as the slope of declining production from 100 to 195 DIM (M3) and in M2. Total milk yield was greater in P60 and P165 vs. C60 for both parities (P<0.05) in M1 and M2 in both L1 and L2. Milk yield was greater in P165 vs. P60 (P<0.05) during M2 for both parities in L1 but no difference was detected in L2. P165 Prim and Mult cows were more persistent vs. P60 (P<0.05) in late lactation (M2) during L1. No significant difference in persistency was detected in L2. Milk production at dry-off (MPD) for Prim cows was greater in P60 vs. C60 or P165 (P<0.05). MPD was not affected by treatments for Mult cows. Days dry was shorter (P<0.05) for all P60 cows vs. P165 cows in both lactations. Days dry was not different for C60 vs. P60. Days to first insemination after the VW were less for P165 cows vs. C60 or P60 cows in both lactations and both parities (P<0.05). A greater percentage of P165 Prim cows became pregnant in the L1 breeding period vs. P60 Prim cows (P<0.01). There was no difference in percent pregnant between P165 vs. C60 Prim cows in L1 or among any of the Mult groups in L1 or L2. There was no effect of POS or delayed breeding on mastitis case rate.

Key Words: Delayed breeding, Milk production, Reproduction

611 Induced lactation: the need for enhanced mammary development and differentiation. B. A. Crooker*[1], R. J. Collier[2], J. L. Vicini[3], M. F. McGrath [3], and W. J. Weber[1], [1]*University of Minnesota, St. Paul,* [2]*University of Arizona, Tucson,* [3]*Monsanto Agricultural Group, St. Louis, MO.*

Induction of lactation has the potential to increase farm profitability through retention of healthy reproductive culls for one or more additional lactations. Of the approximately 1 million dairy cows culled in the US due to reproductive failure each year, about half are healthy and in appropriate condition for another lactation. These potential culls would be retained if they were profitable. Methods to induce lactation have been described for more than 50 years and most utilize twice daily subcutaneous injections of 17β-estradiol (0.05 mg/kg BW/injection) and progesterone (0.125 mg/kg BW/injection) for 7 d with a secondary treatment such as dexamethasone (0.05 mg/kg BW/d). However, these methods have been plagued by considerable variation in the proportion of treated cows that actually produce milk and their subsequent milk yield. Recent efforts to improve the technique have included administration of bST during the induced lactation and inclusion of bST in both the induction treatment phase and subsequent lactation. Although these efforts have increased milk yield, variation in response and in yield relative to previous production remain greater than desired. Clearly the pregnancy and parturition dependent processes of extensive ductal and lobuloalveolar development, proliferation of alveolar cells, and terminal differentiation of these secretory epithelial cells is not mimicked adequately by current methods to induce lactation. More recent efforts to induce lactation have attempted to enhance mammary development and/or differentiation by intramammary infusion of mammogenic compounds. Results from a half-udder model indicate intramammary infusion of prostaglandin E_2 either enhanced mammary development or differentiation which resulted in increased milk yield from cows induced to lactate. Continued refinement of this technology is warranted and required before it can be considered as a practical on-farm technology.

Key Words: Induced lactation, Mammary development, Differentiation

Nonruminant Nutrition Symposium: Energy density of pig diets

612 Energy density of pig diets: effect of energy evaluation system, technology and pig body weight. J. Noblet*[1] and J. van Milgen[1], [1]*INRA, UMRVP, Saint Gilles, France.*

The feed cost is the most important cost in pig production and energy represents the greatest proportion of this cost. Ad libitum energy intake depends on many animal and environmental factors in which feed energy density (or its chemical composition) play an important role. Under satisfactory protein supply, performance of animals depends directly on the energy supply. Finally, nutrient requirements must be expressed relative to energy intake in order, for instance, to take into account changes in the partitioning of energy gain between protein and lipid during growth. It is then important to express feed energy value on an appropriate basis. Both energy supply (a diet characteristic) and requirement (an animal characteristic) should be expressed using the same system. From that point of view, a NE system may be a good compromise. Energy density depends on the nutrient composition which differ markedly in GE content (23.0, 39.0, 17.4, and 18.4 kJ/g for CP, fat, starch (ST) and dietary fiber (DF), respectively). In addition, nutrient digestibility is variable so that the contribution of nutrients to DE supply in growing pigs ranges from 31.7 kJ/g for fat to 22.4 kJ/g for CP, 17.2 kJ/g for ST and only 3.2 kJ/g for DF. Nutrient composition also affects the metabolic utilization of ME: the ratio of NE to ME varies from 90% for fat to 82% for ST and 60% for CP. Consequently, the relative energy density of feeds for pigs depends on the energy system (DE, ME or NE). For instance, the energy values (relative to a conventional diet with corn, wheat, soybean meal and fat containing 14.2, 13.6 and 10.3 MJ/kg of DE, ME, and NE, respectively) of corn, soybean meal and animal fat are 100, 104 and 235 on a DE basis, 102, 99 and 244 on a ME basis, and 107, 79 and 289 on a NE basis. The existing confusion about energy systems is partly due to the existence of different NE systems and care has to be taken when combining values obtained from different systems. The energy density of pig feeds can also be affected by technology. For instance, pelleting increases markedly the fat and energy digestibilities in corn or full fat rapeseed. Finally, digestion of DF becomes more efficient with increasing BW with subsequent differences in energy density of feeds according to pig BW.

Key Words: Pig, Feed, Energy value

Animal Behavior & Well Being: Production challenges

613 Is iodide responsible for the heat-relief effects of *Ascophyllum nodosum*? P. A. Eichen*[1], M. J. Leonard[1], M. A. Kozma[1], B. M. Kronk[1], L. E. McVicker[1], D. E. Spiers[1], and D. P. Colling[1], [1]*University of Missouri, Columbia, MO,* [2]*Acadian AgriTech, Kansas City, MO.*

Previous studies indicate that adding seaweed (*Ascophyllum nodosum*) extract (Tasco-EX®) to the diet results in decreased core body temperature (Tc) in rats experiencing heat stress and fescue toxicosis. A rat model was used to test Tasco-EX (Acadian Seaplants Limited, Nova Scotia) versus ethylenediamine dihydroiodide (EDDI, International Nutrition, Omaha), at an iodide level equal to Tasco-EX (1215 μg I/g). Experiment I was designed to observe changes during each phase of treatment/temperature exposure. Diets contained no additive, 1% Tasco-EX or EDDI. Male rats (n=72; 372 g av BW) were maintained at thermoneutrality (TN; 21°C) for 5 days before treatment to record baseline feed intake and BW. Treatment diets were fed for seven days at TN, followed by exposure to heat stress (HS; 31°C) for 14 days, with a final seven days at TN. Body weight and feed intake were recorded daily. Six rats from each treatment were sampled for organ weight, and blood T3 and T4 at the end of each phase (four sample weeks). Experiment II was designed to look at Tc response to treatment/temperature. Male rats (n = 24; 288 g av BW) were implanted with telemetric temperature transmitters (Mini Mitter, Bend, OR) to record Tc and activity under conditions similar to Experiment I. At the end of week four, all rats were euthanized for determination of organ weights and blood T3 and T4 levels. Feed intake and weight gain were not different for any of the treatments. There were no T3 differences by treatment or sampling time. In contrast, T4 was lower in all treatment groups at the end of week three (P<.004), and was higher in rats receiving either Tasco-EX or EDDI (P<.007) compared to controls. Rats fed Tasco-EX or EDDI tended to have lower average daily Tc compared to control animals during HS. Average daily maximum Tc of rats receiving Tasco-EX was decreased below control level during a period of HS. These results indicate that dietary iodide is associated with some, but not all, responses to Tasco-EX.

Key Words: Heat stress, Seaweed, Telemetry