



Short Communication

Correct taxonomic delimitation of *Nasturtium microphyllum* Rchb. from *Nasturtium officinale* R. Br. (Brassicaceae) in Kashmir Himalaya, India



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ABSTRACT

The correct taxonomic delimitation of *Nasturtium microphyllum* Rchb., previously misidentified as *Nasturtium officinale* R. Br., in the Kashmir Himalaya, India, is reported. This species differs from its closely allied *N. officinale* in the shape, size, and arrangement of seeds in the fruit. A detailed taxonomic account, including complete description and photoplates of diagnostic characters are provided to resolve the misidentification of the taxa in the Kashmir Himalaya.

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Introduction

The family Brassicaceae (*Nom. Alt.* Cruciferae) is a monophyletic group of about 338 genera and around 3709 species distributed worldwide (Al-Shehbaz et al 2006). It includes many economically important crop and ornamental species. *Nasturtium*, which was previously treated under the genus *Rorippa*, has been recognized as a distinct genus in recent taxonomic treatments (Al-Shehbaz and Price 1998). The results of molecular analysis also support the delimitation of genus *Nasturtium* from *Rorippa* (Franzke et al 1998). World over, five species have been reported in this genus, which include: *Nasturtium officinale* R. Br., *Nasturtium microphyllum* Boenn. ex Reich, *Nasturtium gambellii* O. E. Schulz, *Nasturtium africanum* Braun-Blanq, and *Nasturtium floridanum* Al-Shehbaz and Rollins (Al-Shehbaz and Rollins 1988). The former two species are the most common and widespread species of the genus *Nasturtium*; and both are native to Eurasia and northern Africa and widely naturalized elsewhere in the world (Al-Shehbaz and Price 1998).

From the Indian subcontinent, Hooker (1897) reported four species of *Nasturtium* i.e., *N. officinale*, *Nasturtium palustre*, *Nasturtium indicum*, and *Nasturtium montanum*. But, the later three species

are now treated under the genus *Rorippa* (www.theplantlist.org). In India, two species, i.e., *N. officinale* and *N. microphyllum*, have been recorded. The former has been recorded from the Indian states of Tamil Nadu, Goa, Madhya Pradesh, Punjab, Sikkim, and Uttarakhand, while as the latter has been recorded only from Himachal Pradesh and Uttarakhand (Cook 1996; Sharma and Balakrishnan 1993).

Materials and methods

While carrying out botanical surveys to document the aquatic flora of the Kashmir Himalaya, specimens of a typical *Nasturtium* species were collected from different sites. A critical examination of morphological features, in particular the mature fruit characters and arrangement of seeds in fruit, clearly identified these specimens belonging to *N. microphyllum* (Boenn.) Rchb., a species still not reported from the region (Cook 1996; Hooker 1897; Kak 1990; Kaul and Zutshi 1967; Pandit 2005, Stewart 1972; Shah and Reshi 2014). On further investigation of plant material belonging to *Nasturtium* deposited at the University of Kashmir herbarium (KASH), most of the specimens which actually belong to *N. microphyllum* had been previously misidentified as *N. officinale*. Therefore, the present report represents the first valid record of *N. microphyllum* from the Kashmir Himalaya, India and describes in detail its correct taxonomic delimitation from *N. officinale*. All the previously misidentified specimens deposited at KASH have now

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been correctly determined. The present article provides a detailed taxonomic description and photographs of diagnostic characters of *N. microphyllum* (Figure 1A–H) and comparison of delimiting characters with its allied species, i.e. *N. officinale* (Table 1; Figure 2) that will resolve the misidentification of the taxa in the region.

Taxonomic accounts

Nasturtium microphyllum (Boenn.) Rchb., Icon. Fl. Germ. Helv.1: 15 1834.

Syntype: Germany: Gegend von Leipzig bei Abtaundorf Reichenbach; Rothenfelde, Boenninghausen

Synonyms: *Nasturtium officinale* var. *microphyllum* Boenn. ex Rchb.; *Nasturtium officinale* var. *microphyllum* Boenn.;

Table 1. Comparison of two species of genus *Nasturtium* occurring in the Kashmir Himalaya.

Diagnostic characters	Species	
	<i>Nasturtium officinale</i>	<i>Nasturtium microphyllum</i>
No. of leaflets per leaf	3–7	5–9
Inflorescence		
a. Type	Raceme	Raceme
b. Size	Upto 10 cm long	Upto 5 cm long
Fruit		
a. Type	Siliqua	Siliqua
b. Size	Upto 10 mm long, 2–2.5 mm broad	Upto 16 mm long, 1 mm broad
Seed arrangement in fruit	Two-rowed	One-rowed (Either zigzag or straight)



Figure 1. *Nasturtium microphyllum*: A, habit <scale: 2.5 mm>; B, inflorescence <scale: 0.6 mm>; C, adaxial surface of leaflets <scale: 0.8 mm>; D, abaxial surface of leaflets <scale: 0.8 mm>; E, fruit <scale: 1.2 cm>; F, two rows of seeds <scale: 10 cm>; G, single seed <scale: 12 cm>; H, correctly determined herbarium specimen <scale: 1.0 mm>.

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