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CONGENITAL ABNORMALITIES IN SHEEP

By S. M. DENNIS, B.V.Sc., Ph.D., Senior Veterinary Pathologist, Animal Health Laboratory

More than 60 forms of abnormality have been found in lambs in Western Australia and in some flocks the proportion of particular abnormalities has been as high as 8 per cent. of lambs born. In this article Dr. Dennis discusses the causes of abnormalities and reports progress of a Statewide survey of congenital abnormalities.

DEFECTS and abnormalities manifest themselves in all classes of domestic animals and man. Congenital physical malformations occur in at least 0.5 per cent. (one in 500 births) of all newborn lambs. The exact incidence in sheep is not known but based on human records the above figure is conservative.

Results over the past two years have shown that congenital abnormalities may be responsible for just over one per cent. of the lamb losses in Western Australian—part of the average “normal” 10 to 15 per cent. loss on each property.

Congenital abnormalities, therefore, have occurred in all breeding flocks within the State at some time or another. In some flocks, abnormalities may be a significant cause of lamb losses; over the past two years incidences of particular abnormalities have been as high as 8 per cent. of lambs born in affected flocks.

Before we proceed further it would be advisable to define what is meant by these terms.

Definitions

CONGENITAL: Acquired during development in the uterus (womb) and existing at birth. It may be hereditary or non-hereditary in origin.

HEREDITARY: Condition transmitted from parent (or parents) to offspring.

GENE: The agent of hereditary transmission of a characteristic.

LETHAL GENE: Incompatible with life; the lamb is usually born dead or dies soon after.

MALFORMATION: A congenital deformity. This word is interchangeable with abnormality, anomaly, defect and deformity.
THE SURVEY

The survey into the causes of perinatal lamb losses during the past two years has re-opened the question of congenital abnormalities in sheep.

Many farmers will remember the severe outbreak of multiple abnormalities that occurred in scattered flocks in the South-West during the 1960 autumn lambing season. The cause of these unrelated outbreaks was never determined but the consensus of opinion is that they may have been due to the ingestion of a particular plant or plants by ewes in early pregnancy as the result of summer rains.

It was decided to define what types of congenital abnormalities occurred in sheep in Western Australia. Firstly, a questionnaire was designed and forwarded to all farmers who had reported abnormalities in their flocks at some time or other. The response to this questionnaire has been good and to date some 600 questionnaires have been completed and returned. These answers are now being prepared for analysis.

Secondly, a request was issued through the Press during winter and spring lambing in 1964 for abnormal lambs to be forwarded to the Animal Health Laboratory. The response to this request was also good and nearly 160 deformed lambs were received.

Examination of 174 deformed lambs over the past two years revealed a wide range of abnormality. These abnormalities varied from minor single defects such as a short, twisted tail to limb deformities to multiple defects such as siamese twins, cyclops, two-headed lambs or lambs without a neck or head.

Briefly, the congenital abnormalities examined were as follows:

Head: Two heads, no head, no eyes, small eyes, misplaced eyes, cyclops (large single eye), undershot lower jaw, cleft palate, four ears, small ears, misplaced ears, small brain, sac on top of the head, twisted face.

Spinal Column: Twisted or wry-neck, no neck, twisted spine, curved spine, shortened spine, incomplete spine, fused spinal columns, siamese twins, protrusion of the spinal cord to the exterior (crania bifida and spina bifida), misplaced tail, two or three tails, shortened tail, twisted tail.

Limbs: Additional legs, missing legs, shortened or "amputated" legs, bowed forelegs, twisted fixed leg or legs in abnormal positions, legs longer than normal, missing hock joints, missing hooves, one hoof, small hooves, twisted hooves, three hooves.

Heart: Interventricular septum (hole in heart or "blue lamb"), enlarged heart.

Kidneys: Missing kidney, polycystic kidneys.

Intestinal Tract: Imperforate anus (blind anus), blockage of the back of the mouth by a membranous sheet, cleft palate, harelip, no opening to the mouth, no tongue, small tongue, large tongue.

Genital System: Hermaphrodite (intersexual animal), hypospadias (pseudo or false hermaphrodite), split or bifurcated purse.

Hernia: Diaphragmatic (intestines into the chest cavity), scrotal (in the purse) and perineal (between the tail and anus and to both sides).

Coat: Black, broken, colour, hairy, smooth and hairy (dog-like).

This list is not complete but it gives an idea of the range of abnormalities seen in the lambs submitted.

Common Abnormalities

The most common abnormalities seen in this State appear to be:

- Agnathia—missing lower jaw.
- Entropion.
- Limb deformities—bowed forelegs, arthrogryposis, "amputated" hindlegs.
- Imperforate anus.
- Hypospadias.
- Undershot lower jaw.
- Cleft palate.

Brief descriptions of these common abnormalities are given below.
Agnathia

Agnathia or missing lower jaw was the most common abnormality encountered during 1964. The variation in the opening to the mouth cavity ranged from a cylindrical shaped opening 2 in. long down to complete occlusion. Frequently associated with this abnormality is misplacement of the ears and eyes which tend to migrate down the side of the face and nearly meet in the midline beneath the jaws. All the agnathic lambs examined died immediately after birth due to the inability to breathe because the air passages were occluded by the deformity. Agnathia is a hereditary condition due to a lethal recessive gene.

Entropion

Entropion, by all reports, is common in most of the sheep breeding areas in the State. This condition may affect one eye but usually involves both and is due to a turning in of the lower eyelid. The eyelashes irritate the eye and infection rapidly follows leading to a copious discharge which runs down the side of the face. Entropion is frequently mistaken by farmers as “pink-eye” or grass seed damage.

The best way to deal with this condition is by a small modified “Mules” type operation performed by removing an oval shaped piece of skin ½ in. long from beneath the inturmed lower eyelid. Entropion is suspected to be hereditary in origin.
**Limb Deformities**

Limb deformities accounted for a large part of the abnormalities examined but only three are mentioned here.

*Bowed forelegs* is a common abnormality and is easily recognised by its characteristic appearance.

*Arthrogryposis*, or fixed joints, is a common abnormality that varies considerably, depending upon the extent of involvement; one leg, two legs or all four legs may be affected. The affected legs are fixed and twisted into abnormal positions due to fixation of the joints. These legs may be longer or shorter than normal and the conditions is associated with wasting of the accompanying muscles. Many of these arthrogrypotic lambs, for obvious reasons, caused difficult or prolonged births. The majority of these lambs were born dead or died soon after birth. This condition has been shown to be hereditary and to be due to a recessive lethal gene.

*Shortened or “amputated” legs* present a striking picture and may be the result of complete absence of the lower part of the leg or to missing hock joints, etc. Whether this condition is hereditary or not is unknown.

**Imperforate Anus**

Imperforate anus (atresia ani) or blind anus is one of the commonest abnormalities seen in sheep in this State. The affected lamb is born alive, is active, walks and sucks, shows a pot-bellied appearance and usually dies within the first three days of life due to the inability to pass its faeces. The condition is lethal in males, and most affected female lambs void the faeces via the vagina. This common passage is referred to as a cloaca. Imperforate or blind anus cases are commonly missed by farmers and the death is usually attributed to other causes.

It is not known whether this condition is hereditary in sheep. It has been shown to be hereditary in pigs and is considered to be so in sheep.
Hypospadias

Hypospadias (pseudo or false hermaphroditism) occurs regularly in our flocks. This condition is commonly referred to as a hermaphrodite by most farmers and is usually encountered during marking. A true hermaphrodite or intersexual animal shows both male and female characteristics and usually one sex predominates.

The hypospadiac lambs, on the other hand, are males that show deformity involving the urethra (the tube through which the urine is voided) and the scrotum (purse). The scrotum is usually divided into two equal halves, each containing a normal testis. An external groove is present that runs along the full length of the penis and passes through the divided scrotum. Urine maybe voided anywhere along the length of this groove.

The condition is the result of incomplete fusion of the two halves during development and it is not known whether or not it is hereditary in nature.

Undershot Jaw

Undershot lower jaw is a common deformity that is known to all farmers. The degree of deformity varies from slight to so severe that it interferes with normal grazing. Such animals are undesirable and are poor “doers” during times of feed shortage. It is advised that affected animals be not used for breeding.

This condition is inherited and is due to a recessive gene.

Cleft Palate

This condition is considered to be more common than our records indicate; it is easily missed unless especially looked for, as these lambs show no external signs of deformity. The affected lambs usually die from starvation because of their inability to suck properly. Because of the cleft in the hard palate of the roof of the mouth these lambs are unable to develop a satisfactory vacuum and the milk may be observed to flow out of the nostrils.

In the light of evidence in other animals, cleft palate is considered to be hereditary in sheep.

Economic Importance of Congenital Abnormalities

Although there is much to learn about the inheritance and origin of congenital...
defects in sheep, it is recommended that deformed sheep of any nature be culled and not used for breeding.

**How Can You Help with this Survey?**

This type of work depends completely upon farmer co-operation; without it, surveys of this nature are impossible. Farmers can assist in this survey by forwarding any deformed lambs to the Animal Health Laboratory in South Perth or to the nearest office of the Department of Agriculture; and secondly, by sending for and completing the questionnaire dealing with congenital abnormalities.

**ACKNOWLEDGMENT**

The writer wishes to thank all farmers who have assisted with this survey, which could not have been carried out without their co-operation.

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