

RESEARCH NOTES

НАУЧНЫЕ ЗАМЕТКИ

HISTORICAL RECORDS OF *NEOTTIA CORDATA* AND *HAMMARBYA PALUDOSA*, NEW IN THE KAZAKHSTAN FLORA

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The article provides data on two orchid species, new in the flora of Kazakhstan. These are *Neottia cordata* from Markakol State Nature Reserve (East Kazakhstan) and *Hammarbya paludosa* from Mugodzhary Mts. (West Kazakhstan). The nearest previously known locations of *Hammarbya paludosa* are more than 500 km northwards from the reported location. The nearest previously known location of *Neottia cordata* is ca. 300 km north-east of the reported location. The new sites of these species are based on historical herbarium specimens collected in 1908 and 1934 and stored in the herbaria of LE, NS, and MW.

Key words: Central Asia, *Listera cordata*, Kazakh Altai, Mugodzhary, new records, orchid, Orchidaceae

Orchidaceae Juss. is one of the largest families in the world, with about 880 genera and more than 25 000 species (Cribb et al., 2003). According to Abdulina (1998), 30 orchid species are known in Kazakhstan. The study of the Orchidaceae family receives an increased attention, since many species are rare and threatened plants. Most studies are conducted in the tropics, while in Central Asian countries, studies on the orchid family are rare (Khapugin, 2020).

Since 2020, we have been working on the revision of orchids in Kazakhstan based on the material stored in herbaria in Russia and Kazakhstan: LE, MW, TK, MHA, SVR, KUZ, ALTB, AA, NUR, KG, KSPI, NS, NSK. The revision of the herbaria of the Komarov Botanical Institute of RAS (LE), Central Siberian Botanical Garden (NS, NSK), Moscow State University (MW) (Seregin, 2020) has resulted in the discovery of two new locations of rare species, namely *Hammarbya paludosa* (L.) Kuntze, and *Neottia cordata* (L.) Rich. Neither of the species was previously listed for the flora of Kazakhstan (Kuznetsov & Pavlov, 1958; Abdulina, 1998).

Neottia cordata (syn.: *Listera cordata* (L.) R.Br.), a rare species with a Circumpolar distribution, is widely distributed in the subarctic and temperate zones in the Northern Hemisphere (Kotlínek et al., 2017). The herbarium specimen was collected in Kurchum District of the East Kazakhstan Region in 1908. On the la-

bel of the herbarium specimen is given: Semipalatinsk Region, Ust'-Kamennogorskiy County, village of Elovka, the northern shore of the Lake Marka-Kul' (48.806° N, 85.686° E), fir (*Abies sibirica* Ledeb.) forest, near peat land, 04.07.1908, A.N. Sedelnikov (LE!, NS!) (Fig. 1S). The location is situated on the southern spur of the Kurchumsky Mt. Ridge, near Lake Markakol (Fig. 3S). This site has a protected status of the Markakol State Nature Reserve. The nearest location of *Neottia cordata* is known 300 km north-east, in the Republic of Altai, Russia (Altai State Nature Reserve, upper reaches of the River Bayas – MW 47738!). *Neottia cordata* may be found in the Katon-Karagay National Park, because this area borders the Markakol State Nature Reserve. These large areas are occupied by relict fir (*A. sibirica*) forests (Sultanova et al., 2014), which are preferred by this species (Tsiftsis et al., 2019).

Hammarbya paludosa is a Holarctic species with a disjunctive range covering temperate regions of Eurasia and North America (Bragina & Vakhrameeva, 2008; Vakhrameeva et al., 2008). The new location belongs to the Mugalzhary District of the Aktyubinsk Region. We report this species on the basis of the herbarium specimen collected during the Mugodzhary-Emben expedition under the leadership of G.I. Dokhman. On the herbarium specimen label is written: Aktyubinsk Region, site Urkach (49.262° N,

58.187° E), on the peat moss bog, 01.09.1934, U.N. Samseev, №514 (MW 0816996!) (Fig. 2S). The site Urkach is located on the elevated watersheds of the River Emba, River Ilek, and the tributaries of the River Or, northwest of the Mugodzhyr Mts. (Fig. 3S; Rusanov, 1948). This specimen was initially misidentified as *Microstylis monophyllos* (L.) Lindl., and re-identified as *Hammarbya paludosa* in 2002 (Fig. 2S).

The nearest locations of *Hammarbya paludosa* are known near Lake Kukai, 530 km northwards, in the Chelyabinsk Region, Russia (Kulikov, 2005) and 510 km northwest, near the village Mebel'nyi, Republic of Bashkiria, Russia (Mirkin, 2011). In Kazakhstan, new records of this species may be found in bogs of the Kostanay Region, including the Nauryzim State Nature Reserve, as well as in the *Sphagnum* bogs of the West Kazakhstan Region.

The presented records of two rare species of *Hammarbya paludosa* and *Neottia cordata* based on the material of herbarium collections can be used for navigation in field studies, which are required to confirm the current species occurrence in Kazakhstan. Despite the possible extinction of these species in Kazakhstan, we consider it necessary to include them in the Red Data Book of the Republic of Kazakhstan, because otherwise these species could be left without legal protection status in case of their re-discovery.

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Supporting Information

The map of the new locations of *Hammarbya paludosa* and *Neottia cordata* and digitised files of their herbarium specimens (Electronic Supplement. Digitised files of herbarium specimens and a map of the new locations of *Hammarbya paludosa* and *Neottia cordata*) may be found in the [Supporting Information](#).

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ИСТОРИЧЕСКИЕ НАХОДКИ *NEOTTIA CORDATA* И *HAMMARBYA PALUDOSA*, НОВЫХ ДЛЯ ФЛОРЫ КАЗАХСТАНА

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Приводятся сведения о двух видах семейства Orchidaceae, ранее не указанных для флоры Казахстана. Среди них *Neottia cordata* с Маркакольского государственного заповедника (Восточный Казахстан) и *Hammarbya paludosa* из Мугоджар (Западный Казахстан). Ближайшие ранее известные местонахождения *H. paludosa* находятся на расстоянии более 500 км севернее публикуемой находки. Ближайшее местонахождение *N. cordata* находится на территории России приблизительно в 300 км северо-восточнее публикуемой находки. Новые местонахождения указанных видов определены на основе исторических гербарных образцов 1908 и 1934 гг., обнаруженных в гербариях LE, NS и MW.

Ключевые слова: *Listera cordata*, Orchidaceae, Казахстанский Алтай, Мугоджары, новая находка, орхидея, Средняя Азия