



REFOREST

NATURAL GRASSLAND BOTANICAL COMPOSITION AND PRODUCTIVITY IN AGROFORESTRY FARM IN THE STRANDZHA REGION, BULGARIA

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INTRODUCTION

Agroforestry is a land use system that integrates tree vegetation with agricultural crops or livestock. The Silvopastoral agroforestry system is popular in the mountain and semi-mountainous regions of our country. Natural pastures are a valuable and cheap source of forage for farm animals. Additionally, they perform critical environmental functions by protecting the soil from water and wind erosion, increasing soil fertility, protecting groundwater from contamination, and reducing the carbon dioxide content in the atmosphere through intensive photosynthesis. They are essential for biodiversity as some birds and mammals live or find their food there. Wood and shrub species play an essential role in improving the microclimate of the agricultural system.

The present research is part of the activities of the REFOREST project - Agroforestry at the forefront of farming sustainability in multifunctional landscapes in Europe.

The aim of this study is to establish the productivity and botanical composition of natural grasslands used in forest farming and silvopastoral agroforestry systems in the region of Southeastern Bulgaria.

MATERIALS AND METHODS

The study was conducted during two growing seasons in the period 2023–2024 in the field of Strandzha Beekeeping Farm, located in the area of the village Indje Voyvoda, Burgas district, in the southeastern part of Bulgaria, at an altitude of 297 m above sea level. The object of the study are two grasslands – a grassland in the area of “Lipata” (point 1), in which an apiary is located, and a grassland called “Pasishte” (Point 2), which is used for grazing animals. The observed territories have the following coordinates: 42.22; 27.43 and 42.23, 27.42.

To establish the productive characteristics of grasslands in each of the indicated areas, 5 working sites were created. During the experimental years, a total of 5 field studies of grasslands were conducted. The following indicators were recorded: density of grass cover, share of grass groups of grassland (cereals, legumes, weeds) and productivity (yield of green mass and dry matter).

RESULTS AND DISCUSSIONS

The grassland located in the “Lipata” field is characterized by a lower degree of grass cover – an average of 73.05% (Table 1). Cereal grasses predominate in the grassland with a share of 47.7% (Table 2). The share of weeds increased during the studied years and reached an average of 44.0%. The share of leguminous grasses is the lowest. The productivity of the grassland is low with an average yield of green mass of 4808.2 kg/ha and 1488.5 kg/ha (Table 3).

Table 1. Grass cover density, %

Area	2023	2024	Average
Lipata (apiary)	86,4	59,7	73,05
The pasture	90,5	89,3	89,9

Table 2. Botanical composition of the natural grassland by the years and average for the period 2023-2024, %

Area	Groups	2023	2024	Average
Lipata (apiary)	Perennial cereal grasses	53,8	41,5	47,7
	Legumes	5,8	10,9	8,4
	Weeds	40,4	47,6	44,0
The pasture	Perennial cereal grasses	65,1	58,2	61,7
	Legumes	16,2	26,2	21,2
	Weeds	18,7	15,6	17,2

Table 3. Productivity of natural grasslands by the years and average for the period 2023 -2024, kg/ha

Area	2023		2024		Average	
	kg/ha	%	kg/ha	%	kg/ha	%
Green mass yield						
Lipata (apiary)	5595,0	100,0	4021,3	100,0	4808,2	100,0
The pasture	15150,0	270,8	14362,7	357,2	14756,4	306,9
Dry matter yield						
Lipata (apiary)	1896,6	100,0	1080,3	100,0	1488,5	100,0
The pasture	4696,5	247,6	4233,8	391,9	4465,2	300,0

The grassland located in the “Pasishte” area has a high density of grass cover - an average of 89.9%. Cereal grasses predominate - 61.7% at full development. The share of weeds is low – 17.2%. In 2024, a high share of leguminous species in the grassland was found (26.2%), with representatives mainly from the genus *Trifolium*, which are one of the most valuable forage species. The higher productivity of the grassland - yield of green mass 14756.4 kg/ha and 4465.2 kg/ha dry matter is due to the better grass cover and the higher share of leguminous species.

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