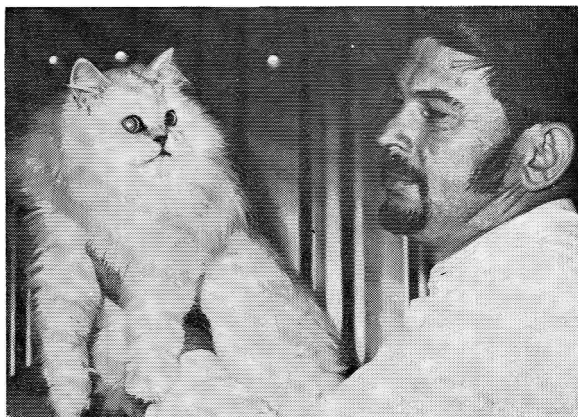


SEX-LINKED COLOR IN THE DOMESTIC CAT

A. David Bandy

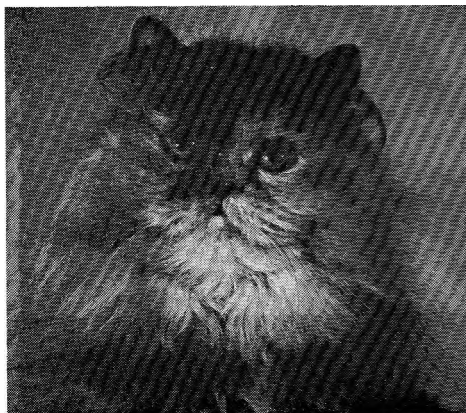
To most cat breeders the most anxiously awaited event is the **birth of kittens**. Throughout the waiting period we attempt to predict the result, hoping against hope that we will get that particular color of kittens we desire the most. **Since every coat color, except white, is sex-linked in the domestic cat, accurate predictions of the possible colors of kittens can be made on the**



Mr. Bandy with Gr. Ch. Lowlands Futura

knowledge of the colors of each parent of the litter. Predictions are made on the possible colors according to sex, but there can be no assurance of how many kittens of the possible colors will be in the litter. For example, the mating of a black male and tortiseshell female could produce four colors of kittens in both sexes, but the law of chance may dictate that all of the kittens in the litter may be of the same color or any or all of the possible colors.

In the domestic cat all of the genes for coat color, except white, are found on the female sex (X) chromosome. The white coat color gene is found on an autosomal (regular) chromosome and is inherited like a regular gene. All female cats have two female sex chromosomes (XX). All male cats have one female sex chromosome and one male chromosome (XY). It follows that all female cats, except white, carry two genes for coat color while all male cats, except white, carry only one gene for coat color. All white cats carry the normal complement of sex-linked coat color genes plus one or two genes for white coat color. The recessive coat



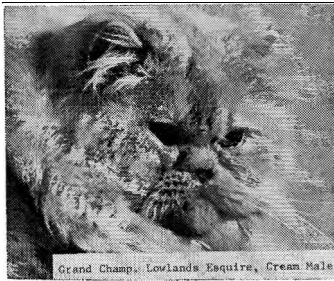
Blue Cream, Lowlands Anastasia

color genes behave in the same manner in white cats as in cats of other colors.

White coat color genes are dominant over all other colors. If a spotting gene is present in the genetic make-up of the cat it can permit the genes for other coat colors to produce their colors in certain parts of the cat's coat. There is some question in regard to the existence of a recessive white gene in cats but I have not had any experience in this regard and cannot comment. In order to produce white kittens in a litter at least one of the parents must be white. Since white coat color is dominant, if a cat carries a gene for white coat color it will show in the cat's coat color.



Dilution genes affect the coat color gene to modify black to blue and red to cream. A cat needs a pair of dilution genes to be a dilute coat color (blue, cream, or blue-cream). Reds, blacks, and tortiseshell cats may carry one dilution gene which, when paired with another dilution gene passed on to the offspring by the other parent, can produce dilute colored kittens in the litter. It should be possible, conversely, to find cats that do not carry any dilution genes. These cats



would be black, red, or tortiseshell and would produce non-dilute kittens (red, black, or tortoiseshell) because the kittens could at best inherit one dilution gene from the other parent.

Pattern and shading genes affect the basic coat color of the cat and change it in appearance. Shaded and patterned cats behave in coat color inheritance the same as their solid color counterparts. Silver, Silver Tabby, and Brown Tabby cats are basi-

cally black cats. The other colors can be identified by their basic coat colors.

One interesting aspect of coat color inheritance is that all male cats, except white, do not pass a gene for coat color to their sons. They must pass the male sex chromosome, which does not carry a coat color gene, to their sons in order to give them their male sex character. The dam provides her sons with the female sex chromosome which carries the gene for coat color. In solid colors, a blue or black female will produce males only in blue or black; a cream or red female will produce males only in cream or red. The above females can have tabby males of the above basic colors and, of course, white males if mated with a white stud. The male can pass a dilution gene to his male offspring which, when coupled with a dilution gene inherited from the mother by the offspring can produce a dilute coat color in the litter.

If the situation arises where there is some doubt as to just which male has sired a litter, the color of the kittens can indicate the possible



Blue Male Kitten (Lowlands Xavier)

very rare occurrences and are often falsely given as the reason for this unusual color occurrence.

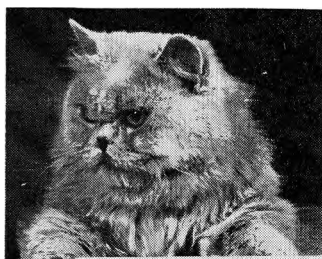
In regard to blue-creams and tortoiseshells, it is possible to have one that is almost entirely one color or the other with an apparent solid color coat. Generally these cats are more often blue or black in appearance rather than cream or red. The only method that uncovers their true genetic make-up is to breed them and experi-



Blue Female (Lowlands Oriana)

color, or colors, of the sire. It should be noted that different males can sire kittens in the same litter if the matings occur within a few hours. Cats are induced ovulators and only release the eggs from the ovaries after being mated. It is possible that the *eggs* may not all be released after the first mating. For this reason it is best to mate a female several times over the period of a few days to insure conception and the maximum litter size.

Cats are reliably predictable for coat color inheritance. Generally if the female produces kittens that are different in coat color from those possible from the stud she is said to be mated with, there has been a mis-mating with another male. Mutations are very



ence the surprise of seeing the unusual colors occur in the litter. I once had a pale blue female from a blue-cream and cream mating that I just took for granted as being a blue. I bred her with a blue, which should produce only blue kittens in the litter, and she had two blue-creams. On very close examination she had a 1/8 inch diameter cream patch in her whisker area.

This article is written, I hope, in a manner that most cat breeders can understand. So often when the mention of genetics is made people just turn it off as being far too complicated

for them to understand. All genetic knowledge has been obtained through observation. The animal breeder has a much better chance to learn first hand from his breeding programs than the geneticist who spends much of his time on literary matters. If you believe that your cats are behaving abnormally genetically, record your observations over a period of time in which the animals repeat their unusual behavior, then contact a geneticist. These people are generally only too happy to be able to assist you in solving your problems.

Color Chart for the Inheritance of Sex-linked Coat Colors in the Domestic Cat.

Legend :

1m — Black male
2m — Red male
3m — Blue male
4m — Cream male

if — Black female
2f — Red female
3f — Blue female
4f — Cream female
5f — Tortiseshell female
6f — Blue-cream female

SEX LINKED COLOR CHART

	1 M	2M	3M	4M
1F	1M 1F 3M 3F	1M 5F 3M 6F	1M 1F 3M 3F	1M 5F 3M 6F
2F	2M 5F 4M 6F	2M 2F 4M 4F	2M 5F 4M 6F	2M 2F 4M 4F
3F	1M 1F 3M 3F	1M 5F 3M OF	3M 3F	3M OF
4F	2M 5F 4M OF	2M 2F 4M 4F	4M OF	4M 4F
5F	1M 1F 2M 3F 3M 5F 4M 6F	1M 2F 2M 4F 3M 5F 4M OF	1M 1F 2M 3F 3M 5F 4M OF	1M 2F 2M 4F 3M 5F 4M 6F
6F	1M 1F 2M 3F 3M 5F 4M OF	1M 2F 2M 4F 3M 5F 4M OF	3M 3F 4M OF	3M 4F 4M OF

BIOGRAPHICAL NOTE

Dave Bandy has been an animal fancier most of his life. Reared on a farm, he was breeding horses, cattle, and chickens before the age of ten. He was recently accepted as a trainee to the CFA judging program for longhairs.

He holds a BA degree in Biological Science from San Jose State College, a BS degree in Animal Husbandry and an M. ED. degree in Agricultural Education from the University of Calif. He worked on the research staff at the Univ. of Calif. until two years ago when he assumed his present position of Agriculture Instructor. He is currently breeding Crested Polish Chickens, African Grey Parrots, Doberman Pinschers, and Cats, of course. Address: Aaron David Bandy, Lowlands Cattery, 15207 Rosemar Avenue, San Jose, California, 95127..