Synopsis of the sect. Hymenocoleus, sect. Hymenostegis, and sect. Macrophyllum belonging to Astragalus (Fabaceae) in Turkey

Seher KARAMAN ERKUL1,*, Zeki AYTAÇ2, Murat EKİCİ2
1Department of Biology, Faculty of Arts and Sciences, Aksaray University, Aksaray, Turkey
2Department of Biology, Faculty of Sciences, Gazi University, Ankara, Turkey

Abstract: A synopsis of the sect. Hymenocoleus Bunge, sect. Hymenostegis Bunge, and sect. Macrophyllum Boiss. belonging to Astragalus L. in Turkey is given based on a revisional study carried out in Turkey. As a result of this study, an account of 19 species including keys and general distribution as well as their conservation status in Turkey is given. It is determined that A. narmanicus Karaman & Aytaç is new to science and A. expetitus Maassoumi, A. pereshkhoranicus Maassoumi & F.Ghahrem., and A. marivanensis Maassoumi & Podlech do not exist in Turkey. Additionally, the name of the sect. Hymenocoleus is preserved.

Key words: Astragalus, section, conspectus, Turkey

1. Introduction
The genus Astragalus L. (Fabaceae) has approximately 3000 taxa around the world. The genus is known to spread vigorously in cold, semiarid, and arid regions of the Old World (approximately 2400 species); in western regions of North America (about 450 species); and especially along the Andean Mountains in South America (about 100 species) (Maassoumi, 1998; Podlech and Zarre, 2013).

Astragalus section Hymenostegis was first named by Bunge (1868–1869) in his revision, entitled “Generis Astragali species gerontogeae” under the subgenus Calyphyssa. This section was revised by Rechinger et al. (1958) and then was included in the Flora of Turkey (Chamberlain and Matthews, 1970), Flora of USSR (Gontscharov, 1946) and Flora of Iraq (Townsend and Guest, 1974). The latest revision of the section was made by Zarre and Podlech (1996). Astragalus section Macrophyllum Boiss. was described first by Boissier (1872).

Species assigned to the section Hymenostegis Bunge are spread throughout western Asia. The origin and the diversification center of this section are in Iran. The section is represented by 12 species (A. uraniolimneus Boiss. has been recorded as a doubtful species) in the Flora of Turkey volume 3 (Chamberlain and Matthews, 1970) and one extra species in volume 11 (Aytaç, 2000), a total of 13 species, four of which are endemic. In 2008, A. expetitus Maassoumi was published as a new record for Turkey by Podlech and Ekici (2008). According to Podlech and Zarre (2013), there are 54 species of sect. Hymenostegis in Iran, 14 in Turkey (including two endemics), three in Armenia, three in Azerbaijan, three in Iraq, and one in Georgia.

The number of species assigned to A. sect. Macrophyllum in the flora of Turkey was thought to be nine, five of them being endemic (Chamberlain and Matthews, 1970). However, Zarre (2000) reduced the number of species in Turkey to five and the number of endemic species to one. Karaman and Aytaç (2013) published A. yukseli Karaman & Aytaç within the sect. Macrophyllum and increased the number of species to six, two of which are endemic to Turkey.

The main objectives of this study were to clarify the taxonomic status of species belonging to Astragalus sect. Hymenocoleus Bunge, sect. Hymenostegis Bunge and A. sect. Macrophyllum Boiss. in Turkey based on field studies and herbarium surveys, and provide their emended descriptions, distributions, and ecology.

2. Materials and methods
Since 2011, as part of a revision of the genus Astragalus, extensive field surveys were conducted in Turkey and a large number of specimens were collected. The specimens were all cross-checked with the various Astragalus accounts given in the relevant literature: Flora Uzbekistana (Borissova, 1955), Flora Tadzikistana (Borissova, 1937), Flora USSR (Borissova, 1946), Flora Kavkaza (Grossheim, 1964), and Flora of Turkey (Chamberlain and Matthews, 1970).
1952), *Flora Europaea* (Chater, 1968), *Flora of Turkey* (Chamberlain and Matthews, 1970; Aytac, 2000), *Flora Azerbaĳana* (Razzaade, 1954), *Flora of Iraq* (Townsend, 1974), *Flora Palaestina* (Zohary, 1987), *Flora of Iran* (Maassoumi, 2003), and other relevant literature (e.g., Yakovlev et al., 1996; Zarre and Podlech, 1996; Maassoumi, 1998; Zarre, 2000; Podlech and Zarre, 2013). The section keys were based on the work by Podlech and Zarre (2013), the authors’ own samples, and examined specimens in both domestic (ANK, GAZI, HUB, KNYA, and V ANF) and foreign herbaria (MSB, E, K, and G). Author abbreviations were given according to Brummitt and Powell (1992) and herbaria acronyms were given according to *Index Herbariorum* (Thiers, 2015). The conservation status was assessed according to the IUCN (2014). The examined species are listed in the Appendix. The species are given in alphabetical order in the article and Appendix.

3. Results and discussion


_Type (monotypic): A. vaginans DC., Astragal.: 210. 1802._


*Hymenocoleus* and *Hymenostegis* were recognized as two different sections in the *Flora of Turkey* (Chamberlain and Matthews, 1970). *Astragalus vaginans* is the only member of the sect. *Hymenocoleus* is separated from the sect. *Hymenostegis* by imparipinnate (not paripinnate) leaves and forming wide cushions (Chamberlain and Matthews, 1970). However, the section *Hymenocoleus* was reduced to the rank of subsection. Moreover, *A. vaginans* is characterized by stems 30–50 cm long, internodes 1–1.5 cm long, and imparipinnate leaves (Zarre and Podlech, 1996). As a result of our field work and specimen examinations, we agree with the previous literature (Maassoumi, 1995; Podlech et al., 2001; Bagheri et al., 2011; Podlech and Zarre, 2013) in contrast to Zarre and Podlech (1996) and we decided to keep *Hymenocoleus* at sectional level.


Güzeldere pass in Van (Turkey) Province is an important diversity center for *Astragalus* sect. *Hymenostegis*. It is possible to find *A. uraniolimneus* Boiss., *A. ciloeensis* Podlech, *A. qoturenensis* Podlech, *A. hirticalyx* Boiss. & Kotschy ex Boiss., *A. zohrabi* Bunge, and *A. hynemocystis* Fisch & C.A.Mey. in this region. The corolla in all these species is purple and the habits (e.g., peduncle length, leaflet shape and length, bract shape and length) are very similar to each other. For this reason, it is often very hard to distinguish the species from each other during field work in this region.

Podlech and Zarre (2013) stated that *A. marivanensis* Maassoumi & Podlech, a member of the section *Hymenostegis* described originally from Iran, is also found in Turkey. The plant materials of this species were collected from Bitlis Hanemir Mountain by T. Engel and there are two samples on one herbarium sheet labeled as T. Engel 109 stored in MSB. While the peduncle and rachis are spreading hairy in *A. marivanensis*, they are adpressed to subadpressed in *A. lagopoides*. Our observation showed that while one of the samples (T. Engel 109) includes both spreading and adpressed to subadpressed hairs on the rachises, the other one has only adpressed to subadpressed hairs. Furthermore, especially among the older individuals representing *A. lagopoides*, we also observed erect hairs towards the base of the rachis along with semierect/subadpressed hairs. Our observations on herbarium specimens and field studies showed that the samples from Bitlis Hanemir Mountain deposited in MSB indeed represent *A. longipes*.

There are three samples (Cheese & Watson 2950! and Lemond 2650! and Hub-Mor 11444) described as *A. persicus* by Chamberlain and Matthews (1970) in the *Flora of Turkey*. Based on sample deposited in E, we found that this specimen belongs to *A. zohrabi* Bunge in fact. The specimen of Lemond 2562 was determined as *A. persicus* (DC) Fisch. & C.A.Mey. by Chamberlain and Matthews (1970). However, it was identified as *A. lagopoides* Bunge, which is present in E, by Douglas McKeen. *A. persicus* is also reported from the Chasm of Çuh in the Güzeldere district of Van (Chamberlain and Matthews, 1970), where *A. ciloeensis*, *A. qoturenensis*, *A. zohrabi*, and *A. hirticalyx*, which are morphologically very similar to *A. persicus*, are widely distributed. The main discrepancy between *A. persicus* and the other species of the section *Hymenostegis* is the hairs on the inner side calyx. Moreover, Podlech and Zarre (2013) indicated that this species is endemic in the W Iranian Zagros mountains. All indications outside of this area are based on misinterpretations. In light of these data, *A. persicus* is here excluded from the flora of Turkey.

*Astragalus expetitus* Maassoumi was recorded as a new species for the Turkish flora by Podlech and Ekici (2008) based on an individual collected from Muradiye near Van (Sorger 81-10-1). However, Sorger’s sample stored in W! was identified as *A. hynemocystis* Fisch. & C.A.Mey. by S Karaman Erkul. Some of the characteristics that separate *A. expetitus* from *A. hynemocystis* are as follows: leaflets ascending and spreading (not adpressed to subadpressed) hairy, and the bracts glabrous (not sparse or dense hairy). *Astragalus expetitus* is excluded from the list of Turkish species of *Astragalus*.

Our research shows that there are 13 species belonging to the sect. *Hymenostegis* in Turkey, three of which are endemic.
A revised key of *Astragalus* sect. *Hymenostegis* in Turkey

1. Petal yellow
2. Stipules hairy
3. Stipules 13–17 mm; leaves (1.5–) 3–8 cm; peduncules 1–4 cm ........................................... *A. velenovskiyi*

4. Peduncle adpressed to subadpressed hairy
5. Bracts persistent; rachis ascending–spreading hairy .................................................. *A. sosnowskyi*
6. Peduncle adpressed to subadpressed hairy ............................. *A. lanpoides*

1. Petal pink–purple or red–purple
2. Stipules glabrous or only ciliate at the margins
3. Stipules 30–35 mm; leaves 9–20 cm; peduncles 24–28 cm .................................................. *A. narmanicus*

6. Inflorescence lax
7. Peduncle ascending–spreading hairy ................................. *A. zohrabi*
8. Peduncle adpressed–subadpressed hairy .......................................................... *A. uraniolimneus*

9. Rachis adpressed to subadpressed hairy
10. Standard angular–hastate ...... *A. uraniolimneus*
11. Standard glabrous ............................ *A. ciloensis*
12. Standard hairy ............................... *A. qoturensis*
13. Rachis ascending–spreading hairy

12. Stipule hyaline–membranous; peduncle longer than leaves or equal
13. Stipules with densely netlike nerves in lower part; legume 7–9 mm .............. *A. uraniolimneus*
14. Stipules without densely netlike nerves in lower part; legume 4–6 mm ...... *A. hymenocystis*
15. Stipule papery; peduncle shorter than leaves ........................... *A. hirticalyx*
8. Peduncle adpressed to subadpressed hairy, with sparsely ascending hairs
13. Leaflets 1–3 pairs, upper side glabrous, inner side sparsely hairy; stipule hairy . *A. trifoliastrum*
14. Leaflets 4–6 pairs, both sides dense hairy; stipule glabrous ......................... *A. lagopoides*

*Astragalus ciloensis* Podlech, Feddes Repert. 120: 51. 2009.

**Distribution:** Irano-Turanian element. Endemic.

**Conservation status:** VU: B2 ab (i, ii, iv)

This species was published by Podlech (2009) based on a sample (P.H. Davis and O. Polunin 23974) that was collected in Turkey. Although the type specimens are available at both E and ANK, we also collected more plant materials from the type locality and neighboring areas during our research.


**Distribution:** Irano-Turanian element. Endemic.

**Conservation status:** VU: B2 ab (i, ii, iv)

In the *Flora of Turkey*, footnotes under *A. hirticalyx* indicate that the sample collected by Simon & Hub.–Hub.-Mor. 15070 is an intermediate species between *A. hirticalyx* and *A. persicus*. It was reported that it has a short peduncle and ovoid inflorescence like in *A. hirticalyx* and also a glabrous and hairy bract (Chamberlain and Matthews, 1970). This sample was published by Podlech (Podlech and Zarre, 2013) as a new species under the name *A. gueruenensis*.

*Astragalus gueruenensis*, which was only known from the type locality before our research, was collected during the field study in Van Province. Some missing items and measuring errors due to deficiencies of the type collection are improved in the description provided. In this study, the legume and seed characters were indicated; legumes subsessile, ovate-ellipsoid, 7–8 × 4–5 mm long, keeled ventrally, flattened dorsally; densely villose hairy. Seed only one, ellipsoid-reniform, dark brown and black spotted, 2 × 3 mm. *A. gueruenensis* was initially identified by Podlech (Podlech and Zarre, 2013) as having purple flowers, despite actually having yellow flowers (at maturity sometimes turning purple).


**Distribution:** Iraq, Iran, Turkey. Irano-Turanian element.

It is well known that the flower is purple in *A. hirticalyx*. However, during the field study conducted in the Güzeldere region of Van Province, a specimen with a white corolla was also observed.


**Distribution:** Iran, Turkey. Irano-Turanian element.

*A. hymenocystis* Fisch. & C.A.Mey. was examined at specific level in the *Flora of Turkey* by Chamberlain and Matthews (1970). Later, Zarre (1996) identified two subspecies in his revisional study; subsp. *hymenocystis* and subsp. *confiniorum* Zarre & Podlech. *A. hymenocystis* subsp. *hymenocystis* was separated from all other species in the section *Hymenostegis* by its yellow–brown hairs.

Subsequently, *A. hymenocystis* subsp. *confiniorum* Zarre & Podlech was added to the flora of Turkey (Aytaç, 2000).
is known from Iran. On the other hand, *A. hymenocystis* subsp. *confiniorum* is considered a synonym of *A. pereshkhoranicus* by Podlech and Zarre (2013).

This taxon is considered a synonym of *A. pereshkhoranicus* Maassoumi & F. Ghahrem. (Podlech and Zarre, 2013). *A. pereshkhoranicus* was given as a new record for Turkey. However, no locality for Turkey was given and the type locality of the species was published as Iran. *A. hymenocystis* subsp. *confiniorum* subspecies is actually a synonym.

*Astragalus hymenocystis* is separated from *A. pereshkhoranicus* by the following characteristics: 3–6 pairs of leaflets (not 5–6 pairs), elliptic obovate (not narrowly elliptic) and 3–7 × 2–4 mm (not 5–8 × 1.5–2.5 mm), bracts hyaline on the edges (not hyaline–membranous), calyx teeth 4–7 mm long (7–12 mm) (Podlech and Zarre, 2013).

*Astragalus hymenocystis* was also recorded in the *Flora of Turkey* from Muradiye, Van (Aytaç, 2000). As a result of our field investigations in this region and visiting national and foreign herbaria, it was concluded that *A. pereshkhoranicus* does not exist in Turkey. Podlech and Zarre (2013) also stated that this species does not grow in Turkey.


**Distribution:** Azerbaijan, Armenia, Iran, Turkey. Irano–Turanian element.

*Astragalus brachypodus*, which is mentioned as a member of the sect. *Hymenostegis* in the *Flora of Turkey* is synonymous of *A. lagopoides* (Zarre, 1996). It is separated from *A. lagopoides* by the following characteristics: peduncle shorter than leaves and flowers are ovoid instead of rectangular (Chamberlain and Matthews, 1970). Specified locations where *A. brachypodus* is reported were investigated and specimens were collected. Our study showed that in some samples the peduncle does not exceed the length of the leaves, whereas in other samples it is longer. In addition, the inflorescence is ovoid or often cylindrical, indicating the high level of variability regarding this character.

Our intensive collection from the type locality of *A. sonamerensis* has shown that the only taxon of the sect. *Hymenostegis* distributed in this area is *A. lagopoides*. Therefore, in contradiction with Podlech (2011), we put *A. sonamerensis* under synonymy of *A. lagopoides*, not under *A. sosnowskyi* as suggested doubtfully by Podlech (2011) and Podlech and Zarre (2013).

There are footnotes under *A. lagopodioides* in the *Flora of Turkey* explaining that *A. lagopoides* was initially identified by Lamarck (1785) as having yellow flowers, despite actually having purple flowers. The footnote continues to clarify that this confusion resulted from dry material. Thus, it was stated that *A. lagopoides* should be synonymous with *A. lagopodioides*. During field studies, several samples of *A. lagopoides* from different localities were collected. Samples show that flowers are mostly yellow when blooming and turn purple from the top of the standard. For this reason, corolla color of *A. lagopodies* is given both as purple and as yellow in two different places in our diagnostic key.

*Astragalus narmanicus* Karaman & Aytaç, sp. nov. (Figures 1–2).

**Type:** Turkey, A8 Erzurum: Between Narman and Oltu, steppe, 1916 m, 08.07.2014, S. Karaman 2897 & Z. Aytaç (holo. GAZI, iso. ANK, GAZI).

**Diagnosis:** It is closely related to *A. velenovskyi*, but differs from it by longer peduncle than leaves, (not as long as or shorter); longer stipules 30–35 mm, not (13–17 mm); leaflets 6–9 pairs [not (3–)4–6(–7)]; and longer bracts 25–30 × 7–10 mm [not 8–14 × 3.5–6(–9) mm]. It is also similar to *A. lagopoides*, but differs from it by longer stipules 30–35 mm (not 12–30 mm); longer peduncle 24–28 cm [not (2–) 6–15(–20) cm] and longer bracts 25–30 × 7–10 mm (not 14–23 × 3.5–8 mm). Sometimes can be mistaken for *A. hymenostegis*, but peduncle 24–28 cm (not 3–15 cm) and bracts 25–30 mm (not 18 × 7–12 mm) may be used for their separation.

**Description:** *Plants* subshrubby, caespitose, 25–45 cm tall, spiny. *Stipules* chartaceous, slightly hyaline toward the tip, yellowish, 30–35 mm, 23–25 mm adnate to the petiole, connate behind the stem for 8–10 mm, the free tips narrowly triangular, densely hairy at the midline, tip and ciliate at the margins with ascending hairs up to 2 mm. *Leaves* 9–20 cm; petiole 3–10 cm, like the rachis rather densely to very densely covered by adpressed and few ascending hairs 0.5–1 mm, spiny. *Leaflets* in 6–9 pairs, narrowly elliptic, 12–22 × 2–5 mm, acute to acuminate, with a pungent yellowish cusp 1.5–2 mm, on both surface densely adpressed to somewhat spreading hairy. *Peduncles* 24–28 cm, longer than the leaves, erect, densely adpressed hairy mixed with some ascending hairs, adpressed hairs 1–1.5 mm and ascending hairs 0.5–1 mm. *Racemes* long cylindrical, 8–13 cm long and 2.5–3 cm in diameter, densely many-flowered. *Bracts* persistent, glumaceous, pale yellowish, narrowly hyaline at the margins, 25–30 × 7–10 mm, widely ovate acuminate, with a cusp up to 5 mm, hairy dense hairy at the midline and ciliate at the margins, on inner side mostly hairy toward the tip. *Calyx* tubular at first, soon ellipsoid-inflated, 17–19 × 3–4 mm, pale yellow, with greenish teeth, rather densely covered with spreading hairs 3–4 mm and with long hairs up to 5 mm, mostly sparsely hairy in upper part of tube on inner side; teeth subulate, 5–6 mm. *Petals* yellow. *Standard* 14–18 mm, sometimes slightly shorter than the calyx; blade 6–8 mm wide, trullate to elliptic or ovate–panduriform and in this case shallowly constricted below the middle,
slightly retuse, at the base sharply angular–hastate to obtusely angular, with widely cuneate claw. Wings 13–17 mm; blades narrowly oblong to narrowly elliptic, obtuse, 6–7 × 2–2.8 mm; auricle 0.3–0.6 mm, claw 7–10 mm. Keel 12–15 mm; blades obliquely obovate, subacute, with rectangularly curved lower edge and slightly convex upper edge, 5–6 × 2.5–3 mm; auricle minute, claw 7–10 mm. Ovary c. 4–5 mm, ellipsoid, densely hairy; style hairy up to the middle. Legumes sessile, 5–7 mm long, 1.5–2.5 × 2.5–3 mm, densely subadpressed hairy. Seed one, olive green to red or dark brown, 3–4 × 1.5–2.5 mm, pitted.

**Etymology:** The specific epithet is derived from the locality of the type specimen, Narman, Erzurum Province. Flowering time is late July.

**Distribution, habitat, and ecology:** Turkey, endemic, ca. 1900 m. It grows on high mountain steppe with


**Conservation status:** This species is found in Narman. It can be found as a small, separate (less than five locations), and small-numbered population (less than 50 mature individuals) in the area. Its population is under anthropogenic effects (recreational activities, fire, and sometimes grazing). The new species should be regarded as critically endangered (CR B2ab (i, ii, iv) based on IUCN conservation status (IUCN, 2014).


**Distribution:** Iran, Turkey. Irano-Turanian element. *A. qoturensis* was known as endemic to Iran until the current study, but during our field studies we also collected it in Turkey in Van Province (Podlech and Zarre, 2013; Karaman Erkul et al., 2015). *Astragalus qoturensis* is the only species of the sect. *Hymenostegis* in Turkey having a hairy standard. Additionally, we observed that the indumentum of bracts may vary from glabrous to densely hairy in contrast to the description provided by Podlech and Zarre (2013).


**Distribution:** Armenia, Iran, Turkey. Irano-Turanian element.

This species is characterized by lax inflorescences, striate calyces, and red to purple petals.


**Distribution:** Georgia, Iran, Turkey. Irano-Turanian element.

A revised key of Astragalus sect. Macrophyllium in Turkey

1. Stipule hyaline–membranous
2. Leaflets and rachis glabrous; bracts linear, glabrous; bracteoles absent...A. isauricus
3. Leaflets and rachis hairy; bracts ovate–lanceolate, hairy; bracteoles present .................. A. yukseli

1. Stipules chartaceous
3. Leaflets densely to sparsely tomentose hairy above...

Astragalus uraniolimneus Boiss., Fl. Or. 2: 380. 1872

Distribution: Armenia, Iran, Turkey. Irano-Turanian element.

Astragalus uraniolimneus was recorded doubtfully from Turkey. Astragalus woronowii, which was considered a separate species in the Flora of Turkey (Chamberlain and Matthews, 1970), has been reduced to synonymy with A. uraniolimneus by Zarre and Podlech (1996).

Astragalus velenovskyi Nábělek, Spisy Prir. Fak. Masarykovy Univ. 35: 82, 1923.


Conservation status: VU, B2 ab (i, ii, iv)


Distribution: Iran, Turkey. Irano-Turanian element.

Astragalus zohrabi was given as a synonym of A. lagopodioides in the Flora of Turkey (Chamberlain and Matthews, 1970). Later, A. lagopodioides was reduced to a synonym of A. zohrabi (Podlech, 2011). A. zohrabi is separated from other species in the sect. Hymenostegis in Turkey by having a lax inflorescence.

Additionally, during our field study, A. rubrostriatus, another species of the section with lax inflorescences, which was thought to be endemic to Iran, was collected from the Van region as a new record for the Turkish flora (Karaman Erkul et al., 2015).


The number of species within Macrophyllium in the flora of Turkey was thought to be nine, five of which are endemic (Chamberlain and Matthews, 1970). However, Zarre’s research reduced the number of species in Turkey to five and the number of endemic species to one (Zarre, 2000). Our research published A. yukselii within the section Macrophyllium and increased the number of species within this section to six and the number of endemic species to two (Karaman Erkul and Aytaç, 2013).


Distribution: Turkey, Georgia, Syria, Lebanon, Iran. Irano-Turanian element.

Because of having bracteoles, A. cephalotes was classified and placed in the section Pterophorus by Boissier (1872). However, Zarre (2000) transferred this species into the sect. Macrophyllium, by possessing large and glabrous leaves. In the Flora of Turkey, A. cephalotes is placed in the sect. Rhacophorus (Chamberlain and Matthews, 1970). However, our morphological findings support treating A. cephalotes under the sect. Macrophyllium in agreement with Zarre (2000).


Distribution: Iran, Syria, Turkey. Irano-Turanian element.


Conservation status: EN: B2 ab (i, ii, iv)


Distribution: Iraq, Turkey. Irano-Turanian element.

Astragalus oleaefolius DC., Astragalologia: 192. 1802.

Distribution: Azerbaijan, Armenia, Iraq, Iran, Lebanon, Syria, Jordan. Turkey. Irano-Turanian element.


Conservation status: CR: B1ab (i, ii, iv)
Acknowledgments
We would like to thank the Scientific and Technological Research Council of Turkey (TÜBİTAK) for financially supporting this study (Project No: TBAG 110 T 911), all the curators of herbaria that we visited, all the botanists who helped during the fieldwork, Dr Dieter Podlech, Dr Ali Asghar Maassoumi, Dr Shahin Zarre, and Ali Bagheri.

References


**Sect. Hymenocoleus**

*A. vaginans* DC.


**Astragalus ciloensis** Podlech

Turkey. B9 Van: Gürpınar, Güzeldere pass, steppe, 2760 m, 13.07.2011, *S. Karaman* 2652; Hoşap, Cuğ gediği, steppe, 2700 m, 11.08.2011, *S. Karaman* 2679; C10 Hakkarı: Cilo Mountain, below Cilo yaylā, 2743 m, 7.08.1954, *P.H. Davis & O. Polunin* 23974 (M; ANK, E).

**Astragalus gueruenensis** Podlech


**Astragalus hirticolas** Bunge

Turkey. A7 Bayburt: Osluk Köprüsü, open limestone slopes, 1700 m, 21.06.1967, *Tobey* 2154 (E). B9 Van: Hoşap–Başkale road, Güzeldere pass, steppe, 2616 m, 21.06.2011, *S. Karaman, F. Taeb & İ. Kaval* 2599; ibid., 11.08.2011, *S. Karaman* 2681; Güzeldere pass, steppe, 2640 m, 21.06.2011, *S. Karaman, F. Taeb & I. Kaval* 2660; Erciş, north of İkizçalı village, steppe, 2040–2240 m, 31.07.2005, *O. Karabacak* 3983 (VANF); Gürün, above Tutmaç village, steppe, 2600 m, 15.07.2003, *M. Ünal* 8682 (VANF); Gürün, Köçğüden village, steppe, 2950 m, 31.07.2002, *M. Ünal* 7834 (VANF); Van–Hoşap, Güzeldere pass, mountain steppe, 2800 m, 08.08.1993, *Y. Altan* 5466 (GAZI); Van–Hoşap Güzeldere pass, steppe, 22.08.1993, *Y. Altan* 5568 (GAZI); Hoşap, Kepir Mountain, 2800 m, 30.07.1954, *P.H. Davis & O. Polunin* 23337 (ANK, K, E); Van–Hakkari, 2 km to Güzeldere pass, steppe, 2700 m, 23.07.1983, *N. Adıgüzel & T. Ekim* 7932 (GAZI, ANK); 34 km from Başkale to Hoşap, Güzeldere pass, rocky slopes in sandy soil (mountain steppe), 2800 m, 03.07.1966, *P.H. Davis* 45911 (K); Gevaş, Artos Mountain, 2590 m, 14.07.1954, *P.H. Davis & O. Polunin* 22713 (K, E); Gevaş, Artos Mountain, rocky slopes, 3048 m, 16.07.1954, *P.H. Davis & O. Polunin* 22769 (ANK, K, E); Gevaş, Artos Mountain, N facing snow line, 2896–3506 m, 03.08.1966, *M. Tong* 316 (E); 20 km S of Hoşap, dry stony hill side, 24.07.1965, *E.M. Rix* 335 (K); 34 km from Başkale to Hoşap, Güzeldere pass, rocky slopes in sandy soil (mountain steppe), 2800 m, 03.07.1966, *P.H. Davis* 45911 (E); Çatak, Kavusshah Mountain, rocky slopes, 3100 m, 23.07.1954, *P.H. Davis & O. Polunin* 23128 (K, E); in summo juga inter
Bashkale et Hoshap, 2700 m, 30.06.1975, Rechinger 53882 (M); Bitlis: Adilcevaz, Ziyarettepe, kalker anakaya, 2000 m, 13.06.1988, L. Bırand 825 (VANF); Yeşiltepe, South part of plateau, 2200–2400 m, L. Bırand 123 (VANF). C10 Hakkari: top of Bajırge to Yüksekova pass by Delezi village, upland hills, shale, grassy area, meadow, subalpine flora, 2550 m, 29.06.1967, Watson et al. 2944 (K, E); between Van and Hakkari, Çuh Mountain, 2600 m, 19.07.1956, H. Bırand, K. Karamanoğlu 988 (ANK); Mor Mountain, limestone, S of rocky slopes, 3100 m, 16.08.1967, Watson et al. 3633 (E).

Astragalus hymenocystis Fisch. & C.A.Mey.

Turkey. A9 Erzurum: Oltu, Dutlu Mountain, Eski Dutlu village, 2200–2500 m, 19.07.1982, N. Demirkuş 1393 (ANK). A10 Erzurum: Aşkale–Bayburt road 17 km, sandy slopes, 1600 m, 05.07.1975, R. Çetik 8322 (GAZI); between Namran and Oltu, 5 km to Oltu, gypseous slope, 1327 m, 16.06.2011, S. Karaman 2591; Özdal, 2348 (HUB); Erzurum, Hamami stream, 1900 m, 13.07.1971, A. İlçim & B. Çetin s.n. (ANK). A11 Kars: Kağızman, between Kötek and Sarıkamış Mountain, under Çavdarlık, upper sides of Quercus scrub, 1750 m, 12.07.1973, A. Düzenli 447 (ANK, KNYA). B5 Niğde: Melendiz Mountain, Asmasız village, 1900 m, 29.07.1982, H. Ocakverdi & B. Eyce 191 (KNYA); Kayseri: Kayseri, 31.07.1941, A. Heilbronn & M. Başaran s.n., ISTF 1014 (ISTF); Tadas, 29.07.1941, A. Heilbronn & M. Başaran s.n., ISTF 927 (ISTF); Kiranardi, Quercus scrub, 1560 m, 17.07.1973, R. Çetik 4081 (ANK); Ali Mountain, Talas, 1600 m, 17.06.1935, Balls & Gourlay 1395 (ANK, K); Nevşehir: Ürgüp, Aksalur village, steppe, 1490 m, 30.06.2011, S. Karaman 2618; Ortahisar, Gemil Mountain, kuzey yamaç, Festuca steppe, 1450–1500 m, 18.06.1989, M. Vural et al. 1989 (HUB, GAZI); between Nevşehir and Ürgüp, steppe, 1200–1300 m, 22.06.1952, Dodda, Çetik & P.H. Davis 19123 (K). B6 Sivas: Hafik, Çınarlık village, 1400 m, 25.07.1979, T. Ekim & B. Çetin s.n. (KNYA); 15 km from Sivas to Kayseri, Domuzluçi slopes, 1500 m, 06.08.1985, S. Çivelek 2076 (ANK); Sarkışla, steppe, 1100–1200 m, 10.07.2009, A. İlçim & L. Bırand 1761 (VANF); between Yıldızeli and Sivas, 30 km to Sivas, 1340 m, 26.06.1974, K. Karamanoğlu, & M. Koyuncu. s.n. (HUB); 3 km from Yıldızeli to Tokat, steppe, 1375 m, 26.06.2011, S. Karaman 2616; ibid., 23.08.2011, S. Karaman 2694; 46 km from Gürün to Pınarbaşı, roadsides, 1700 m, 16.07.2013, S. Karaman 2779; Yozgat: Çayıralan, Akdağ, calcareous slopes, 1600–1750 m, 16.07.1980, T. Ekim 4754 (ANK); B7 Tunceli: Pülümür, igneous slopes, 1375 m, 11.07.1957, P.H. Davis & Hedge 30926 (ANK, K); Erzurum: Çimin, Keşiş Mountain, rocky slopes, 2200 m, 26.06.1957, P.H. Davis & Hedge 31705 (ANK, K). B8 Erzurum: 18 km from Hınıs to Pasinler, S side of calceous pass, 1900 m, 12.07.1966, P.H. Davis 46334 (K); Horasan, Haci Ahmet village, steppe, 1750 m, 15.07.2011, S. Karaman 2662. B9 Van: Erçiş, Pay village, steppe, 2050 m, 14.06.2012, S. Karaman 2716; Horasan–Ağrı road, steppe, 2090 m, 14.07.2011, S. Karaman 2654; Horasan–Karaurgan, marly hillsides, 1650 m, 07.07.1957, P.H. Davis & Hedge 30754 (K); 18 km from Hınıs to Pasinler, S side of calceous pass, 1900 m, 12.07.1966, P.H. Davis 46334 (K); Palandöken Mountain, 40 km from Çat to Erzurum, rocky igneous slopes, 2000 m, 27.07.1966, P.H. Davis 47413 (K); Erzurum road, 23.07.1947, A.Heilbronn et M. Başaran s.n., ISTF 8034 (ISTF); Köp Mountain, 25.07.1947, A.Heilbronn 8115 (ISTF); İlçeci–Tezcan, 1900 m, 10.07.1957, rocky igneous slopes, P.H. Davis & Hedge 30888 (ANK, K); Karakaya Mountain from Ağirvan pass, 15 km N of Hınıs, upland ridge, limestone, 2250 m, 20.08.1967, CM & W 3675; Palandöken Mountain, 40 km from Çat to Erzurum, rocky igneous slopes, 2000 m, 27.07.1966, P.H. Davis 47413;
Karamay Mountain, 15 km N of Hınıs, limestone, steppe, 2250 m, 20.08.1967, Watson et al. 3675; Kop Mountain pass, stony slopes, 8000 ft., 09.08.1962, P. Forde 3800 (K); Erzincan: Erzincan, Kızılkalesi, steep slopes, steppe, 2100 m, 28.07.1990, A. Güner 7819 (HUB); Bitlis: Süphan Dagh, above Adilcevaz, rocky S slopes, 9500 ft., 28.08.1954, P.H. Davis & O. Polunin 24702 (K); Ağrı: Suluçem (Musun) above Adilcevaz, rocky S slopes, 9500 ft., 28.08.1954, P.H. Davis & O. Polunin 3099 (HUB); Nemrut Mountain, east slopes, steppe, 1950 m, 13.07.1956, Hub-Mor., H. Birand & K. Karamanoğlu 282 (ANK); W side of Pelli Mountain pass, schistose slopes, 2200 m, 07.07.1966, P.H. Davis 46012 (K); Ağrı: Patnos, Top Mountain, above Kiskapan village, steppe, 2000 m, 25.06.2006, H. Emlık 434 (VANF); between Horasan and Ağrı, pass Velıbăa Gedik in etwa, 2500 m, 04.08.1962, F. Höfflinger s.n. (K); Horasan–Karaurgan, marly hill sides, 1650 m, 07.07.1957, P.H. Davis & Hedge 30754 (K); Mus: Malazgir, north of Kardeşler village, steppe, 1672 m, 06.07.2006, L. Behçet, F. Özgökçe & M. Ünal 1351 (VANF); Malazgirt, between Aktuzla and Karıncalı, steppe, 1650 m, 23.06.2001, L. Behçet & S. Almaner 1592 (VANF); Malazgirt, around iyikomuş and Kirmkaya villages, steppe, 2095 m, 01.08.2007, L. Behçet, F. Özgökçe & M. Ünal 3360 (VANF), B10 Ağrı: between Tutak and Hamur, steppe, 23.07.2011, S. Karaman 2614; between Doğubeyazıt and Diyadin, dry clay to sandy loam, 1067–1220 m, 29.07.1969, Hewitt 172 (K); Doğubeyazıt, steppe, 1900–2100 m, 24.06.2013, S. Karaman 2783; İldrü: 20 miles from İlgird, hillside, dry loam, 1829–2134 m, 11.08.1970, Hewitt 352 (K); Ardahan: 5 km from Digor to Kars, steppe, 2050 m, 21.07.2013, S. Karaman 2794; Kars: Aralik, Ağrı Mountain, above Sultantop Karakol, 2000 m, 05.07.1984, M. Tänker, F. ılsulu & M. Koyuncu 6941 (GAZI); Van: Başkale, Çaldıran village, south slopes of Türtpepe, steppe, 2050 m, 01.07.2007, L. Behçet & D. Avlaman 802 (VANF); Özalp, between Eregbelen and A. Tulgali villages, steppe, 2150 m, 07.07.1997, F. Özgökçe 4875 (VANF); Özalp, Salmandı village, steppe, 2050 m, 20.06.2011, S. Karaman 2593; Başkale, Geyna Mevkii, steppe, 1950 m, 03.07.2007, D. Avlaman 347 (VANF). C5 Niğde: Dikilitaş, Quercus pubescens scrub, 1600 m, 21.07.1995, N. Adıgüzel & Z. Aytac 7187 (GAZI), C7 Dijyarbakır: Karaca Mountain, Turbelek, open ground on mountain, 5800 ft., 24.06.1958, E.S. Brown 548; ibid., 11.07.1958, E.S. Brown 674 (K). C9 Van: Güpınar, southeast of Çatakibdi village, steppe, 2500 m, 26.07.2006, M. Ünal & F. Özgökçe 111 (VANF); C10 Hakkâri: between Beytüşü̈şebap and Uludere, Tanın Mountain, 2500 m, 25.07.1974, Rix 2355 (HUB).

*Astragalus qoturensis* Podlech

B9 Van: between Başkale and Hoşaş, Güzeldere pass, steppe, 2760 m, 13.07.2011, S. Karaman 2653.

*Astragalus rubrostiatus* Bunge

C9 Van: Güpınar, between Kırkgöz and Taşınocak, steppe, 2207 m, 22.06.2011, S. Karaman 2603; Güpınar, between Dikbıyık village and Tırsın Plateau, steppe, 2400 m, 03.08.2007, M. Ünal & F. Özgökçe 2371 (VANF).

3
**Astragalus sosnowskyi** Grossh.

Turkey. A8 Erzurum: S. Karaman 2666; ibid., 11.08.2011, S. Karaman 2666; ibid., 16.07.1989, Podlech (G, GAZI, MSB); Narman–Ölten road, 5 km from Narman, roadside, 1327 m, 16.06.2011, S. Karaman 2569; Tortum–Ölten road 26 km, steppe, 2180 m, 15.07.2011, S. Karaman 2660; oberhalb Orman Evi, 21 km NW Oltu, 2000 m, 08.07.1992, Nydegger 46632 (MSB); Dutlu Mountain, NW Oltu, 16.07.1989, Nydegger 44454 (G, GAZI, MSB); 26 km from Tortum to Oltu, W side of pass, 2200 m, 29.07.1966, P.H. Davis 47545 (M).

**Astragalus trifoliumstrum** Hub.-Mor. & V.A.Matthews

Turkey. B9 Van: Gürpınar, between Hamurkese and İşkıpınar villages, steppe, 2155 m, 13.07.2011, S. Karaman 2650; ibid. 13.07.2011, S. Karaman 2651; Kurubaş pass, steppe, 2000 m, 20.07.2013, S. Karaman 2781; Erek Mountain, western slopes, steppe, 2000 m, 10.08.1989, Z. Aytaç & Metzger 1991 (GAZI); 7 km from Van to Erçek, igneous slopes, steppe, 1850 m, 05.06.1966, P.H. Davis 44283 (K, E); Hoşap, dry mudstone hills, near Hoşap Castle, 10.07.1968, E.M. Rix et al. 827 (E).

**Astragalus uraniolimneus** Boiss.

Turkey. A8 Artvin: Yusufeli, Ziyaret Mountain, Narlık plateau, alpine meadows, 2630 m, 23.07.2013, S. Karaman 2797; ibid., 03.09.2011, S. Karaman 2799; Yusufeli, Öğden, from Kapreşet to Ziyaret Mountain, 2500 m, 05.08.1984, N. Demirkuş 2418 (HUB); A9 Erzurum: Olur, Kekikli village plateaus, Şiriş, 1750–2300 m, 01.08.1984, N. Demirkuş 2298 (HUB); Gürpınar, 2 km to Koçgüden village, steppe, 2645 m, 21.06.2011, S. Karaman & F. Tieb 2605. B9 Van: Gürpınar, above Koçgüden village, steppe, 2950 m, 31.07.2002, M. Ünal 7810 (VANF); Gürpınar, south slopes of Başet Mountain, steppe, 2600 m, 14.06.2001, M. Ünal 5165 (VANF); Muradiye, Pirreşit Mountain, steppe, 2734 m, 18.06.2011, S. Karaman 2582; Muradiye, above Babacan village, steppe, 2062 m, 18.06.2011, S. Karaman 2577; Güzeldere pass, steppe, 2650 m, 22.06.2013, S. Karaman 2755; Hoşap, Çuh pass, steppe, 2700 m, 22.06.2013, S. Karaman 2749; Özlarp, Sügeçer village, steppe, 2800 m, 28.06.1997, F. Özgökçe 4138 (VANF). B10 Van: Özlarp, between A. Koçkuran and Damlaköy villages, Boncuklutepe, steppe, 2363 m, 05.07.1997, F. Özgökçe 4745 (VANF). C10 Hakkâri: Cilo Mountains, rocky ground near glacier stream, 2700 m, 15.07.1965, R. Fedden & P. McCall 63 (K).
km S of Hoşap, dry stony slopes, 2743 m, 07.1965, E.M. Rix 289 (K); Gürpınar, above Koçgüden village, steppe, 2200 m, 27.06.2001, M. Ünal 5320 (VANF); Erciş, northeast of Aksakal village, steppe, 2484 m, 29.07.2007, O. Karabacak 7312 (VANF); 6 km from Timar (Canik) to Van, steppe, 1850 m, 03.06.1966, P.H. Davis 44188 (K); Güzeldere pass, 34 km from Başkale to Hoşap, S side of calceeous (E); 6 km S of Hoşap, rocky scrub, 600 m, 04.06.1957, P.H. Davis & Hedge 2383 (GAZI); Gevaş, Artos Mountains, 2590 m, 14.07.1954, P.H. Davis & O. Polunin 22733 (MSB); N side of Artos Mountain, S of Gevaş, 2000–2200 m, 22.07.1978, Ehrendorfer, Sorger et al. 787 93–11 (MSB); Peli Mountain, between Van and Tatvan, 2000–2500 m, 29.06.1968, Rix et al. 728 (M); slopes above Erçek lake, 1800 m, 10.06.1985, Archibald 6627 (M); Gürpınar to Başkale, Güzeldere pass, 2900 m, 12.08.1966, Engel 118 (MSB); Van to Kurubass pass, 2000 m, 12.06.1993, Altan 4880 (GAZI). Ağrı: east of Doğubeyazıt Ishak Paşa Sarayi, steppe, 1900–2100 m, 27.06.1988, Z. Aytaç 2383 (ANK); Doğubeyazıt, 1900–2100 m, 27.06.1988, Z. Aytaç 2383 (GAZI); C10 Hakkari: 21 km from Bajırge to Yüksekova pass, limestone slopes, 1400 m, 16.07.2011, S. Karaman 2669; Şavşat, between 2 km from Köprülü to Ciritdüzü, 1490 m, 16.07.2011, S. Karaman 2669; Şavşat, between 2 km from Köprülü to Çiritdüzü, 1400 m, 16.07.2011, S. Karaman 2670; Şavşat, Yalnızçam pass, naked slopes, 2630 m, 22.07.2003, S. Karaman 2793; from Yusufeli to Özdem, forest openings, 1700 m, 22.07.2013, S. Karaman 2795; Çoruh Gorge, between Artvin and Ardanuç, rocky igneous slopes in open oak scrub, 26.06.1957, P.H. Davis & Hedge 30054 (E); 6 km W Altıparmak NW Yusufeli, 18.06.1988, 1780 m, Nydegger 43390 (MSB). A9 Erzurum: Oltu, Dutlu Mountain, Eski Dutlu village, 2200–2500 m, 15.07.2011, S. Karaman 2665. B5 Kayseri: Sarız, Yokal (Yesilkent) Dayoluk village, Koca Mountain hill, 1750 m, 05.08.1988, Aytaç 2513 (GAZI). B6 Malatya: 50 km na poludnie od Malatya, droga do Pazarcik, 17.05.1975, K. Brownicz & Z Zielinski 250 (E); Kozluk, in the upper course of the river above İsmet Paşa, rocky hillsides, 08.06.1968, R. Alava 7074 (E); Aghateh (Akça Mountain) to Arga, 16.07.1906, Post 134 (G); 50 km N Malatya, Pazarcik, 17.05.1975, Brownicz & Zielinski 250 (E); near vill. Kołzik, river above İsmet Paşa, 08.06.1968, Alava 7074 (E). B7 Elazığ: Elazığ–Kale, 22 miles E of Elazığ, marly vineyards, 1300 m, 04.06.1957, Davis & Hedge 28940A (E); Elazığ–Pertek, banks, 1300 m, 06.06.1957, Davis & Hedge 29197 (E); Tunceli to Elazığ, zw. Munzur Suyu und Peri Suyu, 1050 m, 25.08.1987, Engel 170 (MSB); Elazığ to Pertek, 1300 m, 06.06.1957, Davis & Hedge 29197 (E, M); Diyarbakır: Ergani, 10 km from Diyarbakir, 750 m, 01.06.1957, Davis & Hedge 28798 (E). C4 Konya: S Hadim Taşkent, 1450 m, 19.10.2002, Ulrich A26 (MSB); Sultandag, supra Jasan ditionis Akscheier, 100 m, 01.07.1899, Bornmüller 4415 (K). C5 Adana: Karınca Mountain, 2 miles NE of Alpu, 3 miles N of Pozanti, pine woodland, 1100 ft., 18.06.1971, Fz. 428 (E); Adana: Feke, 10.06.1971, Y. Akman 6102 (E); N. Pozanti, E slopes of Toros Mountains, 1000 m, 13.07.1971, Abb. Uni. Aman. Exp. B170 (E); Karinka Da., 2 miles NE Alpu, 3 miles N Pozanti, 18.07.1971, Fz 428 (E); Pozanti to Tekir Yayla, M. Viral 6866 (GAZI); Osmaniye, Yarpuz vill., Sokou area, 1500 m, 20.07.1988, Z. Aytaç 2439 (GAZI); Mersin: S foot of Bolkar Mountain, between Yavcua and Arslan villages, NE of Mersin, 01.06.1991, Boratynsky et al. 6856 (MSB); Delikkaya–Cambalir, 810 m, 26.06.1972, Uslu 1550 (E); Gülek Bogazi, 1300 m, 20.06.1987, Nydegger 42877 (MSB); Zaurus occid. pr. Gülek, 1836, Kotschy 132 (G–BOIS, K); Taurus, pres du défile des Portes Citlilenes, 23.06.1855, Balansa 485 (G, MSB); Gülek Bogazi, 1300 m, 20.06.1987, Nydegger 42877 (MSB). C6 Kahramanmaraş: 2 km from Çağlayancerit to Bozlar, 1000 m, 22.07.2011, S. Karaman 2673; Ahır Mountain above Maras, 1100 m, 02.05.1957, P.H. Davis & Hedge 27472 (E); Valley of Tekir river near Suciati, NE Allikayasi, stony places, 06.06.1991, Boratynsky et al. 6887 (MSB); Öksüz Mountain, Tarla kenarı, 1400–1500 m, 14.06.1987, H. Duman 3277 (GAZI); ibid., 26.07.1987, H. Duman 3766 (GAZI); Engizek Mountain, Aksu, 1000–1100 m, 24.05.1987, H. Duman 2907 (GAZI); above Maras, Balls 954 (E); [montis Kara Kirdagh] supra Seytun, 04.08.1865, Haussnicht 2 (G–BOIS). Gaziantep: Campus of Gaziantep University, steppe, 1050 m, 04.06.2013, S. Karaman 2733; W of Gaziantep, 19.05.1972, D & U. Ruckbrodt s.n. (E); Aintab [Gaziantep], 20.05.1937, Frère Louis 94 (E); S of Kilis, 16.05.2005, Rabaut s.n. (MSB); Hatay: Amanus, envir. of Belen, 24.07.1862, Kotschy 76 (E, G–BOIS, MSB). C7 Urfa: 15 km from Urfa to Bilvan, 18.05.1957, Davis & Hedge 28255 (E); circa Aintab, 610 m, 20.06.1865, Haussnicht 2 (G–BOIS); S of Kilis, 16.05.2005, Rabaut s.n. (MSB); Hatay: Amanus, envir. of Belen, 24.07.1862, Kotschy 76 (E, G–BOIS, MSB). C7 Urfa: 15 km from Urfa to Hilvan, 18.05.1957, Davis & Hedge 28255 (E); circa Urfa [Urfa], 15.05.1865, Haussnicht 45 (G–BOIS). C8 Diyarbakır: Diyarbakır–Ergani, 10 km from Diyarbakır, bazalt field, 750 m, 01.06.1957, Davis & Hedge 28798 (E). Mardin: Mardin, eroded banks, 1100 m, 24.05.1957, Davis & Hedge 28531 (E); Bakakri, 02.07., P. Sintenis 1283 (E).
Astragalus dipodurus Bunge

Turkey. B9 Ağrı: Patnos, Erkeli village, steppe, 2300 m, 04.10.2000, L. Beşchet 6349 (VANF); Bitlis: Süphan Mountain, Erkeçilli village, stony and rocky slopes, kayalik, 2300–2500 m, 02.07.2000, L. Beşchet 6319 (VANF); Van: Muradiye, Babacan village, Derişi plateau, steppe, 2400 m, 24.06.2002, O. Karabacak 3256 (VANF). C4 Konya: Karasınır, steppe, field margins, 1100 m, 15.07.1966, Ledingham et al. 4351 (E); ibid., 07.07.2011, S. Karaman 2625; ibid., 25.08.2011, S. Karaman 2693; 24 km S. Seydişehir toward Bozkır, 1050 m, 30.07.1992, Nydegger 46898 (MSB); Karaman: Ermenek, Güktepe, Dumlügöz village, Gavur alani, 1300 m, 16.07.1984, H. Sümübül 3176 (HUB).

Astragalus isauricus Hub.-Mor. & V.A.Matthews


Astragalus longifolius Lam.

Turkey. A8 Erzurum: between Köprü village and Narman, steppe, 1950 m, 15.07.2011, S. Karaman 2658. B7 Elazığ: between Elazığ and Bingöl, Hoşmat Karayolları Park, protected area, 1200 m, 21.06.1983, Ekim 7310 (GAZI); c. 25 km N Erzurum toward Tortum, 1750 m, 18.08.1987, Engel 145 (MSB); Erzurum to İspir, vor İspir, 2150 m, 19.08.1987, Engel 151 (MSB). B9 Van: Erçiş, between Hasanabadal and İşbaşlî villages, moving slopes, 1855 m, 19.06.2011, S. Karaman 2587; ibid., 12.07.2011, S. Karaman 2647; ibid., 10.08.2011, S. Karaman 2678; ibid. 1950 m, 26.06.2005, O. Karabacak 3647 (VANF); Muradiye, above Şeytan bridge, southern slopes, steppe, 2000 m, O. Karabacak & L. Beşchet 2553 (VANF); Bitlis: Tütün Bakımevi, steppe, 1500–1600 m, 23.06.1983, N. Adğüzêl 1988 (GAZI); Nemrut Mountain, 1800 m, P.H. Davis 23546 (ANK); Tatvan, Nemrut Mountain, volcanic rocky slopes, 2900 m, 18.06.1972, H. Peşmen 2896 (HUB); E flank of Nemrut Dag, 1829 m, 03.07.1954, P.H. Davis & O. Polunin 23546 (E, K); Nemrut Mountain, im Krater am Nemrud Gölü, 2300 m, 09.08.1987, Engel 102 (MSB); E flank of Nemrut Mountain 1830 m, 03.07.1954, P.H. Davis & O. Polunin 23546 (E). C9 Hakkari: Çukurca, 2 km from Üzümülü to Ceylanlı, rocky slopes, 1450 m, 21.06.2011, S. Karaman & İ. Kavall 2598; ibid, 11.08.2011, S. Karaman 2683; Çukurca, Marinos Dere above Marunus, 20 km from bridge across Zap, rocky limestone slopes, 1900 m, 21.06.1966, P.H. Davis 45780 (E).

Astragalus oleaefolius DC.


*Astragalus yukselii* Karaman & Aytaç

C4 Konya: Hadim, 3 km from Hadim to Taşkent, steppe, 1580 m, 11.06.2011, *S. Karaman* 2620 & *Y. Karaman*; ibid., 24.08.2011, *S. Karaman* 2691.