

The Pigeon Genetics Newsletter, News, Views & Comments.

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(Founded by Dr. Willard .F. Hollander)

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This Month , another "PEEK AT PIEDS"



There was a study done years ago by **Alan Zuschlag** and joined by **Willard Hollander** and **Paul Gibson** regarding the Markings of the Lahore Pigeon and the Gazzi Modena. The breeding program was set up to determine whether or not the two were alleles. Those of you who are new to this , an allele is a mutation at the same locus on a chromosome that results in a somewhat different version of the original mutation from wild type and thus a new genotype as well as a new phenotype.

My understanding of the Pied mutation is that it is simply the appearance of some white feathers on an otherwise self coloured Pattern series bird OR a solid coloured bird in Pigeons. The multitude of different markings that are possible have been selectively manipulated over the years to create many 'man-made ' white on colour arrangements. Wendell Levi first referred to these fixed markings as "Designs" , but somehow most people still called them Patterns. This becomes confusing as we already have the term Pattern to mean the series of colour hues on the shields of pigeons in Bar, and Checker "Patterns".

SO, we will refer to all fixed arrangements of white on Colour as Designs from now on in this Newsletter.

Now , is it possible to consider any one of these fixed Designs as an allele of any other specific Design or are all variations of Pieds actually just one specific mutation expressing variably? We know some pied traits are dominant, while still others are partial dominant genes and some are recessive to wild-type.

Below I have reprinted some of the original talks on the subject but have replaced 'Pattern' with "Design", the arrangement of white on colour. Some people believe that there are various traits that are white on colour while others are colour on white, we will try to sort all of this out :

In the December 2005 Issue Pigeon Genetics News, Views, & Comments, **Dr. Richard Cryberg** wrote ,
"excerpt by Paul Gibson":

" Every nucleated cell in the body has all the genes. But that does not mean that every cell is capable of making pigment. As I understand it, the pigment is only produced by a special class of cells in the neural crest of the developing embryo. These cells then migrate to various points in the birds body where the melanocytes produce pigment. If the genes controlling this migration dictate that no pigment cells migrate to the wing tips, then the wing tips will be white. The same is true for any piebald or white area no matter if it is gazzi, saddle, or recessive white. This is not theory , it is fact! And is true of not just birds but of animals also."



2024 Champion Gazzi Modena Blue Hetero Ts Hen Bred and owned by **Mohamaad Alfouderi** of Kuwait
and 2024 Champion Schetti Modena young hen 97 pts. bred by **Terje Eljervik** at the Norwegian
National.

The Gazzi Design was found to be recessive to non-pied and many breeders mate Gazzi to Schetti non-pied to create their best Gazzis , but of course this takes several crosses back to Gazzi and plucking is often needed. Gazzi Design was also found to be an allele of recessive white so that the F2 offspring were found to be produced in a ratio of 1:2:1 , One - gazzi, : two of an intermixture, : and : one white.



Photos by Owner / breeder **Anwarul Kabir**.

Anwarul got Tail marks from some of his matings as part of the intermixture it seems.

Lahore X Swallow Study bred by **Anwarul Kabir** .



Hen same bird after moulting =



The Lahore X Swallow cross reveals some traits very similar to those that come from Lahore X Baldhead. Usually the young are predominantly white with a coloured cap that may extend part way down the back of the head. The shields will be mainly coloured. Flights and tail feathers are usually all white with the odd coloured feather.. Muffs are white matching the flight feathers, which clearly shows a linkage between the two. Bishop wing (white along the lower edge of the shield) is common.

The Lahore in his test may carry shell crest as some young had crests, if I have the facts right. The Swallow hen is not correctly marked for a Swallow so that too is a factor in the type of results.



Lahore X white head Design Saxon Monk, tests by Bob R.



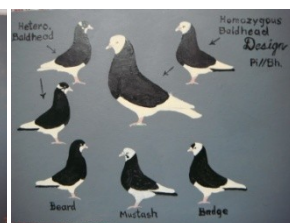
The offspring of this cross were virtually identical to those produced by a number of other Lahore X Baldhead pairs. Usually the white extends further down the back of the skull and well down into a deep beard on the breast. Some offspring will have a coloured spot or cap on the top of the head and this may also have extension down the back of the skull. The forehead is almost always open/white. Flights and muffs are mainly white in the order from the outer most flight showing a dominant trait. The tails are usually all white with perhaps a few coloured feathers. This may be outer edge if colour had been extended along from the hocks, or center tail if the colour had extended from the cushion. Here is a son from the full siblings above that shows the influences of the original Lahore X Monk cross. The slight cap on the head and coloured tail patch both coming from the mismarked Intense /dilute mosaic Lahore originally used. The dominant white flights and the extra large muffs coming from the Monk hen. He should be homo Ts1 at least but does not show it.



All but the last two of the above were hetero Ts, but seen in the bar, in hand only.



Possible component designs of the Lahore



Various types of Baldheads .

When the baldheads were mated to non-pied Feral checker pattern birds the offspring showed typical hetero baldhead markings along with the dominant 'mookee' marked white flights. However this is hetero baldhead whereas the Mookee is a specific white flight fixed trait usually consisting of just two white flights.



Breeder - Bob R. (hetero baldhead) Pi,Bh//+.

Photo - **Levi.** (Mooke)

Tests with the homo baldheads above mated to baldhead show Rollers, produced Shield Design with and without caps, and baldhead with and without forehead spots, coloured underbelly and some coloured tail feathers plus full dominant white flights and matching foot feather.



In the Newsletter Dec. 2005 **Paul Gibson** : Excerpt Bob R. - {Paul } wrote - "In some of my research I worked with Baldhead in several breeds, a little with Swallow {Design}. quite a bit with Lahore {Design} and some with the Helmet {Design}. I found as listed in literature that the (Bh) gene produces a Baldhead phenotype. I suspect that some Pied colorations are the result of one or more genes or are modifications of other pied colorations.

Working with Baldhead has led me to be convinced that the Classical Baldhead is made up of the action mainly of three genes. The (Bh) gene produces the white head, the (Wf) white flight gene produces the white flights, and a recessive gene for white tail produces the white tail. When these are combined the belly and legs usually are also whitened. I crossed hetero Baldhead to Lahore and produced all homozygous (Bh) phenotype F1. F2s also were 100% Baldhead ??????

The Lahore {Design} has been batted around and those that have worked with it feel very strongly that the {markings} are the result of three genes. As listed above the Swallow {Design} is recessive. The Helmet {Design} is recessive and produces some helmet {Design} from F1s but these need work to bring them back to showable Helmet {Design}. Usually they have an area of colour mismarking their backs."

Editor Bob R. - I think we can consider five (5) different designs to make the Lahore design: (1) Shields, (2) Coloured flights., (3) Cap , (4) forehead Spot, (5) Bellneck. Below are some instances whereby various Designs have been produced that do not present exactly as expected:



White head white flight bred from a line of normal Baldhead Show Rollers , **Barry McPhee.**



Bred by Bob R., this Canadian Show Roller is a Baldhead but on this side he is virtually a "saddleback" or Magpie Design with a recessive white tail. On the opposite side he is typical coloured shield with white flights of a (Bh) Roller. This Design will often also have a coloured forehead spot. The baldhead design may also have moustashe markings extending from each side of the beak gape just under the eyes.



Bred by **Anwarul Kabir** - This is an example of the Lahore X Pied Indian Fantail whereby the Shields, back, and an oversized Bellneck marking combine leaving the rest of the bird white. The open breast and underbody of the Lahore have converged with a very deep beard of the lower Baldhead marking. This is somewhat close to the Saddleback markings of the Australian Saddleback.



Breeder **Manuel Alvernaz** - A similar effect where again the Bellneck area is attached to the back and shields, in this case we would usually call this simply a "splash". The white wing butt and thumb feathers extending along to the secondary and Primary flights is usually referred to as "Bishop or bishoped wing" on particularly a bird with body colour.



Srk Shawon Owner- The Magpie Design with a white band that looks like hetero Baldhead, however these breed true for the trait. They are Baldhead but with a forehead SPOT



Now for analysing the genetics here , only the first backcross and the true F2 are useful, unless more detailed info is given. So I think you need not go beyond B1 and F2 for PGNV&C.

Your true F2 consists of only 3 young. None of these was self colored (all were pied).

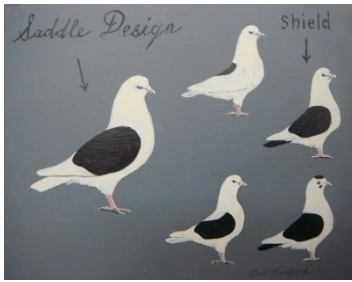
Your backcross B1 from Lahore hens and also from Lahore cocks gave no self-colored young (all were variously pied). The one "almost solid colored" may be considered an extreme variant of Gazzi, but very puzzling from such a mating. (How sure are you of the fidelity here?)

In view of the amount of mismarking in pure stocks of Lahores and Gazzi Modenas, I think we must recognize that the basic mutant genes are easily "disturbed" in producing the phenotypes, most likely by modifier genes of totally unknown nature, but perhaps also by the varied early embryo' environment (temperature?), also totally unknown so far. Guy Marlar may have some comment on that . ---

{ Bob R. Editor's Note }: I bred many Lahores over many years and noted that my best marked birds were always produced during the cold winter months. It was much more troublesome because the parents did have difficulty keeping the squeakers covered before they had enough feather cover to hold their own heat. Lahore X recessive white produced whites and Saddles so the white carried saddle to match the Saddle design within the Lahore design, and the Lahore recessive white seems most likely.

Here are charts that I made for Newsletters a couple of years ago





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Back in 1998 Tim Kvidera wrote in the December Issue :

Hard to believe that it has been five years since I shared any of the results of my Saddle markings project. I had mentioned that of the 77 F2s there were 4 well marked saddles, 3 saddles with colored tails., 42 assorted pied birds, and 35 selfs. I have since produced 50 backcross offspring from F1s to saddles and found the results listed below.

| Results                                  |                   |                |                 |
|------------------------------------------|-------------------|----------------|-----------------|
| F1 (from saddle X self paired to saddle) |                   |                |                 |
| Pied Splashes                            |                   | Saddles        |                 |
| w/white in tail                          | w/o white in tail | all white tail | w/color in tail |
| 4                                        | 23                | 10             | 13*             |

\* of these 13 saddles with color in the tail, six (6) had less than 1/3rd. retrices colored.

Tim's thought as to what that means was that the shield marked version that is called 'saddle' in Fantails, and other breeds, is caused by multiple genes. That there must be a dominant gene present for pied to get white onto the bird. Then a recessive gene to produce the whole white body, and a third gene to produce the white tail. He states that the white tail gene is a variable dominant and probably linked to the white body gene.

Editor's Note: { We know that it is possible for a recessive gene to place white into a self or solid coloured bird to be carried hidden. The development of the various recessive to wild type, pied phenotypes would all depend upon artificial selection. I do not think we require a gene for an all white body in order to have birds with a coloured saddle, coloured tails , coloured flights , or coloured head etc. }

Paul Gibson found the white tail to be a recessive gene.

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In the June 1999 Issue , Letter from Layne Gardner :

The other difficult area is the whites. Some of the genes that cause white are Dominant, some are Partial Dominants, and some are recessives. Some are only expressed in the presence of other genes such as the recessive red gene. And like recessive red, may be epistatic to color. As intimated, there are many types of white and usually one cannot be told from the other without testing or knowing the genetic background. Quinn (1971) suggests that there are at least 40 separately caused whites. Since white is the absence of color expression, it masks all the other color expressions in certain areas, indiscriminately in various areas, and even over the entire bird.

{Editors Note} Quinn also stated in his booklet that there are two types of epistasis. One whereby a colour gene "masks" that of another, and the second is one that stops all color production in the skin and feathers rendering them white, which is quite different from the former. I also believe that it would be quite easy to find more than 40 distinct pied designs in Pigeons.



When we consider the comments by Richard Cryberg at the beginning , and everything we have seen in these study reports , plus the definition of an allele, I hesitate to conclude that any of the actual Designs of White on colour or colour on white are alleles of one another. There may be an allelism between a Dominant Pied Gene , a partial Dominant Pied Gene and a recessive pied gene, but only the fact that they are each a different version of the Pied Gene mutation from Wild type in reference to their dominance, rather than in their effect on the overall phenotypes produced by each. They all still express as some white on a coloured base. Their arrangement of markings / placement throughout the feathering and skin of each bird is selectively created artificially by mankind by combining the three

versions of the inheritance of the pied expression plus modifiers that restrict pigment production and not as a result of the arrangements being mutated into a completely different expression. Perhaps we first must correctly identify and name the locus where the "Pied" mutation takes place as "Leucism". All creatures sooner or later can have a leucistic gene mutation occur in an offspring, including humans. It invariably expresses on the head area first and through inbreeding expands to other body areas such as the stomach, legs and feet. The expressions are irregular. Natural selection rarely gets to take place due to predation in wild settings., so it is only through selective breeding that 'fixed' designs are produced. These may involve any Dominant, partial dominant and recessive gene versions of the mutation. All other phenotypic variations would be combinations involving these three along with factors that restrict pigment production.



All painted charts by Bob R.



so, which group represents colour on white and which represents white on colour?

Both are the direct result of Pied genes on a self or solid bird, some recessive, others partial dominants or dominants. There may actually be two types of the Baldhead gene with one a partial dominant and the other a dominant as Michael Spadoni of Australia has previously pointed out in Trumpeters..

Can we determine a difference based upon the amount of white versus the amount of colour showing?



Above are two birds that are full brother and sister. F2s the result of Baldhead X recessive white. Bob R.

Then below a white hen with a black patch on her vent area that also has a small splash of black on her neck on the opposite side. Obviously both the above blue bar and his black splash sister below are genetically Baldheads but do not express as such. They are genetically more colour than white as baldheads but phenotypically more white than colour. Ironically the dominant and partial dominants have less effect of "whitening" even in the homozygous state than do the recessive genes. Therefore it is problematic to state that any are colour on white genetically. {Bob R. breeder}



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The Last word goes to Dr. Lester .P. Gibson - Exerpted from his letter to Alan-

"I crossed Lahores with solid- colored Kings and got F1s that were nearly solid- colored with usually a white head spot and whites with a colored head spot. ( The Kings were carrying recessive white.) The F2s showed NO Lahore {design}. One B1 was nearly perfect Lahore {design} but most were variously pied.

When Lahore was crossed with a heterozygous Baldhead, the resultant young were mostly "apparent" homozygous Baldheads with a few heterozygous Baldheads.F2s and B1s from these have all been Baldheads ( a few heterozygous) and no Lahore {Design} A few of these Baldheads also have the dark head spot, thus producing a head coloration similar to the Koros Tumbler. (Interestingly when I crossed Helmets with Baldheads, I got 100% marked like the Koros Tumbler.

Your comments about gazzi being a cleanly segregating recessive {design} is not quite true. Oh, gazzi segregates generally as a recessive all right, but not cleanly. The gazzi segregates have a lot of mismarks especially over the breast area. Of course , most breeders that show gazzi have to pluck a lot of these out on the show floor anyway.

You state , the Lahore {design} evidently is a combination of 3 Piebald {designs} that are "glued together" through selective breeding. The head spot, bell neck, and wing shield that are "stretched" to form the Lahore {design}. This sounds like a very good analogy. I have not run a test yet but my results strongly indicate that the head spot is probably the same genetically as that on the Swallows. In fact, if you artistically add a good bell neck {design} to the Swallow {design} you get a {design} similar to a poorly marked Lahore.

I intend to mate Swallows to Lahores this season to see what results. One last thought - in my backcrosses of F1 to Lahore a number of mismarked gazzi {designs} appeared. Question - were the Kings also carrying Gazzi ?????

We all owe you a great deal for adding to our "understanding" of the Lahore {Design} Keep up the good work." Genetically questing, PG.

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Next Month A special issue on the "Silky" gene by Hein Van Grouw of England.

Then in May Co-Editor Shoibal will bring us a look at "Taking Flight with grizzles" - Bangladesh Highfliers.