

# CAMEO PEWTER AND SMOKE PERSIANS IN THE U.K.

## A SUGGESTED BREEDING PROGRAMME.

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I posed the question in a previous magazine (2019) "Where have all the Cameo's gone?" and raised questions about the Agouti influence in the breeding of our three incredibly special Persian varieties, and I have become increasingly concerned that the unique differences have become blurred. **GCCF have long maintained that all Smokes are non-agouti and all Shaded and Tipped cats (Cameos, Pewters & Chinchillas) need to have the Agouti allele.** This rule has been tried and trusted for decades by many dedicated breeders and seems to be reliable. It must be understood that all cats have the gene "Agouti" but they also have either agouti or non-agouti alleles for this gene. The important factor is that when the GCCF theory was first developed, we did not have the benefit of DNA testing for the Agouti gene, but now we do. My own breeding experience, with the benefit of DNA testing, strongly supports the "GCCF agouti rule", and although I have produced a few kittens with Cameo phenotype from my non-agouti parents, it is a scientific fact that when non-agouti cats are bred together, they can only produce non-agouti offspring, So when those parents produce a Cameo phenotype, it becomes confusing to categorise their offspring between Smoke or Cameo. For the show bench they may be Cameo, but in genetic and breeding terms, they are "false" Cameo.

I have debated the "GCCF agouti rule" with numerous breeders and judges from U.K. Europe and USA leading me into much confusion and disagreement, never-the-less I am increasingly convinced that I need to trust the GCCF theory. Unfortunately, I am aware my trust is not shared across all the feline registries, or by all Breeders.

### Where it all began

It all began with the Chinchilla. According to records, in U.K. it was an itinerant Tom who was a transient resident of Babbacombe in Devon, who with a little help from an unusual silver tabby called 'Chinnie', was responsible for the foundations to the glamorous Chinchilla Persians of today. There can be little doubt that those offspring inherited the Agouti allele, and no doubt the wide band allele too, from either or both of their parents. Persian breeders then worked for decades on developing the Chinchilla into the magnificent green-eyed creatures we know today.

Years later an article published in 'CATS' (U.K.) stated that "to obtain Cameos it was necessary to use both Smokes and Chinchillas" but went on to mention that "those early generations were sometimes difficult to assess between Smoke or Cameo". It seems safe to conclude from this that some of them carried the Agouti allele and were Cameo's and some did not and were Smokes. Unfortunately, only the phenotype of the kitten could help decide the difference in those days and that, unfortunately could be very misleading.

In U.S.A. Cameos were originated early in the 1950's in Rachel Salisbury's VANAKI Cattery in Wisconsin using cross breeding of Chinchillas x Smokes, (reds, creams and tortoiseshells).

The important ingredient in common at that time, between USA breeding and UK breeding seems to be the Chinchilla (Silver) cats, although it is not clear at that stage what importance was placed on the agouti and wide band alleles that the Chinchillas brought with them. Possibly more by luck than scientific judgement, and certainly without the luxury of DNA sampling, selective breeding improved our Cameos, who have an early Chinchilla to thank for their genetic make-up. Sadly, in more recent decades, the importance of the Agouti and wide band influence seems to have become overlooked, with some current top world breeders now believing that Cameos are non-agouti and they repeatedly, but I believe mistakenly, breed Cameos with Smokes in order to eliminate the agouti, thus blurring the essential difference.

**We have three types of Persian cat with a white undercoat.**

- 1. Those with the least white undercoat are called Smoke, Agouti status (a/a).**
- 2. Those with a medium white undercoat are called Shaded, Agouti status (A/a).**
- 3. Those with the deepest white undercoat are called Shell, Agouti status (A/A).**

### **SMOKE PERSIANS**

Smoke cats are based on a natural breed. Cats with a white undercoat can be found in wild cats, feral and household cats. They carry an allele for the Inhibitor gene which stops pigmentation forming on the base (closest to the skin) section of the hair shaft. This gives them their distinctive white undercoat, which is hidden by and contrasts distinctly with the solid topcoat. Smoke cats can appear in a very wide range of colours: Black, Blue, Red, Cream, Tortie, Blue cream, Chocolate, Lilac, Chocolate tortie or Lilac tortie. It is unlikely that Smoke cats also have an influence from the Wideband gene, because they are non-agouti and this gene needs the Agouti allele to which it can attach. Smoke cats are truly striking when they have the correct breeding and appearance.



**REMILAKAT MORGAN**  
**Black Smoke.**

**Agouti Status a / a**

This is a kitten pic. but the lack of a solid mask is evident here.  
There is also an abundant white undercoat, both undesirable for a Smoke. His parents are both non-agouti a/a Cameo phenotypes.

Foto von Ming-Yuan Tseng



### REMILAKAT CHANEL

#### Red Smoke

hanel is the offspring of two non-agouti (a/a) Cameo phenotype Parents.

She went on to produce some beautiful smoke babies and Cameo phenotypes when she was mated to a different non-agouti phenotype Cameo.

coloured with no visible white. Their large round eyes need to have a deep orange or copper colour, the deeper colour and the larger and rounder the better.

### Imp Gr Ch Rocawen Hanz Off

Bred by Mrs Carol Owen

Owned by Heathrose Persians



### Gr Ch Heathrose In the Negative

Owned and Bred by Heathrose Persians Ian Morris and Jonathon castle



Photo by Ian Morris

Two excellent examples of **Black Smoke** Persians, showing the solid face mask and the dense Black top layer of fur.

The best Smokes have coats which are dense in colour of whatever shade. (approximately 3/4 of hair shaft coloured). When they sit still their body should look the same as a solid coloured cat, however when they move, glimpses of their white undercoat will be seen. They also have a pronounced silver ruff running around their neck and down the front of their chest. Their ear furnishings and whiskers are silvery white, and their face should be densely



**UK GRAND CHAMPION &  
IMPERIAL GRAND CHAMPION HEATHROSE  
'URSA MAJOR''**

An excellent example of a Blue Smoke Persian.

Owned and Bred by Heathrose Persians. Ian Morris / Jonathon Rewcastle

### **CAMEO PERSIANS (Shaded and Shell/Tipped)**

Cameos are a much more lightly coloured cat, with more white undercoat than a Smoke. They can appear as Shaded or Shell (Tipped). A shell cameo has the greatest depth of white undercoat and the least coloured tipping (no more than 1/8th colour), while the Shaded has less undercoat and more colour (1/2 to 2/3 colour). Cameos come in Red, Cream, Blue-cream and Tortie. In theory we might also see Chocolate and Lilac Cameos but so far none are known to have been bred in the UK. A Cameo type will be the same as for all Persian Cats. Their coats will be incredibly special. The Shell Cameo will look similar to its Chinchilla ancestor, but with deeply coloured orange or copper eyes. It will look like a white cat with a sparkling coloured dusting of red, cream or Tortie over the back of its head, its shoulders, back and the top surface of its tail. It's face will appear white.

The shaded Cameo will have more colour and show obvious glimpses of its white undercoat. A Shaded cameo may have some colour on its face but the whiter the face the better. It should have no suggestion of a coloured mask.



**REMILAKAT GELIATELLI**

**Red Shaded Cameo**  
**DNA agouti status A/a**  
Besitzer: Mrs Sarah Azam.

Owned by Mrs Sarah Azam.  
This boy has sired "true" Cameo offspring  
With DNA Agouti status A/a although he was  
mated to a non-agouti Cameo. Only one Parent  
is needed to be A/a to produce some A/a  
offspring, but the litter will be mixed with  
non-agouti, roughly 50:50  
Photo by Ming-Yuan Tseng.



**Grand Champion**  
**Sunlit Grand Wizard Theodore**

**Cream Shaded Cameo**  
**DNA Agouti status a/a**

Bred by Mrs Karen Greenman  
Owned by Remilakat Persians

Theo has sired many lovely babies but most  
of them are poorly coloured smokes. He has  
been mated only to non-agouti females.



**GRAND CHAMPION REMILAKAT PABLO.**  
**Red Shaded Cameo**  
**DNA Agouti status a/a**

(Owned and beautifully shown by Mrs Rennie  
Fairs)

Photo by Rennie Fairs.

**CH. REMILAKAT RAYMOND**  
**Red Shaded Cameo**  
**DNA agouti status a/a**

Owned by Ms. Terri White

This boy has never been used for breeding, but had he been mated to another nonagouti Cameo it is likely they would have produced only poorly coloured smoke offspring.

Photo by Amy Thompson



**GR CH SUNLIT LI'L SPARKLE**  
**Tortie Shaded Cameo**  
**DNA Status a/a (non-agouti)**

Bred by Mrs Karen Greenman  
Owned by Remilakat Persians.

When mated to a/a Cameo phenotype she bears mainly poor coloured smoke kittens.

Photo by Stephen Hannington



**CHAMPION PERSIADOLL APHRODITE (aka Rain)**  
**Red shaded Cameo**  
**DNA Agouti status A/a**  
Züchter: Mrs Rennie Fairs.

Owned and expertly shown by Ms Carole Pearson.

She has correct colouring, with little colour on her face, and evenly distributed light shading and a full white undercoat.

Photo by Stephen Hannington

## PEWTER PERSIANS

The Pewter is a Black or Blue Shaded cat and was developed from a Chinchilla Persian out-crossed to a solid Black/Blue cat or a Black/Blue Smoke. The Pewter has deep orange or Copper eye colour thanks to decades of selective breeding. Pewter Persians may not have a Black nose leather, all cats with the agouti allele have a brick red or pink nose leather, and Pewters retain the Brick red nose leather of their Chinchilla ancestor. All Pewters must possess the Agouti allele. They are black shaded or shell cats and were given the name Pewter rather than Cameo to give distinction to their variety. No shell Pewters are known to exist in the U.K. currently.

The Shell Pewter will look very much like a Chinchilla cat, but it will have deep orange or copper eye colour, and carry the agouti status *A/A*.

A shaded Pewter may look like a Shaded Silver cat, but with deep orange or copper eyes, although most shaded Pewters tend to have a more strongly coloured "mantle" over their shoulders and back, and carry the agouti status *A/a*.

There remains some confusion about the Black/Blue Shaded Cameo with black/blue nose leathers, and indeed the GCCF has accepted cats of that description onto their registers. These individuals with black/blue nose leathers are highly questionable and we need more evidence that a black nose leather is not possible in a shaded cat with the Agouti allele. DNA testing is required to establish that fact. I have been able to locate and DNA test only one such adult cat, and his DNA test showed that he is non-agouti (*a/a*); proving that he is genetically Smoke. One swallow maketh not a summer, but at least we can see the direction in which it flies. The individual cat tested is maintained in excellent condition by his owner, and he looks much younger than his 15 yrs. Visually, his body coat is typical of a Pewter, but his face is darker, with a solid black area surrounding his nose and black nose leather. I am as certain as it is possible to be at this stage that Black or Blue shaded Cameos do not exist separately from Pewters, and those that do with solid Black/blue nose leathers are wrongly registered. In truth I am certain that if DNA tested, they would show to be genetically Smoke.

It must be remembered that all shaded cats carry the non-agouti allele, and therefore when mated can produce offspring with non-agouti status. Such individuals may have the misleading phenotype of a Shaded (Cameo, Pewter or Silver), but if they have a black nose leather it is, I believe, confirmation of their non-agouti status and they will never breed like a shaded cat. It has been reported that a few Chinchilla Persians have appeared with black nose leathers. It is quite conceivable that the same issue arises with them. Before DNA testing became available breeders could only rely on their perception of phenotype to decide the registration of kittens. It is likely that some Shaded Silvers were registered as Chinchilla., because of the difficulty in distinguishing one from the other. If so, they would have *A/a* agouti status, and when mated to a parent also with Agouti status *A/a*, they would inevitably produce some nonagouti offspring who would have black nose leathers.

We need more Black/Blue nosed Black/Blue shaded cats to come forward for testing. I am sure we already know where these shaded cats with Black/blue nose leathers come from, but

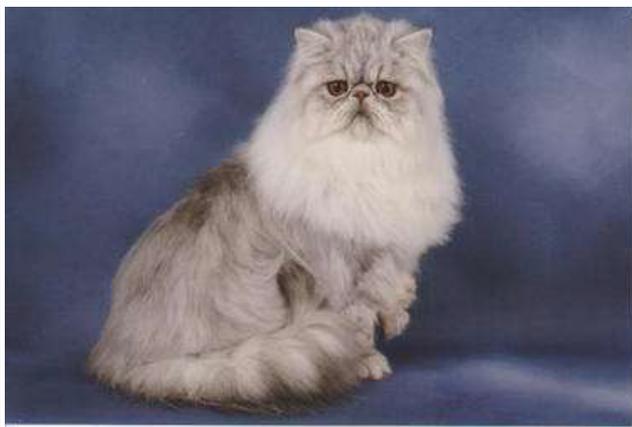
we just need to prove it? It seems highly probable they were produced from matings in which one or both Parents carried the non-agouti allele. That parent may have looked like a Pewter (or a Chinchilla) but in fact it was of Pewter (Chinchilla) phenotype only. If that is all true then the black/blue nosed Shaded Cats we currently have registered separately from Pewters, are all likely to be non-agouti and therefore Black/Blue Smokes, at least by their Genetic identity if not by their Phenotype.



**TAMOSAH JASON (HARVEY)**  
**Agouti status a/a (non agouti)**

Bred by Mrs Sue Danks  
Owned by Mrs Marguerite Abbott.

Photograph clearly shows his black nose leather, and the solid black "mini mask" on his face. This boy is registered as a Black Shaded but is genetically Smoke. A non agouti cat cannot be a shaded cat or a Pewter.



**GRAND CHAMPION**  
**TAMOSAH FERNANDO**  
**Pewter**  
**DNA status A/a**

Bred and Owned by Mrs Sue Danks.  
Fernando is father to many lovely Pewter babies.



**GEE WHIZ PANDEMONIUM DITE PRO-TOTYPE**

**Tipped (Shell) Pewter  
Agouti status A/A**

Tipped (Shell) Pewter Owned and bred by Ben Edwards. (France)

**The genetics (as I understand them)**

"Seeing is believing" or so they say; but is it? I have discovered that the appearance of a cat can often belie their breeding potential. This has sadly led many breeders over decades to repeatedly breed Cameo and Smokes together. (Agouti cats with non-agouti cats). The result of those matings has been that the two varieties have lost their distinct qualities and we are now seeing more and more cats that are "in-betweens"; neither one or the other, or cats that look like Cameos, but when DNA tested are non-agouti, informing that although they may have a Cameo phenotype, they are genetically Smokes. When these cats are used for breeding, they produce only poor-quality Smokes, with too much undercoat and a lacy mask, not a solid one. Instead of having a distinct contrast, these Smokes have a much more variegated coat, where the degree of tipping varies from one hair to another. Even those that appear to be Cameo do not have uniform demarcation in degree of tipping that should ideally be present. The Wide Band gene is an important gene about which a lot less is known. We do know that it works with the agouti allele to compress the colour in the hair shaft towards the tip, giving us shaded and tipped cats with their much wider undercoat of white and much less colour to the tips of their fur. In some way it also seems to suppress the formation of a tabby pattern, and our genetics experts are working hard to try and identify the wideband gene and to understand how it works. However from my experience it appears that by too frequently mixing Cameo and Smoke in breeding programmes the wide band gene has in some complex way transferred from the Cameo to the Smoke where it should not be, and is responsible for the poor quality smoke we see today, and also for those cats which look like Cameos but are nonagouti and will only breed like Smoke.

I believe we need to work towards a breeding programme where only non-agouti (a/a) cats are mated to non-agouti (a/a) cats and only Agouti cats are mated to Agouti cats. To widen the gene pool and preserve health and vigour, we may need to do an occasional outcross. I do not wish to suggest that Cameo x Smoke mating should never be done; indeed, it might be a very desirable outcross at some point, however it must be understood that when such outcrosses are carried out, some of the progeny will be non-agouti and some will have the agouti allele,

regardless of what they look like. They could all look the same, which is why I suspect historically, before DNA testing was possible some cats that were non agouti Cameos were again mated to another agouti or non-agouti cat confusing the influence of the Wide Band and Inhibitor Genes so that in consequence we are producing cats that are neither Cameo nor Smoke.

We have no choice but to register our shaded kittens by phenotype, because that is the way they are shown and judged. But without testing their DNA we cannot be sure of the most suitable mating for producing either Cameos or Smokes. The lack of DNA Agouti status being identified, makes the reading of pedigrees complicated, if not impossible. I will in future be recording Agouti status on my pedigree forms, where I know it.

### **The way forward**

$A/A \times A/A = 100\% A/A$

$A/a \times A/a = 25\% A/A \quad 50\% A/a \quad 25\% a/a$

$A/a \times a/a = 50\% a/a \quad 50\% A/a$

$a/a \times a/a = 100\% a/a$

Improving our Smokes may prove to be the easier task. I believe the best way to progress is to DNA test everything we breed from, unless we are very certain of the DNA of both parents, and mate only non-agouti cats with non-agouti cats. Non-agouti parents can only produce non-agouti offspring. We may need to do this for a few generations until once again we see the high-quality Smoke reappearing. When an outcross is done a purely bred solid (self) coloured cat, i.e. one with only non-agouti ancestors and preferably no Bi-colours or Colour-points, can be used for one generation only, after which we should return in subsequent generations to using only smoke with smoke. It may lead us quite quickly to see the return of the truly glamorous Smoke cats we used to see on our show bench several years ago. With a solid looking coat concealing a bright white undercoat of no more than  $\frac{1}{4}$  of the hair shaft, and a solid coloured mask and silvery white ruff and furnishings.

Improving our Cameos will be more complicated, especially with the shaded version. All shaded cats have the Agouti status  $A/a$  which means they carry the non-agouti allele so mating two shaded cats can produce both agouti and non-agouti offspring. They are likely to have a very similar appearance and only DNA testing will confirm which is a "True Cameo" and which is a "Phenotype Cameo". For breeding purposes we need to select only the "True Cameo" and generally speaking mate them to a "True Cameo". Unfortunately, there are precious few true Cameos currently existing, so because of the lack of  $A/a$  breeding Cameos we may be forced in the interim to mate  $A/a$  Cameos with our phenotype  $a/a$  Cameos. In either case DNA testing of all potential breeding offspring will be essential to determine their DNA Agouti status. It is not possible to achieve the ideal all at once, since we must work with the cats we have. DNA testing is the important key. One alternative outcross would be to outcross to a pale  $A/A$  Pewter. These would make an ideal outcross to a phenotype cameo ( $a/a$ ) to introduce the Agouti gene and help produce a pleasing light even tipping/shading, without spoiling eye colour. Another outcross possibility that should be considered would be a red/

cream silver mackerel tabby Persian. This could produce good results especially if the mackerel tabby were homozygous. We know that only one A/a parent is needed for the outcome of the mating to be 50% a/a and 50% A/a. (some litters could be 25% : 75% for example, as an element of luck is involved) We will then need to DNA test all offspring with breeding potential to discover their Agouti status. The difference between the two may not be visually obvious, making DNA testing essential. It will be a helpful idea for all Cameo and Pewter breeders to add to pedigree certificates the Agouti status for the cats that have been tested.

After this process, the future for Cameos may become less certain again, and we must evaluate coat colour and pattern after repeated A/a matings. We certainly do not want our Cameos with stripes and may need to outcross to a properly bred self-coloured cat (as described above) to clear the coat pattern.

If you, dear reader, know of the existence of a true Shell Cameo please tell me, for I am not aware of one existing in the U.K. I do know of a few in Germany and America but without DNA testing I remain uncertain if they are "true". With any luck, if we use the GCCF rule and apply DNA testing, we will see some Shell cameos appearing again. Proper Shell Cameos with white faces and the lightest dusting of sparkling colour over their bodies.....oh what a dream !

Genetic testing is not all that costly, and we must use it efficiently if we are to see the results we aim for. The Langford Veterinary Genetics Laboratory produces speedy results and offer a discounted price for members of any Cat Club.

This article has been reviewed and endorsed by Dr Leslie Lyons. Gilbreath-McLorn Endowed Professor of Comparative Medicine. U.S.A.

Review by Mrs Sarah Johnson.

*I think what this article highlights most sharply, is that there is little known about the genetic composition of the Cameo and Pewter group of Persians. The Chinchilla/Shaded is a tabby (agouti) cat. This is a given just as it is accepted that a Smoke is a self (solid) or non-agouti cat. As such we can remove them from the debate.*

*However, Cameo and Pewter is a different matter. They may or may not be tabby (agouti) – the lines are blurred. The subject is further confused by the fact that the SOP calls for a solid nose leather and a complete lack of tabby markings for the Cameo, suggesting that the preference is for a non-agouti (self), cat whilst the desire for a pink nose lined with colour as defined but a lack of tabby markings for the Pewter would suggest an agouti cat might also be acceptable. With these credentials, the preferred gene-type would appear to be for a more extreme expression of the silver undercoat than is desired in the Smoke varieties – to mirror the relationship with the Smoke as the Chinchilla has with the Silver Tabbies. The greater challenge remains with the Pewters who have supposedly to retain the features of both agouti (the nose leather colour) and the non-agouti (the coat pattern).*

*The way forward is to begin to gene-test these cats to determine exactly how the best examples are created. It seems to me that the more extreme the expression of silver in these cats, the less the agouti expression is visible, and this is where the blurring of lines begins.*

*There is a further confusion in that Cameos are also classified as shaded and tipped (shell). These are phrases commonly associated with an expression of agouti and to use them in association with a cat whose standard would seem to favour a non-agouti cat further serves to complicate the understanding. If these cats are not agouti, then perhaps they need to have a different classification for their colour dependent on the expression of the silver gene. This should not present a problem in nomenclature as the GCCF already created a code for Pewter (14) and should benefit a further understanding of the desired status of the breed should it prove to be non-agouti.*

*There can be no doubt that there are huge challenges ahead for these varieties. Before we had the miracle of genotyping, the visual story was enough however with greater knowledge comes further questions. I think that the problem lies in that there is no easy answer and certainly no easy method of maintaining these varieties. It is a task for the most dedicated of breeders to re-lay the foundations for the breed – and most importantly of all, to make it their aim to unite with one voice with a consolidated decision upon what the breed is genetically and how this integrity can be maintained.*

*Then they must educate their judges to understand what their breed is and how it must be evaluated correctly.*

*Sarah Johnson. FIFe Int Judge Cat 1, 2 & 4D..*