

A TAXONOMIC REVISION OF THE GENUS *PAEONIA* (PAEONIACEAE) IN IRAN

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Received 2016. 08. 17; accepted for publication 2016. 11. 02

Assadi, M. 2016. 12. 30: A taxonomic revision of the genus *Paeonia* (Paeoniaceae) in Iran. -*Iran. J. Bot.* 22 (2): 75-78. Tehran.

The genus *Paeonia* L. is the single genus of Paeoniaceae family and contains ca. 40 species worldwide, mostly Eurasian elements. The number of species in Iran and the name of them are variable in different literature. A taxonomic revision of the genus was done in Iran. Different available herbaria were visited and the plants compared with the description and partly available photographs of the herbarium specimens. Morphological characters were recorded based on herbarium specimens and living materials in the field. *Paeonia wittmanniana* usually is reported as a more widespread species in northern Iran seems not occur in Iran, but instead *P. tomentosa* is the most common species well distributed in northern Iran. Presence of two other species namely *P. wendelboi* and *P. mascula* formerly recorded from Iran is confirmed.

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Key words: Taxonomy; *Paeonia*; Paeoniaceae; identification key; distribution; Iran

تاکسونومی جنس *Paeonia* L. از تیره گل صد تومانی (Paeoniaceae) در ایران
مصطفی اسدی: مؤسسه تحقیقات جنگلها و مراتع کشور

جنس *Paeonia* L. تنها جنس تیره Paeoniaceae است که حدود ۴۰ گونه در دنیا دارد و اغلب جزو عناصر اروپائی آسیائی محسوب می گردند. تعداد گونه های آن در ایران در منابع مختلف متفاوت و نامهای متفاوتی نیز برای آنها بکار برده شده است. تاکسونومی جنس در ایران مورد بررسی قرار گرفت. در این رابطه نمونه های هرباریومهای معتبر و در دسترس ایران مورد بررسی و بازبینی قرار گرفت و با مطالعات صحرائی تکمیل یافت. تصاویر نمونه های تیپ و یا نمونه های معتبر شناسائی شده برای شناسائی نمونه ها مورد استفاده قرار گرفت. صحت گزارش گونه *P. wittmanniana* برای شمال ایران مورد تایید قرار نگرفت، بلکه به جای آن نام *P. tomentosa* به عنوان نام صحیح بکار برده شد. وجود دو گونه دیگر به نامهای *P. wendelboi* و *P. mascula* در ایران مورد تایید قرار می گردد.

INTRODUCTION

Paeonia L. is the only genus of the family Paeoniaceae. It includes ca. 40 species worldwide. Most of the species occur in Eurasia but two from western North America (Tamura 2007). Many of the species are used as an ornamental plants or they may have a potential to be an ornamental plant. Boissier (1867) and Parsa (1951) recorded *P. corallina* Retz. with its two varieties, i. e. typical variety and var. *tridentata* (Pall.) Boiss. and *P. wittmanniana* Stev. from Iran. Riedl (1969) reported only *P. wittmanniana* from Iran with two varieties, var. *wittmanniana* and var. *nudicarpa* Schipcz. The former with hairy and the

latter with glabrous folicles. Assadi (1984) reported *P.* cf. *mlokosewitschi* Lomak. from NW Iran. Later Ruksans & Zetterlund described the same specimen as a new species named it *P. wendelboi*. Maroofi (2005) recorded *P. mascula* (L.) Mill. subsp. *mascula* from western Iran. The Caucasian taxa of *Paeonia* have been treated taxonomically that partly cover Iranian materials (Kemularia-Nathadse 1961 and Hong 2003). The aim of the present study is to revise the genus *Paeonia* in Iran.

MATERIAL AND METHODS

Materials in the two large herbaria of Iran including

TARI and IRAN were studied (acronyms according to Thiers, B. [continuously updated]). Habitats of many stands in the field were observed. Appropriate Floras i. e. Flora Iranica (Riedl 1969), Flora of Turkey (Davis & Cullen 1965), Flora of the USSR (Shipchinskii 1937) Flora of Iraq (Townsend 1980) and taxonomic treatments (Hong & Zhou 2003; Kemularia-Nathadse 1961) were studied. Diagnose of the species were prepared according to the biometry done on the herbarium specimens and field observations.

RESAULTS

Three species of the genus *Paeonia* are recognized from Iran. The presence of *P. mascula* subsp. *mascula* formerly recorded from Iran is improved (Maroofi 2005). *Paeonia wittmanniana* formerly recorded from Iran by different authors (Riedl 1969; Parsa 1951) do not occur in Iran. *Paeonia tomentosa* is the most widespread species of the genus in Iran, occurring in Caspian forests mainly in *Fagus* communities. *Paeonia* cf. *mlokoewitschii* recorded from Iran by Assadi (1984), later was described as the new species *P. wendelboi* by Ruksans and Zetterlund (2014). In this paper it is accepted as *P. wendelboi*, even if the differences might be only variation at the population level. Descriptions, distribution of the species in Iran (map 1) and list of selected specimens are provided in this paper.

Paeonia L.

Herbaceous perennials, rhizomatous. Stems often solitary, with colored large scales at the base. Leaves alternate, ternate, biternate or pinnate. Flowers terminal, hermaphrodite. Sepals 5, free. Petals ca. 8, free, white, yellow or red. Stamens numerous; filaments free, inserted on fleshy disc, longer than the anthers; anthers yellow, basifixed, longitudinally dehiscent. Ovary superior, consisting of free hairy or glabrous carpels; stigma falcate, flat. Fruiting follicles 2-5, divergent, ventrally dehiscent by a longitudinally slit. Seeds red or blackish, albuminate.

Key to the species

1- Plant glabrous all over. Petals red.

1. *P. mascula* (L.) Miller

- Plants hairy in lower surface of leaves. Sepals hairy or glabrous on the outside. Petals white or yellow 2

2- Petals white. Sepals glabrous on the outside. Leaflets 5-8 cm long, ovate to elliptic

2. *P. tomentosa* (Lomak.) N. Busch

- Petals yellow. Sepals hairy on the outside. Leaflets 3-6 cm long, often orbicular or broadly elliptic

3. *P. wendelboi* Ruksans & Zetterlund

1. *Paeonia mascula* (L.) Miller, Gard. Dict. Ed. 8, no. 1 (1768).

Syn.: *P. officinalis* L. var. *mascula* L., Sp. Pl. ed. 1, 530 (1753); *P. carollina* Retz, Obs. Bot. 3: 34 (1873); *P. kavachensis* Azn., Magyar Bot. Lapok 16: 7 (1917); *P. carollina* var. *orientalis* Thieb., Fl. Lyb. Syr. 1: 37 (1936); *P. kurdistanica* Zohari, Palaest. Journ. Bot. ser. 2: 155 (1942).

subsp. *mascula*

Plant 44-70 cm high, glabrous. Stems simple. Scales at the base of stem up to 3×1.5 cm., oblong, purple. Lower leaves biternate; petioles up to 9 cm long; leaflets 6-12×6-8 cm, ovate to elliptic, acute to acuminate; upper leaves smaller, simply ternate. Flowers solitary, terminal. Sepals up to 2.5×1 cm, elliptic, acute, pale green, tinged purple. Petals up to 4 cm long, elliptic, red. Filaments purple; anthers ca. 4.5 mm long. Carpels 2, densely hairy.

Specimen seen: Kurdistan, Marivan to Saghez, Chenareh village, in *Quercus* forest, 1450 m, Maaroufi & Anvar Mohammadi 6660 (TARI) (map 1).

The other subspecies bear hairs on the lower surface of leaves and occur mainly in Europe and Mediterranean region.

2. *P. tomentosa* (Lomak.) N. Busch, Fl. Kavcasi 2: 91 (1930).

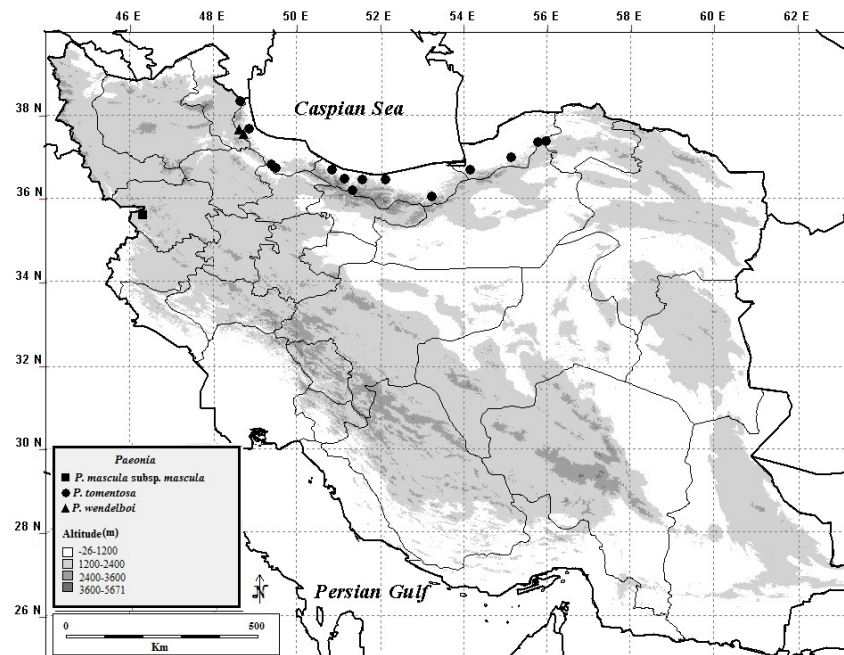
Syn.: *P. wittmanniana* Stev. var. *tomentosa* Lomak., Trudy Tiflis. Bot. Sad. 2: 283 (1897); *P. wittmanniana* subsp. *tomentosa* (Lomak.) Busch, Fl. Caucas. Crit. 3(3): 14(1901); *P. daurica* subsp. *tomentosa* (Lomak.) D. Y. Hong, Bot. J. Linn. Soc. 143 (2): 148 (2003); *P. wittmanniana* auc. pl. fl. Iran non Hartw. ex Lindley nec Stev; *P. corallina* auct. fl. Iran non Retz.; *P. daurica* Davis & Cullen, Fl. Turkey non Andrews; *P. wittmanniana* var. *nudicarpa* Schipcz., Not. Syst. Herb. Bot. Petrop. 2: 44 (1921).

Plant 20-50 cm high, hairy only on the lower surface of leaflets. Stems simple. Scales at the base of stem up to 8×1.5 cm., oblong, brownish violet to purple. Lower leaves biternate; petioles 7-14 cm long; leaflets 5-12×3.5-8 cm, ovate to elliptic, acute to acuminate; upper leaves smaller, simply ternate or pinnate with 5 leaflets. Flowers solitary, terminal. Sepals up to 2.5×1 cm, oblong, obtuse, pale green. Petals 4-6 cm long, elliptic, white. Filaments yellow or violet; anthers ca. 4.5 mm long. Carpels 3-5, densely hairy or very rarely glabrous.

Selected specimens. Golestan: S. Kordkuy, Draznow mountains, 2600 m, Maassoumi 55096; Golestan forest, 1250 m, Wendelbo & Cobham 14332. *Mazandaran:* Polsefid, Sangdeh forests, Kharnaro mountain, 2200-2700 m, Assadi 55309; Polsefid, Sangdeh forest, above

Talar-e Sarband, Renz & Iranshar 16756; Noor, Chamestan, Vaz. 310-1800, Mozaffarian 72851; Chalous, above Siahbisheh, 2200 m, Wendelbo & Shirdelpour 11668; Kelardasht, Asalak, 1400-1600 m, Termeh & Matin 68066; Ramsar, between Tanurekash and Janatrudbar, 2000-3000 m, Assadi & Maassoumi 51395. **Gilan:** Manjil, Amarlou area, 1600 m. Assadi &

Shahmohammadi 60090; E. of Rudbar, Damash, 1700 m, Wendelbo & Ala 13506; Manjil, Rostamabad to Dogaheh, 1600 m, Mozaffarian & Nowrouzi 33977; Asalem to Khalkhal, 40 km to Khalkhal, 1700 m, Termeh & Mousavi 68067; between Astara and Ardabil, Heyran pass, 1600 m, after the tunnel, 1500-1600 m, Assadi 73779 (map 1).



Map. 1. Geographical distribution of *Paeonia* species in Iran.

This species in different literature concerning Iranin materials have been named *P. wittmanniana* Hartw. ex Lindley (Riedl. H. 1969) Type materials of *P. wittmanniana* was based on plant specimens grown by seeds collected from Abchazia, Georgia (Kemularia-Nathadse, 1961). In the original description of the species flowers are described as yellow and carpels as glabrous, therefore do not fit with the Iranian materials having always white flowers and more often densely tomentose carpels. Moreover, *P. tomentosa* was described from Talysh, a species in the distribution of Iranian materials and having exactly characters of the plants distributed in N. Iran. Therefore, Iranian materials should actually be *P. tomentosa*. Hong (2003) regarded the taxon as a subspecies namely *P. daurica* Andrews subsp. *tomentosa* (Lomak.) Hong. The other subspecies of the species in the area are *P. daurica* subsp. *wittmanniana* (Hartwiss ex Lindl.) Hong and *P. daurica* subsp. *molokosewitschii* (Lomak.) Hong. The three taxa have great morphological characters with completely different distribution and habitat. Therefore

it is preferred to regard them as distinct species in this paper. *P. daurica* has red flowers and it is completely different from Iranian materials.

Boissier (1867) and subsequently Parsa (1951) recorded *P. corallina* including typical variety and var. *triternata* from northern Iran. This species have red flowers. Extensive collections in northern Iran show that none of the plants bear red flowers; therefore it seems the records are based on fruiting materials. Boissier (1867) describes flowers of *P. wittmanniana* as yellowish brown and with glabrous follicles. Herbarium specimens of northern Iranian specimens usually have yellowish brown flowers in dried stage and very rarely specimens with glabrous follicles are observed, as *P. wittmanniana* have pure yellow flowers, Boissier records of *P. wittmanniana* from northern Iran are referable to *P. tomentosa*. The specimen Renz & Iranshar 17756 bear glabrous follicles, it seems it does not need to raise a distinct taxon for it. It is obviously referable to *O. wittmanniana* var. *nudicarpa* of Flora Iranica (Riedl

1969).

3. *P. wendelboi* Ruksans & Zetterlund, *Alpine Gardener* 82 (2): 236 (2014).

Plant 20-40 cm high, more or less hairy only on the lower surface of leaflets and outer side of sepals. Stems simple. Scales at the base of stem up to 8×1.5 cm, oblong, brownish violet to purple. Lower leaves biternate; petioles 5-9 cm long; leaflets 4-8×3.5-6 cm, orbicular to broadly elliptic; upper leaves smaller, simply ternate. Flowers solitary, terminal. Sepals ca. 1.5 cm long and broad, semiorbicular to oblong, rounded at the apex, pale green. Petals 4-4.5 cm long, elliptic to broadly ovate, pure yellow. Filaments yellow; anthers ca. 4.5 mm long. Carpels 3-4, densely hairy.

Selected specimens: Azerbaijan: Asalem to Khalkhal, after the pass, 2000 m, Wendelbo & Assadi 27809, Assadi 30834, Termeh ahd Mousavi 68071 and 67072 (map 1).

This species grows on a shrubland slope of high elevations in a restricted area near Khalkhal, Azerbaijan. Some of the component species are *Berberis integerrima* Bunge, *Arum kotschyi* Boiss., *Verbascum gossypinum* M. Bieb. and *Allium akaka* Gmelin. Morphologically, it is clearly different from the other species of Iran and look likes the characters of *P. mlokosewitschii* Lomakin from Caucasus, Georgia. In *P. mlokosewitschii* plants are taller to 100 cm (not 20-40) and leaflets are narrow ovate to ovate (not broadly elliptic to broadly ovate). Moreover, according to the notes of the authors of *P. wendelboi*, the two species differs in ecological preferences (Ruksans & Zetterlund 2014).

ACKNOWLEDGMENTS

Thank to my colleague Dr. M. Mahmoudi for the preparation of the map.

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