Black, Red or Dun – Understanding and Breeding Dexter Coat Colour

(The generous help of Dr. Sheila Schmutz, University of Saskatchewan, made this article possible. Dr. Schmutz, along with T.G. Berryere, R.J. Schimpf, C.M. Cowen and J. Potter, discovered the mutation that leads to Dexter dun brown, unique among cattle.)

Dexters come in three different colours; black, red and dun. But what makes a Red Dexter red or a Dun Dexter dun? Or for that matter allows a Black Dexter to have a coloured calf?

Two major genes are involved in producing these colors. Clear as mud? Well it actually is not that confusing when we break it down.

At the E locus on chromosome 18, a Dexter either carries the black allele E^D, or the red allele 'e', or the E+ allele which is considered the original version of this gene. Black, E^D, is dominant over red, 'e' so a Dexter must have two red genes, to 'appear' red. If the Dexter is E^D/ E^D , E^D /e or E^D / E^+, they will look black. If the Dexter looks red, then they have either E^+/ E^+, E^+ /e, or e/e, and no black allele.

Now at a totally different gene on chromosome 8, some Dexters carry dun brown,'b'. The mutation causing dun brown is unique to Dexter cattle. Remembering that black, E^D, is dominant and that when there are two b alleles, the eumelanin pigment produced is brown instead of black. A Dexter must have two copies of dun, and at least one copy of black, in order to appear dun or be E^D/ E^D , b/b or E^D/ E^+ , b/b or $E^D/$ e , b/b. If the Dexter only has one copy of the dun, b, and the other allele is B, the Dexter will look black but be carrying dun. Also this mutation causing 'b' only causes dun in cattle with black pigmentation, not on red, so it is possible for a red Dexter, to also have two copies of the dun gene. However an e/e, b/b Dexter is red.

This is why when you breed two red Dexters together, you can only get a red calf. Both black and dun require at least one black allele at the E locus.

So exactly what are the possibilities of combinations of colours, that a Dexter could carry and what would the resulting phenotype or appearance colour be?

E locus (MC1R gene): base coat colour:

E^D -black, e - red, E+ - wild or original type;

B locus (TYRP1):

B- black or original type, b- brown or dun brown

E^D/ E^D B/B = Black
E^D/ E^D B/b = Black
E^D/ E^D b/b= dun

E^D/ e B/B = Black
E^D/e B/b = Black
E^D/e b/b = dun

E^D/E+ B/B = black
E^D/E+ B/b = black
E^D/E+ b/b = dun

e/e B/B = red
e/e B/b = red
e/e b/b = red

e/e+ B/B = red
e/e+ B/b = red
e/e+ b/b= red

E+/E+ B/B = usually red
E+/E+ B/b = usually red
E+/E+ b/b = usually red

Ok so now you are ready to breed your Dexter, what are the probabilities of colour with the calf?

Breeding two red Dexters will always result in a red calf, even if the parents carry dun, either homozygous (two copies) or heterozygous (one copy) so it is said that red is the only colour in Dexters that will breed true or always be predictable.

Breeding two dun Dexters will result in a dun calf, if the calf inherits at least one black gene (E^D) from either parent. But if both parents carry red, could result in a red calf if the calf inherits a red gene from each parent. Remember, dun only alters black so there must be one black gene present.

Breeding a black Dexter, who carries dun, to a dun Dexter will result in 50% dun calves and 50% black calves. The same could be said of a black Dexter, who carries red being bred to a red Dexter.

Two black Dexters who both carry dun, (remember it must be homozygous to work its magic), will result in 25% of the calves being dun and the rest black. Similarly two black Dexters who carry red should produce the same 25% red calves and 75% black calves.

These are only statistics though, and only a few combinations of colour, but it gives you an idea of the vast number of possibilities once you know the colours that your cow or bull carry!