

EL NIÑO-SOUTHERN OSCILLATION IMPACT ON NITROGEN LEACHING IN NORTH FLORIDA DAIRY FORAGE SYSTEMS

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Assessment of biomass production and mostly nitrogen (N) leaching from north Florida dairy forage systems is an imperative need because the presence of N in water, as a consequence of leaching, is an environmental hazard that affects human health and ecosystem welfare. Evidence indicates that climatic variability measured by the El Niño Southern Oscillation (ENSO) impacts greatly on north Florida forage systems. Improvements in climate predictions (lead times of 6 to 12 months) can play an important role in devising management strategies that dairy farmers in north Florida could adopt to pursue economic and ecological sustainability. This study investigates the variability of N leaching and biomass accumulation of north Florida dairy forage systems by using crop simulation models, DSSAT v4.0, under different ENSO phases: El Niño, La Niña, and neutral years. Five focus groups and 21 interviews were held, the most common forage sequences and their management practices were identified, soil series for the 63 dairy farms in the study area were located, and daily weather information was selected from Levy station between the years 1956 and 1998. Results indicated that there is substantially more N leaching in winter when less biomass accumulation is observed by the winter crop, an association of oats, rye, wheat, and/or ryegrass. January and February are critical months when the maximum leaching is predicted and significantly ($p < 0.05$) different between El Niño and La Niña years; higher for El Niño in January (35%) and for La Niña (18%) in February. Biomass accumulation in El Niño and neutral years was significantly ($P < 0.05$) lower (19 and 17%) than La Niña years in January and El Niño events were significantly lower than neutral years in February (11%) and March (20%). No significant differences were found during the other months, but consistently the most N leaching is predicted during El Niño years, and the least during La Niña years and the opposite with respect to biomass accumulation. Bermuda grass is more efficient to prevent N leaching than corn and sorghum together during spring-fall period.

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