# A taxonomic revision of Elymus sect. Caespitosae and sect. Elytrigia (Poaceae, Triticeae) in Iran 

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# A taxonomic revision of Elymus sect. Caespitosae and sect. Elytrigia (Poaceae, Triticeae) in Iran 


#### Abstract

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Elymus sect. Caespitosae and sect. Elytrigia in Iran are revised, a key to the taxa, synonymies, descriptions, quotation of selected collections, data on geographical distribution, and additional notes, where necessary, are presented. The genus is treated in a broad sense, as comprising the genera Elytrigia, Pseudoroegneria, Thinopyrum, Lophopyrum, and Trichopyrum. The combinations Elymus pertenuis, E. tauri var. kosaninii, E. elongatiformis, E. hispidus var. podperae and E. hispidus var. villosus are formed as names new to science. Elymus nodosus subsp. dorudicus and E. gentryi var. ciliatiglumis are described as subspecies and variety new to science, respectively.


## Introduction

Elymus L. is the largest genus in the grass tribe Triticeae and comprises about 180 species world-wide. The delimitation of the genus has been dealt with in widely differing ways by different authors (Nevski 1933, Runemark \& Heneen 1961, Melderis 1978, Löve 1984, Dewey 1984, Melderis 1985). In this paper, the delimitation and sectional subdivison of Elymus by Melderis (1978) have been followed, and Agropyron Gaertn. is excluded from Elymus, while the genera Elytrigia Desv., Pseudoroegneria (Nevski) Á. Löve, Thinopyrum Á. Löve, Lophopyrum Á. Löve and Trichopyrum Á. Löve are included in Elymus (see Assadi \& Runemark 1995). Bor (1970) in "Flora iranica", in contrast, included all the Iranian species that have been referred to Elytrigia, Pseudoroegneria, Thinopyrum, Lophopyrum and Trichopyrum in Agropyron. He recognized 13 species from Iran, which he all treated as members of A. sect. Holopyron Holmb.

Since Bor's (1970) treatment, some species have been subject to taxonomical and cytological investigations (Tzvelev 1976, Dewey 1978, 1980, Melderis 1985, Wang \& al. 1986, Liu \& Wang 1989, Jarvie 1992, Moustakas 1993). The present author has revised the Iranian representatives of the group in a biosystematic project including field observations, study of herbarium material (including type specimens) and plants in cultivation, mitotic and meiotic chromosome observations, crossing experiments, and hybrid fertility investigations (Assadi 1994a-b, 1995, 1996, Assadi \& Runemark 1995). Tab. 1 shows a list of the Elymus species occurring in Iran, their chromosome numbers and genomic constitutions, as far as known. As it can be seen, the genomic constitution of the species does not agree with Melderis' subdivision based on

Tab. 1. The species, their chromosome numbers and genomic constitutions, as far as known, of the species of Elymus sect. Caespitosae and sect. Elytrigia (Melderis 1978) in Iran.

| Species | 2n | Genomes | References |
| :--- | :--- | :--- | :--- |
| $\quad \quad$ E. sect. Caespitosae |  |  |  |
| E. libanoticus | 14 | S | Dewey 1972 |
| E. pertenuis | 28 | SP | Assadi 1995 |
| E. tauri var. kosaninii | 28 | not known |  |
| E. nodosus subsp. dorudicus | 28 | SJ* | Liu \& Wang 1989 |
| E. gentryi | 42 | not known |  |
| E. elongatus subsp. ponticus | 70 | JbJbjbjeje** | Moustakas 1993 |
| $\quad$ E. sect. Elytrigia |  |  |  |
| E. hispidus | 42 | SJJ | Löve 1986, Liu \& Wang 1989 |
| E. repens | 42 | SSH | Assadi \& Runemark 1995 |
| E. elongatiformis | 56 | SSHX | Assadi 1994b |

$\begin{array}{ll}\text { * } & \text { The data for the genomic constitution are based on E. nodosus subsp. caespitosus. } \\ \text { ** } & \text { See Assadi (1995). }\end{array}$
caespitose or rhizomatous habit: E. hispidus is morphologically similar to E. repens in that it produces long, creeping rhizomes, but it is genomically closer to E. nodosus and probably also to E. gentryi from E. sect. Caespitosae. On the other hand, E. libanoticus and E. pertenuis, with different genomic constitutions, are morphologically so similar that they are difficult to distinguish from each other. E. tauri var. kosaninii, with an unknown genomic constitution, is morphologically intermediate between E. pertenuis and E. nodosus subsp. dorudicus. E. repens is morphologically similar to E. elongatiformis (SSHX) but has the same constitution SSH, as is found in E. transhyrcanus (Nevski) Tzvelev of E. sect. Goulardia (Husnot) Tzvelev (Tzvelev 1976, Dewey 1972).

Disagreement between traditional subdivisions of Elymus and the genomic constitution have been reported also for other sections of the genus (Lu 1993). However, further investigations are needed before genomic constitution can be used as the basis for a subdivision of the genus.

Taxa with different genomic constitutions are treated as distinct species in the present revision. In some cases, however, delimitation of species even with different genomic constitutions is difficult.

## Material and methods

The study of herbarium specimens was based mainly on the collections at the herbarium of TARI (quoted without herbarium abbreviation under 'selected specimens seen'), furthermore the herbaria of C, LD and LE were visited. Type specimens and some other specimens from Iran and adjacent countries were received from the herbaria BM, BRA, E, K, PR, UTC and W on loan.

The morphological characters given in the descriptions were measured on herbarium specimens. Since the length of the spikelets, rachis internodes and the density of spikelets varies along the spikes, the measurements refer to the middle part of the spike. Leaf blades are flat under controlled cultivation and under favourable conditions in the field. The leaf margin of many species growing in dry habitats, or of old leaves and in herbarium specimens are partially or totally rolled inwards and are then described as convolute. Measurements of leaf width refer to flat or unrolled leaves.

## Taxonomic treatment

Elymus L., Sp. Pl.: 83. 1753.
= Elytrigia Desv. in Nouv. Bull. Soc. Philom. Paris 2: 190. 1810.
= Pseudoroegneria (Nevski) Á. Löve in Taxon 29: 168. $1980 \equiv$ Elytrigia sect. Pseudoroegneria Nevski in Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vyš̌. Rast. 2: 77. 1934.
= Thinopyrum Á. Löve in Taxon 29: 351. 1980.
= Lophopyrum Á. Löve in Taxon 29: 351. 1980.
= Trichopyrum Á. Löve in Veröff. Geobot. Inst. ETH Stiftung Rübel Zürich 87: 49. 1986.
Perennials, densely caespitose or with long, creeping rhizomes, self- or cross-pollinating. Leaf sheaths ciliate or eciliate at the margin; ligules small and membranous; leaf blades flat to convolute. Inflorescence a lax or dense spike. Spikelets in Iranian species at the nodes laterally appressed towards the rachis, with 3 or more florets; rachilla disarticulating below the glumes or florets. Glumes 2 , subequal or unequal, shorter than the florets, dorsally rounded and veined. Lemma with or without an awn. Palea as long as or somewhat shorter than the lemma, with two, often ciliate keels. Florets hermaphrodite, stamens 3, anthers yellow or purple; ovary hairy at the apex.

## Key to the species of Elymus sect. Caespitosae and sect. Elytrigia in Iran

1. Culms usually $>100 \mathrm{~cm}$ tall and 3 mm in diameter at the base; spikelets strongly compressed laterally; florets $7-9$ per spikelet; leaf blades broader than 3 mm , with c. 7 prominently ridged veins on the upper surface
2. E. elongatus subsp. ponticus

- Culms usually < 100 cm tall, not more than 2.5 mm in diameter at the base; florets 3-7 per spikelet; leaf blades if broader than 3 mm then with c . 15 veins on the upper surface . . . . 2

2. Plants not caespitose, with long, creeping rhizomes; leaf blades usually flat and broader than 3 mm 3

- Plants densely caespitose, without long, creeping rhizomes; leaf blades usually convolute and less than 3 mm broad

3. Glumes obtuse or truncate, rarely awned, sometimes $\pm$ densely hairy or ciliate; leaf sheaths always ciliate; plant dark or greyish green . . . . . . . . . . . . . . . . . . . . 7. E. hispidus

- Glumes acute, acuminate or shortly awned, never densely hairy; leaf sheaths glabrous or ciliate; plant light or yellowish green $\qquad$

4. Spike dense, greyish, usually turning violet; middle internodes $4-6 \mathrm{~mm}$ long; spikelets imbricate, 2-3 times longer than the internodes; lemma acuminate or awned; leaf sheaths never ciliate at the margin 8. E. repens

- Spike lax, green, usually turning yellow; middle internodes c. $6-8 \mathrm{~mm}$ as long as the internodes; lemma awnless; leaf sheaths sometimes ciliate at the margin

9. E. elongatiformis
10. Glumes softly coriaceous, triangular-lanceolate, lanceolate or ovate-lanceolate, with acute, acuminate or shortly mucronate tip 6

- Glumes coriaceous, oblong, with truncate, or rounded or, rarely, obtuse tip . . . . . . . . 7

6. Glumes narrowly triangular-lanceolate, gradually narrowing towards the tip, acute or acuminate, narrowly membranous at the margin, veins equal
7. E. libanoticus

- Glumes ovate-lanceolate, abruptly narrowing near the tip, often mucronate, broadly membranous at the margin, middle vein more prominent than lateral veins . . . 2. E. pertenuis

7. Glumes coriaceous, with rounded and broadly membranous tip; culms densely hairy, sometimes puberulent or hairy in the lower part . . . . . . . . . . . . . . 3. E. tauri var. kosaninii

- Glumes woody coriaceous, with truncate or emarginate or, rarely, obtuse, leathery and green tip; culms glabrous, sometimes pubescent or hairy in the lower part

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Fig. 1. Lower glumes of Elymus - a: E. libanoticus, b: E. pertenuis, c: E. tauri var. kosaninii, d: E. nodosus subsp. dorudicus, e: E. gentryi var. gentryi, f: E. gentryi var. ciliatiglumis, g: E. elongatus subsp. ponticus, h: E. hispidus var. hispidus, i: E. hispidus var. podperae, j: E. hispidus var. villosus, k: E. repens, l: E. elongatiformis.
8. Leaf blades $2(-3) \mathrm{mm}$ broad, convolute; spikes lax; spikelets not or slightly overlapping; internodes more than 10 mm long at the middle of spikes; glumes narrowly membranous at the lateral margins; lemma sometimes shortly mucronate
4. E. nodosus subsp. dorudicus

- Leaf blades 3-6 mm broad, flat or sometimes involute at the margin; spikes often broadly membranous at the lateral margins; sometimes auriculate near the tip; lemma often mucronate or awned

5. E. gentryi

Elymus sect. Caespitosae (Rouy) Melderis in Bot. J. Linn. Soc. 76: 375. 1978.
$\equiv$ Agropyron sect. Caespitosae Rouy, Fl. France 14: 315. $1913 \equiv$ Elytrigia sect. Caespitosae (Rouy) Tzvelev in Novosti Sist. Vysš. Rast. 10: 28. 1973.

Plants perennial, without long, creeping rhizomes.

1. Elymus libanoticus (Hack.) Melderis in Bot. J. Linn. Soc. 76: 377. 1978 - Fig. 1a.
$\equiv$ Agropyron libanoticum Hack. in Allg. Bot. Zeitschr. 10: 21. $1904 \equiv$ Elytrigia libanotica (Hack.) Holub in Folia Geobot. Phytotax. 12: 426. $1977 \equiv$ Pseudoroegneria tauri subsp. libanotica (Hack.) Á. Löve in Feddes Repert. 95: 445. $1984 \equiv$ Pseudoroegneria libanotica (Hack.) D. R. Dewey in Gustafson, Gene Manip. Pl. Improv.: 272. 1984. - Holotypus: Libanon, felsige Orte des westlichen Dschebel Sanin, Kreidekalk, ca. 2400 m, 6.-7. 1903, E. Hartman (W!; isotypus: C!).
= Agropyron sosnovskyi Hack. in Věstn. Tiflissk. Bot. Sada 29: 26. $1913 \equiv$ Elytrigia sosnovskyi (Hackel) Nevski in Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vysš. Rast. 2: 82. 1936 $\equiv$ Elymus sosnovskyi (Hack.) Melderis in Notes Roy. Bot. Gard. Edinburgh 42: 80. $1984 \equiv$ Pseudoroegneria sosnovskyi (Hack.) Á. Löve in Feddes Repert. 95: 445. 1984. - Syntypi: [Turkey], Prov. Kars, distr. Olty, locus Borachane, prope Olty, in collibus siccis, 29.5.1912, D. Sosnowsky 11 (BM!, W!); Turkey, prope Olty, in rupestribus, 18.6.1911, D. Sosnowsky 17 (BM!).
=Agropyron gracillimum Nevski in Komarov, Fl. SSSR 2: 638. $1934 \equiv$ Elytrigia gracillima (Nevski) Nevski in Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vysš. Rast. 2: 79. 1936 $\equiv$ Pseudoroegneria gracillima (Nevski) Á. Löve in Feddes Repert. 95: 447. 1984. - Holotypus: Caucasus, Daghestania, Mirka, 1.7.1885, Radde 422 (LE!).

Perennial, caespitose, without creeping rhizomes. Culms $45-85 \mathrm{~cm}$, glabrous, rarely finely puberulent in the lower part. Leaf sheaths glabrous, eciliate; leaf blades $1-2 \mathrm{~mm}$ broad, convolute, hairy on the upper surface, glabrous or pubescent beneath. Spikes $6-15 \mathrm{~cm}$ long; internodes $8-14 \mathrm{~mm}$ long at the middle of spike. Spikelets $10-15 \mathrm{~mm}$ long, not or slightly imbricate, with 3-6 florets. Glumes unequal, lower 6-8 mm and upper 7-9 mm long, triangular-lanceolate, acute or acuminate, narrowly membranous at the margin, glabrous, with $3-5$ or, rarely, 7 veins. Lemma $8-9.5 \mathrm{~mm}$ long, lanceolate, usually acute, glabrous. Palea as long as or sometimes a little shorter than the lemma, usually ciliate on the keels, rarely scabrous or glabrous. Anthers $4-5 \mathrm{~mm}$ long. $-2 \mathrm{n}=14$; genomic constitution: S .
Flowering in 6-7. Mountain slopes, 1500-300 m.
Selected specimens seen
Iran: Azarbayejan: 41 km to Gharachman from Mianeh, 1410 m , Assadi 70783; 27 km from Khoy to Ghotur, 1550 m , Assadi 70847; 70 km W of Khoy, 2000-2250 m, Assadi \& Olfat 68907; 20 km from Razi to Germi, 1600-2000 m, Mozaffarian \& Nowroozi 34751. - Kordestan: 47 km to Divandarreh from Saghez, 2100 m , Assadi 70852. - Tehran: Ghazvin, Alamout area, 2200-2700 m, Assadi \& Maassoumi 51049; Dizin, 2720 m, Assadi 70880; Kandavan, 29003050 m, Pabot 27382; Elburz mt., supra Farahzad, alp. Touchal, 1700 m, Bornmüller 8481 (W).

Distribution: Lebanon, Turkey, Caucasus, Iraq and Iran (Fig. 2).


Fig. 2. Distribution of Elymus libanoticus in Iran.

Note: The type of the name Agropyron sosnovskyi differs from the type of E. libanoticus in having acuminate glumes with 3 veins. The type of A. gracillimum differs from E. libanoticus in having thinner leaves. These differences fall within the variation of the Iranian material of $E$. libanoticus. Hybrids in crossing experiments between different forms were fertile, with regular meiotic metaphase. Therefore the three names are considered as synonymous.
2. Elymus pertenuis (C. A. Mey.) Assadi, comb. nova - Fig. 1b.
$\equiv$ Triticum intermedium var. pertenue C. A. Mey., Verz. Pfl. Casp. Meer.: 25. $1831 \equiv$ Agropyron pertenue (C. A. Mey.) Nevski in Komarov, Fl. SSSR 2: 640. $1934 \equiv$ Elytrigia pertenuis (C. A. Mey.) Nevski in Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vysš. Rast. 2. $1936 \equiv$ Elytrigia tauri subsp. pertenuis (C. A. Mey.) Tzvelev in Novosti Sist. Vysš. Rast. 10: 30. 1973 $\equiv$ Elymus tauri subsp. pertenuis (C. A. Mey.) Melderis in Notes Roy. Bot. Gard. Edinburgh 42: 81. $1984 \equiv$ Pseudoroegneria pertenuis (C. A. Mey.) Á. Löve in Feddes Repert. 95: 445. 1984. Holotypus: In rupestribus subalpinis prope pagum Siwers, 14.6.1830, C. A. Meyer 133 (LE!).


Fig. 3. Distribution of Elymus pertenuis in Iran.

Perennial, caespitose, without creeping rhizomes. Culms $45-80 \mathrm{~cm}$, glabrous or finely pubescent to hairy towards the base. Leaf sheaths glabrous or sometimes minutely hairy, eciliate; leaf blades $1-2 \mathrm{~mm}$ broad, convolute, hairy on the upper surface, glabrous or pubescent beneath. Spikes $5-10 \mathrm{~cm}$ long, $\pm$ dense; internodes $5-8(-9) \mathrm{mm}$ long at the middle of spike. Spikelets $10-15 \mathrm{~mm}$ long, often distinctly imbricate, with 3-6 florets. Glumes unequal, the lower $5-7 \mathrm{~mm}$ and the upper $6-8 \mathrm{~mm}$ long, lanceolate to ovate-lanceolate, abruptly narrowing to an acute or mucronate tip, broadly membranous at the margin, glabrous, with 4-6 veins, the middle vein more prominent, $\pm$ carinate towards the apex. Lemma $6-9 \mathrm{~mm}$ long, lanceolate, obtuse or acute or shortly mucronate, glabrous. Palea as long as the lemma, ciliate on the keels, rarely scabrous. Anthers $3-4 \mathrm{~mm}$ long. $-2 \mathrm{n}=28$; genomic constitution: SP.

Flowering in 6-8. Mountain slopes, 1500-2500 m.
Selected specimens seen
Iran: Azarbayejan: (Talysh?), Anburani, 24.6.1880, Radde (LE); prope Tabriz, Ejnal-Zeinal, 1850-1800 m, 15.6.1924, A. Grossheim (LE); Marand to Makou, between Koshksarai and

Erelan, 1300-1500 m, Assadi 70794. - Tehran: Arak, slopes of Kuhe Rasvand, 2100-2750 m, Mozaffarian 64028.
Distribution: Caucasus and Iran (Fig. 3).
Note: This species differs from E. tauri mainly in having lanceolate, acute to obtuse, and often shortly mucronate glumes. In E. tauri the glumes are elliptical and rounded at the tip, with a broad membranous margin.

## 3. Elymus tauri (Boiss. \& Balansa) Melderis var. kosaninii (Nábělek) Assadi, comb. \& stat. nov.

 - Fig. 1c.三Agropyron kosaninii Nábelek in Spisy Přír. Fak. Masarkovy Univ. 111: 25. 1929 ミElytrigia kosaninii (Nábělek) Holub in Folia Geobot. Phytotax. 12: 426. $1977 \equiv$ Pseudorogneria kosaninii (Nábělek) Á. Löve in Feddes Repert. 95: 445. $1984 \equiv$ Elymus kosaninii (Nábělek) Melderis in Notes Roy. Bot. Gard. Edinburgh 42: 79. 1984. - Holotypus: Kurdistan turcicae distr. Ramoran, mons Halakur-Dagh ad orientem ab urbe Seert, ca. 2400 m , Nábělek 3336 (BRA!).

Perennial, caespitose, without creeping rhizomes. Culms $55-60 \mathrm{~cm}$, hairy, sometimes pubescent or hairy only in the lower part. Leaf sheaths hairy, eciliate; leaf blades up to 2.5 mm broad, convolute, both sides hairy or pubescent only beneath. Spikes 6-10 cm long, lax; internodes $9-14 \mathrm{~mm}$ long at the middle of spike. Spikelets $10-14 \mathrm{~mm}$ long, not or slightly imbricate, with $3-5$ florets. Glumes unequal, the lower 6 mm and the upper 7 mm long, oblong, rounded at the tip and with a broad membranous margin, glabrous, with $4-5$ veins. Lemma $8-9 \mathrm{~mm}$ long, triangular-lanceolate, acute to obtuse, glabrous. Palea as long as or a little shorter than the lemma, ciliate on the keels. $-2 \mathrm{n}=28$.

Specimens seen
Iran: Fars: N side of Kuhe Dena, near Abmalakh, 2800-3600 m, Assadi \& Mozaffarian 31462. - Tehran: Arak, Kuhe Latedar, 2200-2650 m, Mozaffarian 63833; Bordsch, 50 km SSW Sultanabad, 2600 m, Køie 98 (C); Arak, Rasband, 1960 m, Mirdamadi 1709 p.p. (IRAN).

Note: The difference between this variety and var. tauri, represented in Turkey, is in its indumentum. However, the hairiness of the culm varies (from pubescent to partly hairy in the lower part or totally hairy) in different plants. The genomic constitution of E. tauri var. kosaninii is unknown.

## 4. Elymus nodosus (Nevski) Melderis subsp. dorudicus Assadi, subsp. nova - Fig. 1d.

Holotypus: [Iran], Lorestan, Doroud, Oshtoankuh, 2400-2700 m, 9.8.1991, Assadi 70752 (LD; isotypus: TARI).

Gramen perenne, caespitosum, sine rhizomatibus repentibus. Culmi $75-90 \mathrm{~cm}$ longi, plerumque partibus inferioribus puberulis, interdum omnino pilosi. Filiorum vaginae glabrae, puberulae vel pilosae, eciliatae vel raro partim ciliatae; laminae 20 cm longae et $2-3 \mathrm{~cm}$ latae, convolutae vel interdum involutae, supra pilosae, subtus vix pubescentes. Spicae (6-)9(-15) cm longae, erectae; rachides $\pm$ rectae; internodiis $10-14 \mathrm{~mm}$ longis, marginibus scabris. Spiculae 10-14 mm longae, $4-8$-florae. Glumae inaequales, inferior $6-8 \mathrm{~mm}$ et superior $8-10 \mathrm{~mm}$ longae, oblongae vel truncatae vel rotundatae, marginibus anguste membranaceis, apicibus viridibus, glabrae, $5-7$-nervatae. Lemma $7-10 \mathrm{~mm}$ longum, oblongum vel lanceolatum, obtusum, interdum breviter mucronatum, glabrum. Palea lemmati aequilonga vel paulo brevior, carinis ciliatis.

Perennial, caespitose without creeping rhizomes. Culms $75-90 \mathrm{~cm}$, usually puberulent to hairy in the lower part or sometimes totally hairy. Leaf sheaths glabrous or puberulent to hairy, eciliate or, rarely, sparsely cilate; leaf blades up to 20 cm long and $2-3 \mathrm{~mm}$ broad, convolute or sometimes involute at the margin or, rarely, flat, hairy on the upper surface, glabrate to pubescent beneath. Spikes (6-)9(-15) cm long, erect; rachis $\pm$ straight; internodes $10-14 \mathrm{~mm}$ long,


Fig. 4. Distribution of Elymus tauri var. kosaninii (circle) and E. nodosus subsp. dorudicus (square) in Iran.
longer in the lower part of the spike and shorter in the upper part, scabrous along the edges. Spikelets $10-14 \mathrm{~mm}$ long, not or slightly imbricate, with $4-8$ florets. Glumes unequal, the lower 6-8 mm and the upper $8-10 \mathrm{~mm}$ long, oblong, truncate or rounded, narrowly membranous at the margin, green at the tip, glabrous, with $5-7$ veins. Lemma $7-10 \mathrm{~mm}$ long, oblong or lanceolate, obtuse, sometimes shortly mucronate, glabrous. Palea as long as or a little shorter than the lemma, ciliate on the keels. $-2 n=28$; genomic constitution: SJ in subsp. caespitosus.

Flowering in 6-7. Mountain slopes, 2000-2900 m.
Additional specimens seen
Lorestan: Between Nzna and Doroud, Darband, mountains above the village Bidestaneh, 2000 m , Assadi 70735; mountains S of Doaoud on the road to Lake Gahar, 2000 m , Assadi 70744; 55 km on the road from Aligoodarz to Shulabad, the pass N. od Ghalikuh, 2900 m , Runemark \& Lazari 26295. - Bakhtiari: Shahrekord, Noghan, Kuhe Kase-Kase, 2350-2950 m, Mozaffarian 54870.

Distribution: W Iran (Fig. 4).

Note: The new subspecies differs from subsp. caespitosus (C. Koch) Melderis in having a much more robust habit, a height of up to 90 cm , eciliate leaf sheaths, and longer glumes up to 6-10 mm . In subsp. caespitosus the culms are c. 50 cm high, the leaf sheaths ciliate and the glumes $4.5-7 \mathrm{~mm}$ long. The new subspecies resembles E. gentryi (Melderis) Melderis, but differs in the characters mentioned in the key, in the ploidy level, and the habit (E. gentryi forms larger tufts, in natural habitats). Subsp. nodosus is restricted to the Crimea and differs from the new subspecies in particular in having shorter glumes, a narrower leaf lamina, and a different indumentum.

Jarvie (1992) recorded also subsp. sinuatus (Nevski) Melderis from N Iran under the name Elytrigia caespitosa subsp. sinuata (Nevski) Tzvelev. This taxon was described from the Caucasus, and Bor (1970) mentioned it as to be likely found also in the 'Flora iranica' area. However, Jarvie (1992) reports no specimen and it is quite doubtful if it has ever been recorded from Iran correctly.
5. Elymus gentryi (Melderis) Melderis in Notes Roy. Bot. Gard. Edinburgh 42: 82. 1984. $\equiv$ Agropyron gentryi Melderis in Rechinger, Fl. Iranica 70: 165. $1970 \equiv$ Elytrigia gentryi (Melderis) Tzvelev in Novosti Sist. Vysš. Rast. 10: 30. $1973 \equiv$ Elytrigia intermedia subsp. gentryi (Melderis) Á. Löve in Feddes Repert. 95: 487. $1984 \equiv$ Thinopyrum gentryi (Melderis) D.R. Dewey in Gustafson, Gene Manip. Pl. Improv.: 275. $1984 \equiv$ Trichopyrum gentryi (Melderis) Á. Löve in Veröff. Geobot. Inst. ETH. Stiftung Rübel Zürich 87: 49. 1986. - Holotypus: Iran, Kuhrang, Chaharmahal, 8500 ft., 28.8.1955, H. S. Gentry 15616 grown in 7.1967 at USDA Plant Protection Station Pullman, Washington, USA (K!).

Perennial, caespitose, without creeping rhizomes. Culms $55-90 \mathrm{~cm}$, glabrous or rarely finely hairy in the lower part. Leaf sheaths glabrous or rarely puberulent, eciliate; leaf bladed 2.5-5.5 mm broad, flat or, rarely, involute at the margin, hairy on the upper surface, glabrous or puberulent beneath. Spikes $5-14 \mathrm{~cm}$ long; internodes $10-14 \mathrm{~mm}$ long at the middle of spike. Spikelets $10-16 \mathrm{~mm}$ long, often distinctly imbricate, with $4-8$ florets. Glumes unequal, the lower $5-8$ and the upper $6-9 \mathrm{~mm}$ long, oblong, truncate or rounded or rarely obtuse or emarginate, often shortly mucronate, broadly membranous at the margin, green at the tip, glabrous or, rarely, ciliate, with 5-7 veins. Lemma (5-)7-9 mm long, oblong or lanceolate, obtuse to truncate and often mucronate or with an awn c. $1-2 \mathrm{~mm}$ long, glabrous or rarely ciliate at the margin. Palea as long as the lemma, ciliate on the keels. Anthers c. 4 mm long. $-2 \mathrm{n}=42$.
Flowering in 6-7. Mountain slopes, 2500-3000 m.

## Key to the varieties of Elymus gentryi in Iran

1. Glumes and lemma glabrous . . . . . . . . . . . . . . . . . . . . . . . . . . . . var. gentryi

- Glumes and lemma ciliate . . . . . . . . . . . . . . . . . . . . . . . . . . . var. ciliatiglumis


### 5.1. E. gentryi var. gentryi - Fig. 1e.

Selected specimens seen
Iran: Lorestan: 20 km to Aligoodarz from Khomein, 2560 m , Assadi 70727 \& 70728. Esfahan: Semirom, Kuhe Aiineh-Ghari, 300 m , Mozaffarian 62173. - Конgilouyeh-Boirahmad: Dilegoon, Kuhe Sawerz, 2200-3200 m, Assadi \& Abouhamzeh 46426. - Baкнtiari: Boroujen, Boldaji, Kuhe Chiro, 2200-2600 m, Mozaffarian 57321; Barrage de Kuhrang, 2500 m, Pabot 2162.
Distribution: Turkey(?) and W Iran (Fig. 5).
Note: Elymus gentryi was recorded by Melderis (1985) from Turkey, Hakkari province. This record was based on the collection Davis 45553, which was not possible to trace in the Edinburgh herbarium (E).


Fig. 5. Distribution of Elymus gentryi var. gentryi (circle), E. gentryi var. ciliatiglumis (square) and E. elongatus subsp. ponticus (triangle; empty triangle cultivated or naturalized) in Iran.
5.2. E. gentryi var. ciliatiglumis Assadi, var. nova - Fig. 1f.

Holotypus: Iran, Kohgilouyeh-Boirahmad, Kuhe Dena, S side of Gardane Bijan, 2700 m, 16.7.1983, Assadi \& Abouhamzeh 46190 (TARI).

Differt ab varietate typica glumis et lemmatibus ciliatis.
Additional specimen seen
Iran: Bakhtiari: Brojen to Dorahan, after Godare Kabk, Kuhe Dodelou, 2300-2700 m, Mozaffarian 57237.

Distribution: W Iran (Fig. 5).
6. Elymus elongatus (Host) Runemark subsp. ponticus (Podp.) Melderis in Bot. J. Linn. Soc. 76: 377. 1978. - Fig. 1g.
$\equiv$ Triticum ponticum Podp. in Verh. Zool.-Bot. Ges. Wien 52: 681. 1902 三 Elytrigia pontica
(Podp.) Holub in Folia Geobot. Phytotax. 8: 171. $1973 \equiv$ Thinopyrum ponticum (Podp.) Barkworth \& D.R. Dewey in Great Basin Naturalist 43: 570. $1983 \equiv$ Lophopyrum ponticum (Podp.) Á. Löve in Feddes Repert. 95: 487. 1984. - Typus: Bulgaria, auf dürren steinigen Hügeln gegen Gerdem bei Kavaklij, Podpěra (BRNM?).
Perennial, caespitose, without creeping rhizomes. Culms $70-150 \mathrm{~cm}$ (in cultivation up to 300 $\mathrm{cm}!$ ), glabrous or rarely puberulent below the nodes. Leaf sheaths glabrous, often ciliate at the margin; leaf blades up to 8 mm broad, convolute, with stiff hairs on the upper surface and sometimes beneath. Spikes $10-40 \mathrm{~cm}$ long; internodes $10-20 \mathrm{~mm}$ long. Spikelets $14-20 \mathrm{~mm}$ long, not or slightly imbricate, with 5-10 florets. Glumes subequal, 7-9 mm long, oblong, truncate or truncate-emarginate, very narrowly membranous at the margin, glabrous, with 5-8 veins. Lemma (7-)8-9.5 mm long, oblong, truncate or truncate-emarginate, rarely obtuse, glabrous. Palea as long as or a little shorter than the lemma, ciliate on the keels. Anthers c. 5 mm long. $-2 n=70$, genomic constitution: jbjbjbjeje.
Flowering in 7-9. In saline places, $0-1000 \mathrm{~m}$; in cultivation up to 2600 m .

## Selected specimens seen

Iran: Azarbayejan: Parsabadm, sea level, Assadi \& Akhani 61621; 17.6 km E of Makou, 1020 m , Pabot 5377. - Hamadan: 18 km to Razan, from Hamadan, cultivated, 1800 m , Assadi 70778. - Tehran: Dizin, probably naturalized, 2620 m , Assadi 70875b; Karaj Valley, 5 km N of Karaj, 1350 m , Runemark \& al. 21702.
Distribution: S and SE Europe, Turkey, Caucasus and Iran (Fig. 5).
Note: Jarvie (1992) mentioned E. elongatus subsp. turcicus (McGuire) Melderis under the name Elytrigia pontica subsp. turcica (McGuire) Jarvie \& Barkworth as to occur in N Iran. He recognized this taxon as an octoploid and subsp. pontica as a decaploid. However, Iranian material even from the area mentioned by Jarvie (1992) matches morphologically and cytologically clearly subsp. ponticus (Assadi 1995).

The report of Elymus elongatus subsp. elongatus from Iran (Jarvie 1992) is not verified by a herbarium specimen and seems doubtful. This taxon is found mainly around the Mediterranean Sea and differs from subsp. ponticus, apart from the ploidy level (diploid or tetraploid), in its eciliate leaf sheath, shorter culm and in spike characters.

Elymus sect. Elytrigia (Desv.) Melderis in Bot. J. Linn. Soc. 76: 377. 1978.
$\equiv$ Elytrigia Desv. in Nouv. Bull. Sci. Soc. Philom. Paris 2: 191. $1810 \equiv$ Agropyron sect. Elytrigia (Desv.) Dumort., Fl. Belg.: 95. 1823.
= Agropyron sect. Holopyron Holmb., Scand. Fl. 2: 273. 1926.
Plants not caespitose, with long, creeping rhizomes.
7. Elymus hispidus (Opiz) Melderis in Bot. J. Linn. Soc. 76: 380. 1978.
= Agropyron hispidum Opiz in Berchtold \& Opiz, Oekon.-Techn. Fl. Böhm. 1: 413. 1836. Holotypus: [Česka Republiká], Prag, Opiz 413 (PR!).
Perennial, with long, creeping rhizomes, sometimes glaucous. Culms (30-)70(-120) cm, glabrous or, rarely, hairy, sometimes hairy only on the nodes. Leaf sheath ciliate, rarely densely hairy; leaf blades ( $3-) 5(-10) \mathrm{mm}$ broad, usually flat, hairy on the upper surface, less densely hairy or glabrous beneath. Spikes (5-)10-15(-23) cm long; internodes c. 10 mm long at the middle of spike, shortly ciliate at the margin. Spikelets $7-20 \mathrm{~cm}$ long, not or slightly imbricate, with 3-8 florets. Glumes unequal, lower 5-9, upper 6-10 mm long, oblong or lanceolate, obtuse, rounded or truncate, usually shortly mucronate, membranous at the margin, glabrous, ciliate or hairy, with 5-7 veins; veins sometimes scabrid towards the apex. Lemma $7-13 \mathrm{~mm}$ long, usually


Fig. 6. Distribution of Elymus hispidus var. hispidus in Iran.
lanceolate, obtuse or rounded, rarely with an awn of up to 8 mm long at the tip. Palea as long as the lemma, ciliate on the keels. Anthers $5-7 \mathrm{~mm}$ long. $-2 \mathrm{n}=42$; genomic constitution: SJJ.

Flowering in 6-7. Mountain slopes, field margins and wet places, c. 1200-2700 m.
Note: Elymus hispidus is a polymorphic species which shows great variation in size and vigour, colour (green or glabrous), occurrence and distribution of indumentum on glumes and lemma as well as presence or absence of an awn at the tip of the glumes and lemma. The different character states show little correlation. E. hispidus has usually been split into 3 to 5 species or subspecies, based on indumentum differences and presence or absence of an awn. The author grew different morphological variants from wild-collected seeds in glasshouses and in the open. Even if the majority of the cultivated plants resembled the maternal parent, there was often segregation of other morphological variants. Crossing experiments showed that hybrids between different morphological variants were fertile and normally had a regular meiotic metaphase I (Assadi 1996). Even if different variants grow together in the field under favourable conditions, they show different habitat preferences and are therefore treated as varieties: var. hispidus is


Fig. 7. Distribution of Elymus hispidus var. podperae in Iran.
mainly found in mesic habitats, var. villosus in dry slopes and var. podperae in field margins and wet places.

Key to the varieties of Elymus hispidus in Iran

1. Glumes and lemma glabrous . . . . . . . . . . . . . . . . . . . . . . . . . . . var. hispidus

- Glumes and lemma ciliate or totally hairy . . . . . . . . . . . . . . . . . . . . . . . . . . . 2

2. Glumes and lemma ciliate . . . . . . . . . . . . . . . . . . . . . . . . . . . . . var. podperae

- Glumes and lemma hairy . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . var. villosus


### 7.1. E. hispidus var. hispidus - Fig. 1h.

= Triticum intermedium Host, Icon. Descr. Gram. Austriac. 3: 23, t. 22. 1805 [non Elymus intermedius M. Bieb., Fl. Taur. Cauc. 1: 82. 1808] $\equiv$ Agropyron intermedium (Host) P. Beauv., Ess. Agrostogr.: 102, 146. $1812 \equiv$ Elytrigia intermedia (Host) Nevski in Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vysš. Rast. 1: 14. $1933 \equiv$ Thinopyrum intermedium (Host) Bark-
worth \& D.R. Dewey in Gustafson, Gene Manip. Pl. Improv.: 275. $1984 \equiv$ Trichopyrum intermedium (Host) Á. Löve in Veröff. Geobot. ETH Stiftung Rübel Zürich 87: 49. 1986. - Holotypus: Istria, Dalmatia, in insulis maris Adriatici, Host (W).
Selected specimens seen
Iran: Mazandaran: Polsefid, Sangdeh, 1400 m , Domanchik 31325. - Azarbayejan: Haris, Akuzdaghi, 2350 m , Olfat \& Fathi 416; Arasbaran protected area, Doghroon mt., 2300 m , Runemark \& Assadi 21863. - Kordestan: Bijar area, margin of Telvar river, c. 1800 m , Assadi 61009. - Hamadan: Kuhe Alvand near Ganjnameh, 2250 m, Assadi 70776. - Lorestan: 24 km to Aligoodarz on the road from Khomein, 2290 m , Assadi 70723. - Bakhtiari: Boroujen, Boldaji, Kuhe Chiro, 2200-2600 m, Mozaffarian 57322. - Khorasan: C. 25 km SW of Darreh-Gaz, Tandooreh National Park, Chehelmehr, 1200 m , Assadi \& Maassoumi 56744. Tehran: Between Polour and Gazanak, 2150 m , Assadi 70884.

Distribution: S and Central Europe, Russia, Turkey, Caucasus, Iraq, Iran (Fig. 6), Pakistan and Central Asia.
7.2. E. hispidus var. podperae (Nábělek) Assadi, comb. \& stat. nov. - Fig. 1i.
$\equiv$ Agropyron podperae Nábělek in Spisy Přír. Fak. Masarykovy Univ. 111:24. 1929 三Elytrigia podperae (Nábělek) Holub in Folia Geobot. Phytotax. 12: 426. 1977 三 Elytrigia intermedia subsp. podperae (Nábělek) Á. Löve in Feddes Repert. 95: 487. $1984 \equiv$ Thinopyrum podperae (Nábělek) D.R. Dewey in Gustafson, Gene Manip. Pl. Improv.: 275. $1984 \equiv$ Elymus hispidus subsp. podperae (Nábělek) Melderis in Roy. Bot. Gard. Edinburgh 42: 78. $1984 \equiv$ Trichopyrum intermedium subsp. podperae (Nábělek) Á. Löve in Veröff. Geobot. ETH Stiftung Rübel Zürich 87: 49. 1986. - Holotypus: Kurdistan Turc. ad distr. Berwari, mons Mirgamira ad orient ab urbe Seert, 1500 m, 24. 7. 1910, Nábělek 3313 (BRA!).
= Agropyron ciliatiflorum Roshev. in Køie, Beitr. Fl. SW Iran 1: 52. 1945. - Holotypus: [Iran], Kharon [50 km E of Khoramabad], 1800 m, 1.6.1937, Køie 737 (C!).
= Agropyron afghanicum Melderis in Bor, Grass. Burma, Ceylon, India Pakistan: 689. $1960 \equiv$ Elytrigia afghanica (Melderis) Holub in Folia Geobot. Phytotax. 12: 426. 1977. - Typus: [Iran], Khorasan, common at altitudes above 500 ft ., Aitchison 1145 (BM!, C!).
= Agropyron podperae var. velutinum Melderis in Taxon 16: 467. 1967. - Holotypus: Iraq, Distr. Mosul (Kordistan), ad confines Turciae prov. Hackari, in ditione pagi Sharanish, in montibus a Zakho septentrionem versus, in saosis (Tonschiefer) montis Zawita, c. 1600 m , 4.-9.7.1957, Rechinger 10915 (W!).

Selected specimens seen
Iran: Gorgan: Parke Golestan, 1750 m , Wendelbo \& Forounghi 12615. - Mazandaran: 37 km W of Baladeh, on the road to Kandavan, 2600 m , Assadi 70888. - Azarbayejan: 40 km from Razi to Germi, 1700 m , Mozaffarian \& Nowrouzi 34768. - Kordestan: Sanandaj, mt. above the village Narran, 2200-2600 m, Assadi 60447. - Lorestan: Azna, village DarrehTakht, 1860 m, Assadi 70732. - Esfahan: N of Kuhe Dena, near Noghol, 2500 m, Assadi \& Abouhamzeh 46059. - Fars: Kuhi Dena, Sichani to Sisakht, Behboudi 919 p. p. (IRAN). Khorasan: mountains NW of Neyshabour, above Mirabad, 1600-1900 m, Assadi \& Mozaffarian 36031. - Tehran: Boroujerd to Arak, Zalian pass, 2300 m , Assadi 70763.

Distribution: Turkey, Iraq, and Iran (Fig. 7).
Note: The leaf sheaths are mostly glabrous, but rarely hairy. The type specimens of E. hispidus var. podperae and Agropyron podperae var. velutinum were examined. They both have hairy leaf sheaths, and these names are therefore treated as being synonymous.
The type specimen of $A$. afghanicum was examined. It differs from the type specimen of $E$. hispidus var. podperae in having shorter marginal hairs, c. 0.2 mm long on the glumes and


Fig. 8. Distribution of Elymus hispidus var. villosus in Iran.
lemma. Marginal hairs of the glumes and lemma in the type specimen of E. hispidus var. podperae are c. 0.4 mm long. However, the length of these hairs varies continuously from c. 0.2 to 0.4 mm in different plants, and is therefore of no taxonomic value.

### 7.3. E. hispidus var. villosus (Hack.) Assadi, comb. nova - Fig. 1j.

$\equiv$ Triticum intermedium var. villosum Hack. in Halácsy \& Braun, Nachtr. Fl. Nieder-Oesterr.: 43. 1882. - Typus: [Austria], St. Pölten in N. Oest., 7.7.1879, Hackel, Dr. Baenitz, Herbarium Europaeum (LD!).
$=$ Triticum trichophorum Link in Linnaea 17: 395. 1843 = Agropyron trichophorum (Link) K. Richt., Pl. Eur. 1: 124. 1890 = Agropyron intermedium subsp. trichophorum (Link) Asch. \& Graebn., Syn. Fl. Mitteleur. 2: 658. 1901 = Elytrigia trichophora (Link) Nevski in Trudy Sredne-Asiatsk. Gosud. Univ., Ser. 8b, Bot. 17: 61. 1934 = Elytrigia intermedia subsp. trichophora (Link) Á. \& D. Löve in Bot. Not. 114: 50. 1961. - Described from the salines "prope Tergestum".
=Agropyron aucheri Boiss., Diagn. Pl. Orient., ser. 1, 5: 75. 1844. - Typus: [Iran], prope

Schiras Perezend [= Pirezan], Aucher-Eloy 5424 (W!).
= Agropyron barbulatum Schur in Verh. Mitth. Siebenbürg. Vereins Naturwiss. Hermannstadt 4: 91. $1853 \equiv$ Elymus hispidus subsp. barbulatus (Schur) Melderis in Bot. J. Linn. Soc. 76: 381. $1978 \equiv$ Elytrigia intermedia subsp. barbulata (Schur) Á. Löve in Taxon 29: 350. 1980. - Typus: [Romania], Transylvania (W).
$=$ Agropyron pulcherrimum Grossh. in Věstn. Tiflissk. Bot. Sada 13/14: 42. 1919 ㅌ Elytrigia pulcherrima (Grossh.) Nevski in Trudy Sredne-Asiatsk. Gosud. Univ., Ser. 8b, Bot. 17: 61. $1934 \equiv$ Elytrigia intermedia subsp. pulcherrima (Grossh.) Tzvelev in Novosti Sist. Vysš. Rast. 10: 31. $1973 \equiv$ Trichopyrum intermedium subsp. pulcherrimum (Grossh.) Á. Löve in Veröff. Geobot. Inst. ETH Stiftung Rübel Zürich 87: 49. 1986. - Typus: [Turkey], prov. Kars, distr. Ardachan, prope Guljabert, in locus stepposus, 14.7.1925, Grossheim (LE!).

Selected specimens seen
Iran: Mazandaran: 37 km W of Baladeh, 2600 m , Assadi 70890; Elburz mts., Firouzkuh area, 6500 ft . Furse \& Singe 476 (IRAN); ibid., Gaduk, Behboudi \& Aellen 8027 (IRAN); Kamarband, 2400-2600 m, Rechinger 6433. - Azarbayejan: Tabriz to Marand, 1500 m , Assadi \& Mozaffarian 29791. - Kordestan: 47 km W of Bijar towars Divandarreh, 2000 m , Rechinger 42660, p. p. (W). - Hamadan: c. 8 km E of Ganjnameh, 2750 m , Assadi \& Mozaffarian 36882. - Bakhtaran: 14 km N of Kerend, 1800-2000 m, Assadi 60893. - Lorestan: Doroud, Oshtorankuh, 2400-2700 m, Assadi 70747. - Kohgilouyeh-Boirahmad: near Dilegoon, 2300 m , Assadi \& Abouhamzeh 46371. - Tehran: Gachsar, 2270 m , Assadi 70862.

Distribution: S and Central Europe, Russia, Turkey, Caucasus, Iraq, Iran (Fig. 8), Afghanistan, Pakistan and Central Asia.
8. Elymus repens (L.) Gould in Madrono 9: 127. 1947. - Fig. 1k.
$\equiv$ Triticum repens L., Sp. Pl.: 86. $1753 \equiv$ Agropyron repens (L.) P. Beauv., Ess. Agrostogr.: 102. $1812 \equiv$ Elytrigia repens (L.) Nevski in Trudy Bot. Inst. Akad. Nauk SSSR, Ser. 1, Fl. Sist. Vysš. Rast. 1: 18. 1933. - Lectotypus: Herb. Linnaeus No. 104/7 (LINN).

Perennial, with long, creeping rhizomes. Culms $50-110 \mathrm{~cm}$, glabrous. Leaf sheaths glabrous, eciliate; leaf blades 3-9 mm broad, flat, rarely involute at the margin, glabrous or, rarely, sparsely hairy on the upper surface. Spikes $7-15 \mathrm{~cm}$ long, dense; internodes $4-6 \mathrm{~mm}$ long in the middle of spike, spinulose-ciliate on the edges, rarely totally hairy. Spikelets $11-14 \mathrm{~mm}$ long, imbricate, overlapping for more than half their length, with 4-6 florets. Glumes subequal, including awn 7-10 mm long, lanceolate or, rarely, lanceolate-ovate, acuminate, mucronate or awned at the apex, narrowly membranous at the margin, glabrous, with 3-7 veins, oblique; awn up to 3 mm long. Lemma, including awn, $7.5-13 \mathrm{~mm}$ long, lanceolate, acute, mucronate or shortly awned, glabrous. Palea as long as or a little shorter than the lemma, ciliate all along the keels. Anthers $4-4.5 \mathrm{~mm}$ long. $-2 \mathrm{n}=42$; genomic constitution: SSH.

Flowering in 5-8. In field margins, wet places around lakes and along rivers, $100-2600 \mathrm{~m}$.
Selected specimens seen
Iran: Mazandaran: 37 km W of Baladeh, 2600 m , Assadi 70892; Elborz, Gadouk, Chashm to Nizva, Behboudi \& Aellen 9036 (IRAN). - Gilan: Astara, Heyran pass, Mirkamali 10025. Azarbyejan: Bandare Sharafkhaneh, 1320 m , Assadi \& al. 68458; Khoy, Toreh, 2600 m , Akbarzadeh 23; near Bazargan, c. 1500 m, Assadi 70824 \& 70814. - Tehran: Firouzkuh, Lazour, Karis, 2500 m, Mozaffarian 54174; Dizin, 2620 m, Assadi 70877.

Distribution: Europe, Russia, Turkey, Caucasus, Iraq, Iran (Fig. 9), Afghanistan, Pakistan, and Central Asia; furthermore introducted to many temperate areas of the world.


Fig. 9. Distribution of Elymus repens in Iran.
9. Elymus elongatiformis (Drobow) Assadi, comb. nova - Fig. 11.

三 Agropyron elongatiforme Drobow in Vvedenskij \& al., Opredelitel' Rast. Taškenta 1: 42. 1923 [\& Feddes Repert. 21: 44. 1925] $\equiv$ Elytrigia elongatiformis (Drobow) Nevski in Trudy Sredne-Asiatsk. Gosud. Univ., Ser. 8b, Bot. 17: 61. $1934 \equiv$ Elytrigia repens subsp. elongatiformis (Drobow) Tzvelev in Novosti Sist. Vyš̌. Rast. 10: 31. $1973 \equiv$ Elymus repens subsp. elongatiformis (Drobow) Melderis in Bot. J. Linn. Soc. 76: 379. 1978. - Holotypus: Distr. Taschent circa urb. Taschent, Drobov 1919 (LE [few spikelets]!).

Perennial, with long, creeping rhizomes. Culms $60-110 \mathrm{~cm}$, glabrous. Leaf sheaths glabrous, sometimes ciliate; leaf blades $4-11 \mathrm{~mm}$ broad, glabrous or scabrous, rarely sparsely hairy on the upper surface. Spikes (4-)10-15(-17) cm long; internodes $6-10 \mathrm{~mm}$ long in the middle of spike, spinulose-ciliate on the angles. Spikelets $10-16 \mathrm{~mm}$ long, overlapping up to half their length, with 3-8 florets. Glumes subequal, 5-8 mm long, lanceolate, acute or mucronate at the apex, narrowly membranous at the margin, with 5-7 veins, glabrous or the middle vein scabrous toward the apex, oblique. Lemma $6.5-8 \mathrm{~mm}$ long, lanceolate, obtuse or rounded or truncate-


Fig. 10. Distribution of Elymus elongatiformis in Iran.
emarginate or sometimes shortly mucronate, glabrous. Palea as long as or a little shorter than the lemma, scabrous or $\pm$ ciliate along the upper half of the keels. Anthers $4-4.5 \mathrm{~mm}$ long. -2 n $=56$; genomic constitution: SSHX.

Flowering in 6-8. In fields and in wet places, 100-2600 m.
Selected specimens seen
Iran: Gorgan: Golestan forest, Almeh, 1650 m , Foroughi 7107. - Mazandaran: 37 km W of Baladeh, 2600 m, Assadi 70889. - Azarbayejan: Near Bazargan, c. 1500 m , Assadi 70823; c. 10 km S of Shabastar, 1450 m , Assadi \& Akhani 61487. - Kordestan: Beginning of the road Divandarreh to Bijar, Assadi 70854. - Hamadan: 17 km to Tuyserkan, from Malayer, 1930-2050 m, Assadi 70766. - Lorestan: Azna, village Darreh-Takht; 1860 m, Assadi 70733. - Khorasan: Zoshk, mountains N of Binaloud, 1600-1900 m, Saghafi \& Beizai 39. Tehran: Gatschar, Azadbar, 2520 m, Assadi 70867; Abali, 220 m, Dewey 23189 (UTC); Karaj, Azadbar, Gauba 1714 (IRAN); Karaj, Mardabad, Gauba 1720 (IRAN).

Distribution: SE Russia, Ukraine, Turkey, Caucasus, Iraq, Iran (Fig. 10), Afghanistan and Central Asia.

## Doubtful record from Iran

Agropyron cognatum Hack.
A. cognatum was recorded from the Doroud area, Iran, by Bor (1970). Tzvelev (1976) identified this species with the Central Asiatic Elytrigia geniculata subsp. ferganensis (Drobow) Tzvelev but he excluded Iran from the distribution area of this taxon. The specimen cited by Bor (1970) was not traceable but, at its collection locality, an Elymus species was found which morphologically approaches the description of Bor's Agropyron cognatum. However, the new collections are not assignable to A. cognatum. They proved to represent a new taxon described as Elymus transhyrcanus subsp. lorestanicus Assadi, belonging to E. sect. Goulardia (Husnot) Tzvelev (Assadi 1994a).

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