A SYNOPSIS OF COLOR INHERITANCE IN THE DOMESTIC PIGEON, *Columba livia*

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(as related in outline form to Wilmer J. Miller)

The first step to be constantly kept in mind is the choice of a standard type with which to compare all variations and deviations. Charles Darwin and later geneticists agree that the preferable standard type should be the wild type. There is only one color and pattern predominantly occurring in normal native birds of the pigeon, *Columba livia*, from the sea cliffs of England to the eastern Mediterranean. Birds gone wild from domestic stocks (feral) are not to be considered when a true wild form is available.

The standard type = wild type = normal is the **blue bar** with a light rump patch and whitish on the outer side of the tail feathers. The light blue background contains clumped eumelanin pigment granules. The dark, almost black, bars on the wing shield are a coarse spreading of the pigment granules. A microscope would show patchy clumps of granules at the edges of the bar. The tail band is a smooth spreading of the granules with a neat even border. Some smooth spreading occurs in the neck area as well.

All domestic pigeons are considered to have developed from this wild type, which generally will be simplified to blue bar hereafter. All other colors are considered to be mutants and combinations of mutants.

Phenotypic differences, that is, the way they look to an observer, are usually more easily detected by eye, simply looking at the bird, than by microscopic examination. Individual cells, sector to sector, might not be distinguished as can be the population of cells seen grossly. Two types, or two entities genetically, may look alike. That is, they may be **mimics**! Too much refinement of observational details may obscure the genetic entity. The various types of crest, for example, are all basically the sane genetic recessive. Other modifying factors for peak crest, shell crest, etc., ought not obscure the fact that they are all the basic crest first.

The following synopsis is best understood if one knows basic genetics. But it can be worked out by others with a little effort. The genes controlling mutant forms are symbolized for quick paper work when needed in breeding problems. The genes are located at specific places on specific chromosomes of the pigeon. Except for the sex chromosome all the chromosomes occur in equivalent pairs. Therefore, the genes occur in pairs, except for the sex-linked ones in females which essentially have only one. The pigeon has 40 pairs of chromosomes so some genes could be "linked" on the same chromosome and could recombine in different expected ratios than the standard Mendelian ones. Only the sex-linked characters and the pattern series of characters are known to be in such linked combinations. While this changes the ratios of types among the progeny, it does not change the mutants and combinations that can occur. So we won't worry about linkage further in the following descriptions.

We will now list the single mutants by name, genetic symbol, descriptions and interactions.

DIRTY (AKA VARICOLOR), *V*. Vet Kleur (greasy color named by Bol, 1926). It seems to have variable expressivity and age effects in expression. It is not as completely worked out as other genetic entities as yet, but it seems useful to consider it as one.

At hatching the bill ring is less distinct and heavy pigment is smeared throughout most of the bill. The foot scales are also darkened considerably, but in the juvenile form only. After the first day of hatching its diagnosis is less certain until the juvenile plumage comes through. In the plumage this mutant appears to control white areas in the hocks and around the eyes frequently. Pleiotrophic actions of the gene that are perhaps more noticeable are that blue background areas are darker than in the normal. Especially, the rump and under the wings is darkened, but there is little or no effect on the edge of the tail.

The pattern mutants do not exhibit any interactions that would not be expected on the basis of its known single mutant effects. However, with various piebald conditions it seems to increase the white areas. *V* is hypostatic to (hidden by) recessive red. Indigo and milky are made darker in combination with *V*. The sex-linked genes ash-red, brown, dilute, reduced, and pale allow it to show its effects. Almond, as expected, is epistatic to (hides) *V*. Interactions with smoky have not been examined (see dark archangels for such effects). The effects of *V* combined with gazzi have not been examined.

The utility of this condition is mainly to enrich, i.e. darken, the other colors of black and red so that the combination is a rich or darker red or black. For example, the tail bar showing on the simple recessive red tends to become more evenly pigmented. The effect of *V* is not appreciated by fanciers on the otherwise clear blue birds.

This particular condition may be a natural polymorphic form, perhaps occurring predominately in Indian populations of wild birds. It is probably maximized in its expression by a vitamin D deficiency.

SOOTY, *sy*. Again this condition may not be a simple entity, but it is close enough with our present outlook to assume this for now. It acts mostly as recessive, but some degree of dominance is evident in small effects. Its main effect is to induce a spread area near the tip and along the shaft of the feather. Thus, it could mimic checker to some degree. It does not show well in juveniles and is not detectable in the newly hatched. Again, shortage of vitamin D maximizes sooty expression.

Sooty darkens indigo, milky, reduced, dilute, pale and brown. Spread is epistatic to it, but it does improve the richness of color in reds end blacks. Almond is epistatic to sooty, but sooty affects ash-red by increasing the reddish effect. This is frequently called strawberry by the fanciers. Sooty is not liked by pigeon breeders as a single condition on the blue background.

SMOKY, *sm*. The effects of smoky are probably not noticeable until the first plumage is well developed. The outer edge of the tail is darkened. The skin and the scales of the feet and base of the beak are lightened, but direct sunlight will darken the bill base. The claw color is not affected. The colored squabbing breeds have smoky in higher frequency. That is, it is selected for in order to have the preferred lighter skin. Again, the blue areas, the major portions of the plumage are darkened. The coarse spread areas such as the wing bars are weakened. That is, the border of the bar with the bordering blue area is smeary. The base of the wing feathers is lightened. This effect mimics grizzle.

Its interactions with other mutants are generally recognizable, except with recessive red and spread, Almond and albino are both epistatic to smoky. With ash-red its effects are less obvious. Like varicolor and sooty, smoky improves, enriches the colors like red and black and tends to ruin blue in the viewpoint of the fanciers. More study on interactions of the three genes varicolor, sooty, and smoky (*V*, *sy*, *sm*) would be useful to the breeder.

RECESSIVE RED, *e*. This mutant is detectable at day one of hatching. The bill ring is red on these squabs. Basically, this mutant converts black pigment to reddish, especially in the spread areas. Some of the tail and wing bar effects show through. The skin, beak and claws are lightened.

Recessive red is generally epistatic in interactions with other mutant colors. Spread recessive red is a more uniform red and, therefore, desired by most breeders. The T-pattern factor also aids recessive red to be somewhat more uniform, but the tail bar still shows. The most striking interaction is with dilution and recessive red, which yields yellow. A mimic of this yellow is pink eye dilute and recessive red. The combination of reduced, milky or almond with recessive red is a light red color. It has been postulated that if more of these mutants were put together a pink pigeon would result. This is an interesting research angle yet to be tested. Faded and recessive red also yields a light red since faded works only on the black pigment and not on the red pigment. The utility of recessive red is mainly in the area of lightening the skin so that the "table birds" conform to the preference for light-skinned squabs.

MILKY, *my*. This is a well established mutant sometimes called powdered silver. It lightens all pigment and in this respect may resemble lavender in chickens. If so, the pigment cell process (that is, the tendrils) would be lacking. No one has investigated this under the microscope as yet. Milky is often confused with ice, both giving a somewhat ashy-like dilution. It is not distinguishable in the newly hatched squab.

Milky interacts with recessive red to give a light red— almost yellow color. Other mutant combinations with milky are generally recognizable. Milky with ash-red yields a color often called lavender which is an elegant shade occurring in the Lahore breed of pigeons. Indigo and milky, and milky and faded are combinations not yet recorded for their results. Again, the research angle is awaiting trial.

INDIGO, *In*. This mutant is a codominant. It affects the spread pigment. It mimics ash-red to some degree, especially in the homozygote; but experienced breeders can distinguish

between them, more easily in bar birds. The rump is darker than normal. The homozygous indigos have a dark rump but otherwise are very much like ash-red, and they show some tendency to lacing in the wings. The newly hatched squab cannot be diagnosed for indigo, but the first plumage should reveal its presence. It does not change appreciably with further age effects.

One of the most interesting interactions of mutant colors in pigeons is the interaction between spread and indigo which yields Andalusian. Such birds are dark, often with darker lacing on the wing shield, or else a slate color. Indigo is hypostatic to (hidden by) recessive red. Ash-red is mostly epistatic to (hides) indigo except for some flecking in the male; and the rump, of course, has the darker color effect. Brown and indigo also have a pseudo ash-red mimic effect. Combinations that are not recorded and are awaiting research efforts are indigo with milky, indigo with pink eye dilute, and reduced with indigo. Indigo may well have a superiority in vigor unusual for mutant gene effects. This also awaits further research study.

BRONZE, *k* (for kite) as demonstrated by Quinn. This mutant is not a well established (demonstrated) entity. There may be several types of bronze. Certainly they differ by breed. We'll first take up Modena bronze about which most is known. Here the mutant effect is a reddening in the bar area and a very minor bronzing of the crop. The newly hatched squab does not show its effects, and the first plumage has its effects very poorly developed or expressed. Assuming that it is a genetic mutant, it is not a full dominant; but it may have some degree of dominance. Generally, however, it ought to be treated as a recessive. Its interactions are interesting. T-pattern bronze is called kite in tumblers, but bronze in the Modena. Spread, recessive red and ash-red are all epistatic to bronze. Brown or reduced combined with bronze are research angles needing investigation.

Archangel bronze has a reddening primary effect on the neck and on the breast. Unlike Modena bronze, ash-red is not epistatic to archangel bronze, but spread and recessive red still are epistatic to it. The ash-red combined with archangel bronze gives an enhanced ash effect, a lightened color that even approximates white and is the source of the so-called white wing archangels.

Brander bronze looks very much like recessive red with black wing tips and a tail band. Its interactions are mostly unknown.

PINK EYE DILUTE, *pd*. This mutant blocks all melanin in the eyes and dilutes melanin in the plumage. On day one of hatching the pink eyes and a faint bill ring along with short down imply its presence. Otherwise it is a mimic of the sex-linked dilute gene without the eye diagnosis, which distinguishes them. Its most obvious interaction is with recessive red which makes yellow as in dilute recessive red. Most other combinations are not well studied. Milky interacting with pink eye dilute is an interesting research angle.

SPREAD, *S*. This mutant is a dominant. It converts all pigment to a smooth spreading effect so that the bird is uniform in color. However, the wing bars may show through to various degrees on some birds. On the day of hatching the bill may show the pigment effects spread throughout somewhat like varicolor. Nevertheless, spread is so frequently combined

with other modifiers or other color gene effects that it has not actually been well studied in a single mutant form. Therefore, it will be pertinent to study dosage effects, that is heterozygote versus homozygote spread in stock free of such modifiers. A breed suitable for this would probably be the African owl. White outer tail feathers sometimes do show through in a single mutant form, and this is one of the things that needs further investigation.

Its interactions with other mutants are numerous. It enhances recessive red. It is epistatic to bronze, T-pattern, check and barless. It assists some bleaching mutants to form lacing effects; e.g. with the reduced, recessive opal, indigo and the oriental frill stenciling factors, but not with milky. Spread milky gives a dark lavender phenotype. Spread, ash-red, milky, a triple combination of mutants, is the best lavender color available, being smooth, soft and a light ash color. Spread is also epistatic to smoky, dirty and sooty, although these may improve the total phenotype. Dilute spread is the dun phenotype. Pale spread is a dark dun. Spread ash-red is an ash color and spread brown is frequently called chocolate. More recently, the spread and reduced combination yields a beautiful ashy effect with dark lacing. Other modifiers, however, may change it to various degrees. Spread faded is a sort of frosty dark dun color also called faded black. Spread dominant opal yields a muddy dun color. Spread combined with toy stenciling yields white wing bars on a black background, a most remarkable phenotype. Spread, indigo, dun and opal yields a light color called oyster white. And of course spread, dilute and red is a yellow ash-color. Research is needed further in the area of combination of spread with ice and the quadruple combination of spread indigo, dominant opal and reduced, for example.

BARLESS, *c*. This phenotype lacks the deep blue-black bars on the wings. The neck is somewhat lighter in color as well. While it is recessive, there may be a slight effect in the heterozygote in showing somewhat more narrow bars. The basic action is an absence (blocking) of the coarse pigment.

Barless is epistatic to the toy stenciling, but barless is hypostatic to recessive red and albino. Several combinations with other mutants are known to have both mutants recognizable in a reasonably obvious way. For example, barless with ice, milky, pink eye dilute, varicolor, sooty, smoky, dominant or recessive opal, brown, reduced, dilute, or pale are all recognizable in their paired combinations. Almond barless, however, just looks almond; barless is hypostatic to it. Faded, or bronze with barless allows both mutants to be recognizable. Archangel bronze with barless allows both to be recognized. However, Modena bronze is hypostatic! (Brander bronze effects are not known in combination).

CHECKER, *C*. Possibly, this mutant is actually a series of closely related alleles, merely different in the degree of phenotypic effects. Checker increases the coarse pigment in the wing shield and somewhat in the neck area. It is not recognizable at the day of hatching. The total effect on the appearance of the shield is often of triangular like patches resulting from the way feathers overlap.

Checker is hypostatic to spread, recessive red, albino and other white plumage effects. Checker combined with toy stencil gives a white checker. The heterozygote for toy stencil with checker shows bronze-like color that is a reddish border to the white area. Checker is

hypostatic to almond; but with the allele of almond, faded, both checker and faded can be distinguished. Interacting with spread and toy stencil, checker yields a white checker on black. Checker also interacts with toy stencil and ice to yield a white checkered ice color which is called porcelain. Checker interacts with sooty to yield a darker blurred checker which is difficult to distinguish from other possible checker alleles. Brander bronze possibly is epistatic to checker, while Modena bronze allows both to be recognized. Most all other combinations yield the mutants both recognizable. Some that we know about are checker with dominant or recessive opal, varicolor, pink eye dilute, milky, indigo, dilute, ash-red and reduced.

T-PATTERN, C^{T}. Top dominant of the pattern alleles, T-pattern is like checker but more extensive. Coarse pigment may appear also on the back and down the sides of the body. Again, the T-pattern may actually consist of a series of closely related alleles. The T-pattern interacts with toy stencil to yield laced effects. Otherwise, it is very much like checker, but just more so in adding the coarse pigment. The most dark T-pattern birds are often called velvet.

GAZZI, *z*. Gazzi is the most regular of the white patterns in inheritance. It is autosomal recessive. The white extends completely around the base of the neck and the underside of the bird. The head and especially the front part of the neck as well as the tail, back and wings are pigmented.

ICE, *Ic*. Existence of ice as a genetic unity is not established. As a single mutant, if it is one, it yields a powder blue effect. The basic action of the character is to lighten the clumped pigment areas to a light blue. It has a minor effect on spread pigment. .

Ice combined with ash-red is frequently called crescent or moon pigeon. Ice with brown are both recognizable. Ice with faded, ice with dominant opal or indigo are mostly unknown. Also, for so other mutants research is needed to verify particular combinations.

TOY STENCIL—tentative symbol = *Ts*. Toy stencil has white bars with black borders. The heterozygotes have reddish borders and less white in the bar area of the wings. The basic action seems to be blocking the pigment in the coarse spread areas. It may also lighten the neck area.

Interactions show that barless is epistatic to toy stencil. Toy stencil and checker = white checker as already described, and toy stencil and T-pattern = lace. Toy stencil and spread = white barred on black, and toy stencil and recessive red yields white barred on red. Bob Pettit has shown that toy stencil with dominant opal and toy stencil with indigo yield white bars, both mutants being recognizable. Toy stencil with varicolor and with sooty are both recognizable with some whitish sooty marks. Toy stencil with ash-red and brown are both recognizable. Many interactions have not been recorded, such as toy stencil with reduced, ice, milky, faded and smoky. Again, there are research opportunities for somebody for these combinations.

ORIENTAL FRILL STENCIL—no postulated symbol has yet been assigned but it is probably a genetic unit, mostly recessive. It is not diagnosable at hatching, but it does show a marked increasing effect with maturity in its phenotypic expression. The basic action is to block pigment in both kinds of spreading, coarse and smooth. Oriental frill stencil interacts with spread and T-pattern to yield a laced effect. It can even yield a pearly laced red effect in an appropriate situation. Combined with brown, ash-red and dilute, all are recognizable; but the effects of oriental frill stencil with dominant opal, recessive opal and indigo as well as with sooty, smoky, reduced, almond and faded are unknown and represent research opportunities.

DOMINANT OPAL, *Od*. This mutant is not predictable in newly hatched squabs. The homozygote is probably sterile and semi-lethal. However, some roller breeders do not think this is so. Research on genetic ratios is needed for more definite conclusions. The basic action of dominant opal is to exhibit an ash color on the smooth spread pigment areas with some reddening in the coarse spread combination. Some white areas also turned up frequently enough to allow this mutant to be confused with stencil. There is a slight tendency to lacing in the areas of the coarse pigment, even on the bar.

Interaction with other mutants shows a "weaker", lighter red when combined with recessive red. A dominant opal, ash-red is an orange bar. Almond and albino are, of course, epistatic to dominant opal and there are several mutant interactions which yield a confused result, not allowing one to decide very easily what is present. Such confused combinations are dominant opal with indigo, with recessive opal and with faded. But dominant opal with checker, T-pattern, barless, brown, bronze, archangel bronze, varicolor, and sooty allow both mutants to be recognized. There is some confusion with dilute and pale but less so than with the others mentioned. Research results are needed for dominant opal with smoky, with reduced and with milky. Dr. Hollander predicts that dominant opal with milky would be one of those confused phenotypes.

RECESSIVE OPAL, *o*. The basic action of recessive opal is similar to dominant opal but there is generally a more reddish effect than with dominant opal in the coarse spreading pigments. Frequently there are horizontal banding pigment marks on the tail which may represent thyroid variation effects.

Recessive opal with T-pattern and with barless are recognizable with varicolor and sooty. Recessive opal with ash-red yields a brighter ash but not an orange bar. Recessive opal is mostly hypostatic to dilute and brown. Combined with spread there is a tendency to lacing effects. Recessive opal and indigo with faded give a confused phenotype usually not diagnosable. Some research areas of combinations are opal with pale, with ice, and with stencil. Who is going to do it first?

GRIZZLE, *G*. Grizzle is an incomplete dominant. Grizzle is sometimes called tortoise and it is likely that there are two or more alleles for grizzle. There is a great deal of variation in the phenotypic expression. Homozygous grizzle yields a near white phenotype. The storked pigmentation of the wing tips is sometimes ruined by the molting out to white. The basic action of grizzle is rather randomized blocking of clumped pigment areas, the head,

neck, wing bars, tail and flight tips. The so-called tiger grizzle heterozygotes do not show tail effects as much as regular grizzle.

Spread is epistatic to grizzle. Most other combinations are recognizable but several have not been tested. For example, stencil and grizzle effects in combination are not known.

SEX-LINKED MUTANTS

BROWN, *b*. Brown is a richer, warmer, more brown color than dilute with which it is sometimes confused. The eye color is a mimic or false pearl color. Brown combined with the true pearl eye still yields pearl eyes. The choroid pigment is also lighter in the eye of brown pigeons.

Several interactions are known from long ago. Dilute brown is called drab; spread brown is called chocolate. Recessive opal is hypostatic to brown. Brown itself is hypostatic to recessive red. Some other combinations allow both mutants to be recognized. Brown with varicolor, sooty, smoky, ice, toy stencil, oriental frill and two kinds of bronze allow both to be recognized. The interaction with Brander bronze is unknown. Dominant opal with brown also are not known as to how they interact. Indigo brown yields a pseudo ash-red as has already been mentioned. However, Dr. Hollander can usually distinguish these.

ASH-RED, B^A. This mutant probably converts the coarse spreading eumelanin to pheomelanin. The smooth spreading pigment converts to an ash color, gray. The tail is an ashy color.

Spread and ash-red interact to give ash color all over. spread and ash-red with milky yield a bright silver dollar color and is a very pretty combination not widely spread among pigeon breeds. The ash-red, recessive red combination yields a dusky red color. Bronze combined with ash-red yields a red color ahead of the tail bar. Ash-red indigo, ash-red almond, ash-red dominant opal or recessive opal are interaction effects that Dr. Hollander can usually distinguish, but are rather confusing to most pigeon breeders.

DILUTION, *d*. Dilutes all melanin including the bill ring of the newly hatched squab. Dilute red is yellow, dilute blue becomes "silver", and dilute black is called dun. Recessive opal tends to be hypostatic to dilution. White or albino is epistatic to dilution since they so interfere with any melanin pigment of the pigeon feather, bill or feet. Christie and Wriedt believed *St* and *d* combination was near-lethal or at least detrimental showing coloboma and nystagmus. Other interactions: B^A *d* yields "cream" (if a bar); *d my my* is called "moon-glow silver". Other combinations are about what one would expect in appearance.

PALE, d^P. Pale is an allele (alternative form) to dilution and partially dominant to it, the heterozygote exhibiting a blending effect. The single mutant pale (i.e. on an otherwise blue bar) makes the bar more olive-colored. Pale red yields "orange". Pale Archangels are called "gold gimpel" with a yellowish breast and blackish wings.

REDUCED, *r*. The single mutant form is opal-like, and exhibits reddish bars with black edges. It comes mostly from a single source, Graefe's Roller stock. There is a marked change from juvenile plumage to that of the adult, especially the adult's crop is darker. The squab has a lighter bill. Reduced is a near mimic of recessive opal, but the interactions with other mutants are more extreme: *ee r* yields "pink"; *r S* in adults is sometimes very pretty, ashy with lacing effects, but it exhibits much variation. Dirty reduced and possibly other such mutants with reduced make a muddy color in the juvenile, but the adult looks better. Some of the prettiest effects are with Checker or T-pattern. B^A *r* is a "pink" bar. Unknown mutant combinations of potential interest: are *r S* B^A, *In S r*, *r oo*, and *r Od*. |

ALMOND, *St*. (Symbol from Christie and Wriedt's German name meaning "sprinkled". The single mutant form is white with dusty aspect. The eye color is pearly in adults. More and larger flecks occur in the male and also develop with age. Newly hatched squabs have short down and pink beak. The homozygous males are nearly pure white with blackish eyes, and are usually weak (not thrifty) with eyes often bulged (if "bladder-eyed" they have no eye lens and are blind). Much variation exists in the homozygous phenotype. The hemizygous female almonds have faded flecks and wild type flecks. Heterozygous males have only wild type flecks!?

Males heterozygous for the trans phase of mutants, $\frac{b \quad +}{+ \quad St}$ on opposite chromosomes, exhibit brown flecks more abundantly than the wild type flecks, although brown would not have been expected to show, since they are not alleles. Males with the cis phase of heterozygous mutants, $\frac{b \quad St}{+ \quad +}$ on the same chromosome, yield only the wild type flecks. Thus, there is a position effect according to the phase of linkage. Homozygous brown heterozygous almond birds, $\frac{b \quad St}{b \quad +}$ are almond with only brown flecks.

Ash-red almond males with the mutants on opposite chromosome strands as $\frac{B^A \quad +}{+ \quad St}$ have ash-red flecks; but on the same strand such heterozygotes have both ash red flecks and wild type flecks with usually the latter more abundant (again position effect). Brown almond females, $\underline{b \quad St}$ have brown flecks (and possibly difficult to see faded brown flecks?) Ash-red almond females have ash-red flecks (and possibly faded ash-red flecks). Dilute almond females have dilute flecks and the squabs are "bare" of down. Vigor is poor (semi-lethal) as already noted under Dilution.

Almond is epistatic to most other color and pattern mutants. Nevertheless, when flecks are big enough the pattern may be recognizable. Exceptions are Almond with recessive red which yields a salmon color with red flecks (= "De Roy" color). Almond with bronze or kite has a bronze-like infusion (less white) resembling its namesake, a dried almond seed color.

FADED, St^F. The single mutant form is highly variable. General slight depigmentation gives a frosty appearance with a tendency for coarse-spreading bronzing to appear. Hemizygous females and heterozygous males look much alike, but the quantity of flecking is increased in the male similarly to the flecking in the Ash-red pigeons. Newly hatched faded squabs with only one faded gene resemble wild type. The homozygous St^F St^F males have a reduced amount of down, a pink beak, and look whitish like the heterozygous almond. Increasing age shows more faded flecks.

Since the hemizygous females and homozygous males are pure- breeding, yet strikingly different, this forms the basis of the autosexing types such as the Texan Pioneers and Rehani Dewlaps. The sex is distinguishable from hatching on. In some older auto-sexing males the flecking can become so extensive that they approach the wild type.

Males with brown and faded genes on opposite strands yields both brown and wild type flecks, if any show. Ash-red faded genes in the same trans phase show a very light ash-red with faded flecks. But ash-red faded on the same strand in heterozygous males (cis phase) exhibit any noticeable flecks as wild type. Again heterozygous brown faded males in the cis phase yield wild-type flecks, if any show.

Brown faded females have brown flecks, if any. Ash-red faded females are pinkish light as red with flecks ordinarily not noticeable. Faded homozygous brown males have brown flecks. Dilute faded females are dilute faded as one expects. Similarly, reduced faded is about as expected and is rather pretty.

Homozygous faded males often mimic the heterozygous almond. Recessive red with homozygous faded is a salmon color, while a hemizygous female approximates an ordinary recessive red. This again is auto-sexing, but it is not as easily distinguished as the regular auto-sexing. Auto-sexing brown was termed "amber white" and auto-sexing ash-red was termed "copper white" (Gottfried).

Faded indigo is rather pretty being a near mimic of opal color. Faded does not inhibit bronzing.