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# A New Species of *Linaria* Sect. *Versicolores* (Scrophulariaceae) from Iran

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**ABSTRACT.** *Linaria iranica* Hamdi & Assadi (Scrophulariaceae) is a new species from Kerman Province, Iran. It belongs to *Linaria* Miller sect. *Versicolores* (Benth) Wettstein, and its closest relative is *L. tenuis* Sprengel. *Linaria iranica* differs from *L. tenuis* in the smaller corollas (7–8 mm vs. 12–17 mm), longer spurs relative to the remaining corolla, smaller capsules (3–3.2 mm vs. 3.5–6 mm), and the ornamentation of seed surfaces.

**Key words:** Iran, IUCN Red List, *Linaria*, Scrophulariaceae.

*Linaria* Miller is widely distributed throughout the world and is introduced in the Americas (Hong, 1983). The genus comprises annual or perennial herbs that grow in diverse habitats including dry and sandy areas and rocky slopes. Sutton (1988) recognized 150 species, of which 24 occur in Iran. This genus is divided into seven sections mainly based on seed morphology. The seeds in section *Versicolores* (Benth) Wettstein are reniform, irregularly trigonous, or tetrahedral, and not laterally compressed. It is composed of 21 species worldwide, of which one occurs in Iran. Geographically, section *Versicolores* is distributed in Central and Southern Europe, West and South Asia, and North Africa. Sutton (1988) recognized some 150 species, of which 25 occur in Iran (Boiss, 1867; Parsa, 1949; Davis, 1982; Sutton, 1988; Hamdi et al., 2005a, b, 2006, 2007). While revising *Linaria* material among herbaria in Iran (IRAN, TARI, TUH, FUMH), specimens were found that could not be identified as any known species of *Linaria*. Closer investigation, including micromorpho-

logical studies of the seed and capsule surfaces, revealed that the material represents a hitherto undescribed species of *Linaria* sect. *Versicolores*.

***Linaria iranica*** Hamdi & Assadi, sp. nov. TYPE: Iran. Kerman Province: Girouft, 1300–1600 m, 10 May 1998, M. Mirtadzadini s.n. (holotype, TARI 95669). Figures 1, 2.

Planta annua, herbacea, glauca, inflorescentia excepta glabra, erecta; caules fertiles 15–20 cm longi, supra ramosi. Folia caulina fertilia 10–20 × 0.3–0.4 mm, alterna, filiformia, acuta. Inflorescentia 2–5 cm longa, floribus 2 ad 5, laxa; bracteae ca. 2 × 0.5 mm, apice acutae, glandulosae, lanceolatae; pediceli 2.5–3 mm longi, glanduloso-villosi. Calycis lobi inequales, 2.5–3 × 0.6–0.8 mm, apice subacuta, linearilanceolati; corolla 7–8 mm longa, flava; tubus ad os ca. 2.5 mm latus; sinus labii 0.7–0.75 mm longi; calcar ca. 4 mm longum, ad basem ca. 0.8 mm latum, rectum. Capsula 3–3.2 × 2.4–2.6 mm. Semina 0.6–0.65 × 0.32–0.36 mm, 3-vel 4-angulata.

Annual herb, glaucous, glabrous except for inflorescences, erect; fertile stems 15–20 cm, branched above. Leaves of fertile stems 10–20 × 0.3–0.4 mm, alternate, filiform, acute. Inflorescences 2–5 cm, 2- to 5-flowered; inflorescence axes lax in flowering and fruiting, fertile bracts ca. 2 × 0.5 mm, apices acute, lanceolate, glandular-villose; pedicels 2.5–3 mm, glandular-villose. Calyx lobes unequal, 2.5–3 × 0.6–0.8 mm, apices subacute, lanceolate to linear, not scarious, glandular-villose; corollas 7–8 mm, yellow, corolla tubes ca. 2.5 mm wide at mouth, adaxial lip with sinuses 0.7–0.75 mm, distance between lip apices ca. 1.5 mm, corolla spurs ca. 4 mm long, ca. 0.8 mm wide at base, straight, length equaling half of corolla. Capsules 3–3.2 × 2.4–



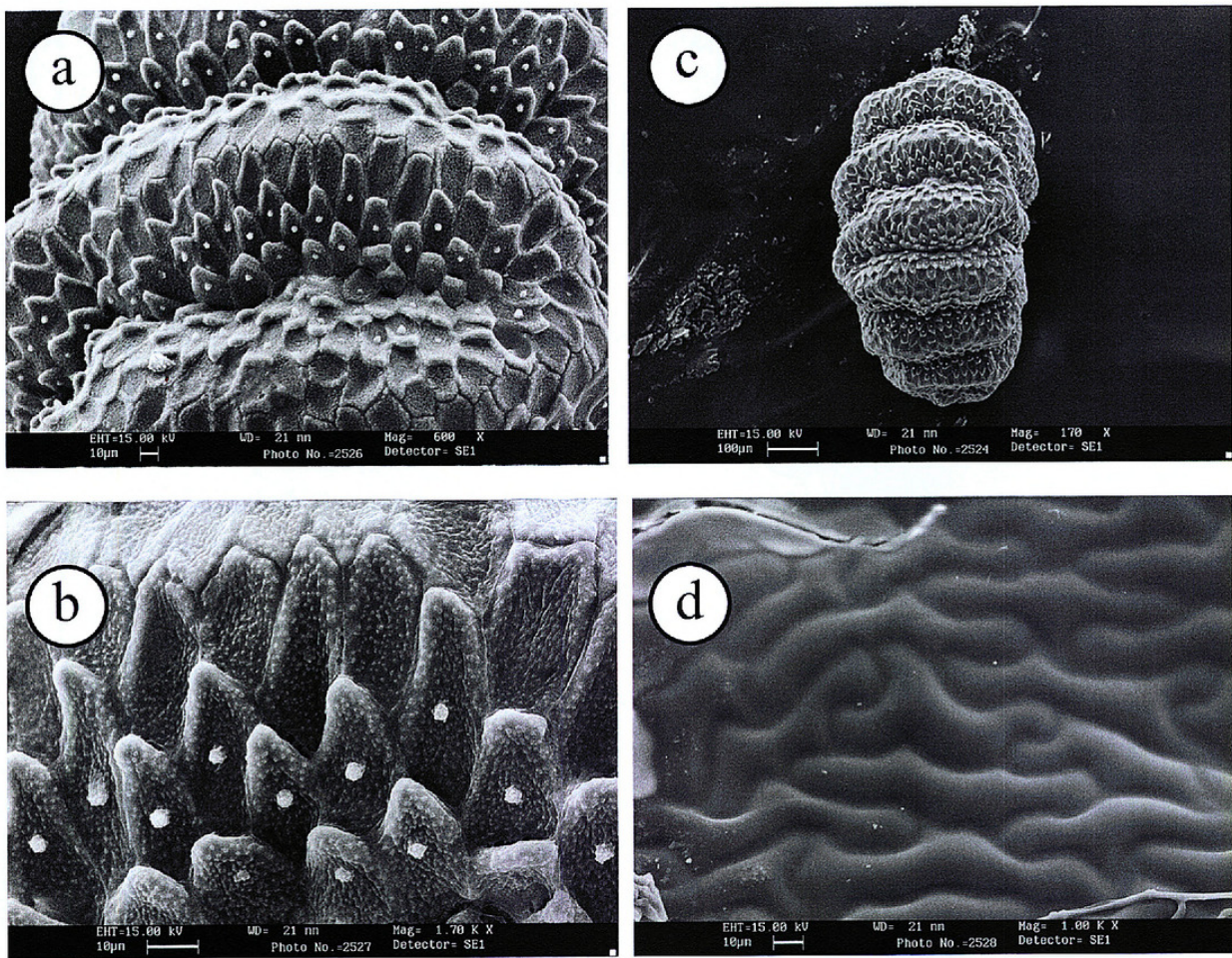


Figure 1. SEM images of seeds and capsule of *Linaria iranica* Hamdi & Assadi. —A. Transverse seed ridges showing periclinal wall of testa cells from sides of ridges with long median papillae and slight marginal papillae. —B. Transverse ridges showing periclinal wall of testa cells from sides of ridges with long median papillae and slight marginal papillae. —C. Lateral view of seed, showing transverse ridges with few anastomoses. —D. Surface of inside capsule wall at the base of valve from dehiscent capsule. A–D from the type *Mirtadzadini s.n.* (TARI 95669).

2.6 mm; seeds  $0.6\text{--}0.65 \times 0.32\text{--}0.36$  mm, 3- to 4-angled, dark gray; seed with 5 to 7 transverse ridges; seed testa cell ca.  $50 \times 12$   $\mu\text{m}$ .

**Distribution, habitat, and IUCN Red List category.** *Linaria iranica* grows in mountainous habitats of Kerman Province, in southern Iran, at elevations from 1300–1800 m and is presumably endemic. It seems to be limited to the upper alpine climatic zone (Kerman subprovince, Iran-Turanian region) (Zohary, 1963, 1973). From a phytosociological point of view, it is part of the grassland communities in Iran. The conservation status of the new species is considered to be incomplete according to IUCN Red List criteria (IUCN, 2001), with an assessment of Data Deficient (DD).

**Etymology.** The species epithet recognizes the country of origin, Iran.

**Relationships.** *Linaria iranica* is allopatric to, and appears to be related to, *L. tenuis* Sprengel, with the latter species from north-central and Northeast Africa

and Southwest Asia (Palestine, Iraq, Libya, Syria, Saudi Arabia) (Sutton, 1988). The new species differs from *L. tenuis* in the size of the corollas, capsules, spurs, bracts, and seeds, as well as in the ornamentation of seeds (Table 1). Seed coat micromorphology (Elisens, 1985) provides further differences within the Scrophulariaceae, and less conspicuous differences may be seen in the shape and size of the seed coat cells (Fig. 1, Table 1).

KEY FOR DISTINGUISHING *LINARIA TENUIS* AND *L. IRANICA*

- 1a. Corollas 12–17 mm, spurs 1/3 length of remaining corolla. . . . . *L. tenuis*
- 1b. Corollas 7–8 mm, spurs 1/2 length of remaining corolla. . . . . *L. iranica*

**Acknowledgments.** We thank N. Sadeghi and S. Eshghi for assistance with the scanning electron microscope from Islamic Azad University Science and Research Branch for scanning the seed coat. We also thank M. Mehranfard from IRAN herbarium for the drawing of the new species.



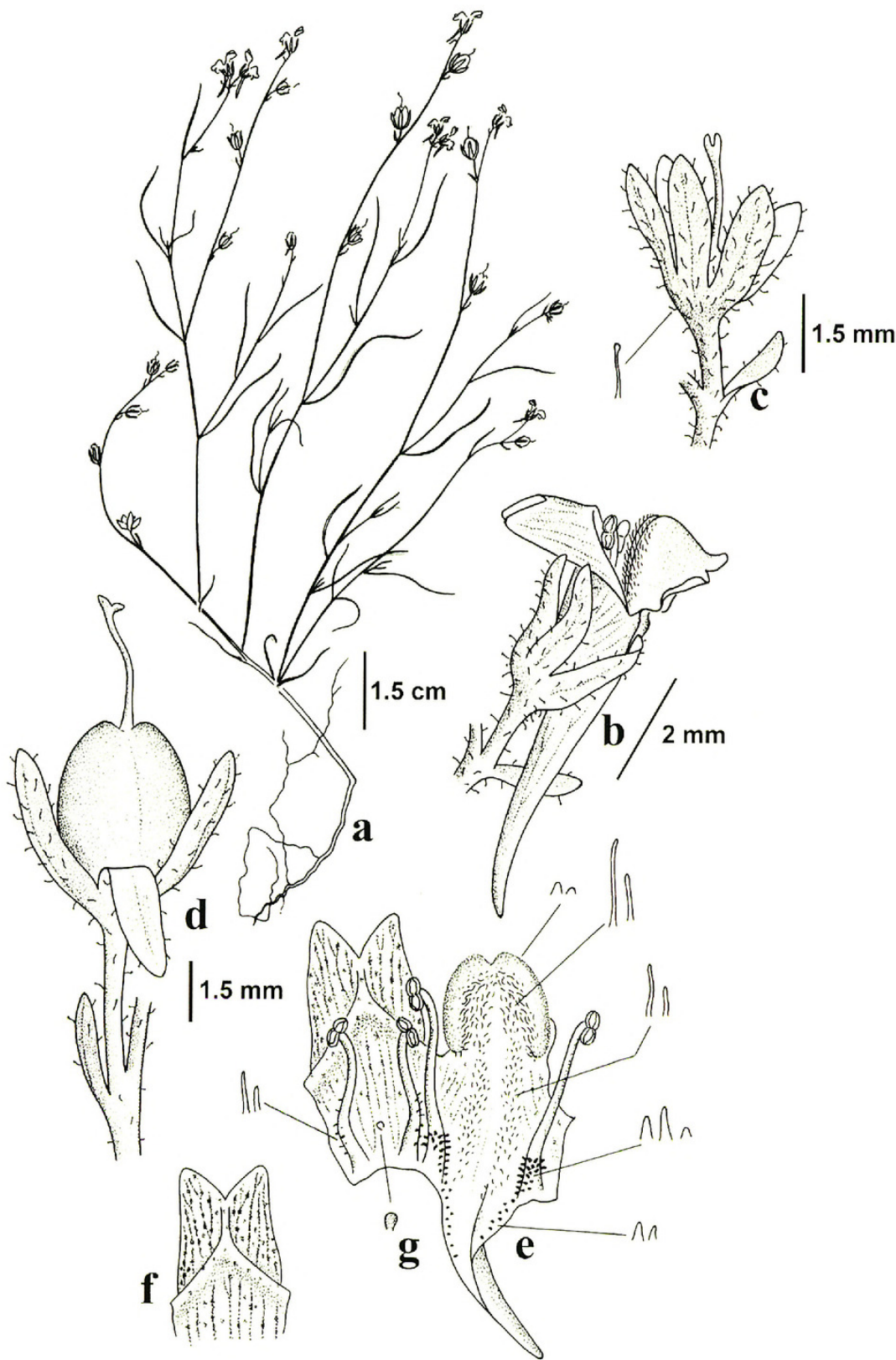


Figure 2. *Linaria iranica* Hamdi & Assadi. —A. Habit. —B. Flower. —C. Flower with corolla removed. —D. Capsule. —E. Floral dissection, with stamens evident. —F. Flower, adaxial lip of corolla with sinus. —G. Floral dissection, sterile stamen. A–G drawn from the holotype *Mirtadzadini s.n.* (TARI 95669) by M. Mehranfard.

Table 1. Morphological comparison of *Linaria iranica* and *L. tenuis*.

Characters	<i>L. iranica</i>	<i>L. tenuis</i>
Stem (cm)	15–20	6–58
Leaves (mm)	10–20 × 0.3–0.4	8–60 × 0.5–1.8
Pedicel (mm)	2.5–3	1.5–3.5
Fertile bracts (mm)	ca. 2 × 0.5	2–10 × ca. 0.7
Calyx lobes (mm)	2.5–3 × 0.6–0.8	2.5–6 × 0.5–1.7
Corollas (mm)	7–8	12–17
Adaxial lip with sinuses (mm)	0.7–0.75	0.6–1
Spurs (mm)	ca. 4 × 0.8 at base	3.5–6 × ca. 1
Spur:corolla ratio	1:2	1:3
Capsules (mm)	3–3.2	3.5–6
Seeds (mm)	0.6–0.65 × 0.32–0.36	0.7–0.8
Seed transverse ridges	5–7	5–9
Seed testa cell (µm)	ca. 50 × 12	30–45 × 15–20

Literature Cited

- Boissier, E. 1867. *Flora Orientalis*, Vol. 4. Geneva and Basel.
- Davis, P. H. 1982. Scrophulariaceae. Pp. 458–748 in P. H. Davis (editor), *Flora of Turkey and the Aegean Islands*, Vol. 5. Edinburgh University Press, Edinburgh.
- Elisens, N. J. 1985. The systematic significance of seed coat anatomy among New World species of tribe Antirrhineae (Scrophulariaceae). *Syst. Bot.* 10: 282–299.
- Hamdi, S. M. M., F. Fallahian, M. Assadi & A. A. Maasoumi. 2005a. *Linaria khorasanensis* (Scrophulariaceae): A new species from Iran. *Willdenowia* 35: 299–304.
- , M. Assadi, F. Fallahian & A. A. Maasoumi. 2005b. A new species of the genus *Linaria* (Scrophulariaceae) from Iran. *Iran. J. Bot.* 11(1): 79–83.
- , ———, ——— & ———. 2006. *Linaria mazarandaranensis* and *Linaria golestanensis* (Scrophulariaceae), two new species from Iran. *Iran. J. Bot.* 11(2): 251–258.
- , ——— & T. Nejadsatari. 2007. *Linaria farsensis*, a new species of *Linaria* sect. *Linaria* (Scrophulariaceae) from Iran. *Bot. Bull. Acad. Sin.* 48(2): 233–237.
- Hong, D. Y. 1983. The distribution of the Scrophulariaceae in the Holarctic with special reference to the floristic relationships between Eastern Asia and eastern North America. *Ann. Missouri Bot. Gard.* 70: 701–712.
- IUCN. 2001. IUCN Red List Categories and Criteria Version 3.1. Prepared by the IUCN Species Survival Commission. IUCN, Gland, Switzerland, and Cambridge, United Kingdom.
- Parsa, A. 1949. *Flora de l'Iran*, Vol. 4. Ministry of Science Press, Tehran.
- Sutton, D. A. 1988. *A Revision of the Tribe Antirrhineae*. Oxford University Press, Oxford.
- Zohary, M. 1963. On the geobotanical structure of Iran. *Bull. Res. Council Israel, Sect. D, Bot. (Suppl.)*.
- . 1973. *Geobotanical Foundations of the Middle East*, Vols. 1 and 2. Gustav Fischer Verlag, Stuttgart.



Hamdi, Seyed Mohammad Mahdi et al. 2008. "A New Species of *Linaria* Sect. *Versicolores* (Scrophulariaceae) from Iran." *Novon a journal of botanical nomenclature from the Missouri Botanical Garden* 18, 340–343.

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