PROPOSING MEASURES TO IMPROVE GRAZING MANAGEMENT AT SHEEP

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Abstract: *In the climatic conditions from Romania, sheep grazing can be carried out between April and September and during the stable period from the warm season, feeding with mowed green fodder is done in covered paddocks or in other fenced and shaded areas. To improve grazing management in sheep, overgrazing management measures are required, with the aim of avoiding soil degradation of meadows. Improved organization through the best management of using meadows requires increased efforts with high energy consumption, which stimulates nitrogen oxide emissions by adding nitrogen through the application of fertilizers to increase the production of vegetative mass. Grazing, which concentrates sheep herds above the optimum allowed, for long periods of time, reduces vegetation through overgrazing and degrades the soil, and managerial measures regarding effective management must help to combat pollution by the pollution source, reduce the effects of overgrazing through soil rotation and through the well-managed grazing of sheep flocks, the development of integrated farms and ecological production systems to avoid soil degradation and maintain biodiversity.*

***Key words**: sheep, meadows, management, grazing*

INTRODUCTION

In the Romanian climate, sheep grazing can be carried out between April and September and during the stable period in the warm season, covered paddocks or other fenced and shaded areas are needed. During the summer, sheep feed is based on table administered green mown in the crib [1,2,8,11]: 1-2 kg/day for lambs, 3-4 kg/day for youngsters over 6 months old and 7-10 kg/day for adults. This animal production system, in stables, presents the following economic advantages compared to grazing:

- increases the consumption yield of forage plants to 81-85% compared to 71-75% if the same plants were grazed;
- is prevented the spread of parasitic and infectious diseases;
- the entire production of green mass is utilized through less selective consumption because although sheep are not pretentious, they prefer certain types of fodder and even parts of fodder;
- are ensured constant quantitative and qualitative production indicators;
- the market can be supplied with large batches of quality processed meat and dairy products.

In extensive exploitation, in freedom, on pasture in the conditions from our country, herbs consumption varies between 51.0-80.0%. The diet of farmed sheep may consist of a single mixture chopped, homogenized and possibly moistened with a weak brine or molasses solution, consisting of the following types of feed: [7,10,20,21]

- 65% fibrous fodder, in equal parts hay and roughage fooder;
- 20% silage or green mass;
- 15% chopped corn cobs.

The sheep's diet for protein-vitamin-mineral balancing depending on the expected production must be supplemented by adding in rations of:

- concentrated fodder and protein-mineral-vitamin supplement;
- mineral salts through lumps of salt for licking.

Because grazing is an essential part of sheep farming during the period April-September in the pasture operation, the flock must be protected by managerial measures and from the poisonous/toxic plants existing in the meadows. In order to detect sheep intoxication in time, the specific types of behavior, signs and symptoms must be identified because sheep act confusedly when they are poisoned: [6,12,13]

a. convulsions and/or breathing difficulties;
b. consumes a lot of water;
c. apathy and bloating;
d. states of fatigue and lack of consumption;
e. isolation from the herd.

Plants poisonous/toxic to sheep – studied for over 60 years – are found along fences and hedgerows, in landscaping, on field edges or ditches, and even on poorly managed pastures. The following plants are considered poisonous/toxic in the floristic composition of the meadows: broccoli (Brassica oleracea var. italica), the sky/cerioul/wild oak (Quercus cerris), wild cherry (Prunus sp.), ilex (Ilex aquifolium), iris (Iris germanica), lantana (Lantana sp.), mountain laurel (Calia secundiflora, Cryptocarya nova-anglica, Kalmia latifolia, Umbellularia californica), evening primrose (Ipomoea sp.), oleander (Nerium oleander), rhubarb (Rheum sp.), yew (Taxus baccata) and cabbage (Brassica oleracea) [4,14,19].

Poisonous/toxic plants more likely to be found in a permanent pasture are: bear's beard (Equisetum palustre), sedge/sorghum (Sorghum halepense), boglari/poisonous rooster's foot (Ranunculus sceleratus), sedge/big grass (Scrophularia nodosa), autumn thistle (Colchicum autumnale), hemlock (Conium maculatum), woolly finger (Digitalis lanata), field fern (Pterodium aquilum), arrow grass (Triglochin sp.), nightshade (Solanum dulcamara), water lily (Glyceria maxima), common nopal (Opuntia cacti), yellow mulberry (Aconitum anthora), spring rush (Adonis vernalis), acacia (Robinia pseudoacacia), St. John's wort (Hypericum perforatum) and thistle (Solanum nigrum).

The severity of poisoning of sheep with toxic plants depends on a multitude of factors such as [15,16]:

- the amount of ingested toxin;
- the environmental conditions in which the toxic plant grows;
- duration of the toxin ingestion period;
- the size, sex, general condition and age of the animal;
- the chemical nature of the toxin;
- ingested toxic plant parts;
- the maturity stage of the toxic plant;
- the general condition of the toxic plant.

Studies undertaken in five meadows [5,10,18] show that the load of small ruminants is almost twice as high as allowed, which means:

- defective management of meadows;
- overgrazing and the destruction of biodiversity;
- soil erosion and degradation;
- major imbalances.

In order to reduce at halve the pressure on grasslands, the same author recommends to sheep breeders new production systems, ecological agriculture, to sheep farmers [3, 17].

MATERIALS AND METHODS

Exploitation of pastures through the uncontrolled grazing of sheep of different categories, in terms of the optimal herds, between April and September, contributes to the degradation of the floristic composition through overgrazing and by reducing the amount of vegetative mass due to erosion and quality degradation of the soil. In order to avoid overgrazing and maintain the health of the soil of the meadows used for sheep production systems, within this scientific approach, using the known methods of evaluating the productive capacity of the meadows and the optimal herds, we sought solutions to avoid the degradation by proposing for the implementation of managerial measures to manage the efficient use that contributes to the maintenance of floristic biodiversity and optimal productive capacity and contributes to the sustainable development of areas, through the efficient use of resources.

RESEARCH RESULTS

In order to improve sheep grazing management, measures are needed to help avoid the degradation of meadows through:

a. overgrazing, which has negative effects on the floristic composition of the meadows, being necessary the improved management of pastures and grazing that has positive and negative effects on the environment because:

• accelerates atmospheric carbon sequestration in soils;
• helps reducing soil degradation and erosion by water and wind;
• creates more sustainable livelihoods for shepherds;
• increases biomass in meadows;
• sequesters carbon as an important part of the fight against greenhouse gases;

Improved management through best management requires increased intensive efforts with high energy consume through increased irrigation during periods of drought, which boosts nitrogen oxide emissions by adding nitrogen through NPK fertilizers to increase vegetative mass production. It is considered that in order to restore native meadows and sensitive sites that have suffered due to overgrazing or the development of energy (high voltage poles) or industrial capacities, the following steps must be taken to restore them:

- removal and replacement of displaced soil;
- restoring the vegetation on the topsoil;
- combating soil erosion;
- preparation of the germinal bed;
- the choice of seeding methods;
- choosing seeds from native species;
- choosing the moment of sowing;
- establishing the seed mixture;
- avoiding fertilization;
- avoiding invasive species;
- improved management planning through overgrazing management measures.

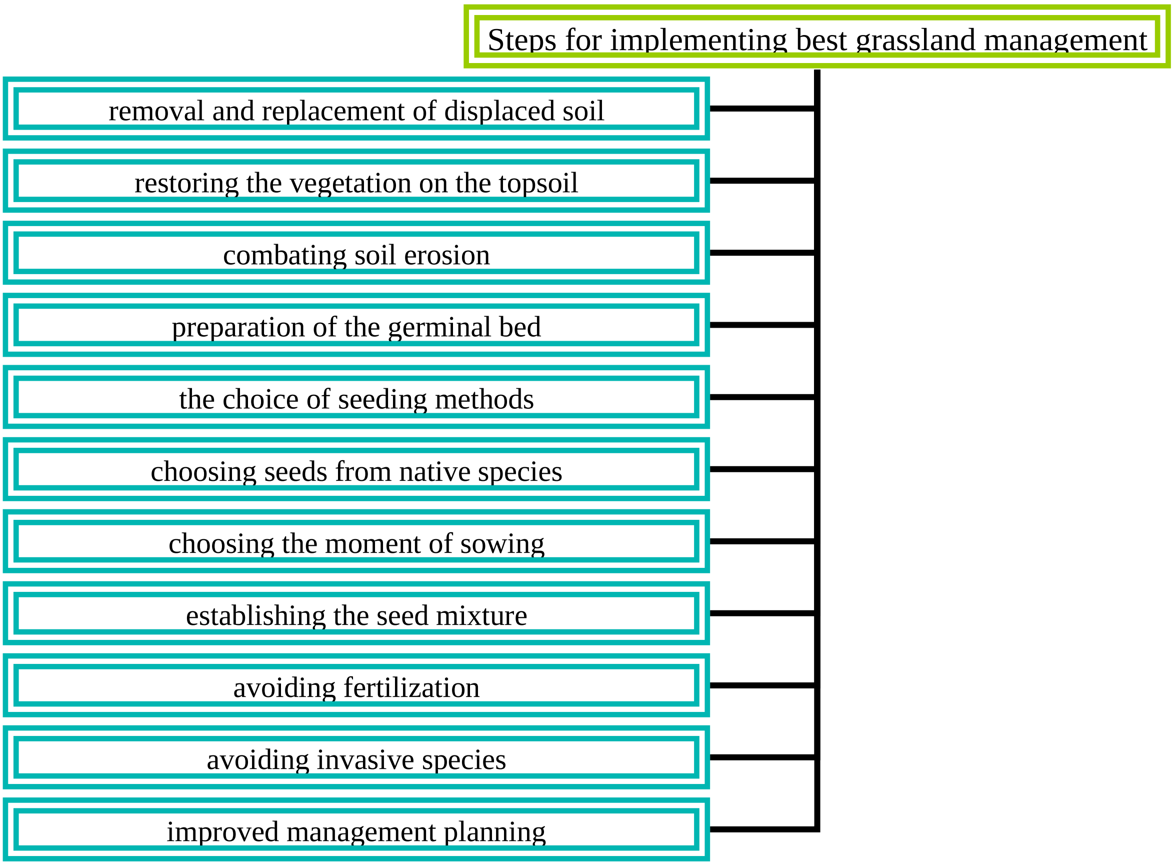

Figure 1. The main steps for implementing best grassland management

To reduce the negative effects of overgrazing, we recommend the following management measures to maintain the biodiversity of meadows and avoid soil degradation through overgrazing:

- optimization of livestock according to the biological value of the meadow;
- the cultivation of plants that provide large amounts of vegetative mass;
- dividing the meadow;
- the rotation of herds, to restore the vegetative mass;
- implementation of the best agro-silvo-pastoral system, to avoid overgrazing, especially in periods of high humidity;
- the use of models regarding the management of the vegetative value of meadows and the distribution of those categories of animals that do not degrade the soil and have a high capacity for selective assimilation of food;
- the sustainable development of the areas, through effective measures to mitigate the negative effects of aridization and desertification caused by global warming.

a. the deterioration of the health of the soil of the meadows. The health of mountain meadows soil is threatened according to the opinion of many researchers of acidification, compaction, nutrient imbalances, erosion, salinization and alkalinization, activities that contribute to the loss of biodiversity through a bad management of: herds, optimal grazing periods, water management. Health status of grassland soil used for sheep grazing can be assessed in the following steps (Healthy Grassland Soils – Four Quick Steps to Assess Soil Structure):

- 1 - Assessment of the area covered with grass to identify weeds;
- 2 - Evaluation of areas burnt by the sun, compacted, uneven or soil exposed to degradation;
- 3 - Extraction of a soil block to determine the soil structure;

- 4 - Evaluation of the soil from the point of view of the soil structure uniformity;

- 5 - Giving a grade: 1-2 (Good: friable, intact), 3 (Moderate: firm), 5 (Poor: compact, very compact).

The soil from the meadows with a pH below 5.2 requires amendments, substances that are incorporated into the soil, used to correct and improve its physico-chemical properties, to obtain good productions of vegetative mass and to ensure a high biodiversity.

c. protecting the riparian areas from the vicinity of the meadows. Both overgrazing and undergrazing contribute to the soil degradation of meadows, if the sheep herds exceed the optimal affordability, both pastoral activities being considered, degrading factors that lead to ecological disturbances and loss of biodiversity. The riparian areas differ from the surrounding lands by the unique characteristics of the soil and vegetation that are strongly influenced by the presence of water. General indicators of riparian areas include water and nutrient cycling, energy flow and resources. All these attributes of riparian areas are disturbed by:

- clearing the vegetation by overgrazing and transforming the area into other uses;
- recreational development, which can destroy the diversity and natural structure of plants, can lead to soil compaction and erosion;
- excessive exploitation, which can strip the banks of vegetation;
- the invasion of the area by invasive plants that take advantage of the good growing conditions found here leads to a decrease in the general vegetative diversity of the meadows;
- the removal of vegetation through uncontrolled productive activities causes water to flow rapidly from a watershed through a riparian area and reduce soil moisture storage and productivity, which can lead to prolonged periods of no flow or with low flow, leading to a drastic decrease of productivity;

Grazing, which concentrates sheep herds above the allowed optimum, in riparian areas for long periods of time, reduces vegetation through overgrazing and degrades the soil, managerial measures regarding the management of riparian areas must come up with solutions that help to:

- combating pollution by the pollution source, the sheep, by retaining and using nutrients and by reducing sediments;
- combating overgrazing through rotational grazing;
- well-managed grazing;
- combating soil degradation, by maintaining the base flow in wetlands due to the high water level;
- maintaining migration routes and stopping points between habitats for a variety of species from the grassland ecosystem;

e. the development of integrated sheep farms. The integrated farming system means combining of grassland production with livestock management complementing each other in a viable symbiotic relationship in terms of:

- economical, obtaining products at reduced price of fodder resources;
- profitable because it transforms vegetable resources into animal protein;
- ecological because it completes the needs of the market through other production systems;
- benefits from production diversity and brings additional income.

The purpose of developing integrated farms is multiple through:

- ensuring additional and complementary relations of the farm for the use of the vegetative mass of the meadows as an input for the meat and milk processing industry;
- maintaining the health state of the meadow and soil through the integronic management of the use by sheep;

- obtaining a maximum profit per surface unit, with little human resource;
- reducing environmental pollution by optimizing herds and rotating soils for grazing.

The basic principle of integrated farms that use pastures to feed sheep is to improve ecological diversity by controlling soil health and biodiversity:

- selecting the rotational grazing method;
- the adoption of ecological methods of obtaining sheep production;
- the use of floors, so that the total available area of the meadow to be used efficiently and ensure a high level of interaction between the biological and abiotic components.

CONCLUSIONS

In order to reduce the negative effects of overgrazing, maintain the biodiversity of meadows and avoid soil degradation, management measures must aim at optimizing the sheep flocks according to the productive value of the meadows, dividing the meadows for a good rotation of the herds, implementing the best agropastoral production system and using of models for effective management of the nutritional value of meadows, all with the aim of sustainable development of the areas.

The development of integrated farms for the exploitation of sheep on pastures in a classic or ecological system contributes to improving the efficiency of inputs, the profit margin, the productivity of plant production and operating income. The purpose of the development of integrated sheep farms resides in ensuring additional and complementary relations of the farm for the use of the vegetative mass of the meadows as input for the meat and milk processing industry, maintaining the state of health of the meadow and the soil through the integronic management of efficient management of the use by sheep and obtaining a maximum profit per surface unit as well as reducing environmental pollution by optimizing herds and rotating soils by implementing the best grazing management.

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