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"Solidarity in a competing world — fair use of resources"

Nitrogen management as affecting development of super early genotypes of dry bean

Adriano Stephan Nascente, Maria da Conceição Santana Carvalho, Alexandre Bryan Heinemann
Embrapa Arroz e Feijão, Brazil

INTRODUCTION

The use of irrigated super early cycle genotypes (SEG) of common bean (*Phaseolus vulgaris*) would allow achieving high grain yields in shortest time thus providing irrigation water and power savings, and could also allow best land use, such as cultivation of two crops during the rainy season, or even up to three crops during the same year in irrigated areas. These genotypes have life cycle of 65-75 days, while traditional cultivars have 90-100 days.

This study aimed to evaluate SEG of dry bean development as affected by timing of nitrogen application.

MATERIAL AND METHODS

Field experiments were conducted in the 2014 and 2015 growing seasons in central Brazil with a randomized block experimental design with split plots scheme and four replicates. The plots comprised the dry bean genotypes (Colibri – check cultivar, CNFC 15873, CNFC 15874, and CNFC 15875), and subplots comprised applications of N at different timings: 90 kg of N at sowing, 90 kg N at top-dressing; 45 kg of N at sowing plus 45 kg at top-dressing, with urea as the source of N. We also used a control treatment without N application.

CONCLUSION

1. The CNFC 15874 super early genotype of dry bean had the higher grain yield (2776 kg ha^{-1}) and differed from the CNFC 15873 genotype (2492 kg ha^{-1}).

2. Nitrogen fertilization allowed higher grain yield (2619 kg ha^{-1}, when applied N at sowing; 2605 kg ha^{-1}, when applied N at sowing and at top-dressing; and 2680 kg ha^{-1}, when applied N at top-dressing) than the control, 2360 kg ha^{-1} (no N fertilization).

3. The time of N fertilization in super early genotype of dry bean did not affect grain yield.

Figure 1. Overview of experimental field. 15 days after emergence

RESULTS AND DISCUSSION

Table 1. Stems, leaves, pods and total plant dry biomass accumulated at 77 days after emergence (DAE) in growing season 2014 and at 70 DAE in growing season 2015 of super early cultivar of dry bean as a function of the nitrogen timing of genotypes (plot), top-dressing fertilization (subplots) and growing season (sub subplot), Santo Antônio de Goiás, growing seasons 2014 and 2015.

Genotypes	Plant dry biomass				Grain yield
	Stems	Leaves	Pods	Total	
	g m^{-1}				kg ha^{-1}
Colibri	32.25 a	27.99 a	116	177 ab	2736 ab
CNFC 15873	32.83 a	24.45 a	110	168 b	2492 b
CNFC 15874	36.75 a	25.64 a	132	195 a	2776 a
CNFC 15875	24.39 b	15.70 b	117	156 b	2535 ab
N top-dressing fertilization					
90 kg N at sowing (S)	31.80	24.03	117	173	2619 +
45 kg N at S and 45 kg N at T	32.26+	23.22	127	183	2605 +
90 kg N at topdressing (T)	30.61	23.09	112	166	2680 +
Control – 0 Nitrogen	26.94	20.02	108	155	2360
Growing season					
2014	29.94	21.72	156 a	208 a	3098 a
2015	33.17	25.17	81 b	140 b	2172 b
Factors	Analyze of variance (F probability)				
Genotypes (GEN)	0.0026	0.0030	0.2594	0.0478	0.0473
N top-dressing fertilization (N)	0.7647	0.8711	0.2904	0.3968	0.7857
GEN * N	0.2710	0.2522	0.6169	0.3891	0.0558
Growing season (GS)	0.0720	0.0594	<0.001	<0.001	<0.001
N * GS	0.6367	0.2572	0.3210	0.2708	0.7211
GEN * GS	0.4744	0.0777	0.7770	0.6743	0.0949
N * GEN * GS	0.7112	0.7489	0.3917	0.4682	0.1684

Figure 2. Overview of experimental field. 25 days after emergence

Figure 2. Overview of experimental field. 33 days after emergence

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