GRAIN YIELD OF FOUR NEW BEAN CULTIVARS
BASED ON PLANT DENSITY

A. F. Alves¹, M. J. B. Andrade¹, N. M. B. Vieira² and P. M. Rezende¹

¹Departamento de Agricultura, Universidade Federal de Lavras, Caixa Postal 3037, 37200-000 –
Lavras; and ²Universidade Estadual de Montes Claros, campus Janaúba,
Caixa Postal 91, 39440-000, Minas Gerais State, Brazil

INTRODUCTION

New types of beans were a good way to add value to the end production, only with the new choice of
cultivar for sowing. This demand took some bean programs to dedicate also to the other commercial
types, beyond the “carioca”, that already are available. However, to make possible the effective
utilization of these new cultivars by farmers, has necessity to test them in different soil and climate
conditions, mainly with relation to the plant densities. Aiming to study the agronomic behavior of
four news beans cultivars in different plant densities in the north region of the Minas Gerais State,
Brazil, were conducted two field experiments on Mocambinho and Jaiba localities.

MATERIAL AND METHODS

The experimental design was randomized blocks with three replications and a 4x5 factorial scheme
involving four cultivars and five plant densities (100, 200, 300, 400 and 500 thousand plants.ha⁻¹).
The cultivars were BRS-Radiante (determinate growth, habit type I and large mottled grain), Ouro
Vermelho (indeterminate, type II and small red grain), Bolinha (indeterminate, type II and small
yellow grain) and Novo Jalo (indeterminate, type II and large yellow grain) (Ramalho & Abreu,
2006). Each plot had four rows with 5.0 m length and spacing of 0.5 m between rows. The manual
sowing was carried on July and the harvest, on October/2007. At sowing, all the plots had received
identical fertilization, determined by the soil analysis interpretation. The N fertilization at covering
was carried at to the 21 days after emergency, using 30 kg.ha⁻¹ of N, urea source. The experiments
were lead under irrigation, using the conventional aspersion at Mocambinho and microaspersion at
Jaiba. In the harvest, samples of 10 plants for determination of the pod number per plant, grain
number per pod and one hundred grains weight were collected. The grain yield was determined by
the total grain weight of the each plot.

RESULTS AND DISCUSSION

The bean cultivars differed in relation to all the evaluated characteristics and this effect varied with
the localities. The grain yield of the four cultivars varied from 1962 kg ha⁻¹ at 3410 kg.ha⁻¹. The bean
cultivar BRS Radiante showed the bigger grain yield on the two localities, but on Mocambinho it did
not differ from the cultivar Bolinha (Table 1). The increment of the plant density in the interval of
100 the 500 thousand plants.ha⁻¹ reduced the grain number per pod (Figure 1) and the pod number
per plant, this last differentially on the two localities (Figure 2) and on each cultivar (Figure 3). The
grain yield, however, was not influenced by the plant densities.
TABLE 1 – Averages values of the pod number per plant, grain number per pod, one hundred grains weight (g) and grain yield (kg ha$^{-1}$) of four bean cultivars grown at two locations Jaiba and Mocambinho.

<table>
<thead>
<tr>
<th>Cultivars</th>
<th>Pods.plant$^{-1}$</th>
<th>Grains.pod$^{-1}$</th>
<th>100 grain weight</th>
<th>Grain yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jaiba</td>
<td>16</td>
<td>4,0</td>
<td>33,4</td>
<td>2566</td>
</tr>
<tr>
<td>BRS Radiante</td>
<td>17 b</td>
<td>3,4 c</td>
<td>38,6 a</td>
<td>3410 a</td>
</tr>
<tr>
<td>Novo Jalo</td>
<td>12 d</td>
<td>3,9 b</td>
<td>38,7 a</td>
<td>2492 b</td>
</tr>
<tr>
<td>Bolinha</td>
<td>14 c</td>
<td>4,0 b</td>
<td>35,1 b</td>
<td>2399 b</td>
</tr>
<tr>
<td>Ouro Vermelho</td>
<td>20a</td>
<td>5,0 a</td>
<td>21,3 c</td>
<td>1962 b</td>
</tr>
<tr>
<td>Mocambinho</td>
<td>11</td>
<td>4,0</td>
<td>31,8</td>
<td>2452</td>
</tr>
<tr>
<td>BRS Radiante</td>
<td>36,6 b</td>
<td>13a</td>
<td>3,3 b</td>
<td>2739a</td>
</tr>
<tr>
<td>Novo Jalo</td>
<td>40,0a</td>
<td>7 c</td>
<td>3,6 b</td>
<td>2311 b</td>
</tr>
<tr>
<td>Bolinha</td>
<td>31,5 e</td>
<td>10 b</td>
<td>3,9 b</td>
<td>2530a</td>
</tr>
<tr>
<td>Ouro Vermelho</td>
<td>19,1 d</td>
<td>14a</td>
<td>5,3a</td>
<td>2227 b</td>
</tr>
</tbody>
</table>

FIGURE 1 – Grain number per pod of the bean crop in relation to the plant densities (averages from four cultivars and two localities). Winter season 2007.

FIGURE 2 – Pod number per plant of the bean crop in relation to the plant densities at two localities (averages from four cultivars). Winter season 2007.

FIGURE 3 – Pod number per plant of the bean crop in relation to the plant densities by four cultivars (averages from two localities). Winter season 2007.

REFERENCE