

The Pigeon Genetics Newsletter, News, Views & Comments.

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(Founded by Dr. Willard .F. Hollander)

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{ Special thanks to all those whose photos are presented to demonstrate the information }

The first two issues this year dealt with , The "colour locus Base pigments" and then The "Base patterns". This issue we take a look at a Modifier of Both Colour and Pattern that continues to keep Breeders guessing despite a couple of centuries of believing that we understood this Modifier Family.

We will be discussing the '**grizzle Family**' ! This locus on the non-sexlinked chromosome causes two separate stages of its effect. One stage is the impure or heterozygous state , while the other is pure or homozygous state.

The effect of the **Family** of grizzles is to cause pigment loss such that some or all feathers are partially or completely void of pigment expression. The reason for much confusion among opinions of Breeders is that, depending on the base colour , the base pattern and perhaps other modifiers , the various allelic grizzle effects may look quite similar to one another or to any separate combination of an allele and other traits.

Dr. Willard .F. Hollander did considerable work with this locus and consulted back and forth with Dr. Lester .P. Gibson. Hollander's tests revealed that Tiger grizzle was the original mutation and that all other grizzle traits of this family mutated from it. This has never been proven in the Lab by certified Geneticists , so the premise remains a topic of doubts and suppositions .

The **Tiger grizzle** trait was given a symbol of (G^AT), capitol letters to denote Dominant. The gene is distinguished in the nest by birds that are hetero for the trait as having mainly a self , solid or pied phenotype with additional 'frosted lacing' effect on the outer edges of feathers particularly on the head , neck , and wing shields. This frosting appears on any of the self patterned colours as well as any of the solid coloured birds. When the first moult takes place , these frosted laced feathers almost always grow in pure white in a somewhat '**MOTTLED**' arrangement with self whole coloured or solid whole coloured feathers. The flights and tail feathers remain self or solid coloured depending on the presence or absence of spread factor, self, non- spread or solid spread factor.

The general rule is that there will ideally be an evenly expressed checkerboard mix of pure white and separately coloured feathers over all except the flights and tail . When a pied trait is present , or in some cases as the birds age , the white may express in the flight and tail feathers but for some show stipulations is undesirable. The homozygous state is nearly pure white with the typical '**tiger**' flecks or stripes of coloured feathers, and at most European shows not eligible by standard.

Now let's take a look at some of the typical expressions before moving on :

Tiger grizzle

Here is a perfect example of Blue series Dark Check Pattern heterozygous Tiger grizzle that happens to have kite bronze. The bronze factor resists the whitening effect of the grizzle gene and thus gives an expression similar to Classical Grizzle salt & Pepper as opposed to the distinct pure white and self or solid coloured feathers of the true Tiger grizzle. The key clues of Tiger grizzle are the increased amount of white at the front half of the bird and the (in this case Self) coloured tail and flights. This sort of tri-colour phenotype also sometimes gets mistaken as the Stipper gene (almond) phenotype.

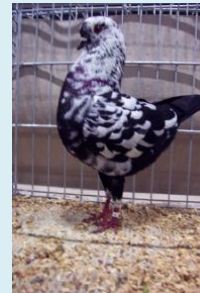


^ Heterozygous Tiger Blue series T- Pattern with kite bronze - "**Pigeon Galery**". {Gallery}



^ Heterozygous Tiger grizzle T-pattern without bronze - "**Kalifa Lalit Khan**".

Spread, (1) blue/Black pepper head - **Jesse Sciberras**. (2) Juvenile hetero Tigers - **Terry Lovelace WCRC**. (3) Adult hetero Tiger grizzle Mottle - photo by **Mick Bassett**.



Below is a spread factor Tiger grizzle showing the typical solid colour interspersed with pure white feathers, again with most of the white toward the front half of the bird and having the flights and tail feathers solid colour. Photo **Michael Spadoni** Australia. Note the speckled head and frosted wing shields of the youngster, the hetero recessive red effect will probably disappear with the moult.



Below are selectively bred variations of the Tiger grizzle gene .



Here is a youngster showing the typical shield 'frosting' of a tiger grizzle, but already the Timisoura Tumbler (Ttg) has white as the primary expression on the head and neck which would be frosted on base colour in the case of a standard Tiger grizzle. . The frosted feathers will also moult in as pure white feathers. Photo (1) by **Michael Spadoni** of Australia. (2) by **Michael Spadoni** . Sometimes a white feather overlapping a coloured one will look a bit like a mixed grizzled feather in Tigers.



(Ttg)



Ozay Ozzy {Butterfly}



Danish Tumbler (Dtg) - **Levi**.

We also mentioned that like most modifiers , Tiger grizzle varies greatly depending on a host of reasons from the base colour , to the base Pattern , as well as any other modifiers or combination of modifiers that may be involved. The main effect is de-pigmentation . The de-pigmenting action does not work well on the bronze factors just like so many other de-pigmenting modifiers such as Stipper , reduced , and the Opals but does easily depigment ash-red . Here is a bird from **Levi**., It probably owes some of its colour to a bronze . , "may be Classical G." or even "pencil" , but is labelled as an Ash-Red Tiger.



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Below a comment from **Gene Hochlan**:

" The various types of Grizzle that we recognize are not all that complicated until they are combined, {some} are probably a combination of Typical and White Grizzle. That is what most "Bandits" are." **Gene Hochlan**.

{Note: "Bandit" is a name given to a famous Light Grizzle Racer male, I cannot find his photo but do have it here}

Below Hetero Tiger/ mottles on Spread blue/Black- **Mother's Pigeon Loft Ctg.**

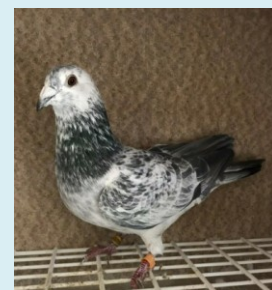


Below is a blue bar show King that is heterozygous for Tiger grizzle (G^AT) . We may not see them as often due to the fact that Breeders tend to use Spread factor when breeding Tigers in order to get the much more pronounced contrast of solid black feathers and pure white feathers. **Mick Basset Photo.**



Classical Grizzle

The main Mutation that followed from Tiger was the CLASSICAL GRIZZLE with the symbol (G). This trait is a partial dominant in that the heterozygous state has only a minimal overall effect on wild type. This heterozygous state is referred to as 'salt & pepper' to denote the finely dispersed white ticking throughout the base pigment expression. The entire clumped patterned bird including the flights and tail feathers have some of the grizzle effect. The general rule here is that the more dark pigment, the less effect the grizzle trait will have in all stages. Therefore modifiers such as Dirty, and smoky will resist the grizzle trait right along with the checker patterns and spread factor. (1) hetero (G) spread blue /Black - **Levi**, (2) T-pattern Grizzle head - **Dennis Murphy**, (3) Dark Checker - **Slam Alali**



(4) hetero Classical Grizzle Blue bar, Salt & Pepper Bob R., (5) homo (G) Storked - **Marlo Reishus**.

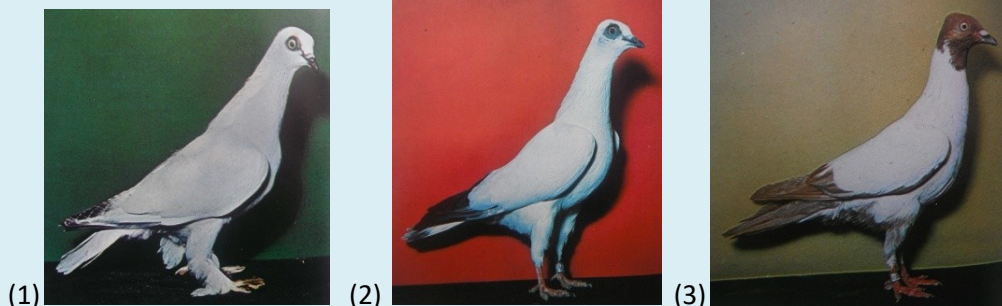


The homozygous state creates an almost pure white bird with some colour pigment in the tips of the flight and tail feathers and in some feathers of the head giving way to its popular name of "STORK" or STORKED to coincide with the markings of the wild bird species - the Stork.

The young of the Classical Grizzle appear about the same in the nest as they will be in adult feather with only slight darkening in colour tone. (1) hetero (G) -**Josef Franz**, (2) homo (G) stork - Bob R.



The name Stork , or storked normally stands for the homozygous state of Classical Grizzle , however we see various versions of the trait as the following photos demonstrate. The first one is usually seen as homozygous Classical Grizzle , the second one is seen as a pure version of Print grizzle and the last one as a pure form of the Vienna Tumbler, (possibly a form of Tiger grizzle such as the Danish Tumbler.)



Photos from **Levi's Encyclopedia of Pigeon Breeds**.

Some have been of the opinion that the type of Classical Grizzle seen in the FRILLBACK Breed is different than that in the Dragoon and Homer Breeds etc. The reason for that is that it has been noted that there is no homozygous "storked" state in that Breed. However after we reported on that in an earlier issue , a member wrote to say that he in fact had many Stork colouration homozygous Grizzle Frillbacks. It is possible that the standard Classical (G) trait had since been introduced . Some refer to the Frillback grizzle trait as Light Grizzle .

There was a lighter version of the Classical Grizzle reported by Tom Barnhart , but that is not what we see in the Frillback Pigeons. It is Light or Slight Grizzle : American symbol (G^L), German (G^S). There is a modifier called "eraced" , that seems to be present and causing these lighter expressions.



Photo /Owner Kawsar Moin SPLC.



Print Grizzle

NOW -- lets discuss the trait that no two people seem to agree upon. This is the "PRINT GRIZZLE" No symbol , it was thusly named Print by Dr. Lester .P. Gibson , and he stated in early issues of this Newsletter that the trait required much more study. It is usually associated with Flying Tipplers and other High Flyer Breeds. Here we see a pair of hetero Prints by **Purno Pigeon House**. They may be in nest feather and have homo Dirty factor. Note that they have similarities to juvenile Classical Grizzle in expression , but more 'laced' and less peppered than Classical Grizzle.



Below is a typical Blue Bar Print Grizzle by - **Ranjith Balram** . {As you can see coarse spread and clumped smooth spread are all but totally de-pigmented.}



We have shown some birds as Tiger in earlier issue that we now suspect may all be Prints in spread factor and also Brander bronze. **More on this in the Issue on black whitesides later in the year.**

Dr. Gibson stated that the Print Grizzle seemed to be "Classical Grizzle" that was also Tippler Bronze and Undergrizzle. Pied factor(s) often is /are involved. { However there seems to be a more SPECIFIC characteristic here which makes it a unique mutation unto itself.} The amount of colour on these specimens is more than we see on both hetero and homo (G) "Stork" birds. This involves the head {particularly the throat} neck, the flights and tail feathers. The expression becomes darker depending on which Pattern is involved of course. Now some have questioned why we never see a heterozygous Print Grizzle, We suggest we are showing you that state, first photo above plus #2 & #3 below. Dirty, smoky and Sooty may be involved in some in various combinations but they are all basically the same expression!

Photo credits : (1) Dhanmandi PLC, (2) Nadem Bappy P Pankhi GPC, (3) Asif Iqbal CTG, (4) Tom deMunnik, (5) Rob Grogan, (6) Raza Toor, (7), (8), & (9) Levi's Encyclopedia of Pigeon Breeds.



The Print Grizzles seem to have been selectively bred in many Countries such that specific arrangements have been fixed in various strains of High Flyers to create : Pseudo white side, pseudo Tail marked, and various other versions of the stork phenotype by mating only homozygous birds together and selecting, to a point whereby every bird in a loft may appear almost identical.

Below the first group are Print Grizzles that have been fixed to express colour on all but the shields and underbodies (1) **PBCPD Safiqul Islam Rubel / Sakib Asad** , (2) **Sameer Ali Khan Pigeons** , (3) **Raza Toor**.



Below are darker versions : (1) **Ebic Saci .**, (2) **Mehar Rustam** , (3) **Raza Toor**.



The last four photos of birds often confused with Tiger grizzle, are spread blue/Black Print Grizzles. (1) **Rahul Sayhay** , (2) **Raza Toor** , (3) **Adhor's Loft**, (4) **Raza Toor** .



Below Print Grizzles showing the throat "chuck" markings - **Atif Baig** Photo.



There are always contradictions or exceptions to any ideas that we may have, so it is probably wise not to make definitive statements, but one common trait specific to most Prints is a rather precise "CHUCK" at the throat of each bird, and called for in some Breed standards as a separate trait. A chuck is a patch of coloured feathers like a bib. You will note that it is normally present on most storked birds, except in the birds that have been carefully selected for some other phenotype. You will not see this chuck trait in any versions of Classical Grizzle. This to me eliminates the idea that Prints are just Classical Grizzles that sport other modifiers such as a bronze, and undergrizzle.

All of these birds lack any of the bronze traits. When bronze is present the tri-coloured birds are referred to as Torts, or Tortoiseshells. Tippler bronze is said to be a recessive trait that moults out to allow the white to take precedence. This is an idea that requires much more testing.

You may see dark neck areas on some heterozygous Tiger Grizzles. I think this is a different expression than the Print Chuck marking, however more investigation would have to be done to determine if that is indeed the case, or if indeed such birds are actually Tigers to begin with.



Racers - **Abdulah El Qafi** (Note solid underbody)

Meuleman Red - **Asas Do Alem** (not grizzle)

Below are a few exceptions to some of the generally accepted rules. (1) **Sialkoti Pigeons**, (2) **Abdulah El Qafi**, (3) ash Tiger? - **Hien van Grouw**, (4) Ash Print - Bob R., (5) Blue Tiger (6) homo Tiger black and (7) Hetero Tiger black pied and (8) mottled Brander (Print Grizzle) - **Levi**.



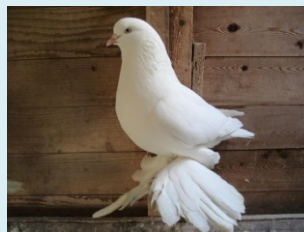
White grizzle

"Hello Bob, My experience with White Grizzle is fairly extensive as I bred Cumulets for several years and crossed them with a variety of colors. The best way to describe the phenotypic effect of White Grizzle is to say that it has double the strength of Typical Grizzle in whitening a bird. Heterozygous White Grizzle looks very similar to homozygous Typical Grizzle. **Gene Hochlan** ." { Note: 'typical' is used for "Classical" }

There are other grizzle traits that have been tested and reported : (1) is the White grizzle (G^W) or Dominant white (Wh) , this bird is fledged with some scattered coloured feathers that usually moults to a pure white bird and may retain a coloured beak or horn tipped beak ., and coloured eyes. They can easily be mistaken for homozygous grizzles of other types depending on base pigment and other factors which are not alleles . Below are some examples (1) **Kobutor Bazz** Pure Print, (2) **Sudip Bhadra**. Pure Prints. (3) **Levi** - may be connected to dominant white but not officially determined..



The Ash red birds especially spread factor homozygous ash combined with homozygous Classical Grizzle will produce pure white birds with clear beaks and usually orange or pearl iris eyes. These may be white in the nest with ash red laced shield feathers that moult out to white. (**Australian F G, Michael Spadoni**)



Homozygous Tiger grizzle combined with ash will also produce white birds with coloured eyes. The beaks and toe nails may be horn tipped or flesh, and juveniles may have scattered ash neck feathers which usually but not always , moult to mainly a white bird.



Ash-Red T-Pattern Tiger grizzle - **Zahid Pigeon House**.

Not grizzle locus Traits

Despite the word 'grizzle' in their name these are not alleles at the grizzle locus !

Photos of a bird bred by Bob R., progression of reversion from Undergrizzle plus Classical (G).

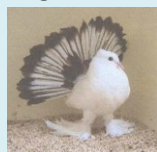


Two genetic traits that also cause variable de-pigmentation of feathers are : Undergrizzle , and Flash grizzle. They both emanate from the mid-rib (rachis) of each feather starting basally and radiating outward into the vane webbing of each feather. These traits are not alleles at the grizzle locus , and therefore may be found on any grizzle bird regardless of its mutation status. They both tend to visually affect the tail feathers as well as the flights both primary and secondary. Undergrizzle is a dominant autosomal (Paul Gibson) , and Flash is a recessive autosomal (Lynn Kraal). They may appear together on the same bird. All genetic traits affect the entire bird genetically speaking , but we may only see their effect in certain areas . Undergrizzle tends to lighten the entire bird, in some cases to almost white in the nest particularly in the homozygous state , but as the bird ages it's undergrizzle weakens so that reversion to normal base pigment occurs. Flash is only visible in the Tail feathers and the wing secondary feathers as false bars. The expression stays basically the same from nest to adulthood and beyond.

Homozygous (Ug) bred by **Jith Peter.**, Tail of heterozygous (Ug) Bob R., Combo Flash and (Ug) **PG.**



Flash grizzle **Paul G.**



The de-pigmented basal areas of feathers has a number of causes that in some instances may trick us into suspecting a 'grizzle' gene is involved. Here are some examples. (1) unknown trait on Lal band - **Jith Peter.**, (2) & (3) by **Adam Archer** trait unknown, from Australia by the way , not England as stated last issue. (4) Unknown by **Mike Bordelon.** , (5) unknown **Tristan Claypool** , (6) possibly hetero print and undergrizzle - **Sahroz Khan.** { Other known traits such as the "pencilled' gene could be added .}



(6)

Recessive whites with bull eyes may be masking any of the three base colours plus hetero or homo Tiger grizzle or classical Grizzle. The Classical Grizzles will fledge as white youngsters with as little as one row of tail cushion feathers laced in the base colour that moult out to a pure white bird.

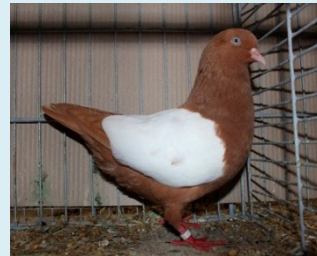
There are often cases where ash-Red , and recessive red birds become more white with age and may even tend to LOOK a bit like they are poorly marked whitesides. These may or may not express white feathers in the nest. They may be caused by a grizzle gene such as Classical Grizzle or (Ug) in perhaps combination with T-Pattern being masked by either spread factor and/or recessive red/yellow, or it may just be associated with the pigment production itself. Some examples below:



(1) washed out-**Arun Mathiramparambath** United PC., (2) (e) **Clint Robertson**, (3)(e) **Jith Peter** , (4) (e) **Anwarul Sabbir** . {There are additional genetic combinations that will result in like depigmentation}

WHITE WING and WHITESIDE

Black white sides have long been thought to be a type of Tiger grizzle gene that when combined with spread factor , would eventually produce a solid black bird that had white shields . The trait usually requires plucking to give clean cut lines to the overall design. Recently **Tom Ah DeMunnik** now a long time Canadian citizen from Holland, has been doing extensive work with the white side trait in both Blacks and Reds. **Bill Greenslade** also of Canada has been working with him. They have kept me abreast of their observations and have sought my opinions. Tom has compelling evidence that Print Grizzle is indeed the trait involved with Black white sides.. We decided that it would make a very interesting Issue unto itself , so that will be forthcoming later in the year. Photos here - **Mick Bassett**.



True recessive red and yellow whitesides are solid colour in the nest, and with the first moult begin to show the white shields. They are thought to have an "enabler" gene that causes the production of recessive red to malfunction during development of adult feather in the shield area. IF they should express white in the nest , they are not True whitesides and owe their colour effects to other genes which may include a grizzle trait.



Photo (1) **Kurt Goossens** Classical (G) recessive yellow, Photo(2) **Amit Kumar** - Print grizzle dilute ash red/cream or recessive red/yellow. **(White wings)** Below variations of shield and flights white.

(1) **Ikram Atif**, (2) **Ameer Hamza** (Print variations), (3) **Mick Basset** photo , Archangel ash pale barless.



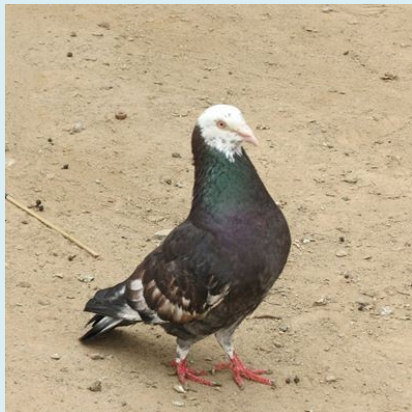
Unnamed Grizzle-like Trait



Photo - Christain Reut.



photo: Shaan Shanawaz.



Sadavar Singh. May also be combined with Undergrizzle etc.

This trait causes a heterozygous state that looks much like 'Pepper Head' , but does not seem to be a grizzle factor at all and therefore not an allele at the grizzle locus. The homozygous state resembles a Pi/Bh (Baldhead) trait. The gene is also different than the typical 'pepper head' in that it expresses the same on self patterned birds as it does on Solid spread factor birds. Some Indian Breeds that have the trait are also plucked to cause the moulting in of a white false bar or other pied-like phenotypes.

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That does it for another Month ., the April Issue will feature another family that still offers a great deal of confusion and debate . The "BRONZE FAMILY" ! This phaeomelanin (red pigment) family appears to have many separate genetic expressions that may or may not be individual mutations at a BRONZE factor locus. This will be explored at great length with your past input added to help sort it out.

We leave you with a very attractive phenotype that we believe is a Tiger grizzle T-pattern Tort, Indian Fantail that expresses a bronze gene that may be one typical of Indian Fantails , that is not Kite or brander. The tail band and wing flights seem to be expressing **frill stencil**, but not full expression..



Some may suspect Dominant Opal . This bird is owned by **Anik Anis** , and has been kindly shared with us to present to you the members. He had other photos that showed a better stance , but this one gave us the best view of the tail and flight colouration. ~~~~~ .

Here is a comment I made last Issue on the Sooty factor expression, and a reply by Robert Mangile :

" The type of pigment granules that are deposited here do not appear to be Coarse spread such as we see in the usual pattern series. Another clue is that the modifiers such as those that usually affect coarse spread, such as (Ts1) do not express on Sooty marks. However frill stencil , that will affect the smooth spread of the tail band, will express on Sooty."

**Robert Mangile** recently responded : Bob, " I wonder how the expression of the bird in the attached photo fits into your comment."



{ I responded by asking him if he ever saw this phenotype in the hetero state with the white shield Sooty marks in bronze ( Red) pheomelanin . }