The GCCF Ragdoll Breeding Policy

Compiled by the Ragdoll Breed Advisory Committee January 2012

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1 - Aims of the Breeding Policy & background of the Breed

This Breeding Policy accompanies and supplements the Ragdoll Registration Policy and should be read in conjunction with that document. If there are any queries regarding either document, these should be referred to the BAC delegates of the affiliated Ragdoll Breed Clubs.

The aim of this Breeding Policy is to give advice and guidance to ensure breeders observe what is considered "best practice" in breeding Ragdolls with the over-riding objective of improving the Ragdoll cat to meet all aspects of the Ragdoll Standard of Points, which describes the ideal Ragdoll cat.

The origins of the Ragdoll are well documented and can be traced back to a mating of a white Angora-type semi-feral cat, Josephine. Josephine was sadly put to sleep, but in 1963 Ann Baker managed to secure three of Josephines offspring. Daddy Warbucks, a Seal Mitted male with a white tipped tail and a white nose blaze, Fugianna - a Seal Bicolour, and Buckwheat - a black self (solid). These cats were compared to the Burmese and Birman, but Josephine and the fathers were semi-feral, and therefore their parentage is unknown.

Ann Baker began a regimented breeding programme which resulted in her producing Colourpointed, Mitted and Bicolour patterns from the three original cats and their offspring. In 1971 she set up her own registering body, the International Ragdoll Cat Association (IRCA). In 1975 she patented the Ragdoll name, and franchised out 'breeding stock' under strict contracts. Her aim was to develop a breed that resembled Daddy Warbucks, the Seal Mitted with a white nose blaze and white tipped tail, the founding father of the breed.

The Ragdoll was initially imported into the UK in 1981 by Lulu Rowley (Petil-Lu Cattery) and Pat Brownsell (Patriarca cattery).

The Ragdoll is now well established in the UK and subsequent years of breeding has gone some way towards developing and fixing good phenotype in the breed along with a good gene-pool. The combination of genes make it possible for a total of 60 colour and pattern permutations to be registered under the Ragdoll Standard, and in reality, 120 colour and pattern permutations when taking into consideration the extremes of pattern (High Mitted, Mid-High White and High White).

While Ragdoll breeders are "fixing" the type and specific appearance of the Ragdoll, breeders will also need to pay close regard to further improving other aspects of the breed, such as tail length, earset, strength of the chin, and eye colour.

There is no current permitted outcross programme for the Ragdoll (but see Registration Policy for details of previous GCCF permitted outcrosses). However, future windows of opportunity for outcrossing will be determined by the Ragdoll BAC if and when considered beneficial to the breed's gene pool. No Ragdoll should be registered with the GCCF if it has any outcross other than those specified in the existing GCCF Ragdoll outcross programme anywhere in the pedigree, no matter how many generations back this may have occurred. This is to prevent bringing in undesirable genetic traits, for example the Birman Gloving Gene, or genetic problems such as PKD.

2 - Genetic Makeup of the Breed

Background

The Ragdoll holds a number of both dominant and recessive genes, all of which are predictable, and allow for accurate predictions of matings. All cats have 19 pairs of chromosomes upon which there are many thousands of genes that govern the eventual shape, size, sex, colour, pattern, and hair length of the individual animal. Over the generations a number of mutations have occurred and selective breeding has been used to isolate these to produce the various pedigree breeds we see today.

Genetics

In the case of the Ragdoll the key genes influencing the colours and patterns within the breed are:

Siamese Colour Restriction (c^s) – an albinism allele. The Siamese Colour Restriction allele is responsible for the Colourpointed coat pattern in the Ragdoll. The c^s gene causes the normally black coat colouration to be expressed as Seal, and for the colouration to be limited to the points. The colouration is dependent on the temperature. At the points, which are generally a cooler temperature, the Seal colour is expressed, whereas on the body, where the temperature is generally higher, the colour is lighter. This gene also affects the pigment in the eyes, which is what gives the Ragdoll its' characteristic blue eye colour.

Agouti (A) - the natural "wild" gene that is the basis of the tabby cat. The base agouti pattern is bands of black on a yellow background, resulting in bands of colour along the shaft of the hair. Other genes work to change the pigment to other colours (see below).

Non- agouti (a) - The result of a genetic mutation, and a recessive gene. Responsible for changing the original Tabby patterning into a solid, although often in certain light the 'ghost markings' of the underlying tabby pattern may still just be visible. Other genes work to change this black pigment to other colours (see below).

Orange (O) – A mutation on the X chromosome and is sex-linked. It eliminates the melanin pigment from the hair fibres, replacing it with phaenomelanin, a lighter compound appearing yellow or orange depending on the density of the pigment. The agouti to non-agouti mutation does not have a discernible effect on red or cream coloured cats, resulting in these self-coloured cats displaying tabby striping regardless of the agouti gene. This explains why you can usually see some tabby pattern on red and cream coloured non-agouti cats, even if only on the head/face. Rufus polygenes, as yet unidentified, affect the richness of the orange gene's expression. All male cats carrying the O gene will be red. A female carrying the O gene on both X chromosomes will be red. A female who carries the O gene on only one chromosome will be Tortie. Other genes work to change this colour. See Dilute (below).

Brown (b) - A recessive gene. Homozygous (bb) cats will have a Chocolate coat colour, unless the colour is affected by the dilute gene. Results in a change in the pigmentation from Seal to Chocolate. Other genes work to change this colour. See Dilute (below).

Dilute (d) – a recessive gene which reduces and spreads out the pigment granules along the hair-shaft and turns a Seal to Blue, Chocolate to Lilac, and Red to Cream.

Mitted (s2) - A dominant gene. Causes white spotting. The s2 gene is a minimal expression of the white spotting gene, and is usually limited to the feet, chin, and band of white running from the chin, across the underside, to the tail. If the Ragdoll is Homozygous for the s2 gene (High Mitted), the levels of white increase, giving the appearance of a Bicolour Ragdoll. When mating a Homozygous Mitted Ragdoll to a Colourpointed Ragdoll, all offspring will be Heterozygous for the s2 gene, and will only express the Mitted patternation. Due to the random nature of this gene, the white patching can vary from a small amount of white on the tips of the toes, to white legs and a wide nose blaze, resembling the inverted 'V' expected of the Bicolour.

Bicolour (s4) - A dominant gene. Causes white spotting. The s4 gene expresses more white than the s2 gene. It usually limits itself to the legs and a white inverted 'V', sometimes with white patches on the cats' back. If a Ragdoll is Homozygous for the s4 gene (High White), the levels of white increase. This can result in anything from a 'standard' Bicolour pattern through to an entirely white Ragdoll. When the Homozygous Bicolour Ragdoll is mated to a Colourpointed Ragdoll, all offspring will have the appearance of a Bicolour as they will all be heterozygous for the s4 gene.

Mid High White - A Mid High White usually has the appearance of a Bicolour, but carries both the s2 and s4 gene. When mated to a Colourpointed Ragdoll, the offspring will be Bicolour and Mitted.

High White - A High White usually has the appearance of a Bicolour, but carries two s4 genes. When mated to a Colourpointed Ragdoll, all the offspring will be Bicolour.

3 - Type, coat, eye colour, colour & pattern

The Ragdoll is a cat with no extremes. Care should be taken when breeding to ensure that the breed does not move away from this. For example, there should be no extreme nose scoops, as these can result in short muzzles, equally an overly long muzzle may result in a straight profile

Breeders need to continue to work on improving the type of the Ragdoll and fixing the correct look. It must never be forgotten that the Breed has always been renowned for its laid back sweet nature and this should also be maintained in any breeding programme.

Coat

The Ragdoll coat is medium in length with a soft and silky texture. The coat tends to be longer around the ruff, through the underbelly, and around the back of the rear legs. The body colour is paler than the points colour, and may become more shaded with age, however this is acceptable as long as there is still a contrast between the points and the body colour.

Eye Colour

All Ragdolls, without exception, have blue eyes. The intensity of the blue can vary from a very pale blue to a deep, almost navy blue. The shade of blue is dependent on the amount of pigment inherited. The less pigment, the deeper the shade. The depth of blue can be improved by selecting a stud or queen with a good eye colour, as the progeny may inherit less pigmentation, resulting in a deeper eye colour.

Colour

The Ragdoll is a pointed cat. The colouring is more intense on the ears, legs and tail. Comes in the following colours:
Seal, Blue, Chocolate, Lilac, Red, Cream, Seal Tortie and Blue Tortie variations thereof.

Seal – The body colour should be beige. Points should be deep seal brown and all of the same shade.

Blue – The body colour should be bluish white. Points colour should be greyish-blue and all of the same shade.

Chocolate - The body colour should be ivory. Points should be milk chocolate and all of the same shade.

Lilac – The body colour should be magnolia. Points colour should be pinkish-grey and all of the same shade.

Red – The body colour should be pale cream. Points colour should be deep orange to red on points. Points may match in tone, but they may not all be the same shade, the legs and feet will often be paler.

Cream – The body colour is off-white. The points colour is a buff-cream through to mid-orange. Points may match in tone, but they may not all be the same shade, the legs and feet will often be paler.

Seal Tortie - Seal point colour, with patching of red. The body colour can range from a pale magnolia through to a deep fawn. The nose and paw pads must be Seal and/or flesh through to deep coral colour to match the points.

Blue Tortie - grey point colour, with patching of cream. The body colour can range from pale, almost white, through to a deeper shade of blue. The nose and paw pads must be grey and/or flesh through to deep coral to match the points.

Chocolate and Lilac Ragdolls

The subject of the Chocolate gene in the Ragdoll in the UK has been fraught with controversy for many years. In the original twelve imported cats from the Blossom-Time cattery, three were registered as being either Chocolate or Lilac. Over time there were more cats imported who were registered as Chocolate or Lilac. It was never proved whether the colours of those cats were true and many people believed they were probably 'mis-coloured' seal or blue. Some breeders concentrated on breeding from these cats to establish whether the Chocolate gene did exist in the Ragdoll – it was never proven. Subsequent DNA testing has proven that previously registered Chocolate and Lilac Ragdolls were in reality Seal or Blue.

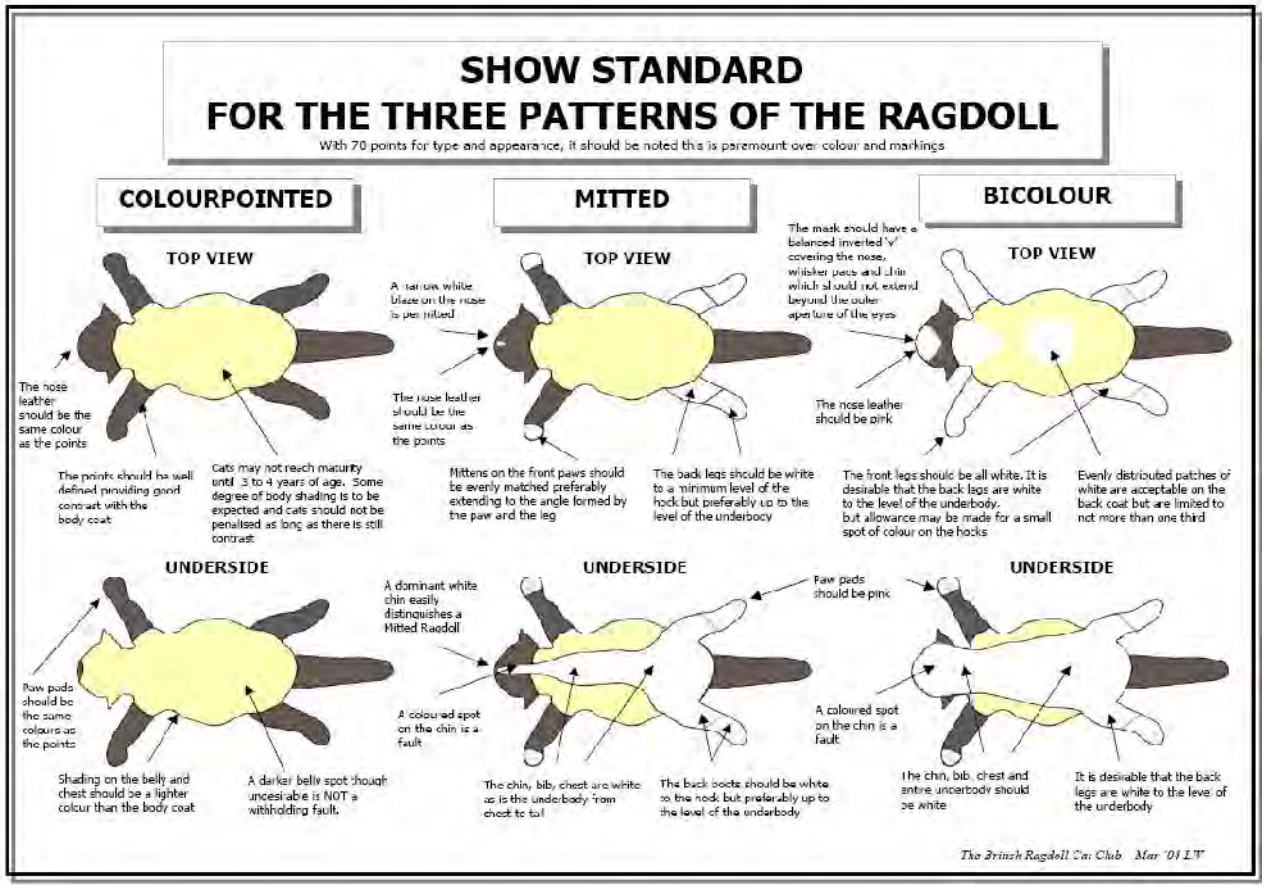
In 2002 the GCCF Ragdoll Breed Advisory Committee introduced an outcross programme to re-introduce the Chocolate gene into the Ragdoll. The only cats that were permitted to be used in this programme were the Siamese and the Persian, their colours being limited to prevent the possible introduction of Cinnamon or Fawn. This outcross programme also enabled the Red and Tabby series Ragdolls to be recognised.

Other countries and registering bodies also did their own outcross programmes to Balinese, Birman and possibly other breeds of cats. These outcrosses are not recognised under the current GCCF Ragdoll Registration Policy. Breeders need to take great care when researching pedigrees of Chocolate/Lilac Ragdolls to ensure they do not contain any unrecognised outcrosses. If in doubt please contact a breed archivist at one of the affiliated Ragdoll breed clubs or the Ragdoll BAC.

We now have the benefit of DNA testing. Due to the colour previously being incorrectly recognised and recorded in the past, only Ragdolls that have been DNA tested as being Chocolate can be registered under the Chocolate or Lilac colour breed numbers with GCCF, unless both parents are already tested registered as being Chocolate or Lilac.

Please note a cat can NEVER carry the Lilac gene. Only the Chocolate gene is carried, which with the correct matings can produce Lilac.

Pattern



Colourpointed - Mask, ears, legs and tail colour dense and clearly defined. Body colour lighter than point colour. Body shadings is allowed on body, providing there is a contrast between the body and points colour.

Mitted - Points to be well defined, with the exception of the feet. Chin must be white. A white blaze is permissible. White mittens on front legs to be evenly matched, and no higher than the joint with the leg. Back legs must be entirely white at least to the hock. White must go around hock entirely. White stripe varying in width extending from bib, down underside between forelegs to under base of tail. Nose colour to match the points, pad colour pink. Body is a shade paler than point colour.

Bicolour - The points to be well defined. Mask to have a white inverted “V”. Stomach and all four legs, feet and ruff to be white, body colour a shade lighter than points. May have various markings of white and colour patches on the back, the white no more than thirty per cent on the body Nose and pad leather pink.

Tabby - Mask must show clear tabby markings, vertical on the head and displaying the classic “M” on the forehead, and horizontal striping on the sides of the head. Lighter rings around the eyes, and darker spots on the whisker pads. Inner ear light, with darker colouration around the outer ear. Markings dense, broad, and clearly defined. Legs evenly barred. Tail barred, with a lighter coloured underside.

Tabby is classed as a pattern and can only be produced if one of the parents is a visual Tabby. Tabby cannot be ‘carried’.

When a Tabby Ragdoll is used in a mating to a Red series Ragdoll it can be hard to establish whether the offspring are visually Tabby. The ghost markings that are present in the Red and Cream Ragdoll can give the illusion that a cat is Red or Cream tabby. Tortie markings can also ‘mask’ slightly Tabby markings. It

is for this reason a breeder must consider whether to register all visual red series Ragdoll kittens where one or more parents is a visual tabby as tabby, unless proved otherwise by a simple DNA test for the agouti gene. This must be considered an important tool in a breeders programme to establish the true genotype of their breeding cats and also when considering putting a cat on the show bench.

It can be a number of years (documentary evidence proves this) before the true genotype is established unless this test is done. It could save the breeder problems with amending registration further down the line if this test is done at an early age.

There are three main patterns of Ragdoll – Colourpointed, Mitted and Bicolour. It is this fact that makes the Ragdoll cat unique. The Mitted and Bicolour have the presence of a dominant white spotting gene. The Colourpointed Ragdoll does not have the white spotting gene but the recessive Colourpointed gene that is similar to the Siamese. The control of the white spotting gene lies with the breeder and it is in this area that the breeder needs to make particular care as to not 'lose' track of the genotype of the Ragdoll cat.

The dominant white spotting gene that is present in the Mitted and Bicolour Ragdoll must never be confused with the white gloving gene that is present in the Birman. It is for this reason that the Birman is not considered a suitable outcross to the Ragdoll. The Birman has been used as an outcross under other registering bodies to re-introduce the Chocolate gene. With this in mind a breeder wishing to import a Ragdoll onto the GCCF register in the UK must pay particular attention to any outcrosses the cat may have in its lines not matter how many generations back they are. A 'Ragdoll' containing such an outcross would never be acceptable. This measure is taken to protect the unique patterning genetics of the Ragdoll breed.

Genotype is basically the genetic make-up of the cat (think of GENotype being the GENetics) and phenotype is what the cat actually looks like (think of a PHenotype being a PHoto, which you look at). Please bear in mind that genotype and phenotype can be two different things when looking at the Ragdoll cat with regard to pattern. This is one of the main points a breeder must understand.

As mentioned before, a breeder is fully in control of the white spotting gene but the breeder must also understand basic Ragdoll patterning genetics. In certain parts of the world, breeders lost control in this area of the Ragdoll resulting in them being unable to produce what is called a 'true Bicolour' or 'heterozygous Bicolour'. They are basically producing Bicolours via the 'high Mitted' route. It is this breakdown that we are trying to avoid in the UK.

When a breeder uses the Mitted x Mitted, Mitted x Bicolour, Bicolour x Bicolour, matings they are starting to perform what is called 'extreme' pattern matings in the Ragdoll. The incidence of the white spotting gene is increased. From such matings you can produce six genetic Ragdoll patterns – Colourpointed, Mitted, Bicolour, High Mitted, Mid High White or High White.

The Bicolour, Mid High White and High White can have the same phenotype (visually the same). It can be very difficult to tell the difference between the patterns. It can be said that the Mid High White has a larger amount of white on their body but this is not always the case. The only correct way to tell if a Ragdoll is genetically a Bicolour, Mid High White or High White is by mating the cat to a Colourpointed cat. This is the only true way to establish the genotype of such a cat. If a breeder has a cat that could be either a Bicolour, Mid High White and High White then it is strongly recommended that a Colourpointed cat is used in matings until the true genotype is established.

Example of a Mid High White (genotype) displaying High White (phenotype) pattern.

Please see below for a breeding pattern chart for the Ragdoll. Extreme pattern matings are very useful for breeders, especially if they wish to specialise in the Mitted or Bicolour patterns.

	Colourpointed (cc)	Mitted (mc)	High Mitted (mm)	Mid High White (mb)	Bicolour (bc)	High White (bb)
Colourpointed (cc)	Colourpointed	Colourpointed Mitted	Mitted	Mitted Bicolour	Colourpointed Bicolour	Bicolour
Mitted (mc)	Colourpointed Mitted	Colourpointed Mitted High Mitted	Mitted High Mitted	Mitted High Mitted Bicolour Mid High White	Colourpointed Mitted Bicolour Mid High White	Bicolour Mid High White
High Mitted (mm)	Mitted	Mitted High Mitted	High Mitted	High Mitted Mid High White	Mitted Mid High White	Mid High White
Mid High White (mb)	Mitted Bicolour	Mitted High Mitted Bicolour Mid High White	High Mitted Mid High White	Mid High White High Mitted High White	Mitted Bicolour Mid High White High White	Mid High White High White
Bicolour (bc)	Colourpointed Bicolour	Colourpointed Mitted Bicolour Mid High White	Mitted Mid High White	Mitted Bicolour Mid High White High White	Colourpointed Bicolour High White	Bicolour High White
High White (bb)	Bicolour	Bicolour Mid High White	Mid High White	Mid High White High White	Bicolour High White	High White

Each cat has two alleles that govern pattern. Each parent will pass on one allele to each kitten (one from sire, one from dam).

Using the above chart you can see that a Colourpointed has two Colourpointed alleles and when put to a Colourpointed cat each cat can only pass on a Colourpointed gene.

A Mitted cat as a Colourpointed and a Mitted allele so can pass either allele onto its offspring.

A Bicolour cat has a Colourpointed and Bicolour allele so can pass either allele onto its offspring.

It can be seen that when starting to mix the Mitted and Bicolour alleles an array of patterns can be produced.

It is this genetic pattern make-up that makes that Ragdoll unique.

4 - Genetic Defects

Hypertrophic Cardiomyopathy (HCM) and the Ragdoll Cat

Hypertrophic Cardiomyopathy (HCM) is the most common form of heart disease in the cat. In many breeds it can be an inherited disease. There is no cure for HCM.

One genetic mutation (MyBPC3) was found in the Ragdoll cat by Dr Kathryn M Meurs, DVM, PhD, Diplomate ACVIM (Cardiology) at Washington State University in 2006. In May 2007 a test was made available to identify this mutant gene in the Ragdoll cat.

It should be noted that in human beings there are many different genetic mutations which can cause the disease. It is likely to be the same in the Ragdoll cat but additional mutations have not yet been identified.

Very importantly, the absence of the mutation in a cat DOES NOT mean that it will never develop HCM. It means that it does not have the only known mutation that can cause the disease in the cat at this time. In the future, additional mutations may be identified that can be tested for as well. There is currently a test available for the mutation known to be found in Ragdoll cats.

Testing Procedure

It is recommended that all kittens sold for breeding after 23rd June 2011 are tested using the procedure detailed below so breeders are fully aware of their cats status moving forward and can help to plan future matings. It is for this purpose a genetics register will be set up.

Ragdolls who have not been tested, are Heterozygous or Homozygous for the known HCM gene, or not tested in the manner described below may still be registered Active and may still be shown, but will be listed on the Genetic Register. Any Ragdoll who has tested negative, or whose parents have tested negative and are already on the Full or Supplementary Register as Active breeding cats will be placed on the Full or Supplementary Register.

The Ragdoll BAC strongly recommends that testing is carried out in the following manner:

1. The cat is micro-chipped.
2. A swab or blood sample is taken by a qualified Veterinary Surgeon and the test submission form contains the cats full details (i.e. registered name, micro-chip number, registration number, date of birth, colour and pattern).

As at the date of this Policy, the following laboratories have been listed by the GCCF (Reference: GCCF Breeding Policy – Guidelines for Healthy Breeding 14th May 2009), and are able to perform the Ragdoll MyBPC3 Gene Test:

AnimalsDNA - http://www.animalsdna.com/feline/hcm/
Laboklin – www.laboklin.co.uk
UC Davis - http://www.vgl.ucdavis.edu/services/cat/

The following laboratory in the UK has also started to perform the Ragdoll HCM tests:

Langford Laboratories - http://www.langfordvets.co.uk/diagnostic_laboratories.htm

For further information on appropriate laboratories reference can also be made to the Feline Advisory Bureau (FAB).

Test results for Ragdolls that breeders wish to move from the Genetic to the Full/Supplementary Register should submitted to the GCCF.

Providing all breeders use the above procedure there should be a steady decline in cats being placed on the genetics register. The genetics register will then be made redundant for the purpose of eliminating this mutant gene from the Ragdoll gene pool in cats registered with the GCCF in the UK. Once any cat has been tested clear and placed on the active register, it will not be necessary to test any of its offspring again, provided it is mated to a cat with a similar status, although the Ragdoll BAC considers it good practise for breeders to routinely test any kittens being registered for breeding where the kitten is microchipped first and the swab taken by a veterinary surgeon. This will be considered 'gold standard' testing and ensures the breeds and breeders integrity is maintained at all times.

Interpreting the results

Each cat has two alleles. The alleles may be normal or mutant. One of the cats alleles will be passed onto its progeny. Therefore, each kitten acquires one allele from each parent.

There are three possible results:

· Negative for the mutation (normal/normal or -/-)

· Positive heterozygous for the mutation (normal/mutant or -/+)
Also know as 'having one copy of the mutation'

· Positive homozygous for the mutation (mutant/mutant of +/+)
Also know as 'having two copies of the mutation'.

There are three possible results and each has a different meaning. A negative result means your cat does not have this mutation. It may or may not develop HCM in its lifetime but it will not develop the form of HCM associated with this mutation.

Positive heterozygous means your cat has one copy of this mutation (instead of two). It may or may not develop HCM in its lifetime but is more likely to develop HCM than a negative cat.

Positive homozygous mans you cat has two copies of this mutation (instead of one). It may or may not develop HCM in its lifetime but it is more likely to develop HCM than a negative cat.

In conclusion, a positive heterozygous or homozygous cat may go on to live a long healthy life just like a negative cat but it has an increased risk of developing HCM. It is important to understand that additional studies to evaluate all the clinical aspects of this disease are pending.

Not all cats with HCM test positive for the MyBPC3 mutation associated with the Ragdoll cat.

Breeders Help

Long term we hope to eradicate the currently only known mutant gene from all the breeding Ragdoll cats registered with the GCCF. This will take time, patience and co-operation from all breeders.

Whilst eliminating this gene a breeder also has the responsibility to maintain the gene pool of Ragdoll cats in this country and also 'type' so we strongly recommend that any breeding cat testing either positive heterozygous or homozygous is not removed from a breeding programme but is bred to a negative cat with a compatible pedigree. The diversity of the gene pool and 'type' must be maintained at all times. The wholesale neutering of breeding cats may have a devastating effect on the breed.

The mode of inheritance is as follows:

	Clear	Heterozygous	Homozygous
Clear	Clear	Clear Heterozygous	Heterozygous
Heterozygous	Clear Heterozygous	Clear Heterozygous Homozygous	Heterozygous Homozygous
Homozygous	Heterozygous	Heterozygous Homozygous	Homozygous

Whilst it is the goal of the Ragdoll BAC that this mutant gene is eradicated from the Ragdoll breed, an experienced breeder may wish to continue to breed with either a positive heterozygous or homozygous cat in order to maintain the diversity of the gene pool and also the Ragdoll 'type' as described in the standard of points. This is allowed but the overall aim is to move forward to producing negative cats as soon as possible.

Cats placed on the genetics register (positive homozygous or heterozygous) can still be used for breeding and can still be shown.

It is also extremely important for all breeders to work together to achieve the elimination of this defective gene. This will only be possible if more breeders with negative stud boys allow matings to take place with other breeders heterozygous or homozygous breeding queens with a view to breeding through the defect and allowing breeding cats to be kept from those matings and also, for a breeder with a negative breeding queen, allow a breeder with a heterozygous or homozygous stud boy to be mated with a similar aim. Whilst it is not always possible for stud owners to offer stud services due to practicalities, the Ragdoll BAC hopes that more people will be more open to selective matings. This will ensure the defect is removed quickly and the genetic diversity of the breed is maintained which is paramount.

With all matings that take place when breeding, when a view is taken to keeping breeding cats, you must remember the phrase 'heirs and spares'. Lines can be lost very quickly and without warning for a variety or reasons and this should be standard practise for all breeders.

When a breeder (vendor) sells a cat/kitten with breeding potential to another breeder (purchaser), it is the vendors responsibility to provide the purchaser with the status regarding this genetic fault of the cat/kitten or the cat/kitten's parents.

When a breeder offers stud services, the breeder must provide any visiting breeder with the genetic status of the stud boy to be used or proof of the status of both parents.

In ALL cases, it is the breeder as a vendor or stud owner who MUST declare the status of the cats involved. It is NOT the buyers responsibility.

Great care must be taken by all breeders when advertising the status of all their breeding cats in literature and on their websites. No breeder can ever claim that a cat is 'HCM free'. If a breeder chooses to advertise the status of their cats they must also provide full information of this defective gene. This procedure will not only protect the buyer but also the breeder themselves.

Moving Forward

If you have a cat that has developed HCM, or one that has been lost to HCM, and it has tested negative for the Ragdoll mutation through the DNA test, and you have an echo, or necropsy proving that it has/had HCM and would like to send in for the DNA Ragdoll Research project, please send it to the address listed below with you contact information listed along with any other information that you deem important.

Dr. Kate Meurs
Dept. Vet Clin Science
Washington State University – College of Veterinary Medicine
Pullman, WA 99164
meurs@vetmed.wsu.edu

Dr. Meurs will then contact you for any further information, blood samples, etc. that she might require.

Further research may help to identify other mutant genes that we are currently not aware of.

If you have a Ragdoll cat that has tested either heterozygous or homozygous for the known defective MyBPC3 gene and goes on to develop HCM it is very important that this incidence is notified to either the Ragdoll affiliated clubs that go to make up the Ragdoll Breed Advisory Committee or the Ragdoll Breed Advisory Committee directly. This information is vital so we can ascertain the levels of incidence that are currently not available.

The Ragdoll Breed Advisory Committee would like to thank Dr Kate Meurs for her help and advice when writing HCM genetic defect part of this policy and for permission to reproduce content from the websites http://ragdollresearch.org/ and http://www.vetmed.wsu.edu/deptsVCGL/felineTests.aspx

AD-PKD – Polycystic Kidney Disease

PKD is a predominantly inherited disease for which there is currently no cure. The genetic mutation has been found in all breeds of cats but was seen predominantly in Persians, Exotics and also related breeds. In the UK in 2011 a small number of Ragdolls tested positive for the genetic mutation. To the best of our knowledge, no Ragdoll in the UK has been diagnosed with PKD. This may change in the future. One laboratory has tested 511 Ragdolls with 13 being heterozygous positive. This is just over 2.5%. The data from Ragdolls tested at other laboratories is not available. At this moment in time, the Ragdoll BAC will not be introducing a genetics register but this will be constantly under review.

It is possible for cats testing heterozygous to go on and live normal long healthy lives. It is dependent on the severity of the cysts on the kidneys and how quickly they progress. There is evidence of this.

The Ragdoll BAC recommends that any Ragdoll owner who tests positive for the faulty gene, providing they are over nine months of age, be scanned at a Feline Advisory approved vets to see the severity of the cysts. Any information should then be forwarded to the Ragdoll BAC for monitoring. This will be kept confidential. If anyone has had their cats tested at any laboratory other than Langfords Diagnostics, the Ragdoll BAC would welcome the information (numbers only) so that this can be factored into the information we already have so that the situation can be correctly monitored.

For further information on PKD we recommend you visit the Feline Advisory Bureau website.

http://www.fabcats.org/breeders/infosheets/pkd/pkd_scheme.php

Feline Infectious Peritonitis (FIP)

This is not an inherited disease, however, a genetic predisposition in cats of various breeds to the development of FIP was identified by Drs. Foley and Pedersen in 1996. They examined pedigree and health data from 10 generations of cats in several pure-bred catteries and found that the inheritance of susceptibility to FIP could be very high (about 50%). At present the advice from veterinary scientists is not to repeat matings that have produced FIP succumbing kittens.

It is likely a polygenetic trait rather than a simple dominant of recessive mode of inheritance. Inbreeding, by itself, is not a risk factor. Selecting for overall disease resistance is a helpful tool for breeders. The likely defect in immunity to FIP is in cell-mediated immunity. Therefore cats that are susceptible to FIP are also likely susceptible to some other infections as well, especially fungal and viral infections. This finding gives breeders the ability to achieve success in reducing the risk of FIP by using pedigree analysis to select breeding cats from family backgrounds that have strong resistance to FIP and other infectious diseases.
See link: http://www.cfa.org/articles/health/FIP.html

There are studies taking place at UC Davis into the genetic aspects of FIP and breeders' participation is requested if they lose a cat or kitten to this disease. For details of this see:
http://www.sockfip.org/fip-studies.html

For more information and advice on this disease see: www.fabcats.org.

General Defects

There is a publication 'Guide To Defects Listed In The GCCF Standard Of Points' which goes into detail of the general defects that can affect any cat. Some of these defects (i.e. polydactyl – abnormal number of toes on either front or back legs) would be considered undesirable in a breeding cat.

5 - BAC recommendations

The BAC recommend that breeders re-appraise themselves of this Breeding Policy, the Ragdoll Registration Policy, and the Ragdoll Standard of Points and the general GCCF Breeding Policy at least once a year.

Ragdoll breeders are encouraged to work closely with other like-minded breeders to improve the Ragdoll breed whilst maintaining a diverse gene pool.

The Ragdoll BAC recommends that breeders apply caution when importing cats onto the GCCF register. There have been outcrossing programmes which have taken place under different registering bodies to reintroduce these colours into the Breed. The outcrosses have included, but are not limited to, Birmans, Ragamuffins and Balinese. These outcrosses are not permitted under the current Ragdoll Registration Policy.

The BAC would also advise other breeders that by purchasing a kitten descended from an import there is a possibility that the pedigree may be the result of a non-GCCF outcrossing programme. If you are considering purchasing a breeding kitten descended from imported lines then contact the Ragdoll BAC for advice and guidance. Only full register Ragdolls, or kittens from the existing GCCF outcrossing programme must be used in Chocolate and Lilac breeding programmes.

The BAC further recommends that any breeder wishing to import any Ragdoll onto the GCCF register (either from overseas or from another registry within the UK), obtains a copy of the pedigree and forwards this to the BAC for checking before agreeing to purchase the cat/kitten to ensure it conforms with the current registration policy.

Please note that any cat or kitten found to not confirm to the GCCF Ragdoll Registration policy may, together with any registered progeny, be transferred to the GCCF Reference Register with no progression.

The BAC recommends that breeders do not purchase a stud boy until they have at least three queens, and have raised at least one litter of kittens, nor is it recommended that a breeder sell a stud boy to a breeder who has yet to raise a litter of kittens. It is also recommended that novice breeders do not sell kittens on the active register to any other novice breeder. Any experienced breeder who sells a kitten for breeding to a novice breeder must be willing to mentor the novice breeder, or to take responsibility for finding them a mentor who lives closer to them.

6. FURTHER NOTES

At the time of writing this document there are many more advancements in science taking place that will aid Breeders in their programmes. Two of which are possible tests for the Silver gene (covers Silver, Shaded and Smoke) and the white spotting gene. These may be covered in future versions of this policy if they are relevant to the Ragdoll breed.