Important Information for Bull Buyers on

Arthrogryposis Multiplex (AM)

Angus™ AUSTRALIA

Introduction

This is information bull buyers need to know about Arthrogryposis Multiplex (AM) to make sound selection decisions.

What is AM?

AM is a lethal genetic defect. The name is derived from Greek, with Arthrogryposis literally meaning 'curved or hooked joints'. Multiplex indicates there are multiple abnormalities associated with the condition.

Key point: All breeds have genetic defects. The number of reported observations of possible AM calves is very low and there is certainly no need for panic.

How is the condition inherited?

Research in the U.S. and Australia indicates that AM is a simply inherited recessive defect. This means that a single pair of genes controls the condition. For this mode of inheritance two copies of the defective gene need to be present before the condition is seen; in which case you may get a calf with AM. A more common example of a trait with a simple recessive pattern of inheritance is black and red coat colour.

Animals with only one copy of the defective gene (and one copy of the normal form of the gene), that appear normal, are known as "carriers".

What happens when carriers are mated to other animals?

Carriers, will on average, pass the defective gene form to a random half (50 %) of their progeny.

When a carrier bull and carrier cow is mated, there should be a 25% chance that the progeny produced will have two normal genes and consequently will never pass on the defective gene. There should be a 50% chance that the mating will produce a carrier. However, there could be a 25% chance that the progeny have two copies of the defective gene . Reports from breeders show lower than expected numbers of affected (dead) calves and therefore it appears that there may be some other factors influencing the percentages indicated above. This is under investigation.

If animals tested free of the defective gene are mated to carrier animals the AM condition will not be expressed. All calves will appear normal, but approximately half (50%) could be expected to be carriers.

Key point: For the condition to be expressed the defective gene needs to be present on both sides of the pedigree and both the sire and dam need to be a carrier.

How is the AM status of animals reported?

U.S. scientists have identified a mutation that they believe is responsible for causing the condition. A DNA-based test has been developed that can be used to assess whether an animal is a carrier or free of the AM gene.

Key point: With today's DNA tools genetic defects can be managed!

The AM status of animals is being reported using five categories:

AMF	AM-Free: **Tested** for the AM mutation and been found to be **free** of this genetic condition.
AMFU	AM-Free, Untested: Indicates that the animal is **expected to be free** of the mutation based on pedigree information supplied by the breeder of the animal. However, this animal has not been tested for the AM mutation and Angus Australia gives no guarantee as to the animal's "free" status.
AMS __%	AM-Suspect: Based on pedigree information supplied by the breeder of the animal, it is **suspected to be a carrier** of the mutation at the indicated level of probability. The higher the indicated percentage, the larger the chance the animal may be a carrier. To verify the status of this animal, Angus Australia recommends that AM testing be undertaken prior to using this animal for breeding purposes.
AMC	AM-Carrier: The **DNA test** has shown that the animal has one normal and one defective form of the AM gene.
AMA	AM-Affected: **Affected calves** are rarely tested as they are dead at birth. However they would have two copies of the defective form of the gene.

Registration certificates and animal details pages in the Angus Australia (AA) web-database will display these codes. This information can be accessed by conducting a "Database Search" from the Angus website for a specific animal.

Key point: The AM status of an animal is subject to change and will be re-analysed and adjusted each week as DNA test result of relatives are received.

For further information contact Angus Australia: Carel Teseling on 02 6773 4602 or Emma Weatherly on 02 6773 4601.

GLOSSARY

Carrier: Animals with one copy of the recessive (in this case AM) gene and one copy of the normal form of the gene. The animal appears normal and is known as "a carrier".

DNA: Deoxyribonucleic acid. DNA is a complex molecule that forms the genetic code of all living things.

Gene: Genes are the basic unit of inheritance. They influence characteristics of many animals eg colour, weight and carcase quality.

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