



# Spider Syndrome

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Spider Syndrome is a genetic problem, common in the Suffolk breed and becoming more common in the Hampshire breed. Spider syndrome has been compared to dwarfism in beef cattle. It has been prevalent since the 1950s. Spider syndrome has also been diagnosed in commercial flocks that keep brockle-faced lambs back as replacement ewes. Those ewes are coming from Suffolk or Hampshire rams that carry the syndrome. Researchers feel certain that spider syndrome is caused by a simple, autosomal, recessive gene. If a producer has a flock of carrier ewes and breeds them to a carrier ram, one-fourth of his or her lamb crop could have spider syndrome!!!

## Diagnosis

Spider lambs are affected in one of two ways: 1) lambs are abnormal at birth and will probably never be able to stand, or 2) lambs appear normal at birth, but develop into a spider lamb at two weeks to six weeks of age.

Spider lambs usually have abnormal bone and cartilage growth. Affected lambs commonly develop an outward deviation of the front legs below the knee, this also may be present in the rear legs below the hock. There could be varying degrees of facial and spinal deformities.

It is important to confirm suspicions, not every deformed lamb born has spider syndrome. Do not convict a specific bloodline until a postmortem evaluation has been done on the suspected lamb. At this time, Kansas State and Michigan State are performing these tests.

## Genetics

The consensus among researchers in the U.S. and Canada is that spider syndrome is a "simple, autosomal, recessive gene."

First, understand the terminology of spider syndrome. A gene in general terms means the characteristics transmitted from parents to offspring. Some genes are specifically related to the sex of the individual; these are called sex linked. Other genes, such as eye color, hair color, etc., are not related to an individual's sex. These are called autosomal genes. An autosomal genetic trait can, therefore, be found in both the male and female.

A simple recessive trait, such as spider syndrome, is controlled by only one pair of genes. Therefore, we use a capital (S) for the dominant gene and a lower case (s) for the recessive gene. The following table shows the three genetic combinations that sheep will carry.

Normal Appearing		Spider
Homozygous Dominant	Heterozygous	Homozygous Recessive
SS	Ss (Carrier)	ss

The genes that make up this trait can either be dominant or recessive. If the dominant gene (S) exists along with a recessive gene (s), the genetic makeup of this individual would be (Ss) or heterozygous. This individual would be normal appearing, because the dominant gene would mask the effects of the recessive gene. This heterozygous individual would be a "carrier" of the spider gene. When mating occurs, one of the two genes is passed from each parent to the offspring. For a spider lamb to be born, it must carry both recessive genes (ss). Therefore, to produce a spider lamb, each parent must be a carrier (Ss).

Example:

Ram	X	Ewe	
(Ss)		(Ss)	
Offspring			
(SS)	(Ss)	(Ss)	(ss)

The ram can pass on either the dominant (S) or the recessive (s) to the lamb. The ewe can pass on either the dominant (S) or the recessive (s) to the lamb. If the ram passes on the (s) and the ewe passes on the (s), a spider (ss) is produced. If the ram passes on the (s) and the ewe passes on the (S), a carrier (Ss) is produced. If the ram passes on the (S) and the ewe passes on the (s), a carrier (Ss) is produced. If the ram passes on the (S) and the ewe passes on a (S), the lamb is normal (SS) and does not carry the spider gene.

If a producer has an entire flock of carrier (Ss) ewes and bred them to a carrier (Ss) ram, he or she would expect 25 percent of the lambs to be spiders (ss), 50 percent would be carriers (Ss), and 25 percent of the lambs would be free of the spider gene (SS).

## Terminology

The terminology now being used throughout the industry for describing Suffolk and Hampshire pedigrees is quite simple. A white pedigreed ram or ewe is an individual that has no spider carriers as one of his or her ancestors.

A gray pedigreed ram or ewe is an individual having a spider carrier as any one of his or her ancestors. This does not mean that this individual is a carrier, but it does mean that there is a chance he or she is a spider carrier. If the sire is white pedigreed and the dam is a carrier, there is a 50 percent chance that the lamb will be a carrier.

A known carrier ram or ewe is an individual that has produced a spider lamb and therefore is a carrier (Ss). There is no way visually to detect that this individual is a carrier; only by producing a spider can an individual be called a spider carrier.

## Commercial Flocks

A commercial producer that is maintaining a Rambouillet, Rambouillet x Dorset, or a strictly whiteface ewe flock, need not worry. The spider syndrome must be carried by both the ram and ewe, and at this time there is no evidence that any of the whiteface breeds carry the problem. Therefore, any Suffolk or Hampshire ram can be used as a terminal sire.

If a commercial producer has purchased or kept brockle-faced ewes as replacements, it is then very important to use only white pedigreed Suffolk or Hampshire rams as terminal sires. If white pedigreed (SS) rams are used, there is no chance for getting any spider lambs, as the ram should not carry the gene, even if some of the ewes do carry the spider (s) gene.

## Purebred Flocks

In Suffolk and Hampshire flocks, producers should first check pedigrees of their own sheep and determine if they have any gray pedigreed sheep in their flock. This may require the assistance of the state sheep specialist and/or the specific breed association.

Ideally, gray pedigreed should be eliminated from the flock, but that isn't always economically feasible. The best way to clean up the Suffolk and Hampshire breeds is to select and breed only white pedigreed sheep.

If you have gray pedigreed ewes, use only rams with white pedigrees. Then, even if there are carriers in the flock; chance of getting spider lambs has been eliminated. If only white pedigreed rams are used, and replacements are produced within the flock, through generations, the number of carriers within the flock will decrease.

Progeny testing will be utilized within the next few years to begin to clean up the spider syndrome problem in our terminal sire breeds. In a progeny testing program, a ram bred to carrier (Ss) ewes would have a 99 percent probability of being free of the spider (s) gene after siring 16 normal lambs from these ewes.

A national task force has been formed to deal with the spider syndrome problem. It is imperative for all producers to take the necessary steps to clear up this problem.

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