

# Expression of Bronze Phenotypes in Pigeons

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## ABSTRACT

To know the color genetics of pigeons, the inheritance of bronze could be an interesting issue. This color is commonly found in most fancy and feral individuals. This observation focused different degrees of bronze colors in twelve breeds of pigeons (Plates 1-12).

**Keywords:** Bronze, Expression, Phenotype, Pigeons.

## INTRODUCTION

Combination of the pigments of eumelanin and pheomelanin on phenotypes, commonly called the bronze phenotype and generally governed by many genes. Any combination of black and red pigments results in the bronze color, which appears neither fully blue/black nor purely red. Today it can be pretty sure that most bronzes are not alleles. Numerous secondary genes and polygenes enhance the phenotype of rich bronze coloring [1]. The brander is a Copenhagen tumbler of a black ground color, but strongly glossed with reddish bronze. In Bangladesh, there is a pigeon named 'cheela' which is similar to this brander pigeon. It is also described as fire-pigeons by several English authors [2]. The brander was successfully used as an outcross in producing the show tippler [2]. Brander is especially Danish tumblers and could be come out with brander color and markings [3]. Bronze in different kinds appears in street pigeons and as a fault in many fancy breeds; some of them affect the breast. The recessive reds (masking the brander bronze) make a good impact on the pearl eyes (dark eyes in the nest) of the bronze birds. Homozygous brander is free from recessive red mutation. In recessive red factor, the feather of nest-birds is red but after molting those are transferred into partial white. Brander in the UK was commonly called black (enough to confuse anyone) [4].

**Tippler bronze:** Tippler bronze affects the wing bars and in a lesser degree of body [5,6]. This phenotype is closely associated with grizzle. When this bird crosses with wild-type, they produce all forms of grizzles and pied combinations [7]. Spread mutation in this breed does not express completely mask completely but show high degree of bronzing. T-pattern in tippler bronze is called tortoiseshells (Plate 1). The grizzle traits do not break down into bronze [8].

**Roller bronze:** It is possible that the roller bronze might lack or have additional genes [9]. Quinn [6] stated that roller bronze affects smooth spreading in the flights and tail with minor effect on blue areas (Plate

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2). It is dominant but masked by spread. Simple autosomal dominant gene has the tendency to increase the expression of bronze in smooth spread areas on ash red birds. It is difficult to increase or decrease the amount of red in this breed by selective breeding.

**Kite bronze:** Some kite breeds, the feathers are almost black with sprinkle of red (Plate 3). This bronze color is completely masked and are not a spread (S) [1]. Kite produces a bronze in the wings, especially in the inner webs of the flight feathers, and sometimes similar to solid blacks. The diluted kites are sulphur at the breast and known as gold dun [10].

**Brander bronze:** Brander bronze looks very rich and bronzy version of recessive red [11,12]. In addition, the bronzes also have primary and secondary flights tipped with solid black and the tail shows a distinct solid black bar (Plate 4). Brander bronze is produced by combination kite recessive red and T-pattern check (dark check in the wings). True brander is very rich bronze that is homozygous. Light brander is tigered Danish brander. The common genetic basis of the different brander bronze is caused by dark checker pattern, heterozygous or homozygous recessive red. Grizzle is present in a brander phenotype, the color seems to stay bright even after the adult molt. The effect differs in several breeds will be caused by modifying factors. East and south European tumblers are caused by grizzle and pied factors not yet analyzed in a sufficient manner. Brander bronze may be transferred in brown and dominant red pigeons. According to Gibson, dominant red brander bronze has white marking near the flight tips and white tail bar. The effect of brander bronze mated with the wild-type is kite, a slight bronze only heterozygous recessive red, and brander bronze carried the bleaching trait of white. Brander bronze is related to under-grizzle.

**Lebanon bronze:** This is two recessive bronzes found on gimpel (archangel) head and neck. Lebanon bronze is best expressed on T-check (dark check) ash-red plus a darkener possibly sooty or dirty. This bronze factor may intensify the reddish color (Plate 5) [13].

**Modena bronze:** Spread and ash red masks modena bronze where the ash red and black modenas show no traces of the bronze characteristic of this breed (Plate 6). According to Cryberg [14], Modena bronze is a combination of three bronze mutants—dominant, co-dominant, very nearly recessive [15].

**Archangel/Gimpel bronze:** This is reverse expression of Modena bronze. The wing shield color and pattern can be any possible combinations These genes will mask the entire body. Mating of archangel with wild-type produces slight bronzing in the blue areas. In archangel bronze, dominant

and recessive trait are not allelic to each other. The bronze trait of archangels is identical with that of copper bluewing or gold bluewing gimpel. Archangel bronze affects primarily blue areas of the body including head and neck. The coloration of wings and the tail are not changed by this gene. In the juvenile plumage many gimpel show brown bronze in the shield and in most cases, this will disappear during the molt. The bronze of breast and belly is a dominant and usually does not affect the wings. Black wings and black tail of archangels are not caused by spread. Actually, spread is not present in any gimpel coloration. Most black-wings are genetically checkers. Black-wings seem to be caused by recessive darkening factors that are suppressed by the wild-type in the F1 and show up in the F2 and in the backcross to pure archangels. The lighter gold is caused by modifiers and not a hint on dilution instead of pale. Gimpel pigeons exists in combination with different pied markings like white wings, white heads, monk markings, etc. (Plate 7).

**Toy stencil bronze:** Toy stencil is produced by three co-dominant genes [16]. If toy stencil is mated with wild-type, F1 always produces some sort of bronze especially on shield and some breeds turn bronze into white after 3-4 years (Plate 8). When a frill stencil is mated to wild type the F1 hardly gets any bronzing. The toy stencil bronze differs from all other forms, it will stamp out the masked pattern in a spread pigeon. Bronze breeders suggest that bronze will not show in the sooty phenotypes. Robert Mangile [17] stated that breeding toy stencil and frill stencil, sooty masking the bronze is not totally accurate.

**Lark bronze (Atlas bronze):** Atlas was one of the first coloration of Arabian trumpeters imported to Germany from Arabia in the 1960s. Ordinary smoky-blue is also common in this breed with dark eyes (Plate 9). Yellow atlas is the dilute [18].

**Cheela bronze (Bangladeshi brander):** In cheela pigeon, this is bronze colored with its black tail tips and primaries (Plate 10). This is a flying bird in Bangladesh. Its plumage is a deep, rich-red with a green sheen to the neck feathers and black markings on the primaries and tail [2]. The cock is darker, showing less bronze over the black ground color [19]. Red cheela is very common and class one pigeon in Bangladesh. In the case of orange bird, body feathers are orange instead of red. Mixed cheela (phata pigeon) is sometimes describes as a 'saf (clean or pearl-eyed) cheela'. Yellow brander is appeared sulphur (dilute bronze) as in the nest it appears as a very pretty clear mustard yellow [4].

**Shakh Sharli bronze:** It is most evident on the shields (Plate 11) [20]. There is considerable variation even within the various modifiers [8].

Other bronze traits (feral birds): Bronze bars and bronze tints in the check pattern resembling a poor kind of mahogany often present in ferals. Dilute blue bars become sulphur bars (Plate 12) [21].



Plate 1. Tippler bronze



Plate 2. Roller bronze



Plate 3. Kite bronze



Plate 4. Brander bronze



Plate 5. Lebanon bronze



Plate 6. Modena bronze



Plate 7. Archangel bronze

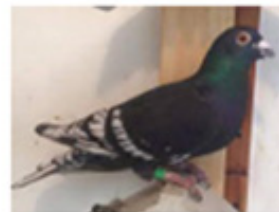


Plate 8. Toy stencil bronze



Plate 9. Lark bronze



Plate 10. Cheela bronze



Plate 11. Shakh sharli bronze



Plate 12. Feral bronze

## CONCLUSIONS

The bronze color inheritance is very compelling to the geneticists. Since, this plumage color is common and normally looks black but actually this is a mix of black and red to minute observation. There is a scope to study the inheritance of this mysterious color with many degrees of expression in all pigeons.

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