Clip plots were taken daily to determine DM availability of each paddock allotment. Heifers were weighed before and after each 24 d (approximately) grazing period. Heifers consuming PRG consumed slightly more DM than those consuming TF (9.7 vs 9.5 kg/h/d, P = 0.005). Intake of OG was intermediate, 9.6 kg/h/d. No difference in ADG resulting from grass species could be detected (P > 0.05). All heifers were gaining BW at an acceptable rate (1.2 kg/d). The carrying capacity of OG and PRG did not differ (194 vs 129 grazing d/ha, respectively, P > 0.05). The TF exhibited increased carrying capacity compared to OG (264 vs 194 grazing d/ha, respectively, P > 0.05) and PRG (264 vs 129 grazing d/ha, respectively, P < 0.05). Based on the results of this study, TF is superior to either OG or PRG for irrigated pasture in northern Utah for development of yearling beef heifers.

Key Words: Grazing, Heifers, Carrying capacity

W244 Influence of turning cows out to pasture on fatty acid profile of milk. R. C. Khanal*, T. R. Dhiman, and R. L. Boman, *Department of Animal, Dairy and Veterinary Sciences, Utah State University.*

Five late lactation Holstein cows milking an average of 25.4±6.4 kg/d were used to study the influence of turning cows out to pasture on fatty acid profile of milk. The 45-d experiment was divided into 3 phases. During first 2 d (Phase 1) of the experiment cows were fed TMR containing 50% forage and 50% grain mix, from 3-31 d (Phase 2) cows were grazed on a predominantly ryegrass pasture with no grain supplementation, and from 32-45 d (Phase 3) cows were fed a diet similar to phase 1. Milk yield was recorded daily. Daily milk fat content and fatty acid profile was determined for samples collected from both a.m. and p.m. milkings. Spline regression was performed to determine the changes in fatty acid profile during different phases. Cows produced an average of 25.2±6.1, 14.0±4.8, and 11.2±5.6 kg/d of milk with 3.4, 4.0, and 3.6% fat in phase 1, 2, and 3, respectively. The CLA content was 4.54 mg/g of fat in phase 1 and reached a maximum of 25.3 mg/g of fat on d 25 of the experiment. No significant change (P>0.05) occurred thereafter in phase 2. The $C_{18:1t-11}$ content was 28.9 mg/g of fat in phase 1 and reached a maximum of 79.5 mg/g of fat on d 24 of the experiment with no significant change thereafter (P>0.05) in phase 2. The $C_{18:2}$ fatty acid declined gradually with no further decrease observed after d 24 (P>0.05) of the experiment while $C_{18:3}$ increased significantly (P<0.05) with no further increase after d 9 (P>0.05) of the experiment in phase 2. The CLA content in milk fat reached the value similar to phase 1 within d 5 once cows were taken off the pasture with no change thereafter (P>0.05). There was no significant change (P>0.05) in other fatty acids after d 7 once the cows were moved to phase 3. In the present study it took 23 days to establish the highest level of CLA in milk fat after cows were turned out to pasture for grazing with no grain supplementation. Other fatty acids were also stabilized near d 23 after turn out of cows to pasture.

Key Words: CLA, Pasture, Cows

W245 Consumer acceptability characteristics of conjugated linoleic acid (C LA) enriched milk and cheese. R. C. Khanal*[1], T. R. Dhiman[1], C. Brennand[1], R. L. Boman[1], and D. J. McMahon[1], [1]*Utah State University.*

Consumer acceptability characteristics of CLA enriched milk and cheese was studied in two experiments. Experiment 1: 15 cows were randomly assigned either to a diet containing 51:49 forage to concentrate ratio (TMR), grazed on pasture (PS) or PS with 3.2 kg/d of a grain mix containing 75, 10, 10, and 5% of full-fat extruded soybeans, beet pulp, ground corn, and molasses on DM basis, respectively (ES). Experimental duration was 6 wk with final 3 wk for measurement. Average CLA contents in milk fat were 5.2^b, 16.2^a, and 16.9^a mg/g of fat for TMR, PS, and ES diets, respectively. Milk from wk 4 to 6 was used for consumer acceptability characteristics. Experiment 2: 18 cows were randomly assigned either to a TMR, PS, or PS with 3.2 kg/d of full-fat extruded soybeans (ES) diet. Cheese was manufactured from the milk collected during wk 4 to 6 of the experiment. Cheese had 4.7^b, 15.7^a, and 14.6^a mg of CLA/g of fat for TMR, PS or ES diet, respectively. An open panel of consumers (n=75) evaluated CLA enriched milk (mouth-fill, color, flavor, and overall quality) and cheese (color, flavor, texture, and overall quality) from experiment 1 and 2, respectively on a hedonic scale of 1-9. A trained panel evaluated the milk (n=8) and cheese (n=7) for evenness of color, flavor, and overall quality in a scale of 1-10. There were no significant differences (P>0.05) among treatments for any of the parameters studied for milk and cheese by both open and trained panels except for oxidized flavor in cheese. Trained panel scored significantly lower (P=0.04) for oxidized flavor in cheese from ES treatment (2.6) compared to either of the cheese from TMR (2.9) or PS (3.0) treatments. In conclusion, CLA enriched milk and cheese were similar in color, flavor, and consumer acceptability characteristics except for oxidized flavor in cheese made from the milk of cows fed full-fat extruded soybeans while on pasture.

Key Words: CLA, Milk and cheese, Consumer acceptability

W246 Influence of genotype, heading date and cutting date on fatty acid composition of ryegrass. V. R. Loyola*[1,3], J. J. Murphy[2], M. O'Donovan[2], N. Gowen[2], M. D. S. Oliveira[3], and C. Stanton[1], [1]*Teagasc, Dairy Products Research Centre, Moorepark, Fermoy, Ireland,* [2]*Teagasc, Dairy Production Research Centre, Moorepark, Fermoy, Ireland,* [3]*Universidade Estadual Paulista, UNESP, Jaboticabal, Brasil, supported by FAPESP.*

Ruminant products are the only significant source of conjugated linoleic acid (CLA) and they are an alternative as a source of omega-3 fatty acids, which may be beneficial components in the human diet. Linoleic and α-linolenic acids in feed are the precursors of these fatty acids in milk and meat. Animals grazing fresh grass have higher levels of omega-3 and CLA in their meat and milk, when compared with those consuming conserved forages. Therefore, it is important to quantify the variation in the precursors of these fatty acids in grasses. Our objective was to evaluate the effects of genotype, heading date and cutting date on the concentration of fatty acids (FA) in perennial ryegrass (*Lolium perenne* L.) cultivars. Ryegrass samples were taken at four cutting dates (22/05, 12/06, 03/07 and 28/08/2000) from a 2x2 factorial experiment in a split-plot design with three replications. The four ryegrass cultivars used were: Millenium, Portstewart, Napoleon and Spelga. Forage samples were freeze-dried and grounded. Fatty acids were methylated using a one-step methylation, and analyzed by gas chromatography. The genotype effect was significant (P<0.05), with tetraploid cultivars resulting in higher total FA concentrations (19.03 g/kg DM), in comparision to diploid cultivars (16.73 g/kg DM). Intermediate heading cultivars presented higher (P<0.05) total FA levels (19.38 g/kg DM), compared to late heading (16.38 g/kg DM). There was also a significant effect of cutting date (P<0.01) on total FA concentrations, with the highest levels 18.52 and 19.97 g/kg DM, found in May and August, respectively. The June and July total FA concentrations, 16.59 and 16.45 g/kg DM, respectively, differed only from August (P<0.05). This work demonstrates the viability of manipulation of ruminant products through management and breeding of grasses, aiming alter its FA levels.

Key Words: Ryegrass, Growth stage, Fatty acids

Extension Education

W247 Consumer response to beef quality assurance certification of producers. J. W. Comerford*[1], J. P. Slayton[2], and L. Zerby[2], [1]*Penn State University, University Park, PA USA,* [2]*Pennsylvania Beef Council, Middletown, PA USA.*

A study was conducted to evaluate the response of consumers to information about beef quality assurance certification training of producers. Two methods were used. First, six focus groups were interviewed after observing three separate informational posters about beef quality assurance training at a mock retail meat case. Secondly, 168 consumers were interviewed while shopping at the meat case at one of nine retail food stores in central and eastern Pennsylvania. Group interviews revealed that consumers were receptive to information about beef products; implications of "advertisement" and the use of the terms "animal welfare" and "training of producers" were highly negative, while "safety" and "quality" were neutral; some form of validation of the program was positive and desirable; and information should be located on the meat package or within the meat case. Store interviews revealed 74% of consumers thought quality assurance labeling had "some importance" to

them, 87% felt producers were "concerned about the quality and safety of beef", and 63% indicated quality assurance information positively influenced their "confidence in buying beef". The results indicated consumer confidence in the quality and safety of beef can be enhanced by providing beef quality assurance certification labeling.

Key Words: beef quality assurance, consumers, food safety

W248 Dairy beef: Maximizing quality & profits—an educational program for dairy producers. D.A. Moore[1], J. Kirk[1], F. Garry[2], W. Wailes[2], J. Dalton*[3], J. Busboom[4], D.J. Klingborg[1], M. Payne[1], J. Marchello[5], and M. Poe[1], [1]*University of California, Davis,* [2]*Colorado State Univeristy,* [3]*University of Idaho,* [4]*Washington State University,* [5]*University of Arizona*.

Dairy producers not only ship milk, they are in the beef business too! Dairy market cattle are a major source of beef and can represent up to 15%of a dairy's income. In western states alone, over 800,000 dairy cows worth about $500 million are marketed to slaughter every year. Demands on meat packers as a result of Hazard Analysis Critical Control Point plan implementation have focused their attention on the quality of incoming cattle. In response to this, a 7-western state collaborative project was developed to create a distance learning program for dairy producers, cooperative extension advisors, and dairy veterinarians to provide a consistent message about dairy beef food safety. Project coordinators at the University of California-Davis designed this program with input from dairy and meats scientists, veterinarians and media specialists from six other western states: Arizona, Colorado, Idaho, New Mexico, Oregon and Washington. The curriculum was developed in a modular format and individuals from different states took lead on specific segments. Educational segments include videos, narrated slide sets, written materials, and interactive evaluation tools (quizzes, discussion questions, and evaluations) as well as links to more detailed informational websites. The course was also designed to be packaged as a trainer's and participant's CD-ROM for individuals requesting in-residence training or without access to the Internet. As part of the development process, the project team solicited formative evaluations from extension specialists, dairy producers, veterinarians, and milk processor representatives that allowed these individuals to be part of the project and make important suggestions to improve program quality. Twenty individuals reviewed all course segments, completed an evaluation tool, and provided written comments. They highlighted correctable navigation problems and image quality on different computers and internet access but all were positive about the content and messages. "Dairy Beef: Maximizing Quality and Profits" http://dairybeef.ucdavis.edu is a distance learning program that focuses on improving the quality of the dairy cattle going to slaughter to increase income from cull dairy cattle and assure future access to beef markets.

Key Words: Dairy beef, Food safety, Training

W249 Bacteria counts on the surface and subsurface of *Klebsiella pneumoniae* inoculated sand and wood shavings. L. Clow, R. Bey, J. Reneau*, and R. Farnsworth, *University of Minnesota, St. Paul, MN 55108*.

PVC pipe was used to simulate a cow's stall. Sterile sand and wood shavings were placed in 4 inch diameter PVC pipe which had been cut to 1-4 inch lengths. The pipe was filled with bedding material and K. pneumoniae spray inoculated at a rate of 25 ml per 1 inch of bedding material. Experiments on sand and wood shavings were performed in duplicate at the same time. All bacteria concentration determinations were made in duplicate as well.
At 0.5, 1.0, 1.5, 2.0 hours following inoculation bacteria concentrations were determined on the surface and bottom of the cylinders for both sand and wood shavings.
Results of these studies indicates that regardless of depth the surface of sand had lower bacteria counts per sq. cm. than wood shavings. This observation was independent of time following inoculation. When the depth was increased from 1 to 2 or more inches the same trend held that bacteria counts on the surface were lower for sand. In general, bacteria counts were higher on the bottom than on the top of the inoculated sand or wood shavings.
These observations help explain why cows housed on clean groomed sand have lower incidence of udder infections than cows housed on wood shavings or dirty (ungroomed sand). Inaddition, it provides further evidence that care must be taken not to till to deeply when grooming stalls.

Key Words: Bedding, Cows, Klebsiella

W250 Oregon dairy environmental stewardship program. M. E. French*, T. W. Downing, and P. D. French, *Oregon State University, Corvallis, OR/USA*.

The Oregon Dairy Environmental Stewardship Program was designed to recognize dairies for producing high quality milk and providing safe dairy products to Oregonians as well as educating the public. Today many of the dairy's neighbors have been removed from agriculture. There is a wealth of misinformation that has generated consumer concerns, from antibiotic residues to odor issues. The Oregon Dairy Environmental Stewardship Program focuses on the need for environmental soundness, but assumes the producer's care and concern for the environment and considers how to work with the producer to achieve this goal. As animal agriculture becomes more consumer driven, dairy producers will be challenged to enhance product value, while simultaneously controlling cost, animal well being, integrity of the environment, and food safety. This is a voluntary program that will put the dairy industry in the forefront of any future regulations. In order to become an Oregon Dairy Environmental Steward, a ten-step process must be completed. These include: a nutrient management plan, milk sanitation permit to produce and sell Grade A milk, completion of a water quality evaluation, wildlife protection assessment/ wetlands determination, odor management plan, elimination of mercury, emergency action plan/ farm plan, confined animal feeding operation (CAFO) compliance, six hours of continued education - completed within 18 months, and some form of public outreach. The dairy must remain in compliance with changing state regulations, take at least three hours of continued education within a twenty-four month period after certified and update plans as needed. Many dairies have already achieved several of the stewardship criteria and should be recognized for their continued achievements. The Stewardship program was patterned after several programs already in existence and was revised to meet the needs of both Oregon dairy producers and Oregon citizens. Overall, the Oregon Dairy Environmental Stewardship Program was designed to protect the long-term growth of the entire dairy industry.

Key Words: Environment, Stewardahip, Voluntary

W251 Effect of artificial insemination versus natural service breeding on production and reproduction parameters. J. W. Smith, L. O. Ely, W. D. Gilson, and W. M. Graves, *University of Georgia*.

U.S. dairy cows are bred by artificial insemination (AI), natural service (NS), or by a combination. This study examines the effect of four breeding systems on production and reproduction performance parameters and the interaction of region and herd size on breeding system. DHI Holstein herd summary records for the year ending 2001 obtained from DRMS, Raleigh, NC were sorted and classified by region (North, Midsouth, South) and herd size (small [< 100 cows], medium [100-249], and large [> 250]). Herds were assigned to breeding systems by % NS usage as follows: (1) 0, (2) 1-20, (3) 21-89, and (4) 90-100. The average % AI and % NS usage by breeding system was: (1) 100, 0; (2) 93, 7; (3) 54, 46; and (4) 1, 99. The main effects of breeding system on milk production and reproductive performance parameters are in the table.
Milk production and actual calving interval (CI) were lower ($P < 0.05$) with breeding system 4 within each region. Milk production was not different between breeding systems 1 and 2 within each region. Actual CI was not different for breeding systems 1, 2, and 3 in the Midsouth and South regions and breeding systems 1 and 2 in the North region. Days dry tended to be higher for breeding systems 3 and 4 than breeding systems 1 and 2. Breeding system 4 had the lowest average % in milk within each region. The % dry 40-70 days was lowest for breeding system 4 within each region and within each herd size group ($P < 0.05$).

Breeding System	1	2	3	4	SEM
Herd Milk Production (kg/yr)	9572^a	9225^b	8752^c	8108^d	53
Actual Calving Interval (mo)	14.09^b	14.20^b	14.35^a	13.62^c	0.04
Days Dry	64.2^c	66.9^b	69.4^a	69.6^a	0.4
% Dry 40-70 d	72.9^a	68.7^b	60.1^c	49.8^d	0.6
% Dry > 70 d	20.4^d	24.3^c	29.8^b	35.2^a	0.5
% Dry < 40 d	8.2^c	7.9^c	10.7^b	15.5^a	0.4
% in Milk	87.5^a	86.9^b	86.2^c	84.8^d	0.1
% Left Reproduction	21.8^a	19.7^a	17.7^b	15.4^c	0.6

^{abcd} Least squares means within a row with the same superscript do not differ ($P < 0.05$).

Key Words: Reproduction, Breeding, DHI

W252 Ranking of dairy farms based on economic measures per cwt milk sold and per cwt milk equivalent.

A. E. M. de Araujo* and A. de Vries, *University of Florida*.

Our objective was to compare the ranking of dairy farms based on economic performance measures per cwt milk sold and per cwt milk equivalent. A common method is to calculate cost, revenue, and profit per cwt sold. A disadvantage of this straightforward method is that the production cost per cwt cannot be directly compared to the price received for milk when other revenue is obtained, such as from the sale of livestock. Therefore, an alternative method is to calculate economic performance measures based on cwt equivalent. Cwt equivalent is calculated as the total revenue divided by the price of milk per cwt. It is the amount of milk produced to obtain the same total revenue if no revenue was obtained from other sources but milk on the farm. The total production cost per cwt equivalent can be directly compared to the price of milk. The same price of milk should be used to compare the economic performance of dairies. Data were collected through the Dairy Business Analysis Project (DBAP) from dairy farms in Florida, Georgia, and Alabama between 1995 and 2001 (n = 15, 20, 33, 44, 20, 15, 39, respectively). Average milk price used was $17.50. The ratio of cwt sold to cwt equivalent was on average 0.93, ranging from 0.65 to 1.26. Total production cost / cwt sold ranged from $12.71 to $25.28 (average $17.58) while total production cost / cwt equivalent ranged from to $11.59 to $23.54 (average $16.19). Average net farm income from operations (NFIFO) / cwt sold was $1.52 and average NFIFO / cwt equivalent was $1.31. The top 6 dairies based on NFIFO / cwt sold and NFIFO / cwt equivalent were identical for 1995, 1996, 1999, and 2000. One of the top 6 dairies was replaced in 1997, 1998, and 2001. The lowest Pearson correlation coefficient between NFIFO / cwt sold and per cwt equivalent of the seven years was 0.984 (1996). The Pearson correlation coefficient between total production cost / cwt sold and per cwt equivalent ranged from 0.419 (2001) to 0.878 (1995). We concluded that the ranking of dairies based on the cost of production may be significantly affected by the method of choice, whereas the ranking based on NFIFO is hardly affected.

Key Words: Dairy, Economics, Production equivalent

W253 Lamb carcass education program for Oregon sheep producers indentifies characteristics that determine carcass value.

R. R. Mills*, J. M. Thompson, and K. Walburger, *Oregon State University, Corvallis, OR*.

A lamb carcass education program in conjunction with the Umatilla County Fair was established in 1990 as a carcass value information feedback system for purebred and commercial sheep producers in northeast Oregon. The program provides the opportunity for participants and other producers to evaluate value-determining factors of market lambs and correlate live animal characteristics with the carcasses from the same lambs. Detailed lamb carcass data, including ribeye area were collected and analyzed on market lambs (n=241) entered by producers from the years 1990 to 2002. Sire breed types represented were SF (Suffolk, n=200), TX (Texel and Texel x Suffolk, n=28), and OT (other sire breeds, n=13). Lambs from TX sires had lighter live weights, lighter carcass weights, and lower dressing percentages than SF and OT sired lambs (live weight = 48.8, 54.1, and 52.4 kg; carcass weight = 24.9, 29.3, and 28.3 kg; and dressing percent = 50.9, 54.1, and 53.9%, respectively; P<.05). There were no sire type effects (P>.05) for fat thickness, leg conformation score, ribeye area, USDA Quality Grade, or USDA Yield Grade. However, TX sired lambs produced larger ribeye areas / unit of carcass weight than SF and OT sired lambs (0.64, 0.59, and 0.57 cm^2/kg carcass weight, respectively; P<.05). Over the 13 year history of the program there was no change (P>.05) in fat thickness, dressing percentage, ribeye area, or USDA Yield Grade. During the same time, live weight and carcass weight declined (3.4 and 0.5 kg, respectively; P<.05), but leg conformation score and ribeye area per unit of carcass weight increased (0.57 conformation score and 0.08 cm^2/kg carcass weight, respectively; P<.05). The data from this study (2.1% Yield Grade 4 and 5) confirms that genetics and management / production systems currently exist in the US lamb industry to produce high quality, lean, heavily muscled lamb that can be competitive with other sources of human dietary protein.

Key Words: Lamb, Lamb carcass, Cutability traits

W254 Financial performance of dairies in Florida and Georgia in 2001.

L. O. Ely*[1], A. deVries[2], and R. G. Giesy[2], [1] *University of Georgia,* [2] *University of Florida*.

The Dairy Business Analysis Project (DBAP) includes an annual survey of the financial performance of dairies primarily located in Florida and Georgia. Its objective is to document the dairies' financial success using standardized, accrual accounting methods in order to calculate benchmarks and provide feedback on the dairies financial strengths and weaknesses.

Forty-one dairies submitted financial data for 2001. Thirty-nine dairies were included in the summary with complete data. Of these, 27 were located in Florida, 11 in Georgia and 1 in Alabama. The average herd size was 977 cows and 477 heifers with 17,170 lbs. of milk sold per cow. The average culling rate was 36 percent. There was an average of 19 FTE workers per farm with 51.5 cows per FTE worker and 880,000 lbs. milk sold per FTE worker. Total revenue per cwt. was $20.00/cwt. with $18.24/cwt. milk income. The average total expense was $17.75/cwt. The largest expense items were purchased feed ($7.32/cwt.), labor ($2.69/cwt), and livestock ($1.64/cwt). Net farm income from operations was on average $2.25/cwt. and net farm income was $2.39/cwt. The debt to equity ratio was 0.72, the rate of return on assets was 0.09, the rate of return on equity was 0.11, the operating profit margin ratio was 0.09 and asset turnover rate was 0.90. Individual expense items did not have a clear association with either herd size or level of production.

Milk price/cwt. was positively associated with herd size while total expenses/cwt. has a negative association, resulting in an average net farm income of $1.88/cwt for ≤400 cows, $2.31/cwt. for 400-900 cows and $2.76/cwt for ≥900 cows. Total expenses/cwt were negatively associated with level of production, resulting in an average net farm income for level of production of $1.98/cwt. for ≤16,000 lbs./cow, $2.25/cwt. for 16,000-18,000 lbs./cow and $2.94/cwt. for ≥18,000 lbs./cow.

Rate of return on assets had a positive association with both herd size and level of production.

Herd size and production level were positively associated with higher profitability.

Key Words: Dairy, Financial, Management

W255 Biological and economical efficiency of an accelerated, value-added cow-calf production system.

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The major objective of the study was to determine the biological and economical efficiency of an accelerated, value-added cow-calf production system. The system contains three major components, which are grazing, feedlot and wintering periods. Thirty-two mature crossbred beef cows (700 kg) with superior milking ability (10 kg/d) were selected and mated to bulls known for exceptionally rapid growth EPDs. From May through October, cow-calf pairs grazed improved, irrigated pastures using management intensive grazing practices. On September 1, calves were stratified into early weaned (EW) and normal weaned (NW) groups. The EW were weaned from their dams and placed back on pasture September 1, while the NW remained with their dams on pasture until weaning on November 1. On November 1, all calves were placed in a feedlot and stepped up to an 80% concentrate finishing diet in

21 d. Cows were wintered December through April, on either ammoniated wheat straw supplemented with alfalfa hay or the cows grazed standing corn plants. Feed inputs were monitored daily during each period. Calves and cows were weighed on a monthly basis and cows were body condition scored at the same time. All economic inputs and outputs were analyzed using actual market data. Profitability was assessed at September and November weaning and at feedlot finish. Marketing calves (262 kg) at September 1 indicated a $94 loss per cow. By November 1, NW calves weighed 26 kg more than EW calves (341 vs 315 kg, P < 0.05). Marketing calves at November 1 indicated a $61 and $86 loss per cow for the NW and EW calves, respectively. By retaining ownership to feedlot finish, a $72 and $70 profit per cow was indicated for NW and EW calves, respectively. Carcass quality was not affected and there were no differences in finish weight (506 vs 498 kg, P = 0.25). Wintering cows on grazed corn plants instead of ammoniated straw-alfalfa hay increased profitability by $30.61 per cow.

Key Words: Beef, Pasture, Nutrition

W256 Dairy herd expansion and modernization options available in UW-FARM. S. M. Combs, S. M. Lindsey, and D. K. Combs, *University of Wisconsin-Madison*.

UW-FARM (Field Nutrient Application and Recommendation Manager) is designed to identify acceptable strategies for managing on-farm and purchased nitrogen and phosphorus in a profitable and environmentally responsible manner. The program relies on soil test results consistent with Wisconsin Soil Test Recommendations for Field, Vegetable and Fruit Crops (UWEX A2809) to maximize optimum use of nutrients and restricts nutrient/manure applications in environmentally sensitive areas consistent with best management practices and NRCS- 590 (USDA-Natural Resources Conservation Services-Wisconsin, 1993). UW-FARM can also be used to ask "what if" when producers are considering expansion or other modernization practices. Assessing the impact on meeting current best management practices and NRCS-590 prior to actual expansion will allow producers to meet environmental constraints in a proactive manner. UW-Farm runs on all versions of Microsoft Windows beyond version 3.x. The program can be downloaded from www.uwlab.soils.wisc.edu or requested on CD. Entering herd cow numbers on the "expansion/modernization options" screen will show the manure quantity, available N and corn acres needed to use manure available N produced from these animals. The impact of raising heifers on or off-farm is available. Increasing cow numbers increases the need for feed and dairy producers traditionally have met forage requirements by growing and feeding alfalfa. UW-FARM calculates forage needs for cows and replacements. Producers may opt to grow less alfalfa and more corn for silage when acreage is limited because greater tonnage can be realized from corn silage. Users can estimate the percentage of the forage requirement to be supplied as alfalfa and corn silage. Total acres of each forage and total N need for corn silage is estimated. The impact of raising replacement heifers on or off-farm on forage needs manure N production can be evaluated. The total tons of P2O5 required at optimum soil test P levels are totaled for the alfalfa/corn silage options. The potential decrease in available manure phosphorus by limiting dietary phosphorus or cow numbers can be evaluated.

Key Words: Dairy, Manure, Nutrient cycling

W257 Net present value economic analysis model for adoption of photoperiod manipulation in lactating cow barns. R. L. Crill*, J. J. Hanchar, C. A. Gooch, and S. T. Richards, *Cornell University, Ithaca, NY*.

New technologies requiring capital investment in assets that have useful lives greater than one year should be analyzed using Net Present Value methods to assess whether the technology should be adopted. Photoperiod manipulation, also known as long-day lighting, is an emerging technology in the dairy industry. A Net Present Value Analysis Model to determine discounted cash flows over a ten-year expected useful life associated with the adoption of long-day lighting technology was developed by the authors. The model, in electronic spreadsheet form, allows farm business managers to evaluate the economic worth associated with the investment, and perform quick assessment of "best" and "worst" case scenarios using farm-specific values. In addition, the farm manager can easily develop more extensive sensitivity analyses on key variables. Using farm level data from two operating dairy farm businesses and the model, the authors estimated net present values over the ten-year expected useful life of $56,990 and $28,915. All investments with positive net present values are attractive investments, since they assure a rate of return that is greater than the minimum acceptable rate specified for the individual farm business. Sensitivity analyses results suggest that factors having a negative impact on overall economic worth include low milk production response, high electricity costs, and high ration costs. Farm business managers that utilize this analysis tool in decision-making should find this tool valuable for estimating the economic worth associated with long-day lighting technology.

Key Words: Net present value, Photoperiod manipulation, Economic anlysis model

W258 Regionalization of dairy Extension in-service training in the Mid-Atlantic and Northeast states. R. R. Peters*[1], M. L. O'Connor[2], L. J. Hutchinson[2], M. L. Westendorf[3], E. A. Claypoole[4], G. W. Anderson[5], D. P. Marcinkowski[5], W. E. Graves[6], S. M. Andrew[7], W. L. Shockey[8], P. S. Erickson[9], and J. W. Barlow[10], [1]*University of Maryland,* [2]*Pennsylvania State University,* [3]*Rutgers University,* [4]*Cornell Cooperative Extension,* [5]*University of Maine,* [6]*University of Massachusetts,* [7]*University of Connecticut,* [8]*West Virginia University,* [9]*University of New Hampshire, and* [10]*University of Vermont*.

The Middle Atlantic Consortium was awarded a grant from the Kellogg Foundation to develop a project titled, Regionalization of Programs in the Mid-Atlantic and Northeast to Enhance the Quality and Accessibility of Education in Animal Science. The objective for Extension training was to develop a high quality, regional program by increasing the cooperation among institutions and reducing redundancy in development and delivery of training materials. The organizational structure to plan the annual two-day dairy Extension in-service training program has been through a regional steering committee. The themes and location for the training programs during the last four years are as follows: 1999,Cattle Health Assurance Training, New Paltz, NY; 2000, Environmental Management of Dairy Farms, Hagerstown, MD; 2001,Tools for Dairy Production and Finance, Wilkes-Barre, PA; 2002, Clearing the Way to Profitability: Nutrition and Herd Health, Labor Management, and Profitability, Wilkes-Barre, PA. Nationally recognized keynote speakers with expertise on the theme subject have participated each year. Attendance has ranged from 55 to 65 educators. A valued feature of this training program is that speakers prepare presentations in PowerPoint. These presentations and other resources in electronic format are copied to a CD and presented in a notebook at registration. The training program has provided the opportunity to capitalize on cooperative efforts that provides excellent in-depth, regular training. Participants have rated the program as excellent or very good (84/%), and 94/% plan to use some part of their learning experience in their next year's Extension programs.

Key Words: Regional, Extension, Training

W259 Relationship of cow hygiene scores and SCC. J. K. Reneau*, A. J. Seykora, B. J. Heins, R. F. Bey, M. I. Endres, and R. J. Farnsworth, *University of Minnesota*.

The objective of this study was to investigate if there was any correlation between cow hygiene score and individual cow SCC. A scoring system scale from 1 to5 was selected to score cows for hygiene. Score 1 indicates a cow that is clean while a score 5 indicates a very dirty cow. The cow hygiene scorecard was broken down into five general areas: Tail head, Flank, Belly, Udder, and Rear legs and feet. Nine herds were selected for the trial (8 free stall, 1 tie stall). All herds were deemed to have predominantly environmental mastitis problems as indicated by bulk tank cultures. Individual cow SCC and culture data were used to edit known contagious mastitis pathogen infected cows from the data. A total of 1093 cows in the 9 herds were hygiene scored within 2 days of DHI test day. Each cow was scored in each of the five body areas. An udder-leg composition score was created, by averaging the udder and rear legs scores. A regression model was used to determine the effect that hygiene score had on SCS: SCS = Herd + Parity + DIM + DIM + "Hygiene score"; where SCS is the linear somatic cell count on DHIA test day, there were four parity groups (1,2,3, and 4 or greater), and DIM is the days in milk on DHIA test day. The model was run separately for each hygiene score trait. The mean SCC, SCS, FCM, DIM, and 305ME for the 1093 cows in the study were 405,242 (SD 1,017,000),

3.35 (SD 1.98), 80.91 lbs (SD29.2), 207 days (SD 139.59), and 24,321 lbs (SD 5022) respectively. Herd, Parity, DIM and DIM were all significant effects in the model (P < .01). Of the hygiene score traits Tail head, Flank and Belly were not significant. However, as Udder, Rear legs, and Udder - Rear legs composition scores increased SCS also increased. For each 1 standard deviation increase in Udder, Rear legs or Udder - Rear legs composition score, SCS increased by 0.13, 0.17 and 0.17, respectively. Similar herds with predominance of environmental mastitis infections and similar somatic cell count levels may expect to see a 40-50,000 change in herd SCC for each 1-unit change in cow hygiene scores.

Key Words: SCC, Cow hygiene score

W260 Implementation of a pilot Dairy Quality Management Program in Maryland. R. R. Peters*[1], R. A. Kohn[1], J. W. Simms[1], D. M. Schwartz[1], S. W. Fultz[1], M. R. Bell[1], J. E. Hall[1], J. Fearer[2], D. Booth[2], M. Clarke[2], K. Hendricks[2], and D. Shinham[2], [1]*University of Maryland, College Park, MD,* [2]*Maryland Department of Agriculture, Annapolis, MD.*

A one-year pilot Dairy Quality Management Program (DQMP) was launched starting with a one-day training program for five Maryland dairy producers and their advisors on July 3, 2001. The training program focused on three programmatic areas: biosecurity, animal health, and animal nutrient management. As a pilot program, it was emphasized that a major objective for everyone was experiential learning. The team approach to problem solving was implemented to enhance learning. Dairy advisory teams usually included six professionals. The initial team meeting with the producer started with a survey of farm and herd health information, herd goals and concerns, employee management, a farmstead map, detailed maternity and heifer-calf management practices, and ranking of current herd health concerns. Subsequently, a walk-through progressing from youngest to oldest animals was conducted with the advisory team using risk assessment forms. At the completion of risk assessment, the team convened with the farm family. Areas in need of improvement were discussed from two perspectives: most important for animal health risk and most practical for producer to improve. As assessments were completed, the advisory team outlined a herd plan with three to five goals supporting the overall herd goals initially discussed with the producer. The herd plan included the person responsible for task implementation, deadline for implementing the practice and the frequency to conduct task. Rations were examined and milk urea nitrogen was measured monthly to evaluate herd nutrition. The producer and team met at least quarterly to monitor progress. A personal interview was completed for each herd using producer attitude and herd plan as criteria for evaluation. All producers expressed a positive experience with DQMP. Farms changed 1 to 7 (median = 3) management or facility changes per farm. It is concluded that producers will adopt and implement DQMP on their farms.

Key Words: Dairy, Quality, Management

Dairy Foods: Microbiology and Cheese

W261 EPS and lactic acid production by *S. thermophilus* 1275: influence of pH, temperature, nutrients and co-culturing with non-EPS starter. B. Zisu*[1], G. Harvey[2], and N. P. Shah[1], [1]*Victoria University, Melbourne, Australia,* [2]*Dairy Farmers, Tingalpa, Queensland, Australa.*

Lactic acid bacteria that synthesise exopolysaccharides (EPS) are used increasingly in the dairy industry to improve rheological behaviour, mouthfeel and texture of fermented milks. We have identified a strain of *Streptococcus thermophilus* 1275 which produces both capsular and extracellular EPS.

The objective of this study was to examine EPS and lactic acid production by *S. thermophilus* 1275 in skim milk under various pH and temperatures, supplementation with whey protein concentrate (WPC) and co-culturing with non-EPS *S. thermophilus*.

S. thermophilus 1275 was grown in skim milk in a Biostat B fermenter and samples were taken at 0, 6, 12, 18 and 24 h to determine the amount of EPS, and levels of lactic acid, lactose, glucose and galactose. The bacterial count was also enumerated. EPS was isolated by protein removal and precipitation with ethanol and quantified using the phenol-sulphuric method. Lactic acid, lactose, glucose and galactose were determined using HPLC.

S. thermophilus 1275 produced 406 mg/L of EPS and 3.09 g/L of lactic acid at 37^{o}C. High temperatures and low pH reduced the EPS production, which ultimately ceased at pH 4.5. Maximal growth of the organism and lactic acid production occurred at conditions different to those for EPS production. The pH, temperature, WPC and co-culturing played an important role in the rate and the amount of EPS and lactic acid produced. EPS production peaked at pH 5.5 and at 37-40^{o}C reaching at 458mg/L. The EPS production was further stimulated by co-culturing with non-EPS *S. thermophilus* reaching at 832mg/L and the highest lactic acid concentration of 31.41 g/L. EPS production was highest at 1029 mg/L with WPC supplementation at pH 5.5, however, lactic acid concentrations were lower with WPC supplementation. Significantly less lactic acid was produced when the pH was not controlled during fermentation with or without WPC supplementation.

EPS production can be increased by supplementation with WPC. WPC also reduced the concentration of lactic acid. Co-culturing with non-EPS *S. thermophilus* significantly increased EPS production and may provide a more attractive means of increasing EPS production, thereby improving textural and functional characteristics of dairy foods without the use of additives.

Key Words: Exopolysaccharides, Co-culturing, Nutrient supplementation

W262 selection of prebiotics utilization from *Lactobacillus acidophilus* ATCC 43121 for synbiotics. E. Y. An*[1], S. Oh[2], and S. H. Kim[1], [1]*Korea University,* [2]*Hnkuk Yakult Institute.*

The number of food and other dietary products containing live Bifidobacterium and Lactobacillus bacteria has increased in recent years. In the large intestine, prebiotics, in addition to their selective effects on bifidobacteria and lactobacilli, have influenced many aspects of bowel function through fermentation. The selected synbiotic pairs of stimulated lactobacillus strains and oligosaccharide enhancing their growth were studied to determine the effect of probiotics, prebiotics and synbiotics. This research was investigated effective ability of *L. acidophilus* ATCC 43121 bacteria on minimal media by ratio of adding prebiotics which was used as substrates. Viable cell count of *L. acidophilus* ATCC 43121 and pH of media were measured during twelve, twenty four hours incubation at 37 with seven prebiotics which were of different concentrations to increase the growth of *L. acidophilus* ATCC 43121 selectively. From this experiment results, the effect of prebiotics was signicantly($P<0.05$) higher in control media compared to media adding ratio of fructooligosaccharide, lactulose, raffinose of incubation for twenty four hours. The addition ratio expansion of this three prebiotics was increased consequently by strains growth but pH was decreased. For this experiment response surface methodology to create the right mix ratio which will maximize the bacteria's vital energy by using mix of selected three prebiotics and from this, the right mixture ratio was 36.5%, 0.00% and 63.5%.

Key Words: *Lactobacillus acidophilus*, Prebiotics, Synbiotics

W263 Factors affecting autoaggregation behavior of bifidobacteria. S. A. Ibrahim*, O. A. Hassan, C. W. Seo, Y. Murad, M. Worku, and G. Shahbazi, *North Carolina A&T State University.*

Recent evidence suggests that the addition of bifidobacteria as a dietary adjunct or probiotic may have important health benefits. However, in order for these bacteria to manifest beneficial effects, they need to achieve an essential mass through aggregation. Consequently, the ability of bifidobacteria to aggregate is a desirable property sought for use in commercial food preparations. The objective of this research was to determine the effect of media composition and incubation temperatures on autoaggregation behavior of bifidobacteria. Another objective of this work was to determine the cell surface characteristics of bifidobacteria as related to autoaggregation. Autoaggregation behavior of bifidobacteria was determined using different media (TPY, Wilkins-Chalgren and