UNIVERSITY OF FLORIDA

Institute of Food and Agricultural Sciences

Dairy Update

Department of Animal Sciences

Quarterly Newsletter - Spring 2001

WE'RE BACK.

The Dairy Group in the Department of Animal Sciences will be sending the dairy farmers and agribusiness people in Florida quarterly updates on management practices, Milk Check-Off projects, coming events, and items we think might be of interest to you. As always, our main interest is to best serve the needs of the Florida dairy industry. We hope this newsletter will help to keep you informed on what we're doing. MBH

COME VISIT US…

Come visit our website at
www.animal.ufl.edu/dairy/

We even have manure on the web at www.animal.ufl.edu/hall/
Go to that site, look under "Publications" at the "Manure Evaluation" page. You can find the ins and outs of evaluating manure to evaluate what the herd has decided to do with the rations you feed.

SEND US YOUR EMAIL ADDRESS

If you would like to get this newsletter or various notices and updates from the Dairy Group in the Animal Sciences Department sent to you by email, email your email address to: umphrey@animal.ufl.edu
The address list will not be shared outside of the department, and you can unsubscribe from at any time.

IT'S SPRING CLEANING TIME

David R. Bray

Now is the time to prepare for the long hot summer. Even though it's been dry, hopefully it will rain some day. Things to do:

1. Clean out high organic matter dirt in lots and add new dirt.
2. Clean out cooling ponds – pump out the water, and clean out the sludge and spread it some place where the cows do not access to it.
3. Let ponds sit dry for the sun to work on the bacteria, mycoplasma lives in ponds, you must clean them out, at least once a year if you continuously add water to the pond. If you *DO NOT* continuously add water, you need to sample the ponds for mycoplasma and pump and clean out the ponds once or twice during the summer.
4. Clean your fans, dirty fan shields can reduce fan efficiency by 50%.
5. Make sure your sprinklers, foggers, etc, work. It was a cold winter, many pipes froze and/or broke.
6. Clean and rebuild your pulsators, make sure all ATO's work.
7. Clean your condenser fins on your milk coolers, dirty fans cut down cooling and efficiency and you get warmer milk at higher electric costs.
8. Mow & spray careless weeds in pastures
9. Dip the dogs – To keep the fleas out of your pick-up.

NEW DAIRY SPECIALIST

Brent Broadus will be joining the extension faculty as a Dairy Specialist for Hillsborough, Hardee, Pasco and Polk Counties as of April 23. Brent grew up in St. Pete and is a graduate of the University of KY. Join us in welcoming Brent back to Florida!

MILK CHECK-OFF REPORTS

USE OF IN VITRO FERTILIZATION TO IMPROVE FERTILITY IN SUMMER

P.J. Hansen and Y.M. Al-Katanani

As embryos grow in the reproductive tract, they become more resistant to damage caused by heat stress. Not surprisingly, pregnancy rates achieved by embryo transfer during the summer months are higher than those achieved by AI. This is because embryos are transferred at day 7 of pregnancy, when they have already become more resistant to heat stress.

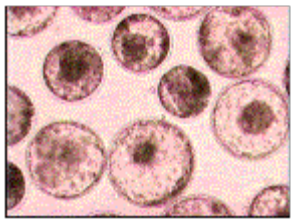
A less expensive method than superovulation is to produce embryos through in vitro fertilization (abbreviated IVF)

using oocytes collected from slaughterhouse material. The oocytes are fertilized in the laboratory and then grown in culture until they are ready to be transferred into recipients. The costs of embryos produced in this way is likely to be $25-50.

One concern with using slaughterhouse material is that the cull cows from which the oocytes come from have reduced genetic merit. The predicted difference for milk yield for the average cow slaughtered is about -125 lb. Semen from bulls with high genetic merit can be used to improve the genetics of the calf produced. It is inexpensve to use high-quality semen in this way - a single straw, possibly of sexed semen, can be used to fertilize 100 or more oocytes.

The purpose of our experiment was to determine whether embryo transfer using non-frozen (Afresh@) IVF-produced Holstein embryos would increase pregnancy rate compared to AI and whether vitrification (a new embryo preservation method) would allow embryos to survive cryopreservation (freezing). Since it is difficult to detect cows in estrus during heat stress, we used the OvSynch ovulation synchronization protocol to perform AI or embryo transfer without the need for estrus detection.

At day 45, 18% of the cows receiving a fresh embryo were pregnant while 6% of the cows receiving a vitrified embryo were pregnant and 7% of cows that were inseminated were pregnant. The results are much the same when we evaluate only those cows that responded to synchronization (68% of the cows) except that pregnancy rates were higher (25% for the fresh embryo group). The results of this experiment confirm that embryo transfer using IVF-produced embryos can improve fertility during the summer. However, additional work is necessary to find a practical way to store these embryos.



Embryos produced by in vitro fertilization. Shown here are embryos that have become blastocysts, the stage at which embryos are transferred into recipients.

LACTATIONAL INFERTILITY SYNDROME

William W. Thatcher

THE PROBLEM:

As milk production has increased in the last 50 years, reproductive performance has decreased. Now, herd pregnancy rates (heat detection rate x conception rate in a 21 day period) at best are 25%. For example, the herd pregnancy rate is 20% when 50% of the heats are detected over a 21-day period and conception rate to these detected heats is 40% (20% = 50% x 40%). The number of missed heats has probably increased due to the cow management conditions: cows continuously on concrete, feeding rations that predispose cows to lameness, and problems with identifying individual active cows in extremely large groups. This problem is further increased as we enter the warm-hot season of the year: cows are less active as they try to reduce their heat production to deal with both environmental heat load and heat production associated with lactation.

Undoubtedly, there are physiological reasons for poor heat expression in lactating cows. For example, concentrations of estradiol are lower in lactating than non-lactating cows. This is critical since estradiol produced by the ovarian follicle is responsible for inducing heats. Perhaps to increase estradiol lactating dairy cows develop two ovulatory follicles; in our studies 20% of postpartum cows have double ovulations. Wisconsin workers reported that the

incidence of double ovulations and potentially twins is greater in high producing dairy cows. The other part of the pregnancy rate equation is conception rate or the ability to sustain a pregnancy following insemination. Lactating dairy cows have lower conception rates than dairy heifers, and our challenge is to develop strategies to enhance embryo survival. Decreased fertility associated with lactation is designated as "Lactational Infertility Syndrome" in dairy cows.

POTENTIAL REMEDIES:

A series of Milk Check-Off grants focused on development of reproductive management systems to improve pregnancy rates.

Pregnancy rates for the Ovsynch program in our Florida trials was normal for first service and the program was cost effective with increases in net revenue per cow ranging from $15 to $25 depending on season. The Ovsynch program gives the major management benefit of being able to inseminate all animals at the designated voluntary waiting period without the need to detect heats. Our challenge was to improve pregnancy rates on the Ovsynch program. We found that by pre-synchronizing cows with two injections of Lutalyse given 14 days apart, cows were programmed to be between days 5 to 10 of the estrous cycle when the Ovsynch program was initiated 12 days after the second Lutalyse injection. In cyclic cows, pre-synchronization increased pregnancy rates from 31% to 52%, which is a sizeable increase. Because we took two blood samples, 12 days apart, just prior to beginning the Ovsynch protocol, we could identify those cows that were anestrus or cycling based upon progesterone concentrations. Twenty three percent of the cows were not cycling when it was time to begin Ovsynch, and of course their pregnancy rate to Ovsynch was lower than that of cycling cows (22.4% < 41.7%). These findings are important from two perspectives. First we need to nutritionally manage the dry and postpartum period of cows to insure that they are cycling when they reach the voluntary waiting period. Secondly, it appears that a certain portion of anestrous cows will conceive after receiving the sequence of GnRH and Lutalyse injections of the Ovsynch program. If the cows ovulated to both the first and second injection of the Ovsynch program their pregnancy rates (39%) were nearly comparable to cyclic cows.

Two major advancements have been made to increase embryo survival following insemination. Our dairy producers were concerned whether initiating a Posilac program in the 9th week of lactation would have any negative effect on pregnancy rates. Our check-off studies in the cool season indicated that if the first injection of Posilac (e.g., Bovine Growth Hormone) is given at the time of insemination of the Ovsynch program than pregnancy rate to the service is increased in cycling cows that were either pre-synchronized as described above (56% > 43%) or not pre-synchronized (34% > 25%). Additional studies indicated that Posilac treatment increased fertilization rate, advanced embryo development and improved the uterine environment to maintain a pregnancy. The beneficial effect of Posilac was related to first service and Posilac injections were continued at 14-day intervals. We found no evidence that Posilac was having any detrimental effect on pregnancy rate when used as part of an Ovsynch program in which management was not dependent upon heat detection.

The second strategy to increase embryo survival was the injection of Human Chorionic Gonadotropin (hCG;3300 units) on day 5 after insemination. This allowed for induction of an accessory corpus luteum that increased plasma progesterone concentrations. Conception rates were increased by 6.5%, and this was associated with increased embryo survival since only cows that were inseminated were treated with either hCG or saline. Increased progesterone may have advanced embryo development, which help maintain the CL

These investigations with Milk Check-off support have launched additional studies to improve reproductive management to counter the Lactational Infertility Syndrome. Strategies are to develop systems of re-synchronization for 2nd service, target dietary nutrients to improve embryo survival and to devise additional systems that are more efficient and less costly. Investment of Milk Check-off funds into these projects has led to improvements in reproductive efficiency and recruitment of additional grant support from the USDA and Allied Industries.

WHY DO WE DO THAT?

Mary Beth Hall

Every once and again, it's good to remind ourselves just why we do some of the things we do. When it comes to managing a dairy, that question can help us sort out what things we should change, and which are successful just as they are. In terms of the herd's ration that question becomes important in deciding which feeds to use.

For instance, a common question that's come up is,"What corn silage variety should I plant?" My question is, "What do you want it to do in the ration?" That is not just me being difficult, it gets at the heart of the matter.

Generally speaking, we can buy protein and energy through commodity feeds. The nutrient that is most limiting to dairies in Florida is often good quality effective fiber. We get effective fiber from forages (cottonseed hulls are a bit different in how they work). Effective fiber keeps a cow chewing her cud, keeps the rumen working well, prevents ruminal acidosis, and allows the cow to efficiently use the energy and protein in her ration. Without enough effective fiber, farms get less milk per pound of feed a cow eats, and they often get sick cows. So, although many think of grain, the main benefit of corn silage to our rations is actually the stalk. So, should you select the highest grain variety if you are actually looking for a good fiber source? No. Not unless you can feed enough silage so that the cow gets the total pounds of effective fiber that she needs.

Although it's often been considered a poor cousin to corn silage, sorghum silage can be an excellent source of effective fiber…if you recognize why you're putting it in the ration and balance around it. Striking a balance among effective fiber, starch, and neutral detergent fiber (and then checking with the cows to see what they think), we can use a variety of forage or concentrate sources successfully. But it works best if we know just what we want to accomplish.

DAIRY PRODUCTION CONFERENCE AGENDA

Plan on attending on May 1 & 2 at the Gainesville Best Western. There will be agribusiness exhibits, awards, and an excellent program. Early registration is $50 (before April 20), and $75 after that. Contact Jack Van Horn or Sarah at 352-392-5594 for more information.

Dairy Business Management

- Dairy Investment and Risk Management Strategies: Stay Ahead of the Curves…**Marvin Hoekema**
- Financing Southeast Dairies: Where We Have Been, Where We Are, and Where We Are Going…**Ed Henderson**, **Ronnie Marchant** and **Tim Jones**
- Pocket Dairy®: Dairy Herd Management Software for the Palm PC…**Gary Griffin**.
- New DHIA Tools to Evaluate Herds Using Benchmark Comparisons for Production, Reproduction, Udder Health and Young Stock…**Dan Webb**

Nutritional & Health Management

- Optimizing Feed Particle Size for Health and Performance… **Michael Hutjens**
- Revisions in 2001 NRC Nutrient Requirements of Dairy Cattle: How Changes May Affect Your Rations…**Mary Beth Hall**
- Mycoplasma Again…**Dave Bray**
- Timed AI Methods: Discussion Workshop… **William W. Thatcher, Dan W. Webb**

Manure and Water Quality Issues

- Agricultural Water Quality Issues: Perception or Reality? … **Jerry Scarborough**
- What I Have Seen and Learned Walking Florida's Dairy Farms That Will Help Improve Water Quality and the Environment…**Jack Hodges**
- Overview of Comprehensive Nutrient Management: What is Required of Dairymen…**Nga Watts**
- Utilization of Dairy Waste Effluent in Year-Round Cropping Systems for Nutrient Recovery and Water Quality Enhancement…**K. R. Woodard, L. E. Sollenberger**
- Dairy Family Award Citation … **Dave Bray**

Tour Stops at Dairy Research Unit

¨ **Manure and Water Quality (Solids Separating Area)**

-DEP Permitting: **Vince Seibold**

-Nutrient Management Planning

Discussion: **Jesse Wilson**

-Anaerobic Digester: **Ann Wilkie**

-Solids Separation:

Roger Nordstedt