

***GYPSOPHILA* × *MOLDAVICA* PÎNZARU NOTHOSP. NOVA IN THE REPUBLIC OF MOLDOVA**

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Abstract: The article describes a new hybrid namely *Gypsophila* × *moldavica* Pinzaru (*G. glomerata* × *G. collina*), formed under *ex situ* conditions, in the author's private garden. Arguments have been brought to support the claim of recognizing the species *G. glomerata* Adams and it is considered appropriate to synonymize the species *G. pallasii* Ikonn.

Key words: Caryophyllaceae, distribution, *Gypsophila* × *moldavica* Pinzaru nothosp. nova, morphology, Republic of Moldova.

Introduction

The genus *Gypsophila* L. in the *Flora of Bessarabia* is represented by 8 species, and in the Republic of Moldova – by the following taxa: *G. collina* Steven ex Ser., *G. paniculata* L., *G. perfoliata* L., *G. elegans* M. Bieb. and *G. pallasii* Ikonn. [IZVERSCAIA, 2016]. The species *Gypsophila pallasii* Ikonn. is a name that has not been recognized by all the botanists [GHEIDEMAN, 1986; NEGRU, 2007; SEREGIN, 2008; PÎNZARU & SÎRBU, 2016]. The recent floristic research conducted by the author has brought arguments in favour of the opportune synonymization of the species *G. pallasii* Ikonn. As a result of growing together the species *G. glomerata* Adams and *G. collina* Ser., a new hybrid species appeared in the author's private garden; its detailed description is presented in this article.

Materials and methods

The article is based on the floristic research carried out in natural habitats in the Republic of Moldova, Romania (Constanţa county: Cotul Văii village in Albeşti commune and Tulcea county: nature reserve Capul Doloşman in Jurilovca commune) and Bulgaria (Dobrich province: Topola village in Kavarna municipality), as well as on plants grown under *ex situ* conditions in 2018–2022. The identification of the species was carried out with the help of guides for species identification and already published information regarding the studied species, taking into account the morphological and ecological peculiarities. The exsiccatae are stored in the Herbarium of the “Alexandru Ciubotaru” National Botanical Garden (Institute) in Chişinău [CHGB], in the Herbarium of “Anastase Fătu” Botanical Garden of Iaşi [IAGB], and in the Herbarium of the botanist Pavel Pînzaru at the Tiraspol State University (based in Chişinău) [CHUST-PP].

The dried specimens (exsiccatae) from the Herbarium of “Alexandru Ciubotaru” National Botanical Garden (Institute) were analysed.

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The list of exsiccatae of *Gypsophila glomerata* Adams analysed by the author:

Republic of Moldova:

- Chişinău municipality, Codru commune, in the author's private garden, 27.07.2017, P. Pînzaru [CHUST-PP 4331], 24.07.2022, P. Pînzaru [IAGB 47744];
- Vulcăneşti district, Musaid commune, steppe slope, 04.07.1950, leg. L. Nikolaeva; Vulcăneşti commune, hill with steppe vegetation, 05.07.1950, L. Nikolaeva [CHGB 32302, 32303, 32304], 27.07.1958, L. Nikolaeva [CHGB 32309], 27.07.1958, T. Gheideman [CHGB 32305], 10.07.1986, T. Bogoutdinova [224506]; Etulia commune, steppe slope, 27.07.1958, L. Nikolaeva [CHGB 32310], 27.07.1958, T. Gheideman [CHGB 32308], 06.07.2017, P. Pînzaru [CHUST-PP 4900];
- Taraclia district, Ciurmai village in Vinogradovca commune, steppe slope, 26.08.1958, L. Nikolaeva [CHGB32307], 26.08.1958, T. Gheideman [CHGB 32306, 32311]; 09.08.1988, Gh. Postolache [CHGB 221601, 221611, 221612, 221613], 23.08.2009, P. Pînzaru [CHUST-PP 4892];
- Cahul district, Colibaş commune, hill with steppe vegetation, 03.09.1971, A. Istrati [CHGB 32300]; Giurgiuleşti commune x Cişliţa-Prut commune, hills with loamy soil and steppe vegetation, 19.07.1979, L. Nikolaeva [CHGB 217166, 217167, 217168, 217169]; Slobozia Mare commune, hills with loamy soil and steppe vegetation, 06.08.1997, P. Pînzaru [CHGB 233809], 13.09.2009, V. Ghendov, G. Şabanova, T. Izverscaia (*G. pallasii* Ikonn.), teste T. Izverscaia [CHGB 236773, 236774], 04.09.2013, V. Ghendov, T. Izverscaia (*G. pallasii*) [CHGB 238695], 11.07.2019, P. Pînzaru, V. Cantemir, Ş. Manic [CHGB 239707]; Cişliţa-Prut commune, steppe slope, 12.07.2019, P. Pînzaru [CHUST-PP 4899]; Brînza commune, slope with clayey-sandy soil, 12.07.2019, V. Cantemir, P. Pînzaru [CHGB 239708, 239709]; Văleni commune, slope with steppe vegetation, 11.07.2008, V. Ghendov, T. Izverscaia, G. Şabanova (*G. pallasii*) [CHGB 236320, 236321, 236322, 236323, 236324].

Russia:

- Reg. Stavropol, in the vicinity of Pyatigorsk city, Mashuk Mountain, on limestone soil, 30.06.1901, Iv. Şiraeuskij [CHGB 215384, 127724].

Bulgaria:

- Dobrich province: Topola village in Kavarna municipality, on limestone hills, 26.08.2022, P. Pînzaru [CHUST-PP 4841, 4842; CHGB 239993; IAGB 47745].

Romania:

- Constanţa county: Cotul Văii village in Albeşti commune, on limestone soil, col. P. Pînzaru, Dan Pînzaru, det. P. Pînzaru, 16.10.2022 [CHUST-PP 4926, 4950];
- Tulcea county: nature reserve Capul Doloşman in Jurilovca commune, on limestone soil, col. P. Pînzaru, Dan Pînzaru, det. P. Pînzaru, 16.10.2022 [CHUST-PP 4960, 4963].

The list of exsiccatae of *Gypsophila collina* Ser., collected by the author:

- Floreşti district, Gvosdova village in Gura Camencii commune, on limestone hills, 22.07.2017, P. Pînzaru [CHUST-PP 4897]; Stîrceni village in Vărvăreuca commune, in rock fissures, 21.08.2016, P. Pînzaru [CHGB 239540], 23.07.2022, P. Pînzaru [CHUST-PP 4894; CHGB]; Vărvăreuca commune, on limestone hills, 23.07.2022, P. Pînzaru [CHUST-PP 4329]; Caşunca commune, in rock fissures, 17.07.2009, P. Pînzaru [CHUST-PP 4326]; Cenuşa village in Roşietici commune, on limestone hills, 21.08.2016, P. Pînzaru

[CHGB 239541]; Ciutulești commune, on limestone hills, 24.07.1947, A. Ivankov, tested by V. Andreev [CHGB 32292];

- Rezina district, Țipova village in Lalova commune, on limestone hills, 15.07.2020, P. Pînzaru [CHGB 239706], 28.07.2021, P. Pînzaru [CHUST-PP 4898];
- Orhei district, Butuceni village in Trebujeni commune, on limestone hills, 04.08.1954, L. Nikolaeva [CHGB 32296, 32297], 22.09.1962, L. Nikolaeva, tested by T. Gheideman [CHGB 32287, 32288, 32289], 22.07.2022, P. Pînzaru [CHUST-PP 4893];
- Criuleni district, Mașcăuți commune, in rock fissures, 22.07.2022, P. Pînzaru [CHUST-PP 4889; CHGB 239992; IAGB 47741];
- Camenca district, Camenca commune, on limestone hills, 26.07.1947, A. Ivankov, tested by A. Andreev [CHGB 32294];
- Dubăsari district, Doibani commune, on limestone hills, Iagorlic, 07.1934, Kleopov [CHGB 32290], Dubăsari commune, on East-facing slope, col. L. Nikolaeva, 06.08.1950, tested by T. Gheideman [CHGB 32285, 32286, 32295]; Goian commune, on limestone hills, 07.07.1989, P. Popescu, tested by V. Chirtoca [CHGB 231630, 231631];
- Rîbnița district, Molochișul Mare commune, on limestone hills, 30.08.1934, T. Bilik [32291], 06.05.1987, L. Nikolaeva, teste T. Izverscaia [CHGB 224169], 10.08.1988, P. Pînzaru, tested by T. Izverscaia [CHGB 223340], 11.08.1995, P. Pînzaru [CHGB 233808], 14.06.1997, P. Pînzaru [CHUST-PP 4896]; Haraba commune, on limestone hills, 04.07.1987, K. Vitko, A. Railean [CHGB 217942, 217893], 13.06.1997, P. Pînzaru [CHUST-PP 4895]; Sărăței village in Hărjău commune, on limestone hills, Nistru, 16.05.1984, K. Vitko [CHGB 213740].

The list of exsiccatae of *Gypsophila* × *moldavica* Pînzaru, nothosp. nova:

Republic of Moldova

- Chișinău municipality, Codru commune, in the author's private garden, 20.08.2019, P. Pînzaru [*Holotype*: CHGB 239989; *Isotype*: CHUST-PP 4890]; 20.08.2019, P. Pînzaru [CHUST-PP 4332, 4333], 24.07.2022, P. Pînzaru [CHGB 239991; IAGB 47742, 47743]; 13.09.2022, P. Pînzaru [CHUST-PP 4964]; 10.10.2022, P. Pînzaru [CHUST-PP 4947; CHGB 239990].

Results and discussions

As a result of floristic investigations on the vascular flora of the Republic of Moldova, a new hybrid species was described: *Gypsophila* × *moldavica* Pînzaru nothosp. nova (*G. glomerata* × *G. collina*).

The hybrid species *Gypsophila* × *moldavica* was formed as a result of cultivating together the species *G. glomerata* and *G. collina* in the author's private garden. The species *Gypsophila glomerata* Adams, until 1976, was indicated for South-Eastern Europe, Ukraine and the Caucasus [SĂVULESCU & RAYSS, 1926; PRODAN, 1953; BARKOUDAH & CHATER, 1964; GHEIDEMAN, 1975]. In 1976, in *Novosti Sistematiki Vysših Rastenij*, the Russian botanist S. Ikonnikov mentioned 2 species: *G. glomerata* Adams, 1805 [= *G. globulosa* Boiss., 1867; *G. glomerata* var. *globulosa* (Steven) Schmalh., 1895], for the flora of the Caucasus region and *G. pallasii* Ikonn. sp. nova [= *G. glomerata* auct., non Adams: M. Bieb., 1808] for the flora of Crimea, without the morphological description of the species. Later, *Gypsophila pallasii* Ikonn. was accepted by other botanists [AKERROYD, 1993; ZIMAN, 1999; IKONNIKOV, 2004; CIOCĂRLAN, 2009; SÂRBU & al. 2013]. At the same time, the botanist

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A. P. SEREGIN (2008), researching the flora of Crimea, recognized *G. glomerata* Adams (incl. *G. pallasii* Ikonn.). The species *G. glomerata* Adams had (previously) been recognized by T. GHEIDEMAN (1986) and A. NEGRU (2007), without indicating the presence of *G. pallasii* Ikonn. in the Republic of Moldova. Later, for the flora of the Republic of Moldova, only *Gypsophila pallasii* Ikonn. was cited [IKONNIKOV, 2004; IZVERSCAIA, 2016]. The difference between *G. glomerata* and *G. pallasii* was noticed while comparing the bracts, capitula and seeds: obovate-rounded, obtuse, eroded-toothed bracts, capitula of 8-15 mm in diameter and seeds with obtuse tubercles for *G. glomerata*, and for *G. pallasii* – oblong – rounded, entire bracts, capitula 3-12 cm in diameter and seeds with long conical, acute tubercles [IKONNIKOV, 2004; IZVERSCAIA, 2016]. According to S. IKONNIKOV (2004) – *G. pallasii* occurs on rocks and arid stony hills in R. Moldova (Bugeac), Crimea, the Caucasus (near Novorossiysk) and the Balkans.

In the habitats of Bugeac, in the Republic of Moldova, there are no rocks or stony hills, but there are areas with steppe vegetation, formed on clayey-sandy soils or on various chernozems. As a result of recent floristic research conducted in the field, as well as under *ex situ* conditions, it was found that *G. glomerata* grows in the Bugeac steppe, producing seeds with obtuse and not acute tubercles, and the bracts are broad-ovate, the lower ones are cuspidate at the tip, with finely eroded-denticulate margins, the diameter of the capitula on the same plant varies between 3 and 12 mm. In the summer of the current year, floristic research was carried out in Bulgaria (on the calcareous slopes on the Black Sea coast near the village of Topola, Kavarna municipality, Dobrich province) and in Romania (on the calcareous slopes around the Cotul Văii village in Albești commune, Constanța county and reserve Capul Doloșman in Jurilovca commune, Tulcea county, where *G. glomerata* plants with obtuse seed tubercles were found. As a result of the analysis of the aspect of the seeds of the species *G. glomerata*, *G. collina* and the hybrid species *G. × moldavica*, it was found that all these species produce seeds with obtuse tubercles, arranged in circles (Figure 8).

Gypsophila glomerata Adams, 1805, in Weber & Mohr, Beitr. Naturk. 1: 54. – Figure 1, 6.1, 7.1, 8a.

Syn.: incl. *Gypsophila pallasii* Ikonn. 1976, Novosti Sist. Vyssh. Rast. 13: 118, nom.nud.

The plants are 60-110 cm tall, usually with several stems, lignified at the base, branched at the top and with glandular hairs. The lower leaves are 3-veined, up to 10 cm long and 3-5 mm wide; in cultivated plants, the width of the lower leaves reaches up to 10 mm; the size of the other leaves gradually decreases towards the top of the stem. The inflorescences are globose capitula, 3-15 mm in diameter, with sessile flowers. Bracts – scarious, broad-ovate, the lower ones cuspidate, irregularly finely denticulate, with short glandular hairs. Calyx teeth with white membranous margin and short glandular hairs. Corolla 5 mm in diameter, white. Petals lanceolate, 4 mm long and 1 mm wide. Stamens exserted, with pink anthers. Fruit – capsule, unilocular, globose, dehiscent to the middle through 4 valves, with 2-4 seeds. Seeds dark brown, reniform-rounded, slightly compressed bilaterally, about 1.5 mm, with obtuse tubercles, arranged in circles.



Figure 1. *G. glomerata* – inflorescence, 05.08.2022

Biological and ecological peculiarities. Chamaephytic, xerophytic species. Blooms in July - October, the seeds ripen at the end of August - October. In the territory of the Republic of Moldova, it grows on clayey-sandy slopes, in steppe phytocoenoses; and in Bulgaria and Romania it grows on calcareous slopes.

Distribution in the Republic of Moldova (Figure 9). It occurs in the districts: Cahul (Giurgiulești, Cîșlița-Prut, Slobozia Mare, Văleni, Brînza and Colibaș communes), Vulcănești (Vulcănești, Etulia) and Taraclia (Musaitu, Ciumai).

General distribution. Greece, Bulgaria (Topola village in Kavarna municipality Dobrich prov.), Romania (Constanța county: Cotul Văii village in Albești commune and Tulcea county: nature reserve Capul Doloșman, Jurilovca commune), Ukraine (Odessa, Kherson, Mykolaiv, Donetsk oblast, Crimean peninsula), Russia (Stavropol krai), Caucasus (Novorossiysk), Turkey.

Gypsophila collina Ser. 1824, in Candolle, Prodr. 1: 352. – Figure 2, 6.2, 7.2, 8b

The plants are 60-70 cm tall, the stems – glabrous, lignified at the base. Leaves linear, one-veined, the lower ones up to 7 cm long and 3-5 mm wide, the others gradually smaller up to 2 cm long and 2 mm wide, with finely scabrous margins. Corymb inflorescences, flower stalks and peduncles glabrous. Bracts scarios, lanceolate, tapering towards the tip, with ciliated margins. Calyx teeth lanceolate, with white scarios and shortly ciliated margins. Corolla 5 mm in diameter. Petals obovate, 3 mm long and 1.5 mm wide, white, pale pink at apex. Stamens exserted, with pink-purple anthers. Fruit – capsule, globose, dehiscent to the middle through 4 valves, usually with 4 seeds, dark brown, reniform-rounded, about 1.5 mm, with obtuse tubercles, arranged in circles.



Figure 2. *G. collina* – inflorescence, 13.07.2018, Butuceni village, Orhei district

Biological and ecological peculiarities. Chamaephytic, xerophytic, calcicole species. Flowers in July - October, seeds ripen in September - October. In the territory of the Republic of Moldova, it grows in rock crevices and on friable limestone in the Dniester River Basin.

Distribution in the Republic of Moldova (Figure 9). It occurs in the districts: Florești (Ciutulești, Vărvăreuca communes and Stîrceni village, Cenușa village of Roșietici commune, Gvozdova village of Gura Camencii commune), Șoldănești (Rogojenii Vechi), Rezina (Țipova village of Lalova commune), Orhei (Butuceni and Morovaia villages of Trebujeni communes), Criuleni (Mașcăuți commune), Camenca (Camenca), Rîbnița (Beloci, Molochișul Mare, Haraba, Plopi, Sărăței), Dubăsari (Coicovo, Dubăsari, Doibani, Goian), Grigoriopol (Delacău).

General distribution: on rocks, stony slopes in Romania [CIOCĂRLAN, 2009; SÂRBU & al. 2013], Ukraine [ZIMAN, 1999].

Gypsophila × *moldavica* Pînzaru nothosp. nova (*G. glomerata* × *G. collina*) (Caryophyllaceae) – Figure 3, 4, 5, 6.3, 7.3, 8c.

The plants are perennial, glaucous. Stems 110-150 cm tall, lignified in the lower part, dichotomously branched from the base. Leaves opposite, sessile, linear, finely scabrous on the margins; the lower and middle ones 3-veined, 75-95 mm long and 5-8 mm wide; the upper ones one-veined, 25-30 mm long and 1.5-3 mm wide. Inflorescences – corymbiform dichasia. The middle and upper axes of inflorescences, bracts, floral peduncles and calyx are glandular-pubescent. Bracts broad-obovate, broad-lanceolate, cuspidate to tapering, whitish-scaly, on margins finely unevenly denticulate, with glandular hairs. Flower peduncles 2-5 mm long. Calyx 3-4 mm long, with 5 lanceolate teeth, ± as long as the tube, white membranous on margins. Corolla 5 mm in diameter, white. Petals lanceolate, 5 mm long and 1.3 mm wide.

Stamens grouped by 10, exserted, purple anthers. Styles 2, divergent, obviously longer than the stamens. Capsules shorter than the calyx, open by 4 valves, produce few fruits, with only one seed. Seeds dark brown, reniform-rounded, 1.5 mm, with obtuse tubercles.

Holotype: Republic of Moldova, Codru commune, Chişinău municipality, in the author's private garden, collected on 24.07.2022, P. Pînzaru [CHGB 239989]

Biological and ecological peculiarities. Hybrid species, chamaephyte, appeared under *ex situ* conditions, as a result of the hybridization of the species *G. glomerata* with *G. collina*. It blooms in July-October, seeds ripen in September-October.

Affinity. Differs from *G. glomerata* in the presence of 2-5 mm long pedicels (not sessile flowers), peltate inflorescence (not capitulum). Differs from *G. collina* in the lower and middle leaves with 3 veins (not one-veined), middle and upper axes of inflorescences with glandular hairs (not glabrous axes).

Distribution (Figure 9). The plants of the hybrid species appeared under *ex situ* conditions, as a result of the cultivation of the parental species in the author's private garden (Schinoasa Veche in Codru commune, Chisinau municipality).

Conclusions

The research carried out has confirmed the presence of the species *Gypsophila glomerata* Adams in South-East and East Europe, North Caucasus and Turkey.

The hybrid species *Gypsophila* × *moldavica* Pînzaru (*G. glomerata* × *G. collina*) possesses morphological characters of both parental species, rarely bears fruits, which produce only one seed, not 2-4; it is more vigorous and has higher decorative qualities.

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Figure 3. *Gypsophila* × *moldavica* Pînzaru nothosp. nova, 05.08.2022.



Figure 4. *G.* × *moldavica* Pînzaru nothosp. nova – inflorescence, 05.08.2022.



Figure 5. Holotype of *Gypsophila* × *moldavica* Pinzaru (CHGB 239989).

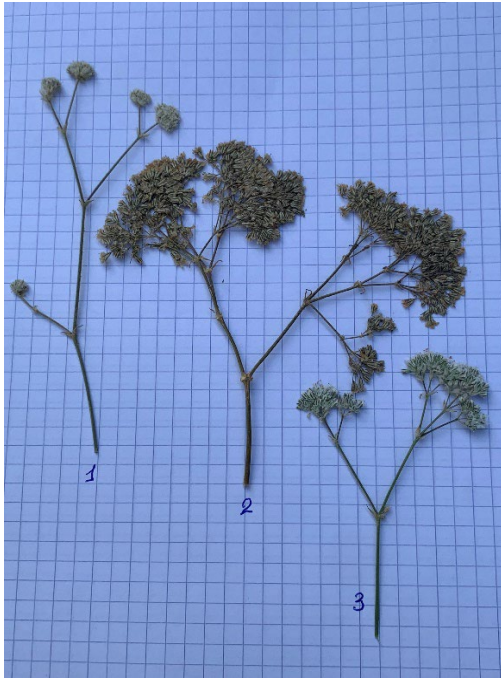


Figure 6. Inflorescence: 1. *G. glomerata*,
2. *G. collina*, 3. *G. × moldavica*.



Figure 7. Leaves: 1. *G. glomerata*,
2. *G. collina*, 3. *G. × moldavica*.



Figure 8. Seeds: a - *G. glomerata*, b - *G. collina*, c - *G. × moldavica*.

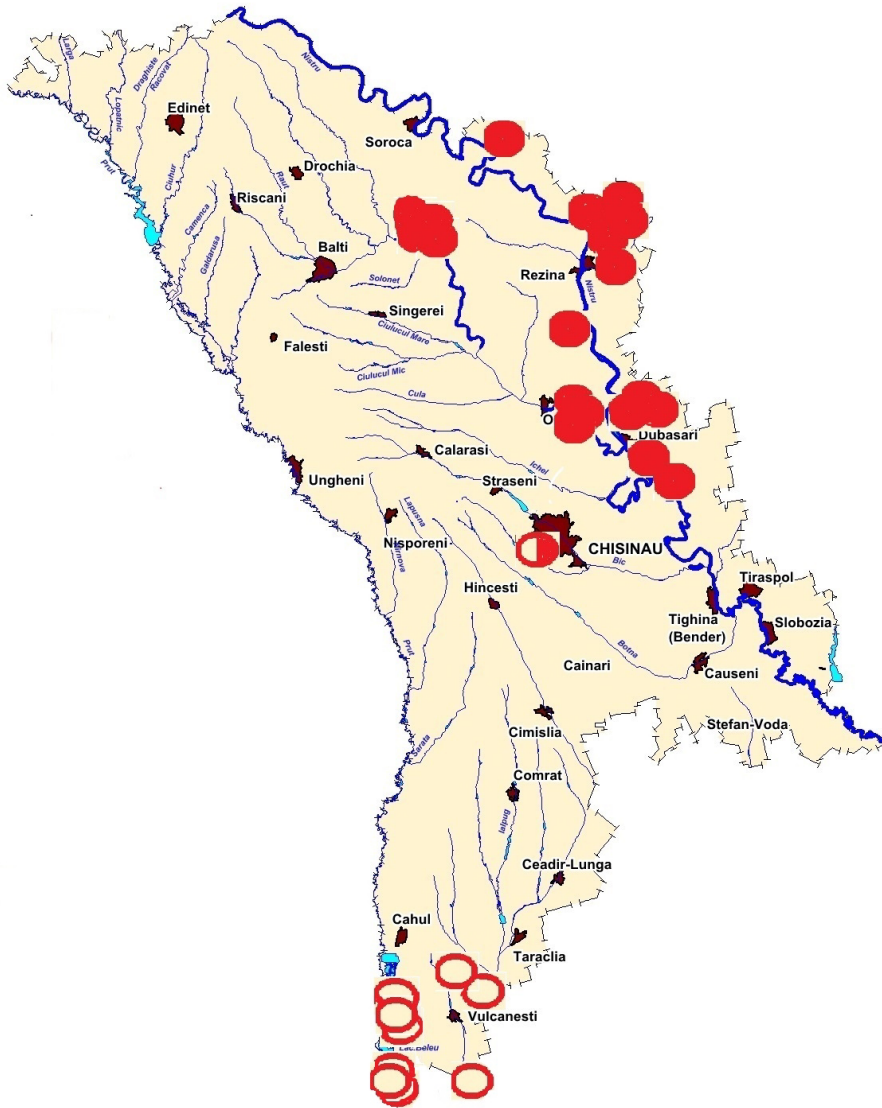





Figure 9. Distribution of the species *G. colina*, *G. glomerata*, *G. × moldavica* in Republic of Moldova.

-  *Gypsophila collina* Ser.
-  *Gypsophila glomerata* Adams
-  *Gypsophila × moldavica* Pinzaru

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