



Lone Mountain Ranch

Frequently Asked Questions about Recessive Genetic Conditions

Definitions

- Free** Indicates the animal has two copies of the normal gene
(Also referred to as *Normal* or *Clean* or *Non-Carriers*)
- Carrier** Indicates the animal has one copy of the normal gene and one copy of the mutated gene
- Affected Calf** Indicates the animal has two copies of the mutated gene
(An unhealthy calf showing evidence of the genetic condition)

The science of genetics predicts the following results of each type of breeding:

1. Free sire with Free cow = All Progeny Free (100%).
2. Carrier sire with Carrier cow = 25% Free, 50% Carrier, 25% Affected.
3. Affected to Affected = All Affected (100%).
4. Free to Carrier = 50% Free, 50% Carrier.
5. Free to Affected = All Carrier (100%).
6. Carrier to Affected = 50% Carrier, 50% Affected.



What is an Affected Calf?

An Affected animal is born with two copies of the mutated gene for a genetic condition and displays the effect of that condition in its phenotype.

What is a Carrier?

A Carrier is a cow, heifer, bull, or steer that carries one copy of the mutated gene for a recessive mutation but does not display the mutation in its phenotype.

Why are Carriers important?

Carriers used in breeding programs or commercial programs are responsible for propagating the recessive mutation within the cattle population.

What does a Carrier look like?

A Carrier looks normal – there is nothing in the way the animal looks (its phenotype) that indicates that the animal is a carrier of the recessive mutation.

If a cow has an Affected Calf, what does that indicate?

If a cow has an Affected Calf, and if it is the cow's natural calf, it indicates that both the cow and the sire are Carriers of the recessive mutation and each carry one copy of the mutated gene for the calf's genetic condition.

If a Recipient Cow has an Affected Calf, what does that indicate about the recipient cow?

If a recipient cow has an Affected calf, it indicates that both the donor cow and the sire are Carriers and each carry one copy of the mutated gene for the calf's genetic condition. The recipient cow is not genetically related to the calf so it implies nothing with respect to the recipient cow.

If a bull sires an Affected Calf, what does that indicate?

If a bull sires an Affected calf, it indicates that the bull and the cow are both Carriers and each carry one copy of the mutated gene for the calf's genetic condition.



I have never had an Affected Calf, does that indicate my cows are Free?

Not necessarily, you could have Carrier animals in your herd.

What about mating a Carrier to another Carrier?

If I breed a Carrier cow to a Carrier bull, what is the risk of having an Affected calf?

Every time you breed a Carrier to a Carrier, there is a 25% risk of having an Affected calf.

If I breed a Carrier cow to a Carrier bull, what is the chance of having a Carrier calf?

Every time you breed a Carrier to a Carrier, there is a 50% risk of having an otherwise normal-looking calf that carries the recessive mutation (Carrier).

If I breed a Carrier cow to a Carrier bull, what is the chance of having a Free (Non-Carrier) calf?

Every time you breed a Carrier to a Carrier, there is a 25% chance that you will have a Free (Non-Carrier) calf.

If I breed a Carrier cow to a Carrier bull and have three live calves, will the fourth calf be Affected?

The risk is the same every time you breed a Carrier to a Carrier - there is always a 25% risk of having an Affected calf, a 50% risk of having a Carrier calf, and a 25% chance of having a Free calf.

What about mating a Carrier to a Free (Non-Carrier)?

If I breed a Carrier bull to a Free cow, what is the chance of having an Affected Calf?

Zero. You will never have an Affected Calf if you breed a Carrier bull to a Free cow.



What about mating a Carrier to a Free (Non-Carrier)? (cont.)

If I breed a Carrier bull to a Free cow, what is the risk of having a Carrier calf?

Every time you breed a Carrier bull to a Free cow there is a 50% risk of having a normal looking calf that carries the recessive mutation (Carrier).

If I breed a Carrier bull to a Free cow, what is the chance I will have a Free calf?

Every time you breed a Carrier bull to a Free cow, there is a 50% chance you will have a Free calf.

If I breed a Free bull to a Carrier cow, does that change the risks?

No. The risks do not change. A Carrier mated to a Free always produces a 50% chance of a Free calf and 50% risk of a Carrier calf.

I have cows that have known or suspected Carriers in their pedigrees. Until they are tested, I won't know if they are Carriers or Free – How should I breed them?

You should breed any suspect cows to known Free bulls. You will not have Affected offspring; however, if the cow tests as a Carrier in the future, then the probability is that 50% of the offspring will also test as a Carrier.

After the test is available, what do I do with confirmed Free females in my herd?

If the females are tested Free, and they are bred to Free bulls, they will never produce Affected Calves or Carriers. These Free females can be used throughout your breeding program with no risk of propagating the genetic mutation into future generations of the Wagyu breed.



After the test is available, what do I do with confirmed female Carriers in my herd?

You have several options:

- If you have a cow that carries the genetic mutation and you want to produce calves from her, you must make a commitment to test all offspring retained for breeding;
- If you have both a breeding and a commercial herd, retain your Carrier cows in the commercial herd, breed to a Free bull, and test any calves retained for breeding purposes;
- If you always breed your Carrier cows to a Free bull, you will never have an Affected Calf.
- Use your Carrier cows as ET recipients. As a recipient female, she has no genetic effect on the embryo calf she raises.