

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

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"When is it a MUTATION., as opposed to simply a Modification of a gene? "

More and more we are seeing new variations of COLOUR that sometimes defy identification. We have talked about this sort of thing previously. We often see photos that are labelled by their Breeders as being this genetic trait or that genetic trait , but often we have nothing but their word on the matter even IF we see the parents.

I am always very cautious to believe people especially when they say that they have a free range loft. They insist that they know all of the genetic backgrounds so they are absolutely certain about this or that offspring being of a certain trait. Nine chances out of ten they have no idea just what genes lurk hidden in their loft. All it takes is for one hen to allow several males to take turns covering her and you will have no idea what the offspring will inherit.

Mutations are actually quite rare. You will hear all sorts of argument to the contrary , but in fact it is extremely unlikely that you will ever see a mutation occur in your loft in your lifetime. It is far more likely that you will raise either a somatic or a Chimera mosaic before you ever have an actual 'mutation' pop up in your loft. It is said that the unstable nature of the Stipple gene allows it to mutate into alleles more rapidly than the expected norm., however , in many cases , people have thought they had a mutation when in fact they only had a variation of phenotype within the stipple gene expression .

While a careful breeding test done by a knowledgeable individual can ascertain whether or not a bird is indeed a mutation, usually a laboratory DNA examination will be necessary to be certain.

Mutations at the major colour locus are certainly very obvious in that the base Black pigment of "wild-type" is well established throughout the world in the 'blue series' Columba livia pigeon.

The dominant red mutation at that locus created the ash-Red series, and is quite distinct from wild-type in that it has phaeomelanin (red pigment cells ) instead of the eumelanin (Black) pigment cells. There is no evidence of dominant Red mutating more than the one time.

The third mutation at that locus was the Chocolate pigment giving rise to the 'brown series'. This mutation appears to have taken place perhaps as many as seven times at this locus over the years. We believe that we are working with only one of these chocolate mutations but there could be several out there that all look alike, or nearly so phenotypically. Chocolate pigment is also eumelanin like the Black pigment.



Every colour has an INTENSE phase , however further mutations at this locus have created a PALE phase, a DILUTION phase, and possibly an extreme DILUTION phase.

At least one person who studies colour in birds of other species, believes that what we call dilution in pigeons should not be referred to thusly. He has created another name for it called (INO). He ( **Mr. Hein Van Grouw**), believes that our named Milky factor is actually the true dilution gene/ locus, as it relates to what is happening in all other species of birds.

This does make a great deal of sense as it places dilution as we know it into a new locus for a form of 'albinism' where offspring all have pink eyes when in the early stages of life. The idea of making a change to that new classification may prove to be a very rocky road.



By now you may have noticed that we are talking about various mutations from wild-type that also are indeed 'modifications' of wild-type! When a mutation took place to create the alleles Pale , dilution and E cru., those 'versions' of Intensity have modified it so that we see it differently in each case. Likewise with every other mutation. Each new mutation at that locus becomes a new VERSION of whatever gene expression already existed at that given locus, and they are referred to as alleles if they are located at one specific locus on the same chromosome.

A locus is a 'spot' on a chromosome where it is connected to a second strand of matching loci, like rungs on a ladder. This DNA structure is referred to as a double helix.

In the case of sex-linked (Z) chromosomes, males have matching strands , females have one strand matching the males , and a second strand that determines the gender information carried by the female.

The males require two doses of a sex-linked gene in order to be pure ( homozygous) for it and express it , while females require only one dose to be pure for the trait ( hemizygous) and thus express the trait.

Some of you who are also on Facebook Pigeon Groups, may recall that there have been a couple of fellows who continually criticize me for being 'speculative' . Well Speculation is 'creativity' ! Speculation is the beginning of hypotheses and we need that sort of forethought in order to make any progress into genetic research!

I have presented you with some new ideas regarding the Modifiers : Dirty (V) , Sooty (So), and smoky (sy) and a wide range of other traits in Pigeon Genetics. I have shown how other genetic traits interact with the above modifiers in such ways that prove my hypotheses . This month I would like to offer a little more on this subject.

The sub-terminal Tail band has long been thought to be Smooth Spread colour pigment. I suggested that we should add the word 'concentrated' to that description as we also have long known that not all smooth pigment is deposited in feathers in exactly the same way. Some is 'clumped' together, or scattered in various haphazard groupings such as we find in the so-called "Blue" areas, particularly the wing shield light gray areas.

Closer examination seems to reveal that "Coarse Spread " pigment is deposited at the outer edges of the sub-terminal tail band . If we observe specimens where other certain traits are also involved , we will soon realize that the sub-terminal band is affected differently.

If we take a look at smoky (sy) factor birds , we will see this similar effect. This time the concentrated smooth spread is NOT affected , but the outer edges are de-pigmented giving an image of a narrower sub-terminal tail band and a much wider or more pronounced terminal tail band at the tips of the tail feathers.



These hetero Print grizzles bred by **Noor Namz** demonstrate beautifully what I mean. Photo one is a homo smoky factor (sy) showing a wider terminal tail band and somewhat narrower sub-terminal band. The bird also expresses a typical horn tip beak, and NO albescent strips or rump patch.

The second bird most likely is only hetero smoky and does not express the same points as dramatically. The sub-terminal band appears wider as in normal wild-type except for the influence of the grizzle trait. The beak is dark, and the albescent strips are showing more whitening.



Then

here we can see that, without smoky (sy) , the pigmentation is much more distinct overall - with a very wide sub-terminal tail band and virtually no noticeable terminal band. Dirty (V) factor may also be expressing to make the darker tone. photo by **Bhaga & Giribaj - Pigeon Club Bangladesh**.

Another example is the frill stencil on a blue pattern series bird. The so-called "Moon" spot whitens most (but not all ) of the tail band. I believe the reason is because (fs) frill stencil whitens concentrated smooth spread pigment cells , but does NOT have any effect on the Coarse spread edges that remain Black.



Here you can clearly see in this photo of a Satinette bred by **Shoibal Sabbir** of Bangladesh that the whitened 'moon marks' of the concentrated tail band contrast with the black outer edges , which I believe are coarse spread, not affected by frill stencil.

We see similar examples when we look at the effects of frill stencil on Sooty (So). I presented the idea a few Issues back that Sooty was Concentrated smooth spread and NOT coarse spread as has been the belief all along. Frill Stencil will print on smooth spread but not Coarse spread.



Photo by Imran Haider.

There is always the possibility that several whitening genes occur on one bird which may have been intentional in order to achieve much whiter patterns etc. Years ago Dominant Opal was added along with the stencils for this reason but then the Breeders realized that they had to carefully avoid double dominant opal offspring so as to prevent the lethal white syndrome that caused the death of a number of offspring that were pure for the Opal (Od) gene.

Another feature of Dominant Opal was that it lightened all of the coloured plumage on the bird to softer tones and that sometimes /prevented the stronger colour and white contrasts that they desired.

Gene mutations that interact with smooth and coarse spread in different ways are : Dominant Opal, Frill Stencil., Toy Stencil., Stipple ., Indigo., Reduced., Recessive opal., and alleles to any of these. Most have a whitening effect on Smooth spread. Fewer have an effect on Coarse spread and when they do, it may be enhanced by the addition of one of the other traits. This seems to be due to some traits like Frill Stencil acting more on the inner vanes of feathers or more basally . Regardless of which one, or which combination that may be utilized , there is almost always a residual black line along the bar areas in particular.

Study under the microscope may be the only way to determine just what pigment/s are involved.



**Norbert Christl** presents this beautiful Dominant Opal Blue bar Sooty factor Homer. You can readily see the whitened smooth spread areas of the sooty marks on the shields as the Opal gene de-pigments the center most portion of each Sooty spot. In this case the darker outline may not be coarse spread as Sooty tends to express darker from the center rachis ( mid-rib) of each feather outward. Opal tends to express variably and even on the concentrated sub-terminal tail band only de-pigments the center most region. Dominant Opal de-pigments both Coarse spread and smooth spread variably and seems to cause some of the black pigment to be pushed into more concentrated edging on the bars. This requires more study. This bird may also be frill stencil? Norbert posts many pictures, but I do not think the birds featured on his timeline all belong to him. If anyone knows who owns this bird please let me know.

Dominant Opal almost always leaves a slight residual expression of a bronze in the "C" areas of pattern.

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Here is a young Dominant Opal checker of the blue series that is expressing a Pied factor, Dirty (V) factor., and a bronze factor. It was bred and presented by **Siddartha Roy**.



Note the dark and pink areas of the toes. This tells us that the bird is for certain both Dirty (V) factor and a Pied factor very early in the nest. The light gray clumped pigment at the center of each shield feather and black outer edges tells us that Sooty factor is not present . Whiting the bronze areas requires very careful selection away from any bronze and is a slow and difficult task.



The tail feathers of Dominant Opals almost always will be somewhat multi banded in the nest feathers , but will sort themselves out in the first moult. The sub-terminal band will usually be lighter while the rest of the tail may become almost normal colour.





In each photo you can see a small white 'tic' marking at the back of the eye, this was once said to be associated with Dirty (V) factor., but I have found in my own stock , that it is common when there is also a recessive white flight gene in combination with Dirty factor.



It is difficult to say what bronze factor is involved. This one seems to be associated with the "C" Pattern area only which suggests Ts1. It may be simply associated with the Dominant Opal gene itself, but there are Opals that do not leave any bronzing residue.

I expect the pseudo ( white) finch marks at the tips of some of the flights may moult away .

I find it interesting that there have been no alleles that have mutated at the Dominant Opal locus.

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Here is a pretty little pouter presented by **Kamal El Motaouakkel**. This is of course a Pied factor blue series T-Pattern that is what should be referred to as a "SPLASH". A splash is any pied bird that has some colour splashed over the upper regions on an otherwise white bird. They may have a coloured tail or a white tail and also may have all white flights , all coloured flights or some of each. The question here was in regard to the trait that is causing a partial de-pigmentation of some of the feathers that still express colour.

I believe this is a trait we call "undergrizzle, symbol (Ug)., Birds with this mutation are usually quite light or white in the nest with dark lacing , but not always. They can resemble the "Pencil" gene also. However they almost always moult in much more colour with age. The undergrizzle gene is not one of the grizzle factor family alleles. It is so named as it causes this 'grizzle-like' phenotype in the basal areas of the feathers so that often as adults you have to look at the base of the wing and tail feathers in particular to see it. It often has kite bronze expressed with it, which is typical as the de-pigmentation affects only the base colour and not any bronze that is usually part of the base colour granules .

Below first three shots of (Ug)., (1) is from the above bird **Kamal**., (2) Jith Peter., and (3) **Barry McPhee**.



Below are two entirely different traits that resemble Undergrizzle but are not typical. Breeder Jith Peter.



The first one is a youngster so would darken with age if it was typical Undergrizzle , but this bird retains its whitened flights and has no typical whitening of the wing bar areas. The tail feathers are very similar to (Ug). This trait appeared in a Lal Band Ghagra genome study and was not evident in the parents.

The recessive red is typical of a Migrational white trait in some recessive reds. Most recessive reds tend to have whitened feathers basally, but in this case it is much more evident in the nest feather and instead of moulting in more colour, it will become much whiter to be Pied factor in appearance with many pure white feathers.

There we have it for the third Month of the New Year 2022. While we are hearing some hopeful news about the Covid situation in many Countries , we are also hearing about the terrible invasion of the Country of Ukraine by the Russian Government.

We wish all of the people of that Country safety and regained freedom to self government. Take care everyone !