

## Black, Red or Dun – Understanding and breeding Dexter coat colour

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??

Basically Dexters carry their colour coding on two separate chromosomes, black and red exist on one and dun exists on another and is actually a dilution of the black. Clear as mud? Well it actually is not that confusing when we break it down.

At the bovine 'colour' chromosome, 18, a dexter either carries black,  $E_D$ , or red  $E_+$  or 'e', (wild red and true red – both of which visually look the same but can be distinguished by DNA). Black,  $E_D$ , is dominant over red,  $E_+$  or 'e' so a Dexter must have two red genes, to 'appear' red. If the Dexter is  $E_D/e$  or  $E_D/E_+$ , they will look black, but be carrying red. If the Dexter looks red, then they have two red genes, either  $E_+E_+$ ,  $E_+e$ , or  $ee$ , and no black gene.

Now at a totally different chromosome, 8, some Dexters carry dun, 'b'. Remembering that black,  $E_D$ , is dominant and that this dun gene 'b' is really a mutation causing a protein to develop that makes a dilution of the black. A Dexter must have two copies of dun, and at least one copy of black, in order to appear dun or be  $E_DE_D/bb$  or  $E_DE_+/bb$  or  $E_De/bb$ . If the Dexter only has one copy of the dun, b, gene and the other gene is neutral, B, the Dexter will look black but be carrying dun. Also this dilution only works on black, not on red, so it is possible for a red Dexter, to also have two copies of the dun gene.

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 gene at the same chromosome as red.

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?

Locus 1: base coat colour: B -black, r - red, w - wild; Locus 2 brown colour b-brown, n- null (I am using these initials for the ease of typing the colours, genetic testing will use the ones given above)

BB nn = black  
BB nb = black  
BB bb = dun

Br nn = black  
Br nb = black  
Br bb = dun

Bw nn = black  
Bw nb = black  
Bw bb = dun

rr nn = red  
rr nb = red  
rr bb = red

rw nn = red  
rw nb = red  
rw bb = red

ww nn = red  
ww nb = red  
ww bb = 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 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 dilutes 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!