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1. Accession 0223678	Agency Identification No. 2. NIFA 3. LA.B	5. Work Unit/Project No. LAB94058	03/22/2012 6. Status Annual Report
7. Title Whole Farm Dairy and Beef Systems: Gaseous Emissions, P Management, Organic Production, and Pasture Based Production			
12. Investigator Name(s) (Last Name and Initials) Moreira, V. R.; Achberger, E. C.; Westra, J.			
20. Termination Date 10/01/2015		40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011	
Outputs: A poster was presented during the 2011 USDA-CSREES National Water Conference in Washington, DC. The poster summarized results from five of the previous Dairy Wastewater Treatment Evaluation System's studies. Preliminary results were presented as posters to dairy producers during the spring and fall Southeast Research Station field days. Another study focusing on economics is examining methods for replacing row-crop with pasture-based beef production as land use in Minnesota. Manure and nutrient management are key components of the project. Producers were interviewed with various pasture and confinement beef systems. Economic and environmental outcomes from these systems are being evaluated through modeling.			
Outcomes/Impacts: The objective of this project was to evaluate and improve primary (anaerobic/facultative lagoon), secondary (aerobic lagoon) and tertiary (constructed wetland) dairy wastewater treatment practices that are appropriate for manure typically collected in grazing dairy farms. This project was initiated in September, 2010. During 2010-2011, floating islands were used in two densities covering anaerobic lagoons, 2,000 vs. 1,000 sq ft or 8% vs. 14% coverage, respectively. Forages and treatment stage were chosen based on the studies carried out during the 2009 and 2010 cool and warm seasons. Corn and ryegrass were chosen for this study. Ryegrass planted in the fall of 2010 was harvested in the spring 2011. Corn was planted immediately after the last ryegrass harvest in June. Corn plants were harvested in September, 2011. Forage samples are being processed to evaluate yields and nutrient outputs. Dairy cows' Escherichia coli isolated from wetland samples were identified as "survivor" strains or "non-survivor" strains by DNA fingerprinting. "Survivor" strains seem to exhibit GASP phenotype, which allows specific populations of E. coli to persist and contaminate waters downstream. Forage growth on floating islands showed promising results, particularly in anaerobic and aerobic lagoons. Ryegrass (Lolium multiflorum) was most productive among cool season forages (estimated 12.7 tons/ha). Summer crop estimated yields ranged from an estimated 2.3 tons/ha with sunflower (Helianthus annuus) to 43 tons/ha with corn (Zea mays). Corn, sorghums (Sorghum bicolor), and pearl millet (Pennisetum glaucum) grew well among warm season forages. Maximum nutrient removal rates ranged from 350 mg/m ² /d and 47 mg/m ² /d in the cool season to 850 mg/m ² /d and 220 mg/m ² /d in the warm season, respectively, for nitrogen and phosphorus. Floating islands are proving to have high forage yield and nutrient removal rate potentials. Current study will allow the comparison between plant nutrient uptake and wastewater nutrient abatement throughout the system. This study intends to determine the extent of treatment that floating islands can provide in addition to current multi-stage treatment capacity. Our ultimate goal is to maximize wastewater treatment to a degree which will allow grazing dairies to minimize gaseous losses, land apply effluent with minimum risk of nutrient buildup, and/or allow discharge without the risk of public water contamination.			
Publications: Kliebert, C., T. N. McGraw, J. Stowe, and E. Achberger. 2011. Genetic basis for differential survival of Escherichia coli in the environment. Summer Undergraduate Research Forum, LSU. Moreira, V. R., B. D. LeBlanc, E. C. Achberger, R. E. Sheffield, L. K. Zeringue, A. B. D. Pereira, C. Leonardi. 2011. Improving dairy wastewater multi-stage treatment effectiveness. In Proceedings of the 2011 CSREES National Water Conference, Washington, DC. http://www.usawaterquality.org/conferences/2011/posters/Moreira.pdf (Abstract). Moreira, V. R., B. D. LeBlanc, E. Achberger, R. E. Sheffield, L. K. Zeringue, C. Leonardi. 2011. Improving multi-stage wastewater treatment system effectiveness: effect of wetland flow rates. 2011 Louisiana Dairy Report. B. F. Jenny, ed. 39-			

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Moreira, V. R., B. LeBlanc, E. Achberger, R. Sheffield, K. J. Han, L. K. Zeringue, C. Leonardi. 2011. Improving multi-stage wastewater treatment system effectiveness: Evaluating plant growth on artificial floating islands over two growing seasons. Preliminary results. In: Southeast Research Station Field Day Summaries, 2011. LSU AgCenter SERS, Franklinton, LA. 44-48.

Participants:

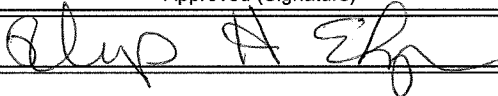
V. Moreira (PI), D. LeBlanc, R. Sheffield, E. Achberger, J. Westra, C. Leonardi, and L. Zeringue, LSU AgCenter.

Target Audiences:

This project is designed to improve our understanding of biological treatment of dairy wastewater and to promote the use of best management practices for waste treatment and recycling. The study's results target specifically dairy scientists, environmental engineers, dairy farmers; but they benefit the public at large.

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date
		3-23-12