

GENETIC CONDITIONS

Breeders face many challenging decisions as they attempt to produce better sheep for themselves and their customers. Animal breeding uses selection and mating decisions to increase desirable genes and decrease or eliminate undesirable ones. Fortunately, the inheritance of some of the most serious genetic defects is relatively predictable. In many cases, these conditions are controlled by only a single gene, and their expression is not influenced by the environment. For recessive conditions, the defect is visible when an individual carries two copies of the gene. Modern genetic testing allows the genotype of parents to be known and, for certain conditions,

the genotypes of their offspring can be predicted. The following Punnett Squares show the possible offspring genotypes for scrapie resistance, spider lamb syndrome, and dwarfism. Sires and dams each randomly contribute one of the two genes in their own genotype to their offspring. In turn, offspring inherit one gene at random from each of their parents. The combination of these two random genes forms the genotype of the offspring. The four quadrants of the Punnett Square show the range of possible offspring genotype(s), and their relative likelihood, for different matings between parents of known genotype(s).

— SPIDER LAMB SYNDROME —

GENETIC ABBREVIATIONS

NN – Non-Carrier, free of spider gene
NS – Carrier of spider gene
SS – Exhibits Spider gene

WHAT IS IT - Inherited disorder associated with severe skeletal deformities. Affected animals have long splayed (bent) legs and exhibit twisted spines, flattened ribs and facial defects.

WHY IS IT A CONCERN - Lambs have trouble standing and rarely survive beyond 6 months of age. There is no treatment.

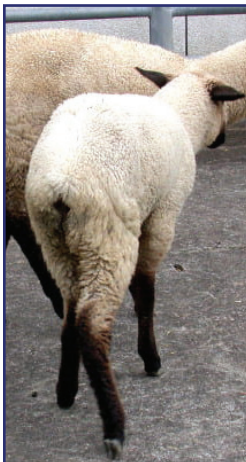
MANAGEMENT - Genetic testing is available to determine if the sheep is a carrier of the gene. Select resistant animals.

This condition was first found in Suffolk sheep in the 1980s. Thanks to genetic selection by Suffolk breeders, this is no longer a commonly seen condition.

	N	S
N	NN	NS
S	NS	SS

	N	S
N	NN	NS
S	NS	SS

	N	N
N	NN	NN
N	NN	NN



— SCRAPIE —

GENETIC ABBREVIATIONS

RR – Least susceptible, and all offspring will have at least one “R” gene
QR – Least susceptible (but some offspring can inherit the “Q” gene)
QQ – Most susceptible if exposed

WHAT IS IT - Fatal brain disease affecting the nervous system in sheep and goats.

WHY IS IT A CONCERN - Clinical signs are progressive and fatal once they develop. Infected animals may not become ill for years. There is no treatment.

MANAGEMENT - Biopsy of the brain or lymphoid tissue. Genetic testing is available to determine an animal's susceptibility. Select the least susceptible animals. “RR” breeding stock have been favored because all of their offspring will inherit a copy of the “R” (least susceptible) gene. In 2001, the USDA created National Scrapie Eradication Program in efforts to eradicate scrapie in the US sheep and goat population. Through this program official USDA Scrapie tags must be in place for sheep sold, exhibited, or slaughtered. USDA Scrapie tags identify where the sheep originated by premise ID and the animal's individual number.

	R	R
R	RR	RR
R	RR	RR

	R	R
Q	QR	QR
R	RR	RR

	R	R
Q	QR	QR
Q	QR	QR

	Q	R
Q	QQ	QR
R	QR	RR

— DWARFISM —

GENETIC ABBREVIATIONS

FF – Free, non-carrier
FD – Carrier
DD – Exhibits dwarf gene

WHAT IS IT - Recessive defect causing severe skeletal shortening of the limbs.

WHY IS IT A CONCERN - Animals are very slow growing and may never reach normal size.

MANAGEMENT - Genetic testing is available to determine if the animal is a carrier of the gene. Select resistant animals.



	F	F
F	FF	FF
F	FF	FF

	F	D
F	FF	FD
F	FF	FD

	F	D
F	FF	FD
D	FD	DD

