TWO NEW RECORDS OF COUSINIA CASS. (ASTERACEAE) FROM NE IRAN, KHORASAN PROVINCES

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Received 16.03.2011. Accepted for publication 04.05.2011.

Memariani, F. & Joharchi M. R. 2011.06.30: Two new records of *Cousinia* Cass. (*Asteraceae*) from NE Iran, Khorasan provinces. -*Iran. J. Bot. 17 (1): 69-74.* Tehran.

Cousinia glochidiata (Sect. *Pseudactinia*) and *C. albiflora* (Bornm. & Sint.) Bornm. (Sect. *Stenocephalae*), two narrow endemics to Kopetdagh mountains, are newly recorded for the flora of Iran from Razavi and North Khorassan provinces near the borders of Turkmenistan. The presence of *C. apiculata* Tscherneva in Iran is confirmed. New localities and additional notes on the distribution and conservation status of some *Cousinia* endemic species to Khorassan-Kopetdagh floristic province are provided.

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Key words. Cousinia, new record, endemism, biodiversity, Khorassan, Iran

گزارش دو گونه جدید از جنس .Cousinia Cass برای فلور ایران از خراسان

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دو گونه *Cousinia glochidiata* و *C. albiflora* که انحصاری کوههای کپه داغ هستند، به عنوان گزارشهای جدیدی برای فلور ایران از نزدیک مرزهای ترکمنستان در استان‌های خراسان رضوی و شمالی معرفی می‌شوند. حضور گونه *C. apiculata* در ایران تأیید می‌شود و اطلاعات جدیدی درباره پراکنش و وضعیت حفاظتی تعدادی از گونه های انحصاری *Cousinia* در حوزه خراسان-کپه داغ ارائه می‌گردد.

INTRODUCTION

The genus *Cousinia* with *ca.* 600-700 species (Attar & Djavadi 2010; Assadi 2010; Attar & Maroofi 2010; Mehregan & al. 2010) is the third largest genus, after *Senecio* and *Vernonia*, in the family *Asteraceae* and the largest in the tribe *Cardueae* and is subdivided into three subgenera and *ca.* 70 sections (Kadereit & Jeffrey 2007, Mehregan & Kadereit 2009). It is unique in the degree of diversification and in the restricted area of high number of species (Rechinger 1986). Eight major centers of species diversity have been defined for the genus in SW Asia and C Asia. The most important center of species diversity is situated in Pamir- Alay range in the Middle Asia with ca. 170 species, of which 130 are endemics (Knapp 1987). Khorassan-Kopetdagh floristic province in NE Iran and S Turkmenistan can be considered as the second important center of the diversification of *Cousinia* inhabited by approximately 100 species, of which 70 species are endemic to the area (Rechinger 1972, 1979).

Cousinia sect. *Pseudactinia* Tscherneva, an endemic section to Kopetdagh mountain ranges, is known only by three narrow endemic species: *Cousinia oreodoxa* Bornm. & Sint., *C. apiculata* Tschern. and *C. glochidiata* Kult. (Tscherneva 1962 and Rechinger 1972). *C.* sect. *Stenocephalae* Bunge is among the largest sections of the genus with 31 species, of which 11 are endemics to Alborz and 8 are endemics to Khorassan-Kopetdagh mountains (Rechinger 1972 and 1979; Djavadi & Attar 2006).

In this paper two Kopetdaghi endemic species i.e. *C. glochidiata* (sect. *Pseudoactinia*) and *C. albiflora* (Bornm. & Sint.) Bornm. (sect. *Stenocephalae*), hitherto known only from outside of the Iranian borders in S Turkmenistan, are newly recorded for the flora of Iran. Additional notes on the distribution and conservation status of endemic species of these two sections in Khorassan-Kopetdagh are provided.

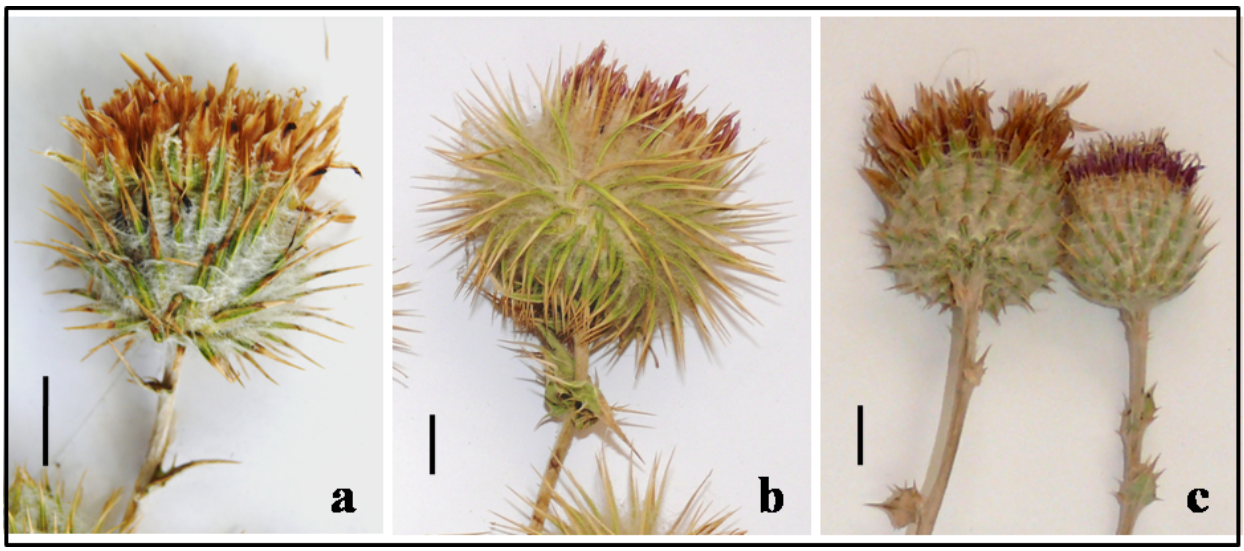

Fig. 1. Capitula in *Cousinia* sect. *Pseudactinia*: a) *C. apiculata* (Rafeie & Zangooie 26140 (FUMH)); b) *C. glochidiata* (Joharchi 33836 (FUMH)); c) *C. oreodoxa* (Joharchi 36955 (FUMH)). Scale bar = 1 cm.

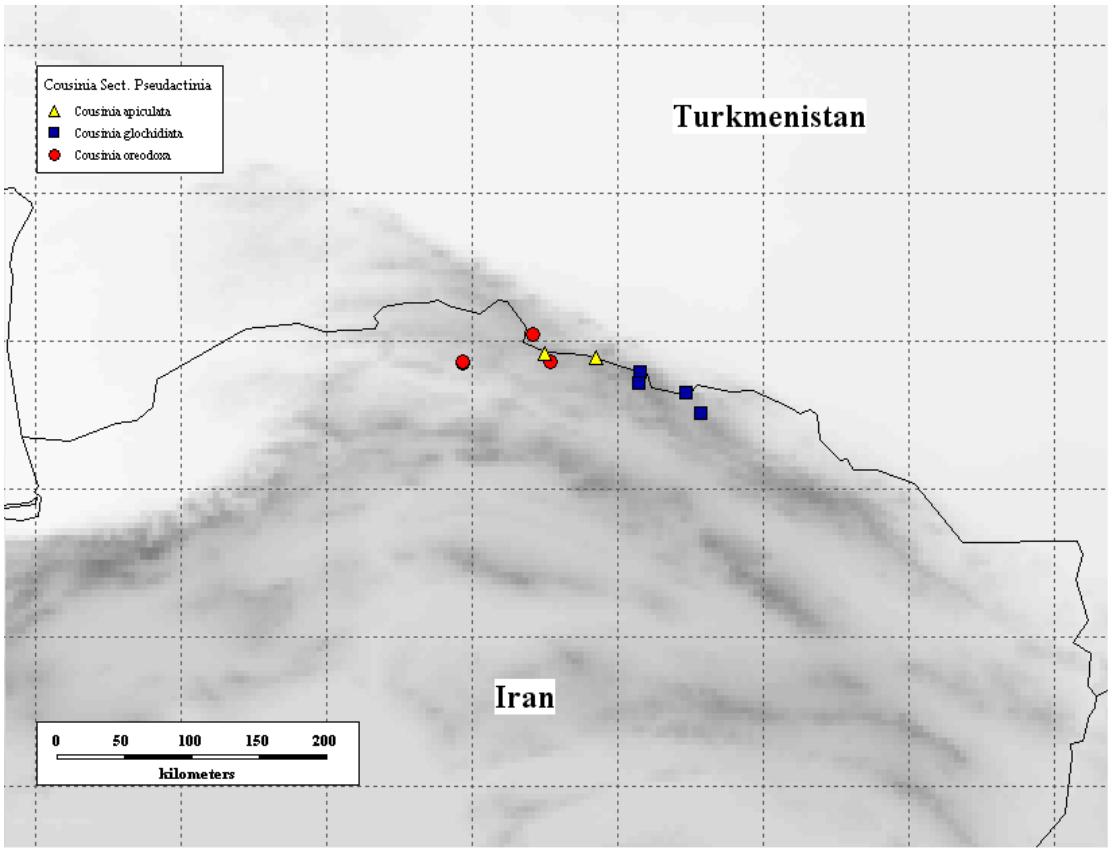

Fig. 2. Distribution map of three narrow endemic species of *Cousinia* sect. *Pseudactinia*; *C. apiculata*: triangle, *C. glochidiata*: square (new record), *C. oreodoxa*: circle.

MATERIAL AND METHODS

Based on extensive plant collections from Khorassan-Kopetdagh mountain ranges in NE Iran, especially along the borders with Turkmenistan, *ca.* 400 *Cousinia* specimens have been collected and preserved in herbarium of Ferdowsi University of Mashhad (FUMH). Nomenclature and identification of the specimens are based on keys and descriptions in Flora Iranica (Rechinger 1972 and1979) and Flora of USSR (Tscherneva 1962). The distribution maps of the species have been provided mainly based on herbarium records in FUMH and geo-referencing of the distribution data in Flora Iranica by DIVA-GIS 5.4 software. IUCN Red List categories and criteria (IUCN 2010) have been consulted to determine the threat status of the species, which have not been evaluated yet in global and regional Red Lists.

RESULTS AND DISCUSSION

Cousinia sect. Pseudactinia Tscherneva

Cousinia glochidiata Kult.

Khorassan: N of Shirvan, Sarani Mt., 2200 m, 2.7.2001, Joharchi 33836 (FUMH); W Daregaz, Alibolagh Mt., 1900 m, 26.6.2002, Joharchi & Nasseh 34305 (FUMH).

C. glochidiata is a narrow endemic species to central Kopetdagh, recorded in Flora Iranica from only two localities in Aselma Mount (the type locality) and Mirza Mount in Turkmenistan at very close vicinity of Iranian borders. *C. glochidiata* grows on stony slopes in middle and high mountain zone and differs from its closely related species, *C. apiculata* and *C. oreodoxa*, in having ± horizontal middle involucral bracts and completely falcate outer bracts not erect spreading or divergent ones (Fig. 1). Concerning the extent of occurrence and number of recorded localities, it is categorized as an endangered species (EN B1ac(iii)). Two new recorded localities in Iran are located in protected areas, the first in Golul-Sarani Protected Area and the later in Tandooreh Protected Area at the vicinity of western borders of Tandooreh National Park (Fig. 2).

Cousinia apiculata Tscherneva

Khorassan: NE of Bojnord, Gifan, Misino (Mesinev) Mt., 2000 – 2200 m, 24.7.1995, Rafei & Zangooei 26140 (FUMH).

This species is very similar to *C. glochidiata* but can be distinguished by its partly separate and erect spreading middle involucral bracts which are broadened at base (Fig. 1). Attar & Joharchi (2002) recorded this species based on a misidentification of the specimen from Sarani Mt. (27664 TUH; duplicate in FUMH: 33836) which belonged to *C. glochidiata*. The above cited specimen from Misino Mt. confirms the presence of *C. apiculata* in Iran. The habitat of this central Kopetdagh narrow endemic species is on stony slopes in middle and high mountain zones. It is known only from two locations in Misino Mt., one in southern slopes in Iranian side which is not officially protected and another in north- western slopes in Turkmenistan (the type locality between Kheirabad and Germakom) which is located in Kopetdagh Nature Reserve (Fig. 2). Concerning the very small extent of occurrence and area of occupancy, severely fragmented and low number of subpopulations and the quality of habitats, the threat status of this species is evaluated as critically endangered (CR B1+B2 ac(i,iii)). Field conservation of remaining populations and also *ex situ* conservation through seed banking and cultivation in botanical gardens is very necessary.

Cousinia oreodoxa Bornm. & Sint.

Khorassan: NE of Bojnord, Gifan pass (SE of Gifan), 1833 m, 20.7.2005, Joharchi 36955 (FUMH).

C. oreodoxa differs from very closely related *C. apiculata* mainly by the reduced number (90-110) of involucral bracts per head which are pressed together at base, and from *C. glochidiata* by erect spreading bracts (Fig. 1). According to Rechinger (1972) the key characteristics in Flora of USSR (Tscherneva 1962) are misleading. This west- central Kopetdagh narrow endemic species grows on schistose slopes of lower to middle mountain zone. In Flora Iranica, it is known only from two locations; one from the type locality in Suluklü (Turkmenistan, near the Iranian borders) and another one between Bojnord and Gholaman in Iran which can not be localized for geo-referencing, however it seems the other recorded collections might be from near the later population: "inter Bojnord and Raz, 7 km from Tangeh Torkaman to Ashkhaneh, 1000 m, Mehregan 150 (MJG)" (López-Vinyallonga *et al.* 2009). The above cited specimen from Gifan pass extends the distribution area of *C. oreodoxa* more eastward, however it is evaluated as an endangered species (EN B1ab(iii)) because its extent of occurrence is not more than 700 km^2 (Fig. 2).

Cousinia sect. Stenocephalae Bunge

Cousinia albiflora (Bornm. & Sint.) Bornm.

Khorassan: NW Bojnord, NW Gholaman, Sangsar Mt., near Turkmenistan border at opposite side of Kenekesir (Kohneh Kesir), 2.7.1985, Joharchi & Zangooei 13288 (FUMH).

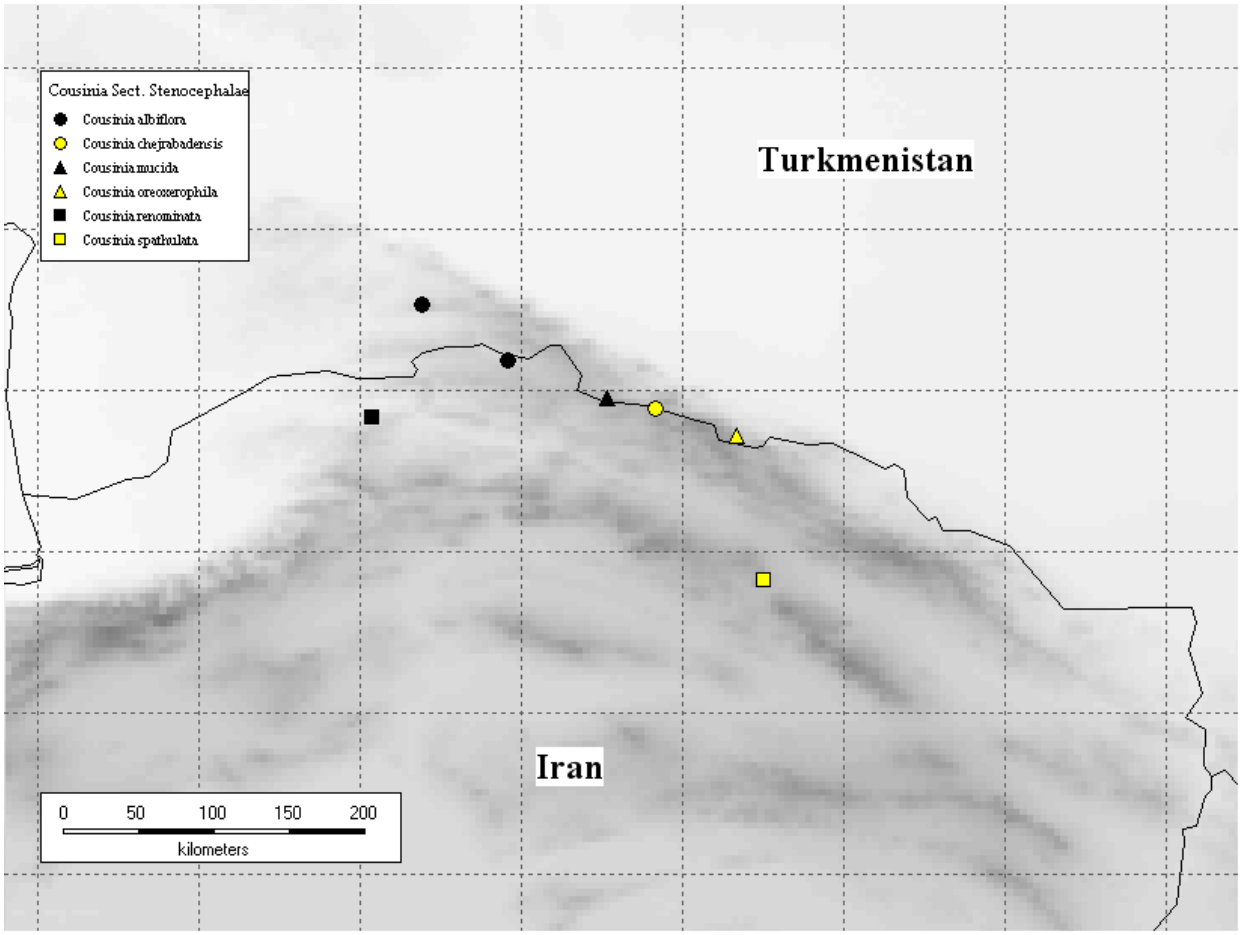

Fig. 3. Distribution map of new recorded *Cousinia albiflora* (black circle) and five local endemic species of *Cousinia* sect. *Stenocephalae*.

This western Kopetdagh endemic species, hitherto known only from the type locality in Sundsodagh (Karakala, Turkmenistan), is recorded for the first time from Iran (Fig. 3). It is distinguished from the closely related *C. hypopolia* Bornm. & Sint. by its almost entire and very distantly spinose upper leaves and by its white flowers. According to extent of occurrence and area of occupancy, *C. albiflora* is categorized as an endangered species (EN B1 ac(i,iii)).

Nine *Cousinia* species of sect. *Stenocephalae* occur in Khorassan- Kopetdagh which can be classified into two groups:

1) Local endemics known only from the type locality (Fig. 3), including *C. renominata* Rech. f. (near Maraveh Tappeh, W Kopetdagh), *C. mucida* Kult. (Mesinev Mt., C Kopetdagh), *C. chejrabadensis* Kult. (Kheirabad, C Kopetdagh), *C. oreoxerophila* Kult. (Dughri-Dara, C Kopetdagh) and *C. spathulata* Kult. (near Chakaneh, W Binalood). More collections and data are needed for taxonomic delimitation of these species, therefore sufficient information is lacking to make a sound status assessment and they are categorized as Data Deficient (DD). *C. oreoxerophila* has been qualified by Kamakhina (1994) as a probably extinct species.

2) Narrow endemics, including one western Kopetdagh endangered species (the new recorded *C. albiflora*, Fig. 3), two western- central Kopetdagh species (*C. hypopolia* Bornm. & Sint. and *C. stahliana* Bornm. & Gauba), and one eastern Alborz- western Kopetdagh species (*C. decipiens* Boiss. & Buhse) (Fig. 4). Based on extent of occurrence, *C. hypopolia* and *C. stahliana* are assessed as vulnerable species (VU B1 ab(iii)). According to our data, *C. decipiens* has a wider distribution range and it is one of the main elements of higher mountain steppe communities and *Juniperus* woodlands in E Alborz and W Kopetdagh. Therefore it is categorized as Least Concern (LC).

Flora and vegetation of Kopetdagh have evolved since the Eocene under a constant climatic aridization

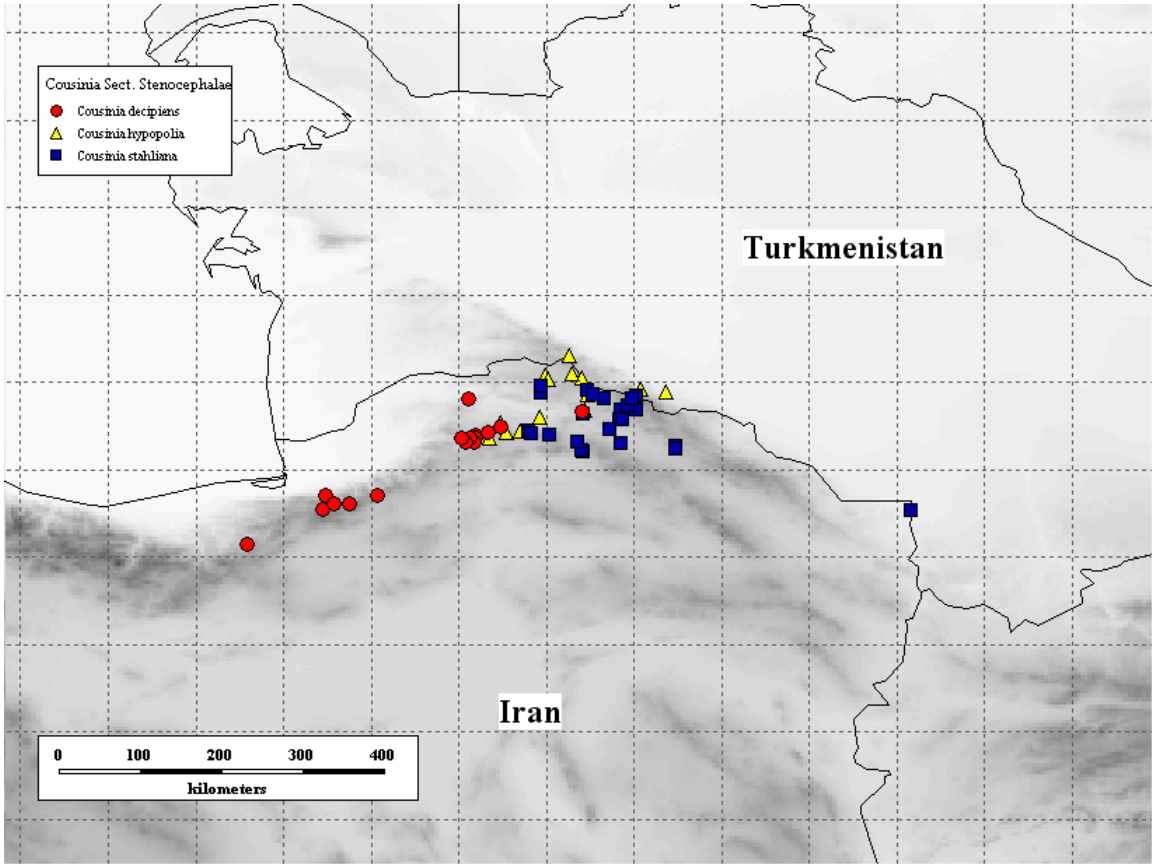

Fig. 4. Distribution map of three narrow endemic species of *Cousinia* sect. *Stenocephalae* occurring in Khorassan-Kopetdagh; *C. decipiens*: circle, *C. hypopolia*: triangle, *C. stahliana*: square.

which has led to the evolution of many local xerophytes (Kurbanov 1994). *Cousinia* species are fully adapted to semidesert open foothills up to high mountain semiarid conditions of Khorassan-Kopetdagh with high degree of diversification and many neo-endemics. Regarding the unique species diversity and endemism and increasing human settlements and construction, overgrazing of vegetation and habitat loss in Khorassan- Kopetdagh, an urgent conservation planning for the threatened species is inevitable.

ACKNOWLEDGEMENTS

The authors would like to thank the staff assistance of FUMH in field and herbarium. We gratefully acknowledge Dr. I. Mehregan for revision and determination of the species.

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