University of California Cooperative Extension

Newsletter for the
BIFS Forage Production & Dairy Manure Management Project

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Most of the BIFS data for summer 2000 are now in from the lab. Silage corn yields where fertilizer application was reduced and nutrient application in lagoon water was monitored were as high as conventional practice. Some dairies came close to balancing nitrogen (N) application and removal, while others plan to reduce manure and fertilizer applications next year. In some locations with high potassium (K) in the soil, the manure contributed more K than the crops removed.

One issue of importance to BIFS participants is record keeping. What are the best ways to keep track of lagoon water nutrient application to crops, and how can this be integrated into record keeping systems already in place? BIFS participants use data recording methods ranging from pencil and paper to computer spreadsheets. Therefore, record keeping of lagoon water management will also be as diverse.

This newsletter contains a report on two field tours held in the fall, a discussion on backflow prevention, summary of some lagoon water nutrient concentration information, and a calendar of events of importance to the dairy / forage BIFS project.

Lagoon Water Nutrient Concentrations

Some dairy BIFS participants have wondered how their lagoon water nutrient concentrations compare with others on the project. Since we now have samples collected from all the dairies over a period of about a year, here is a summary of the data.

Dairy Lagoon Water Nutrients, BIFS Dairies 2000

	NH4-N (ppm)	Org-N (ppm)	NH4 to Org N ratio	NH4-N to P ratio	NH4-N to K ratio
median	230	100	2.2	5.3	0.9
minimum	62	12	0.2	3.3	0.5
maximum	642	1642	15.1	10.6	2.8

Ask the Experts – Back-flow Prevention

Q—What is backflow?
A— Backflow is the undesired reverse flow in a pipeline. It is most often of concern when the reverse flow may contain a substance (e.g. manure water) that could contaminate a freshwater source such as a well or irrigation district water supply.

Q—Why should I be concerned about backflow prevention?
A— No one wants to be responsible for contaminating the groundwater or an irrigation district's water supply. In addition though, enforcement of backflow protection regulations for agricultural wells is becoming more common. While most of these regulations are aimed at protecting wells where "labeled" chemicals (e.g. pesticides and herbicides) could cause contamination, preventing backflow of manure water into wells is required.

Q—How do you prevent backflow?
A— Backflow prevention can be done by: (1) physically separating the freshwater source from the pipeline – an air gap, or (2) using a mechanical device to prevent backflow. Using the air gap method would be the most reliable and many times the least expensive system for the low pressure irrigation systems used in dairies. The air gap can be achieved by having the pump discharge pipe dump into the top of a standpipe connected to the irrigation system. The regulation standard for the size of the air gap is usually 2 pipe diameters. For example, if the pump discharge pipe is 8 inches, the air gap would need to be 16 inches. The air gap is the distance between the top of the standpipe and the lowest point of the discharge pipe above the standpipe.

Mechanical backflow devices vary substantially in complexity and cost, and it is often unclear what backflow prevention device(s) will satisfy local regulations. The devices range from a simple atmospheric vacuum breaker to complex, reduced pressure principle (RP) assembly backflow prevention valves, consisting of two spring-loaded check valves and a hydraulically operated, mechanically independent differential pressure relief valve. While the RP assembly is the most reliable, it is also the most expensive (for a 10-inch pipe it may cost as much as $10,000). Two additional drawbacks to the RP backflow prevention valves are that they cause a very significant pressure loss (often 6 psi or more), and they may need

to be inspected periodically. The RP backflow prevention valves in urban applications require yearly testing by a certified inspector.

Q—Which backflow prevention system should I use?

A—If possible, use the air gap system for backflow prevention. Discharge freshwater sources into the top of a standpipe with a 2-pipe-diameter air gap. This is the most reliable, trouble-free, and probably the least expensive way to achieve backflow prevention.

Larry Schwankl, UCCE Irrigation Specialist, & Deanne Meyer, UCCE Waste Management Specialist, UC Davis.

Fall Field Tours at Four BIFS Dairies

Two field tours this past fall offered public visits to four dairy BIFS sites, in addition to three other dairies with innovative waste management systems. Field tours were held in Stanislaus, Merced, and Tulare Counties.

The September 21st tour in Merced and Stanislaus Counties started off at Clauss Dairy in Hilmar, where Jeff Strom, mentor grower for the dairy BIFS project, has been using flow meters for the past three summers to improve dairy manure management. UCCE farm advisor Marsha Campbell Mathews showed data that noted reduced nitrate concentrations in shallow groundwater after making improvements in lagoon water N management. It was exciting to see these positive results. We also visited Ahlem Farms and Bar Vee Dairy, two BIFS dairies, where we saw inventive ways of adapting the pipeline systems to accommodate a flow meter. Each dairy grew some silage corn in 2000 without commercial fertilizer application during the season. It was so successful that the plan for 2001 is to increase the non-commercial fertilizer acreage. The final tour stop was Midland Dairy, where flow rates are being measured in a gravity flow lagoon water system.

On October 25th, the USDA / NRCS helped to sponsor a tour of two BIFS dairies and one other dairy. The non-BIFS dairy has installed a system that collects methane off the dairy lagoon to produce electricity by using a Caterpillar generator. The NRCS AgStar project helped to provide some of the funds for this project. The two BIFS dairies also received some assistance from the AgStar project for purchase of flow meters. We visited Barcellos Farms, where a tube-style electromagnetic meter has been installed. It was used to measure nutrient flow to silage corn in 2000. The person in charge of irrigating found lagoon water sample and data collection to be an easy addition to his other irrigation tasks. At Pinheiro / Milanesio Dairy, the magmeter has been installed underground, with a cable running from the meter to a conveniently located read-out more than 100 feet away.

These tours showed that with some creativity, flow meters can be incorporated into a lot of different systems for lagoon water management. Tour participants went home thinking about how a flow meter might be useful in their own or in their clients' dairy operations.

Calendar of Events

Jan 19, 26, Feb 9 (Modesto); Jan 18, 25, Feb 1 (Visalia); Feb 20, 27, Mar 6 (Chowchilla) – Short Course on Using Lagoon Water Nutrients for Crop Production. For more info, contact Marsha Campbell Mathews (Modesto – 209-525-6800), Carol Frate (Visalia – 559-733-6483), or Ron Vargas (Chowchilla – 559-966-2417).

Feb 16, 2001—BIFS Participants Lunch Meeting, Visalia. BIFS dairy participants will meet to look at the past year's data and share experiences. Peter Robinson, dairy nutrition specialist at UC Davis will give a short presentation on the practical significance of potassium (K) on dairies. For more info, contact Alison Eagle, phone: 559-646-6589, or email: ajeagle@uckac.edu.

Feb 20, 2001—BIFS Participants Lunch Meeting, Modesto. As above, different location. See previous event for details.

Mar, 2001—Back-flow prevention workshop. Larry Schwankl, irrigation specialist, UCD, will present a workshop on options for backflow prevention in dairy manure water irrigation. For more info, contact Alison Eagle, phone: 559-646-6589, or email: ajeagle@uckac.edu.

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