

A new epitype specimen for *Campanula peshmenii* Güner

Campanula peshmenii Güner için yeni bir epitip örneği

Research Article

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ABSTRACT

In this study, a new type (epitype) specimen for *Campanula peshmenii* Güner is determined. Detailed description and conservation status of this species are given. This study also contained SEM images and photographs of pollen, seed, hairs of corolla, and stylus, holotype and epitype specimen, habitat, flowering, and fruiting shape of habitus.

Key Words

Campanulaceae, *Campanula*, ICBN, pollen, seed, SEM, taxonomy, type.

ÖZET

Bu çalışmada *Campanula peshmenii* Güner için yeni bir tip (epitip) örneği belirlenmiştir. Bu türe ait ayrıntılı bir morfolojik tür tanımı ve tehlike kategorisi verilmiştir. Ayrıca bu çalışmada, polen, tohum, korolla tüyü, stilyus SEM görüntüleri ile holotip ve epitip örnekleri, habitatı, çiçekli ve meyveli durumlarının fotoğrafları verilmiştir.

Anahtar Kelimeler

Campanulaceae, *Campanula* ICBN, polen, tohum, SEM, taksonomi, tip.

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INTRODUCTION

Campanula L. is the largest genus of the Campanulaceae family, involving approximately 420 species and distributed from Northern hemisphere to Mediterranean Region [1,2]. The genus in Turkey consists of 133 taxa (7 subspecies and 3 varieties). *Campanula peshmenii* Güner is one of the endemic species for the genus *Campanula* of which 66 species are endemic in Turkey [3,4].

Specimens of *C. peshmenii* were firstly collected by Hasan Peşmen in 1971 (Figure 1). Hasan Peşmen, the first head of Botany Department in Hacettepe University, died in a car accident in 1981. Twelve years after the first collection, this specimen was published as a new species by Adil Güner [5]. *Campanula peshmenii* has only one type specimen (as holotype) in HUB herbarium. This specimen is inadequate to describe flowers colours, fruit, and seed morphologies. Therefore, new type specimen has been described as an epitype for *C. peshmenii*.

MATERIAL AND METHODS

Many fruiting and flowering specimen collected from type locality. Collected specimens were prepared as herbarium specimens according to Bridson and Forman [6]. These specimens that assigned a separate inventory number are kept in INU herbarium. Flora of Turkey and papers of new species are especially used to identify the specimens [3,5,7-9]. Type specimen of *C. peshmenii* was examined in HUB herbaria. Morphological characters of studied specimens were examined by using a binocular stereoscopic microscope. SEM micrographs of seed and pollen samples, coated with gold, were obtained by using an EVO 40XVP (LEO Ltd., Cambridge, UK) scanning electron microscope at an accelerating voltage of 20 kV.

RESULTS AND DISCUSSIONS

Campanula peshmenii has only holotype specimen in HUB herbarium (Figure 1). This specimen is inadequate to describe flowers colours, fruit, and seed morphologies. Colour of corolla in the holotype specimen was not clear. If collected

specimens are not properly dried, colour of the corolla changes to light brown when dried. Outer surface of corolla also is covered densely with white tector hairs. Colour of the corolla looks milky white because of these reasons. Colour of corolla was described as "lactae" (milky white) in the protologue of the *C. peshmenii* [5]. In this study, the colour of corolla of *C. peshmenii* was described as lavender blue (Figures 2,3).

Capsule, pore of capsule and seed properties of *C. peshmenii*, which was collected in the late of July, were absent in the type specimens and this situation was indicated in the protologue [5]. Therefore, new type specimen, which has clear colour of the corolla, capsule, pore of capsule and seed, was described as an epitype and four isoepitype for *C. peshmenii* according to "Article 9.8" and "Rec. 9C1" in ICBN [10] (Figure 2)

Number of stigma pairs of *C. peshmenii* was determined as only three in its protologue; but, four pairs of stigma in some flowers of *C. peshmenii* were observed in this study.

Pollen properties of *C. peshmenii* species are mostly oblate-sphaeroidal and triporate, tectums are scabrate and Amb axes are circular (Figure 4). These properties are mostly observed in species of the genus [11]. Two exine sculpture types (granulate scabrate and regulate-scabrate) were described in some species of genus *Campanula* by Erkara et al. [11]. The exine sculpture type is regulate-scabrate in *C. peshmenii*. There are 95-110 spinules in $1\ \mu\text{m}^2$.

Two seed surface types were described by Akçin [12] as reticulate (type1) and striate (type2) in some *Campanula* (Subgenus *Campanula* and *Rapunculus*) species. Testa shapes of these subgenera (excluding *C. olympica* Boiss.) are mostly type2. *Campanula peshmenii* included in the subgenus *Campanula* and show the seed morphology (fusiform shape and interrupted striate testa) of this subgenus (Figure 4).

Taxonomy

Campanula peshmenii Güner, in Notes Roy. Bot. Gard. Edinburgh, 41:287 (1983). (Subgenus *Campanula*, Section *Rupestres* (Boiss.) Charadze)



Figure 1. Holotype specimen of *Campanula peshmenii* Güner in HUB herbarium (Peşmen 2717).

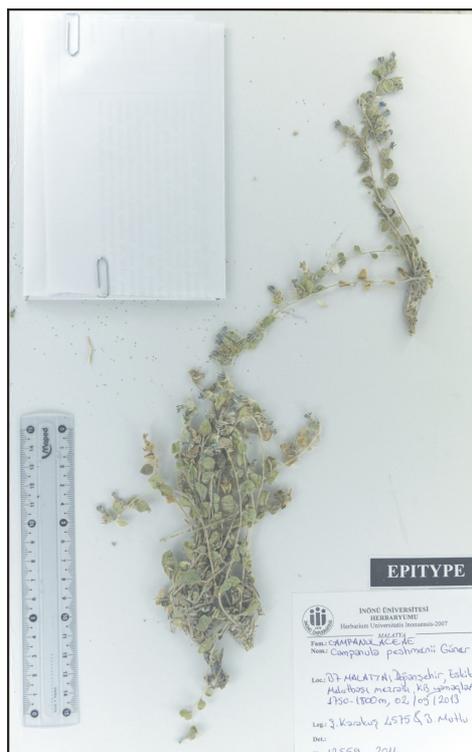


Figure 2. Epitype specimen of *Campanula peshmenii* Güner in INU herbarium (Karakuş & Mutlu 4575).

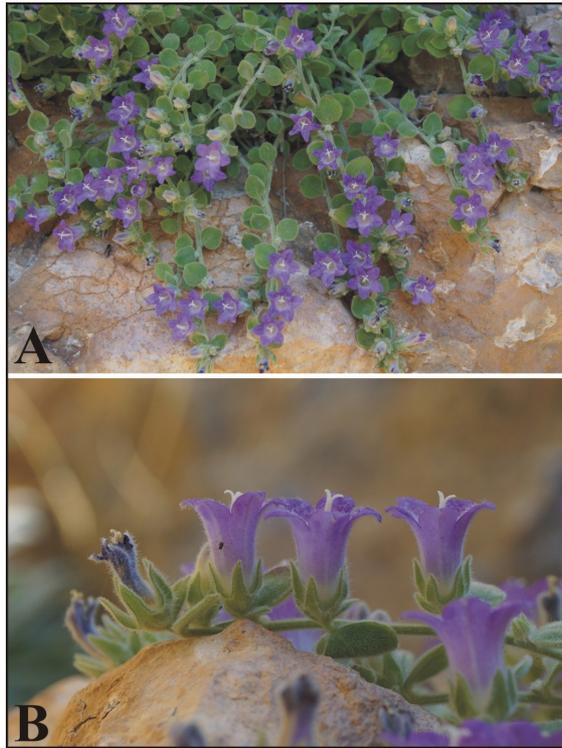


Figure 3. Flowering plants of *Campanula peshmenii* Güner. (A) habitat, habitus, three and four pairs stigma; (B) flowers, (Karakuş & Mutlu 4488) (photo: B. Mutlu).

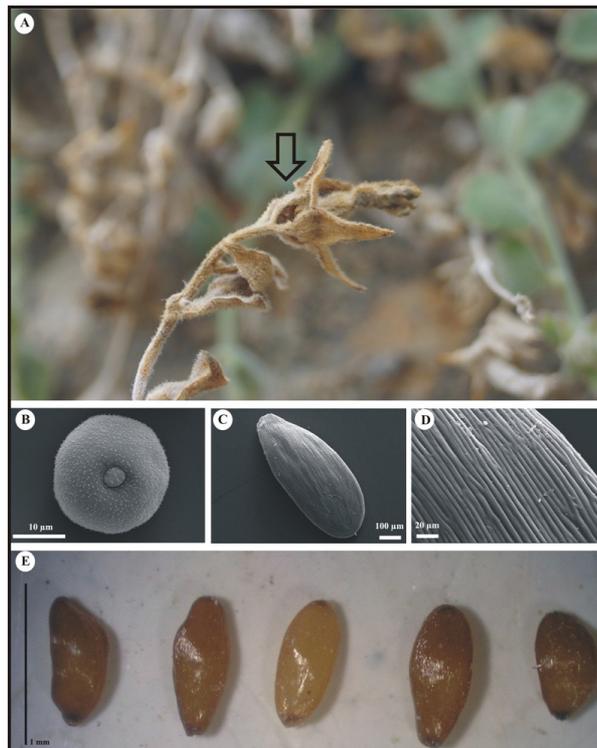


Figure 4. Photograph (A), SEM images (B-D) and stereoscopic microscope view (E) of *Campanula peshmenii* Güner. (A) fruit; (B) pollen; (C-E) seed and (D) seed surface (Karakuş & Mutlu 4575) (photo: B. Mutlu).

Holotype: [Turkey] B6 Malatya: Doğanşehir, Eskiköy village, slopes of opposite side of Meletbaşı Hamlet, limestone rocks, 1800-2200 m, 26 vii 1971, H. Peşmen 2717! (HUB 26185; photo ANK, E) (Figure 1).

Epitype (designated here): [Turkey] B6 Malatya: Doğanşehir, Eskiköy village, slopes of opposite side of Meletbaşı Hamlet, limestone rocks, 1700-1800 m, 02 ix 2013, Ş.Karakuş 4575 & B.Mutlu [INU (INU 12559-2014)]. isoeotype: *ibid.*, Ş.Karakuş 4575 & B.Mutlu [INU (INU 12560-2014)]; *ibid.*, Ş.Karakuş 4575 & B.Mutlu [HUB (INU 12561-2014)]; *ibid.*, Ş.Karakuş 4575 & B.Mutlu [ANK (INU 12562-2014)] (Figure 2).

Description

Dwarf caespitose chasmophytic perennial, without sterile shoots. Stems ascending, 6-15 cm, with thick scaly collar at base, woody caudex, unbranched 3-8 leafy, tomentose hispid (hairs 0.7-1.3 mm). Flowering stems numerous, prostrate, 9-12 cm long, usually simple, hirsute-tomentose, leafy throughout. Basal leaves, broadly elliptic or ovate, 10-20 x 6-14 mm, entire or shallowly crenate, crisply tomentellous; petiole 10-25 mm. Cauline leaves ovate to obovate, to 6-13 x 4-10 mm, most often entire, crisply tomentellous, sessile or with petiole 0.5-2 mm. Inflorescence racemose, 3-6-flowered, terminal flower opening first. Flowers patent, pedicels to 3 mm. Calyx lobes triangular-lanceolate, 4-5 x 2-2.5 mm, erect, acute, tomentose. Appendages inconspicuous. Corolla lavender blue, cylindrical-infundibular, 8-13 mm, lobes 2-3 mm, tomentose outside, divided to 1/4 into triangular-ovate, acute lobes. Stamen (4-) 4.5-5 mm; filiform part of filament 0.5-0.6 mm; base oblong-elliptic, 1-1.5 x 1.0 mm, ciliate. Anthers 3.5-4 mm, shorter than style. Receptacle glabrous. Style 8-9 mm, included in corolla tube. Stigma 3(-4), 0.8-1.2 mm. Capsule (-3.5) 4-5 (-6) x 3 mm, erect turbinate, opening by 3 basal pores. Seed cinnamon, 0.7-0.8 x 0.3-0.35 mm, striate.

Habitat and phenology

Campanula peshmenii grows as a chasmophyte in the north side of carbonated calcareous (70-90 % limestone and 70-90 % dolomite) rocks in the Meletbaşı Hamlet at 1800-2200 m (pers. comm.

M.Önal). Associated species at the type locality include: *Hypericum malatyanum* Peşmen, *Silene odontopetala* Fenzl, *Parietaria judaica* L., *Prangos pabularia* Lindl., and *Silene caryophylloides* Otth. subsp. *stentorian* (Fenzl) Coode & Cullen. While flowering periods of this species are observed from early July to early September, its fruiting periods are observed from early August to late

Conservation status

Campanula peshmenii was evaluated as "Critically endangered" (CR) in The Red Data Book of Turkish Plants [13]. Area of occupancy of the species is limited to less than 10 km², and total number of mature individuals is approximately 50-100. Therefore, this species should be evaluated as "Critically endangered" (CR B2ab(v)) according to the IUCN threat categories [14].

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