Basic Concepts of Dexter Color Genetics

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This page contains the fundamental principles of the inheritance of color in Dexter cattle. These principles are stated in the form of ten basic concepts and are presented in logical sequence.

1. Dexter cattle occur in three distinct colors: black, red, and dun. Two pairs of genes that are located on separate chromosomes control these colors. Cattle chromosome 8 contains the B (brown = Dexter dun = TYRP1) locus, and cattle chromosome 18 contains the E (extension = red = MC1R) locus.

2. Black and red is one pair of alternative colors. In Dexter cattle, there are two different red genes. The two red genes are alternatives to each other, *and they are not visually distinguishable*. However, they are distinguishable by a DNA test. Both red genes are recessive to their black alternative. This means that every red Dexter contains two red genes, one inherited from its sire and one inherited from its dam.

3. Black and dun is another pair of alternative colors. The dun color in Dexters is due to a brown mutation, and it is recessive to its black alternative. This means that every dun Dexter contains two dun genes, one inherited from its sire and one inherited from its dam.

4. Two black Dexters can produce black, red, or dun calves. In order for two black parents to produce a red calf, each parent must carry a hidden red gene. In order for two black parents to produce a dun calf, each parent must carry a hidden dun gene.

5. In Dexter cattle red is the only color that breeds true. Two red Dexters can produce only red calves even if each parent carries a hidden dun gene. A Dexter that contains two red genes and two dun genes is red in appearance.

6. If a red Dexter that has two dun genes is crossed with a dun Dexter that does not carry a red gene, the result will be a dun calf. Each dun calf resulting from this cross will carry a hidden red gene.

7. Two dun Dexters can produce dun or red calves. In order for two dun parents to produce a red calf, each parent must carry a hidden red gene. Every red calf that is produced by two dun parents will have two dun genes. (See #5 and #6 above.)

8. When a red Dexter that doesn't carry a dun gene is crossed with a dun Dexter that doesn't carry a red gene, the result will be a black calf. Each black calf resulting from this cross will carry a hidden red gene and a hidden dun gene.

9. A colored Dexter calf must be red if its sire or dam is known not to carry dun. Conversely, a colored Dexter calf must be dun if its sire or dam is known not to carry red.

10. Additional genes, independent of the genes for the basic colors, may be present in an animal's genotype and may modify the appearance of the animal. Such genes include but are not limited to those which are responsible for brindling, black noses in reds, black shading in reds, and the shade of color of reds and duns. Modifier genes do not alter the principles contained in the preceding nine concepts.