Year	Season	b	a+b	c	EP
1999	Dry	38.2^a	39.9^a	0.048^b	25.2^a
	Wet	43.4^a	43.5^a	0.071^a	30.5^a
2000	Dry	33.0^b	30.9^b	0.049^b	18.4^b
	Wet	40.9^a	40.4^a	0.066^a	27.6^a

EP= Effective gas production; means within a row with same superscript do not differ (P<0.05)

Key Words: goats, gas production, grazing

Horse Species

1183 Effects of feeding a blend of grains naturally-contaminated with *Fusarium* mycotoxins in feed intake, serum chemistry and hematology of horses. S.L. Raymond*[1], T.K. Smith[2], and H.V.L.N. Swamy[2], [1]*Equine Research Centre, University of Guelph,* [2]*University of Guelph.*

A study was conducted to determine the effect of feeding mature horses a blend of grains naturally-contaminated with *Fusarium* mycotoxins. Changes in feed intake and metabolism and the efficacy of a yeast cell wall polymer mycotoxin adsorbent were determined. Nine non-exercising, mature mares were randomly assigned to one of three experimental diets for 21 days (d). The experiment was subsequently replicated in time. Diets included: (1) control, (2) blend of contaminated grains (10 ppm deoxynivalenol, DON) and (3) blend of contaminated grains + 0.2% yeast cell wall polymer (MTB-100, Alltech Inc.). All diets included 35% grain + 65% forage. Feeding of contaminated grains to horses resulted in reduced feed intake compared to controls (p<0.05). Supplementation of the yeast cell wall polymer to the blend of contaminated grains significantly improved feed intake compared to the feeding of contaminated grains. Consumption of forage remained unaffected regardless of diet fed. Gamma-glutamyltransferase levels were significantly higher in serum of horses consuming contaminated grain on days 7 and 14 but not on day 21 implying that the horses might be adapting to the hepatotoxicity caused by the mixture of *Fusarium* mycotoxins. It was concluded that the feeding of grains naturally-contaminated with *Fusarium* mycotoxins can decrease feed intake and alter serum chemistry in mature horses. Supplementation of yeast cell wall polymer to contaminated grains was beneficial in alleviating reduced feed intake in mature horses.

Key Words: Equine, *Fusarium*, Deoxynivalenol

1184 Serum vitamin E and trace minerals levels and blood parameters in growing throughbred horses during the period of pasture grazing and the stable feeding. C. E. Lee*[1], N. K. Park[1], S. B. Ko[1], S. H. Jin[1], D. H. Kang[2], and K. I. Kim[3], [1]*National Jeju Agri. Exp. Station, Jeju, Rep. of Korea,* [2]*Korea Racing Association, Jeju, Rep. of Korea,* [3]*Cheju National University, Jeju, Rep. of Korea.*

Nutritional adequacy of growing horses raised in an alternate feeding system - grazing during late spring through early fall and stable feeding for the rest season - was assesed by determining vitamin E and mineral levels in serum, and various blood parameters related to nutrition and health. During the stable feeding, 50 growing female horses were fed concentrates (1.4% of their body weight), grass hay (0.62%) and alfalfa hay (0.37%). During the grazing, the same horses were fed supplementary concentrates (1.1%). Blood samples were taken the day before (average BW, 321 kg at the age of 11 to 14 mo) and 45 d after the start of grazing (355 kg). Serum vitamin E increased (P < 0.01) during grazing compared to that found before the initiation of grazing (1.35 vs 0.96 mg/L). Serum Fe, Cu and Zn contents were much lower (P < 0.01) during than before grazing. Blood urea (25.2 vs 31.2 mg/100 mL), GOT (378 vs 407 IU/L), GTP (7.0 vs 9.7 IU/L), T-bilirubin (0.35 vs 0.46 mg/100 mL) and D-bilirubin (0.14 vs 0.18) levels were much higher (P < 0.01) during than before grazing. Blood glucose (120 vs 91 mg/100 mL), creatinine (1.4 vs 1.2) and Ca (14.9 vs 12.9) levels were lower (P < 0.01) during than before grazing. Results indicate that general nutrition in these horses is adequate during both the pasture grazing and stable feeding periods, although vitamin E and some trace minerals in the serum vary with feeding system.

Key Words: Horses, Feeding system, Vitamin E

1185 Pilot study investigating the potential of ginseng (Panax quinquefolium) to potentiate routine vaccination in horses. W. O'Neill*[1], J. T. Arnason[2], S. McKee[3], and A. F. Clarke[4], [1]*Nutraceutical Alliance Inc., Guelph, Ontario, Canada,* [2]*University of Ottawa, Ottawa, Ontario, Canada,* [3]*Equine Research Centre, Guelph, Ontario, Canada,* [4]*University of Melbourne, Melbourne, Australia.*

This paper reports a pilot investigation into the potential for using ginseng to potentiate routine vaccination in healthy horses. Ten horses with known vaccination history were included in the randomized, placebo-controlled, double-blind trial. Five horses received ground, powdered ginseng (35mg/kg BW) in molasses carrier, and five horses received a blank molasses carrier (placebo). Ginseng used in the study underwent phytochemical analysis for ginsenoside levels. The study was a double-blind, placebo controlled, completely randomized design. Horses received ginseng or placebo for a total of 28 days, and on Day 14 each horse was vaccinated with rhinophenumonitis vaccine. Measurement parameters included antigen-specific antibody formation, total peripheral T-Cell and B-Cell quantitation, CD4+ and CD8+ presenting lymphocytes, and complete haematology and biochemistry blood screens. Changes in antibody levels and lymphocyte profile parameters were determined by calculating the difference between each test day and day zero. The Wilcoxon rank-sum test was used to determine if there were differences between treatment and control groups at each day. Antibody results were ranked using the ranking procedure in SAS and then the GLM procedure with repeated measures was used to determine differences over time. There was a visual trend to increased antibody formation upon vaccination challenge in ginseng-treated animals compared with control animals, but these data did not reach statistical significance. Based on the clear trend shown when data was graphically displayed, it is concluded that this trial provides adequate rationale for further research into the potential for ginseng supplementation to potentiate the immune response of horses. However, future studies must incorporate a larger sample size, fully standardized experimental subjects, and dose titrations for ginseng dose optimization.

Key Words: Ginseng, Vaccination, Equine

1186 Illinois equine checkoff initiative. K Kline*[1], [1]*University of Illinois at Urbana-Champaign.*

The Horsemen's Council of Illinois, in cooperation with the Illinois Farm Bureau, Illinois Grain and Feed Association, Illinois Department of Agriculture, and representatives of several colleges and universities with equine programs formed a committee in October of 2001 to pursue legislation establishing a Checkoff program to support equine education, promotion and research.
The committee met in December of 2001 to discuss the procedures for developing legislation, defining language, and establishing the structure of the Equine Checkoff Board.
The committee discussed the need to determine board structure as it relates to potential board members, scope of coverage, and authority. Concluding the discussion, the committee reviewed funding and refund procedures to be administered by the board.
Specific recommendations of the committee and subsequent actions of the Equine Checkoff Board will be presented to serve as a example to other states interested in pursuing Equine Checkoffs.

Key Words: Illinois, Equine checkoff, Draft legislation

1187 Development of a light-weight, microwavable equine artificial vagina. K. Bennett-Wimbush*, B. Raimonde, and P. Stull, *Ohio State University Agricultural Technical Institute, Wooster, Ohio USA*.

A light-weight equine artificial vagina (AV) incorporating reusable gel packs (Consolidated Products and Services, Inc. Braintree, MA) as the heat source was constructed and tested for use in teaching breeding laboratories. A Missouri model AV was fitted with a specially constructed leather outer case which housed reusable gel packs. Gel packs were microwaved in order to achieve an internal AV temperature of at least 44° C. The internal size diameter was adjusted using air. Five trials were conducted to compare the length of time that the internal AV temperature remained in breeding range (44 to 52° C) for the gel-pack AV vs. a Missouri model AV. Both AV models were set up with approximately the same internal diameter and placed outside together in ambient temperatures which ranged from -2 to 8° C. The experiment started when the internal AV temperature reached between 44 and 46° C. A thermometer (Animal Reproduction Systems, Chino, CA) was placed 30 cm inside each AV and the time that each AV remained in the breeding range was recorded. Data was analyzed using student t-test GLM, SAS. The gel-pack AV held its internal temperature longer ($p < .01$) than the Missouri model AV with means of 39.8 ± 7.2 and 18.4 ± 2.7 minutes respectively. Additionally the gel-pack AV weighed 2.8 kg when adjusted for breeding while the Missouri model weighed 4.4 kg., an increase of 57%. Although breeding trials were not conducted, the gel-pack AV was used several times during semen collection with no observable problems. This modified AV offers an alternative to the traditional AV models. Its lighter weight and increased heat retention may be beneficial for students learning collection techniques or on farms where personnel is limited and the AV must be set up in advance.

Key Words: Horse, Semen collection, Artificial vagina

Milk Synthesis

1188 Conjugated linoleic acids (CLA), *trans* fatty acids, and lipid content in milk from Holstein cows fed a high- or low-fiber diet with two levels of linseed oil. J. Loor, A. Ferlay, A. Ollier, M. Doreau, and Y. Chilliard*, *Unite de Recherche sur les Herbivores, INRA-Theix, 63122 St.-Genes Champanelle, France*.

To determine effects on lipid content and fatty acid profiles of milk in response to altered rumen fermentation and 18:3*n*-3 availability, four Holstein cows were fed a high (65:35 forage to grain; HF) or low (35:65; LF) fiber [derived from grass hay] diet without (HFN, LFN) added oil or with linseed oil (HFO, LFO) at 3% of DM. A 4 × 4 Latin square design was implemented for 4 wk. Milk yield (26.7 kg/d) and DMI (20.2 kg/d) were not affected by treatments. Milk fat percentage and yield, however, were lower in response to feeding LFN or LFO (2.31%, 625 g/d) compared with HFN or HFO (3.38%, 870 g/d). Yield of total CLA in milk averaged 6 g/d due to feeding HFN or LFN, and increased to 13 g/d in response to HFO or LFO. *Cis*9,*trans*11-18:2 accounted for 85-90% of total CLA. Its yield was not affected by fiber level but increased by 116% in response to linseed oil. Feeding low-fiber diets resulted in greater yield of *cis*11,*trans*13- and *cis*9,*cis*11-CLA. Linseed oil supplementation further increased yield of *cis*9,*cis*11-CLA, but also *trans*11,*trans*13-CLA. The *trans*10,*cis*12- isomer of CLA was not detectable under any feeding conditions. Yield of *trans*11,*cis*15-18:2, an intermediate during hydrogenation of 18:3*n*-3, was 1 g/d in cows fed HFN or LFN compared with 10 g/d due to feeding HFO or LFO. Total *trans*-18:1 yield in milk averaged 19 g/d when cows were fed HFN, increased to 30 g/d in response to LFN, and peaked at 89 g/d due to feeding HFO or LFO. Greater yield of *trans*10-18:1 (10 vs. 2 g/d) accounted for the increase in total *trans*-18:1 when LFN was fed compared with HFN. In contrast, increases in *trans*11-18:1 (24 vs. 8 g/d) and *trans*13+14-18:1 (40 vs. 4 g/d) yields were primarily responsible for the greater *trans*-18:1 yield when linseed oil was fed. Milk fat depression was only observed when diets induced a marked increase in milk *trans*10-18:1 but was not related to any increase in *trans*10,*cis*12-CLA.

Key Words: low-fiber, linseed oil, *trans*-fatty acids

1189 Intestinal supply of *trans*10,*cis*12-18:2 lowers milk fat output in Holstein cows fed a high- or low-fiber diet with two levels of linseed oil. J. Loor, A. Ferlay, M. Doreau, and Y. Chilliard*, *Unite de Recherche sur les Herbivores, INRA-Theix, 63122 St.-Genes Champanelle, France*.

To assess effects of enhanced *trans*10,*cis*12-18:2 (10/12CLA) availability on milk fat content and fatty acid profiles in milk, four Holstein cows fed a high (65:35 forage to grain; HF) or low (35:65; LF) fiber [derived from grass hay] diet without (HFN, LFN) added oil or with linseed oil (HFO, LFO) at 3% of DM were infused (0.208 g/h) with 10/12CLA for 5 d via the duodenum. A 4 × 4 Latin square with repeated measures was utilized. Diets were fed for 4 wk prior to each 5-d infusion period. Infusion of 10/12CLA did not affect DMI or milk yield. Prior to infusion, milk fat concentrations ranked by treatment were HFO (3.82%) and HFN (3.28%) > LFN (2.73%) and LFO (2.43%). Milk fat yield averaged 936 or 766 g/d in cows fed high- or low-fiber diets. Yield of *trans*10-18:1 in milk through d 5 of infusion was 9 or 3 g/d when low- or high-fiber diets were fed. *Trans*11-18:1 and *cis*9,*trans*11-18:2 yields averaged 24 and 10 g/d for HFO or LFO compared with 9 and 4 g/d for HFN or LFN through d 5. Although 10/12CLA was not detectable in milk fat prior to infusion, it averaged 0.2% of total fatty acids and 0.9 g/d by d 5. Secretion of this CLA isomer was associated with a 36% decrease in milk fat percentage and yield across diets. A 42% decrease in yield of saturated 4:0 to 16:0 contributed to the reduction in milk fat output. Infusion of 10/12CLA regardless of diet decreased the ratios [indicators of Δ9 desaturase action] of *cis*9-18:1 to 18:0 (0.65 to 0.59) and *cis*9,*trans*11-18:2 to *trans*11-18:1 (0.34 to 0.27) in milk fat. Results suggest 18:1 and CLA isomers with a *trans*10- double bond may be involved in milk fat depression. If production of *trans*10,*cis*12-18:2 in the rumen is shown to be high enough to bypass further hydrogenation, it could affect mammary lipid metabolism by simultaneously reducing *de novo* synthesis and desaturation of long-chain fatty acids.

Key Words: low-fiber, linseed oil, *trans*10,*cis*12-18:2

1190 A dynamic model of concentrate supplementation effects on milk production in high producing ewes. Reza Imamidoost*[1] and John Cant[1], [1]*University of Guelph*.

A computer model was developed to predict lactational performance responses of ewes to concentrate supplementation, whether on pasture or stall-fed, given concentrate once per day or in multiple feedings, and suckling one lamb or up to six. The model considers effects of concentrate supplementation on forage intake, rumen pH and metabolizable energy and protein supply. The user defines ewe bodyweight, feed composition and concentrate feeding times and amounts. The reference ewe has free access to pasture and water. On consumption, forages and concentrates enter into lag pools for 2.0h and 0.24h, respectively. Carbohydrates then enter rumen pools of digestible fiber, indigestible fiber, or non-structural carbohydrate, from which they are degraded or pass to the lower gut. Rumen pools of organic acid from carbohydrate fermentation and buffer from rumination are simulated to determine rumen pH. The pH, in turn, affects fiber degradation rates. Forage intake continues during daylight hours of 5:00 AM to 9:00 PM until rumen dry matter exceeds 1.3% Body Weight, or organic acid concentration exceeds 130 mM. Daily milk production is calculated from the postruminal flow of digestible cabohydrate, absorption of rumen organic acids and intake of protein and fat. The model predicted the substitution effect on forage intake of increasing rates of concentrate supplementation, the temporal pattern of rumen pH fluctuation with multiple concentrate feedings per day, the increase in dry matter intake when concentrate meals increases.

Key Words: Milk Production, Lactating Sheep, Modelling

1191 Effects of two levels of protein and conjugated linoleic acid (CLA) prills on performance, milk composition and fatty acid profile of dairy cows[1]. M.A.S. Gama*[2], S.R. Medeiros[2], L.J.M. Aroeira[3], and D.D.P. Lanna[2], [1]*Supported by FAPESP and Agribrands Int.*, [2]*LNCA-ESALQ/USP, SP, Brazil*, [3]*CNPGL-EMBRAPA, MG, Brazil*.

Forty-eight 7/8 Holstein X Zebu cows in early lactation (30±5d) were assigned to four treatments in a factorial arrangement for six weeks: 1) control diet (CD) plus Lac100; 2) CD plus CLA; 3) high protein