

# Coat Colour (Red/Black)

Coat colour in cattle is primarily determined by the Extension locus (E) on the MC1R gene, which controls whether an animal produces black pigment (eumelanin) or red pigment (phaeomelanin).

## How does it work?

There are three alleles (forms) of this gene:

- Dominant black (ED) – this allele is dominant over both the other alleles so animals will have black coats if they have one ED copy.
- Recessive red (e) – all homozygous recessive animals will have red coats.
- Wild type (E+) – is neutral causing variable coat colours ranging from fawn/yellow to dark brown/black in homozygous animals. This is further influenced when other modifying genes are present – see note.

Breeds that commonly carry a wildtype (E+) allele are: Limousin, Simmental, Jersey, Shorthorn, Red Devon, South Devon, and Highland.

How to interpret the results:

Genotype result	Interpretation	Coat colour
ED/ED	Homozygous dominant black	Black
ED/e	Dominant black/recessive red	Black (red carrier)
ED/E+	Dominant black/wildtype	Black (wildtype carrier)
E+/e	Wildtype/recessive red	Red (wildtype carrier)
E+/E+	Homozygous wildtype	Varied*
e/e	Homozygous recessive red	Red

\* Depends upon modifier genes.

Mating outcomes (statistically):

	E <sup>D</sup>	E <sup>D</sup>	E <sup>D</sup> E <sup>D</sup> x E <sup>D</sup> E <sup>D</sup>		E <sup>D</sup>	E <sup>+</sup>	E <sup>D</sup> E <sup>D</sup> x E <sup>D</sup> E <sup>+</sup>
E <sup>D</sup>	BLACK	BLACK	100% progeny will be Black	E <sup>D</sup>	BLACK	BLACK	100% progeny will be black
E <sup>D</sup>	BLACK	BLACK		E <sup>D</sup>	BLACK	BLACK	
	E <sup>D</sup>	e	E <sup>D</sup> e x E <sup>D</sup> e		E <sup>D</sup>	E <sup>+</sup>	E <sup>D</sup> e x E <sup>D</sup> E <sup>+</sup>
E <sup>D</sup>	BLACK	BLACK	75% progeny will be Black, 25% will be Red.	E <sup>D</sup>	BLACK	BLACK	75% progeny will be Black, 25% will be Red.
e	BLACK	RED		e	BLACK	RED	
	E <sup>+</sup>	e	E <sup>D</sup> e x E <sup>+</sup> e		E <sup>+</sup>	e	E <sup>+</sup> e x E <sup>+</sup> e
E <sup>D</sup>	BLACK	BLACK	50% progeny will be Black, 50% will be Red	E <sup>+</sup>	VARIED	RED	75% progeny will be RED, 25% will vary depending upon other factors.
e	RED	RED		e	RED	RED	