

INTERESTING NEW SPECIES OF ASTRAGALUS, SECT. HYMENOSTEGIS IN IRAN

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A phenetic study of 39 species of the genus *Astragalus* sect. *Hymenostegis* Bunge has been done, using more than 400 specimens and 78 characters. Phenogram of the species is given. *Astragalus altiusculus* and *Astragalus pauxillis* are described as new from Iran. *Astragalus hymenocystis* subsp. *confiniorum* Zarre & Podlech is transferred to species level, and new latin description is written for it. These are all endemic to Iran and belong to the sect. *Hymenostegis* Bunge.

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گونه‌های جالب دیگری از جنس *Astragalus* بخش *Hymenostegis* در ایران
علی اصغر معصومی و فرخ قهرمانی نژاد

گونه‌های *Astragalus altiusculus* و *Astragalus pauxillis* به عنوان گونه‌های جدیدی از ایران شرح داده می‌شوند. زیرگونه *Astragalus hymenocystis* subsp. *confiniorum* Zarre & Podlech به خاطر تناقض با کلاستر UPGMA به سطح گونه ارتقاء می‌یابد و برای آن شرح جدید لاتین نوشته می‌شود، و چون نام "*confiniorum*" در سطح گونه از قبل موجود بوده است، لذا برای آن نام جدید انتخاب می‌گردد. این گونه‌ها هر سه انحصاری ایران بوده و متعلق به بخش *Hymenostegis* Bunge هستند.

INTRODUCTION

The section *Hymenostegis* Bunge of the genus *Astragalus* contains 38 species, of which all occur in Iran (73% endemics), and is known from Iran (38 spp.), Turkey (10 spp.), Azerbaijan (3 spp.), Armenia (2 spp.), Gruzia (1 sp.), and Turkmenistan (1 sp.). (Maassoumi 1998 ; Yakovlev & al. 1996)

Since 1992 this section has been the main object of several botanists. But because high morphological similarities, existing of cryptic taxonomical characters, untraceable inadequacy of the type materials and the lapse of time between the publications of the authors the results does not well coincide. Ghahremani-nejad (1992 a & b), Maassoumi (1994 & 1995), Zarre & Podlech (1996). Based on the recently published two revisions, we tried to identify the herbarium materials and to do a phenetic study on the species. In this work three other new taxa are known as the new species.

MATERIALS AND METHODS

For the purpose of present study more than 400 specimens of the *Astragalus* L. sect. *Hymenostegis* Bunge were studied. All of materials are preserved in the herbarium

of TARI. A phenetic study of 39 species was made using 78 characters. Species were treated as OTUs. The numerical taxonomic system (NTSYS)-pc ver. 1.4 (Rolf 1987) was used for multivariate statistical analysis. Cluster analysis using the unweighted pair-group method with an arithmetic average (UPGMA) was used for grouping of the species.

NEW SPECIES

1. *Astragalus altiusculus* Maassoumi & F. Ghahremani, **sp. nov.**

Differt ab *A. ferruminatus* Maassoumi, foliolis 6-8 (nec 5-6)jugis, 3-4 (nec 1-3) mm latis; vexillo 19 (nec 15) mm longo. Plantae perennae, suffruticosae, caespitosae, erinaceae, multiceps, ca. 20-25 cm longae. Stipulae lanceolatae, chartaceae, ca. 17-18 mm longae, glabrae, basi ca. 8-9 mm petiolo adnatae, inter per 3 mm se connatae. Folia ca. 6-10 cm longa, petiolo 1.2 cm longo, sicut rachis dense patenter piloso; foliola 6-8 juga, oblongo- elliptica, apicem versus abrupte attenuata, distincte pungenta, utrinque dense appresse pilosa, ca. 5-12 mm longa et 3-4 mm lata. Pedunculi folium rarim aequantes vel duplo longiores, dense brevissime et sparse long patenter pilosi. Inflorescentiae sphaericae

vel sensim ellipticae, ca. 4.5 cm longae et 3-3.5 cm latae, multiflorae. Bracteae ovatae, ca. 7-8 mm longae, dense pilosae. Calyx ca. 16-18 mm longus, tubulosus, diende inflatus, dense molliter longe pilosus, dentibus linearibus vel setaceis, ca. 8 mm longis. Corolla purpurea, calycem aquantes. Vexillum ca. 19 mm longum, panduriforme; lamina elliptica, antice truncata, leviter emarginata, atropurpurea, in part mediano constricta, alba, basi distincte angulata. Alae ca. 17 mm longae; lamina elliptica, antice obtusa, basi auriculata, ungue lamina paulo longiore. Carina ca. 16 mm longa; lamina elliptica, purpurea; ungue lamina duplo longiore. Ovarium ellipsoideum, pilosum. Legumen biloculares.

Holotypus. Ghazvin province. Alamut area, above the Moallem-Kelayeh village, 9.7.1984, 2100 m, Assadi & Maassoumi 50998 (TARI).

2. *Astragalus pauxillis* Maassoumi & F. Ghahremani., sp. nov.

Differt ab *A. laguriformis* Freyn, foliolis 7-8 (nec 3-4) jugis; vexillo 23 (nec 13-19) mm longo.

Plantae perennae, suffruticosae, erinaceae, dense appressissime sericeo-pilosae, basi

petiolo anni precedenti persistantae, ca. 15 cm altae. Stipulae lanceolatae, coriaceae, glabrae, margine ciliatae, ca. 13 mm longae, dense, nervosae, parte libra lanceolatae, ca. 8 mm longae, basi ca. 4 mm se connatae. Folia 10-15 cm longa, petiolo ca. 3-3.5 cm longo, sicut rachis dense patenter pilosa; foliola 7-8 juga, anguste elliptica vel lanceolata, apicem versus abrupte attenuata, distincte mucronulata, mucrone ca. 1 mm longo, utrinque dense appresse pilosa, ca. 16 mm longa et 3.4 mm lata. Pedunculi folio breviores, dense longe et brevissime patenter pilosi. Inflorescentiae terminales, multiflorae, ovato-oblongae vel ellipticae. Bracteae ovatae, ca. 13 mm longae, coriaceae, sparse pilosae vel glabrae, margine ciliatae, parte mediano purpureae. Calyx tubulosus, inflatus, ca. 17 mm longus, dense molliter pilosus, dentibus filiformibus, violaceis, ca. 7 mm longis. Corolla brunnea vel purpurea. Vexillum 23 mm longum; lamina oblonga, antice obtusa, in parte mediano constricta, basi auriculata vel angulata, ca. 8 mm lata. Alae ca. 22 mm longae; lamina ca. 8 mm longa, oblongo-elliptica, antice acutissima, basi breviter auriculata; auricula ca. 1 mm longa; unguis ca. 13 mm longus. Carina ca. 18 mm longa; lamina oblique elliptica,

ungue ca. 13 mm longo. Ovarium pilosum, basi distincte stipitatum. Legumen ignotum.

Holotypus. Zanjan province, from Mahneshan to Dandi, ca. 12-18 km from Anguran to Belgheis mountain, 25. 5. 1987, 2100-2200 m, Maassoumi 64818(TARI).

Other specimens seem. Zanjan Province, Soltanieh, Arjin village, Kuh-e Sheikh-Serri, 2. 7. 1991, 2100-2170 m, Ranjbar, F. Ghahremani-nejad & Zarre 69604 (TARI); Gheydar, 35 km S. Soltanieh, Kuh-e Hazeh-Gheydar, 3. 7. 1974, 2200-2650 m, Terme & Moussavi 16465 (IRAN); Soltanieh, 7 km to Soltanieh, from Gheydar, 2. 7. 1974, 1850 m, Terme & Moussavi 40920 (IRAN).

3. *Astragalus pereshkhoranicus* Maassoumi & F. Ghahremani, **sp. nov.**

Syn.: *Astragalus hymenocystis* Fisch. & C.A.Meyer subsp. *confiniorum* Zarre & Podlech, Sendtnera vol. 3: 273, holotype: Iran, Prov. W. Azarbaijan, in monte Chailil Kuh prope Razhan, 2600-3200 m, 2.7.1974, Rechinger & Renz 48846a (W).

Differt ab *A. hymenocystis* foliolis gracilibus; calycis dentibus longioribus 6-12 (nec 4-7) mm longis, tubo aequilongis vel ad duplo longioribus (nec brevioribus vel

ad aequilongis).

Plantae perennae, suffruticosae, caespitosae, erinaceae, basidense ramosae, prostratae, dense appressissime sericeo-argireo pilosae, ca. 12-15 cm altae et 10-12 cm diametro; caules abbreviatis; caudex multiceps, ca. 4-6 cm longus. Stipulae lanceolatae, membranaceae vel hyalinae, ciliatae, 10-13 mm longae, parte liberae lanceolatae, ca. 8 mm longae, basi ca. 4 mm petiolo adnatae, inter ca. 3 mm se connatae. Folia ca. 2-3 cm longa, petiolo ca. 5-8 mm longo, sicut rachis dense longe et brevissime patenter pilosa; foliola 5-7 juga, anguste elliptica vel lanceolata, apicem versus attenuata, breviter mucronulata vel pungentia, utrinque dense appresse pilosa, ca. 7 mm longa et 2 mm lata. Pedunculi folia aequantes vel rarim breviter superantes, ca. 2-4 cm longi, dense longe et brevissime albo patenter pilosi. Inflorescentiae terminales, multiflorae, ovato-oblongae vel sphaericae. Bractee ovatae, chartaceo-membranaceae, apicem versus attenuatae, glabrae, margine leviter ciliatae, ca. 12 mm longae et 6-7 mm latae. Calyx ca. 18 mm longus, tubulosus, purpureus vel apicem versus intense violaceus, inflatus, dense molliter sericeo-pilosus, paralleliter purpureo-nervosus,

dentibus linearibus, ca. 8-10 mm longis. Corolla glabra, violacea. Vexillum ca. 18 mm longum; lamina oblongo-elliptica, antice retusa vel emarginata, in parte mediano constricta, basim versus dilatata, auriculata vel angulata, ca. 7 mm lata. Alae 16 mm longae; laminae oblongae, obtusae, basi auriculatae; ungues ca. 9 mm longi. Carina ca. 12 mm longa; lamina oblongo-elliptica, ungue ca. 7 mm longo. Ovarium pilosum, ca. 4-5 mm longum. Stylus basi pilosus. Legumen ignotum.

Holotypus. Azarbaijan province, Orumieh, Silvāna, Mavana, Kuh-e Khizan (Bardarash), 6.7.1991, 2600-3000 m, Mozaffarian 69902 (TARI).

DISCUSSION

The phenogram resulting from UPGMA clustering of similarity matrix is presented in figure 1. In this cluster 39 distinctive species were detected. The UPGMA cluster grouped the species in to 8 clusters (at 0.53 similarity level).

In the recent revision presented by Zarre & Podlech (1996) without observing the type specimens of *A. pediculariformis*, Maassoumi it was accepted as a distinct species. Zarre & Podlech (l. c.) in reality selected a specimen as *A. pediculariformis*

which is quite different in the size of floral parts comparing to the true *A. pediculariformis*. This specimen is described in this paper as *A. pauxillis*.

According to the phenogram resulting from UPGMA clustering of similarity matrix, *A. hymenocystis* subsp. *hymenocystis*, *A. hirticalyx* and *A. uraniolimneus* were detected at 0.75 similarity level. The phenon line is in contradiction with *A. hymenocystis* subsp. *confiniorum*, while it is transferred to 0.63 similarity level. Morphologically, *A. hymenocystis* subsp. *confiniorum* in floral parts, particularly on the standard shape and the calyx teeth also on the type of indumentum is totally different from subsp. *hymenocystis*. Therefore, *A. hymenocystis* subsp. *confiniorum* is transferred to the specific rank and given a new name as *A. pereshkhoranicus*. Two related taxa, *A. hirticalyx* and *A. uraniolimneus* should be treated as synonymous.

In order to introduce species no. 34 (fig. 1). i.e. *Astragalus* sp., more material is, needed, and we refrain to give a complete description for the species.

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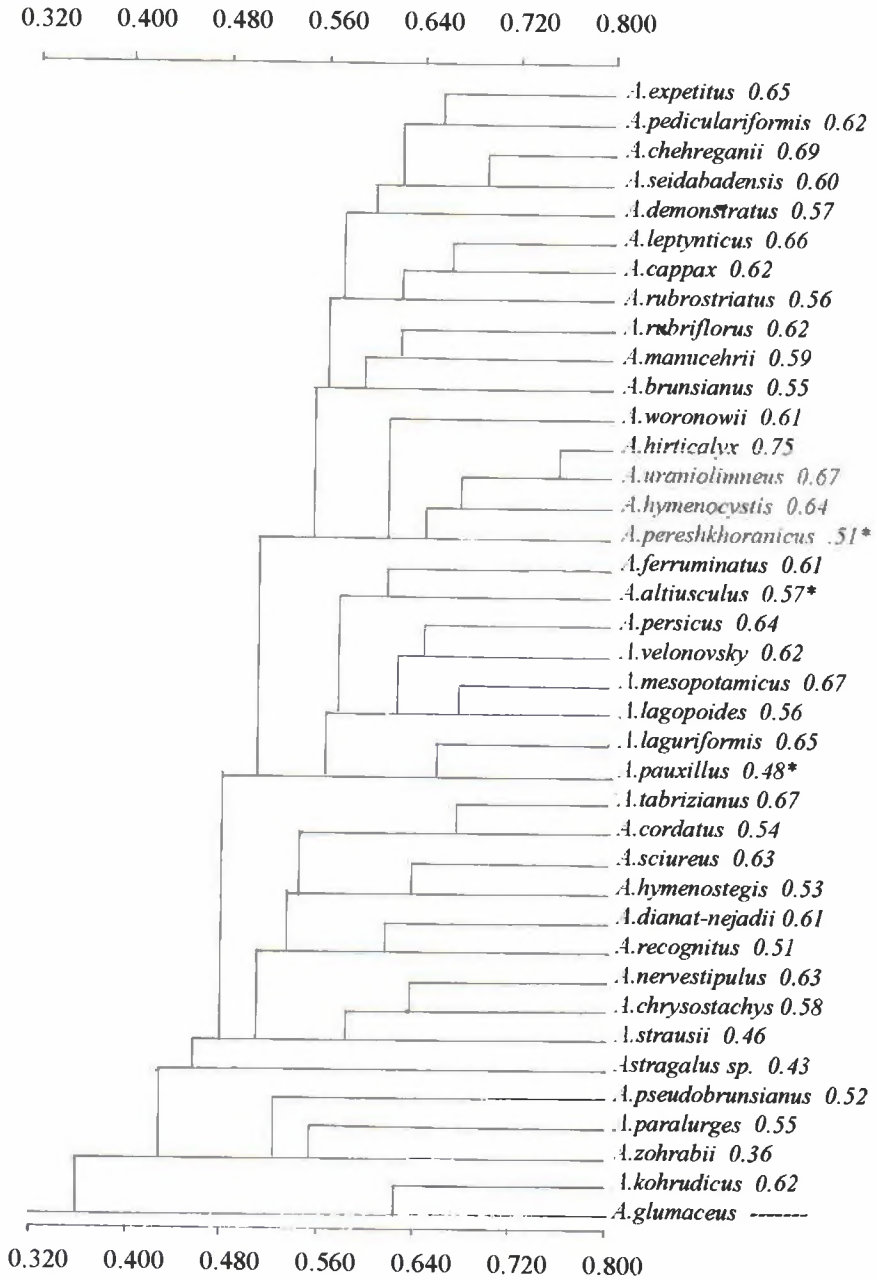


Fig. 1. Phenogram of the species of sect. *Hymenostegis* Bunge, new species are marked by an asterisk (*).