The **Pigeon Genetics** Newsletter

News , Views , & Comments

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April - Issue 2017. (third in a series of three)

"Leucism" Piebald (**Pied Factors**).

"This Month Saddle Design , Swallow Design, Gazzi Design & Lahore Design "

This is the third and final Issue dealing with "PIED" factor and Fixed "Designs" until we get more responses to bring you updates on what people are testing and discovering. The only person that I have noticed who is actually studying the effects of Pied factor(s) is Michael Spadoni of Australia. We would love to have input from any others out there who also have been working with any aspect of this vast and complex study. There has been some past work done on the order of Dominance of all pieds in relation to non-pied (Wild type), but without a great deal of completion on Record. Then we have even less work on the very complicated study of the order of Dominance among the various Pied traits when mated together in the hundreds of different ways that are possible.

Often Pieds have split, cracked , broken., or odd coloured eyes. A common error is that people think that white headed birds never have coloured eyes but think of them as, "BULL", black eyes. This, of course, we know is not always so, as many Baldheads are Pearl eyed , and also orange / red eyed. The colour of the eye Iris is not totally influenced by genes governing skin and feather colour originating from the neural crest. The proximity of coloured skin and feather to the eye does not ensure that the eye Iris will be coloured. Colour at the back of the eye originates at the Optic Cup situated at the back of the eye ball. If there is no actual pigment in the outer layer of the Iris, then the black at the back of the eye gives us the Bull eye colour. The red or pearl pigments present at the front side are produced by different genes and different cell types. There are genes likely involved in both melanin and red or pearl

pigment production. They are produced by different biochemical pathways and there are most likely genes particular for each pathway. The science of all of this is still just beginning to be understood.

Below are examples of a Baldhead orange eye, a Baldhead slightly split eye, and a mismarked Baldhead Bull eye .

Bred by Bob R.

Norman Pradan's - Ever so slightly "mismarked ", (perhaps just underwing feathers showing), Gazzi Design, gorgeous German Modena. Note that the top of the tarsus (heel) is ridged in black indicating that if it was a muffed breed it would have black muffs. This is linked to the coloured flights.

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To summarize the components: Above is the **Saddle Design**, it is composed of two components; a coloured **heart**, and a coloured **shield**. The Satinette saddle is referred to as a shield Design to which we have added the **coloured tail**. The **"markings" are the outlines** of the coloured areas, they must comply with STANDARD specifications to avoid penalties at the shows. Markings may be either white encroaching onto coloured areas or the reverse with Colour intruding into the white areas.

Below lovely Saddle Designs the first referred to as a "Shield " Cropper, the second as a : Saxon Shield Pigeon. Usually the shield Design also has a Coloured tail, but in both of the these Breed Standards there is an exception.

Mohammad Bilal Owner.

Mick Bassett photo.
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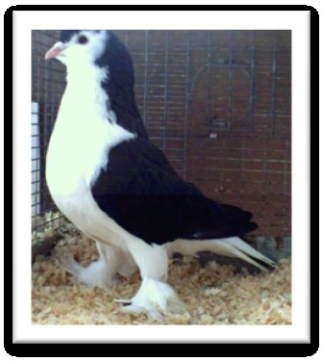
(1)  (2) 

Selection of Pied traits in order to perfect a specific or "FIXED" DESIGN, is no simple task. Breeders have been struggling with it since the first Leucistic mutations occurred in Columba livia. There are two ways to "map" the markings of any given trait. One is to sketch the individual markings carefully in a notebook when the birds are fully fledged or even after the first moult when the feathers are in peak condition. The other is when the birds are just starting to show their strongest skin colour, but before those outlines are obliterated by new feather quills, it is here that you can see exactly where the pigment is based. You may find that it only works for the darkest pigment. You can use this method to help control the tendency of pigment travelling out over the upper mandible of breeds like Lahores. You will also need to note other areas such as the underwing colour, to observe its likelihood to travel out along to the outer tail feathers or forward into the neck, breast and underbody. These are common faults in Lahores and some of which can be disqualifications or at least severe point deductions. Above, specimen (1) bred by Bob R., shows a poor head and neck marking which is a major point region on Lahores. If all other traits were perfect and you had nothing better for markings, then this bird could be used in a breeding program., but this stance and neck markings would otherwise keep him out. (2) This bird would be the close to ideal specimen that you want and most certainly valuable in any breeding program for European Lahores. Post by Royal Khan .

We have no idea how many individual modifiers may exist to control the delineation of specific markings within each genetic unit, that when combined, create our overall "Design". We can; however, select carefully so that the same two unwanted irregularities are not combined. Avoiding mismarked designs, ...that is the name of the game .

The Lahore Design is thought to be a combination of at least four single unit traits if not five. Some of which have been selectively conjoined. This leaves a great deal of room for a wide variety of mismarked birds, and breeding quality Lahores just by markings alone, separates the Men from the Boys !!

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Here you see the Swallow Design in both a spot, and a full head trait. They consist of several **single unit traits**: Coloured flights, coloured shields, coloured Muffs., and a spot or fullhead trait. The Stork design appears to be closely related. The Nun Design is more closely akin to the Moorhead Design. Below a Swallow cock that had been mated to a Lahore, and his offspring:

From this, it looks as if we could eliminate the forehead spot as part of the Lahore genome, and confirm the full head cap. We could also discount the theory that Dominant white flight presents in this manner, since both Breeds have coloured flights. However, we would have to closely observe the parents and raise numerous offspring, tabulating the results carefully in order to arrive at a consensus. It is interesting to note that there are matching coloured foot feathers with the one coloured flight feather
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further solidifying the linkage. The conjoined Bellneck and Heart Traits are obviously recessive to their respective white areas in the pied factor scheme of things. Half siders are common in this cross also. Note that the shell crest most likely was also carried recessively by the Lahore. Breeeding test by Anwarul Kabir of Bangladesh.

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It was stated on one of my Genetics Facebook Groups that it was easy to identify Dominant white flight gene and recessive white flight gene expressions by phenotype. Some have said that the same rule applies to Dominant and recessive white tail colour.

Paul Gibson states in his Book that White flight is a **Dominant**., and white tail is a **Variable Dominant**.

You may have seen it stated that a Dominant white flighted bird will produce hetero white flight young that have only two or more white flights starting with the very outside primaries first. In the case of recessive white flights (if they actually exist)., their young from non-pieds should show no white flights in the (f1) generation. In the (f2)'s , or from a back cross (B1) generation the white flights are said to occur sporadically within the primaries but not the outer two or three flights. Below are examples of Pied to pied, that had one parent white flight and one parent coloured flights : Picture number (1) pair are offspring of a Lahore X Saxon Monk cross and led to : photos (2), (3), (4) and (5). The original Lahore cock had a coloured center to his tail and of course coloured flights. The hen was a Saxon Monk , of course with white flights and tail rectrices. Their offspring, photo (1) (f1s), were mated together, and their offspring photo (2) = (f2 generation). Then their offspring mated again to siblings = (f3 generation) photo (3). Note the increase in both coloured flight and tail feathers. (one would expect the Dominant Flights and white tail to increase).

(1) (f1's)  (2)(f2)  (3) (f3) 

A subsequent out-cross of the (f2) to a blue white tail Roller produced the blacks with outer tail and flights white #'s (4) & (5). Here the Roller would likely have had a Variable Dominant White tail and Dominant flights.

(4)  (5) 
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Below is , again the Grand Dam of the above Dun Bars photo 3 , and mated to a Blue T-Checker Feral , she produced the two black sons hetero for "Partial Dominant "Baldhead and both with partial white flights ,and one with partial white in the tail. Both lack the white belly band., but have mainly white foot feather linked to the white flights.

A subsequent cross of one of her Dun bar sons to a Barless blue (non-pied) Racer produced Monk head - marked young with the same Mookee type white flights, and completely coloured tails. The Racer may have carried a pied gene.

PHOTO SHOWCASE

(1) Paul Sulja's . Blue Bar Shakh Sharli Design with Dark eyes and cheek patches .

(2)The Gazzi Design of the Prachen Kanik with white flights and a blaze face. Mick Bassett.

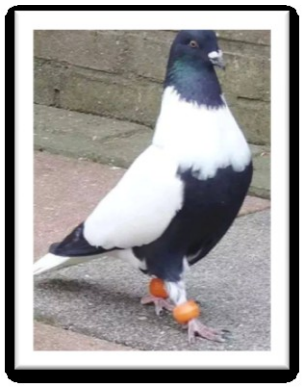
Shield Cropper photos by Jerry Sindelar .

Black Saddle Champion hen -Garry Glissmeyer . Blue Gazzi photo Layne Gardner .

Very beautiful phenotypes of halfsider Satinettes by Shoibal Sabbir in Bangladesh missed last Issue.



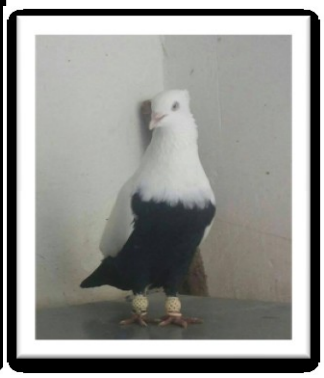
The "Half Sider" is often categorized along with the Mosaics ., but in this case whereby one wing is white whilst the other is coloured, and the fact that this trait is much more common than any of the Mosaics, suggests that it is something completely different. These are Afghan Musafeer Pigeons. By standard ideally half-siders, but related different phenotypes are retained and used in the breeding program. Below are two Breeds with unique phenotypes. Enes Cetin , Pakistan.




(1) Zia Rehman Pigeon (2) Enes Cetin Pakistan

Birds below owned by Enes Cetin of Pakistan , he could not give details as he does not speak English.





There are a number of examples that demonstrate that an actual "PIED" factor may not be responsible for some birds expressing white feathers or even large white tracts combined with coloured areas. There can be a range of reasons for such phenomenons. In the case of the above photos we suspect at

least one reason may be a "grizzle " trait that when combined with Spread factor and centuries of selection, results in an almost entirely white bird save the underbody and tail that lacks all indication of that trait.

Recent comments from You ! **{ PLEASE TAKE NOTE : In the following email there are a variety of terms used in various ways that we do not normally use when speaking about our Domestic Pigeons . The writer Hein Van-Grouw uses them primarily as he does when referring to other Bird Species in particular}.**

Dear Bob (if I may),

At a friend's I recently read the PGNs about Leucism. The complicated information was very well presented what hopefully helps fanciers to understand the matter better.
A few comments, however, on the Introduction by Jith Peter.
Piedbaldism and Leucism are, in my opinion, the same and therefore it should be better to use the one term; Leucism. Leucism can come in 100% Leusism (self-white) and partial leucism (marked patterns ('piedbaldism')) and the white feathers are the result of the way the early pigment cells (fail to) migrate into the skin of the embryo.
In all forms of leucism the pigment in the upper layers of the eyes is affected (as these come from the neural crest), but not the pigment at the back of the eye (they derive NOT from the neural crest and therefore Leucism does not affect these). Therefore self-white pigeons (100% leucism), and marked birds (partial leucism) with white areas on the head have dark eyes due to the dark pigment at the back of the eye which can be seen through the transparent iris tissue.
In Jith's explanation Leucism is a form of dilution (weaker color (see PS). In Leucism, however, from the Greek Leukos = white, the affected feathers are white without any melanin pigment, due to the absence of pigment cells in the affected (skin) areas.
At the 27th of October 2016 I send you (in fact Axel Sell, but you're copied in) a paper about Leucism (in the raven) and I wonder whether Jith had seen this (based on some of the info in his introduction it seems he had seen it, but from other statements I would think not).
I've attached another paper, fyi, about the most common colour aberrations found in birds in the wild. You'll see that all of these mutations are also present in our pigeons. Again, what I call dilution is different from what is called dilution among pigeon fanciers; the latter is what I call a dark form of Ino.
And Ecru in pigeons is probably the light form of Ino
Best wishes.
Hein

PS, note that Diluted in my definition is different from Diluted in pigeon terms (we discussed this before: *In my definition Dilution is a quantitative reduction of pigment. Brown, for example, is a qualitative reduction. What is called dilution (and pale) in pigeons is also a qualitative reduction.* ***Milky, for example, is a quantitative reduction and therefore, in my (and others) definition, Milky is a form of dilution*).**

(Editors' comment) If we could place dilution ., pale ., milky., ., and all other mutations where we see a depletion of either eumelanin or pheomelanin or both, under the umbrella of a single locus named (Qualitative reduction) or (Quantitative reduction), then we would agree with Mr. Van-Grouw's idea. However; especially in view of the fact that some of these Mutations do not appear at the same locus

nor even on the same type of chromosomes, we cannot in all practicality, lump them together for that similar characteristic under the name dilution, particularly when dilution has a well established specific designation and locus positioning.

Below is Jith's statement to which Hein has responded earlier :

Leucism is a condition of depleted pigmentation that is marked by overall diminished colour or patches of weaker colour and this is caused by a genetic mutation which inhibits melanin and other pigments. The pigment cells in the eyes are not affected by the condition because retinal pigment cells are derived from another source, not from the neural crest cells . In the case of the Albino, it effects pigment production in the eyes. NOTE: Most of the pigment in the Iris of the eye IS produced by the neural crest . SEE November 2016 Issue . (BR)

I discussed Hein's remarks with Jith ., Jith had given a summary in general without being particularly specific about any or all of the facets involved, however Jith does stand behind his statement that leucism and Piebaldism are not exactly the same thing., this was researched on the net also and consensus is that the names do not describe exactly the same thing.

Hein has also written about a very interesting trait that is not used or considered by Pigeon Fanciers. It is much more common in other Bird Species where the WARM colour Pigments of true RED , Yellow , and Orange exist. Columba livia does not have warm colours such as those, but the gene he mentions most likely does play a significant role in variations we see regularly but which hitherto now, have not been well explained. That mutation is "ino". You may want to picture it as an albino, without the "alb", It could explain the lemon trait. Here is his explanation of that trait.

(ino) by Hein Van-Grouw

Ino is defined as a strong qualitative reduction of both melanins. In contrast to **dilution** (where the chemical composition of the **melanins is normal**, but their **quantity is deficient**), for ino mutations both melanins are produced in normal quantities, but are incompletely oxidised, resulting in brown eumelanin and pale phaeomelanin. Ino seems to be connected to the same gene, located on the sex chromosomes, in all species. The relevant gene also appears to mutate easily, as different mutations (alleles) from that gene are known to occur in many species. Depending on the relevant allele, the degree of melanin oxidisation differs but the black eumelanin can vary from dark to very pale brown, while the reddishbrown phaeomelanin is always very pale or even hardly visible. In the darkest forms of ino the incompletely oxidised eumelanin may produce the same colour as the mutation brown; but ino can be distinguished from brown in that the phaeomelanin is also reduced. In species without phaeomelanin, ino can be distinguished from brown by the bill and feet, which are always pink because of the absence of melanins. While the darkest forms of ino resemble brown, the lightest forms resemble albino. In the latter, the phaeomelanin has almost disappeared and there is also hardly any oxidation of eumelanin, so that black becomes a very pale brown. In fresh plumage, colour and pattern remain just

visible, especially in the plumage parts that normally have the highest eumelanin concentration; but worn plumage is heavily bleached and thus almost white. In ino the eyes are reddish due to the reduction of melanin, Any adult bird in the wild with 'white' plumage and reddish eyes is thus an ino and not an albino. The inheritance of ino (both the light and the dark forms) is recessive and sex-linked so only females will be found in the wild., but the eyesight of an ino bird is much better than that of an albino.

Hein says " Ecru" (lemon) is probably a light form of "ino". I mentioned this to Dr. Lester .P. Gibson, and he agrees. This would make a great deal of practical sense given discrepancies found when testing "Lemon", which led a number of Breeders to speculate that the gene was not an allele of our dilution but rather another sex-linked recessive located at a locus near to, attached to, or overlapping the dilution locus. This also may explain why tests involving two different species with a similar mutation would suggest that both were forms of dilution and therefore thought to be alleles, when in fact both may have been Ino instead. First we must establish its relationship , if any , to our dilution. I sincerely hope that several can now test this new theory.}

(1) Lemon Bar, (2) Khaki Bar, (3) faded dilute ash Bar, (4) Dilute ash bar split Lemon, Gary Boomershine. (5) reduced recessive red, Jijo Thomas.

We wonder if "ino" may actually explain a wide array of slight phenotypical differences in Base colours that are not yet fully understood. First that comes to mind right away are the differences in "silver" (dilute blue) birds that may range from almost normal intense blue , to a very light silvery dun patterned specimen provided Our accepted dilution mutation and (ino) can express together. These were talked about back as early as the 1800's by J.C.Lyell to as recent as Paul Gibson's comments on the internet.

True silver(1) Bob R., Other dilute blues (2) Attaullah Saleem ,(3) & (4) Bob R. (5) brown Bassett Photo.

Some variations may simply be caused by modifiers such as Dirty Factor (V).

Next Month we take a closer look at the Breeding program of Tyller Milan and his pencilled Strassers .