

Neotropical Ecosystems



WAVES

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The Influence of Phosphorus Fertilizer on Maize Yield under Conditions of Slash-and-mulch in Eastern Amazonia

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1 Introduction

Phosphorus deficiency is one of the main limiting factors of crop production in Eastern Amazonian agriculture. The objective of the present study is the determination of adequate levels of phosphorus to achieve feasible production of maize with slash-and-mulch system, with and without NK, and the residual nutrient effect in maize yield. The field experiment was conducted in small holder farm in the municipality of Igarapé Açu, PA, Brazil. The land preparation was slash-and-mulch. Three field experiment were conducted. Treatments were arranged in randomized block design with 8 (Aug/99 and Jan/00) and 16 treatments (Aug/00) and 4 replications. The amounts of fertilizer applied were in Aug/99 0, 30, 60 e 90 kg P₂O₅ ha⁻¹, with 0-0 e 120 – 60 kg NK ha⁻¹, in Jan/00 were tested the residual effect and Aug/00 the same level of P₂O₅ with 0-0, 30-15, 60-90, 120-60 kg NK ha⁻¹.

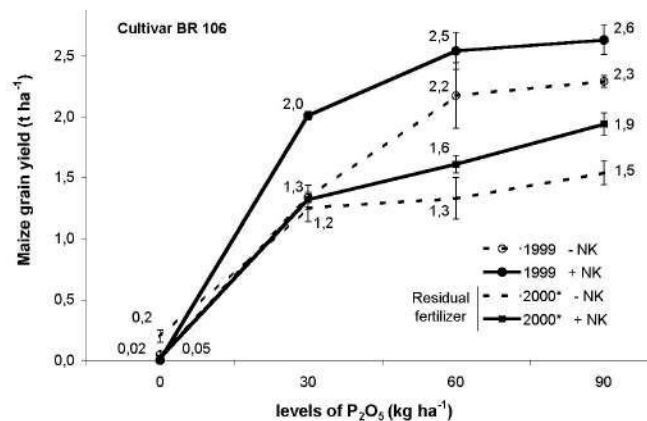


Fig. 1. P-fertilizer and residual fertilizer response in maize (cv. BR 106) under slash-and-mulch system. Igarapé Açu-PA-Brazil.

2 Results

Maize grain yield (Aug/99) were very low or nearly to zero if P was missing, similar to the control treatments (Fig. 1). P fertilization alone increased yield from 0 t ha⁻¹ to 1.3 t ha⁻¹, 2.2 t ha⁻¹ and 2.3 t ha⁻¹ at levels of P₂O₅ of 0, 30, 60, 90 kg ha⁻¹, respectively. P fertilization over 60 kg ha⁻¹ doesn't seem to positively effect yield. Higher response in the yield with NK application was observed at 30 kg P₂O₅ ha⁻¹

(1.3 to 2.0 kg ha⁻¹).

The residual fertilizer had a significant effect on maize grain yields. The differences between treatments were similar to the found in the first plantation. Grain yield varied from 0.10 t ha⁻¹ to 1.94 t ha⁻¹ (Fig.1).

Significant differences were observed for P and NK application for maize grain yields. The interaction P x NK showed significant difference. High levels of N and K fertilizer did not have any yield effect if no P was applied (Fig 2). With 30, 60 and 90 kg ha⁻¹, considerable yield increments were achieved. Above 60 kg P₂O₅ ha⁻¹ the effect leveled out. The effect of NK in the maize yield was just observed when P was applied. With 30 kg ha⁻¹, without NK, yield increment was of 0 t ha⁻¹ to 1.4 t ha⁻¹, but the increase in NK level did not imply in increasing yield (1.4 to 1.8 t ha⁻¹). The application of 60 kg P₂O₅ ha⁻¹ showed higher grain yield (from 1.9 to 2.7 t ha⁻¹). For further recommendation to small farmers it is necessary to refers economic analyze The results confirm the previous experiments (Fig.1).

3 Conclusion

- In slash-and-mulch system, 60 kg P₂O₅ ha⁻¹ with NK application is sufficient to achieve economic yields.
- Increasing phosphorus applied beyond the level of 60 kg P₂O₅ ha⁻¹ does not contribute to increasing yield.
- High levels of N and K fertilizer did not have any yield effect if no P was applied

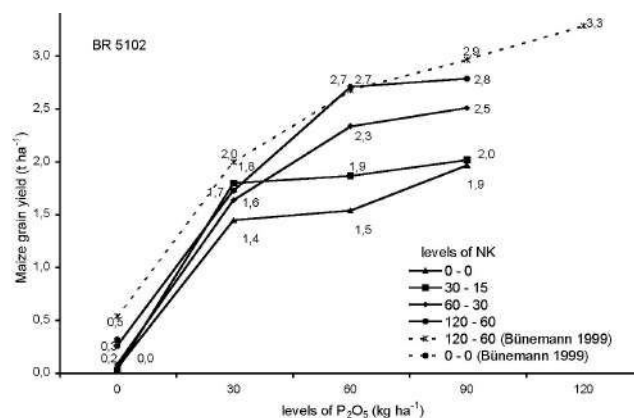


Fig. 2. P-fertilizer response in maize (cv. BR 5102) under slash-and-mulch system