

# A NEW VARIETY AND A REVIEW OF THE GENUS NEOTORULARIA (BRASSICACEAE) IN FLORA OF IRAN

M. Khodashenas, M. R. Joharchi & M. Sharifi Yazdi

Received 15 12 2009; Accepted for publication 20 09 2010.

Khodashenas, M., Joharchi, M. R. & Sharifi Yazdi, M. 2010 12 31: A new variety and a review of the genus *Neotorularia* (Brassicaceae) in flora of Iran. -Iran. J. Bot. 16 (1): 225-228. Tehran.

A short review of the genus *Neotorularia* is presented. Altogether, three species including *N. torulosa*, *N. contortuplicata* and *N. dentata* are known from Iran. *Neotorularia dentata* var. *grandiflora* is described as a new variety to the science. The specimens of the new variety have been collected from NE. of Iran (Khorassan province). The new variety differs from the type variety mainly by the size of flower organs. Key to the taxa and illustration of the new variety is given.

Mansoureh Khodashenas (correspondence) and Mohammad Sharifi Yazdi, Organization of Agricultural and Natural Resources Centre, Kerman, Iran. -Mohammad Reza Joharchi, Ferdowsi University of Mashhad Herbarium (FUMH), Mashhad, Iran.

Key words. *Neotorularia*, Brassicaceae, review, new variety, Iran.

معرفی یک واریته جدید از جنس *Neotorularia* و بازنگری این جنس در ایران

منصوره خداشناس، عضو هیئت علمی مرکز تحقیقات کشاورزی و منابع طبیعی استان کرمان.

محمد رضا جوهرچی، هرباریوم دانشگاه فردوسی مشهد.

محمد شریفی یزدی، عضو هیئت علمی مرکز تحقیقات کشاورزی و منابع طبیعی استان کرمان.

*Neotorularia dentata* var. *grandiflora* به عنوان یک واریته جدید معرفی می گردد. بنابراین *N. dentata* به دو واریته تقسیم می شود. این واریته که از خراسان جمع آوری شده است با *N. dentata* قرابت دارد و بر اساس گل های درشت تر، تعداد زیاد گلها و برگهای ساقه ای و ساقه های متراکم تر از واریته اصلی *N. dentata* مجزا می شود. صفات کلیدی دو واریته مورد مقایسه قرار می گیرند. همچنین کلید شناسایی گونه های جنس *Neotorularia* در ایران ارائه می گردد.

## INTRODUCTION

The first author has been preparing *Sisymbriaceae* part of *Brassicaceae* Flora of Iran (Assadi 1989). She has studied herbarium specimens of TARI, FUMH and local provincial herbaria of Iran. In addition, she has made several excursions to different parts of Iran, collecting herbarium specimens and doing field observations. Hedge and Lamond (Leonard 1986) were introduced the genus *Neotorularia* Hedge & Lamond in Leonard to include the species of *Torularia* (Cosson) O. Schultz (*Brassicaceae*) as this genus antedated by *Torularia* Bonnemaison an algal genus. The genus *Neotorularia* has About 11 species in Mediterranean region to C and SW Asia, one species extending to N Africa (Hedge 1965; Hedge 1968; Jeffrey 1973). According to Flora Iranica four species occur in Iran (Hedge 1968), but one of them namely *N. aculeolata*

(Boiss.) Hedge & Lamond based on phylogenetic studies should belong to the genus *Sisymbrium* (Warwick et al. 2002) as *S. aculeolatum* Boiss.

The aim of this paper is to present a short revision of the genus *Neotorularia* in Iran and to describe a new variety of the genus.

## RESULTS AND DISCUSSION

The following characters may circumscribe the genus *Neotorularia* in Iran. Annual plants, branched from the base, covered with simple and or branched hairs. Leaves entire, sinuate or lobed at the margin, narrowed at base to a petiole. Racemes ebracteate. Pedicels short, often thickened and appressed to stem. Sepals erect, not saccate at the base. Petals mainly white, longer than sepals; median glands absent. Fruits a siliqua,

dehiscence, often variously curved; stigma bilobed. Seeds uniseriate, wingless; cotyledons incumbent.

-Sepals 2.7-3 mm long, Petals 6.5-7.5 mm long and 2.7-3.7 mm wide var. **grandiflora**

### Key to the species of *Neotorularia* in Iran

1. Pedicels and siliqua appressed to stem, only upper part recurved **3. N. dentata**

-Pedicels and siliqua not appressed to stem 2

2. Pedicels very short or to 1 mm long. Petals 2.5-4.5 mm long **1. N. torulosa**

-Pedicels 1-8 mm long. Petals 5 mm long

#### **2. N. contortuplicata**

**1. N. torulosa** (Desf.) Hedge & J. Léonard, Bull. Jard. Bot. Natl. Belg. 56 (3-4): 395 (1986).

Syn.: *Sisymbrium torulosum* Desf., Fl. Atlant. 2; 84 (1798-1800); *Torulularia torulosa* (Desf.) O. E. Schulz in Engler, Pflanzenr. 86 (IV, 105): 214 (1924).

*Specimens seen.* **Fars:** Shiraz to Kazeroon, 800 m, Maassoumi & Abouhamzeh 51841. **-Booshehr:** 86 km from Genaveh to Dogonbadan, 350 m, Runemark & Mozaffarian 27311. **-Khuzestan:** 58 km from Behbahan to Ramhormoz, 260 m, Runemark & Mozaffarian. **-Kerman:** Zarand, Dehzyar, 2100 m, Khodashenas 3026, 2831, 2817, 3033Y, Fath Abad, 1560 m Khodashenas 97; Kahnuj, Mehruieh, 640 m, Saber 5830, 5827. **-Khorassan:** 35 km south of Sabzevar, 950 m, Rajamand and Bazargan 31633; Mashhad to Sarakhs, wild Pistachia forests, Khodashenas 7609, 7610. **-Semnan:** south of Shahrood, 1420 m, Freitag & Mozaffarian. **-Tehran:** 43 km from Tehran to Ghom, 1120 m, Wendelbo & Maassoumi 19025; Karaj, Shahdasht, 1175 m, Forughian 5915.

**2. N. contortuplicata** (Stephan ex Willd.) Hedge & Leonard, Bull. Jard. Bot. Natl. Belg. 56 (3-4): 393 (1986).

Syn.: *Cheiranthus contortuplicatus* Stephan ex Willd. in Willd. Sp. Pl. ed. 4, 3 (1): 521 (1800); *Torulularia contortuplicata* (Stephan ex Willd.) O. E. Schulz in Engler, Pflanzenr. 86 (IV, 105): 219 (1924).

*Specimens seen.* **Gorgan:** Aytmar, south of Hotan, 230 m, Hewer 3697. **-Khorassan:** NW. Bojnurd, between Garmab and Shahrabad, 634 m, Memariani & Zangooei 37085 (FUMH).

**3. N. dentata** (Freyn & Sint.) Hedge & Lamond, Bull. Jard. Bot. Natl. Belg. 56 (3-4): 394 (1986).

Syn.: *Cryptospora dentata* Freyn & Sint., Bull. Herb. Boiss. 2 (3): 693 (1903); *Torulularia dentata* (Freyn. & Sint.) Kitam., Fl. Afgh. 165 (1960).

1. Sepals 2.2-2.5 mm long. Petals 4-5 mm long and 2 mm wide var. **dentata**

#### var. **dentata**

*Specimens seen.* **Gorgan:** 69 km from Azadshahr (Shahpasand) to Shahrood, 1000 m, Wendelbo & Assadi 29590. **-Khorassan:** NE. of Torbate Jam, East of Saleh Abad, Between Saleh Abad & Garmab-e Olia, 546 m, Khodashenas & Joharchi 34501b; Torbate Jam to Taybad, 1050 m, Faghinihnia and Zangooei 18219, 18214 (FUMH); Sout of Torbat-e Heydariyeh, Kheyr Abad, 900 m, Joharchi and Zangooei 19883 (FUMH); Robat Sefid, 1700-2000 m, Runemark & Sardabi 3608, 3595; Road of Mashhad to Sarakhs, 800-900 m, Assadi & Mozaffarian 23329; 14 Km Mazdavand to Sarakhs, 850 m, Ayatollahi & Joharchi 13204 (FUMH) & Joharchi and Zangooei 13897 (FUMH).

var. **grandiflora** Khodashenas & Joharchi, var. **nov.** - Fig. 1.

Differt ab *N. dentata* var. *dentata* sepalis 2.7 - 3 mm longis (nec 2.2-2.5 mm), petalis 6.5-7.5 x 2.7-3.7 mm (nec 4-5 x 2 mm), filamentis magnis 3.8-4 mm longis (nec 3 mm), filamentis parvis 3.3-3.5 mm longis (nec 2.3 mm).

Annual herbs, 20-30 cm tall, erect, branched, ± covered with short, branched hairs. Lower leaves, obovate-oblong, stalked, 40-60 mm long, 6-15 mm broad, sinuate-dentate to subentire; upper leaves oblong-linear, 10-45 mm long, 2-5 mm broad, subdentate to entire, attenuate at base. Racemes 20-40-flowered, ebracteate. Flowers c. 10-15 mm across, white or tinged pale pink. Pedicels 3-5 mm long in fruit, thickened, erect, appressed to the axis. Sepals 2.8-3 mm long. Petals 6-8 mm long, 3-3.5 mm broad. Long stamens 3.8-4 mm and short stamens 3.3-3.5 mm long; anthers 0.7-1 mm long. Siliqua 15-30 mm long, 1 (-1.5) mm broad, erect or often curved or irregularly coiled above, torulose, scabrous with short branched hairs; style c. 1 mm long; stigma bilobed; septum membranous; seeds 5-8 in each locule, c. 1.5-2 mm long, ellipsoid, yellow-brown.

*Typus.* Iran, Khorassan: NE. of Torbat-e Jam, east of Salehabad, between Salehabad and Garmab-e Olia, 546 m, Joharchi & Memariani 42008 (holotypus FUMH; isotypus TARI). *-Paratypus.* 35 km Torbat-e Jam to Taybad, 1050 m, Faghinihnia and Zangooei 14314 (FUMH). Sarakhs, after Mazdavand (Mozduran), Pistachio forests, Ayatollahi & Zangooei 14004

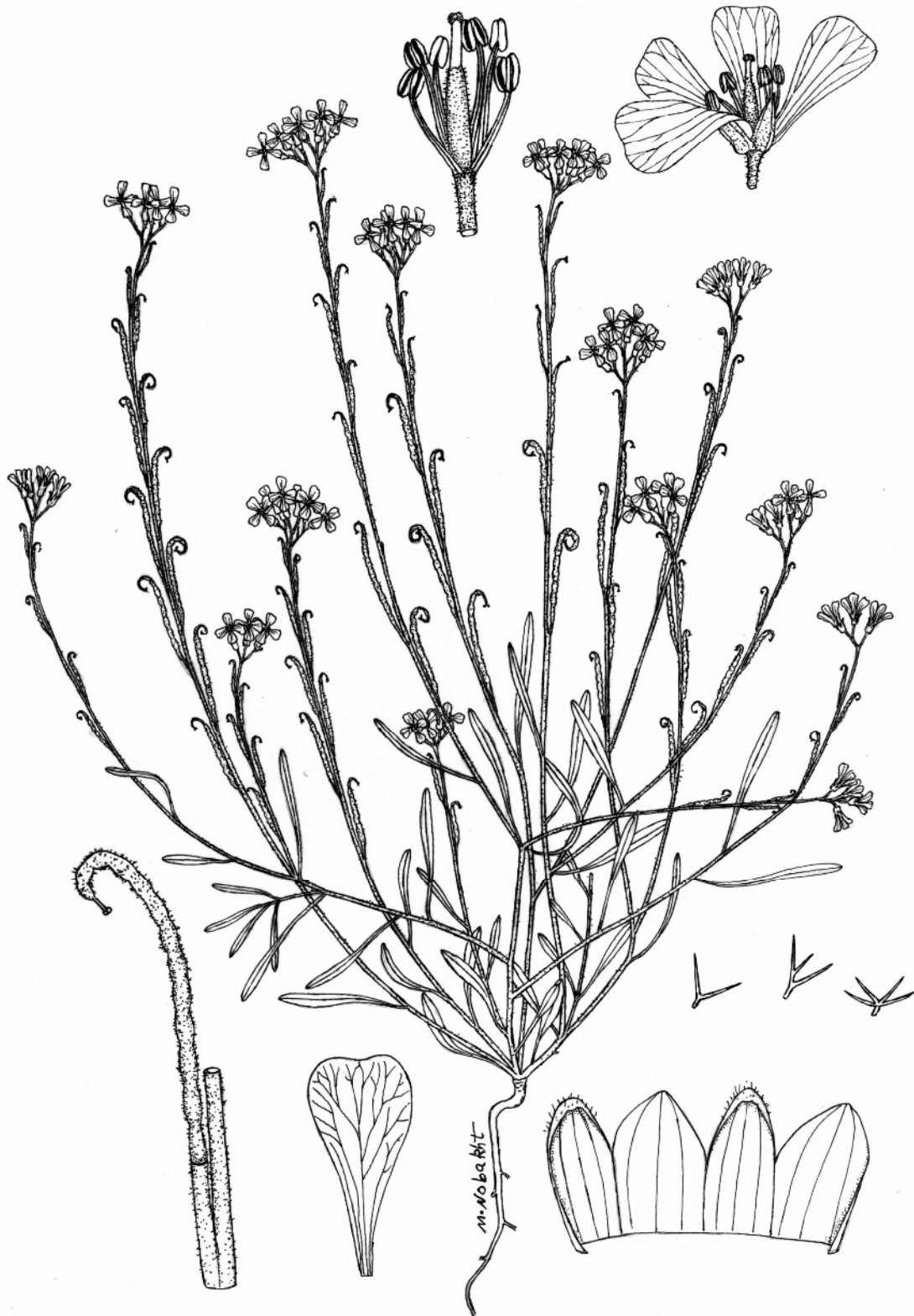


Fig. 1. *Neotorularia dentata* var. *grandiflora* ( $\times 0.7$ ); flower ( $\times 2.8$ ); stamens ( $\times 3.5$ ); opened calyx ( $\times 10$ ); petal ( $\times 4.2$ ); fruit ( $\times 2.2$ ).

(FUMH). NE. of Mashhad, between Chahchahe and Kuhe Khoaje, 604 m., Joharchi 43474(FUMH).

*Notes.* This plant might approach *N. korolkowii* (Regel & Schmalh.) Hedge & Lamond which is found in Afghanistan and Turkmenistan, but the most reliable distinguishing feature is the trichomes on the leaves and fruit. In *N. korolkowii* they are exclusively Y-shaped, whereas in *N. dentata* they are well branched, also pedicels in *N. korolkowii* are narrower than fruits.

*Neotorularia dentata* is distributed in Afghanistan, Iran, Pakistan, Tajikistan, and Turkmenistan. It grows in North and North east of Iran (Gilan and Khorassan provinces), at an altitude 800-2000m above sea level. In border of NE and E Khorassan some plants are found among the *N. dentata* population, which differ from the typical *N. dentata* by having obviously larger and many flowers, with several stem leaves. These specimens are described as a new variety.

#### REFERENCES

Assadi, M. 1989: Plan of the Flora of Iran. -Research Institute of Forests and Rangelands, Tehran.

Hedge, I. C. 1965: Sisymbriaceae in K. H. Rechinger (ed.) Flora Iranica, 57: 309-342. -Akademische Druck-U. Verlagsanstalt, Graz, Austria.

Hedge, I. C. 1968: Torularia in P. H. Davis Flora of Turkey and the East Aegean Islands, vol. 1: 488. - Edinburgh.

Jeffrey, S. M. H. 1973: Brassicaceae in E. Nasir & S. I. Ali (eds.) Flora of West Pakistan. 55. - Karachi.

Leonard, J. 1986: Neotorularia Hedge & Lamond nom générique nouveau de Cruciferae. -Bull. Jard. Bot. Nat. Belg. 56: 389-395.

Mabberley, D. J. 2008: Mabberley's plant-book: A portable dictionary of plants, their classification and uses. -Cambridge University Press.

Warwick, S. I., Al-Shehbaz, I. A., Price, R. A. & Sauder, C. 2002: Phylogeny of *Sisymbrium* (Brassicaceae) based on ITS sequence of nuclear ribosomal DNA. -Can. J. Bot. 80: 1002-1017.

Archive of SID