Creams - the Heartbreaking Beauty

By Kathryn McKay (Willowmist Stud) ©2013

An adult DE cream sow with a slightly "hotter" colour

We have been exhibiting DE Creams in Self, Satin and Crested for nearly 10 years. In those 10 years they would have to be the one colour that I have heard the most old cavy tales about. Creams, whether they are Dark Eyed or Pink Eyed tend to have nice conformation, big bold eyes, gorgeous heads and large drooping rose petal ears. They are, on the physical side of things, quite capable in taking out top awards at shows.

The real tragedy and challenge of creams is to get their topcoat and undercoat colour right. They are a heartbreak breed – breathtakingly beautiful, but often just not perfect enough on the table.

The first stumbling block in pursuit of the perfect cream, particularly for those new to the fancy is that they do not breed true. If you breed two creams together you can and often do get other colours. This is how we lost our original cream line. Another hurdle that makes it hard for people to get their head around cream breeding that it is relatively easy to make a cream. In theory by mating two creams together and depending on their background you could get DE Cream, PE Cream, Buff, Saffron, PE White and DE White. On the law of averages for every four babies born to cream parents you should have a 25% change of getting a White, 25% chance of a Buff/Saffron and a 50% chance of getting Cream. However because the law of averages is never that predictable, you could just as easily have a litter of all PE whites or Buffs. The only way to guarantee a 100% litter of creams is to mate a White with a Buff or Saffron. The only issue with this is it is impossible to tell what minor/modifying genes for good or bad undercolour the White may be carrying.

A paler, more favoured coloured DE cream, with her day old son

Nick Warren in the UK has written an excellent article about the genetics of cavy colour and coat type entitled Cavy Genetics: An Exploration. It was revised and updated by Bryan Mayoh, with input from Simon Neesam in 2008. Although dealing with cavies in the UK I feel most of the genetic information relating creams applies in Australia. Firstly to deal with eye colour in creams. Australia recognises two eye colours – Dark Eye and Pink Eye. In Pink Eyed Creams and Saffron the Pink Eye is produced by a double expression of pp. If the cavy has PP it will be Dark Eyed. If it is Pp it will be Dark Eyed, but carry the potential to produce a Pink Eyed cavy if bred to another carrier. If it is PP but carries the cr gene pair on the C Series (Colour Dilution Series) it will be dark eyed, with a ruby cast to them. On the C Series the ch gene pair is the Himalayan gene that dilutes all colours to white giving a "false albino: which is what Pink Eyed Whites are. The ck pair is also a diluting gene similar to the cd pair, but it produces slightly darker animals. The existence of this pair was first written about by Dr Seawall Wright in 1923 in an article published in the American Naturalist, entitled "Two New Color Factors in the Guinea Pig". He wrote it was nearly impossible to tell animals with this pairing apart from the cd gene pair.

To complicate things even further there are genes known as Rufus modifiers or polygenes. These are stand alone genes that do not have to be part of a gene pair and they are polygenes because one or more could be present on the same animal all interacting on each other and the C Series genes. The Rufus modifiers/polygenes affect the intensity/saturation and brightness of colour of the C Series. These modifying genes are one of the reasons it is so difficult to get consistency of colour in cream breeding.

Type of Cream	Extension	Black	Pink Eye	C Series
PE White	ee	bb	PP	ch ch
DE White	ee	bb	PP	cr cr
Buff	ee	bb	PP	cd cd
Saffron	ee	bb	pp	cd cd
DE Cream (Buff & PE White Carrier)	ee	bb	PP	cd ch
DE Cream (Buff & DE White Carrier)	ee	bb	PP	cd cr
DE Cream (Buff, Saffron, PE Cream & PE White Carrier)	ee	bb	Pp	cd ch
DE Cream (Buff, Saffron, PE Cream & DE White Carrier)	ee	bb	Pp	cd cr
PE Cream (Saffron & PE White Carrier)	ee	bb	pp	cd ch
PE Cream (Saffron & DE White Carrier)	ee	bb	pp	cd cr
DE Cream (slightly darker) (Buff & PE White Carrier)	ee	bb	PP	ck ch
PE Cream (slightly darker) (Saffron & PE White Carrier)	ee	bb	pp	ck ch

Just a few of the many possible combinations that will produce Cream in cavies. The actual shade/tint will be determined by other modifying and minor genes.

Now for the tricky bit. Creams can be produced by a combination of different pairing of gene alleles. (See Chart for some possibilities). Unless colour DNA testing is done or the parentage over several generations is known it is nearly impossible to tell by looking at the animal's appearance which genotype it has. It is possible for two DE Creams from the same litter to have the same phenotype, but to be genetically very different. Then if bred together could produce surprising and unexpected results, especially for those new to the fancy.

Now for examples of what happens when you pair up animals with particular genotypes. PE White (ch ch) x PE White (ch ch) will only produce PE Whites. It breeds true. As does the Buff (cd cd) x Buff (cd cd) in that it will only produce Buffs. A PE White (ch ch) x Buff (cd cd) will produce DE Creams (cd ch) - with one gene taken from each parent resulting in a hybrid colour that doesn't always breed true. Then it starts to get complicated if you breed a DE Cream (cd cr) x DE Cream (cd ch), you might get DE Cream, DE White, PE White and Buff. A DE Cream (Pp cd cr) x PE Cream (pp cd ch) could produce DE Cream, PE Cream, Buff, Saffron, DE White or PE White. DE Cream (Pp cd ch) x DE Cream (Pp cd ch) could produce those colours minus the DE White. There are many ways the genes can pair up and then throw in the modifiers and the picture becomes very complicated.

De-Bunking Some of the Cream Myths

An adult PE Cream boar

Myth 1: If you breed a Cream that is too light to one that is too dark you should get babies that are the right colour.

You might, but you are more likely to get more cavies that are too light or too dark. Animal coat colour is not like mixing paint, breeding light and dark colours together will not necessarily give you a mix of the two. If you have a Cream that is too light or too dark, find a mate that is close to the ideal colour as possible to maximise your chances of producing the correct colour.

Myth 2: Using Whites that do not come from cream breeding will ruin your cream program.

As you can see from the chart Whites that come from Cream breeding and Whites that come from White breeding are genetically the same. Cream bred Whites carry no Cream genetic potential. Is it “safe” to use these Cream-bred Whites in a White breeding program, genetically it makes no difference. They cannot introduce the Cream gene into a White strain. The only possible advatage in using a Cream bred White in a Cream program is that if they have Cream or Buff/Saffron siblings you can get some idea if they might be carrying genes that produce better or worse undercolour.

Myth 3: Cream-bred Buffs are not really Buffs; they are just very dark Creams.

As with Whites, a Buff produced from a Cream program is genetically a Buff and will when mated to another Buff only produce Buffs. The problem arises because some creams are on the darker side (some people refer to them as “cruffs”, neither Cream nor Buff). Genetically they are Creams, but because they carry the Rufus modifiers/polygenes that intensify their colour they are darker than a “normal” cream. We actually had a Buff (she was on the lighter side) that had come from several generations of Buffs that popped out a litter of a DE White, Cream and Buff. This proved she was Cream not Buff. This is possibly how this myth arose. However, a Cream-bred Buff will have the cd cd genotype which is identical to a Buff as one from a Buff only strain.

Myth 4: Using DE Whites in a Cream program will turn the undercolour white and the cream is not the right colour.

What will give good undercolour is the selection of parents with good undercolour. When using DE or PE White it is not possible to see the undercolour so this needs to be taken into account when selecting what to breed it with. Again the paint box theory applies, mixing white in doesn’t make for lighter undercolour - it depends on the modifying genes.

A younger DE Cream Satin sow

Myth 5: A Satin Cream always has better undercolour than a Self Cream.

Maybe, maybe not. Satinised coats have the ability to trick the eye. The colour of Satins often appears more intense because of the way light is reflected off it. The undercolour can appear more even and match the topcoat better because the eye is tricked by the optical effect.

A DE Cream English Crested

How We Breed Creams

We have and probably will continue to use a variety of methods to breed creams. We have had great success introducing DE Whites into our Cream lines. We resurrected our lost Cream line by breeding DE Whites to Buffs that had come from the Creams. Hey presto - instant Creams. We have used PE Whites and Buffs with success, as well as Cream x Cream pairings. We select for good undercolour and a topcoat free from flakiness. Our aim is to produce a Cream that is a nice, clotted cream colour.

A DE Cream, PE White and a Buff from the same litter. The parents were both DE Creams

When Creams are born they more than likely to be darker than their eventual colour. If you look to the colour on their belly, this should give you a good idea of their ultimate colour. Creams go through many changes until their coat finally settles. We find they can have particularly ugly, flaky stages. It is important not to given up on them while they go through this, the same cavy in six months time could look very different. Do not over groom Creams. If you take away too many guard hairs you can end up with a patchy, unattractive animal that will never do any good on the table. A well groomed animal on the other hand is a potential Best in Show winner.

However, remember what has worked with our lines may not work with yours. Many factors, importantly the Rufus modifiers/polygenes are at work. Creating the perfect Cream is like producing any great work of art. It takes patience, skill mixed with a fair bit of luck.

‘Cavy Genetics: An Exploration’ by Nick Warren, 1999; Revised and updated by Bryan Mayoh, with input from Simon Neesam, 2008
Wright S. Two New Color Factors in the Guinea Pig. American Naturalist 1923
Colour Inheritance in Small Livestock, Roy Robinson, NDR FIBiol, 1978