

Hossein Akhani*
Abdol-Basset Ghorbani
Department of Biology, Faculty
of Science, University of Tehran,
P.O. Box 14155–6455,
Tehran, Iran

submitted August 2002

accepted January 2003

Mandragora turcomanica (Solanaceae) in Iran: a new distribution record for an endangered species¹

Abstract *Mandragora turcomanica* Mizg. is reported from gardens of Dahaneh village c. 7 km north of Kalaleh in Golestan Province (NE Iran). The plants were transplanted from wild populations by the local people many years ago, because of their highly aromatic leaves and fruits. Current information suggests the species is extinct or extremely rare in natural habitats in Iran and protection of extant stands in this village is urgently recommended. It is already known to be endangered in Turkmenistan. The detailed morphological characteristics are discussed and compared with the Mediterranean *M. officinarum* L., and photographs of the plant are provided.

Key words Biodiversity, conservation, endangered species, Flora of Iran, Golestan, Irano-Mediterranean link, *Mandragora*, Solanaceae

Introduction

Mandragora L. (mandrake) is an old world genus of Solanaceae with only three species: *M. officinarum* L., a circum-Mediterranean species, *M. turcomanica* Mizg., a (sub) Irano-Turanian species and *M. caulescens* C.B. Clarke, a Sino-Himalayan species (Ungrič *et al.*, 1998). The Mediterranean and Himalayan species of *Mandragora* are well studied and represented by extensive collections in herbaria. However, *M. turcomanica* is already known as an endangered species from a few localities in Turkmenistan (Kurbanov, 1994), and it is almost unknown to western botanists. Ungrič *et al.* (1998), the authors of a recent monograph of the genus, based their data solely on the literature, without citing any herbarium specimens.

In late February 2002, the student of the first author (A.B. Ghorbani) showed me a curious aromatic plant from his village Dahaneh, located about 7 km north of Kalaleh in Golestan Province, NE Iran. We quickly realized that this plant belonged to Solanaceae and because of the stemless habit, it was easily keyed out as *Mandragora turcomanica* using *Flora Iranica* (Schönbeck-Temesy, 1972). The author of the *Flora Iranica* account had not examined any material and her data were obtained from *Flora URSS* (Lincevskij, 1955). The discovery by Mr Ghorbani that this species was growing in gardens, transplanted many years ago from the nearby wild population, motivated me to make an immediate visit to Dahaneh village on 22 March 2002, and study the species *in situ*. It is named by the local people 'Yer Alma' which means 'potato' in Turkmen language, because of the potato-like thick storage

roots. Unfortunately, we were not able to obtain information of previous local uses of this old medicinal and mythically important plant.

Morphological features and taxonomic status

Mandragora turcomanica Mizg. in *Trudy Turkmen. Fil. Akad. Nauk SSSR. Ashkabad* 2: 165 (1942). Type: Turkmenistan, western Kopet Dag, Kara Kala region, southern foot of Mt Syunt, Schevlan valley, on scree slopes, 26 November 1938, O.G. Mizgireva, M. Nastacalicz & G. Nastacalicz s.n. (ASH-holotype, n.v.). (Fig. 1.)

Plants stemless; roots thick, branched. Leaves all arranged in a rosette, 34–66 cm long (including petiole), elliptic-ovate, slightly pubescent, margin crenate-dentate; blade 24–50 × 16–28 cm, 6–7 pairs of pinnate veins; petioles 7–21 cm long. Flowers 7–20 per plant; pedicels 4.5–12.5 cm long. Calyx-lobes with prominent mid-vein and reticulate venation, 1.6–1.8 × 0.5–0.8 cm in flower, 3.5–4 × 1.5 cm in fruit. Corolla 2.3–2.7 cm long, violet, glabrous inside, with spreading hairs outside; lobes 15–21 × 8–10 mm, oblong. Filaments unequal, 9–12 mm long; anthers 3 mm long, with a tuft of spreading, 2–3 mm long hairs at base. Style 18–19 mm; stigma 1–1.2 × 2.5–3 mm. Fruiting pedicels 8.5–14 cm long. Fruits 3.6–4.8 cm in diameter, yellow, strongly aromatic.

Specimens examined

Iran: Golestan (former E. parts of Mazandaran); 7 km N. of Kalaleh, Dahaneh village, 37°26'25''N, 55°29'32''E, 185 m, 22 March 2002, H. Akhani 16128 (full flowering and early

* Corresponding author: Email: akhani@khayam.ut.ac.ir

¹Notes on the flora of Iran, 2: followed from Akhani (2002).

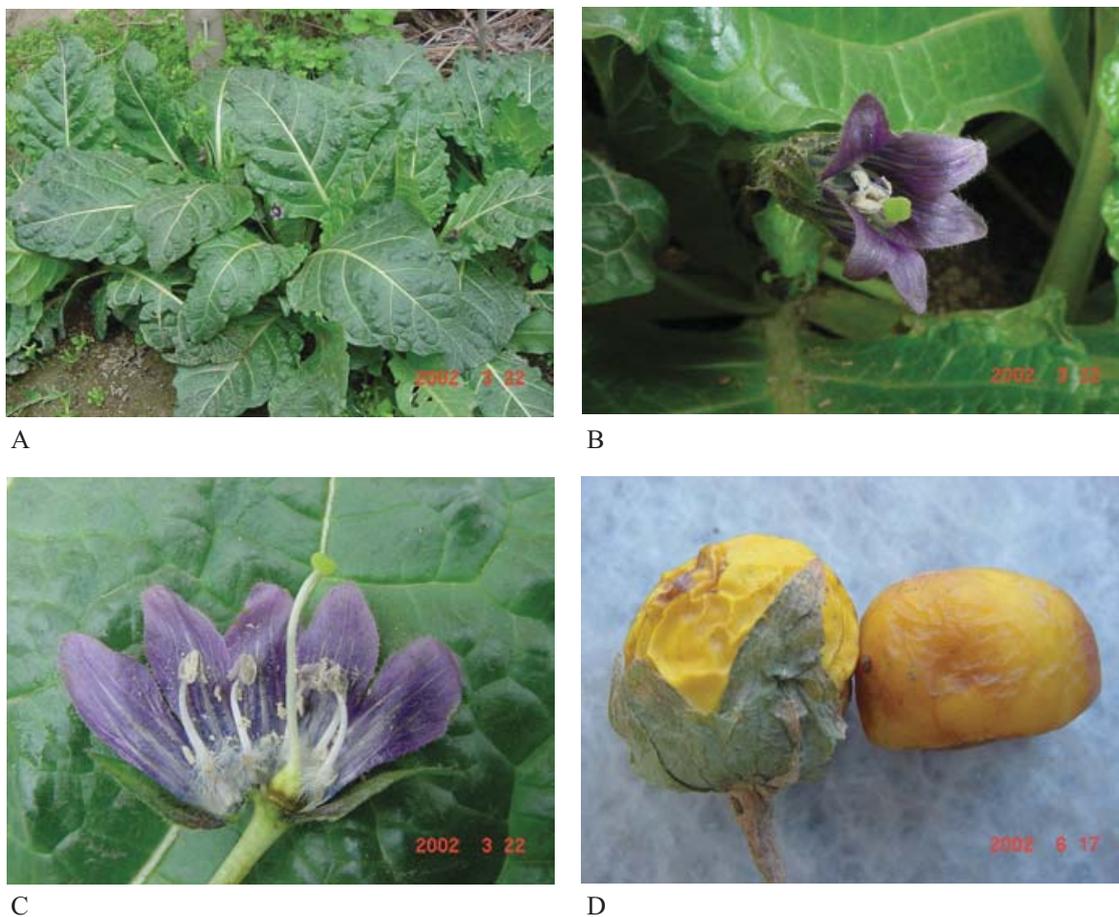


Figure 1 *Mandragora turcomanica* photographed in Dahaneh village: A: Habit, B: Flower; C: Opened flower; D: Ripe fruits.

	<i>M. turcomanica</i>	<i>M. officinarum</i>
Habit	Vigorous plant, with large rosette of mature leaves often more than 100 cm across	Less vigorous plant, with large rosette of mature leaves less than 100 cm across
Leaves	34–66 cm long	Maximum 45 cm long
Flowers	Violet, 2.3–2.7 cm	Greenish white to pale blue and violet, 1.2–6.5 cm
Fruits	3.6–4.8 cm in diam.	0.5–4 cm in diam.
Flowering period	Late winter and early spring only (February to March)	Autumn and spring (September to April)
Distribution	Restricted to Kopet-Dagh mountains in Turkmenistan and Iran	Circum-Mediterranean

Table 1 Comparison of the characters of *Mandragora officinarum* and *M. turcomanica*, based on herbarium specimens and data obtained from Ungricht *et al.* (1998).

fruiting specimen, BM, TUH, Hb. Akhani); *ibid.*, 25 February 2002, A.B. Ghorbani *s.n.* (young flowering plant, TUH).

Because of the rarity of *M. turcomanica*, we avoided collecting many specimens, and therefore the morphological data are based on measurements made in the field. Ungricht *et al.* (1998) separated *M. turcomanica* from *M. officinarum* by the large rosette of mature leaves and larger berries. A comparison of the material collected in Iran with some specimens of the Mediterranean *M. officinarum* in

UB (*Deil 2798* from Morocco, *Deil 5150* from Spain) showed minor differences (Table 1). Most of the studied characters of *M. turcomanica* overlapped with the Mediterranean species. It seems that the most distinctive feature of *M. turcomanica* is its vigorous habit and larger leaves; the largest one we have measured was up to 66 cm long. But it is reported to be more, up to 90 cm in Turkmenistan (Ungricht *et al.*, 1998). We consider that a lower taxonomic status, at the subspecific level, would be more appropriate for this population. However, we avoid making this change until further studies, including

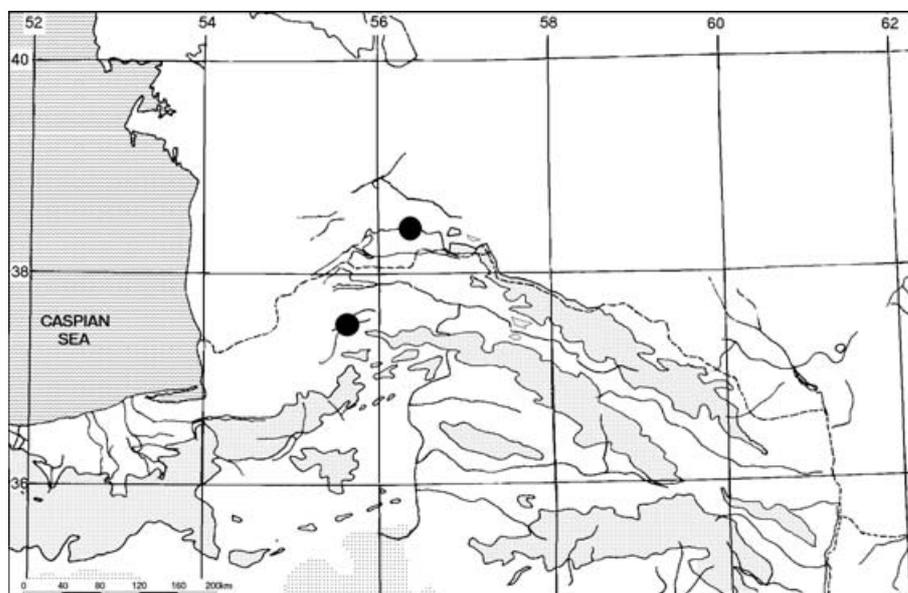


Figure 2 Distribution map of *Mandragora turcomanica* (Turkmenistan record according to Kurbanov, 1994).

an examination of the type specimen, have been carried out.

Several populations of *M. officinarum* in the Mediterranean area produce flowers during autumn. Such populations are considered as the separate species '*M. autumnalis* Bertol.' by several authors (Hawkes, 1972; Feinbrun-Dothan, 1978). But based on the detailed observations by the second author, *M. turcomanica* flowers exclusively during late winter and early spring.

Habitat, distribution and plant geography

According to Kurbanov (1994, and in Atamuradov, 1999), sparse populations of Turkmen mandrake are found at the base of the southern slopes of the Syunt-Khassardagh range in West Kopetdagh, within the Syunt-Khassardagh Reserve. Locations include the valleys of Chokhagach, Shevlan, Altybai, Yekechinar, Syunt, Khozly, Sarymsaki and Dagdanli. These specimens grow among trees and shrubs at 600 m altitude. The new find in Iran is located about 100 km south of the Turkmenistan border (Fig. 2). According to information gleaned from local people, the species was common some 50–60 years ago around the village Dahaneh. During the Second World War, when northern Iran was occupied by Russian troops, many plants from the surrounding hills were collected by the Russian soldiers, according to the local people. The subsequent conversion of areas of natural vegetation to cultivated land has resulted in its disappearance. Evidence based on the remnants of trees and shrubs, the vegetation of the neighbouring area, and available climatic data from Kalaleh station (Fig. 3), indicates that the area must have been covered by a mixture of grasses and shrubs such as *Paliurus spina-christi* Mill., *Acer monspessulanum* subsp. *turcomanicum* (Pojark.) E. Murray, *Crataegus pentagyna* Waldst. & Kit. ex Willd.

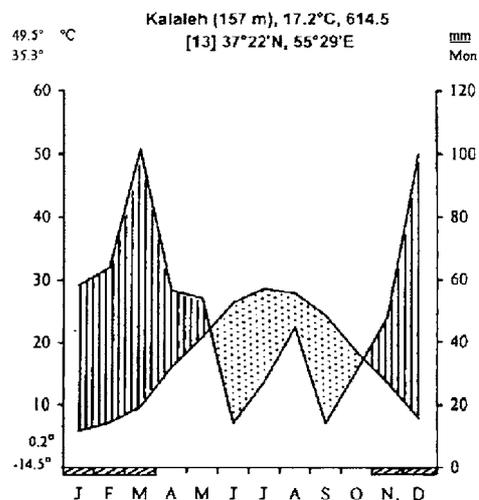


Figure 3 Climatic diagram of Kalaleh, a station close to the habitat of *Mandragora turcomanica* (Akhani, 1998).

subsp. *pentagyna* and *Prunus divaricata* Ledeb. (Akhani, 1998). The very hot summers with high rainfall, together with evidence from the open shrubby vegetation of the eastern parts of the south Caspian forests with similar climatic condition (Akhani & Ziegler, 2002), suggest that there might have been plenty of C₄ grasses in the area.

The area in which *Mandragora turcomanica* was discovered is a transition zone between two phytogeographical provinces: Khorassan-Kopetdagh province of the Irano-Turanian region and Hyrcanian province of Euro-Siberian region. The occurrence of Mediterranean elements in suitable habitats in the easternmost parts of the Caspian forests is already known (Rechinger, 1989; Akhani & Ziegler, 2002). There are several such examples known from Golestan National Park, about 50 km east of Dahaneh village: *Caucalis platycarpus*, *Convolvulus cantabrica*, *Cynoglossum creticum*,

Medicago rigidula, *Asteriscus spinosus*, *Petrorrhagia prolifera*, *Teucrium polium* var. *tonsum*, *Trifolium angustifolium*, *T. scabrum*, *Vicia amphicarpa*, *V. lutea*, *Jasminum fruticans*, *Stipa bromoides*, *Carex hallerana*, *Daucus guttatus*, *Laser trilobum*, *Orlaya daucooides*, *Fumana arabica*, *Ononis pusilla* and *Sternbergia lutea*. *Plantago podlechii*, recently described by the first author from Golestan National Park, is a vicariant taxon of the Mediterranean-Euro-Siberian *P. argentea* Chaix (Akhani, 1999).

Conservation

Several authors have noted that *Mandragora turcomanica* is a very rare species on the verge of extinction (Anonymous, 2001; Kurbanov, 1994). In Turkmenistan there are only 499 specimens in natural habitat (Kurbanov in Atamuradov, 1999). It is included in the *Red Data Book of Turkmenistan*, with the status of category 1 (Atamuradov, 1999). But in spite of Kurbanov's statement that the species is included in the *IUCN Red List of Threatened Plants*, it is apparently overlooked in the most recent edition (Walter & Gillett, 1998). Our present knowledge indicates that the species is almost extinct in its natural habitats in Iran. There are only about 50 plants existing in Dahaneh village. Its successful existence for many years in the grassy gardens indicates that the area belongs to the natural habitat of the species and should be protected. Heavy grazing pressure from many existing herds in and around the village and usual land degradation are large threats to the small remnants of *M. turcomanica* in Iran. The area needs to be legally protected and designation as a National Natural Monument with protection of the small population by establishing a fence, is urgent. However, several other measures need to be considered such as a search for the species in surrounding areas, a population census, restoration of vegetation, transferring the species in surrounding areas, and cultivation in botanical gardens.

Acknowledgement

This paper is part of the results of the research project 'Geobotanical studies in different parts of Iran' supported by the Research Council University of Tehran.

References

- AKHANI, H. 1998. Plant biodiversity of Golestan National Park, Iran. *Stapfia* **53**, 1–411.
- AKHANI, H. 1999. Studies on the flora and vegetation of the Golestan National Park, NE Iran III. Three new species, one new subspecies and fifteen new records for Iran. *Edinburgh Journal of Botany* **56**(1), 1–31.
- AKHANI, H. 2002. Notes on the flora of Iran: 1. *Asparagus* (Asparagaceae) and *Nitraria* (Zygophyllaceae). *Edinburgh Journal of Botany* **59**(2), 295–302.
- AKHANI, H. & ZIEGLER, H. 2002. Photosynthetic pathways and habitats of grasses in Golestan National Park (NE Iran), with an emphasis on the C₄-grass dominated rock communities. *Phytocoenologia* **32**(3), 455–501.
- ANONYMOUS. 2001. *Biodiversity assessment for Turkmenistan*. USAID Central Asian Republics Mission, Almaty, Kazakhstan. Chemonics International Inc., Washington, DC. (<http://www.biofor.com/documents/turkmenistan.pdf>).
- ATAMURADOV, KH. I. 1999. *The Red Data Book of Turkmenistan. 2: Plants*. National Institute of Desert Flora and Fauna, Ashgabat.
- FEINBRUN-DOTHAN, N. 1978. *Mandragora*. In Feinbrun-Dothan, N., *Flora Palaestina* **3**. The Israel Academy of Sciences and Humanities, Jerusalem, p. 167.
- HAWKES, J.G. 1972. *Mandragora*. In Tutin, T.G., Heywood, V.H., Burges, N.A., Moore, D.M., Valentine, D.H., Walters, S.M. & Walters, D.A. (eds), *Flora Europaea* **3**. Cambridge University Press, Cambridge, pp. 199–200.
- KURBANOV, D. 1994. *Flora of Kopetdagh*. In Fet, V. & Atamuradov, K.I. (eds), *Biogeography and Ecology of Turkmenistan*. Kluwer Academic Publishers, Dordrecht, pp. 105–128.
- LINCEVSKIJ, I.A. 1955. *Mandragora*. In Shishkin, K. & Bobrov, E.G. (eds), *Flora URSS* **22**, 75–77.
- RECHINGER, K.H. 1989. Fifty years of botanical research in the Flora Iranica Area (1937–1987). In Tan, K. (ed.), *Plant taxonomy, phytogeography and related subjects*. The Davis & Hedge Festschrift, Edinburgh, pp. 301–349.
- SCHÖNBECK-TEMESY, E. 1972. *Solanaceae*. In Rechinger, K.H. (ed.), *Flora Iranica* **100**. Akademische Druck- u. Verlagsanstalt, Graz.
- UNGRICHT, S., KNAPP, S. & PRESS, J.R. 1998. A revision of the genus *Mandragora* (Solanaceae). *Bulletin of The Natural History Museum, Botany* **28**, 17–40.
- WALTER, K.S. & GILLET, H.J. (eds), 1998. *1997 IUCN Red List of Threatened Plants*. Compiled by the World Conservation Monitoring Centre, IUCN, The World Conservation Union, Gland, Switzerland and Cambridge.