia and also pain, due to hemorrhoids, fistula, abscesses and similar inflammation. Careful consideration of the toxicity of the plant is required before its use. Its ingestion induces characteristic symptoms, just like over dosage, whether is inadvertent or international. The mouth becomes dry, an intense thirst develops, the visions get blurred with prominent mydriiasis and the heart rate increases. This is followed by hallucinations, delirium, loss of motor coordination which may lead to coma and ultimately to death by

Pharmacopoeia

- British Herbal Pharmacopoeia, 1976.
- Egyptian Pharmacopoeia, 1984.
- European Pharmacopoeia, 1997.

Pharmaceutical products

- Nospa **(EPICO)**
- Buscopan, Buscopan Compositum: Buscopan plus **(CID)**, (Boehringer Ingelheim)
- Butacid **(CID)**
- Farcorelaxin **(Pharco)**
- Spasmoein **(Memphis)**

Traditional medicinal and indigenous knowledge

The whole plant is used for asthma and as a sedative. The leaf extract is an ingredient in remedies for cough and chest complains. Plant boiled in water is taken to ease asthmatic breathing and for sedation. Dried leaves and flowers are smoked as tobacco to relieve difficult breathing. Seeds 'are taken as analgesic in small doses. The seeds of ripe fruits arc burnt and the smoke inhaled for treating epilepsy. *D.stramonium* is an alternative medicine treatment for parkinson's disease.

Diseases

- Chest disease.
- Gastro intestinal (peptic ulcer)
- Pertussis disease.
- Rheumatic disease.
- Sialorrhoea in parkinsonism.

Other uses of the plant

The leaves may be made up into cigarettes or smoked in a pipe, either alone, or with a mixture of tobacco, or with cubebs, sage, belladonna and other drugs, more commonly, however, the coarsely-ground leaves are mixed into cones with some aromatic and with equal parts of potassium nitrate, in order to increase combustion and are burned in a saucer, the smoke being inhaled into the lungs. Great relief is afforded, the effect being more immediate when the powdered leaves are burnt and the smoke in haled than when smoked by the patient in the form of cigars or cigarettes, but like most drugs, after constant use, the relief is not so great and the treatment is only palliative, the causation of the attack not being affected. Accidents have also occasionally happened from the injudicious use of the plant in this manner. *D.stramonium* was used as a sedative in epilepsy. The seeds are smoked with tobacco to relieve asthma. In Egypt, till now dried leaves and flowers are smoked as tobacco to relieve difficult breathing, influenza, leaves are used as poultices (with some oil) for rheumatic pain.

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***Ecballium elaterium* (L.) A. Rich**
Family: Cucurbitaceae

Plant name

***Ecbalium elaterium* (L.) A. Rich.**

Synonyms : ─

Distribution

- **National**: Cultivated in Mma
- **Local**: 31º 03´ 24.54´´N 28º 07´ 21.84´´ E

Status

- **Täckholm**
- **IUCN**
- **Current**

} Introduced from Libya and cultivated in Dabaa

Main Habitat

Cultivated lands

Part used

The roots and the fresh fruit juice.

Collection

The fruits are collected just before it ripens and left until it naturally eject the seeds and juice.

Preparation

- The fresh fruit juice is used fresh or it dried in flakes and called Elaterium drug.
- Elaterin is a mixture of α and B-elaterin, and it obtained from *Ecballium elaterium* by boiling the fruit with alcohol.

Two preparations are made using elaterin powder:

1. Pulvis Elaterini compositus, B. P. Compound powder of Elaterin
   Elaterin powder, 1: milk sugar powder, 39.
   Dose: 1-4 gm.
2. Trituratio Elaterini U.S. P. Trituration of Elaterin
   Elaterin, 10: milk sugar, in moderately fine powder, 90.
   Dose: 30 mg.

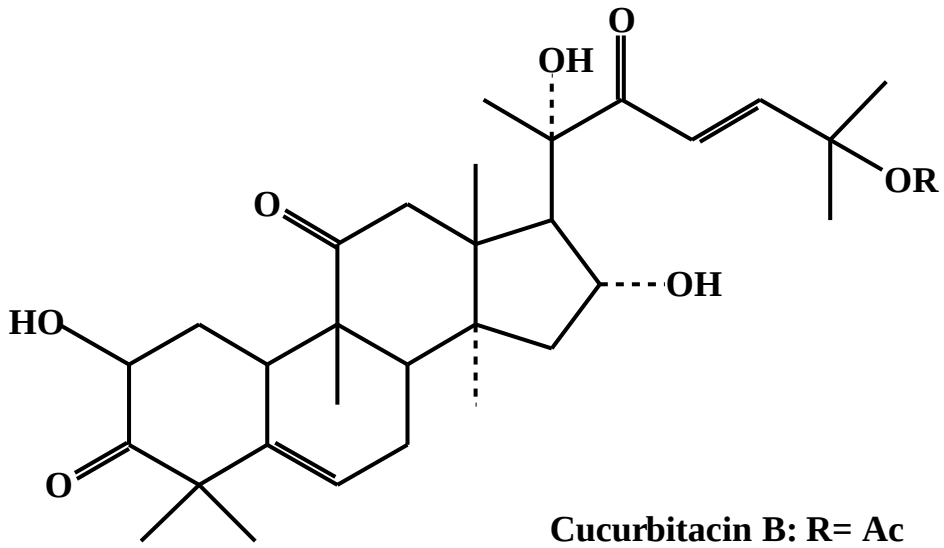
Use

Orally, externally and in the form of nasal drops.

Chemical constituents

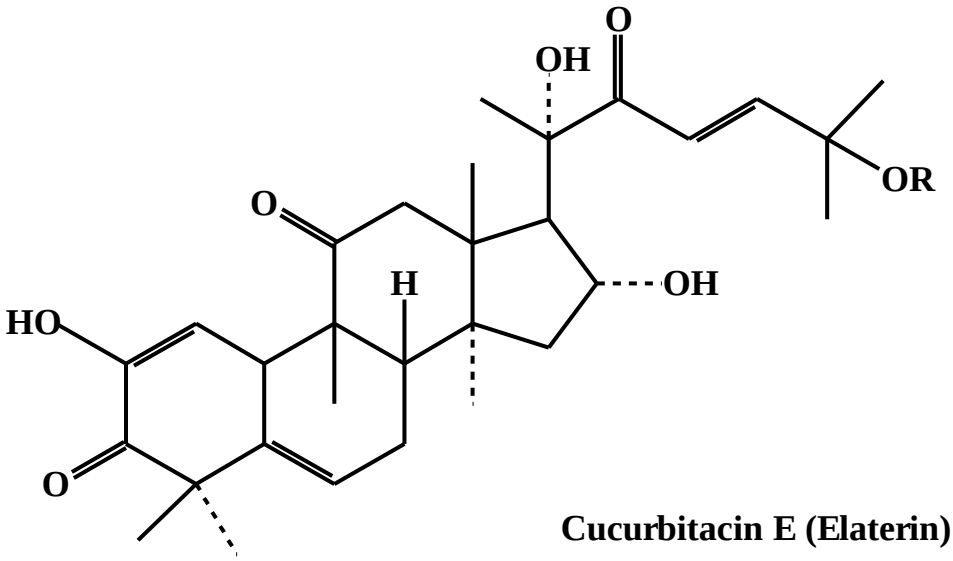
The plant contains Cucurbitacins (α and *β*-elaterin, elatericins A and B, Cucubitacins B, D, E, I). The fresh fruit contain the highest percentage of Cucubitacins while leaves and flowers contain the lowest percentage.

The plant also contains ecballin, prophitin and ecbalic acid. The pollens contain Kaempherol-3-O-rutinoside, rutin and flavonol-3-O-glucoside. The plant contains small protein that can inhibit the activity of elastase, chymotrypsin and trypsin enzymes.



Cucurbitacin B: R= Ac

Cucurbitacin D (Elatericin A): R= H



Cucurbitacin E (Elaterin): R= Ac

Cucurbitacin I (Elatericin B): R= H

Pharmacology and toxicology

The plant is a powerful hydragogue cathartic, and in large doses excites nausea and vomiting. If administered too frequently it operates with great violence on both the stomach and bowels producing inflammation and possibly fatal results. It also increases the flow of urine, and is of some use in the treatment of dropsy, especially when oedema is due to disease of the

kidney. Aqueous extract of the plant have anti-inflammatory activity *in-vitro*. Elaterium and cucurbitacin B showed anti hepatoxic activity.

Elaterium drug causes depression and violent griping. It must not be used especially if the state of the heart is unsatisfactory. Elaterin should be used with great caution as its action is frequently followed by prostration. Exposure to the juice of the plant, mainly in its undiluted form, cause irritation of mucous membranes and uvular oedema in some patients, when the juice is used as nasal drop.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical Products

No pharmaceutical preparations containing *Ecballium elaterium* are available in the Egyptian market.

Some pharmaceutical preparations containing *Ecballium elaterium* in the market abroad.

Pharmaceutical preparations

- Pulvis Elaterini compositus, B.P.
- Trituratio Elaterini U.S.P.

Traditional medicinal and indigenous knowledge

Roots used externally by rubbing for painful articular conditions. Root and fruit juice are violent purgative, diuretic, emetic. Fruits dipped in oil used as suppository against piles. Fruit juice is used as nose drops and for jaundice by nasal instillation. The fruit juice is effective in cases of parasitic scalp diseases. It promotes hair growth in cases of baldness. The plant is powerful hydragogue purgative. The Elaterins compounds have antitumer effects. Elaterium drug is valuable in cases of dropsy and Bright's disease, and also in cases of cerebral haemorrhage. Elaterin is a most powerful hydragogue cathartic, it is used chiefly in cardiac or renal disease, accompanied by dropsy.

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***Glebionis coronaria* (L.) Tzveleu.**
Family: Compositae

Plant name

***Glebionis coronaria* (L.) Tzvelev**

Synonyms

Chrysanthemum coronarium L.

Distribution

- **Global**: Mediterranean region, Sinai, eastwards to Iran.
- **National**: Nd(r), Nv(r, Mma, Mp
- **Local** : 31º 22´ 27.00´´N 27 º 03´ 46.50´´ E

Status

- **Täckholm**: Rare
- **IUCN**: ─
- **Current**: Under threat

Main habitat

Wadi mouth

Part used

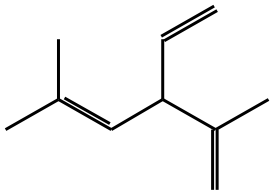
- Leaves.
- Flower heads.

Collection

Plants are cut in the flowering stage.

Chemical constituents

The plant (particularly the flowers) contains several flavone and flavonal glycosides which were identified as: (Luteolin-7-glucoside, Luteolin-7-glucuronide, Chrysoeriol-7-glucoside, Chrysoeriol-7-rutinoside, Quercetin-7-glucoside, Quercetagetin-3'-methyl ether 7-glucoside and Kaempferol glucoside). It also contain chlorogenic and isochlorogenic acids. The seed oil contains epoxy monoenoic acids and coronaric acid. The plant contains Lyratol esters and s-containing alkenynes. The plant contains polyphenol oxidase enzyme. Comphor (22.1%), cis-chrysnthenyl acetate (19.9%), α-pinene (14.8%), β-Pinene (9.5%, Lyratyl acetate (9.8%) are the main constituents of the flower oil and the blue color of the oil is due to the presence of chamazulene (0.5%). Plants also contain the antioxidants (chlorogenic acid, 3,5-dicaffeoylquinic acid, 4-succinyl-3,5-di caffeoylquinic acid and caffeic acid. The stems contain emodin and chrysophanol. The roots contain chrysazin and chrysophanol. The leaves are rich in quercetin, rutin and isoquercetin and conatin high concentrations of ascorbic acid and carotenoids. The seeds contain 13.4 k Da protein called chrysancorin.



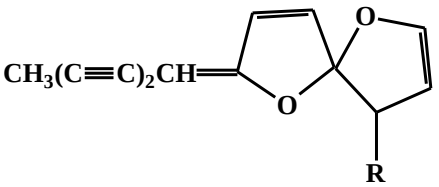
Lyratol: R= CH_2OH

Lyratol Esters:

R= CH_2OAc

R= $CH_2OCOCHCH_3C_2H_5$

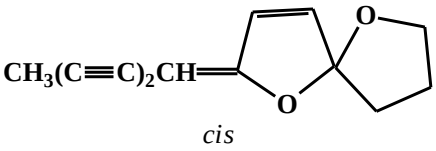
R= $CH_2OCO(CH_3)=CH\text{-}CH_3$



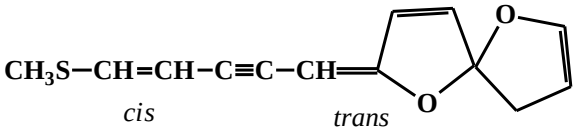
ALkenynes

R= H *cis*

R= H *trans*

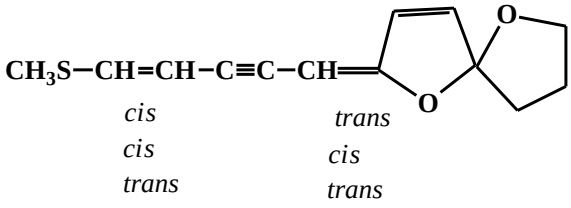


cis



S-containing Alkenynes

cis *trans*



cis *trans*

cis *cis*

trans *trans*

Pharmacology and Toxicology

The methylene chloride extract of the fresh flower heads showed antibacterial activity. The chrysancorin protein isolated form seeds stimulates the proliferation of the mouse splenocytes and inhibits the activity of human immunodeficiency virus-1 reverse transcriptase. The protein showed antifungal activity against *Botrytis cinerea*, *Mycosphaerella arachidicola* and *physalospora piricola*. The flower head essential oil showed antifungal activity against 12 agricultural pathogens. The plant has antioxidant activity.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations containing *Chrysanthemum coronarium* are available in the Egyptian market.

Traditional medicinal and indigenous knowledge

Flowers vermifuge, used against itch.

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***Haplophyllum tuberculatum* (Forssk.) Juss.**
Family: Rutaceae

Plant name

***Haplophyllum tuberculatum* (Forssk.) Juss.**

Synonyms

Ruta tuberculata Forssk.
Haplophyllum longifolium Boiss.

Distribution

- **Global**: North Africa, Sinai, East Mediterranean region, Arabia, Iran, Pakistan, Afghanistan, North Sudan.
- **National**: Nv, Mma, Mp, Da, O, R, S
- **Local** : 31º 23′ .733′′N 27º 01′ .612′′ E

Status

- **Täckholm**: Very common
- **IUCN** : ─
- **Current**: under threat

Main habitat

Road Side

Part used

- The entire plant.
- Flowering and fruiting branches.

Collection

Plants are harvested in flowering and fruiting stage.

Preparation

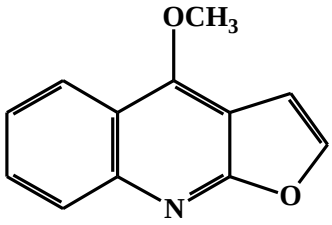
Decoction.

Use

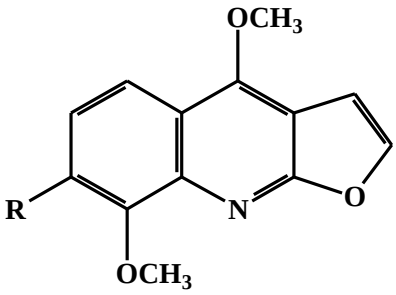
Orally**.**

Chemical constituents

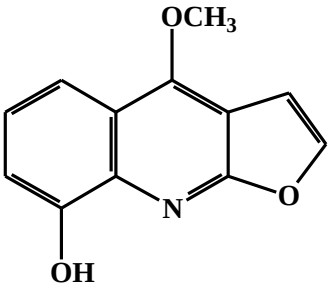
Leaves and stems contain alkaloids (Haplutubinone, Haplutubine), (Rubustine, Dubamine, V-Fagarine, Dictamine, Haplophlin, Dictammine, Skimmianine, Flindersine, Evoxine and 3-dimthyl allyl-4-dimethyl allyloxy-2-quinolone). Plants contain lignans (Ciphyllin, Justicidin A, Justicidin B, Tuberculatin), Flavonoids and cumarins. The aerial parts of *Haplophyllum tuberculatum* plant contain the amid N-(2-phenylethyl) – benzamide.



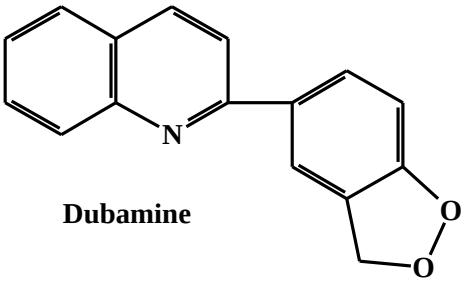
Dictamine



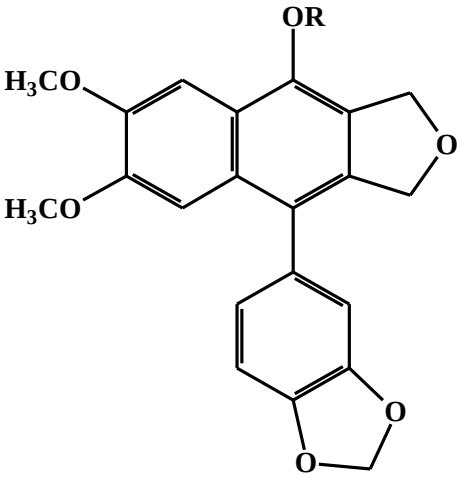
v-Fagarine: R= H
Skimmianine: R= OCH3
Evoxine: R= OH2-CHOH-COH(CH3)2



Robustine



Dubamine



Diphyllin: R= H
Justicidin A: R= CH_3
Diphyllinin: R= apiose

Pharacology and toxicology

Plant extract showed antiplasmodial activity *in-vitro* against *plasmodium flaciparum* strains 3D7 and Dd2. It is also showed low hepatoprotective effects against paracetamol-induced hepatotoxicity in mice.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical Products

No pharmaceutical preparations containing *Haplophyllum tuberculatum* are available in the Egyptian market.

Traditional medicinal and indigenous knowledge

Decoction of the plant is recommended by herbalists for preparations used as carminative for children. It is also used for rheumatic pains. Flowering and fruiting branches are febrifuge and used for vomiting, nausea, constipation, malaria, difficult childbirth, anemia, gastric pains, intestinal worms, and eye and ear troubles.

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***Hyoscyamus muticus* L.**
Solanaceae

Plant name

***Hyoscyamus muticus* L.**

Synonyms

Hyoscyamous datora Forssk.
Scopolia mutica (L.) Dunal in DC.
Scopolia datora (Forssk.) Dunal in DC

Distribution

- **Global**: Libya, Egypt, Sudan, Arabia, Iran to Pakistan and India.
- **National**: Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, GE, S
- **Local** : 31º 28′ 44.64′′N 25º 16′ 40.20′′ E

Status

- **Täckholm**: Rare
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Inland plateau

Morphological description

The stems are yellowish, terete, hollow and longitudinally grooved as a result of drying; the dried leaves are pale green and brittle, up to 15 cm. long, ovate-lanceolate to lanceolate; the radical ones are petiolate and the lamina has two or three large teeth on each side and an acuminate apex; the upper leaves are sessile, more lanceolate and have an entire margin; the venation and surface characters resemble those of henbane. The flowers are crowded at the ends of the stems; each flower has a hairy campanulate-cylindrical calyx, about 3 to 4 cm. long with ten longitudinal ribs and five short triangular teeth; the corolla is deep purple with yellowish streaks and five unequal lobes, projecting beyond the calyx; the epipetalous stamens have hairy purple filaments and oblong, yellow anthers. The fruit is a bilocular cylindrical pyxis about 1,5 cm. long and 6 mm. wide; it is enclosed by the persistent calyx. The seeds, when present, closely resemble those of henbane and are about 1 mm, in diameter, Odour fetid and heavy; taste bitter and acrid.

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 and that the most suitable habitat for it is a sandy soil (considerable fine sand fruction) with low medium carbonate content. *Hoscyamus 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 is now spotlighted and an increasing interest is directed towards its cultivation as a source for alkaloid production for pharmaceutical industrialization. So, different trials to cultivate *H. muticus* in two different localities were carried out to determine the total alkaloidal contents in addition to the other plant growth criteria.

Parts used

- Total herb.
- Leaves.
- Flowering tops.

Collection

The flowering tops are collected in the mid flowering stage.

Preparations

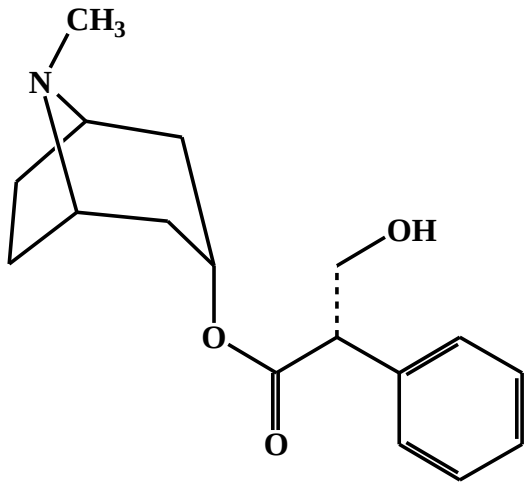
- Infusion.
- Decoction.
- Powder.

Use

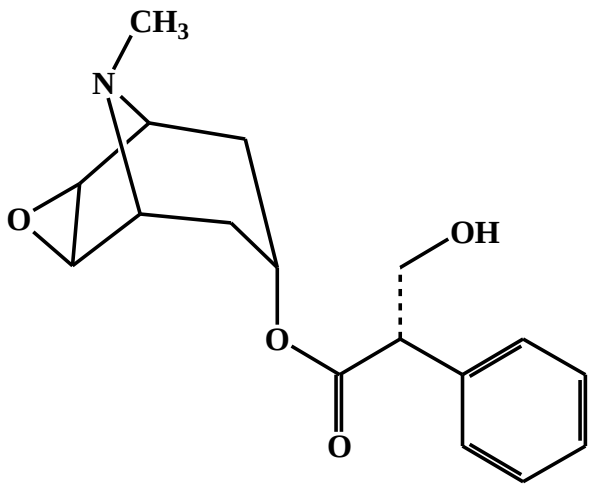
Orally, external and ointment.

Chemical constituents

Total trop alkaloids ranging from 1.38-1.58% during flowering stage. Hyoscyamine represents 90% of the total alkaloids in addition to small amount of hyoscine (scopolamine). Upon drying or during the process of isolating the alkaloids, hyoscyamine is converted to atropine by racemization. The plant contains high amount of alkaloids up to 1.5%. It is used commercially for the preparation of alkaloids.



Hyoscyamine



Scopolamine

Pharmacology and Toxicology

Antispasmodic, anodyne, sedative, mydriatic. Principally employed in irritable conditions and nervous affections. Also, used in asthma, whooping cough, as a sedative and as substitute for opium, where this is inadmissible, as in children's complaints. The alkaloid hyoscine is used very widely, as a pre-operative medication, to prevent travel sickness. *H.muticus* 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.

Pharmacopoeias

- Egyptian Pharmacopoeias 1984.
- British Pharmacopoeias 1809, 1968. 1973.

Phytopharmaceutical product

- *H. muticus* fluid extracts.
- Herba *H .muticus.*
- Standardized powder of *H. muticus.*
- Tincture of Egyptian *H. muticus.*
- *Avicenne* powder; **Kahira,** 20g *H.muticus* leaves. 75g.
- Buchu and *H. muticus* mixture.

Traditional medicinal and indigenous knowledge

Greeks and Romans knew it as a painkiller, the Babylonians and the Egyptians were acquainted with both its good and bad qualifies. Brewers in earlier times made use of henbane in brewing beer, probably in order to make it more intoxicating. The plant relieves painful spasmodic condition of lead colic, digestive and urinary tracts. It is used in toothache, whooping

cough. Boiling herb relieve pain killer during labor. Smoking Sakaraan cigarettes to treat asthma.

Medicinal uses

- mental and maniacal excitement
- epileptic mania
- chronic dementia
- paraylsis agitans
- convulsions
- neurolgia
- functional palpitations
- spasmodic cough and asthma .
- gastro-intestinal tract and the gastric or duodenal ulcers
- acute mania and delirium.
- in the treatment of withdrawal symptoms
- in morphine dependence .

Plant provides relief from painful spasmodic conditions of the non-striated muscles, characteristic of lead colic and irritation of the bladder; also used to allay nervous irritation of hysteria and irritable cough. Cataplasm of fresh leaves used to allay pain; dried leaves smoked as cigarettes against asthma.

Other uses of plant

In some parts of the world it is being used as poison.

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***Malva parvilfora* L.**
Family: Malvaceae

Plant name

***Malva parviflora* L.**

Synonyms

Malva flexuosa Hornem.

Distribution

- **Global**: Europe, North Africa, temperate Asia, naturalized in other temperate regions.
- **National**: Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, R, S
- **Local** : 31º 21′ 44.82′′N 27 º 59′ 31.02′′ E

Status

- **Täckholm**: Very Common
- **IUCN** : ─
- **Current**: Very Common

Main habitat

All habitats

Part used

- Leaves.
- Flowering and fruiting branches.
- Seeds.

Preparation

- Infusion.
- Rectal enema.
- Cataplasm.
- Lotion (Eye Lotion).
- Gargle.

Use

- Orally.
- Externally
- Rectally.

Chemical constituents

The plant contains sterol, triterpenes, mucilage, tannins and proteins. The plant also contains thiamins. .

Pharmacology and toxicology

Malva parviflora proteins have a potent antimicrobial activity. The hydroalcoholic extract of the plant is used for the treatment of various skin disorders due to its antibacterial and antifungal activity against different skin bacterial and fungal strains. The boiled leaves are diaphoretic and emmenagogue. Leaf infusion is nerve tonic. It is used as douche for uterine troubles and as eye lotion. The whole plant is emollient and pectoral. It can be used as a poultice on swellings, running sores and boils. The seeds are demulcent. They are used in the treatment of coughs and ulcers in the bladder. A decoction of the roots or leaves has been used as a hair rinse to remove dandruff and to soften the hair.

There is no report of toxicity for *Malva parviflora*.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical Preparation in the market

No pharmaceutical preparations containing *Malva parviflora* are available in the market.

Traditional medicinal and indigenous knowledge

Root chewed or rubbed into the gums for pyorrhea. Infusion of flowering and fruiting branches used as a gargle for their astringent properties, prescribed for people on diet, for gastro-intestinal ailments, bechic, emollient. Seeds and leaves used as a cataplasm, rectal injection or gargle according to the case.

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***Marrubium vulgare* L.**
Family: Labiatae

Plant name

***Marrubium vulgare* L.**

Synonyms : ─

Distribution

- **Global**: Europe, Caucasia, Mediterranean region, Sinai, Arabia, Iraq, Iran, Pakistan, naturalized in North America, South Africa and Australia
- **National**: Mma, Mp
- **Local** : 31º 22′ 35.88′′N 26º 09′ 10.50′′ E

Status

- **Täckholm**: Rare
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Road sides

Part used

The flowering herb without roots.

Collection

Plants are cut in the flowering stage.

Preparation

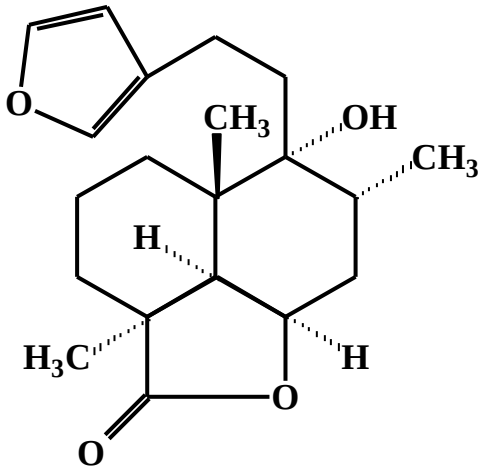
- Infusion.
- Decoction.
- Tincture.

Use

Orally and externally.

Chemical constituents

The plant contains furane labdane diterpenes (Marrubiin, Marrubenol) and Marrubiinic acid. The aerial parts of the plants contain the phenylpropanoid glycosides (acteoside, forsythoside B, arenarioside, ballotetroside and Marruboside) and the non-glycosidic derivative caffeoyl-1-malic acid. The plant also contains volatile oil, tannin, saponin glycoside, ursolic acid, sterols, choline, sesquiterpenes and unknown alkaloid most probably stachydrine.



Marrubiin

Pharmacology and Toxicology

Marrubiin and Marrubiinic acid extracted from the plant showed analgesic effect on experimental models of pain in mice. Infusion of the dry leaves of the plant showed hypoglycemic effect on type 2 diabetics, alloxan-induced diabetic rats and dextrose-diabetic rabbits. Phenylpropanoid glycosides isolated from the aerial parts of *Marrubium vulgare* plant have a beneficial effect in inhibiting atherosclerosis development in bovine aortic endothelial cells *in-vitro*. Water extract of the plant has antihypertensive effect on spontaneously hypertensive rats. It also has a vasorelaxant activity and inhibits smooth muscle contraction by blocking L-type calcium channels, the chemical analysis of the extract revealed marrubenol and marrubiin as the most active compounds. The leaves and the phenylpropanoids extracted from the plant have antioxidant activity.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations containing *Marrubium vulgare* are available in the Egyptian market.

Many pharmaceutical preparations containing *Marrubium vulgare* are available in the markets abroad.

Pharmaceutical preparation, company (country), indication(s)

Single ingredient preparations

- **Angocin,** Bronchial Tropfen (Ger.), Treatment of Catarrh.

Multi-ingredient preparations

- **Catarrh-eeze**, Chefaro (UK), treatment of catarrh.

- **Herbal Throat,** Jamison (Canada), respiratory disorders.
- **Fucus Compuesto,** Hochstetter (Chile).
- **Allens Chesty Cough,** Allens (UK).
- **Asthma and Catarrh Relief,** Herbal Concepts (UK)**.**
- **Apo-Infekt,** Pekana (Ger.).
- **Bronchosedina,** FAMA (Italy), respiratory tract disorders.
- **Modern Herbals Cough Mixture,** Lane (UK).
- **Natusor Bronchopul,** Soria Natural (Spain).
- **Asthmatee EF-EM-ES,** Smetana (Austria).
- **Hustensaft Weleda,** Weleda (Austria), herbal and homoeopathic preparation.
- **Herb and Honey Cough Elixir,** Weleda (UK).
- **Gallen und Lebertee EF-EM-ES,** Semtana (Austria).
- **Tan-Intest,** Genevrier (France), treatment of diarrhoea.
- **Hedrix,** Plan (Switz.).
- **Toxorephan,** Repha (Ger.), tonic.
- **Honey and Molasses,** Lane (UK).
- **Vegetable Cough Remover,** Potter's (UK).
- **Marrubene Codethyline**, Lemoine (France), respiratory tract congestion.
- **Stomasan,** Vicente (Spain).
- **Modiflor Tisane Hypotensive,** Monot (France), hypertensive.
- **Elixir Contrela,** Toux Weleda, Weleda (France).
- **Tisane Hepatique et Biliaire "H",** Hanseler (Switz.).
- **Verbascum Complex,** Blackmores (Australia), respiratory system disorders.
- **Neuners Krautertee Nr.7-Bronchial-und-Lungtee,** Neuners (Austria), treatment of catarrh and cough.
- **St. Radegunder Leber-Galle-Tee,** Synpharma (Austria), gastrointestinal and bilary tract disorders.
- **Iodocafedrina,** Parisis (Spain), respiratory tract disorders.
- **Gastro-Vial,** Klever (Ger.), gastrointestinal disorders.
- **Neuners Krautertee Nr.28-Zur Unterstutzung der Tätigkeit der Galle,** Neuners (Austria), treatment of bilary disorders.
- **Neo-Codion,** Fatol (Ger.), oral drops for cough.
- **Neo-Codion**, Bounchara (Switz.), tablets for cough.

Traditional medicinal and indigenous knowledge

Infusion of leaves recommended for cases of jaundice, diabetes, fevers, typhoid, typhus, takes part in the treatment of otitis and eczema, reputed as diuretic and emmenagogue. Infusions or decoctions mainly of the fresh plant mixed with dry resins or honey, febrifuge used in the treatment of malaria, typhus and liver infections, particularly jaundice, pulmonary troubles, headaches, often by inhaling the fresh juice of the

plant; tonic and stimulant in cases of anemia and convalescence, antidiabetic, of a regulatory action in cases of cardiac troubles; infusion after meals antidiabetic, antirheumatic and for colds. Strong doses purgative and emetic. Infusion of the f1owering summits expectorant for various respiratory disorders. Tincture for gastrointestinal, hepatic and bilary disorders. Hot infusion febrifuge, antidiabetic, stomach troubles, pectoral, tonic, chologogue.

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***Melilotus indicus* (L.) All.**
Family: Leguminosae

Plant name

***Melilotus indicus* (L.) All.**

Synonyms

Trifolium indicum L.
Trifolium melilotus - indica L.
Melilotus parviflorus Desf.
Melilotus bonplandii Ten.
Melilotus tommasinii Jord.

Distribution

- **Global**: Mediterranean region, Eurasia, introduced and naturalized elsewhere.
- **National**: Nd, Nv, Nf, O, Mma, Mp, Da, Di, D1, S
- **Local**: 31º 22´ 27.0´´N 27º 03´ 46.5´´ E

Status

- **Täckholm**: Very common
- **IUCN** : ─
- **Current**: Common

Main habitat

Wadis

Part used

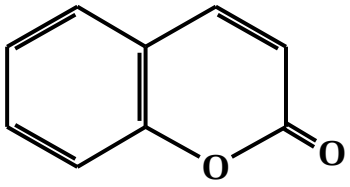
The entire herb.

Preparation

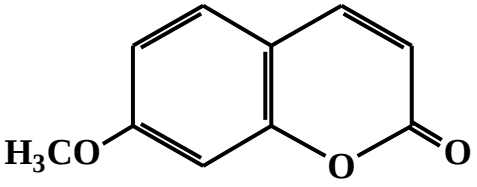
- Infusion of flowering branches.
- Cooked leaves

Chemical constituents

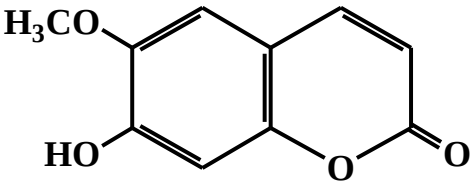
Plant contains coumarin as (coumarin, herniarin, scopoletin, umelliferone), and unsaturated sterols, carbohydrates, nitrogenous base, glycosides and traces of flavonoids. This plant also contains C-glycosides, methylene-dioxypterocarpan), pterocarpane and prenylated pterocarpan. From the seeds of this plant can be isolated the flavone glycoside, (5,7,4'-Trihydroxy-6,3'-dimethoxyflavone-7-O-alpha-L-arabinopyranosyl (1⟶b) -O-beta-D-galactopyranoside.



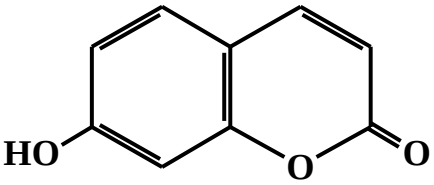
Coumarin



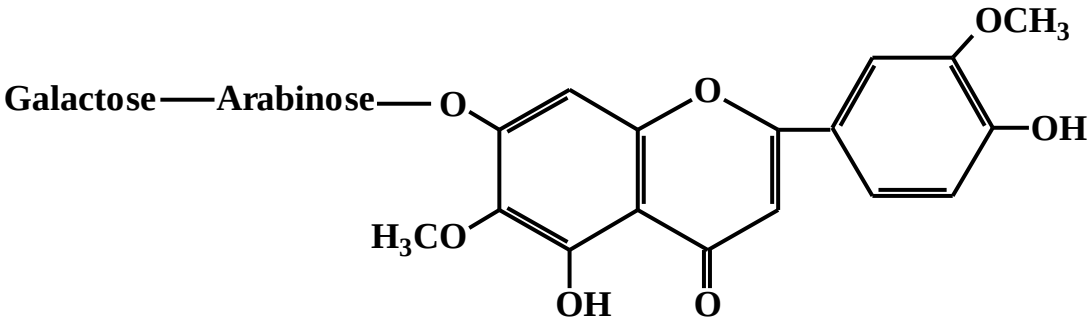
Herniarin



Scopoletin



Umbelliferone



5.7,4'-trihydroxy-6,3'-dimethoxyflavone-7-O-α-L-arabiosyl(1-6)-O-β-D-galactopyranoside

Pharmacology and toxicology

The plant is discutient, emollient, astringent, strongly laxative and narcotic. It is used externally as a poultice or plaster on swellings. The plant contains coumarin which is an anticoagulant. The plant also contains dicumarol which is a broad spectrum bactericide. Seeds used for diseases of genital organs of both sexes. The toxicity of the plant is due to the conversion of the coumarin content of the herb, during fermentation, to the poisonous anticoagulant dicoumarol.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical Preparation in the market

No pharmaceutical preparations containing *Melilotus indicus* are available in the market.

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***Pancratium maritimum* L.**
Family: Amaryllidaceae

Plant name

***Pancratium maritimum* L.**

Synonyms: ─

Distribution

- **Global**: Atlantic shores of Portugal and France, shores of the Mediterranean, Black and Caspian seas.
- **National**: Mma, Mp
- **Local**: 31º 34′ 48.6′′N 25º 48′ 58.8′′ E

Status

- **Täckholm**: Common
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Coastal sand dunes, consolidated and rocky dunes, sand formations

Part used

Bulbs.

Preparation

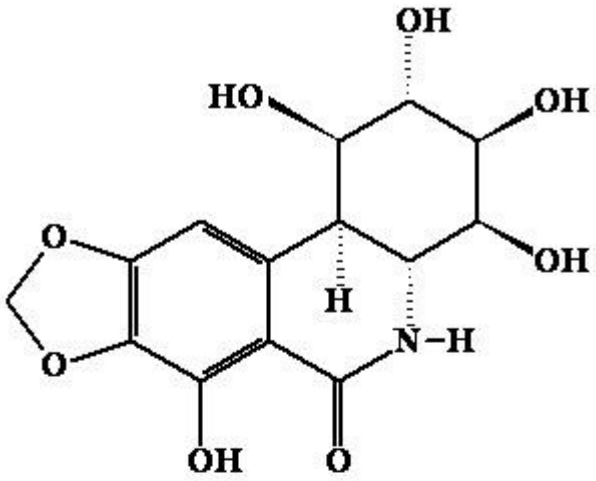
Infusion.

Use

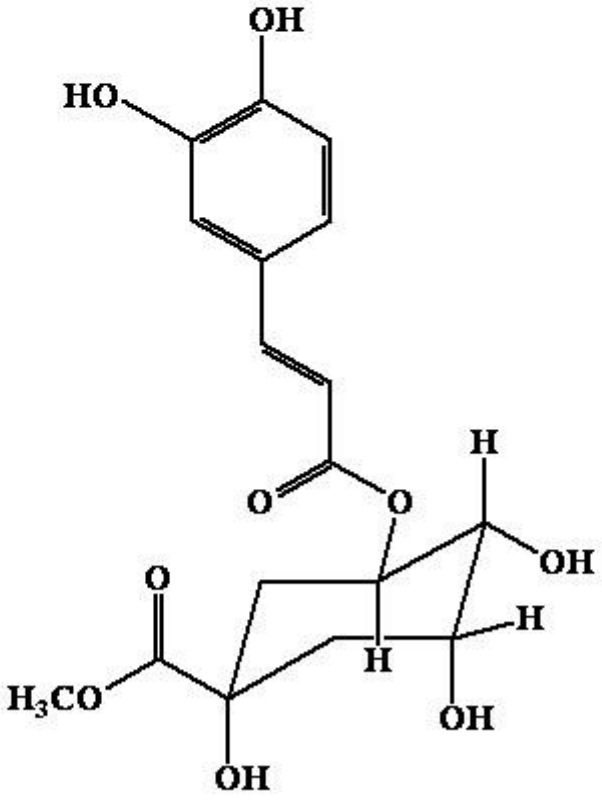
Orally.

Chemical constituents

The leaves, bulbs and roots of the plant contain 16 alkaloids, the most important of which are pancratistatin, Haemanthamine, Galanthane, Lycorine, Tazettine, Ambelline, Crinidine, Crinine, Pomelline, Crinamine and Crimelline. The bulb conatin flavonoid compound and rutin.



Pancratistatin



3-caffeoylquinic acid methyl ester

Pharmacology and Toxicology

Pancratistatin has anti-cancer activity and induces apoptosis in rat and human cancer cells *in-vitro*. Plant alkaloid exhibited antimalarial activity against *plansmodium falciparum*, 6-hydroxyhaemanthmine, haemanthamine and Lycorine are found to be the most potent alkaloids against *P. falciparum* and galanthamine and tazettin have the least potent activity. The methanol extract of the bulbs showed antifungal activity against four *Candida* species. Pancratistatin showed potent cytotoxic activity against Hela cells and moderate antituberculosis activity against *Mycobacterium tuberculosis* H37RV cell. The bulbs and leaves extracts showed insecticidal activity against the mosquito larvae and acaricidal activity against two kinds of spiders. Ethanolic extract of the plant bulb has antinociceptive effect in experimental tests on mice.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations are available in the market.

Traditional medicinal and indigenous knowledge

The fresh bulb is sliced and boiled in sugar solution or honey for few minutes then stained. The strained solution is taken everyday in the morning as a treatment for asthma.

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***Papaver rhoeas* L.**
Family: Papaveraceae

Plant name

***Papaver rhoeas* L.**

Synonyms: ─

Distribution

- **Global**: North Africa, Europe, Asia
- **National**: Nd, Mma, Mp, Di, Dl
- **Local** : 30 º 53´ 36.36´´N 28º 52´ 47.94´´ E

Status

- **Täckholm**: Rare
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Wadis

Part used

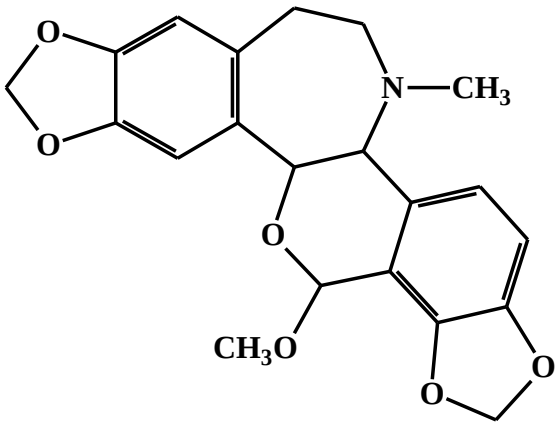
- flowers
- Seeds
- Leaves

Preparation

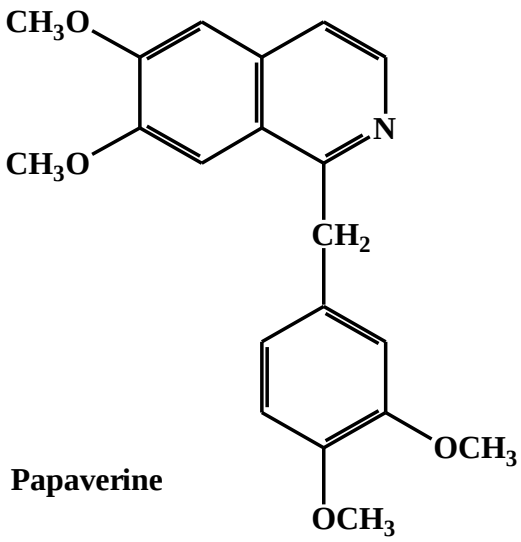
- Decoction.
- The bruised leaves of the green heads can be applied to boils, hot ulcers and burning fevers.
- Flowers syrup

Chemical constituents:

The plant contains alkaloids (including papaverine, rhoeadine, isorhoeadine, and many others), meconic acid, mekocyanin, mucilage and tannin. Flowers contain mucilage, anthocyanins such as mekocyanin and traces of alkaloids mainly rhoeadine.



Rhoeadine



Papaverine

Pharmacology and toxicology

The flowers have an analgesic and Sedative effect. The plant is used chiefly as a mild pain reliever and a treatment for irritable coughs and reduces nervous overactivity. The alcoholic and aqueous extracts of the plant show reduction in locomotory, exploratory and postural behavior. The herb is used also for insomnia, nervous irritability, coughs – especially paroxymal coughs and asthma. The flowers and seeds are pectoral, calmative, emollient, slightly narcotic, sodorific and expectorant. The plant reduces the acquisition but not the expression of morphine-induced conditioned place preference. The herb has antioxidant activity.

All parts of this species except the seeds are potentially toxic if eaten.

Pharmacopoeias:

- British pharmacopoeia Codex (1949)
- Euro pharmacopoeia (5.0)

Pharmaceutical preparations in the market

- No pharmaceutical preparations containing popy flowers are available in the Egyptian market.
- Several pharmaceutical preparations containing popy flowers are available in the market abroad.

Pharmaceutical preparation, Company (Country), indications

- **Tisane pectorale et, antitussive**, Sidroga (Switz.), Coughs and Congestion
- **Actisane Nervosite**, Dolisos (Fr.), Cardiac disorders
- **Presselin stoffwechs-eltee** , Presselin (Ger.), Constipation
- **Astressane**, Dolisos (Fr.), Cardiac irritability
- **Bramserene** , Corvi (Ital.), Insomnia
- **Normalax**, Herbaline (Ital.), Constipation
- **Relaten**, Herbaline (Ital.), Insomnia, anxiety, agitation
- **Baune** , Zeller (Switz.), Gastrointestinal disorders
- **Melissa Tonic**, Geistlich (Switz.), Agitation, nervousness, sleep disorders
- **Tisane antitussive et pectorale "H"**, Hanseler (Switz.), Respiratory-tract disorders

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***Peganum harmala* L.**
Family: Zygophyllaceae

Plant name

***Peganum harmala* L.**

Synonyms: ─

Distribution

- **Global**: North Africa, southern Europe, Southwest Asia to Tibet.
- **National**: Mma, Mp, Da, Di, S
- **Local** : 31º 21´ 54.90´´N 27 º 03´ 07.56´´ E

Status

- **Täckholm**: Common
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Wadi slope

Part used

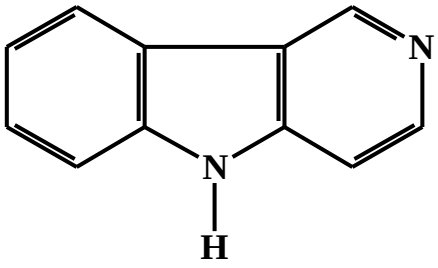
- Dried ripe seeds.
- Leaves and flowers.

Preparation

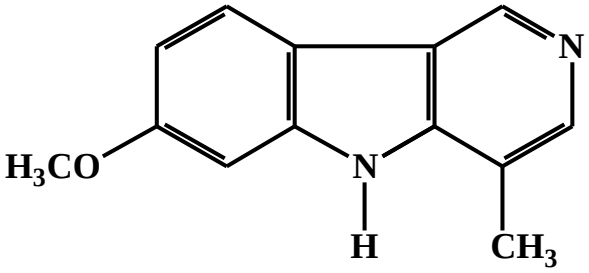
- Dried powder.
- Decoction in oil.
- Fresh branches.
- Powdered seeds mixed with honey and ginger.
- Powdered seeds boiled in olive oil.
- Seed infusion.
- Powdered roots and seeds mixed with tobacco.

Chemical constituents

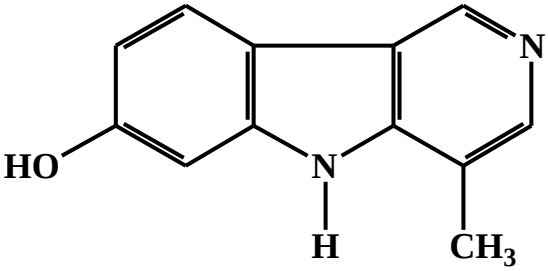
- *Peganum harmala* contains Harman alkaloids, e.g. Harman, harmaline and harmlol and quinazoline alkaloids e.g. vasicine and (peganine) vasicinone.
- Lipids (13.3%), sterols (β-sitosterol and α – amyrin).
- The aerial parts of *Peganum harmala* yieled four flavonoids: acacetin7-O-rhamnoside, 7-O-[6"-O-glucosyl-2"-O-(3"'-O-cetylrhamnosyl)] glucoside and 7-O-2"'-O-rhamnosyl-2"-O-glucosylglucoside) and the glycoflavone 2"'-O-rhamnosyl-2"-O-glucosylcytisoside.



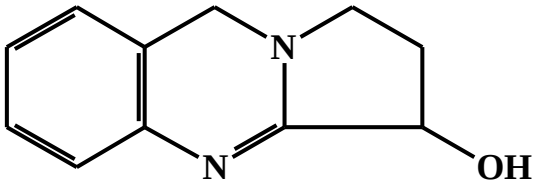
Harman



Harrmaline



Harmalol



Peganine

Pharmacology and toxicology

- Seeds possess undoubted hallucinogenic compounds and said to be aphmdisiac, anthelmintic, lactalgogue, stimulant to CNS followed by paralysis, emetic, diuretic, vapors of burnt plant for headache, hemorrhoids, depurative, rheumatism, analgesic, alopecia, asthma, roasted seeds for indigestion and diabetic infusion of seeds for cardiac disorders.
- The plant is anthelmintic used for tape-worms, narcotic, antibacterial and protozoacidal. Leaves and stems strengthen the uterus, ease delivery and restore sexual potency. Toxicity appears as convulsions,

tremor, depression of central nervous system, weakness of the heart and low blood pressure. Harmalol causes sudden paralysis.

- *Peganum harmala* alkaloid extract (harmaline) has effective antinociceptive agent.
- Methanolic extract from seeds have relaxant activity.
- The alkaloidic fraction of the methanol extract of *Pegamum harmala* seeds was effect on the tumoral cells.

Pharmacopoeias

The plant is not pharmacopoeial

Pharmaceutical preparations in the market

No Pharmaceutical preparations containing *Peganum harmala* are available in the market.

Traditional medicinal and indigenous knowledge

Leaves and flowers are used for rheumatism and stomach problems. Seeds are used as an anthelmintic and as a narcotic.

The leaves are rubbed on joints for rheumatic pain. A tea made from leaves is used as an anthetmintic. A tea made from blossoms is taken for stomachache.

Ground seeds mixed with senna and honey are used for stomachache, or mixed with black pepper and applied on painful joints. Seeds are powdered and its decoction made with water taken orally as a vermifuge, narcotic and for removing kidney stones. In far east countries (mainly in Pakistan) powdered seeds are used for asthma, colic, jaundice and as an anthelmintic against tapeworms, the decoction of seeds is given for laryngitis. It is also recorded to increase the flow of milk in new mothers; also used as abortifacient. The smoke is considered antiseptic and wounds are fumigated by burning seeds and leaves and letting the smoke pass over them.

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***Plantago ovata* Forssk.**
Plantaginaceae

Plant name

***Plantago ovata* Forssk.**

Synonyms

Plantago decumbens Forssk.

Distribution

- **Global**: Western North America, Atlantic Islands, Mediterranean region, southwest Asia to Pakistan.
- **National**: Mma, Mp, Da, Di, Dl, S
- **Local**: 31º 22′ 33.72′′N 27 º 03′ 55.38′′ E

Status

- **Täckholm**: Very common
- **IUCN** : ─
- **Current**: Very common

Main habitat

Consolidated and rocky dunes,inland ridges, inland plateau, wadis

Morphological description

A stemless annual herb, about 5-15 cm high, with linear-lanceolate, acute leaves. The leaves taper at base to a petiole. The leaves are densely pubescent to villous giving the plant a silky appearance. Spikes, dense, ovoid to cylindrical, 0.8 -3 cm long, 0.5-1 cm wide, on scopes shorter than or slightly exceeding the leaves. Bracts, glabrous, obovate, obtusish, equaling the calyx, broadly white-scarious margined. Sepals glabrous, elliptic, obtuse, scarious-margined, weakly keeled above. Corolla lobes, glabrous, obovate, mucronate. The petals arc broadly lanceolate with brown centre. Capsule ellipsoid, dehiscent near the middle, ca 3 mm long. Seeds, 2, oblong, plano-convex and boat-shaped with the flattish side hollowed, brown, 2.3-3 mm long. The seeds are oval, boat-shaped, 1.5-3.5 mm long vary considerably, in colour from pale pink to grayish brown and even reddish yellow. On the convex surface, there is a reddish-brown oval fleck, while the concave surface is grooved and has a distinct scar (hilum). When placed in water, the seeds swell rapidly and become surrounded by a colourless, transparent layer of mucilage. Taste: bland and mucilaginous.

Ecology

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

Status

The plant grows in sandy habitats in deserts. Its appearance and prosperity arc affected with the irregular rainfall. Therefore, there is a great need to cultivate this plant in sandy soils to be sufficient for the needs of the market. A very important environmental requirement of this crop is clear, sunny and dry weather proceeding harvest. It grows best on light, well drained, sandy loams.

Parts used

- Seeds or Ispaghla Husk.
- Ispaghula Husk consists of the epiderms and the collapsed adjacent layer removed from the dried ripe seeds of *Plantago ovata* Forssk.

Collection

Harvest seed must be dried below 12% moisture to allow for c1eaning milling and storage. Seeds should be soaked in water before they are used. Husks are generally powdered for use in a variety of preparations.

Preparation

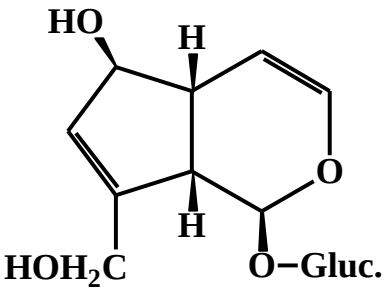
- Decoction.
- Infusion.
- Powder

Use: Orally, external.

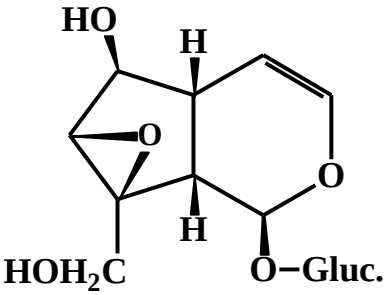
- Cold maceration for constipation.
- Capsules of powdered husk for hemorrhoids.
- Poultice (with *Calendua*) for boils.

Chemical constituents

Constituents include a mucilaginous polysaccharide, consisting of a highly branched acidic arabinoxylan with axylan backbone and branches of arabinose, xylose, and 2-0- (galacturonic acid) - rhmnose residues, about 2.5% fixed oil, linoleic leic, and palmetic acids. Other constituents include aliphatic hydrocarbons and starch. It contains aucubin glucoside.



Aucubin



Catalpol

Pharmacology and toxicology

The principle pharmacological actions of *plantago ovata* can be attributed to the mucilage component. Ispaghula is 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. Ispagula is also used in the management of diarrhoea and for adjusting faecal consistency in patients with colostomies and in patients with diverticular disease or irritable bowel syndrome. Soluble fibre intake with muscilage decrease 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 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 found that it was an effective treatment for dehydration due to acute diarrheal 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 people with diabetes. The seeds when taken with Mesalamine (anti-inflammatory drug) were more effective in treating ulcerative colitis. The use of the fresh leaves prevented itching and spread of dermatitis in poison ivy-induced dermatitis. The oil in the seed embryo has been used as a preventative of antherosclerosis. It is also effective in reducing cholesterol levels in the blood. Ispaghula husk is nearly as effective as Simvastatin improving the lipid profile of hyperlipidemic patient. Psyllium is also recommended in Crohn's disease.

Using *Plantago ovata* in recommended amounts is generally safe and non toxic. Unlike some laxatives, Ispaghula husk are not habit forming, and can be taken every day. lspaghula supplements may reduce or delay the absorption of certain medications, so medications should be taken at least

one hour before or between two and four after taking Ispaghula. In common with all bulk laxatives, Ispaghula may temporarily increase f1atulence and abdominal distension, and may cause intestinal obstruction. If swallowed dry, Ispaghula may cause esophageal obstruction. The drug can be used during pregnancy and lactation and contraindicated in case of intestinal obstruction.

Pharmacopoeias

- 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.
- DAB 10 US Pharmacopoeia XXII

Pharmaceutical products

- Agiolax (Madaus, CID)
- Laxiplant (Minapharm).
- Biolax (Sekem).

Traditional medicinal and indigenous knowledge

History: Decoction of Ispaghula is employed as a cooling demulcent drink, or the seeds are 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 inflamed mucous membranes. The crushed seeds mixed with hot water are used externally as a poultice for rheumatism. Seeds are taken dry or mixed with water in chronic diarrhoea and in atony of the intestine with constipation. Sold in the "'Attarin" (traditional herb's seller shops) at Cairo, are used as contraceptive viginal pessary for 7 days. Seeds or Ispaghula husk tends to swell which contacting water, it create a feeling of "fullness" in the body, which can also help curb appetite. Ground seeds or husks are used as laxative, also used as an emollient, demulcent and astringent, particularly in chronic colitis. Seeds are used in urinary infections as an ancillary treatment. Seeds are crused and applied in a poultice for furunculosis; Fresh leaves are applied topically to treat various skin irritations including poison ivy reaction and insect bites and stings and hemorrhoids. Ispaghula husk help soften stool and reduce the pain associated with hemorroids. Ispaghula has also been used effectively to treat yeast infections. Ispaghula may also be used to treat irritable bowel syndrom, and reduce cholesterol and blood sugar levels, Young leaves of this plant are eaten in salads. Ground seeds are added to cereal or yogurt.

Medicinal uses

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

Oral intake of *P. ovata* seeds adapts the clonic flora to increase the production of butyrate (or acetate) from the dietary fiber and increased faecal concentrations of butyrate by 42% patients resected for colonic cancer. The seeds regulate or moderate the colon motility and enables a physiological balance of the colonic transit. *Plantago ovata* seeds taken to control diets as it affects fat intake and may have some effect on the subjective feeling of fullness. *Plantago ovata* seeds were found to decrease serum cholesterol, mainly LDL cholesterol, through enhancing cholesterol elimination as faecal bile acids.

Doses: *ca* 10 g preswollen with ca 100 ml water are taken morning and evening followed by drinking at least 200 ml water.

Other uses of the plant

Contraceptive, food supplement, thicker of stabilizer in frozen dairy deserts. Also as a hydrocolloidal agent to improve water retention for newly seeded grass.

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***Reaumuria hirtella* Jaub. & Spach**
Family: Tamaricaceae

Plant name

***Reaumuria hirtella* Jaub. & Spach**

Synonyms: ─

Distribution

- **Global**: Libya, Egypt, Palestine, Syria, Lebnon.
- **National**: Mma, Di, Dl, S
- **Local** : 31º 03´ 43.02´´N 28º 12´ 1.92´´ E

Status

- **Täckholm**: Very common
- **IUCN**: ─
- **Current**: Under threat

Main habitat

Coastal sand dunes, consolidated and rocky dunes, saline depressions, inland ridges inland plateau

Part used

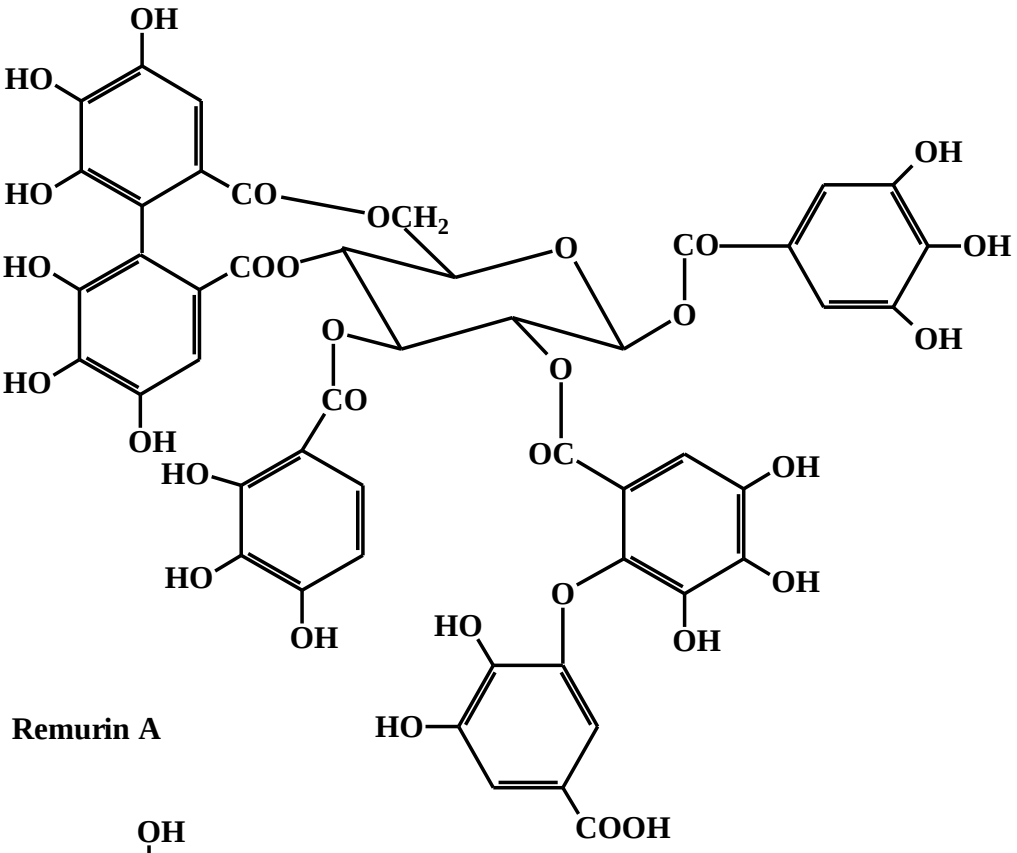
Leaves.

Preparation

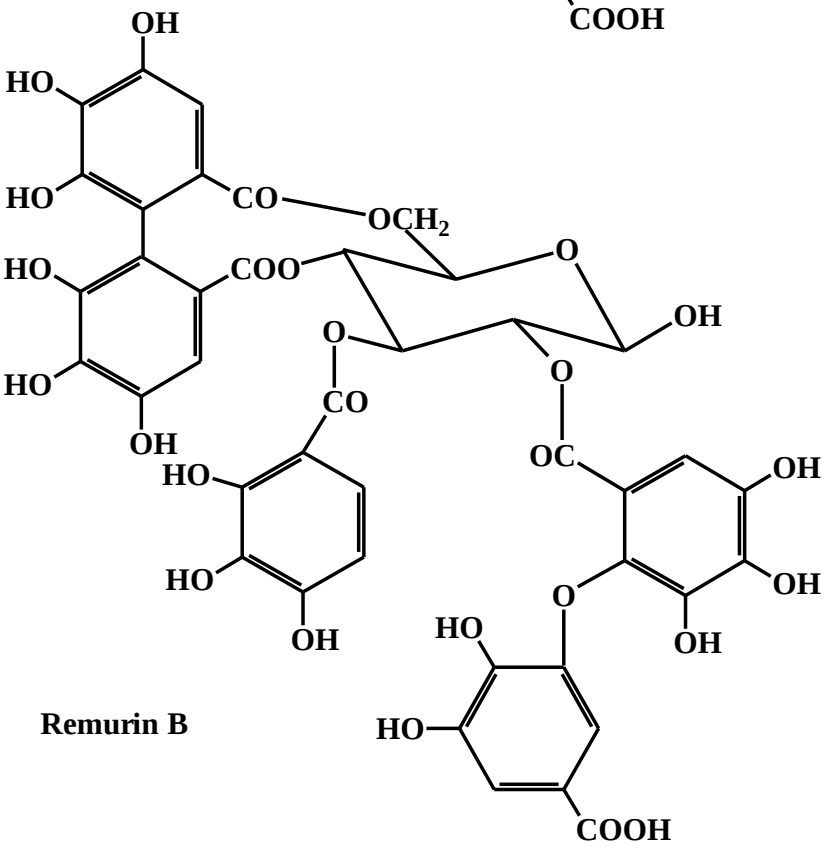
Dried powdered leaves.

Chemical constituents

Reaumuria hirtella contains 15-20% tannin in the leaves. It contains remurin A and its four dimers (hirtellins A, B, C, F, and G) in addition to gallic acid and monomeric hydrolyzable tannis (gemin D, Tellimagrandin I, 1,3-di-O-galloyl-4,6-O-(S)-hexahydroxy-diphenoyl-*β*-D-glucose), and also contain, hydrolyzable tannin monomer, remurin B and its three dimers (hirtellins D, E and hirtellin B, three new trimers (hirtellins T_1 , T_2 , and T_3) and a tetramer (hirtellin Q) in addition to tellimagrandin II.



Remurin A



Remurin B

Pharmacology and Toxicology

Hirtellin exhibited a remarkable antitumor activity: over 70% of ILS (% increase in the life span) or at least one regressor out of six of mice. Among them hirtellin B showed a potent antitumor activity comparable to

that of oenothein B against mouse ascites sacroma 180. The antitumor activity is related to molecular weights, nature of linking groups of monomers. The antitumor activity seems to be due to polentiation of host immune defense mechanism such as interleukin-1 induction from macrophages. Reaumuria tannins exhibited significant immunopotentiation activity (immunopotentiators) by stimulating activity of iodination in the human peripheral blood polymorphonuclear cells. The plant is used in the egyptian folk medicine for the treatment of some respiratory disorders like asthma and dry cough, and also for treatment of skin diseases such as allergy, itching and scabies. Moreover, its local application is known to be useful in treatment of hemorrhoids, oozing sores, toothache and gum weakness.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical Preparation in the market

No pharmaceutical preparations containing *Reaumuria hirtella* are available in the market.

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***Salvia lanigera* Poir.**
Family: Labiatae

Plant name

***Salvia lanigera* Poir.**

Synonyms: ─

Distribution

- **Global**: Cyprus, North Africa, Sinai, Palestine, Lebanon, Syria, Arabia, Iraq, Iran.
- **National**: Mma, Mp, Di, Dl, S
- **Local**: 31º 22′ 26.64′′N 27º 07′ 19.94′′ E

Status

- **Täckholm**: Common
- **IUCN** : ─
- **Current**: Common

Main habitat

Plateau

Part Used

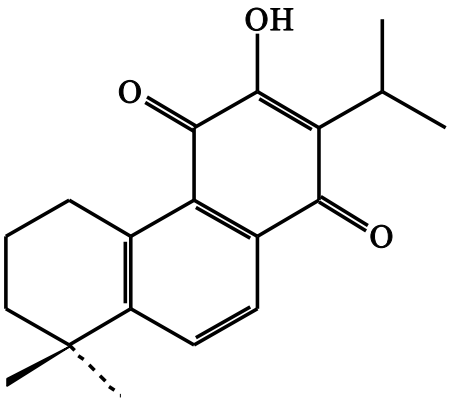
Roots.

Preparation

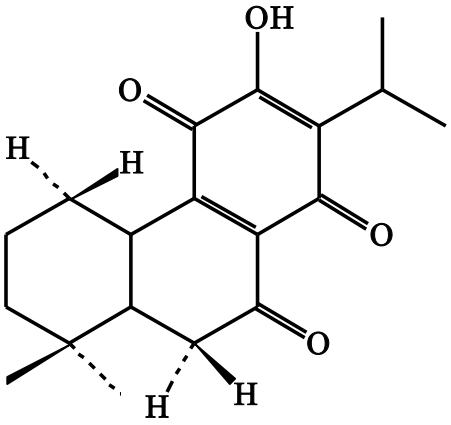
Air-dried powdered roots.

Chemical constituents

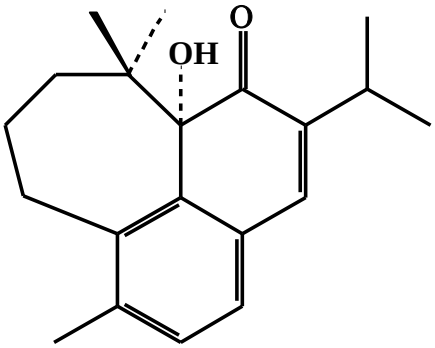
The root of *Salvia lanigera* contains diterpene quinone, deoxyneocryptotan shinone, 7-oxoroyleanone, Icetexane (10, 12-dihydroxy-9 (10→20)-abeo-8,11,13-abietatriene) named lanigerol, microstegiol, ferruginol and 7α-ethoxyroyleanone.



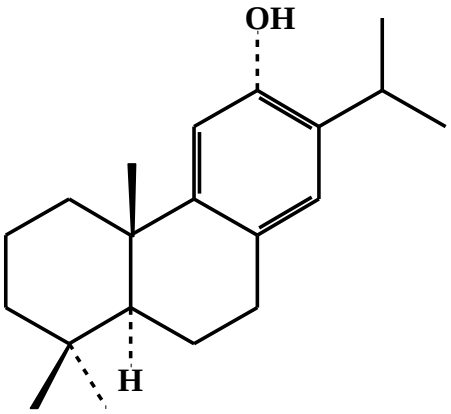
Deoxyneocryptanshinone



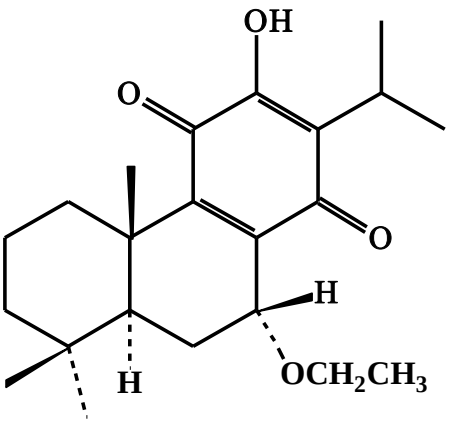
7-oxoroyleanone



Microstegiol



Ferruginol



7α−ethoxyroyleanone

Pharmacology and Toxicology

Lanigerol have antibacterial activity (against gram positive bacteria), besides the antifungal activity of ferruginol. Microstegiol one of diterpenoids active against P388 lymphocytic leukemia system.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical Preparation in the market

No pharmaceutical preparations containing *Salvia lanigera* are available in the market.

Traditional medicinal and indigenous knowledge

Used in the form of aromatic tea for a variety of abdominal troubles.

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***Seriphidium herba-alba* (Asso) Sojàk.**
Family: Compositae

Plant name

***Seriphidium herba-alba* (Asso) Sojàk**

Synonyms

Artemisia herba-alba Asso
Artemisia arragonensis Lam.
Artemisia inculta Delile
Artemisia herba-alba Asso var. *tenuiflora* Boiss.

Distribution

- **Global**: Southern France, Spain, Crete, North Africa, Sinai, Palestine, Syria, Arabia, Iran.
- **National**: Mma, Di, Dl, R, S
- **Local** : 30º 44´ 40.56´´N 29º 10´ 5.94´´ E

Status

- **Täckholm**: Rare
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Consolidated and rocky dunes, sallum plaateau, inland ridges, wadis, cultivated land

Part used

Unexpanded flower heads and flowering branches .

Collection

Plants are cut in the flowering stage.

Preparation

Infusion

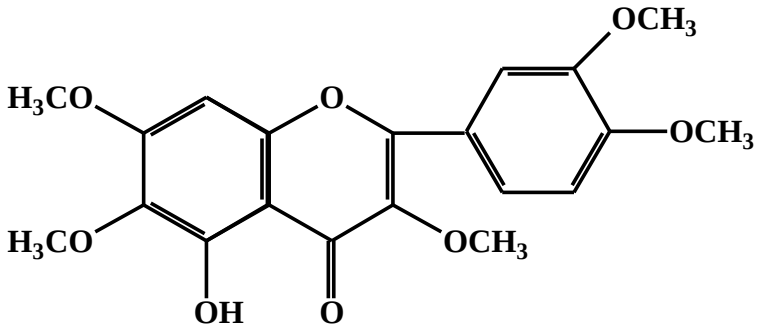
Use

Orally.

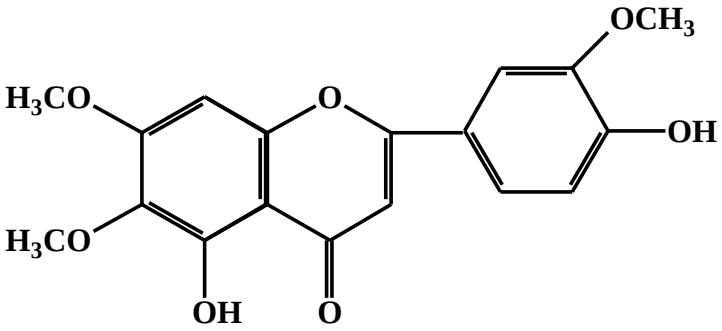
Chemical constituents

The plant contains 0.29% essential oil, containing 6.7% cineole. It also contains the sesquiterpene lactone (Santonin), β-sitosterol, stigmasterol, thymol, hydroxy davanone, Arteincultone and dihydrosantamarin. The essential oil contains four monoterpene alcohols (Artemisia alcohol, Santolina alcohol, Yomoge alcohol and Lyratol). The aerial parts of the plant contain flavonoids (Artemetin, 5,,4-dihydroxy-6,7,3'-trimethoxyflavone, isovitexin, vicenin-2, Schaftoside, isoschaftoside,

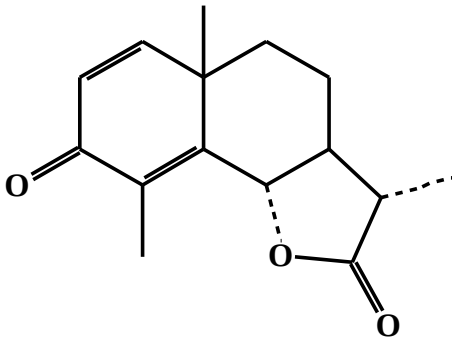
3-glucosides and 3-rutinosides of quercetin and patuletin, hispidulin, cirsilineol, dinatin and skrofulein). The fresh leaves of the plant contain volatile compounds carvone and piperitone.



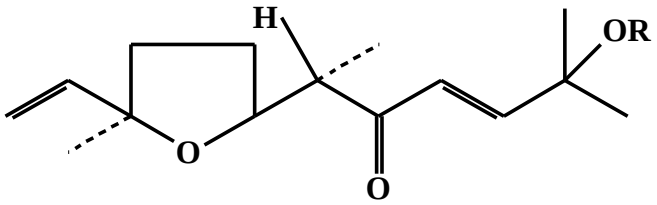
Artemetin



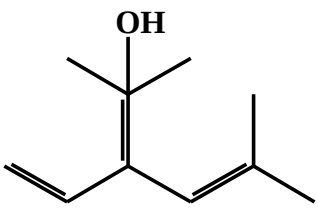
5,4'-Dihydroxy-6,7,3'-trimethoxyflavone



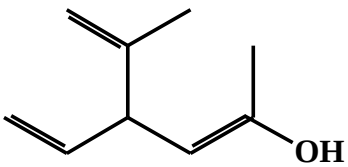
Santonin



Hydroxydavanone: R= H
Areincultone: R= OH



Santolina alcohol



Lyratol

Pharmacology and Toxicology

Carvone and piperitone compound isolated from the fresh leaves of the plant showed antifungal activity against *Penicillium citrinum* and *Mucora rouxii*. The essential oil has antibacterial activity against some Gram-positive and Gram negative bacteria, the principal component of the most active fraction was santolina alcohol. Seven day-old bovans chicks showed susceptibility to low dietary levels of *Artemisia herba-alba* shoots. The aqueous extract and essential oil of *Artemisia* showed antileshmanial activity against *Lieshmania tropica* and *Leishmania major*. Aqueous extract of the leaves showed gastroprotective effect against ethanol-induced gastric damage in rats. Aqueous extract of the aerial parts of the plant has hypoglycaemic effect on diabetic animals and patients, It also possesses a hypoliposis effects, in addition to the protection against weight loss of diabetic animals. The powdered shoots has anthelmintic activity against *Haemonchus contortus* infection in goats. The essential oil is toxic to Ascaridae and ground worms.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical products

No pharmaceutical preparations are available in the market.

Traditional medicinal and indigenous knowledge

Leaves and flowers febrifuge, calmative for stomach, cough and cephalalgia, cures nervous troubles and calms the emotions, used for ophthalmic diseases, enters in mixtures for treating hemorrhagic wounds. Infusion of flowering branches vermifuge, emmenagogue, tonic, stomachic. Dry powdered plant for healing wounds and burns, diuretic; infusion for rheumatism, bronchitis; cataplasm of boiled flowers used to ripen and cure abscesses, antidiarrhoeic; essential oil distilled from the plant good antiseptic and insecticide, also used as parasiticide in veterinary medicine.

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***Silybum marianum* (L.) Gaertn.**
Asteraceae (compositae)

Plant name

***Silybum marianum* (L.) Gaertn.**

Synonyms

Carduus marianus L.

Distribution

- **Global**: Mediterranean region, Sinai, eastwards to Afghanistan, naturalized elsewhere.
- **National**: Nd, Nv, Nf, O, Mma, Di
- **Local**: 31º 22´ 33.72´´N 27º 03´ 55.38´´ E

Status

- **Täckholm**: Very common
- **IUCN** : ─
- **Current**: Very common

Main habitat

Sand formations, wadis

Morphological Description

Silybum marianum is an annual to biennial herb, up to 2m high. It has a stem 20-150 cm high, rarely shorter, glabrous or slightly downy, erect and branched in the upper part. The leaves are alternate, large, white veined, glabrous with strongly spiny margin. The inl1orescences are large and round capitula, solitary at the apex of the stem or its branches, surrounded by thorny bracts. The florets are hermaphrodite, tubular in shape with corolla red-purple. The fruits are hard skinned achenes 6 to 8 mm long, generally brownish in color with a white silk like pappus at the apex. The fruits are harvested in May - June, after blooming.

Status

The plant is common in the region. It is not seriously endangered. Trials to cultivate in Egypt were carried out. The amounts needed for industry must be obtained by cultivation.

Parts used

Fruits (Seeds) and herb

Collection

- Plants are cut when flowering and seeds are collected when ripe. The fruits are dried for use in infusions and tincture or for extraction of silymarin.
- The fruits without pappus are known as Qortom.
- Seeds (contain silymarin)
- Fresh flower head (are eaten as a tonic food)
- Dried flower head.

Preparation

- Infusion.
- Decoction.
- Tincture.

Use

- Orally, external.
- Decoction of seeds for liver infections, take ½ cap a day.
- Capsules of seeds for a hangover, take 500 mg capsule.
- Tincture of seeds is prescribed for chronic liver conditions.
- Tablets are prescribed for long-term treatment of liver disorders.

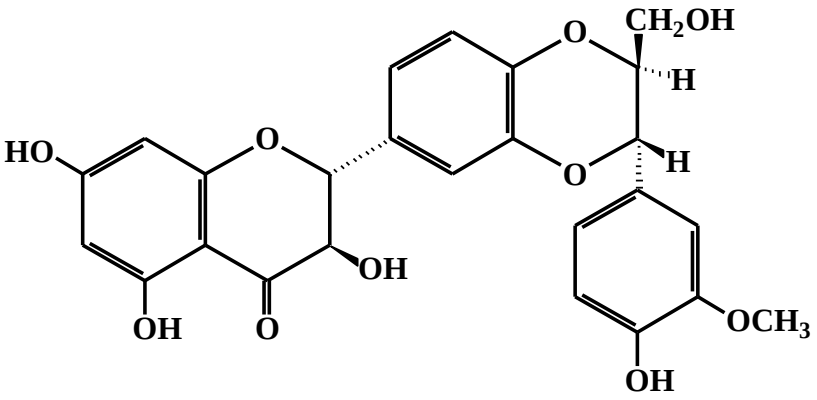
Chemical constituents

a- The fruits

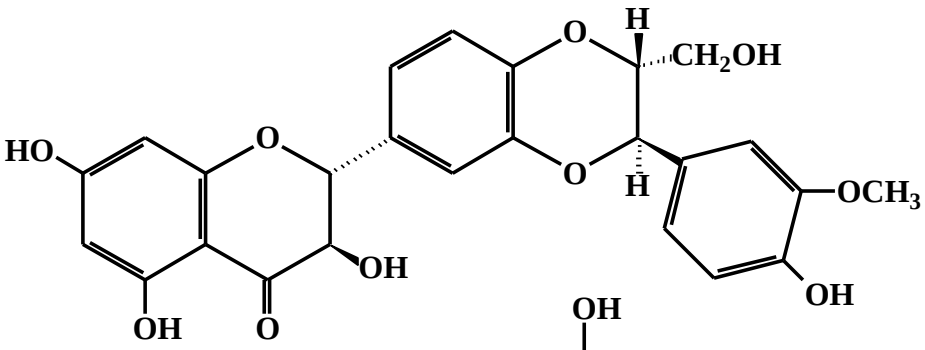
1.5-3% of a mixture of flavolignans known as silymarins consisting of: silybin, silychristin and silydianin, 3-deoxy-derivatives of silychristin and silydianin (= silymonin). Silyhermin, neosilyhermin A and B, 2, 3-dehydrosilybin, tri- to pentamers of silybin. Taxifolin, quercetin, dihydrokaempferol, kaempferol, apigenin, naringin, criodyctiol, chrysoeriol, 5-7,dihydroxy chromone, dehydroconiferyl alcohoJ. *20-30%* fixed oil with a high proportion of linoleic acid (≈ 60%), oleic acid. ≈ 30%) and palmitic acid (≈ 9%), 0.038% tocopherol, 0.63% sterols: cholesterol, campesterol, stigmasterol and sitosterol; ≈ 25-30 % protein, some mucilage.

b- The herb

Flavonoids: apigenin and its 7-0-glucoside, 7-Q-glucuronide and 4,7-diglucoside, kaempferol and its 7/-glucoside and 3-sulphate, luteolin and its 7-glucoside, Sitosterol and its glucoside, a triterpene acetate, polyatcetylenes, and fumaric acid. The very young leaves contain only traces of silymarin.



Silybin a



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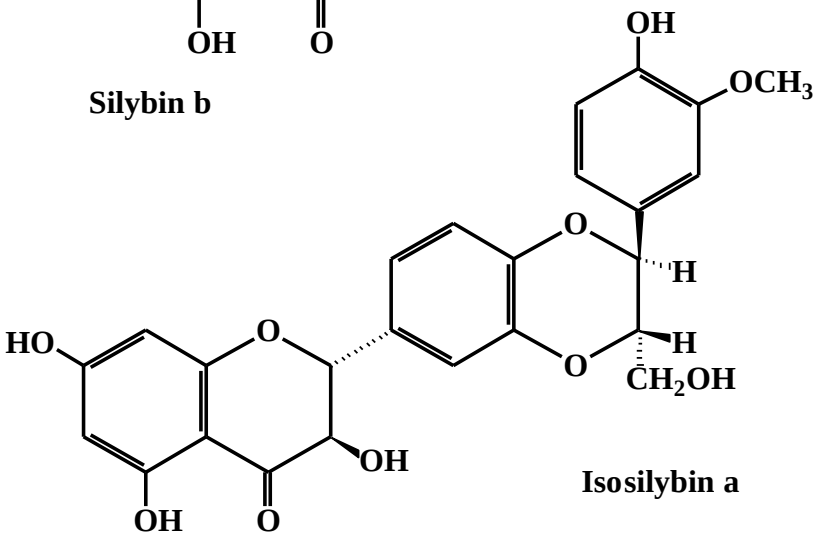
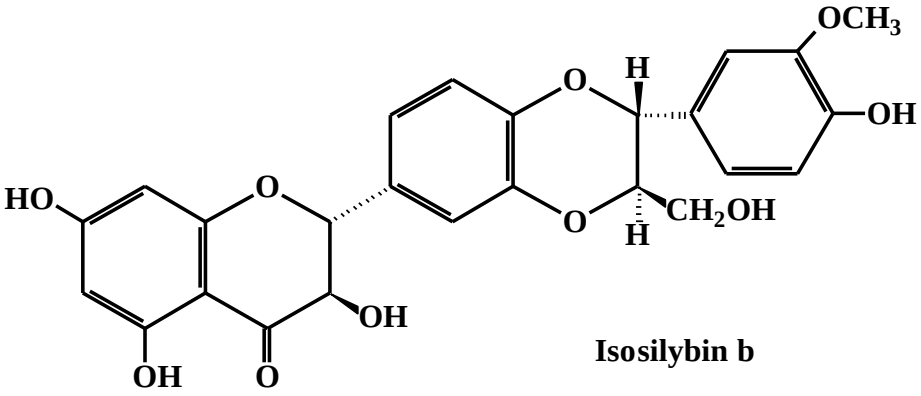
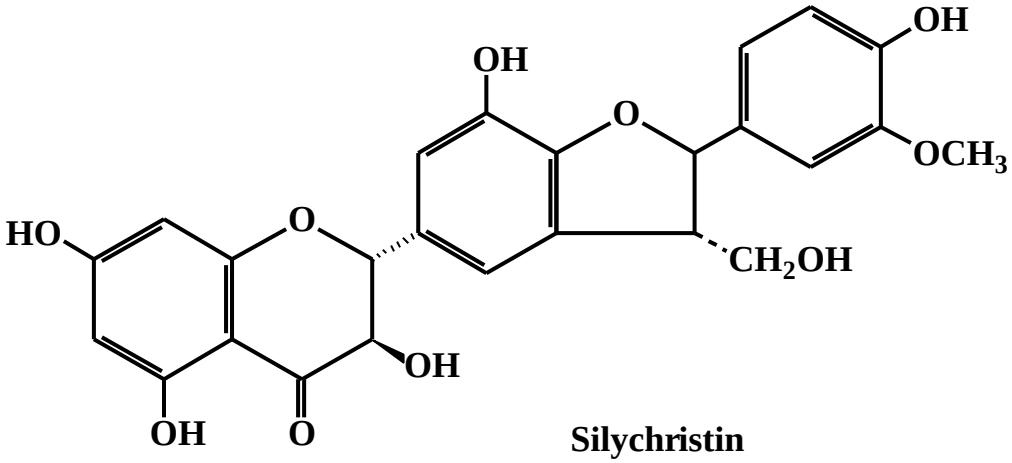


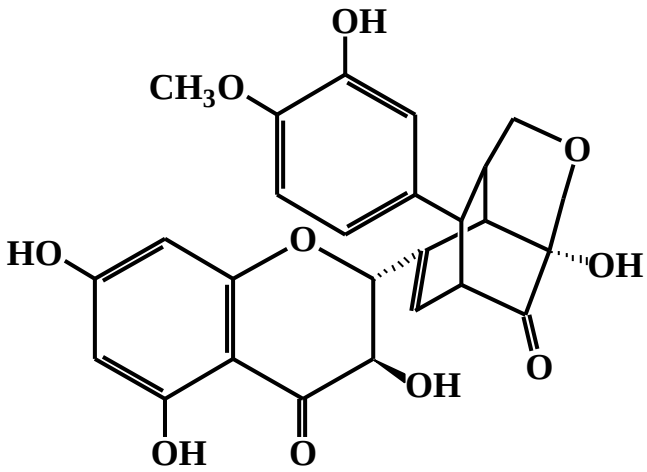
Isosilybin a



Isosilybin b



Silychristin



Silydianin

Pharmacology and Toxicology

Milk Thistle effectively act as hepatoprotective and/or antihepatotoxic. It protects the liver from the poisonous effects of alcohol and other toxic chemicals and heavy metals. The silymarin compounds in Milk Thistle actually accelerate protein synthesis in the liver, which stimulates the production of new healthy liver cells. The flavonoids present in Milk Thistle act as effective free radical scavengers, which also protect the liver from damage. Milk Thistle helps to block certain inflammatory reactions and is an anti-allergenic substance. Certain chemical constituents of Milk Thistle help to increase the flow and solubility of bile which is beneficial for both the liver and the gallbladder. Increased bile flow helps to prevent the formation of gallstones. Milk Thistle can effectively treat jaundice, cirrhosis, hepatitis, and fatty infiltration of the liver. Silymarin is considered a spleen and gallbladder tonic. Milk Thistle may be helpful in treating psoriasis, chronic fatigue syndrome, diabetes and estrogen-related disorders. Even in large dose silymarin is safe, with practically no side

effects, as well as no embryo toxic effect. Also, silymarin is used as a reference to evaluate the efficacy of new substances found.

a- The Fruit

1. Silymarin competitively suppresses the action of hepatotoxic substances. Prophylactic administration is more effective than therapeutic administration after the liver damage has occurred. The demonstrated antihepatotoxic effect is explained by membrane-stabilizing action, probably through antioxidant and radical-scavenging actions.
2. Silybin increases the rate of synthesis of ribosomal ribonucleic acids through; stimulation of the nuclear polymerase I which inforces protein synthesis and accelerates cell-regeneration processes.

The fruit as well as silymarin arc indicated for the prophylaxis and treatment of liver damage caused by metabolic toxins, e.g., alcohol, tissue poisons, in liver dysfunction and after hepatitis, in chronic degenerative liver conditions, such as liver cirrhosis and fatty liver and in latent hepatopathies. Studies revealed free radical scavenging and antioxidative properties of silybin complexes on microsomal lipid peroxidation. Silymarin was found to provide substantial protection against different stages of UVB-induced skin carcinogenesis, possibly via its strong antioxidative properties. Long-term treatment with silymarin was found effective on hyperinsulinemia, exogenous insulin need and malondialdehyde levels in cirrohsis diabetic patients. Silymarin retards collage accumulation in early and advanced biliary fibrosis secondary to complete bile-duct obliteration in rats. German research suggests that silybin, a flavonoid component of the seed, is clinically useful in treating severe Amanita mushroom poisoning. The antihepatoxic effect of silymarin was found to depend on the time interval in which poisoning and therapy, took place as well as the degree of liver damage. The most recent clinical investigations have demonstrated that the flavonolignan silibinin is the most effective compound, it is used as an adjunct to current methods has lowered mortality rate below any levels that have previously been achieved. Future breeding activities should be direct to the production of genotypes and lines that produce silibinin.

b- The herb

Different from the fruit; as a cholagogue in supportive treatment of hepatic and biliary functional disorders. Data to substantiate these applications are lacking.

Pharmacopoeias

- Deutsches Arzneibuch 10.1991.
- Rote liste, Germany, 1987.

- Dectionnaire vidal, France, 1986.

Silybum marianum is covered by a positive commission E monograph and has the following applications:

- Crude drug: dyspeptic disorders;
- Preparations: for toxic liver damage; as supportive treatment in chronic inflammatory liver conditions and liver cirrhosis.

Pharmaceutical Products

- Legalon tablets **(CID)**.
- Silymarin granules "instant" **(SEDECO) .**
- Hepanox Capsules **(Technopharma Egypt for National Pharmaceuticals Co. Under License of Tishcon Corporation (USA)**.
- Hepaticum Capsules **(Medical Union Pharmaceutical Abu-Sultan, Ismailia, Egypt)**.
- Hepamarin Capsules **(UNI PHARMA – EL Obour City, Cairo – Egypt).**
- Hepadox Capsules **(Arab Caps – Alamreya – Alexandria - Egypt)**
- Mariagon Capsules **(Alpha Chem Advanced Pharmaceutical Industries Co. – Badr City – Third Industrial Zone – Cairo - Egypt).**
- Levatone Capsules **(Under license of Pan Pharmaceuticals Australia for Golden Queen Co.).**
- Levanox Capsules **(Tiba Pharmaceutical Industries)**.
- Liver Albumin Plus Capsules **(Sigma Pharmaceutical Industries).**
- Silipex Capsules **(PHARO PHARM pharmaceuticals for EMA pharm)**.
- Simepar Capsules **(MINAPHARM – Egypt. Under license of Mepha Ltd. Basel, Switzerland Mepha pharma Egypt S.A.E).**
- Seralon-E Capsules **(TIBA Pharmaceutical Industries)**.
- Cyncholine Plaus Capsules **(The Arab Company for Pharmaceuticals and medicinal Plants).**
- Mepacure Capsules **(The Arab Company for Pharmaceuticals and medicinal Plants)**.
- Heba2 **(Pharco Pharmaceuticals).**

Traditional medicinal and indigenous knowledge

Herb, bitter appetizer, tonic, febrifuge, resolvent, antimalarial, emmenagogue and in disorders of uterus and spleen. Tincture from seeds used for liver disorders, jaundice, gall stones, peritonitis, cough, bronchitis, congestion of uterus and varicose veins.

Diseases

- Anorexia disease.
- Cancer disease.
- Demulcent in catarrh and pleurisy.
- Diabetes.
- Estrogen-related diseases.
- Haemorrhoids.
- Hydrophaints.
- Liver diseases (toxic liver diseases, chronic inflammatory hepatic disease and liver cirrhosis).
- Malaria.
- Spleen disease.

Uses

The herb is antipyretic, emmenagogue, stimulant tonic and expectorant. It stimulates both the production and flow of bile. Seeds are hydragogue. It is used in haemorrhoids and hepatic infections. Silymarin and silybin have anti-hepatoxic properties. The plant is toxic to animals. Toxicity is due to the presence of nitrates which are converted to nitrites in the body which causes gastroenteritis leading to anoxia, difficult respiration trembling, weakness, convulsions then death. The blood is dark red to coffe brown in dead animals. Plant bitter appetizer, tonic, febrifuge, resolvent. Tincture from seeds used for liver disorders, jaundice, gall stones, peritonitis, coughs, bronchitis, congestion of uterus and varicose veins.

Other uses of the plant

For improving appetite as a food. Young leaves are eaten as spinach substitute. Young stalks are peeled and soaked, eaten as *Asparagus*. Roots soaked over night to remove bitterness are eaten as salsify. Flowers are boiled and eaten as *Artichoke*. Roasted sees are used as coffee substitute.

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***Solanum nigrum* L.**
Family: Solanaceae

Plant name

***Solanum nigrum* L.**

Synonyms: ─

Distribution

- **Global**: Cosmopolitan
- **National**: Nd, Mma, Mp, Di, Da, O, R, S
- **Local** : 31º 32´ 12.30´´N 26º 09´ 00.30´´ E

Status

- **Täckholm**: Very common
- **IUCN** : Endemic
- **Current**: Common

Main habitat

Wadis

Part used

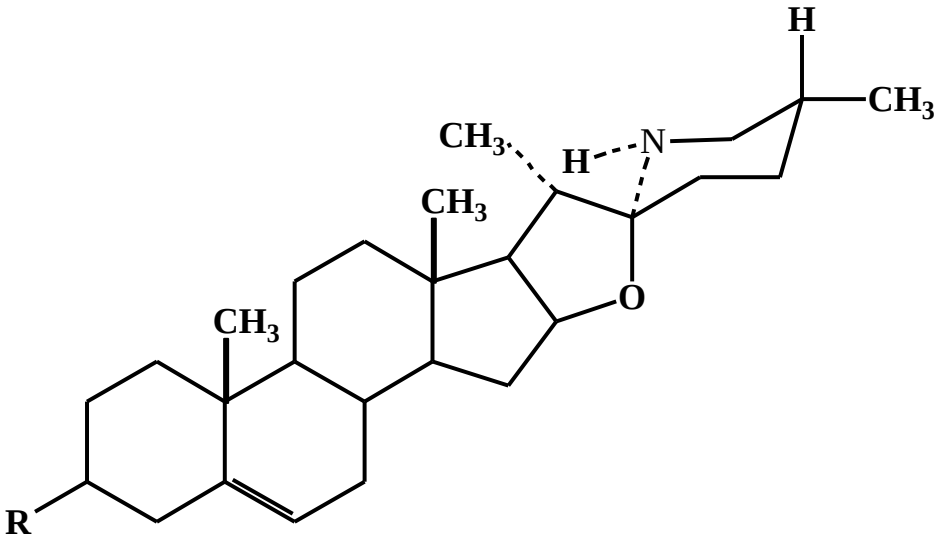
- Leaves and green unripe fruits.

Preparation

- Decoction of plant.
- Infusion of berries.
- Burnt powdered roots.

Chemical constituents

Solamum nigrum contains solasodine and solasonine glycosides. The berries contain solanine, solamargine and α- and *β*-solamargines. They contain glucose, fructose, vit.C and carotenes. The plant contains the sapogenins tigogenin and diosgenin. It contains rutin, aspargin, solangustin and demissine.



Solasodine: R=OH

Solamargine: R= glucose. rhamnose. rhamnose

B-Solamargine: R= glucose. rhamnose

Solasonine: R=glucose. galactose. rhamnose

Pharmacology and Toxicology

- The whole plant is antiperiodic, antiphlogistic, diaphoretic, diemollient, febrifuge, narcotic, purgative and sedative.
- The leaves, stems and roots are used as a poultice, wash in the treatment of cancerous sores, leucoderma and wounds. Extract of the plant are antispasmodic, anti-inflammatory and vasodilator. The plant has been used in the manufacture of locally analgesic ointments. The juice of the fruit has been used as an analgesic for toothaches.
- The isolated glycoprotein from *Solanum nigrum* has antioxidative effect.
- The ethanol extract of the plant showed hepatoprotective activity.
- Berries extract used as and anti-oxidant and cancer chemo-preventive material.
- Leaves extract showed larvicidal activity against larvae of two mosquito species.

- Unripe fruits are poisonous due to their alkaloidal content. In both man and animal the toxic symptoms are stupefaction, staggering, loss of speech, feeling and consciousness, cramps, dilation of the pupil and sometimes convulsions. Death is rare and is apparently by respiratory paralysis.

Pharmacopoeias

The plant is not pharmacopoeial

Pharmaceutical preparations in the market

No Pharmaceutical preparations are available in the Egyptian market.

Pharmaceutical preparations, Company (Country), Indications

- **Liverguard**, Pharmadass (UK)
- **Paravertebral LWS**, Infimarius–Rovit (Ger.), Homoeopathic
- **Liv 52**, Ebi (Switz.), Gastrointestinal disorders, Tonic

Traditional medicinal and indigenous knowledge

- Leaf, root and stalk used for cancerous sores, leucoderma and wounds. Stem young shoots eaten as pot herb, considered tonic for virility in men and for dysmenorrhea in females, for dysentery, sore throat, and whitlow.
- Plant, diuretic, febrifuge, decoction of the whole plant for abscesses, cancer of the cervix inflammation, leucorrhea and open sores, for dermatitis, diarrhea heavy female discharges, and sore throat. Berries, narcotic, analgesic, if used externally sedative, sees aphrodisiac (mixed with food).

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***Teucrium polium* L.**
Family: Labiatae

Plant name

***Teucrium polium* L.**

Synonyms: ─

Distribution

- **Global**: Southern Russia, Balkans, Mediterranean region, Sinai, Arabia, Iraq, Iran, Afghanistan, Somalia.
- **National**: Mma, Dl, R, S
- **Local** : 31º 23´ 42.48´´N 27 º 01´ 37.08´´ E

Status

- **Täckholm**: Very Rare
- **IUCN** : ─
- **Current**: Very Rare

Main habitat

Wadi bed

Part used

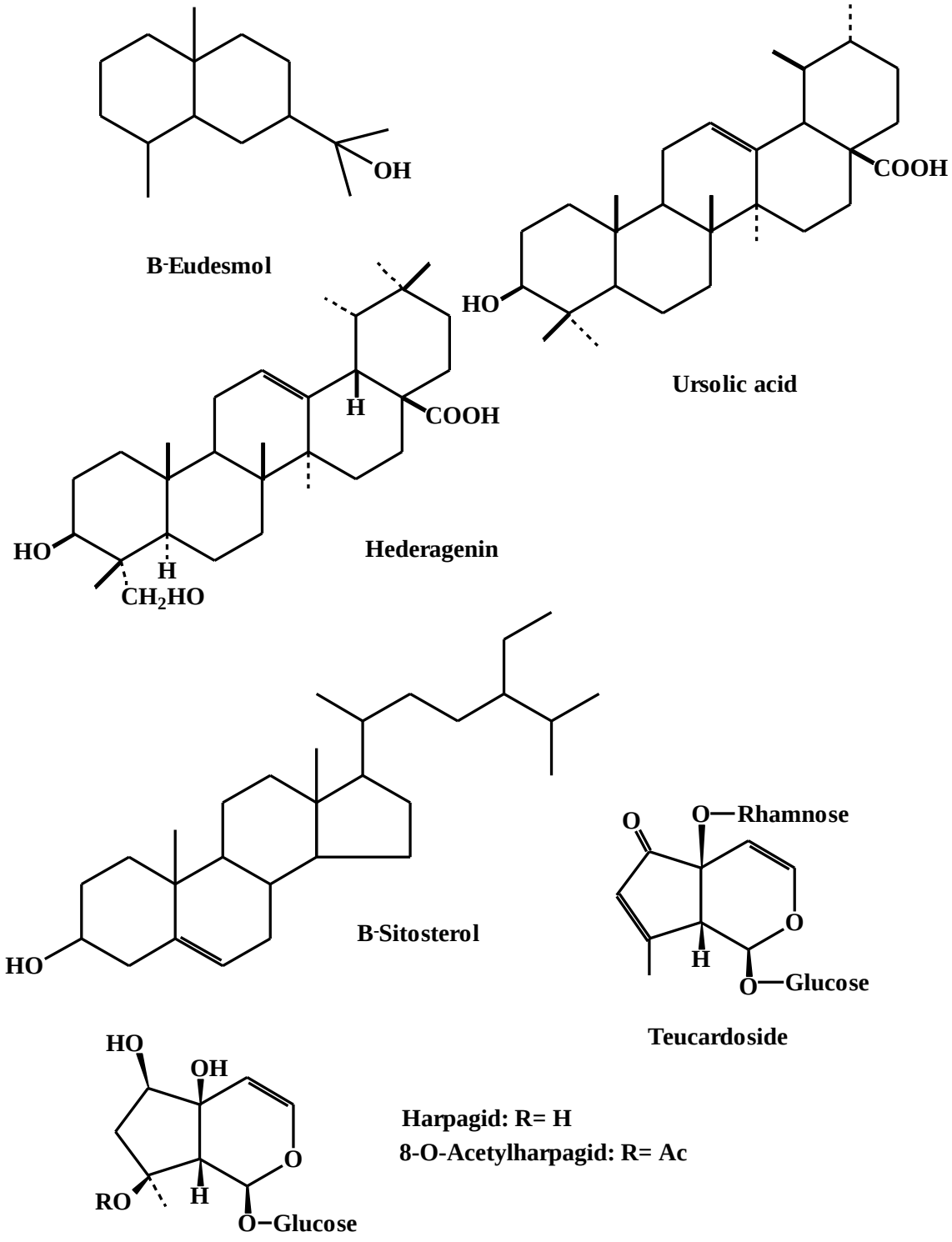
- Leaves.
- Stem and flowering tops

Preparation

- Infusion.
- As a steam bath for colds and fevers
- The plant liquid extract
- Leaf extract

Chemical constituents

The plant contains volatile oil (0.05 – 0.09%). The major components of the oil are: α- and *β*-phellandrene, myrecene, *P*-cymene, *V*-terpinene, bomylacetate, camphor, borneol, terpineol, piperitone, copaene, *β*-caryophyllene, cadinene, menthofuran, ocimene, pulegon and α-humulene. The plant contains the diterpenes picropolin, 6-acetyl picropolin isopicropolin, 19-acetylgnaphalin, teucrins P_1, P_2 and P_3, montanin, teupolins I-V, flavonoids, ursolic acid, α- and *β*-amyrins, cyasteron and *β*-eudesmol. The plant contains also free sugars and fatty acids. Iridoids isolated/or identified in the plant are harpagide, 8-O-acetyharpagide and teucardoside.



Pharmacology and toxicology

The plant extract reduces high blood glucose levels through enhancing insulin secretion by the pancreas. It has anti-inflammatory activity due to the presence of flavonoids and sterols. It has a marked antinociceptive effect. The aqueous extract of the plant has antilipidemic effect. The ethanolic extract of the flowering tops have antipyretic as well as antibacterial actions.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical preparation in the markets

No pharmaceutical preparations containing *Teucrium polium* are available in the market.

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***Thymus capitatus* (L.) Link.**

Family: Labiatae

Plant name

***Thymus capitatus* (L.) Link**

Synonyms

Satureja capitata L.

Coridothymus capitatus (L.) Rchb. f.

Distribution

- **Global**: Mediterranean region
- **National**: Mma
- **Local** : 31º 29′ 59.52′′N 25º 18′ 38.88′′ E

Status

- **Täckholm**: Common
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Rocky coastal ridges

Part used

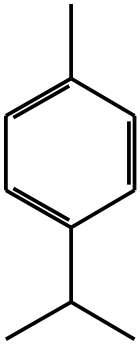
Leaves and flowering branches .

Preparation

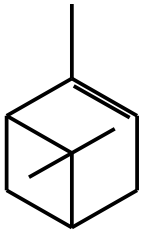
Infusion (hot and cold).

Chemical constituents

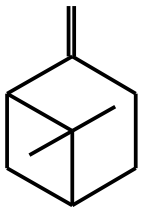
The plant contains flavonoids, caffeic acid derivatives, resins, saponins (essential and fixed oils), and volatile oil contain: caryophyllene, *p*-cymene, neral, carvone, *β*-pinene, α-pinene, linalool, α-thujene, *β*-bisabolene, cis-ocimene, fenchone, sabinene, terpinolen-4-ol, trans-sabinene hydrate, α-terpineol, borneol, bornyl-acetate, camphor and carvacrol.



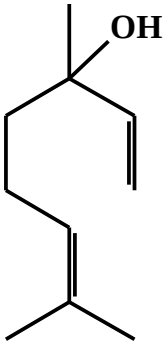
***p*-Cymen**



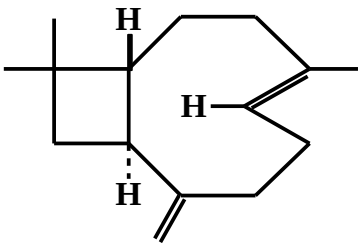
α–Pinene



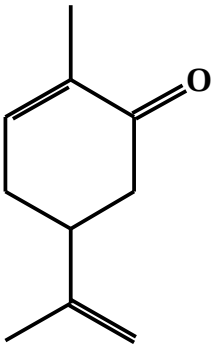
β–Pinene



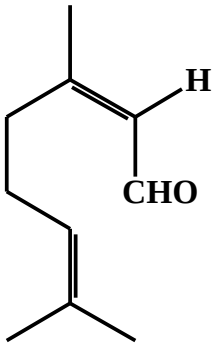
Linalool



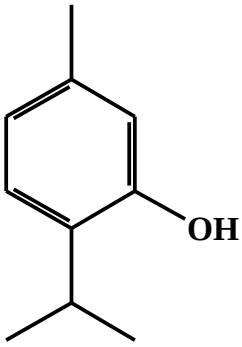
Caryophyllene



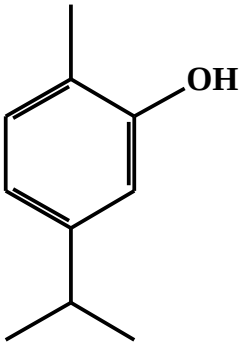
Carvon



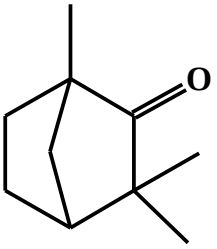
Neral



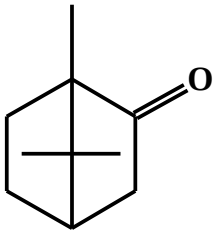
Thymol



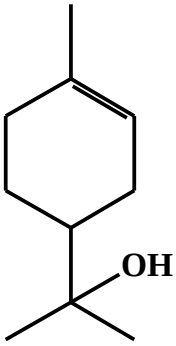
Carvacrol



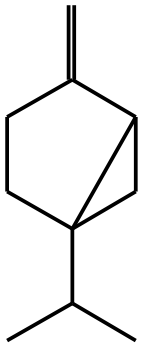
Fenchon



Camphor



α–Terpineol



Sabinene

Pharmacology and toxicology

Antibacterial and antifungal activity of oil (carvacrol) and its fractions have been demonstrated against number of microorganisms larvicidal of thymol and volatile oil was shown in experimental studies against the tested insect. Undiluted oregano essential oil derived from *Thymus capitatus* oreganum species causes cutaneous irritation, so it should not be used at all on hypersensitive, diseased or damaged skin.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical preparation in the market

No pharmaceutical preparations containing *Thymus capitatus* are available in the Egyptian market.

Several pharmaceutical preparations containing *Thymus capitatus* are available in the market under the name of the Oregano Oil.

Traditional medicinal and indigenous knowledge

Used as refreshing drink for treatment of stomach diseases and cough.

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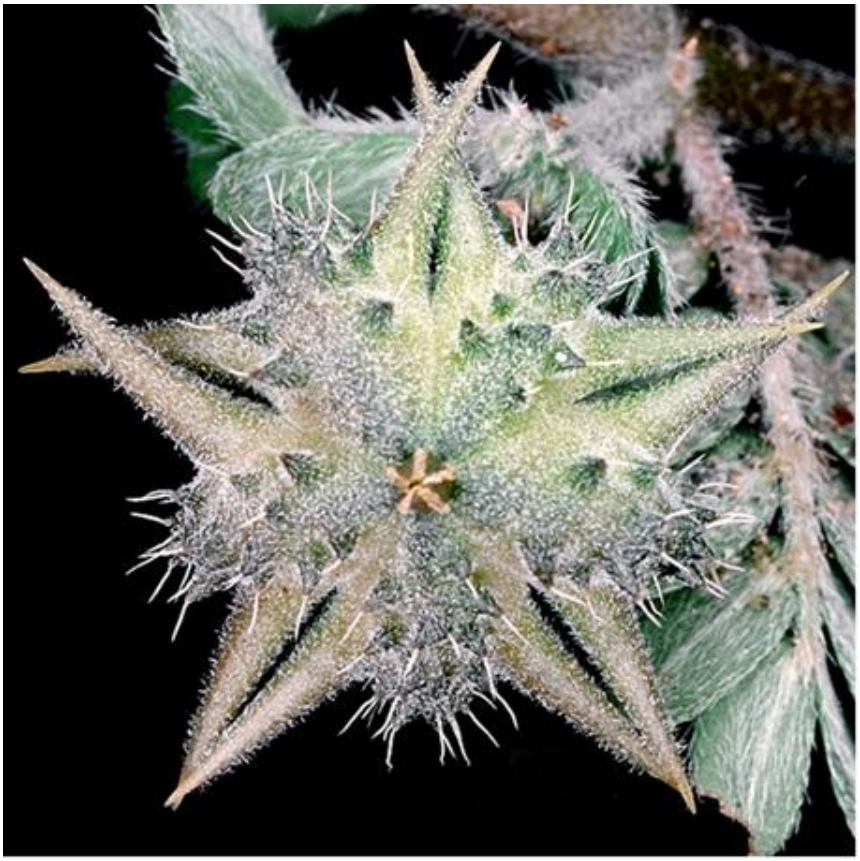
***Tribulus terrestris* L.**
Family: Zygophyllaceae



Plant name

***Tribulus terrestris* L.**

Synonyms

Tribulus lanuginosus L.

Tribulus robustus Boiss. & Noë in Boiss.

Distribution

- **Global**: Mediterranean region, tropical and subtropical regions.
- **National**: Nd, Mma, Mp, Da, Dl, R, S
- **Local**: 31º 03′ 2.76′′N 28º 20′ 29.58′′ E

Status

- **Täckholm**: Common
- **IUCN** : ─
- **Current**: Common

Main habitat

Cultivated Areas and Fallow fields

Part used

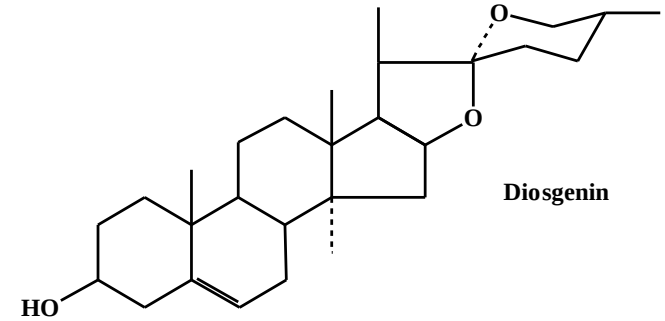
- Dried and powdered aerial part.
- Seeds, fruits.
- Roots.

Preparation

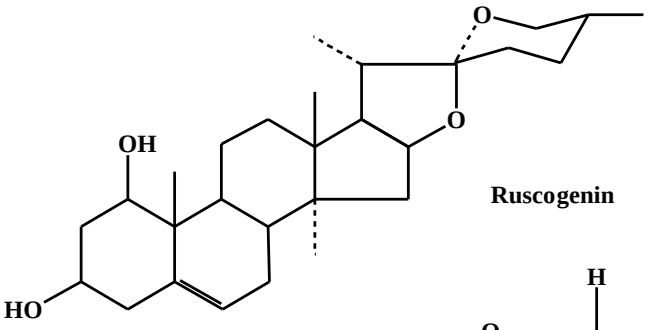
- Powdered aerial parts.
- Decoction.
- Extract.
- Dried seeds and fruit.

Chemical constituents

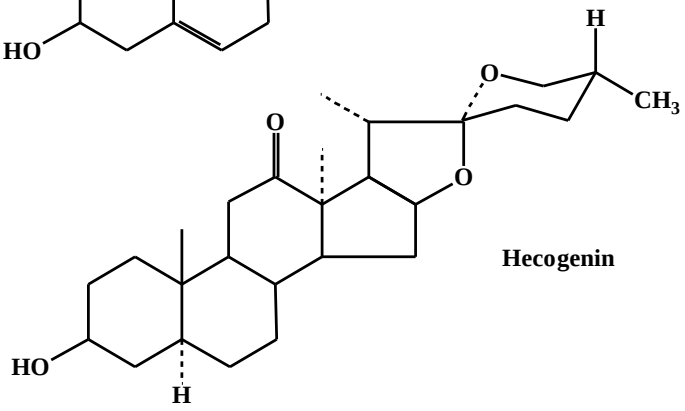
Kaempferol, kaempferol-3-glucoside, kaempferol-3 rutinoside and tribuloside have been reported from fruits and leaves. Various steroidal sapogenins, have been reported from the plants. Diosgenin, hecogenin, ruscogenin, spirosta-3,5-diene, steroidal sapogenins, kaempferol, and quercetin isolated from the flowers. The plant also contains alkaloids (harman, harmol, and harmine; oligosaccharide (tribulosin) and sterols.



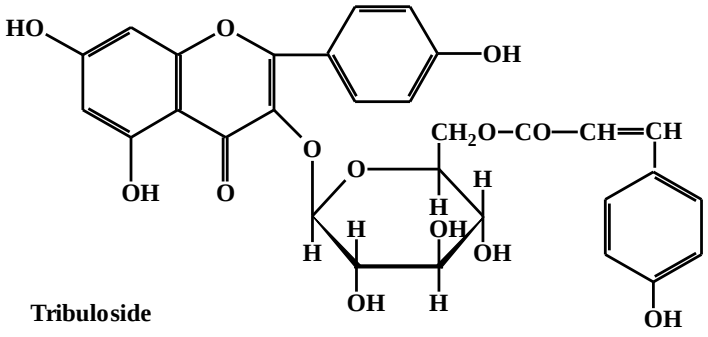
Diosgenin



Ruscogenin



Hecogenin



Tribuloside

Pharmacology and toxicology

The plant possesses anticancer activity. The extract of the plant is antispasmodic. The aqueous extract of the plant lowers experimentally induce hyperoxaluria. The fruit of the plant is a well recognized drug of the Ayurvedic system of medicine. It has anti-inflammatory, adaptogen, nervine tonic and aphrodisiac activities. The root is a good diuretic when used as a decoction in urinary diseases. The drug is used in consumption, dropsy, diabetes, gonorrhoea, impotence, kidney diseases, painful micturition and urinary discharge.

Tribulus terrestris is a testosterone enhancer that may promote improved muscles overall body strength. It enhances the production of the

luteinizing hormone (LH) are increased, the natural production of testosterone is also increased. LH is a hormone enhances sex drive and libido. It improves sexual activity, and also prolongs penile erection in men. In women it improves sexual activity, stimulates ovogenesis and has other beneficial effects as well. It improves muscle growth and body strength. *Tribulus terrestris* increases the number and motility of spermatozoa. Some European studies reports that *Tribulus terrestris* can increase testosterone levels 30-50% above baseline levels but still well within the normal range.

Traditional medicinal and indigenous knowledge

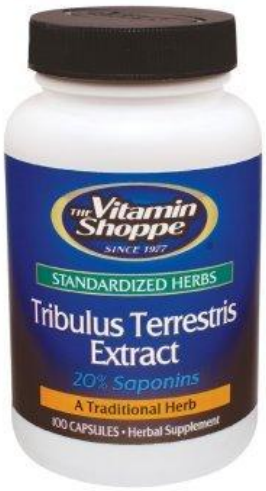
Flowers: for leprosy; stem: for scabious skin diseases and psoriasis. Fruit: for congestion, headache, hepatitis, impotence, liver, ophthalmia, stomatitis, vertigo recommended for kidneys, liver and vision. Seeds: as abortifacient, aphrodisiac astringent, diuretic, tonic, for abscesses, anaemia, coughs, fluxes, heamorrhoids spermatorrhea and stomatitis. Plant is recommended as anticancer. Extract of the plant antispasmodic. Fruit used as tonic in spermatorrhia, neurasthenia, vertigo, astringent for oral inflammations, detersive, diuretic, for dysentery and pains of the bladder.

Pharmacopoeias

The plant is not pharmacopoeial.

Pharmaceutical preparation in the market

- No pharmaceutical preparations containing *Tribulus terrestris* are available in the Egyptian market.
- A huge number of pharmaceutical preparations containing *Tribulus terrestris* are available in the markets abroad.



Pharmaceutical preparations containing *Tribulus terrestris* as a single component

Pharmaceutical preparations, Company (Country), Indications

- **NSI *Tribulus terrestris* Extract Capsules,** (Nutraceutical sciences Institute), Aphrodisiac, Tonic.
- **Tribestan Tablets,** Bulgarian Pharmaceutical Group BPG.
- **Optimum Tribulus, 625 Capsules,** Optimum
- **Dymatize Trib-650, Capsules.**
- **Higher Power Tribulus Terrestris, 625 Capsules**
- **Maximum Nutrients Tribestone, Capsules**
- **MRM Tribest, 750 mg Capsules.**
- **NOW Tribulus, Capsules.**
- **NOW Tribulus, 1000 Tablets.**
- **Porfight Tribulus terrestuis, 750 mg Capsules**
- **Scifit Tribesterene, 1500 capsules.**
- **Solaray Tribulus Fuel Extreme Tablets.**
- **Winlab Tribulus Fuel Extreme Tablets.**
- **Ultimate Nutrition Tribulus terrestris, 750 mg Capsules.**
- **4 Your Health Pro V for Men Tablets.**
- **4 Ever Fit Trib 750 mg. Capsules**
- **AST Trioxalon 500, Capsules.**

More than 100 pharmaceutical preparations contain *Tribulus terrestris* with other components are available in the market abroad e.g.:

1. **Libeeda**, Nutravite (Canada), Aphrodisiac, Tonic.
2. **Herbal Support for Men Over 45,** Nutravite (Canada), Aphrodisiac, Tonic.

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***Urginea maritima* (L.) Baker, J. Linn.**
Liliaceae

Plant name

***Urginea maritima* (L.) Baker**

Synonyms

Scilla maritima L.
Urginea scilla Steinh.
Drimia maritima (L.) Stearn,

Distribution

- **Global**: Atlantic Islands, Portugal, Mediterranean region, Sinai, Saudi Arabia.
- **National**: Mma, Di,
- **Local**: 31º 30′ 48.00′′N 26º 12′ 06.66′′ E

Status

- **Täckholm**: Rare
- **IUCN** : ─
- **Current**: Under threat

Main habitat

Sand flats

Morphological description

A bulbous plant with rosetted leaves. The leaves appear at the beginning of winter. Leaves basal, lanceolate to linear-lanceolate, 10-35 × 2-7 cm, glabrous, margin smooth. Leaves become dry by the onset of summer and the plant becomes dormant for a period of 2-3 months depending on the climatic conditions as well as the soil moisture content. In August, or even one month later flowers appear. The bulb is huge, frequently white, or red, growing in clumps up to 70 together, each bulb more than 10 cm across and weighing more than 1 kg. Inflorescence has a long scape reaching 60 cm to 1.5 m high and carrying small flowers from the middle upwards. **Red squill** has longer and more stout scapes (l-l.5m), while **white squill** has shorter ones (60 cm). Fruits are produced by the end of October. They are larger in red squill than in white squill. Seeds, 1-4 in each fruit, minute, very light, compressed, oblong ca 3x7 mm and dark black-glossy coloured.

Urginea maritima is a polymorphic species with various varieties and forms. In Egypt there are three distinct morphological features collected from the different localities. The specimens collected from Barrani along the western Mediterranean coast, show two features regard the colour and size of the bulb. The average diameter of the bulb of white squill is 8.5 cm, while it reaches 17 cm in the case of red squill. On the other hand, in the specimens collected from the eastern Mediterranean

coastal zone between EI-Arish and Rafah, the bulbs have intermediate dimeter and their white tunics have reddish tinge. So, squills growing in Egypt show distinctive features regarding the morphology of their bulbs. One with moderate size and reddish tinge in the eastern coastal region, the second with white tunics and small size and the third with dark-red tunics and very large bulbs.

Description

The scales are odourless or with a slight odour, and a mucilaginous, bitter, acrid and disagreeable taste. They occur in irregular, curved, flattened narrow pieces, frequently tapering towards both ends, 0.5-5 cm long, 3-8 mm wide in the middle, 2-5 mm up to 8 mm thick, yellowish-white to pale yellow, somewhat translucent, exhibiting raised slightly darker points of lines. The vascular bundles brittle when quite dry, tough and flexible when moistured; fracture, short, The transverse cut surface shows a line of prominent vascular strands near the concave edge and numerous small strands scattered in the mesophyll.

Ecology

The plant is found in dry, sandy places specially near the sea coast in most of the Mediterranean districts. It has been found that, the white and red squills grow on soils with different physical and chemical properties. Soils supporting the white squill are shallower, more compact, with higher content of carbonates and soluble salts than those supporting the red squill. The soils supporting the red squill are of sandstone origin, while those supporting the white squill are of limestone origin. The total plant cover of the community dominated by the white squill is about 60 percent; almost half of it is occupied by the squill. On the other hand, in the case of the red squill, the total plant cover is 68 %, and the squill occupies about 90% of this cover. The number of bulbs was found to be 430/100 m^2 in white squill and 250/100 m^2 red squill, while the weight of these bulbs was 70 kg in white squill and 123 kg in red squill.

Status

Recently, the plant has been subjected to severe uprooting and collection for pharmaceutical companies. It is now rare as compared with its status since thirty years. It has been shown that a more or less equal number of bulbs would be established three years after collection. However, the weight of the newly established bulbs would be 13.7 kg compared with the 70 kg from a natural unharvested area. This confirms that the reestablishment of the squill will take numerous years even in the case of protecting the habitat after collection. Conservation of this plant and its cultivation for further use by the pharmaceutical companies is essential. It is a very endangered species. The plant, being unpalatable,

there is no fear to cultivate it along the coastal Mediterranean region without exclosure. Reseeding of the plant would be in the areas from which the bulbs were collected. One must consider that the collection of the bulbs is usually undertaken in the late summer before flowering; at that time the active principles are at their highest level and in the mean time, than plants were not yet fruiting. This means that the soil will be deprived from the seed rain which enriches the seed bank.

Part used

The dried fleshy scales of the bulbs of the white latex varieties.

Collection

Bulbs are harvested after six years of cultivation in late Autumn, sliced transversely and dried for use.

Preparation

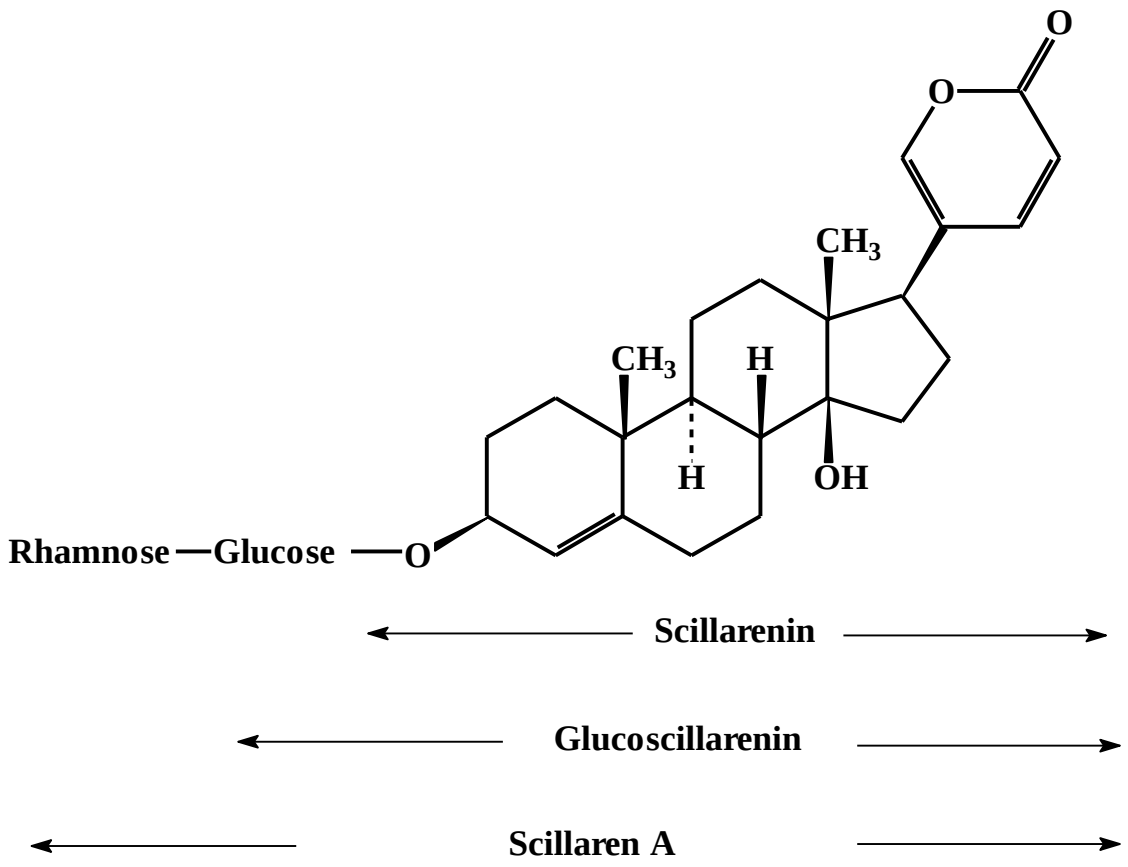
- Infusion.
- Liquid extracts.
- Squill.
- Vinegar.
- Tincture.

Use

Orally and externally.

Chemical constituents

White squill contains; as active constituents; several steroiod glycosides (bufadienolides), including scillaren A (scillarenin + rhamnose + glucose), glucoscillaren A (scillaren A + glucose), proscillaridin A (scillarenin + rhamnose), scillaridin A, scillicyanoside, scilliglucoside, scilliphaeoside (12 B-hydroxyproscillaridin A), and glucoscilliphaeoside (12 B-hydroxyscillaren), The most important ones being scillaren A and proscillaridin A. scillaren B has been used to describe a mixture of squill glycosides as opposed to pure scillaren A. Other constituents present in white squill include flavonoides (vitexin, isovitexin, orientin, isoorientin, scoparin, vicenin-2, quercetin, dihydroquercetin or taxifolin, dihydroquercetin-4-monoglucoside.), stigmasterol, scilliglaucosidin, mucilage (glucogalactans). Red squill contains scilliroside; it also contains cardiac glycosides as white squill.



Pharmacology and Toxicology

The glycosides present in squill have digitalis-like cardiotonic properties which are due to their aglycones. Action is more rapid, but shorter than that of digitalis glycosides. Squill as stimulating action on the heart makes it useful for heart failure and fluid retention brought on by the heart problems. It is well used in case where Digitalis would be considered dangerous. In medicinal doses it acts upon the circulation like Digitalis slowing and strengthening the cardiac contractions, making the pulse slower and stronger, raising arterial tension, and increasing the flow of urine. The action of the drug is that of a cardiac stimulant, with three important further properties all dependent on its irritant constituents. Even in small doses, such as will not affect the heart, it is a gastro-intestinal, a bronchial and renal irritant. The two later properties constitute it a powerful expectorant and a fairly active diuretic. The difference between its actions as an expectorant and a cardiac stimulant would seem to indicate its possession of two or more active principles, one specifically affecting the secretory mucous membranes, and the other the circulatory apparatus. Squill may be combined with *Marrabium* and *Tussilago* in bronchitis, with Ipecacuanha in whooping cough. Squill is considered an abortifaciant and may lead to SAB if used during pregnancy; thus its use is not recommended.

It is given in pill form, made from the powdered root beaten into a mass with the addition of syrup or mucilage of gum arabic. In case of overdose the plant is an irritant poison, causing nausea and vomiting, purging, gastro-enteritis, straugury, bloody urine, perhaps suppression, convulsions, and death by paralysis of the heart in systole. The root is bitter to the taste and so acrid that it will blister the skin if it is handled too much. Combined with a sedative, such as opium, it may be given in chronic bronchitis, it must not be given in acute bronchitis, which it only aggravates; nor in phthisis, which is invarially accompanied by a hypersensitive state of the alimentary tract. For similar reasons quill should not be given in any form at Bright's disease. The text book prohibition against its use in acute Bright's disease should certainly be extended to chronic nephritis in all its forms.

Toxicity

The plant is poisonous. Toxicity due to ingestion of 2 bulbs of *U. maritima* as a folk remedy for arthritic pains by a 55-years old female was reported. Symptoms shown were cardiac glycoside intoxication which included nausea, vomiting seizures, hyperkalaemia, atrioventricular block and ventricular arrhythmias resembling digitalis toxicity. The patient died 30 hours after ingestion.

Pharmacopoeias

- Egyptian pharmacopoeia, 1984.
- British pharmacopoeia, 1988.

Pharmaceutical Products

- **Scillaren,** (Sandoz).
- **Palmocadil syrup**, (Nile).
- **Cosylan syrup** (Park Davis).
- **Lobestra syrup** (Nile).
- **Expectyl syrup** (Adco).
- **Broncho cough syrup** (Mcpaco).

Phytopharmaceuticals in the Egyptian market

Fresh bulbs, dried scales, tincture squill, compound squill linctus, liquor pro tincture squill, squill elixir, pediatric opiate squill linctus, squill oxymell, squill liquid extract, squill vinegar, squill pastilles.

Traditional medicinal and indigenous knowledge

White squill bulbs are applied fresh for treatment of wounds and tumours, expectorant in bronchitis, chronic catarrh and pneumonia. In strong doses, emetic, cathartic and upsets nerves. Fresh bulb is vesicant, rubefacient, anthelmintic, and useful for rheumatism, oedema and gout. Its

cardiac action is like that of digitalis, slowing down the pulse and increasing its strength, emmenagogue, abortive, aphrodisiac. Dried powdered bulbs made into tablets, sucked slowly in the mouth against internal tumors. Infusion of dried bulb is a strong purgative. Aqueous infusion of the fresh bulb is used for treatment of diabetes. A piece (2g) of fresh fleshy leaves, boiled in a glass of water. Cool and drink every morning for 45 days (Matruh). For treatment of painful joints: a slice of red squill is warming in direct heat then placed on the joint after painting it with cooking oil 3 times day over a period of 45 days (Matruh). It is reported to be used by ancient Egyptians in dropsy. The bulb extract is usually used as an expectorant if small doses were taken; in large doses it is usually used as emetic. The frontier soldiers usually use it as an emetic when one has some food poisoning. The plants are used for curing dermal fungal infections.

Medicinal uses

- Cancer diseases.
- Chest diseases (bronchial asthma, bronchial catarrh, bronchopneumonia, allergic cough, acute and chronic bronchitis).
- Constipation.
- Diabetes.
- Heart diseases (heart failure and fluid retention brought on by the heart problems cardiotonic).
- Neurological diseases.
- Renal diseases (chronic nephritis, promotion of urine).
- Skin diseases (wound, oedema, dermal fungus infection).
- Rheumatic diseases

Other uses of the plant

It is planted in the vicinity of Arab graves, to protect them, according to tradition. The Bedouin believe that whenever there is an abundance of *Uriginea maritima* flowers, there will be a rainy winter. In the eastern Mediterranean zone in Egypt (EI-Arish, Rafah zone), the plant was used as territory marker. This practice was also recorded in Libya. The Bedouins use it mainly as a rodenticide. Squill is a household word in many countries, especially in England, where it is freely used in domestic practice for coughs of infants and children, and causes many deaths by direct poisoning. It is chiefly employed as an expectorant and diuretic, through it renders excellent service as a cardiac stimulant, hair tonic.

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***Urtica urens* L.**
Family: Urticaceae

Plant name

***Urtica urens* L.**

Synonyms: ─

- **Distribution**
- **Global**: Temperate regions worldwide
- **National**: Nd, Nv, Nf, O, Mma, Mp, Da, Di

Status

- **Täckholm**: Very common
- **IUCN** : ─
- **Current**: Very common

Main habitat

Cultivated Land

Part used

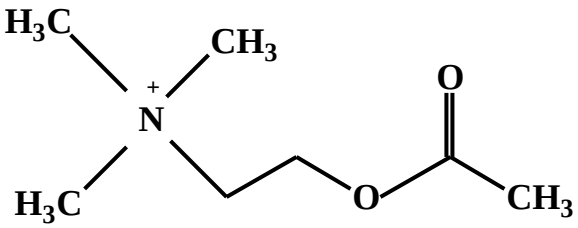
- The entire plant.
- Aerial parts, leaves and seeds.

Preparation

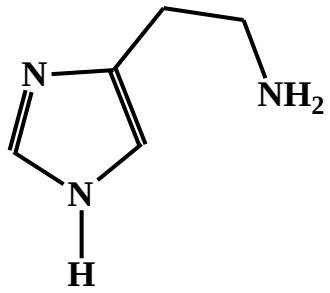
- Infusion of leaves.
- Decoction of leaves.
- Fresh plants.
- Infusion of entire plant.
- Powdered plant.

Chemical constituents

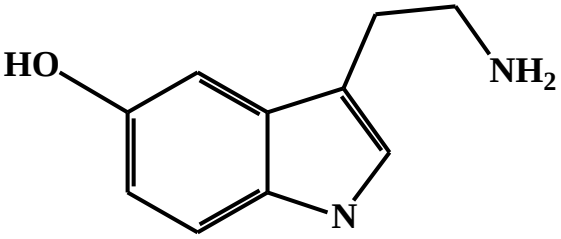
The plant contains histaminic compounds (Histamin), acetylcholine formic acid, tannin, silicon, potassium salts, glucoquinines, iron, 5-hydroxytryptamine (serotonin) and vitamins A and C.



Acetylcholin



Histamin



Serotonin

Pharmacology and toxicology

- Fresh plants used as an effective but painful rub to treat rheumatism, antidiarrhoeic, aphrodisiac, used for hemorrhage, kidney ailments, revulsive. Infusion of entire plant antihemorrhagic, galactogogue. Infusion and decoction of leaves diuretic; extract of fresh leaves used in homeopathy for eczema, dysmenorrhoea, metrorrhagia, nose-bleeding and in lotions to promote hair growth; used externally, it soothes wounds and ulcers.
- The plants as well as its pharmaceutical preparations are used, worldwide, for the treatment of prostatic disorders; joint disorders; urinary tract disorders and cough and colds symptoms.
- The entire plant especially on contact with its stinging hairs causes skin irritation, several rashes with itching (urticaria).
- *Uritca urens* is an excellent remedy for skin disorders especially if they are burning and stinging rashes due to an allergic reaction

such as insect bites or hives from eating shell fish. The skin is hot and blistered, itchy and blotchy. It is also used for burning urine that causes itching and may be associated with cystitis.

Pharmacopoeias

- ph. Eur. 5.0
- DAB 1999.

Pharmaceutical preparations in the market

No Pharmaceutical preparations containing *Urtica urens* are available in the Egyptian market.

Several pharmaceutical preparations containing *Urtica urens* are available in the market abroad.

Pharmaceutical preparation, Company (Country)**,** indications

- (Single active ingredients)

- **Bazoton,** Scheing – plaugh (Braz.), Antineoplastic.
- **Arthrodynat N,** Ziethen (Ger.), Rheumatic disorders.
- **Uro-Pos,** Croma (Austria), Micturition disorders in males
- **Logomed Prostata-Kapseln,** Logomed (Ger.), Micturition disorders associated with prostatic cancer.
- **Venustas Shampoo per Capelli Con Forfora elo Grassi,** BPR (Ital.), Seborrhoeic dermatitis.
- **Hox Alpha,** Strathmann (Ger.), Rheumatic disorders
- **Kneipp pflanzen-Dragees Brennessel,** Kneipp (Ger.), Urinary-tract disorders
- **Reumaless,** Pharmaton (Ger.), Rheumatism
- **Serless,** Truw (Ger.), Bengin prostatic hyperplasia
- **Prostaherb N,** Cesra (Ger.), Bengin prostatic hyperplasia
- **Urticur,** Biocur (Ger.), Bengin prostatic hyperplasia
- **Boericke & Tafel *Urtica urens* 6X** 100 tablets, Insect bites and stings. Burns and scalds. Heavy or prolonged menstruation. Leucorrhea. Hives. Eczema. Itchy blotches. Ill effects of eating shell fish. Sore Throat. Rheumatism. Gout. Gravel. Vertigo.

- (Multi active ingredients)

- **Befelka-Tinktur,** Befelka (Ger.), Metabolic disorders, circulatory disorders, Skin disorders
- **Prostagut Tropfen,** Schwabe (Ger.), Prostatic disorders
- **Colehicum-Strath,** Strath-labor (Ger.), Joint disorders
- **Rheuma-Tee,** Stada (Ger.), Rheumatic disorders
- **Savlon Natural First Aid for Burns,** Novartis Consumer (UK), Burns

- **Cough Relief,** Brauer (Austral), Coughs
- **Infant Tonic,** Brauer (Austral), Tonic
- **Respatona Decongestant Formula,** Brauer (Austral), Coughs and cold symptoms
- **Apotheker Hoyers Brennesseltonikum,** St Valentinus Apotheke (Austria), Tonic
- **Ehrmann's Entschlackungstee,**Ehrmann (Austria) ,Urinary disorders
- **Florissamol,** Andrae (Austria), Soft-tissue disorders, muscle and joint pain, chilblains, scalp disorders
- **Bogumil-Tassenfertiger Mider Abfurtee, Enzypharm** (Austria), Dyspepsia, constipation flatulence
- **Krauterhaus Mag Kottas Entschlackungstee,** Kottas-heldenberg (Austria), Diuretic
- **Mag Doskar's Nieren und Blasentonikum,** Doskar (Austria), Renal and ladder disorders
- **Species Carvi Comp,** Weleda (Austria), Gastrointestinal cramp flatulence
- **Naturland Rheuma Tee,** Strallhofer (Austria), Inflammation, pain
- **Krauterhaus Mag kottas Fruhjahrs und Herbstkurtee,** Kottas – Heldenberg (Austria), Tonic
- **Salus Rheuma – Tee,** Salushaus (Ger.), Rheumatic disorders.
- **Morera compuesta,** Hochstetter (Chile), Homoeopathic preparation.

			
Canada	USA - West	USA - East	UK
Remedies by Boiron Deliveries within Canada only.	Remedies by Boiron Deliveries worldwide, except France, Germany.	Remedies by WHP Deliveries worldwide, except France, Germany, Spain and Canada.	Remedies by Weleda UK residents only
✓ *Urtica Urens* is available from this supplier.	✓ *Urtica Urens* is available from this supplier.	✓ *Urtica Urens* is available from this supplier.	✓ *Urtica Urens* is available from this supplier.
Available options: **Pellets**: 3X, 6X, 12X, 30X, 3C, 6C, 12C, 30C, 200C, 1M, 10M, CM, **Liquid Dilutions**: 3X, 6X, 12X, 30X, 3C, 6C, 12C, 30C, 200C, 1M, 10M, CM, **Mother Tincture**: Q,	**Available options:** **Pellets**: 3X, 6X, 12X, 30X, 3C, 6C, 12C, 30C, 200C, 1M, 10M, CM, **Liquid Dilutions**: 3X, 6X, 12X, 30X, 3C, 6C, 12C, 30C, 200C, 1M, 10M, CM, **Tinctures**: Q,	**Available options:** **Pills**: 6X, 12X, 30X, 3C, 6C, 12C, 30C, **Granules**: 200C, 1M, **Standard Ointment**: -, **Liquid Dilution**: 6X, 6C, 200C, 1M, **Tincture**: Q,	**Available options:** **Pillules - made to order**: 6C, 30C, 6X, 12X, 30X, 12C, 200C, 1M, **Creams**: -, **Tablets**: 6C, 30C, 6X, 12X, 30X, 12C, 200C, 1M, **Liquid Remedies**: 6C, 30C, 6X, 12X, 30X, 12C, 200C, 1M, **Lotion**: -, **Powder**: 6C, 30C, 6X, 12X, 30X, 200C, 1M, **Tinctures**: 10%, 33%, 50%,


Urtica urens 6X


SEALED FOR
Urtica urens 30C
HOMEOPATHIC MEDICINE
100 tablets


SEALED FOR YOUR
Urtica urens 30X
HOMEOPATHIC MEDICINE
100 tablets


Hylands
HIVES
100 TABLETS


WELEDA
Urtica urens
6

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8. DEFINITION OF KNOWLEDGE GAPS FOR FUTURE STUDIES

No doubt that there is a shortage of knowledge about the production and reproduction ecology of the Egyptian natural populations in general and those of medicinal plants in particular. Thus, the Research Team suggests carrying out the following studies:

1. Estimation the standing-crop phytomass and primary production for the harvestable organs used in medical treatments.
2. Construct regression models for the non-destrutive estimation of the woody plants using easy mesurable dimensions.
3. Estimating the reproductive ecology of these plants in terms of:
   a. Size structure in order to know the ratio of seedlings and Juvnilles to the adults and aged plants.
   b. Fruits setting and seed production per unit area.
   c. Assessing the germination and seedling requirements of *ex-situ* and *in-situ* propagation.

We suggest carrying out these studies on the following species:

Species	Current status	Socio-economic value	Suggested action
Achillea santolina	Common	Medicinal	Seed propagation and sanctuaries
Arisarum vulgare	Common	Medicinal	Propagation by corm
Artemisia herba-alba	Undre threat	Medicinal	Conservation programme (sanctuaries)
Asparagus stipularis	Rare	Medicinal and forage	Propagation by seeds and cutting
Bryonia cretica	Rare	Medicinal	Propagation and sactuaries
Capparis spinosa	Rare	Medicinal and fuel	Propagation by seeds and cutting
Centaurea pumilio	Under threat	Medicinal	*In-vitro* propagation
Colchicum ritchii	Common	Medicinal	Propagation by seeds
Ecballium elaterium	Cultivated	Medicinal	Propagation by seeds
Lygeum spartum	Common	Medicinal and forage	Propagation by rhizome
Hyocyamus muticus	Under threat	Mdedicinal	Propagation by seeds (sanctuaries)
Lotus polyphyllos	Common	Medicinal and forage	Propagation by seeds and enclosures
Marrubium vulgare	Under threat	Mdedicinal	Sanctuaries and enclosures
Ononis vaginalis	Common	Mdedicinal	Propagation by seeds
Onopordum alexandrinum	Common	Medicinal and forage	Propagation by seeds and enclosures
Otanthus maritimus	Rare	Medicinal	Propagation by seeds
Pancratium maritimum	Under threat	Medicinal	Propagation by seeds and enclosures
Peganum harmala	Under threat	Medicinal	Propagation by seeds
Periploca angustifolia	Common	Medicinal and forage	Enclosures and sanctuaries
Phlomis floccosa	Rare	Medicinal and forage	Propagation by seeds, *in-vitro* and enclosures
Posidonia oceanica	Common	Medicinal	*in-vitro* Propagation
Prasium majus	Under threat	Medicinal and forage	Propagation by seeds, cutting and enclosures
Retama raetam	Under threat	Medicinal and forage	Propagation by seeds
Salvia lanigera	Under threat	Medicinal and forage	Enclosures
Teucrium polium	Under threat	Medicinal and forage	*in-vitro* Propagation
Thymus capitatus	Under threat	Medicinal	enclosures and *in-vitro* Propagation
Urginea maritima	Common	Medicinal	Enclosures and sanctuaries
Varthemia candicans	Under threat	Medicinal	Enclosures and sanctuaries

9. ANNEXES

Annex 1 List of actual and potential medicinal plants in the north western coastal region of Egypt. I: Sallum, II: Barrani, III: Maktala, IV: Matrouh wadis, V: Dabaa, VI: Alamein and VII: Omayed transects.

No.	Species	Habitat	Transect
1	*Achillea santolina* L.	Barley fields	III, IV, V, VII
2	*Adonis dentata* Del.	Desert plains & rocky ridges	I, III, IV, V, VI, VII
3	*Aeluropus lagopoides* (L.) Trin. Ex Thwaites	Sandy & moist ground	IV
4	*Ajuga iva* (L.) Schreb.	Rocky Ridges	V
5	*Alhagi groaecorum* Boiss.	West places & canal banks	VII
6	*Ammi visnaga* (L.) Lam.	Weed in moist places	VI
7	*Anagallis arvensis* L.	Around Cultivated lands	III, IV, V
8	*Arisarum vulgare* Targ.-Tozz. var. *veslingii* (Schott) Engl.	Maritime sand & siliceous deposits	II, III, IV
9	*Artemisia herba-alba* Asso	Sandy places	I, IV, V, VII
10	*Artemisia monosperma* Delile	Non-Saline depression	VII, VI
11	*Asphodelus ramosus* L.	Rocky ground	I, II, III, IV, V, VI, VII
12	*Astragalus hamosus* L.	Non-Saline depression, road sides	I, IV, V, VI, VII
13	*Astragalus spinosus* (Forssk.) Muschl.	road sides rocky plateau	I, V, VI, VII
14	*Asparagus stipularis* Forssk.	Rocky Slope	V, VI, VII
15	*Avena sativa* L.	Casual weed of cultivated land	IV, V, VII
16	*Beta vulgaris* L.	Casual weed of cultivated land and road sides	I, II, III, IV, VI
17	*Bryonia cretica*	Sand dunes	V, VI
18	*Calendula arvensis* L.	Cultivated & waste ground	IV, V
19	*Capparis spinosa* L.	Rocky slopes	IV
20	*Carrichtera annua* (L.) DC.	Sandy plains	I, IV, V, VII
21	*Carthamus lanatus* L.	Moist places	IV, V
22	*Centaurea pumilio* L.	Maritime Sand	IV
23	*Centaureaaegialophila* Wagenitz	Maritime dunes	V, VI
24	*Chenopodium murale* L.	Winter weed	IV, V
25	*Glebionis coronaria* (L.) Tzveleu	Cultivated & waste ground	IV, V
26	*Cistanche phelypaea* (L.) Cout.	Road Sides	V, VII
27	*Citrullus colocynthis* (L.) Schrad.	Wadis with sandy, silty ground	I
28	*Colchicum ritchii* R. Br.	Sandy & loamy soils	III, IV, VI, VII

Annex 1. Cont.

No.	Species	Habitat	Transect
29	*Convolvulus lanatus* Vahl	Sandy plains	VII
30	*Cyperus rotundus*L.	Cultivated & waste ground	IV, V, VII
31	*Datura stramonium* L.	Weed in west ground, road sides, orchards & fields	IV, V
32	*Ecballium elaterium* (L.) A. Rich	Cultivated lands, deep sands	V
33	*Echium sericeum* Vahl.	Wadi beds	IV, V, VII
34	*Euphorbia paralias* L.	Matitime dunes	VI
35	*Fagonia arabica* L.	Rocky ridges, Rocky plateau	I
36	*Globularia arabica* Jaub. Et Sp.	Rock fissuers, stony ridges	I, V, VI, VII
37	*Gynandriris sisyrinchium* (L.) Parl.	Non- saline depression	I, II, V, VI, VII
38	*Halocnemum strobilaceum* (Pall.) M. Bieb.	Salt marshes	VI
39	*Haloxylon scoparium Pomel*	Arable stepps soil	IV
40	*Haplophyllum tuberculatum* (Forssk.) Juss.	Sandy plains, Road sides	IV, V, VI, VII
41	*Hyoscyamus muticus* L.	Sandy plains & wadi beds	I, IV, VI
42	*Ifloga spicata* (Forssk.) Sch.-Bip.	Gravelly soil	I, V, VI, VII
43	*Kickxia aegyptiaca* (L.) Nábelek	Sandy silt ground in wadis & on slopes	IV, VII
44	*Launaea nudicaulis* (L.) Hook. F.	Silty wadis & stony slopes	I, II, IV, V, VI, VII
45	*Lotus polyphyllos* Clarke	Maritime sand	I, IV, V, VI, VII
46	*Lycium europaeum* L.	Rocky ground & sandy dunes	IV, V, VI, VII
47	*Lygeum spartum* Loefl. ex L.	Maritime sand	I, II, IV, VI, VII
48	*Malva parviflora* L.	Sandy places	I, II, III, IV, V, VI, VII
49	*Marrubium vulgare* L.	Road side & barely fields	I, III, IV, V
50	*Melilotus indicus* (L.) All.	Sandy places, road sides	III, IV, VI
51	*Nicotiana glauca* R. C. Grah.	Moist places & Sandy plains	IV, VI, VII
52	*Ononis vaginalis* Vahl	Maritime sand	I, II, IV, V, VI, VII
53	*Onopordum alexandrinum* Boiss.	Sandy-silty soil	I, II, IV, VI, VII
54	*Ornithogalum trichophyllum* Boiss. & Heldr.	Rocky ridges	I, II, V, VI
55	*Osteospermum vaillantii* (Decne.) Norl.	Sandy soil	IV
56	*Otanthus maritimus* Hoffmgg. Et Link.	Maritime sand	II
57	*Pancratium maritimum* L.	Coastal dunes	I, II, IV, V, VI, VII
58	*Papaver rhoeas* L.	Weed in barely field	IV
59	*Peganum harmala* L.	Sandy places	I, IV

Annex 1. Cont.

No.	Species	Habitat	Transect
60	*Periploca angustifolia* Labill.	Inland sandy plateau	I
61	*Phlomis floccos*a D. Don.	Steep slopes of wadis	IV, VII
62	*Plantago albicans* L.	Wadi beds	III, IV, V, VI, VII
63	*Plantago ovata* Forssk.	Rocky habitat	I, III, IV, V, VI, VII
64	*Polygonum equisetiforme* Sibth. & Sm.	Sandy places & west land	I, III, IV, V, VII
65	*Posidonia oceanica* (L.) Del.	Marine water , seashore	I, VI, VII
66	*Prasium majus* L.	Rocky ridges	VII
67	*Ranunculus bulbosus* L.	Moist places	III, IV
68	*Reaumuria hirtella* Jaub. Et sp.	Desert wadi & rocky ground	III, IV, V, VII
69	*Retama raetam* (Forssk.) Heywood	Coastal plains & wadi beds	I, II, IV, V, VI, VII
70	*Rumex vesicarius* L.	Moist places	VII
71	*Salvia aegyptiaca* L.	Sandy plains	IV, VII
72	*Salvia lanigera* Poir.	Sandy plains & rocky habitat	I, II, III, IV, V, VI, VII
73	*Scorzonera undulata* Vahl	Rocky ridges and inland plateau	I, II, IV, V, VI, VII
74	*Senecio vulgaris* L.	Sandy plain and cultivated lands	III, IV, VI
75	*Silybum marianum* (L.) Gaertn.	Road side, west land, canal banks, field margins	II, IV
76	*Solanum nigrum* L.	Field & west land	IV
77	*Sonchus oleraceus* L.	cultivated lands	IV, VI, VII
78	*Tamarix aphylla* (L.) H. Karst.	Wide wadis with sandy silty ground	IV, VII
79	*Terfezia claveryi*	Sandy, inland plateau	I, II, VII
80	*Teucrium polium* L.	Sandy plains	I, IV, VII
81	*Thymelaea hirsuta* (L.) Endl.	Sandy plains	I, II, III, IV, V, VI, VII
82	*Thymus capitatus* (L.) Hoffmgg. et Link	Rocky habitats	I, IV, VII
83	*Tribulus terrestris* L.	Sandy plains, west places & weed in gardens	III, IV, V,VII
84	*Urginea maritima* (L.) Baker (red)	Maritime sand & rocky ground	III, IV
85	*Urtica urens* L.	Winter weed	IV, VI
86	*Varthemia candicans* (Delile) Boiss.	Sandy soil	I, IV
87	*Zilla spinosa* (L.) Prantl	inland plateau and slopes	V
88	*Ziziphus lotus*	Flat inland plateau	I,

Annex 2. List of medicinal plants in the north western coastal region. The habitats are: CD: coastal sand dunes, RC: consolidated and rocky dunes, SP: Sallum plateau, SD: saline depressions, ND: non-saline depressions, IR: inland ridges, IP: inland plateau, SF: sand formations, RS: road sides, WS: wadis and CL: cultivated lands. P: the relative number of stands. The coordinates of the represented stands are shown in *Vol 1*.

Species	Habitat	Stands of occurrence	P (%)
Achillea santolina	SD	22', 29, 35, 39, 50, 59, 61	8.75
Adonis dentata	RC, ND, IR, IP, SF, RS, WS, CL	15, 16, 19, 22, 23´, 23´, 23, 35, 36, 38, 42, 51, 52, 60, 62, 63, 64, 69, 78	25.00
Aegilops kotschyi	WS	78, 35, 15, 16, 36, 38, 42, 52, 60, 62, 63, 64, 69, 23´, 19, 22, 51, 23´, 23	23.75
Ajuga iva	CL	75	1.25
Allium roseum var. *tourneuxii*	RC, SD, ND, IR, IP, SF, WS	5, 7, 13, 15, 16, 17, 38, 43, 51, 52, 77	13.75
Anabasis articulata	RC, ND, IR, IP, RS	25, 42, 43, 44, 45, 51, 52, 53, 46, 15	12.50
Anabasis oropediorum	RC, ND, IR, IP, SF, RS, WS, CL	5, 7, 11, 30, 34, 35, 38, 39, 52, 53, 63, 78, 79, 80, 15, 16, 19, 25, 47, 22´	25.00
Anagallis arvensis	RS, WS, CL	22, 22', 36, 57, 60, 61, 78	8.75
Argyrolobium uniflorum	SF, WS	6, 64	2.50
Arisarum vulgare var. *veslingii*	IP, SF, RS, WS	19, 54, 60, 61, 62, 63, 28, 32, 33, 23, 30, 31, 29, 5	17.50
Artemisia herba-alba	RC, SSP, IR, WS, CL	10, 34, 35, 39, 57, 59, 60, 63, 53, 58, 10´, 52	15.00
Artemisia monosperma	ND	36	1.25
Arthrocnemum macrostachyum	CD, SD, WS	40, 41, 81, 82	5.00
Asparagus aphyllus	SP, IR	10, 52, 53	3.75
Asparagus stipularis	CD, RC, IR, SF, WS	1, 12, 33, 37, 57, 58, 61, 63, 53, 25	12.50

Annex 2. Cont.

Species	Habitat	Stands of occurrence	P (%)
Asphodelus ramosus	All habitats	5, 6, 8, 10, 15, 16, 17, 19, 22, 22´, 23´, 23´, 23, 28, 29, 31, 32, 33, 34, 36, 38, 39, 40, 41, 42, 43, 45, 46, 47, 51, 52, 53, 57, 58, 60, 61, 62, 63, 69, 77	50.00
Asteriscus pygmaeus	WS	80	1.25
Astragalus spinosus	Cd, RC, ND, IP, RS	18, 38, 42, 44, 49	6.25
Atractylis carduus	CD, RC, SD, ND, IP, SF, WS, CL	18, 36, 42, 43, 45, 46, 47, 49, 50, 67, 77, 81	15.00
Atriplex halimus	CD, RC, SP, SD, IP, SF, RS, WS, CL	3, 10, 12, 13, 15, 18, 25, 35, 36, 37, 39, 44, 61, 67, 78, 79, 80, 81, 82	23.75
Atriplex semibaccata	RC, WS, CL	34, 36, 58	3.75
Avena barbata	WS	80	1.25
Bassia muricata	CD, RC, SD, ND, IP, WS, CL	18, 36, 43, 45, 47, 48, 49, 50, 56, 78	12.50
Biscutella didyma	WS	79	1.25
Blepharis ciliaris	WS	46, 50, 61, 62	5.00
Brassica tournefortii	ND, RS, CL	22, 22', 36, 39, 42, 43	7.50
Bromus rubens	WS	79, 80	2.50
Bupleurum semicompositum	RC, ND, IR, WS	42, 43, 45, 79, 80	6.25
Cakile maritima	CD, RC	40, 75, 76	3.75
Calendula arvensis	CD, ND, IR, WS, CL	52, 45, 35, 60, 62, 63, 64, 61, 39, 32, 33, 57, 65, 37, 48, 53	20.00
Capparis spinosa	WS	28, 57, 58, 60, 65, 81	7.50
Carrichtera annua	RC, SP, IR, WS, CL	10, 34, 36, 52, 53, 63	7.50
Carthamus lanatus	ND, WS	28, 29, 33, 35, 38	6.25
Centaurea glomerata	SF, RS, WS	6, 31, 32, 54, 55, 60, 61, 62, 64, 65, 79	13.75
Centaurea alexandrina	IP, WS	18, 80, 82	3.75
Centaurea calcitrapa	ND, SF, WS	51, 60, 61, 62, 63, 64, 67, 77, 78, 81	12.50
Chenopodium murale	WS, CL	61, 62, 64, 54, 36, 56	7.50

Annex 2. Cont.

Species	Habitat	Stands of occurrence	P (%)
Chrysanthemum coronarium	ND, WS, CL	35, 36, 38, 54, 56, 61, 62, 77	10.00
Cichorium endivia subsp. *pumilim*	WS	61, 65	2.50
Cistanche phelypaea	WS	80	1.25
Citrullus colocynthis	IP	18	1.25
Cleome amblyocarpa	IP	18	1.25
Colchicum ritchii	ND, IR, IP, WS	19, 29, 32, 46, 47, 52, 53	8.75
Convolvulus althaeoides	WS, CL	36, 54, 60, 61	5.00
Convolvulus arvensis	WS, CL	36, 54, 62, 63	5.00
Convolvulus lanatus	ND	51	1.25
Cotula cinerea	WS	35	1.25
Cressa cretica	WS	79, 80	2.50
Crucianella maritima	CD, RC	12, 14, 26, 27, 37, 40, 48, 49, 75, 76	12.50
Cynodon dactylon	CD, SD, IR, SF, RS, WS	48, 35, 44, 50, 52, 53, 54, 61, 64, 67, 77	13.75
Dactylis glomerata subsp. *hispanica*	RC, WS	32, 34, 80	3.75
Daucus syrticus	CD, IR, SF, RS	7, 22´, 22, 23´, 37, 52, 75	8.75
Deverra tortuosa	All habitats	6, 7, 8, 9, 10, 11, 16, 17, 20, 25, 26, 28, 30, 31, 32, 34, 35, 36, 37, 38, 39, 42, 46, 47, 48, 49, 50, 51, 53, 57, 58, 59, 60, 61, 63, 64, 69, 76, 77, 78, 80	51.25
Diplotaxis simplex	RC	14	1.25
Ebenus armitgei	IR	53	1.25
Echinops spinosissimus	All habitats except SD	3, 6, 8, 9, 10, 15, 16, 22´, 22, 25, 31, 33, 34, 35, 37, 38, 39, 42, 44, 45, 46, 48, 49, 51, 53, 54, 59, 61, 62, 63, 65, 75, 76, 77, 78, 80, 81	46.25
Echium sericeum	CD, RC, WS, CL	28, 37, 39, 48, 75, 76, 79	8.75
Emex spinosa	ND, WS, CL	35, 36, 38, 39, 54, 55, 61, 62	10.00
Enanthrocarpus strangulatus	RC, RS, CL	22´, 22, 36, 39, 42, 43	7.50

Annex 2. Cont.

Species	Habitat	Stands of occurrence	P (%)
Ephedera alata	WS	65	1.25
Eruca sativa	CL	36	1.25
Euphorbia hierosolymitana	IR	53	1.25
Euphorbia paralias	CD	40	1.25
Fagonia arabica	IP	15	1.25
Filago desertorum	CD, RC, SD, ND, IR, IP, CL	18, 34, 36, 38, 42, 43, 45, 47, 49, 50, 51, 52, 53	16.25
Frankenia revoluta	CD, SD	40, 41	2.50
Fumaria densiflora	CD, WS, CL	36, 37, 54, 58, 61	6.25
Gagea fibrosa	RC	34	1.25
Globularia arabica	RC, IR, IP	12, 18, 34, 42, 53	6.25
Gymnocarpos decander	All habitats except CL	1, 5, 6, 7, 10, 11, 13, 14, 15, 18, 26, 32, 34, 42, 46, 47, 48, 49, 51, 52, 53, 57, 59, 63, 76, 77, 78	33.75
Gynandriris sisyrinchium	RC, ND, IR, IP, SF	5, 7, 15, 34, 46, 52, 53	8.75
Halocnemum strobilaceum	SD	41	1.25
Helianthemum Kahiricum	RC, ND, IR, WS	32, 42,51, 52	5.00
Helianthemum Lippii	CD, RC, SP, ND, SF, RS, WS	7, 8, 9, 10, 25, 26, 27, 32, 37, 40, 44, 47, 48, 49, 51, 76	20.00
Helianthemum stipulatum	CD, RC, SP, SF, WS	7, 8, 9, 10, 25, 26, 27, 32, 34, 59	12.50
Herniaria hirsuta	CD, RC, SD, ND, IR, RS, WS, CL	35, 37, 38, 39, 42, 44, 45, 46, 49, 50, 51, 52, 76, 78, 81	18.75
Hippocrepis areolata	RC, SD, ND, IR,WS, CL	34, 35, 36, 42, 46, 50, 51, 53	10.00
Hippocrepis cyclocarpa	ND	51	1.25
Hordeum marinum	WS, CL	35, 36, 39	3.75
Hyoscyamus muticus	ND, IP, RS	18, 44, 45, 66	5.00
Hyoseris scabra	CD, WS	3, 27, 37, 48	5.00
Ifloga spicata	RC, SD, ND, IR, IP, SF	18, 38, 42, 43, 45, 47, 50, 51, 52, 53, 67	13.75

Annex 2. Cont.

Species	Habitat	Stands of occurrence	P (%)
Kickxia aegyptiaca	IR, WS	53, 78	2.50
Launaea nudicaulis	All habitats	3, 10, 15, 18, 28, 34, 35, 36, 37, 38, 39, 40, 42, 43, 44, 46, 47, 48, 50, 51, 53, 57, 59, 60, 67, 80	32.50
Launaea resedifolia	RC, ND, IP, SF	2, 17, 26, 42, 43, 45, 46	8.75
Launaea tenuiloba	RC	42	1.25
Limoniastrum monopetalum	RC, SD	12, 13, 14, 41, 42, 43, 50	8.75
Limonium pruinosum	CD, RC, SP, SD, IR, WS	10, 34, 40, 41, 52, 55, 57, 62, 76	11.25
Lobularia arabica	RC, ND	43, 45, 51	3.75
Lolium multiflorum	WS	54, 55, 59, 61, 62	6.25
Lotus glaber	CD, IR	48, 52	2.50
Lotus polyphyllos	CD, RC, WS	14, 27, 35, 37, 40, 48, 49, 76	10.00
Lycium europaeum	CD, RC, SD, ND, IR, WS, CL	34, 35, 36, 37, 39, 40, 42, 43, 46, 48, 49, 50, 51, 53, 58, 60, 61, 63, 64, 75, 78	26.25
Lycium shawii	RC, SD, IR, IP, SF, RS, WS	1, 2, 3, 4, 5, 13, 14, 15, 16, 17, 28, 30, 31, 33, 52, 54, 77, 82	22.50
Lygeum spartum	CD, RC, SP, ND,SF, RS, WS	7, 10, 12, 25, 31, 40, 48, 49, 51, 57, 58, 60, 76	16.25
Malva parviflora	RC, SD, ND, IR, IP, SF, RS, WS, CL	6, 7, 15, 16, 18, 19, 22´, 22, 31, 32, 35, 36, 38, 39, 42, 43, 46, 50, 52, 54, 55, 62, 64, 67	30.00
Marrubium vulgare	SF, RS, WS, CL	22, 36, 39, 61, 67, 78	7.50
Matthiola longipetala subsp. *livida*	CD, RC, SD, IR	48, 49, 50, 52	5.00
Medicago littoralis	WS	54, 55, 59, 61, 62, 63, 65	8.75
Medicago polymorpha	RC, ND, WS, CL	35, 36, 39, 42, 47, 78,	7.50
Moricandia nitens	RC, SP, SD, CL	10, 10', 13, 14, 36, 39	7.50
Nicotiana glauca	CD, RS, WS	24, 44, 49, 62, 66	6.25
Ononis serrata	IR, WS	52, 53, 59, 64	5.00
Ononis vaginalis	CD, RC, SF, WS	2, 3, 14, 26, 27, 37, 40, 48, 75, 76	12.50
Onopordum alexandrinum	CD, RC, SD, SF, RS, WS	22, 22´, 28, 42, 43, 49, 50, 67, 77, 78, 81	13.75

Annex 2. Cont.

Species	Habitat	Stands of occurrence	P (%)
Osteospermum vaillantii	RS	24	1.25
Otanthus maritimus	WS	3	1.25
Pancratium maritimum	CD, RC, SF	1, 2, 14, 27, 34, 37, 40, 75, 76	11.25
Pancratium sickenbergeri	ND, IR	47, 52	2.50
Papaver rhoeas	WS	54, 61, 62, 64	5.00
Paronychia argentea	CD	27	1.25
Peganum harmala	IP, SF, WS	15, 61, 64, 65, 67, 78, 79, 81, 82	11.25
Periploca angustifolia	SF, RS	11	1.25
Phagalon rupestre	RC, IR, WS	32, 34, 52, 53, 57, 59, 63, 64, 80	11.25
Phlomis floccosa	IR, WS	28, 53, 54, 57, 58, 60, 63, 80	10.00
Phoenix dactylifera	CD	49	1.25
Phragmites australis	WS	82	1.25
Plantago albicans	CD, RC, SD, ND, IR, SF, RS, WS, CL	23, 27, 36, 37, 38, 39, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52, 53, 57, 69, 75, 76, 78	27.50
Plantago crypsoides	CD, RC, SD, ND, WS, CL	28, 32, 34, 35, 36, 37, 38, 39, 42, 50, 51, 78	15.00
Plantago ovata	RC, IR, IP, WS	18, 19, 28, 34, 42, 52	7.50
Polygonum equisetiforme	CD, IP, SF, RS, WS, CL	18, 22, 22´, 31, 35, 39, 48, 49, 54, 59, 60, 61, 62, 67, 81	18.75
Prasium majus	IR, WS	53, 60	2.50
Reaumuria hirtella	CD, RC, SD, IR, IP	19, 34, 37, 50, 52, 53, 76	8.75
Reichardia tingitana	CD, RC, ND	42, 45, 48, 49	5.00
Retama raetam	CD, RC, SF	1, 2, 12, 14, 27, 37, 40, 48	10.00
Rumex pictus	IP, WS	15, 54, 61	3.75
Rumex vesicarius	ND	51	1.25
Saccharum spontaneum	CD	37, 75	2.50
Salsola kali	CD, IR	45, 47, 49	3.75
Salsola longifolia	CD, WS	48, 78	2.50

Annex 2. Cont.

Species	Habitat	Stands of occurrence	P (%)
Salsola tetragona	CD, RC, SP, IR, IP	10, 10´, 16, 17, 34, 40, 52	8.75
Salsola tetrandra	CD, RC, SP, SD, IP, RS, WS	10, 10´, 11, 13, 15, 16, 17, 31, 41, 42, 43, 49, 50, 78	17.50
Salvia aegyptiaca	CD, RC, WS	29, 30, 48, 49, 76	6.25
Salvia lanigera	CD, RC, ND, IR, IP, SF, RS, WS, CL	6, 7, 16, 18, 19, 22, 22´, 31, 36, 37, 38, 39, 42, 43, 45, 46, 47, 48, 49, 51, 52, 53, 57, 59, 61, 62, 75, 76	35.00
Schismus barbatus	RC, SD, ND, IR, IP, SF, WS, CL	18, 36, 38, 39, 43, 45, 47, 50, 51, 52, 56, 59, 60, 61, 67, 81	20.00
Scorzonera undulata	All habitats except CD	5, 6, 10, 10´, 11, 13, 15, 16, 17, 23´, 29, 31, 32, 34, 39, 42, 45, 46, 47, 50, 51, 52 , 53, 59, 61	31.25
Silene villosa	CD, ND	37, 47, 49	3.75
Silybum marianum	SF, WS	8, 33, 54, 60, 64, 65, 80	8.75
Solanum nigrum	WS	60	1.25
Sonchus oleraceus	SD, ND, WS	46, 50, 60, 61	5.00
Suaeda pruinosa	SP, SD, IP, SF, RS, WS	4, 5, 10, 13, 18, 31, 50, 81, 82	11.25
Suaeda vera	WS	75	1.25
Tamarix aphylla	CD, RC, SD, SF, RS, WS	2, 12, 13, 35, 37, 40, 42, 43, 44	11.25
Teucrium polium	CD, RC, SP, IR, WS	10, 10´, 32, 48, 52, 53, 57, 63, 76	11.25
Thymelaea hirsuta	CD, RC, ND, IR, IP, SF, RS, WS, CL	1, 2, 4, 6, 7, 11, 16, 17, 19, 20, 23´, 23, 23´, 30, 32, 33, 34, 35, 37, 38, 39, 40, 42, 44, 45, 46, 48, 49, 51, 52, 53, 57, 58, 60, 61, 62, 63, 64, 65, 69, 76, 77, 78, 79, 80, 81, 82	58.75
Thymus capitatus	RC, IR, RS, WS	12, 26, 31, 32, 33, 53, 57, 58, 60, 63	12.50
Trigonella stellata	RC, SD, ND, WS, CL	33, 35, 36, 38, 42, 43, 46, 50	10.00
Urginea maritima (red)	IP, SF	19, 21, 23, 23´, 23´´, 69	7.50
Urginea maritima (white)	SF	69	1.25
Urginea undulata	ND, SF	5, 38	2.50

Annex 2. Cont.

Species	Habitat	Stands of occurrence	P (%)
Varthemia candicans	SP, RS, WS	10, 10´, 28, 31, 33, 59, 60, 61, 63, 64, 65	13.75
Verbascum letourneuxii	WS	78	1.25
Vicia sativa	RC, WS, CL	32, 34, 36, 54, 59, 61, 62	8.75
Zilla spinosa	ND, WS	35, 38	2.50
Zygophyllum album	CD, RC, SD, ND, IP, SF, RS	1, 4, 12, 14, 18, 25, 37, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 75	23.75

Annex 3 Global and national geographical distribution of the medicinal plants recorded during the present study. Nd: Nile Delta, Nv: Nile Valley, Nf: Nile Faiyum, O: Oases of the Libyan desert, Mma: western Mediterranean coastal region, Mp: eastern Mediterranean coastal region, Da: Arabian desert, Di: Isthmic desert, D1: Libyan desert, R: Red sea coastal region, GE: Gebel Elba and surrounding mountains, and S: Sinai proper. T: total regions (out of 12). The abundance categories are: cc: very common, c: common, r: rare, rr: very rare, and +: present Reserve (after Täckholm 1974).. The abbreviations of the global distribution (i.e. floristic categories) are: ME: Mediterranian, COSM: Cosmopolitan, SA: Saharo-Arabian, TR: Tropical, SU: Sudanian, MA: Malysian, ES: Euro-Sibarian, IT: Irano-Turanian, GC: Guineo-Congolese and IN: Indian.

Species	Global distribution	National distribution												T
		Nd	Nv	Nf	O	Mma	Mp	Da	Di	D1	R	GE	S	
Achillea santolina	IT				c	c	c		c	c			c	**6**
Adonis dentata	ME+SA+IT					cc	cc		cc					**3**
Aeluropus lagopoides	ME+SA+IT	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc		cc	**11**
Alhagi graecorum	ME+SA+IT+SU	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc		cc	**11**
Anagallis arvensis	ME+ES+IT	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc		**11**
Anagallis arvensis		cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc		**11**
Arisarum vulgare	ME					c	c							**2**
Artemisia herba-alba	IT					c			c	c	c		c	**5**
Artemisia monosperma	ME+SA					cc	cc		cc	cc			cc	**5**
Asparagus stipularis	ME+SA				cc	cc	cc		cc				cc	**5**
Asphodelus ramosus	ME					c	c		c				c	**4**
Astragalus spinosus	SA+IT					cc			cc	cc			cc	**4**
Beta vulgaris		cc	cc	cc	cc	cc			cc				cc	**7**
Calendula arvensis	ME+SA+IT+ES	+	+	+	+	+	+	+	+	+	+		+	**11**
Carrichtera annua	SA	c				c	c	c	c	c			c	**7**
Carthamus lanatus	ME	r		r		r								**3**
Centaurea pumilio	ME					c								**1**
Chenopodium murale	COSM	cc	cc	cc	cc	cc	cc	cc	cc	cc		cc	cc	**11**
Chrysanthemum coronarium	ME	r	r			cc	cc							**4**
Cistanche tubulosa	ME+SA		r			r	r		r			r	r	**6**
Citrullus colocynthis	SA	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	**12**

Annex 3. Cont.

Species	Global distribution	National distribution												T
		Nd	Nv	Nf	O	Mma	Mp	Da	Di	D1	R	GE	S	
Colchicum ritchii	SA					r	r		r	r			r	**5**
Convolvulus lanatus	SA					cc	cc	cc	cc	cc			cc	**6**
Cyperus rotundus	ME+IT+TR	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	**12**
Echium angustifolium subsp. sericeum	ME					c	c		c	c			c	**5**
Euphorbia paralias	ME+ES					c	c							**2**
Fagonia arabica					cc		cc	cc		cc				**4**
Globularia arabica	ME+SA					c			r				r	**3**
Gynandriris sisyrinchium	ME+IT	c	c	c		c	c		c	c			c	**8**
Halocnemum strobilaceum	ME+SA+IT	c				c	c		c		c		c	**6**
Hyocyamus muticus	SA	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	**12**
Ifloga spicata	ME+IT					+	+	+	+	+	+	+	+	**8**
Kichxia aegyptiaca	ME+SA+IT+SU					cc		cc	cc	cc	cc		cc	**6**
Launaea nudicaulis	SA+IT+SU	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	**12**
Lotus polyphyllos	ME					c								**1**
Lycium europaeum	ME	c				c	c	c	c	c				**6**
Lygeum spartum	SA					c	r							**2**
Malva parviflora	ME+IT	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc		cc	**11**
Melilotus indicus		cc	cc	cc	cc	cc	cc	cc	cc	cc			cc	**10**
Ononis vaginalis	SA+IT					c	c							**2**
Otanthus maritimus	ME					r	r							**2**
Pancratium maritimum	ME					c	c							**2**
Papaver rhoeas	ME	cc				cc	cc		cc	cc				**5**
Peganum harmala	ME+IT+ES					c	c	c	c				c	**5**
Phlomis floccosa	ME				r	r								**2**
Plantago albicans	ME+SA					c	c		c					**3**
Plantago ovata	SA+IT					cc	cc	cc	cc	cc			cc	**7**
Polygonum equisetiforme	ME+IT	cc	cc	cc	cc	cc	cc		cc					**7**
Prasium majus	ME					rr								**1**

Annex 3. Cont.

Species	Global distribution	National distribution												T
		Nd	Nv	Nf	O	Mma	Mp	Da	Di	D1	R	GE	S	
Reaumuria hirtella	SA+IT					cc			cc	cc			cc	**4**
Retama raetum	ME+SA+IT					cc	cc		cc	cc			cc	**5**
Rumex vesicarius	ME+SA+SU					cc		cc			cc	cc	cc	**5**
Salvia aegyptiaca	SA+SU					cc	cc	cc	cc		cc	cc	cc	**7**
Salvia lanigra	ME+SA					c	c		c	c			c	**5**
Scorzonera undulata	SA					cc		r		r				**3**
Senecio vulgaris		cc	cc		cc	cc			cc					**5**
Silybum marianum		cc	cc	cc	cc	cc			cc					**6**
Sonchus oleraceus	COSM	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc		cc	**11**
Tamarix aphylla		cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	cc	**12**
Teucrium polium	ME+IT					c				c	c		c	**4**
Thymelaea hirsuta	ME+SA				cc	cc	cc			cc				**4**
Thymus capitatus	ME					c								**1**
Urtica urens		cc	cc	cc	cc	cc	cc	cc	cc					

10. RESEARCH TEAM

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11. COORDINATE AGENCIES

Governmental Sector

- Mubarak City for Scientific Research & Technology Applications. Ministry of Scientific Research
- Faculty of Science, Alexandria University.
- Faculty of Science, Tanta University
- Egyptian Environmental Affairs Agency (EEAA) represented by Omayed Biosphere Reserve (OBR).
- National Center of Social and Criminal Research, Ministry of Higher Education.

Private Sector

- PHARCO Pharmaceuticals.