

Changing of the Guard



Photo by Catherine Bishop



Photo by Mark Llewellyn

A stroll through the barn at the Kentucky Equine Research (KER) facility this winter reveals some changes since last autumn. In the stalls that used to house the Thoroughbred geldings Willy and Fat Man, inquisitive baby faces peek over the gates to watch the stable cats sleeping in a sunny corner. Vinnie and Damien, former kings of the equine treadmill, graze in a side field while slender youngsters explore a black-fenced paddock adjacent to the barn. In the tack room, bright yearling halters hang next to a row of well-used equipment in larger sizes. The new year is bringing a revised focus to studies at KER.

Dr. Larry Lawrence, an equine nutritionist and KER's director of research, talked about the decision to phase out the experienced treadmill horses and purchase a group of Thoroughbred yearlings to use in upcoming studies. "To understand where we're going, you need to look at the history of KER," he explained. "Dr. Joe Pagan, KER's president, did a lot of the original research on energy needs of exercising horses, and his work was the basis for many of the National Research Council (NRC) recommendations for equine nutrient levels. In more recent years, our research has been directed toward mature horses performing strenuous exercise—racing, endurance riding, or three-day eventing, for example. The goal was to determine exactly how horses metabolize nutrients and energy during exercise. With that knowledge we could formulate feeds and provide feeding programs to optimize energy use in exercising horses."

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KER will continue to examine the interaction of exercise and nutrition, according to Lawrence, but future studies will take a slightly different direction. "If you look at the horse industry today," he said,

"one big difficulty is keeping athletic horses sound. A lot of effort has gone into ways to prevent and heal sports-related injuries. Instead of fixing horses after they are injured, researchers are now wondering if we can grow better horses that are less likely to get hurt in the first place. Is it possible to encourage the development of a stronger skeleton and tougher connective tissue in young horses? Some field studies have been done on the overall effects of nutrition on broodmares and young horses from birth through the first few years of life. This work has yielded important information, but we feel there is also a need for controlled studies under laboratory conditions using young horses with metabolically active bones. With our group of young



Photo by Jeff Rogers

Thoroughbreds, we're interested in putting these horses in training programs that will simulate what's going on in the racing industry. We'll look at the effects of different exercise and nutrition programs on bone quality and quantity."

Lawrence explained that recent studies of super fibers, high-fat diets, and low-glycemic-response feeds have led to changes in the understanding of how to feed horses. This information is exciting, he said, because researchers are now looking at the influence of specific nutrients on the array of hormones that affect growth. If nutritional management can enhance balanced development of muscular and skeletal tissue, it might be possible to prevent some of the more common problems like bucked shins as young horses enter training. Eliminating the negative effects of stress during the early years might also carry over into maturity and allow horses to remain healthy as they continue their athletic careers.

Lawrence feels the time is right to move KER's research program into this new field. He explained, "The technology is available to answer some questions that have been around for a long time. In the last few years a lot has also been learned about the effects of hormones on bone. Studies done at several places have shown us that it's possible to manipulate hormones and produce effects from the cellular level on up. This work has been done on several species, but it turns out that the horse is actually a very good model for looking at bone development. Unlike the situation in cattle where the rumen modifies practically everything the animal eats, nutrients in the horse are digested more directly, and it is somewhat easier to trace their impact on growth. During the same time, the tools have been developed to let us look at bone noninvasively and to monitor skeletal development over a period of several years."

Three tools will be of particular value in the upcoming research. Recent refinements in the use of metabolic bone markers give researchers a very sensitive indicator of the earliest phases of metabolism as bones reshape under the influence of stress. X-ray photodensitometry and ultrasound scanning yield slightly different data related to the type, amount, and density of mineral material in bone. Combining feedback from the various techniques should give researchers an excellent outline of the chemical and mechanical changes resulting from exercise and diet.

The new direction of study has great potential to help the horse industry, according to Lawrence, if only because the cost of a year lost to lameness or injury is so great. "The focus of Kentucky Equine Research is the same as it has always been," he explained. "The goal is to increase knowledge of exercise physiology and nutrition in order to produce sounder, more athletic horses. As we develop new ideas, technologies, or products based on our research, we want to move the findings to the industry as rapidly as

possible and then analyze the results of any changes that occur. We want to turn our discoveries into practical applications that will help individual horses and the industry as a whole."

To find young horses to carry the research torch in its new direction, Lawrence and KER farm manager Delia Nash scouted Thoroughbred yearling sales. The ideal set of animals had to be fairly uniform in age and size. Horses born in late spring would be suitable for the study of muscular and skeletal development from an early stage, but the yearlings needed to be mature enough to enter an exercise program without running a high risk of injury. Individuals showing obvious structural defects or signs of developmental orthopedic disease were not considered.

Temperament, an extremely important factor for a research horse, was not easy to assess, but Lawrence and Nash brought years of horse experience to the sales and were able to make preliminary evaluations that eliminated some prospects. "If a horse was continually dancing and never had all four feet on the ground, we were pretty sure that one wouldn't fit our needs," Nash commented with a grin. "I've worked with a lot of young horses, and I could get a pretty good idea which ones were nervous because of the strange environment of a sales barn and which were just probably bad-tempered."

After weighing all the variables, Nash and Lawrence selected nine yearling colts on the basis of their disposition, structural correctness, and athletic way of going. Their arrival at the research farm prompted a flurry of suggested names. Laughing at the memory, Nash explained that youngsters Dr. Joe and Dr. Larry were given their titles



Photo by Mark Lewellyn

Larry Lawrence and Delia Nash evaluate young horses at a Thoroughbred sale in central Kentucky.

in honor of the KER president and research director. Following the same line of thought, the names Nash and Izzie were bestowed on two more yearlings to recognize the farm manager and KER vicepresident Karen Isberg Pagan. One colt, Russo, already had a moniker, so the naming spree ended as the remaining horses were christened Barney, Bob, Ollie, and Sam.

During their first few weeks at the KER research farm the yearlings were given time to settle into their new surroundings before being gelded. As with any young horses, training will proceed slowly, Nash said. "We'll do a lot of ground work—leading, grooming, picking up their feet—just getting them used to being handled and setting the habits of trust and cooperation. We'll longe and ground-drive them a little, not to get them fit but just to help introduce the ideas of being responsive and going forward. Probably they will learn to wear a surcingle or saddle so that later, when we strap on a heart monitor, that won't be an unfamiliar feeling. After a few months we'll start them on the treadmill at a walk, and then work up to a little slow trotting." Nash emphasized the importance of remembering that the new horses are babies, both physically and mentally, and therefore must be handled somewhat differently than the treadmill veterans. "We'll plan very gradual advances in work, and each horse will be examined daily for signs of heat or strain in the feet and legs. We do this routinely with all the exercise horses, but it will be doubly important with these youngsters. We know the older horses so well that we can tell by their mannerisms if something is not quite right, and it will take some time to get that familiar with the new guys."

Nash has seen no problems with the yearlings so far and doesn't expect major surprises as they move into an exercise program. "The new horses mean a lot more work for me and the research interns right now, but we're pretty excited about having them here," she said. "Before I came to KER most of my experience was with young horses, and it will be fun to watch these youngsters grow and develop. It will take some time to find out where each one's aptitude lies. The ones that get along well on the treadmill will probably spend some years in exercise research. We need only four or five new exercise horses, so if some of these yearlings show outstanding athletic ability, they may move on to careers in racing or eventing."

And what of the older horses that have spent years in the KER barn? Several of the veterans will continue to participate in exercise studies for the next year or so. Others will retire from the treadmill but will be put into digestibility trials, eating carefully formulated and measured amounts of feed and hay and wearing harnesses for the complete collection and analysis of waste material. Horses in these trials eat in their stalls and have frequent muzzled turnout periods so they can socialize with pasturemates.



Photo by Catherine Bishop

These Thoroughbred yearling colts will become an integral part of growth and exercise physiology studies conducted at Kentucky Equine Research.

The oldest campaigners will eventually live out their days in the pensioners' paddock on the research farm but will stay on a regular schedule of feeding, grooming, vaccinations, deworming, dental care, and farrier visits.

There's a different story for each horse, of course. Clyde and Vinnie were born at the research farm after pregnant mares were purchased for use in an early study on milk replacement formulation. Teenaged Vinnie is still in the prime of health and will continue to participate in exercise studies. Clyde will leave the treadmill and move into feeding trials along with Willy and Wally, also members of the foundation herd but a few years older than the others. Damien, Fat Man, and Mikey were added to the research herd seven years ago. Damien and Fat Man will participate in feeding trials, while Mikey has found a new career as a pleasure horse. "Most of our retired horses stay right here," Nash said, "and a few others go to people the Pagans know personally. Although we know they will get good care at their new homes, we always set up an unlimited send-back guarantee. These horses have made their contributions to the KER research program, and everyone here is very attached to them. All of them are sound and in good condition, just getting on in years. They deserve, and will be given, continued care and a peaceful future." ☺