

## New plant records for Khorassan province, Iran, III

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### Abstract

Sixty vascular plant taxa from 24 genera in eight families are recorded for the first time from Khorassan province, Iran. All taxa are angiosperms (36 dicotyledons and 24 monocotyledons). Three of these taxa are endemic to Iran. All specimens recorded here are deposited in FUMH<sup>1</sup>, and/or in W and FAR. This contribution is a continuation to the recently published papers on this province (GHAHREMANINEJAD & al. 2005; JOHARCHI & al. 2007). In these three papers 420 species are recorded for the first time from this province.

**Key Words:** Flora; Iran, Khorassan province, new records.

### Zusammenfassung

60 Taxa der Blütenpflanzen aus 24 Gattungen in 8 Familien werden das erste Mal für die Provinz Khorassan (Iran) angegeben. Drei dieser Taxa sind endemisch im Iran. Belege sind im Herbar FUMH und/oder W und FAR deponiert. Diese Publikation ist eine Fortsetzung früherer floristischer Meldungen für die Provinz Khorassan (GHAHREMANINEJAD & al. 2005; JOHARCHI & al. 2007). Insgesamt wurden bisher 420 Arten für die Provinz neu festgestellt.

### Introduction

Khorassan province is located in NE Iran, covering an area of 313,335 km<sup>2</sup>. It extends from 30°21' to 38°17' N and from 55°28' to 61°20' E. Recently 360 plant taxa have been recorded for the first time from this province (GHAHREMANINEJAD & al. 2005; JOHARCHI & al. 2007). In this paper 60 further taxa are added to the flora of the province. They are based on recent field research and critical evaluation of existing specimens.

### Material and Methods

The study has been carried out mainly with material from the herbarium of the Ferdowsi University of Mashhad [FUMH<sup>1</sup>]. The new records are based on 181 critically evaluated specimens. In order to ensure the completeness the records have been re-checked in the herbarium of the Natural History Museum Vienna [W]. Thus some additional locali-

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<sup>1</sup> All herbaria are named with their acronyms in Index Herbariorum <http://sweetgum.nybg.org/ih/>.

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ties could be added to the list. All recorded specimens are deposited in FUMH, and/or W and FAR. The specimen are cited in the same style as traditionally used in *Flora Iranica* (RECHINGER 1963–2010).

For each taxon the specimens of Khorassan province are cited, additionally the distribution in Iran (mostly based on the "Flora Iranica" and "Flora of Iran" treatments) and further comments are given. In the following list the order of entries is alphabetical for families and taxa within the families. For each taxon the locality, the altitude, the date and the collector's name are presented. Localities within Khorassan are sequenced from NW to SE, according to figure 1. The list consists of 60 specific, subspecific and varietal taxa, belonging to 25 genera and eight families. All the taxa are angiosperms (36 dicots and 24 monocots). Three of these taxa are endemic to Iran.

The families with the largest recorded numbers of new taxa are Poaceae (24), Brassicaceae (18), Tamaricaceae (7), and Rubiaceae (6).

For the 60 recorded taxa 178 plant specimens are cited. Among these specimens, 43 are recorded from NW, 45 from N, 41 from NE, seven from W, seven from C, three from E, 21 from SE, and 11 from SW of the province (fig. 1). The altitudes of the localities are between 300 m (N: Darrehgaz: Hatam-Ghala) to 2579 m (NW: Bojnord: Saluk Mt.). They have been collected during the years 1964–2008 (44 years) by 27 collectors. The collectors alphabetically are: A. Ajani, H. Akhaneh, M. Akramian, R. Alava, A.A. Arjmandi, M. Ayatollahi, M. Aydani, M. Bazargan, KH. Emadzadeh, GH. Faghihnia, F. Ghahremaninejad, J.Ghoralshialhoseini, S. Hojjat, M. Iranshahr, M. Joharchi, F. Khasanov, F. Memariani, Y. Nasseh, M. Puyan, A. Raafeei, K.H. Rechinger, M. Rejamand, H. Rezaei, A. Ruttner, H. Safavi, H. Zangoeei, and A. Zargari.

This contribution is a continuation to two recently published papers on the flora of Khorassan (GHAHREMANINEJAD & al. 2005; JOHARCHI & al. 2007). Including the present paper a total of 420 species are recorded for the first time from this province. This research is the first of its kind focusing on floristic details for a province in Iran; and at the moment there is no equivalent research for other provinces, which would help complete the knowledge on distribution of each taxon given in *Flora Iranica* (1963–2010) for Iran. Because plant collecting is now easier than in the past, this should be a priority for research.

There are now several local herbaria in Iran, like FUMH, which are useful for working on the flora in detail. They can take advantage of local collectors' knowledge of the roads, routes, villages, mountains, valleys, higher altitudes, and several unknown localities of their regions.

During history most botanists have been concentrated in Tehran and some capital cities of the provinces - attention to local herbaria and collections is critical, thus losing or not making available existing information. The minimum benefits of intensive floristic research will be the finding of new species and new records of plants in areas difficult to access, thus contributing to better knowledge of the biodiversity.

## Results

### MONOCOTYLEDONES

#### Poaceae BARNHART

Ref.: BOR 1970; TSVELEV 1983.

*Avena barbata* POTT ex LINK in SCHRAD., Jour. für die Bot. 2: 315 (1799).

Khorassan: NE: Mashhad, Ferdowsi University Campus, 1038 m, 26.4.2007, MEMARIANI 38737 [FUMH].

Distribution in Iran: S, E.

*Avena sativa* L., Sp. Pl.: 79 (1753).

Khorassan: N: S Chenaran, Freyzi, Darma, 1964 m, 28.6.2005, MEMARIANI & ZANGOUEI 36785 [FUMH].

Distribution in Iran: W, S, E.

*Avena sterilis* L., Sp. Pl., ed. 2: 118 (1762)

#### subsp. *sterilis*

Khorassan: NW: NW Bojnord, Rein, Delove valley, 1650-1700 m, 3.7.2006, MEMARIANI & ZANGOUEI 38242 [FUMH].

Distribution in Iran: W, E.

*Avena wiestii* STEUD., Syn. Pl. Glum. 1: 231 (1854).

Khorassan: NE: N Torbat-e Jam, E Salehabad, between Saghar Cheshmeh and Garmab-e Olia, 523-550 m, 25.4.2007, JOHARCHI & NASSEH 38729-a [FUMH]; – SW: Ostrand der Großen Kawir, Ozbah-kuh (Ozbagu), 34 40 N, 57 E, Kuh-e Sefid, 19.4.1964, RUTTNER 440 [W 1965-120].

Annotation: The last specimen was determined by the author of Flora Iranica, B.L. Bor in 1971, after the publication of the treatment (1970).

Distribution in Iran: N, S, E, C.

*Bromus fasciculata* PRESL, Cyp. et Gram. Sic. 39 (1820)

var. *alexandrinus* THELL., Feddes Repert. 5: 161 (1908).

Khorassan: E: SE Khaf, Mahabad, 1050 m, 5.5.1986, AYATOLLAHI & ZANGOUEI 14158 [FUMH]; – SW: N Tabas, Ozbagou, Alimorad mine, 22.4.1986, AYATOLLAHI & ZANGOUEI 13884 [FUMH].

Distribution in Iran: W, E.

*Bromus gracillimus* BUNGE, Mem. Acad. Petersb. Sav. Etrang. 7: 527 (1851).

Khorassan: C: N Kashmar, Chalpo, 1700 m, 29.5.1997, HOJJAT & ZANGOUEI 38912 [FUMH]; – N Kashmar, Chalpo, 1700 m, 13.5.2007, ZANGOUEI 38851 [FUMH]; – N Kashmar, Sar-e Godar-e Ili, 1857 m, 22.2.2007, ZANGOUEI 38913 [FUMH]; – SE: SE Ghayen, between Dezg and Ahangaran Mt., 1500 m, 15.5.1989, JOHARCHI & ZANGOUEI 17358 [FUMH]; – SE Birjand, Makhunik, 1600 m, 28.4.1997, RAAFEEI & ZANGOUEI 28269 [FUMH]; – SE Birjand, between Sarbisheh and Mokhtaran, Fall, 1700 m, 9.4.1991, FAGHIH Nia & ZANGOUEI 19300 [FUMH].

Distribution in Iran: W, S, E, C.

***Bromus lanceolatus*** ROTH, Calaelecta Bot. 1: 18 (1797)

**var. lanuginosus** (POIR.) DINSM., Fl. Pal. ed. 2,2: 774 (1933).

Khorassan: SE: SE Birjand, Khorashad, 1900 m, 22.4.1985, AYATOLLAHI & ZANGOOEI 12161 [FUMH].

Distribution in Iran: N, W, S, E.

***Bromus rubens*** L., Cent. Plant. 1: 5 (1755)

**var. glabriglumis** MAIRE in EMBERGER & MAIRE, Cat. Pl. Maroc. 4: 943 (1941).

Khorassan: SW: Boshruyeh to Tabas, km 45, 22.4.1986, AYATOLLAHI & ZANGOOEI 13848-b [FUMH].

Distribution in Iran: N, S, E.

***Bromus rubens*** L., Cent. Plant. 1: 5 (1755)

**var. rubens**

Khorassan: SW: Tabas, Kalshaneh, 1000 m, 8.4.1985, AYATOLLAHI & REZAEI 11857 [FUMH]; – Boshruyeh to Tabas, km 45, 22.4.1986, AYATOLLAHI & ZANGOOEI 13848-a [FUMH].

Distribution in Iran: N, W, S, E.

***Echinochloa crus-galii*** (L.) P.BEAUV., Ess. Agrost. 53, 161 (1812)

**var. submutica** NEILR., Fl. Nied. Oest. 31 (1859).

Khorassan: NE: Mashhad, Ferdowsi University Campus, 1035 m, 3.7.2006, AKRAMIAN 38209 [FUMH].

Distribution in Iran: N, W, S, E, C.

***Eleusine indica*** (L.) GAERTN., Fruct. Sem. Pl. 1: 8 (1789).

Khorassan: NE: Mashhad, Ferdowsi University Campus, 1070 m, 10.7.2006, AKRAMIAN 38316 [FUMH].

Distribution in Iran: N, E.

***Elymus caninus*** (L.) L., Fl. Suec., ed. 2: 39 (1755).

Khorassan: NE: Mashhad, Ferdowsi University Campus, 1064 m, 4.6.2006, AKRAMIAN 37869 [FUMH].

Distribution in Iran: N, E.

***Elymus elongatus*** (HOST) RUNEMARK, Hereditas (Lund) 70. 156 (1972)

**subsp. elongatus**

Khorassan: NE: Mashhad, Ferdowsi University Campus, 1040 m, 5.5.2006 AKRAMIAN 37359 [FUMH]; – *ibid.* 1064 m, 17.8.2006, AKRAMIAN 38435 [FUMH]; – *ibid.* 1060 m, 9.6.2006, AKRAMIAN 38573 [FUMH].

Distribution in Iran: N, E.

***Elymus transhyrcanus*** (NEVSKI) TZVELEV, Novosti Sist. Vyssh. Rast. 9: 61 (1972)

**subsp. transhyrcanus**

Khorassan: N: S Chenaran, Freyzi Mt., 1720-1810 m, 8.6.2005, MEMARIANI & ZANGOOEI 36586 [FUMH].

Distribution in Iran: N, W, E, C.

***Hordeum murinum*** L., Sp. Pl. 85 (1753)

**subsp. leporinum** (LINK) ARCAND., Comp. Fl. Ital.: 805 (1882).

Khorassan: N: S Chenaran, Freyzi region, 1721 m, 1.5.2005, MEMARIANI &

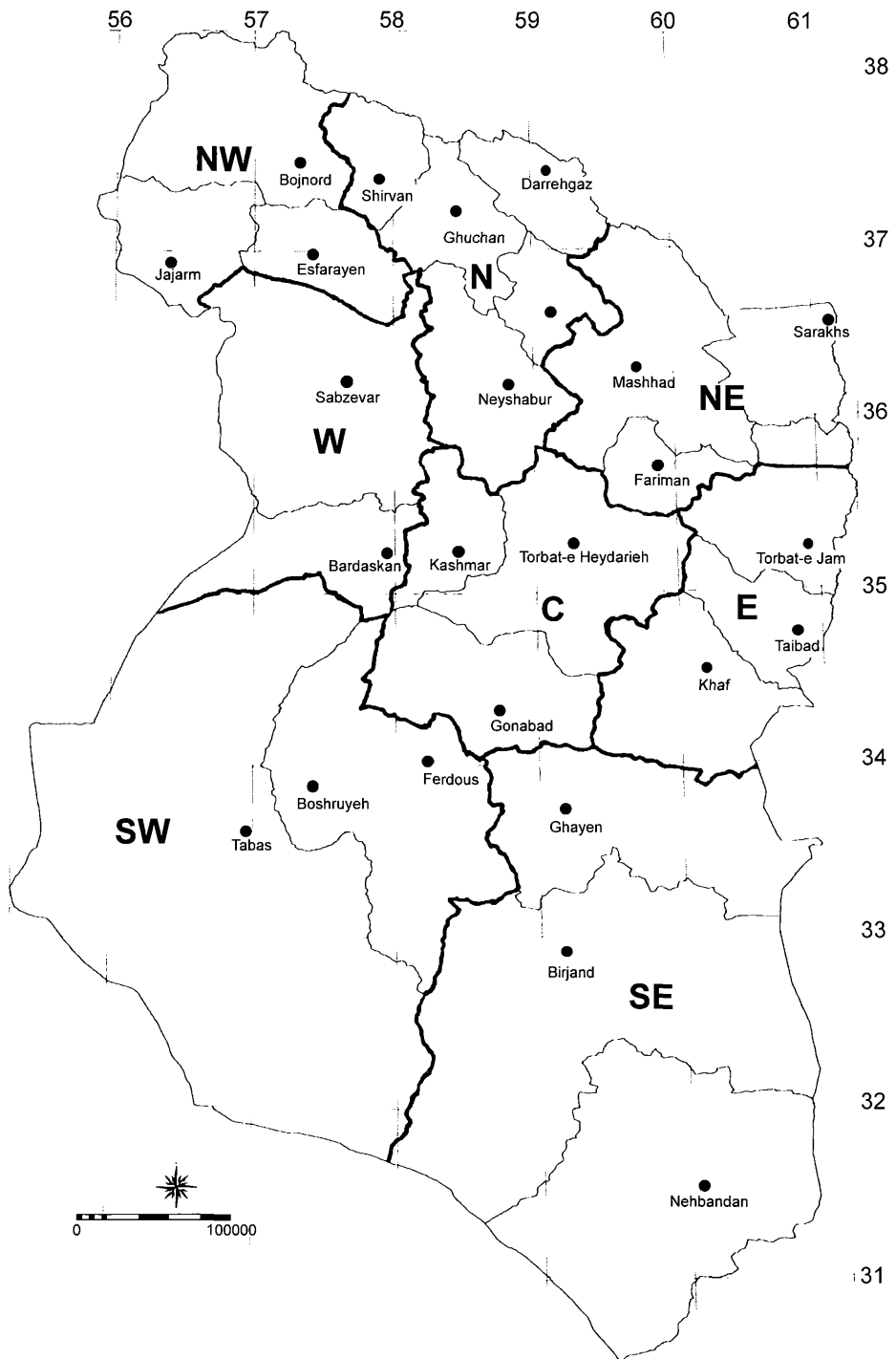


Fig. 1: Province of Khorassan. Localities in the catalogue are listed from NW to SE.

ZANGOUEI 36037 [FUMH]; – NE: Mashhad, Ferdowsi University Campus, 1064 m, 5.5.2006, AKRAMIAN 37346 [FUMH].

Distribution in Iran: N, W, E.

*Lolium multiflorum* LAM., Fl. Franc. 3: 621 (1778).

Khorassan: NE: Mashhad, Ferdowsi University Campus, 1064 m, 4.6.2006, AKRAMIAN 37358, 37873 [FUMH].

Distribution in Iran: N, W, E.

*Lolium persicum* BOISS. & HOHEN. ex BOISS., Diagn. Pl. Or. Nov. Ser. 1, 13: 66 (1853). Khorassan: NW: NW Bojnord, Rein towards Garmak, 1650-1700 m, 20.6.2006, ZANGOUEI & ARJMANDI 38115 [FUMH].

Distribution in Iran: N, W, S, E, C. This species was recorded from Khorassan in Flora Iranica. But the locality (SHARIF 8026-E!) belongs to Sistan & Baluchestan province, not Khorassan. Now it is confirmed with a correct locality.

*Parapholis incurva* (L.) C.E.HUBB., Blumea, Suppl. 3, 14 (1946).

Khorassan: SW: In argillosis salsis ad radices montium 8 km NW Aliabad, 33 59 N, 56 54 E, versus Asfak, 34 05 N, 57 06 E, 800 m, 12.5.1975, RECHINGER 51686 [W 1980-3705]; – SE: Nehbandan towards Tabasin, Asbest mine, 900 m, 30.4.1991, FAGHIHNIA & ZANGOUEI 19827 [FUMH].

Distribution in Iran: N, S, E. This species is recorded from Khorassan in Flora Iranica. But the locality (SHARIF 8013-E!) belongs to Sistan & Baluchestan province, not to Khorassan. Now it is confirmed with a correct locality.

*Poa annua* L., Sp. Pl.: 68 (1753).

Khorassan: N: Chenaran, Golmakan, Cheshmeh-Sabz [green spring], 1560 m, 31.10.1985, AYATOLLAHI & JOHARCHI 13632 [FUMH]; – NE: Mashhad, Zoshk, 2100-2500 m, 2.6.1991, JOHARCHI & ZANGOUEI 20598 [FUMH].

Distribution in Iran: N, W, E.

*Poa nemoralis* L., Sp. Pl.: 69 (1753).

Khorassan: NW: W Bojnord, between Haver and Barfandil, 1700-1900 m, 6.6.2004, JOHARCHI, AYDANI & GHAREMANINEJAD 35485 [FUMH, FAR]; – W Bojnord, S Darkash, Nargesli rangeland, 1590-1600 m, JOHARCHI, AYDANI & GHAREMANINEJAD 35697 [FUMH, FAR].

Distribution in Iran: N, W, E, C.

*Poa sterilis* M.BIEB., Fl. Taur.-Cauc. 1: 62 (1808).

Khorassan: NW: SW Bojnord, Hesar towards Shughan, 2502 m, 1.6.2008, JOHARCHI & ZANGOUEI 40599 [FUMH]; – N: Chenaran, Golmakan, Cheshme-Sabz [green spring], 1560 m, 2.6.1985, AYATOLLAHI & ZANGOUEI 13274 [FUMH].

Distribution in Iran: N, S, E, C.

*Rostraria berythea* (BOISS. & BLANCHE) HOLUB, Folia Geobot. Phytotax. 9: 271 (1974).

Khorassan: NE: Mashhad, Ferdowsi University Campus, 1064 m, 11.6.2006, AKRAMIAN 38048 [FUMH]; – ibid. 1040 m, 5.5.2006, AKRAMIAN 37354 [FUMH].

Distribution in Iran: W, E.

*Setaria viridis* (L.) P.BEAUUV., Ess. Agrost. 51, 171, 178 (1812).

Khorassan: N: S Chenaran, Freyzi region, Kandalan valley, 1414 m, 19.7.2005, MEMA-

RIANI & ZANGOUEI 36943 [FUMH]; – ibid. Gushkhar, 1620 m, 23.8.2005, MEMARIANI & EMADZADEH 36965 [FUMH]; – NE: Mashhad, Ferdowsi University Campus, 1035 m, 4.6.2006, AKRAMIAN 37883 [FUMH]; – Mashhad, Fallow fields and waste land at the Plant Pest and diseases Research Institute, 10.7.1972, ALAVA 10913 (with IRANSHAHR) [W 1974-22133].

Distribution in Iran: N, W, S, E, C.

*Trisetum flavescens* (L.) P.BEAUUV., Ess. Agrost. 88, 153, 180 (1812).

Khorassan: NW: SW Bojnord, Rein towards Garmak, 1600-1650 m, 21.6.2006, JOHARCHI & ZANGOUEI 38185 [FUMH].

Distribution in Iran: N, E. This species is recorded from Khorassan in Flora Iranica. But the locality (MERTON 3917!) belongs to Golestan (Gorgan) province, not to Khorassan. Now it is confirmed with a correct locality.

## DICOTYLEDONES

### Asteraceae DUMORT.

Ref.: DITTRICH & al. 1989.

*Iranecio elbrusensis* (BOISS.) B.NORD., Fl. Iranica 164: 55 (1989).

Khorassan: NW: SW Bojnord, between Hessar and Shughan, Saluk Mt., 2542 m, 1.6.2008, JOHARCHI & ZANGOUEI 40637 [FUMH]; – ibid. Saluk Mt., 2579 m, 13.7.2008, MEMARIANI & ZANGOUEI 41023 [FUMH].

Distribution in Iran: N, E, C. (endemic to Iran).

### Brassicaceae BURNETT

Ref.: DUDLEY 1964; HEDGE & RECHINGER 1968; LEONARD 1983; KAVOUSI 2001.

*Alyssum argentum* ALL., Miscell. Taur. 5: 73 (1774).

Khorassan: SE: NW Ghayen, Boskabad dam Mt., 2000 m, 3.5.1999, HOJJAT & ZANGOUEI 32260 [FUMH].

Distribution in Iran: N, W, E.

*Alyssum contemptum* SCOTT & KOTSCHY, Oesterr. Bot. Wochenbl. 4: 177 (1854).

Khorassan: N: Neyshabur, Sarvalayat, Chakane-ye Olia Mt., 1750 m, 13.5.1990, JOHARCHI & FAGHIHNIA, 18520 [FUMH].

Distribution in Iran: S, E, C.

*Alyssum harputicum* DUDLEY, J. Arn. Arb. 45 (1): 76, t, 4, f. 1-12 (1964).

Khorassan: N: SW Darrehgaz, Tandureh National Park, Shekarab Mt., 2300 m, 27.5.1991, JOHARCHI & ZANGOUEI 20451 [FUMH]; – NE Chenaran, 78 km from Boghmech to Hezar-masjed summit, 2400 m, 30.4.2000, HOJJAT & ZANGOUEI 32737 [FUMH]; – NE: S Mashhad, Maj Mt., 2300 m, 17.5.2001, JOHARCHI 33581-a [FUMH]; – S Kalat-e Naderi, Jarf, Sabzeh Meydan region, 1950-2100 m, 17.6.1996, RAAFEI & ZANGOUEI 27393 [FUMH]; – Mashhad, Zoshk Mt., 2500 m, 5.5.1985, JOHARCHI & SAFAVI 12557 [FUMH]; – S Mashhad, Pivejan, 1550 m, 29.4.1985, JOHARCHI & SAFAVI 12362 [FUMH]; – 75 km from Mashhad to Torbat-e Heydarieh in old road, near Assadabad, 29.4.1984, REZAEI & ZANGOUEI 10908 [FUMH]; – S

Mashhad, Robat-e Sefid Mt., 2000 m, 9.6.1991 JOHARCHI & ZANGOUEI 20663 [FUMH]; – C: 30 km SW Gonabad, Kalat Mt., 1700 m, 15.4.1985, JOHARCHI & ZANGOUEI 11951 [FUMH]; – SE: NW Ghayen, Khezri, Pir-e Mardanshah, 1700 m, 19.5.1986, AYATOLLAHI & ZANGOUEI 14373, 14377 [FUMH].

Distribution in Iran: E, C.

*Alyssum hirsutum* M.BIEB., Fl. Taur.–Cauc. 2: 106 (1808).

Khorassan: NW: 80 km west of Bojnord, between Jowzak and Chamanbid, 1300 m, 15.5.1988, JOHARCHI & ZANGOUEI 16622 [FUMH]; – SW Bojnord, after Firuzeh, Zo-ye Garivan, 1450 m, 1.6.1998, HOJJAT & ZANGOUEI 31205 [FUMH]; – N: SW Shirvan, Zoeram, 1100 m, 18.4.2000, JOHARCHI & ZANGOUEI 32673 [FUMH]; – NW Neyshabur, between Damanjan and Bar, 1450 m, 22.4.1997, FAGHIH NIA & ZANGOUEI 28215 [FUMH]; – NE: SW Sarakhs, Agh-Darband mine Mt., 1500 m, 14.4.1999, HOJJAT & ZANGOUEI 31925 [FUMH].

Distribution in Iran: N, W, E, C.

*Alyssum iranicum* HAUSSKN. ex BAUMG., Jahresber. Kais.-Franz-Josef-Oberrealschule Baden b. Wien 48: 9 (1911).

Khorassan: NW: SW Bojnord, Rein, Bauli, 2370-2520 m, 28.5.2006, MEMARIANI & ZANGOUEI 37827 [FUMH]; – SE: Ghayen to Birjand, 30 km, 1900 m, 17.5.1986, AYATOLLAHI & ZANGOUEI 14218 [FUMH].

Distribution in Iran: W, E.

*Alyssum lanigerum* DC., Reg. Veg. Syst. Nat. 2: 308 (1821).

Khorassan: N: SW Shirvan, Kalateh Sohrab Mt., 2100 m, 15.6.1998, RAAFEEI & ZANGOUEI 31629 [FUMH]; – N Ghuchan, Kalateh Mollamohammad, 1500-1550 m, 17.6.1981 GHORASHIALHOSEINI 922-G [FUMH]; – N Ghuchan, 12 km after bifurcation, towards Darrehgaz, 1900 m, 21.6.1995, RAAFEEI & ZANGOUEI 25912 [FUMH]; – S Darrehgaz, 9 km from Kalateh Gorni to Rishkhar, Aleza region, 2050 m, 9.6.1997, RAAFEEI & ZANGOUEI 29144 [FUMH].

Distribution in Iran: W, E, C.

*Alyssum murale* WALDST. & KIT., Pl. Rar. Hung. 1: 5 (1799).

Khorassan: NW: SW Bojnord, Arkan to Rein, Gharanghazo, 2050 m, 20.5.2006, MEMARIANI & ZANGOUEI 37598, 37599 [FUMH]; – ibid. Topal-Raye, 1961 m, 7.5.2006, MEMARIANI & ARJMANDI 37456 [FUMH].

Distribution in Iran: E, C.

*Alyssum obtusifolium* STEV. ex DC., Syst. Nat. 2: 305 (1821).

Khorassan: NW: Between Bojnord and Esfarayen, Garivan, 1800 m, 13.5.1991, FAGHIH NIA & ZANGOUEI 20130 [FUMH]; – N: Chenaran to Boghmech, km 30, 1900 m, 29.4.2000, HOJJAT & ZANGOUEI 32720 [FUMH].

Distribution in Iran: E, C.

*Alyssum polycaldum* RECH.f., Phytion 3: 55 (1951).

Khorassan: NW: W Bojnord, Ghorkhud, 1600 m, 31.5.1998, HOJJAT & ZANGOUEI 31183 [FUMH]; – N: SW Shirvan, Badamlegh, Malek-Aman Mt., 1600 m, 8.6.1998, FAGHIH NIA & ZANGOUEI 31375 [FUMH]; – 27 km south of Darrehgaz, AllahoAkbar pass., 1750-1800 m, 4.6.1981, GHORASHIALHOSEINI 709-G [FUMH].

Distribution in Iran: N, W, E, C.



*Alyssum repens* BAUMG., Enum. Strip. Transs. 2: 237 (1819)

**subsp. *trichostachyum*** (RUPR.) HAYEK, Prodr. Fl. Penins. Balcan. 1: 436 (1925).

Khorassan: N: N Ghuchan, between Emam-baad and Alibolagh, 2000 m, 13.6.1988, JOHARCHI & ZANGOUEI 16900 [FUMH].

Distribution in Iran: W, E.

*Alyssum sibiricum* WILLD., Sp. Pl. 3 (1): 465 (1800).

Khorassan: NW: SW Bojnord, Shughan, Saluk Mt., 2250 m, 27.6.1995, RAAFEI & ZANGOUEI 26035 [FUMH].

Distribution in Iran: W, E.

*Alyssum singarense* BOISS. & HAUSSKN., Buser, Suppl. Fl. Or. 49 (1888).

Khorassan: NW: 10 km from Bojnord to Esfarayen, 1450 m, 13.5.1991, FAGHIHnia & ZANGOUEI 20111 [FUMH].

Distribution in Iran: W, E.

*Alyssum strictum* WILLD., Sp. Pl. 3 (1): 464 (1800).

Khorassan: NW: SW Bojnord, Rein, Delove valley, 1693 m, 22.4.2006, MEMARIANI & ZANGOUEI 37261 [FUMH]; – NW Bojnord, Emam Darreh, 1000 m, 17.4.2001, JOHARCHI & ZANGOUEI 33297 [FUMH]; – N: Between Ghuchan and Darrehgaz, bifurcation of Darrehgaz, new road, 1750 m, 9.5.1999, HOJJAT & ZANGOUEI 32295 [FUMH].

Distribution in Iran: N, W, E.

*Alyssum strigosum* BANKS & SOLAND., in A. RUSSELL, Nat. Hist. Aleppo 2: 257 (1794).

Khorassan: NW: NW Bojnord, between Anabay and Gouinik, 1150 m, 22.4.2001, JOHARCHI & ZANGOUEI 33484 [FUMH]; – NW Bojnord, Emam Darreh, 1000 m, 17.4.2001, JOHARCHI & ZANGOUEI 33296 [FUMH]; – NW Bojnord, Gouinik, 1200 m, 22.4.2001, JOHARCHI & ZANGOUEI 33506 [FUMH]; – SW Bojnord, Rein towards Garmak, 1560-1644 m, 15.4.2006 MEMARIANI & ZANGOUEI 37167 [FUMH]; – SW Bojnord, Rein, northern slopes of Shahnesan Mt., 1850-2010 m, 6.5.2006, MEMARIANI & ARJMANDI 37406 [FUMH]; – SW Bojnord, Rein, Delove valley, 1693 m, 22.4.2006, MEMARIANI & ZANGOUEI 37235 [FUMH]; – W Bojnord, Badranlou hills, 1920 m, 12.6.1996, RAAFEI & ZANGOUEI 27285 [FUMH]; – E Bojnord, Sisab, Researches station, 1450 m, 16.5.1988, JOHARCHI & ZANGOUEI 16646 [FUMH]; – N: SW Shirvan, Badamlegh, Shahvalad, 1600 m, 8.6.1998, FAGHIHnia & ZANGOUEI 31406 [FUMH]; – NE Faruj, between Darbandi and Gharkeh, 1400 m, 6.6.1998, FAGHIHnia & ZANGOUEI 31256 [FUMH]; – N Ghuchan, Aselma Mt., 1800 m, 15.4.2001, FAGHIHnia & ZANGOUEI 33310 [FUMH]; – N Ghuchan, between Rahvard and Asibolagh, 1600 m, 10.6.1998, FAGHIHnia & ZANGOUEI 31496 [FUMH]; – N Ghuchan, between Emam-baad and Alibolagh, 2000 m, 13.6.1988, JOHARCHI & ZANGOUEI 16897 [FUMH]; – SW Darrehgaz, Tivan Mt., 2100 m, 5.6.2003, ZANGOUEI & AJANI 34677 [FUMH]; – SW Darrehgaz, Tandureh National Park, between Shekarab and Chelmir, 1650-2000 m, 8.6.1997, RAAFEI & ZANGOUEI 29089 [FUMH]; – *ibid.* 27.5.1991, JOHARCHI & ZANGOUEI 20466 [FUMH]; – *ibid.* Babanestan, 1000 m, 10.5.1999, HOJJAT & ZANGOUEI 32325 [FUMH]; – *ibid.* Chelmir, 980 m, 11.5.1999, HOJJAT & ZANGOUEI 32381 [FUMH]; – W Darrehgaz, Zinadanlou 1000 m, 1.5.1988, JOHARCHI & ZANGOUEI 16422 [FUMH]; – *ibid.* Gadakanlou, 1200 m, 1.5.1988, JOHARCHI & ZANGOUEI 16335

[FUMH]; – S Darrehgaz, Gherkhghez stony hills, 450 m, 2.5.1988, JOHARCHI & ZANGOUEI 16459 [FUMH]; – SW Darrehgaz, Kapkan, 1550 m, 30.4.1988, JOHARCHI & ZANGOUEI 16301 [FUMH]; – NE Chenaran, Boghmech, Hezareh, 1900 m, 18.6.1997, HOJJAT & ZANGOUEI 29269 [FUMH]; – S Chenaran, Freyzi region, Heyte Osta-Ali, 1730 m, 12.6.2005, MEMARIANI & ZANGOUEI 36689 [FUMH]; – ibid. Heyte Shaaban, 1800 m, 15.6.1993, FAGHIH NIA & ZANGOUEI 23370 [FUMH]; – ibid. between Ab-ghad and Freyzi, 1480-1500 m, 23.4.2005, MEMARIANI & ZANGOUEI 35875 [FUMH]; – N Neyshabur, Mirabad Mt., 1650 m, 23.4.1997, FAGHIH NIA & ZANGOUEI 28232 [FUMH]; – Sarvelayat, Chakaneh- ye Olia, eastern Mt., 1750 m, 13.5.1990, JOHARCHI & FAGHIH NIA 18534 [FUMH]; – NW Neyshabur, between Damangan and Bar, 1450 m, 22.1.1997, FAGHIH NIA & ZANGOUEI 28215 [FUMH]; – ibid. Bar, Abshar, 1850-1900 m, 20.5.1996, RAAFEI & ZANGOUEI 27069 [FUMH]; – N Neyshabur, Baghrud, 1500 m, 12.5.1991, JOHARCHI & ZANGOUEI 20091 [FUMH]; – NE: W Mashhad, Zoshk, 1900 m, 27.5.1983, REZAEI 10332 [FUMH]; – NE Mashhad, northern slopes of Ajdarkuh, Joghri, 1300 m, 30.5.1993, JOHARCHI & ZANGOUEI 23236 [FUMH]; – N Mashhad, Kardeh Mt., 1500 m, 23.4.1995, FAGHIH NIA & ZANGOUEI 25023 [FUMH]; – ibid. N Kardeh, All, 1700 m, 23.4.1995, FAGHIH NIA & ZANGOUEI 24996 [FUMH]; – SW Mashhad, Pivajen, old cave Mt., 2000 m, 16.6.1993, FAGHIH NIA & ZANGOUEI 23398 [FUMH]; – ibid. Dizbad-e Olia, 1700-1800 m, 19.5.1996, RAAFEI & ZANGOUEI 26931 [FUMH]; – Sarakhs, Bazangan Mt., 1500 m, 24.4.1985, JOHARCHI & SAFAVI 12232 [FUMH]; – N Mashhad, 65 km towards Kalat-e Naderi, 1550 m, 19.6.1991, FAGHIH NIA & ZANGOUEI 20897 [FUMH]; – SW Kalat-e Naderi, Jarf Mt., 2100 m, 19.5.1994, FAGHIH NIA & ZANGOUEI 23941 [FUMH]; – NW Kalat-e Naderi, Archangan, 830 m, 23.4.1989, JOHARCHI & ZANGOUEI 17084 [FUMH]; – Fariman, Dam (Band), 1500 m, 24.4.1984 AYATOLLAHI & MAHVAN 10814 [FUMH]; – C: NW Torbat-e Heydarieh, 7 km from Fadiheh towards Rudmajan, 1610 m, 14.5.1996, RAAFEI & ZANGOUEI 26821 [FUMH].

Distribution in Iran: N, W, S, E, C.

***Crambe orientalis*** L., Sp. Pl. 671 (1753).

Khorassan: NW: N Bojnord, northern hills of Raz, 1474 m, 19.5.2008, JOHARCHI & ZANGOUEI 40203 [FUMH].

Distribution in Iran: N, W, S, E, C.

***Hesperis kurdica*** DVORAK & HADAC, Preslia 36: 307 (1964).

Khorassan: NW: E Jajarm, Sankhast, Ghelli, 1027 m, 23.4.2008, JOHARCHI & ZANGOUEI 39573 [FUMH]; – NW Esfarayen, Saluk Natinal Park, Darreh-e Jowz, 1789 m, 4.5.2008, JOHARCHI & ZANGOUEI 39781 [FUMH].

Distribution in Iran: W, S, E.

***Neortorularia contortuplicata*** (STEPHAN ex WILLD.) HEDGE & J. LEONARD, Bull. Jard. Bot. Natl. Belg. 56 (3-4): 393 (1986).

Khorassan: NW: NW Bojnord, between Garmab and Shahrabad, 634 m, 12.3.2005, Memariani & Zangooui 37085 [FUMH]

Distribution in Iran: N, E.

***Tetracme contorta*** BOISS., Fl. Or. 1: 317 (1867).

Khorassan: SE: E Ghayen, Yazdan towards Afghanistan border, 500 m, 10.4.1988, JOHARCHI & ZANGOUEI 16003 [FUMH]; – ibid. between Yazdan and Petergan, 450 m,

10.4.1988, JOHARCHI & ZANGOUEI 16012 [FUMH].

Distribution in Iran: E, C.

### **Caryophyllaceae JUSS.**

Ref.: RECHINGER & al. 1988.

*Acanthophyllum pachycephalum* SCHIMAN-CZEIKA, Fl. Iranica 163: 269 (1988).

Khorassan: NW: W Esfarayen, Chaharborj valley, 1200 m, 17.6.1998, RAAFEEI & ZANGOUEI 31677 [FUMH].

Distribution in Iran: W, E, C. (endemic to Iran).

*Gypsophila linearifolia* (FISCH. & C.A.MEY.) BOISS., Fl. Or. 1: 550 (1867).

Khorassan: NE: SW Sarakhs, between Dorahi-ye Salehabad and Mazdavand (Mozduran), 600 m, 4.6.1988, JOHARCHI & ZANGOUEI 16715 [FUMH].

Distribution in Iran: W, S, E, C.

### **Plumbaginaceae LINDL.**

Ref.: RECHINGER & SCHIMAN-CZEIKA 1974.

*Acantholimon gilliatii* TURRIL, Kew. Bull. 1930: 441 (1930).

Khorassan: NW: NW Bojnord, between Gounik and Baghleh, 11.6.2001, JOHARCHI & ZANGOUEI 33696 [FUMH].

Distribution in Iran: W, E.

### **Rosaceae JUSS.**

Ref.: BROWICZ & al. 1969, KHATAMSAZ 1992.

*Cydonia oblonga* MILLER, Gard. Dict., ed. 8 (1768).

Khorassan: NW: NW Bojnord, Shahtut, Wayway valley, 1274 m, 31.8.2008, JOHARCHI & ZANGOUEI 41406 [FUMH].

Distribution in Iran: N, W, S, E.

### **Rubiaceae JUSS.**

Ref.: EHRENDOFER & al. 2005.

*Asperula gorganica* SCHÖNB.-TEM. & EHREND., Bot. Jahrb. 107: 80 (1985).

Khorassan: NW: W Bojnord, Ghorkhud, 6 km from Kasetam to Chalbash, Solabach valley, 1325 m, 14.7.2008, MEMARIANI & ZANGOUEI 41090 [FUMH].

Distribution in Iran: N, E. (endemic to Iran).

*Galium ghilanicum* STAPF, Denkschr. Akad. Wiss. Wien, Math.-Nat. Kl. 50 (1885): 53 (1886).

Khorassan: NW: NW Bojnord, between Ghorrimeydan and Dashtak, 650–700 m, 28.4.2001, JOHARCHI & ZANGOUEI 33391 [FUMH].

Distribution in Iran: N, W, E, C.

*Galium hyrcanicum* C.A.MEY., Verz. Pfl. Cauc. 53 (1831).

Khorassan: NW: SW Bojnord, Saluk Mt., 2400 m, 11.7.1994, ZANGOUEI 24468 [FUMH].

Distribution in Iran: N, W, E, C.

***Galium nupercreatum*** M. POP., Bull. Appl. Bot. Pl. Breed. 17: 278 (1928).

Khorassan: NE: W Mashhad, Kang valley, 1500-1600 m, 1.6.2005, JOHARCHI & ZANGOUEI 36513 [FUMH].

Distribution in Iran: S, E.

***Galium tenuissimum*** M. BIEB., Fl. Taur.; – Cauc. 1: 104 (1808)

**f. *trichophorum*** (KAR. & KIR.) EHREND. & SSCHÖNB.-TEM., Fl. Iranica 176: 247 (2005).

Khorassan: NW: SW Bojnord, between Darkesh and Havar, 1350 m, 13.6.2001, JOHARCHI 33774 [FUMH]; – SW Bojnord, Rein towards Garmak, 1600-1650 m, 21.6.2006, JOHARCHI & ZANGOUEI 38146 [FUMH].

Distribution in Iran: N, E.

***Galium verum*** L., Sp. Pl.: 107 (1753)

**subsp. *glabrescens*** EHREND., Pl. Syst. Evol. 127: 302 (1977).

Khorassan: N: NW Neyshabur, Bar, 1650 m, 19.6.1988, JOHARCHI & ZANGOUEI 16945 [FUMH].

Distribution in Iran: N, W, E, C.

## **Tamaricaceae LINDL.**

Ref.: SCHIMAN-CZEIKA 1964, ASSADI 1989.

***Tamarix arceuthoides*** BUNGE, Mem. Acad. St. Petersb. 7: 295 (1851).

Khorassan: NW: W Bojnord, 20 km from Ashkhaneh to Shahrabad, 700 m, 6.8.1987, ZANGOUEI 15770 [FUMH]; – NE: Sarakhs, Bazangan lake, 800 m, 18.8.1994, AKHANI & ZANGOUEI 24579 [FUMH]; – SE Kalat-e Naderi, 24 km from Chahchah-heh to Kalat road, 700 m, 17.9.1994, AKHANI & ZANGOUEI 24542 [FUMH]; – W Kalat-e Naderi, 10 km from Layen to Kalat, 550 m, 30.5.1976 ZARGARI 6235 [FUMH]; – S Sarakhs, between Dowlatabad and Nowruzabad, 490 m, 31.5.1995, RAA-FEEI & ZANGOUEI 25681 [FUMH]; – C: SE Gonabad, Kabutar Kuh, 1533 m, 12.5.2006, KHASSANOV & MEMARIANI 37461 [FUMH]; – SW: SW Tabas, Mezino mine, 1100 m, 16.4.1996, RAA-FEEI & ZANGOUEI 26356 [FUMH]; – Tabas, Kharw, 1250 m, 9.4.1985, AYATOLLAHI & ZANGOUEI 11883 [FUMH]; – 23 km NE Deyhuk, 33 18 N, 57 30 E, "dasht", 1100 m, 10.5.1975, RECHINGER 57611 [W 1984-12138]; – SE: S Nehbandan, Khunik pass, 1200 m, 31.7.2001, FAGHIHNIA 33930 [FUMH].

Distribution in Iran: W, S, E, C.

***Tamarix aucheriana*** (DECNE.) BAUM, The Genus *Tamarix*: 148 (1978).

Khorassan: W: S Sabzevar, Harsabad, Kalshur, 923 m, 21.5.2007, JOHARCHI & NASSEH 38882 [FUMH]; – Yahyaabad, km 60 SE Sabzevar, 940 m, 29.4.1979, REJAMAND & BAZARGAN 31744 [W 1979-7486]; – ibid. REJAMAND & BAZARGAN 31743 [W 1979-7487]; – Km 75 Sabzevar, 20.4.1976, 940 m, REJAMAND & BAZARGAN 31789 [W 1979-7480]; – ibid. REJAMAND & BAZARGAN 31787 [W 1979-7489]; – Km 10 SW Sabzevar, 940 m, 6.4.1976, REJAMAND & BAZARGAN 31672 [W 1979-7483].

Distribution in Iran: S, E.

***Tamarix brachystachys*** BUNGE, Tentamen 26 (1852).

Khorassan: NW: NW Bojnord, 2 km from Eshghabad to Dashtak, 580 m, 15.4.2008, MEMARIANI & ZANGOUEI 39461-2 [FUMH].

Distribution in Iran: W, E.

***Tamarix dubia*** BUNGE, Tent. Gen. Tam. 18 (1852).

Khorassan: E: SW Khaf, Ebrahimi towards Keybarkuh, 995 m, 29.4.2007, JOHARCHI 38741 [FUMH]; – SE: SE Birjand, Doroh towards Afghanistan border, 1000 m, 30.4.1996, RAAFEI & ZANGOUEI 26519 [FUMH]; – S Birjand, Taghiabad, 1600 m, 27.4.1998, FAGHIHNI & ZANGOUEI 30141 [FUMH]; – W Birjand, Rakat, 1500 m, 14.4.1981, GHORASHIALHOSEINI 436-b [FUMH]; – W Birjand, 97 km towards Tabas, 1350 m, 1.5.1976, ZARGARI 6241 [FUMH].

Distribution in Iran: S, E, C.

***Tamarix karakalensis*** FREYN & SINT., Bull. Herb.Boiss. 2. Ser. 3: 1060 (1903).

Khorassan: NW: N Bojnord, 5 km from Ghezel-Ghala to Shahtut, 610 m, 31.8.2008, JOHARCHI & ZANGOUEI 41381 [FUMH]; – W Bojnord, 20 km from Ashkhaneh to Shahabad, 700 m, 6.8.1987, ZANGOUEI 15771 [FUMH]; – N: SE Darrehgaz, Hatam-Ghala, 300 m, 16.5.1993, JOHARCHI & ZANGOUEI 23112 [FUMH]; – NE: Sarakhs, between Chahchaheh and Kal-Sorkh, pistachio forest, 14.6.1995, FAGHIHNI & ZANGOUEI 25801 [FUMH]; – W Sarakhs, Bazangan lake, 800 m, 18.8.1994, AKHANI & ZANGOUEI 24580 [FUMH]; – W: S Sabzevar, Haresabad, Kal-Shur, 923 m, 21.5.2007, JOHARCHI & NASSEH 38884 [FUMH]; – C: SE Gonabad, Kabutarkuh, 1450 m, 2.5.1999, HOJJAT & ZANGOUEI 32236 [FUMH]; – E: E Torbat-e Jam, Harirud, Pol-e Abrisham [Silk bridge] in Iran-Afghanistan border, 670 m, 3.6.2002, JOHARCHI 34170 [FUMH]; – SW: SE Tabas, 134 km from Deyhuk to Ravar, Dig-e Rostam, 800 m, 28.2.1976, ZARGARI 6234,6236 [FUMH]; – SE: W Birjand towards Rakat, Rech, 1690 m, 30.4.1984, PUYAN, 360 [FUMH]; – ibid. 1500 m, 14.4.1981, GHORASHIALHOSEINI 436-a [FUMH]; – ibid. between Kowr and Mazar-e Balanjir, Kalateh Bagh, 1400 m, 20.4.1999, FAGHIHNI & ZANGOUEI 32134 [FUMH]; – NE Birjand, between Rezg and Piranag, 1800 m, FAGHIHNI & ZANGOUEI 32044 [FUMH]; – Nehbandan, 20 km from Khan-Sharaf to Asbest mines, 1300 m, 13.4.1992, FAGHIHNI & ZANGOUEI 21461 [FUMH].

Distribution in Iran: N, E, C.

***Tamarix mascatensis*** BUNGE, Tentamen 60 (1852).

Khorassan: SE: Nehbandan towards Chah-Chuchu, km 20, 1200 m, 10.4.1998, HOJJAT & ZANGOUEI 29953 [FUMH]; – SE Nehbandan, Bandan, 750 m, 10.4.1998, HOJJAT & ZANGOUEI 29958, 29964 [FUMH].

Distribution in Iran: S, E.

***Tamarix pycnocarpa*** DC., Prodr. 3: 97 (1828).

Khorassan: SW: SW Tabas, Mezino mine, 1100 m, 16.4.1996, RAAFEI & ZANGOUEI 26357 [FUMH].

Distribution in Iran: E, C.

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