Iowa State University Dairy Farm – 2005 Review

A.S. Leaflet R2108

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Summary and Implications

The Iowa State University Dairy Farm continues to be a vital and vibrant asset to all 3 missions of our land grant heritage (learning, discovery, and engagement) as well as the Iowa Dairy Industry and the national and international dairy communities. Learning opportunities have abounded for ISU students in Animal and Dairy Science, College of Veterinary Medicine, as well as local community colleges. Engagement and outreach has touched young (Animal Science Roundup) to adult (BRM training), and local (school tours) to international (visitors from around the world). Research related to improvement of the dairy industry is still a major mission with on going projects across all disciplines (genetics, nutrition, etc.) and animal age groups (calves through milking and dry cows). The herd is doing exceptionally well due to a great manager and farm personnel. Herd statistics (Dec. 2005) are: milk rolling herd average of 23,532 lbs. /cow, SCC of 93,000 cells/ml, 20 % pregnancy rate, and a 27% cull rate. Combining these all result into a fantastic asset looking forward to a great 2006 and to their new dairy facility in 2007.

Learning and Engagement

The ISU Dairy still remains a hub for teaching and outreach although it is situated 25 miles from campus. Many classes still take advantage of on farm labs and workshops (Dairy Management courses in An Sci, Dairy Production Medicine and Reproduction Palpation blocks of CVM), but the opportunity still exists and animals are transported and used in the arena and classroom on the old dairy farm site on the south edge of campus (Dairy Judging, AS 114, AS 332 reproduction lab, etc.). A great deal of outreach is accomplished on farm (Animal Science Roundup, school tours, local and foreign visitors, etc) but the cows (I Milked a Cow – State Fair)and herd data / information makes it's way and impact off the dairy in many meetings/ discussions.

Research

Research continues to be a major focal point and goal with many projects and accomplishments (see other dairy reports). The on-going genetic project (high vs. average combined fat and protein, previously milk production) provides great study cohorts, (especially when combined with the 3rd group from Ames 2 years ago), and is the impetus for new work using molecular tools to evaluate genetic differences in energy balance and nutrient metabolism between groups. A genetically new Brown Swiss herd is being developed at ISU through a collaborative embryo transfer project with New Horizon Genetics and Brown Swiss Association, and donated embryos from excellent dairies from Iowa and beyond. Some other examples of ongoing or completed research this year include: 1) Use of glucagon / glycerol to decrease fatty liver and ketosis and improve nutritional status in early lactation; 2) Using CMT and culture for strategic identification of subclinical mastitis and more cost effective therapy decisions with fresh cows and heifers and clinical mastitis; 3) Evaluations of teat dips developed for winter compared to winter best management milking practices; and 4) Evaluating suckling reflexes in calves of different breeds. As can be seen, projects span all disciplines and every group of animals at the dairy.

Herd Statistics

The herd is currently comprised of 334 cows (~280 milking) and 282 heifers. There are currently 315 Holsteins, 11 Jerseys, 3 Brown Swiss, and 5 others (Ayrshire, Guernsey) cows at the ISU Dairy, with 50 head of Jerseys (25 cows, 25 replacements) at the NEIDF Dairy Center.

Rolling herd average (RHA) milk production is 23,532 lbs. / cow (80th percentile for ~12,000 DRMS herds) and is up 2439 lbs. this year (87th %tile of DRMS Holstein herds > 200 cows and >20,000 lbs. milk: ~1300 herds). Cows are currently milking 84.2 lbs. milk with a 4.0% fat, 3.2% protein (90+ %tile). Current summit milks (average of the highest 2 of the 1st 3 milk production tests for individual cows in early lactation) are 81, 108, and 113 lbs, for 1st, 2nd, and 3+ lactations, respectively which ranks > 90th %tile for all 3 groups. Average calving age for first lactation animals is excellent at 24 months (20th %tile – lower %tile is better).

Current somatic cell count of 93,000 cells/ ml puts the ISU Dairy in the top 1% of all DRMS herds while their average linear score of 2.1makes the top 8 percent. A linear score of 2.1 and >85% of older cows < 100,000 SCC puts these old girls in the top 2%. Cull rate for mastitis is 1%.

Reproduction has been a focal point and key area of emphasis and improvement the past year. Although heat detection was fair in the past (~ 50%), days to first service and conception rates were below average. A targeted synchronization program (Figure 1) was developed with the intent to 1) assure a fixed time insemination of normal animals from 68-74 days post calving, 2) enhance ability to detect estrus in open animals through CIDR resynch at 14 days post breeding (DPB); 3) incorporate ultrasound at 28 DPB and with palpation assess early embryonic death; and 4) enroll diagnosed open cows back into the program as quickly as possible. The first 4 months are shown on top of Table 1. First service and 2nd+ service conception rates (CR) were both 41% with 48% of open cows seen in heat 21 DPB. Changes were made in May allowing abnormal (anaestrous and cystic cows) to be enrolled for 1st service at

68-74 DPB, also. Results from May-Nov are shown on bottom of Table 1. First service and 2nd+ service CR were 32% and 39%, respectively with 22% of open cows seen in heat 21 DPB (more variability and some summer fertility issues). Table 2 breaks out 1st service CR for normal vs. problem cows (41 vs. 28%, respectively) during this period (only weeks where both groups of animals (normal and problem) enrolled for 1st service). Although 1st service CR for problem cows was lower than normal cows (this was expected), > 90% of these cows resumed cyclicity and 60% conceived on 2nd service. This data supports that an organized reproductive program coupled to excellent implementation and compliance can yield excellent reproductive (as well as milk production and more replacements) benefits and also enhanced our labor efficiency and utilization at the dairy.

Conclusions

The ISU Dairy Farm has a rich history with tremendous accomplishments. The current dairy continues to be an excellent model for herd and animal milk production, milk quality, reproduction, and animal health and productivity. The Dairy continues to provide the key hub for teaching and extension / outreach efforts while maintaining excellence in its research goal and mission. The future looks fantastic for the Dairy as well as its new home in spring, 2007. But past, present, or future, the dairy is as excellent as the personnel and staff which make it run smoothly and provide the foundation for the success in all our programs and missions. For more information or a visit, call the dairy (515-964-1343: Joe Detrick, manager). We'd love to have you visit!

Figure 1. Reproductive synchronization and post synchronization heat and pregnancy detection protocols and timetables.

	Week Starting	MON	TUES	WED	THUR	FRI	SAT	SUN	Cume Days
Week 1	MON 3-Jan	1 CIDR™ GnRH	2 CIDR™ Insert	3 CIDR™ Insert	4 CIDR™ Insert	5 CIDR™ Insert	6 CIDR™ Insert	7 CIDR™ Insert	7
Week 2	10-Jan	8 CIDR out Lutalyse®	9	10 GnRH	11 Timed Breeding	12	13	14	14
Week 3	17-Jan	15	16	17	18	19	20	21	21
Week 4	24-Jan	22	23	24	25 CIDR IN	26 CIDR IN	27 CIDR IN	8 CIDR IN	28
Week 5	31-Jan	29 CIDR IN	30 CIDR IN	31 CIDR out KMAR on	1 Heat obs	2 Heat obs	3 Heat obs	4 Heat obs	35
Week 6	7-Feb	5	6	7	8 Ultrasound 1st breed	9	10	11	42
Week 7	14-Feb	12	13	14	15 Palpate 1st breed	16	17	18	49

Cows to enroll: Cows between 58- 64 days post calving (or any cow not bred/ open)

Table 2 First service conception rates for all animals, reproductive normal, and reproductive abnormal (anestrus / cyst/ etc.) in only weeks where both groups of animals occurred during synchronization of 1st service.

	OVERALL --------OVERALL			NORMAL ---------NORMAL			ABNORMAL - ANESTRUS-CYST		
bred	# preg 1st serv	# bred 1st serv	conc rate 1st serv	# preg 1st serv	# bred 1st serv	conc rate 1st serv	# preg 1st serv	# bred 1st serv	conc rate 1st serv
6/2/2005	4	10	40	4	6	67	0	4	0
6/16/2005	4	5	80	3	4	75	1	1	100
7/14/2005	2	6	33	1	5	20	1	1	100
7/21/2005	0	4	0	0	2	0	0	2	0
8/4/2005	4	6	67	3	5	60	1	1	100
8/11/2005	1	9	11	0	7	0	1	2	50
8/18/2005	1	4	25	1	2	50	0	2	0
9/8/2005	0	1	0	0	0	#DIV/0!	0	1	0
10/6/2005	9	24	38	6	13	46	3	11	27
TOTALS	25	69	**36**	18	44	**41**	7	25	**28**

Table 1: ISU Dairy Synchronization Reproduction Summary

11/28/2005 (breedings from 1/13-10/20)

bred	# preg	# bred	Conc rate	# preg 1st serv	# bred 1st serv	conc rate 1st serv	# preg > 1st serv	# bred > 1st serv	conc rate > 1st serv	# in heat 21 d later	% open in heat 21days later
1/13/2005	4	11	36	3	10	30	1	1	100	5	71
1/20/2005	7	18	39	2	7	29	5	11	45	3	27
1/27/2005	6	11	55	4	6	67	2	5	40	4	80
2/17/2005	4	12	33	2	6	33	2	6	33	4	50
2/24/2005	3	7	43	0	1	0	3	6	50	1	25
3/3/2005	5	12	42	0	0	#DIV/0!	5	12	42	7	100
3/10/2005	6	10	60	3	7	43	3	3	100	0	0
3/17/2005	2	10	20	1	3	33	1	7	14	5	63
3/24/2005	5	10	50	5	10	50	0	0	#DIV/0!	4	80
3/31/2005	4	8	50	2	3	67	2	5	40	0	0
4/7/2005	3	12	25	2	8	25	1	4	25	5	56
4/14/2005	6	14	43	4	8	50	2	6	33		0
TOTALS	55	135	**41**	28	69	**41**	27	66	**41**	38	**48**
4/21/2005	3	5	60	0	0	#DIV/0!	3	5	60	0	0
5/26/2005	3	9	33	1	4	25	2	5	40	0	0
6/2/2005	4	9	44	4	9	44	0	0	#DIV/0!	0	0
6/9/2005	7	15	47	3	7	43	4	8	50	0	0
6/16/2005	7	11	64	4	5	80	4	6	67	0	0
6/23/2005	0	5	0	0	2	0	0	3	0	1	20
6/30/2005	5	9	56	2	4	50	3	5	60	1	25
7/7/2005	5	14	36	2	6	33	3	8	38	4	44
7/14/2005	3	11	27	2	6	33	1	5	20	3	38
7/21/2005	0	9	0	0	4	0	0	5	0	0	0
7/28/2005	0	4	0	0	2	0	0	2	0	2	50
8/4/2005	4	11	36	4	6	67	0	5	0	0	0
8/11/2005	1	11	9	1	9	11	0	2	0	4	40
8/18/2005	1	4	25	1	4	25	0	0	#DIV/0!	1	33
8/25/2005	0	2	0	0	2	0	0	0	#DIV/0!	0	0
9/8/2005	2	9	22	0	1	0	2	8	25	1	14
9/22/2005	1	7	14	0	3	0	1	4	25	3	50
9/29/2005	1	6	17	1	6	17	0	0	#DIV/0!	0	0
10/6/2005	19	42	45	9	24	38	10	18	56	8	35
10/13/2005	3	13	23	2	7	29	1	6	17	2	20
10/20/2005	8	15	53	1	6	17	7	9	78	2	29
TOTALS	77	221	**35**	37	117	**32**	41	104	**39**	32	**22**
OVERALL	132	356	**37**	64	186	**34**	68	170	**40**	70	**31**