NOTES ON THE GENUS BROMUS L. (POACEAE) IN IRAN

R. Naderi, M. R. Rahiminejad, M. Assadi & H. Saeidi

Received 23.11.2011. Accepted for publication 21.02.2012.


As a result of our study on the genus *Bromus*, *B. rigidus* and *B. sewerzowii* are reported as new records for the flora of Iran. *Bromus diandrus-rigidus* complex comprises a group of species ranging from tetra- to octaploid levels, which have been treated in different ways. Based on a specimen from Golestan National Park, *B. rigidus* is reported along with its illustration and a comparison with its closely related taxa. Furthermore, *B. sewerzowii* is the second record that is based on a specimen from North Khorasan (Sarakhs). In addition, a taxonomic key to two the species and their allies has been presented.

Reza Naderi, Mohammad Reza Rahiminejad (correspondence<mrr@sci.ui.ac.ir>) & Hojjatollah Saeidi, Department of Biology, University of Isfahan, Isfahan, Iran. - Mostafa Assadi, Research Institute of Forests and Rangelands, P. O. Box 13185-116, Tehran, Iran.

Key words. *Bromus rigidus, Bromus sewerzowii, Bromus diandrus-rigidus* complex, *Poaceae*, new records, Iran.

INTRODUCTION

Taxonomically, *Bromus* is a complicated genus containing diverse annual to perennial plants (Fortune et al. 2008, Smith 1970). The taxonomic status and infra generic relationships of *Bromus* particularly sections *Bromus* and *Genea* Dumort. were the subject of some recent studies (e.g., Sales 1991, 1993; Scholz 1998). Bor (1970) in his account of the Flora Iranica area recognized 29 species occurring in Iran. Later on, this number was increased to about 45 species by adding *B. gedrosianus* Pénzes, *B. pulchellus* Figari & De Notaris, *B. pseudojaponicus* H. Scholz (Scholz 1981a), *B. borianus* H. Scholz (Scholz 1981b), *B. adiricus* Sommier & Levier (was accounted by Smith (1985b) as a synonym of *B. variegatus* subsp. *villosulus* (Staudl.) P. M. Smith), *B. ramosus* Hudson (Assadi 1988), *B. diandrus* Roth, *B. tigridis* Boiss. & Nöe, *B. pectinatus* Thunb. (with the synonym *B. pulchellus* Figari & De Notaris), *B. racemosus* L., *B. paulsenii* Hack. (Termeh 1987), *B. mollis* L. (Hamzeh’ee 2000; although was accounted as a synonym of *B. hordeaceus* L. by Smith 1968), *B. arvensis* L. (Noori et al. 2004), *B. secalinus* L. (Nourouzi et al. 2005) and *B. catharticus* Vahl (Hamzeh’ee et al. 2007) to this list. In addition, Gahreman et al. (2006) and Alemi et al. (2007) reported *B. riparius* Rehnmann and *B. inermis* Leyss. for the flora of Iran. As a part of comprehensive and general study of the genus *Bromus* in Iran two new
species to the flora of Iran are recorded and added to the list of *Bromus* species in this country: *B. rigidus* Roth belonging to section *Genea* Dumort. and *B. sewerzowii* Regel from section *Bromus*.

**RESULTS AND DISCUSSION**

*Bromus rigidus* Roth, Bot. Mag. (Römer & Usteri) 10: 21-23 (1790). Fig 1.

*Specimen seen.* Iran, Golestan province, Golestan National Park. 751 m, 25.5.2011, Naderi 17727 (Herbarium of the University of Isfahan, HUI).

Annual, 30-50 cm tall, erect or decumbent. Leaves 10-25 cm × 2-6 mm, coverd with short hairs. Panicles 10-20 cm long, dense, stiffly erect, and slightly lax; branches never spreading or drooping. Spikelets excluding awns 30-50 mm long, glabrous or hairy; lower glumes 14-20 mm × 2 mm; the uppers 22-27.5 mm × 3.2-4 mm; lemmas 24-28 mm × 4-5 mm; awns rigid, 33-56 mm; palea 15-16.5 mm; anthers 0.5-0.6 mm.

*Habitat.* Roadside.


The taxonomic status of the pair closely related species *B. diandrus* Roth (8x) and *B. rigidus* Roth (6x) from sect. *Genea* has been the matter of controversy for a long time. While some workers like Oja & Jaaska (1996) using isozyme data, Oja & Laarman (2002) relying on cytological observations, and Sales (1993, 1994) using morphological reasoning (e.g., regarding a state transformation of callus/scar shapes) considered them as a pair of closely related species, others (Smith 1980, 1985a; Liang et al. 2006; Fortune et al. 2008) argued in contrast. The latter workers applying the sequence data of the low copy nuclear gene (Waxy) and the multi copy one (ITS) argued that *B. rigidus* (6x) along with *B. sterilis* (2x) have taken part as the progenitors in the origin of *B. diandrus* (8x). Therefore, they split and kept the two polyploids as two distinct species; a notion followed by the authors of this study. However, it is worth of mention that Termeh (1987) reported *B. diandrus* as having partly loose, open and dense panicles in which branches and pedicels are being shorter than spikelets. The two last species morphologically are similar, differing in lemmas/caryopsis width and shape which have been cited in many floras such as Smith (1980, 1985a) and Liang et al. (2006). Hamzeh’ee (2000) also reported *B. mollis* L. based on a depauperate material and no identifiable herbarium sheet “Azimi 50076 (TARI)” for the flora of Iran. This species has been generally known as a synonym of *B. hordeaceus* L. subsp. *hordeaceus* (Smith 1968). Thus, the presence authenticity of *B. hordeaceus* for the flora of Iran will be unresolved.

**Key to the species**

A key to the taxa belonging to the sections concerned including sect. *Genea* Dumort. and *Bromus* are provided and presented here.

1. Spikelets cuneate, with wide apex (sect. *Genea* Dumort.)
   - Spikelets ovate to ovate-lanceolate, terete to slightly compressed (sect. *Bromus*)
   2. Lower glume 6-10 mm long; the upper 10-16 mm long. Lemma less than 20 mm long  
      - *B. sterilis* L.  
      - Lower glume 15-23 mm long; the upper 20-32 mm long. Lemma at least 20 mm long  
      3. Panicle dense, stiffly erect, narrowly ovate; branches...
Fig. 1. Bromus rigidus. 1, habit; 2, spikelet; 3, lower glume; 4, upper glume; 5, lemma including awn; 6, lemma excluding awn; 7, caryopsis; 8, node; 9, leaf; 10, ligule – Naderi 17727 (HUI).
Fig. 2. *Bromus sewerzowii*, Mozaffarian 67633 (TARI).
mainly shorter than the spikelets

B. rigidus Roth

3. Panicle lax, spreading, broadly ovate; branches mainly longer than the spikelets  
B. diandrus Roth

4. Panicle 10-17 cm long. Lower glume 7-7.5 mm long; upper glume 10.5 mm long  
B. sewerzowii Regel

- Panicle less than 7 cm long. Lower glume up to 6.5 mm long; upper glume up to 7 mm long

5. Lemma with margin conspicuously angled about 2/3 up. Grains oblanceolate  
B. hordeaceus L.

- Lemmas with margin rounded or very obscurely angled. Grains narrowly elliptical  
B. scoparius L.

ACKNOWLEDGMENT

We thank graduate department of the University of Isfahan for necessary guidance and support. The authors appreciate Mrs. Mohaghegh for her precise hand drawing.

REFERENCES


Smith, P. M. 1968: The Bromus mollis aggregate in Britain. –Watsonia 6 (6), 327–344.


