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A new record for Turkey: *Michauxia nuda* A.DC. (Campanulaceae)

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Abstract: *Michauxia nuda* A.DC. (Campanulaceae) is recorded for the first time (C8 Siirt province) from Turkey. The diagnostic characters of *M. nuda* are described and its habitat and conservation status are indicated. Besides, it is illustrated, and a distribution map is presented. Notes on collecting number of type specimen of this species are provided.

Key words: Campanulaceae, *Michauxia*, new record, flora, Turkey

Türkiye için yeni bir kayıt: *Michauxia nuda* A.DC. (Campanulaceae)

Özet: *Michauxia nuda* A.DC. (Campanulaceae) türü Türkiye'den (C8 Siirt) ilk defa kaydedilmiştir. *M. nuda*'nın tanıttıcı özellikleri, yetişme ortamı ve koruma durumu belirtilmektedir. Ayrıca bu türün, fotoğrafları ve yayılış alanını gösteren harita verilmiştir. Türün tip örneğinin numarası ile ilgili notlar verildi.

Anahtar sözcükler: Campanulaceae, *Michauxia*, Türkiye, flora, yeni kayıt

Introduction

The genus *Michauxia* L'Hér. honors André Michaux, and it is represented by 7 species in the world: *M. campanuloides* L'Hér. ex Ait., *M. koeieana* Rech., *M. laevigata* Vent., *M. nuda* DC., *M. stenophylla* Boiss. and Hausskn., *M. tchihatchewii* Fisch. and C.A.Mey., and *M. thyrsoides* Boiss. & Heldr. (Al-Zein & Musselman, 2004).

Since the publication of L'Héritier's monograph in 1788, the name *Michauxia* was used till K.H. Rechinger and H. Schiman-Czeika re-employed the name *Mindium* Adanson in Flora Iranica. L'Héritier referred to *Mindium* as a synonym for *Michauxia*, according to Art. 52 of the Code (McNeill et al. 2006). As a result, R.D. Meikle proposed the conservation of the generic name *Michauxia* over *Mindium*, arguing

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that *Mindium* refers to 2 distinct species, *Mindium rhasis* or *Mindium rhasis* Rauwolf (= *Michauxia campanuloides* L'Hér. ex Ait.) and *Canarina canarinensis* (L.) Vatke, while *Michauxia* L'Hér. refers to the *Mindium rhasis* element of Adanson's *Mindium*. The Committee for Spermatophyta conserved *Michauxia* over *Mindium*, with *Michauxia campanuloides* L'Hér. ex Ait. as the type species of the genus (Al-Zein and Musselman, 2004).

Distributions of genus

The genus *Michauxia* is native to the Eastern Mediterranean, Turkey, the Caucasus, Iraq, and Iran. This genus is represented by 3 species (in the genus *Mindium*) in N Iran (Rechinger & Schiman-Czeika, 1965). In addition, there is one species in N Iraq (*M. nuda* A.DC.), in East Mediterranean (Lebanon to Amanus *M. campanuloides* L'Hér. ex Ait.) (Feinbrun-Dothan, 1978, Post, 1896), and S. Transcaucasia (*M. laevigata* Vent.) (Shishkin & Bobrov, 1986). It is represented by 4 species in Turkey, namely *M. campanuloides* L'Hér. ex Ait., *M. laevigata* Vent., *M. tchihatchewii* Fisch. & C.A.Mey. (endemic), and *M. thyrsoides* Boiss. & Heldr. (endemic) (Damboldt, 1978). By means of this study, the fifth species of *Michauxia* was added to the Flora of Turkey.

During floristic investigations, some specimens of *Michauxia* L'Hér. were collected between Siirt and Eruh in gorge of Botan river. At first, they were not determined according to the Flora of Turkey (Damboldt, 1978) together with Supplements and Check-list III and IV of Additional Taxa to the Supplements Flora of Turkey (Davis, 1988, Güner et al., 2000; Özhatay & Kültür, 2006, Özhatay et al., 2009). When they were checked with records of *Michauxia* in Flora Iranica (Rechinger & Schiman-Czeika, 1965) and Flora of Lowland Iraq (Rechinger, 1964) together with the images of specimen in herbaria Kew (K) [Barcode No (BN): K000463903] and Genève (G) (BNs: G00150328, G00165604, G00202782, G00202783), determination was successfully performed (Holmgren et al., 1990). It was identified as *Michauxia nuda*, which is known as an endemic species in N Iraq. The specimens have some similar characters with the species of *M. tchihatchewii* Fisch. & C.A.Mey. and *M. thyrsoides* Boiss. & Heldr. However, it is distinguished from them by its runcinate-pinnatifid basal leaves and branched inflorescence. These 3 species have the most common characters. However, the differences between them are used in the identification key and shown in the comparison table (Table).

Table. Differences between the characteristics of *Michauxia nuda*, *M. tchihatchewii*, and *M. thyrsoides*.

Characters	<i>M. nuda</i>	<i>M. tchihatchewii</i>	<i>M. thyrsoides</i>
Stem	40-200 cm, branched from base	40-120 cm, simple	25-40 cm, simple
Basal leaves	short petiolate, runcinate-pinnatifid, oblong	long petiolate, simple, oblong-lanceolate	long petiolate, simple, oblong-lanceolate
Indumentum (stem)	glabrous, sparsely hirsute at base	densely patent-hirsute	grey-tomentose
Inflorescence	paniculate-racemose, lateral branches spike-like	spike-like	spike-like
Corolla	divided to 1/3, glabrous, stiff hairs on outside middle nerve	divided to 1/2, glabrous, stiff hairs on outside middle nerve	divided to 1/3 tomentose outside
Corolla lobes	lanceolate	oblong	oblong
Appendages of calyx	c. 1-3 mm	6-10 mm	6-10 mm
Style	hairy for 3/4 of its length	hairy for 3/4 of its length	hairy for 1/2 of its length

The description of the species given below is based on the collected specimens and other references (De Candolle, 1838; Boissier, 1875; Rechinger, 1964; Rechinger & Schimann-Czeika, 1965).

As stated by Damboldt (1978), total taxa of *Michauxia* species are 4. The number increased to 5 with the addition of *M. nuda*.

Identification key of *Michauxia* taxa

- 1- Corolla divided 4/5; style (20-) 30-40 mm
 - 2- Pedicels 2-4 cm; corolla lobes 25-45 mm, reflex 1. *campanuloides*
 - 2- Pedicels 1 cm or flowers ± sessile; corolla lobes 15-20 mm, spreading to recurved.....2. *laevigata*
- 1- Corolla divided to 1/3-1/2; style 15-20 mm
 - 3- Corolla tomentose outside; plants 25-40 cm tall, tomentose 3. *thyrsoides*
 - 3- Corolla stiffly hairy outside on middle nerves; plant 40-200 cm tall, coarsely hairy or glabrous
 - 4- Inflorescence spike-like, simple; basal leaves undivided; calyx appendages 6-10 mm 4. *tchihatchewii*
 - 4- Inflorescence panicle-like, branched from base; basal leaves runcinate-pinnatifid; calyx appendage 1-2 mm 5. *nuda*

Michauxia nuda A.DC., Prodr. 7: 457 (1838).

Syn.: *Mindium nudum* (A.DC.) Rech.f. & Schiman-Czeika in Fl. Iranica 13: 48. 1965.

Type: In collibus ad Ninivam, Aucher-Eloy 1826 (G-image!, K-image!) (Figure 1).

Biennial, 40-200 cm, stems stout, erect, branched from base, glabrous, sparsely hirsute at base. Leaves shortly hirsute on both sides; basal short-stalked, oblong in outline, runcinate-pinnatifid, 15-20 cm long, 4-5 cm wide, sinuate and irregularly dentate; median oblong, sessile, lobes irregularly triangular-lanceolate. Inflorescence paniculate-racemose, spike-like on lateral branches. Flowers white, axillary and terminally arranged. Calyx lobes 5-10 mm, triangular-lanceolate, shortly hirsute on margin and middle nerves, with short reflexed appendages, c. 1-3 mm. Corolla 18-20 mm, campanulate, divided to 1/3; lobes lanceolate, erect-patent to reflexed, scabrid outside on middle nerves. Style to 15 mm, hairy for 3/4 of its length. Capsule obconic, 8-10-ribbed, dehiscent by 8-10 valves at base. Seeds numerous, small, 0.8-1 × 0.3-0.4 mm, ellipsoid, light brown, shiny (Figures 2 and 3a-b).

Turkey. C8 Siirt: between Siirt and Eruh, gorge of Botan river, 37°50'37"N, 41°52'37"E, 09.06.2009, 425 m, on limestone slopes, S.Aslan 3802 & B.Şahin (GAZI); ibid., 37°53'4.42"N, 41°53'20" E, 19.05.2009, 700 m, roadsides, S.Aslan 3650 et al. (GAZI).



Figure 1. (a) type specimen of *M. nuda* (G00150328), (b) another image of the type specimen (G00202783).

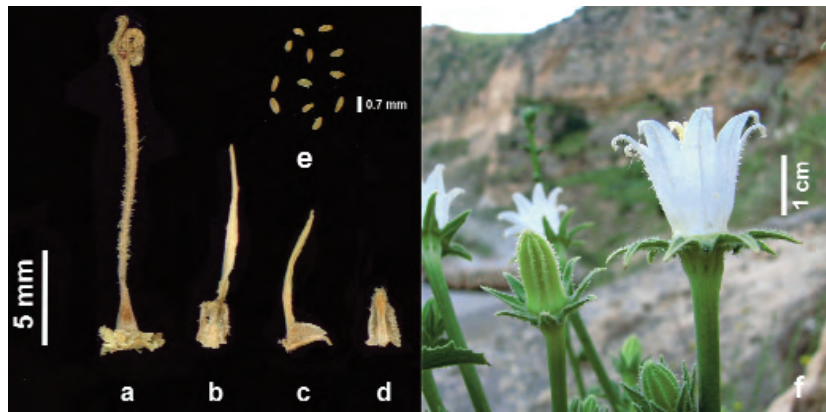


Figure 2. (a) Stigma and style, (b, c) stamen, (d) base of filament, (e) seeds, (f) reflexed corolla lobes and stiff hairs on the middle nerves of corolla.

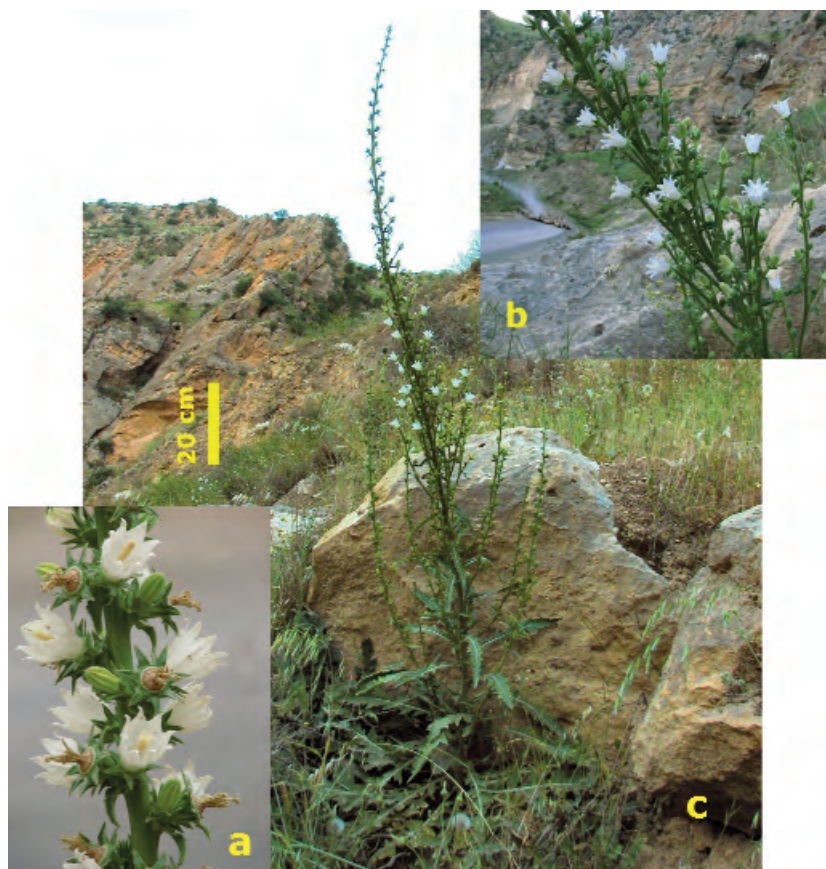


Figure 3. (a) Upper part of inflorescence, (b) median and lower part of inflorescence, (c) habitat and habitus.

Discussion

According to some references *Michauxia nuda* has erecto-patent corolla lobes and its stem is 40-60 (-70)

cm tall (Rechinger, 1964, Rechinger KH & Schimann-Czeika H, 1965). We observed that it has reflexed corolla lobes, and also it grows up to 2 m.

Habitat and ecology

It grows on rocky mountain slopes (Figure 3c), under pine trees, on limestone rocks, coppiced *Quercus brantii* Lindley (= *Q. aegilops* L. subsp. *brantii* (Lindl.) Camus, *Q. infectoria* Olivier subsp. *boissieri* (Reuter) O. Schwarz (Hedge & Yaltırık, 1982), between 320 and 1400 m altitudes. Taxa distributed along with *Michauxia nuda* are as follows: *Allium paniculatum* L. subsp. *paniculatum*, *Vincetoxicum tmoleum* Boiss., *Asperula stricta* Boiss. subsp. *latibracteata* (Boiss.) Ehrend., *Pennisetum orientale* L.C.M. Richard., *Verbascum kotschyi* Boiss. & Hohen., *Nigella unguicularis* (Lam.) Spenner, *Teucrium polium* L., *Micromeria myrtifolia* Boiss. & Hohen., *Thymbra spicata* L. var. *spicata*, *Linum corymbulosum* Reichb. and *Chrysopogon grillus* (L.) Trin.

Specimens examined: Iraq: Zawita, rocky mountain slope, under pine trees, 1000 m, 04.07.1976, Omar et al. 45306 (K-image!); Jabul Sinjar N slope, rocky mountain, 1100 m, Al-Kaisi et al. 50965 (K-image!); Zawitah gorge, on rocky slopes, 853 m, 26.07.1933, Guest 3719 (K-image!); Asi, 1400 m, 01.05.1947, Rami 8411 (K-image!); Zawita, on steep limestone crags, 945 m, 17.07.1933, Guest 4520 (K-image!); Bekhme gorge, on limestone rocks, coppiced *Quercus brantii*, *Q. infectoria* subsp. *boissieri* forest, 450-550 m, Gillett 8224 (K-image!); Zawita, rocky mountain slope, under pine trees, 1000 m, 04.07.1976, Omar et al. 45333 (K-image!); Jabal Sinjar, limestone crag, coppiced *Quercus brantii* forest, 900 m, 26.05.1948, Gillett 11092 (K-image!); Jabal Sinjar, on the top of the mountain with *Quercus* trees, 1000 m, 28.05.1979, Sharief et al. 50275 (K-image!); Region of FNI, 30 km from Mosul to Aqra, clay hillside, 320 m, 04.06.1978, Al-Kaisi 49706 (K-image!); Bikhair Mountain, nr. Zakho c. 90 km NW of Mosul, on mountain slope, 800 m, 02.07.1957, Rami 22971 (K-image!); Balikhian Bridge, Galli Ali beg near last bridge on the way to Rawanduz, rocky mountain near water spring, 07.06.1959, Kass et al. 27200 (K-image!) (Figure 4).

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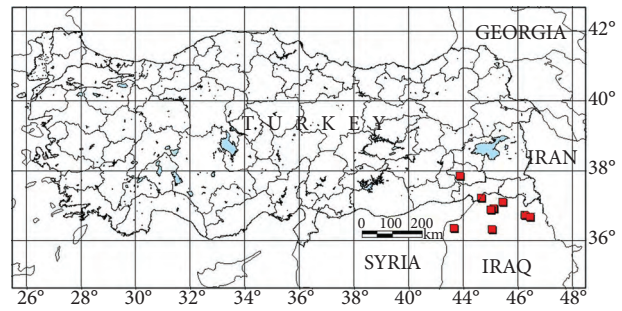


Figure 4. Distribution map of *Michauxia nuda* A.D.C.

Other localities in Flora Iranica: Iraq: Mosul, Dihok, 600 m, *Rech.* 11981, 3 km W Amadiyah, 1000 m, *Rech.* 11623, 103 km N Mosul, prope Zakho, *Rech.* 10664, Amadiyah, 1000 m, *Haines* 1718 M. Gara, *Ky.* 489! – Kurdistan, *Low* 347 (Rechinger & Schimann-Czeika, 1965), (Figure 4).

Threat: *Michauxia nuda* A.D.C. grows in a very limited area (in Turkey), where it is under threat due to a dam construction (Ilisu dam basin) and erosion. Therefore, it was recommended as a regional Critically Endangered (CR (B1a)) (IUCN, 2001).

Notes on the collecting number of type specimen

The collection number of the type specimen of *Michauxia nuda* A.D.C. was given as “Aucher! 1836 et 1837, n. 1626” in De Candolle (De Candolle, 1838), but when the label of type specimen is examined, it can be seen that 1826 was incorrectly typed as 1626.

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