

Presentation on Birman Breeding
to
The Birman Cat Club Show
November 2007

by
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Thank you for allowing me to attend this meeting today. I am following on from Alwyn and plan to talk about the science behind the Birman cat and the probable next 10 years. During the past 2 years, I have been carrying out various pieces of research into disease in cats in general and then concentrating on the Birman breed in particular. My presentation is a collection of observations made by myself breeders, judges, exhibitors and owners and even members of the veterinary profession.

I investigated occurrence of FIP in cats over the past two years.

- a. For those of you who have not heard of FIP then let me explain. FIP is Feline Infectious Peritonitis. It starts off as an innocuous virus like the common cold, present in many cats in multi cat households, but with one additional factor, it can mutate into a killer disease. It needs the virus, a compromised immune system and a trigger like stress.
- b. It has been around for over 40 years, it is incurable, invisible and undetectable and it kills every infected cat.
- c. I did receive over 400 replies but many stated that the diagnosis of FIP was often made by their vets based on little more than a cursory glance. Of the 163 cats who died from confirmed FIP through necropsy (autopsy after death) 53 were Birman.

I have also looked at recent information distributed by GCCF on registrations of cats from the years 1996 to 2006. There is a notable decline in Birman cat registration during this period from 2443 to just over 1740 a drop of over 28% in 10 years.

1. This caused me concern and in an effort to determine if there was an actual drop in numbers I have been conducting a number of surveys on sites like the Novice Breeders Advice web site asking for information on litters during 2007. My analysis shows the litter sizes, birth weights and weights after 7 days for those breeders who were happy to give me the information. I also collected information from other groups of people who had connections with CFA and TICA. Concentrating on Birman I found the following.

- a. The average birth weight for a kitten in the UK was about 94 gms weight and 188gms. The average litter size in the UK is 3.6 kittens, lowest 1, largest 5 most common size 3 mortality was 15% with two litters of singletons both dying.
- b. In Europe we find average litter size is 4.6 lowest 1 largest 5 most common size 5 and average litter weight 96 gms and 196 gms mortality 10%
- c. In America average litter size is 4.4 lowest 3 largest 5 most common size 5 and litter weight 98gms and 200gms. There was no

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mortality listed, it didn't mean none died just none listed as dying in the survey.

2. I attended a Birman AGM earlier this year where one item under discussion was the suggestion to introduce an additional with holding fault in Birmans for small cats.
3. From a personal observation, I have surmised that during the past two years the number of Birman exhibits seem to have fallen dramatically. Some shows in certain registries have experienced falling numbers of exhibits year after year, but have the number of Birman fallen by a greater percentage?
4. From simple checks on public databases I have noticed that the inbreeding coefficient of the Birman cats born since 2000 vary between 0% to 35%. If checks go back right to foundation there are very few if any cats with ICs below 30%

Now individually these observations may not cause concern after all it is possible to explain each one away. So let me do that right now

1. Up to now, there has been only a small sample of cats and litters presented. OK so let me ask you as individual breeders how many of you have litters over the past ten years and kept records. Do they show constant litter size and weights or are they declining in both number and weight?
2. Perhaps the cats in the survey that died from FIP were just unfortunate. Well yes but in a recent presentation at the NBA seminar in June similar percentages were being presented by other speakers, namely Dr Susan Little, Dr Leslie Lyons and Professor Tim Gruffydd Jones
3. So the number of Birman registered is falling,
 - a. Well that could be economics. Yes but that would then be supported by a decline across the individual breed board, but that is not the case. Overall there were still 31000 cats registered every year
 - b. Well maybe the cat is no longer in demand as it was before.
 - c. Ok so perhaps we are not producing the numbers and quality of kittens as we did before. Yes but is it the owner restricting the cat or is it the cat not producing quality and quantity of kittens
4. There are a few small cats out there so what?
 - a. Well where are the big cats, why are they not out there. We have a decline in registration; do we also have a decline in large exhibits?

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- b. Have the actual number of Birman exhibits fallen every year? I remember one year going to a cat show where the Birmans on exhibit covered at least three complete rows, is that the case now do we think?
 - c. Are the big cats not actually of show quality and therefore we have no choice but to show smaller cats?
5. So there is a degree of inbreeding but that is natural. Up to 50% inbreeding, so what? Well if we look at a numerically small known breed like the Singapura, we can trace every genuine Singapura back to the five foundation cats and we still only finish up with 35%. Just to put it into perspective there are probably more Birman breeders in the UK than Singapura cats in Europe.

SO is there a problem with the cat then? We have, after all, explained away all these points individually.

Remember most of these observations are anecdotal and I have not actually presented evidence using scientific sources. One other point to note is that I have treated each point individually a bit like a jigsaw puzzle. You know you look at each piece, pick it up examine it and then put it down. But in medicine what you need to do is to pick up all the pieces and put them together to look at the big picture. And this needs some help after all we do not know what the finished picture looks like do we. So let's do that now.

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And to help me what I would like to do is introduce an authoritative book that many here may know about

'Robinson's Genetics for Cat Breeders and Veterinarians.'

page 114 bold type in the bottom section of the page

Inbreeding depression and Hybrid Vigor

Now if we go to page 115 and read line 3 and 4

"In cases of inbreeding depression almost any feature of the normal cat may be affected"

There now follows six bullet points which Robinson believes may well be affected by inbreeding depression

Bullet point 1

Decline in birth weight. I have already mentioned this as being an observation made during a survey and perhaps some of you will acknowledge this fact yourselves

Bullet point 2

Development Problems. Again, this has been shown to be apparent; otherwise why would your Breed Advisory Committee want to introduce a possible with holding fault for small cats.

Bullet point 3

Fall in average litter size. If you have kept records over the past ten to twenty years, you alone would know if the sizes of litters have fallen. Can you say, hand on heart that everything is OK? Do we still see evidence of difficulty in birthing?

Bullet point 4

Partial Sterility Could this explain the fall in registration numbers? Could this explain the fall in exhibit numbers? Of course you could argue that the average litter size is unchanged over the past five years, but the actual number of fertile cats and the total number of litters being produced year on year has fallen by one third. Imagine losing one third of the population and never questioning it, well that is what is happening with the cat.

Bullet point 6

Asymmetry . So are we seeing are a high number of kittens who are only pet quality. The cats may lack symmetry in their gauntlets, their face mask and tail markings etc. By neutering these animals, we are also reducing our gene pool dramatically because we do not want to breed from poor quality stock.

Bullet point 5

Proneness to illness loss of immunological diversity

Just what does this mean this immunological diversity?

Let me put it in some sort of perspective.

1. Many of you may have heard of the Tasmanian Devil. A short carnivore living off the south of Australia. In 1994 there were 130,000 animals on the island. In 2006 this is down to 55,000, the cause an infectious cancer killing the animal. Geneticists believe that the animal will become extinct in 10 to 20 years. 75,000 dead in 12 years, the remainder wiped out in just over 10.
2. In 1999 no child born in the Amish population in America lived beyond its first birthday due in total to a defect gene leading to Sudden Infant Death Syndrome.
3. In 1778 90% of the indigenous population of Long Island America was wiped out by the European Settler and he never fired a shot in anger. What did he do? Well he just coughed and infected them with the common cold and smallpox.

Three prime examples of living beings being challenged by a lack of immunological diversity

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Is this type of thing happening now in the Birman. We are seeing more and more disease in the breed, the increase in FIP, heart disease and of course internal organ problems. When we think of Maine Coon how many think of HCM? What happens when you think of British Short Hair? Do we want people to think of Birman and think FIP.

This is pure and simple inbreeding depression BIG TIME

So what does Robinson suggest?

The 3rd paragraph below the bullet points starting with the words **"Should inbreeding depression become established..."**

So have I convinced you that we have cause for concern and should be considering possible solutions to the dilemma?

Remember Robinson says use unrelated stock
So where do we find them?

According to naturalist/biologist Roger Tabor in his text "The Rise of The Cat" (1991) *"When selection was made for showing purposes, genetic disasters occurred. In cat breeds, physical mutations that were previously allowed to perish are now being developed merely for the sake of difference. Not all are harmful, but some are achieved at considerable cost to the cat."*

So should we be thinking about these selections in inbreeding or line breeding?

Inbreeding is the deliberate or accidental mating of two closely related cats, by that I mean where the same names appear on both sides of the pedigrees in the last two, three or four generations at least once.

Line Breeding is the deliberate mating of two less closely related cats to establish, maintain or remove specific anomalies from future litters in that line.

Benefits of inbreeding include

1. Produces uniform or predictable offspring.
2. Hidden (recessive) genes show up and can be eliminated.
3. Individuals will "breed true" and are "pure."
4. Doubles up good genes.
5. Eliminates unwanted traits.

Problems of inbreeding include

1. Doubles up on faults and weaknesses.
2. Progressive loss of vigour and immune response.
Increased reproductive failures, fewer offspring.

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3. Emphasis on appearance means accidental loss of "good" genes for other attributes.

4. Genetically impoverished individuals.

Deliberate inbreeding would be acceptable for numerically small breeds but should be avoided if possible. Is the Birman a numerically small breed; NO!

And according to Bill Amos of Cambridge University England inbreeding in cats is more dangerous than previously realized even a cousin to cousin mating may well result in inbreeding depression. His studies suggest that inbreeding is more important than environmental challenges in determining an individual's chance of survival. He goes on to say registries must accept more outcrosses than previously agreed if the cat is to survive the next 20 - 50 years.

So what about Line Breeding

The benefits of Line breeding include

1. Avoid inbreeding of very closely-related cats, but cats are still "pure".
2. Produces uniform or predictable offspring.
3. Slows genetic impoverishment.
4. Helps establish, maintain or remove specific anomalies from future litters

Problems of Line Breeding include

1. Require excellent individuals.
2. Does not halt genetic impoverishment, only slows it down.

Do we need to establish, maintain or remove specific anomalies from future litters; YES! Nevertheless, Robinson says use unrelated stock. The term unrelated has in fact two meanings in science.

1. Unrelated means not having any common relatives in at least 10 generations in a pedigree
2. Unrelated means of a completely different breed sub species or genus

Here unrelated means having no common relatives in 10 generations

So if we go with Robinson will we find this unrelated stock by staying in the UK? The simple answer is NO. We have, over the years allowed prolific studs to do their thing with the result that many cats are now closely related. Too close for comfort, some would say.

So should we consider importing cats from Europe? Again the answer is NO, these cats are in fact quite often only one-step removed from direct British lines.

Should we then consider importing from America? Again the answer is NO, many of the 'out of state' animals are also exported British Lines. So should we think about importing cats then? As I have explained most of these lines are direct from the UK anyway.

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And unrelated stock means just that UNRELATED.

And in truth there are NO unrelated Birman out there anywhere!!!!

So where should we go next?

To begin with, we must first accept that we have a problem. If there were breeders who believe that the breed is safe then I would ask them to declare this and then explain all these occurrences to others to their satisfaction.

However if we do have agreement that there is a problem what should we do?

Well first, we must gain consensus from two groups, the BACs of the Birman Cat Clubs from around the world and the genetics committees of main cat registries like GCCF for UK based breeders, TICA, CFA, FiFE and LOOF. Explain to them in detail the problems, concerns, and then put possible solutions to both groups for discussion. If we agree to do this, then we should do so with a degree of urgency.

Let me give you some scary facts to encourage the urgency.

First the detailed science

Robinson says on page 113 that...'the greater the rate of inbreeding the more rapid the elimination of heterozygosity within the breed.' So in effect, we begin to lose breed diversity. In addition, what we also see are changes anatomically, metaphysically and psychologically within the animal because of polygenetic dilution of genes within the species. Effectively the cat changes physically and mentally. We see extremes in appearance and changes in character from passive laid back to aggressive or totally freaked out animals.

Now the general facts

We already have small litters, small cats, high disease and probably high levels of sterility or low fertility. If we allow conditions to continue as now without any interference then we can expect the breed to enter a bottleneck in the next two to three years then go into free fall over the next eight to ten years where litters will be extreme malformed, dead or sterile. From then on, it is one small step to have a disease affect the population leading to total extinction of the breed, as we know it. Remember geneticists say the Tasmanian Devil 55,000 animals could be wiped out in 10 to 20 years. Do we have 55,000 Birmans; I doubt it so just how long could it take one disease to wipe out our scared Birman.

Are you still happy with the situation as it exists, or do you want to consider something positive?

Well at this stage, we do have three main options.

Option 1 is simply do nothing and in ten years time watch the breed decline into extinction. Some would say that they are not worried after

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all they would probably not care about the cat in 10 years time. Would you?

Option 2 Start again. Remember what Alwyn has said about the breed. Is it possible, is it practical. Do we have access to the Khmer, the Persian and the Siamese of the correct type? Are they the genuine foundation breeds? Will doing this result in loss of character? How long would this take? Will it be effective anyway?

Option 3 For this option, I must ask you all to forget passion and start to think rationally from now on. We now need to take a leap of faith.

This is a combination of direct out crossing to other breeds and a degree of controlled line breeding.

If we do consider out crossing to other breeds, what should they be? Not to Persians, they have problems. Let me remind you of some figures from GCCF; a decline of 73% in registrations of the Persian breed over the past 15 years.

What other breeds then?

I could put my head above the parapet here and make several good suggestions and of course, each one would be dismissed for a wide variety of reasons with comments like... 'Over my dead body'... Or 'The GCCF will never agree to this...'

Well let me say at this time the only dead bodies I am interested in are the Birman cats who never survive to their first birthday. And as for the GCCF not agreeing, they having no say about the future of the cat, the only groups with the power are the BACs. They must tell the GCCF, TICA, CFA, LOOF, FiFE, that they agree to these outcrosses or stand the chance of never seeing this breed being benched at their shows in ten years time.

So are you ready; remember you should regard this with rational thinking not passionate thinking.

So how do we make a choice of breed? Well first they must be phenotypical and then genotypical.

Phenotypical...well they must at least look like a Birman from the outside. So we can immediately exclude breeds like the Sphynx, the Bengal, the Munchkin.

Genotypical...much difficult but they must have some connection to the Birman to help maintain those individual characteristics that are so evident in the cat.

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So breed choices
Ready?

Siberian
Turkish Angora
Norwegian Forest
British Semi-Long Hair
Ragdoll
Oriental Semi Long Hair

And what about numbers

Given the desired results we are seeking, we need numbers of 4 females to 1 male in the breeds. In total I would estimate ideally 96 cats but it is possible to begin with a smaller number.

Now I could end here and give you this as food for thought.

But what would be expected if you were to become one of these breeders involved in this program.

Well to begin with we would like you to foster a cat, aid in the mating program, monitor the pregnancy, assist in delivery and then agree to hand on the suitable kittens into the next stage of the program. All non suitable cats and kittens would need to be neutered and sold as pets. Total time involved is something in the nature of 180 to 250 days for each mating layer and of course responsibility for at least one particular cat. Of course you could be involved with just one litter or you may like to get involved with up to three or four mating layers watching the breed re-emerge in strength and virility.

So now let me end with three final points

1. Do nothing and let the cat become another statistic facing extinction.
2. If you agree to get involved in this project then you must be in it for long term. Remember this project must be controlled by your head not your heart
3. FinallyYou are not alone in being a breed in crisis.

The end... Are there any questions?

I have attached a theoretical breeding pedigree just to give you some idea of the concept

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Theoretical Pedigree and IC %age

The cats were chosen at random to get high ICs to begin with
What this shows is that with a combination of both total outcross and controlled line breeding it is possible to reduce ICs considerably.

The screenshot shows a software application window titled 'Cat Details' with a menu bar (Database, Index, Go to, Record, Tag, Form, Configure, Tools, Help) and a toolbar with icons for navigation and actions. The main window displays a pedigree chart with columns for 'Sophie1', 'Bell1', and 'BIRMAN' cats. The pedigree shows relationships between various cats, with some cells containing 'X' and icons representing sex and status. To the right, an 'Inbreeding Analysis - Coefficient To 32 G' window is open, displaying the following data:

Name:	RaysSecondGo
Max generations:	32
Inbreeding Coefficient(F):	9.1%
Rate of inbreeding:	99.7%
Loss of heterozygosity:	0.3%
Generations found:	32
Full generations found:	4
Theoretical max. ancestors:	8589934590
Total ancestors found:	16466877
Unique ancestors:	1333
Common ancestors:	924
Duplicate ancestors:	16465544
CPU time to calculate F:	0.91s

At the bottom of the software window, there is a status bar showing '32471 cats' and a taskbar with a document titled 'RaysSecondGo' and the time '7:28am'.