

fact sheet

ANIMAL HEALTH AND WELFARE



The Australian Poll Gene Marker test

What is the Australian Poll Gene Marker test?

The Australian Poll Gene Marker test is used to measure the likelihood that a polled animal only carries the polled gene.

The test is used to determine if an animal is 'true polled', known as homozygous (PP), or heterozygous (PH).

Identifying breeding animals that are 'true polled' and carry two copies of the poll allele will dramatically reduce the requirement for dehorning in subsequent generations.

The test was first released in 2010 by the CRC for Beef Genetic Technologies. It has since been refined with increased accuracy and application across a wider number of breeds.

Which breeds can the test be used for?

The test was initially developed on Brahmans and can now be used with a high degree of confidence across a range of tropical and temperate breeds. Research has shown that the test has a high degree of accuracy and will return an informative result in most cases.

Table 1 opposite outlines the number of animals by breed that were tested and the proportion of animals for which the test returned an informative result.

Table 1: Number of polled animals tested and proportion of genotypes assigned with confidence (% non-ambiguous) for nine breeds assessed during polled marker field and commercial testing.

Breed	Number tested	% informative result
Brahman	434	89%
Brangus	115	97%
Charolais	71	86%
Droughtmaster	136	82%
Hereford	183	96%
Limousin	360	95%
Santa Gertrudis	225	92%
Shorthorn	167	93%
Simmental	118	88%

The test has potential application in a variety of other breeds, including cross-bred herds. Laboratories that provide the test can advise on the applicability of the test on different herds.

How accurate is the test?

In most cases where an informative result is returned the accuracy is high – above 98%. If the result is less than 90% accurate, no result will be returned.



How is this test different to the previous test?

The first test was based on a single DNA marker, whereas this new test includes information from a further nine markers.

In some breeds, such as Brahman, a single allele at the DNA marker was almost always associated with polledness and other alleles always associated with horned, making the test highly accurate. However, in other breeds, multiple alleles had associations with both polledness and horned, so the test could not accurately distinguish between PP and PH animals.

By using information from an additional nine markers, the new test can create haplotypes. This allows more accurate tracking of alleles and their association with polledness. The additional information also increases test accuracy and the proportion of animals for which the test returns an informative result.

Who performs the test?

The Australian Poll Gene Marker test will be available from the Animal Genetics Laboratory at the University of Queensland and Zoetis Animal Genetics.

The cost of the test will be set by individual providers. Producers can contact the service providers directly, or through the relevant breed association or society office.

Hair, blood, tissue or semen samples can all be used to perform the test.

Providing information on the breed and phenotype of the animals being tested when submitting the sample will assist increasing the proportion of animals that an informative result can be returned for.





How are the results reported?

The results will describe the percentage chance of the most likely genotype. The genotypes that will be reported are homozygous polled (PP), heterozygous polled (PH) or homozygous horned (HH).

The accuracy of the test result will be reported alongside the most likely genotype. This accuracy will range from 90% to 99%.

If the test does not return an informative result, the accuracy is less than 90%, the result will be returned as Not Determined (ND).

Figure 1: Example of Australian Poll Gene Marker test results.

Bull 1	Bull 2
<p>Polled gene</p>  <p>PP 98%</p>	<p>Polled gene</p>  <p>PH 95%</p>

Definitions

Allele – a variant of the genetic code at the gene. At polled we assume two alleles, P and H.

Gene – unit of genetic code that influences phenotype.

Genotype – each animal carries two alleles, these comprise the genotype.

Haplotype – is a set of characteristics on a single chromosome that are statistically associated.

Heterozygous – the two alleles comprising the animal's genotype are different.

Homozygous – the two alleles comprising the animal's genotype are the same.

Phenotype – the trait as observed in the animal. Phenotype is affected by both genetics and environment.

Further information

Dr Emily Piper
The University of Queensland, Gatton Qld 4343
Phone: 07 5460 1974 Email: e.piper@uq.edu.au



Level 1, 40 Mount Street, North Sydney NSW 2060
Tel: +61 2 9463 9333 Fax: +61 2 9463 9393 www.mla.com.au

Published by Meat & Livestock Australia Limited ABN 39 081 678 364
October 2013

© Meat & Livestock Australia Limited 2013
ISBN: 9781925045628

Reproduction in whole or part of this publication is prohibited without prior consent and acknowledgement of Meat & Livestock Australia.