

Kentucky Equine Research Hosts Nutrition Conference

BY ROBIN STANBACK

An international cadre of participants took part in the ninth annual Kentucky Equine Research Nutrition Conference held in Lexington, Kentucky April 26-27. Over 170 participants from 15 countries, 31 states, 12 universities and 90 companies attended the conference which covered a broad spectrum of nutrition topics presented by some of the leading names in equine nutrition.

The conference was preceded by the Rolex Kentucky Three Day Event, a CCI three and four star competition that drew a wide array of international competitors. Kentucky Equine Research (KER), one of the sponsors of the event, hosted a brunch for its conference guests during the stadium jumping phase. The hotly contested CCI**** provided nail-biting suspense to the very end when just over one jump

Panache, dropped a rail. They rode the remaining three fences carrying the hearts of every spectator. The exciting finish was particularly enjoyable for the KER crowd as Ms. O'Connor and her husband David are among the exemplary stable of world class competitors that are sponsored in part by the company.

Dr. Joe D. Pagan, KER president and the host for the conference, welcomed his guests on Monday morning by introducing the prestigious panel of speakers and describing the schedule for the event. He opened the first session of the program that was set to highlight new methods for measuring nutrient availability in horses by bringing out Dr. Derek Cuddeford of the Royal (Dick) School of Veterinary Studies at Edinburgh University in Scotland as the first speaker. Dr. Cuddeford's program on the partitioning of digestion in horses and ponies highlighted the techniques his research group had adapted from studies done by ruminant nutritionists to determine the different stages of digestion in the equine gut. Using the data collected from the in situ incubation methods as described by Mehrez and Orskov (1977), the mobile nylon bag method favored by Sauer et al. (1983) and the use of markers both singly and in combination adapted for the equine digestive tract by the researchers at Edinburgh University, it may be possible to develop models that could predict how feeds are degraded throughout the digestive system of the horse. Dr. Cuddeford pointed to two areas needing further investigation:



*Dr. Joe D. Pagan and Karen Pagan congratulate 1999 Rolex Kentucky**** winner Karen O'Connor with her husband David O'Connor.*

rail stood between first and second place. Karen O'Connor, an Olympic Silver Medallist and past winner of the Rolex, narrowly defeated New Zealand Gold Medallist and 1998 World Champion Blyth Tait. Mr. Tait, known as one of the sport's best stadium jumping competitors, rubbed three rails but provided one of only five clear rounds in the competition leaving Ms. O'Connor the challenge of completing her round with only one rail "in her pocket." Four fences from the finish Ms. O'Connor's horse, Prince

accurately quantifying digesta passage rates in order to be able to weigh degradation data appropriately and the determination of whether passage rate in different segments of the digestive tract is time-dependent or time-independent.

Dr. Pat Harris of the Equine Studies Group of the WALTHAM Centre for Pet Nutrition was the next speaker. She compared the digestible energy (DE) and net energy (NE) systems for the horse stating that, while much work remains to be done before the energy requirements of the horse are fully

understood, quite a few developments have occurred in the last few years. She favored the French NE system for replacing hay with cereal grains and fats to meet the energy requirements for strenuous exercise.

Describing several different techniques for assessing substrate utilization in exercising horses, Dr. Raymond Geor from the Department of Clinical Sciences at The Ohio State University in Columbus, Ohio concluded the first session. He described techniques to study substrate metabolism including measuring plasma substrate concentrations, analyzing tissue samples for various aspects of metabolism, using indirect calorimetry to calculate whole body oxidation rates of carbohydrates and fats, and employing isotopic tracer methods. Stating that each of the methods has limitations, Dr. Geor indicated a combination of indirect calorimetry and stable isotopic tracer methods may offer the greatest potential for quantitative analysis.

The second session of the conference was devoted to special topics in equine nutrition. Dr. Sarah Ralston of Cook College, Rutgers University in New Brunswick, New Jersey, opened the session with a discussion on the management of geriatric horses. Her presentation, accompanied by slides depicting several of the horses in the geriatric herd at Rutgers, clearly indicated that, with proper attention to dentition, ration and veterinary care, horses can maintain excellent body condition and health well past 30 years of age.

The role of vitamins in the growth of horses was discussed by Drs. Stephen Duren and Kathleen Crandell of Kentucky Equine Research. The presentation focused on specific vitamins required in the diet for optimal growth of young horses, among them the fat-soluble vitamins A and E which the horse cannot produce itself. Vitamins C, D and B



Dr. Joe D. Pagan and Dr. Sarah Ralston

claims of “selenophiles” that this nutrient has a protective role in at least 50 diseases of humans. Stating that some of these claims may be exaggerated, he pointed out that selenium does fill a role as an antioxidant and is an important component in the immune response of horses.

The third session of the conference dealt with nutrition and exercise and was opened by Dr. Harris who discussed nutritional ergogenic aids in horses. Defining ergogenic as “work producing,” Dr. Harris detailed the design of the ideal nutritional ergogenic aid as having three distinct steps. The first is to identify an aspect of exercise physiology

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were described as being produced in the body of the horse by either enzymatic conversion or microbial synthesis of substrates normally found in the diet. These vitamins aid in energy production, bone development and hormone and amino acid synthesis. Vitamin K, which is activated through carboxylation of specific glutamic acid residues associated with the inactive proteins, has a positive effect on net bone formation and the blood's ability to clot.

Dr. Harold Hintz of Cornell University in Ithaca, New York described selenium as being “one of the most interesting of all nutrients.” He discussed some of the many

that is limiting to competition. The second is to identify a nutritional compound or element that will positively affect this aspect. The third and most important is to provide evidence that the feeding or administration of the compound or element is effective in the field. She went on to describe the difficulties of confirming the efficacy of ergogenic aids, citing the expense of testing, individual variability, and the difficulty of judging a horse's response on a treadmill as opposed to its performance in the show ring.

Glycogen depletion and repletion in the horse and their possible limiting factors in performance were reviewed by

Dr. Allan Davie of the School of Exercise Science and Sports Management at Southern Cross University in Lismore, Australia. Dr. Davie discussed glycogen's key role as a substrate for muscle and mentioned the extensive body of research on this subject in the human field. In equines, he maintained that the muscle's initial glycogen concentration seems to be more important as the length of the exercise bout increases, with the short term high intensity not so dependent on the muscle glycogen concentrations. Thus, for events lasting longer than one hour, the concentration plays a significant role in performance.

Dr. Pagan concluded the session with a talk on time of feeding and its relevance to performance. Pointing to many studies done on the time of feeding grains and the results that showed an effect on plasma concentration of nutrients, hormones and substrate utilization during exercise, Dr. Pagan discussed a series of experiments designed to evaluate how feeding forage along with grain influences plasma variables and water intake and if these changes would affect performance. The results of the tests showed a surprising effect, the type of forage and time it is fed relative to grain can have on the fluid balance and prececal starch digestibility. He stated, "The results of these experiments indicate that feeding hay along with grain will result in a decrease of plasma volume and increase in body weight which may be detrimental to performance. Feeding grain either with or without hay two hours before exercise will reduce free fatty acid (FFA) availability and increase glucose uptake by the working muscle. This is probably not desirable during prolonged exercise. Feeding only forage before competition does not appear to interfere with FFA availability and has no adverse affects other than possibly reducing plasma volume and increasing body weight. If forage is fed in small amounts or if time in a grass paddock is limited, then these effects will probably be minimal." Citing a study done by KER researchers in 1997 indicating that completely withholding forage may lead to stomach ulcers, Dr. Pagan concluded, "The slight risk of reduced plasma volume and increased gut fill is more than outweighed by the potential benefit to the horse's long term health and well-being."

The final session of the conference was on starches and

sugars in equine nutrition. Dr. Cuddeford highlighted research done using the techniques described in his earlier presentation and discussed recent work that showed the type of starch and method of processing have significant effects on the site of digestion. He stated, "It is apparent that horse feeders must minimize the flow of fermentable polysaccharide to the large intestine of the horse to maintain health and to maximize substrate (glucose) availability to the performance horse. While this goal is achievable with starch by simply feeding highly degradable micronized cereals little and often, the regulation of fructan intake remains an irresolvable problem."

Dr. Pagan presented information on an experiment done by Kentucky Equine Research in conjunction with the WALTHAM Centre for Equine Nutrition and Care. In this experiment the effect of glycemic response to feed type

and intake was studied. The researchers determined that the level of intake and grain processing may affect glycemic response and that this can be used to evaluate starch digestibility in different feed ingredients.

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wobbler syndrome. She reported on both the old and new theories regarding the causes of DOD in foals. Her recommendations for feeding young foals and weanlings included introducing concentrates when foals are one to two months of age; keeping the foal at an optimum weight but not overweight; feeding weanlings the same type of concentrate as when they were nursing and at the same rate; temporarily reducing the amount of concentrate fed at the first signs of developmental problems; and reducing yearling rations to 12-14% protein with lesser concentrations of minerals.

Kentucky Equine Research has complete proceedings of the 1999 and earlier conferences available in both print and electronic formats. For information on obtaining a copy of this or any past proceeding, contact Ms. Bonnie Harris at 3910 Delaney Ferry Road, Versailles, KY 40383, or call 1-800-772-1988. 