

## To Aby or Not to Aby

### Why the need to outcross?

Ocicats are, unfortunately, a breed with very small gene pool. One way to check how related the cats are, on the average, is to check their inbreeding co-efficients for all generations, in [www.ocicatpedigrees.com](http://www.ocicatpedigrees.com) for example. Almost all ocicats (excluding those with siamese or abyssinian outcross background) have a COI of 18-30%. It is close to, or in some cases above, a severe form of inbreeding (ie father daughter or full siblings which is marked as 25%). In other words most 'ocicat to ocicat' matings compare to a housecat of a father-daughter mating being mated with its paternal cousin when it comes to COIs! The breed also suffers from two other challenges – the amount of Chevy + the foundation cats' input. **Chevy** aka **Dalai Golden Cavalier of Ociville** is seen on many 10 generation pedigrees as many as 50-60 times, making him responsible for 25-30% percent of the cat's genes (more than it's grandparents). To add to the shock Chevy is a result of a father-daughter mating (= extremely inbred, his own COI is 32.8% in just four generations and a disgusting 40.6% in total) AND often when Chevy himself is missing from a pedigree you will instead find his father **Dalai Golden Phoenix**, often mated with females who are related to him. Foundation cats on the other hand refer to the first four original cats behind the breed (**Dalai She** for example) which are repeated in a single pedigree so many times they usually represent from 65% to 70% of an individual ocicat's background. There has also been a rather small amount of lines imported to Europe, giving us Scandinavians an extra challenge with an even narrower gene pool than amongst American ocicats .

It should be noted that inbreeding increases by each generation (unless it is intervened by introducing some outcrosses), causing decrease in genetic variation. That has its benefits: Cats will for example have more uniform, 'typed' looks as genes are "locked". Unfortunately with the same locking we will see an increase in a multitude of defects which would otherwise stay hidden inside the cat's genemap and make rooting them out difficult.

We need to remember that COI's are not "fool proof". They are a mathematical model of calculated averages, based on a database which might have a mistake that will change the result completely. A name could be entered twice, creating a duplicate, or the pedigree could simple be incomplete which would both result in a lower COI than in reality. I recommend going through pedigrees by hand also, perhaps with a help of an experienced breeder, as pedigrees never hold vital information, for example if the cat has produced FCK kittens or has siblings with HCM.

Any experienced geneticist will tell you that there is a connection between high COI's and the amount of defects and health issues in any cat or dog breed – it's called genetic depression. It is difficult to know how many problems ocicats have without extensive research on the subject. Even without, breeders can check their defect and mortality rates: A veterinary study on genetics (*Introduction to Veterinary Genetics* by F.W. Nichols) says a normal rate is from 0-2,5% of offspring to have any sort of defect, caused by natural variation (ie co-incidences) in any mammals. If the amount of kittens born dead, or defective or sick is much higher than that (say 10%) the book suggests problems could be caused by genetic depression. Ocicats' difficulties come in a large variety and it is easy to think of them as something that simply happens. It has been suggested that all of the following problems are either inherited or are may be caused by an inherited tendency: Gastrochis ("intestines outside"), cleft palates, umbilical hernias, missing limbs (toes, nails, tail etc), twisted legs (less severe forms vanish), chest deformities (FCK, pectus, misc - less severe cases may vanish with growth), heart difficulties (deformed heart, HCM) and other deformitiess (deformed spine, deformed urethra etc), "bad health" (FIP, flu's, FUS) problems with fertility (no heats, problems during gestation, studs without "appetite"), allergies and asthma (or other respiratory difficulties). To make things difficult for the breeder most of these conditions can be met in any breed of cats and can also be a result of outside conditons as well. And to top the previously mentioned problems, we are also starting to see an increase in the amounts of cancer and other types of growths, patellar luxation and I have heard of PK and PRA among ocies, without recent F-lineage.

Even if one doesn't agree about any health problems plaguing ocies it is wise to fight high inbreeding COI's now, simply because it is impossible to continue forever with the same limited gene pool and problems will arise at some point anyway.

There are several methods to keep a gene pool wide, for example:

- Matings are planned to ensure maximized gene mixes (Co-operation among breeders is essential for this; for example it is better to use two females out of one litter once each than have two litters by the same female)
- New studs and dams are imported and used only a few times, in co-operation between different breeders and combinations maximize genetic mix
- There are no "Matador" studs in use
- Breeders co-operate by swapping kittens or studs, telling about problems they've had etc.

However, it is rather difficult to import "new" ocicat blood, since most ocicat kittens sold anywhere have the same ca 65-70% of foundation cats in their genes, offering only a very little variation. But even a little variation is much better than no variation at all! Importing has a lot of other challenges but unfortunately there isn't enough space to discuss them.

The only truly effective way to introduce new blood is to add cats who are not ocicats at all. Breed outcrosses are advised everywhere to ensure genetic variation – the positive health (etc) results are commonly known as hybrid vigor, however results aren't always positive (ie an oci and siamese accidental mating produced severe squint). The problem in pet husbandry is often the choice of the right breed to choose as an outcross, as any breeder wishes to minimize the problems faced with different looks or color genetics. Ocicats have three foundation breeds: Abyssinians, American Shorthairs and Siamese. From these breeds the US ocicat breeders have kept abyssinians as a recommended outcross right from the breed's beginning to this day (and at least until 2015, which is the date of current right-to-outcross). Abys were an easy choice as they offer a very similar standard and have exactly the same color genetics. They still appear as the easiest method for new genes - whether or not abys should be the only allowed breed outcross is another matter, which would need to be discussed elsewhere.

### **Everything comes with a price**

Unfortunately even aby outcrosses come with a price. Some people fear for new sicknesses, especially PRA (leads to blindness), PK (phosphorylase kinase deficiency) and RA (amyloidosis). The first two, like luxating patellas, can be excluded before mating and thus do not offer a great risk (and are found among ocicats already). Unfortunately there is no test for Amyloidosis. It is yet rather rare, at least in finnish abys, and can be at least partially avoided by using cats well above two years of age.

Some breeders worry about a permanent loss of outside appearance like the ocicat type, head shapes and that the size of ocicats would diminish, resulting in a lack of (good) show cats. Certainly, while there has actually been one first generation spotted aby-oci outcross (F1), who was awarded Grand Champion title, most F1's are ticked and appear as something inbetween ocies and abys. F2's can be already be spotted and have ocilike looks, ie are showable and on rare occasions actually do well – S\***JohnJohn's Way to Go** was Best In Show in her first show and other F2's have been nominated for panel. F3's are already mostly show quality, of course depending on luck and genes. A permanent damage o the looks would require extreme amounts of F1 outcrosses and that is very unlikely to happen. Size also doesn't seem to be a trait that outcross-lined ocicats inherit that much – i've seen many good sized "hybrids" and have not seen any more smallish ocies (or any smaller) among F1-F4's than i have seen among full-bred ocies. I would worry more about abyssinian's different temperaments and would recommend to use a cat with good show nerves. One should note that this problem has probably more to do with the aby & oci line chosen than with outcrossing on the whole.

The difficulty/easiness of selling F1-F4's is quite dependent on how well "Catbusiness" is doing on the average. I would expect problems in selling outcrosses if there are a lot of unsold ocicat kittens and visa versa. However, ociabys do have their own marketing niche: Some buyers battling between an abyssinian or an ocicat have happily chosen the in-between-kitten where some prefer the mixed but still registered and well-known lineage. Some US breeders are interested in outcrossed kittens, coming with scandinavian abyelines. I would not fear for "cheap" ociabys stealing the market for pet quality kittens. A ticked oci simply isn't like the spotted and i doubt spotted outcross babies to be any cheaper than ocies on the average, perhaps even the opposite.

## Is there enough benefit, then?

Outcrossing clearly lowers COI's – the F1 outcross having a simply zero COI regardless of the amount of generations. How much this impacts the health could be judged only by doing a scientific study on the matter, before such a study we can only guess. However as a "gut feeling" outcross kittens do appear generally healthier and faster growing than fully ocicat-blooded kittens. American breeders claim F1-F4's to be extremely healthy and born free of defects, but estimate that F5's (and from there on) have already so little aby blood that they have same tendencies to defects as any other full-blooded ocicat.

While it would be wonderful to see absolutely no problems for four generations i fear the positive results might here be seen best with just generations F1-F3 (depending on initial ocicats used), simply because the even-smaller-gene-pool is probably "stronger" with it's flaws. I would though expect a smaller percentage of defective kittens and less severe forms of difficulties among F4's than compared to "regular" ocicat litters.

One doesn't often think that outcrossing can also offer benefits for the looks. Abyssinians have usually extremely nice coatings, coat texture and usual coloreds (our tawnies) can offer this remarkable tone to ocicats. They are also those who prefer the outcrosses' temperaments: Almost like ocies, only a bit nicer and less bossy.

## Suggestions for the wanne-do-outcrosses

Plan at least two generations and make sure you have a "plan b" if things go awry; Write your plans down to be attached on a special permit application and to yourself. Check the rules concerning special permits and note that the application process can be painfully slow. Scandinavian abys are generally healthy and have backgrounds that breeders know for many generations, and at least in Finland most breeders will not only openly tell about existing difficulties, but also will happily give their abystuds to outcross use. I would be a bit careful with abys outside Scandinavia as, especially with US cats, PK-tests aren't uniformly made and there is still some breeders ignorant of amyloidosis.

*How to choose an aby for outcrossing:* I would recommend choosing generally healthy aby, from a line that is known to be healthy, and require a resultclear result in PK ( use of carriers needs extra care), without PRA or patellaluxation and of course not a variant (aka carrier of LH-gene) or a cat with white locket. An ideal aby is 4-5 years old or more, minimizing the risk for amyloidosis, but since that is often impossible, even past 2 years is good.

Use of silver abys should be considered carefully. While there is no reason why we couldn't use them ocicats with silver aby in their (five generation) pedigree cannot be exported to CFA. Silver isn't recognized as a abyssinian color in CFA so they do not accept it as an outcross for ocicats either.

I would recommend choosing an aby with nice temperament and good show nerves as timidness for example appears to be at least partially inherited.

While it would be great to use an ocicatlike abyssinian i personally don't think it is that important. Abys who aren't very good inside their breed can have weaknesses that are flaws inside ocies as well: Coat texture might be too coarse, color grayish, much too high on legs, etc. Most outcrosses i know are already very ocicat-like in the second generation, even if the aby used has been a good example of its breed.

Size doesn't seem to get smaller, quite the opposite actually. For example Anorien's Walk thru the Fire and Anorien's Wheels of Fire weigh 4.2 and 4.5 kilos now at the age of 7 months – and they have three abys in their pedigree, in generations 2, 3 and 4.

*How to choose an oci for outcrossing:* Again, I would recommend choosing a generally healthy ocicat, from a line that is known to be healthy, without defects in its background or among its relatives (but if one wished to mate a cat from known risky lines i would suggest using an aby or an outcross and simply petting the kittens out, as the result is probably better for the individual cats and their future owners). It would not hurt the cat to be checked as clear from HCM (as 1 yr and 3 yr old). In an ideal setting the outcrossed ocicat (usually a female) would represent an ocicat line not so common among Scandinavian ocies and would even be homozygous for spots. The later fiancés should be chosen following the above mentioned suggestions, if possible.

*How to choose which ociaby to use:* I would recommend concentrating on the "whole package" (temperament, boning, over all looks etc) when choosing which F1 (or F2 and so on) to continue the lineage. Occasionally you can get an F1 who is already something in between ticked and spotted with minimini-sized freckles all over it's coat. I would put more weight on the over all composition of the kittens and not the pattern alone – but of course if you have a litter of otherwise similar looking kitties do choose the one with almost spots as it's likely that he/she would produce mostly spotted on the F2 generation! Temperament can be a bit difficult to judge, with F1's at least, so you might want to consult an aby breeder for that too.

*How to tell who's suitable for breeding outcrosses:* A breeder doing outcrosses would ideally be very patient, able to plan forward, have contact with many co-breeders and either knows about different lines and their problems or dares to ask around. A suitable breeder would also have a clear vision of what an ideal ocicat is and looks like, to be able to judge which kitten to choose to continue – or s/he is able to ask for help from other breeders.

## **Conclusions**

A breed based on the very same 4 cats everywhere simply cannot maintain its health from generation to generation. I think it is every breeder's wish and also responsibility to try to produce as healthy cats as they can, while trying to create cats closely representing the breed standard – with also making sure the cats have good, docile temperaments. All of this is a huge challenge and it is hard to be able to fulfil all of those at the same time. For me, making sure that the cats from my breeding do not have to suffer from sicknesses nor their owners from an unexpected loss of a family member has become extremely important, more than racial purity which is, after all, something people have literally made up.

I think it is important to remember that no outcross is ever an "instant cure all". It's not magic and always when bringing new blood you are bringing a chance to some new difficulties. Abys have their own share of problems and I'm sure this applies to any outcrosses made, regardless of the breed/s. And what is perhaps more important, outcrossing alone will not save the breed if breeders are not co-operating and fighting the problems we have already encountered.

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This article is based on a lecture the author gave at Ocicat ry's (Finnish Ocicat Club) Oci-Breeders' seminar fall 2006.