Flora of meadow communities of the Uryumkan Nature Reserve (Transbaikalia)

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Abstract. The floristic composition of meadow communities of the valley of the Uryumkan River at the territory of the Uryumkansky nature reserve in Zabaykalsky krai was studied. The flora of meadows is characterized by significant participation of species of the genus Sanguisorba and other medicinal plants used in medicine. The meadows are very attractive and can be used as an educational object for tourist excursions.

1. Introduction
The Uryumkansky nature reserve is one of the oldest nature reserves in the region, it is located in the Gazimuro-Zavodsky district of Zabaykalsky krai. The nature reserve was named after the Uryumkan River, which belongs to the Pacific drainage basin. It springs from the mountain bridge connecting the Gazimur and Uryumkan ridges at the altitude of about 900 m above sea level. Its length is 226 km. The catchment area is 4400 km² [1].

The nature reserve was established in 1986 with the aim to preserve and reproduce species of wild fauna, their habitat, and to maintain overall ecological balance. Its total area is 24 478 hectares. The climate of the area is sharply continental with extreme annual and daily temperature fluctuations. The temperatures in January are –32÷–34 °C, in July are +16 – +18 °C. Annual precipitation is 400–500 mm. The greatest amount of precipitation falls in July–August. Soils: meadow-chernozem and mountain-forest gray. Deep freezing is characteristic. Underlying rocks: sandstones, siltstones, quartzites, limestones, dolomites, conglomerates, granites, quartz diorites, granodiorites.

The research area is located within the boundaries of the Argun Dauria botanical province, Daurian sub district of the East Asian Botanical and Geographical region, exposed to the Pacific monsoon, but located in the ultra-continental climate.

The ridges are covered with larch forests, and in the wide valleys the appearance of vegetation is distinctly forest-steppe. Arched slopes of the southern expositions are covered by petrophytous prairies and steppes, upper parts of the mountains and northern slopes are covered with forests (larch-birch and pine); combinations of steppes and copses are frequently found on slightly sloping plains and penchant slopes. The valleys are covered with meadows with high percentage of swampy (often overgrown) meadows. There are Daurian prairies and wet meadows on the terraces above flood-plains, and complex apple–cherry-willow communities rich in species in the floodplains. The province differs from all other provinces of Dauria by a more humid climate and the presence of many Manchurian vegetation elements [2].
We have not found any literary sources on the composition of flora at the territory of the Uryumkan nature reserve. Therefore, the purpose of our research was to summarize results of the study of the flora of meadows and steppes in the territory of the reserve, which we performed in August 2021.

2. Objects and methods of work.
Meadow communities were studied in the valley of the Uryumkan River, 20 km from the cordon of the nature reserve (figure 1).

![Figure 1. Area and route of research.](image)

Geobotanical studies were carried out by the route method. The "Flora of Siberia" was used to determine the plants [3].

3. Results and Discussion
Most of the Uryumkan River valley is occupied by flood plain meadows and meadows of terraces above the flood plains. The banks of the river are covered with near-water tree and shrub communities. Forests are located along the spurs of the ridges surrounding the valley. There are mountain steppes on the steep southern slopes of the ridges. Anthropogenic impact on the vegetation cover is insignificant. There is a cordon, a facility of the reserve under construction, an abandoned cattle-breeding camp, and a cordon of a game reserve at the research area. The grass cover along the transport routes is disturbed by tracked and wheeled vehicles.

Depending on the degree of soil moisture, forb-sedge meadows, forb meadows, and shrubby meadows are distinguished. Forb-sedge meadows are located in the floodplain of the river, they are characterized by excessive soil moisture, an abundance of burnet and sedge. The meadows are characterized by high abundance of species, significant number of ornamental, medicinal and forage plants.
The shrubs include *Spiraea salicifolia*, *Salix brachypoda*, *Salix taraikensis*. The grass is dominated by *Carex vesicata*, as well as *Sanguisorba officinalis*, *Sanguisorba tenuifolia* and *Sanguisorba parviflora*, locally *Vicia amoena* and *Calamagrostis neglecta* (table 1).

**Table 1.** Floristic composition of meadows of the Uryumkan River valley (Uryumkan Nature Reserve).

| Plant name | Hardy-shrub layer | Projective coverage, point* |
|------------|-------------------|----------------------------|
|            | Forb-sedge meadow | Forb meadow | Shrubby meadow |
| Betula pendula Roth | 2
| Betula fruticosa Pallas | 2 |
| Pentaphylloides fruticosa (L.) O. Schwarz | 1c    |
| Ribes nigrum L. | +b |
| Rosa davurica Pallas | + |
| Salix bebbiana Sarg. | 1    |
| Salix brachypoda (Trautv. et C.A. Meyer) Kom. | 2    |
| Salix taraikensis Kimura | 1    |
| Sorbaria sorbifolia (L.) A. Br. | + |
| Spiraea media Franz Schmidt | 1    |
| Spiraea salicifolia L. | 2    |

| Herbaceous layer |
|------------------|
| Achillea asiatica Serg. | 1    |
| Aconitum barbatum Pers. | 1    |
| Aconitum turczaninovii Worosch. | 1   |
| Aconogonon divaricatum (L.) Nakai ex Mori | 1    |
| Adenophora sublata Kom. | 1    |
| Agrimonia pilosa Ledeb. | +    |
| Agrostis mongolica Roshev. | 1    |
| Artemisia integrifolia L. | 2    |
| Artemisia laciniata Willd. | 1    |
| Artemisia mongolica (Bess.) Fisch. ex Nakai | 2    |
| Aster alpinus L. | +    |
| Aster tataricus L.f. | +    |
| Astragalus membranaceus (Fisch.) Bunge | +    |
| Bupleurum scorzonerifolium Willd. | 1    |
| Calamagrostis neglecta (Ehrh.) Gaertn., Meyer et Scherber | 2    |
| Campanula glomerata L. | 1    |
| Carex vesicata Meinsch. | 3    |
| Castilleja pallida (L.) Sprengel | +    |
| Chamaenerion angustifolium (L.) Scop. | 1    |
| Cicutia virosa L. | +    |
| Cimicifuga simplex Wormsk. | 1    |
| Cirsium vlassovianum Fisch. | +    |
| Dianthus versicolor Fisch. ex Link | +    |
| Equisetum pratense Ehrh. | 1    |
| Erigeron acris L | +    |
| Euphrasia hirtella Jordan ex Reuter | +    |
| Filipendula palma (Pallas) Maxim. | 1    |
| Galatella dahurica DC. | 1    |
| Galium trifidum L. | +    |
| Galium verum L. | 1    |
| Geranium vlassovianum Fisch. ex Link | 1    |
| Geum aleppicum Jacq. | 1    |
| Gymnadenia conopsea (L.) R. Br. in Aiton | +    |
| Plant Name | Author | Status |
|------------|--------|--------|
| Halenia corniculata | (L.) Cornaz | + |
| Hedysarum alpinum | L. | 1 1 |
| Hemerocallis minor | Miller | + |
| Heracleum dissectum | Ledeb. | + |
| Heteropappus biennis | (Ledeb.) Tamamsch. ex Crub. | 1 |
| Hieracium umbellatum | L. | + |
| Iris laevigata | Fischer et Meyer | 1 1 2 |
| Leontopodium ochroleucum | subsp. conglobatum | Turcz. V. Knah. stat. et comb. nov. + |
| Ligularia fischeri | (Ledeb.) Turcz. | 1 1 |
| Lilium pensylvanicum | Ker-Gawler | + |
| Lupinaster pentaphyllus | Moench | 1 1 1 |
| Parnassia palustris | L. | + |
| Patrinia scabiosifolia | Fischer ex Link | + |
| Pedicularis resupinata | L. | 1 |
| Pedicularis spicata | Pallas | + |
| Poa pratensis | L. | 1 |
| Polygonatum odoratum | (Miller) Druce | 1 |
| Potentilla tanacetifolia | Willd. ex Schlecht. | 2 2 |
| Ptarmica alpina | (L.) DC. | + |
| Pulsatilla multifida | (G. Pritzel) Juz. | 1 |
| Rumex gmelini | Turcz. ex Ledeb. | 1 1 |
| Sanguisorba officinalis | L. | 2 2 2 |
| Sanguisorba parviflora | (Maxim.) Takeda | 2 2 |
| Sanguisorba tenuifolia | Fisch. ex Link | 2 2 2 |
| Saussurea amurensis | Turcz. | 1 + |
| Saussurea pulchella | (Fisch.) Fisch. | 1 1 |
| Scabiosa comosa | Fisch. ex Roemer et Schultes | 1 1 |
| Schizonepeta multifida | (L.) Briq. | 1 |
| Sedum pallescens | Freyn. | 1 |
| Sedum telephium | L. | 1 1 + |
| Senecio cannabifolius | Less. | + |
| Seseli seseliloides | (Turcz.) Hiroe | 1 + |
| Silene repens | Patrin | 1 |
| Synurus deltoides | (Aiton) Nakai | 1 1 |
| Tanacetum vulgare | subsp. vulgare | 1 1 |
| Urtica angustifolia | Fisch. ex Hornem. | 1 |
| Veratrum dahuricum | (Turcz.) Loes. | 1 |
| Veronica longifolia | L. | 1 |
| Veronicastrum sibiricum | (L.) Pennell | 1 + |
| Vicia amoena | Fischer | 2 1 |
| Vicia cracca | L. | 2 1 |
| Seseli seseliloides | (Turcz.) Hiroe | 1 + |
| Silene repens | Patrin | 1 |
| Synurus deltoides | (Aiton) Nakai | 1 1 |

*a* The Braun-Blanke Scale is a scoring system for jointly determining projective cover and species abundance.  
*b* it is rare, coverage is low.  
*c* the number of individuals is high, but the coverage is insignificant or the individuals are sparse, but the coverage is large.  
*d* the number of individuals is high, the coverage is from 5 to 25%.

Forb meadows are located upland along the terrace above the flood plain. They are characterized by higher abundance of species, an abundance of burnet, and some species of plants included in the Red Data Book of Zabaykalsky krai such as *Hemerocallis minor* and *Lilium pensylvanicum*.
Shrubby meadows are located upland, near the border with forest communities. The meadows are characterized by increased participation in the phytocenosis of *Pentaphylloides fruticosa*, *Salix brachypoda*, *Betula fruticosa*, as well as the undergrowth of *Betula pendula*.

In the shrub layer of meadows, the characteristic shrub is *Spiraea salicifolia*. *Sanguisorba* species are characteristic for the herbaceous layer.

The grass of meadows includes a number of medicinal plants used in official medicine: *Sanguisorba officinalis*, *Tanacetum vulgare*, *Ribes nigrum*, *Rosa davurica*, *Equisetum pratense*, as well as many plants used in traditional medicine: *Betula pendula*, *Pentaphylloides fruticosa*, *Achillea asiatica*, *Astragalus membranaceus*, *Bupleurum scorzonerifolium*, *Filipendula palmate*, *Parnassia palustris*, *Pulsatilla multifida* and other plants.

The abundance of ornamental plants makes the meadows beautiful: *Aconitum turczaninowii*, *Cimicifuga simplex*, *Ligularia fischeri*, *Veronica longifolia*, *Veronicastrum sibiricum*, *Chamaenerion angustifolium*, *Campanula glomerata*, *Hedysarum alpinum*, *Senecio cannabifolius*, *Filipendula palmate*, *Tanacetum vulgare*, *Saussurea pulchella*, *Synurus deltoids*, and others.

4. Conclusion

Thus, our study of the flora of the nature reserve meadows revealed a significant diversity of plant species. The above list of plants will certainly be supplemented with other plant species as research continues.

To preserve the flora of meadow communities and their attractive habitus at the nature reserve, it is important that the territory should be organized efficiently, including routes of movement between objects.

References

[1] *Small Encyclopedia of Transbaikalia: Natural Heritage* 2009 ed R F Geniatulin (Novosibirsk: Nauka) p 698
[2] *Website of Belikovich A V 2017 Vegetation of Dauria* Retrieved from: http://ukhtoma.ru/geobotany/dahuria_11.htm
[3] *Flora of Siberia* 1988-2003 vol 1–14 ed L I Malysheva and G A Peshkova (Novosibirsk: Nauka) p 3909