times greater than that of fluid-associated bacteria, suggesting different degradation rates between purines. When estimated using TP, flows of microbial NAN did not change and flows of non-microbial NAN (NMNAN) decreased linearly (from 273 to 219 g/d; $P < 0.01$) when SSBM and urea were replaced in the diet with the less degradable LSBM. These results were in contradiction with published results and predicted responses to changes in the ruminal degradability of the protein source fed. However, as RDP decreased, microbial NAN flow decreased linearly ($P < 0.01$) when measured using ^{15}N (from 470 to 384 g/d), and AA profiles (from 392 to 311 g/d), while NMNAN flow (expressed as % of total NAN flow) increased linearly ($P < 0.01$) when estimated based on ^{15}N (from 30.4 to 37.8%) and AA profiles (from 44.5 to 52.0%). The regression ($P < 0.01$) of TP on ^{15}N for microbial NAN flow had a slope of 0.57 ($P < 0.01$) and an intercept of 195 ($P < 0.01$). Averaged across diets, microbial NAN flows estimated using ^{15}N, TP, and AA profiles were 429, 401, and 360 g/d, respectively, and were lowest for AA profiles and highest for ^{15}N and TP ($P < 0.01$). Microbial and dietary NAN flows from the rumen estimated using ^{15}N appeared to be more accurate and precise than flows estimated with the other markers.

Key Words: Microbial Markers, Omasum, Dairy Cows

89 Effects of daily variation in dietary protein concentration on milk production in mid-lactation cows. N. R. St-Pierre* and D. Gerstner, *The Ohio State University*, *Columbus*.

Thirty lactating Holstein cows (18 primiparous, 12 multiparous) with an average body weight of 633 kg and averaging initially 38.2 kg of milk per day at 186 days in milk, were used in an incomplete, balanced cross-over design to assess the effects of fluctuating daily dietary crude protein (CP) on milk production and composition. Three dietary treatments consisting of three levels of daily variation in dietary CP were studied. Each cow was randomly assigned to a series of two dietary treatments that were administered in two consecutive periods of 21 days each. Treatment diets were based on 52% roughage on a DM basis (42% corn silage, 10% alfalfa hay), 8% cottonseed and 40% concentrate. All treatments averaged 15.5% CP but differed in level of day to day variation. Treatment 1 (small variance) consisted of a diet constant in theoretical CP content (15.5%). Treatment 3 (large variance) alternated on a daily basis the feeding of a 19.5% and 11.5% CP diet. Treatment 2 (medium variance) alternated between a 17.5% and a 13.5% CP diet. Two concentrates were used to prepare all 5 diets. Changes in CP were achieved through the substitution of corn for soybean meal in the concentrates. Treatments had no effect on milk yield (34.9, 34.9, 34.4 ± 0.90 kg/d), milk true protein content (2.97, 3.00, 3.00 ± 0.038 %), fat content (3.39, 3.30, 3.25 ± 0.136 %), lactose content (4.87, 4.86, 4.86 ± 0.046%), protein yields (1040, 1050, 1033 ± 30.5 g/d), fat yield (1171, 1146, 1123 ± 54.4 g/d), lactose yield (1708, 1699, 1674 ± 49.1 g/d), and milk urea N concentration (9.33, 9.14, 9.42 ± 0.36 mg/dL), for the small, medium and large variance treatments, respectively. Variation in daily dietary CP content does not affect milk production in mid lactation if the cycle of variation is over a period of two days.

Key Words: Dietary Variation, Milk Response, Crude Protein

90 Relationship between milk urea nitrogen (MUN) and days open in early lactation dairy cows. M. Nowrozi*, M. Raisianzadeh, and M. Abazari, *Agriculture and Natural Resources Research Center of Khorasan, IRAN*, *Mashhad, Khorasan, IRAN*.

Our objective was to evaluate the relationship between MUN and days open in Holstein dairy cows. Ten dairy farms in the countryside of Mashad, Iran were randomly selected, milk samples of postpartum cows (from calf birth to 3 months after parturition) were collected at monthly intervals, and reproduction data were compiled for three years. MUN content of 12,000 samples were measured by enzymatic method. The cows were categorized into four quartiles based on the MUN levels in these data: less than 12, between 12 and 16, between 16 and 18, and greater than 18 mg/dl. Data were analyzed by survival analysis and Cox model. The results show that the effect of mean milk yields in peak, herd, fat percentage, and season on model was not significant, but MUN had a significant effect on days open ($P < 0.0001$). The least days open were observed in cows with 16-18 mg/dl MUN and out of this range, days open were increased, significantly (134 vs. 148.6 and 150.29 d).

Acknowledgements: The authors would like to thank the Agriculture and Natural Resources Research Center of Khorasan IRAN for the technical support.

Key Words: Dairy Cows, MUN, Days Open

Swine Species: Effects of Maternal Nutrition on Offspring Performance

91 Consequences of birth weight for postnatal growth performance. C. Rehfeldt*, *Research Institute for the Biology of Farm Animals*, *Dummerstorf, Germany*.

In multiparous species such as the pig there is an intra-litter variation in birth weight and skeletal muscle fibre number. It is commonly recognized that low birth weight in piglets correlates with decreased survival and lower postnatal growth rates. So-called runts are usually excluded from rearing. In the majority of low birth weight piglets low numbers of muscle fibres differentiate during prenatal myogenesis, for genetic or maternal reasons, and only those low birth weight piglets with normal fibre numbers are able to exhibit postnatal catch-up growth. Pigs of low birth weight show the lowest growth performance and the lowest lean percentage at slaughter. In addition, they tend to develop extremely large muscle fibres (giant fibres) and poor meat quality, which, in part, results from the inverse correlation between fibre number and fibre size. Prenatal growth/myogenesis is under the control of various genetic and environmental factors, which can be targeted for growth manipulation. Prenatal development is mainly dependent on a close interrelation between nutritional supply/utilization and regulation by hormones and growth factors. In particular, the maternal somatotropic axis plays a significant role in the control of myogenesis. Thus, treatment of sows with growth hormone (GH) until mid gestation was able to increase birth weight and the number of muscle fibres in the progeny, which was most pronounced in small littermates disadvantaged by insufficient nutrient supply. GH treatment was associated with increased nutrient availability to the embryos and changes in regulatory proteins of the GH- IGF axis. Interactions between maternal nutrition and the somatotropic axis in determining prenatal growth and myogenesis are worthy of further investigation.

Key Words: Pig, Growth hormone, Muscle fiber