



Current Status and Classification of Vegetation Cover in the Gunnut–Gapicik Region of the Nakhchivan Highlands

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Abstract. Vegetation cover plays a fundamental role in maintaining ecosystem stability, biodiversity conservation, and the sustainable use of natural forage resources in mountainous regions. This study investigates the current status, distribution patterns, and classification of vegetation cover in the Gunnut–Gapicik region of the Nakhchivan Highlands. Field investigations were conducted during 2017–2024 using standard geobotanical survey methods. Vegetation types were identified and classified according to classical and modern geobotanical approaches based on field observations and phytocenological analyses. The results revealed that the vegetation of the study area is represented by eight major vegetation types comprising 33 formation classes, 94 formations, and 137 associations. Mountain-xerophytic, steppe, shrub, forest, meadow, swamp, rock-scrub, and oasis vegetation communities were distinguished, while subalpine, alpine, tugay, and wetland ecosystems occupy significant ecological niches within the region. The distribution of vegetation was found to be closely associated with altitudinal gradients and environmental conditions, reflecting the high ecological diversity of the area. The obtained results contribute to a better understanding of the vegetation structure of the Gunnut–Gapicik region and provide an important scientific basis for biodiversity conservation, sustainable pasture management, and future ecological monitoring in the Nakhchivan Highlands.

Keywords: vegetation cover, Gunnut–Gapicik region, vegetation classification, plant communities, geobotany

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1. Introduction

The Nakhchivan Highlands represent one of the most ecologically diverse regions of Azerbaijan due to their complex relief, wide altitudinal range, and diverse climatic conditions. These environmental characteristics have contributed to the formation of a rich and highly heterogeneous vegetation cover. There are approximately 2.5 million hectares of fodder areas in our republic, of which up to 30% falls on the Nakhchivan Autonomous Republic. The fodder plants of the Nakhchivan plain and low mountainous areas have been partially studied in the area (Movsumova, 2005). The present study focuses on the investigation of forb forage plants in the Gunnut–Gapicik region. This covers an altitude of 1200 - 3906 m above sea level.

Numerous studies have investigated the vegetation of the Nakhchivan Autonomous Republic, providing valuable information on its vegetation classification, floristic diversity, and phytogeographical characteristics. L.I. Prilipko (Lavrenko, E. M., & Korchagin, 1960) divided the territory of the AR into semi-desert, mountain-xerophyte (phrygana), mountain-steppe (gariga), rock-scrub, meadow, forest, swamp, and oasis vegetation types. At the same time, the researcher divided the vegetation types into plant groups and geobotanical regions that form formations and associations. E.M. Gurbanov (Gurbanov, 1984) noted that the Nakhchivan basin belongs to 6 vegetation types; S.Y. Babayev (Babayev, 1999) shows that there are 4 vegetation zones in the Nakhchivan AR: semi-desert, mountain-xerophyte, high mountain steppes,



and alpine meadows. T.H. Talibov inspected the territory only for Cormobionta (Talibov, 2003: 6) according to A.Sh. Ibrahimov (Ibragimov, 2005) the territory of the AR is represented by 17 vegetation types, 16 subtypes, 21 formation classes, 310 formation groups, 13 formation subgroups, 430 formations, 1700 associations and microgroups; in addition, 4 botanical-geographical regions, 16 flora regions and 62 geobotanical regions are distinguished in the region.

The distribution of Apiaceae and Polygonaceae in vegetation types and their formation of tall herbaceous phytocenoses was studied by S.J. Ibadullayeva (Ibadullayeva, 2004; Ibadullaeva et al., 2008) and others. A.H. Ismayilov (Ismayilov, 2007) showed that semi-desert, mountain-xerophyte (phrygana), steppe, shrub, meadow, forest, water-swamp, petrophilous, and oasis vegetation types are distributed in the Gilanchay basin based on vertical zonation. However, the role of forage plants in the Gunnut-Gapicik region in the vegetation type has not been studied. Therefore, we set the goal of studying forb forage plants in the Gunnut-Gapicik region.

2. Materials and Methods

This study was conducted to investigate the composition and distribution of forb forage plants (excluding grasses and legumes) in the mountainous areas of the Nakhchivan Autonomous Republic during 2017–2024. In this regard, the forb forage plants of the flora of the area were studied in detail in the spring, summer, autumn, and winter seasons, and their role in vegetation types was determined.

Field expeditions were conducted in the upper mountainous areas of the Sadarak, Sharur, Kangarli, Shahbuz, Julfa, and Ordubad districts within the Gunnut–Gapicik physiographic region of the Nakhchivan Autonomous Republic.

During the geobotanical research, generally accepted methods were used: “Programs for geobotanical research” (Prilipko, 1939). “Methodology of field geobotanical research” (Haciyev, 2004; Gorodkov, 1938). The forage areas were determined according to the “Research methodology of natural forage areas” (Haciyev et al., 1995), and the classification of vegetation was determined using classical and modern geobotanical methods (Alekhin, 1950; Iljinski, 1935).

3. Results

The vegetation of the forage areas of the region is characterized by diverse phytocenological features and taxonomic composition. The historical development of the vegetation cover of the Gunnut-Gapicig region is determined by a number of factors. We have determined that the vegetation of the spring-summer and winter pastures of the Gunnut-Gapicig region is concentrated in 8 vegetation types, which include 33 formation classes, 94 formations, and 137 associations. Subalpine, alpine, water-swamp, to a lesser extent semi-desert and tugay groupings are also found in its vast areas, which are also included in the above-mentioned vegetation types. The separated vegetation types and their formations are characterized below.

Mountain-xerophyte (phrygana) vegetation. This vegetation type is zonal in nature and is mainly distributed in the region at 1200–1500 m above sea level. Phrygana type is represented by 5 formation classes, 12 formations, and 21 associations. The vegetation classification is as follows. (F-formation; A-association)

Formation class: Thorny bushes

F: *Zygophylleta atriplicoides*

A: 1. *Zygophyllum atriplicoides* + *Peganum harmala*; 2. *Zygophyllum atriplicoides* + *Reaumuria persica* + *Atraphax spinosa*

F: (*Rhamnus pallasii*)

A: *Rhamnus pallasii* + *Cerasus microcarpa* + *Amygdalus fenzliana*



F: Caraganea grandiflorae

A: 1. *Caragana grandiflora*: 2. *Caragana grandiflora* + *Zygophyllum atriplicoides*

Formation class: Tragacanth

F: (*Astragaleta lagurus*

A: 1. *Astragalus lagurus* + *A. regelli*: 2. *Astragalus euoplus* + *Festuca sclerophylla*: 3. *Astragalus euoplus* + *Acantholimon karelinii*

Formation class: Cushion-form

F: *Acantholimoneta karelinii*

A: *Acantholimon karelinii* + *A. araxanum*

F: *Astracantha microcephalae*

A: *Astracantha microcephalae*

F: *Onobrycheta cornutae*

A: 1. *Onobrychis cornuta*: 2. *Onobrychis cornuta* + *Artemisia lerchiana* + *Eremostachys macrophylla*

Formation class: Subshrub and semi-subshrub friganas

F: *Thymeta kotschyanus*

A: 1. *Thymus kotschyanus*: 2. *Thymus kotschyanus* + *Stipa capillata*: 3. *Thymus colinus* + *Astragalus lagurus* + *Acantholimon karelinii*

F: *Stachyeta inflatae*

A: 1. *Stachys inflata*: 2. *Stachys inflata* + *Thymus colinus* + *Acantholimon karelinii* : 3. *Stachys inflata* + *Capparis herbacea*

Formation class: Woody-stemmed perennial herbs

F: *Euphorbieta seguierianae*

A: *Euphorbia seguieriana*

F: *Eryngieta billardieri*

A: *Eryngium billardieri* + *Rosa canina* + *Phlomis pungens* + *Herbosa*

F: *Prangoeta ferulaceae*

A: *Prangoseta ferulaceae* + *P. acaulis*

Steppe vegetation. The steppe vegetation of the region covers 1500- 2300 m a.s.l. Three formation classes, 10 formations, and 17 associations have been identified in the steppe vegetation. The classification is as follows:

Formation class: Grass-forb mountain-xerophytic steppes

F: *Stipeta capillatae*

A: 1. *Stipa capillata*: 2. *Stipa capillata* + *Festuca valesiaca*: 3. *Stipa capillata* + *Atraphax spinosa* + *Herbosae*: 4. *Stipa capillata* + *Stachys inflata* + *Thymus kotschyanus* + *Kochia prostrata*

Formation class: Gariga-type steppes

F: *Atraphaxeta spinosae*

A: 1. *Atraphaxis spinosa*: 2. *Atraphaxis spinosa* + *Caragana grandiflora*

F: *Spiraea crenata*

A: 1. *Spiraea crenata* + *S. hypericifolia*: 2. *Spiraea crenata* + *Rhamnus pallasii*

Formation class: High mountain-meadow steppes



F: *Festuceta valesiaca*

A:1. *Festuca valesiaca* + *F.sclerophylla*; 2. *F.sclerophylla* + *Festuca valesiaca* : 3. *Festuca valesiaca* + *Thymus kotschyanus* + *Astragalus euoplus* + *A.cicer*

F: *Bothriochloa ischaemum*

A:1. *Bothriochloa ischaemum* + *Trifolium pratense* + *Lotus corniculatus* + *Herbosa*: 2. *Bothriochloa ischaemum* + *Ephedra procera*

F: *Brometa racemosus*

A:1. *Bromus racemosus* + *Festuca valesiaca* + *Herbosa*: 2. *Bromus racemosus* + *Filipendula vulgaris*

F: *Koeleria kurdicum*

A: *Koeleria kurdicum* + *Amoria hybrida* + *Trifolium pratense* + *T.canescens*

F: *Poa bulbosa*

A:1. *Poa bulbosa* + *P. trivalis* + *P. pratensis*; 2. *Poa bulbosa* + *Hordeum violaceum* + *H.bulbosum* + *Festuca pratensis* + *Herbosa*

F: *Seselia peucedanoides*

A: *Seselia peucedanoides* + *Stipa capillata* + *Filipendula vulgaris* + *Thymus collinus*

F: *Hedypneta cretica*

A: *Hedypnois cretica* + *Thymus collinus* + *Ziziphora tenuior* + *Z.capitata*

Shrub vegetation. The bushes spread in the areas of the villages of Gilanchay, Paragha, Tivi, Nasirvaz and Nurgut of the basin at altitudes of 1200-3200 m above sea level, rising to the borders of the subalpine and alpine belts. This vegetation is divided into 2 formation classes, 9 formations and 14 associations.

Formation class: Evergreen shrubs

F: *Juniperata foetidissimum*

A:1. *Juniperus foetidissimum*+*J.polycarpus*+ *J.hemispheriaca* + *Astracantha microcephala* + *Herbosa*; 2. *Juniperus foetidissimum* + *J.polycarpus* + *Ephedra procera* + *E.aurantica* + *Fruticosus*; 3. *Juniperus foetidissimum* + *J.hemispheriaca* + *J.polycarpus* + *Atrophax spinosa*

F: *Ephedra procera*

A: *Ephedra procera* + *Astracantha microcephala*

F: *Tamariceta meyeri*

A: *Tamarix meyeri* + *T.kotschy*

Formation class: Deciduous shrubs

F: *Amygdaleta fenzlianae*

A: 1. *Amygdalus fenzliana* + *Atrophax spinosa* + *Rhamnus pallasii*; 2. *Rosa canina* + *Lonicera iberica* + *Amygdalus fenzliana*

F: *Rhueta coriariae*

A: *Rhus coriaria*

F: *Berberieta vulgaretum*

A: 1. *Berberis vulgaris*+*Rosa canina*+*Acer ibericum*; 2. *Berberis vulgaris* + *B.densiflora* + *Cotonoaster melanocarpus* + *Spiraea crenata* + *S.hypericifolia*

F: *Roseta rapinietum*

A: 1. *Rosa rapinii* + *Rosa canina* + *R.nisami*; 2. *Rosa rapinii* + *Rosa canina* + *R.nisami* + *J.hemispheriaca* + *J.polycarpus* + *Crataegus meyeri* + *C.caucasica*

F: *Cotonoaster melanocarpus*

A: *Cotonoaster melanocarpus* + *Cerasus incana* + *C.integerrimus* + *Astracantha gudrath* + *A.insidios*



F: *Sorbueta persicae*

A: *Sorbus persica* + *S.boissieri* + *Viburnum lantana* + *Crataegus orientalis* + *C.pseudoheterophylla*

Forest vegetation. The natural forests of the basin consist of Tillak, Palidlidere, Talalar, Gevik, Ashagi, Yukhari Jalil (117 ha) and Nasirvaz forests (350 ha), spreading around the villages of Nurgut, Alahi, Khurs, Bist, Tivi, Paragha and Nasrivaz at altitudes of 1500-2700 m a.s.l. This vegetation type is divided into 3 formation classes, 8 formations and 17 associations.

The region's tugay forests are spread in narrow strips along the river banks. Species such as *Populus canescens*, *Ulmus minor*, *Pyrus caucasica*, *Berberis iberica*, *Tamarix meyeri*, etc. are found here. *Saliceta albaetum* formation has few components and is mainly located in narrow gorges along the valleys. In the basin areas, willow forests are represented by *Salix aeduptiaca*, *S.triandra*, *S. alba*, and shrubby *S.caprea*.

Tugay forests have great economic and phytocenological importance. These forests limit the excessive expansion of river channels, prevent erosion, and increase soil fertility. In recent years, as a result of direct human activity, tugay forests have undergone changes, and their areas have shrunk significantly. If necessary measures are not taken to protect these forests, they are in danger of complete destruction. Their classification is as follows.

Formation class: Tugay forests

F: *Saliceta albaetum*

A: 1. *Salix alba* + *S.triandra* + *S.caprea*; 2. *Salix alba* + *Elaeagnus angustifolia* + *Tamarix meyeri*

F: *Populeta gracilis*

A: 1. *Populus gracilis* + *P.euphratica* + *P.nigra*; 2. *P.nigra* + *S.triandra*

F: *Ulmua minoretum*

A: *Ulmus minor* + *Populus gracilis* + *Salix alba*

Formation class: Broad-leaved mountain forests

F: *Querceta macrantheretum*

A:1 *Quercus macranthera*; 2. *Quercus macranthera* + *Fraxinus excelsior* + *Acer bericum*; 3. *Quercus macranthera* + *Crataegus meyeri* + *C.orientalis*

F: *Crataegus meyeretum*

A:1. *Crataegus meyeri* + *Pyrus salicifolia*; 2. *Crataegus meyeri* + *Pyrus salicifolia* + *Malus orientalis* + *Quercus macranthera*

F: *Betuleta penduletum*

A:1. *Betula pendula* + *Sorbus greaca*; 2. *Betula pendula* + *Quercus macranthera* + *Fraxinus excelsior*; 3. *Betula pendula* + *S.caprea* + *Altherbosa*

Formation class: Sparse arid forests

F: *Pyrus salicifolietum*

A:1. *Pyrus salicifolia* + *P.caucasica* + *Cotonoaster melonacarpus* + *Rosa canina* + *R.rapinii* + *R.nisami*; 2. *Pyrus salicifolia* + *P.caucasica* + *Crataegus meyeri* + *Malus orientalis*; 3. *Pyrus salicifolia* + *Juniperus polycarpus* + *Quercus macranthera*

F: *Celtiseta tournefortietum*

A: *Celtis tournefortii* + *C.caucasica*

Meadow vegetation. This type covers almost all altitudinal zones in terms of vertical zonation. It is distributed in 14 formation classes, 42 formations, and 52 associations in the floodplain, sinkhole-meadow, forest understorey, post-forest meadow-shrub, subalpine, alpine, and alpine carpet meadow subtypes.



The floodplain and sinkhole-meadow subtype is mostly found in the areas of the Gilanchay River that pass through the villages Bist and Bash Diza. This subtype is divided into 2 formation classes, 6 formations, and 10 associations.

The alpine meadows subtype begins with the gradual disappearance of subalpine meadows in the basin, so that sometimes it is difficult to trace the boundaries of this transition. However, in some areas the transition is quite abrupt, or one of these meadows disappears and is replaced by another. This subtype is divided into 2 formation classes, 3 formations and 5 associations.

Alpine carpets subtype is distributed in the northern slopes of the basin, where the tundra climate prevails, in the rocky, stony-gravelly, subnival and nival zones characterized by snow and glaciers. This subtype is divided into 2 formation classes, 11 formations and 11 associations.

Semitype: Floodplains and meadows

Formation class: Floodplain meadows

F: *Lotus corniculatus* setum

A: 1. *Lotus corniculatus*; 2. *Lotus corniculatus* + *Carex vesicaria* + *Cynodon dactylon* + *Phleum pratense* + *Herbosa*

F: *Trifolium pratensis*

A: *Trifolium pratensis*

F: *Elitrigia caespitosa* setum

A: *Elitrigia caespitosa* + *Dactylis glomerata* + *Cynodon dactylon* + *Alopecurus ventricosus* + *Phleum pratense*

F: *Filipendula ulmaria*

A: *Filipendula ulmaria* + *Hordeum bulbosum* + *H. violaceum*

Formation class: Hole meadows

F: *Cynodoeta dactylon*

A: 1. *Cynodon dactylon*; 2. *Cynodon dactylon* + *Alhagi pseudalhagi*; 3. *Cynodon dactylon* + *Tamarix meyeri*; 4. *Cynodon dactylon* + *Glycyrrhiza glabra*

F: *Aeluropeta repens*

A: *Aeluropus repens*

Semitype: Understorey, post-forest meadows and meadow-shrubs

Formation class: Grass-sedge-forb understorey meadows

F: *Poterieta lasiocarpum*

A: *Poterium lasiocarpum* + *Bromus racemosus*

F: *Potentilla recta*

A: *Potentilla recta* + *Poa araratica* + *Artemisia absinthum*

F: *Carixeta tristis*

A: *Carex tristis* + *Echinochloa crusgalli* + *Aeluropus repens*

Formation class: Grass- legume- forb meadow shrubs

F: *Amorietia bordzilowskiae*

A: 1. *Amoria bordzilowskyi* + *Cephalaria procera*; 2. *Vicia elegans* + *Poa bulbosa* + *Galium verum*

Formation class: Post-forest dry meadows

F: *Agrostieta capillaris*

A: *Agrostis capillaris* + *Vicia variabilis* + *Herbosa*

Semi-type: Subalpine meadows of the high mountains



Formation class: Tall-grass subalpine meadows

- F: *Chaerophylleta bulbosum*
- A: *Chaerophyllum bulbosum* + *Ch.aureum*
- F: *Thalictrueta minus*
- A: *Thalictrum minus*
- F: *Heracleta trachylomae*
- A: *Heracleum trachylomae*
- F: *Aconiteta nasutum*
- A: *Aconitum nasutum*+*Heracleum trachyloma* + *Rumex alpestris* + *R.acetosa*
- F: (*Rumceta alpestris*
- A: *Rumex alpestris*
- F: *Doroniceta macrophyllum*
- A: *Doronicum macrophyllum*
- F: *Cirsieteta arvensae*
- A: *Cirsium arvense*

Formation class: Legume-forb subalpine meadows

- F: *Cicereta anatolicum*
- A: *Cicer anatolicum* + *Pulsatilla violacea* + *Hypericum perforatum*

Formation class: Dry grass subalpine meadows

- F: *Nardueta strictae*
- A: *Nardurus stricta* + *Festuca valesiaca*)
- F: *Festuceta sclerophyllae*
- A: 1. *Festuca sclerophyllae*+*Alchemilla sericea*; 2. *Festuca sclerophyllae*+*Bromus racemosus*
- F: *Poa compressa*
- A: *Poa compressa* + *Stipa capillata* + *Alchemilla epipsila*

Formation class: Humid (mesophilic) subalpine meadows

- F: *Hordeta violaceum*
- A: *Hordeum violaceum*+*H.bulbosum*+*Amoria ambigua*+*Trifolium montana*
- F: *Gentianeta anglosae*
- A: *Gentiana anglosa*
- F: *Geranieta collinum*
- A: *Geranieta collinum*+*G.divaricatum*+*Trifolium trichocephalum* + *T.canescens*

Formation class: Geophyte subalpine meadows

- F: *Allieta atrovioleaceum*
- A: *Allium atrovioleaceum* + *A.kunthianum* + *A.akaka* + *A.mariae*
- F: *Irieta imbricata*
- A: 1. *Iris imbricata*; 2. *Iris imbricata*+*I.lycotis*+ *Herbosa*
- F: *Gageta chloranthae*
- A: *Gagetum chloranthae*
- F: *Eremurus spectabilis*
- A: *Astragalus szowitsii* +*Eremurus spectabilis*
- Semi-type: Alpine meadows of high mountains

Formation class: Mixed grass alpine meadows

- F: *Alopecureta textilis*



A: *Alopecurum textilis* + *Phleum pratense*

F: *Agrosteta lazicae*

A: *Agrostis lazicae* + *Festuca valesiaca*

Formation class: Sedge-grass-legume-forb alpine meadows

F: *Carexeta tristis*

A: 1. *Carexetum tristiae*; 2. *Carex tristis* + *Festuca sclerophyllae* + *Astragalus alpinus*; 3. *Carex tristis* + *Festuca sclerophyllae* + *Alchemilla sericea*

Semi type: Alpine meadows of the tundra-type subnival and nival zones of the high mountains

Formation class: Humid alpine carpets

F: *Veroniceta gentianoides*

A: *Veronica gentianoides* + *V. anagallis-aquatica* + *Myosotis alpestris*

F: *Junceta alpigenus*

A: *Juncetum alpigenae*

F: *Ficarieta ficarioides*

A: (*Ficarietum ficarioides*)

Formation class: Rocky, gravelly alpine carpets

F: *Sibbaldieta parviflorae*

A: *Sibbaldia parviflorae* + *S. semiglabra*

F: *Campanuleta tridentata*

A: *Campanula tridentata*

F: *Minuartieta aizoides*

A: *Minuartia aizoides* + *Plantago atrata*

F: *Pedicularieta crassirostris*

A: *Pedicularis crassirostris* + *Physioptychis caspica*

F: *Carumeta caucasicum*

A: *Carumetum caucasicae*

F: *Alchemileta sericeae*

A: *Alchemilletum sericeae*

F: *Plantageta saxatilis*

A: *Plantagetum saxatilis*

F: *Taraxaceta stevenii*

A: *Taraxacetum stevenii*

Swamp vegetation. This vegetation type is not very widespread in the study area. Swamps are mainly formed in plains where rainwater collects, and groundwater is close to the surface. Swamps are found in high mountain belts, near springs, natural and artificial lakes. Species such as *Veronica anagallis-aquatica*, *Mentha langifolia*, *Rumex acetosa*, *Carex vesicaria*, *Juncus compressus*, etc. are found here.

Formation class: True aquatic plants that are above water, floating on water, and submerged

F: *Typha laxmannii*

A: 1. *Typha laxmannii* + *T. minima* + *T. latifolia*; 2. *Typha laxmannii* + *Phragmites australis*; 3. *Typha laxmannii* + *Poa trivialis*

F: *Lemneta minor*

A: *Lemna minor* + *L. trisulcata*

F: *Persicarieta hydropiper*

A: *Persicarietum hydropiper*

F: *Potamogeta nodosus*



A: 1. *Potamogetonum nodosae*; 2. *Potamogetonum crispusae*

Formation class: Amphibious wetland plants

F: *Bolboschoeneta maritimus*

A: *Bolboschoenus maritimus*+*Typha laxmannii*+*Phragmites australis*

F: *Eleochareta palustris*

A: (*Eleocharietum palustris*

F: *Cypereta longus*

A: *Cyperus longus*

Formation class: Coastal wetland plants

F: *Junceta effusus*

A: *Juncus effusus* +*J. bufonius*

F: *Phragmiteta australis*

A: *Phragmites australis*+*Carexeta vesicariae*

Formation class: Subalpine and alpine wetland plants

F: *Senecieta racemosus*

A: *Senecio racemosus*

F: *Luzuleta spicatae*

A: *Luzula spicatae*+*Carex canescens*+*Elitrigia caespitosa*

F: *Saginetum procumbens*

A: *Saginetum procumbens*

F: *Caltheta polypetalae*

A: *Calthaetum polypetalaea*

Rock and scree vegetation. This vegetation type covers all mountainous zones. It is distributed in 2 formation classes (rock and scree vegetation). Genera and species such as *Saxifraga pontica*, *Sedum tanellum*, *Erysimum pulchellum*, *Dianthus orientalis*, *Campanula bayerniana*, *Ephedra procera*, *Juniperus*, *Crataegus* and *Rosa* are found here. Stable scree compositions include particularly prominent species such as *Vicia ciceroidea*, *Nepeta buschii*, *Cirsium tomentosum*, *Jurinella subacsulis*, *Ranunculus caucasicus*, whereas the partially mobile part includes *Vicia varia*, *Oxyria digyna*, *Sibbaldia semiglabra*, *Nonea pulla*, etc.

Oasis vegetation. This vegetation type covers the areas of gardens and irrigated cultivated fields in the residential plains and mid-mountainous belt. They include trees and shrubs such as *Platanus orientalis*, *Juglans regia*, *Populus gracilis*, *Fraxinus exelsior*, *Salix alba*, *Ulmus scabra*, etc., perennial plants *Onobrychis transcaucasica*, *Hordeum bulbosum*, *Falcaria vulgaris*, *Melilotus*, *Agrimonia eupatoria*, etc., as well as harmful and poisonous species.

4. Conclusion

The vegetation cover of the Gunnut–Gapıcık region is characterized by high phytocenological diversity and includes eight major vegetation types comprising 33 formation classes, 94 formations, and 137 associations. The obtained results improve the understanding of vegetation structure in the Nakhchivan Highlands and provide a scientific basis for biodiversity conservation, sustainable pasture management, and future ecological studies.

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