Siamese Breeders Group of South Africa

Rimchar Mafdet Jackass of San-Shing (aka Jazz)

Photo by: Krystal Callaghan Photography

Newsletter

June 2011

CONTENTS

SBG Committee Members

Chairman:	Ian Moore	021-712 2001	imoore1946@gmail.com
Vice Chairman:	Brenda Kerr	021-671 5332	brendakerr@imaginet.co.za
Secretary:	Charlotte van der Riet	021-556 3683	charlottevdriet@gmail.com
Treasurer:	Marlene vanDyk	021-976 1256	mvandyk@xsinet.co.za
Breed Co Delegate:	Lynel du Toit	021-712 5996	sherlah@kingsley.co.za
Editor:	Tony Perestrelo	021-559 2406	myedens@gmail.com
Trophy Stakes Scorer:	Ian Moore	021-712 2001	imoore1946@gmail.com
PRO:	Brenda Kerr	021-671 5332	brendakerr@imaginet.co.za

Chairman's report for 2010 - By Ian Moore

A warm welcome to you all to this the Group's 25th AGM. I herewith table my Chairman's report:

The past year has been quite eventful what with us holding our 21st Championship show generously sponsored by Royal Canin. The thought of having to use their 'tent' cages was quite daunting but we all seemed to knuckle down to the job at hand and managed fine. We were fortunate that we were able to afford to 'import' Lesley Morgan-Blythe from Australia to judge. Those of us who managed to spend some time with her in the few days she was here after the show were able to tap into her amazing knowledge of cats, their pedigrees and much more.With Cape Town being the centre for SACC Cat of the Year, members were able to host some and see other Siamese qualifiers from around the country. There were a number of Siamese who qualified and we congratulate the following:

Lucy Arend's-Wagner on Sup Ch Mai-Thai's Charlie's Angel of Taigha who was placed 17th in the entire section.

Dawn Enslin on Gr Ch Koosje van Tutte's Earic Flapton of Paddypaws (Imp) who was placed 25th in the entire section

Johan Groenewald and Ian Taylor on Gr Ch Ashways Modry Melynas who was placed 26th in the entire section and on Taldi Zsofika who was placed 9th in the kitten section.

Members Krystle Callaghan & Jarrad Allsopp also need a mention as their Oriental Black, Sup Ch Myeden's Bambina of Kriss Cross was placed 12th best entire.

Regrettably no Siamese qualified for Cape Top Cat although Krystle and Jarrad's Bambina was placed 3rd best entire which was an extremely satisfying result. Well done.

Congratulations also to the breeders of these lovely cats. Thank you to you all for keeping the Siamese flag flying high at COTY.

The Group held 5 meetings during the year, which were fairly well attended. I wish to thank those members who kindly opened their homes for these meetings.No new members were welcomed during 2010 although this new year has started off with quite a number of folk joining the Group.

Due to health problems Janet has unfortunately not been able to continue her work with Siamese Rescue. We owe her a tremendous amount of gratitude for the years she so tirelessly worked with the Rescue. She has said that she will still keep her ears open for homes and give help when she feels able to.

Fund raising for this important part of the Group has for a long time been a sore point and had fallen almost completely on Janet's shoulders. We saw fit to transfer some of our show profit this year to bolster the fund, as we might now need to outsource some of the rescue work.

Our year-end prize giving was, as has become the norm, held at Marlenes' home. After a short meeting and the prize giving, members present, plus a few friends, enjoyed a super braai. We thank Marlene for once again opening up your home for this year-end celebration, Derek Kerr for braaing everyone's meat so well and those members who supplied salads, desserts etc.

I wish to thank all the committee for their dedication and hard work over the last year. We are working well as a team.

Wishing all breeder and exhibitor members success in their breeding endeavours and/ or exhibiting during 2011.

Thank you to you all for being here today

Ian Moore (Chairman)

Feline Immunodeficiency Virus (FIV or Cat AIDS)

Dr Susan Little (parts of this article has been edited)

What is Feline Immunodeficiency Virus?

Known as FIV or cat AIDS, FIV is an infectious disease caused by a retrovirus belonging to the lentivirus family. It is in the same family as the FeLV virus, and is similar to the HIV virus in humans. FIV infects both domesticated cats, lions, tigers, pumas & cheetahs.
FIV attacks the cells of the immune system, leading to FAIDS (feline acquired immune deficiency syndrome). This compromises the cat's ability to fight off infections.
It was first discovered in 1986 in a colony of cats in California, and is found worldwide.

What is a Virus?

A virus is a ultramicroscopic infectious agent which consists of either DNA or RNA wrapped in a protein coat. It is only able to replicate inside living cells. The phrase "a piece of bad news wrapped in protein" is a very well known saying regarding viruses.
Viruses are not living organisms, they don't respirate, process nutrients or generate waste products.

What does FIV do & what are the symptoms?

FIV attacks the cat's immune system which makes it vulnerable to secondary bacterial, viral, fungal & protazoal infections.

Stage 1:
Once inside the body, FIV is carried to the regional lymph nodes where it replicates in the white blood cells known as T lymphocytes (CD4+ lymphocyte). It then spreads to other lymph nodes throughout the body. At this time there may be an acute illness which is characterised by fever, leukopenia, anaemia, malaise & swollen lymph nodes, lasting a few weeks. During this initial stage it may go unnoticed that the cat is unwell.

Stage 2:
This is the asymptomatic phase which can last for many years. During this stage cat appears healthy & is able to lead a normal life.

Stage 3:
As we've already discussed, FIV destroys the T lymphocytes, these cells are required for the proper functioning of the immune system. Eventually when enough T lymphocytes have been destroyed, the immune system loses it's ability to fight off opportunistic infections & signs of immunodeficiency develop.

How is FIV transmitted?

The virus is present in large quantities in the cat's saliva, and the most common mode of transmission is via bite wounds. Free roaming, entire male cats are at greater risk as they are more likely to become involved in territorial fighting.
Occasionally FIV is passed onto kittens who's mother is FIV positive. This may happen either in utero or via infected milk.
Cats don't become infected via mutual grooming, nor will the act of mating, although the biting that goes along with mating may pass on the virus.

Cats show a range of symptoms in this stage, these symptoms may vary from cat to cat. Some of which may include:

- Weight loss
- Poor coat condition
- Anemia
- Gastroenteritis
- Gingivitis & stomatitis
- Diarrhoea
- Chronic/recurrent infections of skin, eyes, urinary tract, respiratory tract etc.
- Cancer

How is FIV diagnosed?

FIV is diagnosed based on history, clinical signs & a blood test known as ELISA (enzyme-linked immunosorbent assay), which detects antibodies to FIV. It is possible to get false

positive or false negatives from these results for the following reasons:
False positive:

If a cat has received the FIV vaccine it will have a positive test result.
Kittens born to FIV infected mothers may have received antibodies from their mothers milk. This doesn't mean that the kitten has FIV, just that it's received antibodies to FIV. Kittens who test positive should be re-tested at a later date.

False negative:

It usually takes several weeks for antibodies to FIV to appear in the blood, if the cat is tested prior to this it will show a negative result.
If the cat is in the later stages of infection it may not be producing antibodies.
A FIV PCR (polymerase chain reaction) test is available in some commercial laboratories. PCR detects the presence of the FIV virus in the blood.
Western blot test or IFA (Immuno-Fluorescent Antibody Test): If a cat has tested positive to FIV it is sometimes recommended to follow up with either a Western Blot Test or an IFA test.

If your cat has tested positive to FIV but you are not sure if it has had the vaccine, or want to be sure it does/doesn't have the virus then you may be able to request a PCR (polymerase chain reaction) test, which will be able to detect the presence of FIV DNA in the blood. with Type A toms. Some breeders are actively attempting to eradicate Type B carriers from their bloodlines.

How is FIV treated?

There is no cure for FIV, once a cat has it, it's for life. The goal is to provide supportive care to the infected cat. This may include;

- Regular veterinary check ups.
- Maintaining proper parasite control.
- Ensuring that prompt veterinary attention is sought at the first sign of illness.
- Feed a high quality diet.
- Limiting their exposure to disease by keeping them indoors & away from neighbourhood or stray cats.
- The use of anti bacterial & anti fungal drugs
- Maintain a proper vaccination regime to protect your cat from other infectious diseases.
- Blood transfusions may be necessary in stage 3.
- High calorie supplements may be necessary in stage 3.

There are other drugs available such as interferon & AZT which have been used in some cats, but it is best to speak to your veterinarian about these.

Should I have my FIV positive cat euthanised?

No, this isn't necessary. FIV positive cats can live for many years, especially if they are given prompt medical attention when necessary & supportive care.

Prevention of FIV:

Desexing of all pets, not allowing them to free roam & testing all cats used for breeding. There is now an FIV vaccine which is available, it isn't 100% effective. Cats given the vaccine will test positive to FIV which may result in confusion, especially in the case of a cat being picked up by a shelter or council.

Which cats are most at risk of FIV?

Un-neutered, free roaming males are at the greatest risk of FIV. Any cat allowed to free roam is at risk of catching FIV.
Can FIV positive & FIV negative cats live in the same household?
The general opinion is yes, this is okay as long as there isn't any fighting between the cats. As FIV positive cats are more susceptible to opportunistic infections it is important to ensure the health & vaccination status of ALL cats in the household.
Others suggest either keeping FIV positive cats isolated from FIV negative cats or re-homing the FIV positive cat in a single cat household. Your veterinarian is the best person to speak to in this regard.

Can I catch FIV from my cat?

No it is not possible to catch FIV from your cat, nor is it possible for your cat to catch HIV from a human. While both viruses come from the same family, they are species specific.

Basic Genetics for the Cat Breeder

References
Little, Susan, "How to Select New Breeding Stock"
Lyons, Leslie, "Understanding the Feline Genome", Chapter 76, Consultations in Feline Internal Medicine, ed John August, 4, WB Saunders Company, 2001.
Merck Veterinary Manual, Ninth Edition, Merck & Co, Inc, Whitehouse Station, NJ, 2005
Pedersen, Niels C, Feline Husbandry, American Veterinary Publications, Inc., Geleta, CA, 1991.
Pedersen, Niels C, Feline Infectious Diseases, American Veterinary Publication, Inc., 1988.
Seigel, Mordecai (ed), Cornell Book of Cats, Villard Books, NY, 1989
The Royal Canin Cat Encyclopedia, Aniwa Publishing, 2000
Wright, M (ed) The Book of The Cat, Summit Books, NY

Introduction

The genes that control coat, color and pattern in cats are now being identified and studied. This has been made possible by the mapping of the feline genome, along with the genes that control diseases and structural abnormalities. The resulting information, as it becomes available, allows breeders and others interested in the subject plan what colors will result from a particular mating. In addition, it is now possible to learn more about how diseases and abnormalities can be deselected or eliminated before they become an integral part of a breed. An in depth discussion of colors and patterns can be found at "Understanding the Basic Genetics of Cat Colors" at: http://catgenes.org/pdf/understanding-cat-colors.pdf

The following material is a discussion of basic genetics that breeders of pedigreed animals need to know in order to understand some of the issues facing those who work with pedigreed animals. Those breeders who have been successful have in some way intuitively mastered these basics over time. We see this in all species that are selectively bred. Some groups, such as food animals (cows, pigs, chickens, etc), have been easier to study due to the massive scale in which offspring are produced. We can learn from these large groups because their breeders keep careful tabulations of the positive - as well as negative - influences.
We, as breeders of pedigreed cats, also have learned from the work that has been done in the past. Have you ever heard the expression "Don't double up on that line" when talking to another breeder? Or conversely, "I have had success line breeding these cats"? Both of these statements contain information about the genetics of a given breeding program.

Selective Breeding

Coats, colors and patterns are passed down from parents to offspring, i.e., inherited. But so are aspects of temperament, size, susceptibility to disease, and even diseases themselves. Particular pedigreed breeds may have issues that have arisen through selective breeding (the selection of a

particular trait such as a short nose or fine boning), or issues that have been there all along because of the foundation breeding stock for the breed. If a kitten was suddenly born with 5 legs (clearly an “interesting” mutation) and those who were breeding that breed decided that this was a desirable trait, then more kittens would be born with 5 legs because matings would be done to “select” for this “desirable” trait. If the addition of the leg was not thought to be desirable, then no more matings would be done to “select” for that trait. “Selective breeding” is the heart of any successful breeding program, be it fish, mice, hamsters, or cats.

There is a written set of descriptions that discusses the ideal specimen of a breed, as well as the colors that are accepted for a particular breed. This is called a “Breed Standard” or “Standard of Points”. The standard for a given breed may differ from registering organization to registering organization around the world, and the colors that are accepted may differ as well. However, the ideal example of the breed is what is being discussed. The trick, if you will, is to come very close to the description of the ideal example in as bright and clear a color and pattern as you can, while still maintaining the “genetic strength” of the animal and the breeding program.

Thus, if you have the prettiest animal in the world, it will be to no avail if it is genetically weak, (that is, produces a lot of undesirable or unhealthy traits when it is bred). Conversely, it will do no good to have the most genetically sound animal in the world if it is not remotely close to the standard for the breed.

For those individuals who have been selecting for specific traits or characteristics within a breed, careful attention needs to be given to changing the breed. For example, increasing the length of the head may have other effects such as a change in eye aperture or a change in the slope of the forehead of the animals produced. The “breed standard” may be affected by the decisions of a group of individuals who think that they have enhanced the breed where, in actuality, they have changed the breed standard.

Genetics and the Environment

The occurrence of any particular characteristic depends on two factors: “genetics” and the "environment". "Genetics" refers to the encoded information (instructions) that are carried within the cells of all living organisms and which control traits. These encoded instructions are responsible not only for maintaining the continuity of a species (or breed) but also for many of the differences between individuals within a species or breed. Thus, if you are a breeder and like a particular “look” in your cats, you could influence the breed positively or negatively depending upon what that “look” involves. A good example can be found in the Persian. The Persian breed group has many colors and patterns in the different divisions. However, some years ago, breeders began to select for much shorter noses and faces that were more flat. This was thought to be a

desirable set of visual traits until the resulting offspring had difficulty breathing with eyes watering because the apparatus that controlled these activities was not structurally sound. Today, successful breeders have balanced that pleasant short-faced look with space in the head in which the nose, eyes and tear ducts, jaw, and other structures have room to perform their functions properly. By selecting away from Persians whose tear ducts do not function correctly, or whose eye aperture is not the correct size for the eye, a healthier group of Persians is produced. This does not mean that the resulting offspring will be less close to ideal, but they combine the pleasant "open" expression with the health that perpetuates the breed.

The "environment" that a given animal lives in contributes to the differences between individuals as well. The relative contribution of genetics and environment is not the same for every trait. Some traits such as ear shape or size are influenced very little by the environment. For others, such as temperament, the effect of the environment is much greater. Geneticists use the term heritability to indicate the proportion of the total possible variability in a trait that is genetic. However, except for the cases where genetics is the main source of variability, the heritability of a trait is difficult to establish, and may not be the same for different breeds. Therefore, it is not possible today to say that the heritability of size, for example, is 70% genetic (or whatever it may be), so aside from understanding the basic concept, the notion of heritability has little to offer the breeder at this time. It is possible that, as more is understood about the feline genome and the inheritance of some of the genes, it will be possible to have more information on heritability.

What do we mean by environment? For a kitten, the first environment it encounters is that of the mother's womb. Is the mother well nourished, healthy, and free from stress or parasites? How old is she? Is this her first litter? How big is the litter? Once the kitten is born, it experiences a new environment where it has to compete for food and attention. Litter size is still a factor. How much food does the kitten get? How much attention does it get from the mother, the breeder, and the eventual owner? Does it have a safe and healthy environment? Does it have other cats to associate with?

Epigenetics, the study of multifactorial issues that cause variability while not changing the actual DNA in a gene is a new concept for scientists. As these researchers have looked at the feline genome (and other genomes including the human genome) they have begun to understand that the simplified model of one gene, one trait is not adequate to explain all diseases, abnormalities or variability. Muscular dystrophy is a simplified model where one gene is responsible for the disease in humans (and perhaps cats). However, most diseases are multifactorial – that is, influenced by many genes interacting with one another and by a huge array of signals within the cellular environment (including nutrient supply, hormones, and electrical signals from other cells).

In addition, many diseases are altered when the conditions of life are altered, especially in early life. For diseases involving many genes, the effect of each gene is small, and loss of function for one may be compensated by gene interaction and by environmental conditions.

What are Genes Anyway?

The gene is often called the basic unit or building block of inheritance. A gene carries the information
for a single step in a biological process, but most biological processes -- even the ones that may appear to be simple -- are made up of more than one step. Thus, it is false to assume that a trait is determined by a single gene, but rather that many genes often control a single trait. A good example is color. In some breeds there are a great variety of colors, so it should come as no surprise that this is the result of the action of a variety of genes. There are not only genes for making the different colored pigments, but also genes that control the distribution of the pigments both within the individual hairs, and over the entire body. Other breeds may come in only one color. These breeds have the same genes, but only one version (allele) of them is present.
For more information about colors and patterns, see "Understanding the Basic Genetics of Cat
Colors" at http://catgenes.org/pdf/understanding-cat-colors.pdf.

All animals have 20-25,000 genes, but they do not float around loose in the cells. To make cell division and reproduction more manageable, genes are physically connected to other genes to form long strands called chromosomes. Animals have two sets of chromosomes- one from the mother and the other from the father. These are contained in the egg and the sperm. When the two (egg and sperm) unite, the resulting offspring contain two sets of chromosomes. However, the mechanisms that determine this are not able to tell which chromosomes came from the mother and those that came from the father. Therefore, the set that is passed on in a particular egg or sperm is a mixed set. The number of possibilities depends on the number of chromosomes.

All pedigreed cats (like all random-bred cats) belong to the same species. This means that they all have the same amount of chromosome material and the genes line up basically the same way on those chromosomes. So, any of these could be bred together and produce viable offspring. This is the way cat breeds have been produced – by selecting for specific traits that are desirable and mating cats until the offspring are uniform for that trait. If one tried to breed a cat to a member of another species, there would be no resulting offspring. Assuming that the physical act of mating could take place, the number of chromosomes differ from those in the cat. Therefore, no line up of chromosomes would occur and no resulting offspring would be produced. In any species, one of the chromosomes carries genes that determine sex.

In mammals (including humans) the chromosomes carrying the "female" genes is designated X and the one carrying the "male" genes is designated Y. If you looked at the X and the Y chromosomes under the microscope, the X chromosome resembles the letter X, and the Y chromosome resembles the letter X without one of the arms – therefore, like the letter Y. An animal with two X chromosomes will be a female, while one with an X and a Y will be a male. Genes other than those determining sex can also be located on these chromosomes. These genes are said to be sex-linked. A good example of this is the tortoiseshell color. The genes that control the color black and that control the color red in the cat are located on the X chromosomes (one color on each chromosome). cats and an artificial population bottleneck can occur.
Furthermore, these genes are located on the arm of the X chromosome only, and are not present on the Y chromosome. So in a male offspring (with only one X chromosome) only one color is represented (either black or red) but in the female who has two X chromosomes, it is possible that both black and red can be expressed – tortoiseshell.

What are Mutations?

Most genes carry out their functions correctly. Sometimes, however, a gene or multiple genes can be altered by exposure to radiation (natural or man-made), certain chemicals, or accidentally through random chance when a cell divides. A gene may be thought of as a small computer program. There are many possible places in the program where an error (mutation) might be introduced. Many of these errors will have the same effect; the program will not function. Others may modify the action of the program. Some may appear not to affect the program at all. All mutations, regardless of their effect, change the information carried in the program. Each is, therefore, a different version of that program. In genetics we call each version an "allele".
Different versions, even if they produce the same effect, are different alleles. Generally, we are only concerned about the alleles that produce different effects; we treat alleles that produce identical effects as though they were the same.
Though there are potentially a large number of alleles for each gene, by far the most common are those that entirely prevent function. Therefore, for many genes we only find the normal allele, often called the wild type and "no-function" (null) alleles. For some genes, we also get alleles that function partially or abnormally. However, no matter how many alleles there are in a population, an individual can carry only two -- one from the sire and one from the dam.

When the two alleles are the same, the individual is said to be homozygous for that gene. When the alleles are different, the individual is heterozygous.

Dominance

If, for a particular gene, the two alleles carried by an individual are not the same, will one predominate? Because mutant alleles often result in a loss of function (null alleles), an individual carrying only one such allele will generally also have a normal (wild-type) allele for the same gene, and that single normal copy will often be sufficient to maintain normal function. The gene is said then to be dominant. When someone speaks of a genetic “abnormality” being "carried" by an individual or line, they mean that a mutant allele is present, but it is not apparent. Unless we have a sophisticated test for the allele itself, we cannot tell just by looking at the animal that carries that allele (the carrier) that it is any different from an individual with two normal copies of the gene. An example of this is the black cat that carries dilute. From looking at this cat, it is impossible to tell if the cat genetically carries two genes for black or one gene for black and one for blue. When mated to a dilute cat, a black cat carrying dilute will produce a larger percentage of dilute offspring over time, while one homozygous for black will produce only non-dilute offspring. Lacking a genetic test for carrier states, the carrier will go undetected and inevitably pass the mutant allele to approximately half of its progeny. Every individual, be it man, mouse or cat, carries a package of those undetected mutant alleles. Since we all have thousands of different genes with many different functions, and as long as these abnormalities are rare, the probability that two unrelated individuals carrying the same abnormality will meet (and mate) is low. Breeders, however, “select” the mate for their cats, rather than allowing them to breed randomly. Thus, we increase the degree to which our cats are related to one another and increase the probability that cats will be mated that have the same mutant allele inherited from shared ancestors. In other words, these hidden alleles will become visual. A good example of this is the weakening of the knee joints (called patella luxation). When the knee joint is not correctly formed, the muscle structure that holds the knee together is often not able to function correctly and the knee joint wobbles. This effect can be seen when the animal runs, and can be pronounced or just hinted at. However, if two animals with weakened knee joints are bred together, the effect can be really pronounced with knee joints not able to withstand even small weight.
Sometimes individuals with only a single normal allele will have an "intermediate" phenotype. Mendel, a monk who lived in the 19th century, illustrated this principle dramatically with pea plants. He had red peas and white peas. When he “mated” them together, the resulting crosses were pink peas (they contained one red gene and one white gene). When these pink flowers were “mated” together, there was a resulting batch of peas with some flowers that were red, some that were white and some that were pink. The resulting theory posed by Mendel based on the observations with these peas still hold to this day and percentages of offspring can be theoretically derived based on the results of these experiments. Penetrance and expressivity are terms that describe the ability of the allele to affect the offspring.

If the gene under study is not expressed each time it is inherited, the penetrance may not be full (partial penetrance). If the gene is expressed every time, but the expression is different, it is called variable expressivity.

Recessive Traits

If a trait is carried, but not expressed, it is often because it is "recessive". Two like alleles are needed for the recessive trait to be seen. For example, long hair is recessive. Take a normal domestic cat that is genetically homozygous for short hair (it has two shorthair genes). Should this cat be bred to a long haired cat with two "not shorthair" genes, the resulting offspring will be short-haired, but carry the longhair gene. There may be a way to discern that these cats carry that longhair gene because the hairs are softer and stand away from the body rather than having hard hairs (called guard hairs) of the short hair variety. However, if two of those mixed (shorthair/ longhair) cats are mated together, the resulting offspring will be ¼ longhair i.e., having two longhair genes).
By convention, the dominant allele of a gene is given an upper case letter,
while the recessive allele is given a lower case letter. For the hair length gene, L is the shorthair allele and l is the longhair allele.
We can show this in a diagram called a Punnet Square:
If the shorthair cat carrying longhair is mated to another shorthair cat carrying longhair, the resulting offspring in a litter of 4 kittens will (on average) have one shorthair that does not carry longhair, two shorthairs carrying longhair and one longhair offspring. This is, of course, a very simple example. However, as you can see, genetic outcome can be predicted to some extent, although the ratios in a single litter may not reflect the "average".
If you plan a breeding program that maximizes the genes for which you are selecting, you will have this type of result. That does not take into account the role of the dice that gives you a litter of 5 shorthair cats! If you are trying to select for any particular trait, it is highly unlikely that you will get the desired result unless you start with a cat with that trait.

Sex Linkage

The X and Y chromosomes (X from the female and Y from the male) do not look alike. However, as a pair, they determine the sex of the offspring. These chromosomes are called sex chromosomes. The other chromosomes that carry other information are called autosomes. Females have two X chromosomes and males one X and one Y. The male normally produces an equal number of sperm with either the X or the Y chromosome. As his mate will only be producing eggs with X chromosomes, an equal number of female (XX) and male (XY) offspring should be produced. The perfect ratio of 1:1 (male to female) is only realized over many litters, and breeders know that most of the time there are more males than females.

Determining the Mode of Inheritance

Suppose that you have a litter in which several of the kittens appear to be less robust than their littermates. Further,suppose that in the next few weeks these weaker kittens appear to be growing more slowly and appear less energetic. What do you do? Obviously, the first step is visit your vet for an examination. As this is a hypothetical example without details, let us suppose that after appropriate tests, the vet concludes that these kittens have a hole in the septum between the two sides of the heart.
This abnormality results in a mixing of oxygenated and deoxygenated blood. What caused the problem? Was it simply a developmental accident, an environmentally-induced condition, or is it genetic? This particular problem could arise from any of the three factors. As a rule, if only a single kitten is affected, the problem has not turned up before in related litters, and the problem does not occur frequently in the breed, it is likely a developmental accident. Nevertheless, given the usual under-reporting of health problems, especially those that may be genetic, careful consideration should be given to repeating this particular mating again. On the other hand, if all, or even the majority of the littermates were affected, one might be more inclined to look for something in the environment that could have disturbed the normal developmental process. Another serious consideration is the possibility that the parents carry a recessive gene (s) that caused this problem.
Dominant mutations have a significant impact on health, and will, in most cases, result in death before reproductive age is reached. There are exceptions, such as Huntington's Disease in humans or polycystic kidney disease (PKD) in several species, including cats. Any late-onset genetic disease, whether dominant or recessive, represents a potential problem. A dominant gene allows for a waiting game: one can wait for the progeny to reach an age where the problem would normally have developed, then breed unaffected animals with reasonable assurance that they are not undetected carriers.
Doing the necessary crosses to establish the mode of inheritance can be an expensive and time-consuming task, to which is added the thankless prospect of finding pet homes for kittens that are unsuitable for the breeding program. Consequently, test matings are seldom done on a scale sufficient to produce numbers that can be subjected to statistical analysis, except in a research laboratory. Since the feline genome map has been completed, it is now easier for some institutions to do these test matings to determine mode of inheritance. For breeders, neutering or spaying are viable options. One alternative is retrospective analysis of pedigrees of affected animals. As one generally needs a number of related animals occurring over several generations, the problem will likely already have become fairly common before it is identified. The accuracy of such analyses is directly affected by the number of relatives for which data exists - a strong argument for the open exchange of information between owners, breeders, veterinarians and researchers. When looking at the “affected” pedigrees, it is important to know what happened to ALL of the offspring of each breeding reflected in the pedigree, not just the affected cat.

This is extremely difficult since not everyone wants to share information. In some species, all offspring are tracked in a database, thus giving the prospective breeder a lot of information about the mating prior to actually producing offspring. This is not true in the cat world, although the writer would encourage this practice since it would help to minimize abnormalities in outcross breedings as well as line breedings.

Genetic Load

One of the biggest mistakes that breeders make is assuming that their animals are healthy and do not carry alleles for genetic diseases or abnormalities. This misconception leads many breeders to argue that it should be possible to breed animals with a desired conformation while avoiding undesirable traits. In a perfect world, this would be possible. Breeders do concede that some unfortunate individuals do carry recessive alleles for certain diseases, but believe that if they choose their breeding stock carefully, they can avoid these problems. And, if problems do occur, it is due to "bad luck", the lack of direct genetic tests for recessive alleles; because another breeder has been concealing something; or because it “came from that cat”. The truth is that it is virtually impossible to avoid genetic disease. Geneticists believe that most species carry a "genetic load" of 3-5 recessive lethal genes. The difference between humans and cats is that humans have something in excess of 2500 identifiable genetic diseases which have been studied or whose causes are currently being uncovered by geneticists. Most of these diseases are extremely rare and thus seldom come from both parents to produce an affected child except by accident. This is because we as humans are “random-bred”. We are not bred to our sisters, cousins, fathers, or uncles, on a routine basis. For cat breeds, however, this is not the case. Cat breeds have a few common genetic diseases that may have come along with the development of the breed. It is the frequency of these problems, rather than the number of different ones, that is the true indicator of genetic health in a population. We live in fortunate times. Geneticists have just recently completed the mapping of the feline genome, a daunting task made a little easier by the location of genes that are related to similar diseases in the human. Leslie Lyons, University of California (Davis) has written a chapter in the latest version of a book edited by Dr. John August which includes information about the feline genome project undertaken by several laboratories around the world. When a direct genetic test becomes generally available for a specific disease, the test will identify defective genes carried by individual cats. Take for example, polycystic kidney disease in cats. This disease is caused by a dominant gene. (The cat only needs to have one copy of the mutant allele to have the disease – two copies cause them to die during development in the womb or at birth). The test that was developed by the University of California at Davis along with researchers in Kansas State and Ohio State University allows breeders to test their cats at any age and their kittens at birth to look for the defective gene. Thus, a breeder can mate a known carrier of the defective gene to a non-carrier and select for breeding those offspring that do not have the defective gene.

The other animals are spayed and neutered and placed in good homes with information on the disease for the new veterinarian and owner. In a couple of generations, the disease can be eliminated from that breeding program.
Some diseases are much more complicated. A discussion of specific abnormalities or diseases, “Heritable Diseases and Abnormalities in the Cat”, can be found at http://catgenes.org/pdf/heritable-diseases.pdf. These diseases may have multiple genetic components, may be malfunctions of the immune system or combinations of both. For these issues, the geneticists are challenged to reach a new level of their craft. Breeders are forced to rely on their instincts and careful selection to keep their stock healthy until a definitive answer comes along.

Inbreeding and Line Breeding

Inbreeding and line breeding can be confusing words and the concepts are often confused as well. Inbreeding is the practice of breeding two animals that are related (i.e. have one or more common ancestors). The degree of inbreeding may be assigned a value between 0 and 1, called the inbreeding coefficient, where 0 indicates that the animals have no common ancestors and 1 is a clone of the cat. Inbreeding produces animals that acquire the same allele from both parents as a result of their common ancestry. Thus, it increases number of genes that are homozygous. However, it does not discriminate between good alleles and bad, and therefore is just as likely to make genes homozygous for bad alleles as for good ones.
Inbreeding occurs in most pedigreed domestic animals as the result of several common practices: Some breeders own a small number of animals and breed only within their own group.
Many breeders believe that outstanding animals can only be produced by inbreeding -- by doubling up on the good alleles while somehow avoiding the bad. This is sometimes called the “Winner” effect.
Some breeds are based on a small number of foundation animals and inclusion of new members into the breed is prohibited. Line breeding is a form of inbreeding practiced by some breeders -- often by ones trying to maintain a recessive color -- where a son (or less commonly a daughter) is bred to a relative generally less closely related than a first cousin. If we lived in a world where all the genes followed the simple rule that there may only be good alleles, which are dominant, and bad alleles, which are recessive, then inbreeding could be an effective tool for improving a breed providing the latter were rare. Unfortunately, when inbreeding (and even line breeding) occurs, both “good” and “bad” alleles can be affected. If the mating enhances a bad trait, and this trait continues to be enhanced, eventually an individual or breeding line could be weakened due to the trait that has been enhanced. We often see this in breeding programs where lines are inbred or line bred until the resulting offspring become smaller and less healthy, more susceptible to disease, and often have a reduced lifespan.
The only animals that are routinely inbred to a high level are laboratory mice and rats.

There, the breeders start breeding many lines simultaneously in the expectation that the majority will die out or will suffer significant inbreeding depression, which generally means that they are smaller, produce fewer offspring, are more susceptible to disease, and have a shorter average lifespan. However, the resulting animals may have specific traits that are desirable, such as mice with no hair (called nude mice) or mice with specific diseases to be studied as models for human disease. This also results in a line of mice that are genetically extremely similar and will respond to laboratory test conditions in the same way. Geneticists have developed new tools during the past 20 years, including the ability to detect genetic material in blood samples down to the molecular level. In addition to seeing genetics of population (population genetics) such as what the colors of cats are on an island in the pacific, these geneticists can now measure the diversity in genotype (the genes that make up traits). This discovery led to the theory of "neutral isoalleles" and the concept that heterozygosity (mixed genetic makeup) might actually be a good thing. (Breeders know this intuitively and periodically go to outside breeding programs for “outcrosses”.) Although this concept is controversial for geneticists, anyone interested in protecting an endangered species is very concerned with maximizing genetic diversity. The Florida panther is an example. This animal is genetically homozygous for so many traits due to its environmental influences and lack of new genetic material. It has become susceptible to a variety of viruses including Feline Infectious Peritonitis and a variety of other immune disorders, since resistance to disease is dependent on heterozygosity in the genes responsible for the functioning of the immune system. Scientists have been and continue to work with this group of animals to introduce new genetic material into the gene pool to diversify the genes and make the animal healthier (for more information, see articles by Steve O’Brien at the National Cancer Institute).

The winner effect has been discussed, that is the over-use of a recognized male or female. Many breeders believe in the efficacy of this practice because they will be increasing the frequency of occurrence of the genes that made him/her a “winner.” What they may not realize is that they are increasing the frequency of all genes carried by this animal, whether they be good, bad or innocuous -- and that winning animals, like any other animal, carry a number of undesirable recessive alleles that are masked by wild-type alleles. Think about what happens when many breeders work with the same genetic material: all breed their females to one male, then all breed the offspring to another male, and then repeat the process with a third male. The result is that if there is an immune system weakening, a weak or defective hip joint, a defective sternum, crossed eyes, or some other undesirable trait, it is enhanced many fold through this type of selection.

Genetic Diseases and Abnormalities in Cats

Many breeders label any problem that appears to be inherited a "genetic disease".

However, though there are legitimate genetic diseases, there are also a variety of problems that have an inherited component, but are of a fundamentally different nature. Dealing effectively with any genetic problem requires an understanding of the relationship between the genes (genotype) and the phenotype (the way the animal looks).

Inborn Errors in Metabolism

Inborn errors in metabolism are a group of abnormalities in genes that have been recognized for hundreds of years. They are the easiest to see because they require a direct intervention to prevent fetal or newborn death. Some can be managed by careful attention to diet; others cannot.
We have several of these inborn errors in cats. Glycogen storage diseases, lysosomal storage diseases, and others have been identified. Fortunately, most of these errors result in kittens that are short-lived or born dead, thus limiting the errors to the specific individuals who were mated. However, there are some lines of cats (in several breeds) that have exhibited such issues. Again, these breeders acted correctly in finding a researcher veterinarian who could help them to identify the problem and work with the affected animals.

Structural Abnormalities

There are many structural abnormalities in the cat. From patella luxation and hip dysplasia to xyphoid cartilage abnormalities, structural defects occur at random in cats. As we selectively breed pedigreed cats, we enhance the opportunity to see these abnormalities occur. A discussion of the most common and well-known structural abnormalities can be found in the article on
"Feline Structure" at http://www.cfa.org/articles/structure.html and
"Heritable Diseases and Abnormalities in the Cat" at http://catgenes.org/pdf/heritable-diseases.pdf.

Other Abnormalities

Such issues as blood type incompatibility in cats have been around a long time. They have recently been studied in depth and articles have been written to describe the problem. A discussion of the most common and well-known issues can be found in the article on
"Heritable Diseases and Abnormalities in the Cat" at http://catgenes.org/pdf/heritable-diseases.pdf.

What Can Breeders Do?

As a breeder, you are a practicing geneticist. To breed effectively you need to know

something about genetic principles that have been discussed in the early part of this article. To enhance the possibility of good breeding, you need to know something about how to select breeding stock and what to do when issues arise. To care for the resulting offspring, you need to know how to care for groups of animals – whether they are herds of cattle or a cattery of felines. The genetics we have talked about so far is sometimes called “Mendelian genetics” after the Monk who grew peas in his garden. There is also a science called “Population genetics” which deals with the distribution of genetic traits (alleles) in a population and the effects of mutation, selection, inbreeding, etc. on this distribution. A basic knowledge of both is critical not only to your own success, but also to the survival of the breed with which you work. Genetics at the level of DNA is called “molecular genetics”.

A long time ago, geneticists believed that there were only two alternatives for a gene - "good" alleles that functioned normally and "bad" alleles that didn't. If things were this simple, then the task of the geneticist-breeder would be simplified to one of identifying the bad alleles and trying to eliminate them from the population. Such a simplistic model could be modified to allow for different "good" alleles, but it should not matter whether you have one or another. These early geneticists expected to find little genetic variability in a population. The majority of individuals were expected to be homozygous for the good allele for most genes.

With the recent introduction of modern biochemical and molecular studies, geneticists studying populations found far more variability (diversity) than they had expected. There are a number of possible reasons for this, and even the experts are not in total agreement on the most likely reason(s). However, geneticists have also discovered that populations lacking genetic diversity often have significant problems and are at greater risk from disease and other changes in their environ ment. The conclusion is that genetic diversity is desirable for the health and long-term survival of a population.

Is there much diversity in cat breeds? Cats do not come in varying sizes to the degree that dogs, horses, or many other animals do. Their size differences may be from 5 pounds to about 30 pounds. However the genetic makeup that shows us the distinctive things about breeds, such as their coat textures, patterns, colors, whether or not they have a tail, or folded ears or no hair at all makes them diverse. Also, the places they come from may have influenced their gene pool. Once we could only see the phenotype of cats. Now thanks to the technology that lets scientists see into the very genetic makeup of each animal or breed, we can begin to see the diversity of the gene pool, or lack thereof.

The challenge for breeders is to restrict the variability of the genes that make the breed distinctive without sacrificing the variability/ diversity that is necessary for good health and long-term survival of the breed. In some cases, this has not been achieved, and we are now paying the price in terms of high incidence of specific genetic diseases and increased susceptibility to other diseases, reduced litter sizes, reduced lifespan, inability to conceive naturally, etc. This is not solely the responsibility of cat breeders. This same issue affects breeding populations of all types worldwide.
Why has this happened – and do we have to accept it as an inevitable consequence of creating a pool of cats we call a breed? I do not think we need to accept this.

The principal reasons for limited genetic diversity are:

1. Many breeds have been established with too few founders or cats that are already too closely related.
2. Many registries are closed for almost all breeds. Therefore you cannot introduce diversity from outside the existing population easily.
3. Most selective breeding practices have the effect of reducing the diversity further. In addition, selection is often being made for the wrong things
4. Even if the founders were sufficiently diverse genetically, almost no one knows how their genetic contributions are distributed among the present day population.

Consequently, breeding is done without regard to conserving those contributions that may be of value to the general health and survival of the breed. If a database of genetic makeup for all cat breeds were designed without regard to the showing, or desirability of "winners," such a database would enable breeders to identify which individuals are most likely to carry the genes that defined the breed. Genes that defined health or structural issues within a breed, such as crossed eyes, or poor hip sockets could be found as well. Measures might then be considered by breed groups as a whole to rebalance the breed in order to ensure that the remaining diversity is more evenly distributed and that therefore is less at risk of loss. The Havana Brown breed is a good example. Breeders of Havana Browns in the US decided that an outcross for this breed was necessary to increase the vigor of the breed, reduce its susceptibility to infection, and increase its size a little. A suitable outcross program was approved by the breeders, in conjunction with geneticists, and outcrosses were done. The results

were healthier animals, with greater size and the same (single) color for which the breed was named. At the level of the individual breeder, understanding the issues within their particular breed and observing for possible signs of inbreeding depression will enable that breeder to make intelligent, informed choices when selecting mates. This understanding will also allow breed groups to discuss what to do in general when the health and vitality of their breed is beginning to decline. Registries for pedigreed cats worldwide are facing the same issues that have been described here. Some registries in Europe have elected to not register cats with mutations such as tailessness, white cats (who may carry the gene for deafness), folded ears, etc. Other registries have elected to register and continue to work with these cats. Still other registries require screening for certain heritable diseases before the cat can be included in that breed's official study book. None of these registries are wrong in what they have decided.

Selecting Good Breeding Stock (from an article by Susan Little, DVM)

Before selecting stock it is important to consider the number of animals in the cattery, their overall health, their interactions with one another, and the things we have reviewed earlier in this article. The challenge is not to add animals without a reason, and not to overpopulate the cattery with animals that do not advance your breeding program. The reminder I have used is to decide how many animals make a good breeding program for the cattery and post that number on the refrigerator where you can look at it daily. If the number is exceeded, then one of the current animals will need to be spayed or neutered and placed in a good home. Whether you are selecting foundation cats for a new cattery or contemplating adding breeding stock to an established cattery, it is important to understand how to select breeding stock. Breeders can start by identifying their specific goals clearly when considering the addition of new breeding stock. Important skills for the breeder to acquire include a good understanding of the breed standard, the ability to recognize excellent examples of the breed, and the ability to judge one's own cats impartially to recognize strengths and weaknesses. It is also important to keep accurate breeding and health records so that information will be available for selection criteria.

Catteries may require new breeding stock for several reasons:

1. To improve the overall look of the cats as compared to the breed standard
2. To improve reproductive performance of the cattery
3. To improve the overall health of cats produced

There are a number of ways in which breeders can add new breeding stock to a cattery:

1. Selecting a kitten produced within the cattery
2. Purchasing a new kitten from another cattery

3. Purchasing a mature cat from another cattery
4. Using outside stud service for the cattery's females with the intention of keeping kittens for breeding
5. Leasing a mature cat from another cattery for a specified period of time
Selection implies choosing cats for breeding on the basis of individual merit or on the basis of family performance and characteristics.

In general, selection causes a small decline in heterozygosity, perpetuation of certain genes, and increasing similarity. Mature cats may be selected primarily on individual merit, whereas kittens may be selected primarily on the basis of family performance. Selection criteria should include health, reproductive performance and phenotype. In general, successful breeders select toward a breed standard based on good temperament and sound conformation and select away from breed-related health issues and other detrimental factors (poor temperament, poor reproductive performance, etc.). The first goal of the successful breeder is selection for good health and temperament. Good breeding stock is healthy and as free of inherited defects as possible. Select against breeding stock with:

1. Poor overall health, susceptibility to infectious diseases
2. Any inherited defects (including cryptorchidism)
3. Poor temperament with other cats or with people
4. Conformational faults or anomalies

Physically view as many siblings or relatives as possible in order to have a good understanding of the phenotype of the lines you are contemplating. In the case of young kittens, it will not always be possible to evaluate these factors fully until the kitten is mature. Therefore, you can evaluate these factors in the kitten's closest relatives, especially parents and full siblings. Check on the health of the litter to see that they have all grown normally and have been free of disease from birth. Kittens with eye disorders or poor health are not good candidates for breeding programs.

A cat being considered for potential new breeding stock should be:

1. Free from signs of illness (such as upper respiratory infections, diarrhea, ringworm, etc.)
2. Tested negative for feline leukemia virus and feline immunodeficiency virus

3. Tested negative for intestinal parasites
4. In good body condition
5. Screened free from breed-associated genetic diseases, such as polycystic kidney disease, hip dysplasia, hypertrophic cardiomyopathy, etc.
6. Blood typed, if the breed has a significant amount of blood type B cats
Reproductive performance is often overlooked when new breeding stock is selected.

If care is not taken, poor reproductive performance can be propagated into future generations. It has been suggested that reproductive performance cannot be evaluated fully until a cat has produced at least 3 litters. Queens that have a poor reproductive performance record by the third litter are unlikely to improve. Young kittens should be evaluated by the reproductive performance of close relatives. Evaluate young males by the performance of the father and full brothers. Evaluate young females by the performance of the mother and full sisters. Select mature male and female cats that have good libido, good breeding behavior, and good fertility (average or above average for the cattery or the breed). The stud male is the most important cat in the cattery due to simple statistics. The stud male can sire many more offspring in a lifetime than can any queen. In general, breeders need to apply higher standards for health, reproductive performance and phenotype when selecting a stud male, and if he is not up to par, be prepared to neuter him in favor of an offspring or another addition to the cattery. Also, be aware that the show cat, the most perfect specimen, may not be the best breeding stock. His brother or another sibling could be a better breeding candidate than the show cat himself. A secret to keeping good breeding stock available in these uncertain times is to keep a littermate (male or female) when you are showing another cat heavily so that the breeding stock is available to the cattery if something happens to the show cat. This can be accomplished as well by a group of catteries working together.

Mature queens being considered as new breeding stock have:

1. Normal estrous cycles
2. Normal parturition: no history of complications with labor and delivery
3. Good mothering skills: no history of cannibalism or abandonment
4. Normal milk production
5. Normal kitten birth weights, low neonatal mortality rates

Prepotency is the term used to describe a male or female cat that possesses the ability to produce offspring bearing a strong resemblance to that parent. The term is more often applied to males because it is easier to recognize this trait in them due to the larger number of offspring they produce. Prepotency may occur as an

individual becomes more homozygous for both dominant and recessive traits. Prepotency can be a valuable asset in a breeding cat, but remember that both good and bad features are reproduced in the offspring. Using a prepotent male of superior phenotype can enhance the appearance of kittens produced by a cattery, and using a male known to produce healthy kittens can benefit the long-term health of a cattery and a breed. The popular sire (or "winner") effect occurs when a given stud cat is overused in the breeding population. Sires may become popular because they are a top winning cat or have sired many
winners or because they are known to be free of certain genetic diseases. Recognition programs such as the Distinguished Merit program of the Cat Fanciers' Association (CFA) can actually encourage breeders to flock to certain cats because of their proven track record. However, these programs recognize only the ability to produce show winners, not the overall health of the cat, or its reproductive performance, so caution should be used. In less populous breeds the effect of overuse of certain cats can be extensive. When one cat's genes are widely propagated, any unknown detrimental recessives the male carries will also be propagated, perhaps to be uncovered in future generations. This can be the mechanism behind the foundation of a new genetic defect. Popular sires also block the contributions of other stud cats and an artificial population bottleneck can occur.

The Truth about Cat Food

(Reprinted with kind permission from FAB CatCare Issue One 2010)

An article was recently printed in the Daily Mail (UK) suggesting that commercially produced cat food was detrimental to our pets' health. Sensationally headlined (Is the food you're feeding your pet killing it? (and making your Vet rich)) the article was not based on any sound scientific fact but, understandably, alarmed responsible cat owners. FAB described the article as 'scaremongering'.

FAB's Scientific Advisor, Dr Andy Sparkes, said: We have absolutely no problems with good quality pet foods and indeed our belief and contention would be that the enormous progress in pets' health and in their improved longevity over time owes much to the provision of excellent nutrition through responsible pet food companies.

Much time and money is spent on looking at what cats and dogs really need in their diet and most of us do not have the time or inclination to even attempt to feed a cat a natural diet. This is much harder in a cat than a dog as the cat is an obligatory carnivore and needs high quality meat and other nutrition, whereas a dog is an omnivore and can scavenge and live on all sorts of food if necessary. If it just came down to giving them mice and birds then perhaps that would be balanced – the cat eats whole bodies to get all sorts of minerals and nutrients from skin and bones as well as the meat. Just giving pieces of chicken or other meat and trying then to guess what to supplement them with is very haphazard, not to mention the risks of salmonella etc, which come from raw meat (and raw prey!). We know of very many problems, which have arisen directly as a result of owners trying to feed a 'natural' diet, which, in fact, was not correctly balanced and ended up causing very severe and even fatal problems. We are aware of breeders who have told people that, for example, Bengals need a raw meat diet and where the cat subsequently had to be referred to a specialist for treatment for diseases related to poor nutrition. Theses are not isolated cases.

Providing a truly high quality and balanced diet for a cat is not something that can be taken lightly and while it is perfectly possible to do this with 'home prepared' diets, good quality commercial food from a reputable manufacturer is almost always going to provide a better balance for the long-term health of the cat and avoids the risks of certain infectious diseases that may be associated with feeding fresh foods.

There is no evidence that good quality balanced commercial cat foods cause any disease. To suggest that the feeding of a balanced dry diet caused a cat's kidney disease and subsequent death is simply preposterous. Just as in human medicine, there are diseases that can be diet-responsive and changing a diet in the face of a disease can be helpful in managing the disease. That is certainly true of both kidney and lower urinary tract problems, but there is a world of difference between that and any diet actually causing the disease in the first place. With kidney or bladder problems, wet diets are often recommended because wet food has a higher water content, which will help to prevent dehydration – this can help in the management of both diseases, but again this is entirely different from the suggestion that dry food in any way caused the disease. Millions of cats are maintained in superb condition on dry cat food.

Andy concluded: 'As an organisation, FAB is dedicated to helping cats and improving their health and welfare. We are not afraid to speak out when we believe things are being done wrong, but equally we seek to ensure any advice we give is based on the best possible knowledge. In this case, we are well aware of independent, expert veterinary nutritionists

who support and promote the view that good quality commercial cat

food from reputable manufacturers, whether dry or wet, provides the optimum nutritional support. As and when diet-responsive diseases occur, then appropriate changes to the diet can be made, but I am afraid the allegations made by the *Daily Mail* article are simply sensationalist and we would wholeheartedly support the balanced views represented by Nicky Paull (the former British Veterinary Association President) in that article.

Calicivirus – an old enemy in new disguises by Martha Cannon

(Reprinted with kind permission from FAB CatCare Issue One 2011)

Feline Calicivirus has long been recognised as one of the two main causes of cat flu (the other main cause being feline herpesvirus). It is a member of a very large family of caliciviruses that can cause a range of diseases in a range of host animals. In fact, caliciviruses are thought to have arisen as viruses of marine animals but have subsequently evolved to be able to infect land animals as well.

Other members of the calicivirus family include:

The noroviruses – shellfish that are infected with a norovirus can cause severe episodes of 'food poisoning' in people and the closely related Norwalk virus (also known as the 'winter vomiting virus') can cause devastating outbreaks of vomiting and diarrhoea especially if it gets into a hospital ward or an enclosed community like a cruise ship.

The sapoviruses – this group of viruses includes the sapoviruses, which cause contagious gastroenteritis in babies and young children.

The lagoviruses – which infect rabbits and cause the rapidly fatal 'viral haemorrhagic' disease of rabbits.

The vesiviruses – this is where feline calicivirus fits into the family, but this group also contains viruses that infect pigs (causing signs similar to those of foot and mouth disease) and others that infect sea lions.

<u>Feline Calicivirus (FCV)</u>

Although FCV is classified as a single virus there are in fact very many different strains of FCV with a wide spectrum of potential to cause disease. This huge variation can occur because FCV is a small single-stranded RNA virus, which means that mutations frequently occur during viral multiplications. This leads to a natural process of evolution and, because viruses multiply so quickly, it happens fast enough that we can actually 'see' the effect over a period of only a few years. The many different strains of feline calicivirus (FCV) can behave in many different ways:

Cat Flu

Cat flu is the most common problem that is caused by FCV. Affected cats suffer from sneezing and conjunctivitis and they may also develop painful ulcers in the mouth. Signs of illness usually develop within 2 to 10 days of exposure to the virus and typically last for a week or two.

These days most pets can be vaccinated against cat flu and so have a degree of protection. The vaccines cannot stop cats from picking up the virus but in most cases they do protect them from severe signs of disease. However, because of the huge number of different strains of FCV, it is not possible to produce a vaccine, which protects against every single one. Furthermore, due to the constant evolution of new FCVs, a vaccine, which protected against all the more common strains 10 years ago, may not be effective against the common strains in circulation today. Vaccine manufacturers are in a constant battle to make sure that the vaccines they produce give the widest possible cover against disease.

Chronic gingivostomatitis complex

Chronic gingivostomatitis is a painful condition of the mouth in which there is severe inflammation of the gums and cheek lining. Its precise cause is unknown but it appears to be due to an abnormal immune reaction in the tissues in the mouth. It seems that in affected cats the local immune system reacts to elements in the mouth that it would normally be able to 'ignore' such as dental plaque and tartar, or possibly in some cases and ingredient in the diet.

There has been much interest in the possible role of viral infections as triggers for chronic gingivostomatitis. FeLV and FIV infection can sometimes be a factor but these days they are rarely found in affected acts. By contrast nearly all affected cats carry FCV in their mouth so it does appear that there is a link between FCV and gingivostomatitis. However, it is not a simple case of cause and effect – it has never been possible to identify a particular strain of FCV that is common to the condition and gingivostomatitis is not contagious, even though FCV is highly contagious. Again it seems likely that gingivostomatitis occurs in cats that develop an unusual immune reaction to FCV which may allow the virus to persist in the mouth and also triggers the severe inflammation that characterises the condition.

Skin problems

FCV and feline herpesvirus are well known as causes of cat flu, but it has recently been discovered that they can occasionally also cause inflammation and ulceration of the skin. This is a rare manifestation of infection. The skin lesions are usually around the eyes, nose and mouth or on the forepaws. These are sites in which the skin is likely to be contaminated by ocular or nasal discharges or with saliva and all these fluids can contain high levels of virus.

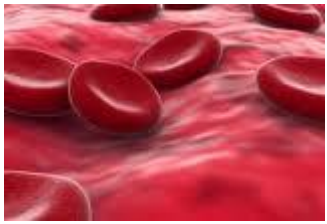
Virulent systemic FCV

Recently some high pathogenic (disease causing) forms of feline calicivirus have been recognised, which cause signs of disease that are very similar to the devastating viral haemorrhagic disease in rabbits.

These virulent systemic caliciviruses arise as a new mutation within a population of cats that carry the more 'normal' strains of FCV. Clinical signs may include fever, jaundice, swelling of the face and legs and ulceration of the skin. Other signs more typical of FCV infections may also develop, such as runny nose and eyes, sneezing, mouth ulcers, poor appetite and depression. Sudden death with no real previous signs of illness can also occur and even with intense treatment only around 65% of cats survive these devastating infections.

Although these strains of FCV arise as new mutations within a population of cats they are just as contagious as the more familiar cat flu strains of FCV. They can spread rapidly through cats within a hospital and very sadly some vets and nurses who have been treating cats infected with virulent systemic FCV have actually transferred the virus to their own cats on their hands and clothes, resulting in the death of their own pets.

Transient limping syndrome



Some strains of FCV can cause a short-lived infection in the joints, producing a 'limping syndrome' in kittens without any associated cat flu signs. Affected cats are reluctant to move due to joint pain and often have a fever. Joint swelling may be present and the lameness may 'shift' from one joint to another. Recovery usually occurs spontaneously within 3 to 7 days and there are no long-term consequences following the infection. Painkillers and anti-inflammatories help to keep the affected cat more comfortable until the problem passes.

Prevention is better than cure

Feline calicivirus is a very common virus in our pet cats, breeding cats and rescue centres and it can cause a wide range of diseases that can be difficult to treat. It is a highly contagious virus that is spread in saliva and in the secretions of eyes and nose. It can be transmitted directly from cat-to-cat by co-grooming or by inhalation of droplets when an infected cat sneezes, but it can also be spread indirectly by contact with contaminated objects such as food and water bowls, grooming brushes and cat carriers. It can also be carried on people's clothes and hands and so can spread by that route too.

Reducing the spread of FCV involves:

Housing and management of multi-cat households, catteries and rescue centres: Avoid overcrowding and ensure good ventilation. Where cats are not free-range, sneeze barriers or sneeze gaps between pens are essential.

Good hygiene:

A good cleaning and disinfection routine, frequent hand washing and no sharing of carriers, grooming tools or food and water bowls are also necessary.

Vaccination:

Although vaccines cannot prevent infection with FCV they are very important for reducing signs disease and reducing the amount of virus that an infected cat sheds into the environment. Recent vaccination guidelines produced by the WSAVA (World Small Animal Veterinary Association) and ABCD (European Advisory Board on Cat Diseases) have highlighted the need to vaccinate as many cats as possible in order to reduce the overall level of virus in the cat population. They also draw attention to the prolonged effect of many vaccines. This means that following a kitten course of vaccines and a first annual booster, three yearly re-vaccination intervals are now recommended for feline panleukopenia (infectious enteritis) and feline leukaemia viruses. However, there is less consensus of opinion as to the most appropriate re-vaccination interval for the cat flu viruses. The WSAVA Guidelines recommend a three-year booster interval for FCV and feline herpesvirus (FHV) but they acknowledge that 'this is a point of debate amongst experts. For example, the ABCD recommends annual revaccination against FCV and FHV for cats considered high risk but triennial revaccination for low risk (predominantly indoor) animals'.

Siamese in the Forefront

By Ian Moore

All Photos in this article by Krystal Callaghan Photography

During 34 years in the Cat Fancy I cannot recall Siamese so overwhelmingly taking over the show bench in Cape Town.

Paul and Tania Prime's 2 imports, Rimchar Mafdet Jackass of San-Shing (aka Jazz) and Mafdet Marchello of San-Shing, between them have taken Best in Show at all 4 shows held in Cape Town so far this year, Jazz at 3 shows and Marchello at the fourth. Quite and achievement especially when it is noted that over a fair number of years Siamese coming up to the front cages have been a fairly rare occurrence and being Best in Show almost unheard of. Not being content with just trotting out their 2 stunning imports Paul and Tania have also been showing a gorgeous owner bred chocolatepoint kitten, San-Shing's Baby Tjoklits, which at the last show was overall Best Kitten on Show. All 3 the above have already qualified in the kitten section for COTY, quite some feat.

Congratulations to the Primes for bringing Siamese so decisively back to the forefront. We wish them continued success with these new additions to their feline family both on the show bench and also when they start producing kittens.

Ian Moore

Mafdet Marchello of San-Shing

Rimchar Mafdet Jackass of San-Shing (aka Jazz)

San-Shing's Baby Tjoklits

Siamese Cat Genetics

Cats have 19 pairs of chromosomes. Chromosomes are located in the nucleus of each cell, chromosomes make up the blueprint of animals. The chromosomes are made up of genes. Genes come in pairs, one from each parent. Each gene is responsible for a single feature, or a group of features. One pair of chromosomes determines the cat's sex. A female has two X chromosomes, and a male will have one X & one Y chromosome.

Siamese cats carry a gene known as the Himalayan gene. This gene is seen in other species, such as the rabbit & the mouse. It is a mutation at the C locus & it causes partial albinism. This gene is recessive to the full colour C gene. This means you need two doses of it (homozygous) for the Siamese colour to show up. If you mate a Siamese to a Siamese, you will get Siamese offspring. If you mate a Siamese to a black cat, you will get black offspring which will carry one dose of the Siamese (cs) gene at the C locus. The Burmese also shares the same type of gene, which is known as cb.

The cs & cb genes are co-dominant and hence if you mate a Siamese (cs) to a Burmese (cb) you will get a Tonkinese (cs/cb), which has "mink" colouring.

This gene is heat sensitive, the cooler the area, the darker the colour. Which explains why a Siamese has dark extremities such as the face, tail & legs. The body being the warmest part of the cat remains lighter in colour. You will notice your Siamese get darker in the winter months, especially if your Siamese is an indoor/outdoor cat. Siamese cats are white at birth, this is due to being in the constant warmth of the mothers womb. This colouring varies from Siamese to Siamese.

Genetically, a seal point Siamese is a black cat. But the Himalayan gene inhibits the full expression of the pigment.

The albino allele has another effect on the Siamese cat. Strabismus (crossed eyes) is sometimes seen in the Siamese cat. This is thought to be due to a misrouting of the nerve fibres from the eye to the brain. Instead of the fibres splitting left & right, they criss-cross, this is believed to be contributory to strabismus. This condition is not only seen in Siamese cats, but other species of true albino animals. Breeders have worked hard to breed this problem out of Siamese cats.

Siamese cats come in four main colours;

Seal Point

(aa BB DD oo cscs) (aa=non agouti, BB=black,DD=dense,oo=non orange, cscs=Siamese)

Chocolate Point

(aa bb DD oo cscs) (aa=non agouti, bb=chocolate, DD=dense, oo=non orange, cscs=Siamese)

Blue Point

(aa BB dd oo cscs) (aa=non agouti, bb=blue, dd=dilute, oo=non orange, cscs=Siamese)

Lilac Point

(aa bb dd oo cscs)(aa=non agouti, bb=lilac, dd=dilute, oo=non orange, cscs=Siamese)
Note how the dd (dilute) gene changes the darker Seal & Chocolate colours into the paler Blue & Lilac.

The outward appearance of a cat is known as the Phenotype. The internally coded, inheritable information is known as the Genotype. So, while a Seal Point Siamese will carry the gene for Seal Point colouration, it may also carry a gene for "Blue Point".
By looking at a cat's pedigree we will get a good idea of the cat's "genotype". We can also predict what colour kittens to expect from a mating between Siamese cats.
We know that Blue Point is a dilute of Seal Point & that Lilac Point is a dilute of Chocolate. Dilution is recessive to non dilution. The dilution gene is represented by the letter "d". The mutant form of dilution is Dm (dilute modifier). This is dominant to the dilute gene. Dm only works where there is already a dilute colour.

Below is a table which shows the effects of the Dilute & Dilute Modifier genes on the dense colours.

Dense Colours	Dilute Colours	Dm Colours
Seal	Blue	Blue based Caramel
Chocolate	Lilac	Lilac based Caramel
Cinnamon	Fawn	Fawn based Caramel
Red	Cream	Apricot

2011 Cat of the Year

www.tsacc.org.za

SACC will be hosting World Cat Congress (WCC) in South Africa from 8 to 11 July 2011. The WCC is hosted annually by one of its member organisations and as part of this prestigious event the hosting member also has the opportunity to run a show during the WCC weekend.

The Governing Council of SACC therefore made use of this opportunity to run our flagship event, the 2011 SACC Cat of the Year Competition at the same time.
It is also a custom of this event that the WCC delegates who are qualified judges will officiate at the show run by the member organisation. This presented SACC with the opportunity to make use of quite a few international judges for the COTY show. As 7 of the delegates to attend WCC are all-reeds judges,
we were faced with a few challenges:

1. Will we let cats be judged 7 times by each judge?
2. What will the impact be on some of the cats if they are handled 7 times during one day?
3. Will all the judges be able to judge all the cats that qualified and still finish in time to clear the show for the evening function?

The solution was easily found and the COTY Committee decided to split the judges in two groups.

SACC's COTY rules present us with a model that will allow such a split to still present a fair and favourable result. It was decided to increase the number of judges to 10 (7 international and 3 local judges) and let the Entire and Domestic Sections be judged by 5

judges and the Neuter and Kitten Section by the other 5 judges. As our COTY model is based on judges placing cats in each section and the computer system assigns the same score for each particular placing, it does not matter that different groups of judges judge different sections. A specific placing by any judge will always carry an equal value to the same placing by any of the other judges.

The judges selected for each grouping will be communicated in due course. This selection will be done by a draw process at the Kitten show. The three SACC judges will be chosen as per the rules closer to the final date. We are all looking forward with mounting excitement to COTY 2011 and we are sure that the correct cat will win and carry the honour of the title of SACC's Cat of the Year for 2011.

Jan van Rooyen
2011 COTY Organising
Committee