

FIRST RECORDS OF FIVE SPECIES OF *GAGEA* (LILIACEAE), NEW IN THE KAZAKHSTAN FLORA

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The article provides information about five rare *Gagea* species that are new to the flora of Kazakhstan. These are *G. subtilis* from Beltau (Alymtau) mountains, *G. kamelinii* from the Karatau ridge and Ulkenburul mountains, *G. artemczukii* from River Tobol floodplain, *G. podolica* from Caspian lowland and Mugodzhary, and *G. deserticola* from the vicinity of the Daryalyk Takyr sands, the Barsakelmessky State Nature Reserve and Bolshye Barsuki. *Gagea podolica* and *G. artemczukii* are noted for Asia for the first time. The new sites of these species are based on herbarium specimens stored in the herbaria of MW and AA.

Key words: Asia, Goose onion, Kazakh upland, rare species, Western Tian-Shan

Gagea Salisb. is one of the largest and most complex genera of the Liliaceae family, which counts worldwide more than 320 species (Levichev, 2013). Abdulina (1998) noted 38 *Gagea* species in the flora of Kazakhstan. Based on the analysis of the literature (Kotukhov, 2005; Ivashchenko, 2015, 2020; Peterson et al., 2016; Kupriyanov, 2020; Tojibaev et al., 2020) published after Abdulina (1998), it was found that 58 *Gagea* species grow in Kazakhstan. It is proved that the high species diversity in the genus *Gagea* is caused by polyploidisation and reticulated intra-sectional hybridisation (Peruzzi, 2008; Peruzzi et al., 2011; Peterson et al., 2011; Zarrei et al., 2012; Tison et al., 2013).

During the study of herbarium collections of Moscow State University (MW) (Seregin, 2021) and the Institute of Botany and Phytointroduction (AA), new locations of five rare *Gagea* species have been discovered (Fig. 1S), including *G. subtilis* Vved. (Fig. 2S), *G. kamelinii* Levichev (Fig. 3S), *G. podolica* Schult. & Schult.f. (Fig. 4S), *G. artemczukii* Krasnova (Fig. 5S), and *G. deserticola* Levichev (Fig. 6S), which have not been previously listed in the flora of Kazakhstan (Goloskokov, 1958; Abdulina, 1998). The floristic region (FR) of species is indicated according to Pavlov (1956). Scientific names of plants are given according to POWO (2021).

Gagea subtilis Vved. (section *Stipitatae* (Pasch.) Davlianidze) is a Central Asian species growing in foothills, desolate semi-savannas at the limits of 800–1200 m a.s.l. New locations (hereafter – NL):

1) Turkestan Region, Saryagash district (D), Turkestan FR: «South Kazakhstan, Chimkent region, Beltau mountain (Alymtau), 25.07.1986, Pimenov et al. 137» (MW0813412!). The species is known only from Tien Shan and Pamir-Alay outside Kazakhstan (Levichev, 1990; Lazkov et al., 2007).

Gagea kamelinii Levichev (section *Platyspermum* Boiss.) is a Central Asian species. It grows on stony places, gravelly slopes and mountain peaks. The species was stored under the incorrect names *Gagea circinata* Loud., *Gagea pseudoreticulata* Vved., being then redefined in 1993. NL: 1) Turkestan Region, administrative territory of Turkestan, Karatau FR: «Turkestan region, Karatau ridge, gravelly peaks and hillsides, in Ush-Uzen tract, 27.04.1930, Lipschitz 111» (MW0813283); 2) Almaty Region, Zhambyl D., Karatau FR: «South Kazakhstan Region, stony placer, piedmont of the Ulkenburul mountains, 29.04.1939, Pavlov 77» (MW0813284). The nearest location of the species is known in the Kukar tract, the Chatkal Ridge, Uzbekistan (Krasovskaya & Levichev, 1986).

Gagea podolica Schult. & Schult.f. (section *Gagea*) is a Eurasian species growing in steppe and forest-steppe areas. In all the examined specimens, the species was stored under the incorrect name of *Gagea pusilla* (F.W. Schmidt) Sw., being then redefined in 1993 and 1997. NL: 1) West-Kazakhstan Region, Zhanibek D., Pricaspiskiy FR: «Ural region, Dzhanybek, 16.04.1950, Kamenetskaya s.n.» (MHA0042569!); 2) «Ural region, Dzhany-

bek, 3–4 km to the east of the village, grass steppe, 17.04.1950, Kamenetskaya s.n.» (MHA0042567!); 3) Aktobe Region, Mugalzhar D., Mugodzhar sub-district of Aktobe FR: «Izembet station, the slopes of gully, 18.04.1909, Noskov s.n.» (MW0288357). The nearest location of the species is known in the Kamyshin mountains, Volgograd Region, Russia (Yuritsyna & Vasyukov, 2020).

Gagea artemczukii Krasnova (sect. *Gagea*) is a Eurasian species inhabiting forb steppe meadows. The species had been stored under the incorrect name of *Gagea pusilla* (F.W. Schmidt) Sw., being then re-defined in 1993. NL: Kostanay Region, Kostanay D., Tobol-Ishim FR: «Vicinity of Kostanay between Lake Bolshoi Kol and the settlement, the River Tobol floodplain, forb-steppe grasslands, 17.05.1942, Utkin s.n.» (MHA0042359!). The nearest location of the species is known in the vicinity of Zhiguli, Mogutay mountains, Samara Region, Russia (MHA0042357!).

Gagea deserticola Levichev (section *Plecostigma* (Turcz.) Pasch.) is a Central Asian species. It grows on sands in desert areas. In all samples, the species had been stored under incorrect names, such as *Gagea afghanica* A. Terracc., *Gagea pusilla* (F.W. Schmidt) Sw., *Gagea obvoluta* Pavlov, being then re-defined in 1992. NL: 1) Aktobe Region, Shalkar D., Priaralskiy FR: «Northern Priaralie, Aktobe Region, Chelkar D., South-Western Bolshye Barsuki sands, near the delve Kul-Kuduk, 24.04.1957, Lushpa s.n.» (AA!); 2) Kyzylorda Region, Aral D., Kyzyl-Kum FR, Barsakelmes State Nature Reserve: «Barsakelmes Island, Aral Sea, 21.04.1946, Platonov s.n.» (AA!); 3) Kyzylorda Region, Shieli D., Kyzyl-Orda FR: «The right bank of River Syrdarya, vicinity of Daryalyk Takyr sands, 21.04.1948» (AA!). The nearest location of the species is known from south of the village Uchkuduk, Uzbekistan (Levichev, 2001).

Gagea podolica and *G. artemczukii* are listed for the first time in the flora of Asia, which is the evidence of their Eurasian distribution. Previously, the general distribution of these species was considered as European (Levichev, 2006). Thus, taking into account our results, 63 *Gagea* species are currently known in the flora of Kazakhstan.

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Supporting Information

The map of the new locations of the *Gagea* species in Kazakhstan and digitised files of their herbar-

ium specimens (Electronic Supplement: A map of the new locations of the genus *Gagea* in Kazakhstan and digitised files of herbarium specimens) may be found in the **Supporting Information**.

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ПЕРВЫЕ НАХОДКИ ПЯТИ ВИДОВ *GAGEA* (LILIACEAE), НОВЫХ ВО ФЛОРЕ КАЗАХСТАНА

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Приводятся сведения о новых для флоры Казахстана пяти редких видов рода *Gagea*. Среди них *G. subtilis* из гор Белтау (Алымтау), *G. kamelinii* из Каратауского хребта и гор Улкенбурыл, *G. artemczukii* из поймы реки Тобол, *G. podolica* из Прикаспийской низменности и Мугоджар, *G. deserticola* из окрестностей песков Дарьялык Такыр, Барсакельмесского заповедника и песков Большие Барсуки. *Gagea podolica* и *G. artemczukii* впервые указаны для Азии. Новые местонахождения этих видов основаны на гербарных образцах, хранящихся в гербариях MW и AA.

Ключевые слова: Азия, гусиный лук, Западный Тянь-Шань, Казахский мелкосопочник, редкий вид