

BEAN PLANT SPACING AND DENSITY IN THE BRAZILIAN CERRADO

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One of the factors responsible for low bean production in Brazil is an insufficient number of plants per unit area. Thus, modifying plant density and spacing may increase yields.

An experiment was conducted in a randomized complete block design with 4 replicates during 3 growing seasons in each of 3 years. Beans were planted in double rows, with a 0.30 m narrow-row spacing and a variable wide-row spacing (Table 1). The traditional spacing of 0.5 m between single rows was included as a control. Plots were row fertilized at planting with 10 kg N.ha⁻¹, 75 kg P₂O₅ . ha⁻¹, and 40 kg K₂O . ha⁻¹, and side-dressed with 20 kg N.ha⁻¹ at 30 days after emergence.

Table 1. Row spacing, density, and row fertilization rate treatments.

| Row spacing (m) | | Plants.ha ⁻¹ | Fertilizer (g.linear m ⁻¹) |
|-----------------|------|-------------------------|---|
| Narrow | wide | | |
| 0.30 | 0.40 | 285.000 | 12.0 |
| 0.30 | 0.50 | 250.000 | 14.0 |
| 0.30 | 0.60 | 220.000 | 16.0 |
| 0.30 | 0.70 | 200.000 | 17.5 |
| 0.50 | 0.50 | 200.000 | 17.5 |

Grain yield was significantly affected by year of planting, but not by season (data not shown). Yields were significantly higher in the treatments with narrower spacings (Table 2) and higher plant populations (Table 1), but with lower rates of fertilizer per linear meter (Table 1).

Table 2. Influence of plant spacing on grain yield

| Row spacing(m) | | Yield (kg/ha) |
|---------------------------|------|---------------|
| Narrow | wide | |
| 0.30 | 0.40 | 1693 a |
| 0.30 | 0.50 | 1692 a |
| 0.30 | 0.60 | 1639 b |
| 0.30 | 0.70 | 1499 c |
| 0.50 | 0.50 | 1616 b |
| Tukey's HSD (p=0.05) Mean | | 1628 |
| C.V. (%) | | 2.74 |