



*Original Contribution*

## SEED PRODUCTION OF PERENNIAL CEREAL GRASSES IN AUTUMN SOWING

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### ABSTRACT

The biological and productive qualities of six types of perennial cereal grasses, cultivated for seeds in autumn sowing, were investigated in the Regional Centre Research Applied Service - Sredets, during the period 2001-2004.

The experiment was done on a leached cinnamon forest soil, with weakly acidic reaction, under the block method, in 4 repetitions and sizes of the crop on a plot of land 10 m<sup>2</sup> in area.

It was established that in the conditions of Strandja in autumn sowing, the perennial ryegrass had the highest production of 50.0 kg/da seeds followed by the tall fescue variety Elena – 33.1 kg/da seeds. The variants with better high seeds production had better numbers of generative stems or better hard grain.

**Key words:** Perennial cereal grasses, seeds, autumn sowing, Strandja.

### INTRODUCTION

For the creation of lawns and sheep walks in Bulgaria the following are used: the perennial cereal grasses-orchard grass, smooth brome grass, tall fescue, perennial ryegrass, etc. The availability of grass seeds is one of the basic needs in the development of the lawn and sheep walks economy in Bulgaria (1). Lots of investigations has been performed to establish influence of term (3), fertilization (2) weed control (1) harvesting, erosion et. c (5).

The goal of this study was to seek the possibility of harvesting the seeds from the perennial cereal grasses in autumn planting season.

### MATERIAL AND METHODS

The studies were carried out during the period of 2001-2004 in the examination field of the Regional Centre Research Applied Service-town of Sredetz. In the examination were included 6 kinds and sorts of perennial cereal grasses: 1) orchard grass – sort Dabrava-standard 2) tall fescue – sort Albena, 3) red fescue – sort Troyan, 4) perennial ryegrass-local sort 5) wheatgrass – sort Kaliakra, 6) tall fescue – sort Elena. The experiment was done

on a leached cinnamon forest soil with weakly acid reaction pH – 5.6 and humus content till 2% under the block method in 4 repetitions and size of crop plot 10 m<sup>2</sup>. The sowing was made during the autumn of 2001 with a distance between the lines 12 cm and sowing norms realized for the separated grass sorts in pure kind. The sowing was created under the standard technology of bringing up of perennial cereal grasses. The following factors were studied: a number and height of the generated plants, the length of small broom flowers, number and weight of the seeds in broom flower and the yield of seeds from 0.1 hectare. The mean annual rainfall in the region for the period 2002-2004 was 454.5 mm with maximum in January and October, and minimum August and September. The average temperatures during the time of experiment were 12.6°C and during the vegetation period 18.2°C.

### RESULTS AND DISCUSSION

The yields of seeds during the years and an average of grade for the period are lowest in the first year of a period of experimentation and they range from 15.0 kg/dka to 36.3 kg/dka (**Table 1**). The second year is characterized by much more production compared to the first (from 1.93 to 2.39 times)

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of all variants. The variant 4 has the highest yield, exceeding the control sample 2.75 times. During the third year the seed yields range from 12.6 kg/dka (var.1) to 36.1 kg/dka (var.6). The lower tempo of growth the red fescue (var.3) and the wheatgrass (var.5) fix their lower seed yield during the first year of the period and the higher one during the second and third years. The perennial ryegrass

(var.4) produced the highest yield during the second year, the seed yield is lowest during the third year. For the period the average of grade seed yields of 1 da range from 19.7 kg/da (orchard grass) to 50.0 kg/da (perennial ryegrass) was obtained. The perennial ryegrass was intermediate in ranking for the period exceeding the control sample more than 2.5 times.

**Table1:** Seed yield of perennial cereal grasses in autumn sowing

Treatments	2002	2003	2004	Mean for the period	
	kg/dka	kg/dka	kg/dka	kg/dka	% toward St
1.	15.0	31.5	12.6	19.7	100.0
2.	22.4	45.0	20.5	29.3	148.7
3.	19.1	37.5	28.2	28.3	143.6
4.	36.3	86.7	27.0	50.0	253.8
5.	17.0	32.8	15.0	21.6	109.6
6.	21.0	42.2	36.1	33.1	168.0

GD – 5% 6.3 8.1 5.5  
 GD – 1% 12.0 15.3 11.0  
 GD – 0.1% 15.8 19. 14.7

The second cultivated plant is the tall fescue sort Elena with 168.0% productivity.

The lowest results of intermediate ranking are generated by the orchard grass and wheatgrass - 15.7 kg/dka and 21.6 kg/dka, respectively.

The perennial cereal grasses are characterised as frost-resisting at low temperatures.

The lowest temperatures during December 2002 (-13.0°C), January 2003 (-11.9 °C) and March 2003 (-14.0°C) had no

influence on their yields, because of their adequate root system.

During the period of research (**Table 2**) the plants tall fescue were the highest– sort Albena (97 cm) and sort Elena (95 cm), followed by the orchard grass (94 cm). The average grade number of generative stems/m<sup>2</sup> occurs in wide ranges. The perennial ryegrass has the highest stems/m<sup>2</sup> with 657, while the least occurred in the orchard grass – 153.

**Table 2:** Morphological characteristic of cereal grasses, mean for the period (2001-2004)

Treatments	Generative stems		Panicle length, cm	Seed per panicle number	Seeds weight - 1 panicle g	1000 - seeds weight, g
	n./m <sup>2</sup>	height, cm				
1.	153	94	10.5	115	0.138	1.2
2.	196	97	14.7	82	0.160	2.1
3.	379	78	14.0	62	0.078	1.3
4.	657	61	13.3	43	0.080	1.8
5.	361	66	5.0	63	0.068	1.1
6.	209	95	14.8	76	0.182	2.3

The length of the cornflower of the different sorts of perennial cereal grasses ranges from 5.0 cm (var.5) to 14.8 cm (var.6) The number of the seeds in one cornflower is one of the elements responsible for the yield of seeds. The range of values in the experiment for this period went from 43 for the perennial ryegrass

to 115 for the orchard grass. The kinds of cereal grasses are recognized also by the

weight of the seeds in one cornflower – from 0.068 (wheatgrass) to 0.182 (tall fescue – sort Elena).

The mass of 1000 seeds is approximately 1.1 g for the wheatgrass to 2.3 g for the tall fescue – sort Elena.

### CONCLUSIONS

The autumn sowing of the perennial cereal grasses in the region Strandja mountain assure good yields of seeds.

The highest yield of seeds for the period is produced by a perennial ryegrass – local sort – 50.0 kg/dka.

The cornflowers of the tall fescue are longest and heaviest – 14.8 cm and 0.182 g.

The highest number of seeds in one cornflower is found in the orchard grass – 115.

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