

TAXONOMICAL AND PHYTOGEOGRAPHICAL STUDIES ON *CENTROPODIA FORSKALII* SUBSP. *FORSKALII* (POACEAE), A NEW RECORD FOR THE FLORA OF IRAN

Y. Asri & M. Rabie

Received 10 05 2010. Accepted for publication 20 09 2010.

Asri, Y. & Rabie M. 2010 12 31: Taxonomical and phytogeographical studies on *Centropodia forskalii* subsp. *forskalii* (Poaceae), a new record for the flora of Iran. -*Iran. J. Bot.* 16 (2): 229-232 . Tehran.

Centropodia forskalii subsp. *forskalii* (Poaceae) is reported as a new record for the flora of Iran. This plant grows on sand dunes of SW and SE of Iran. Taxonomical and phytogeographical studies for two subspecies of *C. forskalii* are provided. It seems that Iran is a transitional zone for two subspecies in the Saharo-Sindian and Irano-Turanian regions.

Younes Asri (correspondence <asriyounes@yahoo.com>), Research Institute of Forests and Rangelands, P. O. Box 13185-116, Tehran. -Mina Rabie, Department of Agriculture, Payam-e Noor University, Karaj.

Key words. *Centropodia*, new record, distribution, phytochorion, Iran.

بررسی تاکسونومیکی و فیتوجغرافیایی *Centropodia forskalii* subsp. *forskalii* (خانواده گندمیان)، زیرگونه جدیدی برای فلور ایران

یونس عصری، استادیار پژوهش موسسه تحقیقات جنگلها و مراتع کشور.

مینا ربیعی، استادیار دانشکده کشاورزی، دانشگاه پیام نور، واحد کرج.

Centropodia forskalii subsp. *forskalii* از تیره گندمیان به عنوان گزارش جدید معرفی می شود. این گیاه روی تپه های شنی جنوب غربی و جنوب شرقی کشور می روید. بررسی تاکسونومیکی و فیتوجغرافیایی برای دو زیرگونه *C. forskalii* ارائه شده است. به نظر می رسد، ایران محل گذر دو زیرگونه متعلق به نواحی صحارا - سندی و ایران - تورانی آن است.

Introduction

The species *Avena forskalii* Vahl was originally described by Martin Henrichsen Vahl (1791), and then in 1812 Palisot de Beauvois changed name of the species as *Trisetum forskalii*. Later, Robert Brown (1826) drew attention to this fact that the grass does not belong to the genus *Avena*, but it is referable to *Danthonia*. *Danthonia forskalii* was transferred to a new genus, *Asthenatherum*, by Sergei Arsenjevic Nevski in 1934. In 1962, Hans Joachim Conert introduced a classification of *Asthenatherum*, in which he recognized a total of four species. Thomas A. Cope (1983) stated that *Centropodia* is an earlier name for *Asthenatherum* based on taxonomic nomenclature. It therefore has priority over *Asthenatherum*. New combinations for the genus currently accepted are as follows:

Centropodia forskalii (Vahl) T.A. Cope (Gen. Dist., Africa: north, west tropical, and northeast tropical. Asia-temperate: Soviet Middle Asia, western Asia, and Arabia. Asia-tropical: India)

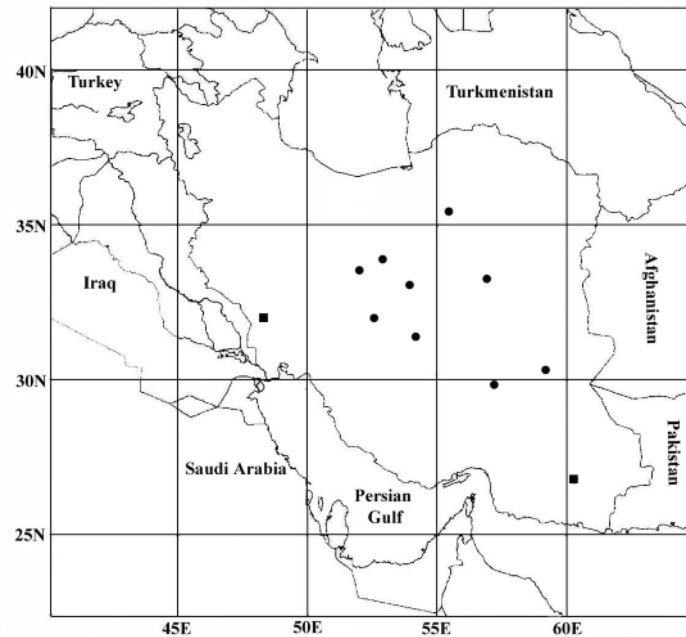
Centropodia fragilis (Guinet & Sauvage) T.A. Cope (Gen. Dist., Africa: north. Asia-temperate: western Asia and Arabia)

Centropodia glauca (Nees) T.A. Cope (Gen. Dist., Africa: east tropical, southern tropical, and south)

Centropodia mossamedensis (Rendle) T.A. Cope (Gen. Dist., southern tropical and south)

Materials and methods

This study was mainly based on plant materials deposited in Central Herbarium of Iran (TARI). Among the plants investigated, *Centropodia forskalii* subsp. *forskalii* were recognized. As this taxon has not been



Map 1. Distribution map of *Centropodia forskalii* subsp. *persica* (●) and subsp. *forskalii* (■) in Iran.

previously reported from Iran, geographical distribution of the species is explained.

Results and discussion

Centropodia forskalii* (Vahl) T.A. Cope subsp. *forskalii (Fig. 1)

Material examined. Khuzestan, NE Bostan, around Kuh-e Mish-Dagh, 50-200 m a.s.l., 16.4.1985, Mozaffarian 53708; Sistan & Baluchistan, 40 km from Bampur to Nikshahr, 530 m, 14.4.1983 Mozaffarian 43037.

A short description of *Centropodia forskalii*

Perennial, caespitose. Culms decumbent, 15-40 cm high. Leaf-blades flat, or involute, 1.5-7 cm long, 1.5-5 mm wide, stiff, glaucous, pungent at the apex; leaf-blade surface ribbed, pubescent. Inflorescence a panicle, exserted, or embraced at base by subtending leaf; panicle contracted, oblong, 2-10 cm long, 1-2 cm wide. Spikelets solitary, comprising 2-3 fertile florets, lanceolate, 6-11 mm long. Glumes persistent, 5-10 mm long, without keels, (5-) 7-9 -veined, glabrous, or pubescent, hairy below, acute at the apex; lower glume elliptic; upper glume lanceolate. Fertile lemma oblong, 5-9 mm long (including awn), without keel, 9 -veined, pubescent, hairy between veins, at the apex lobed, acuminate; awn 3-5 mm; Palea 0.75 length of lemma, 2 -veined; keels ciliolate. Anthers 3, 0.7-1.2 mm long.

Identification key for the Iranian subspecies of *Centropodia forskalii*

-Spikelets 6-8 (-9) mm long; glumes 5-7 (-8) mm long, (5-) 7 -veined; lemma 5-6 mm long; awn 3 mm long; anthers 0.7-0.8 (-1) mm long	subsp. <i>forskalii</i>
-Spikelets 9-11 mm long; glumes 8-10 mm long, 7-9 -veined; lemma 7-9 mm long; awn 4-5 mm long; anthers 1-1.2 mm long	subsp. <i>persica</i>

Phytogeographical distribution of *Centropodia forskalii*

This plant is mentioned in Flora Iranica (Bor, 1970) with the name of *Asthenatherum forskalii* (Vahl) Nevski. It is native in Tropical and N Africa, Arabia, Palestine, Iraq, Afghanistan, Iran and Central Asia. Based on Flora Iranica, this species was reported only from one locality in central part of Iran (Esfahan province: Gav Khoni).

Léonard (1988, 1991-1992) collected *Centropodia forskalii* from Dasht-e Lut and Jaz Murian. He introduced the species as one of several species that were common between Irano-Turanian and Saharo-Sindian regions, which distributed in adjacent regions, including Mediterranean (Egypt and Palestine), Indian (NW. India and Kashmir), Guineo-Congolian (Kenya) and Sudano-Zambezi (Sahel) regions.



Fig. 1. *Centropodia forskalii* subsp. *forskalii* ($\times 0.5$); spikelet, right ($\times 4.5$); floret, left ($\times 8$); ligule ($\times 2.2$); lemma and palea ($\times 5$); anther ($\times 10$); ovary ($\times 5$).

Scholz (1990) distinguished two subspecies for *Centropodia forskalii*: *C. forskalii* (Vahl) T.A. Cope subsp. *forskalii* and *C. forskalii* (Vahl) T.A. Cope subsp. *persica* (Bornm.) H. Scholz. The subsp. *forskalii* is distributed in North Africa, Palestine, Syria, Iraq and Arabia, and the subsp. *persica* is distributed in Iran, Pakistan, Afghanistan and USSR (Tajikistan, Turkmenistan and Uzbekistan). The *Centropodia forskalii* subsp. *forskalii* was not mentioned from Iran by Scholz. The localities of the *C. forskalii* subsp. *persica* in Iran based on Scholz (1990) are as following:

Semnan: Kavir Protected Area, 64 km from Karvan-Sarai Shah Abbasi to Mulkabad, 900 m, 24.5.1974, Rechinger 46335 (B); E Siah Kuh, Rig-e Talhe, 880 m, 4.8.1976, Freitag 14026 (B). –Khorasan: 25 km SE Boshruyeh, 900 m, 11.5.1975, Rechinger 51652 (B). –Esfahan: 30 km from W Chupanan to Anarak, 900 m, 17.5.1975, Rechinger 51995 (B). –Kerman: Kuh-e Tagh-Ali, 2100 m, 1.7.1982, Bornmüller 4856 (B).

On the basis of studies on plant specimens in Central Herbarium of Iran (TARI) *Centropodia forskalii* subsp. *forskalii* is present in SW Iran (Khuzestan) and SE Iran (Sistan & Baluchistan) (mentioned specimens). Other specimens which named under *Centropodia forskalii* subsp. *persica* belong to central part of Iran, including: Semnam: Kavir Protected Area, 64 km from Karvan-Sarai Shah Abbasi to Mulkabad, 900 m, 1974, Rechinger 46335; 50 km from N Torud to Shahrud, 1050 m, 19.9.1975, Wendelbo & Foroughi 18716. –Esfahan: Kashan, Rigboland, 950 m, 28.11.1995, Assadi 75399. –Yazd: Mehriz to Tezerjan, 1500 m, 27.5.1996, Mozaffarian 77443.

Therefore, *Centropodia forskalii* has two distinct separate distributions on sand dunes in the desert areas of Iran: *C. forskalii* subsp. *persica* in C. of Iran (Irano-Turanian region) and *C. forskalii* subsp. *forskalii* in S. of Iran (Saharo-Sindian region) (map 1). It seems that Iran is a linked zone for two subspecies in the Saharo-Sindian and Irano-Turanian regions. *C. forskalii* subsp. *forskalii* is a Saharo-Sindian element, which has a wide distribution range from northern and tropical Africa towards S Iran, and *C. forskalii* subsp. *persica* is an Irano-Turanian element, with limited distribution range from C Iran towards Central Asia.

Acknowledgements

The authors are grateful to Dr. M. Assadi and Dr. F. Ghahremaninejad for their valuable guidance. Thanks extended to Mr. B. Hamzehee for his advises and reviewing the manuscript and also Mrs. Nobakht, the artist in TARI herbarium for preparation of the illustration.

References

- Beauvois, P. de. 1812: Essai Agrostographie. -Paris, 495 p.
- Bor, N. L. 1970: *Asthenatherum* in Rechinger, K. H. (ed.), Flora Iranica, no. 70: 355-356. -Akademische Druck-U. Verlagsanstalt, Graz-Austria.
- Brown, R. 1826: Observations on the structure and affinities of the more remarkable plants collected in Africa. In: Denham, D. & Clapperton, H., Narrative of travels and discoveries in northern and central Africa, pp. 208-246.
- Conert, H. J. 1962: Über die Gramineen-Gattung *Asthenatherum* Nevski. -Senck. Biol. 43 (4): 239-266.
- Cope, T. A. 1983: *Centropodia*: an earlier name for *Asthenatherum* (Gramineae). -Kew Bulletin 37: 657-659.
- <http://www.ars-grin.gov/~sbmljw/cgi-bin/taxon>
<http://www.kew.org/data/grasses-db/www/imp02063.htm>
- Léonard, J. 1988: Contribution à l'étude de la flore et de la végétation des deserts d'Iran, Fascicule 8: Etude des aires de distribution-Les phytochories-Les chorotypes. -Bulletin of the Jardin Botanique National de Belgique, 190 p.
- Léonard, J. 1991-1992. Contribution à l'étude de la flore et de la végétation des deserts d'Iran, Fascicule 10: Etude de la végétation, analyse phytosociologique et phytochorologique des groupements végétaux. -Bulletin of the Jardin Botanique National de Belgique, 2 vols. 454 p.
- Nevski, S. A. 1934: *Asthenatherum*. -Acta Univ. Asiae Mediae, sér. 8b, Bot. Fasc. 17: 8.
- Scholz, H. 1990: *Centropodia forskalii* subsp. *persica* (Gramineae): eine Neubewertung. -Willdenowia 19: 445-447.
- Vahl, M. H. 1791: *Avena forskalii*. -Symb. Bot. 2: 25.