

2005 Dairy Business Analysis Project Financial Summary

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Full report on the DBAP website: <http://dairy.ifas.ufl.edu/dbap>

Table 1. DBAP 2005 Summary - Business size and production efficiency by state and overall average, median, and standard deviation.

Category	Overall			State Averages	
	Average	Median	Std ¹	Florida	Georgia
Number of farms	21	21	21	15	6
Business Size:					
Average number of cows	1,045	575	1,157	1,155	770
Average number of heifers	538	290	720	543	527
Milk sold (million lbs)	20.21	10.99	22.96	21.53	16.94
FTE ² workers	19	12	17	20	16
Acres of pasture + cultivated land	569	320	732	633	410
Production Efficiency:					
Milk sold (lbs / cow / year)	18,322	18,168	3,237	17,659	19,979
Cows / FTE worker	51	52	25	55	40
Milk sold / FTE worker (million lbs)	0.93	0.94	0.44	0.97	0.82
Cull rate	36%	32%	21%	31%	47%

¹ Standard deviation

² Full-time equivalent

Table 2. DBAP 2005 Summary - Revenues and expenses by state and overall average, median, and standard deviation (\$/cwt).

Category	Overall			State Averages	
	Average	Median	Std ¹	Florida	Georgia
Number of farms	21	21	21	15	6
Revenues:					
Milk sold	18.24	18.28	0.62	18.38	17.89
Raised, leased cow sales	0.89	0.33	1.41	0.60	1.62
Heifer sales	0.45	0.36	0.44	0.50	0.33
Gain on purchased livestock					
Sales	(0.13)	(0.06)	0.83	(0.37)	0.48
Other revenues	1.28	0.78	1.45	1.30	1.23
Total revenues	20.73	20.24	2.21	20.41	21.55
Expenses:					
Personnel	3.50	3.08	1.42	3.43	3.69
Purchased feed	7.22	6.81	2.33	7.96	5.36
Crops	0.41	0.13	0.59	0.34	0.58
Machinery	1.11	1.00	0.75	1.18	0.94
Livestock	2.01	1.92	0.90	1.99	2.06
Milk marketing	1.22	1.30	0.24	1.19	1.32
Buildings and land	0.74	0.44	1.01	0.52	1.30
Interest	0.67	0.56	0.61	0.69	0.61
Depreciation:					
Livestock	1.11	0.97	1.07	1.11	1.12
Machinery	0.81	0.40	0.85	0.76	0.95
Buildings	0.39	0.25	0.42	0.37	0.44
Other expenses	1.01	1.03	0.38	1.06	0.89
Total expenses	20.20	18.73	3.80	20.59	19.25
Net farm income from operations	0.53	0.84	3.20	(0.18)	2.30
Gain on sale of capital assets	(0.46)	0.00	1.37	(0.03)	(1.56)
Net farm income	0.07	0.84	3.54	(0.20)	0.74

¹ Standard deviation

2006 Southeast DHIA Production Recognition of High Florida Herds
 Production as of September 30, 2006

Producer	City	BRD	Milkings	RHA Milk	RHA Fat	RHA Protein	Data Collection Rating Milk
WHITE OAK DAIRY	Mayo	H		24,323			94.9
NORTH FLA HOLSTEINS	Bell	H	3X	24,196	847	720	102.6
ELJIM DAIRY	Grandin	H		23,475	991	697	74.6
SHENANDOAH DAIRY	Live Oak	H	3X	22,755	852	687	96.7
ATR DAIRY	Mayo	H		21,519			93.8
SHIVER DAIRY	Mayo	H		21,274			94.0
FULL CIRCLE DAIRY LLC	Umatilla	H	3X	21,264	727	644	91.3
HAYMURPH FARM LLC	Live Oak	H	3X	21,202			91.0
MILK-A-WAY	Webster	H		21,067	740	619	95.5
UNIV FLA DAIRY RESEARCH	Hague	H	3X	21,060	779	629	95.1
V & W FARMS INC	Avon Park	H	3X	20,994			96.6
DPS GEORGIA	Baconton	H	3X	20,526	741	624	96.8
DPS BELL FARM	Bell	H	3X	20,483	712	620	96.6
BRIAN MCADAMS	Mayo	H		20,477			94.3
EICHER DAIRY	Walnut Hill	H		20,467	696	617	98.1
SUWANNEE DAIRY INC	Mc Alpin	H		20,397			99.4
DPS BRANFORD FARM	Branford	H	3X	20,373	633	607	96.6
BRANTLEY DAIRY FARM INC	Mc Alpin	H		20,332			100.4
WALKER & SONS FARMS INC II	Monticello	H		20,000			99.2

Southeast DHIA - Testing cows in Florida and Georgia

2006 Southeast DHIA Breed Comparisons for Southeast States

Results as of October, 2006

	DRMS Holstein	Southeast Holstein	Southeast Jersey	Southeast Other Breeds
No. Herds	11908	421	59	52
No. Cows / Herd	139	297	156	183
No. 1st Lact	51	107	55	63
% 1st Lactation	37%	36%	35%	34%
Avg Days in Milk	192	207	180	195
% Left Herd	33	35	36	39
% Died	6	7	6	7
% Left Repro	6	6	4	8
Milk Price	12.62	14.51	14.72	14.16
Rolling HA Milk	20,925	18,892	14,384	16,733
Rolling HA Fat	777	686	646	640
Rolling HA Prot	638	576	508	535
Summit Milk 1st Lac	69	65	47	58
Summit Milk 3rd+	91	85	64	76
Peak Milk 1st Lac	76	72	53	63
Peak Milk 3rd+	100	95	71	83
Proj 305ME Milk	22,954	21,418	16,216	19,242
Std 150-day Milk	70	66	50	59
SCC Actual	350	477	445	534
SCC Score	3.1	3.7	3.7	3.9
SCC Score 1st Lact	2.7	3.3	3.4	3.5
SCC Score 2nd Lact	3.0	3.5	3.4	3.7
SCC Score 3rd Lact	3.6	4.2	4.1	4.4
% SCC Score <4	59	48	47	42
PregRate Current mo	10	13	13	11
Actual Calving Int	14	15	14	14
Days to 1st Serv	97	108	95	98
1 st Serv Concep Rate	42	49	42	45
# Calvings	139	286	156	181
# Calves per 100 cows	100	96	100	99
%Dry < 40 days	16	14	12	15
%Dry > 70 days	23	31	26	32
%Bred to Proven bulls	63	64	64	56
%Bred to non-AI	23	37	21	34
%Heifers with Sire ID	85	76	89	80
%Cows with Sire ID	68	49	90	54

Southeast - includes 6 southeastern states

DRMS - includes all herds processed by DRMS

2006 Southeast DHIA Data for Southeast Herds

Data from DRMS - October, 2006

Holstein Herds	Alabama	Florida	Georgia	Miss	SC	Tenn.
No. Herds	19	63	146	27	36	130
No. Cows / Herd	155	793	262	238	232	148
No. 1st Lact	51	273	98	95	89	53
% 1st Lactation	33%	34%	37%	40%	38%	36%
Avg Days in Milk	192	208	208	211	207	206
% Left Herd	35	37	34	31	37	34
% Died	8	9	7	7	6	7
% Left Repro	4	6	7	7	6	4
Milk Price	13.84	15.64	15.13	13.45	13.78	13.78
Rolling HA Milk	17,120	18,158	18,770	19,667	20,378	19,043
Rolling HA Fat	555	641	672	700	742	706
Rolling HA Prot	516	547	572	594	629	576
Summit Milk 1st Lac	60	65	65	67	68	65
Summit Milk 3rd+	77	83	84	89	92	85
Peak Milk 1st Lac	67	73	72	74	75	72
Peak Milk 3rd+	89	94	94	99	102	95
Proj 305ME Milk	19,444	20,687	21,262	22,124	22,999	21,621
Std 150-day Milk	60	64	66	66	69	67
SCC Actual	502	550	468	487	419	481
SCC Score	3.7	3.9	3.7	3.6	3.8	3.6
SCC Score 1st Lact	3.1	3.6	3.3	3.3	3.5	3.2
SCC Score 2nd Lact	3.6	3.7	3.6	3.7	3.7	3.3
SCC Score 3rd Lact	4.1	4.4	4.2	4.2	4.2	4.1
% SCC Score <4	46	43	47	48	46	49
PregRate Current	14	8	9	9	12	13
Actual Calving Int	16	14	15	15	15	15
Days to 1st Serv	109	114	109	99	99	107
1st Serv Concep Rate	40	55	51	42	47	48
# Calvings	157	775	245	227	233	140
# Calves per 100 cows	101	98	94	95	100	95
%Dry < 40 days	18	15	14	13	11	15
%Dry > 70 days	29	34	30	26	25	32
%Bred to Proven bulls	66	56	68	68	57	64
%Bred to non-AI	27	44	32	27	31	36
%Heifers with Sire ID	73	62	76	70	88	81
%Cows with Sire ID	44	25	46	58	66	59

2006 Southeast DHIA Comparison of Southeast Herds to DRMS Herds

All Breeds	2005 Southeast*	2005 DRMS**	2006 Southeast*	2006 DRMS**
No. Herds	577	13,774	533	13,693
No. Cows / Herd	261	133	270	135
No. 1st Lact	97	47	97	49
% 1st Lactation	37%	35%	36%	36%
Avg Days in Milk	206	193	203	191
% Left Herd	34	33	35	33
% Died	7	6	7	5
% Left Repro	6	6	6	5
Milk Price	16.39	15.23	14.50	12.74
Rolling HA Milk	18,083	20,090	18,168	20,311
Rolling HA Fat	671	746	675	763
Rolling HA Prot	561	616	562	624
Summit Milk 1st Lac	61	66	62	67
Summit Milk 3rd+	80	87	82	88
Peak Milk 1st Lac	68	73	69	74
Peak Milk 3rd+	89	96	91	97
Proj 305ME Milk	20,160	22,049	20,613	22,264
Std 150-day Milk	61	68	63	68
SCC Actual	496	366	478	350
SCC Score	3.6	3.2	3.7	3.2
SCC Score 1st Lact	3.2	2.7	3.3	2.7
SCC Score 2nd Lact	3.5	3.0	3.5	3.0
SCC Score 3rd Lact	4.1	3.7	4.2	3.6
% SCC Score <4	49	58	47	58
PregRate Current	9	11	11	13
Actual Calving Int	14	14	15	14
Days to 1st Serv	103	97	105	97
1st Serv Concep Rate	47	43	48	43
# Calvings	253	134	261	135
# Calves per 100 cows	97	101	97	100
%Dry < 40 days	13	15	14	16
%Dry > 70 days	31	25	30	24
%Bred to Proven bulls	65	63	63	62
%Bred to non-AI	34	23	35	24
%Heifers with Sire ID	77	84	78	85
%Cows with Sire ID	53	69	54	69

* Southeast - includes 6 southeastern states

** DRMS - includes all herds processed by DRMS

2006 Florida DHIA Herd Performance Averages

September 30, 2006

	1993	2001	2003***	2004***	2005***	2006***
No. Cows	55,648	33,488	56,366	57,510	54,375	54,978
No. Herds	122	52	92	82	71	66
Average Herd Size	456	644	613	698	766	833
% Days in Milk	86	84	84	84	86	85
Pounds of Milk	17,761	18,661	18,160	18,307	18,987	18,835
Peak Milk - 1st Calf (lbs./day)	67	69	70	68	72	72
Peak Milk - 2nd & Later (lbs./day)	88	87	88	87	85	91
Fat %	3.5	3.6	3.8	4	3.7	3.6
Pounds of Fat	622	672	683	672	716	687
Pounds of Protein	592	593	541	546	577	546
Value of Milk (\$)	2,658	3,048	2,579	3,210	3,211	2,982
Projected Minimum Calving Interval	14.1	15.7	16	15.6	15.5	15.7
Days Dry	69	74	78	77	75	72
% Cows Dry > 70 Days	19	21	37	36	19	18
Days to 1st Breeding	77	97	107	106	112	110
Days Open	148	197	197	192	193	196
% cows Open > 100 at 1st Breeding	14	34	33	28	31	27
No. Breedings per Conception	4.0	3.5	3	3	2.8	2.8
% Possible Breeding Serviced	52	26	26	25	26	25
Age at 1st Calving (months)	25	25	25	25	26	26
Age - All Cows (months)	44	44	44	43	44	44
% With Sire Identity	34	33	23	25	29	35
Average PTA\$ Sires	151	147	86	149	98	119
Average PTA\$ Service Sires	210	298	344	354	239	304
% Left Herd	40	33	39	33	31	34

* September 30, of the respective year

** Cows in herds on official types of test (01 - 34)

*** Cows in herds on all types of test (01-74)

Southeast Milk, Inc. Dairy Check-Off Program: Project Summaries

Active and Recently Completed Projects as of July 7, 2006



Project # 240

Title: **Nutrient Handling Systems on Florida Dairies.** R. Giesy

See summary report from 2005. Project is considered complete.

Project # 267

Title: **Evaluating the Effect of Seasonality on Financial Performance of Southeast Dairy Businesses.** A. De Vries (M. J. Hoekema)

The goal of this project is to study the effect of seasonality found in DHI data on the financial performance of Southeast dairies that participate in DBAP. The 2004 DBAP data has been added to the database. A DHIA data set with records from 1990 through 2004 was obtained from DRMS in Raleigh, NC. Analysis is on-going.

Project # 275

Title: **Construction of a Rotational Shade Circle for Livestock on Pasture or Outside Lots.** K. Bachman

Increased awareness of hurricanes factored into the limited progress that has been made in the construction of the shade structure. Optimistic that labor can be focused on the construction of the prototype as planned. This project remains ongoing.

Project # 289

Title: **Efficacy of a New Vaccine to Prevent Abortion in Dairy Heifers Naturally Infected with *Neospora caninum*.** J. Hernandez

No summary report submitted.

Project # 301

Title: **When to Purchase Replacement Animals, How Many, and What You Can Afford to Pay for Them.** A. De Vries

In this project methods are developed to study the economics of cow replacement, give general guidelines, and be able to do farm specific analyses. Cow replacement has consequences for the number of cows that are milking, dry, open and pregnant over time. Coupled with the seasonality in milk production, reproduction, and involuntary culling, a systems analysis is needed to account for all effects and calculate the best course of actions. A computer program has been completed that is able to optimally rank cows in the herd for future profitability, support culling decisions, and suggests when to enter heifers in the herd. The program has been extended to calculate the economics of different reproductive strategies. Papers are available on <http://www.animal.ufl.edu/devries/publications.html> and results have been presented in meetings around Florida. A user-friendly version of the program will be finished in the summer of 2006 and available on <http://dairy.ifas.ufl.edu>. This project is complete.

Project # 308

Title: **Effects of Lameness on Ovarian Activity, Maintenance of Pregnancy, Reproductive Performance, Milk Production and Efficacy of Corrective Foot Trimming Procedures to Prevent Lameness in Dairy Cows (year 1 of 3).**
J. Hernandez

No summary report submitted.

Project # 314

Title: **A New Approach and Evaluation for Detection of *Mycobacterium paratuberculosis* (Johne's disease) in cattle.** O. Rae

Objectives: to explore an alternative method for detection of *M. avium subspec paratuberculosis* (MAP) in infected cattle, by sub iliac lymph node biopsy; to assess the sensitivity and specificity of individual and serial test results using different diagnostic methods in Johne's positive cattle; and to explore methods to improve the sensitivity of sub iliac lymph node biopsy techniques for early detection of Johne's disease. Procedures: About 150 cattle will be utilized (84 animal samples have been processed at present, others are pending). Animals have been selected from Johne's-ELISA tested animals at IFAS research units. Animals are from 2-10 years of age, and may or may not have signs suggestive of Johne's disease. Each study animal is identified by number, age, sex, breed, and evaluated by weight, body condition scores, and previous results of Johne's ELISA tests. Blood is collected for ELISA. A 100 gm fecal sample is cultured for MAP. A subiliac lymph node biopsy is taken or a whole lymph nodes taken at slaughter/necropsy. An impression smear of the lymph node cut-section is stained on a microscope slide (Zeihl Neelson) for microscopic evaluation. The remainder of the lymph node is placed in formalin for later histopathological evaluation.

ELISA test results							
	Lymph node	Negative	Suspect	Low Pos	Med Pos	High Pos	Total
Negative		17	16	8	23	3	67
Positive		0	0	0	0	0	0
Pending		7	4	2		4	17
		24	20	10	23	7	84

Tentative results: The causative organism *MAP* has not been detected in peripheral lymph nodes of the 67 animals thus far evaluated. In 8 of 19 study animals that were followed to markets or necropsy, the organism was recovered and identified in gut wall tissue and (or) mesenteric (gut) lymph nodes. The project is ongoing.

Project # 332

Title: **Thin Soles in Dairy Cattle. Investigation of Factors Affecting Sole Wear.**
S. Van Amstel

The purpose of the claw capsule (horny shoe of the hoof) is to protect the underlying sensitive tissues which contain the vascular supply and nerves of the corium (horn-forming connective tissue including the digital cushion). As dairies expand their facilities to accommodate a larger numbers of animals the need for cows to walk longer distances on concrete flooring surfaces becomes inevitable. Concrete, and particularly wet concrete, can be a very abrasive surface leading to rapid wear of the soles of cows' claws. As a consequence, excessive wear and thinning of the soles of cows has become a major cause of lameness in herds throughout the United States. Our work to date suggests that there are several factors that may predispose to the problem of thin soles including: 1) the abrasiveness of flooring surfaces, 2) distance cows walk, 3) moisture content of claw horn, 4) stage of lactation, 5) parity, 6) type

of bedding (sand may increase claw wear rates, and recycled sand which is coarser may accelerate wear rates), 7) seasonality (incidence seems to be higher during summer months), 8) size and/or weight of the cow, 9) effect of laminitis on quality of claw horn (particularly the horn cell keratinization rate and horn hardness), and 10) poor cow comfort, with respect to design and use of stalls which affects lying or resting time. In November of 2006 we will be presenting results of our studies from 2 large dairies affected with thin soles at the International Symposium on Lameness in Ruminants in Uruguay (see below publications #5 and #6). In one of the studies to be presented, preliminary observations indicate that thin soles accounted for nearly 33% of all lameness problems presented to the trimmer over a 12 - month period. This was second only to digital dermatitis (37.4%) which was the most common lameness disorder recorded. The highest incidence of thin soles occurred in cows between 61 to 350 days in milk. Incidence of thin soles was also seasonal with the highest incidence occurring between August to December. In an effort to cope with the problem the dairy installed rubber in all barns, walkways and holding areas. Frequency of lameness in first calf heifers diminished from 66.9% for the 9 month period prior to, and 32.6% after, the installation of rubber. The thin sole rate in heifers decreased from 21.8% to only 4% following the installation of rubber. Although evaluation of these results is continuing, preliminary information suggests that rubber may be a very important flooring modification for the management of thin soles in dairy cattle. Observations from a second study herd demonstrated an average monthly incidence of lameness of 4.6% with a low of 1.9% during the month of February, and a high of 12.2% in September. As suggested by these data, statistical analysis revealed a strong relationship between lameness and season for all lameness conditions with the exception of digital dermatitis. Claw disorders (white line disease (29%), ulcers (26%), thin soles (11%), punctures of the sole (5%) and sole hemorrhages (3%)) were the predominant lesions recorded on cows presented to the trimmers for evaluation of lameness disorders. Close inspection of these data reveals an unusually high incidence of white line disease that when broken down according to claw zone affected demonstrates a preponderance of lesions (71.6%) occurring in the toe (zones 1 & 2). It is the experience of these authors that white line disease in these zones (1 & 2) represents an important predisposing factor in the development of toe abscesses in thin sole herds. This project is complete.

Publications prepared on this topic thus far:

1. Van Amstel, SR, Palin, FL, Rohrbach, BW, and Shearer, JK: Ultrasound measurement of sole horn thickness in trimmed claws of dairy cows. *JAVMA*, 2003, 223(4):492-494.
2. Van Amstel, SR, Shearer, JK, and Palin, FL: Moisture Content, Thickness, and Lesions of Sole Horn Associated with Thin Soles in Dairy Cattle. *J Dairy Sci*, 2004, 87:757-763.
3. Van Amstel, SR, Palin, FL, and Shearer JK: Measurement of the thickness of the corium and subcutaneous tissue of the hind claws of dairy cattle by ultrasound. *Veterinary Record*, 155, p. 630-633.
4. Van Amstel, SR, JK Shearer, and FL Palin: Thin soles in dairy cattle: characterization of the problem. *ACVIM*, 2005.
5. Van Amstel, SR, JK Shearer, FL Palin, Cooper J, and Rogers G: The effect of parity, days in milk, season and walking surface on thin soles in dairy cattle. *Proceedings of the 14th International Symposium on Lameness in Ruminants and 6th Conference on Lameness in Ruminants*, November 2006.
6. Shearer JK, SR van Amstel, Benzaquen, M, and Shearer LC: Effect of season on claw disorders (including thin soles) in a large dairy in the southeastern region of the United States. *Proceedings of the 14th International Symposium on Lameness in Ruminants and 6th Conference on Lameness in Ruminants*, November 2006.

Project # 333

Title: **Dairy Herdsman Seminars and Cow College in Spanish.** J. Shearer

We were awarded funding through the Dairy Check-Off to establish training programs for multi-cultural Spanish-speaking employees on dairy farms. This past year we conducted 4 training sessions on the topic of reproduction: 1) Artificial Insemination in Dairy Cattle, 2) Detection and Management of Open Cows (via ultra-sound and palpation), 3) Obstetrics and Management of Problems Associated with Calving, and 4) Management of the Cow during the Postpartum Period. All courses and training materials

were presented entirely in Spanish. All participants received handout materials prepared in Spanish and a certificate recognizing their participation in the training program. The specifics of these programs are described below:

On February 1-3, 2005, we conducted our first course on **“Artificial Insemination”** in Spanish. We utilized Mr. Earl Ingram, technical services specialist from Select Sires, Inc., in Latin America to present our lectures and lead the laboratory sessions. A total of 15 participants took the 3-day course which included laboratory exercises with cadaver specimens and live cows. A follow-up with several of the participants has confirmed that most of the attendees are currently breeding cows with good success on a daily basis.

On April 25-26, 2005, we conducted a course entitled **“Detection and Management of Open Cows”**. This 2-day course attracted 12 (2 from as far away as Oregon) participants who were instructed in palpation and ultra-sound techniques used in the detection of open cows. In addition, students learned strategies for the rapid return of these animals to estrus so that a minimum of time may be lost during the breeding period. Lead instructor for the course was Dr. Bartolome, assisted by Dr. Carlos Risco and myself.

On August 17-18, 2005, we conducted a course entitled **“Management of Obstetrics and Problems Associated with Calving”**. This 2-day course attracted 25 participants from Florida and the southeastern United States. Attendees learned techniques for managing dystocia and other calving-related problems in a laboratory equipped with fetal cadavers and phantoms for learning fetal manipulation procedures. Instructors were Drs. Carlos Risco, Pedro Melendez and myself.

On December 21-22, 2005, we conducted a course entitled **“Management of Cows during the Postpartum Period”**. This was a 1 ½ day course that attracted 17 people from Florida and the southeastern United States. The course included one full day of lecture and a ½ day laboratory conducted at Dairy Production Systems, in Branford, Florida. Here participants were able to see a model postpartum program in action.

This program is on-going.

Project # 337

Title: **Determining When to Harvest Stay-Green Corn Varieties for Silage Production.** A. Adesogan

Several Florida dairy producers have observed an increased incidence of digestive upsets, Variable Manure syndrome and Hemorrhagic Bowel syndrome in their cows in recent times. These problems have greatly affected the productivity of such herds, and many producers attribute the problem to feeding corn silage made from hybrids with high staygreen rankings. To address this problem, the University embarked on a series of studies aimed at understanding the influence of the staygreen ranking on the nutritive value of corn hybrids and milk production. This summary presents the results of the first of those experiments, which aimed to determine the effect of maturity at harvest on the nutritive value and aerobic stability of corn hybrids differing in staygreen ranking. One high staygreen corn hybrid and one average staygreen hybrid with similar relative maturity (118 d) were selected from Pioneer Hi-bred and Croplan genetics hybrids. The high staygreen hybrids were Croplan genetics 827 and Pioneer 31Y43, while average staygreen hybrids were Croplan genetics 799 and Pioneer 32D99. The four hybrids were grown on four replicate, 1 x 6 m plots. The hybrids were harvested at 26 (Cut 1), 34 (Cut 2), and 39 (Cut 3) % DM, yield was assessed and some selected plants were separated into ear and stalk fractions for chemical analysis. The rest of the forage from each plot was ensiled (15 kg) within plastic bags in mini-silos for 100 days and then analyzed.

In the freshly harvested plant, yield was similar at Cuts 1 and 2, and higher at Cut 3. High staygreen hybrids had greater stalk crude protein concentration, lower stalk DM and lower stalk sugar concentration than average staygreen hybrids. Whole plant digestibility was also lower in higher staygreen hybrids than average staygreen hybrids.

The staygreen ranking or source (seed company) of the hybrids did not affect silage fermentation, but high staygreen hybrids had greater crude protein and lower starch concentrations than average staygreen hybrids. High staygreen silages tended to be less digestible, than average staygreen hybrids. This suggests that processing is required to improve the digestibility of high staygreen hybrids.

Dry matter and starch content increased with maturity while residual (post fermentation) sugar and crude protein content decreased. Silage pH increased with maturity while ammonia-N, lactic acid and acetic acid concentrations decreased. Yeasts increased with maturity while molds decreased but aerobic stability was unaffected by maturity.

This study therefore indicates that staygreen corn hybrids should be harvested at the intermediate maturity stage (34% DM, Cut 2) to optimize nutritive value and yield. High staygreen hybrids seem more likely to have lower DM and sugar concentrations than low staygreen hybrids and such high staygreen hybrids should be processed to improve their digestibility and ensure proper starch release from the kernel. Staygreen ranking did not affect the normal fermentation indices. Further work on the effects of staygreen on milk production in cows is currently being done. This project is considered complete.

Project #339

Title: **Use of Low-Dosage ECP(estradiol cypionate) to Reduce the Financial Risks Associated with 30-d Dry Period When an Earlier-Than-Expected Calving Occurs.** K. Bachman

Milk lactose in the blood of cows indicates that the tight junctions between the epithelial cells in mammary tissue have become leaky. Leaky tight junctions are an early indicator that the mammary tissue has begun to involute or dry-off. Blood samples collected from cows that received various dosages of ECP are being tested for blood lactose to determine the minimal dose needed to initiate involution (dry-off). Categories of dairy animals from which blood is being analyzed for lactose include: 1) heifers <365d old, 2) dry cows > 40d to expected calving date, 3) cows from late dry period through early lactation, 4) cows at dry-off that received or did not receive various dosages of estrogen (ECP) to accelerate involution, 5) cows in lactation that were milked while receiving various dosages of estrogen (ECP or estradiol). This project is ongoing.

Project #341

Title: **Effectiveness of Two Cooling Systems for Cooling Cows in Free Stall Barns.** J. Bernard

Summary: A trial was conducted over two years to compare two different fan systems for cooling cows in free stall barns. Treatments included cooling with either a high speed fan or a high volume low speed fan (HVLS). A high pressure mister system was used for both fan systems. Cows were fitted with a vaginal temperature probe that recorded body temperature every six minutes. Air speed for the HVLS fans ranged from 2.5 to 5 mph compared with 5 to 8 mph for the high speed fans. Average body temperature of cows cooled with the HVLS was higher than that observed for cows cooled with the conventional high speed fans, 102.7 and 103.1 F, respectively. Results were similar for both 2004 and 2005.

The body temperature of both groups of cows tended to peak at approximately 5:00 p.m. and decreased until 10:00 p.m. when body temperatures increased again until approximately midnight. At approximately 10:00 p.m. high pressure mister system shut off because the relative humidity had increased above 85%.

The results of this trial indicate that the HVLS fans do not provide adequate air flow to cool cows as effectively as the high-speed fans under extremely hot, humid conditions. The results also suggest fans alone do not adequately keep body temperatures from rising in the evening after the mister system has shut off (above 85% humidity). Although the HVLS fans did not cool lactating cows as efficiently as the high speed fans in the hot, humid environment common to Florida and Georgia, they may possibly be useful for cooling animals that do not produce as much heat reducing overall energy cost. This project is complete.

Project #344

Title: **Development of a Milking Machine Monitoring System to Determine Milking Performance.**
D. Bray

We checked many dairies and vacuum stability on almost all dairies with proper working equipment was stable and the determining factor was cleanliness of the vacuum controller if that was the control method, dairies with speed drives had adequate control also. Pulsation function was dependent on age of the pulsators and cleanliness of them, on our large dairies in the S.E. Us with our high humidity, excessive insect population it is evident that a complete new pulsation system should be installed at least every 4-5 years to prevent pulsators malfunction caused by wear due to age. A automatic pulsation monitoring system seems a good way to prevent milking machine damage to teats. This project is completed.

Project #346

Title: **Use of Real-Time Blood-PCR and Milk-PCR for Detection of Cattle Infected with Mycobacterium avium subsp. Paratuberculosis.** C. Buergelt

A total of 164 blood and milk samples were tested and compared against the nested PCR developed in our laboratory. These samples were obtained from 3 dairy herds with 500, 550 and 60 milking cows, respectively. The following results were obtained:

Of the blood samples 7 were positive; of the milk samples, 13 were positive with real-time PCR . There was good correlation between the two test systems in that with one exception parallel results were obtained. One blood sample that was negative on nested PCR was positive on real-time PCR.

Conclusion: Both tests are field applicable and standardized in our laboratory. They are cost effective. While the nested PCR requires a 1-2 day turnaround time, the real-time PCR can be performed within hours .While the nested PCR is an all or nothing event, real –time PCR is quantitative and more direct requiring only one step procedure. It is believed that both tests are user friendly and equal in strength. This project is complete.

Project #348

Title: **2004 Mastitis and Somatic Cell Count Reduction Study.** A. De Vries et al.

We measured milking-to-milking variation for 15 milkings in a row (5 days) in 400 cows at the UF Dairy Research Unit in September 2004. The trial was repeated in December with 3 milkings in a row. Another herd was sampled for 3 days in a row (1 milking per day). The observed variation in all studies was large and many cows had spikes with over 1 million SCC in one milking while dropping to below 250,000 the next milking. A poster was presented at an NMC meeting in Tampa (<http://www.animal.ufl.edu/devries/publications.html>). An article describing the results will appear in Hoard's Dairyman in the summer or fall of 2006. This project is complete.

Project #349

Title: **Antibody Response to Ovalbumin as a Measure of Genetic Disease Resistance of Dairy Cows.** A. Donovan

No summary report submitted.

Project #350

Title: **Dairy Business Analysis Project – Georgia – 2004.** L. Ely

Twenty-seven dairies submitted financial data in 2003. Twenty-six dairies were included in the summary results. Of these, 17 were located in Florida, and 9 in Georgia. The average herd size was 1,316 cows and 619 heifers with 17971 lbs. milk sold per cow. The average culling rate was 40%. There was an average of 24 FTE workers per farm and 0.96 million lbs milk sold per FTE worker. Total revenue per cwt. was \$17.66 / cwt with \$15.89 / cwt milk income. The average total expense was \$18.27 / cwt. The largest expense items were purchased feed (\$7.16 / cwt), labor (\$3.22 / cwt), and livestock (\$1.95 / cwt). Net

farm income from operations was on average \$-.61 / cwt and net farm income was \$-.51 / cwt. The debt to equity ratio was .62, the rate of return on assets was -0.01, the rate of return on equity was -0.18, the operating profit margin ratio was -0.06. There is no clear association income, expenses or returns with herd size in 2003. Milk price / cwt was lowest for <500 cows (\$15.45) but other income was highest (\$1.94 / cwt). Total expenses were highest for the smallest herds (\$19.26 / cwt) resulting in the lowest net farm income from operations (\$-1.66 / cwt). Milk price and total income decreased with production level. Net farm income was highest for lowest production level. Data collection for 2004 is being conducted. This project is considered complete.

Project #354

Title: **The Development of Corn Silage Varieties and Year-Round Cropping System for Florida Dairy Farms.** B. Scully

This project is complete.

Project #355

Title: **Resynchronization of Ovulation and Timed Insemination in Lactating Dairy Cows Using the CIDR Insert 14 or 18 Days After Previous Insemination.**
W. Thatcher

The project had two Experimental Phases involving the use of the Progesterone CIDR device as part of a Presynch-Ovsynch program and a Resynchronization program.

Experimental Phase I: This was reported on in last years report and is summarized as follows: When a CIDR was inserted as part of a Presynch-Ovsynch program, first service-pregnancy rates (PR) at Day 30 and 55 were increased in cows of Presynch-Ovsynch-CIDR Group that had high progesterone at the time the Ovsynch protocol was started (42.3 and 40.2 %; respectively) compared to cows in the Presynch-Ovsynch-CIDR Group with low progesterone (30.0 and 27.5 %; respectively) and control cows (i.e., Presynch-Ovsynch Group with no CIDR insert) with either low progesterone (32.6 and 28.0 %), or high progesterone (32.9 and 27.8 %; respectively). Pregnancy loss was reduced in the Presynch-Ovsynch-CIDR Group (7.0 %) compared to cows in the Presynch-Ovsynch Control Group (15.6 %). For second service, cows were re-synchronized with an Ovsynch protocol starting at day 23 after first service but cows received a CIDR or no CIDR insert for a 7 day period prior to GnRH (i.e., day 14 to 23 after first timed insemination). Pregnancy rates on Day 30 and 55 were reduced for cows inseminated at detected estrus (AIDE) in the Resynch-CIDR Group (28.6 and 26.8 %) compared to cows AIDE in the Resynch Control Group (38.8 and 36.2 %). Pregnancy rates on Day 30 and 55 were increased in cows with a CL at ultrasonography and TAI in the Resynch-CIDR Group (29.7 and 27.5 %; respectively) compared to cows with a CL and TAI in the Resynch Control Group (19.4 and 13.4 %; respectively). Pregnancy rates were reduced in cows without a CL and TAI in both groups (Resynch-CIDR: 10.0 and 7.5 %; Resynch Control: 15.4 and 15.4 %). There was no difference in pregnancy loss for second service between groups.

Based upon these results, the second phase of the project was conducted and is now completed to compare early resynchronization based on ultrasound at day 30 versus a later resynchronization based on rectal palpation of pregnancy at day 36.

Experimental Phase II. The resynchronization protocols have been altered following completion of Experimental Phase I to now include insertion of the CIDR device between GnRH and PGF_{2α} injections. Our objectives were to evaluate pregnancy rates to a resynchronization program following an early ultrasound pregnancy diagnosis (i.e., day 30 after AI) or a pregnancy diagnosis later by rectal palpation (i.e., day 35 after AI). Factored into the experiment is the use of a CIDR device during the Ovsynch protocol. In the ultrasound group, cows received GnRH +/- a CIDR at day 23 after AI and pregnancy diagnosis at day 30, whereas the rectal palpation diagnosis group received GnRH +/- a CIDR at day 29 after AI and pregnancy diagnosis at day 36. The intent is to test the efficiency of the resynchronization systems that provides producers with an progressive early pregnancy diagnosis versus a more traditional-practical system of pregnancy diagnosis.

Placing a CIDR device, following previous insemination for either the ultrasound or palpation group, had no effect on pregnancy rate to prior insemination (20% PR). Cows that were not pregnant to first service and were re-synchronized without a CIDR device had a lower second service pregnancy rate in the absence of a CL compared to the presence of a CL at pregnancy diagnosis with either ultrasound (6.7 < 35.2%) or rectal palpation (5.9 < 27.5%). In contrast there was no difference in pregnancy rates in absence of a CL compared to presence of a CL for cows with a CIDR device in either the ultrasound (36.0 and 37.2%) or the rectal palpation (30 and 21.7%) groups, respectively. Therefore, insertion of a CIDR device allowed for proper synchronization of ovulation for timed insemination in cows without a detected CL at pregnancy diagnosis. Overall pregnancy rates to cows that were inseminated to detected estruses, from time of first service to the second service timed insemination, did not differ between treatments (31.7%). When evaluating only timed inseminations, the early pregnancy diagnosis (i.e., day 30) and re-insemination gave a higher pregnancy rate (33.8%) than PR following a later pregnancy diagnosis by rectal palpation with a PR to second service of (23.1%). Overall results indicate that non pregnant cows following a previous service can be effectively re-synchronized and timed inseminated by 32 days after first service, with the use of ultrasound for pregnancy diagnosis and resynchronization with an Ovsynch protocol that includes a CIDR device. The lower pregnancy rate following a later diagnosis with rectal palpation and re-synchronization with TAI is likely do to less control of follicle synchronization.

Producers can incorporate a timed insemination for first service and repeated services without the need for estrous detection in a programmed fashion with pregnancy rates at least comparable or perhaps better than first service. Implementation of such a program requires careful compliance by field staff that can be achieved by utilization of a timed insemination computer management program to precisely schedule cows for handling, diagnosis and injections of hormones etc. This project is complete.

Project # 357

Title: **Multi-lingual Training Videos.** D. Bray

Over 20 videos have been produced in English and Spanish. This project is completed.

Project # 358

Title: **Environmental Modifications for Reducing Summer Stress on S. E. Dairy Farms.** D. Bray

Comparisons were made between an ultra high pressure fog cooled traditional free stall barn and a 200 PSI fogged barn; there was no difference in cow body temperature between the sides of the barn, use of feed face low pressure sprinklers lowered body temperatures during the night. This project is completed.

Project # 359

Title: **Florida Mastitis and SCC Reduction Study.** D. Bray

We have evaluated various SCC methods, SCC counts are not always repeatable, and more work on this is being done on another project. We are providing participating herds who supply us with their DHIA records with mastitis data from their herds comparing them with other herds on the project. This project is completed.

Project # 360

Title: **Florida Dairy Students Participate in the 4th Annual North American Intercollegiate Dairy Challenge.** A. de Vries

A team of Florida dairy science students participated in the 4th North American Intercollegiate Dairy Challenge (NAIDC) in State College, PA on April 1 and 2, 2005. This year's contest was hosted by Penn State University. Created to inspire students and enhance university dairy programs nationwide, the NAIDC is a 2-day dairy management contest that incorporates all phases of a specific dairy business in a fun, interactive and educational forum. It enables students to apply theory and learning to a real-world dairy, while working as part of a team. The first day of the contest consists of a thorough analysis of a dairy farm's records and a farm visit. The teams prepare a presentation outlining what they believe are strengths and opportunities, including their recommendations to the dairy farmer. The second day the

team presents these findings to a jury consisting of dairy farmers, allied industry, and educators. In addition to the contest, the NAIDC gives students and sponsors plenty of opportunity to interact and many students are recruited for internships or jobs. The Florida team did well and obtained a silver award. The NAIDC is supported financially through generous donations by industry and coordinated by a volunteer steering committee. More information about this exciting contest can be found at <http://www.dairychallenge.org>. This project is complete.

Project # 361

Title: **Dairy Business Analysis Project – 2005.** L. Ely

Twenty-six dairies submitted financial data in 2004. Twenty-two dairies were included in the summary results. Of these, 15 were located in Florida, and 7 in Georgia. The average herd size was 1,170 cows and 585 heifers with 18207 lbs. milk sold per cow. The average culling rate was 31%. There was an average of 20 FTE workers per farm and 0.97 million lbs milk sold per FTE worker. Total revenue per cwt. was \$20.89 / cwt with \$18.98 / cwt milk income. The average total expense was \$19.39 / cwt. The largest expense items were purchased feed (\$8.13 / cwt), labor (\$3.17 / cwt), livestock (\$1.87 / cwt) and milk marketing (\$1.13 / cwt). Net farm income from operations was \$1.50 / cwt and net farm income was \$1.58 / cwt. The debt to equity ratio was -0.24, the rate of return on assets was 0.06, the rate of return on equity was 0.05, the operating profit margin ratio was 0.06. Total expenses decreased and returns increased with herd size in 2004. Herds >1000 cows had the lowest total revenue (\$20.78 / cwt) and the lowest expenses (\$18.12 / cwt) resulting in the highest net farm income (\$2.82 / cwt). The herds with the highest milk production (>19,500 lbs / cow / year) had the lowest total revenue (\$18.86 / cwt) and the lowest expenses (\$18.28 / cwt) resulting in the highest net farm income (\$1.74 / cwt). This project is considered complete.

Project # 362

Title: **Milk Check-Off Recovery.** G. Hembry

No Summary Required.

Project # 363

Title: **The Development of Corn Silage Varieties and a Year-Round Cropping System for Florida Dairy Farms.** B. Scully

Corn Silage: Silage yields and acreage in the southern region of the state has steadily increased over the last five years. Fresh silage yields commonly range between 20 to 25 TPA, and in 2005 was produced on nearly 8000 acres. Over 1000 lbs. of seed from three different IFAS silage populations were distributed to dairy farmers in Avon Park (2), Lorida (1), and to one contract producer in Belle Glade. These included an "Upright-Leaf" population presently under development for high-density plantings of +45,000 plants/ac, and a "Tall" population under selection for maximum forage yield. The "CIMMYT" population is under selection for resistance to the fall armyworm, and is intended for use as a *refugia* variety to compliment the use of *Bt* hybrids. Preliminary results indicate that after four years of selection insect resistance has surpassed many of the *refugia* varieties, and in at least one planting resistance to the fall armyworm was comparable to a *Bt* hybrid. Additionally, field experiments were planted at IFAS research sites in Belle Glade (EREC) and Gainesville (PSREU). Experiments at EREC included the breeding and development of populations, inbreds and silage hybrids. Elite hybrids are now routinely submitted to the Silage Hybrid Performance Trials in Gainesville, and IFAS hybrids have improved relative to the current commercial hybrids.

Winter Legume: A year-round/continual cropping system is an ongoing goal of this research effort and has the potential to improve land productivity, feed quality and fertilizer-use-efficiency. The faba bean has proven sufficiently cold tolerant and robust enough to warrant consideration, and completes the year-round cropping system. In contrast to silage corn, faba bean yields have produced lower fresh yields that have ranged from 10 to 17 TPA. A preliminary comparison of quality indicates that the faba bean is superior to corn silage in some respects, but not others (Table 1).

Table 1: Cross-commodity comparison of the faba bean and silage corn.

Crop	Organic Matter	% IVOMD	% Crude Protein	Phosphorous Content %	NDF(af)
Faba bean	89.1	44.7	12.0	0.55	64.2
Silage corn	94.6	65.1	7.1	0.12	69.2

In addition to adequate yields (\approx 50% of corn silage) and freeze tolerance these data suggest that the faba bean produces significantly higher protein levels and takes up more than four times the Phosphate than silage corn with less than half the Phosphate fertilizer requirement. This project is ongoing.

Project # 364

Title: **Support for Florida and Georgia Youth Programs, 4-H Dairy Activities and Youth Events, Dairy Judging Team Support, Undergraduate Programs and Scholarships.** (Umphrey) B. Broaddus

No Summary Required.

Project # 365

Title: **Factors Affecting the Quality of Corn Silage Produced in Florida, and the Risk of Variable Manure Syndrome in Dairy Cows.** A. Adesogan

Check-Off dollars funded a series of experiments aimed at addressing producer concerns about links between the quality of corn silage produced in the southeast and poor productivity or disease problems (Hemorrhagic Bowel Syndrome, HBS) in dairy cattle. The experiments focused on how certain climatic, plant and management factors affect the quality of silage made in hot, humid environments. The main findings are summarized below:

Rainfall at harvest and high temperatures ($>100^{\circ}\text{F}$) during ensiling adversely affect the fermentation and quality of corn silage. Corn silage producers in hot, humid regions need to avoid harvesting corn in wet weather, and ensure that excellent silage management practices are followed to overcome these climatic challenges to quality silage production. Delayed sealing of bunkers for about three hours can be beneficial at reducing the adverse effects of moisture on the fermentation but prolonged delays (>10 h) can worsen the fermentation and increase deterioration.

Corn silage produced in hot, humid regions is highly prone to aerobic deterioration (within 24 h), but dual-purpose inoculants containing *Lactobacillus buchneri* can improve their aerobic stability. Doubling the rate of inoculant application was not more effective than the recommended rate at enhancing the quality or stability of corn silage. Producers should be advised to avoid this costly, ineffective strategy.

Though molasses application increases the sugar concentration of low-sugar corn hybrids, and therefore increases fermentable substrate levels, it encourages the growth of yeasts that produce ethanol instead of lactic acid, and enhance silage spoilage. Molasses application is therefore discouraged.

Corn hybrids with high stay-green rankings were found to have higher moisture and protein concentrations and lower starch content and DM digestibility values than average stay-green hybrids, but the fermentation process was unaffected by stay-green ranking. Stay-green hybrids should be harvested at about 34% DM (66% moisture) as this maturity stage gave the best combination of yield, nutritive value and low fungal counts. Due to the higher moisture content of high stay-green hybrids, they should not be harvested at DM concentrations below 30% particularly during rainfall or in wet years because excess moisture can cause undesirable fermentations. Kernel processing is recommended for high stay-green silage hybrids in order to increase energy availability from in dairy cow diets.

A dairy cow experiment confirmed that the efficiency of milk production was greater in corn harvested at 35% DM than at 26% DM. The study also showed that high hybrid stay-green rankings were associated with lower feed digestibility and intake and slightly higher rectal temperatures. However no direct link between staygreen rankings and HBS or digestive upsets was found. Indeed several researchers now consider the cause of HBS to be multifactorial. Several factors may contribute to the incidence of the disease including bad silage management practices such as inadequate consolidation, harvesting or ensiling while it is raining, harvesting crops too early, feeding excess levels of readily fermentable carbohydrates etc. Although this work has not shown a direct link between HBS and stay-green ranking, it has demonstrated that high stay-green hybrids have poorer nutritive value than low stay-green hybrids. Also when high stay-green hybrids are ensiled with excessive surface moisture, silage yeast counts may be increased and rumen function in dairy cows may be impaired. A final part of the project which is yet to be completed is to determine if there were differences in the immune response and *Aspergillus fumigatus* or *Clostridium perfringens* counts in the cows fed the high and low stay-green diets. This project is ongoing.

Project # 366

Title: **Enhancing Nutrient Intake and Digestibility and Performance of Lactating Dairy Cows Fed Diets Based on Tifton 85 Bermudagrass.** J. Bernard

Summary: Forty-four lactating Holsteins were used in an 8 week trial to determine the effectiveness of enzyme treatment on the utilization of diets based on corn silage plus either Tifton 85 bermudagrass haylage or alfalfa hay. The diets were formulated to provide similar concentrations of nutrients and included 12.1% of the ration DM as either Tifton 85 bermudagrass haylage or alfalfa hay. Third cutting Tifton 85 was chopped and ensiled in a bag prior to beginning the trial. The alfalfa hay was grown in the Western US and was purchased locally. The average nutrient content (DM basis) of the Tifton 85 was 14.2 % CP, 38.7 % ADF, and 72.4% NDF compared with 20.1% CP, 31.7% ADF, and 39.4% NDF for alfalfa hay.

There were no differences between treatments in dry matter intake (54.0 lb/d), milk yield (91.2 lb/d), milk fat percentage (3.69%), energy corrected milk yield (90.8 lb/d) or dairy efficiency (1.68 lb ECM/lb DMI). We are currently completing the chemical analysis of the diets and will be conduct an economic analysis using the results of this trial and previous research. The initial results indicate that Tifton 85 can be used in rations for high producing cows without any decrease in intake or milk yield. Addition of an enzyme to the TMR did not improve performance of the cows in the current trial. This project is ongoing.

Project # 367

Title: **Use of Nested Real-Time PCR for the Detection of In-Utero Infection of Pregnant Cattle by *Mycobacterium avium* subsp. *Paratuberculosis*.** C. Buergelt

Eleven pregnant Holstein cows were subjected to nested PCR (nPCR) testing for evidence of in-utero transmission with *Mycobacterium avium* subsp. *paratuberculosis* (Map). The following results were obtained:

Six dams (55%) were shown by nPCR to have positive PCR products in blood and/or milk. Tissues or fluid from fetuses were positive on 36% of the pregnancies; 2 of 4 placentomes tested gave positive PCR reaction products and 1 of 11 (9%) allantoic fluids. All pregnant cows were proven paratuberculosis positive through necropsy and microscopic examination. A percutaneous technique on the standing pregnant cow is described for antemortem collection of allantoic fluid for PCR testing.

Conclusion: It is technically possible to obtain allantoic fluid for prenatal Map testing and easily to perform aseptically in late pregnancy (>7months) without inducing peritonitis or abortion. The positive nested PCR in the allantoic fluid of only 1/11 animals (9% success) is disappointing. More late term pregnant animals should be tested for a data base. The detection of Map DNA in various fetal tissues (45%) supports the concept of transuterine transmission of Map in addition to the oral-fecal or milk route of

transmission and should be of concern to the management of disease control by test and cull of only infected adult animals. This project is complete.

Project # 368

Title: **Economic Comparison of Ultrasound Versus Rectal Palpation to Detect and Resynchronize Open Cows.** A. De Vries

Objective is to compare the economics of ultrasound versus palpation to detect and resynchronize open cows using an Ovsynch (\pm CIDR) protocol. A study at a large dairy farm located in north central Florida was conducted to evaluate the physiological responses and pregnancy rates of cows assigned to one of both methods of pregnancy diagnosis and with or without the use of a CIDR insert. The results of this study are currently being finalized. These results serve as inputs for the economic analysis. A complete economic comparison considers all changes in future discounted cash flows due to the use of either ultrasound or rectal palpation. Factors to be considered are the cost of an ultrasound pregnancy diagnosis (\$4) or palpation (\$3), cost of ultrasound machine (\$9,000), number of cows detected in estrus before resynchronization protocol, pregnancy rates, pregnancy losses, semen and drug cost, labor cost, and prices for milk, feed, replacement animals etc. A computer program is available that allows for a detailed consideration of physiological responses, as well as milk production, feed cost, culling policies etc (de Vries et al., 2006). The program is able to do the economics comparison after it has been extended with the resynchronization protocols and both methods of pregnancy diagnosis. Furthermore, typical conditions in Florida need to be incorporated (prices, lactation curves, etc) as it currently is designed for Minnesota herds. This project is ongoing.

Project # 369

Title: **The use of CIDR Insert Post AI to Decrease Early Embryonic Loss in Heat Stressed Animals and the Efficiency of Reusing a CIDR Insert.** J. L. Fain

Two experiments are being conducted to test the efficacy of using progesterone treatment post AI decreased embryonic mortality in dairy animals and to resynchronize estrus in heifers. In experiment 1, all animals were synchronized utilizing a single injection of 25 mg PGF_{2 α} and were inseminated 12 h after animals were observed in standing estrus. Cows and heifers were randomly assigned to 1) receive post AI progesterone therapy (cow n=11; heifers n=13) from d 14 to 21 after AI using the CIDR insert (1.38g progesterone) (treatment) or 2) receive no further treatment post AI (cows n=5 cows; heifers n=9) (control). This trial was split and run in the summer and winter seasons to determine progesterone variability.

In experiment 2, heifers (44) were initially synchronized utilizing a new CIDR insert (1.38 g progesterone) (d-10) with a 5 cc injection of PGF_{2 α} at the time of CIDR removal (d-3). Animals were then artificially inseminated at 12 h after detected estrus (d 0). At 14 d post insemination (d 14), all animals received the same previously inserted CIDR for a second 7-d period until removal on d 21, followed by reinsemination occurring 12 h after detected estrus. This project is ongoing.

Project #370

Title: **Effect of Source of Supplemental Se (SellPlex, Alltech) on Reproduction, Uterine Health, and Lactation in Lactating Dairy Cows.** W. Thatcher

Objectives were to evaluate effects of organic Se on pregnancy rates (PR) at the 1st 2 postpartum (pp) services, pp uterine health and milk yield in the summer heat stress period. Cows were assigned (-23 \pm 8 dpp) to 2 diets of organic Se (Se-yeast [SY; Sel-Plex[®], Alltech; n=289] or inorganic Sodium Se [SS; n=285]) at 0.3 ppm in dry matter for \geq 81d. Rectal temperature was recorded in AM for 10 dpp. Vaginoscopies were at 5 and 10 dpp. Cows within diet were assigned randomly to 2 reproductive management programs (Presynch-Ovsynch vs CIDR-Ovsynch [i.e., Ovsynch begins 3d after withdrawal of a 7d-CIDR]). All cows were resynchronized for a 2nd service with Ovsynch at 20-23d after 1st service and pregnancy diagnosis at 27-30d after 1st TAI. Cows in estrus following Presynchs were AI up to the 2nd TAI service. Strategic blood sampling determined anovulatory status at Ovsynch and ovulatory response after TAI to 1st service. PR at 2nd service was determined by rectal palpation at ~42 dpp. Blood was

sampled for Se (n=20 cows/diet) at -25, 0, 7, 14, 21 and 37 dpp. Plasma Se increased in SY fed cows (.087 > .069 ± .004 µg/ml; P<.01). Milk yield (35.6 kg/d for 81d), milk somatic cells (291,618 cells/ml), and frequencies of retained fetal membrane (9.7%), mastitis (14.4%), anovulation (17.7%) and synchronized ovulation after TAI (82.5%) were not affected by diets or reproductive program. Diet failed to alter 1st service PR at ~d30 (SY, 24.9% [62/249] vs SS, 23.6% [62/262]) or pregnancy losses between ~d30 and ~d42 [SY, 39.3% vs SS, 37.1%]. Diet altered 2nd service PR [SY, 17% (34/199) vs SS, 11.3% (24/211); P<.05]. Diet altered frequency of multiparous cows detected with ≥1 event of fever (rectal temperature ≥ 39.5°C; SY, 13.3% [25/188] vs SS, 25.5% [46/181]; P<.05) but not in 1st parity (40.5%). Vaginoscopy frequencies at 5 and 10 dpp for clear (47.1% [217/460] vs 35.0% [153/437]), mucopurulent (43.4% [200/460] vs 47.8% [209/437]) and purulent (9.3% [43/460] vs 17.1% [75/437]) discharge scores were affected by SY and SS, respectively (P<.05). Organic Se (Se-yeast, Sel-Plex[®]) improved uterine health and 2nd service PR during summer.

Innate immunity (i.e., neutrophil function) was determined by phagocytic and oxidative burst capacity of neutrophils in whole blood using a dual color flow cytometric method. Samples were collected at -26, 0, 7, 14, 21 and 37 dpp for neutrophil function. Adaptive immunity (ability to induce an antibody response) was monitored with anti-IgG to Ovalbumin (Ovalb) following vaccination with Ovalb antigen (1 mg [i.m.]) dissolved in an *E. coli* J5 endotoxemia preventive vaccine at -60 and -22 ± 6 dpp (day of initiating of SY [n=38] and SS [n=47] diets) and again at parturition (day 0) with Ovalb dissolved in PBS with Quil-A adjuvant. Serum samples were collected on days of immunization and at 21 and 42 dpp. Percentage of gated neutrophils that phagocytized *E. coli* and underwent oxidative burst did not differ between diet groups at -26 dpp (44.6 ± 4.6%). For subsequent samples, a diet*parity*day interaction was detected (P<0.05): SY [Organic Se (Se-yeast, Sel-Plex[®])] improved neutrophil function at parturition in multiparous cows (42 ± 6.14% > 24.3 ± 7.2%) and at 7, 14 and 37 dpp in primiparous cows (53.9 > 30.7, 58.6 > 41.9, 53.4 > 34.8%, respectively; pooled SE=6.8%). Anti-IgG to Ovalb did not differ between diets at -60 and -22 dpp (0.18 ± 0.01 and 0.97 ± 0.04 OD). Although Anti-IgG to Ovalb concentration did not differ between diet groups for primiparous cows (1.40 ± 0.08 OD), concentrations were higher in SY cows at 21 and 42 dpp (1.91 ± 0.1 > 1.24 ± 0.07, 1.44 ± 0.7 > 0.99 ± 0.07 OD, respectively; P<0.01). In summary, feeding organic SE as Organic Se (Se-yeast, Sel-Plex[®]) beginning at 26 days prepartum, elevated plasma Se concentrations, increased neutrophil function at the time of parturition, improved immuno-responsiveness in multiparous cows, improved uterine health and increased 2nd service PR during summer in early lactation. In conclusion, Se-yeast induced increases in immuno-competence at the time of normally suppressed immune activity at parturition, benefited subsequent postpartum health and pregnancy rate to 2nd service during summer heat stress in Florida, which is a selenium deficient area.

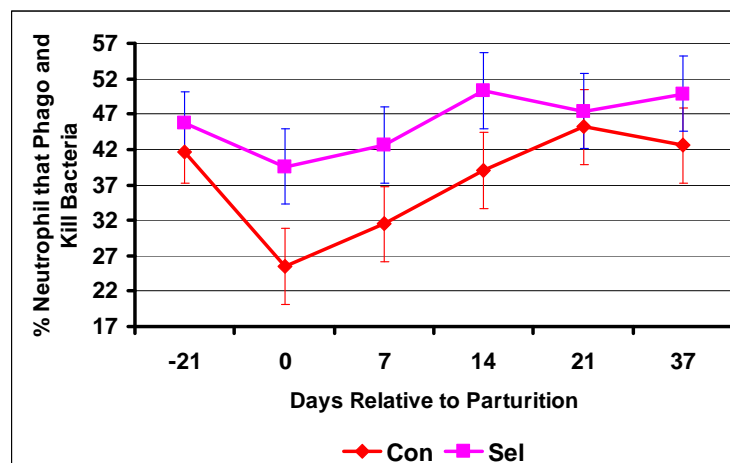


Figure 1. Percent Neutrophil phagocytosis and killing of bacteria in postpartum cows. Organic Selenium yeast increased neutrophil function compared to inorganic selenium.

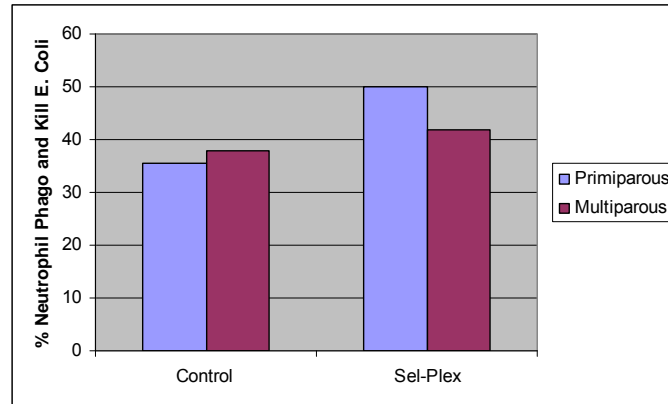


Figure 2: Organic selenium (Se-yeast, Sel-Plex[®]) increased neutrophil phagocytosis in both primiparous and multiparous cows postpartum. This project is complete.

Project # 371

Title: **Use of Radio Frequency Identification (RFID) for Dairy Cattle Management.** D. Webb

Objectives: To determine usefulness of electronic identification for collection of dairy cattle information including: heifer body weights, milk weights on test-day, reproduction and veterinary checks, health data and group movement.

Progress so far: Our group has been working to determine usefulness of electronic identification for collection of dairy cattle information including: heifer body weights, milk weights on test-day, reproduction and veterinary checks, health data and group movement. Animals were tagged with ear tags containing the RFID chip. Cows are identified in the chute or lockup stanchions by waving a wand near the ear, which transmits to a hand-held computer (Palm PDA). Using the newly developed PocketDairy for RFID program associated with PCDART from Dairy Records Management Systems, management data can be entered and automatically attached to the cow's data file. This electronic identification can reduce labor required for record keeping and improve accuracy of records.

After the initial tagging of young animals, we have tagged all animals at the University of Florida, Dairy Research Unit including 527 adult milking cows, 354 heifers and 47 bulls. At two other cooperator herds, 390 cows and 268 heifers have been tagged.

Readability of tags has been variable. Our standard procedure was to apply the tag then read it with the AgInfolink wand, immediately. All of the tags except one, read successfully, immediately after tagging. We attempted to read the tags again approximately two weeks after tagging. Only seven tags would not read at all after two weeks. These tags were removed and replaced. So far, we have used three different wand readers: 1) AgInfolink's Blue tooth, 2) Digital Angel Blue tooth, and 3) Allflex stick reader (wired). All three wands have given satisfactory reads, but the Allflex stick reader has performed the best in our study. Evaluation criteria included distance from the tag and successful read on first try. We found the two wireless wands to be different in that the Digital Angel wand reads from the tip and the AgInfolink reads from the side. Keeping this in mind, similar read results were obtained. Charging and wireless connectivity characteristics have been better for the Digital Angel wand in our experience, so far.

Having RFID on all heifers has enabled us to evaluate the electronic weighing system manufactured and marketed by TruTest. We have used the XR3000 with the companion load bars and the Allflex stick reader. While heifer weighing at the DRU is usually associated with treatments and other management, we have been able to evaluate the system for collection and retrieval of body weight data. In our facilities, the weighing sequence goes like this: 1. heifer enters the approach chute; 2. we open the gate which allows her to enter the platform scale; 3. Identification is read by the wand; 4. press the button to record; 5. open gate to release heifer. This project is ongoing.

Project # 372

Title: **Can Diets Formulated for Low Heat Increment Reduce Body Heat Production and Heat Stress in Dairy Cows?** J. West

The objectives of this project were to formulate low and high heat increment (HI) rations, determine if heat stress could be reduced by a low HI ration, and determine if efficiency of feed to milk conversion could be improved by the low HI ration. The trial was conducted during the summer of 2005, and all analyses are completed and results will be presented at national meetings and then submitted for publication to the Journal of Dairy Science.

Increased dietary concentrations of soy hulls, whole cottonseed, fat and steam flaked corn were used for the low HI diets. Individual ingredient HI values were calculated and a TMR HI value generated (573 and 540 Kcal/Mcal HI for high and low diets). Cows fed the low HI restricted (LR) diet had DMI restricted so that the NEI intake of the HA cows and the LR cows was approximately equal. This was done to determine if a low HI improved efficiency of feed to milk conversion. The third treatment group was a low HI ad lib feeding group (LA). Milk yields for HA, LA and LR were 34.5, 34.6, and 33.0 kg. Increased efficiency for the LR group was observed for milk yield (kg)/ DMI (kg) for HA, LA and LR with conversions of 1.4, 1.5, and 1.6, and for ECM (kg)/ DMI (kg) of 1.3, 1.4, 1.5. Body temperatures and respiratory rates were lower for the LR group.

It appears that HI of the diet can be used to formulate rations to improve efficiency of production. This project is complete.



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Notes
