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
A stallion in pain will often mount and bear a mare, but fail to deliver the required stimulated urethral pulsations (thrusts) due to dismount early. The ideal number of thrusts following ejaculation is seven.

Stallions with cardiac problems or Obstructive Pulmonary Disease can cause a lack of air during resulting in an early dismount.

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

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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.

Urospermina – 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.

Hemospermina – 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 of 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 Balanitis – 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.

NATURAL CAUSES

Diseases possibly the most important diseases for stallion breeders to be aware of are STD’s (sexually transmitted 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.

**Viral Arteritis (EVA) -** Transmitted or shed mainly via semen. On occasion, it will localise in the stallions accessory sex glands and can be shed in the semen for weeks afterwards and possibly even life. It can cause infertility. It can be difficult to identify clinical signs (if the stallion shows any at all) as they may present only as atrophy of the gland. It is best to test for this virus via semen analysis. The virus can be transmitted by sexual contact, close contact with infected stallions, or through the environment. Vaccination is available.

**Hemorrhage of the testes (HTE) -** A rare condition characterised by severe swelling of the testes, often accompanied by fever, depression, lethargy, stiff movement, runny nose, conjunctivitis, and swollen in the lower legs of the reproductive organs. Diagnosis can be difficult as it is often confused with other conditions such as EHV or EVA. Treatment involves rest and pain management. Vaccination is available.

**Hypomature spermatozoa (HSP) -** A condition characterised by reduced motility and fertility of sperm. It is often caused by stress, fatigue, or infection. Treatment involves rest, diet changes, and possibly antibiotics. Vaccination is available.

**Viral myopathy (VM) -** A condition characterised by muscle weakness and atrophy. It is often caused by infection with a virus. Treatment involves rest and supportive care. Vaccination is available.

**Chlamydial infection (CHL) -** A condition characterised by eye and skin infections. It is often caused by infection with a bacteria. Treatment involves antibiotics. Vaccination is available.
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 sarcoma remains the most common malignant cancer in equines and is thought to be linked to the development of squamous cell carcinoma and sarcoma. 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 timed samples. If he is capable of spontaneous erection and masturbation (during breeding season), his libido is generally normal.

**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 balanitis, penile abnormalities are again a relatively common cause of infertility. Phimosis, an inability of the penis to protrude from the sheath of the prepucce 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 prepucce, 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.

**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 spermatzoal 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
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.
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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 thrust (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 later. 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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