معرفی یک گونه جدید، *Silene ghahremaninejadii* (تیره میخکیان)، از ایران

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چکیده.
در این مقاله *Silene ghahremaninejadii* از تیره میخکیان (Caryophyllaceae) به عنوان یک گونه جدید، بر اساس تفاوت‌های چشمگیر در صفات رویشی و زایشی خود با نزدیک‌ترین گونه های موجود، یعنی *S. marschallii* و *S. ruprechtii* شرح داده شده است. گونه جدید دارای قاعده فشرده، برگ ها و دمگل بدون کرک، کاسه استوانه ای فاقد کرک در سطح داخلی، گلبرگ شکافته به صورت عمیق و فاقد فلس های تاجی و میله پرچم بدون کرک است. در این مقاله همچنین فرضیه‌ای در مورد روند گونه‌زایی آن پیشنهاد شده است.

واژه‌های کلیدی. *سیلن*، *سیلن روپرختی*، *سیلن مارشالی*، غرب آسیا، فلورا ایرانیکا، لازیوستمونه

Introducing a new species, *Silene ghahremaninejadii* (Caryophyllaceae), from Iran

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Abstract. *Silene ghahremaninejadii* (Caryophyllaceae) is described as a new species to science in this article based on critical differences in certain characters of both vegetative and reproductive organs, compared with its closely related taxa, i.e. *S. marschallii* and *S. ruprechtii*. The new species has compact caudex, glabrous leaves and pedicles, cylindrical calyx without indumentums on its inner surface, deeply bifid petals without coronal scales and glabrous filaments. In addition, a hypothesis about the speciation process of the species is proposed.

Keywords. Flora Iranica, *Lasiostemones*, Sileneae, *Silene marschallii*, *Silene ruprechtii*

INTRODUCTION

Silene L., a diverse and well-distributed genus of the family Caryophyllaceae, has approximately 700 species around the world, of which nearly 98-101 species are thrived in Iran by various estimations (Edalatiyan *et al.*, 2010, 2011; Gholipour & Sheidai, 2009; Gholipour & Parsa Khanghah, 2015; Melzheimer, 1988).

Interestingly, at least 28 species out of them are considered as endemics (Edalatiyan *et al.*, 2011); in other words, the distribution of 4 percent of *Silene* species is geographically confined to Iran.

Generally, *Silene* members were classified into 42 sections by Chowdhuri (1957), of which 21 sections are present in Iran (Melzheimer, 1988).

This could be considered to be a good indication of its marvelus diversity and strong appeal for this

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speciation. After the publication of the number 163 of Flora Iranica (Melzheimer, 1988) which had been covered previously reported species, only two new species were introduced from Iran, i.e. *S. ferdowsii* Joharchi, Nejati & F.Ghahrem. (Edalatiyan *et al.*, 2011) and *S. mishudaghensis* Gholipour & Parsa Khanghah (Gholipour & Parsa Khanghah, 2015).

Taxonomic studies on *Silene* in Iran have not resulted in a satisfactory conclusion yet. To fill in the gap, herbarium specimens from important herbaria i.e., W, TARI, FAR and T (Thiers, continuously updated) are studied, which led to the discovery of unidentified specimens in TARI herbarium with interesting characteristics. The authors assumed that those specimens do not belong to any previously described species; hence a new species to the science, *Silene ghahremaninejadii sp. nov*.

MATERIAL AND METHODS

The aforementioned specimens were previously collected from Khamin protected area and deposited in TARI herbarium. These specimens were not matched to any previously described species and could not be identified by the identification keys of Flora Iranica (Melzheimer, 1988), Flora of Turkey (Coode & Cullen, 1967) and Flora of the USSR (Schischkin, 1936). Then the specimens were compared with the type specimens and other related materials deposited in G, W, LE and TARI herbaria (Thiers, 2016) via virtual herbaria and personal attendance.

RESULTS

Silene ghahremaninejadii Hoseini & Assadi **sp. nov.** (Figs. 1, 2).

Holotypus: Iran, Kuhgiluye and Boyerahmad province, Gachsaran, ToleTchegah, Khamin protectted area, Khamin mountain, 2700 m, 09.08.2002, Mehregan 85776 (TARI).

Perennial; Caudex compact, Stems branching mainly in below part, ascending to erect, upto 58 cm long, puberulent with eglandular hairs in lower parts (vegetative parts of the stems, i.e. before the initiation of inflorescent branches), then glabrous and highly viscid above.

Basal leaves rosette, pedicellate to sessile, linear-lanceolate to broadly lanceolate, subacute, 5-32×2-4.5 mm, glabrous; cauline leaves smaller in size and the same in shape. Inflorescence loose panicle, coinflorescence dichasium. Pedicles more than half of the length of the calyx, glabrescent to glabrous. Bracteoles small, with scarious margins, 1-1.5 mm long, ciliate.

Calyx cylindric, subcoriaceous, glabrous in inn-er surface and outer surface, 7-9 mm long, with 10 interconnecting nerves, sometimes with violet to purple shade; teeth obtuse, with ciliate and scarious margins. Petals white; claw without coronal scales, glabrous, with broad lateral margins, more or less included in the calyx; limb 2-3 mm long, glabrous, bifid to its base; Stamens more or less included in the calyx; filaments glabrous, more or less equal in length; Styles 3, glabrous; Capsule oblong, 6.5-7×2.5-3 mm; Anthophore (carpophore) glabrous to minutely puberulent, 2.5-4 mm long.

Distribution. The specimens of *S. ghahremaninejadii* were collected from an isolated high mountain in South-west of Iran. Therefore, the new species is a good candidate to be regarded as an endemic taxon with a very restricted distribution.

Etymology. The new species was named after Prof. Dr. Farrokh Ghahremaninejad (Tehran, Iran), a prominent Iranian botanist.

DISCUSSION

The most closely related taxa to *S. ghahremaninejadii* were *S. marschallii* C.A.Mey. and *S. ruprechtii* Schischk. Major differences between these species are listed in Table 1, but some additional notes must also be taken into consideration.

The distribution of neither of the related taxa stretched southward near the location of the discovered specimens of *S. ghahremaninejadii*, so there is no co-occurrence of *S. ghahremaninejadii* with *S. marschallii* or *S. ruprechtii* based on our present knowledge.

S. marschallii is more expansively distributed than the other related taxon, especially in Turkey, Iraq, Caucasus and North-western to the center of Iran.The southernmost known locality of the species in Iran is confined to the north of Semirom in Isfahan province.

Semirom is about 140 kilometers north of the Gachsaran, the area where the specimens of *S. ghahremaninejadii* has been collected.

S. ruprechtii is confined to the northwest of Iran, Caucasus and Turkey, hence fairly unconnected to the habitat of *S. ghahremaninejadii*.

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Fig. 1. The type specimen of *Silene ghahremaninejadii*.

Table 1. Comparison of *Silene ghahremaninejadii* with *S. marschallii* and *S. ruprechtii*.

Character / Taxa	***S. ghahremaninejadii***	***S. marschallii* (s.s)**	***S. ruprechtii***
Caudex	Compact	Caespitose	Compact
Plant height (cm)	Up to 58cm	Up to 53cm	17-26cm
Leaves indumentum	Glabrous	Puberulent	Glabrous
Dimension of basal leaf	5-32×2-4.5mm	27-47×1-3mm	10-25(-40) ×0.5-3mm
Pedicel	Glabrous to Glabrescent	Puberulent	Glabrous
Calyx shape	Cylindric	Campanulate	Campanulate
Inner calyx indumentum	Glabrous	Pubescent	Pubescent
Patel Limbs	Bifid down to the base	Bifid up to 1/3 (-1/2)	Bifid down to the base
Coronal Scale length	Absent	1.5-2 mm	1-1.5mm
Petal Claw	Not auriculate, broad	Auriculate, narrow	Auriculate, narrow
Petal claw indumentum	Glabrous	Pilose	Pilose
Filaments indumentum	Glabrous	Pilose	Pilose
Style	Glabrous	Pilose	Glabrous
Antophore	Glabrescent	Pubescent	Pubescent
Capsule Shape	Ovoid-oblong	Ovoid	Ovoid-oblong

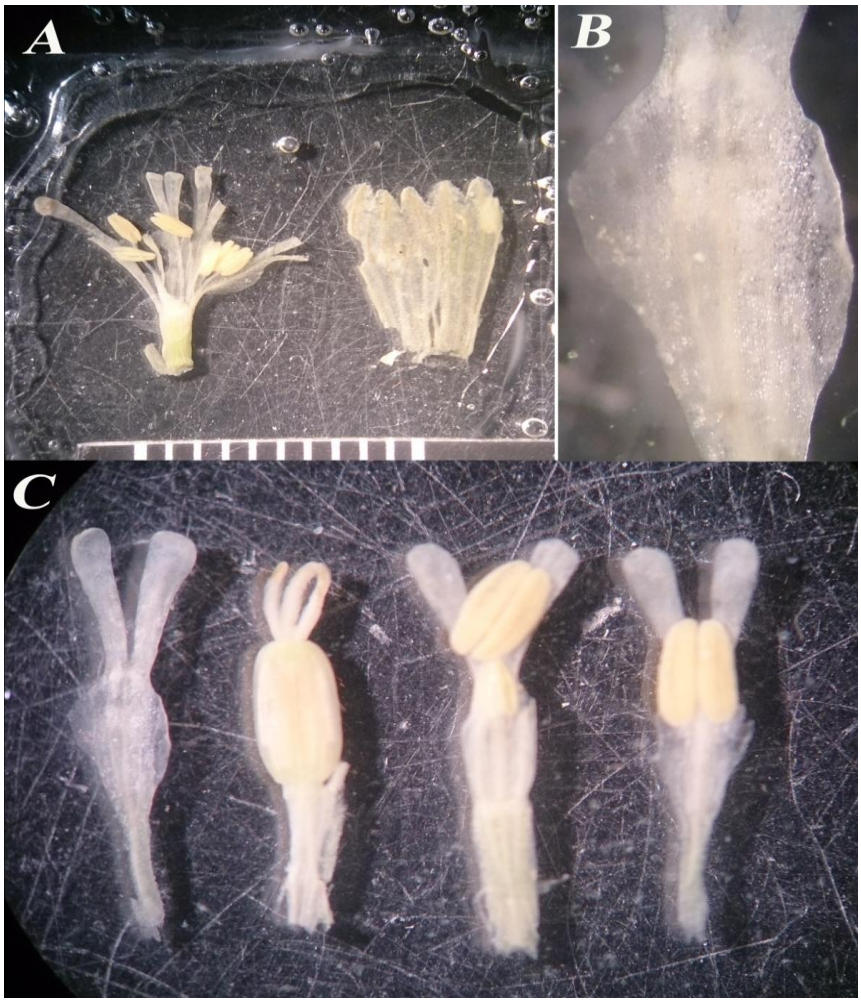

Fig. 2. A: Integrated floral parts (left) and Calyx (Right), **B**: Middle part of a petal; note the lack of auricles and coronal scales **C**: Integrated floral part.

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The separation of *S. ghahremaninejadii* from *S. marschallii* subsp. *sahendica* (Boiss. & Buhse) Melzh. is justified based on the plant height and the diameter of the basal leaves. Moreover, it is also noteworthy that the new species resembles to *S. ruprechtii* more than the *S. marschallii* by having compact caudex, glabrous pedicles and leaves, oblong-ovoid capsule and glabrous styles. However, it could be assumed that both *S. ghahremaninejadii* and *S. ruprechtii* were diverged separately from adjacent populations of *S. marschalli*.

Thus, the shared features of *S. ghahremaninejadii* and *S. ruprechtii* should be regarded as the examples of parallelism. The importance of petal appendages of flowers, e.g. auricles and coronal scales in *Silene*, in attracting pollinators was emphasized by Endress & Mattehews (2006). Therefore, the differences in the shape, size and developent of those visual signs among related taxa could alter the pollinators visiting the species, and therefore, place an additional obstacle against the gene flow among them, and promote the speciation process.

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