

iment. Animals were housed in a free stall barn open on 2 sides. Light was provided by high pressure sodium vapor lamps. Intensity of light at cow eye level was 254 ± 26 lux during the day and 132 ± 9 lux at night. Photoperiod did not affect 4% fat corrected milk (FCM) in either age group in the 1981 experiment although cows in the 18L:6D group were 15% more persistent in 4% FCM over the 16 week period. Persistency in 4% FCM was not affected by photoperiod in the heifers. At 6 wk serum PRL response to TRH (33 ug/100 kg BW) was measured in 5 animals from each group. Blood was obtained by tail venipuncture. Basal (55.1 ± 7.4 ng/ml) and peak levels of PRL were not affected by age or photoperiod. In the 1982 experiment a significant interaction between time and photoperiod occurred in the cows. Cows in the 18L:6D group were 14% more persistent in 4% FCM over 9 wk. Persistency of heifers was unaffected by photoperiod. PRL response to TRH or saline was tested in 10 animals in each group. Basal PRL was similar in TRH and saline injected animals (75.9 ± 10.6 ng/ml) but was lower ($P < .05$) in cows (53 ± 7.7 ng/ml) than in heifers (111 ± 30.9 ng/ml). Saline injection did not elicit a PRL increase. Peak PRL after TRH was higher ($P < .10$) in animals exposed to 18L:6D.

KEY WORDS: Photoperiod, 4% Fat-corrected-milk, Prolactin, TRH

- 103 Metabolic responses of horses to temperature stress. G.E. McBride*, R.J. Christopherson and W.C Sauer, University of Alberta, Edmonton

Six mature quarter horse geldings averaging 513.2 ± 17.7 kg in weight were housed in outdoor pens for a 3 month period from Nov. to Jan. and fed a maintenance ration. The experimental period was divided into 5 six-day periods: during periods 1 & 5 the O_2 consumption and CO_2 production of each horse was measured over a 6 h period in a temperature-controlled chamber maintained at 18 °C. During periods 2, 3 & 4 the horses were assigned to pairs and acutely exposed (6 h) to 6 temperature treatments (+10, 0, -10, -20, -30 & -40 °C) according to a double 3x3 latin square design. Plasma samples for T_3 and T_4 analysis were taken at the beginning of periods 2, 3 & 4, to measure basal levels, and after 6 h exposure to each temperature. Hair density measurements were obtained by clipping a small area on the neck at the beginning of period 1 and at the end of period 5. Outdoor maximum and minimum temperatures were recorded daily throughout the experiment. Winter in Edmonton was relatively mild; daily maximum and minimum temperatures averaged -3.4 & -11.0, -3.0 & -10.0 and -1.5 & -11.7 °C in Nov., Dec. and Jan., respectively. Comparison of the basal levels of T_3 and T_4 and of metabolic rate (MR), measured at 18 °C, did not reveal any significant ($P > .05$) period effects. Furthermore, an insignificant amount of hair growth occurred during the experiment: hair density (mg/cm^2) measured during period 1 & 5 respectively, averaged 23.87 ± 1.71 and 26.73 ± 1.82 . MR ($kJ/kg^{.75}/h$) averaged 23.10 ± 0.82 , 21.31 ± 0.54 , 20.49 ± 0.89 , 20.60 ± 0.40 , 23.55 ± 0.85 , 29.14 ± 1.00 and 35.85 ± 0.65 at ambient temperatures of +18, +10, 0, -10, -20, -30 & -40 °C, respectively. MR was significantly ($P < .05$) elevated above basal levels at ambient temperatures above +10 and below -10 °C. No significant effect of temperature on plasma levels of T_3 and T_4 was observed.

KEY WORDS: equine, temperature stress, metabolic rate, thyroid hormones

- 104 Restraint reduces size of thymus gland and PHA skin swelling in pigs. H. J. Mertsching* and K. W. Kelley. Washington State University, Pullman.

Two experiments were conducted to determine the effect of short-term restraint stress on size of lymphoid organs, serum cortisol and phytohemagglutinin (PHA) skin swelling in young pigs. In the first experiment, 24 pigs were randomly assigned by litter to a control or restraint group. Control pigs were left undisturbed, while restraint pigs were placed in a 13cm x 33cm expanded metal box, with adjustable length, for 2 h beginning at 0800 for three consecutive days. After the third restraint period, all pigs were slaughtered and certain lymphoid organs were collected, weighed and adjusted to a percentage of body weight. Restraint reduces ($P < .05$) size of the thymus gland from .142% to .105% of body weight. There were no significant differences among treatments in size of the spleen, adrenal or mesenteric lymph nodes. Since the short restraint period caused atrophy of the thymus gland, a second experiment was designed to investigate the effect of restraint on *in vivo* cell-mediated immunity and concentrations of serum cortisol. Procedures were as in expt. 1. Blood samples were collected from 8 wk old pigs by venipuncture immediately prior to and after the 2 h restraint period on all three days. Prior to restraint, all pigs were challenged with $2.5 \text{ mg} \cdot \text{ml}^{-1}$ PHA. Average serum cortisol (by validated RIA) in control pigs ranged from 18 to 28 $\text{ng} \cdot \text{ml}^{-1}$. After the three restraint periods, cortisol increased ($P < .01$) to 60, 37 and 39 $\text{ng} \cdot \text{ml}^{-1}$, respectively. Immediately prior to the second and third restraint