

FLORISTIC COMPOSITION AND PHYTOCENOLOGICAL CHARACTERISTICS OF THE *POETA PRATENSIS*–*THYMETUM COLLINUS*–*ALCHEMILLOSUM ERYTHROPODA* ASSOCIATION (GADABAY REGION, AZERBAIJAN)

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Abstract

The study aimed to investigate the phytocenological characteristics of alpine meadows in the Lesser Caucasus of Azerbaijan. The association *Poeta pratensis*–*Thymetum collinus*–*Alchemillosum erythropoda* was identified in the alpine meadow zone of Mount Kechal (Gadabay District) at an altitude of 2967 m on mountain meadow soils. The phytocenosis comprised 26 vascular plant species, including 7.7% shrubs, 3.8% semi-shrubs, 73.1% perennial herbs, and 15.4% biennial herbs. Ecological analysis revealed the predominance of xerophytes (46.2%), followed by mesophytes (42.3%) and mesoxerophytes (11.5%).

Alchemilla erythropoda was the dominant species, while *Thymus collinus* and *Poa pratensis* were subdominants. The vegetation exhibited a three-layered structure with an average height of 10–35 cm and a total cover of 70–90%. Several poisonous and unpalatable species reducing pasture quality were also recorded. The results contribute to the assessment of biodiversity, ecological structure, and pasture value of alpine meadow ecosystems in Azerbaijan.

Keywords: alpine meadows, phytocenosis, biodiversity, *Poa pratensis*, *Thymus collinus*, *Alchemilla erythropoda*, Azerbaijan.

Alpine meadows are one of the main vegetation types of high mountain areas, distinguished by their rich floristic composition, high fodder value and ecological functions. These ecosystems play an important role in regulating soil formation processes in mountain landscapes, protecting the water regime and maintaining biodiversity. The formation of alpine meadows occurs as a result of the interaction of climate, relief, soil and anthropogenic factors, and their species composition varies depending on the ecological conditions of the area.

The Lesser Caucasus mountain system of Azerbaijan is one of the important botanical-geographic regions where alpine and subalpine meadows are widely distributed. These areas are characterized by rich plant diversity and constitute the distribution area of many endemic, relict and economically valuable species. In recent years, as a result of intensive grazing, climate change and other anthropogenic impacts, certain changes have been observed in the structure and floristic composition of high mountain meadows [24,25]. Therefore, studying the current state of these phytocenoses and assessing their ecological and phytocenological characteristics is one of the urgent scientific problems.

Kechal Dag, located in the Gadabay region, is considered one of the important natural areas distinguished by its rich floristic diversity of alpine meadows. Plant groups adapted to various ecological conditions have formed here and have created a complex phytocenological structure. In addition to species of fodder, medicinal and decorative importance, these groups also contain harmful and poisonous plants that reduce the quality of pastures [1-4, 7,14-16].

The aim of the study is to study the floristic composition, biomorphological and ecological structure, dominant-subdominant species, layering and pasture

importance of the *Poeta pratensis*–*Thymetum collinus*–*Alchemillosum erythropoda* association spread on Kechal Dag, Gadabay region. The results obtained are of great importance for the scientific classification of high mountain meadows, protection of biodiversity and efficient use of pastures [26,28].

The studies were conducted in the alpine meadow belt of Kechal Dag in the Gadabay district, which is part of the Lesser Caucasus botanical-geographical region of Azerbaijan. The study area is located at an altitude of 2967 m above sea level and is characterized mainly by grassy mountain-meadow soils. The climate of the area is characterized by cool summers and cold and snowy winters, which creates favorable conditions for the formation of alpine meadow vegetation.

Field studies were carried out using route and stationary observation methods. During the study of plant groups, geobotanical descriptions were made, the floristic composition of species, the degree of abundance, the project cover and the storey of the phytocenosis were determined. The abundance of species was assessed based on the Drude scale, and the total project cover was expressed in percent.

When determining plant species, fundamental publications on the flora and vegetation of Azerbaijan were used, including “Flora of Azerbaijan”, “Vegetation of Azerbaijan” and other taxonomic sources. The nomenclature of species has been adapted to modern systematic principles [11,14,17,21,23].

During the biomorphological analysis of the phytocenosis, the species were divided into groups of shrubs, subshrubs, perennial and biennial herbs according to their life forms. In the ecological analysis, the xerophyte, mesoxerophyte and mesophyte ecological groups were determined, taking into account the relationship of plants to humidity.

As a result of the processing of geobotanical materials, the floristic composition, dominant and subdominant species, layer structure, ecological spectrum and pasture importance of the *Poeta pratensis*–*Thymetum collinus*–*Alchemillosum erythropoda* association, which is widespread in the alpine meadow vegetation, were analyzed [2,5,8,12].

As a result of the conducted geobotanical studies, the association *Poeta pratensis*–*Thymetum collinus*–*Alchemillosum erythropoda* was identified in the alpine meadows located on Kechal Mountain in the Gadabay region, at an altitude of 2967 m above sea level. The association was formed on grassy mountain-meadow soils and is characterized by a rich floristic composition.

26 species of higher plants were recorded in the floristic composition of the association. Analysis of life forms showed that the main part of the species is perennial herbs (73.1%). This indicator confirms that alpine meadows are stable and long-term formed phytocenoses. The minority of shrubs (7.7%) and semi-shrubs (3.8%) is due to the influence of harsh climatic factors in high mountain conditions. The share of dioecious herbs was 15.4%.

As a result of the analysis of ecological groups, it was determined that xerophytic species predominate (46.2%). The specific weight of mesophyte species was 42.3%, and mesoxerophytes - 11.5%. The close ratio of xerophyte and mesophyte elements reflects the seasonal variability of humidity and temperature conditions of alpine meadows [12,24,25,27]. This feature indicates the ecological diversity and adaptation capabilities of high mountain ecosystems.

The dominant species of the association was *Alchemilla erythropoda* Juz. The abundance of the species determines the general appearance and structure of the phytocenosis, with a score of 3–4. *Thymus collinus* Bieb. and *Poa pratensis* L. act as subdominant species. The high abundance of all three species was taken as the basis for naming the association. The ecological characteristics of the dominant and subdominant species indicate that they are well adapted to the harsh conditions of the alpine zone.

The phytocenosis has a three-story structure. The first floor is occupied by shrub species such as *Daphne mezereum* L. and *Rosa canina* L. The second floor is dominated by *Poa pratensis*, *Festuca versicolor*, *Salvia glutinosa* and other tall herbaceous plants. The third layer is mainly represented by low-growing species such as *Alchemilla erythropoda*, *Thymus collinus*, *Cirsium tomentosum* and *Euphorbia macroceras*. Such a layering not only increases the ecological stability of the phytocenosis, but also ensures the distribution of space and resources between species [1-4,9,11].

The average height of the vegetation cover varied between 10–35 cm, and the total project cover was 70–90%. The high project cover indicates that the phytocenosis is well developed and most of the soil surface is covered with plants. This has a positive effect on protecting the soil from erosion and maintaining the stability of the ecosystem.

Some harmful and poisonous species that are not eaten by livestock and reduce the quality of pastures

have also been identified in the association. The widespread distribution of these species can limit the development of productive forage plants and reduce the economic importance of pastures. Therefore, it is considered appropriate to implement phyto-ameliorative measures, regulate grazing load and control the spread of harmful species in order to protect and efficiently use pasture ecosystems.

Thus, the *Poeta pratensis*–*Thymetum collinus*–*Alchemillosum erythropoda* association is a plant grouping with high biodiversity and complex phytocenological structure, typical for the alpine meadows of the Gadabay region. The floristic and ecological characteristics of the association indicate that it has significant scientific and practical importance in terms of the protection and sustainable management of high mountain ecosystems.

The *Poeta pratensis*–*Thymetum collinus*–*Alchemillosum erythropoda* association was identified in the alpine meadows of Mount Kechal (Gadabay District, Azerbaijan) at an altitude of 2967 m. The association comprised 26 vascular plant species, with perennial herbs dominating the floristic composition. Ecological analysis revealed the predominance of xerophytic and mesophytic elements, while *Alchemilla erythropoda* was the dominant species and *Thymus collinus* and *Poa pratensis* were subdominants.

The phytocenosis is characterized by high biodiversity, a three-layered structure, and a vegetation cover of 70–90%. The presence of poisonous and unpalatable species indicates the need for appropriate pasture management and phyto-ameliorative measures. The obtained results contribute to the phytocenological classification, biodiversity assessment, and sustainable management of alpine meadow ecosystems in Azerbaijan.

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