

## Staffordshire Bull Terrier Coat Colors

### Tan Points and Red/fawn

In order for a Staffordshire Bull Terrier (SBT) to have tan points or to be red/fawn:

- First, the dog must be “ $k^y/k^y$ ” at the K locus. This allows the A locus to be expressed in that dog. The A locus is what actually codes for the tan points or the red/fawn color.
- If a dog has a single copy of  $K^B$  at the K locus, the A locus cannot be expressed ( $K^B/k^y$  or  $K^B/K^B$ ). This blocks dogs from being either tan pointed or red/fawn. These dogs still have the A locus, they just can’t show it.
- To have tan points, the dog must be “ $k^y/k^y$ ” and either “ $a^t/a^t$ ” or “ $a^t/a$ ” at the A locus. Either of these genotypes will result in tan points similar to a Doberman.
- To be red/fawn, the dog must be “ $k^y/k^y$ ” and have at least one copy of  $A^y$  at the A locus. Since  $A^y$  is dominant to all of the other possible A locus variants, a dog will be red/fawn as long as it has one copy of  $A^y$ , regardless of the A locus variant received from the other parent. Therefore, dogs that are “ $A^y/A^y$ ”, “ $A^y/a^t$ ”, “ $A^y/a^w$ ”, and “ $A^y/a$ ” would all appear red/fawn if they are also “ $k^y/k^y$ ”

### The issues with Brindle

- There is currently no commercial testing available for the brindle color pattern. The mutation underlying the trait is known. However, this mutation is challenging to test for and testing is not currently offered by laboratories.
- The brindle genetic variant exists in the K locus region.
- On current testing at Paw Print Genetics (and probably most other laboratories), every brindle dog appears as “ $K^B/k^y$ ” on K locus testing. However, since the brindle specific genetic variant is not being tested for directly, this is not an accurate story of what is happening at the K locus. It should also be noted that MOST dogs appearing as “ $K^B/k^y$ ” on testing are NOT brindle.
- It has been determined through breeding experiments that brindle dogs can have one of two possible genotypes at the K locus... The dog must inherit at least one copy of the variant associated with brindle (we will call it “ $K^{br}$ ”) and this dog must inherit either “ $k^y$ ” OR “ $K^{br}$ ” from the other parent. Therefore, even though brindle dogs will appear as “ $K^B/k^y$ ” on K locus testing, in actuality they are either “ $K^{br}/k^y$ ” or “ $K^{br}/K^{br}$ ”.
- Dogs that are actually “ $K^B/K^{br}$ ” will not be brindle because the “ $K^B$ ” blocks brindle from being expressed, just like it blocks the A locus from being expressed. Again however, these dogs will still appear as “ $K^B/k^y$ ” on K locus testing.

### Location of the brindle on the body

- The location of the brindle pattern on the body is controlled by the A locus.
- Dogs that have the genetic variants associated with tan points (“ $a^t/a^t$ ” or “ $a^t/a$ ”) will only have brindle in the regions where the tan points are typically located.
- Dogs that have the genetic variants associated with red/fawn (“ $A^y/A^y$ ”, “ $A^y/a^t$ ”, “ $A^y/a^w$ ”, or “ $A^y/a$ ”) will show a full body brindle pattern.

## White in the SBT

- There are multiple genetic causes of white in the SBT. Only one can currently be tested for; the genetic variant associated with piebald dogs (sometimes called parti-color in other breeds) that is coded for by the S locus. Dogs can have either “S” (no piebald) or “s<sup>p</sup>” (piebald) at the S locus.
- **Typical piebald- dogs with two copies of “sp”** will be piebald (typically greater than 50% white). This appearance is not limited to the body areas associated with Irish white spotting. Colored areas of the dog are controlled by the other areas of the genome.
- **Irish White Spotting-** Dogs with white on the chest (that sometimes is seen around the collar), tips of the toes and tail, and between the eyes on the head have a white pattern known as Irish White Spotting. We do not currently know the underlying genetic cause of this pattern, but we know that the underlying cause is NOT the S locus genetic variant that is associated with a piebald coat color
- **Modification of Irish white spotting-** Even though we know that the S locus doesn't cause the Irish white spotting to appear, dogs with one copy of the piebald variant “s<sup>p</sup>” at the S locus AND Irish white will typically show an Irish white spotting pattern in which the white is somewhat expanded, but still remains in the same areas; chest, collar, toes, tail, and between eyes.
- **Extreme white-** SBTs can also inherit an extreme white appearance in which the dogs are almost 100% white. The genetics behind this pattern are not known. Dogs with this type of white pattern are also at an increased risk of deafness in some breeds.