



## Testing for Microphthalmia in your flock

### What is Microphthalmia?

Microphthalmia is a genetic defect caused by a recessive gene in which affected lambs are born blind. It occurs when a lamb inherits, from *both parents*, damaged copies of a gene needed for eye development. An animal which inherits a damaged gene from only one parent is termed a carrier. Carrier animals have normal, functional eyes because they also carry a copy of the normal, functional gene. When blind progeny are observed, there are likely to be multiple carriers in the flock and DNA testing may be required to remove the condition.

### What is i-SCAN?

i-SCAN<sup>®</sup> is a predictive DNA test which identifies animals that carry the damaged gene causing the microphthalmia disorder. i-SCAN allows sheep breeders to screen their flocks to identify animals with a high probability of carrying the microphthalmia gene. With i-SCAN results, a breeder can plan matings to avoid breeding blind lambs and to progressively remove the microphthalmia gene carriers from a flock.

The i-SCAN test examines the DNA profile of each animal in the region of the microphthalmia gene and compares it to information in a large database of profiles from blind lambs and known carriers. The data is analysed to determine the probability of an animal having:

- No copies of the damaged gene – ( i-SCAN<sup>CLR</sup> )
- One or more copies of the damaged gene – (Microphthalmia Carrier)

i-SCAN can predict the status of an animal without reference to pedigree information, however, inclusion of pedigree, and pedigree links to known blind lambs in particular, can assist in interpretation of the results.

### Interpreting i-SCAN results

i-SCAN DNA results report the probability that an animal is a carrier of the microphthalmia gene. The probability estimates are given in a percent range from zero to one hundred. Zero represents a nil probability and one hundred a certainty that the animal is a carrier. Based on the probability, results and interpretation are provided as described below.

Probability	Result	Explanation
0%	i-SCAN <sup>CLR</sup>	The animal tested is clear of any DNA profiles associated with microphthalmia
1% – 95%	At Risk	There is a chance (indicated by the probability) that this animal carries the microphthalmia gene disorder
>95%	Microphthalmia Carrier	There is a high likelihood this animal carries the microphthalmia gene disorder

## What do your results mean for breeding?

**i-SCAN<sup>CLR</sup>** – where an animal has been identified as i-SCAN<sup>CLR</sup>, it can be considered free of any copies of the microphthalmia gene and selected for breeding.

**At Risk** – the animal is a possible carrier. Matings with other carriers or possible carriers should be avoided.

**Microphthalmia Carrier** – the animal carries one copy of the gene responsible for microphthalmia. If mated to other Microphthalmia Carriers, blind microphthalmia lambs may result. If mated to i-SCAN<sup>CLR</sup> stock all progeny are expected to be normal in appearance, but ½ will be Microphthalmia Carriers.

Mating a double-copy animal displaying the microphthalmia blindness condition should be avoided in all situations.

## Summary of Inheritance

Sire	Dam	Progeny
i-SCAN <sup>CLR</sup>	Microphthalmia Carrier	Physical appearance: Normal <ul style="list-style-type: none"><li>• 50% will be i-SCAN<sup>CLR</sup></li><li>• 50% will be Microphthalmia Carriers</li></ul>
Microphthalmia Carrier	i-SCAN <sup>CLR</sup>	Physical appearance: Normal <ul style="list-style-type: none"><li>• 50% will be i-SCAN<sup>CLR</sup></li><li>• 50% will be Microphthalmia Carriers</li></ul>
Microphthalmia Carrier	Microphthalmia Carrier	75% of animals with normal appearance <ul style="list-style-type: none"><li>• 25% i-SCAN<sup>CLR</sup></li><li>• 50% will be Microphthalmia Carriers</li></ul> 25% blind lambs displaying microphthalmia

## Further Information

The i-SCAN test was developed by AgResearch. The New Zealand Texel Society and breeders, and the University of Utrecht provided samples, pedigrees and financial input.