

## A new species of *Scorzonera* L. (Asteraceae) from Central Anatolia, Turkey

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### ABSTRACT

A new species from Central Anatolia, Turkey, *Scorzonera ekimii* A. Duran (Asteraceae), is described and illustrated. Diagnostic morphological characters are discussed. In addition, its pollen characteristics and seed coat surface are examined.

### INTRODUCTION

While working on the flora of Kazankaya Canyon during summer 1999, in the north of Aydıncık district of Yozgat province, the author came across a striking chasmophytic *Scorzonera* species. This specimen did not have flowers when it was first collected. The specimens with flowers were collected from the same locality in 2000.

*Scorzonera ekimii* is taxonomically close to *S. elata* Boiss., which grows in Anatolia and the East Aegean Islands. Although the achenes of new species are similar to *S. elata*, the leaves are similar to *S. cretica* Willd. and *S. amasiana* Hausskn. & Bornm. After comparison with the literature (Chamberlain, 1975; Tutin et al., 1976; Davis et al., 1988; Güner et al., 2000) and studying the specimens in GAZI (Gazi University, Ankara, Turkey), ANK (Ankara University, Ankara, Turkey), and ADO (Kırıkkale University, Kırıkkale, Turkey) herbaria, the author decided that this is a new species.

The pollen of *Scorzonera ekimii* was compared with *S. hispanica* L., *S. calyculata* Boiss. (Tomb, 1975; Blackmore and Clauger, 1987), and *S. elata* Boiss.

Since the genus *Scorzonera* was revised by Chamberlain (1975) for *Flora of Turkey*, some other new species, such as *Scorzonera pisidica* Hub.-Mor., *S. latifolia* (Fisch. & Mey.) DC. var. *angustifolia* Prilipko apud Lipsch., *S. sandrasica* Hartvig & Strid, and *S. longiana* Sümbül have been added (Davis et al., 1988; Güner et al., 2000). This paper describes and illustrates the new *Scorzonera* species. Forty-four *Scorzonera* species are now known from Turkey.

### *Scorzonera ekimii* A. Duran sp. nov. (Fig. 1)

Affinis *C. elata* Boiss. sed caudice crasso (non tuberascenti), foliis latioribus 0.1–0.4 (–0.6) cm (non 0.1–0.2 cm), planta pilosa (non glabra), phyllariis interioribus 14–17 mm longis (non 19–22 mm) differt.

Perennial herb. Rootstock thick, cylindrical. Stem ascending to erect, striate, 20–45 cm long and 1–1.5 mm diam.; divaricately branched in upper part; lanate, more densely so below. Leaves entire or slightly undulate, lanate; basal leaves linear, linear to lanceolate, entire or slightly undulate, gradually attenuating towards the base, sometimes subamplexicaul, 5–20 × 0.1–0.4 (–0.5) cm; median and upper leaves linear, entire, acuminate, sparsely lanate, decreasing to capitula. Capitula 2–4 per stem, homogamous, ligulate, solitary in the end of the branches, 14–20 mm long, 5–10 mm wide. Outer phyllaries 4–8 mm long, 0.5–2 mm wide below, 1/2–1/3 × inner phyllaries, lanate; inner phyllaries 14–17 mm long, 2–3 mm wide below, lanceolate, acute to acuminate, sparsely lanate. Corolla yellow, equaling involucre, 12–15 mm long, ligules 5 toothed, lobes 0.2–0.3 mm long; style branches filiform with slightly enlarged base, papillose, obtuse. Achenes 7–9 × c. 1 mm, cylindrical, slender, ridged, glabrous; pappus 7–8 mm, dirty white, pappus hairs barbellate and plumose below, barbellate above. Fl. 5–6, Fr. 6–7. Crevices of limestone rocks, 750 m.

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Fig. 1. *Scorzonera ekimii* A. Duran, (a) habit, (b) capitula, (c) outer phyllary, (d) inner phyllary, (e) achene.

**Holotype.** Turkey A5 Yozgat: Aydıncık; Kazankaya town, Kazankaya Canyon passes, 750 m, crevices of limestone rocks, 40°12'N, 35°19'E, 28.vi.2000, A. Duran 5409 (holo. ADO, iso. GAZI, ANK, HUB).

**Paratype.** Turkey A5 Yozgat: Aydıncık; Kazankaya town, Kazankaya Canyon passes, 750 m, crevices of limestone rocks, 40°12'N, 35°19'E, 16.vii.1999, A. Duran 4914 (ADO), (nonflowering specimen), *ibid.*, 13.v.2000, A. Duran (5130) & E. Hamzaoglu (ADO) (flowering specimen).

**Endemic.** It is found in central Anatolia (Yozgat province). Ir.-Tur. element.

This species grows only in the south of Kazankaya Canyon and is known only from the type locality. It should be graded as *Critically Endangered* (CR) (IUCN, 2000).

## ECOLOGY

*Scorzonera ekimii* grows in crevices of limestone rocks with *Inula anatolica* Boiss., *Draba rigida* Willd. var. *rigida*, *Micromeria cristata* (Hampe) Griseb. subsp. *cristata*, *Minuartia anatolica* (Boiss.) Woron. var. *polymorpha* McNeill, *Micromeria myrtifolia* Boiss. & Hohen., *Onosma isauricum* Boiss. & Heldr., *Thymus leucotrichus* Hal. var. *leucotrichus*, *Silene chlorifolia* Sm., *Scrophularia libanotica* Boiss. subsp. *libanotica* var. *pontica* R. Mill., *Arenaria kotschyana* Fenzl subsp. *kotschyana*, *Euphorbia herniariifolia* Willd. var. *herniariifolia*, *Polygala pruinosa* Boiss. subsp. *pruinosa*, *Anthemis tinctoria* L. var. *discoidea* (All.) DC., *Melica ciliata* subsp. *ciliata*, and *Gypsophila sphaerocephala* Fenzl. ex Tchihat. var. *cappadocica* Boiss.



Fig. 2. SEM photos of the pollen grain of *Scorzonera ekimii*, (a) polar view and (b) detail of pollen grain. Magnification: (a)  $\times 2500$ , (b)  $\times 5000$ .



Fig. 3. SEM photos of the pollen grain of *Scorzonera elata*, (a) polar view and (b) detail of pollen grain. Magnification: (a)  $\times 2500$ , (b)  $\times 5000$ .

**Pollen characteristics.** Pollen of *S. elata* and *S. ekimii* were studied in detail (Wodehouse, 1935). *S. elata* is triporate, oblate-spheroidal,  $40.1 \times 41.4 \mu\text{m}$ , Amb semiangular. Exine  $5.2 \mu\text{m}$ . Pollen have lacunae system. Columelle indistinct. Intine  $1 \mu\text{m}$ . Spines concave-conic,  $6.9 \mu\text{m}$  in length, with base diameter  $1.1 \mu\text{m}$ , one-rowed on the ridges. Pollen grains of *S. ekimii* triporate, oblate-spheroidal,  $46.8 \times 44.7 \mu\text{m}$ , Amb semiangular. Exine  $7.1 \mu\text{m}$ . Pollen have lacunae system. Columelle indistinct. Intine  $1 \mu\text{m}$ . Spines concave-conic,  $6.7 \mu\text{m}$  in length, with base diameter  $2.3 \mu\text{m}$ , one-rowed on the ridges. Dimensions of the pollen grains are bigger in *S. elata* than in *S. ekimii*

The pollen grains in the *Compositae* are very polymorphic in structure (Tomb, 1975; Blackmore and Barnes, 1987; Blackmore and Clauger, 1987). In SEM, the pollen grains of *S. ekimii* and *S. elata* have lacuner pollen morphology. Although the lumen of *S. elata* is polygon, it is amorphous in *S. ekimii*. The thickness at the muri in *S. elata* ( $2 \mu\text{m}$ ) is thinner than in *S. ekimii* ( $1 \mu\text{m}$ ) (Figs. 2, 3).

**Achene characteristics.** *Scorzonera ekimii* and *S. elata* have conspicuously different seed coat surfaces. The seed coat is striate-verrucate in *S. ekimii* and striate in *S. elata*. Although the ridge of seed is clearly visible in *S. ekimii*, it is barely visible in *S. elata*.

## DISCUSSION

*Scorzonera ekimii* is related to *S. elata*, which is very widespread in NW and W Anatolia, and less so in inner Anatolia. It differs from *S. elata* because it has a rootstock that is thick (not tuberous), lanate, especially at

the base of the plant (not wholly glabrous), capitula  $14\text{--}20 \text{ mm}$  long (not  $28\text{--}32 \text{ mm}$  long), outer phyllary  $4\text{--}8 \times 0.5\text{--}2 \text{ mm}$  (not  $2\text{--}6 \times 4\text{--}6 \text{ mm}$ ), inner phyllary  $14\text{--}17 \times 2\text{--}3 \text{ mm}$  (not  $19\text{--}22 \times 4\text{--}7 \text{ mm}$ ), pappus plumose and barbellate below (not shorter and longer hairs plumose below).

*S. ekimii* is similar to *S. cretica* in vegetative characters, but its achenes are glabrous (not densely lanate), pappus plumose and barbellate below, barbellate above (not wholly barbellate), capitula  $14\text{--}20 \text{ mm}$  long (not  $30 \text{ mm}$ ). *S. ekimii* looks like *S. amasiana* Hausskn. & Bornm., but its leaf shape is much narrower than *S. amasiana*. The diagnostic characters of *S. ekimii* differentiating it from *S. elata* are given in Table 1.

With regard to the morphological characters of pollen grains, *S. ekimii* and *S. elata* show noteworthy differences in muri thickness, lumen breadth, and pollen dimension. The lumen shape in *S. elata* is similar to that of *S. hispanica* and *S. calyculata*, but differs from *S. ekimii*.

## ETYMOLOGY

The species is named in honor of the eminent Turkish botanist Professor Tuna Ekim (Biology Department, Istanbul University).

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Table 1  
A comparison of *Scorzonera ekimii* with the related species

Characters	<i>S. ekimii</i>	<i>S. elata</i>
Stem	ascending to erect, lanate	erect, glabrous
Height of plant	$20\text{--}45 \text{ cm}$	$30\text{--}40 (120) \text{ cm}$
Root	rootstock thick, cylindrical	tuberous
Lower leaves	$5\text{--}20 \times 0.1\text{--}0.4 \text{ cm}$ , lanate	$5\text{--}20 \times 0.1\text{--}0.2 \text{ cm}$ , glabrous
Leaf margin	entire or slightly undulate	entire
Leaf hair	lanate	glabrous
Capitula	$14\text{--}20 \text{ mm}$ long	$28\text{--}32 \text{ mm}$ long
Outer phyllary	$4\text{--}8 \times 0.5\text{--}2 \text{ mm}$ , $1/2\text{--}1/3 \times$ inner phyllary, lanata	$2\text{--}6 \times 4\text{--}6 \text{ mm}$ , $1/3\text{--}1/5 \times$ inner phyllary, glabrous
Inner phyllary	$14\text{--}17 \times 2\text{--}3 \text{ mm}$ , lanate	$19\text{--}22 \times 4\text{--}7 \text{ mm}$ , glabrous
Pappus hairs	plumose and barbellate below, barbellate above	plumose below, barbellate above

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#### EXAMINED SPECIMENS — *S. Elata*

Turkey. **C2** Mugla: Köycegiz, Kavakarası village, 20 m, macchie, 18.v.1991, A. Güner 9047–M. Vural & H. Sagban (GAZI); **B4** Ankara: Ayas Beli, Gazi Mustafa Kemal Ormanlığı, 1000–1200 m, forest clearings, 9.vii.1986, Z. Aytaç 2179 (GAZI); **C2** Mugla: Ortaca, Tepearası-Eskiköy, 60–80 m, *Pinus brutia* forest, 25.v.1991, M. Vural (5873), A. Güner & H. Sagban (GAZI); **C3** Antalya: Akseki, Güzelsu, Serebil vicinity, *Pinus brutia* forest, 1100 m, 8.vii.1996, A. Duran 4136 (GAZI); **C3** Antalya: Akseki, Çukurköy, Mentese vicinity, in macchie, 700 m, 25.v.1996, A. Duran 3623 (ADO); **A4** Kastamonu: Doday, *Juniperus* community, ca. 700 m, 26.vi.1980, O. Ketenoglu (ANK); **C3** Antalya: Manavgat, Side vicinity, 15.v.1956, Hub.-Mor. & H. Birand (ANK); Eskisehir: Türkmen Dağı, Evcil Düzü, ca. 950 m, 8.vii.1977, T. Ekim (ANK).

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