SNAP BEAN PRODUCTION AND SOIL MICROBIAL BIOMASS IN FUNCTION OF PHOSPHORUS DOSAGES

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Introduction

Microbial biomass is an important component of the organic matter of the soil, since it is a reservoir of essential nutrients for the plants (Kaiser et al., 1995). The carbon content of the microbial biomass indicates the potential reserve of carbon in the soil that participates in the humification process (Gama-Rodrigues et al., 1997). The estimation of the microbial biomass of the soil supplies useful information about the changes in its biological properties due to several agricultural management practices, such as addition of organic residues. According to Sparling et al. (1997), the microbial biomass can be used as a first indicator of alterations in biological processes in the soil, serving as a monitor for the fertility and pollutional state of these. The assay was carried out with the purpose of evaluating the effects of phosphorus dosages in the carbon microbial biomass content of the soil (Bio-C) and the production of snap beans (cv UEL-1).

Materials and Methods

The trial was carried out in a greenhouse. It was used pots with 4 kg of soil collected from 0-20 cm horizon of a Oxisol (Latossolo Vermelho distrófico (EMBRAPA (1999)), clay texture, from the region of Londrina-PR, Brazil. All the pots received basic fertilization as indicated in Novais et al. (1991), except P. The treatments were: Control, 100, 200, 300, 400 and 500 kg P2O5 ha⁻¹, as triple superphosphate, applied at the depth of 5 cm. After the fertilization and during the experiment the soil moisture was maintained at 70% of the maximum water retention capacity. After emergence (8-10 days), 2 plants were left in each pot. The harvesting was carried out 50 days after emergence. The pods and root systems were collected from each pot and a soil sample, which was used to determine the carbon microbial biomass content (Bio-C), according Vance et al. (1987). The experimental design was randomized with 5 treatments (doses of P) and 4 replicates. The data was used to obtain regression equations and correlation coefficients.

Results and Discussion

The correlations between Bio-C, root dry matter production (RDMP) and the fresh matter of commercial snap bean pods production (FMPP) were significant but negative (Table 1).

Table 1. Correlation coefficients between Bio-C, root dry matter and raw matter of pods.

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<th>Bio-C</th>
<th>RDMP</th>
<th>FMPP</th>
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<tr>
<td></td>
<td>-0.73</td>
<td>-0.72</td>
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* Significant at 5%.

The root dry matter productions and pod fresh matter production, increased with the doses of P, adjusting to the square functions defined by the following equations: RDMP (g) = 1.6756 + 0.0199x - 0.00003x² and FMPP (g) = 14.542 + 0.4927x -0.007x², respectively (Figure
1). The soil microbial biomass decreased with the increasing doses of P, adjusting to the equation: \( \text{BIO-C (mg kg}^{-1}) = 282.25 - 0.9097x + 0.0013x^2 \) (Figure 2).

**Conclusion**

The maximum yields of root dry matter and pod fresh matter were obtained with the doses of 331.67 e 351.97 kg ha\(^{-1}\) of P\(_2\)O\(_5\), respectively. The correlation between Bio-C with the plant variables was significant, but negative. The minimum for Bio-C was defined in 349.88 kg ha\(^{-1}\) of P\(_2\)O\(_5\).

**References**


