

UDC 635.57  
AGRIS F40

https://doi.org/10.33619/2414-2948/56/04

## THE ROLE OF SPECIES INCLUDING IN *VALERIANELLA* L. GENUS IN PHYTOCENOSES IN THE AREA OF NAKHCHIVAN AUTONOMOUS REPUBLIC

©**Talibov T.**, Academician of Azerbaijan NAS, Dr. habil., Institute of Bioresources Nakhchivan branch of Azerbaijan NAS, Nakhchivan, Azerbaijan, [t\\_talibov@mail.ru](mailto:t_talibov@mail.ru)

©**Mahmudova U.**, ORCID: 0000-0003-2877-3761, Nakhchivan State University, Nakhchivan, Azerbaijan, [ulkar20@gmail.com](mailto:ulkar20@gmail.com)

## РОЛЬ ВИДОВ РОДА *VALERIANELLA* L., ВХОДЯЩИХ В НЕКОТОРЫЕ ФИТОЦЕНОЗЫ НАХИЧЕВАНСКОЙ АВТОНОМНОЙ РЕСПУБЛИКИ

©**Талыбов Т. Г.**, акад. НАН Азербайджана, д-р биол. наук, Институт биоресурсов Нахичеванского отделения НАН Азербайджана, г. Нахичевань, Азербайджан, [t\\_talibov@mail.ru](mailto:t_talibov@mail.ru)

©**Махмудова У. М.**, ORCID: 0000-0003-2877-3761, Нахичеванский государственный университет, г. Нахичевань, Азербайджан, [ulkar20@gmail.com](mailto:ulkar20@gmail.com)

*Abstract.* In this article the structure of species including in *Valerianella* Genus was studied with geobotanical methods, their role in phytocenosis, their formations, and associations were determined in the vegetation cover in Soyugdagh and Khorhat mountainous areas of Ordubad region. It has been determined that although the species of the *Valerianella* Genus are small numbers in phytocenosis and associations, they have great importance in improving the fodder quality of the vegetation. This plays an important role in the enrichment of food ration of Bezoar Goat and other herbivorous animals that inhabit the area of Zangezur National Park.

*Аннотация.* В данной статье изучена структура видов рода *Valerianella* геоботаническими методами, определена их роль в фитоценозе, определены их формации и ассоциации в растительном покрове горных районов Союгдаг и Хорхат Ордубадского района. Было установлено, что, хотя виды рода *Valerianella* в фитоценозах и ассоциациях малочисленны, они имеют большое значение для улучшения качества корма. Это играет важную роль в обогащении рациона безоарового или бородатого козла и других растительноядных животных, обитающих в районе Зангезурского национального парка им. акад. Гасана Алиева.

*Keywords:* *Valerianella*, phytocenosis, vegetation, valerian, association, systematic.

*Ключевые слова:* валерианелла, фитоценоз, растительность, валериана, ассоциация, систематика.

### Introduction

The study of the modern flora and vegetation of the Nakhchivan Autonomous Republic, to identify changes in phytocenosis, to organize the protection of rare species by fighting against ecological, anthropogenic, and zoogen influences considered most actual issues. The degradation of biodiversity due to various causes and exposing of species to danger is a serious threat to the world community, and steps are taking to create a range of measures, including preserves and national parks [1–14].



In the region of the Nakhchivan Autonomous Republic are located: Zangezur National Park named after Acad. Hasan Aliyev, Shahbuz State Nature Reserve (3139 ha), Ordubad (27869 ha), Arazboy (9118 ha), and Arpachaysky (68911.18 ha) State Nature Reserve. It seems that 27% of the total area (550275 ha) belongs to specially protected natural areas, which is the highest indicator.

On the basis of the Order of the President of the Azerbaijan Republic dated December 8, 2011, no. 1814, in the Cold Mountain Zone of Zangezur National Park created in the highlands of the Lesser Caucasus the species including in the *Valerianella* genus of *Caprifoliaceae* family has been investigated and the role of species of this genus in phytocenosis has been defined.

#### *Material and methods*

The investigation work had been carried out in the Soyugdagh zone of Zangazur National Park during the 2018–2019 years. The total area of the park is 42797.4 hectares, about 27131 hectares of this are summer pastures [1–4]. The structure of species including in the *Valerianella* Genus was studied as a research object with geobotanical methods, their role in phytocenosis, their formations, and associations was determined in the vegetation cover in Soyugdagh and Khorhat mountainous areas of Ordubad region [13–14].

During geobotanical studies, generally accepted methods were used, and the classification of plants was determined using classical and modern geobotanical methods.

#### *The discussion of the research*

The modern Systematic Classification of Flowering Plants was prepared by “The Phylogenetic Group of Angiosperm” (Angiosperm Phylogeny Group, APG-IV) and was published in the March 2016 issue of Linney Society magazine in London, entitled “An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV”.

James W. Byng, Mark W. Chase, Maarten J. M. Christenhusz, Michael F. Fay, Walter S. Judd, David J. Mabberley, Alexander N. Sennikov, Douglas E. Soltis, Pamela S. Soltis, Peter F. Stevens have been the main researchers who research the system of “The Phylogenetic Group of Angiosperm” [5–9].

In addition, Barbara Briggs, Samuel Brockington, Alain Chautems, John C. Clark, John Conran, Elspeth Haston, Michael Möller, Michael Moore, Richard Olmstead, Mathieu Perret, Laurence Skog, James Smith, David Tank, Maria Vorontsova and Anton Weber had contribution in the formation of the system [13–14].

The APG-IV classification system is a continuation of the APG-III (2009) system, an upgraded and supplemented form thus, in the last system, the number has increased from 59 to 64 (Boraginales, Dilleniales, Icaciniales, Metteniusales and Vahliales).

According to the studies, there have been many changes in the final classification spectrum of the *Valerianaceae* Batsch nom. family based on the APG IV system [5].

Diervillaceae Pyck, Dipsacaceae Juss., nom. cons., Linnaeaceae Backlund. Loniceraceae Vest. Morinaceae Raf. and *Valerianaceae* Batsch, nom. cons. families were concerned *Caprifoliaceae* Juss. family with subfamily status:

Subfamilia: *Caprifolioideae*

Subfamilia: *Diervilloideae*

Subfamilia: *Dipsacoideae*

Subfamilia: *Linnaeoideae*

Subfamilia: *Morinoideae*



Subfamilia: Valerianoideae Raf. (1820)

According to recent research, the last systematic spectrum of the Valerianaceae Batsch, nom. cons. family is as follows:

Eukaryota Whittaker & Margulis, 1978

Plantae Haeckel, 1866

Tracheophyta Sinnott, 1935 ex Cavalier-Smith, 1998

Classis: Magnoliopsida Brongniart, 1843 - Dicotyledons

Superordo: Dipsacanae

Ordo: Dipsacales Juss. ex Bercht. & J. Presl

Familia: Caprifoliaceae Juss., 1789 nom. cons.

Subfamilia: Valerianoideae Raf. (1820)

1. Genus: *Valeriana* L.

Subgen.1. *Valeriana*

Sect. 1. *Tuberosae* (Höck) Grub.

1(1) *Valeriana leucophaea* DC., 1830

Sect. 2. *Alliariifoliae* (Mikheev) Gorbunov

2(2) *V. alliariifolia* Adams aggr.

= *V. alliariifolia* Adams, 1805

= *V. tiliifolia* Troitzk., 1919

Sect. 3. *Valeriana*

Subsect. 1. *Alpestres* Mikheev

3(3) *V. alpestris* Steven, 1817

Subsect. 2. *Sisymbriifolia* Mikheev

4(4) *V. sisymbriifolia* Vahl, 1805

Subsect. 3. *Valeriana*

5(5) *V. officinalis* L. aggr.

= *V. grossheimii* Vorosch., 1953

2. Genus: *Centranthus* Neck. ex Lam. et DC.

6(1) *Centranthus longifolius* Steven, 1829

3. Genus: *Valerianella* Mill.

Sect. 1. *Psilocaelae* DC.

7(1) *Valerianella uncinata* (Bieb.) Duf., 1811

8(2) *V. oxyrrhyncha* Fisch. & C. A. Mey., 1837 (*V. diodon* Boiss.)

Sect. 2. *Sclerocarphae* Boiss.

9(3) *V. sclerocarpha* Fisch. & C.A. Mey., 1835

10(4) *V. cymbocarpa* C. A. Mey., 1831

11(5) *V. plagiostephana* Fisch. & C. A. Mey., 1835

12(6) *V. szovitsiana* Fisch. & C. A. Mey., 1836

Sect. 3. *Siphonocaelae* Soy.-Willem.

13(7) *V. dentata* (L.) Pollich, 1776

Sect. 4. *Platycaelae* DC.

14(8) *V. amblyotis* Fisch. & C. A. Mey. ex Hohen., 1838

Sect. 5. *Coronatae* Boiss.

15(9) *V. coronata* (L.) DC., 1805

16(10) *V. lasiocarpa* (Steven) Betcke, 1826

17(11) *V. leiocarpa* (C. Koch) Kuntze, 1887 (*V. dufresnia* Bunge ex Boiss.)

As can be seen 17 species belonging to 3 genera of Valerianaceae Batsch subfamily of *Caprifoliaceae* Juss., 1789 nom. cons. family of Dipsacales Juss. ex Bercht. & J. Presl order spread in the area of Nakhchivan AR.

One species including in *Centranthus* Neck. ex Lam. et DC. — *Centranthus* Genus, 5 species including in important genus for practice *Valeriana* L. and at most 11 species belonging *Valerianella* Hill genus of this subfamily in the area of Autonomous Republic.

The species including in *Valerianella* Genus utilize as treatment and cosmetics, the species concerning *Centranthus* genus use for decorative, the species of *Valerianella* Genus are cultivated in Western Europe, United States and the leaves are utilized as salad.

The species including in *Valerianella* Genus were investigated from the end of May to the end of August in vegetation in the area of Soyugdagh and Khorhat mountain areas of Ordubad region of Zangezur National Park.

*Betula pendula* Roth. and *Celtis caucasica* Willd. clean forest, at the same time *Juniperus exselsa* Bieb. and *J. foetidissima* Willd. sparse juniper wood land had been noted as small glade in the bottom of Soyugdagh and Khorhat mountain in the research area. The hips, goat's-wheat, acantalemon and buckthorn bushes had been attended in the second layer of every two-wood land.

The forest shrubbery which exist as glade are spread over the territory of the national park at an altitude of 1000–2200 m and extend to the boundaries of the subalpine and alpine meadows.

*Rubus caesius* L., *Atraphaxis angustifolia* Jaub. et Srach, *Tamarix meyeri* Boiss., *Ephedra procera* Fisch., *Calligonum polygonoides* L., *Lonicera iberica* Bieb., *Rhamnus pallasii* Fisch., *Cerasus incana* (Pall.) Spach, *Crataegus monogyna* Jacq., *C. pentagyna* Waldst., *Juniperus exselsa* Bieb. subsp. *polycarpus*, *Astracantha microcephala* Podlech, *Rosa tuschetica* Boiss., *R. canina* L., *Berberis vulgaris* L., *Sorbus graeca* Schauer, *Cotoneaster melanocarpus* Fisch. et Blytt species come across in the shore of Kotam river created by spring.

The composition of the vegetation changes dramatically as the Kilit valley and the Kotamchay valley while descending into lower zones. The area of Kotamchay pouring into the Araz River arrange 600 m below the sea level of the autonomous republic. *Punica granatum* L. and *Ficus carica* L. species being relic plants as wild form arrange peculiar formation and association with tamarisk bushes in the cost of Araz river. *Epipactis veratrifolia* Boiss. et Hohen. species entered the Red book of Nakhchivan AR, also participate in rushy place in this association.

In the research area *Valerianella amblyotis* Fisch. et C. A. Mey. including in *Valerianella* Hill genus starting from the coast of Araz River at the slope of the Kilit mountain they create not too dense phytocenosis with *Artemisia araxina* Takht., *Senecio paucifolius* S.G. Gmel., *Glaucium elegans* Fisch. et C. A. Mey., *Biebersteinia multifida* DC., *Stipa barbata* Desf., *Aegilops triuncialis* L., *A. cylindrica* Host., *Erophila verna* (L.) Bess. *Valerianella uncinata* (Bieb.) Dufr. species with *Valerianella oxyrrhyncha* Fisch. et C.A. Mey. take part as a minor species in phytocenosis in the slope of Khorhat mountain.

*Celtis caucasica* Willd., *Asparagus persicus* Baker, *Acantholimon caryophyllaceum* Boiss., *Acantholimon araxanum* Bunge, *Jasminum fruticans* L., *Halimodendron halodendron* Voss., *Rosa canina* L., *Capparis spinosa* L. and others come across along with the *Artemisia absinthium* L., *Prangos acaulis* (DC.) Bornm., *Euphorbia marschalliana* Boiss., *Capsella bursa-pastoris* Medik., *Centaurea behen* L., *Peganum harmala* L., *Stipa barbata* Desf., *Stipa capillata* L., *Allium akaka* S. G. Gmel. ex Schult et Schult, *Allium rubellum* Bieb., *Muscari tenuiflorum* Tausch., on rocks and stony places *Ceterach officinarum* Willd., *Tulipa florenskyi* Woronow, *Fritillaria kurdica* Boiss. et Noe, *Iris caucasica* Stev., *Scilla caucasica* Miscz. species in the phytocenosis (Figure 1).





Figure 1. A. *Valerianella uncinata* (Bieb.) Dufr. and B. *V. szovitsiana* Fisch. & C. A. Mey.

*Erophila verna* (L.) Bess. *Senecio paucifolius* S.G. Gmel., *Glaucium elegans* Fisch. et C.A. Mey., *Aeluropus repens* (Desf.) Parl., *Stipa barbata* Desf., *Aegilops triuncialis* L., *A. cylindrica* Host., *Ceratocarpus arenarius* L., *Cynodon dactylon* (L.) Pers. in which also *Sovich valerianella* participate in the phytocenosis in Arazboyu area near Kilit village (Figure 2).



Figure 2. Phytocenosis created by the Sovich valerianella near the Kilit village.

*Festuceto + Thymuseto + Astragaletum* formation are the most common phytocenosis which have mixed polydominant composition in phrygana vegetation from xerophyte plants. The following species participate in phytocenosis created by *Valerianella plagiostephana* Fisch. & C. A. Mey., 1835 with early spring plants in clay limestone or limestone, rocky-stony, dry, gravelly slopes in the foot of Soyugdagh:

*Formation class:* perennial shrubbery



Formation: *Atraphaxis spinosa* L.+ *Zygophyllum atriplicoides* C. A. Mey. + *Artemisia absinthium* L.

Association: *Artemisia absinthium* L. + *Atraphaxis spinosa* L. + *Zygophyllum atriplicoides* C. A. Mey. + *Peganum harmala* L. + *Festuca sclerophylla* Boiss. ex Bisch. + *Valerianella plagiostephana* Fisch. & C. A. Mey. + *Euphorbia marschalliana* Boiss. + *Roemeria refracta* (Stev.) DC., + *Astragalus tribuloides* Dehlile + *Aegilops cylindrica* Host + *Avena persica* Steud. + *Alhagi pseudalhagi* (Bieb.) Fisch. etc.

Association: (*Artemisia absinthium* L.+ *Reaumuria persica* Boiss. + *Atraphax spinosa* L. + *Zygophyllum atriplicoides* C. A. Mey. + *Euphorbia marschalliana* Boiss. + *Cardaria draba* (L.) Desv. + *Valerianella plagiostephana* Fisch. & C. A. Mey. + *Salsola dendroides* Pall. + *Medicago minima* (L.) Bartalini + *Aegilops cylindrica* Host + *Ceratocarpus arenarius* L. etc.

Formation class: perennial shrubbery

Formation: (*Artemisia absinthium* L.+ *Atraphaxis spinosa* L.+ *Valerianella plagiostephana* Fisch. & C.A. Mey. + *Zygophyllum atriplicoides* C. A. Mey.)

Association: (*Artemisia absinthium* L. + *Atraphaxis spinosa* L.+ *Euphorbia marschalliana* Boiss. + *Peganum harmala* L. + *Zygophyllum atriplicoides* C. A. Mey. + *Valerianella plagiostephana* Fisch. & C. A. Mey. + *Stachys lavandulifolia* Vahl. + *Isatis bungeana* Seidl. + *Thymus collinus* Bieb. + *Stipa hohenackerana* Trin. (Figure 3, 4).



Figure 3. *Valerianella plagiostephana* Fisch. & C. A. Mey.

Formation class: perennial shrubbery

Formation: (*Artemisia absinthium* L.+ *Atraphaxis spinosa* L. + *Valerianella plagiostephana* Fisch. & C. A. Mey. + *Zygophyllum atriplicoides* C. A. Mey.)

Association: (*Artemisia absinthium* L. + *Atraphaxis spinosa* L.+ *Euphorbia marschalliana* Boiss. + *Peganum harmala* L. + *Zygophyllum atriplicoides* C. A. Mey. + *Valerianella plagiostephana* Fisch. & C. A. Mey. + *Stachys lavandulifolia* Vahl. + *Isatis bungeana* Seidl. + *Thymus collinus* Bieb.+ *Stipa hohenackerana* Trin.

Association: (*Artemisia absinthium* L. + *Reaumuria persica* Boiss. + *Atraphax spinosa* L. + *Euphorbia szovitsii* Fisch. & C. A. Mey. + *Zygophyllum atriplicoides* C. A. Mey. + *Eryngium*

*campestre* L. + *Dactylis glomerata* L. + *Valerianella plagiostephana* Fisch. & C. A. Mey. + *Hypericum scabrum* L. + *Festuca valesiaca* Gaudin + *Verbascum pyramidatum* Bieb. + *Ajuga orientalis* L. + *Ziziphora tenuior* L. + *Thymus collinus* Bieb. + *Anisantha tectorum* Nevski + *Bromus arvensis* L.



Figure 4. The phytocenosis created by *Valerianella plagiostephana* Fisch. & C. A. Mey. in the slope of Soyugdagh.

Formation class: Grainy + variety shrubbery + mountain xerophyte vegetation

Formation: Grainy + bean + euphorbia + variety shrubbery steppe

Association: (*Stipa capillata* L. + *Trifolium trichocephalum* Bieb. + *Lepidium vesicarium* L. + *Euphorbia seguieriana* Neck. + *Papaver arenarium* Bieb. + *Kochia prostrata* (L.) Schrad + *Thymus kotschyanus* Boiss. + *Stachys atherocalyx* C. Koch + *Onosma sericea*)

Association: (*Festuca valesiaca* Gaudin + *Andrachne buschiana* Pojark. + *Stachys atherocalyx* C. Koch + *Hyperecum perforatum* L., *Gypsophila capitata* Bieb. + *Stipa capillata* L. + *Aegilops cylindrica* L. + *Eremopyrum triticeum* Neck.)

Association: (*Capparis spinosa* L. + *Euphorbia seguieriana* Neck. + *Atraphax spinosa* L. + *Suaeda altissima* (L.) Pall. + *Alhagi pseudalhagi* Fisch. + *Caragana grandiflora* DC. + *Caccinia macranthera* Brand + *Geranium tuberosum* L. + *Alkanna orientalis* (L.) Boiss. + *Bromus racemosus* L. + *Stipa capillata* L. + *Poa bulbosa* L.)

### Result

The structure of species including in *Valerianella* Genus had been studied in the existing vegetation with geobotanical methods, their role in phytocenosis, created formation and associations had been defined in vegetation cover in the mountain area of Soyugdagh and Khorhat of Ordubad region. It has been cleared that, although the species of *Valerianella* Genus are small number in phytocenosis and association, they have great importance in improving the quality of the fodder of vegetation. This plays an important role in the enrichment of the nutritional diet of Bezoar Goats and other herbivorous animals that inhabit Zangezur National Park.



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Работа поступила  
в редакцию 12.06.2020 г.

Принята к публикации  
15.06.2020 г.

Ссылка для цитирования:

Talibov T., Mahmudova U. The Role of Species Including in *Valerianella* Genus in Phytocenoses in the Area of Nakhchivan Autonomous Republic // Бюллетень науки и практики. 2020. Т. 6. №7. С. 50-58. <https://doi.org/10.33619/2414-2948/56/04>

Cite as (APA):

Talibov, T., & Mahmudova, U. (2020). The Role of Species Including in *Valerianella* Genus in Phytocenoses in the Area of Nakhchivan Autonomous Republic. *Bulletin of Science and Practice*, 6(7), 50-58. <https://doi.org/10.33619/2414-2948/56/04>

