

A taxonomic study on the genus *Silene* (Caryophyllaceae) in Iranمطالعه تاکسونومیک جنس *Silene* (میخکیان) در ایران*

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Abstract

The genus *Silene* includes 98 species in Iran, with 35 endemic to the Iranian plateau (26 species for Iran). The Iranian species are placed in 21 sections. In this article, the most important characteristics for the separation of the sections, relationships between the sections, and an identification key for the sections in Iran are presented. For each section a distribution map is provided. The most important characters that separate sections are morphology and venation of the calyx, length and pubescence of the anthophore, shape and size of the corolla and coronal scales, capsule and seed. During the work on species existed in Herbarium of Ferdowsi University of Mashhad [FUMH], *S. parjumanensis* Podl. (Sect. *Auriculatae*) that had just been reported from Afghanistan in flora Iranica and a new taxon *Silene renzii* var. *khorrassanica* at a variety level is also described from Iran (southern Khorassan province) for the first time.

Keywords: New record, new taxon, taxonomy

چکیده

جنس *Silene* شامل ۹۸ گونه در ایران، با ۳۵ گونه انحصاری محدوده فلورا ایرانیکا است (۲۶ گونه انحصاری ایران) که در ۲۱ بخش طبقه‌بندی می‌شوند. در این مقاله، مهمترین ویژگی‌ها برای جدایی و ارتباط بین بخش‌ها مشخص شده، کلید شناسایی برای بخش‌ها در ایران تهیه شده است. همچنین برای هر بخش یک نقشه پراکنش آرایه شده است. مهمترین صفات جهت جدا کردن بخش‌ها عبارتند از: مورفولوژی و رگه‌بندی کاسه، طول آندوفور و جود یا عدم وجود کرک روی آن، اندازه و شکاف پهنکی (نوک چالدار، دو لوبی یا نوک کامل) و تاجک جام، ویژگی‌های کپسول و دانه. طی مطالعه نمونه‌های موجود در هرباریوم دانشگاه فردوسی مشهد جمع‌آوری شده از نقاط مختلف خراسان، *S. parjumanensis* Podl. از بخش *Auriculatae* که تاکنون فقط از افغانستان براساس فلور ایرانیکا گزارش شده بود و یک واریته جدید از همین بخش *Silene renzii* var. *khorrassanica* در این مقاله برای نخستین بار از ایران (استان خراسان جنوبی) گزارش می‌شود.

واژه‌های کلیدی: گزارش جدید، آرایه جدید، تاکسونومی

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Introduction

Silene L. is the largest genus in the family *Caryophyllaceae* with nearly 700 species world-wide (Melzheimer 1988), is mainly distributed in temperate regions of the northern hemisphere and has its principal centre of diversity in the Mediterranean region and the Middle East. The genus is mostly hermaphrodite although a few species are dioecious or gynodioecious (Bari 1973, Greuter 1995). The circumscription of the genus has long been controversial, with an expanding tendency during the past decades (Chowdhuri 1957, McNeill 1978, Greuter *et al.* 1984, Greuter 1995, Šouková 1978). The genus *Silene* includes several important weedy species, some very beautiful horticultural plants and some medicinal plants (Swank 1932, Vestal 1952, Oxelman & Lidén 1995). At the infrageneric level, a lumping trend has also been prevalent, from the multilevel hierarchical classification of Rohrbach (1869) to Chowdhuri (1957) use of only section and subsection.

Linnaeus (1754) divided the *Silene* group into four genera: *Lychnis* and *Agrostemma* with five styles, *Silene* and *Cucubalus* with (basally) trilocular capsules and three styles, and *Silene* distinguished by the presence of a corona. The first revision on *Silene* was done by Rohrbach (1869). He divided the genus into two subgenera: *Silene* subg. *Silene* and *S.* subg. *Behen*, the latter with two informal groupings, "*Conosilene*" (i.e. *Pleconax*) and "*Eusilene*", largely on the basis of the type of inflorescence. "*Eusilene*" was further divided into three sections: *Silene* Sect. *Dichasiosilene*, Sect. *Cincinnosilene* and Sect. *Botryosilene*. This subdivision of the genus survived almost a century with minor modifications (Williams 1896, Pax & Hoffmann 1934, Shishkin 1936). Chowdhuri (1957) not only expanded

the genus, but also abandoned the recognition of subgenera and recognized 44 sections, some of which were divided into subsections (Oxelman & Lidén 1995).

Cytogenetic studies on *Silene* species of the Sect. *Auriculatae* and Sect. *Lasiostemones*, have been performed by Gholipour *et al.* (2008). Although, all species studied by them showed $2n=2x=24$ chromosome number supporting the earlier reports, the chromosome numbers of some species are new to science. Also they claimed *Silene* species differ in their karyotypic formulae indicating the occurrence of structural changes in their chromosomes.

In Iran, *Silene* includes 98 species with 26 endemic species. The Iranian species are placed in 21 sections (Melzheimer 1988). Major areas of species for the Iranian sections occur in the west of the country (Figs 1 & 2).

Materials and Methods

For taxonomic research, prior to the field studies, all information was gathered from various floras such as Flora Orientalis (Boissier 1867), Flora of Palaestina (Zohary 1966), Flora of Turkey (Cood & Cullen 1967), Flora USSR (Shishkin 1936), Flora Europea (Tutin 1964) and Flora Iranica (Melzheimer 1988). Based on this, all the specimens of *Silene* species (nearly 500 specimens) are preserved in Farabi Herbarium of Tarbiat Moallem University (FAR), Central Herbarium of Tehran University (TUH), Ferdowsi University of Mashhad Herbarium (FUMH), and some of specimens of Naturhistorisches Museum Wien (W) were also studied. In addition, taxonomic identification of the plant specimens collected from different areas of Iran was done accordingly.

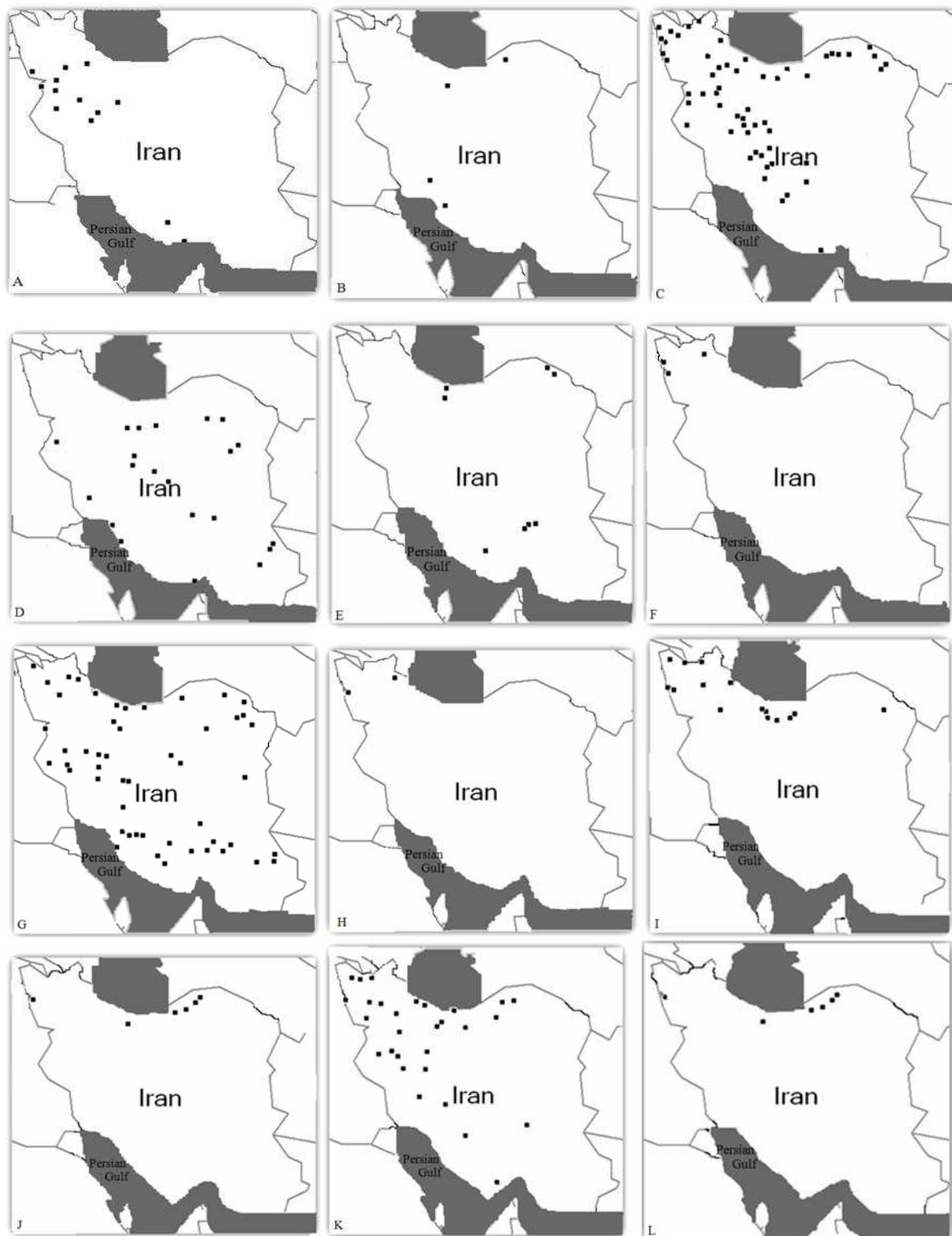


Fig. 1. Distribution maps: A. Sect. *Ampullatae*, B. Sect. *Atocion*, C. Sect. *Auriculatae*, D. Sect. *Bipartitae*, E. Sect. *Chloranthae*, F. Sect. *Compactae*, G. Sect. *Conoimorphae*, H. Sect. *Fimbriatae*, I. Sect. *Inflatae*, J. Sect. *Lasiocalycinae*, K. Sect. *Lasiostemones*, L. Sect. *Lychnidiformes*.

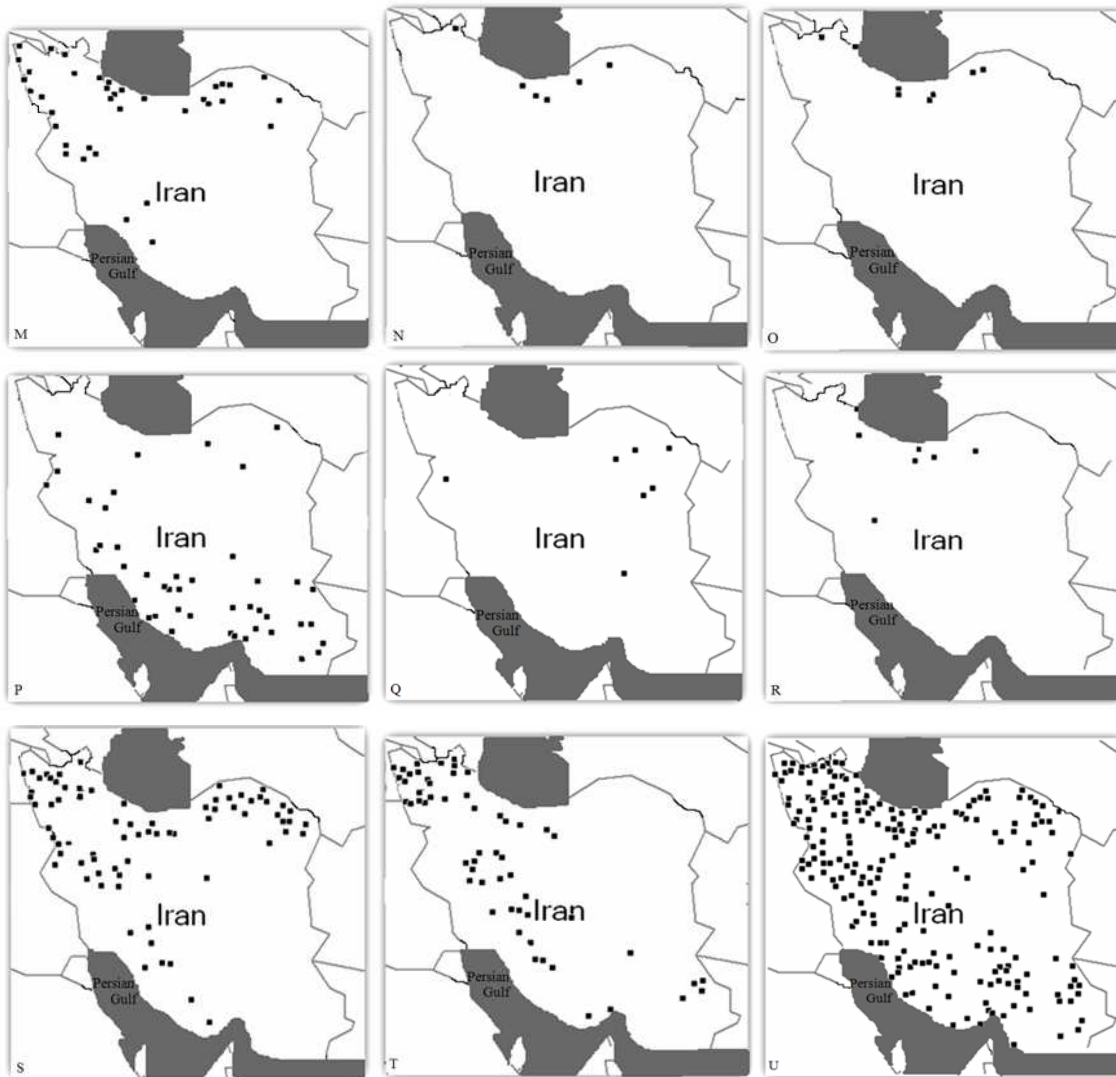


Fig. 2. Distribution maps: M. Sect. *Melandriiformes*, N. Sect. *Otites*, O. Sect. *Paniculatae*, P. Sect. *Rigidulae*, Q. Sect. *Saponarioideae*, R. Sect. *schaftae*, S. Sect. *Sclerocalycinae*, T. Sect. *Spergulifoliae*, U. Genus *Silene*.

Key to the Iranian sections of *Silene*

1. Plants annual or biennial 2
- Plants perennial 13
2. Calyx 15–30-veined 7. *Conoimorpha* Otth in DC.
- Calyx (5–)10-veined 3
3. Stems glabrous 4
- Stems hairy 6
4. Pedicle pubescent (glandular and eglandular). Calyx with eglandular and glandular hairs; teeth obtuse. Claw not auriculate 2. *Atocion* Otth in DC.
- Pedicle glabrous. Calyx glabrous; teeth acute. Claw auriculate 5
5. Plants tall up to 120 cm high. Flowers numerous crowded in compact dichasia at tip of stems. Calyx clavate-cylindric, umblicate at the base. Claw in lower parts hairy 6. *Compactae* Boiss.
- Plants dwarf up to 15 cm high. Flowers 3–10 rarely solitary in non-compact dichasia. Calyx campanulate, not umblicate at the base. Claw glabrous 17. *Saponarioideae* Boiss.

6. Flowers bisexual, usually solitary or in pairs. Calyx longer than 7 mm long 7
 - Flowers unisexual, numerous 6–20 (–30), clustered in verticillasters or heads. Calyx small up to 7 mm long
 14. *Otites* (Adans) Otth in DC.
7. Stems often pubescent above glabrous 8
 - Stems glandular and eglandular-pubescent 9
8. Leaves wide, spatulate to elliptic. Pedicle glandular and- eglandular pubescent. Calyx glandular and eglandular
 pubescent. Petal limb emarginate; claw not auriculate 2. *Atocion* Otth in DC.
 - Leaves linear to lanceolate. Pedicle glabrous. Calyx glandular, rarely glabrous. Petal limb bifid; claw auriculate
 16. *Rigidulae* Boiss.
9. Plants dioecious. Flowers unisexual. Styles 3 or 5 13. *Melandrifformes* Boiss.
 - Plants monoecious. Flowers bisexual. Styles 3 10
10. Inflorescence narrow, raceme-like; pedicle reduced 5. *Chloranthae* (Rohrb.) Schischk.
 - Inflorescence usually cyme ± regular; pedicle tall often up to 50 mm long 11
11. Calyx teeth up to 11 mm long. Staminal filaments pubescent 13. *Melandrifformes* Boiss.
 - Calyx teeth short until 3 mm long. Staminal filaments glabrous 12
12. Plants up to 25 cm high. Inflorescence monochasial, rarely dichasial. Calyx glandular rarely eglandular-pubescent,
 fruiting calyx not contract above. Anthophore pubescent 4. *Bipartitae* Boiss.
 - Plants tall up to 70 cm high. Inflorescence dichasial, with long monochasial branches. Calyx with multicellular hairs
 rarely glandular, fruiting calyx contract above. Anthophore glabrous 10. *Lasiocalycinae* Boiss.
13. Stems glabrous 14
 - Stems hairy 16
14. Inflorescence dichasial. Claw auriculate. Anthophore hairy rarely glabrous. Capsule ovate-globose
 9. *Inflatae* Boiss.
 - Inflorescence panicle or racemose. Claw not auriculate. Anthophore glabrous. Capsule cylindrical to ovate 15
15. Plants monoecious, stems viscid. Leaves lanceolate to cordate (up to 26 mm wide). Calyx glabrous. Claw and styles
 glabrous 19. *Sclerocalycinae* Boiss.
 - Plants often gynodioecious, stems non viscid. Leaves filiform to linear-lanceolate (up to 2.5 mm wide). Calyx with
 glandular and eglandular-pubescent. Claw pubescent. Styles ciliate 20. *Spergulifoliae* Boiss.
16. Stems glandular and eglandular or just glandular pubescent 17
 - Stems simple puberulus 22
17. Plants dioecious. Leaves filiform. Flowers unisexual, numerous, small. Capsule one or two-seeded
 1. *Ampullatae* Boiss.
 - Plants monoecious. Leaves lanceolate to cordate. Flowers bisexual, few rarely numerous, large. Capsule many-seeded
 18
18. Calyx campanulate. Petal limb divided into many parts 8. *Fimbriatae* Boiss.
 - Calyx clavate-cylindrical seldom campanulate. Petal limb bifid 19
19. Pedicle reduced. Petal limb without coronal scales. Staminal filaments and claw pubescent
 5. *Chloranthae* (Rohrb.) Schischk.
 - Pedicle 2 to 32 mm long. Petal limb with coronal scales. Staminal filaments glabrous. Claw often glabrous
 20
20. Plants tall up to 100 cm high. Pedicle viscid. Calyx glabrous or glandular pubescent, inflated, umblicate at the base
 9. *Inflatae* Boiss.

- Plants to 40 (–60) cm high. Pedicle non-viscid. Calyx with glandular and eglandular-pubescent, not inflated, not umbilicate at the base 21
- 21. Inflorescence panicle rarely one-flowered. Bracts pubescent to 6 mm long. Petals violaceous; claw not auriculate..... 8. *Schaftae* Boiss.
- Inflorescence dichasial or racemose seldom one-flowered. Bracts with glandular and eglandular and rarely puberulus up to 12 mm long. Petals often white; claw auriculate 3. *Auriculatae* Boiss.
- 22. Indumentum dense sericeous, white-tomentose. Veins of calyx 5–10, valid, costate. Styles 5. Capsule ± sessile 12. *Lychnidiformes* Melzh.
- Indumentum not dense sericeous, white-tomentose or glabrous. Veins of calyx 10, thin, not costate. Styles 3. Capsule usually with gynophore 23
- 23. Calyx glabrous 24
- Calyx hairy..... 25
- 24. Leaves glabrous (ciliate at the margin), glaucous. Anthophore, staminal filaments, styles glabrous 19. *Sclerocalycinae* Boiss.
- Leaves farinose-papillate, green. Anthophore, staminal filaments, styles hairy 11. *Lasiostemones* Boiss.
- 25. Plants often stoloniferous, stems viscid above. Calyx inflated. Petal limb without coronal scales 15. *Paniculatae* Boiss.
- Plants rarely stoloniferous, stems usually not viscid above. Calyx often not inflated. Petal limb with coronal scales..... 26
- 26. Calyx glabrous or puberulent. Staminal filaments pubescent 11. *Lasiostemones* Boiss.
- Calyx with eglandular and glandular hairs. Staminal filaments glabrous 27
- 27. Plants gynodioecious. Leaves filiform to linear-lanceolate (up to 2.5 mm wide). Inflorescence panicle 20. *Spergulifoliae* Boiss.
- Plants mostly monoecious rarely gynodioecious. Leaves lanceolate to spatulate. Inflorescence dichasial or racemose or one-flowered 3. *Auriculatae* Boiss.

Sections

1. *Silene* Sect. *Ampullatae* Boiss. (1867)

Section *Ampullatae* is well distinguished from all other sections by its unisexual flowers, leaves filiform, a swollen calyx and capsule with 1–2 seeds.

Characteristics: Perennial with eglandular and glandular hairs. Inflorescence paniculate-racemose. Flowers unisexual, numerous. Calyx ovate to oblong-cylindric, inflated, pubescent. Petal limb bifid; claw sparsely ciliate, not auriculate; coronal scale absent. Anthophore pubescent. Staminal filaments glabrous. Styles 3. Distribution: A single species in SW of Asia. Iran: One species (*S. ampullata*) distributed in W & C parts of the country.

Specimens seen: *S. ampullatus* Boiss.: W: Attar & Dadjou 16892 [TUH]; Atee 6196 [TUH].

2. *Silene* Sect. *Atocion* Otth in DC. (1824)

Morphologically, the closest relative of this section is Sect. *Rigidulae* but Sect. *Atocion* differs from it in shape of leaves, having no auricles on claw and pubescence type of calyx.

Characteristics: Annual, eglandular-glandular or glabrous. Inflorescence dichasial; pedicle pubescent (glandular and eglandular). Calyx often cylindrical-clavate, glandular or eglandular pubescent, umbilicate. Petal limb emarginate; claw glabrous, not auriculate; coronal scales present, obtuse. Anthophore pubescent or glabrous. Staminal filaments glabrous. Styles 3.

Distribution: Three species in SW of Asia, East Africa and Middle East. Iran: Two species (*S. rubella*, *S. atocioides*) distributed in N, W, S & C parts of the country.

Specimens seen: *S. atocioides* Boiss.: C: without collector 13073 E [W] – *S. rubella* L.: S: Terme 34442 E [W].

3. *Silene* Sect. *Auriculatae* Boiss. (1867)

Morphologically, the closest relatives of this section are *Spergulfoliae* and *Ampullatae*. It differs from *Ampullatae* in flowers type, and from *Spergulfoliae* in plant type, inflorescence.

Characteristics: Perennial, monoecious, with glandular and eglandular hairs. Inflorescence dichotomous or alternately racemose or cyme rarely unflowered. Bracts glandular and eglandular pubescent or puberulus. Calyx cylindrical-clavate, glandular-eglandular pubescent. Petal limb bifid; claw glabrous, auriculate above; coronal scales present, emarginate rarely bifid. Anthopore puberulent rarely glabrous. Staminal filaments glabrous. Styles 3.

Distribution: The largest section of the genus with 47 species in SW & C of Asia, Caucasia and Middle East. Iran: Thirty five species distributed in N, W, E, C & S parts of the country.

Specimens seen: *S. albescens* Boiss.: C: Parishani 14587 S [FUMH] – *S. aucheriana* Boiss.: E: Raafei & Zangoeei 27303 [FUMH]; Raafei & Zangoeei 29155 [FUMH]; Ayatollahi & Mahvan 11309 [FUMH]; Faghihnia & Zangoeei 31314 [FUMH]; Faghihnia & Zangoeei 23945 [FUMH]; Joharchi & Zangoeei 16899; Joharchi & Zangoeei 14473 [FUMH]; Erther 32504 [FUMH]; Rezvanian 23090 [TUH]; W: Ghahreman, Attar & Gaffari 21691 [TUH]; Mozaffarian 64398 [TUH]; American-Iranian Botanical delegation 34240 [TUH]; Attar & Zamani 36196 [TUH]; Attar & Dadjou 16839 [TUH]; Arefii 6226 [TUH]; C: Attar & Okhovvat 21259 [TUH]; Eslami 29575 [TUH]; Ghahreman & Mozaffarian 5750 [TUH]; Ghahreman & Mozaffarian 5795 [TUH]; Azzat & Ganjalizadeh 6197 [TUH] – *S. commelinifolia* Boiss.: W: Attar & Okhovvat 19603 [TUH]; without collector 598 [TUH]; American-Iranian Botanical Delegation 34632 [TUH]; American-Iranian Botanical Delegation 34725 [TUH]; C: Mobayyen 6198 [TUH]; Attar & Mehdigholi 25570 [TUH]; Ghahreman

& Mozaffarian 9944 [TUH]; Rezvanian 23093 [TUH]; Podlech & Zarre 55130 [TUH]; Ghahreman & Mozaffarian 5767 [TUH]; N: Podlech & Zarre 55188 [TUH]; Ghahreman & Attar 21245 [TUH]; Saidi 18754 [TUH]; Nazarian 33444 [TUH] – *S. crispans* Litw.: E: Joharchi & Zangoeei 12909 [FUMH]; Joharchi & Zangoeei 16382 [FUMH]; Ghorashi 749 G [FUMH]; Ghorashi 707 G [FUMH]; Joharchi & Zangoeei 20519 [FUMH]; Ayatollahi & Mahvan 11078 [FUMH] – *S. eriocalycinae* Boiss.: S: Attar, Khatamsaz & Sheikholeslami 20372 [TUH]; W: Ghahreman, Attar & Mehdigholi 25383 [TUH]; W: Podlech & Zarre 55176 [TUH] – *S. microphylla* Boiss.: W: Gholiour 27105 [TUH]; Assadi 6232 [TUH] – *S. gertraudiae* Melzh.: E: Joharchi & Zangoeei 17217 [FUMH] – *S. indepressa* Schischk.: E: Ayatollahi & Mahvan 11309 [FUMH]; Faghihnia & Zangoeei 20870 [FUMH]; Joharchi & Zangoeei 12928 [FUMH]; Memariani & Zangoeei 35659 [FUMH]; Ghorashi 996 G [FUMH]; Joharchi & Zangoeei 16796 [FUMH] – *S. meyeri* Fenzl ex Boiss. & Buhse.: W: Mozaffarian 69869 [TUH]; Ghahreman & Mozaffarian 9684 [TUH]; without collector 609 [TUH] – *S. persepolitana* Melzh.: S: Attar, Khatamsaz & Sheikholeslami 20359 [TUH] – *S. persica* Boiss.: S: Vaezi & Hakimi 16409 [TUH] – *S. pseudaucheriana* Melzh 23964 [TUH] – *S. renzii* Melzh.: E: Raafei 30927 [FUMH]; Joharchi & Zangoeei, 43215 [FUMH].

4. *Silene* Sect. *Bipartitae* Boiss. (1867)

Morphologically, the closest relative of this section is Sect. *Lasiocalycinae*. Sect. *Bipartitae* differs from it in inflorescence type, calyx contraction and anthophore pubescent.

Characteristics: Annual, with eglandular and glandular hairs. Inflorescence monochasial rarely dichasial. Calyx cylindrical-clavate, glandular rarely eglandular pubescent. Petal limb bifid; claw glabrous, not auriculate; coronal scales present. Anthophore pubescent. Staminal filaments glabrous. Styles 3.

Distribution: Three species in SW & S of Asia, Africa and Mediterranean area. Iran: The species distributed in W, E, C and S parts of the country.

Specimens seen: *S. arabica* Boiss.: C: Jalali 3155 [FAR]; S: Heydari 35681 [FAR]; Ghahreman & Mozaffarian 9529 [TUH]; E: Raafei & Zangooei 28343 [FUMH]; Faghihnia & Zangooei 21433 [FUMH]; Faghihnia & Zangooei 21487 [FUMH]; Hojjat & Zangooei 29822 [FUMH]; Faghihnia & Zangooei 32127 [FUMH]; Faghihnia & Zangooei 30028 [FUMH]; Zargari 1250 [FUMH]; Rashed & Zangooei 15121 [FUMH]; Faghihnia & Zangooei 32104 [FUMH]; Zokaei & Joharchi 598 [FUMH]; Ayatollahi & Zangooei 13800 [FUMH]; Joharchi 1400 G [FUMH]; Rafiee & Zangooei 26367 [FUMH]; Faghihnia & Zangooei 22642 [FUMH]; Raafei & Zangooei 26212 [FUMH]; Raafei & Zangooei 24905 [FUMH]; Joharchi & Zangooei 16025 [FUMH]; Ayatollahi & Zangooei 13749 [FUMH]; Rafeie & Zangooei 24833 [FUMH]; Faghihnia & Zangooei 21625 [FUMH]; Faghihnia & Zangooei 19630 [FUMH]; Faghihnia & Zangooei 18052 [FUMH]; Faghihnia & Zangooei 21558 [FUMH]; Faghihnia & Zangooei 19852 B [FUMH]; Joharchi & Zangooei 17199 [FUMH]; Ayatollahi & Zangooei 13688 [FUMH]; Parsa 6236 [TUH] – *S. villosa* Forssk.: S: Ghahreman & Mozaffarian 14096 [TUH].

5. *Silene* Sect. *Chloranthae* (Rohrb.) Schischk. (1868)

Morphologically, the closest relatives of this section are Sect. *Compactae* and Sect. *Saponarioideae*. This section differs from them in presence pubescence on plant and calyx.

Characteristics: Perennial with glandular pubescence. Inflorescence a long narrow panicle, few-flowered; pedicle reduced. Calyx glandular pubescent, oblong-clavate. Petal limb bifid; claw hairy in lower parts, not auriculate; coronal scales absent. Anthophore pubescent sometimes glabrous. Staminal filaments pubescent. Styles 3.

Distribution: A single species in Europe, E, C, W, S & N of Asia and Caucasia. Iran: One species (*S. viscosa*) distributed in N, W, E, S & C parts of country.

Specimens seen: *S. viscosa* (L.) Pers.: C: Nejati, Khajepiri & Tavakoli 55 [FAR]; E: Faghihnia & Zangooei 24358 [FUMH]; Faghihnia & Zangooei 27437

[FUMH]; Faghihnia & Zangooei 32813 [FUMH]; Joharchi 34732 [FUMH]; Faghihnia & Zangooei 31376 [FUMH]; Joharchi & Nasseh 34301 [FUMH]; Faghihnia & Zangooei 478 [FUMH]; Faghihnia & Zangooei 23439 [FUMH]; Joharchi 33617 [FUMH]; Raafei & Zangooei 27705 [FUMH]; Raafei & Zangooei 25961 [FUMH]; Raafei & Zangooei 25961 [FUMH]; Raafei & Zangooei 27647 [FUMH]; Rezvanian 23101 [TUH]; W: Ghahreman & Mozaffarian 17408 [TUH].

6. *Silene* Sect. *Compactae* Boiss. (1867)

Morphologically, the closest relative of this section is Sect. *Saponarioideae*. Sect. *Compactae* differs from it in length of stems, inflorescence type, calyx shape and claw glabrous.

Characteristics: Biennial or annual, glabrous. Flowers short-pedicled, crowded in a compact inflorescence at tip of stems and branches. Calyx cylindric-clavate, glabrous. Petal limb emarginate or entire; claw hairy, auriculate; coronal scales present. Anthophore glabrous. Staminal filaments glabrous. Styles 3.

Distribution: One species in Europe, Middle East, SW of Asia and Caucasia. Iran: A single species (*S. compacta*) grown in W parts of the country.

Specimens seen: *S. compacta* Fisch.: W: Ghahreman, Hamzehee & Attar 35576 [TUH]; Moazzeni & Keshvari 34972 [TUH]; Ghahreman, Mozaffarian & Sheikholeslami 17503 [TUH].

7. *Silene* Sect. *Conoimorpha* Otth in DC. (1824)

Section *Conoimorpha* is well distinguished from all other sections by number of calyx veins.

Characteristics: Annual, glandular-eglandular pubescent. Inflorescence dichasial. Calyx veins 15–60, ovate or conical-tubular, narrowed above, glandular-eglandular pubescent. Petal limb emarginate to bifid; claw auriculate, glabrous; coronal scales present, rarely reduced. Anthophore hairy. Staminal filaments pubescent. Styles 3.

Distribution: three species in Mediterranean area, Africa, N, SW, S & C of Asia. Iran: species of this section distributed in S, N, W, E & C parts of the country.

Specimens seen: *S. conica* L.: N: Rostami & Takabi 3086 [FAR]; E: Joharchi & Zangoeei 20511 [FUMH]; Faghihnia & Zangoeei 27441 [FUMH]; N: Tregubov 6216 [TUH]; without collector 4440 [TUH]; Naqinezhad 27208 [TUH]; Mozaffarian 6851 [TUH] – *S. coniflora* Nees ex Otth.: E: Emadzadeh, Memariani & Zangoeei 36346 [FUMH]; Ayatollahi 15047 [FUMH]; Halalzade & Mahvan 10025 [FUMH]; Ayatollahi 15058 [FUMH] – *S. conoidea* L.: W: Abdoli 30155 [FAR]; Samiee 17103 [FAR]; Veiskarami 23962 [TUH] – S: Rokhdadad 25938 [FAR]; Mirtadzedini 28731 [TUH]; Tregubov 4480 [TUH]; Mobayyen 6237 [TUH]; Attar & Dadjou 12944 [TUH]; E: Ghorashi 253 G [FUMH]; Joharchi & Zangoeei 20511 [FUMH]; Emadzadeh, Memariani & Zangoeei 36346 [FUMH]; Raafei & Zangoeei 29083 [FUMH]; Ghorashi 724 G [FUMH]; Joharchi & Zangoeei 23130 [FUMH]; Ghorashi 329 G [FUMH]; Ayatollahi & Zangoeei 13865 [FUMH]; Ghorashi 1403 G [FUMH]; Faghihnia & Zangoeei 25160 [FUMH]; Faghihnia & Zangoeei 30058 [FUMH]; Zokaei & Ghorashi 524 [FUMH]; Faghihnia & Zangoeei 30354 [FUMH]; Faghihnia & Zangoeei 30243 [FUMH]; Ghorashi 387G [FUMH]; Zokaei 1043 [FUMH]; Safavi & Zangoeei 12293 [FUMH]; Joharchi & Zangoeei 21979 [FUMH]; Zokaei 925 [FUMH]; Faghihnia & Zangoeei 25220 [FUMH]; Faghihnia & Zangoeei 29043 [FUMH]; Faghihnia & Zangoeei 29017 [FUMH]; Joharchi & Zangoeei 15382 [FUMH]; Faghihnia & Zangoeei 18354 [FUMH]; Raafei & Zangoeei 26017 [FUMH]; Emadzadeh, Memariani & Zangoeei 36331 [FUMH]; Hojjat & Zangoeei 32331 [FUMH]; Faghihnia & Zangoeei 33307 [FUMH]; Zangoeei 24289 [FUMH]; Faghihnia & Zangoeei 31379 [FUMH]; Ghorashi 705 G [FUMH]; Joharchi & Zangoeei 20493 [FUMH]; Faghihnia & Zangoeei 27532 [FUMH]; C: Ghahreman 733/6201 [TUH]; N: Saidi 18755 [TUH].

8. *Silene* Sect. *Fimbriatae* Boiss. (1867)

Morphologically, the closest relatives of this section are Sect. *Inflatae* and Sect. *Paniculatae*. This section differs from them in petal limb that divided into many parts.

Characteristics: Perennial, caespitose, glandular-pubescent. Inflorescence dichasial, Flowers hermaphrodite. Calyx campanula, glandular-pubescent. Petal limb divided into many parts; claw not auriculate, glabrous; coronal scales absent rarely present. Anthophore glabrous or puberulent. Staminal filaments glabrous. Styles 3.

Distribution: Two species in SW of Asia and Caucasia. Iran: One species (*S. multifida*) distributed in W parts of the country.

Specimens seen: *S. multifida* (Adams) Rohrb.: W: Ghahreman, Mozaffarian & Sheikholeslami 17527 [TUH].

9. *Silene* Sect. *Inflatae* Boiss. (1867)

Morphologically, the closest relative of this section is Sect. *Fimbriatae*. Sect. *Inflatae* differs from it in divisions of petal limb.

Characteristics: Perennial, glabrous or glandular-eglandular pubescent. Inflorescence dichasial. Calyx oblong to campanula, glabrous or glandular, often umblicate at the base. Petal limb bifid; claw auriculate, glabrous or pubescent; coronal scales present rarely reduced. Anthophore puberulent rarely glabrous. Staminal filaments glabrous. Styles 3.

Distribution: Eight species in Europe, Africa and temperate Asia. Iran: Three species distributed in E, W, N & C parts of the country.

Specimens seen: *S. odontopetala* Fenzl.: W: Veiskarami 23963 [TUH]; Ghahreman & Mozaffarian 18337 [TUH]; C: Eslami 29571 [TUH] – *S. pungens* Boiss.: W: Ghahreman & Mozaffarian 9673 [TUH] – *S. vulgaris* (Moench) Garcke.: C: without collector 045532 [FAR]; Ghaffari 045531 [FAR]; N: Taheri 026669 [FAR]; Azzat & Ganjalizadeh 6234 [TUH]; W: Ghahreman & Mozaffarian 17529 [TUH]; Ghahreman & Mozaffarian 9681 [TUH]; N: Nazarian 33192 [TUH].

10. *Silene* Sect. *Lasiocalycinae* Boiss. (1867)

Morphologically, the closest relative of this section is Sect. *Bipartitae*. Sect. *Lasiocalycinae* differs from it length of stems, inflorescence type, anthophore

glabrous.

Characteristics: Annual or biennial, glandular-eglandular pubescent. Inflorescence dichasial, with long monochasial branches rarely monochasium. Calyx cylindrical-ovate or campanula, with multicellular hairs rarely glandular, often umblicate at the base. Petal limb entire or emarginate; claw glabrous; coronal scales present. Anthophore glabrous. Staminal filaments glabrous. Styles 3.

Distribution: Four species in Eurasia, Mediterranean area, Middle East, SW & S of Asia, Caucasia and Balkan Peninsula. Iran: Iranian species distributed in E, N, S & C parts of the country.

Specimens seen: *S. apetala* Willd.: S: Mashayekhi 32103 [FAR]; Kyassat 6218 [TUH]; N: Naqinezhad 27834 [TUH]; S: Ghahreman & Attar 32765 [TUH] – E: Ayatollahi & Zangooei 14125 [FUMH]; Faghihnia & Zangooei 22942 [FUMH] – *S. dichotoma* Ehrh.: W: without collector 28819 [FAR]; Ghahreman & Mozaffarian 17431 [TUH]; C: Karimi 13421 [FAR]; Rezvanian 23094 [TUH]; Parsa 4612 [TUH] – *S. gallica* L.: N: Naqinezhad 27286 [TUH]; W: Mehregan 32296 [TUH] – *S. lagenocalyx* Fenzl & BOiss.: W: Marburg 6428 [W].

11. *Silene* Sect. *Lasiostemones* Boiss. (1867)

Morphologically, the closest relatives of this section are Sect. *Spergulifoliae* and Sect. *Paniculatae*. This section differs from Sect. *Spergulifoliae* in auricles and staminal filaments pubescent, calyx eglandular-pubescent and from Sect. *Paniculatae* in pubescent staminal filaments and having coronal scales.

Characteristics: Perennial, eglandular pubescent. Paniculate inflorescence. Calyx obconical-cylindrical, glabrous or puberulent. Petal limb bifid emarginate rarely entire; claw often auriculate, pubescent rarely glabrous; coronal scales present. Anthophore pubescent. Staminal filaments pubescent. Styles 3.

Distribution: Seventeen species in Mediterranean area, SW & C of Asia, Caucasia and Middle East. Iran: Ten species (two species are endemic) distributed in W, S, N & C parts of the country.

Specimens seen: *S. marschallii* C.A. Mey.: C: Nejati, Khajepiri & Tavakoli 58 [FAR]; Azzat & Ganjalizadeh 6207 [TUH]; Ghahreman & Sheikholeslami 6223 [TUH]; without collector 6233 [TUH]; Podlech & Zarre 55156 [TUH]; Podlech & Zarre 55131 [TUH]; W: Ghahreman & Sheikholeslami 6271 [TUH] – *S. macrowizicii* Schischk.: C: Eslami 29572 [TUH] – *S. propinqua* Schischk.: N: Podlech & Zarre 55195 [TUH].

12. *Silene* Sect. *Lychnidiformes* Melzh. (1988)

Morphologically, the closest relative of this section is Sect. *Melandrifformes*. Sect. *Lychnidiformes* differs from it in number of styles, calyx veins and indumentum.

Characteristics: Perennial, indumentum dense sericeous, white-tomentose. Inflorescence dichasial; pedicle long. Calyx campanula, coriaceous, 5–10 veins, sericeous-tomentose. Petal limb emarginate or entire; claw glabrous; coronal scales present. Anthophore glabrous. Staminal filaments glabrous. Styles 5.

Distribution: A single species in Europe, SW & C of Asia. Iran: One species grown in N parts of the country. Specimens seen: *S. coronaria* (L.) Clairv.: N: Akhani 9818 [W]; Terme 44518 E [W].

13. *Silene* Sect. *Melandrifformes* Boiss. (1867)

Morphologically, the closest relatives of this section are Sect. *Otites* and Sect. *Lychnidiformes*. This section differs from Sect. *Otites* in number of styles, inflorescence, indumentum, and from Sect. *Lychnidiformes* calyx veins and indumentum.

Characteristics: Perennial or annual, dioecious rarely monoecious, glandular-eglandular pubescent. Inflorescence dichasial; flowers hermaphrodite. Calyx oblong to campanula, glandular-eglandular pubescent. Petal limb bifid; claw rarely auriculate, glabrous; coronal scales usually present. Anthophore pubescent rarely glabrous. Staminal filaments pubescent. Style 3 or 5.

Distribution: Six species in SW, S & C of Asia, Europe, Middle East and Caucasia. Iran: Two species (*S. latifolia* and *S. noctiflora*) distributed in S, N, W, E &

C parts of the country.

Specimens seen: *S. latifolia* Poir.: C: Nejati, Khajepiri & Tavakoli 55 [FAR]; Nejati, Khajepiri & Tavakoli 56 [FAR]; Nejati, Khajepiri & Tavakoli 57 [FAR]; Rezvanian 23095 [TUH]; Eslami 29565 [TUH] W: Hadadian 3143 [FAR]; Mahmoodi 13277 [FAR]; Podlech & Zarre 55323 [TUH]; E: Faghihnia & Mehrvar 24132 [FUMH]; Faghihnia & Zangooei 20382 [FUMH]; Faghihnia & Zangooei 24683 [FUMH]; Faghihnia & Zangooei 20877 [FUMH]; Faghihnia & Zangooei 20385 [FUMH]; Ayatollahi & Joharchi 13012 [FUMH]; Faghihnia & Zangooei 18635 [FUMH]; Joharchi & Safavi 12575 [FAR]; Faghihnia & Zangooei 20161 [FUMH]; Faghihnia, Raafei & Zangooei 25488 [FUMH]; Joharchi & Zangooei 21961 [FUMH]; Rashed, Bakhshoode & Rezaei 10186 [FUMH]; Hojjat & Zangooei 28765 [FUMH]; Joharchi & Zangooei 33475 [FUMH]; Raafei & Zangooei 29635 [FUMH]; Faghihnia & Zangooei 26773 [FUMH]; Faghihnia & Zangooei 22395 [FUMH]; Joharchi & Zangooei 16781 [FUMH]; Raafei & Zangooei 27058 [FUMH]; Joharchi & Zangooei 16339 [FUMH]; Faghihnia & Zangooei 27506 [FUMH]; Raafei & Zangooei 27221 [FUMH]; Joharchi & Zangooei 33416 [FUMH]; Faghihnia & Mehrvar 24074 [FUMH]; Joharchi & Zangooei 17396 [FUMH]; Faghihnia & Zangooei 22113 [FUMH]; Raafei & Zangooei 27375 [FUMH]; Hojjat & Zangooei 32874 [FUMH]; N: Nazarian 33225 [TUH]; Naqinezhad 27206 [TUH]; Saidi 18739 [TUH]; Naqinezhad 27206 [TUH] – *S. noctiflora* L.: C: Mosavi 40188 [FAR]; Rezvanian 23098 [TUH]; E: Zangooei 24262 [FUMH]; Joharchi & Zangooei 36536 [FUMH]; Memariani & Zangooei 36882 [FUMH]; Faghihnia & Zangooei 31326 [FUMH].

14. *Silene* Sect. *Otites* (Adans.) Otth in DC. (1824)

Morphologically, the closest relative of this section is Sect. *Melandrifformes*. Sect. *Otites* differs from it in number of styles and inflorescence and small flowers.

Characteristics: Biennial, pubescent. Flowers in 6–30 flowered clusters forming a racemose inflorescence, unisexual, small. Calyx campanula, pubescent. Petal

limb emarginate or entire; claw glabrous; coronal scales absent. Anthophore pubescent, very short. Styles 3.

Distribution: Two species in SW & C of Asia, Caucasia and E Europe and Russia. Iran: Two species (*S. cyri* and *S. densiflora*) distributed in E, N & C parts of country.

Specimens seen: *S. cyri* Schischk.: E: Joharchi 33797 [FUMH]; Memariani & Zangooei 39722 [FUMH].

15. *Silene* Sect. *Paniculatae* Boiss. (1867)

Morphologically, the closest relatives of this section are Sect. *Fimbriatae* and Sect. *Lasiostemones*. This section differs from Sect. *Fimbriatae* calyx shape, divisions of petal limb, and from Sect. *Lasiostemones* in having no coronal scales and pubescent staminal filaments.

Characteristics: Perennial or biennial, pubescent. Paniculate inflorescence with dichasial branches. Calyx cylindric-clavate, glandular-pubescent sometimes glabrous. Petal limb bifid; claw glabrous or hairy in lower parts; coronal scales absent. Anthophore pubescent. Staminal filaments glabrous. Styles 3.

Distribution: Two species in Mediterranean area, SW & N of Asia, Europe and Middle East. Iran: Two species (*S. italica* and *S. nemoralis*) distributed in W & N parts of country.

Specimens seen: *S. italica* (L.) Pers.: C: Nejati, Khajepiri & Tavakoli 56 [FAR]; E: Joharchi & Aydani 35599 [FUMH, FAR]; N: Eslami 29564 [TUH]; Tregubov 6238 [TUH].

16. *Silene* Sect. *Rigidulae* Boiss. (1867)

Morphologically, the closest relative of this section is *Atocion* but Sect. *Rigidulae* differs from it in having auricles on claw and pubescence type on calyx and leaves linear-lanceolate.

Characteristics: Annual, eglandular-pubescent and glabrous above. Inflorescence regularly dichasial; pedicle glabrous. Calyx cylindric-clavate, umblicate at the base, glandular-pubescent rarely glabrous. Petal limb bifid; claw auriculate, glabrous; coronal scales present. Anthophore pubescent. Staminal filaments glabrous. Styles 3.

Distribution: Four species in SW, S & C of Asia, Middle East. Iran: Iranian species distributed in W, E, S & C parts of the country.

Specimens seen: *S. austro-iranica* Rech. f. Aell. & Esfand.: W: Veiskarami 23960 [TUH] – *S. chaetodonta* Boiss.: Esmaeeli 3053 [FAR]; E: Raafei & Zangoeei 30745 [FUMH]; Raafei & Zangoeei 30676 [FUMH]; Raafei & Zangoeei 30472 [FUMH]; Raafei & Zangoeei 28578 [FUMH]; Faghihnia & Zangoeei 23023 [FUMH]; Joharchi & Zangoeei 19936 [FUMH]; Ayatollahi & Zangoeei 14275 [FUMH]; Raafei & Zangoeei 26509 [FUMH]; Raafei & Zangoeei 25578 [FUMH]; Raafei & Zangoeei 25622 [FUMH]; Raafei 30815 [FUMH]; Raafei & Zangoeei 25637 [FUMH].

17. *Silene* Sect. *Saponariodeae* Boiss. (1867)

Morphologically, the closest relative of this section is Sect. *Compactae*. Sect. *Saponariodeae* differs from it in length of stems, glabrous claw, inflorescence type, and calyx shape.

Characteristics: Annual, glabrous. Inflorescence dichasial. Calyx campanula-ovate, not umblicate at the base, glabrous. Petal limb various emarginate, bifid or entire; claw auriculate, glabrous; coronal scales present. Anthophore glabrous. Staminal filaments glabrous. Styles 3.

Distribution: A single species in SW & S of Asia. Iran: *Silene nana* is only species of this section distributed in S, E & C parts of country.

Specimens seen: *S. nana* Kar & Kir.: E: Faghihnia & Zangoeei 19753 [FUMH]; Raafei & Zangoeei 28344 [FUMH]; Faghihnia & Zangoeei 19846 [FUMH]; Joharchi & Zangoeei 17384 [FUMH]; Raafei 30777 [FUMH]; Ayatollahi & Zangoeei 13762 [FUMH]; Ayatollahi & Zangoeei 14117 [FUMH]; Joharchi & Zangoeei 17200 [FUMH]; Faghihnia & Zangoeei 18270 [FUMH]; Raafei & Zangoeei 30460 [FUMH]; Joharchi & Zangoeei 19888 [FUMH]; Faghihnia & Zangoeei 22916 [FUMH]; Faghihnia & Zangoeei 18304 [FUMH]; Raafei & Zangoeei 25123 [FUMH]; Ghahreman, Attar, Mehdigholi & Okhovat 28488 [TUH].

18. *Silene* Sect. *Schaftae* Boiss. (1867)

Morphologically, the closest relative of this section is Sect. *Auriculatae* which differs from this section in bracts indumentums, inflorescence type, having auricles on claw.

Characteristics: Perennial, with eglandular and glandular hairs. Paniculate inflorescence rarely one-flowered. Calyx cylindric-clavate, glandular-eglandular pubescent. Petal limb bifid; claw not auriculate, glabrous; coronal scales present. Anthophore glabrous or puberulent. Staminal filaments glabrous. Styles 3.

Distribution: A single species in SW of Asia and Caucasus. Iran: One species (*S. schafta*) distributed in N parts country.

Specimens seen: *S. schafta* Gmel.: without collector 008111 [FAR]; N: Attar, Okhovat & Mehdigholi 26370 [TUH]; Ghahreman & Attar 24330 [TUH]; Ghahreman 6213 [TUH]; Ghahreman & Agustin 486/6211 [TUH]; Nazarian 33219 [TUH]; W: Attar & Dadjou 14689 [TUH].

19. *Silene* Sect. *Sclerocalycinae* Boiss. (1867)

Morphologically, the closest relatives to this section are Sect. *Lasiostemones* and Sect. *Spergulfoliae*. Sect. *Sclerocalycinae* differs in glabrous calyx and reproductive parts.

Characteristics: Perennial or biennial, glabrous rarely pubescent. Paniculate inflorescence or racemose. Calyx cylindric-clavate, glabrous. Petal limb bifid; claw glabrous, not auriculate; coronal scales usually present. Anthophore glabrous. Staminal filaments glabrous. Styles 3.

Distribution: Sixteen species in SW, S & C of Asia, Caucasus, Middle East and Europe. Iran: Fifteen species distributed in E, W, N, S & C parts of the country.

Specimens seen: *S. bupleuroides* L.: E: Faghihnia & Zangoeei 27544 [FUMH]; Faghihnia & Zangoeei 23637 [FUMH]; Raafei & Zangoeei 31613 [FUMH]; Memariani & Zangoeei 35635 [FUMH]; Zokaei 1147 [FUMH]; Joharchi & Zangoeei 20831 [FUMH]; Hojjat & Zangoeei 29219 [FUMH]; Raafei & Zangoeei 25976 [FUMH]; Raafei & Zangoeei 29592 [FUMH]; Zangoeei

24456 [FUMH]; Zangooei 15805 [FUMH]; Zangooei 15797 [FUMH]; Faghihnia & Zangooei 17835 [FUMH]; Joharchi & Zangooei 16866 [FUMH]; Ghorashi 850 G [FUMH]; Faghihnia & Zangooei 22252 [FUMH]; Faghihnia & Zangooei 27442 [FUMH]; Faghihnia & Zangooei 18885 [FUMH]; Faghihnia & Zangooei 25879 [FUMH]; C: Rezvanian 23091 [TUH]; Podlech & Zarre 55157 [TUH] – *S. caesarea* Boiss.: C: Rezvanian 23092 [TUH] – *S. chlorifolia* Sm.: W: Ghahreman & Attar 22435 [TUH]; Ghahreman & Mozaffarian 18270 [TUH]; Veiskarami 23961 [TUH]; E: Garmeh 40279 [FAR]; N: Ghahreman 6224 [TUH]; C: Attar, Dadjou & Mehdigholi 14223 [TUH]; Eslami 29567 [TUH]; Nazarian 33104 [TUH]; Azzat & Ganjalizadeh 6235 [TUH]; S: Attar, Khatamsaz & Sheikholeslami 20375 [TUH]; Azzat & Ganjalizadeh 6227 [TUH] – *S. Morganae* Freyn.: W: Attar, Mirtajdini & Sheikholeslami 19912 [TUH]; Ghahreman & Mozaffarian 18350 [TUH] – *S. peduncularis* Boiss.: W: Podlech & Zarre 55276 [TUH]; Ghahreman, Agustin & Sheikholeslami 6222 [TUH] – *S. swertifolia* Boiss.: C: Safarpoor 3076 [FAR]; E: Ghorashi 282 [FUMH]; Rezaei 10463 [FUMH]; Rezaei & Rashed 10248 [FUMH]; Faghihnia & Zangooei 24027 [FUMH]; Faghihnia & Zangooei 18450 [FUMH]; Faghihnia & Zangooei 20704 [FUMH]; Ayatollahi & Joharchi 10963 [FUMH]; Zakaei 837 [FUMH]; Joharchi & Zangooei 20674 [FUMH]; Joharchi & Zangooei 20729 [FUMH]; Joharchi & Zangooei 15381 [FUMH]; Ghorashi 1185 G [FUMH]; Faghihnia & Zangooei 23573 [FUMH]; Faghihnia & Zangooei 17877 [FUMH]; Ayatollahi & Joharchi 12639 [FUMH]; Hojjat & Zangooei 28887 [FUMH]; Faghihnia & Zangooei 31296 [FUMH]; Joharchi & Zangooei 20770 [FUMH]; Raafei & Zangooei 31550 [FUMH]; Raafei & Zangooei 29593 [FUMH]; Faghihnia & Zangooei 31454 [FUMH]; Hojjat & Zangooei 32610 [FUMH]; Joharchi & Zangooei 33542 [FUMH]; Faghihnia & Zangooei 22341 [FUMH]; Faghihnia & Zangooei 27613 [FUMH]; Joharchi & Zangooei 18653 [FUMH]; Ayatollahi & Zangooei 12783 [FUMH]; Joharchi & Zangooei 23508 [FUMH].

20. *Silene* Sect. *Spergulifoliae* Boiss. (1867)

Morphologically, the closest relative of this section is Sect. *Sclerocalycinae*. Sect. *Spergulifoliae* differs from it in gynodioecious plant, pubescent calyx, filiform leaves, pubescent claw. *Characteristics*: Perennial, eglandular-pubescent or glabrous. Panicle inflorescence. Calyx cylindrical to obconical, glandular-eglandular pubescent. Petal limb bifid; claw pubescent, not auriculate; coronal scales present. Anthophore pubescent or glabrous. Staminal filaments glabrous. Styles 3.

Distribution: Eight species in SW & S of Asia, Middle East, Caucasia and SE of Europe. Iran: Seven species distributed in E, S & C parts of the country.

Specimens seen: *S. brahuica* Boiss.: E: Memariani & Zangooei 35444 [FUMH]; Joharchi & Memariani 42070 [FUMH] – *S. cephalantha* Boiss.: N: Esmaeeli 3049 [FAR]; W: Shirgir 40016 [FAR] – *S. spergulifolia* (Wild.) M. B.: S: Ghahreman & Mozaffarian 5611 [TUH]; C: Eslami 29574 [TUH]; W: Ghahreman & Mozaffarian 17380 [TUH]; Ghahreman & Mozaffarian 17382 [TUH]; Ghahreman & Mozaffarian 55280 [TUH]; N: Taheri 026679 [FAR] – *S. supina* M. B.: W: Parsa 4605 [TUH] – *S. virgata* Stapf.: W: Attar, Dadjou & Mehdigholi 14212 [TUH].

Note:

The authors could not find any specimen from *Silene rasvandica* in Iranian herbaria, the only species of Sect. *Brachypodae* in Iran. Thus we have not mentioned this section in the key. A short note for this section is followed.

This section, which was originally established by Boissier (1867), includes one species in Iranian plateau.

Characteristics: Perennial, pulvinate, pubescent. Inflorescence racemose, 1–5 flowered. Calyx cylindrical-ovate, glandular-pubescent. Petal limb bifid, pale yellow; coronal scales absent.

Distribution: A single species in W of Asia. Iran: For this section, just one species has been reported in Iran which is distributed in W & C parts of the country.

New record and taxon (Sect. *Auriculatae*)**• New record for the flora of Iran:**

Silene parjumanensis Podl., Mitt. Bot. Staatssamml. Munchen 16: 533 (1980) (Fig. 3)

During the work on *Silene* of Iran, *S. parjumanensis* was identified for the first time from Iran, Southern Khorassan province (Fig. 4). It grows on brown sheils of northern rocks of Tajan where form a

great community with *Silene renzii*.

Specimens seen: Iran, southern Khorassan province: west of Ghaen, Tajan, 2000 m, 21.6.2009, Joharchi & Zangooei, 43214 [FUMH].

Although, *S. parjumanensis* Podl. has been confused with *S. kuhistanica* Ovcz., *S. guntensis* B. Fedtsch. and *S. araratica* Schischk. In Table 1 the important differences are given.

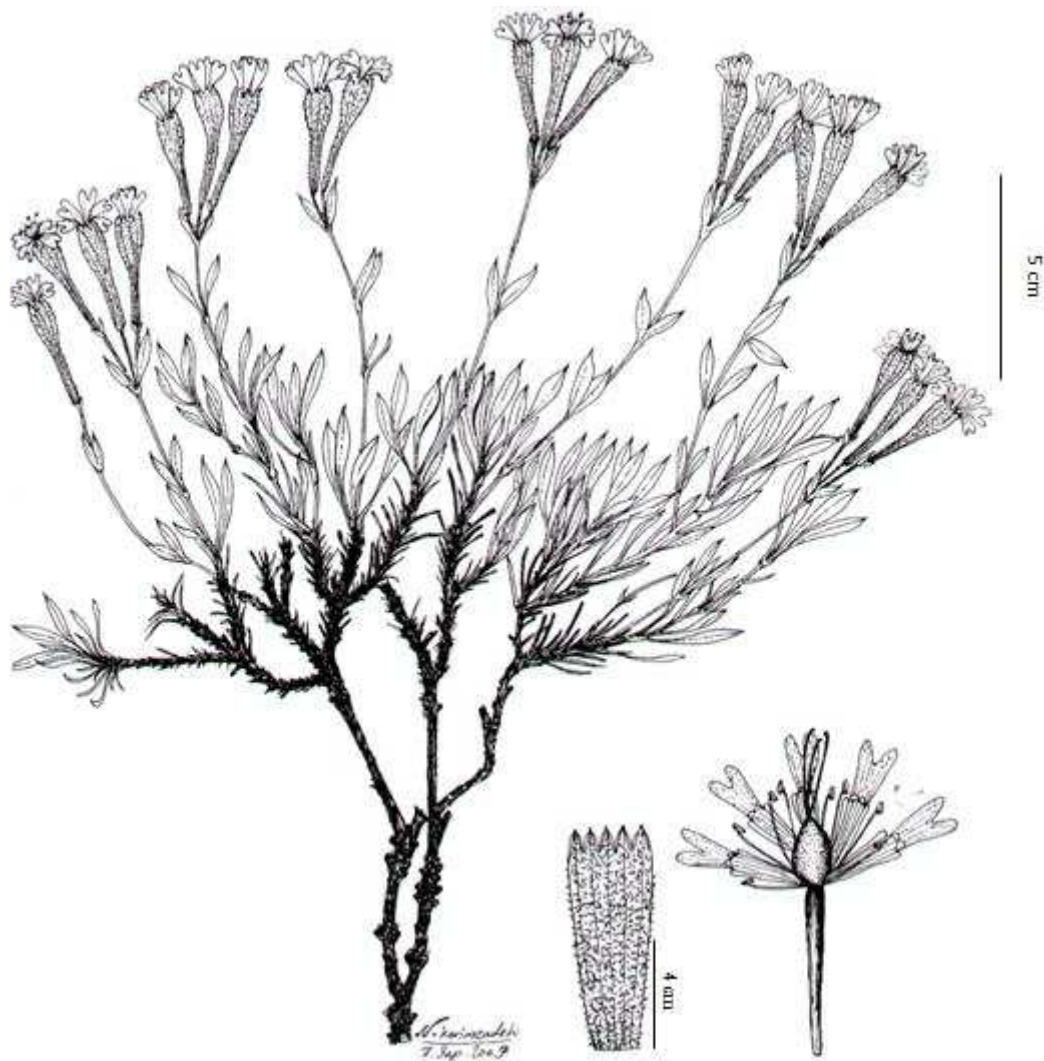
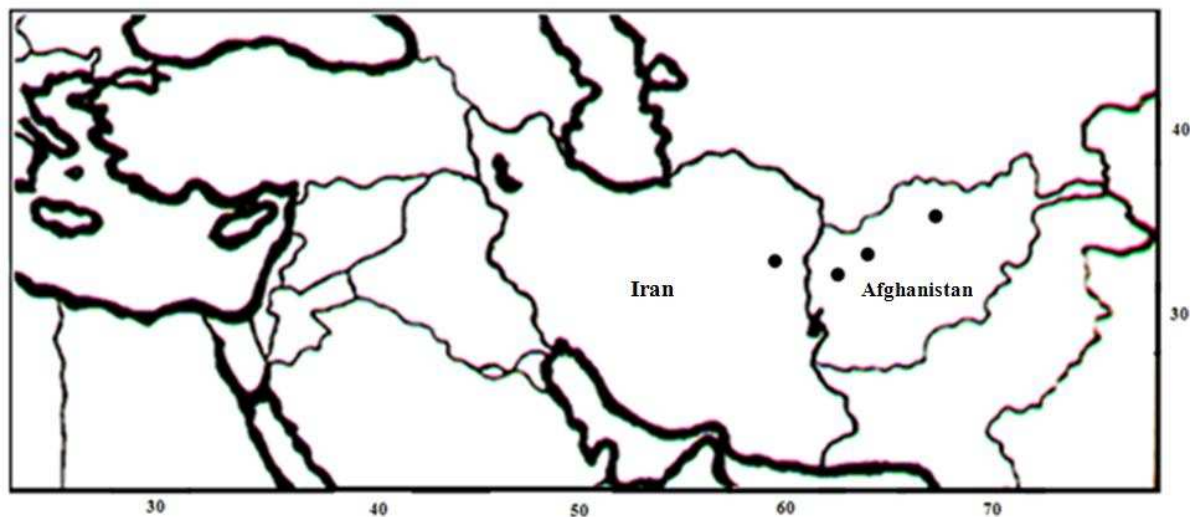


Fig. 3. *Silene parjumanensis*: A. Habit (x 1), B. Calyx (x 2), C. Flower (x 2).

Fig. 4. Distribution map of *Silene parjumanensis*.Table 1. Comparison between *S. parjumanensis* and its relatives

	<i>S. parjumanensis</i>	<i>S. kuhistanica</i>	<i>S. araratica</i>	<i>S. guntensis</i>
Stem	lower parts glabrous, upper parts glandular-eglandular pubescent	totally crisped pubescent	glandular-pubescent	lower part crisped pilose
Leaf	one-nerved, glabrous stem leaves 6 pairs	one-nerved, pilose, stem leaves numerous	three-nerved, puberulent stem leaves 8–10 pairs	1–3 nerved, glandular puberulent, stem leaves numerous
Pedicel	5–15 mm, glandular-eglandular pubescent	2–20 mm, densely pilose	up to 10 mm, glandular-pubescent	2–35 mm
Inflorescence	1–3 flowered	1–2 rarely-flowered	1–2 (–3) flowered	1–3 (–5) flowered
Calyx	glandular-eglandular pubescent	eglandular-pubescent crisped	glandular-pubescent	eglandular-glandular pilose, crisped
Petal	white	pale rose	pale rose to purple	white to rose
Anthophor	glabrous or glabrescens	at the base shortly pilose	glabrous	glabrous

New Taxon:

Silene renzii Melzh., Pl. Syst. Evol. var. *khorrassanica* Nejati, Joharchi & F. Ghahremani. var. *nov.* (Fig. 5)

Perennis, pulvinatae; stolones columnares, foliis emortuis persistentibus, caules glabra vel puberula in parte superior pubescens, breves et 10–12 cm altos, virides. Rosulas foliorum sterilium 8–20 × 2–3 mm, subspathulata, uninervis, glaber, in petiolum attenuate.

Folia caulina inferior subspathulata 5–18 × 2–4 mm; superiora ovatus-lanceolata, base late. Inflorescentia 1(–2) flora. Pedicelli breve 1–2 mm longus, eglanduloso-glanduloso pubescens. Bracteae ad 7 mm longus, late lanceolata, margine et supra puberulus. Calyx ad 25 mm longus, long cylindricus, in parte superior conspicue violaceo-reticulate-venosus, glanduloso-

eglanduloso pubescence. Petala alba vel albidus, ad 1/5 bifidus. Anthophorus inferne brevissime puberulus.

Typus: Iran, Southern Khorassan province: West Ghaen, Tajan, 2000 m, 21.6.2009, Joharchi & Zangooei 43215 (holotypus FUMH; isotypus FAR).

Perennial, pulvinate; stolon columnar, leaves dead persistent in base of stem, stems glabrescent or puberulous in higher parts pubescent, short until 10–12 cm long, green. Rosette sterile leaves 8–20 2-3 mm, somewhat spatulate, one-nerved, glabrous, narrow petiole. Cauline leaves in lower parts almost spatulate 5–18 × 2–4 mm; superior ovate-lanceolata, wide base. Inflorescence 1(–2)- flowered. Pedicel short up to 1–2 mm, eglandular-glandular pubescent. Bract to 7 mm long, wide lanceolate, margine and higher parts puberulous. Calyx up to 25 mm long, lengthy cylindric, in higher parts violaceus reticulate veins, glandular-eglandular pubescent. Petals whitish, until 1/5 bifid. Anthophore in lower parts puberulous.

Paratypus: Iran, Southern Khorassan province: West Ghaen, Tajan, 2000 m, 10.2.2010, Joharchi & Edalatiyan 43472 (FUMH, FAR).

It is similar to *S. renzii* Melzh. var. *renzii*, but it differs from it in long of the plant, c. 10–12 cm tall (not c. 5 cm tall). Leaves 8–20 × 2–3 mm (not 7–20 × 3.5–7).

Inflorescence one or two-flowered (not just one-flowered); pedicle glandular-eglandular pubescent (not pubescent), up to 2 mm long (not to 0.5 mm long). Calyx green-yellow with purple to purple-brown veins (not pink to purple), glandular-eglandular pubescent (not pubescent). Anthophore puberulous (not glabrous).

Silene renzii Melzh. var. *renzii*

Specimen seen: Iran, Southern Khorassan province: West Ghaen, Tajan, 1900 m, 23.5.1998, Raafei 30927! [FUMH]; 2000 m, 10.2.2010, Joharchi & Edalatiyan 43471 (FUMH, FAR); [Southern] Khorassan province: Kuh-e Ahangaran, 33 22 N, 60 06 E, in saxosis calc. summi montis, 2200–2800 m, Renz in Rechinger 56195! [type specimen, W].

With the new record in this paper the number of species for the genus in Iran increases to 99.

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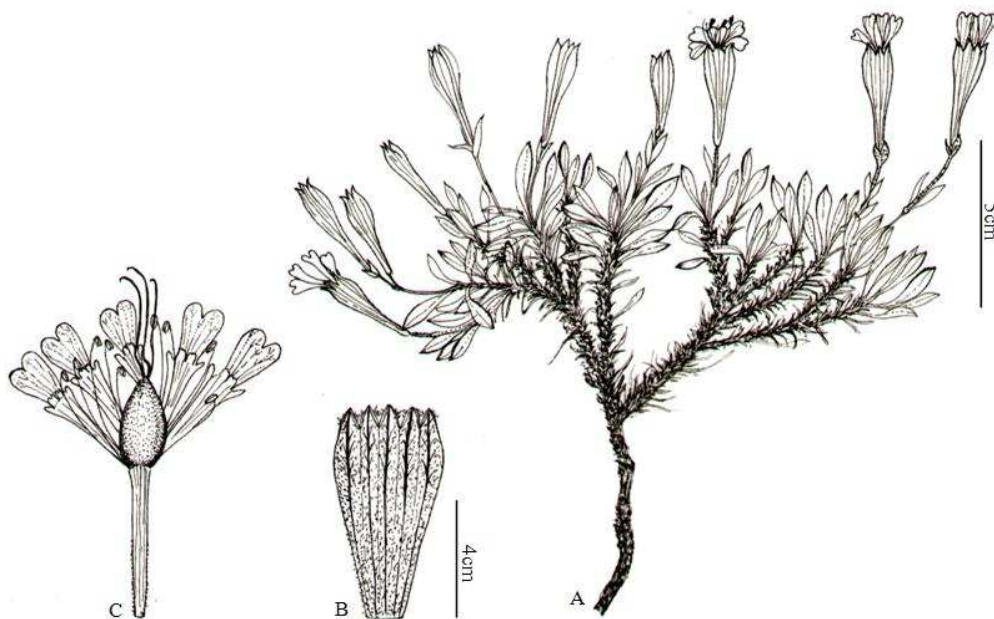


Fig. 5. *Silene renzii* var. *khorassanica*: A. Habit (x 1), B. Calyx (x 2), C. Flower (x 2).

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