Biodiversity preservation in natural grasslands. Serbia's achievements toward sustainable development*

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ABSTRACT
Republic Serbia represents one of the most important centers of geological and biological diversity of the Europe. Owing to big affluence of types of habitats on territory of the Serbia lives numerous plants and animals with different biology, origin, domestication period, spreading and lifestyles. Natural and seminatural grasslands (meadows and pastures) represent the centers of floristic diversity. Natural grasslands represent important resource for intensification os sustainable and rural development and there is a need to work on their quality management, maintenance and utilization. The continuous use of lawns, as well as abandonment of traditional production systems leads to a reduction and even disappearance of certain species from the spontaneous phytocenosis, which conditioned the survival of species. This caused depletion of the overall biodiversity, with special reference on agrocenosis. Sustainable use of the spacious meadow-pasture fields creates the basis for development of low-intensive animal husbandry pasture, with impact on the development of entrepreneurship, tourism and preservation of rural population.

***Keywords*:** *center of biodiversity and geodiversity, meadows and pastures, agrocenosis*

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INTRODUCTION

Biodiversity represents the total diversity of the living world, which includes all forms of diversity and variability, appearances and processes of all organisms and biosfere as a whole. Biodiversity includes:

- genetic diversity (gene variation) - genetic variability within individuals of any kind;
- species diversity - difference and specificity of individual organic species;
- ecosystem diversity (variability of natural ecosystems).

In the special branch of biodiversity are agrophytocenosis which form agrocenosis, that involves the totality of plants and animal species which human use for cultivation and later exploitation for their own needs or for animal feeding or for processing production.

Protection of biodiversity represents the need of mankind, consider it is the irreplaceable resource that provides the quality of human life. As a consequence of human activity, there is an excessive and uncontrolled exploitation of natural resources, threats and destruction of many plant and animal species and ecosystems, which results in the impoverishment of the biosphere and natural disturbance process that ensure normal and quality life. Intensive growth of the population leads to a sharp reduction of natural resources, the accumulation of pollutants that harm the nature. In center of happening are human activity, influence on environment which is causes disappearance about 27.000 species per year or more precisely 74 species per day.

Republic of Serbia represents one of the six centers of biodiversity in Europe. It is characterized by a high degree of genetic, species and ecosystem diversity. Under the protected areas is 522.120 ha, or 5.91% of territory of Serbia. It is planned that by 2015, 10% of the territory is put under protection. Under the protection are 463 natural assets: 5 National parks (158.986 ha), 16 parks of nature (213.302 ha), 16 areas of outstanding features (45.656 ha), 67 nature reserves (97.972 ha), 42 protected areas of cultural - historical values (2.507 ha), 317 natural monuments (7.681 ha). In Serbia there are the following biomes: zonobiom of steppes, zonobiom of deciduous forests, coniferous forests zonobiom and zonobiom of alpine tundra. Genetic resources of plants and animals are very diverse and include many varieties of autochthonous plant species and breeds od domestic animals. It is described 1.200 plant associations, but it is considered that there are 900 associations. Balkan endemits make up 14,94% of the flora of Serbia and local endemic species about 1,5% (59 species). The conclusion is, according to the present data, that there are about 44.200 registered taxa (species and subspecies).

Regardless the fact that Serbia is extremely rich in natural ecosystems and high genetic variability, in the last decades there is a reduction of the number of species and some of the species are extinct. In the Red Book of Flora of Serbia from 1991, it was pointed that about 5% of the total flora of Serbia (171 plant taxa) is completely disappeared or is highly vulnerable.

Diversity and specificity of the ecosystems of Serbia can be observed through overview of basic types of vegetation:

1. forest and bushy vegetation,
2. herbaceous vegetation.

In the area of Balkan Peninsula (according to FAO) are a special group of taxa - grasslads (lawns), which cover about 6.5 milion ha, of which 1.65 milion ha cover the areas in the Republic of Serbia. The number of species in grasslands fitocenosis (meadows and pastures) are not precisely studied, but it is assumed that the number of

widespread sprecies in the 273 plant communities is more than 1.000 species. Insufficient using of meadows and pastures is caused by abandonment of traditional livestock production on pastures, which quickly leads to pasture degradation - growth of useless herbaceous vegetation, shrubs ans bushes, which affects the habitats of valuable grasslands species, small mammals, birds and insects (Popovic and authors, page 313., 2011). Honey plant species are part of meadows and forests ecosystems, and their number in Republic of Serbia is estimated at about 1.800 plants. They have big importance for development of beekeeping and honey making quality.

As a part of very rich agrocenosis, natural meadows and pastures represent the basis of development in rural areas, especially in mountainous areas, where most people have their livehoods based on livestock grazing and selling of final products. Sustainable development of rural areas in the Republic of Serbia depends on biological diversity of plant species and degree of their conservation in the system of changing climate. The extensive utilization may greatly weaken the floristic composition, which affects the reduction of livestock, and hence reduce the presents of products with geografical mark.

MATHERIAL AND METHODS

Conservation of biodiversity is providing the main source of food for humans and animals, provide new varieties of plants, which is good in terms of pollination. Proper use of the soil quality is maintained, the health of all direct and indirect factors are improving. The treatment process can provide a significant amount of bio-fuels for different purposes.

Agro-biodiversity of Republic Serbia include species and habitats of cultivated and endemic plants, and products of agri-biodiversity can be used as building material, ten as a species and ecosystems important for producing human and animal food (species in agro-ecosistems, pastures and meadows, forests and aquatic ecosistems). Traditional knowlege and cultural heritage are also very important component agro-biodiversity of Republic Serbia. The role of agro-biodiversity is directed to increase the productivity and security of food, reducing the pressure on different ecosistems, involves vulnerable ecosistems, forests and endangered species. It also contributes to sustainability of agro-ecosystems, the diversification of organisms in nature, conservation of soil fertility, conservation others ecoistems, etc. In total agro-biodiversity significant contribution gives to the wild plans species, which are very important for food production and agriculture, but which can be observed in production as weed crops, but whose genetic variability (observed independently from the ciltivated plants) has been invaluable to the overall flora.

In Republic Serbia has registreted more than 700.000 farms, and about 44% of total population lives in rural areas, of which 33% work in agriculture. Plants and animal genetic resources are essentials for the sustainable development of many rural areas in Republic Serbia. At the same time the preservation these resources is conditioned, because an active role of rural population in fostering, sistainable using and economic evaluation of agro-biodiversity if under the levels of countries in EU.

According to data from 2011 year in 67% (5.092.000 ha) of land in Serbia is agricultural land. 4.218 million hectares is used in agricultural purposes. In structure of arable land 19,58% takes up pastures, and 14,08% takes meadows. It is characterized by the presents of characteristic plant species, no matter whether in terms of primary grass (first plant association built on observed field) or secondary grass (created as a results of deforestation, drainage field or seeding the grassland by human) and is of great

importance in the genetic sense, and in the order to create the regional sustainable development of mountain regions in Serbia.

Grazing animals in the (semi)natural ecosystems is of great importance (stimulates growth and tillering and other grass species- in firs roud legumes), but leads to quantitative and qualitative change in composition of autochthonous species in the grasslands, and in the bushy, steppe and salty habitats. Grazing has resulted to reduce storey existing between shrubs and herbaceous plants, allowing the formation of dense, highly flamed forests. The negative consequences of grazing cultivated animals can cause damage in areas around stream, coasts and morass, which can cause altered flow regime of water flow regime of water, and the increased amount of nutrient, which accumulates in the depts of the rivers. Those ecosystems which have historically been affected by improper nutrition, may never recover, and this inevitably reduces the genetic resources at national and global level. However, in recent years those changes are not so evident because the livestock are generally enclosed in buildings and their total number is significantly reduced.

Traditional production systems of low investment in the mountain areas are slowly disappearing, which causes the degradation of native habitats. Diverse mosaic of land and semi-natural grasslands depend on the maintenance by human and domestic animals. Leaving a field that is used for crop production or grazing resulted in the disappearance of many natural grassland due to natural process of reduction - the transition from the bushy grass or forest vegetation dominated by woody culture. As a result, intensive farming of high investment (low degree of diversification and over-grazing, monoculture, pollution due to excessive use of mineral fertilizers and pesticides) and the reduction of traditional agriculture to low investment (significantly reducing the number of domestic animals in the mountainous and highland grasslands, cessation of maintenance and use of large areas and the mosaic of agricultural land) cause a lot of pressure on the overall biodiversity, and thus the agro-biodiversity.

Preservation of agro-biodiversity requires significant investments, and the support of competent authorities and institutions in all sectors. Using the results of the Convention on Biological Diversity, the Bern Convention, the Convention of Berlin and the like. made the opening of new fields made to open new fields to be actively involved with the direct stakeholders-the people in the theme and the importance of preserving biodiversity and the environment for future generations. It is particularly important process in which we want to improve the current situation on the ground, because it is desirable to restore the natural grassland ecosystem. As the largest area of natural grassland located in mountainous areas of Serbia, they represent a safe source of biomass for livestock in order to live, voluminous mode in the form of processed-silage, haylage and hay.

Since the mountain areas of Serbia defined as the area above 800 m altitude and inclination over 18°, it is not unusual by the fact that with increasing elevation for every 100 m lowers the temperature by 0.5 °C. Also, the vegetation is delayed 11 days from 100 m rise in sea level, it affects the reduction of soil fertility and the inability to use the machinery, as is the case in lowland areas. As a result it can be concluded that the composition phytocoenological natural and semi-mountainous grasslands poorer with increasing altitude. This is an alarming fact, which should pay attention to the condition of grasslands in mountainous areas, as on biodiversity, and the production capacity that exists.

RESULTS AND MATERIAL

In the Republic of Serbia mountain region accounts for 17% of the total. It is characterized by great natural wealth of plant species and animal breeds, using natural and sown grasslands as a source of quality fresh aboveground biomass. Due to the transition from traditional ways of exploiting the lawn and move on to more intense conditions the disappearance of some indigenous plant species and endangering flora characteristic of grassland ecosystems.

Land under meadows and pastures are reduced based on the five-year average, but in our country, spread over an area of 1.65 million hectares and their floristic composition of plant communities composed of 273 to 1000 species. Grasslands are in poor condition, as those who are in zones of protected areas, and those who are less disadvantaged areas. Plant species are disappearing (especially association Festuco-Brometea), which would later cause the complete disappearance of certain breed of livestock, primarily cattle.

Taking advantage of the benefits that two-thirds of the Serbian municipality belongs to rural areas, reorientation of the organic production of plants and animals, reducing pollution from agricultural pollutants could ensure steady progress towards sustainable development of all regions, especially the mountain. Condition of natural grasslands and its phytocenoses is satisfactory, but notes that reducing the number of cattle are driven to pasture, mowing and constant application of measures to improve production, grassy vegetation slowly becomes bushy and forest vegetation, woody-dominated culture.

The need to improve forage production in Serbia systems from extensive to utilization, which can degrade the natural grasslands, reducing the proportion of useful grasses and legumes. For that reason it is necessary to carry out appropriate measures that may significantly affect the increase in forage yield and its quality of fodder, as well itds quality.

- Recommendations that can be used can be divide into two groups: technical measures (drainage, irrigation, process planning leveling, clearing and removal of tree stumps, etc.)
- Cultural practices (fertilization, cultivation of grasslands, undersowing, weed removal, biological amelioration of natural grasslands).

The correct performing all the operations, with by favoring all the measures that may reduce pollution from agriculture, we can preserve agro-genetic variation thus improving global biodiversity.

CONCLUSIONS

Inadequate use of meadows and pastures can significantly affect the botanical composition of grass communities, in particular lead to favoring plants of poor quality, which can adversely affect the quality of livestock products and livestock health. It can lose a significant part of the genetic variability of plant species, which our country classified as one of six geological centers in Europe. Any loss of spontaneous flora, can cause direct reduction of livestock units, and this will lead to reduced production of milk and dairy products, as holders of the economic development of mountain regions.

To avoid this and to ensure better and healthier forage in the hills and mountain meadows, where they play an important role in meeting the needs livestock for food most of the year, to apply certain measures of repair, such as the timely performance of cattle grazing, mowing the timely, proper and adequate use of fertilizers, lawn maintenance in terms of aeration, sowing of pasture outside the period.

Tests should continue to determine the composition of the community throughout the year and for a longer period of time and dynamics of harmful species, for their better understanding and easier to eliminate of lawn. Should expect more investment funds by the authorities, who can provide funds for the protection and improvement of the environment through conservation of species threatened with disappearance in the case of intensive agricultural production and exploitation of natural grasslands.

Investment in the process of conservation of natural grasslands, as a large source of diversification bioecosystems as a whole, represents an important investment that will retain the natural beauty and diversity of terrain and that will cause economic growth through the development of production and creating opportunities for sustainable development of rural mountain areas.

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