

Short communication

Bromus diandrus (Poaceae), an addition to the Bulgarian flora

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Abstract – The current report discusses *Bromus diandrus*, a new species in the flora of Bulgaria. A concise description of its morphological features with an emphasis on the characters that distinguish it from the already known representatives of *Bromus* sect. *Genea* in the country is presented. The newly established locality is characterized floristically and ecologically. The probabilities of the native or alien origin of the studied population are also discussed.

Keywords: *Anisantha diandra*, *Bromus*, dune vegetation, Grate Brome, native species

Introduction

Bromus diandrus Roth (syn.: *Anisantha diandra* (Roth) Tutin ex Tzvelev) belongs to the infrageneric sect. *Genea* Dumort., which in Europe comprises 8–11 taxa with species or subspecies rank (Smith 1980, Sales 1993, Valdés et al. 2009). The section accommodates mostly ruderal species with annual or biennial life cycles. Three taxa from the section, *B. sterilis* L., *B. madritensis* L. and *B. tectorum* L. have previously been confirmed from Bulgaria (Georgiev 1963, Assyov and Petrova 2012). The similar *B. rigidus* Roth (reported as *B. maximus* Desf.) was noted by Stojanov et al. (1967) as having been erroneously recorded in Bulgarian flora without any reference.

The aim of the current report is to provide a brief description of the species, underlining the characters distinguishing it from other representatives of the section, to comment on aspects of its environmental requirements, habitat affiliation and the probable origin of the studied population.

Materials and methods

The species was observed during field research into the coastal sands at Irakli on the Black Sea coast, about 6 km south of the city of Obzor, on 15 August, 2020. The distinctive features were noted in the field and after examination of the collected specimens under a stereomicroscope. To verify the identification, the collected specimens were compared with herbarium materials kept at SO (Nos. 07440, 82367) and SOM (Nos. 113297, 137672, 140540) or as digital collections from E, P, B, WU and MW herbaria, available at GBIF (2019). The taxonomy of the species follows Smith (1980). Exsiccata are deposited at SO (Nos. 108028–108030)

and SOM (Nos. 177047, 177048). Habitat description is based on the author’s personal observations. The names of the accompanying species or subspecies are quoted after Assyov and Petrova (2012) and/or Valcheva et al. (2020).

Results and discussion

Bromus diandrus is distinctive by reason of its robust appearance; lax and nodding one-sided panicles (Fig. 1a); hirsute panicle axis and stem below the panicle (Fig. 1b); larger glumes, lemmas, lemma lobes and awns as compared with the other representatives of sect. *Genea* from Bulgaria (Fig. 1c). From *B. sterilis* it differs also by the general outline shape of the inflorescence, the usually shorter panicle branches, which are not arched-pendulous, as well as the narrow and longer callus scar. From the similar *B. rigidus*, it is distinguished mainly by the callus scar, ovate, rounded at the end (vs. elliptic, pointed at the end), and by the presence of conspicuous constriction at the base of lemma (Fig. 1d). For more comprehensive description of the representatives of the sect. *Genea* refer to Sales (1993).

Bromus diandrus is a winter annual species native to the Irano-Turanian, Pontic and Mediterranean regions but introduced elsewhere as an alien weed (CABI 2020). Currently it has global distribution and occupies coastal sands or various types of anthropogenic habitats such as crop fields, waste places, roadsides, etc. (GBIF 2019, CABI 2020). Several locations are known from the coastline of the Black Sea and its surroundings - Crimea, southwestern Russia, Georgia and Turkey (GBIF 2019). Most probably, the closest documented locality within the native range of the species to

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the one at Irakli is in the vicinity of Edirne, European Turkey (Webb 1966). More recently, the species was reported for the flora of North Macedonia, preliminarily accepted as native (Kostadinovski et al. 2019).

The site of *Bromus diandrus* at Irakli has the approximate coordinates in WGS84: 42°44'53.22"N, 27°53'21.44"E. The habitat type is identified as B1.324 Pontic white dunes (EUNIS 2007). The vegetation constitutes a narrow (5–15 m wide), sparsely vegetated linear strip, between a non-vegetated sand beach and the foot of sea cliff slope. The species composition is typical for the dune vegetation from the western Pontic region. Most abundant of the recorded species were *Leymus racemosus* (Lam.) Tzvelev subsp. *sabulosus* (M.Bieb.) Tzvelev, *Elymus farctus* (Viv.) Runemark ex Melderis subsp. *bessarabicus* (Savul. et Rayss) Melderis, *Eryngium maritimum* L., *Cakile maritima* Scop. subsp. *euxina* (Pobed.) Nyár., *Salsola tragus* L. subsp. *tragus* and *Vulpia fasciculata* (Forsskal) R.M. Fritsch. Much less abundant or present as single individuals were *Ammophila arenaria* (L.) Link, *Peucedanum obtusifolium* Sm., *Stachys maritima* Gouan, *Euphorbia peplis* L., *Lactuca tatarica* (L.) C.A.Mey., *Xanthium orientale* L. subsp. *italicum* (Moretti) Greuter, *Crambe maritima* L. and *Pancratium maritimum* L. In addition, some species typical for dry grassland communities were also recorded: *Bromus tectorum* L., *Hypochaeris radicata* L., *Centaurea salonitana* Vis., *Allium guttatum* Steven, *Silene dichotoma* Ehrh., *Alyssum hirsutum* M.Bieb., *Carthamus lanatus* L., *Pyrus communis* L. subsp. *pyraster* (L.) Ehrh.

At its first Bulgarian site, *Bromus diandrus* grows in more or less dense patches unevenly distributed over an area of less than 0.1 ha. Between 15–120 culms per m² were counted, while the overall area covered by the species alone was approximately 200 m². Considering the number of individuals and the population density, probably the species occurred in this area a long time ago.

The rapid growth of tourism and its supporting infrastructure during the last 20 years has affected many natural sites along the Bulgarian Black Sea coast. As a consequence, tourism can be expected to have affected the dune vegetation at the studied locality in terms of the introduction of untypi-

cal native or alien flora. However, excluding *Xanthium orientale* subsp. *italicum*, no other alien species were observed. This is in agreement with the evaluation of Valcheva et al. (2020), who reported limited diversity and abundance of alien (incl. invasive) species in the coastal vegetation of Bulgaria.

In conclusion, it can be stated that the locality of *Bromus diandrus* at Irakli is insignificantly affected by trampling, unregulated campsites, campfires or other type of disturbances, thus its current state could be evaluated as close to natural. Moreover, the species is found within its native range, the conditions correspond to its ecological requirements while the state of its population proves that it is well adapted to the environment at this locality. Therefore, *B. diandrus* could be presumably regarded as native for the Bulgarian flora.

However, more studies are needed, particularly in the regions of the country influenced by more or less typical dry Mediterranean climate in order to determine the status of the taxon reported here accurately.

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Fig. 1. Distinguishing features of *Bromus diandrus*: a – one-sided semi-nodding panicle, b – upper stem and panicle axis, c – glumes and first lemma with up to 60 mm long awn, d – ovate callus scar with notable constriction at lemma's base.