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Effect of growth regulators application on seed yield of *Festulolium braunii*

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Key words: festulolium, seed production, growth regulators, lodging

Introduction The current problem in the cultivation of *Festulolium braunii* for seeds, especially in conditions of optimal nitrogen fertilisation, is plant lodging. Among treatment intended to prevent the occurrence of this phenomenon is the application of growth regulators which, in some seed grasses, results in considerable increases of seed yields (Rolston *et al.*, 1997). However, the main issue is the selection of the appropriate preparation. The aim of the performed investigations was to assess the impact of the application of selected growth regulators in the seed production of *Festulolium braunii*.

Materials and methods During 2006-2007, in Brody (52°26' N, 16° 18' E) an experiment was set up in a plot block-design with three replicates (plot size 1 m (10 m)) to evaluate the effect of different growth regulators (1/ control-without application; 2/ trinexapac-ethyl: 100 g/ha (Moddus 250 EC) applied in GS32; 3/ trinexapac-ethyl: 75 g/ha GS32 + 75 g/ha GS41; 4/ trinexapac-ethyl: 150 g/ha GS41; 5/ etephon: 480 g/ha GS32 (Cerone 480 SL); 6/ chlormequat chloride: 500 g/ha GS32 (Cycocel 250 SL) on the seed yield and selected biological features of *Festulolium braunii* cv. Felopa. The experiment was situated on Albic Luvisols soils (pH_{KCl}-5.8, N_t-0.9%, P₂O₅-142 mg/kg, K₂O-158 mg/kg, Mg-73 mg/kg). In August 2005 seeds were sown in the rate of 400 seeds/m² at row spacing of 25 cm. Fertiliser was applied each year at a rate of: N-80 kg/ha, P₂O₅-50 kg/ha, K₂O-80 kg/ha. The following parameters were analyzed: plant lodging (using a 9 point scale-1-very strong lodging, 9-without lodging), seed yield (collecting seeds with a plot Wintersteiger combine harvester from the area of 10 m², drying and cleaning), yield structure and seed quality (according to ISTA). Tests of the main effects were performed by F-tests. Means were separated by the LSD and were declared different at the $P < 0.05$ level.

Results The application of growth regulators reduced significantly the plant lodging in comparison with the control plot on which the degree of this phenomenon, assessed for the two years of studies, was on average at the level of 5.2. The best effect of protection against lodging (9.0) was achieved in the case of the application of trinexapac-ethyl at the GS41 phase. The application of the remaining experimental growth regulators protected against lodging at levels ranging from 6.3 to 8.0. The growth regulators reduced considerably generative shoots length, particularly trinexapac-ethyl applied in GS41 and GS32+GS41 (Table 1). Moreover, this regulator reduced the length of inflorescences by 4.6-7.9%. By reducing or delaying plant lodging, the application of growth regulators in the seed cultivation of *Festulolium braunii* exerted a positive influence on the number of seeds in the spikelet and the effectiveness of seed setting. The best effect in this field was observed in the case of the application of trinexapac-ethyl at the GS41 phase. The application of growth regulators resulted in the increase of seed yields in comparison with the control treatment in the range of 6.4% to 31.0%. The applied growth regulators did not have negative influence on the seed germination capacity.

Table 1 Effects of growth regulators application on seed yield and quality of *Festulolium braunii* (means 2006-2007).

Treatment	Shoots length (cm)	Ear length (cm)	No. of spikelet per ear	No. of seeds per spikelet	Seed set efficiency (%)	Seed yield (kg/ha)	Germination capacity (%)
control	108.7	24.1	17.0	4.24	51.5	543.7	74.2
trinexapac-ethyl GS32	107.4	23.0	17.1	4.88	52.2	578.5	75.5
trinexapac-ethyl GS32+GS41	87.7	22.6	17.6	4.50	52.1	601.5	73.2
trinexapac-ethyl GS41	85.4	22.2	17.8	4.83	56.7	712.0	80.0
etephon GS32	110.1	23.9	17.7	4.16	51.7	598.7	76.3
chlormequat chloride GS32	104.0	24.5	17.5	4.37	52.2	615.2	79.2
LSD _{0.05}	3.14	0.77	0.53	0.317	2.14	87.95	ns

Conclusions The experimental growth regulator trinexapac-ethyl applied in the dose of 150 g/ha in the growth stage GS41 was characterized by the best effects when applied on *Festulolium braunii* cultivated for seeds. In comparison with the treatment without growth regulators application, the use of this preparation increased seed yields of *Festulolium braunii* by 31%. The observed effect was the result of protection against lodging and improved seed set efficiency.

Reference

Rolston, M.P., Rowarth, J.S., Young III, W.C., Mueller-Warrant, G.W., 1997. Grass seed crop management. In: Fahey D.T., Hampton J.G. (ed.) *Forage seed production*. Vol.1: Temperate species. Wallingford: CAB International, 105-126.