Astragalus yukselii (Leguminosae), a new species from Turkey

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1. Introduction

The genus Astragalus L. is represented by approximately 3000 species worldwide. In Turkey, this genus comprises about 425 taxa including 218 endemic species classified in 63 sections (Chamberlain & Matthews, 1970; Davis et al., 1988; Maassoumi, 1998; Aytaç, 2000). The hair characters are very important for distinguishing Astragalus species (Mehr et al., 2012).

Astragalus sect. Macrophyllum Boiss. was validly published by Boissier (1872). Tragacanthic Astragalus in the Flora of Turkey was accounted for by Chamberlain and Matthews (1970). Astragalus sect. Macrophyllum and many other groups of thorny species have been revised in recent decades (Tietz, 1988; Tietz & Zarre, 1994; Zarre & Podlech, 1996; Maassoumi, 1998; Zarre, 2000).

Sect. Macrophyllum is represented by 8 taxa, and of these, 5 are endemic to Turkey (Chamberlain & Matthews, 1970). According to Zarre (2000), the number of Astragalus species assigned to this section in Turkey is 5, and only A. isauricus Hub.-Mor. & V.A.Matthews is endemic to Turkey.

The species of sect. Macrophyllum possess the largest leaves and inflorescences within the tragacanthic Astragalus species. Turkey, with 5 species, is the main diversification centre of the section; the same number of species is also known from Iran. The taxa of this section form more or less loose subcushions, and in contrast to many other tragacanthic species, they do not form dense populations (Zarre, 2000).

Key words: Astragalus, new species, Macrophyllum, Leguminosae, Turkey

2. Materials and methods

In June 2011 during a field trip near Hadim (south of Konya) in the context of a revisional study of sect. Macrophyllum, we encountered an unusual population of Astragalus within an A. isauricus population. Further studies revealed that they were not referable to any known taxon of the genus. Therefore, a new species is described here. The specimens were checked with the Flora Uzbekistana (Borissova, 1955), Flora Tadzikistana (Borissova, 1937), Flora USSR (Borissova, 1946), Flora Kavkaza (Grossheim, 1952), Flora Europaea (Chater, 1968), Flora of Turkey (Chamberlain & Matthews, 1970; Davis et al., 1988; Aytaç, 2000), Flora Azerbajiana (Razade, 1954), Flora of Iraq (Townsend, 1971, 1974), Flora Palaestina (Zohary, 1987), Flora of Iran (Maassoumi, 2003), and other relevant literature (Yakovlev et al., 1996; Maassoumi, 1998; Zarre, 2000) and were compared with the types and other representative collections at the GAZI and E herbaria. The abbreviations of the plant name authors were checked according to Brummitt and Powell (1992).

3. Results

Astragalus yukselii Karaman & Aytaç, sp. nov. (Figures 1 and 2).

Type: C4 Konya: Hadim, 3 km from Hadim to Taşkent, steppe, 1580 m, 11.06.2011, S.Karaman 2620 & Y.Karaman (holotype: GAZI, isotypes: ANK, GAZI).

Diagnoses: Affinis Astragalus isauricus, sed foliis sparsis ad dense hirsutis (non glaber); bracteis pilosus (non

Abstract: Astragalus yukselii Karaman & Aytaç (Leguminosae) is described as a new species and illustrated. The species is distributed near the town of Hadim in Konya Province (South Anatolia). Diagnostic morphological characters useful in discriminating the new species from its close relatives, A. isauricus Hub.-Mor. & V.A.Matthews and A. karjaginii (Boriss.) Boriss., are explained. Both species clearly belong to Astragalus L. sect. Macrophyllum Boiss., which is characterised by large leaves and flowers. We also present some notes on the ecology, biogeography, and conservation status of the new species.

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Figure 1. Habit of *Astragalus yukselii*: a- herbarium label, b- in natural habitat.

Figure 2. Distribution map of *Astragalus yukselii* (✶) and *A. isauricus* (■).
spreading hairy. Inflorescence dense, ovoid to cylindrical, 0.5–1 mm long, prominently veined, sparsely or densely 1–6 mm, narrowly oblong-elliptic, acute at tip, with a mucro × leaflets 7–14 pairs, yellowish to light greenish, 4–26 mm, one-fifth to one-fourth as long as the rachis (3–6 cm long); rachis thick, rigid, straight or curved, obliquely adnate to petiole, otherwise free from each other, with 16–17 parallel nerves at free portion, glabrous. Leaves 7–27 cm long; rachis thick, rigid, straight or curved, obliquely erect, sparsely spreading-hairy, soon glabrescent; petiole one-fifth to one-fourth as long as the rachis (3–6 cm long); leaflets 7–14 pairs, yellowish to light greenish, 4–26 × 1–6 mm, narrowly oblong-elliptic, acute at tip, with a macro 0.5–1 mm long, prominently veined, sparsely or densely spreading hairy. Inflorescence dense, ovoid to cylindrical, 5–12 × 4–5 cm, composed of 4–10 flowered axillary clusters, flowers sessile. Bracts thinly membranous, yellowish white, 10–15 × 2–4 mm, lanceolate-oblong, navicular, acuminate, pilose at tip and base, ciliate at margins. Bracteoles 2 membranous pieces, yellowish whitish, 4–5 × 0.7–1 mm, lanceolate, subulate to linear, distinctly shorter than calyx, glabrous at base. Calyx white to green, turbinate, with green or purple teeth, 20–22 mm long, with 13–15 parallel nerves, densely pilose; teeth 10–12 mm long, as long as or longer than the tube, pilose. Corolla pink to purple, claws of wings and keel 5–6 mm adnate to staminal tube. Standard 24–27 mm long; limb 14–18 × 8–10 mm, oblong-pandurate, constricted at lower part, rounded at tip; claw 7–9 mm long, narrowly cuneate. Wings 22–25 mm long; limbs 9–11 × 2.5–4 mm, oblong, obtuse at apex; auricle 0.8–1 mm long; claw 12–15 mm long, 1.2–1.5 times longer than limb. Keel 18–20 mm long; limb 7–8 × 2.7–3 mm long, elliptic, with broadly curved lower edge and concave upper edge as well as minutely mucronulate keel (not triangular-oblong, with rectangular lower edge and straight upper edge); stamens free at upper 5–6 mm (not 3 mm); fruit 10–12 mm long (not 8–10 mm) (Figure 3).

**Astragalus yukselii** is distinguishable from *A. isauricus* by spreading hairy leaflets (not glabrous); pilose bracts at apex and base that are ciliate at margins (not glabrous); bracteoles 2 membranous pieces (not absent); calyx densely pilose and 20–22 mm long (not densely appressed-villous and shorter than 15 mm); elliptic, broadly curved lower edge and concave upper edge as well as minutely mucronulate keel (not triangular-oblong, with rectangular lower edge and straight upper edge); stamens free at upper 5–6 mm (not 3 mm); fruit 10–12 mm long (not 8–10 mm) (Figure 3).

**Astragalus yukselii** is comparable to *A. karjaginii*, but can be distinguished by the following characteristics: *A. yukselii* is 25–40 cm tall (not 20–30 cm); its stipules are triangular-lanceolate (not ovate to broadly ovate); leaflets 7–14 pairs (not 4–6 pairs); inflorescence ovoid to cylindrical, longer than wide (not globose, wider than long); 2 bracteoles present (not absent); calyx densely pilose, 20–22 mm long (not 13–18 mm); fruits 10–12 × 5–6 mm (not 5–6 × 3–3.5 mm).
Table. Comparison of *Astragalus yukselii* with the 2 morphologically similar species.

<table>
<thead>
<tr>
<th>Character</th>
<th><em>A. yukselii</em></th>
<th><em>A. isauricus</em></th>
<th><em>A. karjaginii</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stipules</td>
<td>21–25 mm, triangular-lanceolate, with 16–17 parallel nerves at free portion, glabrous</td>
<td>13–22 mm, triangular-lanceolate, with 8–17 parallel nerves at free portion, glabrous</td>
<td>10–16 mm, ovate to broadly ovate, with 1–3 parallel nerves at free portion, younger ones densely appressed-tomentose, mature glabrescent</td>
</tr>
<tr>
<td>Leaflets</td>
<td>7–14 pairs</td>
<td>7–12 pairs</td>
<td>4–6 pairs</td>
</tr>
<tr>
<td>Leaflet indumentum</td>
<td>sparsely or densely spreading hairy</td>
<td>glabrous</td>
<td>lower surface with appressed hairs or sometimes dense appressed short hairs and sparse subpatent longer hairs, upper surface sparsely appressed short hairy, soon glabrescent</td>
</tr>
<tr>
<td>Bract indumentum</td>
<td>pilose at apex and base, ciliate at margins</td>
<td>completely glabrous</td>
<td>densely appressed-pilose toward apex and on midrib, ciliate at margins, otherwise glabrous</td>
</tr>
<tr>
<td>Bracteoles</td>
<td>2 densely pilose; teeth 10–12 mm long, as long as or longer than the tube, pilose</td>
<td>absent densely appressed-villous; teeth about 7 mm long, as long as the tube, densely appressed-villous</td>
<td>absent densely appressed-villous; teeth 6–9 mm long, as long as the tube, densely appressed villous</td>
</tr>
<tr>
<td>Calyx</td>
<td>elliptic</td>
<td>triangle-oblong</td>
<td>elliptic</td>
</tr>
<tr>
<td>Free part of stamens</td>
<td>5–6 mm</td>
<td>3 mm</td>
<td>3–5 mm</td>
</tr>
<tr>
<td>Fruits</td>
<td>10–12 × 5–6 mm</td>
<td>8–10 × 5–7 mm</td>
<td>5–6 × 3–3.5 mm</td>
</tr>
</tbody>
</table>

Figure 3. *Astragalus yukselii*: a- calyx and bracteole; b- bract; c- upper surface of leaflet; d- lower surface of leaflet; e- (left to right) standard, wing, keel, staminal tube, calyx, ovary. *Astragalus isauricus*: f- calyx; g- bract; h- upper surface of leaflet; i- lower surface of leaflet; j- (left to right) standard, wing, keel, staminal tube, calyx, ovary.
These specimens were compared to the specimens of related taxa in the GAZI and E herbaria (Appendix).

1. Stipules thinly membranous
2. Shoots, leaflets, and rachis glabrous
3. Leaflets 4–6 pairs; bracteoles absent; fruit 5–6 mm

These specimens were compared to the specimens of related taxa in the GAZI and E herbaria (Appendix).

1. Stipules thinly membranous
2. Shoots, leaflets, and rachis glabrous
3. Leaflets 7–14 pairs; bracteoles present; fruit 10–12 mm

1. Stipules chartaceous

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References

Appendix

Additional specimens examined. – Astragalus yukseli:
C4 Konya: Hadim, 3 km from Hadim to Taşkent, steppe, 1580 m, 24.08.2011, S.Karaman 2689 (paratype: GAZI).

Astragalus isauricus: Turkey. C3 Konya: Seydişehir-Akseki road, 15th km, 1665 m, 24.07.1997, A.Duran 4238 (GAZI! MSB); C4 Konya: Ermenek, Damlaćal, 1750 m, 07.07.1978, forest of Cedrus libani, Vural 960 (E! GAZI!);
C4 Konya: Hadim, 3rd km from Hadim to Taşkent, steppe, 1550–1600 m, 11.06.2011, S. Karaman 2549 (GAZI). – Astragalus karjaginii: Armenia. Vedi region, 1750 m, 14.7.1948, Akhverdov s.n. (E!). Iran: Prov. W Azarbaijan. Qushchii pass between Shahrur and Rezaiyeh, N side, 1800 m, 12.06.1971, Lamond 4093 (E!); 26 km W Rezaiyeh towards Serow, steep and loose conglomerate rocks, 1600–1700 m, 14.06.1971, Lamond 4132 (E!).

1. Shoots, leaflets, and rachis hairy
2. Shoots, leaflets, and rachis glabrous

1. Shoots, leaflets, and rachis hairy

Appendix

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