

Recessive traits may be found in every living thing on Earth. From blue eyes in humans to albinism in ball pythons, and green peas in pea plants, recessive traits are all around us. Although in most cases a recessive trait does not affect the longevity or quality of the organism it belongs to, this cannot be said of all recessive traits. This week we will discuss some recessive traits that are lethal, and have made their presence widely known in the cattle industry.

Often, cattle producers most associate the term “lethal recessive” with the Angus breed. And, with three lethal recessive genetic abnormalities specific to this breed, it is no wonder that Angus is often the first to come to mind. The first of the three abnormalities is Arthrogryposis Multiplex, or Curly Calf Syndrome. Calves affected with this defect are born with twisted legs, a deformed backbone, and joints of all four limbs that are fixed. Affected calves seem small and are rarely born alive. Neuropathic Hydrocephalus, or Water Head, is another genetic defect caused by a lethal recessive gene commonly found in the Angus lineage. As implied, calves with this defect are born with an unusual amount of fluid formation in the cranium. Though affected calves will have an enlarged head, they usually only weigh about 30lbs at birth. Affected calves do not survive this abnormality. Osteopetrosis is the third defect that frequently occurs in the Angus breed. Calves affected with this are often born 10-30 days early, and have a dense bone growth, which fills the bone marrow chamber. Calves with Osteopetrosis have bones that are very fragile, thus easily broken. This, too, is a lethal genetic abnormality caused by recessive traits.

Now that you see the threats that these abnormalities pose to an operation, how can you prevent them from occurring altogether? First, it is important to understand how the parent genes negate whether the progeny is normal, a carrier, or affected. Always keep in mind that two non-carrier parents can never produce carrier progeny (Figure 1).

| | | | |
|---|----|----|---|
| | R | R | Sire: RR Dam: RR Progeny: 100% RR: Homozygous Normal (non carrier) 0% Rr: Carrier, not affected 0% rr: Affected |
| R | RR | RR | |
| R | RR | RR | |

Figure 1.

Likewise, the only way that affected progeny can be produced is if both parents are carriers (Figure 2).

| | | | |
|---|----|----|--|
| | R | r | Sire: Rr Dam: Rr Progeny: 25% RR: Homozygous Normal 50% Rr: Carrier, not affected 25% rr: Affected |
| R | RR | Rr | |
| r | Rr | rr | |

Figure 2.

However, it only takes one carrier parent to create carrier progeny (Figure 3).

| | | | |
|---|----|----|---|
| | R | r | Sire: Rr Dam: RR Progeny: 50% RR: Homozygous Normal 50% Rr: Carrier, not affected 0% rr: Affected |
| R | RR | Rr | |
| R | RR | Rr | |

Figure 3.

A common question asked by producers is “Can I use a carrier bull safely on my females?” As the figures above reveal, knowledge of both the sire and the dam’s traits are required in order to best answer this question. If you believe there is any risk that the females in your herd may be carriers you may want to rethink mating those two animals. This is especially important if you plan to keep replacement females from this mating, as these females will likely be carriers- something they will then pass on to *their* progeny. Tests are available for each of the abnormalities mentioned, and it is recommended that all animals in question be tested prior to mating. A common misconception is that only purebred Angus cattle are susceptible to these abnormalities, but this is not valid. Though the Angus breed is most at risk, composites, or crossbreds, may also be at risk. For example, Brangus cattle have the potential to carry the genetic defects that are found in Angus cattle. In short, at risk animals are those that have a known carrier in their pedigree. This reinforces the importance of testing your animals so that you can have a clear understanding of which animals are carriers of this lethal trait.

Proper management can help prevent these abnormalities, reducing the amount of death loss and financial loss that may occur as a result. Take the necessary precautions to ensure that these genetic abnormalities do not negatively affect your herd. Most importantly, always be aware of the genetics of the cattle you are introducing into your herd. For more information on lethal recessive genes common in Angus cattle, please contact us.

Thanks,

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