Phytocenotic Description of Dracocephalum Species in the Flora of Uzbekistan

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Abstract: In this article a phytocenotic analysis of species of the family Dracocephalum in the flora of Uzbekistan has been provided. The study indicated nine communities of Dracocephalum species in the Pskom, Ugam, Chatkal, and Nurata, Turkestan ridges of the Western Tien Shan between 2016 and 2020.

Keywords: Flora, Genus, Species, Dracocephalum, Phytocenotic, Edificator, Subedificator, Formation, Association, Drude.

1. Introduction

In today's world, the rapid use of natural resources for various economic, social and domestic purposes is leading to the transformation and reduction of biological diversity. This situation leads to a decrease in plant species, changes in flora, transformation and a decrease in biological productivity. Therefore, the study of biodiversity, registration of species composition of flora, determination of phytocenotic status, conservation of natural resources are of great scientific and practical importance.

Dracocephalum L. belongs to the family Lamiaceae. Representatives of this family can be found among the bushes on the fields, forests, roadsides, mountain slopes of Europe and Asia, starting with Scandinavia, Central Europe and Manchuria, Siberia, the Caucasus, Old Asia and Central Asia. Due to the fact that the plants belonging to this category are essential oils, medicinal, they are in the list of plants included in the pharmacopoeia of many European countries and are used in folk medicine.

2. Materials and Methods

The material of the research is the species of D. adylovii IIMalzev, D. discolor Bunge, D. diversifolium Rupr., D. formosum Gontsch., D. imberbe Bunge, D. integrifolium Bunge, D. karataviense Pavlov & Roldugin, D. komarovii Lipsky, D.nodulosum Rupr., D. nuratavicum Adylov, D.nutans L., D.oblongifolium Regel, D. royleanum Benth., D. scrobiculatum Regel, D. spinulosum Popov in the Dracocephalum family in the flora of Uzbekistan. The study used modern methods such as geobotanical, morphological, biometric, statistical and GIS (Geographic information system) mapping.

3. Results and Analysis

Representatives of the group are not evenly spread around Central Asia and the Republic of Uzbekistan. Data on local flora indicates that Dracocephalum is found 18 species in the Kyrgyzistan Republic (2016), 13 species in the Republic of Tajikistan (1986), 22 species in the Republic of Kazakhstan (2001) and 1 specie in the Republic of Turkmenistan (1954). [13; 384-p.; 9; 135-137-p.; 6; 178-p.; 10; 162-164-p.].

The species of the flora of the Republic of Uzbekistan are more than the species of Turkmanistan and Tajikistan which has spread around. Alternatively, they are less than the species of Kyrgyzistan and Kazakistan Republics. Considering that the area of the Republic of Uzbekistan (448978 km2) is almost 6 times smaller than the area of the Republic of Kazakhstan (2724 902 km2), the number of species in the Republic of Uzbekistan is particularly large (Figure 1).

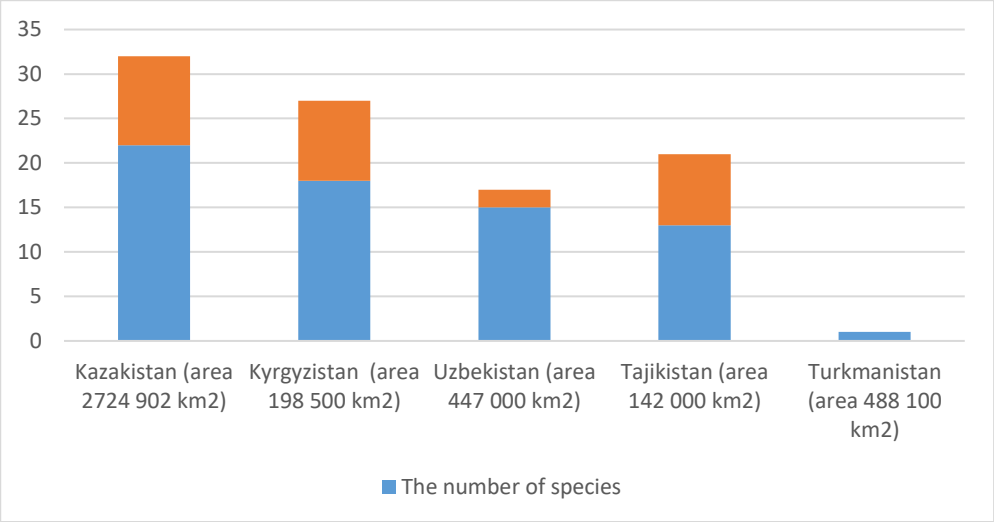

Figure 1. Distribution of Dracocephalum Species in the Flora of Uzbekistan

The above data show that the flora of the Republic of Uzbekistan differs from neighboring republics in the occurrence of species of the family Dracocephalum. Based on the analysis of herbarium samples stored in the herbarium fund of the National Herbarium (TASH) and M.V. Lomonosov Moscow State University (MW), the GIS map of the distribution of species in the territory of the Republic of Uzbekistan was created using Google Earth and ArcMap 10 (Figure 2).

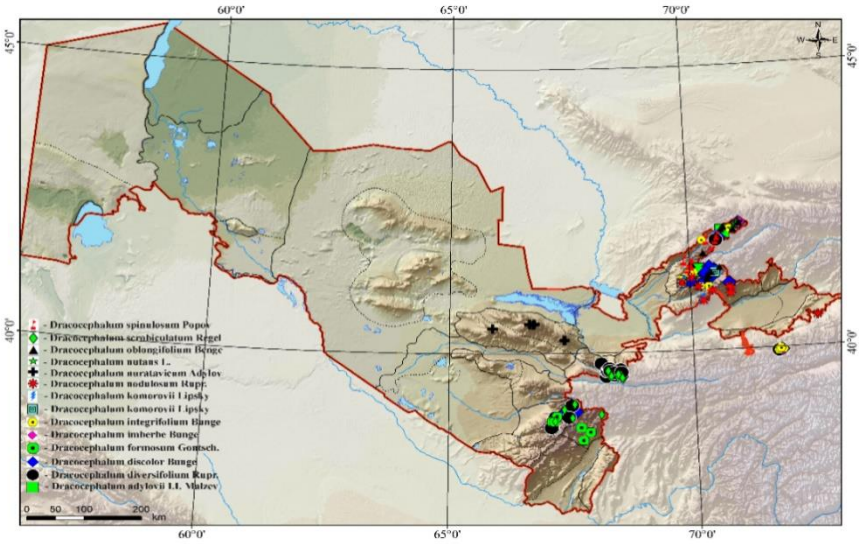

Figure 2. The GIS Map of Dracocephalum Species

There is no targeted study in Uzbekistan on the distribution of Dracocephalum species in our flora. For this reason, species' features of spreading in communities, clarifying floristic composition is achieved [1;29-30.-p].

Due to the relief, climate and soil characteristics, the range of Dracocephalum species is found in the area of specific vegetation. The main parts of the floristic composition of plant communities consists of shrubs and perennial grasses.

During the research 2016-2020, Dracocephalum species which participated 9 plant communities were descriptioned in Western Tyan-Shan's Pskom, Ugom, Chatkal and Pamir Alay's Nurata, Turkestan range.

1. Festuca valesiaca - Dracocephalum komarovii - Artemisia persica.
2. Ligularia tomsonii - Dracocephalum komarovii – Lagotis korolkowii**.**
3. Aconogonon coriarium -Dracocephalum spinulosum – Ferula ugamica.
4. Carex pachystylis - Dracocephalum integrifolium-Origanum tyttanthum.
5. Rosa ecae - Dracocephalum diversifolium - Poa bulbosa - Oxytropis lehmannii, Hypericum scabrum, Festuca valesiaca.

6. Dracocephalum diversifolium - Mellilotus officinalis - Carex pachystylis, Poa bulbosa, Hypericum scabrum.
7. Amygdalus spinosissima - Dracocephalum diversifolium- Festuca valesiaca.
8. Rosa maracandica -Dracocephalum diversifolium - Lagochilus seravschanicus.
9. Prangos pabularia-Dracocephalum nuratavicum - Artemisia sogdiana.

1. Festuca valesiaca - Dracocephalum komarovii - Artemisia persica community. It was distributed in 2106 metres high (41.522477° 70.016539°) south-western slope, stony-gravel soil of Chatkal range, The mountain of Chimgan, Bildirsoy massive. Area is 1 ha. Community was described as having many plant species. Main edificator plants are *Festuca valesiaca* Schleich, *Dracocephalum komarovii* Lipsky. Subedificators which are plentiful *Artemisia persica* L., *Logotis korolkovii* (Regel & Schmalh.) Maxim., and the following by *Ziziphora pedicellata* Pazji. et. Vved, *Galium pamiro-alaicum* Pobed. The vegetation cover of the community is 70-80 %. 58 species of plants were distributed there. Life forms of 2 species of trees, 6 species of shrubs and bushes, 1 species of semi-shrubs and semi-bushes, 41 species of perennials, 8 species of annuals and biennials were distributed.

2. Carex pachystylis - Dracocephalum integrifolium-Origanum tyttanthum community. It was distributed in the east of Pskom range, Nanai village, in Machitgansay valley, on the slopes of the lower and upper reaches of the gorge at an altitude of 2100-2700 metres (41.696730° 70.234881°) in the south-eastern slope. Area is 10ha. Community was described as having many plant species. Edificator is *Origanum tyttanthum* Gontsch., *Carex pachystylis* Regel, subedificator which are plentiful - *Dracocephalum integrifolium Bunge*, *Galium pamiro-alaicum* Pobed., and the following by *Allium barszczewskii* Lipsky, *Centaurea squarrosa* Willd., *Dracocephalum spinulosum* Popov, *Dracocephalum oblongifolium* Regel, *Potentilla fedtzchenkoana* Siegfr. ex Th. Wolf. The vegetation cover of the community is 70-80 % and there are 50 species of plants. There are 6 species of annuals and biennials, 8 species of shrubs and semi-bushes, 34 species of perennials, 2 species of trees. Dracocephalum spinulosum, Dracocephalum integrifolium, Dracocephalum oblongifolium was distributed in the community. During the research new points of growing species was founded.(Figure 3).

Figure 3. Machitghansay. General view of Carex pachystylis - Dracocephalum integrifolium-Origanum tyttanthum community.

Plant communities are also found in Pskom range, Askarsay on the top of Nanay village, in large boulders in Oynatosh valley. Following plants occurs with this species: *Arenaria griffithii* Boiss, *Agropyron repens* (L.) P.Beauv, *Bromus paulsenii* Hack, *Cousinia bonvalotii* Franch, *Festuca valesiaca* Schleich, *Lagotis korolkovii* (Regel et Schmalh) Maxim., *Ligularia alpigena* Pojark, *Papaver croceum* Lebed., *Poa bactriana* Roshev, *Polygonum hissaricum* M. Pop., *Ranunculus olgae* Regel. Our following research was held on the plateau of Ohangaron.

3. Lagotis korolkowii - Dracocephalum komarovii -Ligularia tomsonii community. It was distributed in the mountainous region of Chatkal range, around the lake of Arashon on the valley of the river Ohangaron an altitude of 2900-3100 m above sea level (41.366230° 70.528240°) north-eastern, on stony-gravel slope. Area is

0.5 ha. The vegetation cover of the Earth is 35-40%. 35 species of plant grow there. Edificator is *Ligularia tomsonii* (Clarke) Pojark., *Lagotis korolkowii* (Regel & Schmalh.) Maxim., subedificator which are *Ferula penninervis* Regel & Schmalh., *Carex pachystylis* J. Gay, and following by *Dracocephalum komarovii Lipsky*, *Dracocephalum discolor* Bunge. Life forms of 1 species of semi-bushes, 46 species of perennials, 3 species of biennials and 5 species of annuals were distributed.

Figure 4. Arashon. General view of Lagotis korolkowii - Dracocephalum komarovii -Ligularia tomsonii community.

4. Aconogonon coriarium -Dracocephalum spinulosum – Ferula ugamica community. It was distributed in Ugom range, left stream of the Oygaing river, upper of Pskom village an altitude of 2900-3100 metres above sea level (41.958623° 70.337863°) north-eastern slope**.** Area is 1 ha, brown stony-gravel soil. The vegetation cover of the Earth is 75-80%. (Figure 5).

Dracocephalum spinulosum Popov and *Dracocephalum integrifolium* Bunge is found in the community. Dracocephalum integrifolium is found among the grasses at an altitude of 1800-2100 m above sea level as it flows along the valley floor. Dracocephalum spinulosum is found on the large rocky slopes above the mountain. It has been determined that this place is the new home of the Dracocephalum species. When community was analyzed according to life forms, 28 species of perennials, 8 species of biennials, 2 species of annuals were determined.

Figure 5. Kurumjolsoy. General view of Aconogonon coriarium -Dracocephalum spinulosum – Ferula ugamica community.

Distribution of *Dracocephalum komarovii* Lipsky on the research which conducted on western Tyan Shan. There are totally 46 species of plants, edificator *Ferula ugamica Korovin*, *Aconogonon coriarium* (Grig.) Soják, subedificator which is plentiful *Dracocephalum integrifolium Bunge*, *Dracocephalum spinulosum* M. Pop. And following by *Mediasia macrophylla* (Regel & Schmalh.) Pimenov, *Ligularia thomsonii* (Clarke) Pojark. Life forms of 2 species of trees, 5 species of shrubs and bushes, 36 species of perennials, 3 species of biennials and annuals were found.

Studies in the Western Tyan Shan range have shown that Dracocephalum komarovii Lipsky is distributed in only one local population in the area above the Lashkerek and Gushsay rivers, from 2,600 m to 3,300 m above sea level [12; 110-111 - p.]. Population of *Dracocephalum diversifolium* and *Dracocephalum scrobiculatum* was determined in 1800-3000 metres above from the sea level in the areas of the range of Turkestan Zaamin State Nature Reserve located in the territory of Kyzylturiksay, Boykungirsay and Kashkasuv, Kulsoy, Uriklisay of Zaamin National Park.

5. Rosa ecae - Dracocephalum diversifolium - Poa bulbosa - Oxytropis lehmannii, Hypericum scabrum, Festuca valesiaca community. Distributed in Turkestan range, north-eastern side of Guralashsay, left stream of Kyzylturiksay, 2180 m above sea level(39.643693° 68.254266°), south-western slope. Area is 1,5 ha fine stony-gravel, red sand soil. The vegetation cover of the Earth is 70-80%. There are totally 37 species of plants, edificators which are plentiful *Poa bulbosa* L., *Dracocephalum diversifolium Rupr.*, and following by *Oxytropis lehmannii* Bunge, *Rosa ecae* Aitch., *Hypericum scabrum* L., *Festuca valesiaca* Schleich,, *Centaurea squarrosa* Willd., *Lophantus subnivalis* Lipsky, *Poa bulbosa* L.

Figure 6. Turkestan range. Kyzylturik. General view of Rosa ecae - Dracocephalum diversifolium - Poa bulbosa - Oxytropis lehmannii, Hypericum scabrum, Festuca valesiaca community.

6. Carex pachystylis, Poa bulbosa, Hypericum scabrum L. - Dracocephalum diversifolium - Mellilotus officinalis community (39.603145° 68.444361°). It was distributed in Turkestan range Zaamin National Park western slope of the left stream of Kashkasuv, 2300 m above sea level, north-western slope. (Figure 7).

Figure 7. Carex pachystylis, Poa bulbosa, Hypericum scabrum L. - Dracocephalum diversifolium - Mellilotus officinalis community

The area is 0,10 ha, aspect is purple. Soil: fine gravel red sand. The vegetation cover of the Earth is 70-80%. There 48 species of plants, edificators *Dracocephalum diversifolium, Mellilotus officinalis* (L.) Pall. And subedificators *Carex pachystylis* J. Gay, *Centaurea squarrosa* Willd., *Poa bulbosa* L. *Astragalus nobilis* Bunge ex B. Fedtsch. Life forms of 1 species of trees (*Juniperus seravschanica* Kom.), 4 species of shrubs and bushes, 3 species of semi-shrubs and semi-bushes, 31 species of perennials, 2 species of biennials and 7 species of annuals were determined.

7. Amygdalus spinosissima - Dracocephalum diversifolium- Festuca valesiaca community. It was distributed in Zaamin National Park, Uruklisay 1800-1900 m above sea level(39.649842° 68.510998°), north-western slope. The area is 0,28 ha. The vegetation cover of the Earth is 70-80%. There are 40 species of plants in the community, edificators *Festuca valesiaca* Schleich, *Dracocephalum diversifolium* Rupr., subedificators *Poa bulbosa* L., *Amygdalus spinosissima* Bunge and *Hypericum scabrum* L. There is 1 species of trees, 3 species of shrubs and bushes, 2 species of semi-shrubs and semi-bushes, 23 species of perennials, 2 species of biennials, 9 species of annuals in the community.

8. Rosa maracandica -Dracocephalum diversifolium - Lagochilus seravschanicus community. Community of plants were distributed in the area of Angurlisay, the range of Turkestan Zaamin State Nature Reserve. (Figure 9) Western slope, area is 0,5 ha, 2640 m above sea level (39.608745°, 68.344942°), soil: stony-gravel, fine sand soil. The vegetation cover of the Earth is 70-80%. There are 41 species of plants in the community, edificators *Lagochilus seravschanicus* Knorring, *Dracocephalum diversifolium* Rupr, subedificator *Rosa ecae* Aitch., *Poa bulbosa* L. And with plentiness following by *Eremurus sogdianus* (Regel) Franch. and *Galium tricornutum* Dandy. Life forms of 1 species of trees, 4 species of shrubs and bushes, 2 species of semi-shrubs and semi-bushes, 27 species of perennials, 2 species of biennials and 5 species of annuals.

Population of *Dracocephalum scrobiculatum* Regel was found on the range of Turkestan, large Shivirlisay valley, Kyzylmozorsay and Katta Archamaydon. This species is found in various species of escarpment of the esperate formation in the coarse xerophytes. With species following plants occurs: *Juniperus turkestanica* Kom., *Acantholimon alatavicum* Bunge, *Allium oreophilum* C.A. Mey., *Onobrychis echidna* Lipsky, *Artemisia persica* Boiss., *Scorzonera acanthoclada* Franch., *Thymus seravschanicus* Klok., *Arenaria griffithii* Boiss., *Bromus paulsenii* Hack, *Delphinium oreophilum* Huth., *Festuca valesiaca* Schleich, *Galium pamiralaicum* Pobed., *Ligularia thomsonii* (Clarke) Pojark, *Poa litvinoviana* Ovcz., *Ziziphora pamiralaica* Juz. (Figure 8)

Figure 8. Rosa maracandica -Dracocephalum diversifolium - Lagochilus seravschanicus community

In the area another species except *Dracocephalum diversifolium* Rupr. And *Dracocephalum scrobiculatum* Regel was not found. Plant communities occur in middle and upper mountainous region, northern and western slope, among the rare shrubs, under fir-trees. It doesn't occur lower mountainous regions. Due to the protection of the area, it is possible to constantly monitor the cenopopulations of the species [3;4-8-p.].

9. Prangos pabularia-Dracocephalum nuratavicum - Artemisia sogdiana community. Distributed in the range of Nurata, gorge of Andibarut 1210 m above sea level (40.514025°, 66.737619°), eastern slope. Area is 0,7 ha. The vegetation cover of the Earth is 70-80%. There are 39 species of plants in the community (Figure 9).

Figure 9. Prangos pabularia-Dracocephalum nuratavicum - Artemisia sogdiana community.

Edificators occur *Prangos pabularia* Lindl., *Poa bulbosa* L., subedificators *Dracocephalum nuratavicum*, *Salvia submutica* Botsch et Vved with plentiness following by *Phlomis thapsoides* Bunge and *Hulthemia persica* Bornm. Life forms of 1 species of trees, 3 species of shrubs and bushes, 1 species of semi-shrubs and semi-bushes, 28 species of perennials, 6 species of biennials and annuals. Community distribution area is located in Nurata State Nature Reserve, plot of Hayatsay. *D. Nuratavicum* occurs at an altitude of 1200-1300 m above sea level. Distributed on uplands of mountainous slopes, stony-gravel brown soil and among bushes. It was known that distribution of this plant is related to altitude and wind direction. Nurata mountains decreases from south to north. Individuals can be found more in northern area. The seeds are propagated by wind and rainwater runoff. According

to the literature, the movement of wind in the Nurata Mountains dominates in a north-easterly direction during the summer months[4;10- 12 -p.].

During the research, 9 plant communities were found which have *Dracocephalum* L. species. The distribution of plants in the community was based on Drude's 7-point system, and the naming was done by calculating the edificaor, subedificator species [14; 10-15-p].

Life forms were analyzed according to Budansev A.L. (1987), Alekseeva N.B. (1990), Serebryakova T.I. (2006), Denisova G.R (2006) [7; 260-267.; 5; 202-209-p; 11; 336-348-p.; 8; 112-115-p.].

4. Conclusions

We can say that to conclude, as a result of studies on learning phytocenotic feature of Dracocephalum species, 9 communities of Dracocephalum species in the range of Western Tyan-Shan, Pskom, Ugom, Chatkal and Pamir Oloy's Nurata, Turkestan were described in 2016-2018.

The most common species in phytocenosis of Dracocephalum species (4-8 cenopopulations) were determined: *Festuca valesiaca* Schleich (5), *Artemisia absinthium* L.(8), *Carex pachystylis* Regel (8), *Centaurea squarrosa* Willd. (5), *Hypericum scabrum* L. (6), *Ziziphora pedicellata* Pazji. et. Vved. (5), *Poa bulbosa* L. (4), *Convolvulus lineatus* L. (6), *Galium pamiro-alaicum* Pobed. (4), *Rosa ecae* Aitch. (4)Consisting of 40-60% of perennial plants in communities are a charachteristic feature of the mountainous regions of Central Asia. In described 9 community 5(2,52 %) species of trees, 12(6,06 %) species of shrubs and bushes, 8 (4,04 %) species of semi-shrubs and semi-bushes, 144 (72,7 %) species of perennials, 8 (4,04 %) species of biennials, 21(10,6 %) species of annuals, totally 198 species were determined.

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