The Pigeon Genetics Newsletter, News, Views & Comments.

(Founded by Dr. Willard .F. Hollander)

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This Month , February 2020 , we take a complete look at the "PATTERN SERIES" in Pigeon Colours.

You may have heard people exclaim that PATTERN applies ONLY to the wing shield of pigeons but that is just a segment of the expression . The entire bird is affected by pattern both genetically and phenotypically speaking.

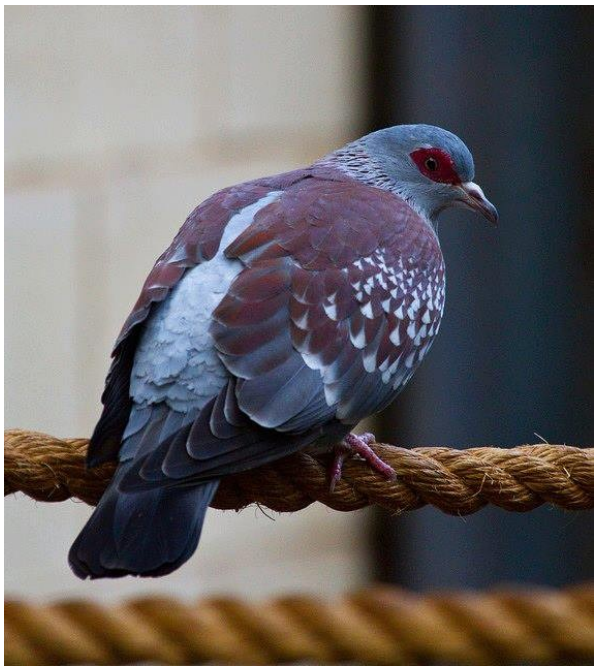
The Patterns have long been considered to express as a result of at least three distinct 'mutations' at the Pattern locus where wild type Blue Bar pattern is the base.. Last issue we mentioned that until as recent as work by Dr. Willard .F. Hollander , it was thought that spread factor was a fifth pattern. However , it is now generally accepted that the Patterns are : T-Checker , Checker, Barred, and Barless in that order of Dominance. The genes are autosomal (not sex-linked) . However as we will explore in this issue , they are not as 'cut and dry' as one would expect of distinct mutations, and perhaps the checker pattern was introduced and not actually a mutation. We find that there is a wide range of expression of the checker pattern such that we divide that trait into three categories : Light , medium and dark checker. Then we also divide the T-checker into a variety of expressions from Laced to Tic to fully saturated . Not all of these constitute separate mutations , or even mutations within a mutation. The more specimens that we study , the more continuity we see in the variations. Some variations may be due to slight changes in expression brought about by various modifiers, some of which may yet to be discovered, **others seem to be the result of deposits of more pigment being laid down by more copies of a stretch of DNA as pronounced by the (U of U) .**

The WILD TYPE Pattern has long been considered to be the BLUE, BARRED pattern. Dr. Paul Gibson once stated that he believed that the Checker Pattern may actually be the wild type and I suggested T-Pattern may be the original, and that all other patterns mutated from that.

The Blue Barred wild pigeons of the middle Eastern Countries across to Africa and regions in between , seem to have evolved as a form of 'colour mimicry' over centuries of living and nesting on the rock cliffs. The pattern blended in with the background offering camouflage so that any birds that did not blend in would certainly be picked off by predators like Hawks, thus culled.

Paintings by Bob R.

Dr. Lester Paul Gibson had put forward this idea of Checker being the 'wild type' , in an old issue of this Newsletter. Then you may recall that Jith and I printed an article in a more recent Issue . The information for that was sent to us by a member who had been speaking with one of the professors at the University of Utah. He did not realize that the university professors doing pigeon genetics tests did not want him to share the information, but by the time they contacted me , the Issue was out. That information had to do with their research into the possibility that the checker pattern was not a mutation from Blue Bar nor vise versa , but rather an introduced gene from another species called the Columba guinea or triangular spotted Pigeon. The subsequent study and published paper seems to show that C.guinea genes were indeed part of the Columba livia genome after they discovered different versions of the "Norrie Disease Protein" NDP gene , previously not associated with Pigeon patterns.



Columba guinea photo provided by n pigeons Facebook.

Another checkered pattern species in the wild is Columba affinis . It has been domesticated and crosses well with Columba livia and has been bred here in Canada. I would be very surprised if it was not also found in the genome of most domestic pigeons. It also had somewhat coarse bright red orbital eye skin and the checker pattern is identical to that of Columba livia domestica specimens..

Probably more relationships will come to the fore as Columba guinea also has other strongly expressed traits that we find now in Columba livia domestica. Characteristics such as a bronzing in the feathers particularly of the shields., Bifurcated neck feathers ., and coarse bright red Orbital eye skin or ceres. We do not think it would be a huge leap to postulate that these traits were also passed on from the C. guinea crosses to modern day pigeons.

We have heard people make the statement that the 'barless' pigeon does not have pattern! Of course it lacks the coarse spread deposits that create the Bar and checker effects. It does however still have smooth spread pigment on the flights and sub-terminal tail band , and the various expressions of clumped pigment and other deposits throughout all feathers. It is a proven allele at the Pattern locus.

Over the many years of this Newsletter , several Editors have dealt with the Pattern series and presented charts and photos to demonstrate the pigment applications in feathers that constitute what we call pattern. The 'fine' granules of smooth spread in one manner or another may affect the entire bird. However the 'coarse' spread granules are mainly found on certain areas of the shield feathers. More examination is needed to prove or disprove the idea that coarse spread pigment may be seen on the thighs, lower breast, and tail feathers of some birds particularly when selecting for several darkening genes. Let's take a look at some newer diagrams for a visual reminder of just what it is we are looking at when we take a bird in hand ! We have shown these in earlier issues also.

Below : is coarse spread of the Bar pattern, each feather would overlap to create a solid bar of base colour. Note : These are various feather expressions so would not come from one bird. Photos : The next 8 photos Bob R.

The checker pattern has deposits of Coarse spread, on either side toward the end of each feather starting on the outer edges and advancing inward , no diagram.


Photo(1) smooth spread sub-terminal tail band,(2) flight tip

Note : in photo 2 the #10 feather shows an outline of its overlying #9 feather when the wing was closed such that the sun faded the end of the #10 feather where it was exposed more, to appear as if we were looking down on two separate feathers.

Below are shield feathers of clumped smooth spread and slightly condensed deposits of possibly smooth spread caused by the Sooty factor mutation (So) on the center ends of each feather.

Below is a photo that may cause some to think that they are looking at a barless or at least a hetero barless specimen , yet this is a Blue Barred youngster that has not yet filled out all of its wing feathers . It is also Sooty factor that has not fully expressed yet. Note that there is strong pigment expression at the ends of not only the primary flight feathers but we can see a few tips of some of the secondary flight feathers that are expressing strong pigmentation. I recall a fellow on Facebook giving me a hard time regarding this topic. He thought that the full extension of <u>both</u> black bars was due to Coarse spread. He did not know that the top or first bar is indeed coarse spread throughout but that the second or bottom bar is actually less than half coarse spread pigment , the rest is made up of the smooth spread ends of the secondary feathers. This is much more noticable on ash -Red birds where the smooth spread is very light ash , and the coarse spread is deep brick Red. An old diagram by Hollander improperly drawn probably caused that confusion years ago.

Here we see an entirely ashy tone bird with just slight coarse spread 'RED' Bars starting to erupt.

Below the same effect only with a Blue Bar that is just starting to show the first bar pattern . Usually we can expect two nice evenly edged bars of good width , but genetics again plays tricks on us due to the occasional unknown factor or group of modifiers that will cause very short wide bars fading out toward the ends , or very long and narrow bars . Birds that are hetero for barless are said to be quite obvious due to the bars being narrow , particularly the top or first bar.

Now let's take a look at the 'gradations' of expression as we go from one pattern expression through variation to the next and onward:

Barless (mutation) > No coarse spread granules expressed - symbol (c)

Barred (Wild type) > wide even bars of coarse spread - symbol (C^+)

> Short thick bars no symbol.

> Long narrow bars no symbol.

> One thick , one narrow Bar , no symbol.

> third bar. (perhaps not part of the barred pattern series). , no symbol.

Checker (introduced) > extremely light , Shield feathers may nearly lack coarse spread , no symbol.

> light , Approx. 75% smooth spread and 25% coarse spread, no symbol.

> medium , 50% of coarse spread and 50% clumped smooth spread symbol (C).

> Dark , majority coarse spread but showing decisive light areas symbol (C^Dk).

T-Pattern (Modified) > T-Pattern , near saturated coarse spread but has slight pattern, symbol(C^T).

> Tic , tiny light speck but no lacing on center tip of each shield feather.

> laced , outer edge of each feather coloured darker or lighter than the rest.

> saturated, each shield feather entirely covered in dark pigment.

> Black wing , Entire shield area solid shiny black, unique to Archangel gimpels.

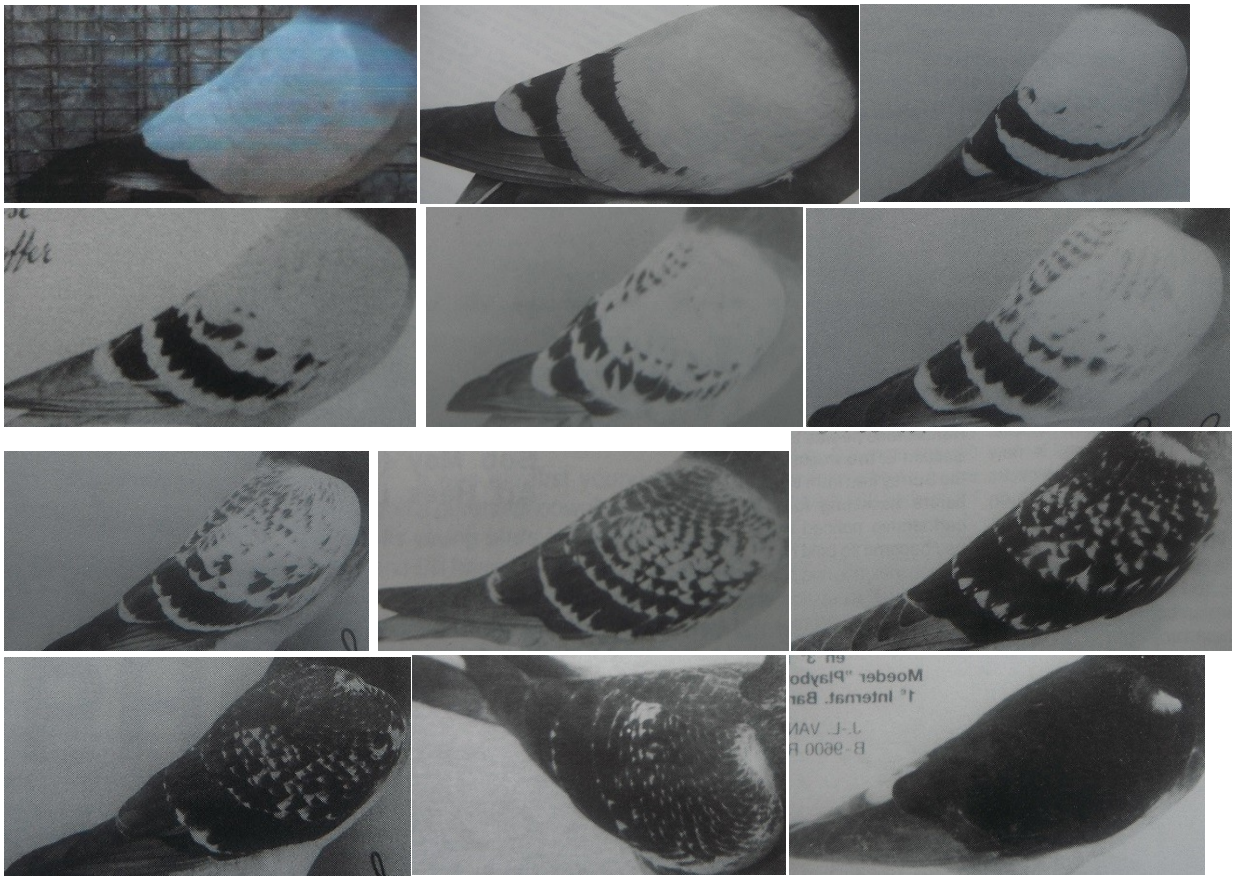
* > extreme saturated , entire bird expressing spread look-alike solid colour.

***NOTE**: The genome of the latter has never been described , as it seems that no one has ever been able to determine how to produce one. Spread factor is not supposed to ever be present. Some say that it is a saturated T-Pattern that is hetero recessive red , and homozygous Kite bronze , and even go so far as to say that 'IT alone IS KITE BRONZE' , which is a notion that I reject completely.

We think that it is also obvious that it is not simply a combination of modifiers in the pure state such as Dirty , Sooty., and smoky. The trait seems unique to ESF Tumblers and is used specifically in their "almond" stipper breeding programs and may have originated in India Centuries ago without record.

Now we can take a look at the actual birds that demonstrate the above information:

Progression from Barless through to T-Pattern.



Left to right : Barless (c), Barred (C^+), Third Bar (no symbol) , Extreme light check (no symbol) note back is also depigmented., the next three are progressions of pigment expression of light checker., then Medium checker (C)., Dark Checker (C^Dk) ., Last three : two progressions to T-pattern and finally T-Pattern. The photo is not clear but there still is some slight pattern present. Saturated T-Pattern shows no pattern at all. (photos: Barless Bob R., **All others : issues of old Racing pigeon Journals**.)

When we realize that there can be many more individual expressions than even shown here , one starts to question the mutation theory for sure. The entire pattern series seems to be a progression of genes that cause more and more pigment to be distributed in the shield feathers in particular and as selection is made for the darkest expressions we end up with a Black look-alike, or Spread factor look-alike. The only aspect that maintains the premise that mutation is involved also, is that there is a decending order of dominance as previously demonstrated. T-Pattern check , Checker, Barred , and Barless.

When some breeders saw the U of U report , they could not accept the premise that the C. guinea pigeon species was contributing the Checker pattern because they felt that the actual 'pattern' was very different on C guinea. This was based upon the visual effect of 'white spots' on the shields of the C. guinea. The light areas of the check pattern of domestic and feral pigeons vary in size and even shape

perhaps due to this cross of C. guinea with C. livia, and thus the wide range of Checker patterns in C.livia domestica.

Last issue we talked about Spread factor being linked to pattern. Another gene modifier that is linked to pattern is recessive opal (o), not to be confused with the dominant Autosomal gene Opal (Od). When a youngster inherits the opal gene, it will also inherit the pattern that was linked to that gene in the parent . If both parents have the opal gene but different patterns, with one not pure, then the offspring will be recessive opal but half will be pattern of sire and half will be the pattern of the hen.

Colour Modifiers both sex-linked and autosomal, have various effects on either smooth spread or coarse spread , and in some cases may affect both . This will translate into quite a wide range of pattern effects that sometimes require new names such as 'laced' , 'Tic' , 'saturated' , 'pencilled', 'stencil' , 'spangled' , ... These generally all refer to checker pattern , but indicate that various gene modifier traits are affecting the check pattern in different ways to create uniquely different expressions. The coarse spread pigment is usually and primarily affected in each of those modifications.

There is now a distinct checker pattern in the Dove, S. risoria. and it appears to have begun in the Species as a white or light lacing on the shields of wild type intense phase , and then advanced via selection to a wide range of fully checkered patterns which they refer to in some circles as 'grizzle' . There seems to be a similar pattern progression in Columba livia domestica. Both are decidedly different than the common check pattern in C.livia and in C.guinea., in that the outer most edge of each feather appears trimmed with varying amounts of very light to white lacing.

The lacing on pigeons is thought to be caused by Sooty in combination with T-pattern. Obviously as each of the darkening traits advance , less and less of the clumped smooth spread is seen .

Levi .

When the Toy stencil complex affects the coarse spread areas of the Check pattern we get an effect that we call "spangled" . The barred version is simply called white bar , and in the second photo below, you can see how the first bar is white all the way along but the second bar is only half way on coarse

spread , the remaining black is smooth spread. Dominant Opal affects BOTH smooth and coarse spread areas so we see the whitening affect not only in the two full bars but the flights and also the tail band.



Spread factor demonstrates the Stencil effect even better with one long bar and one short. Here the chocolate brown bar gives a slightly different effect as we see a long tapered bar , a short tapered bar, and the wide smooth spread end to the second bar when the flights are not snugly tucked up.



Photos : **Levi's Encyclopedia** .

Below is a very attractive Blue Bar Pied that is expressing a nice even pattern of Sooty factor whereby the center of each feather receives the pigment concentration from the mid-rib outward. This application of pigment actually intensifies as the bird ages. It can take place on any bird of any base pigment and any other modifiers. This bird is owned by **Porumbei Colorati.**

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 , like (Ts1) do not express on Sooty marks. However frill stencil that will affect the smooth spread of the tail band , will express on Sooty .

I believe that this bird is also hetero smoky as is indicated by the blurred bars , light terminal band and dull albescent strips on outer tail.

Some pattern expressions on beautiful American Show Racers from Their Facebook Group.

(1) 

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5 

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10 

11 

12 

Photos above : **(1) Robert Corrales, (2) Gary Keith, (3) MD DeDz, (4) Robert Corrales, (5) Hubert Hefter, (6) Gary Keith, (7) Hubert Hefter, (8), (9) , (10), (11) & (12) Gary Keith.**

Below Progression in Barless. According to the Pattern study by the University of Utah, there should be no progression in Barless as they found it to be different than the bar and check patterns in that it had a mutation in the gene sequence itself which impedes the pigment production.

(I am not certain what is causing the pigment deposits here , it may be Sooty but I do not believe that I have ever seen an advanced Sooty barless .)? These appear to have bar & check influence.

Kleurpostduiven Kloostehaar

Grzegorz Szpryngiel **Kleurpostduiven Kloostehaar**

The barless pattern seems to have another recessive trait attached that causes what is generally termed 'feed blindness' . The birds may have slightly poor vision that causes them to have difficulty finding specific seeds and grit. They may even have some problems making good aim to land on perches etc. I did not have that in the strain I worked with and saw no problems whatsoever. It may come with repeated mating of barless to barless. **(The eye problem was of specific interest to the U.of U study).**

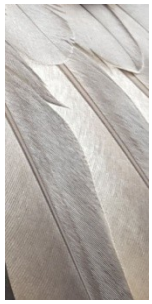
Here we are on the last leg of winter in the Northern and Western world ..some of you lucky people never see winter !! It is not as much fun as it looks ! Next Issue we will begin to take each MODIFIER and explore a summary of everything that is known about them , one trait per Issue. We will begin then with 'grizzle' . Until then , here is a puzzle trait for you to think about.

Mystery Modifier: By Adam Archer - England .




Coarse spread pigment seems to be taking the greatest de-pigmentation HIT on these birds.

Adam states: Attached are photos of two birds from a racing loft, both appear to be unusual smokeys. One bird is a fledgling, the other about 12 months old. The bars on both birds appear more like recessive opal than smokey, but there is no evidence of opal anywhere else on the birds, and both birds do not have an ablescent strip - indicating smokey. Along with this, the younger bird also has major undergrizzling in the flight feathers. It is yet to be seen if this will moult out. I'm not sure if these two birds are related, as the breeder could not find the younger bird in his records.

Adam Archer Pigeons : The older bird has "slight undergrizzling but nowhere near what the baby has , This makes me think the young bird might moult it out .

See you all next Month - Take care and be well !