NEW SPECIES AND NEW RECORDS OF AGROSTIS FOR THE FLORA OF IRAN

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Received 16.10. 2012. Accepted for publication 01.05.2013.


Agrostis gariana is described as a new species from Lorestan province, Iran. The new species is closely related to A. canina from Sect. Agraulus. A. vinealis, as an Irano-Turanian element from Sect. Agraulus, is a new record for the flora of Iran. These species are compared with the closely related species and their distribution data and illustrations are provided.

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Key words. Agrostis, Agrostideae, new species, new record, Iran.

INTRODUCTION

The species of the genus Agrostis (Poaceae, Agrostideae) are distributed in almost all non tropical countries of both hemispheres as well as in mountainous regions of the tropics (Tzvelev 1976). This genus has almost 150 (Tzvelev 1976) to 200 (Nasir & Ali 1972) species in the world. In Flora Iranica (Bor 1970) 5 species from Iran were reported, viz. A. gigantea Roth., A. stolonifera L., A. tenuis Sibth., A. canina L. and A. olympica (Boiss.) Bor. All the species of the genus are fodder plants of pasture and consequently are of great economic importance.

In Flora Iranica the genus has been divided into 2 sections; sect. Trichodium (Michx.) Trin., including all the species without palea or palea/lemma length is about 1/4 (A. canina L., A. tenaefolia M. B. and A. nervosa Nees), and sect. Vilfa (Adans.) Roemer & Schults; all the species with longer palea, including all of the other species reported from Flora Iranica area based on palea length. Tzvelev (1976) did not agree with this circumscription and grouped all Agrostis species in 4 sections; viz., sect. vilfa Adans., plants with lemma glabrous, usually awnless, callus hair usually less than 1/6 of lemma or absent, palea 2/3-1/2 of lemma, anthers 0.6-0.8 mm (comprising A. stolonifera, A. gigantea, A. tenuis), sect. Pentatherum (Boiss.) Bor, plants with lemma somewhat pilose, dorsally awned, callus hair 2/5-4/5 of the length of lemma, palea 2/3 or more of lemma, anthers 0.3-0.8 mm (including A. olympica), sect. Agraulus (Beauv.) Tzvel., lemma glabrous, usually dorsally awned, callus hair less than 1/4 of lemma, palea usually absent, anthers 0.6-1.5 (2) mm (including A. canina and A. vinealis Shreb.), and sect. Trichodium (Michx.) Dum. (without any species from Iran). This article contains one new species and one new record for the flora of Iran and clarifies the Section status of Agrostis in Iran.

MATERIALS AND METHODS

In the course of 3 years research on the taxonomy of the genus Agrostis, many specimens of several herbaria (IRAN, FUHM, TUH and TARI and local herbaria i.e., Nowshahr, Tabriz, Khorasan, Kermanshah, Golestan and Kordestan) were studied using Flora Iranica (Bor 1970), Flora of Iraq (Bor 1968), Flora of Pakistan (Nasir and Ali 1972), Flora of Turkey (Dogan 1985) and Grasses of the Soviet Union (Tzvelev 1976).
Table 1. Diagnostic morphological characters of *Agrostis gariana*, *A. vinealis* subsp. *planifolia* and the closest relatives.

<table>
<thead>
<tr>
<th>Species characters</th>
<th><em>A. gariana</em></th>
<th><em>A. canina</em></th>
<th><em>A. olympica</em></th>
<th><em>A. vinealis</em> subsp. <em>planifolia</em></th>
<th><em>A. stolonifera</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant state</td>
<td>rhizomatous</td>
<td>stoloniferous</td>
<td>rhizomatous</td>
<td>rhizomatous</td>
<td>stoloniferous</td>
</tr>
<tr>
<td>Lemma indumentums</td>
<td>hairy</td>
<td>glabrous</td>
<td>hairy</td>
<td>glabrous</td>
<td>glabrous</td>
</tr>
<tr>
<td>Lemma awn length (mm)</td>
<td>2.5-3.5</td>
<td>0</td>
<td>2-2.5</td>
<td>3.5-4.2</td>
<td>0</td>
</tr>
<tr>
<td>Palea length (mm)</td>
<td>0</td>
<td>0</td>
<td>1.5-1.7</td>
<td>0</td>
<td>0.7-1</td>
</tr>
<tr>
<td>Ratio: Calyx hair/lemma</td>
<td>1/5-1/6</td>
<td>1/5-1/6</td>
<td>1/1</td>
<td>1/6-1/8</td>
<td>absent</td>
</tr>
<tr>
<td>Lemma length (mm)</td>
<td>1.3-2.1</td>
<td>1.7-2</td>
<td>1.5-1.75</td>
<td>2.2-2.4</td>
<td>1.7-2</td>
</tr>
<tr>
<td>Spikelet length (mm)</td>
<td>2.3-2.7</td>
<td>2-2.5</td>
<td>1.5-2.3</td>
<td>3-3.4</td>
<td>2-3</td>
</tr>
</tbody>
</table>

Fig. 1. *Agrostis gariana*: a. habit, b. spikelet (without floret), c. upper glume, d. lower glume, e. lemma.

RESULTS AND DISCUSSION

*Agrostis gariana* (Fig. 1) and *A. vinealis* (Fig. 2) are described as a new species and a new report for the first time from Iran, respectively. These species are compared with their closely related taxa in Table 1.

NEW SPECIES

*Agrostis gariana* Taheri, sp. nov. (Fig. 1).
Section *Agraulus* (Beauv.) Tzvelev
*Typus*. Iran, Lorestan: Broujerd, Kuh-e Garin, 33 m, 23, 07, 2010, Zarini, 95709 (holotypus TARI).
Affinis *Agrostis canina* sed rhizomatibus (in illa stoloniferis), setae lemmatis 2.5-3.5 mm longis (in illa setis evanescentibus), spiculis 2.3-2.7 (in illa 2-2.5) mm longis, a *A. olympica* paleis evanescentibus (in illa 1.5-1.7 mm longis), callo lemma multo breviore (in illa aequanti), seta lemmatae 2.5-3.5 (in illa 2-2.5) mm longo.
Perennial with short fibrous rhizomes. Stem to 15 cm long, erect to decumbent only at base, glabrous and...
NEW RECORD TO IRAN
Agrostis vinealis Schreb. subsp. planifolia (C. Koch) Tzvel., Novit. Syst. Pl. Vasc. (Leningrad) 8: 61 (1971) (Fig. 2).
Section Agraulus (Beauv.) Tzvel.
A. vinealis subsp. planifolia is characterized by the following characters: perennial; panicle lanceolate, rather dense, dark purplish; lemma glabrous, dorsally awned; callus hairs very short; awn 3.5-4.2 mm long, slightly geniculate, attached to lemma in lower 1/3 of its length; palea absent.
A. vinealis is related to A. canina and both are very similar in overall appearance. A. vinealis, due to having panicle relatively short, usually constituting less than 1/3 of the total stem length, lemma glabrous, dorsally awned; callus hairs of five apical teeth, absent palea is distinguished from the other species at a distance. This species is different from A. canina by having creeping underground shoots, but without prostrate aerial branches, shorter ligule of upper stem leaves and lemma with exerted geniculate awn. This species was originally described from Caucasus and it was not included for Iran. The nearest locality to the Iranian collection is Anatolia in NE of Turkey, Perennial with creeping rhizomes. Stem to 60 cm long, erect to decumbent only at base; lemma glabrous and smooth. Leaf sheaths glabrous; ligule 2.5-3.2 mm long; blades linear- acuminate, flat, 3-15 cm x 2-3 mm, scabrid at margins and on both surfaces. Panicles erect, 5-18 x 1.5-2.5 cm; branches ascending, unequal, scabrid, to 3.5 cm long, spikelets solitary; pedicels 1-4.5 mm long, somewhat scabrid. Spikelets 3-3.4 mm long, elliptic, acute, purplish. Glumes 3-3.4 mm long, lanceolate-acute, sub equal, slightly scabrid on keel. Lemma ovate, 2.2-2.4 mm long, 5 veined, glabrous, awned. Awn dorsal, slightly geniculate, arising from slightly below the middle, up to 4.2 mm long. Callus hairs very short. Palea absent.

Specimens examined. Azerbaijan: Sabalan, 2620 m, Foroughi 7153; Arasbaran protected area, between Mahmoodabad and Makiti, 2000 m, Hamzeh’ee & Asri 18611; Arasbaran protected area, Doghrun and Kalan mountains, 2300 m, Assadi & Sardabi 24135; Arasbaran protected area, Toopkhaneh, 2250 m, Hamzeh’ee & Asri 81679.

Key to the Agrostis sections in Iran
1. Lemma pilose. Callus hairs as long as lemma.
   Sect. Penthaterum (Nabel.) Tzvel.
   - Lemma pilose or glabrous. Callus hairs short or absent. Anthers 1-1.5 mm
   2. Lemma awned. Palea absent
   Sect. Agraulus (Beauv.) Tzvel.
   - Lemma usually awnless; Palea 2/3-1/2 lemma
   Sect. vilfa Adans.

Identification key to the Agrostis species in Iran
1. Callus hairs as long as lemma. Lemma awned
   A. olympica
   - Callus hairs short or absent. Lemma awned or awnless
   2. Palea absent
   3. - Palea 1/3 - 2/3 as long as lemma
   4. Lemma somewhat pilose, 1.3-2.1 mm long, awned
   A. gariana
   - Lemma glabrous, 1.7-2.4 mm long, awned or awnless
   4. Spikelets 2-2.5 mm long. Lemma 1.7-2 mm long, without awn
   A. canina
   - Spikelets 3-3.4 mm long. Lemma 2.2-2.4 mm long, with a long exserted awn
   A. vinealis
   - Plant with long stolons
   A. stolonifera
   5. Plant with rhizomes
   6. Ligules of non-flowering culms longer than broad. Panicle branches aculeolate
   A. gigantea
   - Ligules of non-flowering culms usually broader than long; Panicle branches smooth
   A. tenuis

REFERENCES
Fig. 2. *Agrostis vinealis*: a. habit, b. spikelet, c. upper glume, d. lower glume, e. lemma.

