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A new variety of *Bromus* (Poaceae) from Turkey: *Bromus psammophilus* var. *robustus* var. nova

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Abstract: *Bromus psammophilus* P.M.Sm., a rare endemic species, was known only from the type collection on the coastal dunes of Çukurova Delta (Adana, Turkey). Specimens belonging to the new and typical varieties of this taxon were collected from sand dunes and dune slacks where the type specimen was collected the first time. *Bromus psammophilus* var. *robustus* Çakan & H.Scholz was described as a new variety; in examination of the newly collected specimens, it differs from the typical variety by its longer spikelets, higher flower numbers in spikelets, and glabrous glumes.

Key words: *Bromus psammophilus*, Gramineae, Çukurova, Adana, new variety

Bromus (Poaceae) cinsine ait Türkiye'den yeni bir varyete: *Bromus psammophilus* var. *robustus* var. nova

Özet: *Bromus psammophilus* P.M.Sm., endemik ve nadir olup, sadece Çukurova Deltası (Adana-Türkiye) kumulları üzerinde yaşar ve tip örneğinden bilinir. Bu taksona ait örnekler, tip örneğinin toplanmış olduğu kumullar ve kum ambarlarından, ikinci kez toplanmıştır. Bu türe ait toplanmış olan yeni örneklerin kontrol edilmesiyle, başakçık boyutları, her bir başaktaki çiçek sayısı ve glumalarının tüylülük durumlarına göre *Bromus psammophilus* var. *robustus* Çakan & H.Scholz yeni bir varyete olarak tanımlanmıştır.

Anahtar sözcükler: *Bromus psammophilus*, Gramineae, Çukurova, Adana, yeni varyete

Introduction

Bromus psammophilus P.M.Sm. in Notes Roy. Bot. Gard. Edinburgh 42: 492 (1985). Type: S. Turkey, Icel: Taurus, dunes, 3.6.1973, *T.Uslu* ISTE *36425* (holo. E, iso. ISTE). The description of this Turkish endemic (*Bromus psammophilus*), illustrated on a table of line drawings by Smith, fits well in terms of all essential features with the specimens of the new collections (Smith, 1985a, b; Smith & Sales, 1993).

Specimens of the proposed new and typical varieties belonging to *Bromus psammophilus* were

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collected by the first author in 2000 during the course of research about the conservation and management of natural flora and vegetation in the Çukurova Delta, in the south of Adana province (Çakan et al., 2005). Additionally, several field observations and new collections were carried out for the new and typical varieties at Çukurova Delta.

Bromus psammophilus is totally awnless; this quite striking characteristic is in contrast to the 2 relatives *B. pseudobrachystachys* H.Scholz and *B. tigridis* Boiss. et Noë from the Near East region, both of which are with lemma awns. More distantly related species to *B. psammophilus*, despite awnlessness, are *B. briziformis* Fisch. et Mey. and *B. secalinus* L. (some strains), both rather widely distributed and have bigger spikelets and lemmas (Tzvelev, 1983). The genus *Bromus* L. (Valdés & Scholz, 2006) is treated by some authors in a broader sense: the species cited above are under *Bromus* sect. *Bromus*.

Coastal dune habitats of these varieties are located in one of the most important wetlands in the eastern Mediterranean part of Turkey and included in the list of RAMSAR sites designated under the Ramsar Convention for the conservation and good use of wetlands (Çakan & Zielenski, 2004).

The native flora of Çukurova Delta comprises 600 taxa, including 62 rare or threatened taxa, and 32 taxa endemic to the area (Çakan et al., 2005). Sandy coastal habitats of this site are covered with unique psammophilous vegetation formed together with other plants by numerous brome grasses. In addition to the new taxon to be described below, the genus *Bromus* is represented in the area by *B. psammophilus* var. *psammophilus, B. arvensis* L., *B. fasciculatus* C.Presl, *B. lanceolatus* Roth, *B. rigidus* Roth, and *B. tectorum* L.

The genus *Bromus* is disturbed worldwide, but mainly in temperate regions of the northern hemisphere. In the Mediterranean flora, this genus is represented by some 40 species; most of them belong to *Bromus* subgen *Bromus* (Acedo & Llamas, 1997). Western and Central Europe, the Mediterranean area, and the near Middle-East region are the centres of the past and ongoing evolution of annual brome grasses as well as the hot-spots of brome grasses diversity, and the last region is the "hottest" of all (Scholz, 1998). In addition, in the last decade nearly 500 studies regarding the flora of Turkey have been published and many additional taxa, including *Bromus* genera, which are either new to science, or new records have been described in these publications (Özhatay et al., 2009).

Results

***Bromus psammophilus* P.M.Sm.**

Description: Annual herb. Stem very variable in length, up to 50(-80). Leaf-sheaths densely pilose. Leaf blades 3-5 cm × 1.5-3 mm, pilose. Culms and panicles erect, panicle branches ascending up to 8 cm, spikelets narrowly lanceolate or broadly ovate, glabrous or puberulous, 9-25 × 6-7 mm. Glumes broadly lanceolate, glabrous or puberulent, lower glumes 3-4.2 × 1.4-2 mm, upper glumes 4-5.2 × 2.6-3.2 mm. Lemmas subcoriaceous (subchartaceous), glabrous or puberulent, 5.5-6 × 3-4 mm, awns absent. Palea with long hairs along margins and glabrous or shortly hairy on surfaces, almost equalling lemma. Anthers ca. 2 mm. Caryopses flat.

The key for the 2 varieties of *Bromus psammophilus* is given below.

1. Stem up to 40 cm; spikelets 9-11 × 7 mm, broadly ovate, includes 5-12 flowers; glumes densely puberulous, lower glume 3.2 × 1.4 mm, upper 4.5 × 2.6 mm.....var. **psammophilus**
2. Stem up to 80 cm; spikelets 20-25 × 6 mm, narrowly lanceolate, includes 10-20 flowers; glumes glabrous, lower glume 4.2 × 2.0 mm, upper 5.2 × 3.2 mm. .....var. **robustus**

var. ***robustus*** Çakan & H.Scholz **var. nova** (Figure 1.

Type: Turkey. C5 Adana: Tuzla district, around Tuzla stake net, sand dunes and dune slack, 1-2 m, 25.06.2000 *Çakan* 521 (holotype: Çukurova Univ. Herb., isotypes: B, GAZI, ANK).

Spiculae glabrae, 20-25 mm longae, lanceolatae, 10-20-florae (vs. 10 – 20-florae), lemmata apiculata.

B. psammophilus var. *robustus* is closely related to var. *psammophilus,* which differs mainly in having ovate and densely puberulous spikelets (Figures 1 & 2).

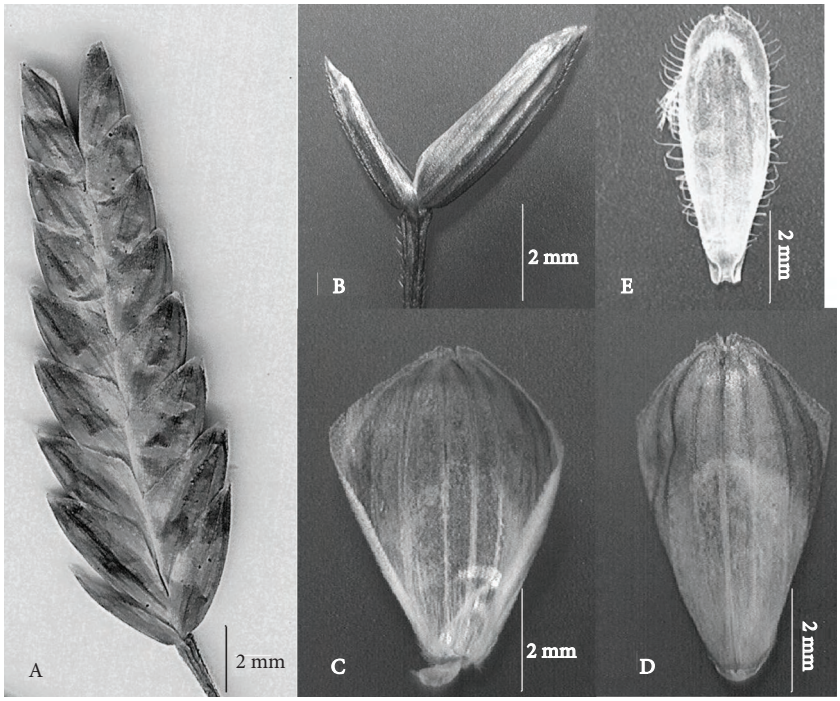

Figure 1. *Bromus psammophilus* var. *robustus*; A-spikelet, B-glumes, C-lemma (inside), D-lemma (outside), E-palea.

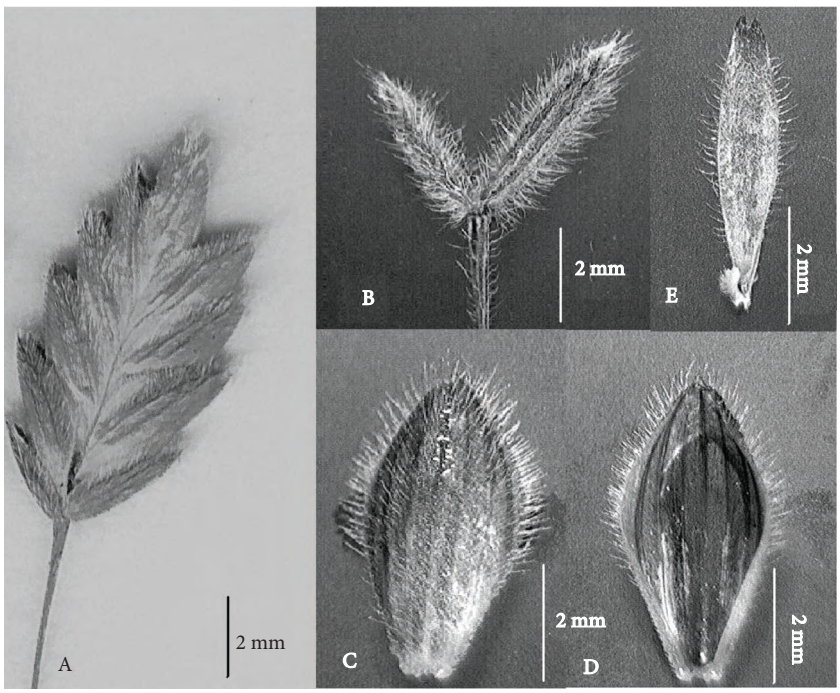

Figure 2. *Bromus psammophilus* var. *psammophilus*; A-spikelet, B-glumes, C-lemma (outside), D-lemma (inside), E-palea.

***Habitat**: B. psammophilus* var. *robustus* grows mainly on sandy places around dune slacks. According to field observations, populations of new and typical varieties grow a short distance from each other and in some sandy areas they have mixed populations.

Conservational status: Natural sand dunes and dunes slacks, including habitats of new and typical varieties of *B. psammophilus* have been altered by human activities, e.g., agriculture and tourism. Both of these varieties are very rare and threatened endemic taxa and known from only a few localities with a limited population size from Çukurova Delta. According to IUCN categories (2001) both of the varieties are "critically endangered" [CR: A1a (estimated population size reduction of 90% over the last 10 years)].

Specimens examined: *Bromus psammophilus* var. *robustus* (Paratypes): Turkey, C5 Adana: Yumurtalık district, Adalı village, sand dunes, 2 m, 27.6.2000 *Çakan* 720 (Çukurova Univ. Herb.); C5 Adana: Karataş district, Akyatan lagoon, sandy and salty areas, 3 m, 06.6.2000 *Çakan* 765 (Çukurova Univ. Herb.). *Bromus psammophilus* var. *psammophilus* (Topotypes): Turkey, C5 Adana: Tuzla district, around Tuzla stake net, sand dunes, 2-4 m, 25.5.2000 *Çakan* 520 (Çukurova Univ. Herb.); C5 Adana: Karataş district, Akyatan lagoon, Kapı, remnant sand dunes, 5 m, 30.4.2000, *Çakan* 470 (Çukurova Univ. Herb.); C5 Adana: Tuzla district, Aydınlar village, Hayıtlı Kum, remnant sand dunes, 27.6.2000, *Çakan* 922 (Çukurova Univ. Herb.).

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References

Acedo C & Llamas F (1997). Two new brome-grasses (*Bromus*-Poaceae) from Iberian Peninsula. *Willdenowia* 27: 47-55.

Çakan H & Zielinski J (2004). *Tamarix duezenlii* (Tamaricaceae), a species new to science from Southern Turkey. *Acta Soc Bot Polonia* 73: 53-55.

Çakan H, Yılmaz K T & Düzenli A (2005). First comprehensive assessment of the conservation status of the flora of the Çukurova Deltas, Southern Turkey. *Oryx* 39: 17-21.

IUCN (2001). *IUCN Red List Categories and Criteria: Version 3.1. IUCN Species Survival Commission.* IUCN, Gland Switzerland and Cambridge, UK.

Özhatay N, Kültür Ş & Aslan S (2009). Check-List of additional taxa to the supplement Flora of Turkey IV. *Turk J Bot* 33: 191-226.

Scholz H (1998). Notes on *Bromus danthoniae* and relatives (Gramineae). *Willdenowia* 28: 143-150.

Smith PM (1985a). Observations on Turkish brome-grasses. I. Some new taxa, new combinations and notes on typification. *Notes Roy Bot Gard Edinburgh* 42: 491-501.

Smith PM (1985b). *Bromus* L. In: Davis PH, Mill RR & Tan K (eds.). *Flora of Turkey and the East Aegean Islands,* Vol. 9, pp. 277-301, Edinburgh: Edinburgh Univ. Press.

Smith PM & Sales F (1993). *Bromus* L. sect. *Bromus*: Taxonomy and relationship of some species with small spikelets. *Edinb J Botany* 50: 149-171.

Tzvelev NN (1983). *Grasses of the Soviet Union.* Vol 1. Leningrad (New Delhi: Translated from the Russian edition 1976 by Amerid Publishing).

Valdés B & Scholz H (2006). The Euro+Med treatment of *Gramineae,* a generic synopsis and new names. *Willdenowia* 36: 657-669.