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ADDITIONAL INFORMATION ABOUT MATTHIOLA SPATHULATA CONTI

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The present study deals with new information on the conspecific taxa of *Matthiola spathulata.* By examining the type specimens and species descriptions, it was concluded that *Matthiola boissieri* and its nomenclatural synonym, i. e. *M. odoratissima* subsp. *boissieri* are synonyms of *M. spathulata*.

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Keywords: *Matthiola boissieri*; *Matthiola farinosa*; *Matthiola odoratissima*; new synonymy; Transcaucasia

اطلاعات تکمیلی درباره Matthiola spathulata Conti

امین زراعتکار: استادیار پژوهشی، بخش منابع طبیعی، مرکز تحقیقات و آموزش کشاورزی و منابع طبیعی استان چهارمحال و بختیاری، سازمان تحقیقات، آموزش و ترویج کشاورزی، شهرکرد، ایران

این مطالعه به بحث در مورد اطلاعات جدیدی از آرایه‌های مترادف با گونه Matthiola spathulata می‌پردازد. پس از بررسی شرح‌های اصلی و نمونه های تیپ، روشن شد که Matthiola boissieri و M. odoratissima subsp. boissieri مترادف‌های جدیدی از گونه M. spathulata هستند.

INTRODUCTION

Conti (1900) described *Matthiola perennis* Conti, *M. pseudoxyceras* Conti, *M. songarica* Conti, *M. spathulata* Conti, *M. superba* Conti, as well as ten infraspecific taxa in his monograph on the genus. *Matthiola spathulata* remained enigmatic for ca. 120 years in the taxonomic and floristic literature and only Rechinger (1968) mentioned the species in *Flora Iranica* (Zeraatkar & Assadi 2018). The type specimen of this species includes three pieces of plants, all of which are at their early flowering stages (Fig. 1). The original description of *M. spathulata* is therefore partly incomplete and ambiguous, especially in the morphological characters of the fruits. Therefore, Rechinger (1968) listed it in the species with an incomplete description. However, this species is distinguished from the other *Matthiola* species by its indumentum characteristics (Zeraatkar & al. 2022). Zeraatkar & Assadi (2018) provided a complete description of species along with an updated geographical distribution. Moreover, they regarded *M. iranica* Zeraatkar, Mahmoodi, F. Ghahrem. & Maassoumi as well as *M. odoratissima* W.T.Aiton var. *dentata* Boiss. as synonyms of *M. spathulata*.

Boissier (1867) established *Matthiola odoratissima* var. *dentata* from northwestern Iran based on the specimens collected by Szovits and kept at "G!". *Matthiola boissieri* Grossh. by having entire or sub-entire (rarely pinnatifid) leaves, broader fruits, and short trichomes was treated as a distinct species based on a type material of *M. odoratissima* var. *dentata* which was kept in the Leningrad herbarium (LE!), (Grossheim 1950). *Matthiola boissieri* was erroneously assigned to synonymy of *M. farinosa* Bunge ex Boiss., probably because of the presence of entire leaves, capitate-bilobed

stigma, and undulation of petal margin (Vidi!), (Rechinger 1968). This taxonomic treatment has been accepted by recent taxonomic studies (Gowler 1998; Dorofeyev 2012; Kaffash & Assadi 2018). In contrast, *M. boissieri* appears accepted in Takhtajan (2012). On the other hand, *M. boissieri* was classified as a subspecies of *M. odoratissima* W.T.Aiton by Takhtajan (1966). *Matthiola odoratissima* W.T.Aiton subsp. *boissieri* (Grossh.) Takht. is mentioned only in "Vascular plants of Russia and adjacent states (the former USSR)" by Czerepanov (1995).

Zeraatkar & Assadi (2018) showed that *Matthiola odoratissima* var. *dentata* is a synonym for *M. spathulata*, but they did not have access to the type materials and protologues of *M. boissieri* and *M. odoratissima* subsp. *boissieri*, therefore no decision was made on these two names. As discussed above, *Matthiola boissieri* and *M. odoratissima* subsp. *boissieri* are homotypic synonyms of *M. odoratissima* var. *dentata* and consequently, both are considered synonyms for *M. spathulata* here (see below).

Taxonomic treatment

Matthiola spathulata Conti, Mem. Herb. Boiss. 18: 49 (1900).

Lectotype (designated here): Iran [as Persia]. In monte Karaghan, 1882, *T. Pichler s.n.* (WU! [plant on lower right]). Syntypes: Iran [as Persia]. In monte Karaghan, 1882, *T. Pichler s.n.* (WU! [plants on top and lower left]).

Syn.: *Matthiola odoratissima W.T.Aiton* var. *dentata* Boiss., Fl. Orient. 1: 149 (1867).

Syn.: *M. boissieri* Grossh., Not. Syst. Leningrad 13: 14 (1950). ***syn. nov***.

Syn.: *M. odoratissima* W.T.Aiton subsp. *boissieri* (Grossh.) Takht., Fl. Armenia 5: 147 (1966). ***syn. nov***.

Type: Iran. Azerbaijan. Khoi (Khoy), prope Shabanli, 3 May 1928, *J. N. Szovits 171*. Holotype: G (G-BOIS-00332031!). Isotypes: K [K000618623!]; LE [LE01039408!; LE01039409!; LE01039410!; LE01039411!; LE01039412!]).

Syn.: *Matthiola iranica* Zeraatkar, Mahmoodi, F.Ghahrem. & Maassoumi, Phytotaxa 261(2): 195 (2016).

Type: Iran. Zanjan province. Zanjan-Dandi road, 4 km before Ghezel-Ozan river, 36 31 48.9 N, 47 52 07.176 E, 1450 m, 29 May 2014, *M. Mahmoodi 100455* (holotype T! isotype TARI!).

The type collection as a whole consists of flowering materials collected in 1882, not defined by day and month, altitude and collection number. The voucher was collected at the beginning of the anthesis or even earlier; while the fully open flower or mature fruit is essential to identify the species of the genus (Zeraatkar & al. 2022). Meanwhile, the plant on the lower right of the type specimen sheet has a flower that is relatively open; therefore, this plant is designated as the lectotype, and the other two as syntypes.

Matthiola spathulata is most closely related to *M. farinosa* and *M. odoratissima* W.T.Aiton whose distribution range extends from NW & W Iran, southern Armenia, and Azerbaijan (Talysh and Nakhichevan Republics). The distribution of *M. farinosa* extends from Afghanistan and Middle Asia to NE and C. of Iran. *Matthiola odoratissima* W.T.Aiton is a rare and threatened species that the shore zone along the Black Sea coasts (such as east Bulgaria, Crimea, west Russia, Georgia, northeast Turkey, north Armenia, and northwest Azerbaijan) is the most suitable habitat for it. *Matthiola spathulata* is a steppic Irano-Turanian element and grows in arid conditions on hills with sterile, marls or reddish marls partly without vegetation or with plants such as *Artemisia*, tragacanth *Astragalus* species, and Chenopods at an altitude between 1100 and 2400 m a.s.l (Făgăraş & al. 2010; Traykova & Goranova 2016; Zeraatkar & Assadi 2018). The morphology of fruits and flowers of *M. spathulata* is constant throughout its range and it is characteristic among almost all species of the genus; while the leaves have slight variation in terms of margin shape and the leaves are usually entire and sometimes dentate or rarely pinnatifid (Zeraatkar & Assadi 2018).

Fig. 1. Lectotype of *Matthiola spathulata* Conti (T. Pichler, WU).

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