Summary

The external and internal phosphorus (P) requirements for *Ischaemum indicum* (syn. *I. ciliare, I. aristatum, Phleum indicum*) and *Brachiaria brizantha* cv. Marandú (CIAT 6780) were determined at CATIE's screenhouse facilities in Turrialba, Costa Rica, but using a low fertility acid soil collected from an area where *I. indicum* is the dominant species. The experimental soil was dried, grinded through a 4 mm screen, sterilized and homogenized, and 3.0 kg of this were used per pot. All pots were fertilized with a basal macro- and microminerals formula, but also were inoculated with mycorrhizae, and irrigated to field capacity. To determine the P levels included in the study, a P-sorption assay was performed in the experimental soil.

A randomized complete block design, with 16 treatments and three replications was used. The treatments were defined by the factorial arrangement of the two grasses x eight levels of phosphorus fertilization (0, 75, 150, 300, 600, 1200, 1800, and 2400 kg P/ha). Several regression models were adjusted to leaf, stem, root and total biomass yields obtained 10 week after planting.

The response to phosphorus was better described by the model $Y_i = A + B\ (1 - e^{-CP})$. From this, the maximum yields (A+B) were estimated for each species, which served as a basis for the determination of the P concentrations in the soil solution and plant tissue

associated with 95% of the maximum yield, the parameters used to define the external and internal P requirements, respectively.

Both species did not differ in their external P requirements (0.0139 and 0.0131 µg P/ml of soil solution, for *I. indicum* and *B. brizantha* cv. Marandú, respectively), but internal P requirements were higher for *B. brizantha* (0.19% vs. 0.15%). These levels are lower than those determined for commonly used grasses (e.g., *Cynodon nlemfuensis*, *Panicum maximum*, *Pennisetum purpureum*); therefore, when pastures degrade as a consequence of soil fertility decline, the invading hability that characterizes *I. indicum* could be enhanced by its lower P requirements.