

Causes of infertility in male rabbits

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Breeding rabbits seems simple. The female rabbit undeniably does the biggest part of the work: gestation, giving birth and producing one of the richest milk of the animal kingdom till her kits reach the age of 6 to 8 weeks. This does not mean that bucks should be neglected, as well as their health.

It is important to inspect a stud rabbit before the breeding season in order to assess its health condition. It is essential to examine the whole body and not only the perineal and genital regions. Male fertility depends on the age, health, diet, hormonal balance, the absence of abnormalities of the reproductive organ, mating frequency,



Figure 1: Falling over at the end of a mating between a female rabbit and a buck, both belonging to the Harlequin breed. Photo: MediRabbit

absence of infections or transmissible parasites, pesticides that mimic the action of female sex hormones in the body, climate and seasonal changes... So many parameters that influence male fertility ! Infertility is, however, rare and most of the male rabbits produce a numerous offspring (Figure 1).

Feeding is important

A buck must have the optimal weight of his breed. Diet should, thus, be rich in nutrients and vitamins, without making obese. Indeed, winter is a difficult season with little variety of fresh foods. This can result in nutritional deficiencies. Deficiencies of vitamins A, E, B_{12} and folic acid cause sterility. Vitamin B_{12} is produced by bacteria contained in the cecotropes. Some rabbits refuse to ingest these. This vitamin increases the sperm count while folic acid prevents chromosomal abnormalities.

Mineral deficiencies such as selenium, zinc and carnitine are also possible. They all play an important role in male fertility. Zinc deficiency causes a low level of the male hormone testosterone in the blood. Zinc comes mainly from meat or sea food. In animals with a vegetarian diet, the balance between zinc and copper promotes the absorption of the latter, at the expense of zinc. It is, therefore, difficult to ensure a sufficient amount. Sesame or pumpkin seeds contain a fair amount of zinc. Carnitine, on its side, ensures the proper functioning of spermatozoids and improves sperm motility. Parsley, broccoli and beet greens are rich in carnitine.



Figure 2: A buck that is too young or that had a painful experience with an aggressive female may be reluctant not want to mount her. Photo : MediRabbit

Sometimes the buck is "timid"

A "timid" stud rabbit is one that looks at the female presented to him, without showing a sexual interest (Figure 2). He refuses to mate. Some of them are still too young for breeding. Others do not have a strong reproductive instinct. Sometimes a young buck had an unpleasant experience with an aggressive female and was unable to finish mating. He has become fearful. If this is the case, he must relearn the course of mating in presence of older and quiet females. After several successful attempts, other females can be presented to the timid male.

It happens also that an experienced male rabbit gets tired easily during courtship or after the first mating attempts. This lack of energy results in a lack of interest in the female before mating. The most common causes are a lack of exercise or overweight. A larger hutch and exercise can solve this problem.

Viral cause: myxomatosis

Myxomatosis is caused by a virus belonging to the Poxviridae family. There are several strains of which some are very virulent, while others are characterized by a chronic form of the disease.

The disease is mainly spread by biting and blood-sucking insects such as fleas, mosquitoes, lice and mites.

The development of the disease is characteristic of a Poxviridae infection. Once the virus is inoculated in the skin, it will begin to replicate in the cutaneous cells and in the lymph nodes. The virus then spreads throughout the body (viremia).



Figure 3: Peri-ocular myxoma on the eyelids. This form of myxomatosis is typically seen in vaccinated rabbits. After recovery, males are often sterile. Photo: Janet Lacey

March 2016

The first signs of the acute form of myxomatosis appear 3 days after infection: inflammation of the eyelids (edema) accompanied by a purulent conjunctivitis, swollen lips and genitals. At more advanced stages of the disease, the rabbit becomes blind. Death occurs between the 8th and 15th day after the viral infection.

The chronic form of myxomatosis is characterized by the appearance of skin tumors on the ears, nose and limbs. These tumors will resorb after a while. Rabbits recover from this form of myxomatosis. The surviving males usually become sterile.

Bacterial and fungal infections

Reluctance to the mate in the presence of a female can also be indicative of pain caused by an inflammation of the testicle or epididymis, which is a part of a testicle. The responsible bacteria are often *Pasteurella multocida* or *Staphylococcus aureus*, but other bacteria cannot be excluded. Affected males have a swollen testicle, compared to the other one. Sometimes both are swollen. The scrotum presents a congestive redness of the skin. Appetite and production of feces are decreased. Fever may be present.

An inflammation of the skin covering the penis is less common but possible. It may be the result of trauma after a violent mating (Figure 4). The penile skin is irritated and red and a pain response is observed when palpated. Bacteria are often responsible for this kind of infections, but fungal infections caused by fungi or yeasts cannot be excluded.

The fever that accompanies these infections can render a male temporarily or



Figure 4: Bacterial infections of the reproductive organs are painful. Photo: Renee Secord

permanently sterile. Indeed, sperm production is dependent on temperature. If the temperature rises too much in the testis, the quality and lifetime of sperm will be reduced.

Rabbit syphilis

Rabbit syphilis or treponematosis is a bacterial infection caused by *Treponema cuniculi*. It is specific to rabbit (Figure 5). The incidence of rabbit syphilis is unknown, but it is probably higher than estimated to date. The transmission of the bacteria is not well understood: it may be direct, during mating between two rabbits, or indirect, transmitted from the mother to her offspring. Other transmission modes cannot be excluded. The incubation period of the disease lasts between 3 and 16 weeks. Sometimes the bacterium remains dormant

for months or even years. The rabbit is infected but it remains asymptomatic. A stressful event or depression of the immune system wakes up the bacterium, leading to the development of the disease.

Syphilis affects the mucous membranes of the genitals, anus and/or the face, especially the eyelids and nostrils. Skin lesions develop slowly. They are covered with scabs. Secretion of a whitish liquid or bleeding is sometimes observed. The immune response is slow; the infection can, therefore, spread to other parts of the body or another rabbit.

Split penis or hypospadia

Hypospadias is a birth defect of the penis (Figures 6, 7). The penis closure is partially or totally incomplete. The development of the penile tissue forming the anterior



Figure 5: Crusts and ulcers on the external genital organs in a female rabbit, classical signs of rabbit syphilis. Photo: Rémy Favre

f the Another birth

urethra or duct leading the urine out of the body and, thus, voiding the bladder, is incomplete. As a result, the orifice of the urethra is found on the ventral side of the penis and looks like a hole or a long split. The foreskin is often poorly developed and is limited to the top and sides of the penis.

A buck does not suffer from this condition. If the problem is mild and located near the end of the reproductive organ, the male rabbit can mate and fertilize female's eggs. The fertility rate can, nevertheless, be reduced because the produced sperm spreads along the split penis, not at the tip. The more the anomaly is located far from the tip of the penis, the more the buck might be infertile. Another birth defect of the penis is observed in bucks, independent of the breed. It is the convex curvature of the penis (Figure 8). The foreskin is retained by a flap of skin (similar to skin flap under the tongue) on the ventral side of the penis. When this flap is too short or when it is connected over the entire length of the penis, it will lead to an abnormal curvature of the penis during erection. Depending on the shortness of this skin flap and the seriousness of the deviation of the penis curvature, mating with a female becomes difficult, painful or impossible.

This anomaly is linked to a recessive gene. It is observed either as an isolated appearance or it is associated to hypospadias. These bucks should not be used for reproduction.



Figure 6: The anomaly of split penis is found either in the form of an opening located more or less far from the extremity of the penis tip or in the form of a split. Photo: MediRabbit



Figure 7: The anomalie can also present itself as a split over the full length of the penis. Photo: Michel Gruaz

Scrotal hernia

Scrotal hernia is defined as the passage of abdominal organs (e.g. small intestine) into the scrotum via the inguinal ring (Figures 9, 10). The origin of scrotal hernia can be congenital and hereditary or acquired. In a young male, it can be the result of fighting or struggle when mounting a female. Edema of the scrotum develops in the scrotum. The presence of fluids and the intestinal loop will exert pressure on the testicle. Blood vessels are compressed, reducing blood flow to the testicular tissues. The temperature increases inside the testicle. Testicular tissue degenerates and will be replaced by fibrous tissue (fibrosis). Over time, fertility of the male rabbit decreases and he may even become sterile. Males should not be used for breeding.

Other transmissible diseases

Further issues that decrease the buck's willingness to mount include joint problem such as arthritis or pododermatitis, or skin problem resulting from frostbite of the scrotum.

Some breeds of rabbits suffer the syndrome of low hanging testicles (Figure 11). Fertility is not affected; this problem seems, however, related to a cutaneous disease leading to "elastic" skin. Since the syndrome appears hereditary, affected males should not be used for breeding.

Bladder stones can enter into the duct leading the urine from the bladder to the outside. The blockage can be partial or total. Affected bucks may become sterile and can



Figure 8: When the flap of skin linked to the foreskin is too short or attached to the full length of the penis, it will lead to the abnormal curvature of the penis during erection. Photo: MediRabbit



Figure 9: Scrotal hernia (arrow) in a Belgian hare rabbit. This problem may be linked to a structure anomaly of collagen. Photo: Michel Gruaz



Figure 10: Detail of the scrotal hernia (arrow) in a rabbit belonging to the Belgian hare breed. Photo: Michel Gruaz

even succumb, depending on the gravity of the situation.

Finally, it is important to check that both female and male rabbits do not have parasites in the fur or the reproductive organs. Scabies is highly contagious and its presence leads to terrible pruritus, also when infesting the scrotal region.

Acknowledgements

Big thanks are due to Janet Lacey (UK), to

Renee Secord (USA), to Rémy Favre (Switzerland) and to Michel Gruaz (Switzerland) for their help and permission to use their pictures in this publication.

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Thank you

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