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

Mehmet FIRAT, Hasan YILDIRM

1 Department of Biology Education, Faculty of Education, Yüzüncü Yıl University, Van, Turkey
2 Department of Biology, Faculty of Science, Ege University, Bornova, İzmir, Turkey

**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; Mordak, 1984; Speta, 1998a, 1998b; Stedje, 1998; Pfosser and Speta, 1999; Ruksans, 2007; Yıldırım, 2012, 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 Daği Güney yamacı, Kireç kayası bloklarının çatlağında, 700 m, 37°23′31″N, 42°20′21″E, 02.05.2014, M.Fırat 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.
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 davisi Wagenitz, Rosularia sempervivum (M.Bieb.) A.Berger subsp. kurdica Eggli, Ajuga chamaepitys (L.) Schreb. subsp. mardinensis P.H.Davis, Umbilicus intermedius Boiss., Bromus sp., and Poa sp.

Figure 1. Prospero cudidaghense: A. habit, B, C. flower.
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. autunnale, (●) P. seisumsianum.
cuđidaghense 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. autumnale and P. seisumsianum (Figure 5). It is easily distinguished
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.

**Acknowledgments**

We are grateful to the curators of the following herbaria for allowing us access to their *Prospero* material for study: ANK, EGE, E, GAZI, HUB, and K.

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

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

**References**


