

Stallion Sexual Behavior

Sue M. McDonnell

This chapter reviews normal and abnormal breeding behavior of domestic stallions. Included are practical considerations for routine management of stallions as well as for the retraining of behaviorally challenging stallions.

NORMAL BEHAVIOR OF DOMESTIC STALLIONS

Descriptions of reproductive behavior of equids under free-running conditions are available in a number of resources.* These can be very instructive toward understanding the basic nature of stallions and how behavior varies under domestic breeding conditions.

Most domestic stallions are handled under halter for live breeding or collection of semen. As opposed to the full complement of harem formation and maintenance behaviors typical of a harem stallion under free-running conditions, the behavior of a domestic stallion bred under halter is typically limited to the immediate precopulatory interactions. Key elements of normal stallion behavior are listed in Table 4-1. To the extent allowed, these may include vocalization to the female, limited olfactory and **tactile investigation**, and flehmen response. Most stallions interact with a mare as soon as allowed, achieve erection within 2 minutes of contact, and are ready to mount within 5 to 10 seconds after full erection is

achieved. Copulatory **behavior** of stallions includes mounting, insertion, thrusting, ejaculation, and dismount. Once mounting occurs, copulatory behavior of halter-bred **stallions** proceeds similarly to that of free-running stallions of any of the equid species. Most stallions ejaculate after 6 to 8 **pelvic** thrusts. For most stallions on organized breeding farms, the entire breeding process, including washing of the penis, is usually accomplished in 1 to 2 minutes. With consistent good handling and a good stimulus mare, most stallions are remarkably consistent over time in their breeding **behavior**. Monitoring of the details of a stallion's typical breeding behavior can be useful in early detection of problems. The most useful aspects to monitor include erection latency, number of mounts, thrusts, and palpable ejaculatory pulses. On many farms, cover breedings or semen collections are videotaped, which provides a valuable record in case behavior problems arise.

Most stallions quickly learn the breeding routine to which they are exposed. They respond to conditioned stimuli associated with the breeding process, and they may breed efficiently with little or no teasing or contact with a mare. Others, still quite normal, may require considerable opportunity to interact with mares. Some stallions that are bred under rigid protocols can appear to become "ritual-bound." Any change in breeding routine

Table 4-1 Normal Behavior of Domestic Stallions

| |
|--|
| Immediate interest and interaction with a mare in estrus |
| Erection within 2 minutes |
| Mount readiness, within 5 to 10 seconds after erection |
| Ejaculation on first mount |
| Total breeding time of 2 to 5 minutes |

may appear to disturb their response, usually temporarily. Ritual-bound stallions can usually adapt to procedural changes, even after years of a fixed regimen, given good handling, optimal teasing conditions, and patience. Once these horses accept anew routine, occasional minor changes in routine can be useful in teaching the horse to be more flexible. In contrast to the ritual-bound stallion; some stallions tend to get "bored" with fixed breeding routines and clearly benefit from reasonable variety in breeding-stimulus mares, breeding location, handlers, and order of procedures. In extreme cases, stallions seem to need something new every few days to sustain their interest.

Starting a Stallion in the Breeding Shed

The handling of stallions for breeding is an art. Table 4-2 summarizes the important characteristics of good stallion handling, as well as common errors. It is also helpful to have a designated breeding area that is out of the way of farm traffic and that has plenty of room for both the animals and the personnel. In many cases of stallion handling difficulties, human fear of the stallion, in general or **specifically** during breeding, is the primary challenge to overcome. Schooling for handling tough horses is probably the best way to become an excellent stallion handler, so such a situation is a good opportunity for development. The best stallion handlers I have known were once fearful but were schooled into excellence,

All stallions can learn the few basics of handling and manipulation required for organized, safe in-hand breeding or semen collection. These include maintaining attention,

willingness to take necessary direction from the handler during teasing, tolerance of genital manipulation and washing of the penis, waiting for direction from the handler to mount, and orderly mount and dismount. Behaviors that are unacceptable and unsafe and that can be easily eliminated **include** biting or kicking of the mare or handler and rushing or charging to mount the mare. **All of** these goals can be achieved in any stallion with thoughtful arrangement of the breeding **situation**, positive reinforcement, and judicious direction and correction. Harsh beating, explosive disciplinary sessions, overcorrecting at

Table 4-2 Important Aspects of Good Stallion Handling

-
- Willingness to work with the stallion in a **nonsexual** situation to establish mutual respect and to establish working commands, to stop, stand, and back
 - Firm, respectful direction of the sexually aroused stallion; calmly using simple, clear physical or verbal cues
 - Recognition that vocalization, prancing, arched neck are precopulatory behavior to be allowed and celebrated
 - Use of positive reinforcement with sparse and judicious aversive conditioning; appreciation that punishment is a dangerous teaching tool
 - Appreciation that stallions vary in the degree of restraint and control required
 - Provision of ample room to remove a stallion from a situation if things get out of hand
 - Recognition that much of what is asked of the stallion is natural and much is not

Common errors

- Ditzing with the stallion to "hold his 'attention'"
 - Allowing the stallion to circle
 - Not allowing the stallion to touch the mare during teasing
 - Allowing the stallion to charge or leap at the mare for mounting
 - Overcorrecting rearing
 - Punishing mounting without erection
 - Rushing the stallion to dismount after ejaculation
 - Using delayed or explosive discipline that only delays learning
-

the head, and jerking and shanking to hold the horse's attention are all unnecessary, usually delaying the learning process. For some stallions, such handling can create serious behavior and libido problems.

Table 4-3 outlines the steps used at our clinic to introduce stallions to washing of the penis. Even for stallions that initially appear

most resentful of penile manipulation, training to tolerate washing can be done safely within a short period of time (usually two to three 5-minute sessions) using simple systematic desensitization, positive reinforcement, and gentle aversive conditioning only when necessary to discourage kicking. The horse needs to learn as quickly as possible that this

Table 4-3 Specific Procedures for Introducing a Stallion to Washing the Penis

The handler of the stallion positions the stallion to stand under control, for example, parallel to a padded wall. The stallion handler stands on the near side almost in front of the stallion, but out of the way of a strike.

The washing technician approaches at the shoulder of the stallion, running the back of the left hand along the neck, shoulder and abdomen of the horse until standing with the left shoulder of the technician touching the side of the stallion. The erect penis is firmly grasped with the left hand midway along the shaft. It is gently directed toward the handler.

If the **stallion** moves away, the technician should attempt to move with the horse, without flinching or otherwise reacting. The stallion needs to learn two things: (a) The procedure is not going to hurt him (it actually quickly appears pleasant to most stallions), and (b) nothing the **stallion** does will avoid the procedure. In other words, his movement does not stop the washing of the penis.

If the stallion kicks, explosive punishment should be avoided. **Gentle discouragement** and continuation of the job so that the stallion gets to know that it can be pleasant and that it leads to the opportunity to breed is usually the best strategy for all but the most dangerously resistant stallions.

If the stallion should thrust forward or the glans penis should flower from the stimulation, no discipline is necessary. Gently deflecting the penis downward toward the back legs naturally reduces the tumescence. Cooler wash water is less likely to stimulate thrusting or flowering. It is useful for most handlers to appreciate that the horse is not misbehaving, just responding positively to this unnatural procedure.

All that is necessary to adequately cleanse the penis is gentle massage along the shaft to loosen flakey debris, with warm **water** splashed from a cup or towel onto the penis. Up and down stroking motion abrades the surface and is unnecessary.

Some horses resent having hot water splashed on their hind legs or abdomen and scrotum. With experience **most** technicians can effectively deliver a vigorous splash of water to the penis without hitting the belly or legs.

The glans penis is deflected with the thumb to rinse out the **fossa** and any smegma "bean."

The base of the penis is an area with heavy smegma accumulation that cannot be effectively cleansed. **It** is often best left undisturbed.

Care should be exercised to allow water run-off to flow toward the base rather than the glans penis, which was just cleaned.

The penis is dried by wrapping and blotting with a clean cloth or **paper** towel from glans to base direction. This keeps the glans cleanest. Rubbing abrades the delicate tissues and is unnecessary.

Nondisposable fabrics are generally too abrasive. Air-drying for a minute or two is also adequate.

Common mistakes

Ditzing with the head of the horse during washing of the penis

Startling the stallion by simply grasping the penis without warning

Too light or too **rough** handling of the penis

Abrading the **penis** by vigorous rubbing of the shaft

Splashing water on the belly, scrotum, or hind legs

Overreacting each time the horse flinches or lifts a leg, teaching him that he can control human behavior

procedure 'does not hurt, it may even be pleasant, and that nothing he does will stop the procedure. Safe positioning of the handler and technician so that the work can proceed quickly and so that the technician can stay with the horse through episodes of mild resistance can greatly facilitate the process. Beyond the breeding hygiene reasons, the lessons of waiting for a procedure before breeding as well as tolerating genital manipulation and examination are valuable basic training for a stallion.

Starting a Stallion on a Dummy Mount

Some stallions mount a dummy when initially presented, sometimes even without a mare in the vicinity. Hence, it is worth trying a stallion without a mare just in case he is one of the few who take to the dummy immediately. Other stallions require more stimulation and some training. Except for stallions with seriously inadequate libido or physical disability, almost all stallions can learn to mount a dummy of appropriate design. Some may take several training sessions lasting 10 to 20 minutes each. Table AA summarizes the key features of dummy mount design, with particular attention to factors affecting behavior.

There is no one correct way to introduce or train a stallion to a dummy mount. The mare and stallion handlers are critical to the

Table 4.4 Key Features of a Breeding Dummy Mount

| |
|--|
| Single pedestal (safest in-event of fall) |
| Smooth, snug, "cool" cover (to avoid abrasions) |
| Sturdy, quiet when mounted |
| Ample head room, front and side clearance (some horses hesitant to mount if too crowded) |
| Especially secure footing, without a pit worn at the rear |
| Grasping grooves or "mane" |
| Angled or level makes little difference for most stallions |
| Other accoutrements unnecessary |

Note: Self-service or adjustable dummies typically do not meet many of these key features. Penis injuries are common with self-serve dummies,

Table 4-5 Steps for Training a Stallion to a Dummy Mount

-
- Stimulate the stallion to readiness to mount using a stimulus mare at a distance from the dummy; gently walk the stallion from directly behind the dummy.
 - Place the mare alongside the dummy and tease across the rear of the dummy.
 - Allow the stallion to mount the mare for semen collection a few times near the dummy to get the stallion comfortable with breeding in that location, then remove the mare.
 - Lead the mare with the stallion following/teasing from behind, diverting the mare at the last moment to the side and bumping the stallion's chest into the rear of the dummy.
 - If the stallion seems ready to mount, but hesitates, stimulate the penis by placing the artificial vagina or warm compresses on the glans while the stallion is teasing.
-

success of this training. The best results can be expected with positive encouragement 'and *with athletic positioning and movement' of the stallion and mare, without frustrating or abusing the stallion. Our usual procedure is to progress through the steps outlined in Table 4-5. Each is tried several times before going to the next. Once the stallion has successfully mounted and ejaculated on the dummy a few times, the mare or other special procedures used during training may be gradually eliminated.

Pasture Breeding

Most domestic stallions also can easily adapt to pasture breeding. Stallions that are turned out to pasture with mares, even after years of halter breeding, usually immediately perform all of the harem formation and maintenance behaviors typical of wild equids. Also, stallions that have been pasture-bred for years usually readily adapt to breeding under halter or to semen collection.

FACTORS AFFECTING STALLION BEHAVIOR

Season and Hormones

Reproductive hormones of the stallion show a seasonal pattern consistent with reduced

reproductive function during fall and winter. Whereas most stallions show sexual interest and respond adequately during fall and winter, most breeding stallions display a measurable decrease in sexual behavior vigor and endurance during fall and winter compared to the spring and summer natural breeding season months.

Stimulus Mare

Most stallions respond adequately to any mare in estrus. Others show clear preferences for a particular mare or type of mare. Clinical observations suggest that mare characteristics such as color, size, breed, age, lactation status, and days from ovulation may affect sexual interest and response of certain stallions. An important mare factor that is often overlooked in artificial insemination programs is that almost all stallions respond more vigorously to stimulus mares in natural estrus than to ovariectomized stimulus mares or to a dummy mount. It is also interesting and not widely appreciated that almost all stallions respond more vigorously when provided with more than one stimulus mare. Occasionally, a stallion does not respond adequately unless provided two or more estrous mares from which to "choose."

Sociosexual Environment

Evidence is accumulating that reproductive physiology of stallions includes mechanisms for modulation by social conditions.* In semi-feral herds, bachelor or harem social status influences a stallion's reproductive hormones. Bachelor stallions have low levels of plasma testosterone, their aggressive behavior is of a playful, sparring nature, and they form close affiliative relationships among males. Harem stallions have higher levels of testosterone, their intermale aggressive behavior is of the serious type, and they generally repel any mature male intruders. When a stallion becomes a harem stallion, testosterone levels rise and remain higher than when a bachelor. If a stallion loses his harem, his testosterone decreases to bachelor levels. These effects of transition can occur at any time of the year.

Evidence is also accumulating that effects

of sociosexual environment seem to be similarly operational in domestically managed stallions.³ In brief, housing conditions, whether with other stallions or as the only stallion with other mares, appear to simulate the bachelor and harem social condition. Access to teasing and breeding also seems to be a positive influence on testosterone levels of stallions*

General Management and Handling

Management and handling of stallions vary considerably throughout the horse breeding industry. In general, stallions are flexible in adjusting to a variety of management and breeding practices. As with general health and semen production, for most stallions there is a tangible benefit to ample exercise, adequate exposure to natural light, and firm but judicious and consistent handling. For all stallions, breeding vigor is affected by frequency of breeding and teasing frequency. However, there is wide variation among stallions in breeding frequency, which maintains optimal libido and copulatory efficiency. Some stallions can maintain adequate libido at the rate of one to three ejaculations per day, 7 days a week. In some, problems develop if they are bred more than three to five times weekly

STALLION BEHAVIOR PROBLEMS

The most common problems related to stallion behavior can be categorized as breeding behavior problems, behavior issues and problems of performance stallions, and residual stallion-like behavior in geldings.

The Breeding Stallion

Inadequate Sexual Interest and Arousal (Libido)

Specific stallion libido problems include slow-starting novices, slow or sour-experienced stallions, and specific aversions or preferences.* Most of these problems are man-made. Stallions that have been disciplined for showing sexual interest in mares during their performance career are discouraged from showing spontaneous erection and masturbation,

or those that are mishandled during breeding under halter often experience a difficult transition to a breeding career. When exposed to a mare for teasing such a stallion may simply stand quietly appear anxious and confused, or even savage the mare. Most stallions with such experience-related libido problems respond well to behavior therapy alone or in combination with anxiolytic medication. These stallions typically respond best to continued exposure to mares, initially with minimal human presence, and then with gradual introduction of quiet, respectful, patient, positive reinforcement-based handling. These stallions appear to respond favorably to reassurance for even small increments of improvement. Tolerance of minor misbehavior, rather than punishment, is often a rewarding strategy. The anxiolytic drug diazepam (0.05 mg/kg slow intravenous [IV] 5 to 7 minutes before breeding) is useful in about half of such cases as an adjunct to behavior modification.

Some libido problems are hormone-related and can improve with management aimed at increasing exposure to mares and reduced exposure to other stallions. This typically increases androgen levels and general confidence, as well as sexual interest and arousal.^{2,3}

Specific Erection Dysfunction

Libido-independent erection dysfunction is rare in stallions. The majority of erection dysfunction that does occur is related to traumatic damage of the corpora cavernosa. Common causes include stallion ring injuries, drug-related paralyzed penis and paraphimosis, kick injuries, and other breeding accidents. A considerable number of such accidents involve "self-serve" dummy mounts and thermometers left in the lumens of artificial vaginas.

An interesting and often confusing type of erection dysfunction involves the folding back of the penis within the prepuce. The behavioral hallmark of this situation is a stallion that appears aroused and ready to mount, without a visible erection. The stallion may also appear uncomfortable or intermittently distracted behind, pinning the ears,

kicking toward the abdomen, or stepping gingerly on the hind legs. Close visualization reveals a rounded, full-appearing prepuce, with the skin stretched taut. Resolution usually requires removing the stallion from the mare until the penis detumesces. Once the penis is fully withdrawn, application of a lubricating cream to the prepuce facilitates subsequent normal protrusion. This situation tends to repeat occasionally with particular stallions. We have observed this condition to repeat in stallions with particularly profuse smegma production, as well as in stallions in which the penis and sheath is fully cleansed one or more times daily for breeding. The tendency for the penis to fold back on itself within the prepuce may be related to having too much or too little smegma lubrication.

Mounting and Thrusting Problems

Many breeding behavior problems, particularly ejaculatory dysfunction, appear to involve neurologic or musculoskeletal problems that affect the stallion's ability to mount and thrust. Many such stallions can continue breeding with therapy aimed at reducing discomfort and accommodating disabilities during breeding, including adjustments to the breeding schedule aimed at reducing the total amount of work. We have found that long-term treatment with oral phenylbutazone (2–4 mg/kg orally twice daily) often works well to keep such stallions comfortable for breeding.

Specific Ejaculation Dysfunction

Whereas any libido, erection, or mounting and thrusting problem can result in failure to ejaculate, there are also stallions in which the dysfunction seems to be specific to ejaculation. Specific ejaculation problems can include apparent failure of the neural ejaculatory apparatus, physical or psychological pain associated with ejaculation, and genital tract pathology? There are a variety of management changes and pharmacologic aids that can enhance ejaculatory function in such instances. These are outlined in Table 4-6.

Rowdy Breeding Stallions

Rowdy, misbehaved breeding stallions in most cases represent a human-animal interac-

Table 4-6 Management and Pharmacologic Aids to Facilitate Ejaculation*MANAGEMENT AIDS***To enhance sexual arousal**

Prolonged teasing under conditions that yield the highest safe level of arousal .
 Breeding schedule for **maximum** arousal
 Natural estrus stimulus and mount mares
 Stable (no side-to-side movement) mount mare, or dummy necessary
 Minimal distractions in the breeding area
 Established breeding routine rich with conditioned stimuli for maximum arousal
 Encouragement and positive* reinforcement

To reduce back and hind limb pain and accommodate musculoskeletal deficiencies

Mount mare or dummy of appropriate height and conformation
 Mare or dummy down-grade from stallion to reduce weight on hind limbs
 Semen collection on the ground (artificial vagina or manual stimulation)
 Weight loss to reduce work of hind limbs, particularly during breeding
 Pain treatment
 Lateral support at the hips during mount
 Good footing (grass or dry athletic surface)

To increase positive stimulation of the penis

Pressure and temperature of artificial vagina that yields best response
 Hot compresses applied to the base of the penis

*PHARMACOLOGIC AIDS***To enhance sexual arousal**

GnRH: 50 µg Cystorelin **SC:** 1 and 2 hours before breeding
 Diazepam: 0.05 **mg/kg** slow IV

To lower ejaculatory threshold

Imipramine: **500-1000** mg orally in grain

To induce ejaculation

Xylazine: 0.66 **mg/kg** IV

Imipramine: **2.2 mg/kg** IV

Prostaglandin **F_{2α}**: 0.01 **mg/kg** IM

GnRH, gonadotropin-releasing hormone; **SC**, subcutaneously; **IV**, intravenously; **IM**, intramuscularly.

tion problem. Most can be overcome with judicious, skillful, respectful training.⁵ As with dogs, it is the rare exception of even the most misbehaved; mishandled stallion that cannot become retrained in 1 or 2 hours total training time. As with the training of pets, the handler typically needs more actual training time than the animal. Successful modifi-

cation of unruly behavior of a breeding stallion holds the special challenge of eliminating undesirable behaviors without suppressing normal sexual behavior. A common misunderstanding of handlers is that vocalization, prancing gait, and normal sexual enthusiasm should be discouraged. Simple handler education, for example, that vocalization is not

particularly associated with dangerous or undesirable behavior, can be productive. Some handlers benefit from systematic desensitization to the shrill sexual call of stallions. This can be done using audiotapes or videotapes of breeding or teasing of a vocal stallion that is being handled by an expert stallion handler.

Even the most strong, vigorous, and misbehaved breeding stallion can be retrained using simple positive and negative reinforcement; **with** very little or no punishment. It can be done in a safe and systematic manner without abuse or commotion, usually within a few brief sessions. Some of the most challenging **stallions** may benefit from initially being allowed several breedings in rapid succession. With reduced urgency to breed, it may be easier to maintain **the** stallion's attention for teaching the breeding shed procedures and manners. Our clinical approach to systematic behavior **modification of** unruly stallions and example case reports from our clinic have been detailed **elsewhere**.⁵

Frenzied Stallions

Distinct from simple rowdiness, some **stallions**, like some mares or geldings, are hyperactive or even "frenzied." Reproductive hormones may or may not be a factor. Important factors are genetics, experience, sociosexual environment, housing, diet, and exercise. Most of these stallions can benefit from more roughage and less grain in the diet, organized and pasture exercise, and consistent housing in a quiet area. **L-tryptophan** supplementation (1-2 **g** twice daily in feed) can have a calming effect on such stallions.

The Performing Stallion

Studlike Behavior During Training or Performance

Despite the strong male sex drive of most stallions, their sexual and aggressive behavior is remarkably amenable to control during performance situations with simple behavior modification. Consistent, firm, judicious, and skillful training is typically all that is necessary even for the most energetic and **strong-willed** stallions. The principles for stallion

training are similar to those of any animal training however, the size and strength of the stallion necessitate a higher **skill** level of the trainer; Even though physical size and strength in the trainer may be helpful, they are not necessary for handling and training stallions. Unlike with the rowdy breeding stallion, behavior problems of performance stallions are usually addressed to trainers rather than to veterinarians. The veterinarian may become involved when asked to provide pharmacologic aids to managing rowdy performance stallions or to provide advice on effectiveness of castration. Progesterone is also used to help quiet sexual drive in stallions. Certainly tranquilizers, both long- and short-acting, are used widely in the show and racing industries. However, medication without good handling and training is rarely satisfactory in controlling stallion behavior.

Most rowdy performing stallions can also benefit from the opportunity to breed. Providing clear signals distinguishing breeding **time** and performing time can help most stallions learn and abide the difference.

Combining Breeding and Performing

With the wide acceptance of cooled-shipped semen and the growth of the hunter-jumper segment of the horse industry, more people are considering breeding a stallion while he is still performing. Opinions vary among owners and trainers concerning whether stallions should combine breeding and performance careers. A commonly expressed concern is that a stallion will lose interest in performance or become more difficult to handle once he has had breeding experience. Another commonly expressed concern is that the physical demands of mounting and breeding can adversely affect high-level dressage or jumping performance. Also, some breeding farm managers believe that performance demands will limit a stallion's fertility. On the other hand, **there** are trainers who believe that stallions become more poised and manageable, both for breeding and for performance, when the two careers are combined. None of these beliefs have been scientifically tested. Examples of all of these outcomes can be found. Important factors include **individ-**

ual stallion variation, the level and demands of each career, and, most importantly, the attitudes and expectations of owners, trainers, and breeding managers. With a positive attitude, a good understanding of a few behavior and reproductive management principles, and reasonable organization, the outcome is typically excellent.

Residual Stallion-like Behavior in Geldings

Castration, regardless of the age or previous sexual experience, does not always eliminate stallion-like behavior in horses. If given the opportunity, as many as half of geldings will show stallion-like behavior to mares; many will herd mares, and even mount and appear to breed. Similarly, even though castration does tend to “mellow” most horses, it does not eliminate general misbehavior. Traditional behavior modification is usually much more effective in controlling sexual- and aggressive behavior in a gelding, under saddle or in-hand than it is with an intact stallion.

Also, treatment aimed at quieting sexual and aggressive behavior, such as progesterone treatment, is typically more effective in geldings than in intact stallions.

REFERENCES

1. McDonnell SM. Normal and abnormal sexual behavior. *Vet Clin North Am Equine Pract* 1992;8:71–89.
2. McDonnell SM, Murray SC. Bachelor and harem stallion behavior and endocrinology. *Biol Reprod Monogr* 1995;1:577.
3. McDonnell SM. Stallion behavior and endocrinology. What do we really know? *Proc 41st Annual AAEP Convention, Lexington, KY, 1995.*
4. McDonnell SM. Ejaculation: Physiology and dysfunction. *Vet Clin North Am Equine Pract* 1992;8:57–70.
5. McDonnell SM, Diehl NK, Oristaglio Turner RM. Modification of unruly breeding behavior in stallions. *Compend Contin Educ* 1994; 17(3):411.
6. Martin BB, McDonnell SM, Love CC. Effects of musculoskeletal and neurologic diseases on breeding performance in stallions. *Compend Contin Educ Pract Vet* 1998;20:1159.