

Pearl Mice

Steven Cowan, WA e-mail

Q I'm curious, do you still have and breed Pearls? Or did yours die out? I know they're almost non-existent in the UK), though there are still some out there in a couple other European countries from breeders I've talked with.

What do you get from Pearl x Pearl? I've heard varying thoughts on what they are genetically, most seem to think they're *a/a B/b si/si*, though others argue to have Pearls you must have the pearl gene (*pe*). Also, what importance does carrying Chocolate have on Pearls? I never quite understood the reason.

A Yes, I have Pearl. Eric Jukes was kind enough to let me get one male in 2004. Even though this male had females of varying ages/colors/known producers throughout life,



English Pearl male from Eric Jukes owned by Karen Robbins. Photo ©2004 Craig Robbins.

he only produced one litter with a PEW female I got from David Whittaker in the same shipment which resulted in an entire litter of black kids. I did several generations breeding back to the F1 male with no results, then when I crossed into the Silver Grey line which I also got in 2004, it showed up in the first litter. There is a photo of one of

my males from 2007 on our web site www.afirma.org/miceaoc.htm#pearlmsc.

My Silver Greys from 2004 were carrying Chocolate and that line has never thrown "Pearl"—just Silver Black/Grey/Chocolate. I have occasionally gotten some Silver Chocolates with a light undercoat—they look like Silver Chocolate until you blow open the coat—but normally any Silver Chocolates from this line or the Pearl line don't have the light undercoat. I've also gotten Silver Black mice with a light undercoat which based on my readings of the old literature they called those dark Pearl. I haven't kept any Silver Chocolates or Silver Blacks with the light undercoat to test with



First Pearl male "KKE2-2469-A" (L) at 3.5 months old compared to a Silver Blue. Photo ©2005 Craig Robbins.

so don't know if you can make show colored Pearls from them. According to Tony Cooke (1977), he says to take these "Silver Grey" with the light undercolor and cross with Silver Blue, then breed to Silver Blue/Self Silver crosses, and blend the shades and select the correctly colored ones after that. Tony Jones (1979), says, "The Pearl mouse is very closely related to Silver Greys...it must carry a gene for silvering in its make-up." and "...it is possible to produce them from light Silver Greys which lack good undercolor...constantly mating the lightest together (provided they have a whitish undercolor), the Pearl will eventually be produced." I never got Pearl in all the years of breeding Silver Grey mice (maybe I just wasn't selecting the right ones?), only when I got the Pearl import and bred him. However, Pearls have been recreated recently in England by Sarah Cudbill by selectively breeding Silver Greys with a light undercolor and selecting for lighter animals.

Having bred Pearl rats for many years I was expecting the Pearl mouse babies to be similar (an off white in the nest), but when the first guy showed up, he looked more like a Silver Blue than Pearl, and I wasn't sure what I had until he got older and lighter with age. I've found it does come in shades from dark to light (show version) which sometimes I have trouble telling if the dark ones are dark Pearl or Silver Blue and have to wait to see if the undercolor is dark or stays whitish when grown. Also, I've found the ones with just the tips of the hairs colored will be better Pearls, which is the same as what is stated in the article in the 1987 *N.M.C. News*



First Pearl mouse born at Karen's Kritters at 11 days old with his Silver Grey and Silver Black siblings. Photo ©2005 Karen Robbins.



First Pearl male "KKE2-2469-A" at 6 weeks 4 days. Here he looks like a lightly colored Silver Blue. Photo ©2005 Craig Robbins.

"Silver Threads Amongst The Gold."

In my breedings of Pearl to Pearl I've gotten Pearl, dark Pearl, Silver Dove, and Silver Blue. The Blue came from the Pearl and test breedings have shown them to be the leaden gene (*ln*), not the dilute (*dd*) gene. My best colored Pearls have come from a Silver



One lighter Pearl, two dark shade Pearl, and two Silver Doves at 15 days old. Mom and dad were both Pearl. Photo ©2011 Karen Robbins.



This litter of 7w5d Pearls show the lighter shade on the left and darker ones middle and right. Mom was a Silver Dove, dad was Pearl. Photo ©2010 Karen Robbins.

Dove (*aa bb dd sisi*) bred with a Pearl and are paler than the dark shade when in the nest.

These Pearls don't fit the description of the Pearl gene, *pe*, as they don't have ruby eyes, are not a dull dark sepia (chocolate) color, and don't have somatic reversions www.informatics.jax.org/wksilver/s/frames/frame5-7.shtml.

Colour Inheritance in Fancy Mice (Kerr, 1935), lists Pearl as *aa bb CC dd PP +?*, a Dove (a.k.a Chocolate-Blue or dilute Chocolate) plus something else, where David Montgomery in *A Fancy For Mice: A Guide For Beginners*, 2004, has Pearl listed as *aa pepe sisi* saying they can be confused with a light colored Silver Grey but have the whitish undercolor, whereas Silver Greys have the dark. According to Albert Jude (1949), any mouse with a light undercolor was considered a Pearl even the ones that looked like Silver Greys (Silver Black). The good Pearls have the black pigmented ears which shows a black base color, where a Dove (*aa bb dd*) would have lighter colored ears.

This color is not silvered but more like Pearl rats with the hairs "tipped" in black with the light undercolor where proper Silvered are solid hairs with light hairs sprinkled throughout the coat (they



A nicely colored Pearl male at 9 months old. Photo ©2013 Karen Robbins.



"KKE2-2568-A" Pearl male at 1.4 years old, son of "KKE2-2469-A," showing the light undercolor seen in Pearls. Photo ©2007 Craig Robbins.

are supposed to have 4 colors of hair: solid black, solid white, black tipped in white, and white with gray or black bands for the Silver Black [Silver Grey, N.M.C.]. White hairs are considered a fault in Pearls (Kerr, 1935). Pearls also tend to have nice big eyes.

The Standard reads: "A Pearl mouse shall be of the palest silver, shading to a whitish undercolor. Each hair shall be delicately tipped with grey or black and carried out top and belly. Eyes black. (English, N.M.C.)" Several sources also say they can come in any color but even though I've had Silver Chocolates out of Pearl litters that were very pale Chocolate and had the whitish undercolor as babies, they didn't keep the undercolor and ended up just being pale colored Silver Chocolates. I did keep one of these and used with the Pearls and got some lighter colored Pearls.

I've also found differing thoughts on what they are:

1. related to the Silvered mice/came from them/linked to Silvered
2. "...they are entirely separate and that Pearl is distinctly inherited and governed by a single recessive gene" (Hutchings, *N.M.C. News*, 1989)
3. "The view given was that the silvered stock had at some time been crossed with Chinchilla, and that the mice showing a white base were Silver Greys carrying the Agouti factor, and that the Chinchilla factor turned the yellow base to white. ... An interesting point is that from the pairing up of the lightest of these Agouti carrying Silvers a strain of Pearls has been established and one of these Pearls recently won the Coronation Cup." (Jude, 1949). According to Nichole Royer, our genetics expert, "That's not to say that combining silver + agouti pattern + Chinchilla wouldn't give you this effect. It absolutely would, and Chinchilla will pull any cream/yellow color out of the coat. It would be one way to "create" Pearl, but outcrossing them would produce agouti offspring."

If they did have Chinchilla, then if I bred a Pearl to Siamese I should get Siamese Sable; however, in my cross of a Pearl female with a Blue Point Siamese male, it produced an entire litter of black babies. I did this breeding again later with different mice and got the same result. Nicole's response to this, "Yes, you would get Siamese Sable. But then if you have ever done a breeding between the Pearls and PEW or Beige, you would have gotten Chinchilla. You should have seen some effect from the *C* locus if Chinchilla is involved in any way."

The several times I outcrossed my Pearls I always got Black babies. I found it doesn't breed as a simple recessive as Silver (*si*)

does. In breeding the 2004 imports of Silver Black (Silver Grey N.M.C.) to other colors, I got Silver Black back in the F2 litters like expected. With my F1 breeding of Pearl x PEW = Black, I did not get Pearl back in the F2 (F1 x F1) or by breeding the daughters and granddaughter back to the F1 Black male—it only showed up when I crossed the Pearl line with the Silver Grey line. My F1 male that was the grandfather of the first Pearl did carry Chocolate as well as my first Pearl male so Chocolate is needed. Even though on paper I got Pearl in 3 generations, it took *many* litters and a year before it showed back up again.

In *The Coat Colors of Mice* www.informatics.jax.org/wksilvers/frames/frame6-2.shtml, it says that *Bb* will intensify and lighten the undercolor to where the animals resembled reverse Agoutis. Silver Chocolates, however, will have less silvering in the coat, where black mice that carry brown (*b*), the effect of the *si* is intensified. This represents an exception to the rule that *B* is always dominant to *b*. The brown allele changes the eumelanin granule from oval black to round brown but that wouldn't explain why *Bb* has a greater affect of the Pearl color. Nichole's comments, "The geneticists were pretty clear in that they didn't know why this is happening. It just does. Truthfully, looking at what the various pigments do, I can't come up with any explanation of why it happens either. One of those mysteries of coat color that's not going to be explained until more research is done. That said, we have similar examples in other species (Silver [Silver Lilac, *Ed.*] and Pearl in rats that only effects Mink and Lilac i.e. 'brownish' animals)."

The first Silver Grey imports from the N.M.C. in 1987 did carry Chocolate so I didn't have to mix that color in. But I only got Silver Grey/Silver Black/Silver Chocolate in those breedings. I did have some written down as light Silver Greys but don't remember them being "Pearl." I did cross in Blue (*dd*) and eventually got Silver Blues but they had some respiratory issues so that didn't go far.



A light Pearl 7w5d compared to a Silver Blue 6w6d. Photo ©2010 Karen Robbins.

So I think Pearl either has modifiers or is a separate allele on the *si* locus or somehow linked to Silver since my breedings rule out it being from Chinchilla, and I never got Pearl in the regular Silver Grey breedings. To me it seems to be like a different color—related to the Silvers but there is something else to make the Pearl. In

The Fancy Mouse (Jude, 1949), he tells of an early fancier's theory of Silver Grey and Pearl being allelomorphic (one of a number of alternative forms of the same gene occupying the same locus on a particular chromosome).

I've also read different views on what dark, medium, and light silvers refer to—some say the amount of silvering, others say the color of the base of the hair (we made Silver Black to mean no white undercolor and Silver Grey has the light undercolor; Silver Greys are grey colored vs. the black of the Silver Blacks), or to some it is the shade of the base color. In *The Fancy Mouse* (Jude, 1949) and *Colour Inheritance in Fancy Mice* (Kerr, 1935), they list dark Silver Grey as *aa BB CC DD PP sisi* (Silver Black) but

light Silver Grey as *aa BB CC dd PP sisi*, a Silver Blue. In the articles by Debra Mauzy Melitz "Color Genetics, How Color is Formed" (www.afirma.org/colorgen3.htm), she says, "Light silvers have more white hairs and larger unpigmented zones than dark silvers. Probably the effect of different alleles of the silver locus."

I put together a page on my Pearls www.afirma.org/kkpearlmice.htm



First Pearl male "KKE2-2469-A" at 1.8 years old. He got lighter as he got older and his ears got darker. Photo ©2007 Karen Robbins.

so you can see what I've gotten. I have a series of photos showing how my first Pearl looked "bluish" and was dark but got lighter with age. My Silver Blues don't change color as they get older.

For the last couple years I was uncertain on the dark Pearls that that is what they were (that shade is what I had been getting a lot of) till I saw photos on

the Finnmouse site's old page for Pearl <http://hiiret.fi/eng/breeding/varieties/pearl.html> and Cait McKeown's (Walgate) old site www.fancymice.info/whattolookforpearl.htm showing Pearls which would be too dark in shade.

References:

- Blowers, E.D. (1934). *The Fancy Mouse*
www.miceandrats.com/eabook1.htm
- "Breeding Silver Grey Mice." *N.M.C. News* #3 Jan. 1986
- Cooke, Tony (1977). *Exhibition and Pet Mice*, pp. 120–123
- Fancy Mice Breeders Forum: "Brindle Bucks" p. 2, "Pearls from the ashes?" "Tell me all about Pearl." "The eyes have it," and "Pearl."
www.fancymicebreeders.com/phpBB3/
- Finnish Show and Pet Mice (Finnmouse) site:
"Genetics, Misc Interesting Genes, Other Interesting Genes 1. Silver *si*"
<http://hiiret.fi/eng/breeding/?pg=5&sub=10>
"Varieties, Silver-ticked, Pearl (*pe*)"
<http://hiiret.fi/eng/breeding/?pg=4&sub=5&ala=4>
- Grüneberg, Hans (1952) *The Genetics of the Mouse*, pp. 58–60
- Hutchings, R. S. (1969). *Fancy Mice*, p. 69
- Hutchings, Roger. "Beginners Start Here: Parts Twenty and Twenty-one: The A.O.V. Section (Part Twenty-One)." *N.M.C. News* (reprinted in *Mouse Review*, Issue No. 12, Oct. 1989)
- Jones, Tony (1979). *Encyclopedia of Pet Mice*, pp. 178–182
- Jude, Albert (1949). *The Fancy Mouse*, pp. 60–61, 102–105
- Kellett, John (1959). "Silver Greys." *N.M.C. News*, May 1986 (reprinted in *Mouse Review*, Issue No. 14, Dec. 1989)
- Kellett, John (1979). "A Gem of the Mouse Fancy - The Pearl." LSCMRC web site www.miceandrats.com/aov_pff.htm
- Kerr, W. Mackintosh (1935). *Colour Inheritance in Fancy Mice*, pp. 44, 66–68
- Maxey, Walter (1920). *Fancy Mice and Rats*, pp.55–56
- Melitz, Debra Mauzy (1999). "Color Genetics, How Color is Formed, Part 3: Genetic Loci." *AFRMA Rat & Mouse Tales*, Summer 1999.
- MGI web site (*pe*, *ru*, *si* genes) www.informatics.jax.org
- Montgomery, David (2004). *A Fancy For Mice: A Guide For Beginners*, p. 63
- "Silver Browns." *N.M.C. News* #8 June 1986
- "Silver Threads Amongst The Gold." *N.M.C. News* #17 March 1987
- Silvers, Willys K. (1979). Chapter 3 (*b*), 4 (*ru*), 5 (*pe*), 6 (*si*). *The Coat Colors of Mice*.
- "Varieties of Fancy Mice - AOV - Pearl." LSCMRC web site
www.miceandrats.com/aov_pea.htm
- Walgate, Cait, Fancy Mice site www.fancymice.info/pearl.html

Send in your general rat and mouse breeding questions, comments, articles, etc., related to colors, markings, or coats. Send to the Editor or e-mail editor@afirma.org.