468 Regional production differences. L. O. Ely*, J. W. Smith, and G. H. Oleggini, *University of Georgia, Athens, GA*.

DHI records from 37 states were grouped into North, Midsouth, and South regions and six herd sizes (20-49, 50-99, 100-149, 150-249, 250-449, and > 449 cows). Data was analyzed by region and by herd size for the year 1998. The North region had higher IOFC, milk, fat and protein rolling herd averages, summit milk, standardized 150 day milk and % cows in milk than the other regions. These variables declined for the Midsouth and were lowest for the South. Cost/cwt., days open, days dry and SCC were lowest in the North and highest in the South. Large herds had higher total feed cost, IOFC, milk, fat, and protein rolling herd averages, summit milk, standardized 150 day milk, %cows entering and %cows leaving the herd than smaller herds. For the period 1990 to 1999, the data were analyzed for the trend in change over time for each of the regions. Milk production per cow, total feed cost, feed cost/cwt. of milk, IOFC, days open and herd sizes increased in the period from 1990 to 1999. The percentage of cows in milk did not show significant variation and SCS decreased. Different rates of change over the last decade have made differences among regions larger for milk production, total feed cost, feed cost/cwt. of milk, IOFC, herd size, and SCS. There were no differences in either the rate of change for days open or percentage of cows in milk among regions. Milk production per cow and total feed cost increased at higher rates in larger herds, making the gap between these and smaller herds larger over time. Feed cost/cwt. of milk, IOFC, days open, % cows in milk, and herd size changes had a similar rate of change during the decade keeping differences among herd sizes constant over time. The SCS decreased at a more rapid rate in small herds than in larger herds, resulting in smaller differences between them.

Key Words: dairy production, regions, trends

469 Heat stress effects on reproduction. E.R. Jordan*, *The Texas A&M University System*.

When dairy cattle are subjected to heat stress reproductive efficiency declines. Dairy cattle under heat stress have reduced duration and intensity of estrus, altered follicular development and impaired embryonic development The most common avenues to ameliorate the effects of heat stress have been to provide cooling in the form of shades, soakers, fans or evaporative coolers. Estrous synchronization tools have been developed which eliminate or greatly reduce the need for estrous detection. Researchers have found that pregnancy rates were more consistent over season when estrous synchronization programs were used compared to AI after detected estrus. Recently, season of calving has been reported to impact success of a programmed first insemination between 70 and 76 days postpartum. Other techniques that have been investigated to reduce the negative impact of heat stress on reproduction include: embryo transfer, addition of antioxidants to the ration, and manipulation of hormone levels.

Key Words: Reproductive Efficiency, Heat Stress

470 Multi-cropped forages for nutrient management. G.L. Newton*[1], G.J. Gaschol[1], J.K. Bernard[1], J.R. Allison[1], R.K. Hubbard[2], R.N. Gates[2], and G. Vellidis[1], [1]*University of Georgia,* [2]*USDA-ARS*.

The Southern US climate provides opportunities and problems for manure management. The extended growing season provided by a warm-temperate and humid climate allows multi-cropping, such that manure can be applied to growing forages throughout most of the year; potentially improving nutrient uptake per land area and decreasing the amount of manure in storage. Multi-cropping allows land and equipment to be utilized throughout the year, improving the economics of ownership. On the contrary, rainfall increases the potential for movement of potential pollutants in runoff and percolation. Streams and wetlands are also usual features. High temperatures are less conducive to the production of some high quality forages than more moderate climates, and pest and disease pressures are often high. These factors limit the locations and the selection of crops available for managing manure, and may also lower the economic returns to cropping programs. Double and triple cropping systems can produce in excess of 30 Mg/ha/yr of forage DM and recover 600 kg of N and 100 kg of P/ha/yr. Cropping systems which include a deep rooted perennial often provide better protection from undesirable leaching than do systems with only annual crops. Forage quality can be higher for annual crop systems, but they usually have greater input costs. The potentially competing objectives of environmental protection, forage quality, and net returns may require site specific resolution. Increasing awareness of the water quality protection benefits of buffers and riparian zones demands that they be considered as part of the cropping/nutrient management system.

Key Words: Manure, Forages, Water quality

471 Rearing dairy herd replacements in the Southeast. R. E. James*, *Virginia Polytechnic Institute and State University*.

DHI data from Dairy Records Management Systems and the NAHMS surveys of 1991 and 1996 provide information to describe the dairy heifer enterprise in the Southeast. DHI herds in the Southeast are larger but produce less milk/cow annually that herds in other regions of the U.S. Peak yields and lactation yields are lower, 1st calving body weight is smaller and age at first calving is higher than in other regions of the U.S. The nationwide NAHMS surveys of 1991 and 1996 revealed a strong positive relationship between heifer growth and rolling herd average milk yield. Heifers were largest in the Midwest, intermediate in the West and Northeast and smallest in the Southeast. Differences were attributed to feeding strategies. A retrospective analysis of survey data revealed death losses were 8.5% of live births in the Southeast as compared to 10% in the West, 8.3% in the Midwest and 6.9% in the Northeast. These data suggests the need to develop management systems to enhance neonatal health and foster improved growth in the more extensive rearing systems common in the Southeastern U.S.

Key Words: Heifers, Southeast

472 Economic evaluation of dairy production in the southeastern United States. A. de Vries*[1], R. G. Giesy[1], and L. O. Ely[2], [1]*University of Florida,* [1]*University of Florida,* [2]*University of Georgia*.

The objective of this study was to evaluate the economics of dairy production in the southeastern US (SE) in comparison to other regions in the US. Data was available from the Florida/Georgia Dairy Business Analysis Project (FL/GA), the North Carolina Dairy Farm Financial Performance Pilot Project (NC), the New York Dairy Farm Business Summary > 300 cows (NY), Milk Production Costs on Selected Wisconsin Dairy Farms (WI), all by universities, and Dairy Farm Operating Trends by Moore Stephens Frazer and Torbet, LLP (Southern California (SCal), San Joaquin Valley (SJV), Arizona (AZ), Idaho (ID), and New Mexico (NM)). For 2000, the average total revenues / cwt were $18.03 (FL/GA), $17.37 (NC), $15.58 (NY), $11.76 (ID), $12.39 (NM), $12.33 (AZ), $12.28 (SJV), and $12.34 (SCal). The average total cost / cwt were $17.03 (FL/GA), $15.08 (NC), $14.92 (NY), $13.20 (WI), $10.65 (ID), $11.46 (NM), $12.21 (AZ), $11.33 (SJV), and $11.24 (SCal). The average feed cost / cwt ranged from $4.76 (ID) to $7.35 (FL/GA). The average rate of return on assets (ROA) was highest in FL/GA with 7.0% and lowest in AZ with 0.6% with most regions reporting 3 to 4%. The variability within the regions is considerable. Total revenues / cwt for the SE ranged from $15.62 to $23.14 (FL/GA, 22 farms) and from $16.23 to $19.11 (NC, 7 farms). Total feed cost / cwt for FL/GA ranged from $4.60 to $10.78. Total cost / cwt for the SE ranged from $13.28 to $21.75 (FL/GA) and from $11.92 to $16.84 (NC). The ROA for the SE ranged from #7.2% to 22.9% (FL/GA) and from 0.2% to 20.1% (NC). Average total revenues / cwt from 1995 to 1999 for FL/GA were $17.03, $19.93, $18.31, $19.41, $19.07, respectively. Average total cost / cwt from 1995 to 1999 for FL/GA were $18.51, $17.79, $18.02, $17.57, $16.40, respectively. The reported data is not necessarily representative for the average economic performance in the regions. Based on these data, the conclusion is that both average returns and cost are higher in the southeastern US, but the margin and ROA are competitive with other regions in the US. Considerable variation in the SE exists, which indicates opportunity for well-managed herds.

Key Words: Economics, Southeast, Dairy

473 The effects of supplementing yeast culture during the transition period on performance of Holstein cows during hot humid weather. J. D. Ward*, *LSU AgCenter Southeast Research Station.*

During the summer and early fall of 2000, 32 multiparous Holstein cows were used to investigate the effects of yeast culture supplementation during the transition period on performance during hot humid weather. Cows being supplemented with yeast culture received 56.7 g of yeast culture for 3 wk prior to expected calving date and then received 113.4 g of yeast culture for 21 d after parturition. All cows were component fed and the yeast culture was top dressed onto the pellet portion of the diet. Prior to calving cows were offered 4.5 kg (as fed basis) of a commercially available pellet once per day, given ad libitum access to bermudagrass hay, and allowed to graze bermudagrass pasture. After parturition, cows were offered 5.0 kg (as fed basis) of the same pellet twice per day. They were given ad libitum access to a partial mixed ration (PMR) consisting of (DM basis) 32.7% alfalfa hay, 20.9% whole cottonseed, 28.5% corn silage, and 17.9% ryegrass haylage. Grain was offered individually in a stanchion barn and PMR was offered behind Calan® gate doors. Daily milk production and DMI were recorded for the first 60 d of lactation. Plasma β-hydroxy butyrate (BHBA) was determined every 10 d during the 60 d trial. Milk fat and protein were determined 20, 40, and 60 d after parturition. Milk production, DMI, milk component, and BHBA data were analyzed using the mixed model procedures of SAS. Peak milk production and days to peak milk production data were analyzed using the general linear models of SAS. Peak milk production (48.1 kg) and days to peak milk (40.5) were not affected ($P > 0.80$) by yeast culture supplementation. Yeast culture supplementation did not ($P > 0.85$) affect grain refusals but did increase ($P < 0.03$) PMR consumption (12.7 vs 12.2 kg of DM per d). Therefore, total DMI was increased ($P < 0.03$) by yeast culture supplementation (21.5 vs 21.0 kg of DM per d). Milk production was also increased ($P = 0.08$) by yeast culture supplementation (39.5 vs 38.3 kg per d). However yeast culture supplementation had no effect on milk fat ($P > 0.80$) or protein ($P = 0.19$). Plasma BHBA was not affected by treatment. The results of this experiment indicate that feeding yeast culture during the transition period was beneficial and increased DMI and milk production.

Key Words: Yeast Culture, Transition Cow, Heat Stress

474 Comparison of nutrient content and digestibility of traditional versus genetically modified whole cottonseed. J. A. Bertrand*[1], T. C. Jenkins[1], and M. Calhoun[2], [1]*Clemson University,* [2]*Texas A&M University.*

The objective of this study was to determine if the in vitro dry matter digestibility (IVDMD) and nutrient and gossypol contents of genetically modified whole cottonseed (WCS) differed from traditional varieties. Varieties included traditional (no genetic modifications) (TRAD), and those with the following gene insertions: Round-Up Ready® (RR), *Bacillus thuringiensis* (Bt), and both gene insertions (RR/Bt). Samples from 1998, 1999, and 2000 were analyzed for IVDMD, dry matter (DM), crude protein (CP), neutral detergent fiber (NDF), acid detergent fiber (ADF), gossypol, and fat content. Fatty acids and amino acids were determined on samples harvested in 2000. Only ADF content was different by type of seed. ADF content of RR/Bt, 45.4%, was significantly higher than that of RR, 42.6%, and there was a trend, $P = 0.06$, for ADF of RR/Bt to be different from TRAD, 43.4%. There was a significant type by year interaction for CP content. The overall effect of year was significant for all variables. Gossypol content was not significantly different by type but was significantly different by year and increased from 0.485% in 1998 to 0.509% in 1999 to 0.743% in 2000. This was quite high and should be monitored. There were no differences in fatty acid or amino acid content by type for seed produced in 2000. In conclusion, IVDMD of traditional versus genetically modified WCS was not different and nutrient content differences were minimal.

	LSM, %				Average
	TRAD	Bt	RR	Bt/RR	SE
IVDMD[a]	58.5	59.0	58.6	58.6	0.62
Nutrient content					
DM[a]	93.1	93.5	93.1	93.5	0.18
CP[a,c]	24.1	24.3	24.3	25.0	0.26
Fat[a]	15.7	16.9	16.9	16.4	0.57
NDF[a]	60.5	61.4	60.2	62.3	0.74
ADF[a,b]	43.4	44.6	42.6	45.4	0.72
Gossypol[a]	0.58	0.59	0.59	0.59	0.03

[a] Effect of year was significantly different ($P < 0.05$). [b] Effect of seed type was significantly different ($P < 0.05$). [c] Effect of year*seed type was significantly different ($P < 0.05$).

Key Words: genetically modified, whole cottonseed

475 Use of DairyMetrics to compare Jersey and Holstein dairy herds of different herd sizes in the southern U.S. J.A. Pennington*[1], J.S. Clay[2], and C.N. Vierhout[2], [1]*University of Arkansas Cooperative Extension Service, Little Rock,AR,* [2]*Dairy Records Management Systems, Raleigh, NC.*

DairyMetrics from Dairy Records Management Systems was used to compare 72 traits of Jersey and Holstein herds in the southern states by different herd sizes. Holstein herds had greater days in milk, % cows leaving the herd, % herd bred to non-AI bulls, milk production, calving interval, days to first service, and somatic cell counts than Jersey herds; Jersey herds had greater % cows identified by sire and % heats observed compared to Holstein herds. Larger Holstein herds had greater increase in herd size and less % cows identified by sire than smaller Holstein herds but had only a slight increase in % cows leaving the herd compared to smaller herds. There were smaller differences in other parameters for these herds with less than 1000 cows.

	Cows/Herd					
	0-49	50-99	100-199	200-299	300-599	600-999
——Holstein Herds						
Number of cows/herd	39	77	142	242	418	756
Change in number of cows	-6	-4	-2	0	5	3
Days in milk	188	185	183	181	184	185
% cows left herd	33	34	34	35	37	36
% herd bred to non-AI bulls	27	37	43	39	50	44
% cows identified by sire	62	53	50	49	31	31
Rolling milk (kg)	8002	8032	8267	8245	8349	8805
Actual calving interval (mon)	14.7	14.3	14.2	14.3	14.4	14.2
Days to 1st service-herd	114	107	106	101	105	98
% heats observed for year	33	30	31	34	30	40
SCC actual (x1000)	458	430	408	406	403	323
——Jersey Herds						
Number of cows/herd	35	74	140	250	442	683
Change in number of cows	-14	1	0	9	19	27
Days in milk	172	177	161	185	171	169
% cows left herd	30	31	32	26	29	31
% herd bred to non-AI bulls	18	24	24	25	9	13
% cows identified by sire	87	87	84	91	85	87
Rolling milk (kg)	6211	6502	6776	6583	6255	6354
Actual calving interval (mon)	13.6	13.6	13.5	14.2	13.7	13.6
Days to 1st service-herd	82	89	84	94	83	79
% heats observed for year	43	42	47	48	51	54
SCC actual (x1000)	351	406	342	384	388	366

Key Words: DairyMetrics, Dairy Breeds, Herd Size