

A regular breeding soundness evaluation on your stallion is a wise investment.

Article and photos by Christine Hamilton

A FORMAL BREEDING SOUNDNESS evaluation on a stallion sounds about as interesting as a 10th-grade term paper. But going through a BSE on a horse with a fertility problem can unfold like a scientific who-done-it, and it can save big management dollars for a farm.

People typically think of conducting a BSE for three reasons: as part of a pre-purchase exam; when a stellar performer first enters the breeding shed; and when there's a sudden fertility problem in a previously sound breeder (see Page 14).

However, experts say that a BSE should be a part of any stallion's regular health check-up to head off unseen problems prior to breeding season, and it can be an important management tool for his breeding career, for example, as the demand for his services increases or as he ages and his physical capabilities change.

But the stamp of "pass" or "fail" on a horse as a successful breeding stallion often depends on variables

outside of what the technical analysis reveals.

"The final evaluation itself changes depending on how you are going to use the horse," says Dr. Jason Bruemmer, professor in the department of animal sciences at Colorado State University. Stallion behavior, physiology and management are his primary research fields, and he directs the stallion services offered at the CSU Equine Reproduction Laboratory.

"For example, is the stallion physically able to work into your program?" he continues. "And the answer could be different if you're using artificial insemination or live cover or frozen semen. You could have different answers for the same horse."

There are standards regarding what a basic stallion BSE should entail. These standards are established by the American College of Theriogenology as recognized by the American Veterinary Medical Association. Any veterinary school, reputable reproductive facility or veterinarian

should follow those. Here's how a typical BSE goes at the CSU Equine Reproduction Laboratory.

Case History

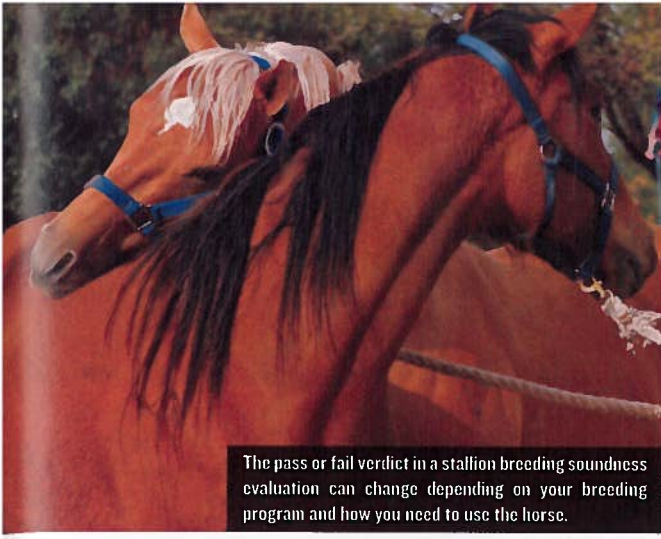
PRIOR TO THE BSE, THE LAB NOTES THE stallion's general history, why he's being evaluated and any breeding history or previous evaluations. Everything about the stallion's lifestyle and use has a potential affect on his reproductive performance.

"Is he exercising or standing in a stall? Currently breeding or breeding and being shown? Is he a performance horse, a halter horse or a racehorse?" Dr. Bruemmer lists off as examples.

"Often owners don't want to talk about the effects of a stallion's lineage on his reproductive performance, but we have to," he adds. "I know of one line of horses that has a high incidence of double-headed sperm cells (an indication of infertility), but they are all very fertile. It's amazing to see that."

Medications, injury or recent sickness can also affect a BSE: "Spermatogenesis

FUNDAMENTAL
 Soundness



The pass or fail verdict in a stallion breeding soundness evaluation can change depending on your breeding program and how you need to use the horse.



A stallion's libido and breeding behavior is greatly affected by handling.

in the stallion is 57 days," Dr. Bruemmer says. "If a stallion has been injured, sick or on medication in the 60 days prior to the BSE, that will affect the semen we collect."

Physical Exam

THE BSE ITSELF BEGINS WITH A BASIC physical exam: checking for lameness, pulse, respiration and body condition – being overweight makes it harder on a horse physically in mounting a mare or a phantom. As the stallion is washed prior to collection, his penis and sheath are evaluated and examined for scarring or lesions.

"I don't do a testicular palpation until after we're done collecting because that's when the stallion is the calmest," Dr. Bruemmer says.

At that point, he checks for cryptorchidism (one testicle instead of two) and the testes' consistency. He uses calipers to measure the total scrotal width, height and length – to calculate total scrotal volume.

"The total scrotal volume is

predictive of what the stallion should be able to produce on a given day," he explains. It can also help flag potential problems, comparing predicted sperm production with the actual numbers.

The lab will also take bacterial culture swabs pre- and post-ejaculation.

"There are always going to be bacteria present," Dr. Bruemmer says. "We just want to make sure there aren't any pathogens."

Behavior

REGARDING THE STALLION'S LIBIDO, Dr. Bruemmer doesn't track the total time of erection, mounting and ejaculation, because those behaviors are affected by handling.

"That is why it's nice when you can have them for a week and handle them regularly," he adds. "For example, you might use a gray tease mare and not realize that he's been kicked by a gray mare and that's what's taking him so long."

It has been Dr. Bruemmer's experience

that behavioral problems typically stem from either a stallion being young and inexperienced, or in how the stallion has been trained either to breed or in his performance career.

"The one problem we run into more than anything else is not necessarily that they are infertile or subfertile," Dr. Bruemmer says. "It's behavioral issues."

That's another good reason to start a young stallion off with a BSE – to learn proper breeding shed etiquette and behavior.

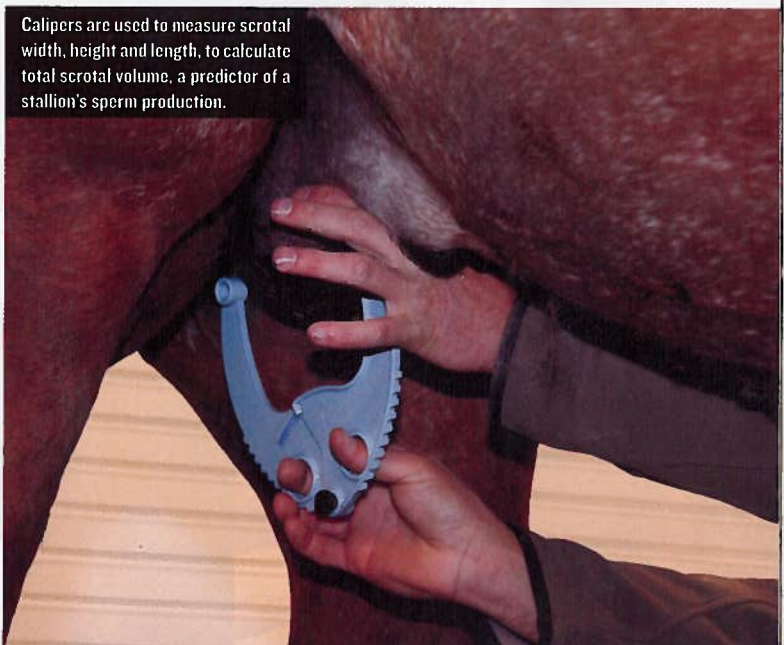
"If he goes through a BSE at the beginning of his breeding career, it's like sending him to college," Dr. Bruemmer says. "Get a BSE, a test cool or freeze, and let him learn how to mount a phantom properly and be collected. You get all the data you need and he gets a good start, behaviorally."

Semen Evaluation

THERE ARE TWO TYPICAL PROTOCOLS for collecting semen for the BSE.



It's important that a stallion learn from the beginning how to properly mount a phantom and be collected.



Calipers are used to measure scrotal width, height and length, to calculate total scrotal volume, a predictor of a stallion's sperm production.

"The first is to collect a stallion every day for a week to 10 days," Dr. Bruemmer explains. "That will answer most of the questions we need to know about him."

Because of the extra cost involved, most owners don't do that.

"The other is to make sure the stallion has been sexually rested for a week and then collect him twice in a given day," Dr. Bruemmer says. "We then compare the quality of the second ejaculate to that of the first."

"In a normal stallion, we expect to find between 20 and 70 percent of the total numbers in the second ejaculate as we did in the first; that indicates he's depleting his extra gonadal reserves normally."

The evaluation of the semen itself involves a number of parameters: 1. measuring total liquid volume of the ejaculate with a graduated cylinder; 2. using a densimeter to measure the concentration of sperm cells per milliliter; 3. estimating the sperm total and progressive motility under a microscope, either by eye or using a motility analyzer; and, 4. looking at the cells' morphology via microscope slide stain.

"The sperm cells should have one head, a long midpiece and a straight tail," Dr. Bruemmer explains. "One of the most common abnormalities is a bent or curled tail, which affects the sperm's progressive motility."

"On the morphological stain, a normal cell won't stain; if the cell takes up the stain, you know its membrane is damaged."

The goal is to get an idea of the sperm

numbers the horse produces from the volume and concentration; and to get an idea of the sperm quality by looking at the cells' progressive motility (the percentage of cells moving in straight lines) and physical structure in the morphology.

Depending on the owner's plans, the BSE might also involve a test cool and/or a test freeze on the stallion's semen.

"A common misconception is that if a horse has good-looking semen that it cools or freezes well," Dr. Bruemmer says. "Until we do a test freeze or test cool, we don't know."

For the test, the lab performs a standard BSE, then gives the horse a day's rest, and on the third day collects the stallion once and splits the ejaculate for the test cool and freeze.

"Just because a stallion has semen that cools well doesn't mean it will freeze well, and vice versa," Dr. Bruemmer adds.

Evaluation

"THE TRICKY PART IS WHAT MAKES A stallion pass or fail a BSE," Dr. Bruemmer says. "When I put one of these together, it's more like any pre-purchase exam you'd get on a horse. There's no such thing as a perfect horse: You simply state this is what we found on this day."

He adds that the BSE measures potential indicators of fertility, and should not be taken as a guarantee either way.

"We've got examples of stallions with the best-looking semen in the world but with poor fertility; and we've got stallions here that I have no idea how they're getting mares pregnant on a

regular basis.

"There is no better test than to breed mares," he says. "If he gets mares in foal, that's your actual pass/fail answer."

Passing or failing can also be dependant on who owns him and how they want to use him. For example, a horse could pass in a live-cover program, but fail in a frozen semen program. (See "BSE Case Studies" on Page 55.)

Predicting Production

COMBINING THE STALLION'S TOTAL SCROTAL volume with the numbers measured in volume, concentration and progressive motility gives owners a valuable tool in managing a stallion's book.

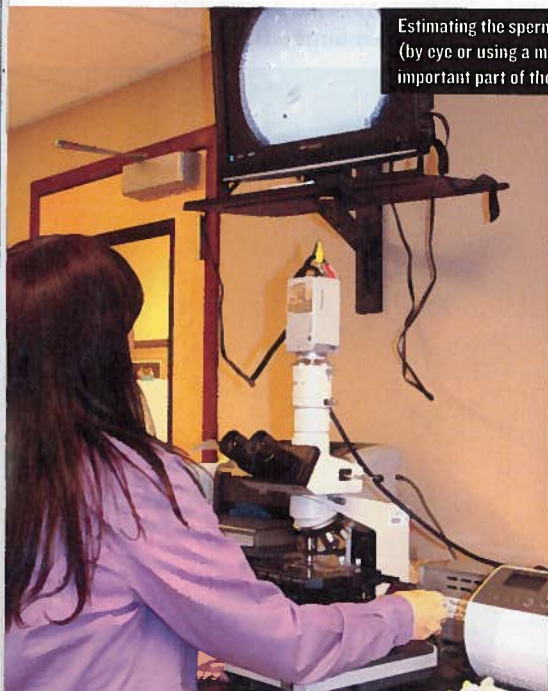
Dr. Bruemmer explains that there are established, expected sperm numbers of what a normal stallion produces throughout the year. The highest sperm production hits in June.

"The idea is that you can do a BSE on a stallion any time of the year and still estimate what his sperm output will be in a peak month, assuming he's been in ambient light," Dr. Bruemmer explains. "Then with that information, we can predict the daily sperm output."

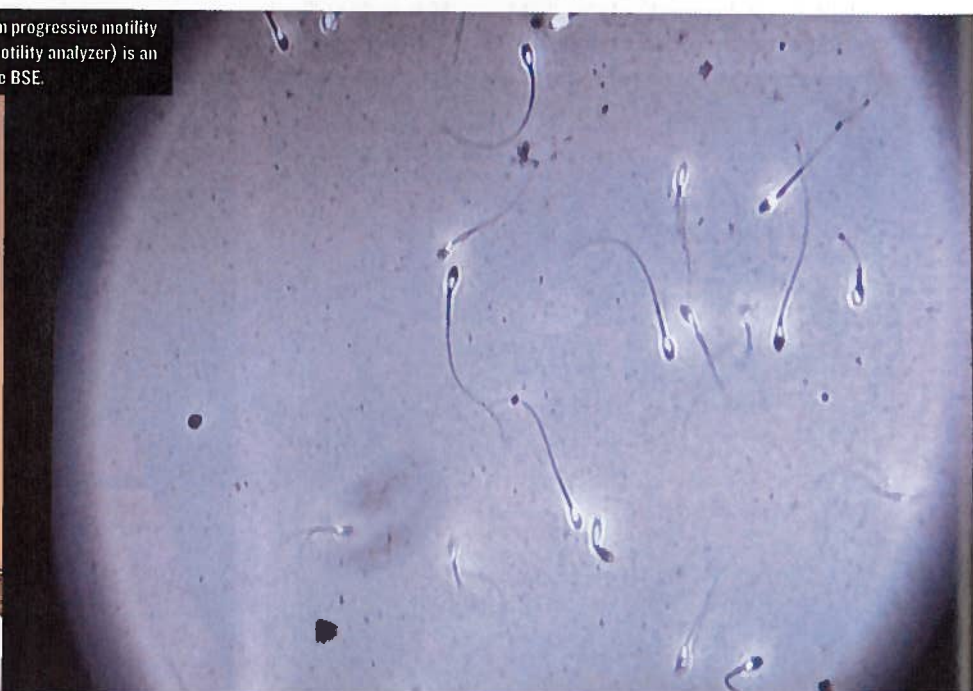
"Some of the farms we've worked with don't actually book mares until they've had evaluations of their stallions, which is brilliant," Dr. Bruemmer points out. "The BSE allows us to estimate a stallion's book so you can better manage your business."

"It helps you know how to manage your stallion to get the output you need." ■

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Estimating the sperm progressive motility (by eye or using a motility analyzer) is an important part of the BSE.





Some stallion owners also request a test freeze be added to the breeding soundness evaluation.

Foundation Action
The American Quarter Horse Foundation has supported a significant body of research since 1972. Of the roughly \$8.5 million in Foundation-funded projects conducted at 32 universities nationwide from 1972 to 2010, approximately \$867,000 was in the area of stallion reproduction.

BSE CASE STUDIES

Dr. Jason Bruemmer of the Colorado State University Equine Reproduction Laboratory has case histories that read like reproductive mystery novels – stallions with odd problems that the experts have to figure out and hope to solve.

Odd Fetish

One big, palomino stallion was brought into the lab one fall to learn how to mount a phantom and be collected. He had been a show horse and was reprimanded every time he acted stud-like toward a mare in the show setting, but when the owners brought him home to start breeding him live cover, he had no problems with his libido.

However, for the BSE at the lab, the staff spent two hours trying to get the horse aroused and collected with a tease mare.

In talking through the situation, Dr. Bruemmer and the owners finally worked out the only difference between breeding at home and the lab was the absence of a foal. Because the horse had been reprimanded around mares, he had cued in on “presence of foals” meaning “OK to breed.” Sure enough, when the staff teased him with a wet mare, the horse’s libido kicked in.

“This stallion would tease to a foal, and mount and breed a mare,” Dr. Bruemmer recalls. “It’s amazing what will ‘click’ in their minds. But you can’t use foals all the time, and it’s hard to call someone and ask to borrow a foal to tease a stallion.”

The lab used two miniature mares to tease him with, but that only worked for a while. They finally transferred the notion “OK to act like a stallion” to putting a muzzle on the horse.

“Eventually, he got to where the muzzle meant more to him than anything else!” Dr. Bruemmer says. “He’s still working well, from what I understand.”

The Accumulator

A Thoroughbred stallion had been breeding mares for eight years with no reproductive problems at all. The owners asked their veterinarian to do dismount samples to check the semen, and it didn’t look very good, but the horse was getting mares pregnant.

“At the end of the season, he collected the stallion one time and got poor-quality sperm and very little motility,” Dr. Bruemmer says. “They brought him to us to try to prevent a potential problem the next season.

“The semen we collected looked awful,” Dr. Bruemmer continues. “In the second ejaculate, instead of his numbers dropping, they went up, which indicated either we got an incomplete first ejaculate on the first one, or something else was going on. The semen quality got a little worse in the second ejaculate.”

The lab collected him an outside-the-norm third time, and the

horse’s sperm numbers finally dropped by the expected half, and his semen quality went up.

“Those things all together told us that he might be what we call an ‘accumulator,’” Dr. Bruemmer explains. “A normal horse sheds sperm cells in the urine if he’s not sexually active; this horse wasn’t doing that, and we were seeing old sperm.”

The horse stayed a few days and the lab continued to collect the horse regularly.

“The closer we got to the fresher sperm, the higher the quality of the semen,” Dr. Bruemmer says. “On paper, on just the two collections (in a standard BSE) alone, you’d have to say he’s an unsatisfactory breeder, but we knew that wasn’t true because he was getting mares in foal.”

For a hand-bred, live-cover breeding program, the lab recommended the managers breed a jump mare once or twice prior to having the horse cover a mare they actually wanted bred to clean the horse out of accumulated, old sperm.

However, atypical for most Thoroughbreds, this horse was being pasture-bred.

“Since he was pasture breeding, he was breeding those mares three to four times a day the whole time, and he was staying cleaned out,” Dr. Bruemmer says. “He wasn’t having any problem until they took him away from the mares.

“To this day, he’s probably breeding 15-20 mares a year in the pasture with 100 percent conception.”

Spinning Solution

One farm brought in a proven stallion because he was suddenly showing declining fertility. In the BSE, all of the stallion’s parameters were “over the top, perfect.” His numbers showed him to be a normal breeder; but he wasn’t getting mares pregnant.

The lab recommended going beyond a standard BSE which included further morphological evaluation via electron microscopy.

“That’s where we found the problem,” Dr. Bruemmer says. “With the electron microscope, we were able to see pitting in the (sperm) head. But we didn’t – and still don’t – know what exactly was causing that.”

Hypothesizing that it could have something to do with seminal plasma or the type of extender being used with the semen, the lab centrifuged an ejaculate to draw off the plasma and then extended the sperm in a non-milk-based extender. And he got a mare pregnant.

“To this day, he’s breeding mares just the way he was before,” Dr. Bruemmer says. “We don’t know what caused the pitting, if he’d been sick, or even if the pitting is still there. But (the system is) working and they’re not about to change anything.”