

## Notes on the taxonomy of *Hedysarum* (Fabaceae) in Iran

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*Hedysarum johartchii* Ranjbar *sp. nova* (Fabaceae) is described and illustrated from Iran. It is compared with the morphologically similar *H. jaxarticum* and *H. iliense*. *Hedysarum macranthum* and *H. singarensis* are reported from Iran for the first time.

Key words: Fabaceae, *Hedysarum*, new species, taxonomy

### Introduction

Although the main center of *Hedysarum* diversity is in Middle Asia, there is, however, another in N America, and the genus also occurs in Europe and the Mediterranean region (Yakovlev *et al.* 1996, Choi & Ohashi 2003). Plants of the genus occur in various habitats such as alpine and arctic meadows, strong grasslands, deserts or seashores (Choi & Ohashi 2003). Many species are also cultivated as fodder or for their ornamental value (Lock & Simpson 1991). They show marked variation in the pods, which often bear features — ribs, spines or prickles — which have been used as diagnostic characters in separating infrageneric taxa (Basiner 1845, Fedtschenko 1902), and to distinguish closely related genera from *Hedysarum* (Hutchinson 1964, Polhill 1981).

*Hedysarum* was divided by de Candolle (1825) into two sections, *Echinolobium* and *Leiolobium*, based on pod morphology. Basiner (1845) proposed an infrageneric classification of the genus, which was adopted by Boissier (1872) and followed in essence by Fedtschenko (1899, 1902). Rechinger (1984) placed 16 spe-

cies under three sections, namely *Multicaulia*, *Subacaulia* and *Crinifera*. Fedtschenko (1902) classified *Hedysarum* into seven sections and his classification was adopted in subsequent works (Fedtschenko 1948, Chrtkova 1968). His infrageneric system has often been regarded as unnatural (Rollins 1940, Thulin 1985, Choi & Ohashi 1996, Choi *et al.* 1999). A revised system was proposed by Choi and Ohashi (1996), dividing the genus into five sections under three subgenera.

### Material and methods

This study is mainly based on herbarium material. Several sheets have been examined for each species, received on loan from the following herbaria: Herbarium of Research Institute of Forests and Rangelands (TARI), Herbarium of Bu-Ali Sina University (BASUH), Herbarium of Ferdousi University of Mashhad (FUMH) and Esfahan, Herbarium of the Research Center of Natural Resources and Animal Affairs of Mashhad, Esfahan, Shiraz, Kerman and Zahedan. Moreover, during several excursions in Iran, some of the spe-

cies such as *H. formosum*, *H. ibericum*, *H. micropterum*, *H. criniferum* and *H. wrightianum* were studied in the field by the first author. All materials are deposited at the herbarium of Research Institute of Forests and Rangelands and Ferdousi University of Mashhad (TARI & FUMH).

## Results

### *Hedysarum johartchii* Ranjbar, sp. nova (Fig. 1)

*H. jaxartico* et *H. iliensi* affinis sed ab *H. jaxartico* statura maiore 18–25 (nec 12–15) cm elata, foliolis 1–3 (nec 3–5) jugatis, alis carina 3-plo (non 2-plo) brevioribus, legumine 3–5 (nec 1–3) articulato, articulis 15–23 × 3–4 mm (nec 0.5 mm) differt. Ab *H. iliensi* foliolis 5–10 (nec 21–22) mm latis, alis carina 3-plo (non 5–6-plo) brevioribus, legumine pilis albis adpressis et aculeis in pilos rubellos elongatis dense (non pilis brevis tomentosis) obsito distinguenda.

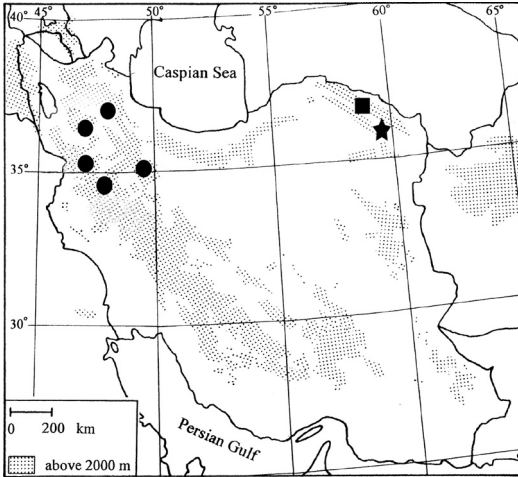
HOLOTYPE: Iran. Khorassan, Kalat, between Zavin and Djenar, 5 km, Southern Zavin, 20.V.1985 Johartchi & Ayatollahi 13129 (FUMH; photo herb. Ranjbar).

Perennial, 18–25 cm tall; stems rather undeveloped, 2.5–3 cm, rarely reaching 5 cm. Caudex up to 20 mm long, with short, thick branches, covered with remnants of old stipules and petioles. Stipules 5–7 mm long, light brown, connate, lower triangular, upper narrowly triangular-acuminate from a wide base, adnate to petiole for 2–2.5 mm, densely covered with appressed white hairs. Leaves 5–7 cm long, petiole 2–2.5 cm long, densely covered with appressed white hairs like rachis. Leaflets in 1–3 pairs, ovate-lanceolate, ovate-elliptic to lanceolate, rounded to obtuse at apex, 15–25 × 5–10 mm, densely hairy beneath, greyish green, above less densely hairy, green. Peduncle 5–6 cm long, erect to ascending. Scapes procumbent to ascending, 1–1.5 mm thick, densely covered with appressed white hairs. Raceme rather densely many-flowered before anthesis, becoming elongated in flower and fruit and up to 15 cm long. Bracts 4–5 mm long, lanceolate, membranous, deciduous. Pedicels 1–2 mm long, hairy, upper flowers often without pedicel; flowers erect



Fig. 1. *Hedysarum johartchii* (from holotype). — A: Habit. — B: Pod. — C: Keel. — D: Calyx. — E: Standard. — F: Wings. — G: Androecium. — H: Gynoecium. Scale bar: A = 1 cm, B = 0.3 cm, C–H = 0.5 cm.

to slightly spreading. Bracteoles conspicuous, subequal to calyx tube, densely covered by short appressed hairs. Calyx 6–10 mm long, tubular, densely covered by short appressed white hairs; teeth narrowly linear to subulate, 6–8 mm long. Corolla bluish violet. Standard 9–11 mm long, blade 6–9 mm wide, orbicular, widely rounded to slightly emarginate at apex. Wings 4–5 mm long; blades oblong, rounded at apex, 3–3.5 × 2–2.5 mm; auricle ca. 1 mm long, claw ca. 2 mm long. Keel 12–14 mm long; blades obovate-triangular, subacute at apex, 8–10 × 4–5 mm; auricle indistinct, claw 4–5 mm long. Staminal tube straightly cut. Ovary sessile, linear, hairy; style glabrous. Pods 3–5 jointed erect to spreading, linear, with a slender stipe 4–5 mm long, narrowly linear



**Fig. 2.** Distribution of *Hedysarum johartchi* (★), *H. macranthum* (■) and *H. singarense* (●) in Iran.

straight, 15–25 mm long, 3–4 mm thick, densely covered with appressed white hairs and prickles elongated into reddish hairs, 2–5 mm long.

**ETYMOLOGY:** The specific epithet is in honor of the Iranian botanist, Mr. Johartchi. He has collected many specimens now deposited in FUMH and written some reports and articles on the flora of Iran.

Morphologically *Hedysarum johartchii* most closely resembles *H. iliense* and *H. jaxarticum*. The differences among the three species are presented in Table 1.

*Hedysarum johartchii* is endemic to Iran with an interesting systematic position between the sections *Subacaulia* and *Multicaulia*. It is known

only from the type specimen collected from a mountainous area northeast of Mashhad in Khorassan province (Fig. 2).

## New records

### *Hedysarum macranthum* Freyn & Sint.

in Bull. Herb. Boiss., 2 ser. VI: 201. 1906.

This species from sect. *Crinifera* was reported by Rechinger (1984). Originally *Hedysarum macranthum* was described from the Kopetdagh mountainous region in Turkmenistan. The species is easily distinguished from the congeners species by larger leaflets up to 28 mm, long-acuminate bracts, and in particular the larger flowers, near 18 mm in length.

**SPECIMENS EXAMINED.** — **Iran.** Gorgan: E Maravehtappeh, near Ghazanghayeh, 300 m, 22.IV.1986 Assadi & Maassoumi 55529 (TARI); N Ghazanghayeh, 500–700 m, Maghsoudlou & Karimidust 1060 (TARI).

### *Hedysarum singarense* Boiss. & Hausskn.

in Boiss., Fl. Or. 2: 522. 1872.

*Hedysarum singarense* originally was described from northern Iraq. According to Rechinger (1984) it was previously known only from Turkey, Syria and Iraq. The cited collections extend its distribution to western Iran.

**Table 1.** Morphological comparison of *Hedysarum jaxarticum*, *H. iliense* and *H. johartchi*.

	<i>H. jaxarticum</i>	<i>H. iliense</i>	<i>H. johartchi</i>
Plant height	12–15 cm long	10–20 cm long	18–25 cm long
Number of leaflets	3–5 pairs	1–3 pairs	1–3 pairs
Leaflet width	6–12 mm	21–22 mm	5–10 mm
Standard length	shorter than keel	much shorter than keel	shorter than keel
Wing length	1/2 keel	1/5–1/6 keel	1/3 keel
Pod	1–3 jointed	3–5 jointed	3–5 jointed
Joints	small, ca. 0.5 mm in diameter	?	15–23 × 3–4 mm
Indumentum of pod	appressed white hairs with long incurved prickles	short tomentose hairs	appressed white hairs and prickles elongated into reddish hairs

SPECIMENS EXAMINED. — Iran. Azarbaijan: ca. 30 km NW of Tekab, 2000 m, 5.VI.1974 *Wendelbo & al 12210* (TARI); on the old road from Gharah-Chaman to Turkman-Chay, 1800 m, 26.V.1987 *Maassoumi 64893* (TARI); Miyaneh, Turkman-Chay, 12 km to N of Turkman-Chay, Varzaghan village, Kuh-e Bozghush, 1940 m, *Ghahremani & Talebpur 2608* (TARI); Maragh, 16 km road Hashtrood, 1920–2070 m, 15.VI.1987 *Olfat & Jabbari 314* (TARI); Kordestan: Sanandaj, 87 km E of Sanandaj, 1940 m, 28.VI.1965 *Babakhanlou 19984* (TARI); Obatou, 1600, 5.VI.1970, *Hamidi 24271* (TARI). Zanjan: 40 km towards Tabriz road, Abdal village, 1900 m, *Musavi 1692* (TARI); Mahneshan, Darbande Hebash, 2200 m, 15.VI.1995 *Musavi 249* (TARI); Taram, 1900 m, 2.VI.1971 *Foroughi 1582* (TARI); 15 km from Zanjan on the road to Bijar, 1900 m, 30.V.1974 *Wendelbo & al 11876* (TARI).

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