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## New Concepts in Horse Behavior Learned From Free-Running Horses

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## *New Concepts In Horse Behavior Learned From Free-Running Horses*

Dr. Sue McDonnell, research assistant professor in medicine and reproduction, is the large animal behaviorist at New Bolton Center. Her work includes watching horses behave and misbehave. Among her study subjects at the moment are approximately 50 ponies pastured on some 32 acres at New Bolton Center. They reveal a glimpse of the day-to-day life of equids. Dr. McDonnell has studied equids in the wild, and loves to do that whenever opportunities arise. But studies of wild horse populations are limited by environmental constraints such as wide range of herd movement through difficult terrain. Human presence can disturb ongoing natural behavior of wild populations.

She has developed a semi-feral model herd of ponies on-site, just a short walk from her office and laboratory. Semi-feral means that they are domestic stock, but have been turned out to organize and fend mostly on their own. They are provided preventive and emergency health care, and additional forage in winter. Interference by humans is deliberately kept to a minimum. Because they are domestic stock and are acclimated to people, they seem to be little disturbed by daily year-round observation and necessary handling.

Their social organization and behavior reflect the equid social order, mares, stallions, and foals just doing what comes naturally. Comparison of the reproductive behavior of these ponies, and of other free-running or pasture breeding equids, with the normal and dysfunctional reproductive behavior of hand-bred horses has taught Dr. McDonnell several important lessons.

In the course of domesticating animals, the art of animal husbandry and selective breeding created a whole set of rules that are often quite different from nature. Over the centuries breeders developed methods for breeding horses which the horses for the most part comply with. However, these are in many ways different from the behav-

ior Dr. McDonnell is observing. She says, "The lessons I learned from watching horses at liberty imply simple changes from currently accepted or recommended breeding farm management practices, either for all horses, or for use when standard practices fail for certain individual animals. Implementation can save considerable time and effort, and in some cases can rescue the breeding career of individual animals."



*Flehmen response.*

Horses or ponies at liberty organize into two distinct social groups: the harem bands with one stallion with several mares and the all-male bachelor bands. The harem stallion interacts with his mares almost continually.

"Interactive behaviors include quiet affiliation or "tending," approaching and retreating, olfactory investigation of urine and feces, flehmen response, and the precopulatory teasing sequence of mares in estrus. The amount and type of interaction varies throughout the cycle and among individual mares, but nonetheless is remarkably frequent and continuous," explains Dr.

McDonnell. He is, also, quite attentive and gentle with his offspring. It appears that in free-running conditions the harem stallion performs a good portion of the parental care. Bachelor bands are composed of stallions that have not attained, or let's say, are waiting to get a harem. In contrast to the harem stallion, these stallions have contact mostly with other males. Their reproductive and aggressive behavior is subdued compared to harem stallions.

Most domestic breeding stallions do not have much of the harem stallion experience. On the modern breeding farm stallions and mares have minimal or no contact until they are brought together in the "breeding shed". The typical breeding stallion today is housed in an individual stall or paddock away from mares.

If there is more than one stallion on a farm, they are often stabled together. Dr. McDonnell states, "It is quite remarkable that most domestic stallions can have a normal breeding career with minimal contact of mares.

Some actually never touch a mare. There are many stallions, however, that simply require or breed much more efficiently with more contact with mares." Dr. McDonnell has documented repeatedly in field studies that the harem stallion is more aggressive and has more libido than a bachelor. His testes and accessory sex glands are larger, and higher numbers of sperm are produced when he becomes a harem stallion than when he is a bachelor. She explains, "Many cases of serious sexual dysfunction or infertility can be overcome by providing greater access to mares. This is particularly the

case for slow starting novice stallions, stallions that tend to sour with the routine during the breeding season, or lifelong low libido stallions. Data is now accumulating suggesting that simple exposure to mares can positively affect stallion endocrinology and so may mediate enhanced sexual interest and response as well as reproductive physiology.”

It's interesting to note that when a stallion is removed from his harem, another stallion from one of the bachelor

sis. Mares that are in the ambivalent early stages of estrus or that are mistakenly in diestrus pose a clear safety threat in close quarters.

Mares at liberty actually solicit the stallion for his attentions. The mares do not do this by turning their rump to the stallion and standing quietly. Instead they approach and interact with the stallion head to head. There seems to be titillating flirtation that transpires, vocalization, sniffing, nuzzling, nipping, or flehmen response all of

chance for injury to animals and personnel.”

Another concern is that allowing a stallion to mount without an erection prolongs the total breeding time. This is not typically the case, and in fact, for some stallions mounting without erection can actually speed the breeding process. Each year at The Georgia and Philip Hofmann Research Center for Animal Reproduction Dr. McDonnell repeats a demonstration experiment for students which nicely illustrates this lesson. Newly acquired research stallions are initially assigned to one of three handling protocols for their first semen collection sessions: 1) mount without erection and dismount allowed without interference from the handler; 2) mount without erection allowed, but followed immediately by forced dismount; and 3) mount allowed only after erection is achieved. The stallions allowed to mount without erection and allowed to dismount at will usually finish breeding in the least amount of time. Those allowed to mount without erection and forced to dismount usually take the longest time to breed.

Another important lesson from watching horses breed at liberty concerns what happens at the end a breeding encounter. The mare that is free to move will slowly and gently walk out from under the stallion, easing him gently down to the sod where he rests a few moments. In the typical modern breeding shed the stallion is required to immediately “dismount” and is rushed to leave the breeding shed, with little time to recover from the extreme use of his energy and the natural surge of endogenous opiates associated with copulation. The breeding floor is often slippery and provides for a hard landing. The unnatural dismounting requires a great effort after the extraordinary hind-limb work of supporting the weight and thrusting during copulation. This can be a considerable problem for older and/or lame stallions already at a physical disadvantage. It is no wonder then, that after only a few breedings as described these stallions seem to anticipate the negative



*Mares interacting with stallion.*

herds will unceremoniously take that stallion's place. The new harem stallion's behavior immediately changes from the subdued bachelor type to the aggressive harem type. The change in social status is closely followed by a change in his physiology. Within sixty days this stallion now has all the physical and behavioral attributes of his predecessor. Should he lose his harem status his behavior and physiology will revert to bachelor type.

Another important observation is that the female is a far more important player in mate location and stimulation of the male than is assumed or typically allowed for hand-bred horses. In domestic breeding, the mare is typically restrained or tranquilized so that she will stand still. She is also unable to show the full complement of normal estrous behavior and postures. This practice has a reasonable practical ba-

which involves the stallion seeing and interacting with the mares' heads and forebody. There may be some mock confrontational displays. All of this seems to excite the stallion. The stallion, whether he is a novice or a seasoned campaigner, will mount the mare, usually two or more times before achieving an erection.

The domestic breeding stallion is rarely allowed access to the mare's head and is typically disciplined if he should try to mount without an erection. Dr. McDonnell says, “The basis for intolerance for a stallion mounting without erection is no doubt complex, and in my experience the managers' explanations include fascinating anthropomorphic references. There certainly are reasonable safety concerns for avoiding repeated mounting. In tight indoor quarters, the greater the number of mounts the greater the

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experience and become reluctant to breed. They may also begin to dismount early, before breeding is completed, seemingly in anticipation of the rush to dismount and leave. If the mare is simply allowed some mobility she typically will take care of the dismount

mare to move. The mare needn't be turned loose with the stallion but perhaps tied on a loose tether from a pole in the middle of a paddock so that she feels as though she has the room to maneuver.

For the stallion with virtually no libido or low sperm count without an

of stallions may impose bachelor status on breeding stallions. If the stallion does not seem interested at the time of breeding lead him to the mare's head and allow some natural equine exchange to take place. This is especially useful for the novice breeding stallion. When all else fails consider turning the stallion and mares out together. Once a stallion puts it all together and has one or two good experiences he can then be brought back to hand-breeding. It is a fact that most stallions and jacks exhibit much more sexual endurance and fertility when breeding at liberty than when hand-bred. Dr. McDonnell states, "Stallions and jacks at pasture breed as often as every one or two hours throughout the day and night with excellent sustained fertility. For most hand-bred stallions libido and fertility diminish with breeding schedules of more than once or twice per day."

Dr. McDonnell's ongoing observational study of equid behavior is a Dorothy Russell Havemeyer Foundation project. Collaborators in this research include academic and practicing equine clinicians and scientists from throughout the world. Students assisting with this work include Havemeyer Foundation Summer Veterinary Research Trainees, graduate students, middle and high school biology students, veterinary technician and nursing students, and community volunteers. 🐾

M.B.



*Stallion interacting with foal.*

by walking forward and allowing the stallion to slide off her back slowly and gently. Providing a cushioned surface with good footing, particularly around a "dummy mount," can also help. And above all, adjusting handling practices to provide, as Dr. McDonnell puts it, "...gentle, respectful accommodation of the stallion's needs or limitations can resolve or avoid most problems".

Dr. McDonnell does not advocate that all breeding operations revert to pasture breeding. She explains, "Certainly, when you have a million dollar mare and a stallion worth even millions more you do not want to take any chances." However, she does encourage breeders with horses that have reproductive behavior problems to take a look at what works in nature and carefully consider applying it in their own operation. For the "rogue mare" that readily explodes before the stallion has even mounted her, consider less restraint and give some room for the

identifiable physical cause, consider simply housing him in the barn with mares. Just being in close proximity for several months is likely to produce a positive outcome. According to Dr. McDonnell data is accumulating which indicates that traditional group housing

### Dr. Delluva Honored



*Dr. Adelaide Delluva, Emeritus Professor of Biochemistry, was honored with a party by the Department of Animal Biology on the occasion of her 80th birthday and presented with a miniature bronze of Benjamin Franklin. Dr. Delluva earned her Ph.D. degree in biochemistry in 1946 and joined the faculty in the Medical School. There she taught biochemistry to veterinary students, among others. In 1969 she joined the faculty at the School of Veterinary Medicine as assistant professor of biochemistry and was appointed professor in 1978. Dr. Delluva served on many School and University committees and still is involved in committee work. She took a keen interest in the students and their welfare and each December is a great "donating" and "bidding" presence at the SCAVMA auction.*