NAMIBIANWAGYU SOCIETY

Namibian Wagyu
P.O. Box 11734
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Namibia

Protocol on imported genetics

Step 1: A registered breeder must send a list as on Ministry of Agriculture permit application to the technical committee. Together with the list, all animal details must be included as well as the DNA profile of the said animal. If it is semen and/or embryos the bull and/or cows DNA profile must be included.

Step 2: The list with animal details will be circulated to at least two technical members. Consensus must be reached between these two members otherwise a third members opinion will be used, of either the technical committee or a board member.
Appeal process: If a breeder does not agree with the technical committees decision he can take the decision on appeal. The appeal will be discussed at the next board meeting and there the majority decision will decide the outcome.

Step 3:The technical committee will send the list and amount thereof, that was approved to finance.

Step 4: Finance will send the invoice to the breeder and the technical committee.

Step 5: Breeder will send proof of payment to finance and technical committee.

Step 6: Technical committee will sign off the permit application and will send it to the NSBA. The NSBA will then sign the permit for Ministry of Agriculture. Ministry will then issue the permit.

Step 7: If a breeder imported less than that he paid for at the application he can hand in all the import documents after the import to the technical committee and reclaim the excess payment.

Criteria for approving genetics:

1. If EBV is available in country from origin:
   1.1 Black animals with above average Self Replacing Index will be aproved.
   1.2 If imported for F1 production purposes. Animals with 20% above the average of the F1 Terminal Index
2. Where there is no EBV's or with Akaushi genetics, Animal details will be scrutinized as well as reason for import. (Terminal, Seedstock ext)
3. Genetic defects: The technical committee will advise but will not be able to decline an application. Genetic defects details attached below.

Genetic defects:

All breeds of cattle, including Wagyu, are prone to undesirable genetic conditions.

Fortunately, advances in molecular genetics have facilitated the development of DNA tests for their management.
The key inherited recessive genetic conditions in Wagyu are: Spherocystosis, Chediak Higashi Syndrome, Claudin 16 Deficiency, Factor XI Deficiency and IARS Disorder.

Research from Japan indicates that there are inherited recessive genetic conditions for Wagyu: Spherocystosis (B3), Chediak Higashi Syndrome (CHS), Claudin 15 Deficiency (CL16), Factor XI deficiency (F11) and IARS Disorder. This means that a single pair of genes controls each condition. For this mode of inheritance two copies of the undesirable gene need to be present before the condition is seen.

The known genetic conditions of Wagyu are as follows:
Spherocystosis (B3) –Cattle that are homozygous (have two copies of the recessive allele) *have pernicious anaemia* (bleeding caused by the abnormal red blood cells). Death normally occurs within the first 7 days after birth. Some cases live to adulthood but there is a severe retardation in growth.

Chediak Higashi Syndrome (CHS) – CHS is a macrophage disorder (a white blood cell that has an important role in the immune response to disease). If cattle have a malfunctioning immune system, this makes them unable to resist the bacterial challenge. *Blood is slow to coagulate* so often the first indicator is unusual umbilical cord haemorrhage at parturition (calving). Cattle with this syndrome often have an unusually pale coat colour.

Claudin 16 Deficiency (CL16) – CL16 (also known as RTD or Renal tubular dysplasia) is a gene disorder on chromosome 1 and *causes kidney failure* (chronic interstitial nephritis often with zonal fibrosis or excess of fibrous connective tissue). Cattle are unlikely to live more than 6 years.

Factor XI deficiency (F11) – F11 is a plasma protein that participates in the formation of blood clots. Factor XI deficiency is an autosomal disorder that is associated with mild bleeding in Wagyu. Affected animals show prolonged bleeding time and abnormal plasma coagulation after trauma or surgical procedures such as castration or dehorning. It is also possible that Carrier x Carrier mating's have increased difficulty producing viable fertilised embryos or full-term pregnancies and may be repeated (return to cycle) breeders. Note – this is generally a non-lethal recessive condition with affected animals being able to live and breed as normal. (Occurs in Holsteins)

IARS Disorder – IARS Disorder results in death of affected calves within the last few weeks of gestation, or shortly after
birth. Research has identified a mutation in the IARS gene as the cause, resulting in a reduction in activity of a key enzyme, important for protein synthesis for the developing

foetus and new-born. Calves affected by this exhibit anaemia, depression, weakness, variable body temperature, difficulty nursing, growth retardation and susceptible to infection.
Note – There are other recessive genetic conditions known to exist in Wagyu cattle (e.g. F13) however they have not been identified in the Australia Wagyu population.

WHAT HAPPENS WHEN CARRIERS ARE MATED?
Animals with only one copy of the undesirable gene and one copy of the normal form of the gene (i.e. no symptoms), are
known as “carriers”. A carrier will, on average, pass the undesirable gene form to an arbitrary 50% of their progeny. When a
carrier bull and carrier cow are mated the three outcomes may be:

- There is a 25% chance that the progeny will have two normal genes and so will never pass on the undesirable gene.
- There is a 50% chance that the mating will produce a carrier.
- There is a 25% chance that the progeny will inherit two copies of the undesirable gene and hence be affected by the genetic condition.

When a carrier animal is mated to an animal tested free of the genetic condition, three outcomes are possible:

- All progenies will appear normal and will be unaffected by the condition.
- There is a 50% chance that the mating will produce a carrier.
- There is a 50% chance that the progeny produced will have two normal genes and so will never pass on the undesirable gene.

Note that an animal that is tested free by DNA testing of the genetic condition will not pass the genetic condition to its descendants, even if it has carriers in its own ancestry. Therefore, DNA-tested free animals can be used in a breeding program with confidence that the unfavourable gene is not passed onto subsequent generations.

(INFORMATION FROM THE AUSTRALIAN WAGYU ASSOCIATION)

Approved on 27th October 2021