

EFFECT OF POPULATION SIZE AND SPATIAL ARRANGEMENT IN A NEW ERECT COMMON BEAN GENOTYPE (*Phaseolus vulgaris* L.), COMPARED WITH COMMERCIAL CULTIVARS IN LOW INPUT SYSTEM

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Before releasing new genotypes, it is essential to test them in field conditions utilized by farmers. In Brazil, common bean average farmers utilize medium-low input system, with suboptimal disease control.

The aim of this research is to test a new erect genotype at medium-low input system, in contrasting population size and spatial arrangement.

A factorial field experiment was carried out in split randomized blocks with five replicates. The treatments were: distance between rows: 45,0 or 22,5 cm; seed density: 10 or 20 seeds per linear meter; fertilization: 500 or 1000 kg/ha (8-28-16) and 3 common bean genotypes: Erect, Carioca and Perola.

The Erect genotype was developed by the Brazilian company "FT-Pesquisas e Sementes Ltda" (FT -Research and Seeds Ltd).

According to Table 1, Erect genotype produced more than traditional cultivars Carioca and Perola at all treatments tested.

Table 1. Seed density, distance between rows, fertilizer level, yield and weight of 100 seeds of an three genotypes of common bean.

Seed density (Seed/meter)	Distance between Rows (meter)	Fertilizer level (Kg/ha)	Yield (Kg/ha)			Weight of 100 seeds (g)		
			Erect	Carioca	Perola	Erect	Carioca	Perola
10	45.0	500	1416	904	590	18.1	21.5	20.8
10	45.0	1000	1928	1341	974	17.8	19.2	20.1
20	45.0	500	1621	911	705	17.7	17.7	19.5
20	45.0	1000	2060	986	1015	18.4	18.2	20.5
10	22.5	500	753	345	280	14.4	17.0	17.0
10	22.5	1000	1662	481	229	18.4	16.0	17.0
20	22.5	500	704	435	274	14.9	17.0	17.0
20	22.5	1000	1832	321	450	18.0	17.0	17.5

Low distance between rows affected Carioca and Perola productivity more than erect genotype due to plant architecture, which was less, affected by distance between rows, mainly when 1000 Kg/ha of fertilizer was utilized.

In spite of 2 fungicides application, according to Figure 01 antracnosis also limited strongly yield mainly for Carioca ($r^2 = -0.99$) and Perola ($r^2 = -0.98$). The new erect genotype had very low antracnosis symptoms (Table 2 and Figure 01). Considering 500 Kg fertilizer/ha, at higher population size, the competition effect for nutrients was more higher then anthracnose symptom, decreasing the antracnosis correlation with yield ($r^2 = -0.60$).

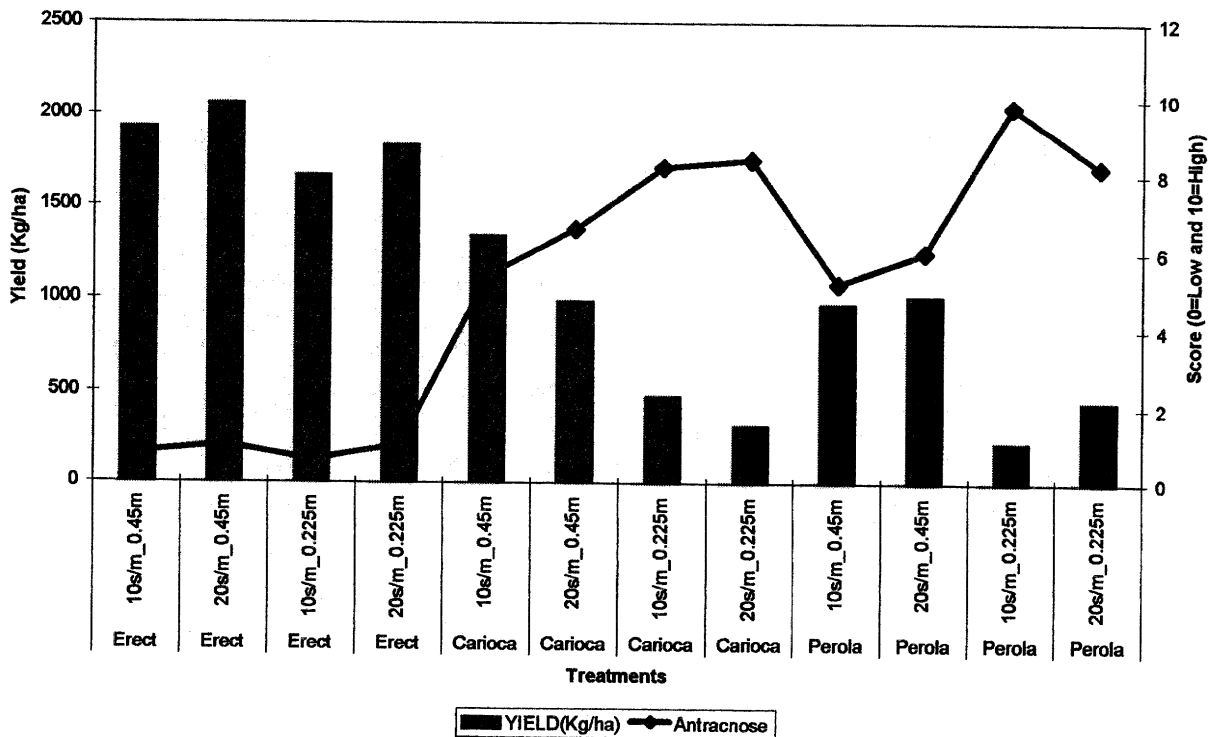
At usual 45 cm between rows and 10 seeds per meter, Erect genotype had lower weight of 100 seeds than Carioca and Perola, but similar to Carioca with 20 seeds per linear meter.

On the other hand, at 22.5 cm between rows, Carioca and Perola had similar weight of 100 seeds, lower than erect genotype at high fertilization level and higher than Erect genotype at low fertilization level. This means that at 22.5 cm between rows, there was higher competition for fertilizers

Table 2. Score of Anthracnose symptoms (*Colletotrichum lindemuthianum*), seed density, distance between rows, fertilizer level, yield and weight of 100 seeds of three genotypes of common bean.

Treatment	Seed density (Seed/meter)	Distance between Rows (meter)	Fertilizer level (Kg/ha)	Anthracnose score (0 = Low and 10 = High)		
				Erect	Carioca	Perola
1	10	0.45	500	2	7	6
2	10	0.45	1000	1	5	5
3	20	0.45	500	1	7	7
4	20	0.45	1000	1	7	6
5	10	0.225	500	1	7	6
6	10	0.225	1000	1	8	10
7	20	0.225	500	1	6	5
8	20	0.225	1000	1	8	8

Figure 01 - Score of Antracnosis attach (*Colletotrichum lindemuthianum*), seed density, distance between rows, fertilizer level of 1000 Kg/ha, yield of an three genotype of common.



According to the results, in the environmental conditions tested, with suboptimal disease control, the new Erect genotype produced more than traditional cultivars at usual and high size population, due to anthracnose tolerance and plant architecture.