

The effect of pH and PBI on the critical phosphorus requirements of two tropical pasture species

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Background & Methods

Northern Australia - a range of different soils with limited nutrient inputs

How do pH and PBI influence nutrient availability and the growth of tropical pasture species?

Five pH (4–8) and five PBI (65–385) treatments, each amended with ten P treatments (0–120 mg P/kg)

Species pH or PBI	Critical external P requirement (mg P kg^{-1} soil)	Critical internal P requirement (mg P g^{-1} DM)
Digit – pH		
pH 4	48.6 (44.7–68.7)	1.74
pH 5	20.1 (17.0–24.7)	1.02
pH 6	18.7 (14.7–25.5)	0.98
pH 7	14.3 (12.4–16.8)	1.14
pH 8	24.0 (20.8–32.5)	0.93
Desmanthus – pH		
pH 4	*	*
pH 5	56.3 (44.8–75.3)	1.33
pH 6	42.6 (33.6–50.0)	1.54
pH 7	39.9 (33.0–46.7)	1.28
pH 8	50.2 (44.3–56.1)	1.42

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Species pH or PBI	Critical external P requirement (mg P kg^{-1} soil)	Critical internal P requirement (mg P g^{-1} DM)
Digit – PBI		
PBI 65	11.0 (9.5–12.9)	0.97
PBI 145	25.7 (22.0–31.6)	0.86
PBI 225	40.1 (25.9–54.4)	1.22
PBI 305	68.9 (50.0–*)	1.20
PBI 385	*	*
Desmanthus – PBI		
PBI 65	62.7 (52.2–74.8)	1.81
PBI 145	75.4 (68.3–83.5)	1.49
PBI 225	*	*
PBI 305	*	*
PBI 385	*	*

Conclusions

Critical external P requirements were lowest at pH 7 and PBI 65

Other soil properties were also important (e.g. texture, drying etc.)

Critical internal P requirements were relatively consistent:

- Digit – 0.09–0.12%
- Desmanthus – 0.13–0.18%

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