Less Than Perfect

A Look At Infertility Issues In Stallions

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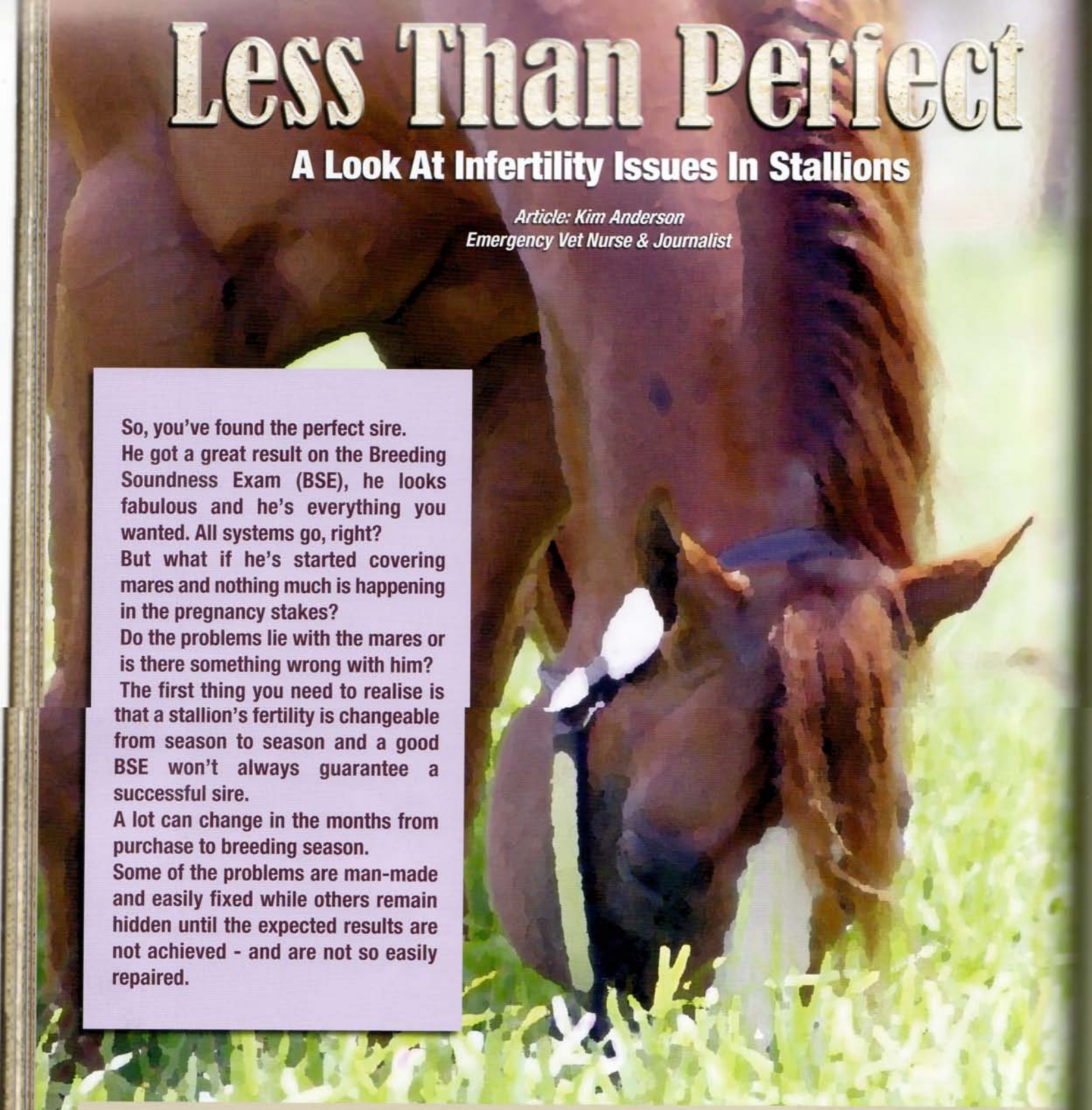

So, you've found the perfect sire. He got a great result on the Breeding Soundness Exam (BSE), he looks fabulous and he's everything you wanted. All systems go, right?

But what if he's started covering mares and nothing much is happening in the pregnancy stakes?

Do the problems lie with the mares or is there something wrong with him?

The first thing you need to realise is that a stallion's fertility is changeable from season to season and a good BSE won't always guarantee a successful sire.

A lot can change in the months from purchase to breeding season.

Some of the problems are man-made and easily fixed while others remain hidden until the expected results are not achieved - and are not so easily repaired.

What is sub-fertility & infertility?

Poor performance in stallions is most often referred to as sub-fertility. It is a term generally applied to stallions who return a less than 30% pregnancy rate in first cycle breedings – and a seasonal pregnancy rate of 10 to 70%.

A stallion is considered infertile if he has a pregnancy rate of less than 10% for the season (0 to 5% in first cycle breeding). The standard BSE remains strictly a means for selecting out obviously unsatisfactory breeding prospects and its usefulness in determining fertility is limited. If your stallion did not have a BSE when you purchased him – then that's your first step in determining the cause of any problems.

For the purpose of this article, we will assume that the stallion in question has had a BSE. The aim of a Breeding Soundness Exam is simply to identify stallions that have all the attributes necessary for adequate fertility. In most cases it is performed before the start of his breeding career – and is likely to be repeated when he is sold.

Looking beyond the scope of the BSE, there are many reasons that a stallion becomes sub-fertile and quite a few of them are reversible.

There are several things you the owner can check before calling in the Veterinarian specialist and beginning a lengthy and expensive batch of blood tests and semen evaluations.

First and foremost, are there any visible physical barriers to his performance? Are there lesions on his penis or around the sheath? Are his testicles bilaterally of a normal size, shape and firmness in

comparison to previous records (i.e. BSE

Does he have any obvious leg, hock, muscle or back injuries – including long term strains or old injuries that would be making it uncomfortable to mount the mare?

A stallion in pain will often mount and ejaculate, but fail to deliver the required ejaculatory urethral pulses (thrusts) due to pain and dismount early. The ideal number of thrusts following ejaculation is seven.

In older stallions, cardiac problems or chronic Obstructive Pulmonary Disease (COPD) can cause a lack of air during breeding – resulting in an early dismount.

The next most common reason for sub-fertility is stress. A stallion can be anxious because of his physical surroundings, his own attitude, the people handling him and the attitude of the mares that are presented to him.

Has he had enough time to 'settle' into new surroundings? Is he comfortable and is there anything in his past history (such as mare rejecting him or previous abuse by handlers) that could be upsetting him when he is around a mare?

He may have psychological barriers to good performance. Any negative or painful sexual experience in a stallion's past history can play havoc on his willingness to mount a mare and breed in a relaxed, natural manner.

Young, nervous stallions can exhibit submissive behavior by chawing (opening and closing the mouth) when a mare is near. If the reason for nervousness cannot be removed or controlled, the administration of a tranquilizer is sometimes useful.

If there are no logical and or visual clues, it's time to look more closely at the differential diagnoses for sub-fertility or infertility.

These can most simply be classified as natural or artificial causes. Natural causes include diseases, hormonal abnormalities, physical abnormalities, trauma or injury, congenital abnormalities and genetic disorders.

Artificial causes can include behavourial abnormalities, stallion mismanagement, drug therapy, manual collection errors, or poor handling of frozen or cooled semen.

NATURAL CAUSES

Disease

Probably the most important diseases for stallion breeders to be aware of are STD's (sexually transmissible diseases). Both the mare and stallion should be swabbed routinely before the start of each breeding season, but for a number of reasons, the disease is not always detected. The most important of these are:

Equine Viral Arteritis (EVA) - Transmitted or shed mainly via semen. On infection, the virus localises in the stallions' accessory sex glands and may be shed in the semen for weeks afterwards and possibly even life. It must be noted that EVA will survive in chilled or frozen semen. It is hard to recognise clinical signs (if the stallion shows any at all) as they are vague at best. They may include fever, depression, lethargy, stiff movement, runny nose, conjunctivitis, and swelling in the lower legs or the reproductive organs – it is also a major cause of abortion in mares. Vaccination is available.

Contagious Equine Metritis (CEM) is spread through direct contact at mating & through the semen of infected stallions.
Infected mares may show a vaginal discharge about a week after mating with a carrier stallion.

Contagious Equine Metritis (CEM) – A transmissible bacterial disease. The species of bacteria responsible for the syndrome are Taylorella equigenitalis, Klebsiella pneumoniae or Pseudomonas aeruginosa, with T. equigenitalis known as the most important of these. It is spread through direct contact at mating and through the semen of infected stallions. Infected stallions are usually passive carriers and infected mares may show vaginal discharge about a week after infection. Prevention is achieved by swabbing for the bacteria and treating appropriately.

Equine Herpesvirus – There are 4 differing mutations of this infectious viral disease and is extremely common in Equine populations overseas. Venereal disease is caused by EHV type 3 and is also known as Equine Coital Exanthema or Genital Horse pox. Clinical signs manifest 4 to 8 days after sexual contact and will be seen as small round lesions on and around the genitalia of both sexes. It can be quite painful and the stallion will be reluctant to serve a mare. Treatment is based on sexual rest for at least 3 weeks, and antibiotic coverage to prevent secondary bacterial disease.

Urospermia – The presence of urine in the ejaculate. Contamination can be detected through colour or smell, but most often is not detected until the sperm is microscopically examined. The cause is unknown and the stallion shows no other signs of illness. If possible, collect semen directly following urination.

Hemospermia – The presence of blood in the semen is not uncommon in stallions in heavy use. This can be caused by infection, excessive trauma to urethral membrane, rupture or tear inside the penis, parasites, or even bladder stones. Can be painful at erection and treatment may involve prolonged sexual rest and/or antibiotics – depending on the underlying cause.

Penile Inflammation or Balantitis – Causes may be bacterial, viral, due to parasitic infection, tumour growth or the result of an injury. Stallion shows a reluctance to breed due to pain. Specific treatment is needed in all cases, but most often includes sexual rest and increased

cleansing of the penis.

Neoplasia/tumours/cancer –The most common primary testicular cancer in stallions is a seminoma. It is most often benign but can spread rapidly and destroy much of the testicle. Other testicular tumours are Sertoli cell tumour, teratoma, Leydig cell tumour, embryonal carcinoma and teratocarcinoma. Squamous cell Carcinoma and sarcoid remains the most common malignant cancer in equines and can affect the sheath and penis. A new papillomavirus (EcPV-2) virus has been discovered and is thought to be linked to the development of squamous cell carcinoma and sarcoid. Luckily, tumours are rare in stallions, but biopsy is the best method of diagnosing – and treatment is generally surgical removal.

Hormonal Abnormalities/imbalances

Stallions are seasonal breeders and their hormone production and resulting increase in sperm production, is stimulated by light. It begins in the hypothalamus (centre of brain) and pituitary gland (base of brain).

An increase in light produces gonadotrophin releasing hormone (GnRH) which stimulates the pituitary to secrete FSH (follicle stimulating hormone and LH (Luteinising Hormone). These gonadotrophins then travel to the testes, where they affect the Sertoli Cells (produce spermatozoa) and Leydig Cells (oestrogen production) respectively.

A high level of oestrogen is important in the stallion during breeding season as it binds testosterone – the key hormone involved in a stallion's libido.

A common reason for sub-fertility is the use of anabolic steroids. The brain recognizes the substance as a high level of testosterone, and shuts down or slows the production of sperm.

Long term use will result in testicular size and low sperm count. It will take at least two months following the cessation of steroid therapy for fertility to return to normal.

Once the days become shorter and cooler (less light), the pineal gland releases melatonin, which inhibits the release of GnRH, thus quieting the Stallion's libido and sperm production. Any imbalance of these substances, whether due to natural or artificial causes, can result in lowered libido and fertility. Pituitary tumours have also been found to be the cause of sub-fertility.

The stallion's libido can be measured with the use of 24 hour time lapse video. If he is capable of spontaneous erection and masturbation (during breeding season), his libido is generally normal.

Physical abnormalities

Testicular degeneration – This is the most common cause for sub-fertility and is generally a chronic condition that leads to infertility. The cause of testicular degeneration may be trauma or injury, nutritional, toxic, genetic or idiopathic (no known cause). It most commonly affects older stallions and signs include a decrease in testicle size, softening of the testicle and a decline in sperm quality and concentration. A large percentage of cases are idiopathic, and the resulting infertility is usually not reversible.

Spermiostasis – This is generally an acquired condition where the stallion experiences intermittent or complete obstruction of one or both of the ampulla. It is best described as abnormal retention of sperm within the duct system and is most often seen in rested stallions. An affected stallion's ejaculate may contain low or no sperm on one collection and high concentrations in the next collection as one or both of the plugged ducts intermittently empties. Treatment is by vigorous massage (per rectum) and frequent collection with persistent conditions requiring prostaglandin injections.

Scrotal abnormalities - Any abnormal conditions within the scrotum can cause infertility. Temperature regulation is extremely important in spermatogenesis (sperm creation) and any inflammation is detrimental to sperm. Diagnosis is most often on ultrasound, but clinically the scrotum may become enlarged or hot to the touch. Conditions include torsion of the spermatic cord, hydrocele (collection of fluid) and scrotal herniation. These are relatively common causes of infertility and can be acquired through injury – or have a genetic link. Surgery is indicated in most cases, and a high percentage of stallions return to full fertility.

Penile abnormalities – apart from the already described balantitis, penile abnormalities are again a relatively common cause of infertility. Phimosis, an inability of the penis to protrude from the sheath or prepuce is a serious problem and is most often a congenital defect. Surgical correction is required. Paraphimosis, the inability of the penis to retract into the prepuce, is more likely to be seen following trauma or other external insults (parasites, post surgical complications etc). This condition requires treatment early with cold packs, suspension bandages, sensible exercise, hydrotherapy and massage. If left unchecked, surgical correction may be necessary.

Scrotal abnormalities include torsion of the spermatic cord (twisted testes seen below), hydrocele & scrotal herniation. These are relatively common causes of infertility and can be acquired through injury or have a genetic link.

Congenital defects & genetic disorders

One of the first investigations on a physically normal sub-fertile or infertile stallion will invariably be semen evaluation. It is not within the scope of this article to discuss the range of spermatozoal defects that can occur, but clinical evaluation techniques will encompass sperm morphology (form and structure), motility and overall quantity and quality of the ejaculate.

It is during these investigations that many congenital or hereditary defects will be discovered – and hopefully, this has occurred during the first

but things change and a clinically normal stallion can develop defects later in its breeding life. The widespread use of cooled and frozen semen has allowed for the routine evaluation of sperm on a regular basis so that stallions collected manually will generally have any problems diagnosed early. A stallion only used for live cover will need to have his semen evaluated and it is of extreme importance that you use a veterinarian who is suitably qualified and experienced in this field.

Other congenital defects include small penile size, early testicular degeneration, small testicular size and cryptorchidism. These are generally picked up at the first breeding exam, if not before.

ARTIFICIAL CAUSES

Behavourial Abnormalities

Poor libido, ejaculatory dysfunction, aggressiveness/shyness, pain, illness, overuse, out of season breeding, nutrition, lack of or inappropriate training, high stress levels, previous trauma – all of these have an influence on how a stallion behaves during mating.

Most are easily rectified, but some (such as poor libido and dysfunction) need further investigation.

It is imperative that you know the history of your stallion. Has he ever been injured during mating and did he suffer any mismanagement or abuse early in his life? Abnormal behavior is often psychological in its origins and high anxiety levels will lead to poor performance, early dismounts – or even a refusal to mate.

Most behavioural abnormalities are learned. Manual semen collection is fraught with the possibility of problematic behavior and its here that breeding training methods will be sorely tested.

In most cases, it will come down to how well you know his unique character and what's 'normal' for him. There is a need to systematically eliminate possible causes of changed or abnormal behavior and a high possibility that your stallion will require some retraining or sexual rest.

Mismanagement

There's a whole host of man-made reasons that a stallion can be labelled sub-fertile or infertile.

They range from the simplest forms of mismanagement – inappropriate and heavy-handed discipline, to the more complex mismanagement of collected sperm within a veterinary laboratory.

From the feeding and daily handling, to handling in the breeding shed and right through to semen collection, and the storing and transportation processes that follow – everything must be scrutinized and eliminated as a possible reason for infertility.

We have covered live breeding – and the psycho-somatic conditions that may arise there, but in the semen collection area there are plenty of things that can go wrong.

Care must be taken to avoid stallion overuse, washing with irritant or spermicidal substances, incorrect artificial vagina preparation and use, contamination of collection utensils or apparatus and overusing him as a teaser stallion.

Choose the right semen presentation for your stallion. The pros and cons of each kind of semen presentation (fresh, chilled, or frozen) must be weighed against the reproductive strengths and weaknesses of your mare or stallion.

A sub-fertile stallion's ejaculate may benefit from undergoing routine laboratory processes used in chilled or frozen semen, giving it a higher concentrate of viable semen than fresh collection or live cover.

ABOVE: Testicals from a cryptorchid stallion after surgery. The larger is a normal descended testi while the smaller one was undecended had to be surgically located & removed.

BELOW: From the feeding and daily handling, to handling in the breeding shed, right through to semen collection & the storing & transportation processes that follow – everything must be scrutinized & eliminated as a possible reason for infertility.

Whatever the method, semen must be processed as soon as possible after collection. Changes in temperature, exposure to light and any exposure to chemicals, lubricants etc can adversely affect sperm viability.

Rule #1 – ensure that you surround yourself with the best qualified people for the job. Never underestimate the importance of trusting your veterinarian – and choose one that has the right qualifications. This is definitely an area that requires specialist involvement.

In cases of chilled or frozen semen, ensure the problem isn't with the mare handlers at the other end – or indeed the handling processes within the lab.

Chilled semen usually retains good viability for 24 to 30 hours plus an additional 24 to 48 hours once inseminated. If the mare hasn't ovulated in this time or if there is a delay in insemination, fresh semen should be ordered.

Not all stallions can have their semen frozen or even chilled; up to 20% of breeding stallions have sperm that are easily hampered by processing and cold temperatures. Sometimes the extender, which dilutes and nourishes the sperm, can be adjusted to improve survival. Find out if your stallion is among that 20% and if so, switch to AI with fresh semen or live cover.

Warning signs of stallion mismanagement: Any of these signs can indicate more serious conditions that require further investigation – but it is wise to rule out easily fixed or reversed farm management problems.

- Poor libido
- Aggressiveness/shyness
- Penile dysfunction – failure to attain or maintain an erection
- Incomplete ejaculation/intromission – lack of sufficient pelvic thrusts (average 7)
- Early dismount – before ejaculation or too soon afterwards
- Failure to ejaculate
- Normal libido and ejaculation – but needing sexual rest to perform well.

CONCLUSION

"Stallions do not become sires because of reproductive capability," Dickson Varner, (DVM, MS, Dipl. ACT, professor of large animal medicine and surgery at Texas A & M University) told his audience at the 2010 American Association of Equine Practitioners Convention. "They're selected based on performance, pedigree, and conformation -reproductive ability is last. The equine breeding industry abounds with stallions whose level of fertility is less than optimal."

The general lack of focus on fertility in the equine industry has resulted in a per cycle pregnancy rate of 45 to 55%. Seasonal pregnancy rates should be above 85% in well-managed herds.

Recent advances in semen processing techniques have improved the pregnancy rate of sub-fertile stallions. It is important to remember however, that there are numerous reasons for stallion infertility and sub-fertility and even today, the cause frequently remains undetermined.

It is hoped that future research will involve a greater use of routine endocrine assessment of stallions in an effort to establish characteristic patterns for each stallion while he is fertile.

In the meantime, it is highly important to first assess the breeding soundness of a stallion well in advance of the breeding season. Secondly it is essential that the stallion be managed in a proper and appropriate manner so that his reproductive system is not compromised by man.

This means determining his reproductive capability and acting accordingly. A stallion that has a low sperm count for example should not be bred each and every day.

Also, if there is a fertility problem with natural breeding, artificial insemination techniques should be considered. The use of extenders and parcelling out ejaculates greatly increases the number of mares that can be covered.

And finally, continued research is still needed to find the elusive answers to questions that surround stallion fertility - or lack of it.

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