Reproductive Programs and Novel Technologies to Maximize Dairy Herd Reproductive Performance and Profitability

Principal Investigator: Julio Giordano, Assistant Professor

The Need: This project helps dairy farmers by addressing two major challenges: reproductive management and business decision-making. Optimal timing of pregnancy in dairy cattle is crucial to ensure a farm’s profitability and sustainability. To reduce the time until a cow becomes pregnant, many farms rely on fertility treatments; this method is labor-intensive and can cause overuse of reproductive hormones. This project also assists dairy industry stakeholders in improving their business decision-making by creating models to calculate the expected economic and environmental impacts of different management strategies and technologies.

The Approach: We created reproductive management programs to combine synchronization of ovulation and estrus detection. We also developed and tested an alternative method that delivers reproductive hormones intravaginally through programmable and reusable electronic devices. Finally, we developed the Cornell Dairy Farm Model (CDFM), which simulates interactions between multiple areas of management and drivers of herd performance, to give farmers better information to inform their business decision-making. The project involved working with dairy producers ranging in size from 25 to 10,000 cows, and conducting multiple experiments at the Cornell University Ruminant Center and Commercial dairy farms.

Impacts: The reproductive management program we developed decreased time to pregnancy ("days open") by 16 days and reduced the proportion of cows not pregnant at the end of lactation by 7 percentage points, a major improvement for dairy farms. The alternative hormone-delivery method we developed will help reduce dairy farm labor costs, improve cow welfare by eliminating injections, and may allow improved fertility treatments. The CDFM tool calculates expected economic and environmental impacts of different management strategies, including: health management programs; reproductive management strategies; multiple diets and feeding strategies at different life stages; and management factors that affect lactation performance. The model simulates the lifetime of cows from birth to death. Data can be sorted by individual cow, group, and whole herd. These findings have been presented in at least 30 events nationally and internationally, reaching thousands of stakeholders. This includes meetings organized by Cornell Cooperative Extension, PRO-DAIRY, veterinary meetings, popular media articles, and scientific publications, including several in the Journal of Dairy Science.

Website: http://blogs.cornell.edu/giordano/