# **LEMON COLOUR ON SILKIE IS DIFFERENT**

#### Silkie colour genetics

... is not different from other chickens although Silkies posses quite a few extras. They are packed with frills you see on other breeds as well but not all together on one chicken (breed). Next to silkiedness, five toes a leg, a crest/tassel, leg feathers, black skin is a striking trait of Silkies.

### **Black skin**

Although... not all colours in Silkies show this, black cuckoo Silkies have white skin with a few blue patches and hens can have a blue hue on their skin because the barred gene (B, cuckoo, barred) is 'incomplete' (B/-, called hemizygous instead of heterozygous) because B is sex linked (males can have two copies). Skin colour of cuckoo coloured Silkie hens (B/- dark cuckoo) is not normative to skin colour of a pure B/B cuckoo Silkie rooster (light cuckoo), because in her less inhibitor of black is present.

When you add lavender, you'll get lavender cuckoo, this colour allows more pigment in skin. The reason is unknown, a split lavender cuckoo won't show a difference in skin colour compared to black cuckoo (white). There is said it is possible to make a cuckoo Silkie with black skin if you put enough black into it. It doesn't work this way because cuckoo has no influence on 'feather black' in skin as if you can stuff the bird full of black (by breeding back to black all the time for instance) by which black goes to the skin when the feathers are 'full'. Stuffing more black into a cuckoo coloured Silkie does have an effect on the feather and eye colour (black pigment patches in red eyes, less leakage in roos). Stuffing black has no influence on skin colour if you want a black skin on a cuckoo Silkies as black skin is a trait of Silkie according to the SOP. In several countries there is awareness about the impossibility of black skin in cuckoo Silkies, and the standard description adjusted. The same story applies to other breeds which should have dark shanks (slate), which won't work when cuckoo gene is

present. Why this cuckoo-talk when the story is about lemon colour? Cuckoo on a black skinned chicken is an example of a feather colour gene which has influence on skin as well, not only on Silkies. There are more genes doing this. Feather-black has

# Comb/eye: id+, Fm

# Blue ear: Fm

# Yellow: s+, Di, ig, Ar+

influence on leg colour when there is no inhibitor of this action is present. A bit dark pigment in epidermis/ouder skin layer of a black chicken (not black Leghorn or Grey Sussex), is normal. But, when you add mottled to such a black chicken, the dark shade disappears or becomes patchy. This is accepted and part of the nature of mottled gene (mo).

Dutch bantams, Padua and Polish must have dark shanks, this is called dusky. But, when you make a Dutch bantam in buff or a Padua in tollbunt (gold laced mottled), suddenly the leg colour changes and is no longer according to the SOP of those breeds.

Breeders might be surprised what they are doing wrong because of this 'non standard' leg colour, it will costs points at a show...

Fortunately there is more and more consensus regarding the influence of feather colour genes on other 'parts' of the chicken. A feather colour gene,

# Black skin: id+, Fm, W

but also frill-genes can affect other parts but the target part. This is called: pleiotrophic effect, a by-effect. These effects can be minimal or a pretty lot,

B/b+, id+/id+, lav/lav, Fm/Fm: blue skin





# ellow: Co, Db, Pg, pg+

The pleiotrophic effect of B on leg, eye and skin

# Under fluff: eb, eWh

colour is known. Just as is mottled (mo) which affect leg colour and in the Dutch bantam red diluter Di (dilute) changes the dark leg colour in a light shade, which happens way less when there is still a bit black present in tail. Dilute is less extreme compared to barred/cuckoo. Buff chickens which ought to have dark legs, have a 'problem' if dark legs is a breed characteristic. In breeds with light coloured (white, yellow) legs/skin you can skip black pigment just as much as you want.

## What is lemon colour in chickens?

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Lemon is a hobby or fantasy name and tells nothing about genotype, it tells only something about phenotype. Lemon colour on Silkies is formed in

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think of genes which are lethal to the embryo when they are homozygous.

B/b+, id+/ id+, Fm/Fm: white skin

B/-, id+/-, Fm/ Fm: white skin



Cuckoo (B) has influence on: Feather, eye, skin, horn, leg colour

Mottled (mo) has influence on: Feather, eye, skin, horn, leg colour

Dilute (Di) has influence on: Red pigment, black pigment in eye, skin, leg colour

Columbian (Co) has influence on: Distribution of black & red pigment, lightens red pigment when pure

Db (black tail gene) has influence on: Distribution of black & red pigment, lightens red pigment when pure

Pg (pattern gene) has influence on: Black pigment, pure and impure

id+ (dermal melanin) has influence on: Feather, eye, skin colour when FM present, without Fm on leg colour

Fm (fibromelanosis, back skin) has influence on: Skin, eye, leg, meat, horn colour and is dependent of the presence of id+

The expression from id+ is influenced by: B (cuckoo), mo (mottled), Di (sex linked gold diluter).

several different ways and this explains, just as buff colour (although a bit less), the variety of shades and also colour distribution differences in red and black.

It is only a relatively short time ago lemon colour started to inherit fairly stable on larger amounts of birds. But, there are still chicks born, which bothered the creator at the time and puzzled him how these colour deviations were actually possible. The troublesome part is you can't see on the outside what happens on the inside of the bird, you only know when you test breed it and continue this just as long with a group until everything hidden becomes pure and therefore visible. Otherwise you'll never know, and you'll be surprised continuesly. Surprises can be fun, but when you strive for an official standard colour variety you need an uniform breeding colour throughout the generations considering meanwhile the shades may be a bit unstable as is in buff colour.

Lemon colour in Silkies is meant to be a strongly diluted golden ground colour as lemon in Sebright is visually. This is a stable basis on which the ground colour before dilution is determined in shade/colour intensity by the e-alelle. This also applies buff coloured Silkies. In Silkies there has never been a discussion on which shade is most desireable. Once buff is established by

Buff and lemon chick down (eb).



Buff and buff on eb partridge and eWh wheaten, plus mixes... (proto-lemon).





Buff on eb, grey under fluff, not enough columbian action, so: not correct.

acceptence of the poultry authorities, one can think: what is IN it? In the Netherlands a dull buff colour was accepted without black in tail and with white under fluff. A bit like Orpington buff colour, but more pale. Can you see the connection to the buff Dutch bantams and their too light legs?

The pale buff coloured Silkies are based on gold wheaten (eWh), a colour which is utterly unfriendly to black pigment because on this allele red is much favored. It is the basis from the chicken

\*) Consideration: silkied has, in contrast to smooth feathers, no closed feather vane, the top colour is mixed with under fluff colour when the vane is not long enough to cover fluff. In silkied/Silkies, it is important to select for a limited under down part compared to the vane of the feather, otherwise the bird has the colour of under fluff instead of the colour of the vane (depending on the e-allele). Crawling up under fluff (to add extra softness and volume) would best be controlled in colours of which colour of the vane differs from under down colour.







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# USA buff on eWh wheaten basis. Not enough black present.

colour factory which got least black pigment. The almost white under fluff mingles visually with the feather vane (which is open due to silkied) by which the bottom side of the the bird can be almost white.\*

There are also yellow ocre almost light orange buff Silkies. These birds are based on eb partridge, an e-allele which allows black and these buffs can be recognised by some black in tail and wings and grey under fluff.

Lemon colour on a Silkies is a by columbians restricted and lightened gold, or... a by columbians restricted silver or half silver (roo) birds with a considerable amount of autosomal red which is pretty evenly spread giving a light yellow colour.

Dilute as red/gold diluter has influence on skin pigmentation of roosters because of their sex hormones by which their combs are more red compared to hens. But Di has also influence on the comb and skin of a hen because she posseses only one dosis id+. In lemon



(and buff based on wheaten) Silkie hens, the comb can be red as well, only less compared to her brother because hens are in general more 'black' compared to cocks, which you can see in patterns and the tendency to be more melanized on the hind part of her body. This is also in Silkies, black Silkie hens show less leakage of gold or silver in hackle compared to roosters when they are mature, where the males show every following moult more gold/silver.

There are different ways to make lemon colour on a Silkie. During the creation you think the colour is stable, but suddenly the colour segregates in all kinds of colour combinations. This is the moment to document these 'colours' because they tell you what genes are around. When you are able to interpret the segregations correctly, you find the combinations to continue with which are pure and stable breeding. You can also discover traits you don't want to see of course. If you understand the underlying genetics you can deduce the unwanted effect to specific genes which are present. Therefore its important you know what you used to create a colour. In this case of the lemon Silkie, it was unknown at that time. Nevertheless is it possible you need certain feather colour genes which influence breed characteristics negatively. Fortunately more and more knowledge is passed through and breeders are aware you can't 'have it all'.

By this time in history (2014) of the fancy and breeding ornamental chickens, its also the time to filter out, genetically impossibilities, a process which is difficult because conservative minds have problems with new developments and new wording of ancient SOP texts. Keep in mind, not every standard colour can be applied to every breed. Every breed has its specific traits which can interfere with a 'general colour description'. For instance buff colour. Buff and lemon on dark shanked or black skinned breeds needs different requirements compared to light shanked or meat colour shanked breeds. Red diluter Di has influence on leg and eye colour (and skin in case of a Silkie), and they are not Orpingtons with white legs/skin, red eyes although the standard colour description is written on this particular colour of buff. You can want anything and everything



Lemon without ig or impure ig, gold diluter, see 'buff' neck.



Dilute has influence on dark pigment, too short black pigment gives too light coloured eyes.



White and 'silver' lemon, cockerel with autosomal red, not enough though.



Another silver lemon (2009), Columbia and Db are present, a lot of black, probably due to eb-buff basis. Short in autosomal red.





Haantje rechts is oorzaak van 'zilvercitroen'. Hij lijkt fokonzuiver voor goud of is gewoon zilver. Een hen kan alleen goud of zilver zijn. Let op zijn vleugeldriehoek die is meer wit dan goud. Met een op goud gebaseerde hen kan hij fokonzuiver zilveren zoons maken. Zilver is dominant, zo kan een practisch witte citroen ontstaan. Zijn dochters zijn zilver of goud.

Note neck colours of lemon and buff. The dark buffs are based on eb asiatic partridge and are therefore dark cinnamon coloured to orange. A shade which you won't see on wheaten based buff. In the same group on the left side proto-lemon coloured.









Top: two eb buffs and an eWh wheaten buff. On wheaten based lemon colour will be very light (white under colour) and won't show much black in tail, resulting in a red comb, light skin and too light eyes.



on paper, nature can be forced only to certain limits. Gene expression, although very stretchy has its boundaries too. Therefore, when you want to document something for future, keep in mind what is possible and a goal which can never be obtained, otherwise you damage the colour variety by making a description which can never be met.

This is also applicable to rare individual birds which show a deviated colour because the basis is different (for example a lemon rooster which is silver, autosomal red and has no dilute, therefore his head/comb will be dark, together with a gold based diluted buff hen, this is not a 'breeding pair').

The breeders are responsible for their, and their bird's success.

Black cuckoo Silkie with black skin? Make them silver autosomal barred as Campine. Nobody will see the difference.





Fm, without id+.

Legs impure Fm and id+.

Fm is incomplete dominant

and shows also impure as

pigment spots. Impure id+



Hen, too light eye colour and comb for a hen. Single comb since the rose comb fraction of dad died in his semen (mum impure too). Mother of most lemon Silkies in the Netherlands.

Even when there is enough black present, a rooster will have red in face when his hormones are at full power. The only way to get rid of red comb is skip Di, by which you don't have lemon colour.

Silkie bantam with chicks (2006), note the different chick down colours. Chick down looked the same as buff down by 2009, only more yellow, incl. Co head dot and Db neck stripe.



Rooster, good (logical) skin (comb) colour, correct eye colour. Rose comb.





Dark legs on lemon? Why? Because there is enough black present.





has no action (recessive). A rooster needs id+/id+. Silkie bantam with chicks (2006), note the dif colours. Chick down looked the same as buff





Hen, good eye and skin (comb) colour. Wrong comb: walnut = no wattles and ugly dewlap.





