

Prospero cudidaghense sp. nov. (Asparagaceae): a new species from southeastern Anatolia, Turkey

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Abstract: *Prospero cudidaghense* Firat & Yıldırım (Asparagaceae) is described as a species new to science based on morphological studies. It is endemic to the eastern Anatolian region of Turkey. *P. cudidaghense* is known from a single locality on Cudi Mountain, located in Şırnak Province. It is an isolated taxon of the genus *Prospero*. It is related to *P. autumnale* and *P. seisumsianum*. Diagnostic morphological characters are discussed and compared with those of related taxa. It can be easily distinguished from all taxa in the genus *Prospero* by its spring flowering time, synanthous leaves, and chasmophytic habit.

Key words: Taxonomy, *Prospero*, Şırnak, Turkey

1. Introduction

The genus *Prospero* comprises about 25 species and is distributed through southern England and the Mediterranean basin to the Caucasus and northern Iraq (Speta, 1982, 1998b). According to the same authors, it is especially characterized by its lack of bracts and prophylls, autumn flowering period, and hysteranthous leaves, appearing in autumn and withering in spring, with the exception of *P. seisumsianum*, whose leaves appear in spring (Yıldırım, 2014).

Until recently, the taxa of *Prospero* were considered in the genus *Scilla* by many authors. However, after molecular, morphological, and karyological studies, it was separated from the genus *Scilla* at generic rank (Speta, 1982, 1998b; Yıldırım, 2014; Govaerts, 2015).

In May 2014, during fieldwork on Cudi Mountain in Şırnak Province, southeastern Anatolia, unusual specimens of *Prospero* were collected on calcareous rocky cliffs.

The material of the new species was compared with herbaria specimens of *Prospero* in ANK, E, EGE, GAZI, HUB, and K (abbreviations following Thiers, 2015). In addition, relevant literature (Speta, 1982; Mordak, 1984; Speta, 1998a, 1998b; Stedje, 1998; Pfosser and Speta, 1999; Ruksans, 2007; Yıldırım, 2012, 2014; Govaerts, 2015) was examined. After careful examination, we concluded that these specimens represent a species new to science.

After close examination of the specimens, we

concluded that the collected specimens belonged to a hitherto undescribed species of *Prospero* and displayed some morphological similarities to *P. autumnale* and *P. seisumsianum*.

2. Materials and methods

The gross morphology of the specimens was examined using a stereo binocular microscope. For scanning electron microscopy (SEM), the selected pollen grains were placed on aluminum stubs, coated with gold using a K550 Emitech Sputter Coater, and examined using an FEI Quanta 250 field emission gun SEM.

3. Results

Prospero cudidaghense Firat & Yıldırım, sp. nov. (Figures 1, 2, 3)

Type: Turkey, C9 Şırnak, Silopi, Cudi Dağı Güney yamacı, Kireç kayası bloklarının çatlağında, 700 m, 37°23'31"N, 42°20'21"E, 02.05.2014, M.Firat 30575 (holotype: EGE, isotypes: EGE).

3.1. Diagnosis

Prospero cudidaghense is related to *P. autumnale* and *P. seisumsianum*. It differs from these species mainly by perigone lobes 2.5–3 mm long (not 3–6 mm), filament 2–2.5 mm long (not 3–4 mm), spring flowering time (not autumn), synanthous leaves (not hysteranthous), and chasmophytic (not growing on soils) habit.

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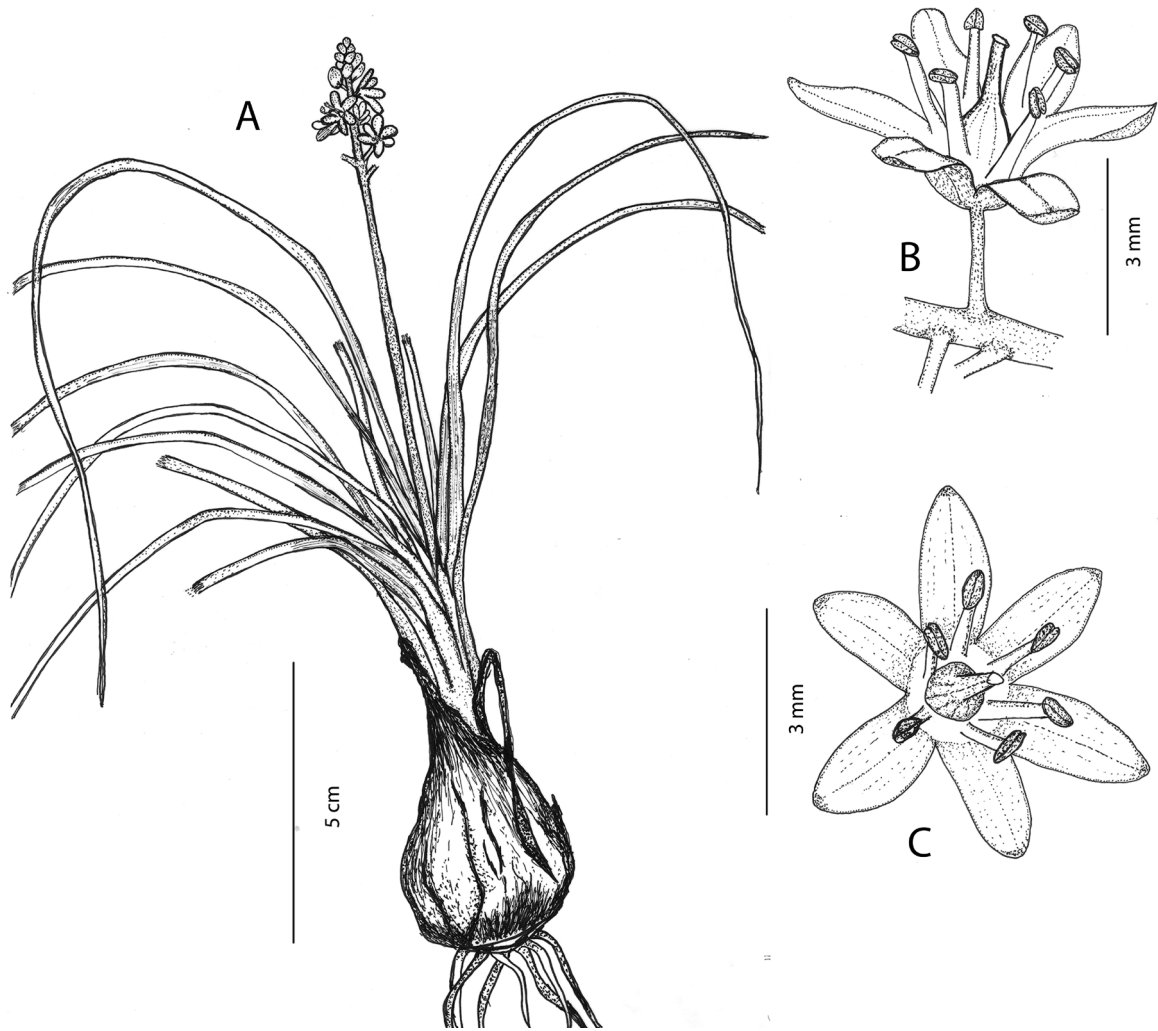


Figure 1. *Prospero cudidaghense*: A. habit, B, C. flower.

3.2. Etymology

The species epithet is derived from Cudi Mountain in Şırnak Province, where the new species was first discovered.

3.3. Vernacular name: In Şırnak province, indigenous people uses the name “Mordemi” for *Prospero cudidaghensis*.”

3.4. Description

Perennial, bulbous plant. Bulbs 2–3.5 cm wide, subglobose to ovoid; outer tunic membranaceous, thin textured, light brown to brown; inner white to very pale brown; without hyaline cataphyll. Scape 1, 9–13 cm long, erect, fragile, and thin; glabrous to slightly scabrous at base, glabrous at upper part. Leaves 8–16, 12–20 cm long, 1–2.5 mm wide, linear, canaliculated; base membranaceous, 3–4 mm wide. Inflorescence a simple raceme, 3–6 cm long, 20–32 flowered, cylindrical. Pedicels erecto-patent to patent, to 5 mm long in flowering time. Flowers broadly infundibular to stellate; segments 2.5–3 × 1–1.5 mm, linear to lanceolate,

bright purplish-pink with darker midrib, outside whitish at base. Stamen 6; filaments 2–2.5 mm long, pinkish; anthers 0.5–0.8 mm dark purple. Ovary globose to elliptical, whitish; style erect, 1.5–2 mm long, bright purplish-pink; stigma small, capitate. Capsule and seed unknown.

3.5. Distribution and ecology

Prospero cudidaghense is a local endemic restricted to Cudi Mountain in Şırnak Province, southeastern Anatolia (Figure 4). It is an element belonging to the Irano-Turanian floristic region. This area has a continental semiarid climate with hot, dry summers and cold, snowy winters. The new species colonizes only on the calcareous rock cliffs of Cudi Mountain, preferably those with southern orientation, at between 700 and 900 m, a.s.l. Species growing in the near vicinity include *Centaurea davisii* Wagenitz, *Rosularia sempervivum* (M.Bieb.) A.Berger subsp. *kurdica* Eggl, *Ajuga chamaepitys* (L.) Schreb. subsp. *mardinensis* P.H.Davis, *Umbilicis intermedius* Boiss., *Bromus* sp., and *Poa* sp.

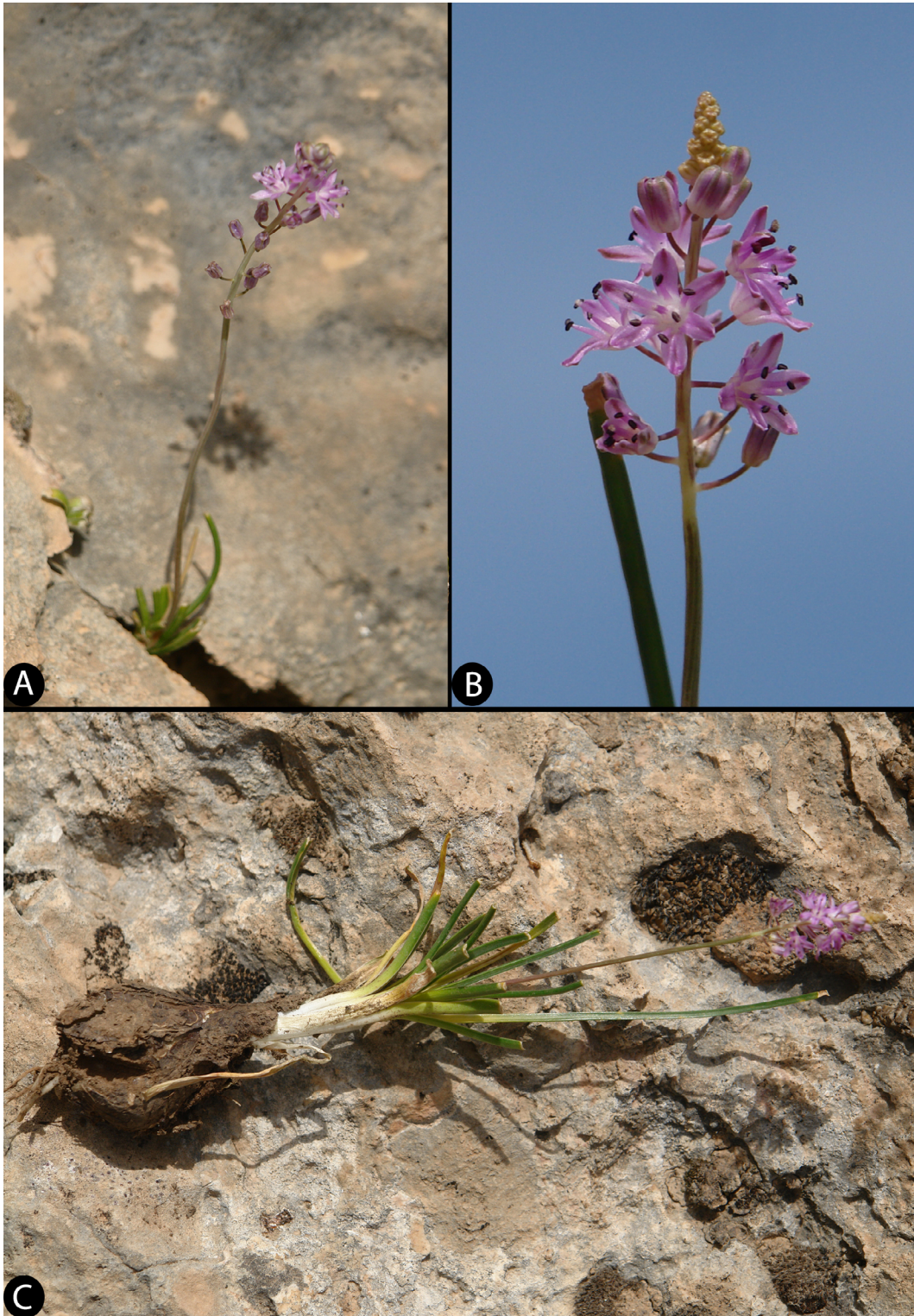


Figure 2. A, B, C. *Prospero cudidaghense*.

3.6. Suggested conservational status

The occupancy area (AOO) of *Prospero cudidaghense* was calculated as 0.55 km² in which about 900 individuals were

estimated to occur. Overgrazing by sheep and goat herds on nearby individuals to soil level was observed. Therefore, in accordance with the criteria of the IUCN (2012), *P.*

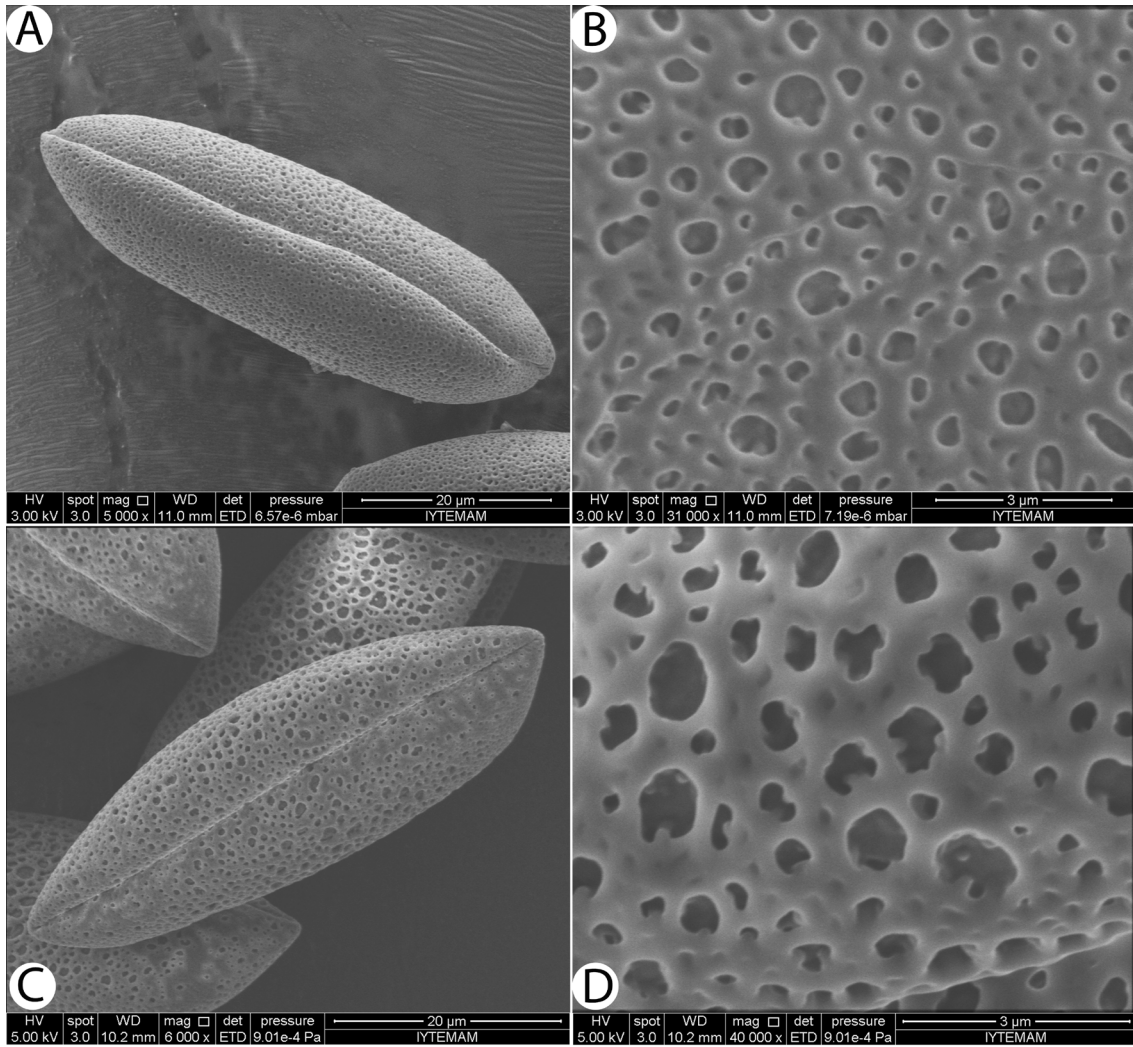


Figure 3. SEM photographs of pollen grain and pollen surface of A, B. *Prospero cudidaghense*, C, D. *Prospero seisumsianum*.

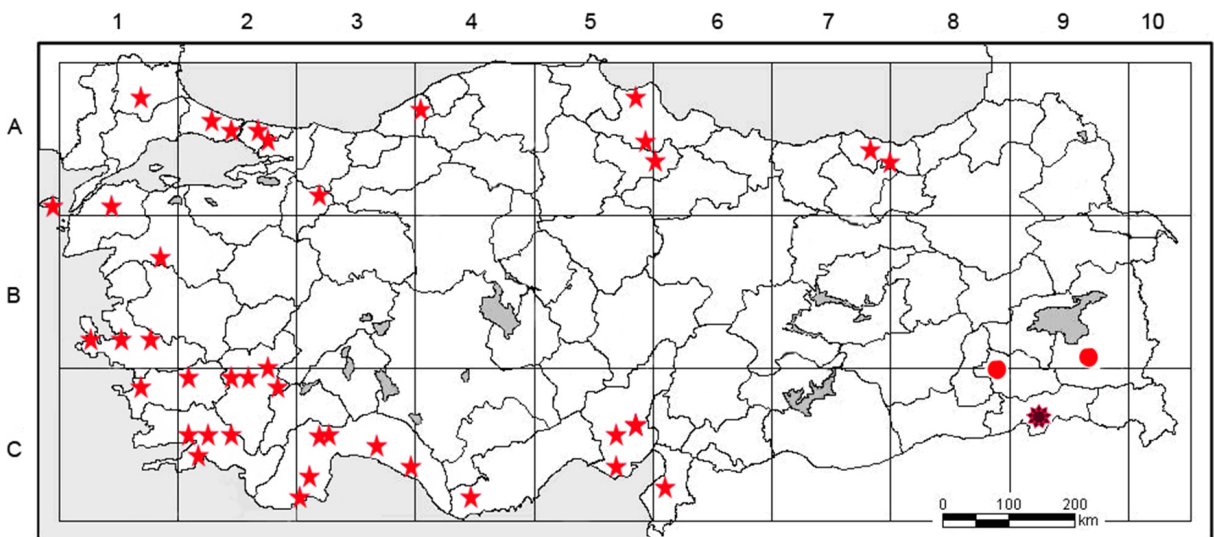


Figure 4. Distribution of: (★) *Prospero cudidaghense*, (★) *P. autumnale*, (●) *P. seisumsianum*.

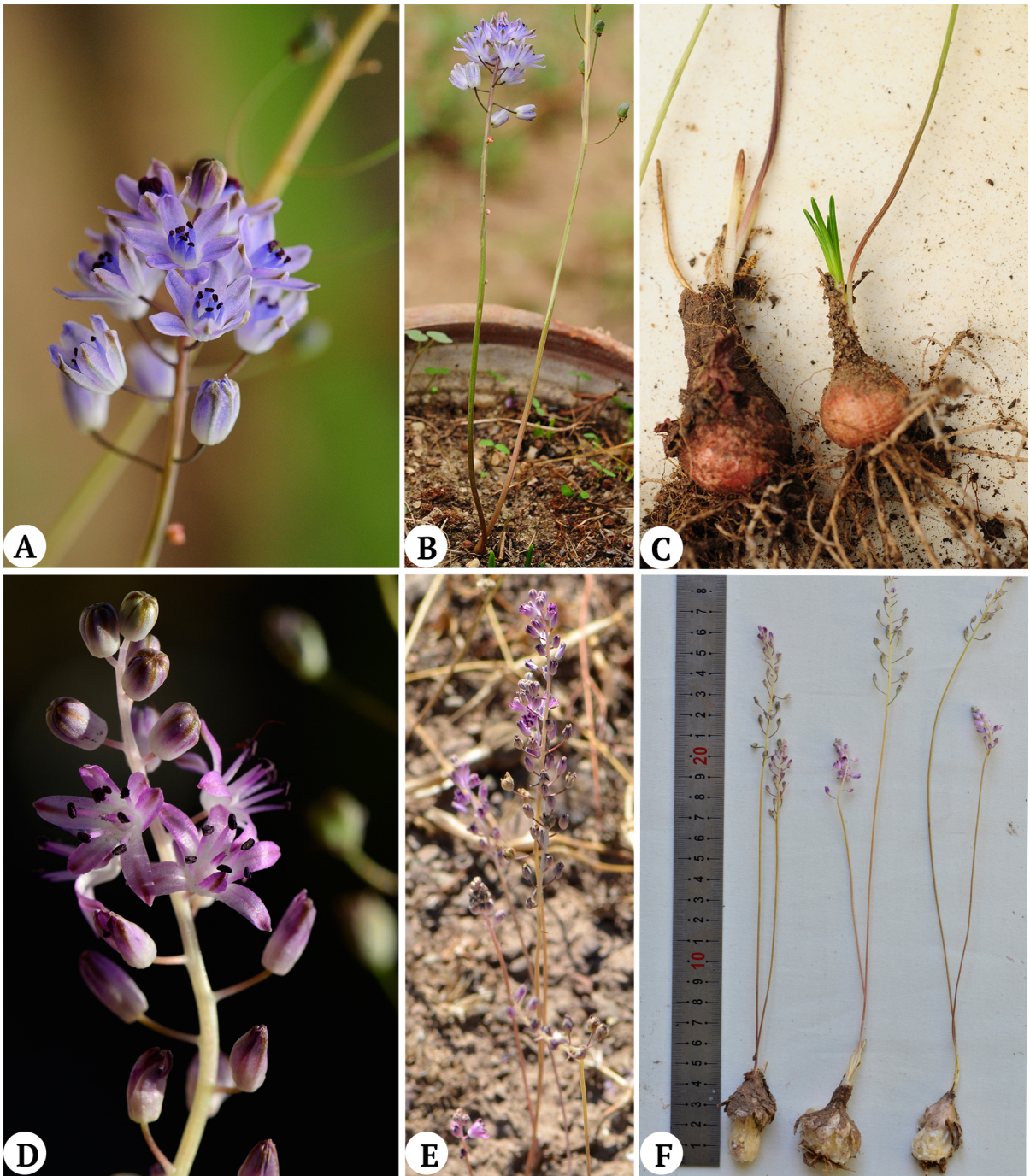


Figure 5. A, B, C. *Prospero autumnnale*, D, E, F. *P. seisumsianum*.

cudidaghense is here assessed as “Critically Endangered” (CR) B2ab(i,ii), on account of its restricted distribution and anthropogenic effects on the population.

3.7. Pollen morphology

The pollen grain dark purple, heteropolar, monosulcate, pollen shape prolate, polar axis 35–54 μm , equatorial axis 62–84 μm , exine ornamentation perforate (Figure 3).

4. Discussion

As a result of our morphological studies, it was concluded that the collected *Prospero* specimens differ from all other *Prospero* species by their morphological characters and different flowering time. It is considered a new species that shows some morphological similarities with *P. autumnnale* and *P. seisumsianum* (Figure 5). It is easily distinguished

Table 1. Morphological comparison of *Prospero cudidaghense*, *P. autumnale*, and *P. seisumsianum*.

Characters	<i>Prospero cudidaghense</i>	<i>Prospero autumnale</i>	<i>Prospero seisumsianum</i>
Leaves	Synanthous; 8–16; 12–20 cm long	Hysteranthous; 3–12; 2–17 cm	Hysteranthous; 3–10; 5–11 cm
Cataphyll	Absent	Mostly with 1–3	Absent
Perianth segment	2.5–3 mm long	3–5 mm long	4–6 mm long
Filament	2–2.5 mm long	3–4 mm long	3–4 mm long
Pollen exine ornamentation	Perforate	Fossulate (Ghavami et al., 2010)	Perforate-reticulate
Leaves appearing time	Late spring	Late winter to end of autumn	Late winter to early spring
Flowering period	Late spring	Autumn	Autumn
Habitat	Only on calcareous rock cliffs	Open slopes, in maquis, open woods, sometimes in limestone rock cracks	Open mountain slopes

from these species as well as from all other taxa of *Prospero* by its unusual flowering time and synanthous leaves. While all other *Prospero* taxa flower in autumn (rarely in late summer), *Prospero cudidaghense* flowers in late spring. The flowers of *P. cudidaghense* appear together with numerous leaves. *P. cudidaghense* is a very isolated species in the genus *Prospero*. Moreover, it grows on the calcareous rock cliffs of Cudi Mountain. Most likely, it is an obligate chasmophytic species. Although *P. autumnale*

can grow both on soil and sometimes in limestone rock cracks, no *Prospero* species is an obligate chasmophytic.

The morphological differences between the new species and related *Prospero* species are summarized in the Table.

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