2 Learning Hub Colour Series

B Loci (Brown)

Let's talk about the B Loci (TYRP1)

There are four alleles on the B locus which include the dominant B allele followed by three recessive alleles bs, bc and bd.

Put simply, the **B Loci** controls whether or not your dog will have a brown coloured coat.

There are several mutations of the TYRP1 gene that can modify your pups black pigment production to brown by effecting the synthesis of eumelanin.

Allele
B
bs
bd
bc

What determines the coat colour?

As the TYRP1 gene is related to eumelanin production, for a pup to have the phenotype of a brown coat it must also have genotype of E/E or E/e on E locus.

This pup will also have a brown nose, brown pads and amber eyes as the B locus effects pigment production in these areas also.

If your pup inherits any two copies (one from each parent) of any combination the recessive alleles then your pup will have a brown coat.

For example, on different mutations Bsbs and Bcbc or on the same mutation like bcbc will result in a puppy having a brown coat.

Ok, so why does my red / cream pup have a brown nose?

If your pup has any two **recessive** alleles at the **B locus** and is **e/e** at the **E locus** then he will have a red coat but display a brown nose, brown pads and amber eyes.

This is because the red coat (recessive e/e) masks the expression of the recessive b allele on the coat but not on the nose leather, foot pads or the eyes.

Interpreting your dogs B locus results

B/B - Dominant / Dominant

Typically, this coat will be black with a black nose and foot pads. Eyes will be dark.

If the dog is also e/e at the E locus, then the coat will be yellow, cream, red with black nose, foot pads, and dark eyes.

This dog carries no recessive alleles and cannot produce brown (b/b) offspring.

B/b - Dominant / Recessive

One recessive copy is carried by this genotype and this dog will typically be black and have a black nose and dark eyes.

If the dog is also e/e at the E locus then the coat will be yellow, cream, red with black nose, foot pads and dark eyes.

This dog carries one copy of b and will pass this to 50% of its offspring.

This dog can produce brown pups if bred with a Bb or bb partner.

b/b - Recessive / Recessive

Two recessive copies are carried and the dog will express a brown coat with brown nose leather, foot pads and amber eyes.

The brown coat is however determined by the E locus. If the dog is also e/e at the E locus it will have a yellow, cream, red coat but have a brown nose, brown foot pads and amber eyes.

This dog will pass the b mutation to 100% of it’s offspring.

The dog can produce brown pups if bred to a Bb or bb partner

Predicting breeding outcomes for B Locus

We've prepared a three examples using a Punnett Square to help you predict the theoretical outcomes of your planned breeding's with regard to the B locus. Of course, as mentioned above, there are other genes that can affect coat colour but for the purpose of introducing you to the B Locus, we are making the assumption that there are no other factors and focusing only on the B locus.

Example 1: Both parents are “BB”

	BB	**BB**
BB	BB	BB
BB	BB	BB

Outcomes

All offspring will be “BB” and therefore have black coats if E/E or E/e or yellow coats if e/e. Cannot produce offspring what are carriers or have brown coats.

Example 2: One parent is Bb, the other bb

	B	**b**
b	Bb	bb
b	Bb	bb

Outcomes

50% of offspring will be “Bb” and have black coats if E/E or E/e or yellow coats if e/e.

50% will be bb and have brown coats if E/E or E/e or yellow coats if e/e.

All offspring can produce carriers (Bb) or brown coats (bb)

Example 3: Both parents are Bb

	B	**b**
B	**BB**	**Bb**
b	**Bb**	**bb**

Outcomes

25% of offspring will be “BB” and have black coats and cannot produce brown pups.

50% of offspring will be “Bb” and have black coats but able to produce brown pups.

25% of offspring will be “bb” and have brown coats.

*Refer to the E locus module for more information on how results can impact outcomes.