

ONA REPORTS

published in

THE FLORIDA CATTLEMAN AND LIVESTOCK JOURNAL

October 2004

Phosphorus Management in south Florida Pastures

Dr. H.K. Pant and Dr. M.B. Adjei

University of Florida/IFAS

Range Cattle Research and Education Center



For questions or comments regarding this publication contact

[Dr. Martin B. Adjei](#)

South Florida encompasses a number of nationally and internationally renowned aquatic and semi-aquatic systems sensitive to phosphorus (P), including Lake Okeechobee and the Everglades. Regulatory approaches to minimize P discharge have raised doubts on long-term sustainability of farms and ranches in the region. Phosphorus was identified as a major nutrient causing algal blooms in Lake Okeechobee.

Over-application of commercial fertilizer/manure could lead to accumulations of excess P in soils. Optimal management of forage production depends on specific characteristics of the site. Perennial grasses mine P from sub-soil, which is often neglected during fertilizer need estimation, hence the application of P may not have a significant effect on forage yield. Pastures are considered as significant contributors of P (95 x 10³ tons per year) to water bodies in the US. A number of measures have been taken to reduce eutrophic impacts from dairy operations to water quality, including the export of hay that contains the mined P from the impacted sites.

Application of P in acidic soils without liming is basically useless due to its rapid conversion to unavailable forms. Similarly, P availability also decreases drastically in alkaline soils. Although the P application needs of forage would be species specific, the P equilibrium status of soil is crucial for the proper estimation of P needs for optimum forage production in a given region. Proper estimation of P requirements can only be possible if existing P availability in soils is accurately determined.

Nitrogen application may be needed for high herbage yield, but the application could alter soil properties. Changes in soil pH due to N fertilization can greatly influence the concentration of potentially mobile P because of their effects on iron and aluminum solubility in soils. Moreover, P utilization by grass often drastically decreases once the P

demand is met. Thus, it is critical to evaluate the grass species that are best suited for a particular site. Recently, the Range Cattle Research and Education Center (RCREC) has established research plots at Butler Oak Dairy, Okeechobee to optimize P removals by commonly used forages in southern Florida, namely, bahiagrass, limpograss and stargrass, in an attempt to find grasses that can be used for P remediation in the region.

Varied responses to nutrient availabilities from different grasses are common, even from grasses of the same genera. Scientists at RCREC have conducted studies on P requirements of the common forages of southern Florida. Studies indicated that 9 lb P per acre per year would maintain quality and quantity of stargrass, and significantly reduce P loss to water bodies. Moreover, other studies showed that current IFAS recommendation for P fertilizer for all improved pastures in South Florida could be reduced below the current 18 lb P per acre per year. It can be concluded that the actual P requirement can vary from grass to grass as well as with the growth stage and soil characteristics related to P diffusion into the grass roots. Since inadequate supply of P could be problematic for forage production, and over-fertilization would be bad for water bodies, utilizing existing knowledge on pasture management is crucial.