Further discussion of the symbol (St), and

exactly what it stands for and has always stood for

in Pigeon Genetics.

The (St) Stipple locus Part 2.

This document is the second installment on the topic of the Stipple gene that occurred spontaneously at the Stipple locus in Pigeons and was named with the (St) symbol for "Stipple" in 1925 by Christie and Wriedt . Considerable confusion surrounds the topic based on old writings and one error leading to another over the Centuries.

By
Bob Rodgers
5/14/2023

The locus is the "Stipple" locus.

The symbol is (St).

The versions and mutations at that locus are ALL "Stippers".

The Action of the gene is to de-pigment base colour areas throughout the skin and feathers.

The phenotypic effect is whitening of at least 50% of the heterozygous "Stippled" bird.

The Stippled blue bar is a blue sprinkle. The Stippled Spread factor bird is a black sprinkle, and so on.

(1) 

(2) 

Photos by Breeder **Chris Northern Lights** showing (1) the Stipple gene white break on a blue/Black base (sprinkle) and then (2) a bird that is expressing phaeomelanin in place of the break which is (Almond) ground. Note the differences here and again with the Spread factor Sprinkle below .

This is a spread factor blue /BLACK "Sprinkle" that has brown / Chocolate on the second chromosome with the Stipple gene linked to the blue/Black (on the same chromosome). When this happens the stipple gene prevents the blue / Black from undergoing reversion back to a near solid Black bird which allows the brown/Chocolate to express more. The result is a bi-colour bird still with some white/colourless Break throughout. Breeder / Owner

I-Opa MatoxHIOK. { Note that some people incorrectly consider white to be a colour, so you may see these called tri-colour, but white is the lack of colour.} { This is a blue/Black sprinkle NOT a brown/Chocolate sprinkle despite the abundance of Chocolate pigment}

Many People make the common mistake of calling just about any phenotype that is caused by the Stipple gene, an 'almond'! These can only be referred to as Almonds if they have the almond ground colour. That ground colour may vary greatly in colour tone , but it should be evenly distributed to cover all areas that otherwise would be white Break except in the Tail band and flight feathers. Those areas must still have Break either as a near perfect white tail band or as a mix of white patches and stripes usually with a 'V' shape end to them due to the structure of the feather rays.

Photo by **Mick Bassett** , this is considered to be an 'Almond', but it lacks the sort of phenotype that would make it ideal Classical Almond. The bronze ground is rather washed out so that the checker pattern can be seen. The black flecking is scant but may increase as the bird ages. Unfortunately the tail will continue to get even more black. Ideally it and the flights should express both the Base colour black and the bronze ground plus the white break evenly mixed in clean cut areas.

This English Short Face Tumbler bred by **Rob Grogan** of Australia, shows a rich even Almond tone ground colour where white break would otherwise be if there had not been any red pigments added. This phenotype is called 'Classical Almond'. It is not a separate

gene , but rather it is a combination of a number of colour gene mutations plus the (St) Stipple white gene. Note that there must be NO break on the head , neck or body. Only the tail band area and flight feather ends will still have Break in the general areas of the feathers where condensed smooth spread is found. I have found that Kite bronze will not express in those areas leaving them as basically colourless break and I was the first and only breeder to make this finding public knowledge..

Dr. Lester .P. Gibson wrote in his 1995 Book , Quote " Most people who have written about "Almond" seem to be blinded by "Classical Almond" as being the effect of the (St) gene."End Quote. Of course it is not and if we were to place a specific phenotype on (St) by itself , it would be **basically a white bird**. So pure (St) males quite often are indeed mainly all white. The gene does its best job of de-pigmentation on the newly feathered young when the feathers are soft and weak. As the bird develops and goes through the first moult , a phase known as 'Reversion' begins to take place as the harder strongly constructed feathers support more colour pigmentation..

Below : Bred by Bob R. showing only the ground as a nestling , then increased black flecking of the original base as the bird ages. This bird was bred from a blue checker Classic Grizzle with no Kite or recessive red. The dam was Stipple with no recessive red and just one dose of Kite. Heterozygous Kite alone produced all of this body ground despite the (St) gene effects.!



This bird would easily produce quality Classical Almond offspring bred to either a Sat. T-Pattern blue /black that is homo Kite and hetero (e) , or a recessive red that is masking such a Sat-T-Pattern blue /black. { Note how the photo lighting can also change the tone of the colours on any bird.} Many of the photos shown on facebook by various breeders have been colour enhansed to make them look better than they actually are in real life! Check other colours in your photos to see signs of enhancement.

The Stipple gene not only de-pigments the base colour throughout segments of the skin and feathers, but it slightly decreases the richness of the phaeomelanin components, the 'red' pigments, so that they appear more yellowish. This leads to various opinions as to what sort of 'ground' colour should be Ideal. Some say Reddish , others Yellowish , still others say orangy. Quinn said 'rusty' yellow. and Fulton said a Burnt colour of the mouldy outer shell of an almond nut. So lets have a look at some of those phenotypes . Examples by Rob Grogan , Grogs Loft Australia .


Reddish ground.



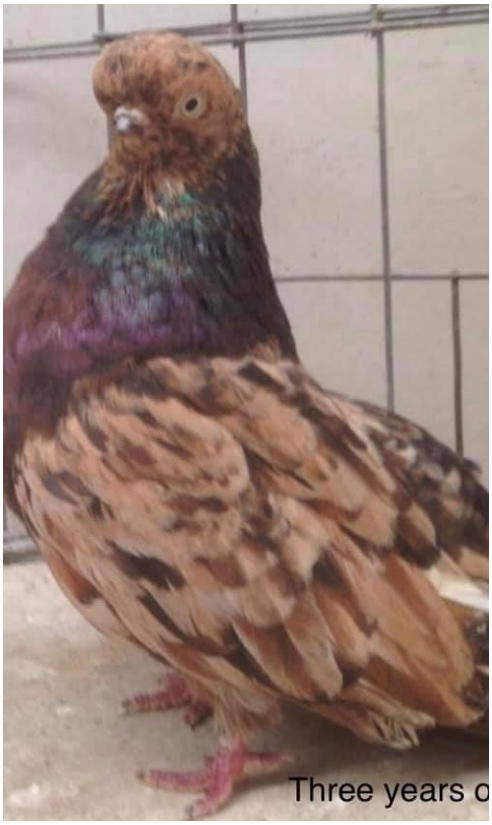
Yellowish ground.



Rusty, burnt Almond that has moldered.

I could not locate any such thing as an 'Orange' ground. So there you have the range of tones, the photos of the almond nuts provided by **Walter Wojcieski**. It is up to you the breeders to decide which you prefer. Keep in mind that these all undergo changes toward a darker phenotype during the lives of the birds from one year to approximately ten or more years of age.

Here is another example of the reversion effect on the same bird: **Rob Grogan** Breeder.



Some old writings promoted the idea that if your birds become too 'reddish' perhaps as a result of mating back to Agates too often , that a cross out to a dilute bird either a yellow agate or a Golden dun (dilute sat. T-Pattern blue / Black) will cause a lighter ground. This is pending of course upon the intense gene being linked (on the same chromosome) , as the stipple gene . Then when reversion begins to take place , the Intensity will be held at bay while the dilution gene takes over. **That sounds good on paper** , but when in fact it is applied, several negative things happen. (1) hetero dilution will have very little effect on the bird but what little it does have will be applied naturally to the entire bird. This will mean that most of the desired black flecking will be a dull dun. Some will be shiny black but also some of the ground will still be deep dark RED . The ground will not be a rich even tone of deep yellow as called for by standard. The stipple gene will 'even out' the tone slightly but not enough to give the predicted result. (2) the other negative side effect is that you have introduced a recessive gene that is difficult to keep track of and so pure dilutes will keep popping up more and more in that breeding program. Most of the birds that are given as examples of 'hetero dilution' are in fact 'pure dilution' and tend to be too light and washed out in tone to be desirable.

Below are a couple of very old paintings of ESFT's with a light ground, the first one is on an old canvas that has the typical yellowish tone all over the entire photo. Both are not actually genetically possible as shown. Photos from very old Books presented by **Walter Wojceiski** on his Facebook Group

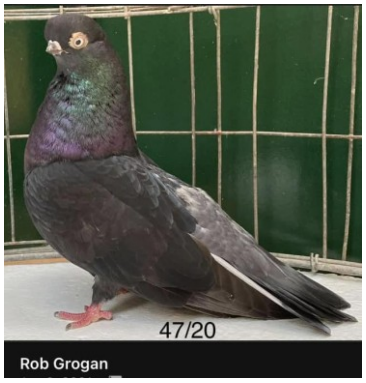
Below a Lithograph by **J.C.Lyell** 1800's Book from my own collection , Bob R..

So , If these yellowish ground birds are the most desirable , yet next to impossible to create , how does a Breeder go about getting close to the Ideal?

The answer is the Base pigment bird. The bird that Breeders insist upon calling a "Kite". There are several different specimens used in breeding programs to the present day and the blood of these birds runs in the veins of just about every bird out there in one way or another. It is the reaction of the Stipple gene on this base pigment , base pattern , and other added components, that will determine how rich, and of what tone the ground will be, Additionally the actual mixture ratios of phaeomelanin versus eumelanin base pigment will alter the overall tone of ground with depigmentation.

Murray Gaskins

Walter Wojceiski



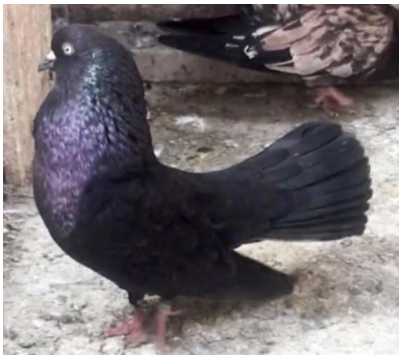
Rob Grogan

Amir Hajai ?

Walter Wojceiski

Mick Bassett

James Ellison



Walter Wojceiski

Rob Grogan

I think we can see from these photos that there is quite a range of phenotypes and certainly also genotypes being used as the Base pigment birds in a variety of Breeding Programs. Along with this is evidence that more types of bronze are involved beside the standard (K) Kite bronze.

We know that the true genome of the pseudo Black Sat.T-Pattern is not known. Some believe that it originated perhaps in India and that it was created using Black-wing Archangels. There is considerable reason to back that theory. The bronzing on the neck and chest regions strongly suggests (Ka1) gene and the shiny black wing shields further support that idea. The recessive (ka2) effects the head region. Recessive reds and Almonds from these (Ka1) specimens often have brassy bronze heads , necks and high gloss sheen.

Mick Bassett photos .

The lighter blue tailed birds usually also have blue underbodies and the wing shields may show some pattern. These birds tend to create Almonds with a lighter ground that shows checker pattern. They also often are at least hetero smoky. They tend to produce Almonds with whitish rumps and tail feathers that quickly revert to black and/or grey.

Walter Wojceiski

Both Brander bronze and recessive red have Kite bronze closely linked. Quote :{ "It becomes very difficult to segregate each one from the other whether you are trying to do it by breeding, or simply just by observation". End Quote (Paul G).} However ., it is key that you try to make that segregation so that you know exactly what genes you are actually working with.

The very dark 'Black' Sat.T-Pattern specimens also come with a wide array of (phaeomelanin) reddish tones . These are usually the result of a heterozygous (impure) dose of recessive red. However with that would almost certainly come a heterozygous dose of Kite bronze. I believe that here is where some breeders are making the mistake of attributing the red phenotype to Kite when in fact they are looking at recessive red. There is also a very real possibility that they are looking at Brander bronze. Numerous breeders have shown this to be fact.

First two homo Kite plus het (e) **Walter Wojceiski**

Octavian Sarofolean Kite without a grizzle.

Grzegorz Szpryngiel Brander

Octavian Sarafolean Brander /Kite .....

Paul Gibson - Brander without and with (e)

 Occasionally birds will be produced that are not up to STANDARD. These may be birds that lack one of the components or have influences from other modifiers that are not generally used as part of the Classical Almond formula. Keep in mind that the (St) gene does not represent the Classical Almond phenotype. The (St) gene represents Stipple gene 'whitening' , so a bird that has areas of white, the base pigment colour, and possibly one of the red pigments, may not be an actual Almond at all. It is most likely a poorly coloured "SPRINKLE" , or what some call an "Almond Splash" #1 below breeder **unknown**. The red pigment seen on these birds is usually on the head and neck areas and is almost certainly just hetero recessive red - #2 sprinkle . If the bird was also kite , or had just Kite bronze , it would be expressing a light ground over all of the head, neck, breast , underbody and shield- #2 &#3 **Joe Powers** Sprinkle program. It may not have Kite on the rump, and almost certainly none in the tail feathers, but #3 is expressing a light kite bronze ground overall.

#1 

#2 

#3 

The grayish staining in the white break is caused by darkening modifiers that do not fully give way to the (St) breaking action. This may also be 'shadowing' from an unknown gene in the Sat. T-Pattern blue. Breeders are calling this phenotype by various names below : (1) Almond Splash., (2) Multi Colour ., (3) sprinkle., Silver Sprinkle and even Almond, but with no full body ground it cannot not be an almond.

(1) **Walter Wojceiski** (2) photo presented by **Walter Wojceiski** Owner? (3) **Joe Powers**.

 One important component in making good Classical Almonds is 'recessive red'. It is a mutation from wildtype at the Sox-10 locus that causes a strangely coloured bird that when in its unimproved state, somewhat looks like an ash-red. We all think of recessive reds and yellows as solid coloured birds but that is only if they have been improved by a combination of selection and addition of other colour enhancing modifiers. Once good quality reds have been developed , care must be taken to maintain that improved colour. This also applies to reds used in the Almond breeding programs as here the quality of the red can be lost over time and thus the quality of all components and the Almond phenotype itself will deteriorate . There is a great deal more to recessive reds than meets the eye and

until you study them and see it with your own eyes , it may never be realized how complex they actually are. Let's take a look at some reds being used in Almond breeding programs.

Murray Gaskins

Rob Grogan

Walter Wojceiski

Murray Gaskins

Walter Wojceiski

Walter Wojceiski

Solid recessive red (no grizzle , no spread factor) Murray Gaskin. Note a slight lightening of the flight feather quills (rib or rachis). This is normal for all recessive red mutations at the Sox-10 locus. This may vary if additional darkeners are present or if the recessive red masks dominant red (ash-Red) in which case the rachis may appear grayish/ brownish, or even bluish.

It was recently asked, what is the description of a red agate? Here lies a great deal of confusion as a small percentage of breeders believe that solid coloured recessive reds should be referred to as "whole feather agates" to identify them from True agates, which express some white usually as a rosewing, mottled wing or whiteside. All of the latter are believed by some to have a gene referred to as an 'enabler' gene that causes the solid red youngster to moult out to having some pure white feathers in mainly the shield area. They were named agate because the mixture of white on red resembled agate rocks in colour design. However the solid reds have no such resemblance and also have no complete genetic relationship to the True agates. I challenged breeders to mate two solids to see if they get any True agates , also to mate two true agates to see if they get any solid reds. Of course I knew that they cannot achieve either but wanted them to try. Obviously no one was willing to follow through on the challenge. It is interesting also to note that the given symbol for the enabler gene is (En) which indicates that it is a dominant gene mutation. Since it is a dominant, it should express anywhere that it is present. Solid reds (so-called whole feather Agates) lack the enabler expression so it is obvious the enabler gene is NOT present! Those reds are therefore NOT Agates.

Recently it was stated that Kite bronze causes the moult to white (agate) in recessive reds. IF that was correct, then ALL recessive reds that have been improved with bronze , especially Kite , would moult to white and of course we know that does not happen ! Therefore the solid reds bred from a classical Almond parent and another carrier of recessive red cannot be considered as whole colour or whole feather Agates. They are NOT agates at all!

I think it is safe to say that the Print Grizzle gene is present in many true agate (mottled) specimens.

We have looked more closely at the Components : Saturated T-Pattern (pseudo black) , recessive red, and Kite bronze. We have discussed the colour phases : Intensity , Pale , and dilution. We now should have a much better understanding of how these components work in the development of good Classical Almond phenotypes. However due to the extreme complexity of the very nature of the STIPPLE gene, it is not possible to determine in advance just exactly what we can expect in any given specimen. We can sometimes guess with rather correct results due to closely bred families, but there can be surprises.

 There is actually only one 'sub-variety of Almond and that is referred to as a DeRoy. It is a recessive red Almond. It occurs when a double dose of recessive red is inherited along with the (St) gene. These should be used exactly as you would use the straight Almond birds. I was able to convince the majority that the COMPONENTS were NOT sub-varieties as they are wrongly referred to in old writings. A sub-variety MUST be expressing the variety that they are a substitute for , so in other words in this case they would both be "Almond" factor birds. The non-almond 'components' of an Almond phenotype can never be considered as sub-varieties of Almond. That is a mistake made by a few people. This matter gets worse when breeders allow one of two things to happen. (1) If they allow any of the other (St) alleles such as Hickory , and Qualmond to be crossed into their 'Almond' breeding programs , and (2) If they place the Almond COMPONENTS : Sat. T-Pattern pseudo Blacks, Recessive red and/or Kite into their other (St) alleles. One unfortunate thing that happens is that any 'DeRoys' produced from such birds in the future will look like very dark recessive reds with only a slightly lighter effect at the head area and in the flights and perhaps the tail basally. A breeder may think that they have dark DeRoys from their Almonds , but if they did, those would not come in a dark red phenotype because the Stipple gene tends to (NOT BREAK) but rather soften the overall phenotype by cutting down intensity of the red. Such breeders will argue that they know what they have and what they are talking about , but several of us have proven them wrong in the past, particularly in regards to alleles having been introduced into their Almond breeding programs. Bottom line is that the STIPPLE gene (St) should cut the intensity of red to a straw tone, but further cuts the dilution of Yellow to a washed out tone. .

That is why a DeRoy is described as "Straw Red" by **Christie & Wriedt**. Good quality DeRoys tend to be a rather tan-like tone with some scattered deep red feathers. Those red feathers are the black flecks still masked by (e), that did not have their intensity cut by the (St) gene.

We mentioned earlier the importance of the quality of the base pigment component birds, and the importance of the Red colour quality working with the (St) whitening to make ideal 'ground colour'. These components only work well if of good quality. The Stipple gene is not always as strong as we expect, and thus reacts differently against some of these components. If your Deroys are very deep red with almost no obvious dark red flecking , then that indicates also that the Stipple gene is NOT having enough weakening effect on the ground colour. This will mean that your Almonds will also become darker red in ground as opposed to the standard deep yellowish requirement.

 Many breeders may actually be using 'Brander" bronze in their Almond breeding program formulas as opposed to just Kite bronze and hetero (e). With this mutation also comes at least one grizzle trait that I feel certain is Print , and no one has ever proven me wrong on this hypothesis. Many people consider Print Grizzles to simply be a variation of Classical Grizzle , but I contend that that idea is incorrect. Here is an example to show what I mean.

Md Hera - Brander plus Print Grizzle. Do you think the bird in the background is a Classical Grizzle or a Print Grizzle? Some key differences between Classical Grizzles and Print Grizzles are: Classicals have a more distinct salt & Pepper overall phenotype in the hetero whereas Prints are less so with a more or less frosted appearance. Hetero classicals have white flecking over the head, face and neck, whereas Prints tend to have dark heads and necks with a lighter area around the eyes(face) and then a darkened throat (chuck). Homozygous classicals are typical "storked" phenotype that are primarily white with just slightly scattered feathers on the head mainly, as well as the tips of the flights and tail feathers. Prints on the other hand, tend to have more colour so that they are basically all white but with dark coloured heads and necks , and their flights and tail feathers are almost completely coloured. Some have been selectively bred to have all white bodies , flights and tails with only the coloured "CHUCK" at the throat as called for in the flying Tippler standards. Classical Grizzles are not selectively bred for specific variations in colouration , whereas Prints are , and often in conjunction with various 'Pied' genes.

On the 8th. of August 2023 I responded to **Octavian Sarofolean** of Romania when he posted this bird on **Walter Wojcieski's** (St) _Almond facebook Group:

He said : "A young bird from a project in which i am trying to find out what Stipper gene is ."

My reply: "I think it is firstly important to see it as a "Stipple" or "Stippling" gene. A bird that expresses that gene is going to be "Stippled". All birds affected by any one of the (St) mutations is a "STIPPER", so Stipper is not a separate gene. A person who shops is a SHOPPER., a person who drives is a driver, likewise a person who works is a worker. Therefore ANY bird that is stippled is a stipper, which includes all (St) mutation alleles at the Stipple locus. Once one understands that, then they may answer what does that Stipple gene do to base pigments that is different than the norm? In the case of the STIPPLE gene it primarily 'de-pigments' or renders the skin and feathers colourless. It is considered by most to be an unstable mutation. A few have stated that it is a gene mutation that was an accidental 'flip/flop' occurrence during meiosis . The fact that it survived and breeds on as a dominant, seems proof enough that it is not an unstable gene. The fact that its de-pigmenting effect is extremely variable is not only due to the gene itself but rather depending upon the many 'counter component' genes that may be added to the breeding program. The answer to your question beyond that point lies at the molecular level and is not known."

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I will close here and this will be the last mail - out to everyone from me personally. Future material will be sent to the New Newsletter Editor **Ash Hammett** for inclusion there. Hope you have found all of this helpful and interesting.

Everything I have presented comes from a combination of my experiences and those of very highly respected breeders around the world over the years. I share what I know as fact to make certain that you all have first hand info to take forward in the advancement of the Hobby. It is up to you to try it, observe the results , and report any new or different findings. That is the only way the Hobby and knowledge can proceed forward as opposed to being stuck in the past quagmire of ignorance that we see being dredged up from old Books. Lets advance the Hobby together!

Bob Rodgers , Nova Scotia, Canada
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