

# INFERTILITY in DAIRY COWS

**F**ERTILITY is usually described as the ability of a species to reproduce itself in a normal manner.

Infertility causes dairy farmers much worry and economic loss. Calves are sometimes born out of season or dead, with a resulting loss of production.

The problems associated with this abnormal breeding are complex and as yet not completely understood. However, quite a lot of knowledge has been gained over the years and the purpose of this bulletin is to try to present briefly some of the things which are known, with particular reference to the anatomy and physiology of the female reproductive system and some causes of failure to breed. It is hoped that this will give dairy farmers a better understanding of the problems they are likely to meet.

## PHYSIOLOGY

It is also necessary to know something about how the organs function, or, to use the scientific term, the reproductive physiology of the dairy cow.

A series of changes begins in the heifer at about six months of age and these changes occur at regular intervals throughout her life.

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By

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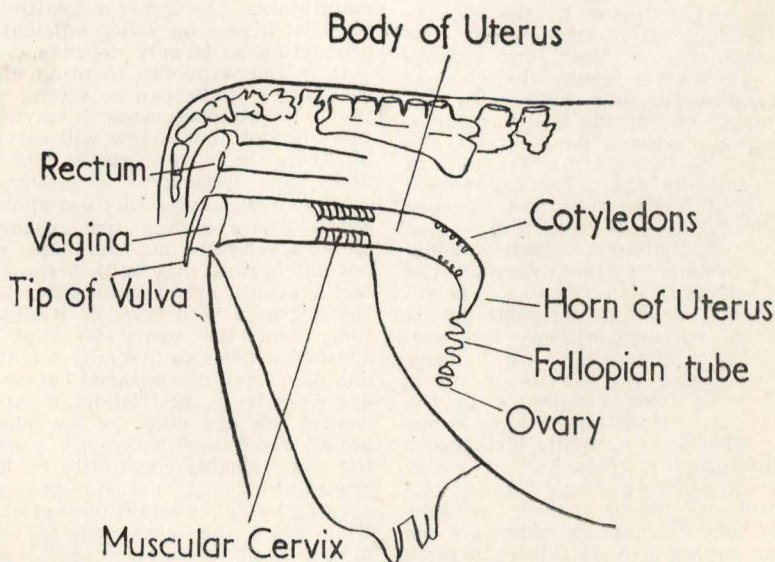
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## ANATOMY

Here is a diagram showing the structures involved.



They make up what is called the Oestrus Cycle and this cycle is repeated about every 21 days until the cow becomes pregnant. They resume about 30 days after the birth of the calf.

To commence each cycle a chemical called a hormone is released from the pituitary gland which is situated at the base of the brain. This hormone is carried by the blood stream to the ovary where it stimulates the production of an egg. The ovary, while making this egg, produces at the same time another hormone called oestrogen. The oestrogen is taken by the blood stream to the reproductive organs and stimulates them to prepare for the arrival of the egg from the ovary. Thus preparation is made for the safe journey of the egg down the fallopian tubes to the uterus; the glands in the uterine wall grow and produce a fluid that nourishes the fertilised egg on its first arrival there; the vagina and cervix are prepared so that spermatazoa if deposited, are allowed to pass through the relaxed cervix up into the uterus and fallopian tubes.

It is of importance to note at this point that the cervix is only slightly relaxed at this time of the cycle (when the cow is on heat) and at all other times, except at calving, it is tightly closed. Therefore it is useless a farmer attempting to "wash out" the uterus; he should leave such procedures to his veterinary surgeon.

To continue our account of the cycles. Just prior to the release of the egg from the ovary, the female comes on "heat" and accepts the male. After service the spermatazoa pass through the cervix into the uterus and up the fallopian tubes. A second hormone passes from the pituitary to the ovary and assists in liberating the egg. The egg passes into the fallopian tube and becomes fertilised. A new structure, called the Corpus Luteum, or yellow body, then develops in the ovary in the cavity from which the egg was released. It produces progesterone, a hormone which continues the preparation of the organs for housing the developing calf; it also prevents more eggs from developing in the ovary. If fertilisation does not occur the yellow body normally disappears. Occasionally it persists and continues to secrete progesterone thus preventing further heat periods. These persistent yellow bodies are one of the causes of cows failing to come on heat. Rectal examination may reveal this condition which can be remedied by a veterinarian.

After fertilisation the egg travels

to the uterus. Here it grows, becoming attached to the cotyledons on the uterine wall by its foetal membranes through which its food materials pass from the mother to the developing calf. Occasionally the fertilised egg dies because it fails to become attached to the uterine wall. This is a common cause of sterility for which, as yet, no preventive measures are known.

Causes of infertility can be divided into two main groups:—

#### 1. NON-INFECTIVE CAUSES OF INFERTILITY

It is clear, from the simplified outline given above, that the normal functioning of the reproductive system depends upon the co-ordinated activity of many glands and organs in the body. The slightest disturbance in any one of these activities is enough to throw the mechanism out of gear. When it is appreciated that the proper functioning of the system is dependent on not only the normal activity of its numerous parts but also on the efficient working of all the other systems of the body, it is surprising indeed that such a delicately-balanced mechanism does not break down more often.

Further, it is easy to understand why the farmer's one remedy for sterility in cattle, namely, douching the vagina with some kind of antiseptic, is so often useless and in some cases even harmful.

Good nutrition and husbandry are two of the most important factors in maintaining the general health and physical fitness on which efficient reproduction so largely depends.

It is impossible to mention all of the things which can go wrong with the intricate processes involved in reproduction, but a few will serve to illustrate the causes usually classified under this heading.

Many cows have structural abnormalities where organs are missing or under-developed, but animals with normal organs may still become infertile even if only temporarily. Thus the egg may be delayed in its liberation from the ovary so that the sperms, which can live only for about one day, have disappeared before the egg reaches the fallopian tubes. Again, the egg may not be released at all from the ovary: as a result the cow remains constantly on heat. Sometimes heat periods are suppressed by heavy lactation just at the time when the cows require to be mated again.

Certain trace elements such as copper, manganese, and iodine appear to play a part in fertility, and recently it has been shown that where

the amount of calcium in the feed is high, more phosphorus has to be supplied to maintain normal breeding efficiency.

A common cause of infertility in individual cows is a general inflammation of some part of the tract—the vagina, cervix, uterus, or tubes—caused by organisms which gain entry following retention of the after-birth or difficult calvings. Associated with this type of inflammation, abnormal secretions are produced which either prevent the sperms from reaching the fallopian tubes or interfere with the development of the fertilised egg in the uterus. This kind of thing may be successfully treated by the veterinarian, but in some cases permanent sterility results.

## 2. INFECTIVE CAUSES

There are many infections which allow fertilisation to occur but destroy the developing calf before it is born. These diseases include the following:—

**Brucellosis, or Contagious Bovine Abortion.**—This is caused by an organism called *Brucella abortus*. It is probably the most important disease in this group. It also causes undulant fever in humans. On gaining entry to a healthy herd it can cause several cows to abort, usually towards the end of pregnancy. Younger rather than older cows are more often affected. This results in loss of calves and productivity and often the foetal membranes are retained, becoming infected and leading to the inflammatory changes already described. The infection is usually introduced by an infected bought-in cow. Whether she herself aborts or not, she can, at calving, still discharge organisms which can infect pastures for months. Other cows can soon pick up this infection from the pasture and the resulting inflammation causes death of the calf, which is then aborted. Any discharges from the infected cows are infective for about a fortnight. It is therefore advisable to isolate such cows for three weeks. Badly-infected herds often have a high percentage of cows difficult to get in calf.

The only sure way of diagnosing contagious abortion is by testing the cow's blood and milk and by isolating the organism from an aborted calf.

Fortunately it is possible to protect young cows against many of the worst effects of the disease by injecting them with Strain 19 Vaccine. All heifers kept for herd replacements should be vaccinated when they are between the ages of six and twelve months. It costs

about two shillings per calf and although absolute freedom from infection cannot be guaranteed, vaccination will reduce the incidence of **Brucellosis** to a low level. When this has been done the complete eradication can be attempted by testing and slaughter of the remaining infected animals.

**Trichomoniasis.**—This is a venereal disease of cattle and occurs in most countries of the world. It is essentially a disease of the male genitals, being transmitted to cows at service. Infected bulls rarely recover and are most difficult to treat, whereas most cows recover spontaneously in a few weeks and therefore require no treatment.

The symptoms of infection vary in severity. Several animals may return to the bull after they were believed to be in calf. These cows will in effect have aborted at two or three months, the "slips" having passed unnoticed. Visible signs such as abnormal discharges and inflammation of the vagina may, however, be observed. After some years affected herds may appear to recover their full fertility. This is because the animals have developed an immunity to the disease. Younger animals, or new ones brought in, will still succumb to infection.

Diagnosis depends on microscopic detection of the organisms or on blood tests of the whole herd. Control of the disease is best achieved by keeping the herd self-contained and using bulls that are known to be free of infection. It is dangerous to use bulls whose history is unknown. If the herd does become infected, the first thing to do is to send the bull to be slaughtered. As cows are able to free themselves from infection they should be allowed three open-heat periods before being artificially inseminated. For more details of control a veterinarian should be consulted.

**Vibrio Foetus Infection.**—This is another venereal disease, the organisms in this case invading the lining of the uterus where they induce sub-acute inflammatory changes. These changes tend to prevent the fertilised egg from developing into a calf. If the egg does develop the calf is usually aborted. One of the symptoms of the disease is simple failure to conceive. Abortions tend to occur in middle and late pregnancy and they are frequently followed by retained foetal membranes. Oestrus cycles may also be prolonged and irregular.

The disease is diagnosed by microscopic examination of "heat" muc-

ous, or by laboratory tests of vaginal mucous taken between heat periods. The organism can also be found in the aborted calf.

If the infection is suspected in the herd all natural breeding should be stopped. A period of sexual rest of about four months assists the cow to recover fertility. This, however, cannot be recommended as it is not known how long the infection persists, even in an apparently recovered cow. It is advisable to replace older infected cows with clean progeny, making use of artificial insemination and mating virgin heifers with virgin bulls. This should build up a herd free of infection. Older infected animals should be mated only with the older bulls and culled as soon as possible, the whole process taking some four to five years. As yet no treatment can be recommended.

**Pyogenic Infections.**—This is an infection of the genital tract with pus-producing organisms. It is not known exactly how much trouble is caused by these organisms as many of them can be found in the vagina and uterus even when no abnormal discharges are present. There is some evidence of venereal transmission and it may be that the organisms become harmful only when the animal's resistance is lowered. An example of this would be during an attack of acute mastitis or pneumonia. Poor nutrition and hormone imbalance can also be blamed.

When a cow has become infected, abnormal genital discharges are seen at about the first or second heat period after calving. Sometimes a calf is born dead or it may die soon

after birth. Cases have been known where the organisms were introduced by a hired bull, nearly all the cows served showing abnormal discharges and being difficult to get in calf.

In order to prevent and control the disease, farmers should never use bulls of unknown breeding-history. Care should always be exercised at calving and after calving. The use of artificial insemination is invaluable in preventing the spread of infection. Treatment of the disease varies and may consist of hormonal injections or irrigation of the vagina and uterus. This should be done by a veterinarian. \* \*

## CONCLUSION

The reproductive processes are very complex and they require a close liaison between the organs and glands of the body. Any slight upset along the line can easily lead to an animal becoming infertile. Upsets may be in individual animals only or whole herds may be affected. It is not always easy for the trouble to be found as quickly as some owners would wish. Time is needed to eliminate individual peculiarities and much thought is necessary to correct the position. If the veterinarian is consulted early he has a greatly increased chance of being able to pin-point the trouble and successfully carry out corrective measures. It pays in the long run to have qualified advice rather than to attempt home treatments which may actually do harm. Research work is continuing in New Zealand and elsewhere which will help dairy farmers to overcome these problems of infertility.

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Copies of this Bulletin may be obtained from—  
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