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BACK MUTATION BLUE

IT IS BLUE AND IT IS NOT

'How to explain the black flecks or splatters in the feathers of blue chickens, midnight-blue black chickens and probably also the the weird coloured feathers of split mottled blues?

There is a phenomenon called 'back mutation'. This is the flipping back into default mode of a feather colour allegedly changed by a mutation (such as blue) which happens in somatic cells.
Somatic cells are all cells that have no-thing to do with sperm and egg cells. Somatic cells can be pigment cells, keratin-producing cells, feather follicle cells, skin-forming cells whatever as long as it has nothing to do with sex.

The work in those cells, not affected by being male or female (otherwise not somatic) may revert to its original, here black pigment instead of blue, and therefore due to back mutations the outcome does not obey to the rules of genetics in terms of phenotype.
A suggested example is the occurance of black specks in blue feathers and black splashes in splash (Bl/Bl). There shouldn't be 'black' in a homozygous blue, the splashes should be blue at it darkest, and they aren't. Specks and splashes are 'back mutations' in somatic pigment cells, they should make blue or super light blue to white but not black.

New blue allele bl^d?
Invisible blue or midnight blue
And what about 'midnight blue', a black

Rheinländer Bantam hen in blue with a few flecks on the feathers.

suddenly giving blue offspring while paired to a black? This event, known by breeders and which surprises many of them, involves a (probably) new allele named bl^d *) *nerds see the end of this story..*

This new allele (with reservations for as long as it is not replicated) was found in 2017 while sequencing a **black** chicken from **blue** breeding. The genotype did possess the mutation of blue (bl^d/bl+ should be blue) however, a gene for making a protein was down-regulated so that the gene that gave the blue colour did not receive sufficient impetus and thus did not do what I should do: be blue.

Conclusion: the black chicken with bl^d should actually be blue. The suggestion of down tuning a causative gene for a specific protein necessary to bring about ‘our’ known gene (blue) is not certain, hence 'probably', second time mentioned. Because it could just be a 'back mutation' in which a gene reverts to default position, which in the case of blue, would be black. So the existance of bl^d needs further investigation of real scientists.

Somatic mutations in other case?
Somatic cells, i.e. general body cells (not being sperm/egg cells) can make print errors. For example a print error consists of the somatic cell not knowing what it is supposed to adhere to. This could be a pigment cell, which is where our attention is most focused on, because it is immediately visible.
Of course this can happen in other cells too. Reasons? Can be many, I’ve no idea, can be the environmental too.

Could it be the case with mottled blue?
An example? Heterozygous recessive genes, we call this ‘split for’ can also suddenly become visible in the presence of the (semi) dominant colour here blue to stay in the blue

Top: a blue Padua bantam hen. Bottom: flecks in khaki (I^D/I^D) there it happens too, the flecks are dun colour, darker brown. Excuse me for my dirty fingers.

(Jingyi Li, 2017 dissertation, Siegel, Andersson, Dorshorst - https://vtechworks.lib.vt.edu/handle/10919/85397)

zone. Since a chicken is not The Printer, this can happen, of course, although you want to know why, nobody can tell you.

Only thing one can do is ‘mindfiddling’ based on what is known from research on other stuff. Not that it is applicable, the research is not replicated (can’t find it), third mention on ‘back mutation’. However, ‘leaking’ recessives happen, whatever you might say. Can ‘mo’ mess with the proteins necessary to make blue look the way as it should ook?

Think of split mottled blue chickens who get a totally weird feather colour as if mottled is messing with blue pigment on the surface. It messes also with blue pigment when homozygous, however not in every chicken since this can be regulated by selection.
Something in mottled, even split, causes the expression of the blue feather colour to become very irregular. Note, this is the idea based on the phenomenon of ‘back mutation’ and missing the necessary dose of protein producing content and here it is in the blue producing pigment cells. In a mottled blue also in splits, whole parts of the chicken can be black, as if blue skipped those feathers. What it is in mottled, no idea, there is no research on this. It might mess with LOC107054603 or THEM110, whatever.

*) Hey nerd: bl^d sequence has compared to that of phenotypical Bl, and a decreased copy number of LOC107054603 (should be duplicated + is a computational predicted gene) compared to a normal level so the modified THEM110-protein could not express, when this LOC107054603 is normally duplicated together with the modified THEM110-protein it gives the Bl phenotype.

The mentioned example of messed up motteld blue in Brahma. I’ve written about it in a facebook post with more example photos. It is just an idea Blue is far from even in colour when there is mottled, also in splits.