

Summary

The effect of different P application rates on the dry matter production of *Brachiaria brizantha* cv. Marandu was evaluated in a clayey yellow Latosol of the municipality of Paragominas (Pará, Brazil). Soil

characteristics were pH = 5.8; Al = 0 meq/100 ml; Ca = 2.9 meq/100 ml; Mg = 0.3 meq/100 ml; K = 61 ppm; and P = 2 ppm. Climate belongs to type Awi, with an average annual rainfall of 1,800 mm and an average temperature of 26 °C. Phosphorus was applied at 0, 50, 100, 150, and 200 kg/ha, in the form of triple superphosphate (TSP) or natural North Carolina phosphate rock, with or without basic fertilization consisting of 500 kg dolomitic lime, 60 kg N, and 60 kg K/ha. Application rates yielding maximum economic efficiency were determined by the ratio $dy/dx = Px/Py$, where Px is the cost of fertilizer and Py the price of the product (tons of unmarketed dry matter). Costs of labor, soil preparation, seeds, and fertilizers were included as fixed costs. A randomized split-plot block design, the main plots being the sources of P and the subplots P rates. Phosphorus levels alone did not differ significantly regarding dry matter yields. Maximum economic efficiency was obtained with 93 kg P_2O_5 /ha in the form of STP and 104 kg P_2O_5 /ha, in the form of North Carolina phosphate rock, yielding 16.9 and 17.5 t/ha, respectively. Based only on the cost of 1 kg P_2O_5 , the economic efficiency of North Carolina phosphate rock can favorably replace TSP. By applying fertilizers + lime, increases in dry matter production were significant only if TSP was applied at high rates (150 and 200 kg/ha).