

POTAMOGETON FRIESII, A NEW RECORD FOR THE FLORA OF IRAN

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Potamogeton friesii Rupr. is reported for the first time from the Flora Iranica area. This species was collected from Chaharmahal va Bakhtiari, Gilan, Isfahan and Khuzestan provinces. It is distinguished from its closest relatives, *Potamogeton pusillus* and *P. berchtoldii*, by having 5-7-veined, wide leaf and stipules which split at the top and being free from each other at upper part and also this species is reddish or brownish in fresh status. A geographical distribution map, anatomical features and an illustration of the species are given.

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Key words: *Potamogeton*; aquatic flora; new record; Flora Iranica; Iran

گزارش *Potamogeton friesii* Rupr. به عنوان گونه‌ی جدیدی برای فلور ایران

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گیاه *Potamogeton friesii* Rupr. برای اولین بار به عنوان گونه‌ی جدیدی برای محدوده فلور ایرانیکا گزارش می‌شود. این گونه از استان‌های چهارمحال و بختیاری، گیلان، اصفهان و خوزستان جمع‌آوری شده است. صفات کلیدی جداکننده آن با گونه‌های نزدیک شامل عرض برگ بیشتر، تعداد ۵-۷ رگبرگ و گوشوارک‌های دو قسمتی و در حالت تازه به رنگ قرمز مایل به قهوه‌ای است. در این مقاله توصیف این گونه به همراه تصویر، صفات آناتومی مهم و نقشه پراکنش ارائه می‌شود.

INTRODUCTION

Potamogeton L. is a cosmopolitan genus of annual and perennial hydrophytes that has distributed in rivers, sweet water ponds and lakes (Sculthorpe 1967). It has about 100 nearly cosmopolitan species (Feinbrun-Dothan 1986) in the world and there are 13 species in Iran (Dandy 1971; Akhiani 1999; Dinarvand 2009; Dinarvand 2011). Iran has a great diversity of aquatic ecosystems that many of them have been recorded in Ramsar Convention (Ramsar 2014). With regard to the large distribution of *Potamogeton* species in most aquatic ecosystems of Iran, complete collection and identification of the species is essential. In recent

collections *Potamogeton friesii* Rupr. was collected from Chaharmahal va Bakhtiari, Gilan, Isfahan, Khuzestan provinces that is reported for the first time for Flora Iranica area. This species has been reported in the China (Youhao & al. 1992), Flora of USSR area (Yuzepchuk 1968) and boreal and temperate regions throughout the northern hemisphere (Wiegleb & Kaplan 1998).

MATERIALS AND METHODS

Specimens of the genus *Potamogeton* L. collected from different places of Iran were identified using different flora such as Flora Rossica (Ledebour 1853),

Flora Orientalis (Boissier 1882), Flora of the U.S.S.R (Yuzepchuk 1934), Flora Iranica (Dandy 1971); Flora of West Pakistan (Aziz and Jafri 1975), Flora Europea (Dandy 1980), Flora of Turkey (Uotila 1984), Flora of Iraq (Dandy 1985), Flora Palaestina (Feinbrun-Dothan 1986). Also specimens of Herbarium of The University of Isfahan, Herbarium of the Research Center of Agriculture & Natural Resources of Khuzestan, Herbarium of Isfahan Center for Research of Agricultural Science and Natural Resources and National Herbarium of Iran, Research Institute of Forests and Rangelands (TARI) have been studied.

RESULTS

New record

***Potamogeton friesii* Rupr.**

Specimens examined: Isfahan province, deemeh spring 2133 m, Afsharzadeh & Abbasi 19635; Bahadoran garden (Zarrin Shahr) 1681 m, Afsharzadeh & Abbasi 19636; Gandoman wetland 2253 m, Afsharzadeh & Abbasi 19637 (Herbarium of University of Isfahan). Khuzestan province, Dezful, Hamidabad river 100 m, Dinarvand 8332; Gilan province, Astara, Plasi village, Dinarvand 8230 (Research Center of Agriculture and Natural Resources of Khuzestan Herbarium).

Submerged plant, reddish or brownish with filiform rhizome. Stems branched. Submersed leaves entire at margins, sessile linear, 30-50 mm long, 2.5-3.5 mm wide, 5-7 veined, narrowly cuneate at base, acute to mucronate at apex. Stipules axillary, shortly connate only at base and split into two remnants at apex, split at the top and being free from each other at upper part, 7-9 mm long, whitish, persistent. Inflorescence spike, 7-9 mm long; Peduncles 15-20 mm long. Flowers hermaphrodite, with 4 tepals, 1 mm long, roundish to spatulate, brown. Stamens 0.8-0.9 mm long, sessile, connected at base of tepals; anthers with 2 thecae. Ovary superior; carpels 4, 1-1.5 mm long. Stele of

circular type; endodermis of 0-type, interlacunar bundles absent, subepidermal bundles present, pseudohypodermis absent (figs. 1 & 2).

This species is similar to *P. pusillus* L. and *P. berchtoldii* Fieber among the Iranian species, but differs from them in many features as indicated in table 1. *General distribution:* circumpolar, boreal and temperate regions throughout the northern hemisphere.

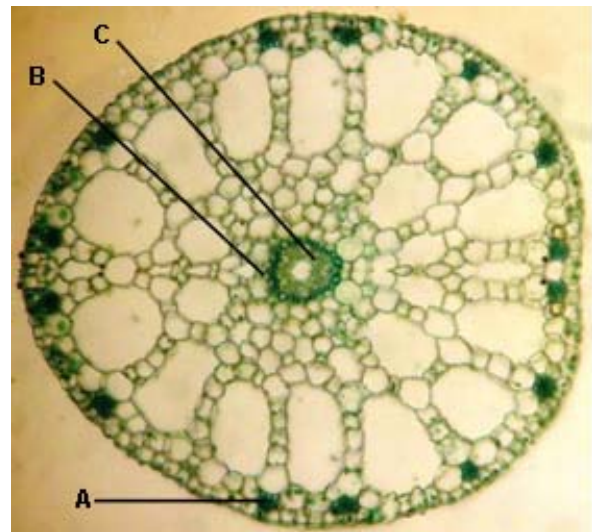


Fig. 2. Stem anatomical features of *P. friesii*: A, sub epidermal bundles; B, endodermis; C, circular type stele. Scale bars=100 µm with objective lens10, zeiss microscope.

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Table 1. A comparison of diagnostic features of *P. friesii*, *P. pusillus* and *P. berchtoldii* in Iran.

Characters	<i>P. friesii</i>	<i>P. pusillus</i>	<i>P. berchtoldii</i>
stipules	connate only at base and split into two remnants at apex	connate, tubular	convolute, open
veins of leaves	5-7	1	3 with white midrib
width of leaves	2.5-3.5 mm	1 mm	1.5-2 mm
nodal glands	paired nodal glands	absent	paired nodal glands
stipule length	7-9 mm	4-5 mm	5-9 mm
spatulate leaves in base of peduncle	absent	present	absent
reddish or brownish leaves in fresh status	present	absent	absent



Fig. 1. *Potamogeton friesii* ($\times 1$), a & b, leaf ($\times 8$); c, stipules ($\times 8$); d, flower ($\times 8$); e, tepal ($\times 8$); f, carpel ($\times 8$); g, stamen ($\times 8$).

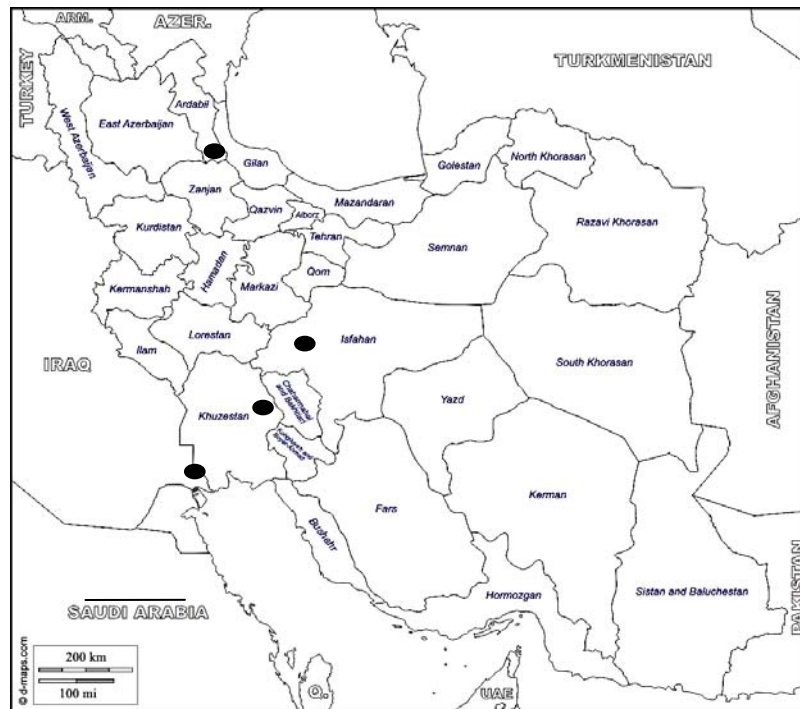


Fig. 3. Distribution map of *P. friesii* in Iran.

REFERENCES:

Akhani, H. 1999: Plant biodiversity of Golestan National Park, NE Iran. III. Three new species, one new subspecies and fifteen new records for Iran. – *Edinburgh Journal of Botany*. 56: 1-31.

Aziz, K and Jafri , S. M. H. 1975: *Potamogetonaceae*. In: Nasir, E. and Ali, SI. (eds.), *Flora of West Pakistan*. 79: 1-4.- University of Karachi.

Boissier, E. 1882:*Flora Orientalis*. vol. 5: 15-19.- Apud H. Georg , *Bibliopolam Lugduni Genevae et Basiliae*.

Dandy, J. E. 1971: *Potamogetonaceae* in K. H. Rechinger (ed.) *Flora Iranica* no. 83.- *Akademische Druck- und Verlagsanstalt Graz*.

Dandy, J. E. 1980: *Potamogetonaceae* . In: Tutin, T. G., Heywood, V. H., Burges, N. A., Moore, D. M., Valentine, D. H., Walters, S. M. and Webb, D. A. (eds.) *Flora Europaea*. vol. 5: 7-11.- Cambridge University Press, Cambridge.

Dandy, J. E. 1985: *Potamogetonaceae*. In: Townsend, C. C. and Guest, E. (eds.) *Flora of Iraq*. 8: 19-26.- Department of Agriculture and Agrarian reform Republic of Iraq, Baghdad.

Dinarvand, M. 2009: Two new records of the genus *Potamogeton* (*Potamogetonaceae*) for the aquatic flora of Iran. –*Iran. J. Bot.* vol. 15 (2): 164-166.

Dinarvand, M. 2011: New record of the genus *Potamogeton* (*Potamogetonaceae*) for the aquatic flora of Iran. *Iran. –Iran. J. Bot.* vol. 17 (2): 230-232.

Feinbrun-Dothan, N. 1986: *Potamogetonaceae* in *Flora Palaestina*. vol. 4: 6-12. –Jerusalem.

Ledebour, C. F. 1853: *Flora Rossica*. vol. 4:22-32.- *Sumptibus Librariae E. Schweizerbart, Stuttgartiae*.

Ramsar. 2014. *The List of Wetlands of International Importance*. Electronic database accessible at <http://www.ramsar.wetlands.org>.

Sculthorpe, C. D. 1967: *Biology of aquatic vascular plants*. 384-387. – Edward Arnold (Publishers) Ltd. London.

Uotila, P. 1984: *Potamogetonaceae* in P. H. Davis (ed.) *Flora of Turkey and the East Aegean Islands* vol. 8: 17-22. -Edinburgh.

Wiegleb, G. and Kaplan, Z. 1998: An account of the species of *Potamogeton* L. (*Potamogetonaceae*). – *Folia Geobotanica*. 33: 241-316.

Youhao, G. Haynes, R. R, Hellquist, C. B. and Kaplan, Z. 2010: *Potamogetonaceae* in Zheng-yi, W., Raven, P. H., Hong , D. *Flora of China*. vol. 23. – Science Press/Missouri Botanical Garden Press.

Yuzepchuk, S. V. 1968: *Flora of the U. S. S. R.* vol. 1: 180-205. – Leningrad.