

# The Pigeon Genetics Newsletter, News, Views & Comments.

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(Founded by Dr. Willard .F. Hollander)  
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July 2022.

We promised that this Month we would be "TRACKING DOWN THE MODIFIERS" !

What exactly is a MODIFIER? It is a gene mutation that alters a phenotype of another gene expression, having a quantitative effect on its expression rather than masking it. This may be in the form of 'enhancing' , or 'suppressing' the original expression.

We most frequently think of colour modifiers in terms of whether they darken or lighten the overall expression of a known base colour.

Wild type Blue / Black pattern series birds may have many different expressions but still be recognizable as blue/black base pigment and Bar pattern. The changes in darker expression may be caused by gene mutations such as Intense phase, Dirty (V) , or smoky (sy). Lighter tones may be caused by other gene mutations such as milky (my), or dilution phase (d), pale (d<sup>p</sup>) , and Ecu (d<sup>ext</sup>).

There are many mutations that alter the expression of various pigment concentrations in feathers but not the entire feather cover. Examples of those are : Toy Stencil Ts1, Ts2, frill stencil (fs), Indigo (In), reduced (r) , rubella (r<sup>ru</sup>), erased, Lead , Rusty, and Anthracit (An).

Then there are mutations that affect both the pattern (C) areas and the smooth spread areas plus the entire feather cover, but sometimes only slightly: Dominant Opal , recessive opal, Saffron, Pink eyed dilute, and Platinum.

Gene mutations that de-pigment feathers basally are: Pencil , Undergrizzle , Flash, and Azuro.

There are also genes that whiten feathers by completely stopping melanin production in some or all feathers: they are recessive white, Pied, Tiger grizzle, Stipple , and Albino.

The gene Ice ( ) lessens the expression of pigment over the entire bird except the Pattern (C) areas and sub-terminal tail band, this seems to be at least in part due to the 'erased' gene.

Partial de-pigmentation in feathers is caused by gene mutations such as : Classical Grizzle (G) , Print Grizzle (Pr<sup>G</sup>)\* , Speckled, Drizzle (Drz), and Juvenile bleaching,

(\* ) above , the symbol I used for Print Grizzle - (Pr<sup>G</sup>)or (G<sup>Pr</sup>) has not been officially assigned .

The mutations that MASK, or hide other expressions and thus not considered to be modifiers are : Spread factor (S), which causes a SOLID whole colour bird that covers pattern and most other modifiers. It has at least one incomplete form, but also depends on additional darkening modifiers to make it completely epistatic . Then 'recessive red' (e), it does not cover well without the addition of other modifiers such as the BRONZE genes but still has been considered "Epistatic" as masking a gene and therefore not a modifier.. It has two alleles Ember and Orojo which are not ever epistatic to wild type but do modify it.

The importance of learning how to TRACK the modifiers becomes much more evident when we consider that so many modifiers are PIGMENT cell SPECIFIC. These mutations may affect only certain groups of pigment cells or granules that we can see with the naked eye, so that if we know where to look , we can determine just exactly what modifiers are present in any given phenotype.

One very good example of this is the Gene that causes the production of concentrated smooth spread pigment granules to be deposited at the center rachis of the shield feathers in particular. This gene mutation is called Sooty (So) . There is an on-going disagreement regarding whether this gene is a dominant or a recessive. However it seems that there may be two distinct genes for this expression , one that is indeed dominant and another that is recessive. I specifically tested this gene and found that it is dominant but has a number of mild expressions in the nest. One is simply a darker lacing on the feathers that will not be produced from non-Sooty parents. Jith Peter had Lahores that appeared to be a recessive sooty as they only produced sooty young from f1 young mated together or back to the carrier parent. NOW- due to the variable expressions of this gene, it is very difficult to follow or track it. That is where my suggestion that Sooty is smooth spread and NOT coarse spread, helps us determine IF Sooty is present in birds that have other genes that prevent us from clearly seeing the Sooty marks. Before now, it has always been thought that Sooty was 'coarse spread' pigment. Any genetic mutation that causes a de-pigmentation of smooth spread will also cause a whitening of Sooty. That makes it possible to see it on an otherwise darkened feather. However this whitening will only express when the expression of Sooty has developed to a point where it is quite large, and Sooty increases each year. Bronze will not express on concentrated smooth spread, therefore that also will help to track Sooty as it will still show black on an otherwise bronze shield.



**Ryan Ward** - Sooty, Dirty, see toe scales, Pied silver.



**Light Sooty Brander Bronze - Nure Alam**

Ts1 and Full complex Ts expressions both showing tics that 'look like' Sooty , but are not , This is spread factor on clumped smooth spread tips of T-checker not affected by the (Ts). photos by **Mick Bassett**.



Two Brander Bronze expressing Sooty marks



Smooth spread does not express in a consistent manner on all feathers and it is my belief that it may deposit at the edges only such as we see at the sub-terminal tail band of Satinettes and Blondinettes , but a residual outline of coarse spread pigment is possible. This combination on the flights may also cause the finch marks on the ends of flights of Ts birds where there may be a small amount of coarse spread allowing the Ts to express. Frill stencil will express on the vanes of the flights but not on the coarse spread ends where you see the bronzing in this foreground bird. Photo by - Unknown , if anyone knows , please let me know.

Below Satinettes express what looks like the black lacing of Spread factor , but this is not spread factor, it is T-Pattern plus Toy stencil and frill stencil white feather vanes. Most of the bronze and base pigment coarse spread pattern have been de-pigmented.

The lacing may contain Sooty that has not been de-pigmented by (fs) at this stage, but often Sooty darkens with each moult so that older birds will express the white in the center of each Sooty mark leaving just a thin black lacing on the white feathers in some situations.



**Arafat Pigeon.**



This dominant Opal blue bar has black smooth spread Sooty marks and coarse spread Bar (C) areas that are whitened as dominant Opal affects both smooth and coarse spread. We discussed this in the March 2022 Issue as well. There can be considerable variance in the effects of whitening genes, and sometimes it seems that pigment is condensed rather than totally eliminated. No one has put extensive time into making the desired number of matings to determine exactly what takes place with these genes.



Another photo showing both the whitened Sooty marks edged in base pigment and the whitened Bar pattern which also has a slight dark edging and residual bronze . If the sub-terminal tail band was visible here , it would have a whitened tail band slightly edged in black but no bronze.

Below the Toy Stencil bird has black Sooty marks matching the black sub-terminal tail band and not affected by Toy Stencil as Ts affects only the Coarse spread pigment of the "C" Pattern areas, but also seems to cause some smooth pigment to concentrate toward the ends of each feather but not totally. If you look at the wide black area next to the white flights, these are the smooth spread ends of the secondary flights. All of these dark areas match the concentrated smooth spread sub-terminal tail band.



Left a Brander Bronze youngster expresses both Sooty and Dirty factors as discussed earlier. Photo by **Pigeons Farm**. Brander Bronze very often does have the Sooty Gene but the usual presence of Kite and recessive red masks it so that breeding tests are necessary to bring it out. Very old paintings of Classical Almonds often show the bronze feathers with black flecking regularly depicted in the center of each shield feather, perhaps just an uneducated depiction by the artist, because if they were Sooty, the spots would have been de-pigmented by the Stipple gene.

This photo shows a Satinette that is Spread factor indicated by the laced tail instead of the Moon marked spot tail of the non-spread Pattern series birds. Normally all coloured feathers would be laced but here we see the center most tips are also coloured indicating that the bird is T-Pattern checker masked by Spread factor (S).. Any check pattern prevents the frill stencil from expressing on the feather tips. The second photo shows a Bar pattern series bird with Sooty de-pigmented by frill stencil, no bronze. Look closely at the laced edging of the barred area , you will see whitened center Sooty marks with what I believe is residual smooth spread edges.



**Afzal's Loft** - Spread blue /Black frill stencil



Blue bar frill stencil Photo - **Imram Haider**.

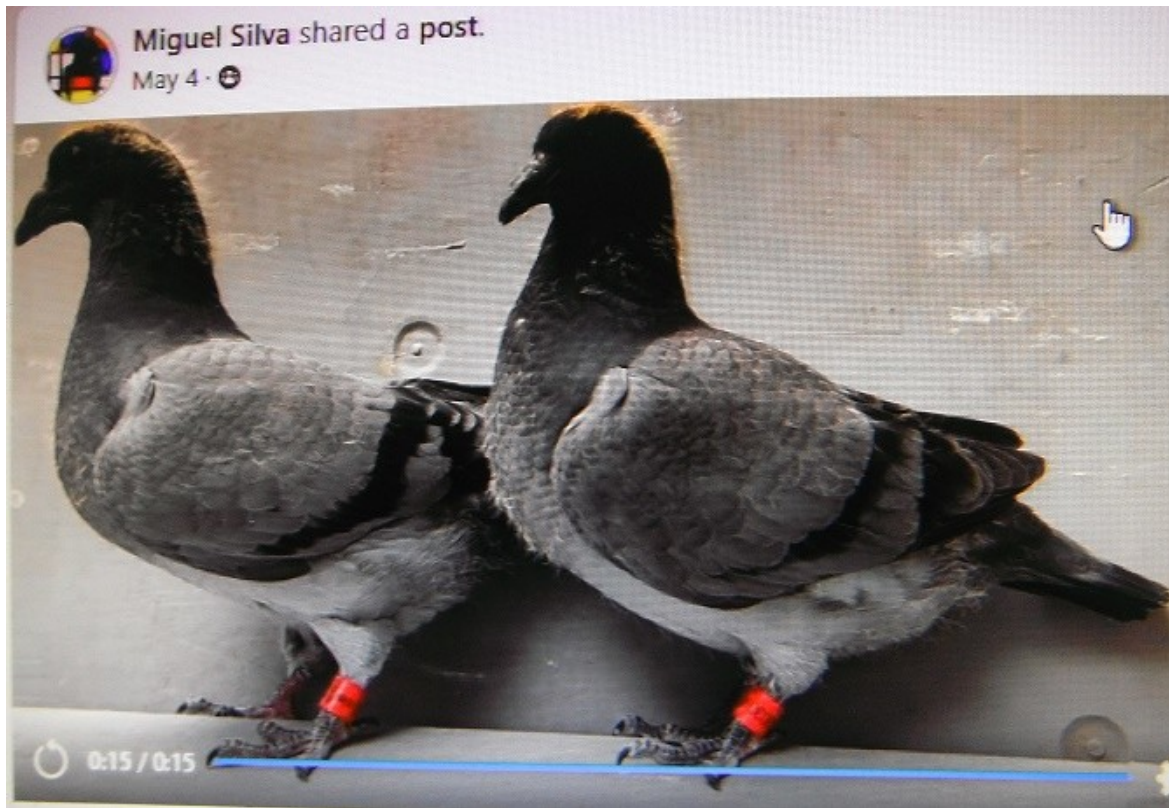
The photo below by breeder **John Gonor Jr.** - Excellent photo demonstrating the effects of the various modifiers. Firstly the darkening all over by Dirty factor. Note the basal reddening (bronze) of, I think, Ts1 gene that leaves a dark residual smooth spread edging to all 'C' areas. Then the 'clumped' smooth spread at the center tip of each shield feather as no Sooty is present.



Normally a Dirty factor (V) bird would have a solid black beak but the stenciling seems to be causing a horn tip beak that will probably darken after the moult. Smoky will cause horn tip, but we know that smoky is not present by the fact that the outer two tail feathers have 'albescent' strips, as does the back have albescent whitening.

This is a light checker and not a T-pattern bird so there is no associated white 'tic' at the back of the eye which is often in partnership with Dirty factor (V) T-Pattern.

The Ts is not able to express on the smooth spread edging or the Clumped smooth spread tips.



POR - 0293626 - 20 ♂  
Linhas: Gaby  
Pedro Simão

PT - 0109300 - 20 ♀  
Linhas: Gaby x Romário



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These Racers are owned and bred by **Miguel Silva** and presented with his permission. Both parents are Sooty and both young are Sooty. The laced markings on the shield may expand with each molt. Note by the black toe and tarsus scales that the young are also Dirty factor (V). Any young that do not show either a lacing or a dark rachis to each shield feather will not be Sooty if parents are hetero Sooty. All young will be Sooty if the parents are homozygous Sooty. The expression may vary .



The above Sooty marked birds are very similar to the ones I previously had presented from my own loft. The sire was a Sooty wild feral cock (1) , dam was a clear blue bar. The youngsters were both Sooty but the hen ( smaller one) (3)below , was ever so slightly marked while the larger one (2) was heavily laced. (4) is him just before first molt. Unfortunately I do not have any photos beyond the nest feather.



(1)

(2)



(3)&(5)

(4), (2) (5)& (6)



(5)

(6)

Some laced birds do not appear to become darker as the bird ages , so more research is needed !

The beaks and foot scales are not Dirty factor (V), so the lacing cannot be attributed to that gene.

(3) is the same as left bird #(5). (4) is an older shot of (2) , the right bird in (5) , and wing (6).

We have discussed many times that a Saturated T-Pattern ( pseudo black) with Kite bronze and/or Brander is not Saturated only because of the three suspected darkener modifiers Dirty , Sooty , and smoky. We know this by observing the many combinations of those genes that never result in a total black phenotype. We also know that both smoky and Sooty can have detrimental effects on a show quality Classical Almond phenotype. The only places where breeders want white on their Classical Almonds are in the tail and flights where the stipple break de-pigments smooth spread, and also the bronze does not express. However if the bird is also Sooty, then de-pigmentation of the Sooty marks by the stipple gene causes small white spots throughout the shield . Smoky also tends to result in a 'multi-coloured' Almond among other unwanted colour quality faults.

I am often asked what colour is this bird or that bird while having no idea what the parents were or anything else about their genome. I think most people are starting to realize that it is just about impossible for anyone to even guess without having some basic knowledge about the ancestry first.

**Ko van Vliet** stated on the "International English Short Face Tumbler Group" : "I think the solution has been found to prevent the appearance of the red splashes in the neck after the moult. White (grizzle) on a ashred basecolor. This 2021 hen remained completely white after the moult !" { note pearl eyes}

White Grizzle was named and given the symbol (G<sup>W</sup>) by **Dr. Lester .P. Gibson** who had it appear in a flock of Gimpel Archangels . It is a partial dominant gene.



Photo **Ko Van Vleit**.

Your responses to the June Issue:

From **Joel Laia** - Love this Issue !

From **Frank Hammond** - Thank you as always Bob. Hope you are well.

From **Tom DeMunnik** - As always a great newsletter . I plan to respond to your writings and questions in a constructive manner but will need a few days to put it all together. Hopefully you will get a response from others also who are working with the white side breeds.

The following is a response from **Tom DeMunnik** of Canada to our June Issue discussion on the Whiteside Phenotype. I want to thank Tom for his efforts and enthusiasm and while we do not agree on a number of aspects, it is important that everyone has their opinions heard.

WHITE SIDE DISCUSSION RESPONSE TO BOB RODGERS GENETIC ARTICLE OF JUNE-2022 It is well known that the white side breeds in black, recessive red and yellow I am working with have had their colors crossed in years passed as they have by current breeders. I have shown in my own loft that they indeed carry a mix of each others genetics and modifiers in whole or in part and in Homo or in Hetero. It's for that reason that it is hard to discuss one without mentioning the other. My definition of Classical Grizzle is that they do not carry Kite or Brander Bronze and are usually Blue series such as in Homers and Budapest High fliers. My definition of a Print Grizzle is that it does indeed carry Kite or Brander Bronze. It is not a Print unless it does, that is my experience with the birds I am working with to get desired results. You cannot produce a Black white side unless Hetero Bronze or Recessive red is present in one of the parents. Therefore either Classical or Print Grizzle may be the key bird providing one of the parents carries Kite, Brander Bronze or recessive red out of Bronze. It is well established that Recessive red is epistatic over all colors and patterns, but is a weak epistatic over Grizzle white, or whatever white you want to call it. This is my sixth year working with the white sides and I have yet to see that the red white sides are anything else other than having Grizzle white on coarse spread shields. Kite or Brander Bronze does to the recessive red white sides, what Kite and Dirty factor does to the black white sides. That is they intensify each ones color expression and resist the grizzle white aggression. My small group of Dutch HF recessive red white sides are the intense recessive red and can hold their color markings for several years (currently 4 or 5 years) only their shields will lighten. So to say that Grizzle will expand after each molt in the colored area is not always the case in all breeds. I have yet to breed a yellow dilute out of this group and get only the occasional Gold (Pale Bronze) The black white sides in the three breeds I am working with all darken after each molt, a matter of fact I rely on that to achieve a showable black white side. Most often a over marked juvenile with a clean white shield without the smudging of smoky, may be a beautiful showable black white side after a couple of molts. The Black Dutch HF variety tend to darken more aggressively then the Vienna that I have and it appears the difference is that they carry Hetero recessive red rather than Hetero Bronze in the Dutch birds. Furthermore the juvenile Vienna tend to be "smoky free" with a clear white shield but more grizzled in the colored area then the other two varieties. All three black varieties require Homo or Hetero Dirty which in my opinion is preferred over Hetero Spread. To respond to your question: #1 Yes, #2 No, #3 No unless you can identify a certain modifier as the enabler, #4 Epistatic re-action.

Questions from last Issue: (1) Do you think that one of the known grizzle traits is causing the moult to white ? (2) Do you think a bronze gene is responsible for the moult to white? (3) Do you think an Enabler gene that does not express unless accompanied by recessive red is the cause?

(4) Do you think it is the reaction when recessive red masks some of the darkener genes along with T-pattern ?

(5) Or do you have an entirely different explanation as to why colour pigments are shut off to some feathers particularly in the shields?

We could devote many Issues to Tracking the Modifiers as there are so many variables to consider. The combinations are virtually endless, not to mention noted variation even within any one given modifier.

The moment we are certain we have discovered an explanation for a given characteristic, there will be an exception to that appear.



**Nazir's Loft** - Smoky Sooty T-Pattern.



**Ryan Ward** - Sooty Opal Silver Bar.



**Hunkari Aksara Hunkari**- Sooty Ts /fs Blue Bar



photo by **Mick Bassett** - Ts Blue Bar



**El Muhammad Quafi** - Very Light Checker .



**Shoibal Sabbir** - Sooty Blue Bar.



Photo of Sooty , smoky Dirty blue bar Cock - by **Ashadulla Hosain**. This bird Must be pure for smoky (sy) as it is a recessive. He therefore may only be hetero Sooty (So), and hetero Dirty (V) but he does look homo Dirty.. Even if he was homozygous for those two mutations , it seems unlikely that he would exactly match the pseudo black of the T-Pattern Kite bronze component of the Classical Almond., however the bronze gene plus homozygous Dirty and homo Sooty MAY create the so -called Saturated T-Pattern Kite. I doubt it. I believe that there is still a missing darkener possibly from the Gimpel marked Archangels of old.

That is it for the Month of July 2022 , Hope you are all keeping well and that you will consider dropping us a line or two to let us know what you are doing in the Pigeon Hobby!

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