SOME COMMENTS ON THE SPECIES OF BROMUS SECT. BROMUS (POACEAE) IN IRAN

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Received 28.05.2012. Accepted for publication 05.09.2012.


This article is a taxonomic review after Flora Iranica concerning some species of Bromus sect. Bromus. Comparing the holotype, isotype and paratype of B. pseudobrachystachys with the lectotype of B. brachystachys and also reexamination of three Iranian and Iraqi herbarium sheets putatively determined under the latter’s name showed all belong to the former. B. racemosus, B. arvensis and B. secalinus are confirmed to occur in Iran. Despite B. tigridis was identified from Turkey based on the sheet Sorger & Buchner 82-62-54, the Iranian specimen was identified as B. racemosus. Furthermore, a new record of this section i.e., B. macrocladus is reported here from mountains of Razi village (W Khoy, NW Iran).

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Key words. Taxonomic revision, new report, Bromus, Poaceae, Iran.

توضيحاتی بر گونه‌های در ایران Bromus sect. Bromus (Poaceae)

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بعد از انتشار فلورا ایرانیکا می‌بایست نمونه‌های هولوتیپ بازبینی و همان‌گونه‌ی لیکتنتیپ B. brachystachys در ایران و عراق معرفی شد که در نام‌گذاری تحت نام گونه‌های دوم قلمداد می‌شود. وجود گونه‌های B. arvensis، B. racemosus و B. tigridis در ایران تایید شده، نمونه‌های هیراربومی گزارش شده از سرده secalinus Sorger & Buchner شامل (باوش و ارگویهای برجسته و موی در پوشه‌ها و پوشه‌های بالغ) برای این گونه تحت ورده هیراربومی از ایران بخشهای گرد. علاوه بر این گونه B. macrocladus اولین بار از کوههای روستای رازی (غرب خوی، شمال غربی ایران) گزارش می‌شود.

Introduction

Bromus L. is a complex genus that encompasses 150 annual to perennial species (Clayton et al. 2002 onwards). Within Bromus, section Bromus is considered as the most advanced section and probably originated during the Pleistocene in SW Asia and the Mediterranean region (Stebbins 1981). Most species of this section grow in field margins, roadsides and disturbed habitats so that human activities had a determinant effect on their evolution. Taxonomic problems of some species cause workers to confuse and harden their determination. Taxa are differentiated only by arbitrary characters, however, the number of species in section Bromus is variable from 30 to 40 species (Saarela et al. 2007).

Following the publication of Flora Iranica (Bor 1970) some new changes occurred in section Bromus (see Table 1). This study aims to evaluate the taxonomic changes made to and clarify the correctness of the new taxa for the flora of Iran. In addition, a new species of section Bromus is reported here.

Material & Methods

In addition to the special collection for this study, the herbarium sheets of Research Institute of Forests and Rangelands (TARI), Iranian Research Institute of Plant
Protection (IRAN), University of Isfahan, Shahid Bahonar University of Kerman, the Natural History Museum of Vienna (W) and Botanical Garden and Botanical Museum of Berlin (B) were examined. The following commonly applied traits by Bromus workers (e.g. Scholz 1972; Smith & Sales 1993) in diagnosis and descriptions were used to evaluate the correct identifications: spikelet length, vein number, length and width of lemma, insertion distance of awn from the apex, the tip shape and the incision depth, awn structure, anther length, and shape and length of Caryopsis.

Results & discussion

Distribution of B. brachystachys is restricted to Central Europe, particularly in Germany (Liang et al. 2006). Scholz (1972) introduced the new species B. pseudobrachystachys to the science from the Middle East. He believed that specimens of Turkey, Syria, Lebanon, Palestine, Iraq, Iran and Afghanistan belong to B. pseudobrachystachys, and asserted to their differences in spikelet structure. Smith & Sales (1993) also declared that the awn insertion of B. pseudobrachystachys is up to 0.5 mm below the apex of lemma but rarely is less than 1 mm in B. brachystachys. The shape of lemma tip in the holotype and isotype of B. pseudobrachystachys (Bormmüller, Iter Persico-turcicum 1850: B, W) were compared with the lectotype of B. brachystachys (Hornung s.n.: W). The former has an integrate-serrate-emarginate tip contrast to short-bidentate one in the latter, as well as the different measurement of awn insertion until the lemma apex. In addition, B. pseudobrachystachys is confirmed by the following specimens from Iran and Iraq:


Distribution. Turkey, Iran (N & W), Caucasus, Russia, Central Asia, Afghanistan and North America. Specimens seen. Iran: Mazandaran: 33 km Sari to Kisar, Alamardeh, Doseleh, along rice field, 27.4. 2009, Naderi s.n. (University of Isfahan). – Gilan: Talesh, Asalem, 16. 6. 1965 (6?), Esfandiar 29173 (IRAN), Esfandiar 23848 (TARI); 10 km Asalem to Khalkhal, jungle region, 600 m, 23. 6. 1988, Assadi & Shamsavari 66028 (TARI); 25 km to Masooleh from Fooman, 200 m, 6. 7. 1995, Assadi 73729 (TARI). – Kordestan: Sanandaj, 35° 56’ N, 47° 01’ E, 1800 m, 18. 6. 1963, Jacobs 6959 (W).

Afghanistan: Kabul, Guzar Gah, 10. 6. 1951, Neubauer 174 (this sheet was determined by Scholz in 1979 and Bor in 1964 as B. tigridis and B. racemosus, respectively. But there is an affinity to B. tigridis, W). B. tigridis Boiss. & Noë recorded from Iran by Termeh (1987) is in fact B. racemosus.

3. B. arvensis L., Sp. Pl. 77 (1753). Ic: Smith & Sales,
**Table 1:** A summary of some new taxonomic changes (*Bromus sect. Bromus*) made to the flora of Iran since Bor (1970).

<table>
<thead>
<tr>
<th>Taxa</th>
<th>References</th>
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<tr>
<td><em>B. pseudobrachystachys</em> H. Scholz</td>
<td>new species from the Middle East which has been wrongly identified as <em>B. brachystachys</em> Hornung until Scholz (1972)</td>
</tr>
<tr>
<td><em>B. arvensis</em> L.</td>
<td>Noori et al. (2004)/new report under 3 specimens.</td>
</tr>
<tr>
<td><em>B. secalinus</em> L.</td>
<td>Nourouzi et al. (2005)/new report under Nourouzi 2016 (MPH).</td>
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</tbody>
</table>


**Distribution.** Europe, Turkey, Iran (NW), Caucasus, Russia, Central Asia, China and America.

**Specimen seen.** *Iran:* Gilan: Heiran neck, 5. 7. 2002, Mirtazadini 1424 (Shahid Bahonar University of Kerman). –Azerbaijan: ad ripas argillosas rivi Qaranqu prope Lamashan, 34 km a Siah Chaman astuo-occidentum versus, 1550 m, 14. 6. 1977, Reechinger Iter Iranianum X 56693 (this sheet was determined by Scholz in 1979 as *B. popovi* Drobov (synonym of *B. racemosus* L.), but its anther is 5 mm and palea is equal to lemma, W); 89 km to Mianeh from Zanjan, along Ghazel Ozun river, 1430 m, 9. 7. 1991, Zehzad et al. 70475 (TARI); Arasbaran jungle, 30. 7. 2012, Rahiminejad 17004 (University of Isfahan); Jofia, Aras river, 790 m, 11. 6. 1972, Foroughi 5210 (TARI); Khoy to Makoo, before Gharah Ziaeddeh, 1065 m, 10. 7. 2003, Rahiminejad & Delghhan 14975 (University of Isfahan); 35 km to Makoo from Marand, 1900 m, 28. 6. 1978, Assadi & Mozafarian 30080 (TARI).

This species was recorded from Iran by Noori et al. (2004).


**Distribution.** Europe, Turkey, Iran (NW), Caucasus, Russia, China, Japan and America.

**Specimen seen.** *Iran:* Azerbaijan, 35 km Ardabil to Astara, Fandoghlo jungle, 20. 8. 2003, Nourouzi s.n. (TARI).

This species was recorded from Iran by Nourouzi et al. (2005).

**New report**

5. **B. macrocladius** Boiss., Diagn. Ser. 1(13): 64 (1854). Fig. 1. – Type: Turkey (B2 Izmir), in collibus ad radices meridionales Tmoli inter Terrassa et Birgii in Lydia, 1842, Boissier s.n. (holo. G).

Annual, up to 65 cm tall. Culm pubescent. Leaf blade flat, wide, with long white cilia up to 16 cm long, 7 mm wide; leaf sheath with long white cilia. Panicle open, 25 cm long; branches ascending, patent or drooping; pedicels and branches much longer than spikelet. Spikelet glabrous, scabrous or strigose, 28 mm long (excluding awns), 36.5 mm long (including awns); rachilla 2 mm long; lower glume 6.5 mm long, 2 mm wide, 4 veined; upper glume 8.2 mm long, 3 mm wide, 7 veined; lemmas 9.5-10 mm long, 4-4.5 mm wide, 7-8 veined, at the tip with short obtuse bifid tooth, up to 0. 5 mm long; awns divaricate or twisted at the middle, 6-12.5 mm long, inserted 2-3 mm below the apex; palea 1.5 mm shorter than lemma; anthers 3-6 mm long, lower 6 mm long, middle 4-5 mm long, upper 3 mm long.

**Distribution.** Turkey and Iran (NW).

**Specimen seen.** *Iran:* Azerbaijan, almost 70 km W Khoy, upper mountains of Razi village, 2000-2250 m, 26. 7. 1990, Assadi & Oliff 68901 (TARI).

*B. macrocladius* in a general aspect, because its anthers are 3-6 mm long, is similar to *B. arvensis*, but insertion of its awn is more than 1.5 mm below the apex of lemma (i.e. 2-3 mm) similar to that of *B. japonicus*. In contrast, the awn insertion in *B. arvensis* and its other relatives (e.g. *B. pseudobrachystachys* and *B. racemosus*) is less than 1.5 mm below the apex. *B. macrocladius* is reported here at the first time for the flora of Iran.
Fig. 1. *Bromus macrocladus* Boiss., Assadi & Olfat 68901 (TARI).
Acknowledgement
The authors would like to thank graduate department of the University of Isfahan and Research Institute of Forests and Rangelands (Tehran, TARI) for necessary guidance and support. We are grateful to Dr. Ernst Vitek and other members of herbarium W for their kindness and hospitality.

References