



ADDITIONS TO THE VASCULAR FLORA OF MONGOLIA - III (Since the “Conspectus of the vascular plants of Mongolia 2014”)

Urgamal M.^{1}, Oyuntsetseg B.², Gundegmaa V.³,
Munkh-Erdene T.¹ and Solongo Kh.¹*

1 Institute of General and Experimental Biology, MAS

**corresponding author: e-mail: urgamal@botany.mas.ac.mn*

e-mail: tmunkhu@gmail.com; rainh7444@gmail.com

2 National University of Mongolia, Mongolia

e-mail: oyuna62@yahoo.com

3 Mongolian National University of Education, Mongolia

e-mail: chalchorum@yahoo.com

Abstract: *The paper presents the updates on the new species; new regional and new location records since the treatment for “Conspectus of the vascular plants of Mongolia” (Urgamal et al. 2014) listed as new for the Mongolian floristic novelties and reported as well.*

*This article includes the data on new species records for 33 species (2 subspecies and 1 varieties) included 20 genera and 14 families to the vascular flora of Mongolia. One genus (*Matthiola*) has been added as new to the flora of Mongolia. An annotated checklist of vascular plant species and phytogeography for Mongolia is given. The most made additions of the number of species of following families and genera: Ranunculaceae (12 species), Rosaceae (6 species), Brassicaceae (3 species) families and *Potentilla* (6 species), *Ranunculus* (4 species), and *Aquilegia* (3 species). The most made additions to the following phyto-geographical regions of Mongolia are: Mongolian Altai (11 species), Khentei (10 species) and Khangai (4 species) regions. The includes to new records for 10 species are as “sub-endemic” and one species as “very rare” to the vascular flora of Mongolia.*

Keywords: *New species, new regional records, new location, vascular flora, Mongolia;*

INTRODUCTION

Mongolia attracts researchers from different countries focusing on biodiversity studies. More or less regular floristic investigations on the territory of the country are being conducted since 1940ths (Grubov 1982; Gubanov 1996; Ganbold 2010; Urgamal et al. 2014) continuously bringing new data on the diversity of Mongolian plants [11, 12, 21, 24]. At the same time, intensive field and herbarium studies of last years yielded so

considerable amount of new data (summarized in Urgamal et al. 2013; Urgamal 2014) that the necessity of preparing an updated checklist became absolutely evident which was done by our scientists shortly afterwards (Urgamal et al., 2014). The new conspectus included 3127 species and subspecies (according to APG III system) of vascular plants compared to 2823 in Gubanov (1996), i. e., ca. 11 % in addition, to demonstrate how important and timely work it

has become [12, 22-24].

This paper is a continuation of the previous work dedicated to new national, new regional and new location records for “*Additions to the vascular plant of Mongolia – I, II*”, and this

MATERIALS AND METHODS

The herbaria at the former Institute of Botany of Mongolian Academy of Sciences (UBA) were checked for new findings and the material was partly critically revised. A database was compiled that included all genera of seed plants known in Mongolia primarily based upon the “*Conspectus of the vascular plants of Mongolia* (2014)”, “*Flora of Mongolia, 1, 10, 17, 14a volumes* (2009, 2014, 2015)” and journal articles pertinent to the flora of Mongolia. Electronic data from the *Database of the Mongolian Flora and Herbarium* (UBA) (<http://www.eic.mn/flora/>) were frequently accessed during this compilation and critically revised with use of herbarium materials, online resources, and published data [24].

This article includes new taxa and new nomenclatural combinations, made according

to the International Codex of Botanical Nomenclature (ICBN, Melbourne 2011). Nowadays research on plant systematics considers phylogeny and origin of a taxon for the classification, as well as chemical composition, specific substances and nucleic acids of a plant. APG IV (updated 2016) system accepted in the present work. Plant names are cited with author names following Brummitt, Powell (1992) and the International Plant Name Index (IPNI; <http://www.ipni.org>) along with the citation of the reference where the relevant plant name was published [1, 3].

We follow the division of Mongolia into 16 phytogeographical regions, which has been introduced by Grubov (1982) and phytogeographical regions were defined (Fig. 1).

to the International Codex of Botanical Nomenclature (ICBN, Melbourne 2011). Nowadays research on plant systematics considers phylogeny and origin of a taxon for the classification, as well as chemical composition, specific substances and nucleic acids of a plant. APG IV (updated 2016) system accepted in the present work. Plant names are cited with author names following Brummitt, Powell (1992) and the International Plant Name Index (IPNI; <http://www.ipni.org>) along with the citation of the reference where the relevant plant name was published [1, 3].

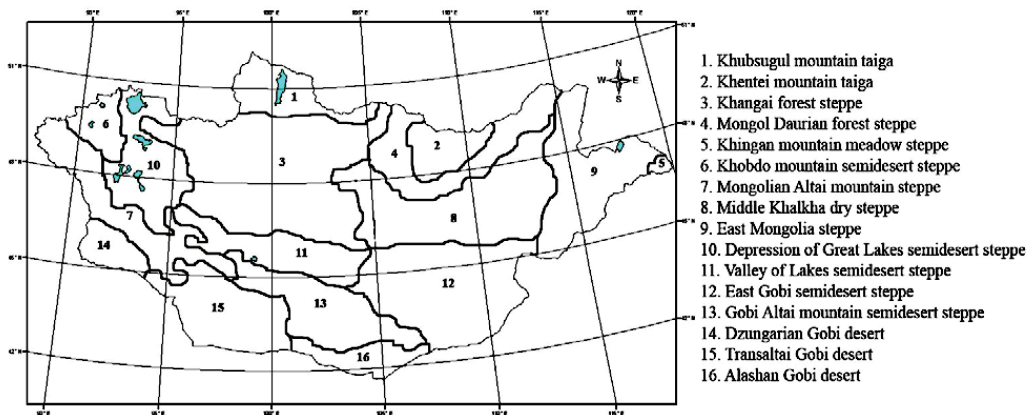


Figure 1. Phytogeographical regions of Mongolia (by Grubov 1982)

RESULTS

Since last conspectus (Urgamal et al. 2014) published, data on new species records for 33 species (2 subspecies and 1 varieties) and 20

genera included 14 families have been added to the vascular flora of Mongolia (Table 1). The new one genus (*Matthiola*) also has been

Caryophyllaceae Juss. (2/2) <i>Cerastium holosteoides</i> Fries 1817 <i>Stellaria zolotukhinii</i> A.L. Ebel 2012	2 (Kharasi-gol) 3 (Khan Khukhii) 10 (Ulaangom, Kharkhiraa gol)	Doronkin <i>et al.</i> 2015 Marcin Nobis <i>et al.</i> 2014
Euphorbiaceae Juss. (1/1) <i>Euphorbia virgata</i> Waldst. & Kit. 1803	4 (Noyon uul) 8 (Ar-Unjuul uul)	USDA-ARS, 2008
Violaceae Batsch. (1/1) <i>Viola nemoralis</i> Kütz. 1832	2 (Kharaa gol)	Doronkin <i>et al.</i> 2015
Fabaceae Lindl. (1/1) <i>Melilotus officinalis</i> (L.) Lam. 1778	2-4	USDA-ARS, 2008
Rosaceae Juss. (1/6) <i>Potentilla elegantissima</i> Polozhij 1949 <i>Potentilla eversmanniana</i> Fisch. ex Claus. 1838 <i>Potentilla martjanovii</i> Polozhij 2003 <i>Potentilla nervosa</i> Juz. 1908 <i>Potentilla olchonensis</i> Peschkova 1979 <i>Potentilla tericholoica</i> Sobolevsk. 1953	6 (Munkhairkhan) 7 (Khovd, Altai) 1 (Bulgan aimag, Teshig, 5 hujir) 4 (Selenge, Evtseg tolgoi) 8 (Tuv, Unjuul, Ar-Unjuul uul) 3 (Khan Khukhii) 7 (Khuren gol) 6 (Uvs, Turgen, Emchiin-am) 6 (Uliastain gol) 7 (Khuren gol)	Gundegmaa & Urgamal 2016 Gundegmaa & Urgamal 2016 Gundegmaa & Urgamal 2016 Gundegmaa & Urgamal 2016 Gundegmaa & Urgamal 2016 Gundegmaa & Urgamal 2016
Onagraceae Juss. (1/1) <i>Epilobium nervosum</i> Boiss. et Buhse 1860	7 (Bodonch gol)	Marcin Nobis <i>et al.</i> 2014
Brassicaceae Burnett (3/3) <i>Matthiola superba</i> Conti 1900 <i>Rorippa dogadovae</i> Tzvelev 1957 <i>Stevenia canescens</i> (DC.) D.A. German 2007	14 (Baitag Bogd) 11 (Orog nuur) 14 (Ikh Khavtaga)	German 2015 Ebel 2000; German 2015 German 2013; Bekket <i>et al.</i> 2015
Balzaminaceae A. Rich. (1/1) <i>Impatiens parviflora</i> DC. 1824	7 (Dain nuur)	USDA-ARS, 2008
Primulaceae Batsch ex Borkh. (1/1) <i>Primula matthioli</i> subsp. <i>mongolica</i> (Losinsk.) Kovt. 2011	2 (Khonin nuga)	Doronkin <i>et al.</i> 2015
Campanulaceae Juss. (1/1) <i>Campanula wolgensis</i> P.A. Smirn. 1947	7 (Tsagaan gol, Dain nuur)	Marcin Nobis <i>et al.</i> 2015

New added 33 species (2 subspecies and 1 varieties) included 20 genera and 14 families

Recently, the Mongolian flora including 3160 taxa (including additional 133 subspecies and 33 varieties) of vascular plants, distributing over 684 genera, 108 families, 39 orders, 12 classes or clades, 5 divisions and 3 superclades (Ferns, Gymnospermae and Angiospermae)

recorded (according to APG IV 2016 system) from Mongolia. The taxa are presented alphabetically in following three ranges (new species, new regional and new locations to the vascular flora of Mongolia).



Table 2. The numbers of new species records of families to the vascular flora of Mongolia

Name of family	Species numbers	Name of family	Species numbers
Ranunculaceae	12	Euphorbiaceae	1
Rosaceae	6	Violaceae	1
Brassicaceae	3	Fabaceae	1
Caryophyllaceae	2	Onagraceae	1
Iridaceae	1	Balzaminaceae	1
Juncaceae	1	Primulaceae	1
Santalaceae	1	Campanulaceae	1

The includes to new records for 10 species as “sub-endemic“ and one species as “very rare” to the vascular flora of Mongolia.

Table 3. The numbers of new records for phyto-geographical regions of Mongolia

Phyto-geographical region name and numbers	Numbers of new records
1. Khubsugul mountain taiga	3
2. Khentei mountain taiga	10
3. Khangai forest steppe	4
4. Mongol Daurian forest steppe	3
5. Great Khingan mountain meadow steppe	1
6. Khobdo mountain semidesert steppe	4
7. Mongolian Altai mountain steppe	11
8. Middle Khalkha dry steppe	2
9. East Mongolia steppe	1
10. Depression of Great Lakes semidesert steppe	3
11. Valley of Lakes semidesert steppe	1
12. East Gobi semidesert steppe	-
13. Gobi Altai mountain semidesert steppe	1
14. Dzungarian Gobi desert	3
15. Transaltai Gobi desert	-
16. Alashan Gobi desert	-
Total: 46 points	

CONCLUSIONS

Currently according to the data on new species records for 33 species (2 subspecies and 1 varieties) included 20 genera and 14 families to the vascular flora of Mongolia. One genus (*Matthiola*) has been added as new to the flora of Mongolia. The includes to new records for 10 species are as “sub-endemic“and one species as “very rare” to the vascular flora

of Mongolia. According to of vascular plant diversity in Mongolia, 3160 taxa (including additional 133 subspecies and 33 varieties) of vascular plants, distributing over 684 genera, 108 families.

The geographical elements of Mongolian plant diversity are dominated by the Siberian, Central and East Asia.

REFERENCES

1. APG (Angiosperm Phylogeny Group) IV. 2016. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Bot. J. Linn. Soc.*, 181 (1): 1-20.
2. Bekket, U., Kechaykin, A.A., Yevdokimov, I.Yu., Kosachev, P.A. & Shmakov, A.I. New findings about flora of West Mongolia. // *Acta Biologica Sibirica*, 2015. Vol. 1, No. 1-2. - S. 132-139.
3. Brummitt, R.K. & Powell, C.E. 1992. *Authors of Plant Names*. Published on the internet <http://www.ipni.org/index.html> [accessed in 2017].
4. Doronkin, V., Shaulo D., Han, I., Vlasova, N., Ivleva, V., Enkhtuya, L., Munkh-Erdene, T., Ochgerel, N. & Munkhjargal, B. New records for the flora of Selenge Province (Mongolia). // *Skvortsovia*, 2015. Vol. 2, No.1. - S. 8-27.
5. Ebel A.L. On the distribution of species of the genus *Rorippa* Scop. (Brassicaceae) in Siberia. // *Krylovia*, 2000. Vol. 2, No. 1. S. - 81–86 (in Russian).
6. Erst, A.C. A new taxa of the genus *Ranunculus* L. from the Altai Mountain. *Turczaninowia*, 2007. 10(2): 5-11. (in Russian).
7. Erst, A.S., Shaulo, D.N. & Kuznetsov, A.A. *Aquilegia daingolica* (Ranunculaceae), a new species from Mongolia. // *Sistematicheskii zametki*, 2013. Vol. 108. - S. 14-22.
8. Ganbold, E. *Flora Severnoy Mongolii (sistematika, ekologiya, geografiya, istoriya razvitiya)* [Flora of Northern Mongolia (systematics, ecology, geography, evolution history)]. Moscow: 2010. 561 p. (in Russian).
9. German, D.A. Proposal to conserve the name *Alyssum canescens* (*Ptilotrichum canescens*, *Stevenia canescens*) (Cruciferae) with a conserved type. // *Taxon*, 2013. Vol. 62. No. 4 - P.836–837.
10. German, D.A. Cruciferae (Brassicaceae): Alternative treatment for the “Conspectus of the vascular plants of Mongolia” (2014). // *Turczaninowia*, 2015. Vol. 18. No. 2. - S. 39–67.
11. Grubov, V.I. *Key to the vascular plants of Mongolia*. Leningrad, Nauka. 1982. (in Russian).
12. Gubanov, I.A. *Conspectus of the flora of Outer Mongolia*. Moskva, “Valang” Press. 1996. (in Russian).
13. Gundegmaa, V. & Urgamal, M. 2016. New records in the Khovd and Mongolian Altai phytogeographical regions to the flora of Mongolia. // “Сохранение разнообразия растительного мира Тувы и сопредельных регионов Центральной Азии: история, современность, перспективы”. Россия, Кызыл, 5-7 июня 2016 г.
14. Gundegmaa, V. & Urgamal, M. 2016. New findings genus of *Potentilla* L. (Rosaceae) to the flora of Mongolia. // *Материалы IV Всероссийской конференции молодых ученых “Биоразнообразие: глобальные и региональные процессы”*. Россия, Улан-Уде, 23-27 июня 2016 г. С. 145-147.
15. Krasnoborov, I. M. Sem. Santalaceae – Santalovye [Fam. Santalaceae]. In: Krasnoborov, I. M. and Malyshev, L. I. (eds.), *Flora Sibiri [Flora of Siberia]* 5. Novosibirsk: Nauka. 1992. - S. 81–87. (in Russian).
16. Marcin Nobis, Aleksandr L. Ebel, Arkadiusz Nowak, Orzimat T. Turginov, Andrei N. Kupriyanov, Agnieszka Nobis, Marina V. Olova, Beata Paszko, Renata Piwowarczyk, Wen-Li Chen, Polina D. Gudkova, Ewelina Klichowska, Sylwia Nowak and Antonio J. Pujadas-Salva. Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 2. // *Acta Botanica Gallica: Botany Letters*, 2014. Vol. 161, No. 2. - P. 209–221.
17. Marcin Nobis, Arkadiusz Nowak, Aleksandr L. Ebel, Agnieszka Nobis, Sylwia Nowak, Polina D. Gudkova, Alla V. Verkhozina, Andrey S. Erst, Grzegorz Łazarski, Marina V. Olova, Renata Piwowarczyk, Alexander A. Bobrov, Irina A. Khrustaleva, Vítězslav Plášek, Marina M. Silantyeva & Joanna Zalewska-Gałosz. Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 3. // *Acta Botanica Gallica*,



2015. Vol. 162, No. 2. – P. 103–115.
18. Marcin Nobis, Aleksandr L. Ebel, Arkadiusz Nowak, Beata Paszko, Alexander A. Bobrov, Yuriy A. Kotukhov, Andrey N. Kupriyanov, Agnieszka Nobis, Joanna Zalewska-Galosz, Marina V. Olonova, Filip Verloove, Wen-Li Chen, Maria Kushunina, Dagmara Kwolek, Nikolay N. Lashchinskiy, Renata Piwowarczyk, Alexander P. Sukhorukov, Sylwia Nowak, Vítězslav Plášek & Artur Pliszko. Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 4. //Acta Botanica Gallica, 2015. Vol. 162, No. 4. - P. 301-316.
 19. Marcin Nobis, Andrey Erst, Arkadiusz Nowak, Dmitry Shaulo, MarinaOlonova, Yuriy Kotukhov, Asli Dođru-Koca, Ali A. Dönmez, Gergely Király, Aleksandr L. Ebel, Maria Kushunina, Renata Piwowarczyk, Alexander P. Sukhorukov, Agnieszka Nobis, FilipVerloove, Joanna Zalewska-Galosz, Golshan Zare, Jean-François Burri, Danka Caković, ElżbietaJędrzejczak, Nejc Jogan, Ewelina Klichowska, Artur Pliszko, Anton V. Popovich, Danijela Stešević, Urban Štilc, Natalia Tupitsyna, Vladimir M. Vasjukov, Wei Wang, Philippe Werner, Magdalena N. Wolanin, Mateusz M. Wolanin & Kun-Li Xiang. Contribution to the flora of Asian andEuropean countries: new national and regional vascular plant records, 6, Botany Letters, 2017. 164: 1, 23-45.
 20. Solongo, Kh. & Urgamal, M. 2016. New species and regional records of family Ranunculaceae to the flora of Mongolia. //Материалы IV Всероссийской конференции молодых ученых "Биоразнообразие: глобальные и региональные процессы". Россия, Улан-Уде, Россия, Улан-Уде, 23-27 июня 2016 г. С. 148.
 21. Ulziykhutag, N. Overview of the Flora of Mongolia. 1989. State Publishing. (in Mongolian).
 22. Urgamal, M. Additions to the vascular flora of Mongolia - II. //Proc. Inst. Bot., Mongolian Academy of Sciences, 2014. Vol. 26. – P. 91-97.
 23. Urgamal, M., Oyuntsetseg, B. & Nyambayar, D. Synopsis and recent additions to the flora of Mongolia - I. //Proc. Inst. Bot., Mongolian Academy of Sciences, 2013. Vol. 25. – P. 53-72.
 24. Urgamal, M., Oyuntsetseg, B., Nyambayar, D. & Dulamsuren, Ch. Conspectus of the vascular plants of Mongolia. (Editors: Sanchir, Ch. & Jamsran, Ts.). Ulaanbaatar, Mongolia. "Admon" Press. 2014. - 334p.
 25. USDA-ARS, Germplasm Resources Information Network (GRIN). Online Database. Beltsville, Maryland, USA: National Germplasm Resources Laboratory. 2008.