



Düzce University Journal of Science & Technology

Review Paper

Endemic and Ornamental Wild Plants in Göreme National Park

Merve ÖRNEK^{a,*}, Selçuk ÖZMEN^b, Mecit VURAL^c

^a Ekoloji ve Çevre Anabilim Dalı, Fen Bilimleri Enstitüsü, Ankara Üniversitesi, Ankara, TÜRKİYE

^b Biyosistem Mühendisliği, Ziraat ve Doğa Bilimleri Fakültesi, Düzce Üniversitesi TÜRKİYE

^c Biyoloji Bölümü, Fen Fakültesi, Gazi Üniversitesi, Ankara, TÜRKİYE

* Sorumlu yazarın e-posta adresi: merveornek@hotmail.com

ABSTRACT

Göreme National Park is located on about 12 km north of Nevşehir province, in Central Anatolia. The national park has 675 taxa at specific and infraspecific levels. A total number of 80 taxa (11.8 %) are endemic to Turkey. The plants in the park have showy flowers with various colors. Also, fruit and leaf shapes can be used effectively in landscape areas for a various designs purposes. In this paper, selected plants recommended for landscaping are given with their pictures, general information and aesthetic uses.

Keywords: Endemic, Göreme National Park, Ornamental plants

Göreme Milli Parkı'ndaki Endemik ve Yabani Süs Bitkileri

ÖZET

Göreme Milli Parkı İç Anadolu Bölgesi'nde Nevşehir'in yaklaşık 12 km kuzeyinde bulunmaktadır. Milli park tür ve tür altı seviyelerinde bulunan toplam 675 taksonu barındırmaktadır. Toplam 80 takson (%11.8) Türkiye için endemiktir. Parktaki bitkiler farklı renklerde gösterişli yapraklara sahiptir. Ayrıca, meyve ve yaprak şekilleri peysaj alanlarında farklı tasarım amaçları için etkili olarak kullanılabilir. Bu çalışmada milli parkta bulunan endemik bitkiler, peysaj düzeni için önerilen bitkiler resimleri, genel bilgi ve estetik kullanımları ile birlikte verilmiştir.

Anahtar Kelimeler: Endemik, Göreme Milli Parkı, Süs bitkileri

I. INTRODUCTION

GÖREME National Park is situated in Nevşehir province. In 1985, it was included by UNESCO on the World Heritage List as “Göreme National Park and the Rock Sites of Cappadocia”.

The National Park is also situated in volcanic regions of mount Hasan and mount Erciyes, near Kayseri. The violent eruptions of these volcanoes mounts were covered the area. The soft volcanic rocks has been eroded by wind and weather. As a result, the extremely dissected amazing landscape is created in this region. The area shows extremely steep geomorphological structure. This extraordinary shapes of rocks are called as “fairy chimney”. The area have been shown cave churches, monasteries, wall pictures and chapels. The course of history men were used underground cities in this region. The fields of Göreme, Zelve, Ortahisar, Çavuşini, Avanos and Ürgüp can be seen by the visitors in National Park. Ihlara valley has a deep narrow canyon c. 15 km long [1]

The flora of Göreme National Park is studied in 1989-1990 by the first author and the second author is jointed some fieldworks, identification and did the vegetation studied. National park has 675 taxa at specific and infraspecific level. A total of 80 taxa (11.8 %) are endemic to Turkey. Göreme National Park areas are dominated by the steppe plants. In the valleys, some small trees and shrubs grow such as *Colutea cilicica*, *Rubus sanctus*, *Populus tremula* [2-3]

II. RESULTS & DISCUSSION

Göreme National Park is situated on 12 km north of Nevşehir province. It covers about 9600 ha. Main plant collections of Göreme National Park consist of 1151 specimens. 675 taxa at the rank of species or below were determined. 80 of which are endemic to Turkey and given in Table 1. Also, these taxa were given in a pie chart in Figure 1 to see which taxon is encountered more often compared with others. Selected and recommended for landscaping plant lists and pictures of some of these plants are given in Table 2 and Appendix section, respectively.

A. PLANTS for LANDSCAPING

There are a number of reasons for choosing attractive plants of National Park for landscape. The plants are used in landscape designs for various aims. Such as ornamental and aesthetics appeal, providing screen. The combination of plants habits, leaves, flowers and fruits can give as an aesthetic appearance. One of the landscape design is color, form, texture, line and scale. For example: using color schemes. Yellow flowered *Alyssum* species give a beautiful color for rock gardens in spring. Flowers of many aromatic plants give therapeutic scent and can use as a nice border [4].

Some trees and shrubs can use as living ornaments. Such as *Clematis*, climbing rose provide for a screen. Ornamental grasses and perennials offer seasonal changes in color and texture as well as in size. “Ground cover” implies a carpet-like growth habit. For example, like *Alopecurus arundinaceus*, *Festuca callieri*, *F. valesiaca*, *Koeleria cristata*, *Melica ciliata*, *Stipa pulcherrima* species can use as ornamental grasses. They look good all year long and can be mixed with shrubs or trees [5].

The abbreviations which will be used throughout the study are as following;

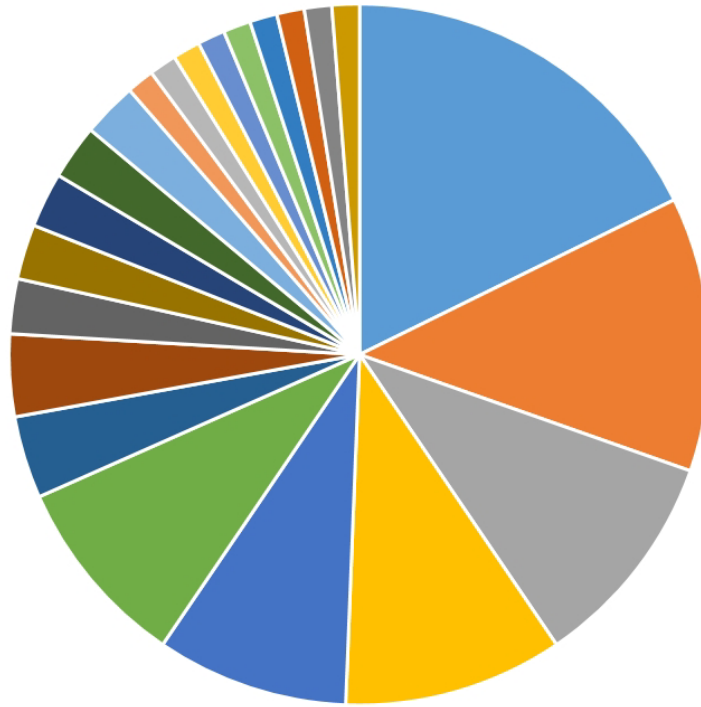
subsp. subspecies

var. variety

Table 1. Endemic plants in Göreme National Park

Endemic Plants of LC Category	Family
<i>Alkanna cappadocica</i> Boiss. & Balansa	Boraginaceae
<i>Alkanna orientalis</i> (L.) Boiss. var. <i>leucantha</i> (Bornm.) Hub. –Mob.	Boraginaceae
<i>Alkanna pseudotinctoria</i> Hub.-Mor	Boraginaceae
<i>Alkanna leptophylla</i> Roemer & Schult. subsp. <i>incana</i> (Ledeb.) D.F. Chamb.	Boraginaceae
<i>Cynoglottis chetikiana</i> Vural & Kit Tan. subsp. <i>paphlagonica</i> (Bornm.) Vural& Kit Tan	Boraginaceae
<i>Nonea stenosolen</i> Boiss. & Balansa	Boraginaceae
<i>Onosma ambigens</i> Lacaita	Boraginaceae
<i>Onosma isaurica</i> Boiss. & Heldr.	Boraginaceae
<i>Paracaryum ancyritanum</i> Boiss.	Boraginaceae
<i>Paracaryum calycinum</i> Boiss. & Balansa	Boraginaceae
<i>Asyneuma limonifolium</i> (L.) Janchen subsp. <i>pestalozzae</i>	Campanulaceae
<i>Eremogone ledebouriana</i> (Fenzl) Ikonn.	Caryophyllaceae
<i>Gypsophila laricina</i> Schreb	Caryophyllaceae
<i>Saponaria prostrata</i> Willd. subsp. <i>prostrata</i>	Caryophallaceae
<i>Silene muradica</i> Schilschk	Caryophallaceae
<i>Hypericum aviculariifolium</i> Jaub. & Spach	Guttiferae
<i>Achillea aleppica</i> DC. subsp. <i>zederbaueri</i> (Hayek) Hub. –Mor	Compositae
<i>Anthemis acipyhlla</i> Boiss. var. <i>acipyhlla</i>	Compositae
<i>Anthemis fumariifolia</i> Boiss	Compositae
<i>Cousina birandiana</i> Hub.-Mor.	Compositae
<i>Cousinia caesarae</i> Boiss. & Balansa	Compositae
<i>Onopordum anatolicum</i> Boiss. & Heldr	Compositae
<i>Scorzonera eriophora</i> DC.	Compositae
<i>Convolvulus assyricus</i> Griseb.	Convolvulaceae
<i>Allysum lepidoto-stellatum</i> (Hausskn. & Bornm.) Dudley	Cruciferae
<i>Isatis floribunda</i> Boiss. ex Bornm.	Cruciferae
<i>Euphorbia anacampseros</i> Boiss. var. <i>anacampseros</i>	Euphorbiaceae
<i>Astragalus condensatus</i> Ledeb.	Leguminosae
<i>Astragalus kirshehiricus</i> D. F. Chamb.	Leguminosae
<i>Astragalus tmoleus</i> Boiss. var. <i>bounacanthus</i> D.F. Chamb	Leguminosae
<i>Astragalus hirsutus</i> Vahl	Leguminosae
<i>Astragalus karamasicus</i> Boiss. & Balansa	Leguminosae
<i>Astragalus pelliger</i> Fenzl	Leguminosae
<i>Astragalus stenosemius</i> Boiss. & Noe	Leguminosae
<i>Hedysarum cappadocicum</i> Boiss.	Leguminosae
<i>Hedysarum pastalozzae</i> Boiss.	Leguminosae
<i>Lathyrus brachypterus</i> Čelak.	Leguminosae
<i>Onobrychis argyrea</i> Boiss. subsp. <i>argyrea</i>	Leguminosae
<i>Vicia caesarea</i> Boiss. & Balansa	Leguminosae
<i>Crocus ancyrensis</i> (Herb.) Maw.	Iridaceae
<i>Crocus danfordiae</i> Maw.	Iridaceae
<i>Iris galatica</i> Siehe	Iridaceae
<i>Marrubium globosum</i> Monbret & Aucher subsp. <i>globosum</i>	Labiatae
<i>Salvia cryptantha</i> Monbret & Aucher ex Bentham	Labiatae
<i>Salvia cyanescens</i> Boiss. & Balansa	Labiatae
<i>Salvia hypargeia</i> Fisch. & Mey.	Labiatae

<i>Salvia recognita</i> Fisch. & Mey.	Labiatae
<i>Scutellaria orientalis</i> L. subsp. <i>santolinoides</i> (Hauskn. ex Bornm.) J. R. Edm.	Labiatae
<i>Stachys cretica</i> L. subsp. <i>anatolica</i> Rech. fil.	Labiatae
<i>Stachys cretica</i> L. subsp. <i>mersinaea</i> (Boiss.) Rech. fil.	Labiatae
<i>Allium cappadocicum</i> Boiss.	Amaryllidaceae
<i>Allium nevsehirensense</i> Koyuncu & Kollmann	Amaryllidaceae
<i>Delphinium venulosum</i> Boiss.	Ranunculaceae
<i>Reseda armena</i> Boiss.	Resedaceae
<i>Rhamnus hirtellus</i> Boiss.	Rhamnaceae
<i>Asperula stricta</i> Boiss. subsp. <i>latibracteata</i> (Boiss) Ehrend	Rubiaceae
<i>Galium margaceum</i> Ehrend. & Schönb.-Tem.	Rubiaceae
<i>Haplophyllum myrtifolium</i> Boiss.	Rutaceae
<i>Linaria corifolia</i> Desf.	Plantaginaceae
<i>Lycium anatolicum</i> A. Baytop & R. Mill	Solanaceae
<i>Bupleurum heldreichii</i> Boiss. & Balansa	Umbelliferae
<i>Ferulago pauciradiata</i> Boiss. & Heldr.	Umbelliferae
<i>Ferulago platycarpa</i> Boiss. & Balansa	Umbelliferae
<i>Malabaila pastinacifolia</i> Boiss. & Balansa	Umbelliferae
<i>Peucedanum palimbioides</i> Boiss.	Umbelliferae
<i>Prangos melicarpoides</i> Boiss. var. <i>melicarpoides</i>	Umbelliferae
Endemics Plants of NT Category	Family
<i>Phryna ortegioides</i> (Fish.& C. M. Mey.) Pax. & K.Hoffm	Caryophyllaceae
<i>Silene splendens</i> Boiss.	Caryophyllaceae
<i>Paronychia condensata</i> Chaudhri	Caryophyllaceae
<i>Paronychia dudleyi</i> Chaudhri	Caryophyllaceae
<i>Matthiola anchoniifolia</i> Hub.-Mor.	Cruciferae
<i>Salvia blepharochlaena</i> Hedge & Hub.- Mor	Labiatae
<i>Astragalus elatus</i> Boiss.& Balansa	Leguminosae
<i>Haplophyllum telephioides</i> Boiss	Rutaceae
<i>Linaria genistifolia</i> (L.) Mill.	Plantaginaceae
Endemics Plants of VU Category	Family
<i>Astragalus talasseus</i> Boiss.& Balansa	Leguminosae
<i>Acantholimon kotschyi</i> (Jaub.& Spach) Boiss.	Plumbaginaceae
<i>Thesium scabrifolium</i> P.H. Davis	Santalaceae
<i>Ferula halophila</i> Peşmen	Umbelliferae
Endemics Plants of EN Category	Family
<i>Reseda tomentosa</i> Boiss. var. <i>tomentosa</i>	Resedaceae
Endemics Plants of CR Category	Family
<i>Acantholimon avanosicum</i> Doğan & Akayaydın	Plumbaginaceae



- | | | | | |
|-----------------|----------------|-------------------|------------------|------------------|
| ■ Leguminosae | ■ Boraginaceae | ■ Caryophallaceae | ■ Labiatae | ■ Compositae |
| ■ Umbelliferae | ■ Cruciferae | ■ Iridaceae | ■ Amaryllidaceae | ■ Plantaginaceae |
| ■ Resedaceae | ■ Rubiaceae | ■ Rutaceae | ■ Campanulaceae | ■ Convolvulaceae |
| ■ Euphorbiaceae | ■ Guttiferae | ■ Plumbaginaceae | ■ Ranunculaceae | ■ Rhamnaceae |
| ■ Santalaceae | ■ Solanaceae | | | |

Figure 1. Pie chart of endemic plants in Göreme National Park (Leguminosae is shown with light blue color having the biggest portion in the pie chart, then follows Boraginaceae with orange color, and the other follows the same pattern with clockwise direction towards Solanaceae having the smallest portion with light orange color right next to Leguminosae in the figure).

Table 2. Selected plants from Göreme National Park for landscape use

Plants	Turkish Name
Trees and shrubs	
<i>Clematis orientalis</i> L.	Köpektutağı
<i>Colutea cilicica</i> Boiss.& Balansa	Patlangaç
<i>Crataegus monogyna</i> Jacq.	Yemişen
<i>Elaeagnus angustifolia</i> L.	İğde
<i>Elaeagnus rhamnoides</i> (L.) A. Nelson	Çıçırğan
<i>Lonicera etrusca</i> Santi var. <i>etrusca</i>	Dokuzdon
<i>Pyrus elaeagnifolia</i> Pall.	Ahlat
<i>Rhus coriaria</i> L.	Sumak
<i>Rosa hemisphaerica</i> J. Herrm.	Kadıngöbeği
<i>Sorbus umbellata</i> Fritsch	Geyikelması
<i>Tamarix parviflora</i> DC.	Delilgın
<i>Viburnum opulus</i> L.	Gilaburu

Annual flowers	
<i>Consolida hellespontica</i> (Boiss.) Chater	Süvari mahmuzu
<i>Consolida raveyi</i> (Boiss.) Schrödinger	Topal mahmuz
<i>Centaurea depressa</i> (M. Bieb.) Sojak	Gökbaş
<i>Silene subconica</i> Friv.	Mahrutinakıl
Perennial flowers	
<i>Acantholimon kotschyi</i> (Jaub.& Spach) Boiss	Tesbihkaradikeni
<i>Acantholimon acerosum</i> (Willd.) Boiss.	Pişikkeveni
<i>Cota tinctoria</i> (L.) J.Gay ex Guss.	Boyacı papatyası
<i>Macrotomia densiflora</i> (Ledeb.) Mcbride	Kocağnik
<i>Asparagus officinalis</i> L.	Kuşkonmaz
<i>Astragalus hirsutus</i> Vahl	Tüylügeven
<i>Astragalus ponticus</i> Pall.	Zümrangeveni
<i>Astragalus xylobasis</i> Freyn & Bornm	Kemaliyegeveni
<i>Centaurea depressa</i> (M.Bieb.) Sojak	Gökbaş
<i>Crambe orientalis</i> L.	Akyumak
<i>Linum mucronatum</i> Bertol.	Sarıketen
<i>Matthiola anchoniifolia</i> Hub.-Mor.	Süsün şebboyu
<i>Alkanna orientalis</i> (L.) Boiss.	Sarısormuk
<i>Salvia absconditiflora</i> Greuter & Burdet	Karışalba
Ornamental grasses	
<i>Alopecurus arundinaceus</i> Poir.	Kamış tilkikuyruğu
<i>Festuca callieri</i> (Hack.) Markgr.	Çarşakyumağı
<i>Hedysarum cappadocicum</i> Boiss.	Tatlıtırfl
<i>Arnebia densiflora</i> (Nordm.) Ledeb	Eğnik
<i>Melica ciliata</i> L.	Kirpikliinci
<i>Onobrychis argyrea</i> Boiss.	Gümüşkorunga
<i>Onosma taurica</i> Willd	Emzikotu
Plants for rock-garden	
<i>Dianthus crinitus</i> Sm.	Uzunçanak
<i>Globularia trichosantha</i> Fisch. & C.A.Mey.	Köseyalımı
<i>Helichyrisum arenarium</i> (L.) Moench <i>subsp. aucheri</i> (Boiss.) P.H.Davis & Kupicha	Ölmez çiçek
<i>Saponaria prostrata</i> Willd.	Ebenterliği
<i>Scutellaria orientalis</i> L.	Sarıkaside
<i>Sedum subulatum</i> (C.A. Mey.) Boiss.	Kediturnağı
<i>Silene compacta</i> Fisch. ex Hornem	Kanlıbasıraotu
Flowering bulbs	
<i>Allium cappadocicum</i> Boiss.	Perikörmeni
<i>Allium nevsehirense</i> Koyuncu & Kollmann	Nevşehir soğanı
<i>Colchicum triphyllum</i> Kunze	Öküzali
<i>Crocus ancyrensis</i> (Herb.) Maw	Ankara çiğdemi
<i>Crocus danfordiae</i> Maw	İnce çiğdem
<i>Muscari caucasicum</i> (Griseb.) Baker	Arapşümbülü
<i>Muscari comosum</i> (L.) Mill.	Morbaş
<i>Muscari neglectum</i> Guss. ex Ten.	Arapüzümü
<i>Iris caucasica</i> Hoffm.	Kaf navruzu
<i>Iris galatica</i> Siehe	Kabaavruz

Plants for shaded areas

<i>Lonicera etrusca</i> Santi	Dokuzdan
<i>Lotus aegaeus</i> (Griseb.) Boiss.	Nohudak
<i>Scorzonera eriophora</i> DC.	Köksakızı
<i>Cynoglottis chetikiana</i> Vural & Kit Tan	Dağarısı
<i>Trifolium pratense</i> L.	Çayır üçgülü
<i>Viburnum opulus</i> L.	Gilaburu

III. CONCLUSION

675 taxa at specific and infraspecific levels were detected in the park. Among them, 80 taxa are endemic to Turkey. Top 5 family in terms of number of taxa are *Compositae*, *Leguminosae*, *Cruciferae*, *Gramineae* and *Boraginaceae*. Most of the woody species in culture form belong to Rosaceae family and they are garden plants whose fruits are utilized. Due to the abundance of residential areas, intense agricultural and touristic activities in Göreme National Park which is under the effect of severe erosion, flora and vegetation in the park is restrained. The population of lumpy and beautiful geophytes that indicates incoming spring, such as *Crocus ancyrensis*, *Crocus danfordiae* and *Iris galatica*, is weakened. Taking these plants to culture as ornamentals, as well as planting and reproducing them in gardens, are important to sustain their life and to have a more beautiful landscape in the region [6].

IV. REFERENCES

- [1] Anonim, *Göreme Tarihi Milli Parkı Uzun Devreli Gelişme Planı*, Printed in CM-USAID/T-June-1972-0275-300 (1972).
- [2] M. Vural, Ü. Kol, S. Çopuroğlu, B. Umut, *Göreme Milli Parkındaki Bitkilerin Tesbiti ve Bunların Peyzaj Mimarisi Yönünden Değerlendirilmesi*, Ormancılık Araştırma Enstitüsü Yayınları, No: 263 (1996).
- [3] T. Ekim, M. Koyuncu, M. Vural, H. Duman, Z. Aytaç, N. Adıgüzel, *Türkiye Bitkileri Kırmızı Kitabı*, Türkiye Tabiatını Koruma Derneği, Ankara (2000).
- [4] N. Tanker, M. Koyuncu, S. Kurucu, *Cappadocia-Ürgüp, Göreme and Ihlara Plants and Landscape*, Ankara (1989).
- [5] M. Vural, H. Duman, N. Adıgüzel, Ü. Kol, *Göreme Milli Parkı (Nevşehir)Vejetasyonu*, Turkish Journal of Botany, 19(3): 389-400 (1995).
- [6] T. Ekim, M. Koyuncu, S. Erik, R. İlarıslan, *Türkiye'nin Tehlike Altındaki Nadir ve Endemik Bitkileri*, Türkiye Tabiatını Koruma Derneği, Yayın No. 18, Ankara (1989).

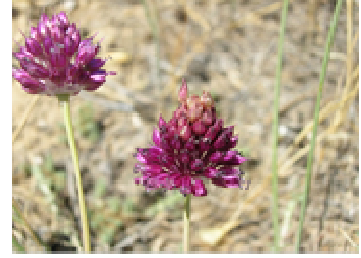
V. APPENDIX



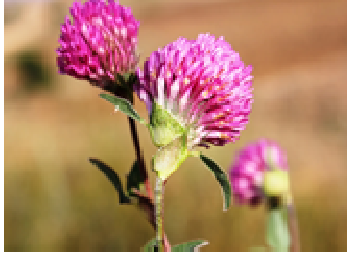
Helichrysum arenarium



Acantholimon kotschy



Allium cappadocicum



Trifolium pratense



Salvia absconditiflora



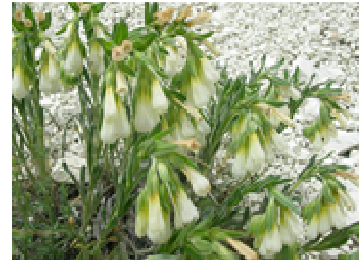
Astragalus hirsutus



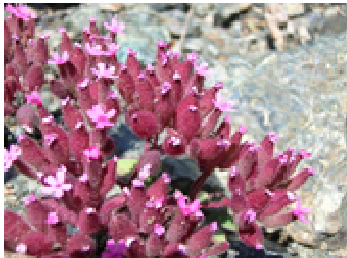
Cynoglossis chetikiana



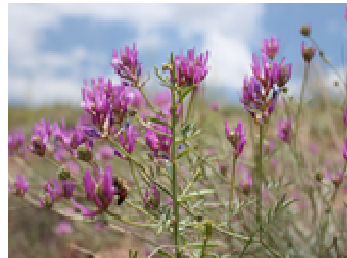
Crocus ancyrensis



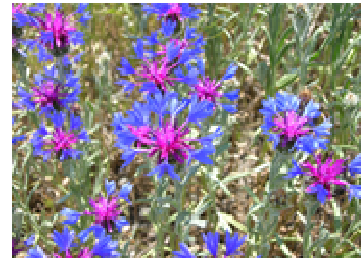
Onosma taurica



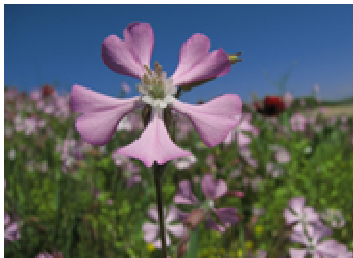
Saponaria prostrata



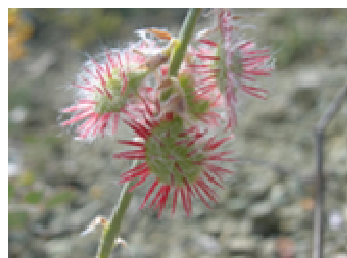
Astragalus xylobasis



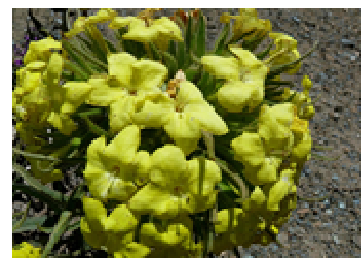
Centaurea depressus



Silene subconica



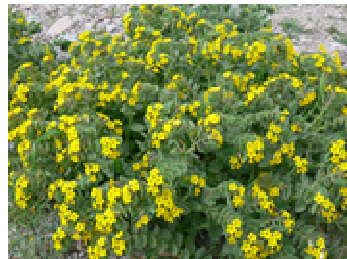
Onobrychis argyrea



Arnebia densiflora



Papaver rhoeas



Alkanna orientalis



Hedysarum cappadocicum