

PRODUCTION DIMENSION AND POTENTIAL OF PERMANENT GRASSLANDS OF ROMANIA IN RELATION TO ANIMALS GROWTH

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Abstract

Permanent grassland is part of the national land heritage, the destination of which can never be changed. The current surface of Romania's permanent grasslands is estimated at 4.81 million hectares, representing 20% of the country's surface area and 34% of the agricultural area, surface that increased by 9% compared to 1990. Romania's permanent grasslands are found in all the altitude zones, from the Black Sea shore to the alpine peaks, being permanently under the influence of the natural factors of these areas (soil, slope, altitude, exposition, etc.), resulting in a decrease in the degree of use of the resulting phytomass as animal feed. Thus, it is estimated that out of the total area of grassland about 17% (780 thousand hectares) are affected by natural limiting factors. Bovines are found in 50% in the plain area, 30% in the hill area and 20% in the mountain area. Sheep and goats are found in the highest proportion in the hill area (40%), followed by the plain and mountain areas by 30%. In the current situation of the distribution of ruminant animals, on relief areas, except for hill and mountain meadows where there is a green mass overflow in these areas, the largest green mass deficit is found in the plains (75%).

Keywords: permanent grassland, production potential, animal husbandry.

According to UNESCO, the definition of meadows is: "Area covered with herbaceous plants, with less than 10% trees and shrubs". Other authors consider that grassland can be covered up to 10-40% of trees and shrubs (White, 1983). Global grasslands include over 10000 species of grasses and over 12,000 leguminous species that most often grow together. Terra's grasslands are usually divided into two categories: tropical meadows (located around the equator in: Africa, Southeast Asia, Australia and poles); and temperate meadows (located in: North America, Europe, South-East and South America, Africa and Australia).

Worldwide, the total area of meadows is 3.44 billion hectares, representing 26% of the total land area (13.40 billion hectares) and 69% of the Terra's agricultural area (4.96 billion hectares).

The total phytomass production of Terra's grasslands in 2000 was estimated at around 1,000 million tons, which directly or indirectly provides much of the resources needed to the lives of more than one billion inhabitants (FAOSTAT, 2000).

At the EU level, permanent grasslands occupy an area of 57 million hectares, and temporary grasslands around 10 million hectares. Together, these grasslands account for 15% of the total land area and 39% of the agricultural area.

The grassland particularizes the Romanian space and ensures its permanence over time, both through the great abundance of natural species existing in the vegetation as by the life safety offered to man by animal husbandry. As a result, the permanent grassland area is part of the national land heritage, the destination of which can never be changed.

The boundary territories on both sides of the Carpathian Mountains have always consisted of grassland areas intended for animal husbandry, with the maintenance of their multifunctional character and a synergistic balance between the components of this natural ecosystem (soil-plant-animal-environment).

The problems of the Carpathian grasslands are today complex and only ample and long-lasting studies can help to solve them, so that the grasslands remain not only a pleasant part of the Carpathian space, with an increasingly important recreation space but a stronger support of the national economy in the Carpathian region. The main function of the Carpathian grasslands remains supporting of increased animal husbandry, because only the prosperous households will cause the population to remain in the mountains and for the mountains, the greatest danger is to be abandoned

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by the people, the people that can use their riches (Anghel G., 1985).

MATERIAL AND METHOD

The studies were carried out by analyzing statistical and research data carried out over the past three decades on permanent grasslands of our country (Dragomir N., 2005, 2009; Marușca T. *et al.*, 2010; Motcă G. *et al.*, 1994; Vintu V. *et al.*, 2004; Iacob T. *et al.*, 2015; Marușca T., 2016; Anuarul Statistic al României, 2017). After processing of statistical data the following aspects were highlighted: the evolution of permanent grassland areas during the period 1990-2018; area distribution of grassland and livestock (cattle, sheep, goats); estimating the number of large

livestock units and the density of animals; the balance of the green mass production of permanent grasslands in Romania.

RESULTS AND DISCUSSIONS

The current area of Romania's permanent grasslands is estimated at 4.81 million hectares, representing 20% of the country's land area and 34% of the agricultural area. This area increased by 9% compared to 1990. Reported to European Union, our country, by surface, occupies the 5th position, and in relation to the number of inhabitants it is in 4th position. Also, the proportion surfaces used as pastures used is 75% compared to 25% for hayfields (*table 1*).

Table 1

Romania's permanent grassland evolution and reporting to European Union (Dragomir N.)

Year	Total surface		of which:		ha grassland/ inhabitant	To the UE *)		
	mil ha	%	Pastures	Hayfield		% of total surface	ha grassland/ inhabitant	Position
1990	4.40	100	3.00	1.40	0.19	-	-	-
2007	4.70	107	3.20	1.50	0.22	8.19	0.10	4
2018	4.81	109	3.60	1.21	0.22	8.44	0.11	4

*) In 2018: Grassland total surface is 57 mil ha;
Population is of 512 mil inhabitants.

Romania's permanent grasslands are found in all the altitude zones, from the Black Sea shore to the alpine peaks. The conditions of these areas hierarchize the area of grasslands: field grasslands with an area of 0.60 million hectares (12%); hill grasslands with an area of 2.53 million hectares (53%); mountain grasslands with an area of 1.68 million hectares (35%). The natural factors in these areas (soil, slope, altitude, exhibition, etc.) strongly

influence the vegetation of permanent meadows by decreasing the degree of use of the resulting phytomass for animal feed. Thus, it is estimated that out of the total area of grasslands about 17% (780 thousand hectares) are affected by limiting natural factors, especially in hill areas (15%) and mountain (20%), so that the total area of usable grasslands to be capitalized is 4.0 million hectares (*table 2*).

Table 2

Zonal distribution of permanent grassland and impact of limiting factors on usability (Dragomir N.)

Relief	Total surface		Usage (mil ha)		Surface under limiting factors		Surface to be used	
	mil ha	%	pastures	hayfields	mil ha	%	mil ha	%
Plain	0.60	12	0.56	0.04	0.06	10	0.54	13
Hill	2.53	53	1.62	0.91	0.38	15	2.15	53
Mountain	1.68	35	1.42	0.26	0.34	20	1.34	34
Total/Average	4.81	100	3.60	1.21	0.78	16	4.03	100

The estimated data presented in Table 3 show that under the natural and specific conditions of Romania the species of ruminant animals (cattle, sheep, goats) have a differentiated distribution on the relief areas. Bovines are found in 50% in the plain area, 30% in the hill area and 20% in the mountain area. Sheep and goats are found in the highest proportion in the hill area (40%), followed by the plain and mountain areas by 30%.

At present, these animal species comprise a total UVM of 3229 thousand, with a share of 2.41% of the total UVM at the EU level,

distributed to relief areas: 40% in the plain area, 35% in the hilly area and 25% in the mountain area. The stock density on permanent pastures in Romania is 2.17 UVM / ha in the plain area, 8.45 UVM / ha in the hilly area and 0.24 UVM / ha in the mountain range. The average density of ruminant animals in our country, based on the total area of permanent grasslands, which can be used (4.03 million hectares), is 0.80 UVM / ha. Taking into account the areas planted with fodder plants, the density decreases by 40% in the plain area and 20% in the hill area.

Table 3

Estimated number of cattle, sheep and goats in Romania (Dragomir N.)

Relief	Cattle			Sheep and goats			Total UVM *)		Animal density UVM/ha/grassland
	mil.	UVM (thousands)	%	mil.	UVM (thousands)	%	thousands	%	
Plain	1.03	824	50	3.41	477	30	1301	40	2.17
Hill	0.62	496	30	4.54	636	40	1132	35	0.45
Mountain	0.40	320	20	3.40	476	30	796	25	0.24
Total/Average	2.05	1640	100	11.35	1589	100	3229	100	0.80

*) The share of total EU is 2.41% (total UE: 134 mil. UVM)

The total area of permanent grassland that can be used, 4.03 million hectares, achieves a total green mass production estimated at 22670 thousand tons, with an economic value of ROL 1,134 billion. During the grazing period, the 3229 thousand UVMs need for forage a total green mass of 22670 thousand tons, with a distribution per area of relief: 57% in the plain area, 29% in the hill area and 14% in the mountain area. In the current situation of the distribution of ruminant animals, on relief areas, except for hill and mountain grasslands where there is a green mass surplus in these areas, the largest green mass deficit is found

in the plains, of 75% (table 4). The high green mass deficit in the plain area during the grazing period (April to October) can be covered by sown grasslands, consisting of special mixtures of grasses and perennial legumes, which at the country level would cover a surface of about 500 thousand hectares. If a different livestock distribution could be achieved by increasing their share in the hill and mountain areas, the green fodder deficit would be reduced by 40% and this would be covered by the establishment of sown grassland with a surface area only 250 thousand hectares.

Table 4

Estimated balance of green fodder obtained on permanent grasslands under animal feed (during grazing) with the green mass obtained on these areas (Dragomir N.)

Relief	Available green mass		Necessary for feeding ruminants		Deficit / Surplus	
	thousand tone	%	thousand tone	%	thousand tone	%
Plain	2160	10	15768	57	-13608	-86
Hill	15050	66	8190	29	6860	84
Mountain	5360	24	3828	14	1532	40
Total/Average	22670	100	27786	100	-5216	X

As it can be seen, in the hill and mountain area there is the lowest density of animals, respectively the smallest animal load, where the permanent grassland area is the highest (five times higher than in the plain areas). This proves that hill and mountain meadows, characterized by higher green mass and high fodder value, are not sufficiently exploited. In comparison, plain grassland with low green mass and low-quality forage fields have a five-fold increase in livestock and a very high degree of floral degradation (over 60% of the plants in the vegetal carpet are of no fodder value, many being harmful or toxic to animals).

CONCLUSSIONS

The current area of Romania's permanent grasslands, of 4.81 million hectares, representing 20% of the country's land area and 34% of the agricultural area, has increased by 9% compared to 1990, being used 75% as pasture land and 25% % as a hayfield.

Romania's permanent grasslands are found in all the altitude zones, from the Black Sea shore to the alpine peaks. Of the total area of grassland about 17% (780 thousand hectares) are affected by limiting natural factors, especially in hill areas (15%) and mountains (20%), so that the total area of grasslands that can be utilized is 4,03 million hectares.

The average density of ruminant animals in our country, based on the total area of permanent grasslands, which can be used (4.03 million hectares), is 0.80 UVM / ha. Taking into account the areas planted with fodder plants, the density decreases by 40% in the plain area and 20% in the hill area.

The hill and mountain grasslands, characterized by higher green mass and a high fodder value, are not sufficiently exploited. In the hill and mountain area there is the lowest density of animals, respectively the smallest animal load, as the permanent grassland area is five times larger than in the plain areas. In comparison, plain grasslands, with low green mass and low-grade

forage have a five-fold increase in livestock load and a very high degree of floral degradation.

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