

The Asian Umbelliferae Biodiversity Database (ASIUM) with Particular Reference to South-West Asian Taxa

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Abstract: An original database, ASIUM, on Asian *Umbelliferae* has been compiled at the Moscow State University to include all accepted names and synonyms, principal citations in regional Floras, monographs and critical articles, protologue data and distribution in countries, their regions and provinces. A special option permits the arrangement of synonyms, which can be divided into several homotypic groups. It is also possible to extract information for analysis and comparison, for instance, of species sets from different regions to estimate their similarity. ASIUM is a mobile monograph of the *Umbelliferae* for a continent, with their maximal biodiversity at the generic and specific levels: 286 genera and 2089 species of the family (s.l.) are registered in the database. The largest *Umbelliferae* genera in Asia are *Ferula* L., *Bupleurum* L., *Pimpinella* L., *Heracleum* L., *Seseli* L., *Angelica* L., *Bunium* L., *Prangos* Lindl., *Ferulago* W.D.J.Koch, *Hymenidium* Lindl., *Hydrocotyle* L., *Chaerophyllum* L., *Eryngium* L., *Pternopetalum* Franch., *Elaeosticta* Fenzl, *Acronema* Falc. ex Edgew. and *Semenovia* Regel & Herder. Maximal species diversity is observed in China, Asiatic Turkey, Iran, Asiatic Russia, Kazakhstan, India, Afghanistan, Kyrgyzstan, Uzbekistan, Georgia and Syria. Nearly all these countries boast the largest number of endemics. In Turkey there are 4 endemic genera and 140 endemic species, including 6 problematic ones. South-west Asia as a whole is an area of considerable diversity and endemism of the *Umbelliferae*.

Key Words: Asian Umbelliferae, ASIUM, biodiversity, database, distribution, endemism

Introduction

The documentation of plant biodiversity is now one of the main tasks of any botanical community, and has several applications in conservation and protection. The use of databases is one of the most effective ways to document taxa and their distribution. At the Moscow State University (MSU) an original database, ASIUM, has been designed to store and retrieve information on the Asian *Umbelliferae*.

This has been possible after more than 40 years of multidisciplinary investigations of the Umbels of the largest continent: Asia. These investigations included anatomy, especially carpoanatomy, morphology, karyology, phytochemistry and molecular systematics, as well as field research, before 1991 in various regions of the former Soviet Union and after 1991 in other parts, for instance in Turkey, China, India, Nepal and Iran. ASIUM is the third computer database compiled at the Botanical Garden, MSU and has been prepared in cooperation with the Department of Computer Science of the same university.

Since 1984 the multidisciplinary studies of the plant family *Umbelliferae* at the MSU Botanical Garden have been designed as specialised databases and are permanently maintained and upgraded in an MS-DOS environment under FoxPro 2.6 on an IBM PC-486 (66 Mhz). Several informative outcomes have resulted this database:

GNOM: Generic NOMenclator: a database on the nomenclature of the worldwide *Umbelliferae* genera which is constantly updated (<http://www.botanik.cs.msu.su>; Pimenov & Leonov, 1993; Pimenov & Leonov, 1992). There are 464 accepted generic names registered in GNOM and the total number of names, including synonyms, exceeds 1019; 1107 references have been used. In Asia there are 286 genera, with 141 in Europe, 133 in Africa, 93 in North America, 27 in Central America, 51 in South America and 36 in Australia.

CARUM: CARyologia UMBelliferarum, a database compiling information on chromosome numbers and karyotypes of the worldwide *Umbelliferae* (see Pimenov et al., 2003). In this database karyo-taxonomic

information is arranged according to the species names and synonyms, and under each accepted species, in chronological order. The database provides chromosome numbers for 1761 species in 345 genera and geographical data showing the origin (with exactness regarding country or, sometimes, province) of the plant material is examined.

The ASIUM database is now nearing completion with polishing left to be done mainly in the typification and lectotypification of names of old and "exotic" species, as well as distribution on a provincial level. In general, the list of Asian *Umbelliferae* has now been compiled. The database contains all accepted names and synonyms of Asian *Umbelliferae* and main citations from regional Floras, including the Caucasus (Tamamschian, 1967), Turkey (Hedge et al., 1972), Pakistan (Nasir, 1972), China (Shan & Sheh, 1979, 1985, 1992), Middle Asia and Kazakhstan (Pimenov, 1983), Tajikistan (Korovin et al., 1984), the "Flora Iranica" area (Hedge et al., 1987), the Russian Far East (Pimenov, 1987), India (Mukherjee

& Constance, 1993), Siberia (Pimenov, 1996) and Japan (Ohba, 1999) and from monographs and critical articles.

In ASIUM, Asia is circumscribed in more or less the usual extent (from the Ural Mts, including the Causasus as a whole, the Eastern Aegean Islands, Turkey and Sinai, excluding Sokotra, up to Chukotka, Japan, the Philippines and Papua-New Guinea). It includes 2089 accepted names of Asian species (the total number of names, accepted and synonyms, specific and infraspecific, is 7201), belonging to 286 genera; the number of references is 2061. A special option permits the arrangement of synonyms, which can be divided into several homotypic groups. This option is especially valuable for the *Umbelliferae*, as in this family many species have considerable synonymy, and generic nomenclature constantly changes. An example of a common East Asian species, *Angelica dahurica* (Fisch. Ex Hoffm.) Benth. & Hook.f. ex Franch. & Savat., is given in Table 1. The synonyms can be arranged as nomenclatural, homotypic or taxonomical (heterotypic); there are also misapplied names.

Table 1. Arrangement of synonyms in the ASIUM database.

I. Accepted name (<i>Angelica dahurica</i>) and 10 synonyms, arranged chronologically	
<i>Callisace dahurica</i> Fisch. ex Hoffm.	1816
<i>Thysselinum dahuricum</i> (Fisch. ex Hoffm.) Spreng.	1825
<i>Imperatoria dahurica</i> (Fisch. ex Hoffm.) D.Dietr.	1840
<i>Angelica dahurica</i> (Fisch. ex Hoffm.) Benth. & Hook.f. ex Franch. & Savat.	1875
<i>Angelica pubescens</i> Maxim. var. <i>glabra</i> Yabe	1902
<i>Angelica edulis</i> auct. non Miyabe: H.Boissieu	1906
<i>Angelica glabra</i> (Yabe) Makino	1907
<i>Angelica tschiliensis</i> H.Wolff	1926
<i>Angelica macrocarpa</i> H.Wolff	1930
<i>Angelica formosana</i> auct. non. H.Boissieu: M.Hiroe	1958
<i>Angelica porphyrocaulis</i> auct. non Nakai & Kitag.: M.Hiroe	1958
II. Names, arranged in homotypic groups	
1 <i>Callisace dahurica</i> Fisch. ex Hoffm.	1816
1 <i>Thysselinum dahuricum</i> (Fisch. ex Hoffm.) Spreng.	1825
1 <i>Imperatoria dahurica</i> (Fisch. ex Hoffm.) D.Dietr.	1840
1 <i>Angelica dahurica</i> (Fisch. ex Hoffm.) Benth. & Hook.f. ex Franch. & Savat	1875
2 <i>Angelica pubescens</i> Maxim. var. <i>glabra</i> Yabe	1902
2 <i>Angelica glabra</i> (Yabe) Makino	1907
3 <i>Angelica tschiliensis</i> H.Wolff	1926
4 <i>Angelica macrocarpa</i> H.Wolff	1930
X <i>Angelica edulis</i> auct. non Miyabe: H.Boissieu	1906
X <i>Angelica formosana</i> auct. non. H.Boissieu: M.Hiroe	1958
X <i>Angelica porphyrocaulis</i> auct. non Nakai & Kitag.: M.Hiroe	1958

The largest genera of the *Umbelliferae* in Asia are *Ferula* L. (177 spp.), *Bupleurum* L. (155 spp.), *Pimpinella* L. (125 spp.), *Heracleum* L. (109 spp.), *Seseli* L. (101 spp.), *Angelica* L. (87 spp.), *Bunium* L. (43 spp.), *Prangos* Lindl. (43 spp.), *Ferulago* W.D.J.Koch (37 spp.), *Hymenidium* Lindl. (35 spp.), *Hydrocotyle* L. (35 spp.), *Chaerophyllum* L. (34 spp.), *Eryngium* L. (34 spp.), *Pternopetalum* Franch. (32 spp.), *Acronema Falc. ex Edgew.* (23 spp.) and *Semenovia* Regel & Herder (22 spp.) (Table 2). In the table the number of species in the world and in Turkey is also provided. Global diversity in some genera, especially in the largest one, is approximate. It can be seen that the majority of the worldwide species diversity is concentrated in Asia in such genera as *Ferula*, *Seseli*, *Bupleurum*, *Pimpinella*, *Bunium*, *Ferulago* and *Prangos*, and *Hymenidium*, *Pternopetalum*, *Acronema* and *Semenovia*, which are exclusively Asiatic. The Asian countries with the greatest biodiversity are China, Turkey (As.), Iran, Russia (As.) and Kazakhstan (Table 3). The maximum number of *Umbelliferae* species

is given for Chinese flora (677 species in 108 genera). The distribution of species in its provinces is very irregular (Table 4) with Sichuan and Yunnan, the 2 provinces of South-West China, having an outstanding diversity of species. In the same provinces the maximal number of *Umbelliferae* endemics are also present. The rather high numbers of species in Xizang and Xinjiang could be explained by very large areas of both these provinces. Turkey, with a considerably smaller area, occupies second place in our list (450 species in 109 genera). This means that Asiatic Turkey has the highest concentration of species-level *Umbelliferae* diversity in Asia, and probably in the world. There are 4 endemic genera in Turkey: *Aegokeras* Raf., *Ekimia* H.Duman, *Postiella* Kljuykov, and *Crenosciadium* Boiss. & Heldr. ex Boiss. The number of endemic species is high, 140 (including 6 problematic) species in 42 genera (Table 5).

Table 2. The largest genera of Asian Umbelliferae number of species.

Genus	Asia	World	Turkey
<i>Ferula</i>	177	180-185	17
<i>Bupleurum</i>	155	185-195	49
<i>Pimpinella</i>	125	170-180	24
<i>Heracleum s.l.</i>	109	120-125	23
<i>Seseli</i>	101	125-140	9
<i>Angelica</i>	87	110-115	4
<i>Bunium</i>	43	45-50	14
<i>Prangos</i>	42	43	14
<i>Ferulago</i>	37	47	28
<i>Hymenidium</i>	35	35	-
<i>Hydrocotyle</i>	35	120-130	2
<i>Chaerophyllum</i>	34	45	16
<i>Eryngium</i>	33	250-260	22
<i>Pternopetalum</i>	32	32	-
<i>Elaeosticta</i>	26	26	2
<i>Acronema</i>	23	23	-
<i>Semenovia</i>	22	22	-

Table 3. Asiatic countries with the greatest biodiversity in the Umbelliferae.

Country	Genera	Species
China	108	677
Turkey (As.)	109	450
Iran	111	350
Russia (As.)	105	278
Kazakhstan	78	236

Table 4. Umbelliferae biodiversity in China.

Country part and province	Genera	Species
NW China	66	201
Xinjiang Weiwuer A.R.	52	125
Gansu	33	86
Tibet	53	208
Xizang A.R.	50	186
Qinghai	21	53
N China	46	135
Neimenggu A.R.	28	49
Ningxia Huizu A.R.	8	11
Shaanxi	29	72
Shanxi	30	53
Hebei	37	66
Shandong	27	40
NE China	36	75
Heilongjiang	24	44
Jilin	26	54
Liaoning	30	52
Central China	44	123
Henan	17	31
Jiangsu	28	38
Anhui	32	50
Hubei	30	70
Hunan	22	38
Jiangxi	23	44
Zhejiang	28	51
Fujian	19	34
SW China	58	370
Sichuan	51	276
Guizhou	27	72
Yunnan	51	256
S China	27	69
Taiwan	18	36
Guangxi Zhuang A.R.	19	38
Guangdong	20	35
Hainan DAO	7	10

Table 5. The species of Umbelliferae endemic to Turkey.
 140 species from 42 genera
 4 endemic genera (underlined>

<u>AEGOKERAS</u> caespitosa (Sm.) Raf.	F. pachyloba (Fenzl) Boiss.
BUNIUUM fallax Freyn	F. platycarpa Boiss. et Balansa
B. nudum (Post) H.Wolff	F. sandrasica Pesmen et Quezel
B. pinnatifolium KJjuikov	F. silaifolia (Boiss.) Boiss.
BUPLEURUM anatolicum Hub.-Mor. et Reese	F. thirkeana (Boiss.) Boiss.
B. antiochium Post	FRORIEPIA gracillima Leute
B. citrinum Hochst. ex Lorent	GEOCARYUM stylosum (Boiss.) Engstrand
B. davisii Snogerup	GRAMMOSCIADIUM confertum Hub.-Mor. et Lamond
B. eginense (H.Wolff) Snogerup	G. haussknechtii Boiss.
B. erubescens Boiss.	G. schischkinii (V.M.Vinogr. et Tamamsch.) V.M.Vinogr.
B. euboium Beauverd et S.Topali	HELLENOCARUM pisidicum Kit Tan
B. heldreichii Boiss. et Balansa ex Boiss.	HEPTAPTERA cilicica (Boiss. et Balansa ex Boiss.) Tutin
B. koechellii Fenzl	HERACLEUM amanum Boiss. et Kotschy ex Boiss.
B. lophocarpum Boiss. et Balansa ex Boiss.	H. argaeum Boiss. et Balansa ex Boiss.
B. lycaonicum Snogerup	H. artvinense Manden.
B. pendikum Snogerup	H. crenatifolium Boiss.
B. polyactis Post ex Snogerup	H. davisii Manden.
B. pulchellum Boiss. et Heldr. ex Boiss.	H. incanum Boiss. et Huet. ex Boiss.
B. schistosum Woronow	H. marashicum Kit Tan et Yildiz
B. setaceum Fenzl ex Tchih.	H. paphlagonicum Czezcott
B. subuniflorum Boiss. et Heldr. ex Boiss.	H. pastinaca Fenzl
B. sulphureum Boiss. et Balansa ex Boiss.	H. peshmenianum Ekim
B. turcicum Snogerup	H. platytaenium Boiss.
B. zoharii Snogerup	JOHRENIA alpina (Fenzl) Fenzl
CARUM leucocoleon Boiss. et Huet. ex Boiss.	J. berytea Boiss. et Hausskn. ex Boiss.
C. multiradiatum (K.Koch) M.Hiroe	J. polyscias Bornm.
C. rupicola Hartwig et Strid	J. selinoides Boiss. et Balansa ex Boiss.
CHAEROPHYLLUM aksekiense A.Duran et Duman	JOHRENIOPSIS carvifolia (Boiss. et Balansa ex Boiss.) Pimenov
C. hakkiaricum Hedge et Lamond	J. chrysea (Boiss. et Heldr. ex Boiss.) Pimenov
C. karsianum Kit Tan et Ocakverdi	KUNDMANNIA anatolica Hub.-Mor.
C. leucolaenum Boiss.	K. syriaca Boiss.
C. posofianum S.Erik et N.Demirkus	LASERPITIUM carduchorum Hedge et Lamond
<u>CRENOSCIADIUM</u> siifolium Boiss. et Heldr. ex Boiss.	LEIOTULUS pastinacifolius (Boiss. et Balansa ex Boiss.) Pimenov et Ostroumova
CYMBOCARPUM amanum Rech.f.	OENANTHE cyclocarpa Pimenov et KJjuikov
C. wiedemannii Boiss.	PASTINACA tryisia Stapf et Wettst.
DAUCUS blanchei Reuter	P. zosimoides Fenzl ex Tchih.
ECHINOPHORA chrysantha Freyn et Sint.	PEUCEDANUM alpigenum Boiss.
E. lamondiana B.Yildiz et Z.Bahcecioglu	P. graminifolium Boiss.
E. tournefortii Jaub. et Spach	PIMPINELLA anisetum Boiss. et Balansa ex Boiss.
E. trichophylla Sm.	P. flabellifolia (Boiss.) Benth. ex Drude
<u>EKIMIA</u> bornmuelleri (Hub.-Mor. et Reese) H.Duman et M.F.Watson	P. isaurica V.A.Matthews
ERYNGIUM davisii Kit Tan et Yildiz	P. lazica (Boiss.) M.Hiroe
E. hedgeanum Kit Tan et Yildiz	P. ramosa Schischk.
E. ilex P.H.Davis	P. sintenisii H.Wolff
E. isauricum Contandr. et Quezel	POLYLOPHIUM petrophilum (Boiss. et Heldr. ex Boiss.) Boiss.
E. kotschyi Boiss.	POSTIELLA capillifolia (Post ex Boiss.) KJjuikov
E. palmito Boiss. et Heldr. ex Boiss.	PRANGOS denticulata Fisch. et C.A.Mey.
E. polycephalum Hausskn. ex H.Wolff	P. heyniae H.Duman et M.F.Watson
E. pseudothoriifolium Contandr. et Quezel	P. longiradia H.Wolff
E. thoriifolium Boiss.	P. scabrifolia Post et Beauverd
FERULA amanicola Hub.-Mor. et Pesmen	RHABDOSCIADIUM microcalycinum Hand.-Mazz.
F. anatolica (Boiss.) Boiss.	R. oligocarpum (Post ex Boiss.) Hedge et Lamond
F. drudeana Korovin	SCANDIX balansae Reut. ex Boiss.
F. halophila Pesmen	SESELI andronakii Woronow
F. huber-morathii Pesmen	S. hartwigii Parolly et Nordt
F. longipedunculata Pesmen	S. resinolum Freyn et Sint.
F. lycia Boiss.	SMYRNIUM galaticum Czezcott
F. parva Freyn et Bornm.	STEFANOFFIA aurea (Boiss.) Pimenov et KJjuikov
F. tenuissima Hub.-Mor. et Pesmen	S. insoluta KJjuikov
FERULAGO antiochia Saya et Miski	STENOTAENIA macrocarpa Freyn et Sint.
F. armena (DC.) Bernardi	TAENIOPETALUM urbanii (Freyn et Sint. ex H.Wolff) Pimenov
F. aucheri Boiss.	THECOARPUS carvifolius (Boiss. et Balansa ex Boiss.) Hedge et Lamond
F. blanchiana Post ex Boiss.	TORDYLIUM brachytaenium Boiss. et Heldr. ex Boiss.
F. bracteata Boiss. et Hausskn. ex Boiss.	T. ebracteatum Al-Esawi et Juri
F. idaea Ozhatay et E.Akalin	T. ketenoglui Duman et A.Duran
F. isaurica Pesmen	T. lanatum (Boiss.) Boiss.
F. kurdica Post	T. macropetalum Boiss.
F. latiloba Schischk.	T. pustulosum Boiss.
F. macroscadia Boiss. et Balansa ex Boiss.	TORILIS triradiata Boiss. et Heldr. ex Boiss.
F. mughlae Pesmen	TRIGONOSCIADIUM intermedium Freyn et Sint.

Not only Turkey, but South-West Asia as a whole is a region of high diversity for the *Umbelliferae* (Table 6), and the following countries have a high number: Iran, Georgia, Syria, Azerbaijan, Iraq, Armenia and Lebanon. The floras of Oman, Kuwait, UAE, Bahrain and Qatar are poor in *Umbelliferae*. Within Turkey, the distribution of *Umbelliferae* biodiversity is also not regular (Table 7). Amongst the 5 main floristic regions of the country (approximately corresponding to Davis' regionalisation, proposed for the Flora of Turkey and the East Aegean Islands, see Hedge et al., (1972)), South-West and East Anatolia are the richest. East Anatolia belongs to regions with high diversity in the *Umbelliferae* (242 species in 80 genera). Although the majority of species are distributed in one or another adjacent part of Turkey, or in such countries as Iran or Iraq, there are some East Anatolian endemics (23 species in 15 genera [Table 8]). There are no endemic genera. Data on species distribution according to provinces are incomplete in ASIUM, although there is constant updating through visits to Turkish and other herbaria and from the literature.

We can calculate a simple coefficient of similarity through ASIUM; for example, the Van set of *Umbelliferae* is most similar to the sets of West Azerbaijan (Iran) (0.452), Bitlis (0.414), Kars (0.381), East Azerbaijan (Iran) (0.375), Hakkari (0.368), Gümüşane (0.344),

Armenia (0.329), Erzurum (0.326), Kordestan (Iran) (0.289), Hamadan (0.264) and Ağrı (0.257).

The country with the next highest diversity of *Umbelliferae* is Iran, and the mountainous regions of the Albours Mts, the Zagros Mts and Khorassan contain the highest species numbers (Table 9).

Eastwards from Iran the countries of Middle Asia also have a high level of richness in *Umbelliferae*. From Middle Asia and Kazakhstan about 430 species are known. The distribution of richness in some new independent countries of this region is given in Table 10. In the Tianshan and Pamiro-Alai mountains there are 19 endemic genera. The high number of endemic genera can be explained by the region's border position near the frontier of Central Asia, as well as by the isolation of the local high mountain systems, surrounded by extremely arid plains. In these areas, *Umbelliferae* with some unusual characteristics are also present as secondary shrubs (*Schrenkia kultiassivii* Korovin) and some *Seseli* species with lignified rootstocks (see also Pimenov, 1983; Pimenov & Kljuykov, 2002).

Table 7. Species and genera of the *Umbelliferae* in the main parts of Turkey and in provinces of East Anatolia.

Country part and province	Genera	Species
N (Pontic) Anatolia	74	185
Central Anatolia	80	221
W Anatolia	64	132
SW Anatolia	82	251
E Anatolia	80	242
Gümüşhane	41	76
Erzincan	40	68
Erzurum	44	83
Kars	43	86
Ağrı	27	39
Malatya	38	72
Tunceli	27	45
Elazığ	32	50
Bingöl	15	16
Muş	25	41
Bitlis	49	110
Van	44	88
Adıyaman	18	24
Urfa	26	50
Diyarbakır	27	36
Mardin	30	46
Siirt	26	35
Hakkari	32	57

Table 6. *Umbelliferae* biodiversity in SW Asian countries.

Country	Genera	Species
Turkey	109	450
Iran	111	350
Georgia	77	185
Syria	68	173
Azerbaijhan	73	169
Iraq	62	148
Armenia	70	138
Lebanon	56	120
Israel	44	90
Jordan	46	79
Cyprus	37	73
Greece (E Aeg.)	35	64
Saudi Arabia	23	43
Egypt (Sinai)	19	28
Yemen	18	26
Oman	7	11
Kuwait	6	7
U.A.E.	5	6
Bahrain	2	2
Qatar	2	2

In conclusion, we can say that ASIUM is a database providing nomenclatural and phytogeographical information about the *Umbelliferae* in the continent

where they are at their richest. The compilation of similar databases on other taxa and continents seems to be a rational way to produce a global plant diversity checklist.

Table 8. Species of the Umbelliferae endemic to East Anatolia.
23 species from 15 genera
No endemic genera

BUPLEURUM citrinum Hochst. ex Lorent
CARUM leucocoleon Boiss. et Huet. ex Boiss.
CHAEROPHYLLUM hakkiaricum Hedge et Lamond
C. karsianum Kit Tan et Ocakverdi
C. leucolaenum Boiss.
C. posofianum S.Erim et N.Demirkus
DAUCUS blanchetii Reuter
ECHINOPHORA chrysantha Freyn et Sint.
E. lamondiana B.Yildiz et Z.Bahcecioglu
ERYNGIUM ilex P.H.Davis
E. polycephalum Hauskn. ex H.Wolff
FERULA huber-morathii Pesmen
FERULAGO bracteata Boiss. et Hauskn. ex Boiss.
FRORIEPIA gracillima Leute
GRAMMOSCIADIUM schischkinii (V.M.Vinogr. et Tamamsch.) V.M.Vinogr.
HERACLEUM davisii Manden.
LASERPITIUM carduchorum Hedge et Lamond
PIMPINELLA flabellifolia (Boiss.) Benth. ex Drude
P. ramosa Schischk.
P. sintenisii H.Wolff
PRANGOS longiradia H.Wolff
RHABDOSCIADIUM microcalycinum Hand.-Mazz.
TRIGONOSCIADIUM intermedium Freyn et Sint.

Table 9. Umbelliferae biodiversity in Iran.

Country part and province (ostan)	Genera	Species
W	93	228
W Azerbaijan	54	108
E Azerbaijan	60	110
Ardabil	17	24
Zanjan	36	60
Kordestan	44	86
Kermanshah	39	67
Hamadan	40	70
Ilam	17	21
Lorestan	55	117
N	62	123
Gilan	34	47
Mazandaran	48	82
Golestan	43	66
E Khorassan	47	102
Central	76	183
Semnan	35	66
Tehran	57	118
Arak	37	56
Ghom	14	19
Esfahan	33	63
Chaharmahal va Bakhteyari	45	78
Yazd	20	36
S	62	150
Khuzestan	30	49
Boyerahmad va Kohgiluyeh	31	45
Bushehr	18	23
Fars	52	96
Kerman	30	57
Sistan va Baluchestan	19	33
Hormozgan	16	24

Table 10. Umbelliferae biodiversity in the countries of Middle Asia.

Country	Genera	Species
Kazakhstan	78	236
Kyrgyzstan	63	193
Uzbekistan	64	191
Tajikistan	63	167
Turkmenistan	52	124

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