

A TAXONOMIC REVISION OF THE GENUS *EREMOPOA* ROSCHV. (POACEAE, POEAE) IN IRAN

S. Rahmanian, H. Saeidi, M. Assadi & M.R. Rahiminejad

Received 2013. 10. 4. Accepted for publication 2014. 05.06

Rahmanian, S., Saeidi, H. Assadi, M., Rahiminejad, M.R. 2014. 06. 31: A taxonomic revision of the genus *Eremopoa* Roschv. (Poaceae, Poeae) in Iran.- *Iran. J. Bot.* 20 (1): 08-15. Tehran.

Based on a taxonomic review of the Iranian materials of the genus *Eremopoa* and the relevant literatures, four species and three varieties were recognized for the genus in Iran. A variety (*E. persica* var. *oxyglumis* as a new combination) is added to the flora of Iran.

Sorour Rahmanian, Hojatollah Saeidi, Mohamad Reza Rahiminejad (correspondance <mrr@sci.ui.ac.ir>) Department of Biology, University of Isfahan, Isfahan 81746-73441, Iran.- Mostafa Assadi, Research Institute of Forests and Rangelands, PO Box 13185-116, Tehran, Iran.

Key words: *Eremopoa*; Poaceae; taxonomic review; new combination; Iran

***Eremopoa* Roschv. (Poaceae, Poeae)**

بر مبنای بازبینی تاکسونومیک، جنس *Eremopoa* و منابع مربوط به این جنس با دارابودن چهار گونه و سه واریته در ایران به رسمیت شناخته می‌شود. که یک واریته (*E. persica* var. *oxyglumis*) به عنوان ترکیب جدید به فلور ایران اضافه می‌شود.

INTRODUCTION

In his account of a complex of closely related genera, Rozhevits (1934) described his new genus "*Eremopoa*" introducing *Poa persica* (Trin.) Roshev. as the type of the genus; which differed from the genus *Poa* L. based on the diagnostic characters of glumes of sterile florets, lemma apex and the duration of plants. In his taxonomic treatment for the Flora of USSR, he (Rozhevits 1934) included 6 species in this new taxon, all new combinations of the genera: (*Poa*, *Aira* L., *Glyceria* Nutt., & *Festuca* L.). Later on and based on the Køie's collection from Iran, Rozhevits (1945) added *E. nephelocloides* Roshev. to his list. Bor (1968, 1970) accepted *E. persica* (Trin.) Roshev. with two varieties: var. *persica* and var. *songarica* (Shrenk) Bor and *E. bellula* (Regel) Roshev. for the Flora of Iraq and *Flora Iranica* area. Scholz (1981) published *E. medica* as a new species from Iran.

As the literature shows there is lack of sufficient diagnostic morphological characters to explain the

infra-generic and specific taxa belonging to this taxon, therefore this study aims to review the taxonomic status of *Eremopoa* in Iran.

MATERIALS STUDIED

Based on Bor (1970) a total of 95 accessions belonging to 4 *Eremopoa* species were taxonomically examined. Voucher specimens are preserved in the herbarium of the Research Institute of Forests and Rangelands (TARI), Central Herbarium of Tehran University, Faculty of Science (TUH) and the Herbarium of the University of Isfahan (HUI). Totally, 26 morphological qualitative and 7 quantitative characters were evaluated among 630 plants from 63 accessions.

RESULTS AND DISCUSSION

In comparison with the relevant literature and our observations, this study shows that the most effective diagnostic characters among the Iranian *Eremopoa* taxa are: the number of spikelets, florets, the width of leaf

blade, sterility of the lowest 1-2 whorls of panicle, the number of branches per panicle's whorl, the habit of plant and kind of lemma apex shows the observed variability of each character examined.

In the latest account of the genus, Bor (1970) accepted two *Eremopoa* species and two varieties occurring in Iran. Regarding to the materials examined in this study and the relevant literature four *Eremopoa* species including three varieties are recognized to be present in Iran. A combined key to the *Eremopoa* species, their varieties and descriptions, relevant illustrations and geographic distributions are provided below.

1. Lowest 1-2 whorls of panicle always sterile
 - E. nephelochloides*
 - All whorls of panicle fertile 2
2. Lemma with emarginated apex; plant robust
 - E. medica*
 - Lemma with pointed apex; plant slender 3
3. Plants densely tufted from the base up to the end of panicle
 - E. bellula*
 - Plants loosely branched from the base up to the end of panicle (*E. persica*) 4
4. Spikelets bearing 1-3 florets, leaves less than 2 mm broad
 - var. *songarica*
 - Spikelets bearing more than 3 florets, leaves more than 2 mm broad 5
- 5- Leaves at the apex long acuminate var. *oxyglumis*
- Leaves at the apex acute var. *persica*

Eremopoa persica (Trin.) Roshev., Flora of URSS, 2: 430 (1934).

Plant annual, often slender, delicate and ± tufted. Leaf blade flat. Inflorescence a diffuse, often large panicle with branches in whorls; branches bare in lower part, ± branched above and bearing pedicellate spikelets. Spikelets elliptic, (1-) 2- many-florets, laterally compressed or terete; rachilla geniculate, scabrid-puberulent, disarticulating above glumes and below florets. Glumes unequal; the lower 1-veined; the upper 3-veined. Lemmas narrowly lanceolate, indistinctly 5-veined, keeled, hyaline at the pointed or obliquely truncate apex, with a hairy keel (sometimes glabrous). Palea 2-keeled, subequal to lemma. Lodicules 2. Stamens 3. Stigmas plumose. Caryopsis lanceolate, trigonous, adherent to the palea, embryo rather small, hilum punctiform.

Plants with longer anthers (1.5-2.5 mm), ± glabrous lemmas and more florets in each spikelet are sometimes regarded as subsp. *multiradiata* (Trautv.) Tzvelev, but the distinction between the latter and *E. persica* is not at all clear. We believe the putative Iranian materials of *E. multiradiata* belong fairly to *E. persica* and only worthy of varietal rank as var. *songarica*.

Eremopoa persica (Trin.) Roshev. var. *persica*, Fig. 1. Syn.: *Poa persica* Trin., Mém. Aad. Scienc. Petersbg. ser. 6, 1: 373 (1831); *Festuca persica* (Trin.) C. Koch, Linnaea 21: 410 (1848); *Nephelochloa persica* (Trin.) Griseb., in Ledebour, Fl. Ross. 4: 366 (1852).

Type: Iran

Distribution: Azarbayejan, Kordestan, Kermanshah, Hamadan, Lorestan, Khoozestan, Fars, Kerman, Khorasan, Tehran, Ghazvin & Semnan.

Selected specimens seen: TARI 63129, Khuzestan, Dehdez . Alt.:1300m. TARI 53671, Khuzestan, between Baghmalek and Izeh, Ghale-tal , Alt.: 500m. TARI 63072, Khuzestan, Eizeh, Rasvand, Alt.: 830m. TARI 63011, Khuzestan, Masjed soleyman, Andica, Alt.:600m. TARI 29032, Semnan, Touran protected area, Foot mountain of kuh-e peyghambar. TARI 19939, Azarbayejan, 10 km on the road from Mianeh to Zanjan, large gorge system , Alt.: 1000m . TARI 1196, Esfahan, Chadegan, Havanirooz Alt.:2000m . TARI 54483 , Chahar mahale-e Bakhtiari, Road from Lordegan to Yasuj, Maymand, Margh-e chendar, Kottuk, Alt.: 1750m . TARI 57370, Chahar mahal-e Bakhtiari, Share kurd, Naghan , Alt.:1900m. HUI 13086, Bakhtiari, Shahr-e-kord, Naghan, Alt.: 2060m . TARI 605, Kermanshah, 43 km N. of Kermanshsh, above the village Maimoonabad, Parrow mountains, Alt.:1400-1880m. TARI 11694 , Km.31 S of Saveh, Handys, Alt.:1500m. HUI 17327, Azarbayejan, Orumieh lake, Alt.: 1288m. HUI 17312, Azarbayejan, 15 km to Mirabad, Alt.: 1355m . HUI 17308, Doroud to Khorram abad, 50 km before Khoram abad. HUI 17331, Kordestan, 15 km to Saghez from Bane, Alt.: 1890m. HUI 17326, Kordestan, Malayer to Arak, 50 km Arak. Alt.: 1824m . HUI 17336, Kordestan, 70 km Sanandaj to Piranshahr, Alt.: 1619m . HUI 17328 , Hamadan, 34 km to Arak from Malayer Road, Alt.: 1864 m. HUI 17325 , Lorestan, 60 km to Kermanshah, Alt.: 1870m. HUI 17335, Lorestan, 20 km to Aligudarz. HUI 17310, Khuzestan, Baghmalek, Alt.: 630 m. HUI 17318, Khuzestan, Izeh, Alt.: 820m. HUI 6406, Isfahan, Soh mountain. Alt.: 2650m .

Eremopoa persica (Trin.) Roshev. var. *songarica* (Shrenk) Bor, in Grasses Burma, Ceylon, India, Pak.: 532 (1960). Fig. 2.

Syn.: *Glyceria songarica* Shrenk in Fisch. & C. A. Meyer, Enum. Pl. Nov. Schrenk 1: 1 (1841); *Nephelochloa songarica* Grisb. in Ledebour, Fl. ROSS. 4: 367 (1852); *Nephelochloa persica* β *songarica* Rgl., in A. H. P. 7: 603 (1880).; *Poa songarica* (Schrenk) Boiss., Fl. Or. 5: 611 (1884); *P. persia* Trin. var. *songarica* (Schrenk) Hook. f., Fl. Brit. Ind. 7: 337 (1897); *Eremopoa songarica* (Schrenk) Roshev. in Komarov, Fl. URSS. 2: 431 (1937).

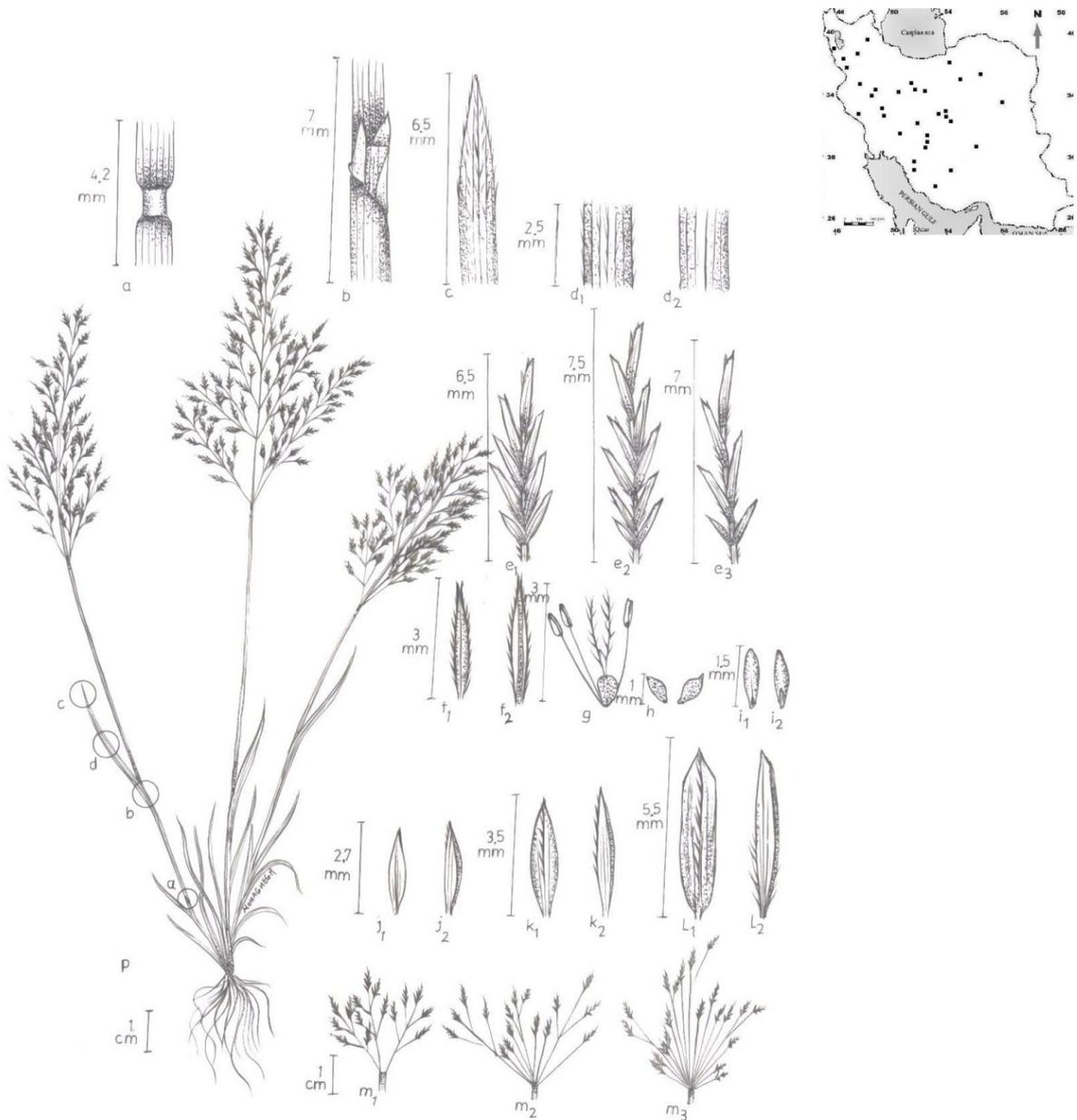


Fig. 1: Map shows the distribution of *E. persica* var. *persica* in Iran and the illustrations show morphological features as: a, node of culm; b, ligul; c1, leaf apex; d, upper surface of leaf; d2, lower surface of leaf, e, spikelet; f, upper glume; g, flower; h, lodicule; i, grain; j, lower glume; k, palea; l, lemma; m, branches of panicle in nodes; p, habit.

Stems 2-35 cm, solitary, more rarely branching at the base, very slender, smooth; nodes included in leaf sheaths. Leaf narrowly linear; leaf blades 0.4-2 mm

broad, long acuminate, more or less folded, scabrid on the upper surface. Panicle oblong; the very slender scabrous branches arranged on the axis in (1-) 2-11(-13)



Fig.2: Map shows the distribution of *E. persica* var. *songarica* in Iran and the illustration shows morphological features as: a, node of culm; b, ligul; c1, leaf apex; d, upper surface of leaf; d2, lower surface of leaf; e, flower; e1, upper glume; e2, lower glume; g, lodicule; h, grain; j, lemma; k, palea; m, spikelet; n, branches of panicle in nodes; p: habit.

per whorl in panicle, ascending, greenish. Spikelets lanceolate, 3.5-6 mm long, 1-3-florets; lemma narrowly lanceolate, gradually acuminate, keel hairy only at base or glabrous. $2n = 28$ (Bailey & Stace 1989, Stoeval1984).

Type : Central Asia

Destribution: Azarbayejan, Kermanshah, Tehran, Isfahan, Semnan, Khorasan, Fars, Kerman
Selected specimens seen: Tehran, Karaj, Kalak, Alt.:1800m, TARI 11695. Azarbayejan, Arasbaran protected area, Tolua-Ali. Alt.: 650m, TARI 24935.

Kordestan, Kamiaran, Baizpreneh, Alt.: 1700 m, TARI 1536. Semnan, Shahroud, Nekarman village. Alt.: 2650m, HUI 17319. Azarbayejan, Ghinerjeh. Alt.: 1777m, HUI 17333 .

***Eremopoa persica* Roshev. var. *oxyglumis* (Boiss.) S. Rahmanian, **comb. nov.** Fig. 3.**

Syn: *Poa persica* var. *oxyglumis* Boiss., Fl. Or. 5; 610 (1884); *E. oxyglumis* (Boiss.) Roshev., in Fl. URSS 2. 430, 756 (1934).

Plants annual. Stems 15-50 cm high, solitary or branching at the base, slender, smooth. Leaf narrowly



Fig.3: Map shows the distribution of *E. persica* var. *oxyglumis* in Iran and the illustration shows morphological features as: a, node of culm; b, ligul; c1, leaf apex; d, upper surface of leaf; d2, lower surface of leaf; e, flower; e1, upper glume; e2, lower glume; g, lodicule; h, grain; j, lemma; k, palea; m, spikelet; p, habit.

linear, up to 3 mm broad, long-acuminate, flat or folded, scabrid on the upper surface. Panicle oblong, loose; the scabrous branches arranged on the axis in 3-7 (-10) per whorl in panicle. Spikelets elliptical, 4-7 mm long, with 3-5 florets, green or somewhat purplish; glumes narrowly lanceolate, unequal; lemma gradually acuminate, often with short mucronate. $2n = 14$ (see Davis 1967).

Type: Armenia

Distribution in Iran: Azarbajejan, Hamadan, Isfahan, Semnan

Selected specimens seen: Azarbajejan, 20 km

Oshnaviye to Orumie, 17313HUI. Isfahan, Semirom, Vardasht, Alt.: 2500m, HUI 17320.

Eremopoa bellula (Regel) Roshev., Fl. URSS. 2: 431 (1934). Fig. 4.

Syn.: *Festuca bellula* Regel, Acta Horti Petrop. 7: 594 (1880).

Plants annual. Tufts dense (not compact). Stems very slender, 3-8 cm high, subcapillary, glabrous, smooth. Leaf narrowly linear, 0.5 mm broad, flat or folded. Panicle oblong, to 2.5 cm long, very narrow, with prominently scabrous 3-angled branches in 1-3 per whorl in panicle. Spikelets narrowly elliptical, 4-6 mm

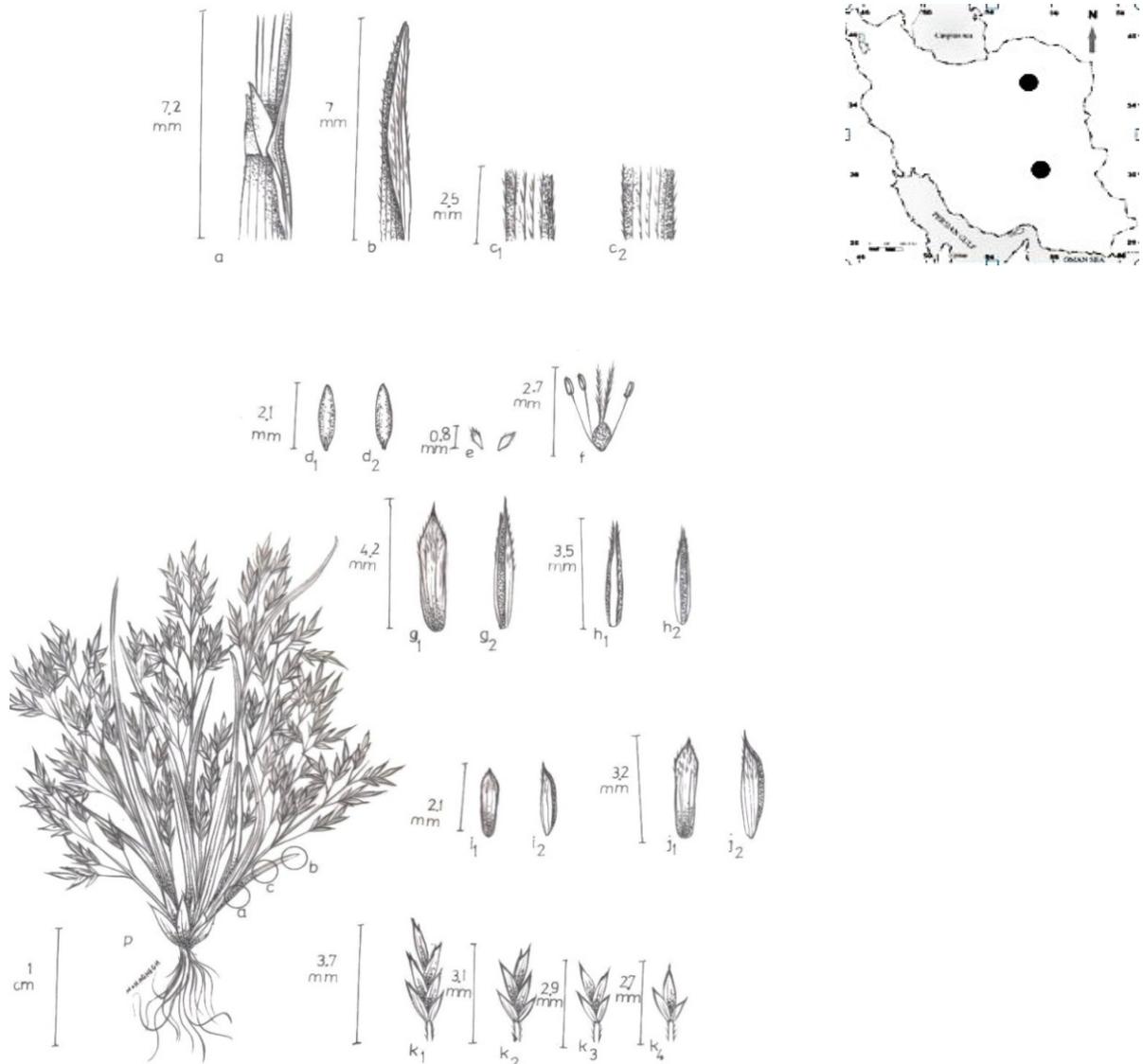


Fig. 4: Map shows the distribution of *E. bellula* in Iran and the illustration shows morphological features as: a, ligule; b, leaf apex; c1, upper surface of leaf ; c2, lower surface of leaf; d, grain; e, lodicule; f, flower; g, lemma; h, palea; i, upper glume; j, lower glume; k, spikelets; p, habit.

long, 1-3- flowered, green, more or less brownish at the tip. Glumes lanceolate, unequal. Lemma narrowly lanceolate, long-acuminate, obscurely nerved.

Type: Central Asia, Pamir.

Distribution in Iran: Semnan and Kerman.

Selected specimens seen: Shahrud-Bustam, In declivibus australibus M. Shahvar supra Nekarman (Nigaeman) supra Raheh. Alt.: 3300m, TARI 6063 . Kerman, Baft, Gugher. Alt.: 2800m, TARI 75978 . Kerman, Baft, Gugher, Bondar. Alt.: 3350m, TUH 31843 .

Eremopoa medica H. Scholz in Willdenowia 11 (1): 96. (1981), Fig. 5.

Plants annual, robust, tufted. Stems 60-90 cm high, erect. Leaf linear, glabrous, 35 cm long and 1-2 mm broad, acute, scabrous on the upper surface. Panicle oblong, 30 cm long; the scabrous branches arranged on the axis per whorl. Spikelets elliptical, 6-8 mm long, with 5-6 (-7) florets. Glumes unequal; lower glume 1.5 mm long; upper glume 2.5 mm long. Lemma 3 mm long, palea slightly shorter than lemma, obliquely



Fig. 5: Map shows the distribution of *E. medica* in Iran and the illustration shows morphological features as: a, culm surface; b, rachilla surface; c1, upper surface of leaves; c2, lower surface of leaves; d, lemma; e, spikelet; f, glum; g, palea; p, habit.

truncate, distinctly mucronate, keeled.

Type: Iran.

Distribution in Iran: Azarbayejan

Specimen seen: Azarbayejan, 5 km from Salavat to Goli daragh. Alt.: 1500m, TARI 35082.

Eremopoa nephelocheloides Roshev. in Koie, Beitr. Fl. Sudwest-Iran I Danish Sci. Invest. Iran 4: 50. (1945). Fig. 6.

Stems 15-27 cm long; nodes included in leaf sheaths. Leaf linear, 0.5-1.2 mm broad, scabrid on veins; Leaf sheaths smooth, glabrous. Panicle oblong, effuse; the scabrous branches arranged on the axis in 7-15 per whorl, filiform, purplish; lowest 1-2 whorls often

totally and rarely partly sterile. Spikelets 2-3.5 mm long, with 1-3 (4) florets. Lemma 2-2.5 mm long, purplish, obtuse at the apex, pilose on veins in lower part. Palea slightly shorter than lemma.

Type: Iran.

Distribution: Fars.

Selected specimens seen: Fars, Shiraz, Sadra mountain. HUI 17315.

Acknowledgments

The authors wish to thank the Office of Graduate Studies of the University of Isfahan for their supports. Also we would like to thank Mrs Mohaghegh for her hand drawings.

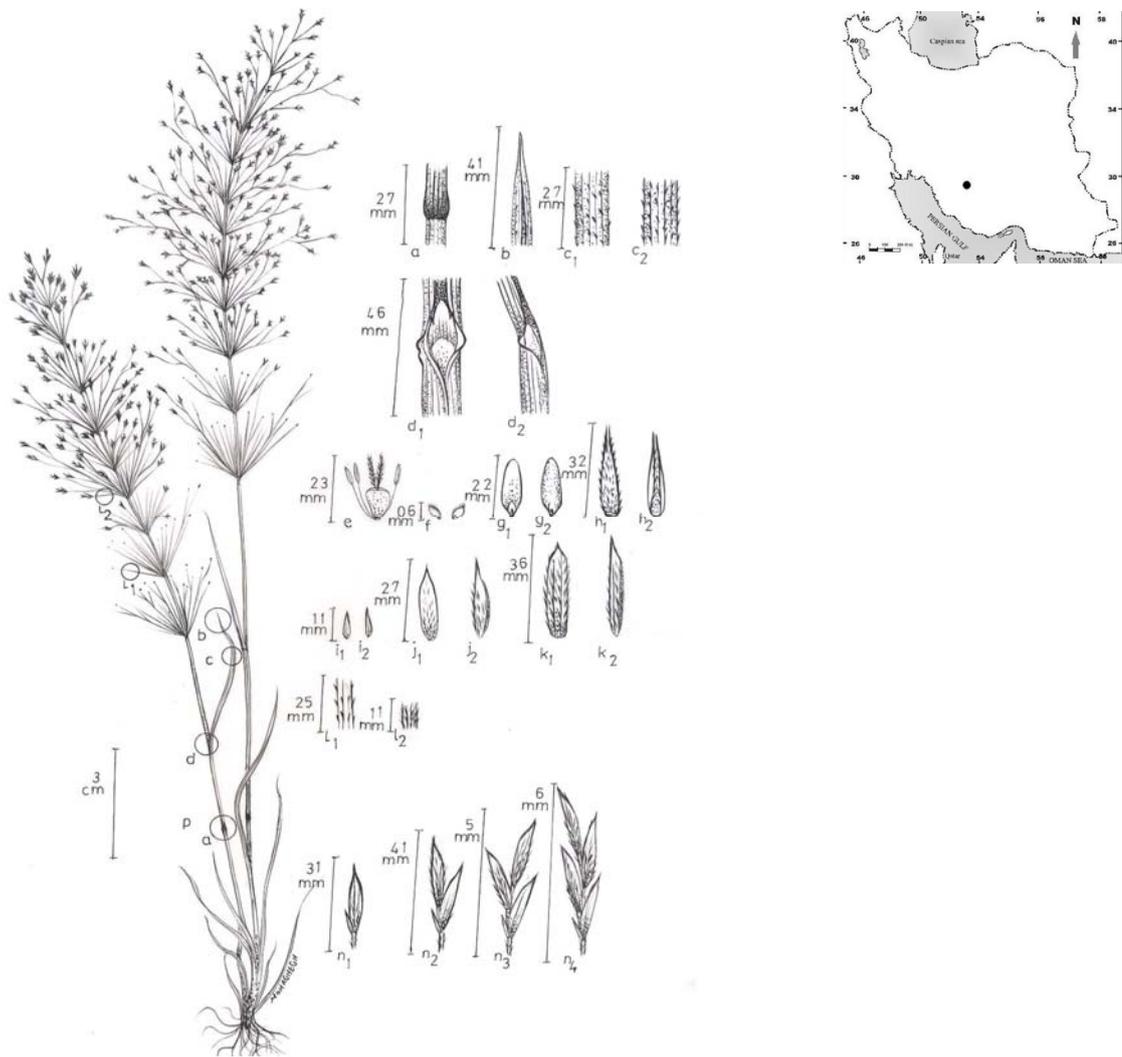


Fig. 6: Map shows the distribution of *E. nephelochloides* in Iran and the illustration shows morphological features as: a, node of culm; b, leaf apex; c1, upper surface of leaf; c2, lower surface of leaf; d, ligul; e, flower; f, lodicule; g, grain; h, upper glume; i, lower glume; j, palea; k, lemma; l, rachilla surface; n, spikelet; p, habit.

REFERENCES

- Bailey J. P. & Stace C. A. 1989: Chromosome Data 1. International Organization of Plant Biosystematists newsletter 13: 16.
- Bor, N. L. 1970: Gramineae, in: Rechinger, K. H. (ed.), *Flora Iranica*, 70: 47-49. Akademische Druch_u. Vevlagsanstalt, Graz.
- Bor, N. L. 1968: Gramineae, in: Townsend, C. C., Guest, E. and AL Rawi, A. (eds.), *Flora of Iraq*, 9: 80-82. The Ministry of Agriculture of the Republic of Iraq, Baghdad.
- Davis, P. H. 1967: *Flora of Turkey and the East Aegean Islands*. Edinburgh University Press. Edinburgh.V. 9, 486-492.
- Rozhevits, R.Yu. 1934. *Eremopoa*, in: Komarov, V. L. (ed.), *Flora of the U. S. S. R.* (English Trans) 2: 429-432. Russian Pages. Bishensingh amahendra Pal Singh and Koeltz Scientific Books.
- Roshevitz, R.J. 1945: in koie, Beitr. Fl. Sudwest-Irans I, Danish Scientific Investigations in Iran 4: 50.
- Scholz, H. W. 1981: Drei nenu Gramineen aus Iran and Libyen. *Willdenowia*, 11(1): 96.
- Stoeva, M. P. 1984: Chromosome Number Reports LXXXV. *Taxon*33, 756-760.