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Tightening the phosphorus cycles on CAFO dairies in north-central Texas

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Abstract Text:

A multi-disciplinary, multi-institutional team of researchers, educators, and extension specialists funded by an NIWQP integrated grant has focused on phosphorus (P) movement within three dairies in the Bosque and Leon watersheds of north-central Texas. Research has: 1) mapped soil-P within dairies and determined which soils in surrounding areas best sequester P; 2) estimated P coming into dairies as feed and leaving as manure, milk and hay; 3) determined how efficiently P is being absorbed from the various dietary components by cows; 4) measured P application and potential runoff from crop fields; 5) quantified the P removal capacity of various cool-season forages and the main warm-season forages, Tifton-85 and Coastal bermudagrass (Cynodon dactylon); and 6) evaluated C, N and P sequestration and surface-runoff mitigation of various native species with potential for inclusion in vegetated buffer and filter strips. Results, along with information gathered elsewhere, have been included in a CAFO nutrient management course developed and taught cross-departmentally at Tarleton State University. The group has had positive interaction with dairy producers, NRCS-USDA, and regulatory agencies at field days, on-line web pages and fact sheet development that provide both concrete data and constructive melioration of current best management practices for dairy P management. Results have been submitted or are currently being prepared for submission to national and international scientific journals with the hope that CAFO dairy P management and regulation in warmer climates can base decisions on data from those regions rather than extrapolation of cool-season data.

Impact Statement:

Our integrated research, education and extension project has provided concrete data for dairy producers and regulatory agencies from warmer climates as they decide how best to manage their phosphorus (P) cycles. These data, like the systems they derive from, differ considerably from those collected in cooler climates. Feed ingredients and their animal-available P, soils, crops recycling P, rainfall patterns, and adapted native species for vegetative buffers are all unique to warmer climates. As these data become available, dairy producers can tighten the P cycles in their systems and regulatory agencies can make more intelligent prescriptions for P management.