Using plasma inorganic phosphorous to define the phosphorous deficiency in beef cattle across Northern Australia

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Phosphorus (P) is a major component of muscle, bone, and many essential metabolic pathways. A decreased feed intake is the first sign of a chronic P deficiency and the major cause of physiological and performance outcomes such as depressed live-weight gain, lower milk production, poor fertility, bone weakening, and death in cattle in extreme cases (Dixon, 2020). Despite extensive and conclusive research on the effect of P deficiency and how it can be overcome through supplementation, the biggest challenge has been quantifying P deficiency on a mob basis, and then demonstrating an economical benefit (Bowen *et al*, 2019). The value of PiP testing for grazing cattle has been demonstrated with results suggesting a close alignment with dietary P, especially through periods of high P demand, including growth, lactation or pregnancy (Quigley *et al*, 2015). Meat & Livestock Australia (MLA) conducted the P Challenge in 2019 to highlight the application and role of plasma inorganic phosphorous (PiP) testing in determining the adequacy of P in the diet.

Blood samples were analysed for PiP from 68 properties across Queensland (45), Northern Territory (10) and Western Australia (13) at the end of the wet season in 2019. A random selection of 20 animals per herd were sampled in a P deficient or old cropping paddock, containing growing animals, heifers in early-mid pregnancy, or lactating first calf cows. Participating producers received customised feedback with interpretation and potential actions to discuss with their veterinarian or nutrition consultant.

Properties were characterised by a range of soil types (18.5% forest, 15% alluvial flats, 14% sandy desert, 13.2% open forest and 12.2% open grassland), pasture species (17.2% Buffel, 9.2% bluegrass, 8.6% spinifex and 7.2% Mitchell), animal classes (82.6% young breeders and 6.6% steers), cattle breeds (32.8% *Bos indicus*, 27.4% cross bred and 10.96% *Bos taurus*), age groups (35.6% 2-3 years, 31.5% 3-5 years and 19.1% 1-2 years) and lactation status (57.5% non-lactating and 28.7% lactating). Across all of the properties 62% had a mean PiP >1.5 mmol/L (acceptable) (Figure 1.0). A further 15% had a mean range from 1.1 – 1.5 mmol/L (marginal), and 23% had a mean range <1.1 mmol/L, (deficient) (Figure1.0) (EXCEL recall).

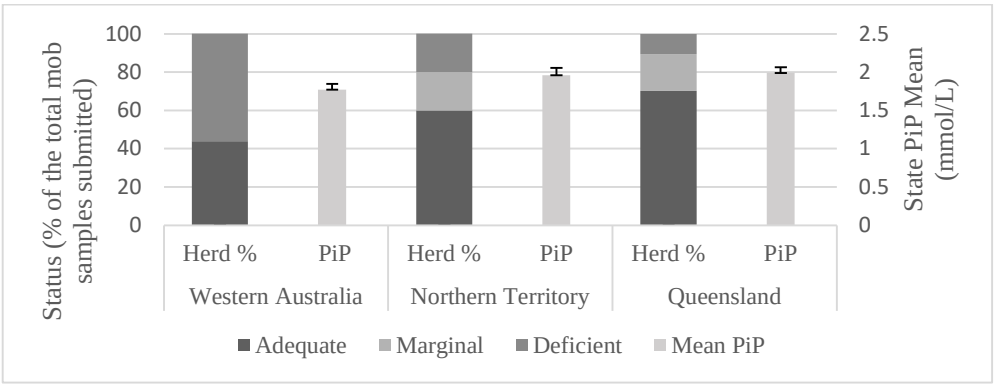

Figure 1. Mean (± sem) PiP (mmol/L) and status (% of the total mob samples submitted) compared to minimum requirement, by participating state herds

P supplementation has been reported to increase PiP levels, lifting live weight at first calving, re-conception rates, and calf weaning weights – all leading to economically beneficial outcomes for deficient cattle (Schatz, 2016). The MLA 2019 P Challenge highlighted the value of the PiP test to determine deficiencies at the mob scale on individual properties. This is an ongoing initiative to raise awareness of supplementation opportunities, along with building a broader picture of P deficiency status across Northern Australia.

References

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