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## Floristic novelties of *Veronica* subgenus *Pseudolysimachium* (W. D. J. Koch) Buchenau of the Altai Mountain Country and adjacent territories

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**Summary.** The article presents new floristic novelties of *Veronica* L. subgenus *Pseudolysimachium* (Plantaginaceae) of the Altai Mountain Country and adjacent areas. For the first time, *Veronica* × *grisea* Kosachev et A. L. Ebel was collected in the Republic of Altai, *V. pinnata* L. is indicated for the Novosibirsk Region. In addition, new locations for 7 rare and endemic species of *Veronica* are given. Point distribution maps are given for most species.

## Флористические находки вероник подрода *Pseudolysimachium* (W. D. J. Koch) Buchenau Алтайской горной страны и прилежащих территорий

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**Ключевые слова:** ареал, гибрид, дополнение к флоре Алтая, карта распространения, редкий вид, эндемик.

**Аннотация.** В статье приведены новые флористические находки вероник из подрода *Pseudolysimachium* (Plantaginaceae) для территории Алтайской горной страны и прилежащих районов. Впервые в Республике Алтай собран *Veronica* × *grisea* Kosachev et A. L. Ebel, для Новосибирской области указана *V. pinnata* L. Кроме того, приводятся новые местонахождения для 7 редких и эндемичных видов вероник. Для большинства видов даны точечные карты распространения.

As a result of expedition trips to collect material of species of *Veronica* subgenus *Pseudolysimachium* (Plantaginaceae) within the framework of the international project “Adaptive introgression in *Veronica spicata* in three regions of Eurasia”, several new floristic records were discovered for the territory of the Altai Mountain Country (AMS). A new species has been found for the flora of the Republic

of Altai, several new locations of rare *Veronica* species have been found for the territory of the Altai Mountain Country and adjacent areas. Herbarium specimens were deposited in the Herbarium of Altai State University, Russia, Barnaul (ALTB), doublets were transferred to OLD (Oldenburg, Germany) and KW (Kiev, Ukraine).

### A new species for the Republic of Altai

*Veronica* × *grisea* Kosachev et A. L. Ebel: “Russia, Republic of Altai, Ongudayskii distr., pass Chike-Taman, above road, under power line, 50°38'46"N, 86°18'52.1"E, with young birch. 08 VIII 2014. P. Kosachev, D. Albach, S. Smirnov”; “Russia, Republic of Altai, Ongudayskii distr., pass Chike-Taman, above road, under power line, 50°38'46"N, 86°18'52.1"E, 1309 m, after deforestation, with young birch and meadow. Plot 8. 16 VII 2016. P. Kosachev et al.” – This hybrid was first published in 2010 from the territory of Siberia (Kosachev, Ebel, 2010). It was found in the Republic of Khakassia (Shirinsky district, near village Efremkino, valley river Belyy Iyus).

A new location has been discovered in the Republic of Altai (Fig. 1a). The habitat was exposed to strong anthropogenic impact, being located under a power line. The plants were collected among dense thickets of young birches (*Betula pendula*) and willow-tea (*Chamaenerion angustifolium*). Parent spe-

cies grew in the immediate vicinity: *Veronica longifolia* L. in the thickets of *Rhododendron ledebourii* and *V. incana* L. on a settled rocky slope.

### A new species for the Novosibirsk Region

*Veronica pinnata* L.: “Russia, Novosibirsk Region, Suzunsky distr., upper Karakan river valley, 54°16'5.9"N, 82°26'52.5"E and 54°16'6.6"N, 82°27'1.9"E. Alexander Dubynin” (Dubynin, 2022a, b). – Two observations of this species were made in 2020 from the Novosibirsk Region: As A. Dubynin points out in the comments to one observation (URL: <https://www.inaturalist.org/observations/67506777>), herbarium material is stored in the Herbarium of the Central Siberian Botanical Garden (NS).

“Russia, Altai Territory, near city Barnaul, village Belmesevo, 53°10'38.6"N, 83°42'56.2"E, clay slope of the Ob River terrace. 11 VI 2022. P. Kosachev; and 10 VIII 2022. P. Kosachev” (ALTB).

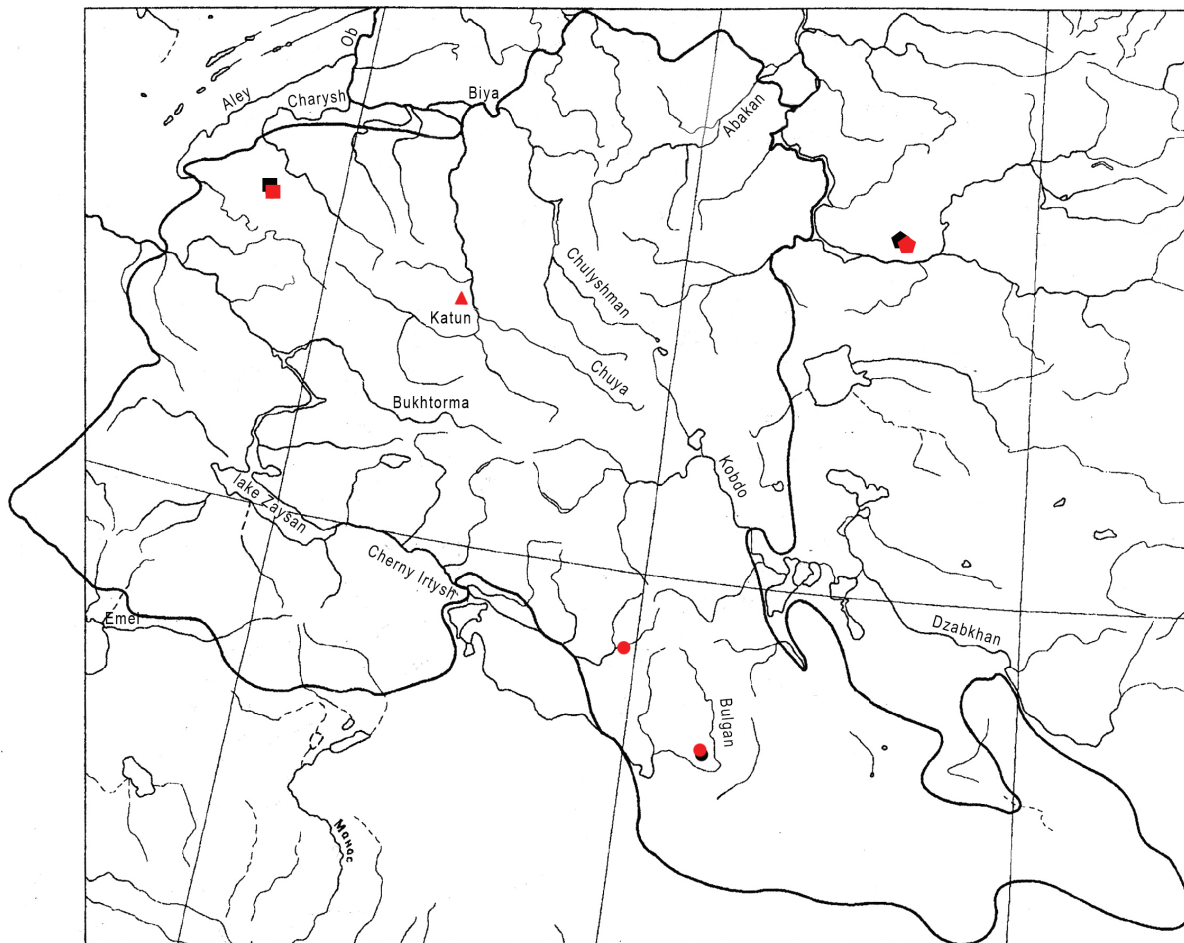


Fig. 1. Distribution of *Veronica* × *grisea* (a, triangle), *V. spicata* subsp. *kamelinii* (b, square), *V. x smirnovii* (c, circle), *V. krasnoborovii* (d, pentagon). Black color – previously known locations, red color – new locations.

In the flat part of the area in the city of Barnaul (the village of Bolshoy Glyaden, now the village of Vostochny), in the vicinity of Barnaul (the village of Gonba) and Kalmanskii district (the village of Buranovo), the species was discovered by V. I. Vereshchagin (Vereshchagin, 1988).

Thus, in the flat part of the range, the species was collected in two locations in the AMS and the Novosibirsk Region. *Veronica pinnata* is mainly a mountainous South-Siberian-North-Kazakhstan-North-China-Mongolian species. The species is a xerophyte, growing in mountainous areas on the rocky steppe slopes of southern exposure, in flat areas – only on the dry clay and steppe slopes of the Ob River terrace, as well as its tributaries.

#### New locations of rare species

*Veronica spicata* subsp. *kamelinii* Kosachev: “Russia, Altai Territory, Kurjinskii distr., Kolyvanskii ridge, near mountain Sinyucha, lake Mochovoe, 51°15'9.7"N, 82°33'37"E, 747 m, pine forest, 15 VII 2016. P. Kosachev et al.” – A very rare subspecies

of *V. spicata* L., described from the Western Altai (Kosachev, 2003). Previously, this subspecies was known only from its type location. A second location of this subspecies was discovered in the vicinity of the classic location (Fig. 1b).

*Veronica* × *altaica* Kosachev: “Russia, Altai Territory, Tretyakovskii distr., mount Chernyi Kamen, 50°54'56.1"N, 82°19'35.3"E, rocky steppe. 12 VII 2012. P. Kosachev”; “Russia, Altai Territory, Tretyakovskii distr., upper river Aley, village Krasnoe Razdole, south-western side of mountain Chyorny Kamen, 50°54'55.7"N, 82°19'36.1"E, 392 m, bushy rocky steppe outputs granite rocks. Plot 3. 13 VII 2016. P. Kosachev et al.” – A rare hybrid found only in the Western Altai within the Altai Territory (Kosachev, 2003). The new location complements the range of this species (Fig. 2).

*Veronica* × *kolyvanensis* Kosachev et Shmakov: “Altai Territory, Kurjinskii distr., river valley Loktevka, 5 km from the village Kolyvan, mouth of stream Zmeevskii Klyuch, 51°17'47.3"N, 82°29'27.5"E, 421 m, steppe shrubs, 14 VII 2016. P. Kosachev et al.”; “Russia, Altai Territory, Kurjinskii distr., 20 km N

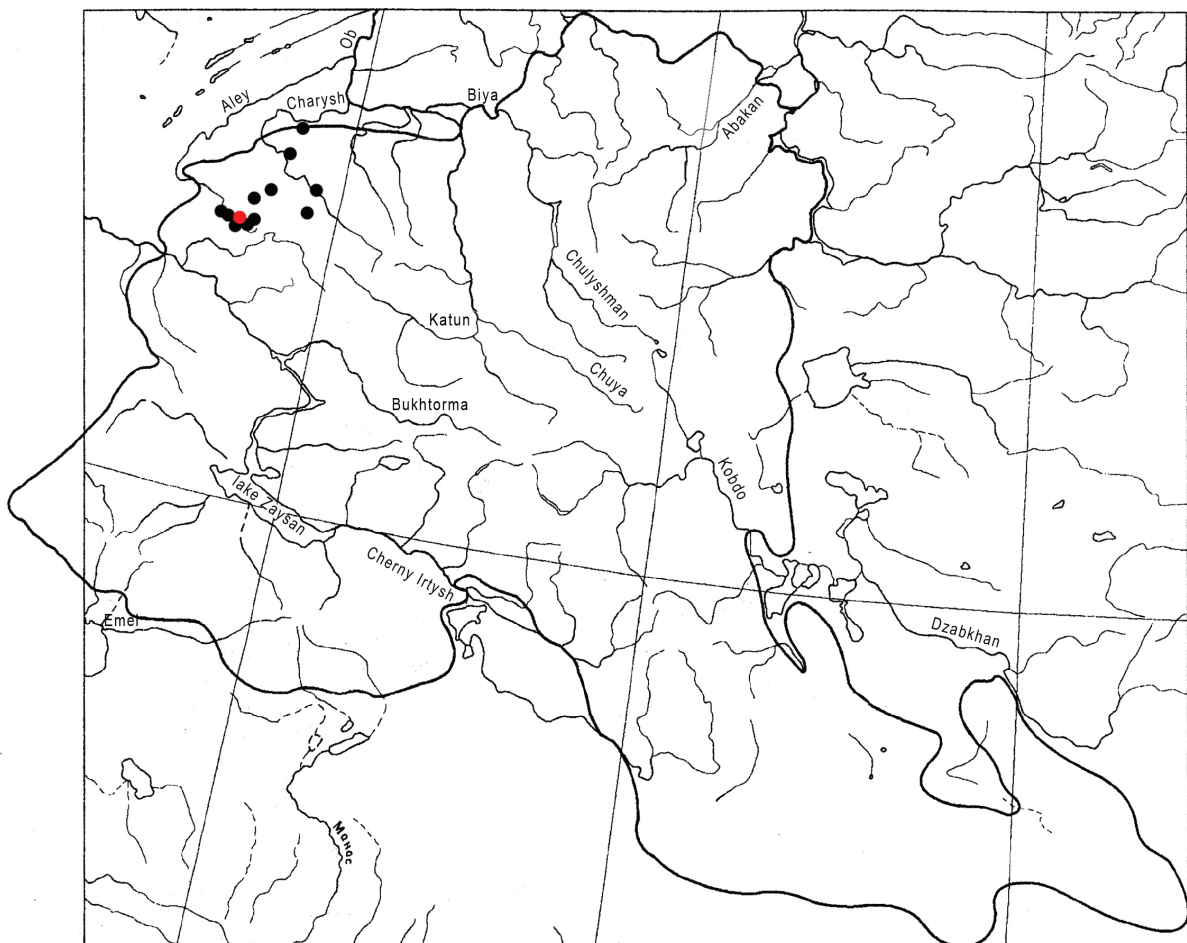


Fig. 2. Distribution of *Veronica* × *altaica*. Black color – previously known locations, red color – new locations.

from village Kurya, 51°46'6.1"N, 82°8'17.9"E, steppe near road. 12 VII 2016. P. Kosachev et al.". – This is another narrow endemic of the Western Altai also known only from the type location (Kosachev, 2003). In 2016, two locations of this species were discovered (Fig. 3).

*Veronica* × *sessiliflora* Bunge: "Russia, Republic of Altai, Kosh-Agachskii distr., South-Chuyskii ridge, upper part of valley of river Akkol, 49°55'17.9"N, 88°0'36.5"E, 2365 m, high mountain gravelly steppe. Plot 16. 20 VII 2016. P. Kosachev et al."; "Russia, Republic of Altai, Ulaganskii distr., Chulyshman river, 50°58'39"N, 88°05'24.8"E, 627.8 m, steppe. 26 VI 2017. P. Kosachev, S. Schöngart"; "Russia, Republic of Altai, Ust-Koksinskii distr., village Tyungur, 50°9'49.3"N, 86°18'16.8"E, 876 m, rocky slope. SK3. 21 VII 2018. P. Kosachev, S. Schöngart"; "Russia, Republic of Altai, Chemalskii distr., between rivers Biyka and Cheba, right bank of river Katun, 51°9'13.7"N, 86°11'22.1"E, 541 m, meadows steppe, rocks. SK18. 16 VIII 2018. P. Kosachev, S. Schöngart". – The hybrid is endemic to the Altai Mountain Country. In total, 17 locations were known within

the Altai. Four new locations have been discovered in the Republic of Altai (Fig. 4).

*Veronica* × *smirnovii* Kosachev et D. German: "Mongolia, Khovd aimak, Bulgan Sum, Mongolian Altai, Arshantyn-Nuru range, valley Bayan-Gol, 46°21'12.1"N, 91°12'34.1"E, 1927 m, steppe with *Caragana pygmaea*. SK6. 04 VIII 2018. P. Kosachev, S. Schöngart". – The hybrid was described from Mongolia (Kosachev, German, 2004), from the Arshantyn-Nuru ridge (Mongolian Altai), located on the border with China. Later, the species was also recorded from the territory of China of the southwestern slope of the Mongolian Altai (Chen et al., 2011). In 2016, we found the species in another location on the Arshantyn-Nuru (Fig. 1c).

*Veronica* × *schmakovii* Kosachev: "Mongolia, Mongolian Altai, basin of the river Yelt-Gol, river valley Chorabain-Salaa, 48°07'N, 89°11'E, 2150 m. EK21. 11 VII 2015. P. Kosachev, I. Evdokimov"; "Russia, Republic of Altai, Kosh-Agachskii distr., river Chuya (right bank), mouth of river Kuektanar, 50°9'24.7"N, 88°17'43.3"E, 1723 m, meadow, pasture. Plot 17. 21 VII 2016. P. Kosachev et al."; "Rus-

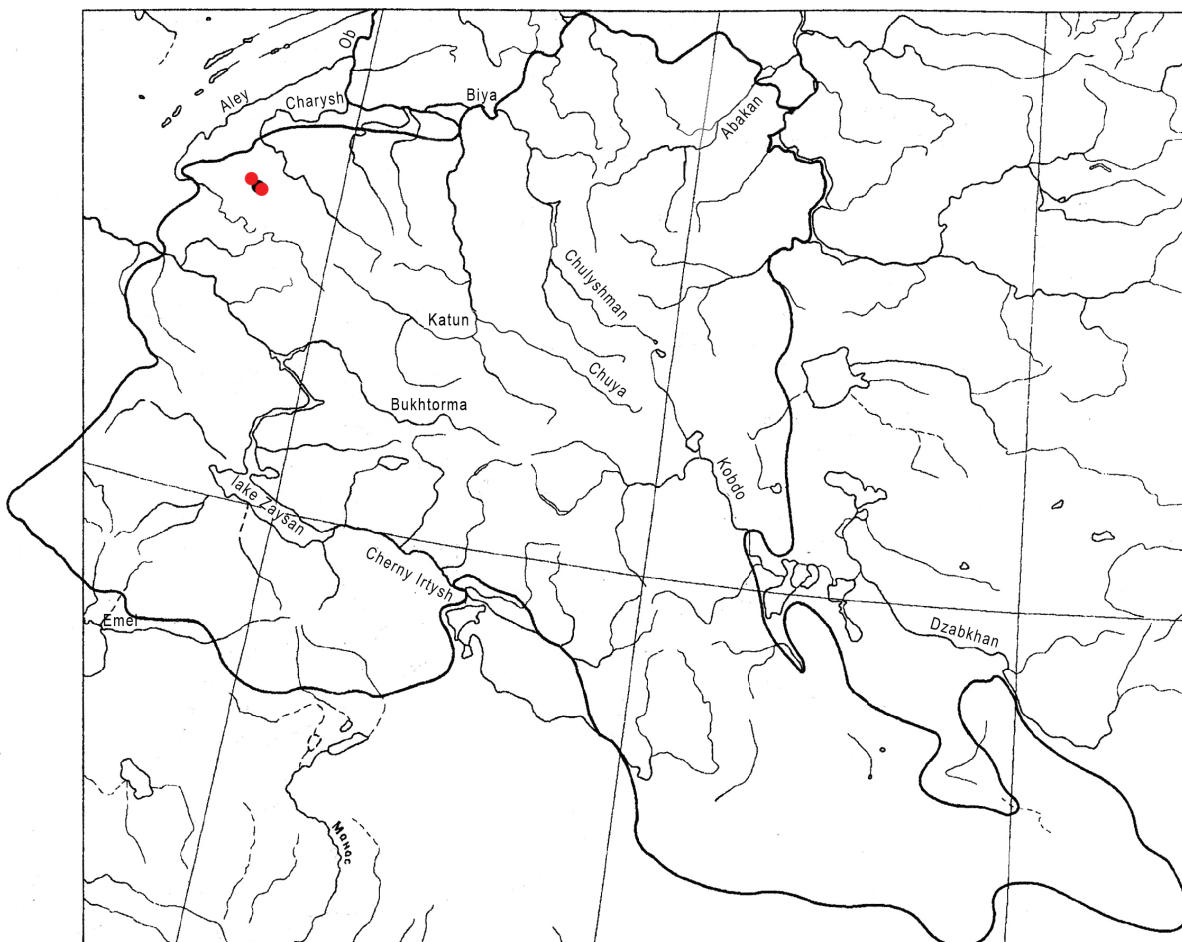


Fig. 3. Distribution of *Veronica* × *kolyvanensis*. Black color – previously known locations, red color – new locations.



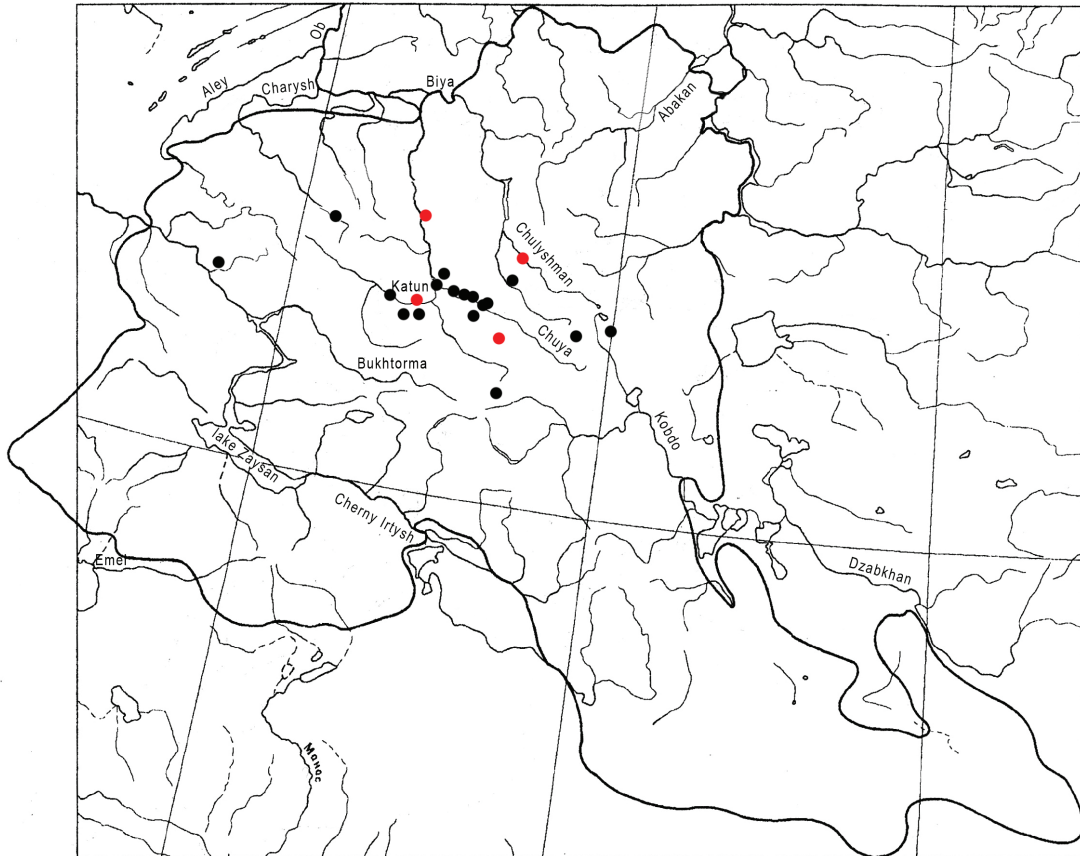


Fig. 4. Distribution of *Veronica x sessiliflora*. Black color – previously known locations, red color – new locations.

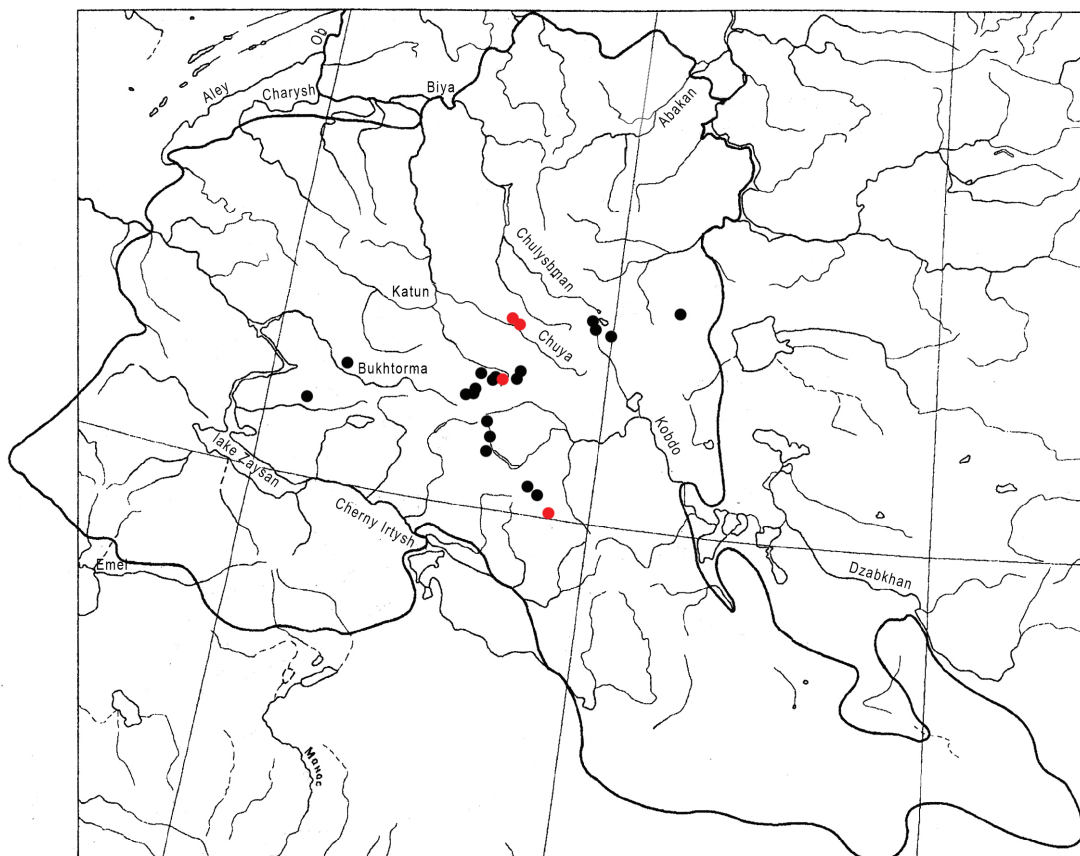


Fig. 5. Distribution of *Veronica x schmakovii*. Black color – previously known locations, red color – new locations.

sia, Republic of Altai, Ulaganskii distr., Kurayskii range, near mercury factory, valley river Jarly-Amry, 50°19'0,6"N, 87°42'50,5"E, 2142 m, subalpine meadow. 27 VII 2017. P. Kosachev, S. Schöngart"; "Russia, Republic of Altai, Kosh-Agachskii distr., valley Usay, left bank of Usay river, 49°30.461'N, 88°09.959'E, 2512 m, steppe wise, rocky. SK10. 07 VIII 2018. P. Kosachev, S. Schöngart". – This hybrid is endemic to the Altai Mountain Country, previously known only from 19 locations. Here, we provide four more locations (Fig. 5) – three from the Republic of Altai, one from Mongolia.

***Veronica krasnoborovii*** Kosachev et Shaulo: "Russia, Republic of Tuva, Kyzylskii distr., valley river Orta-Khem (tributary of the river Bayan-Kol), left bank, 51°46'52.9"N, 93°26'23"E, 1100 m, overgrown pebbles. PP7. 14 VIII 2021. P. Kosachev,

P. Ryzhkova". – In 2021, we attempted to find this rarest species described by us from herbarium material and known only from one location in the Republic of Tuva (Kosachev et al., 2013). We have almost reached the classic location of the species and managed to collect non-flowering specimens (Fig. 1d). By the nature of the pubescence (long entangled hairs) and the structure of the leaf blade (oblong-ovate, short-stemmed, rounded at the base, shallow-unequal and short-pointed), we identified the plants as *V. krasnoborovii*.

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