EQUINEWS

Kentucky Equine Research's Nutrition and Health Quarterly · Volume 5, Issue 1

Kentucky Equine Research® INCORPORATED

USET

Official Equine Nutritionist of the USET


Research
separates the
innovator from
the imitator®.
Kentucky
Equine
Research®
INCORPORATED
USET
Official Equine Nutritionist of the USET
1.800.772.1988, www.ker.com

EQUINEWS

VOLUME 5 ISSUE 1

CONTENTS

EQUINEWS features on its front cover a photograph submitted by Excalibur Hotel & Casino in Las Vegas, Nevada.
U.S. subscription price is $12 per year.


Photo submitted by Excalibur Hotel & Casino

EQUINEWS™

EQUINEWS© is the official quarterly journal of Kentucky Equine Research, 3910 Delaney Ferry Road, Versailles, Kentucky 40383, USA. Telephone 859-873-1988. Fax 859-873-1163.

Kentucky Equine Research Congratulates Team Member Champions

BY ROBIN STANBACK

Allied Feeds, Inc. in Cuero and San Antonio, Texas recently joined the family of feed manufacturers around the globe that are a part of the Kentucky Equine Research (KER) Team Member program. The company's introduction to KER came about, as often happens, through a client that had found great success using KER-formulated feeds for his horses. That success brought KER and Allied together to offer other horse owners in Texas the same high-quality formulations and products Team Members from Australia to Maine have come to expect.

Jim Boudreau is the ranch manager of the Heiligbrodt Racing Stables in Palacios, Texas. The ranch raises and races Thoroughbreds and is renowned for producing outstanding American Quarter Horses like Meradas Little Sue, a three-time world champion cutting horse and the highest money-winning mare in the sport.

Mr. Boudreau learned about KER when he visited Kentucky to tour farms and check on horses Heiligbrodt had stabled there. He found that the Kentucky horses were in better overall condition than the horses he had stabled in Texas. While he had experienced success with his feeding program in Texas with the Quarter Horses, the Thoroughbreds that he brought there did not flourish as he had hoped. As the stables are becoming increasingly more focused on the Thoroughbreds, Mr. Boudreau sought the advice of the nutritionists at KER and described his horses' needs. The Thoroughbreds demanded a specific nutritional program related to their athletic prowess that would take into consideration the dissimilar weather conditions and hay types in Texas. Any feeding program developed for the horses would have to take into account the diversity in activity, forages, and climate.

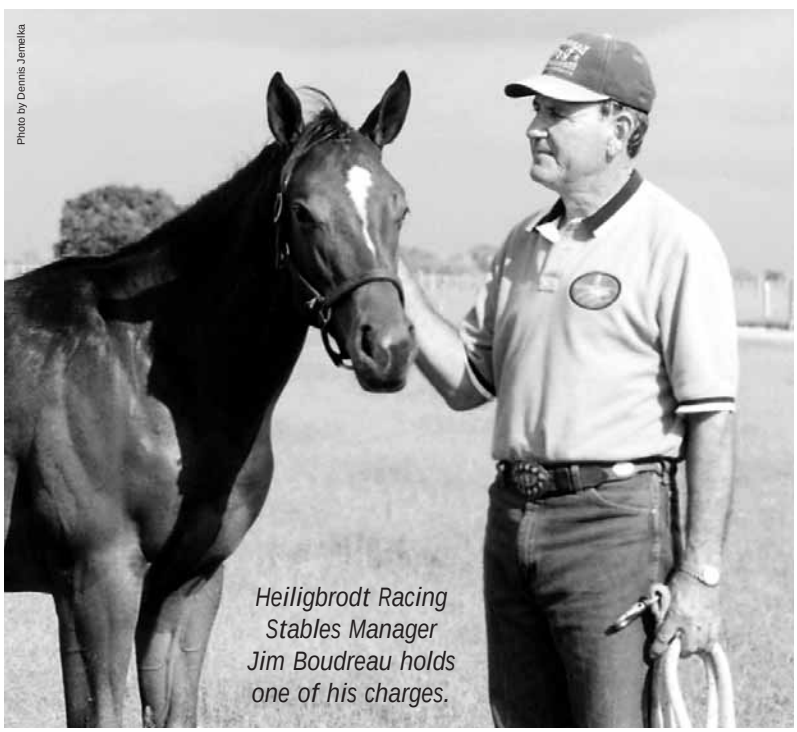


Photo by Dennis Jemelka

Heiligbrodt Racing Stables Manager Jim Boudreau holds one of his charges.

KER President Dr. Joe Pagan worked with other members of his staff to develop feeding programs that would meet all the needs of the Heiligbrodt horses. These programs have been in effect for a year and have already proven to be effective. Mr. Boudreau reports that he has been able to feed 30% less concentrate than he was previously providing to his horses. The horses transferred from Florida to Texas do not lose any ground on growth or condition. The horses all look as if they are groomed daily, and have a muscular appearance without looking fat. "What makes this operation work," said Mr. Boudreau, "is a good feed program, a managed forage plan, and monitored parasite control. It is a winning combination."

Through its connection with KER, Allied Feeds is poised to provide the same type of successful, tailored program as that used by Heiligbrodt Racing Stables to farms throughout Texas. The company's feed specialists have worked with Dr. Pagan and his staff to develop concentrates and specialty products to help enhance both equine performance and breeding results.

Team Member Brandt's Mill in Lebanon, Pennsylvania is the proud feed supplier of Quel Senor, the winner of the Breeders' Cup Steeplechase. The horse, owned by Coppertree Farm, was piloted by Cyril Murphy to a 5 3/4 length victory in the race held at Far Hills in New Jersey. This is Brandt's Mill's second Breeders' Cup winner. The company also supplied a nutritional program for John's Call, the horse that won the Turf Classic at Belmont Park in 2000. The horse placed in 29 of 34 starts, including a few in-the-money finishes over fences.

Fueling Champions Across the Globe

Photo by Clive Cohen

Kentucky Equine Research proudly congratulates Team Member Brooks Feed and its distributor Vlaar Equine Supplies on being the feed supplier for Liberty Balance, the winner of the Breeders Crown at Woodbine (Canada).

112B Martin Street
Brighton VIC 3186
Ph: (03) 9530 6334
Fax: (03) 9530 6339
equivit@ker.com
www.ker.com
C33-109

Kentucky Equine Research® INCORPORATED
AUSTRALASIA

BROOKS
FEED STORE

R.R. #4
1580 Highway 7A
Port Perry, ONT, Canada
Phone 905-985-7992
Fax 905-985-8297
robvancamp@look.ca

Medieval Madness: Jousting Then and Now

BY MARK LLEWELLYN

Knights clad in suits of armor atop galloping steeds are a potent, ubiquitous image of medieval times. Wielding lance and shield, armored knights and horses were fleeting tanks of flesh and bone and far more agile than foot soldiers in times of war. Despite the romantic images of them as the epitome of chivalry or of their initiation ceremony as the height of pomp and splendor, knights were first and foremost warriors, simple fighting men.

Knights honed their battling skills in one of two ways, in actual warfare or in practice off the battlefield. In times of peace, tournaments or mock battles were staged with twofold intent, for the delight of spectators and for the sharpening of skirmishing tactics. Tournaments were considered credible practice grounds until the status of knights in actual war declined. With the advent of gunpowder, the skill of unhorsing a rider from his steed became obsolete. The tournament field then became a place of sport, an outlet for knights to display their skill. Kings and other aristocracy begrudgingly tolerated the new sport, but cited the gatherings as sparks that might ignite civil disturbances. As sportsmen, however, the zeal of nobility for competition often overshadowed any hint of statesmanship.

Set in mainland Europe, the first tournaments usually featured two teams of knights that fought under established conditions. The knights would often battle for a prescribed time using preordained weaponry, typically swords and lances. The brawls, referred to as melees, did not pit one knight against another in individual combat. Melee fighting was undoubtedly more frenzied and crude than one-on-one battle. Tournaments featured both the savory and unsavory aspects of war, including camaraderie, enthusiasm, gallantry, stealth, bloodshed, and occasionally death. In time, tournament organizers imposed more concrete rules which significantly reduced fatalities.

> And the sharp spurs are thrust now into side.
> Now see men who can joust and who can ride!
> Now shivered are the shafts on bucklers thick;
> One feels through very breastbone the spear's prick;
> Lances are flung full twenty feet in height;
> Out flash the swords like silver burnished bright.
> Helmets are hewed, the lacings ripped and shred;
> Out bursts the blood, gushing in stern streams red.
>
> – Geoffrey Chaucer, *The Canterbury Tales*

By the beginning of the thirteenth century, the first jousts were documented. Some historians believe jousts were started as a reaction against the fortuity and brute force that decided the fate of those engaged in melees. Jousts did not replace tournaments, but rather were staged as sideline exercises. In jousting, a warhorse was asked to gallop head-on towards another warhorse, while both carried knights armed with lances. This maneuver required refined horsemanship skills, including a secure seat, as the lances were about twelve feet long and three inches in diameter. As the popularity of jousts rose, scoring was introduced, with the object being to break three lances squarely on the opponent's armor or shield while simultaneously averting a counterblow. Unhorsing an opponent meant instantaneous victory whether the spear splintered or not.

In jousting, skill became paramount and endurance less important. The joust was effective in determining which of two knights was defter in battle. Among the knights, jousts were the more vainglorious ventures, as a personal victory in a joust was far more impressive than being part of a winning melee team.

Until the mid-thirteenth century, thesword was more decorative than practical, as mounted sword fighting was unheard of. When knights wished to draw out the jousting competitions beyond the breaking of three lances, swordplay on foot followed. When one of the two knights became unhorsed, the other would dismount and ground jousting would begin using blunt-edged weapons. If neither of the knights was unhorsed, both knights would dismount and commence fighting. Over the years, this element of the joust began to resemble a crude fencing match and actually became the most difficult portion of the competition. Swinging the heavy and sometimes awkward sword repeatedly into resilient armor was taxing for the knights and often sheer stamina

determined the victor. By the early fourteenth century, the joust was a staple of tournaments, often obscuring the more traditional melee.

In the late fifteenth century, jousts were sometimes conducted "at the tilt," meaning a wooden barrier separated the warriors. Use of the barrier was implemented because accidental or intentional collisions were potentially perilous to horses and knights, regardless of being clad in armor.

Despite their great popularity, tournaments began to fade in significance as economic reforms and changes in social order swept across Europe. By the end of the 1500s, other forms of entertainment had replaced the colorful spectacle of armed battle on horseback.

Resurgence of Sorts

One offshoot of jousting is the "ring tournament." Introduced in Maryland in the mid-1600s, the ring tournament may be the consummate test of equestrian eye-hand coordination. In this event, three small rings, the largest with a diameter of 1 3/4" and the smallest with a diameter of 1/4", are suspended from arches spaced equidistantly through an 80- to 100-yard course. Ring size is decided based on rider experience with more novice participants spearing the larger rings. Using a fine-tipped lance, riders gallop full-tilt through the course recovering as many rings as possible in eight seconds. Points are awarded according to the number of rings successfully skewered. Jousting became the official state sport of Maryland in 1962 and is played throughout not only Maryland but also surrounding states.

Nearly five hundred years following the decline of tournaments, resurgence in the popularity of jousting and all things Renaissance began. Renaissance festivals have mushroomed throughout the United States, fueling the rebirth of full-contact jousting. Bedecked in authentic-appearing suits of armor and brandishing lances and blunted swords, modern-day knights have revived this time-honored sport. The content of these shows is often outlined, and a certain degree of trickery is inherent with the winner usually determined prior to the start of the joust. Improvisational skills are refined with each performance, however, as some variables are beyond the control of the production team or the scriptwriters.

Various breeds of horses are used by the knights of the twenty-first century. Any mount chosen as a festival steed must be sturdy enough to carry the weight of his armored rider. He must also possess the temperament and training to mix with other pennant-bedecked horses and to accept the noisy accolades of spectators expressing their enthusiasm for this ancient sport.

The Mounts

In the book *Chivalry: A Series of Studies to Illustrate Its Historical Significance and Civilizing Influence*, the authors describe the medieval charger as "the emblem of chivalry" because it "prolonged the legs of the knight and gave him immeasurable superiority over the lightly armed foot soldier."

Artists and writers illustrated the mounts of knights as elite among the equine populace of the day. The horses portrayed were not palfreys, ordinary horses used for simple travel, but were large, powerful steeds that resembled the draft horses of today. These contrasted considerably with the lighter-boned and more agile horses favored by high society for driving, hunting, or day-to-day riding. A towering and steadfast mount reinforced the image of the mounted warrior as a just member of the knightly class. Any devoted knight owned at least one heavy steed that would be suitable for jousting tournaments and ceremonial activities. So well liked were the warhorses that they were often bequeathed by a knight upon his death.

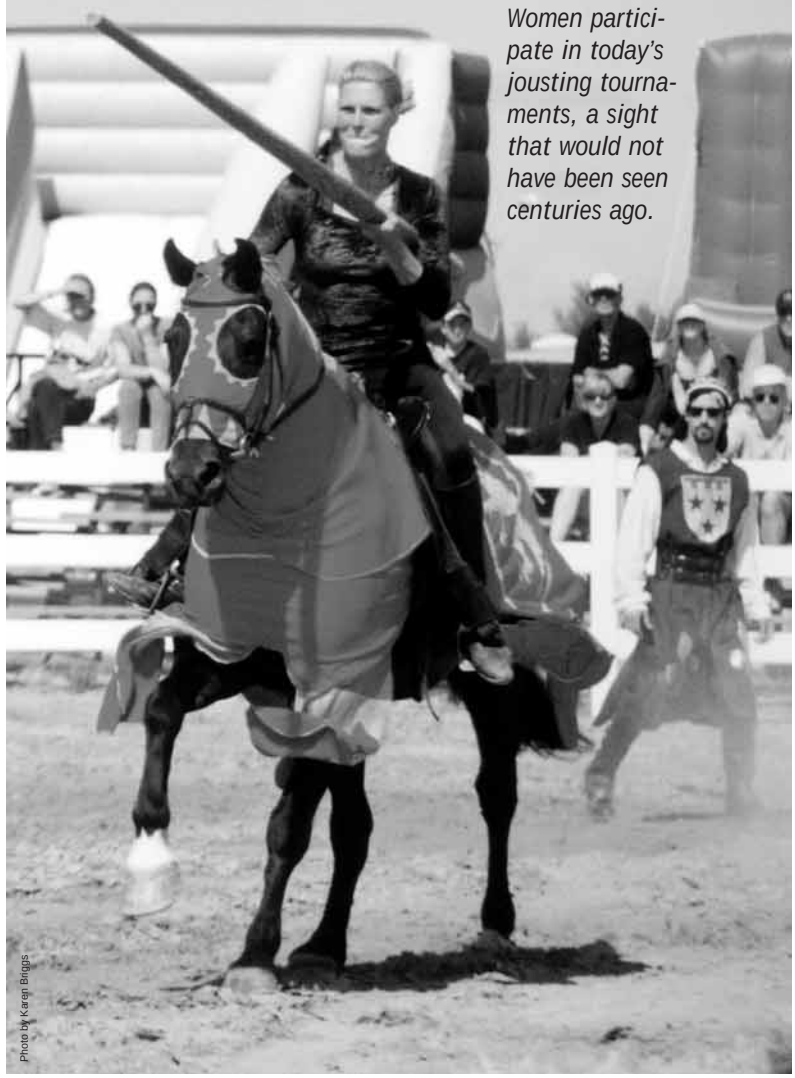


Photo by Karen Briggs

Women participate in today's jousting tournaments, a sight that would not have been seen centuries ago.

Electrolytes and the Endurance Horse

BY JOE D. PAGAN, Ph.D.

Every endurance competitor appreciates that electrolytes are a critical component of a horse's nutritional program. Electrolytes are mineral salts that play an important role in maintaining osmotic pressure, fluid balance, and nerve and muscle activity. During endurance exercise, sodium (Na+), chloride (Cl-), and potassium (K+) are lost in large quantities through sweating. Loss of these electrolytes causes fatigue and muscle weakness, and decreases the thirst response to dehydration. It is vitally important that endurance horses begin competition with optimal levels of fluids and electrolytes in their bodies and that these important nutrients are replaced throughout a ride.

Sweat Losses

It is important to have some idea of the magnitude of electrolyte loss a horse incurs during exercise before a feeding program can be developed to replace these losses. Because most electrolyte losses in the horse occur through sweating, one method of calculating electrolyte requirements can be based on different amounts of sweat loss. Table 1 contains the levels of Na+, Cl-, and K+ required per day by a horse at rest and after exercising hard enough to lose 5, 10, 20, or 40 liters of sweat.

Table 1. Total daily electrolyte requirements (grams/day) as a function of sweat loss.

	Sweat loss (liters/day)				
Electrolyte	**Rest**	**5 liters**	**10 liters**	**20 liters**	**40 liters**
Sodium (Na+)	15-20	33	50	85	155
Chloride (Cl-)	27-33	55	83	139	251
Potassium (K+)	40-50	46	52	64	88

Sweat losses deplete many vital electrolytes from the horse's system.

Photo by Mark Llewellyn

The amount of sweat loss will depend on a number of factors such as duration and intensity of exercise, temperature, and humidity. In general, horses exercising at low intensity (12-18 km/hr) will lose between 5 and 10 liters of sweat per hour. During high-intensity exercise (30-35 km/hr), sweat loss levels reach as high as 15 liters per hour. At the 1996 Olympic Games in Atlanta, horses lost an average of 18.4 kg of body weight during the speed and endurance phase (day 2) of the three-day event, and this translates to a sweat loss of around 15 liters.

Electrolyte Requirements During Training

Daily electrolyte requirements can be estimated by calculating the total amount of mileage logged weekly by the horse, taking into account the environmental conditions under which the training occurs (Table 2). For example, if an endurance horse was logging 50 km of work per week in a cool dry environment, it would require only about 60-120 grams of a well-formulated electrolyte supplement to meet its daily electrolyte requirements. The lower level of supplementation would be adequate if the horse was also receiving adequate forage and a grain mix that contained supplemental salt, as well as access to a salt block. Horses at rest will normally consume around 50 grams of salt per day from a salt lick. As training mileage and environmental temperature increase, so does the requirement for

Photo by Mark Llewellyn

Electrolyte supplementation is now safe and easy with KER's Endura-Max Plus.

electrolyte supplementation. Horses that are training heavily (100 km/week) in a hot environment may need 140-200 grams (5-7 ounces) of supplemental electrolytes.

The recommendations in Table 2 are based on supplementing electrolytes at the same rate daily even though the amount of exercise performed each day will vary. This is probably a reasonable approach to supplementation except for days when the training distance is especially long. For those days, additional supplementation may be warranted. As a rule of thumb, 60 grams (2 ounces) of electrolyte supplementation are required for each hour of exercise in cool climates. This rate of supplementation will double in hot environments when sweat loss is extensive. A long training ride of 60 km (~4 hours) in moderate temperatures would therefore produce enough sweat loss to require 240 grams (8 ounces) of electrolyte supplementation. This level of supplementation would need to be partially replaced during the ride (60 grams at 20 and 40 km) using an oral electrolyte paste with the remainder of the electrolyte administered after the ride. If the horse will not consume this quantity of electrolyte (120 grams or 4 ounces) in a single meal, then 60 grams can be administered as a paste at the end of the ride. When administering oral electrolyte pastes, it is absolutely essential that the horse have access to water. If the horse refuses to drink, do not administer an electrolyte paste.

Supplementation During Competition

There is a great deal of controversy about how to administer electrolytes during competition. A number of different strategies have been used successfully by competitors, and the recommendations that will be given here are not necessarily the only way to achieve success.

During competition, sweat losses can be very large. How much water and electrolytes does an endurance horse lose during a competitive ride? Using the sweating rates described earlier, an endurance horse will lose between 45 and 60 liters of sweat during a 160-km ride. This represents electrolyte losses of 460-690 grams. Additionally, 9-14 grams of calcium and 5-8 grams of magnesium will be lost through sweating. It is debatable whether all of the losses can or need to be completely replaced during the competition. Research has shown that endurance horses participating in 80- to 160-km events often have a fluid deficit of 20 to 40 liters despite having access to water and electrolytes during the ride. Canadian researchers have shown, however, that endurance horses with less

Table 2. Daily electrolyte requirements based upon workload.

	Weekly mileage and training environment					
Electrolyte	**50 km/wk (cool)**	**50 km/wk (hot)**	**75 km/wk (cool)**	**75 km/wk (hot)**	**100 km/wk (cool)**	**100 km/wk (hot)**
Sodium (Na+)	24	32	27	40	32	48
Chloride (Cl-)	40	54	47	67	54	80
Potassium (K+)	43	46	44	49	46	51
Daily electrolyte supplementation*	60-120 g 2-4 oz	90-150 g 3-5 oz	75-130 g 2.5-4.5 oz	120-170 g 4-6 oz	90-150 g 3-5 oz	140-200 g 5-7 oz

*Based on the composition of Equivit Restore. The amount of daily electrolyte supplementation will depend on the amount of electrolyte in the ration and whether the horse has access to a salt block.

pronounced fluid and electrolyte alterations during a competitive ride were more successful than those with greater changes. Therefore, it is absolutely essential that a large proportion of the electrolytes and water lost in sweat be replaced during the ride.

Pre-ride electrolyte loading

The endurance horse must start the competition with adequate stores of both water and electrolytes. This can be accomplished in two ways. First, the endurance horse should be on a high level of forage (hay or pasture) intake before a ride. When a horse is fed liberal quantities of forage, it can store extra water and electrolytes in its large intestine. These stores can be called on to replace sweat losses early in the ride. Second, extra electrolytes can be administered the night before and the morning of the ride. The horse's system is finely tuned to balance the amount of electrolytes and water that it stores in its body at rest, so excessive pre-ride electrolyte supplementation should be avoided. Moderate supplementation (60 grams the night before and 60 grams the morning of competition) will insure that the horse has adequate electrolytes within its body and will provide additional electrolyte stores within the gastrointestinal tract.

Electrolyte supplementation during competition

Electrolytes should be supplemented throughout competition. The type of electrolyte supplement used during competition is slightly different than that which is used during training. This electrolyte should provide additional calcium and magnesium along with sodium, chloride, and potassium. If calcium and magnesium losses are not replaced by mobilization of skeletal stores or by supplementation, metabolic disturbances such as thumps may occur. Electrolytes should be administered to horses at each vet check and at water stops along the trail. The best way to administer electrolytes is in the form of a paste. Pastes are commercially available, or they can be made up fresh at the vet check by diluting an electrolyte powder in applesauce, water, or liquid antacid. A reasonable dose of electrolyte powder (or equivalent) is 60 grams at each vet check. Thirty- to 60-gram doses of electrolyte can be administered on the trail. It is worth reemphasizing that the horse must have access to drinking water when receiving concentrated electrolyte pastes. These pastes are hypertonic (a greater concentration of electrolytes) compared to blood and will effectively draw fluid out of the horse and into the gut if they are not diluted by water. Administering large doses of electrolytes without adequate water intake will result in serious problems, including colic, dehydration, and possibly death.

How well will this electrolyte supplementation program replace losses from sweating? Endura-Max powder and Endura-Max Plus paste are calcium- and magnesium-containing electrolytes formulated specifically for endurance competition. Supplementation with 300 grams of Endura-Max powder (60 grams at five vet checks) along with five tubes of Endura-Max Plus paste on the trail will provide 336 grams of sodium, chloride, and potassium, the quantity of electrolytes lost in 33 liters of sweat. If the horse consumed enough water to complement this level of electrolyte intake, then it would finish the ride with a fluid deficit of between 12 and 27 liters. While this level of fluid deficiency is as good as or better than what has been reported in scientific literature, why not try to replace all of the electrolytes lost during the ride? The answer lies in the horse's ability to absorb and retain large quantities of electrolytes in a short period of time. Sodium is actively transported across the intestinal wall by an energy-requiring process. The maximal rate of sodium transport is not known. Practical experience has shown that the levels of supplementation described above can be safely administered. Higher levels may be possible, but the risk of complications related to malabsorption will certainly increase.

Post-ride supplementation

Administering 120-280 grams of electrolyte over the 24-hour post-ride period can eliminate most residual electrolyte deficit. A portion of this can be given as a paste shortly after the conclusion of the ride followed by top-dressing of electrolytes on the next two or three meals.

Conclusion

The health and well-being of the endurance horse can be enhanced by proper electrolyte supplementation during training and competition. The level of supplementation should be adjusted to match sweat losses, which are affected by exercise intensity, terrain, and environmental conditions. A well-formulated electrolyte supplement that replaces the quantities of sodium, chloride, and potassium lost in sweat should be used during training. An electrolyte containing calcium and magnesium is recommended to prevent metabolic disturbances such as thumps from occurring during competition. Electrolytes should only be administered when the horse has access to water because both electrolytes and water are needed to maintain optimal fluid balance.

The Will to Run… and Run and Run and Run and Run and Run and Run and Run and Run and Run and Run and Run and Run and Run and

BY ROBIN STANBACK

"To run a marathon is a solitary endeavor. Even when you are surrounded by other competitors, you are competing with yourself to finish. Winning is a secondary goal. You run to finish and no one who enters the race considers that they won't," said Jeff Thompson, who has completed many marathons but considers his completion of the 1999 New York City Marathon a highlight of his career.

"Most competitors in an endurance race are there to finish. Oh, there are some that are there to win, but most are there to finish. No one enters the race if they think they won't. Winning is great, but finishing in itself is a victory," explained Yvette Vinton, DVM, a member of the Canadian Pan Am Games endurance team and a rider who has competed in endurance races all over the world.

The difference between these athletes is that Mr. Thompson runs his race as an individual, while Dr. Vinton is part of a team. That description doesn't quite hit the mark. The word team implies a coordinated effort between two similarly matched participants. Only in an equine sport would the members of the team be so diverse. Dr. Vinton must protect, push, encourage, and assist her partner, an animal of almost 1,000 pounds that knows only how to cover ground - lots of it - as fast as possible. Dr. Nancy Loving, an endurance competitor, judge, and veterinarian, likens the connection between the horse and rider to the mythical centaur, a beast fabled to be half horse and half man. Perhaps it is the sheer number of hours spent in preparation and competition that solidifies this impression. Possibly it is the uniqueness of the athletes who are drawn to endurance riding, one of the world's fastest growing and most grueling equine sports.

Endurance riding received official recognition from the Federation Equestre Internationale (FEI), the international governing body of equestrian sports, in the early 1950s. Since that time, the number of races throughout the world has grown, as has the number of people involved in the sport. There are many levels of endurance competitions, ranging from short rides 25 miles or less to 250-mile races run over five days. International events typically involve 100-mile courses run in one day that are divided by mandatory veterinary inspections to insure the health and safety of the equine competitors. Stringent rules provide specific guidelines for officiating veterinarians to follow when judging a horse's ability to continue the race. The horses' respiratory and heart rates are monitored, feet and legs are carefully examined for signs of problems that could lead to lameness, and the horse is assessed for signs of dehydration.

With over 6,000 miles of competitive trail riding experience, Revel's Raider was awarded a 2001 Cosequin Equine Exemplary Service Award.

Photo submitted by the Trueman Communications Group

Any problem in one of these areas can cause a horse to be eliminated from the competition, and many are either withdrawn by their riders or eliminated at the veterinary checks. At the 2001 Tevis Cup, a particularly arduous endurance competition held in California, 225 entries began the race and only 91 finished.

For those horses and riders in the upper echelons of the sport, resourcefulness, resilience, and courage are mandatory. It takes a strong, well-conditioned horse and rider to face the grueling and often varied terrain of some of the elite endurance races. A horse that wins at this level may have competed in Dubai, where the sands

provide a hard-packed surface in some areas and soft footing in others, and in the western United States, where horses can travel through 19,000 feet of altitude changes in one race. Differences in heat and humidity play a factor as well. An endurance team will often need to spend time acclimating to the area where the race will be held prior to competing, which leads to yet another form of resourcefulness – financing.

Top athletes in this sport must train consistently either at home or when traveling. Dr. Vinton described financing this exacting regimen as a "balancing act. It is hard to juggle the amount of time it takes to train with the amount of time needed to work to support yourself and your horses." Travel costs can dip heavily into the wallet of even the most well-heeled enthusiast. Fortunately for the endurance world, some of its staunchest supporters are the sheiks of the United Arab Emirates (UAE). Their sponsorship of the sport and generosity made it possible for the 1998 World Endurance Championship, held in Dubai, to see the largest collection of countries (37) ever represented at an equine world competition. This event, and subsequent races subsidized by UAE enthusiasts, have elevated the profile of endurance competitions and have been responsible for bringing more people into the sport.

Dr. Ray Randall, a veterinarian from Montana with years of experience as an international endurance race official, mentioned that the UAE involvement has raised the stakes considerably for many endurance enthusiasts in a number of ways. He explained, "It used to be that a good endurance prospect could be purchased for a small or relatively reasonable amount of money. Now, with more people looking for those types of horses, and some of those people being able to spend a good amount of money, the price tag has gone up. Also, there is more prize money involved than ever before, and that is a drawing card."

Support teams help both horse and rider at required veterinary stops during endurance rides.

Dr. Vinton was a catch rider for Sheik Mohammed in the March 2001 Worlds Most Preferred Endurance Ride held in Dubai.

Dr. Randall described another change. "The sheiks are able to pair the right rider for the right horse. While many ride their own horses, they may also have more than one horse entered, so they need a very good catch rider or they may even pay jockeys to ride their other horses. This has had a considerable impact on the sport."

Because of the increasing number of endurance races throughout the world, there are more opportunities for people consumed by the sport to participate. However, a horse can only complete so many 100-mile races in one year. As a result people like Linda Crandell, a member of one of the most involved families in the sport, often travel the world over as catch riders. Mrs. Crandell, her husband, sons, and a daughter-in-law have all had the opportunity to enter endurance races on horses belonging to foreign endurance enthusiasts. Mrs. Crandell's interest in the sport began in 1978 when her husband entered a Tennessee Walking Horse in a race in New York. She competed for the first time in 1980 and began winning almost immediately because, as she put it, "I had this absolutely incredible horse that had a racing trot that was hard to beat." She was hooked and has been an avid enthusiast of the sport ever since.

Mrs. Crandell and some of her relatives have spent months training in Dubai and riding horses belonging to various members of the UAE Endurance Committee. She, like Dr. Randall, feels that the contribution these horsemen have made to the sport has been instrumental in raising the awareness of endurance riding and bringing more monetary incentive into breeding programs and sweepstakes. She also credits them with providing exceptional care for their animals. She stated, "Sheik Hamdan flew my son over to Dubai to do some blacksmith work on his horses. I had the opportunity to go as well, and we

EQUIVIT®

ENDURA-MAX

Oral Electrolyte for Endurance Horses

- Unique formula designed specifically for Endurance Horses to replenish electrolyte and losses during competition

EQUIVIT®

PRESERVE

An Aid To Reduce Muscle Damage In Performance Horses

- Scientifically formulated source of antioxidants, Vitamin E, C and Selenium.

EQUIVIT®

HEMABUILD

Blood Booster

- Combination of vitamins and iron.

EQUI-JEWEL®

High Fat Stabilised Rice Bran with Calcium, Vitamin E and Selenium

Successfully used by Claudia Reid and Ningadoo Arabians

Kentucky Equine Research® INCORPORATED AUSTRALASIA

Feeding & Nutrition Advice

1800 772 198

www.ker.com

equivit@ker.com

Selected supplements now available in New Zealand from NRM • Freecall 0800 800 380

were able to help in his training program. One horse I rode was from Australia and was very fit. It had won eight straight 30-mile races."

The winner of the FEI/UAE Worlds Most Preferred Race in March of last year is another good example of the international flavor of endurance competitions and the involvement of the UAE Endurance Committee. Everly De Quivarch, a mare of French origin, owned by H.H. Sheik Mohammed bin Rashid Al Maktoum, was ridden by Abdullah Bilhab of Dubai and trained by Erwann Droumaget of France. Yet another example is Canadian Dr. Vinton, who competed at the 2000 World Endurance Championship in France on a horse imported from Australia by his new English owners.

With few exceptions, most of the horses that excel at this sport, regardless of their country of origin, have genetic roots that trace back to ancestors that traversed desert sands. The vast majority of these horses are of Arabian extraction. Mrs. Crandell explained, "These horses have large nostrils and lung capacities that allow for greater oxygen intake. Arabians have veins that are close to the skin surface, which help in cooling the blood and allowing for quicker recovery times. They are a slighter horse with lighter muscling that makes it easier for them to carry themselves and their riders over longer distances."

Dr. Yvette Vinton riding Armistice, owned by Yavonne Tyson of England, in the 2000 Endurance World Championships in France.

Still, not every Arabian or Arabian cross makes a winning endurance horse. Dr. Vinton, who owns two Arabians, WW Due Me and EH Malachi, said, "It is important to look for specific conformation traits that will make the horse better suited to the sport. Due Me has terrific hindquarters and a huge motor. Malachi is small but well put together. What really made them standouts for me was their attitudes and personalities. These horses have to be competitive. They have to like to pass that other horse. Sometimes they can have too much heart and will go beyond what they should. That is when the rider has to step in and protect the horse. If they don't have the heart and will to drive themselves, they will not succeed in this sport."

"Heart" is the one trait that horsemen across many equine disciplines search to find and define. It cannot be seen or measured, but, according to Mrs. Crandell, "If it is there to begin with, it can be further developed. Too much heart is almost more of a problem than not enough. I almost prefer a young horse to be a little bit lazy. They will be easier to protect than a horse that just wants to push ahead. That horse will leave his race in the early miles, whereas the more deliberate horse will still be there at the end of it."

A horse that exemplifies heart for the Crandell family is Bold Soldier, a 22-year-old Arabian stallion that competed in endurance races until he suffered a kick from another horse at the age of 19. He will cover a full book of mares this season and is being conditioned to compete again. He has passed his unique blend of conformation and heart on to many of his progeny.

Mrs. Crandell said, "Usually, by the time our horses are two-year-olds, we know which ones will be most likely to make endurance horses. We look for conformation and temperament, then we slowly work at conditioning them. If we think they have it within their ability to be horses that can compete at the highest levels, we continue on with our training. If not, we sell them to people who still want a nice horse, but aren't interested in going quite as far in the sport. The horses we keep are then conditioned to compete. We may not push them to be in the lead; in fact, we try not to be in the lead for the first few races, so that we can teach them to rate themselves and listen to their rider. Then, if they keep progressing well, we will push them to win. I want to win. I can't imagine why I would enter a race if I didn't, but I would never want to win at the expense of the horse. Finishing a 100-mile race is also a victory."

Horses with all the physical and mental attributes necessary to compete in endurance competitions still need riders that can judge pace and choose the most advantageous routes through the course. Dr. Randall quoted an often-used phrase in endurance riding: "A good horse ridden smart will beat a great horse ridden stupid every time."

At the highest levels of the sport, riders have a great deal of assistance provided by a knowledgeable crew of people that can offer encouragement, and veterinary and farrier aid at required stops. These assistants can help a competitor "ride smart" by providing information about potential problems and the placement of other riders. But, an endurance race must, in the end, be a team effort between two fit and well-matched athletes: a horse with heart and a rider with skill covering ground – lots of it – together.

Feed to Succeed:
Supplements to Help the Endurance Horse

BY KATHLEEN CRANDELL, Ph.D. AND PETER HUNTINGTON, BVSc

The endurance horse is unique among all other equine athletes. Because of the prolonged demands placed upon the endurance horse with protracted moderate intensity exertion, its performance may be influenced quickly by the quality of its diet. A simple diet of hay and oats may lack essential nutrients that allow the horse to perform as expected. Understanding how competition affects the nutrient needs of the horse will help the owner select the appropriate supplementation program for the individual endurance horse.

Improving the diet

Approximately 80 to 90% of the feed eaten by horses is used to satisfy their energy requirements. Horses, like people, utilize energy to run most of the chemical reactions within the body, particularly to fuel muscle contractions vital to the work effort. As such, any horse diet should focus on providing adequate energy (calories). The major source of that energy is dietary carbohydrates (grass, hay, grain, molasses, etc.) Because the amount of energy available from forage alone can be a limiting factor for performance, grain is often added to increase the energy density of a diet.

Dietary fat is another source of energy readily employed by the horse for calories. Fat contains roughly 2.25 as much energy as an equal weight of carbohydrate, so less is needed to fuel body processes. Dietary fat has been scientifically proven to be advantageous to the performance of horses undergoing prolonged bouts of exercise. During long duration, moderate intensity exercise, the body depends on fat stores to supply energy for work. The addition of fat to the diet has been found to increase the ability of the horse to mobilize fat stores for energy, sparing the muscle glycogen (sugar) stores for more intense bouts of exercise. In a study done at Kentucky Equine Research comparing differences in fat utilization between breeds, it was found that Arabians (the most common breed used for endurance) are much more efficient at mobilizing and burning fat as an energy source than are Thoroughbreds.

There are different dietary fat sources available to the horse, and the most common are vegetable oils. Vegetable oils can be fed safely up to 15% of the total diet. Another source of fat is rice bran, the heat-stabilized outer layer of the rice kernel which contains 20% fat. Compared to oats, rice bran can contain 25% more energy on a pound for pound basis. Therefore, this source of fat is beneficial in adding calories to the diet without increasing the amount of grain being fed.

The remaining 10 to 20% of the diet is used to satisfy the nutrient requirements that drive the cellular processes inside the body. Protein is the major nutrient the body needs to support normal body functions. Vitamins and minerals play a vital role in metabolism but are needed in relatively small amounts. A simple diet of hay and oats may lack some of these key nutrients. Grain concentrates are designed to complement the nutrient profile of forages but must be fed at the recommended level in order to obtain balanced nutrition. For many endurance horses of Arabian descent, the recommended feeding rate of commercial grain mixes provides too many calories, resulting in excess weight gain. A horse that eats less than the recommended amount may be short on the supplemental protein, vitamins,

Photo by Mark Llewellyn

Supplements designed to enhance hoof health are strongly recommended for endurance horses.

and minerals that are added to complement the deficiencies in forages. A specialized grain mixture designed for endurance horses is preferable. Failing that, a specially designed concentrate containing essential proteins, vitamins, and minerals can be used to top off a feed that is provided at a lower rate than recommended. If protein is sufficient in forage and grain, then adding a well-balanced vitamin and mineral supplement will be sufficient to fill in the shortcomings of the diet.

Supplements

Hooves: Horses often have unique requirements for certain nutrients to help improve performance. This is especially true of endurance horses. For instance, not every horse is blessed with hard, resilient hoof walls. The hooves of endurance horses often take a beating from the long hours on the trail. Research has shown that some horses with weak hooves benefit from supplementation of certain nutrients. Specific additives like biotin, methionine, iodine, and zinc, or a combination of them, can be added to the horse's diet to improve hoof quality.

Muscles: Endurance competitions can also be hard on the horse's muscles, which are in constant use during the hours of training necessary to compete successfully. During muscular exertion, free radicals (waste products of oxygen metabolism that can damage cell components) are produced and can cause muscular damage if not eliminated. Certain nutrients, specifically vitamins C and E and selenium, are key antioxidants responsible for quenching free radicals found to build up in muscle tissue. These nutrients work in concert to reduce muscular soreness and stiffness associated with exercise. Magnesium is necessary

Supplements for Peak Performance by Endurance Horses

Kentucky Equine Research has developed many products that support the efforts of equine athletes in every field of competition. Perhaps the most challenging horse to feed is the endurance competitor that must exert tremendous energy during competitions and training, but must be fed carefully to avoid weight gain or other problems associated with high energy feeding. These horses have benefited greatly from the following products.

- **EQUI-JEWEL** This high fat heat-stabilized rice bran contains 20% fat. Feeding rice bran can add calories to the diet without increasing the amount of grain and also supplies the antioxidants vitamin E and selenium. The recommended feeding rate of Equi-Jewel is half to one kg per day.
- **PRESERVE** Containing the antioxidants vitamin E and selenium, as well as vitamin C and magnesium, Preserve works to protect muscle tissue. It also helps to reduce muscular pain and stiffness associated with work. It is recommended as a daily supplement, particularly for horses with a history of myopathies such as tying-up. Preserve can also be used when a horse is being brought to peak condition for competition. Supplementation with Preserve should begin the week before the competition and be continued through the week after the competition. This will help the horse have a smoother recovery from intensive work. When fed in combination with Perform before, during, and after competition, Preserve may also boost the immune system of the endurance horse.
- **ENDURA-MAX** Endura-Max is an electrolyte formulated specifically for endurance horses. The amount of sweat produced by an endurance horse during a competition is considerable. Because electrolyte balance is critical for maximal performance, replacement of lost electrolytes is imperative. Endura-Max contains added calcium and magnesium in highly available forms to replenish those losses along with the other electrolytes such as sodium, chloride, and potassium.
- **ENDURA-MAX PLUS** This is the latest addition to the KER supplement range, Endura-Max Plus comes in easy-to-administer paste tubes for convenience in camp and on the trail. This product contains Endura-Max in a highly palatable base and added components to help soothe stomach upsets caused by the rigors of endurance competition.
- **RESTORE** This heavy-duty electrolyte was developed for all performance horses, but may be appropriate as a daily electrolyte supplement for the endurance horse. Restore can be added directly to the daily grain ration during training whilst Endura- Max is used during rides.
- **PERFORM** This supplement is for horses that may be receiving all the protein they require from their forage and grain concentrates but an inadequate supply of vitamins and minerals, Perform can be used to ensure that all of these nutrients are provided in a concentrated 30-g dose. Perform also contains live yeast culture to act as a digestive aid and the micromineral chromium. For the horse

for proper nerve and muscle function and may be insufficient in the diet of some hard-working horses.

Immune function

Antioxidants are also important for support of the immune system. Human endurance athletes may have reduced immune function for about 70 hours following a bout of prolonged and intensive exercise. During this period the body may be particularly susceptible to infection, allowing viruses and bacteria to gain a foothold. Lack of sleep, severe mental stress, malnutrition, weight loss, or other stressors commonly associated with shipping and competing can also exacerbate depression of immune function. Although the research has been done in humans, it may very likely be similar for the equine endurance athlete. Whether human or equine, body cells need specific nutrients to be able to properly divide and produce necessary antibodies. Many enzymes in immune cells require the presence of micronutrients, and critical roles have been defined for zinc, iron, copper, selenium, and vitamins A, B6, C, and E.

Electrolyte losses

Electrolytes are ions (charged particles) found inside and outside of cells in the body. Electrolytes play an important role in maintaining osmotic pressure, fluid balance, and nerve and muscle activity. A horse sweats in order to get rid of excessive heat that has built up in the muscles. Horse sweat consists of water and a high concentration of electrolytes. Any level of work produces body heat and subsequent sweating. When an endurance horse sweats, it loses essential electrolytes (particularly sodium,

that has a low tolerance to large amounts of grain in the diet, Perform may be a useful supplement and it may also help horses that have experienced problems with tying-up.

- **ALL PHASE PELLET** (Equine Balancer Pellet -NZ) - This comprehensive balancer pellet can be fed at 750 g - 1 kg per day with grain such as barley and fat, or can be used alone to complement forage. It supplies quality protein, minerals, vitamins, yeast culture, and organic chromium. Just add energy, fibre, and electrolytes for a balanced diet that allows optimum health and peak performance.

- **BIO-BLOOM** This product is a specially designed biotin, methionine, iodine, and zinc supplement for horses. Bio-Bloom contains 15 mg of biotin per ounce, which is the amount proven by research to significantly impact hoof quality. These vital hoof nutrients are combined with lecithin, full-fat soybean meal, and yeast culture to provide a source of essential fatty acids and to maximize absorption. Bio-Bloom also produces a healthy, shiny hair coat.
- **NEIGH-LOX** Neigh-Lox is a feed supplement for performance horses on high grain diets or subject to stress. It helps buffer stomach acid while coating and protecting the stomach lining. For horses with signs of ulcers or sour stomachs, Neigh-Lox can be added to the grain portion of the diet on a daily basis. To use Neigh-Lox as an aid in easing the stresses of competition, horses should be started on this product prior to being loaded on the float and kept on it until they are returned to pasture.
- **HEMABUILD** Hemabuild is a supplemental source of B-complex vitamins and organic trace minerals. It is useful strategically as a blood booster or a pick-me-up after heavy training, travel, or a hard ride.

KER continues to develop beneficial products for all performance horses. They work with KER Team Members, feed manufacturers across the globe, to develop nutritional programs specifically designed to meet a wide variety of equine needs.

Low-intake, oats-free feed concentrates developed for all performance horses such as Stablemaster Phar Lap and NRM Run Free are great premixed feeds for endurance horses. These supply added energy, oil, protein, vitamins, and minerals in a 1.5 - 3 kg daily intake. Most endurance horses will just need added forage and electrolytes.

The stresses of loading and floating can cause stomach problems for horses.

chloride, and potassium) that are necessary for top performance. Other factors may cause a horse to sweat, such as the time the horse spends in or tied to a trailer during the heat of the day or the stress of an unfamiliar environment. Excessive sweating with subsequent loss of electrolytes can cause fatigue and muscular weakness. Usually, a horse can replenish lost electrolytes from its normal diet. However, under extended work or stressful circumstances, the electrolytes that are lost in sweat cannot be replaced from the daily ration of grain and forage. The amount of sweat produced by an endurance horse during a competition far exceeds that of any other sport horse. It may be difficult to realize the volume of fluid lost as the sweat may evaporate before it is even seen. Because electrolyte balance is critical for maximal performance, replacement of lost electrolytes is imperative. During long rides, calcium and magnesium may be also be lost in sweat in amounts high enough to cause metabolic disorders. Specific electrolyte supplementation can be provided to the horse during the competition phase, but it may also be necessary to provide a daily dose for horses that are in training for endurance events. Free choice water should always be available to the horse when electrolytes are used.

Stomach problems

The rigors and routines of training often interrupt the natural grazing behavior of performance horses, and consequently their stomach acid buffering mechanism. Indigestion often results. If a horse has any of the following signs it may be suffering from heartburn: drop in performance, sour attitude, poor hair coat, grinding teeth, inappetance, and weight loss. Many endurance horses enjoy the luxury of having 24-hour turnout on pasture, which is ideal for the prevention of ulcers or heartburn. However, when this lifestyle is interrupted and the horse is loaded on a float, put in a stressful situation, fed differently than normal, and then asked to compete for hours with limited meals, he may end up with a sour stomach that will affect performance or attitude. Medications designed to alleviate these discomforts or those specifically designed to be stomach buffers can help horses with these problems.

Chromium supplementation

Strenuous exercise and high-grain diets increase the excretion of chromium in the urine of equine athletes, thereby depleting the natural reserve of this mineral in the body. Chromium is an integral component of glucose tolerance factor, which is thought to potentiate the action of insulin in chromium-deficient tissue. In a Kentucky Equine Research trial, chromium-supplemented horses showed lower insulin levels in response to a meal, and maintained lower insulin levels throughout a standardized exercise test. This means that with chromium supplementation less insulin is required to assimilate and utilize the same amount of glucose from a meal. Another significant result was that peak levels of lactic acid were lower when the horses received supplemental chromium. Since lactic acid accumulation contributes to fatigue during exercise, this can be interpreted as being beneficial for the performance horse. For the endurance horse that has a low tolerance to additional grain in the diet, a chromium supplement may be advantageous. Chromium supplementation may also help reduce the incidence of tying-up in certain horses. One of the possible causes of tying-up is related to carbohydrate metabolism, and therefore chromium's action on glucose and insulin may be beneficial in this situation.

Keeping an endurance horse fit and healthy involves more than just putting in a large number of miles on trails. The work required of these horses is quite different than that of any other equine athlete. The challenge is to provide the correct combination of nutrients that will support the special needs of these athletes during both training and competition.

How Do They Do It?

Technological Advances Transform Research Methods

BY ROBIN STANBACK

Technological advances have burst open vaults of knowledge that even the most innovative scientific minds could not have imagined 50 years ago. Researchers have used these to reap a myriad of benefits that can be seen in every field from human neurology to equine physiology. The knowledge gained in equine sciences has grown exponentially, largely because of the dedication of researchers who have stepped outside conventional scientific structures to develop new methods for studying equine reproduction, growth, maintenance, performance, and aging. Some of the new methods, like the use of high-speed treadmills, have brought what would formerly have been considered field trial studies into the controlled atmosphere of the laboratory. In other cases, equipment once thought to be of use only in the laboratory has been modified for field utilization. These breakthroughs have dramatically changed the face of modern equine research.

"Technology has so expanded research capabilities that we now have the opportunity to answer questions we would not have considered years ago."

Straight laboratory research, well-defined studies performed with tightly controlled parameters, provides very specific information. With today's technology, these studies can impart even more information. Treadmills designed for equine exercise research have become more affordable and available in recent years, but it was not so long ago that such research depended upon tracks that were subject to weather and surface variables. Heart monitors that relied upon large machinery too cumbersome to be utilized in the field have become so small and affordable that researchers and competitors alike can easily use them.

Dr. Joe Pagan, president of Kentucky Equine Research (KER), stated, "Technology has so expanded research capabilities that we now have the opportunity to answer questions we would not have considered years ago. We can also more completely investigate earlier research findings. A good example would be research done in the early 1970s to determine the advantages of feeding fat to endurance horses. A drawback of that research was that blood samples could only be pulled post exercise. Today, modern technology makes it possible for us to mimic endurance work on a treadmill. Using stable isotopes, calorimetry units, and blood chemistries drawn from the horses as they exercise, we can provide more complete answers to even more complex questions."

Dr. Pagan continued, "Ideally, research should travel full circle. Field studies ought to indicate what specific questions need to be answered. Researchers can then use the laboratory to carefully control variables, and use devices that can provide precise numbers and measurements to answer those questions. Then the research should return to the field to validate the laboratory findings. We have been able to do just that with our endurance studies at KER. We knew from earlier research and from questions raised in the field that specific types of fat supplementation should help endurance horses maintain their condition and remain competitive. We designed a research protocol to determine the most effective type of supplementation for these horses. Our findings were taken back to the field and validated by high-level endurance horses. The successful outcome of this research will influence the health and competitive edge of these equine athletes."

Dr. Tracy Turner of the College of Veterinary Medicine at the University of Minnesota has done a series of field research projects using a thermographic unit that affords a noninvasive pictorial representation of surface temperature and is useful in the detection of inflammation. It can also reflect alterations in the circulation of deeper tissues. Dr. Turner undertook the challenge of using a thermograph in the field to establish its usefulness as a diagnostic tool. In one 10-week study, Dr. Turner used this device to monitor 45 horses from the stables of seven trainers. He was able to identify areas of suspicious heat in 60% of the horses, which correlated with the trainers' concerns about their horses in 88% of the cases. There was also a similarity between the conclusions of the horses' veterinarians and those drawn from the information gathered by the thermogram. Dr. Turner found that a thermographic examination could be useful in determining lamenesses in horses, and that it could successfully predict significant injuries two weeks before they were a clinical problem.

"The advantage in testing the thermograph at the racetrack is that you have the opportunity to see how

reliable it is when faced with a number of variables. In the laboratory we can control almost everything. The reality is that veterinarians, trainers, and owners cannot control all the variables in their horses' lives. If a tool is to be useful, it has to hold up in the field," Dr. Turner explained.

Another example of the connection between field and laboratory research was work begun by the Animal Health Trust (AHT) in Newmarket, England that led to valuable changes in the care provided to three-day event horses. This work also highlighted the international nature of research and how a project that began in one country can ignite the interest of researchers in another. In field trials done on the speed and endurance day at the Burghley**** Three-Day Event, researchers from the AHT were able to determine that the equine athletes experienced stresses that could be detrimental to them in warmer and more humid climates. Questions raised by the work done at Burghley led to laboratory treadmill studies and the determination of protocols that would mimic the physiological and metabolic changes that occur in these horses during the cross-country phase of competition. The resulting tests allowed the researchers to evaluate the effects heat and humidity would have on the horses. Using this information, researchers at KER were able to develop specially formulated electrolyte supplements and feeding programs that were used to help the horses competing in the Atlanta Summer Olympic Games in 1996. Even as the horses took to the field on cross-country day in Atlanta, the research continued as the veterinarians caring for the horses provided feedback to help researchers determine the efficacy of the treatments that had been developed. The results of the work done in the laboratory and in the field at both Burghley and Atlanta were used and evaluated yet again in Sydney at the Summer Olympics in 2000.

High-speed treadmills have revolutionized equine research.

The use of modern technology and the ability to carefully emulate field work in a laboratory setting is evidenced by a study being done at Massey University in New Zealand. In a protocol designed to determine bone mineral density changes in growing and training Thoroughbreds, Dr. Elwyn Firth and a staff of researchers have employed a number of controls that would be impossible to implement by studying horses in the field. The number of horses they were able to use and the ability to control so many aspects of their upbringing and care have allowed the research team to develop a protocol that closely simulates field work. The horses were bred at the university, raised there, and treated similarly. The exercise programs were designed by a licensed trainer and controlled by the research team, with every aspect of the training regime monitored and recorded. The horses were weighed on a regular basis and fed on a specific program. Paddock exercise was excluded to eliminate variables that might have presented. The test results were carefully examined and compared with similar studies done on horses confined in normal stables.

Dr. Firth found considerable differences between his research horses and the random source New Zealand Thoroughbreds studied. He concluded, "Being able to measure these differences gave us the opportunity to offer the hope that management practices could help horses with bone density problems. Helping horses is the driving force for all of us."

While Dr. Firth's research was a controlled large group study, KER has been involved in a groundbreaking research protocol that further blurs the line between field and laboratory research and uses the latest technology to determine results. Drawing from research done on osteochondritis dissecans (OCD) from Rutgers University and using a test patented by that university, KER worked with six central Kentucky horse farms to study OCD lesions and their possible connection with glycemic response in 218 Thoroughbred weanlings. The sheer number of horses used in the study sets it apart from many research projects, as does the length of time the young horses were followed – from less than a year in age to 16 to 20 months. The information gained from the study may change the way people feed young horses and may result in stronger, healthier animals.

Questions and Answers

I am just beginning to ride endurance horses. How are endurance horses trained to compete in 100-mile races?

Competitive 100-mile endurance horses are born, not trained. Every endurance horse must have a strong desire to cover the distance, so willingness is paramount. These horses and their riders must be properly prepared to withstand the journey.

Conditioning for a 100-mile ride is complicated and not easily explained in a couple of paragraphs. The conditioning process takes a minimum of two years. The first 12-18 months establishes base levels of fitness. This stage of conditioning gradually strengthens the heart, lungs, muscles, and bones. During this time, hundreds of short training rides (3-10 miles) and several 25-, 50- and 75-mile endurance rides are done. Horses are taught to pace themselves, negotiate all types of obstacles, and most importantly eat and drink throughout the ride. These horses will undergo changes in body condition and will have little fat cover over the body. Horses should not be allowed to become too thin or they will not have the energy reserves to complete a 100-mile ride.

For the six months leading up to a 100-mile ride, a horse's fitness must be maintained. Training mileage during this period is usually 30-40 miles per week but varies depending on the horse. This mileage is usually obtained with one long ride and one to two shorter rides. When not ridden, the horse should be turned out so it can move around and not become stiff. The goal in the six months preceding to the race is not to overcondition the horse, which could cause structural or metabolic problems. During the two weeks prior to competition, the horse should be well rested with several short rides and a general reduction in mileage. This allows the horse to recover completely from all previous exercise and ensures its body is loaded with fuel for the ride.

The old adage "You can lead a horse to water, but you can't make it drink" describes my endurance horse perfectly. How can I get my endurance horse to consume more water?

Encouraging horses to consume water during competition can be difficult. Several different strategies may be used with the degree of success dependent on the individual horse. To get horses to drink out of natural water sources including rivers, creeks, and ponds, horses must be previously exposed to them. Under the pressure of competition it is difficult for some horses to drink from a source of water they may have never seen. In other words, horses that drink from automatic waterers their entire lives may not quickly understand that a creek is also a source of water. These horses would rather rush through the water and continue on the ride. Horses should be conditioned to rest when water is available. Many endurance riders will slow horses when approaching a water stop to allow the horse to relax, slow its heart rate, and to promote drinking.

Consumption of hay or grass stimulates horses to drink. In research studies, water intake is linked to the amount of dry feed consumed, with water ingestion increasing as more dry feed is eaten. Endurance riders often try to couple feed and water intake by wetting feed prior to feeding. Soaking hay in water and adding water to grain mixes does enhance water consumption. Finally, it is thought that feeding salt increases water intake. Horses that consume large amounts of salt will drink more water, but unfortunately feeding salt does not seem to stimulate horses to do it immediately. Further, giving electrolytes (salt) to horses that are dehydrated is not recommended.

What are the benefits of adding fat to the diet of a performance horse?

The main benefit of adding fat to the diet is increased energy intake. Dietary fat is energy dense, containing 2.25 times as many calories, on an equal weight basis, as carbohydrate or protein. Therefore, fat is an efficient way of adding calories to the diet without increasing grain intake. This is particularly helpful for performance horses that may have difficulty eating enough feed to maintain body weight.

Another advantage of dietary fat is that its digestion does not increase blood sugar. Many performance horses seem to have behavioral problems associated with high-carbohydrate (grain) diets. Because digestion and absorption of grain produce large amounts of blood glucose, many people believe these fluctuations in blood sugar may be responsible for the behavioral changes. Blood glucose does not change with the digestion of fat, yet the horses receive the calories required for exercise.

Dietary fat is a safe energy source. For example, if fed too much concentrate in a single meal or during the course of a day, a horse can suffer from grain overload. This occurs when a horse is not able to properly digest the large volume of grain in the small intestine and the grain is fermented by bacteria in the hindgut. Unfortunately, rapid fermentation of grain in the hindgut can lead to digestive upset (colic) and laminitis (founder). Replacing some of the calories that would normally come from grain with fat decreases the chances of grain overload and adds a margin of safety to high-calorie diets.

Kentucky Equine Research Team Member Directory

Allfarm AG
Ruttimatt 130
Pfeffingen, CH-4148
Switzerland
011-41-61-751-7501
011-41-61-753-9620 Fax

Allied Feeds, Inc.
208 Hutcheson St.
Cuero, TX 77954
361-275-5711
361-275-2475 Fax

4542 Rigsby Ave.
San Antonio, TX 78222
210-648-0141
210-648-2135 Fax

Bagdad Roller Mills, Inc.
5740 Elmburg Rd.
P.O. Box 7
Bagdad, KY 40003
502-747-8968
502-747-8960 Fax

Banks Mill
1270 Banks Mill Rd.
Aiken, SC 29803
803-641-0007
803-502-0600 Fax

Bartlett Milling Co.
701 South Center, 28677
P.O. Box 831
Statesville, NC 28687
800-438-6016
704-873-8956 Fax

Brandt's Mill
630 N. 9th Street
Lebanon, PA 17046
717-272-6781
717-272-7009 Fax

Brooks Feed Store
RR #4
1580 Hwy 7A
Port Perry, ON L9L 1B5
Canada
905-985-7992
905-985-8297 Fax

Brumfield Hay & Grain
671 Bizzell Dr.
Lexington, KY 40510
859-255-0788
859-254-5722 Fax

Burkmann Feeds
1111 Perryville Road
Danville, KY 40422
859-236-0400
859-236-7307 Fax

Cooperative Plus, Inc.
638 S. Kane St.
P.O. Box 220
Burlington, WI 53105
262-767-2019
262-767-2026 Fax

Culpeper Farmers Cooperative
15172 Brandy Rd.
P.O. Box 2002
Culpeper, VA 22701
540-825-2200
540-825-2210 Fax

Farmers Feed Mill
251 W. Loudon Ave.
Lexington, KY 40508
859-255-7602
859-255-9815 Fax

Feed-Rite
17 Speers Road
Winnipeg, MB R2J 1M1
Canada
204-233-8418
204-235-1260 Fax

Fitmin a.s.
Helvikovice 90
Zamberk 56401
Czech Republic
011-42-446-613-265
011-42-446-613-267 Fax

Flint River Mills
1100 Dothan Rd.
P.O. Box 280
Bainbridge, GA 31718
229-246-2232
800-288-4376 Fax

Hi-Pro Farm Supplies
P.O. Box 886
White Marl, Spanish Town
St. Catherine, Jamaica, W.I.
876-984-7918
876-986-5914 Fax

La Hacienda SA de CV
Homero 1804 Piso II
Los Morales,
Polanco Mexico D.F. 11510
52-55-5557-7200
52-55-5395-1537 Fax

Lakin Milling Co.
4456 S. Dysart Road
Avondale, AZ 85323
623-932-3970
623-932-2798 Fax

Milne Feeds Pl
103-105 Welshpool Rd.
Welshpool,
Western Australia 6106
011-61-8-9351-0700
011-61-8-9351-0705 Fax

NRM NZ
100 Carlton Gore Rd.
Newmarket, Auckland
New Zealand
011-64-09-379-1869
011-64-03-300-3185 Fax

Nutribec, Ltee
2950 Rue Ontario Est
Montreal,
QUE H2K-1X3
Canada
514-527-9661
514-527-9452 Fax

Ocala Breeders' Feed & Supply
431 NW 27th Ave.
Ocala, FL 34475
352-629-8686
352-629-7925 Fax

Otter Co-Op
P.O. Box 4200
3600-248th Street
Aldergrove, BC V4W 2V1
Canada
604-856-2517
604-856-3598 Fax

Pennfield Feeds
711 Rohrerstown Rd.
Lancaster, PA 17603
800-995-0333
717-295-8783 Fax

Premier Feeds
238 Melvin Road
Wilmington, OH 45177
800-888-8162
937-584-4874 Fax

Producer Feeds
165 North Clay Street
Louisville, KY 40202
800-295-2836
502-568-2293 Fax

Ridley Agriproducts PL
1924 Hume Highway
Campellfield, VIC 3061
Australia
011-61-03-9357-7797
011-61-03-9357-7874 Fax

Saracen Horse Feeds
The Forstal
Beddow Way
Aylesford
Kent ME2Ø 7BT
United Kingdom
44 (0) 1622 718487
44 (0) 1622 790321 Fax

Tottenham Feed Services
41 Mill Street
P.O. Box 159
Tottenham, ONT LOG 1W0
Canada
905-936-4163
905-936-2812 Fax

Woodford Feed
498 Lexington Rd.
P.O. Box 116
Versailles, KY 40383
859-873-4811
859-873-5430 Fax

Many stressed horses develop ulcers.

Neigh-Lox
is recommended
for all the
stressful times
in your horse's life.

Yours shouldn't be one of them.

Neigh-Lox

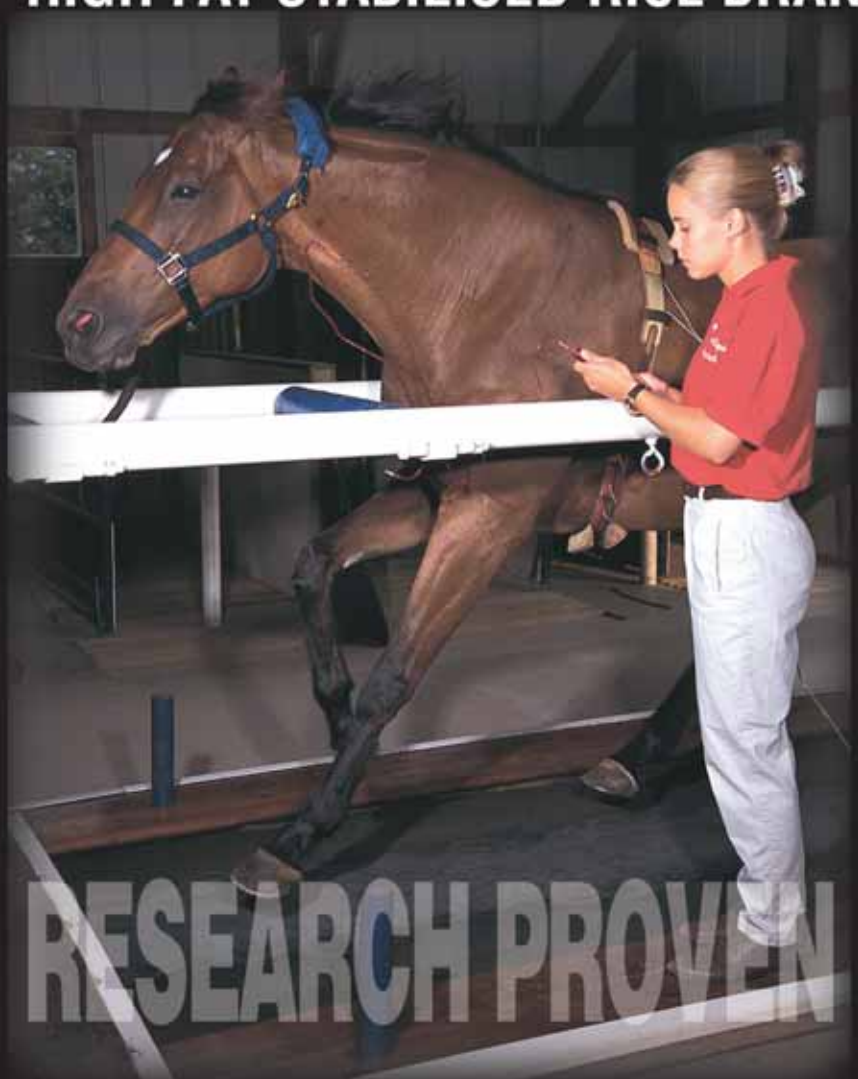
US Patent 6,284,265
www.neigh-lox.com

For more information call 1-800-772-1988.

EQUI-JEWEL®

outperforms oil

HIGH FAT STABILISED RICE BRAN



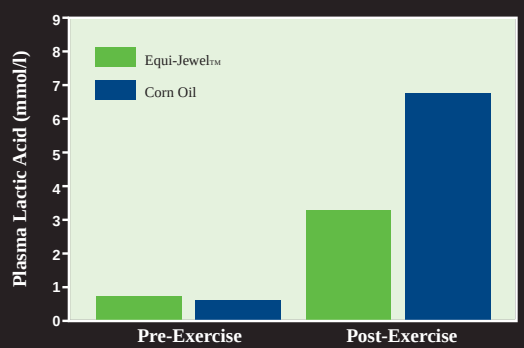
In a recent scientific study, during strenuous exercise horses fed Equi-Jewel had lower lactic acid levels than horses fed corn oil.

- ***Highly palatable and digestible form of fat.***
- ***Easier to use than oil***
  - Replace 1 cup of oil with 500 g Equi-Jewel
- ***Provides fatty acids essential for healthy skin and hair***

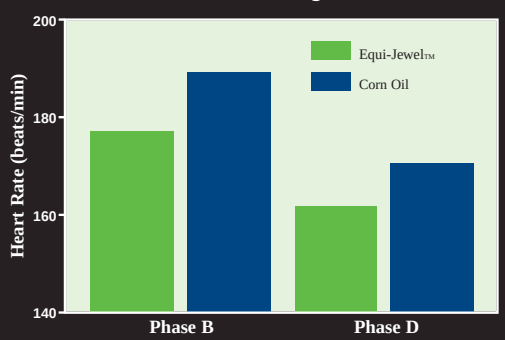
Suitable for

- ***Horses prone to tying up and those that 'fizz' on grain***
- ***Poor doers, picky eaters, and those needing rapid weight gain***
- ***Sales preparation and show horses***
- ***Safe source of energy for aged horses***

Reduced Lactic Acid Accumulation



Lower Heart Rates During Exercise

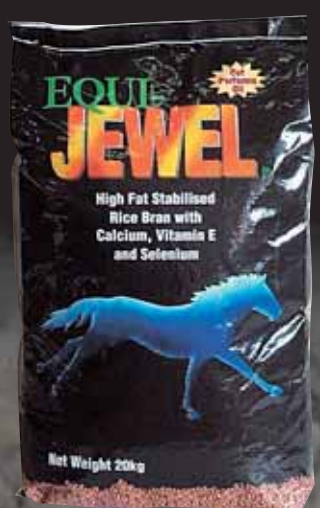


RESEARCH SEPARATES THE INNOVATOR FROM THE IMITATOR®

AVAILABLE FROM GOOD PRODUCE STORES

Free Call: 1800 772 198
Website: www.ker.com
Email: equivit@ker.com

Kentucky Equine Research® INCORPORATED
AUSTRALASIA



Now available in 20 kg bags