

APPENDIX 3¹

ACF (INC.) BREEDING POLICY FOR THE MUNCHKIN (LONGHAIR AND SHORTHAIR) CATS

Effective: November 2020

THIS POLICY IS TO BE APPLIED IN CONJUNCTION WITH ACF (INC.) BY-LAWS PART 2: BREEDING AND REGISTRATION RULES²

Also, cat breeders need to ensure compliance with current Federal and State government legislation and Local regulation applying to the keeping, breeding, management and selling of cats as well as ensuring their Member Body or Provisional Member Body requirements are adhered to.

Introduction

Munchkin cats were accepted by ACF (Inc.) for breeding and showing in 2019. The Munchkin is a medium-sized cat, well-muscled, with strong distinctive short legs. The short legs do not hamper mobility or survival ability. Munchkins are outgoing, intelligent and respond well to handling. They are accepted in both long and short coat lengths in all patterns and colours (except amber); however, they must not resemble any recognised breed. Males are generally larger than females (Ref: 1,2).

Origins and History

Short-legged cats have been documented a number of times around the world since the 1940s. A British veterinary report in 1944 noted four generations of short-legged cats which were similar to normal cats except for the length of legs. This line disappeared during the WWII but other short-legged cats were spotted in Russia during 1956 and New England, USA in 1970 (Ref: 3).

In 1983, a rescued pregnant short-legged cat in Louisiana, USA had a litter where half the kittens were short-legged. It is from these cats that the Munchkin breed was developed. In 1991 the Munchkin was introduced to the general public via cat shows held by TICA (The International Cat Association) in Madison Square Garden. The Munchkin was officially accepted by TICA as a new breed in 1994 before progressing to championship status in 2003 (Ref: 3).

In 2002, the first Munchkin cat 'HowHi' was imported from New Zealand into Australia by Annette Joesbury who subsequently applied for breed recognition by CCCA (Co-ordinating Cat Council of Australia (Inc.) (Ref: 4).

Gene inheritance and DNA discovery

The Munchkin cat has a dominant form of inherited dwarfism due to a natural genetic mutation. DNA studies have identified a mutation in a novel gene known as UDP-Glucose 6-Dehydrogenase (UGDH) that is located on cat chromosome B1 (Ref: 5,6,7,7a). The Munchkin gene is described as 'novel' in that it has not been reported in other short-legged animals to date. The Munchkin gene has been designated 'Mk' for the purposes of this breeding policy.

The small litter sizes reported by breeders when two Munchkin cats are bred together indicated that homozygous embryos for the Munchkin gene are non-viable, ie they do not develop into kittens. This observation has been validated by the research of Dr Leslie Lyons who found that none

¹ 2019: Added: Provision for Breeding Policy for Munchkin Longhair & Shorthair (advice under development).

² 2020: Added: Breeding Policy for Munchkin approved GM November 2020

of the six Munchkin offspring from 10 mating's of two dwarf parent cats were homozygous for a DNA marker that is closely linked to the Munchkin gene region on chromosome B1 (Ref: 5).

Munchkin Health

The genetic disorder causing the short-legged trait in Munchkin cats resembles a type of disproportionate dwarfism termed hypochondroplasia. Disproportionate dwarfs possess shortened limbs with a normal trunk and result from genetic disorders involving bone and or cartilage (Ref: 5). Recent studies suggest that the Mk gene caused a decrease in the production of an essential protein for bone growth. This resulted in reduced growth in the long bones causing dwarfism in cats (Ref: 7,7a).

Despite this, Munchkin cats have the 'ability to run very fast' and 'show off their jumping prowess and intelligence'. Under the oversight of the TICA Genetics committee, Munchkins are reported as: 'being not prone to arthritis and do not have trouble walking or moving any more than other breeds as they get older' (Ref: 3).

The original breeders of Munchkin cats in Australia have described similar positive observations about the health and personalities of Munchkins based on their combined experience breeding 91 Munchkin and 84 normal-legged (referred to as non-standard Munchkin or Munchkin 'high' legs (Ref: 4) kittens from 49 litters. In addition, two Munchkin kittens from their respective first litters are now in their 17th and 18th years of age (Ref: 4,8).

In 2019, a written report from a Veterinarian who had examined 20 different Munchkins that were bred in Australia over a 4-year interval stated that: 'the Munchkin is a healthy breed with no health problems'. A further written appraisal affirming the health, personality and agility of Munchkins was provided by an ACF (Inc.) all breeds international judge who had observed Munchkins in their home-setting overseas and while judging in Australia (Ref: 9).

Welfare and health concerns

Nevertheless, welfare concerns have surrounded the acceptance of chondrodysplastic (dwarf) cats as a recognised breed in some organisations. Controversy regarding the immediate and long-term health of Munchkin cats has focused on the potential for impaired ambulation, secondary osteoarthritis and intervertebral disc disease, which is common to many chondrodysplastic dog breeds, including dachshund, corgi, and basset hound. These dog breeds have been found to have a mutation in completely different gene known as Fibroblast growth factor 4 (FGF4). Thus, since the Munchkin cat does not have the FGF4 mutation, disc disease is a less likely concern. However, poor breeding practices, such as striving for the shortest legs or longest body, could lead to similar health concerns in the cats to those that plague the dwarf dog breeds (Ref: 5,10).

In 2009, it was reported that: 'chondrodystrophic Munchkin cats may also have an increased incidence of pectus excavatum and spinal lordosis' (Ref: 11). At present, the authors of this ACF Inc. policy have not been able to locate any published studies that detail how common these two conditions may be in the Munchkin breed as compared to other breeds or household cats. The original breeders of Munchkin cats in Australia did not observe these health issues or cow hocking in any of their cats (Ref: 4,8).

Condition 1: Lordosis (excessive curvature of the spine inwards), a condition in which the spinal muscles grow too short, making the spine sink down into the cat's body. In worst-case scenarios, this condition can be fatal due to pressure on the heart, lungs and trachea.

Condition 2: Pectus excavatum (hollowed chest), a condition in which the breastbone is sunken into the chest. In severe cases, pectus excavatum can look as if the centre of the chest has been scooped

out, leaving a deep dent. Severe cases of pectus excavatum can eventually interfere with the function of the heart and lungs.

More importantly there has been a report of Elbow incongruity (elbow dysplasia) in a Munchkin cat with a pronounced curved radius (lower leg bone) resulting in an abnormal development of the elbow joint coupled with characteristic pathological changes^(Ref: 12). It is therefore important to ensure that the leg bones are not excessively curved. As stated above, poor breeding practices such as selecting for shorter and shorter legs may enhance skeletal problems^(Ref: 5,10).

Furthermore, show awards are to be withheld for Munchkin cats that display: sway back or an excessive dip behind the shoulder known as lordosis. In addition, Munchkin cats that exhibit faults such as: cow hocks, excessive bowing of front legs, foreign type or fine boning, extreme nose break or excessively long nose, excessive cobbiness and any resemblance to an established recognised breed should be penalised^(Ref: 2).

Breeding of Munchkin Cats

The gene is described as autosomal dominant and fully penetrant ie all cats with the Mk gene have short legs^(Ref: 5). Homozygous embryos for the Munchkin gene are not viable, and do not develop in the womb. It is not known whether these embryos fail to implant or are resorbed post-implantation. The loss of homozygous embryos during pregnancy does not appear to affect the health of the pregnant queen cat or littermates^(Ref: 4).

Only embryos that are heterozygous for the gene develop into viable short-legged Munchkin kittens. Because only heterozygous (short-legged) Munchkin cats are able to pass on the gene, all litters with at least one standard (short-legged) Munchkin parent have the possibility of containing kittens with the phenotypes: short-legged or normal-legged (referred to as non-standard Munchkin or Munchkin 'high' legs⁴), with the genotypes of Mkmk or mkmk, where Mk is the trait for short legs and mk is the trait for long legs. The mating of two Munchkin parents, Mkmk x Mkmk, have the chance of producing these offspring: 25% MkMk: a nonviable kitten, 50% Mkmk: short-legged, 25% mkmk: normal with full-length legs. The resulting litter will be 2/3 Mkmk: short-legged and 1/3 mkmk: normal.

Punnett squares in which the **Mk** represents the dominant Munchkin gene and the **mk** represents the recessive normal gene, may be used to illustrate the chances of a particular mating resulting in a short-legged cat.

Kittens bearing two copies of the Munchkin gene (**MkMk**) will not develop in the womb. Kittens bearing one Munchkin gene and one normal gene (**Mkmk**) will be short-legged Munchkins. Kittens bearing two normal genes (**mkmk**) will have normal-length legs. **Mkmk** Munchkin kittens will be able to pass on the Munchkin gene to their offspring. Normal **mkmk** kittens will not, as they do not have a copy of the Munchkin gene.

Mating two standard Munchkins (Mkmk):

	Mk	mk
Mk	MkMk	Mkmk
mk	Mkmk	mkmk

For each kitten conceived from this mating, there is a 25% chance it will fail to gestate, a 25% chance it will be normal non-standard (long-legged), and a 50% chance it will be short-legged Munchkin.

Mating a standard Munchkin (Mk) with a normal cat (mkmk):

	Mk	mk
mk	Mkmk	mkmk
mk	Mkmk	mkmk

For each kitten conceived from this mating, there is a 0% chance it will be homozygous for the Munchkin gene, a 50% chance it will be normal non-standard (long-legged), and a 50% chance it will be a standard (short-legged) Munchkin.

Allowable Outcross

The ACF (Inc.) By-Laws Part 2: Breeding and Registration Rules allow outcrossing Munchkin cats with Domestic Shorthair and Longhair cats that have good health, temperament and have been tested for Leukaemia virus, FIV (Feline Aids) as well as had DNA tests available for all currently known inherited diseases of cats^(Ref: 1).

In addition, all Munchkin variants (ie cats with normal-length legs) may be used in Munchkin breeding programs with those not used to be desexed before homing as pets. Munchkins are not to be used in other breed programs and must not resemble any recognised breed. Furthermore, the ACF (Inc.) By-laws disallow the recognition of any breed which results from more than one structural mutation (ie two or more structural mutations are not to be combined in any breed)^(Ref: 1).

Selecting leg length

In 2013, Guinness World Records named Lilieput, a tortoiseshell Munchkin cat from Napa, California, the world’s shortest living cat. The diminutive cat stood a mere 5.25 inches (13.34 cm) tall from the bottoms of her paws to the top of her shoulders (withers). Whereas other cat breeds measured from ground to withers range from 8-14 inches (20.32-35.56 cm)^(Ref: 5).

Variable leg length has been observed in short-legged Munchkin littermates with some kittens having slightly longer or shorter legs than others^(Ref: 4). Munchkins have recently been bred with ultra-short legs with very little clearance under the chest. These cats have been described as ‘rug huggers’ or ‘VW Microbus’. With welfare considerations in mind it is imperative that this extreme breeding be discouraged. It is vital that Munchkins are bred with a leg length consistent with good welfare of the cat that ensures ease of movement and less chance of developing joint problems.

Although slightly variable leg lengths have been observed in short-legged Munchkin kittens, when either two Munchkin cats are bred together or when a Munchkin cat is bred with a non-standard Munchkin, there was no evidence that a non-standard Munchkin could produce Munchkin kittens unless it was mated to one^(Ref: 4). It is worth noting that in the absence of DNA testing, dwarf cats have been phenotyped by using radiography to measure and compare the length of their forelimbs with normal cats^(Ref: 6). In summary, it is recommended that breeders do not continuously mate Munchkin to Munchkin without incorporating a non-standard Munchkin or suitable Domestic cat in their breeding program. Also, it is recommended that breeders select cats with forward-facing feet to minimise the likelihood of ‘ballerina front feet’ ie feet pointing outwards and cow-hocking^(Ref: 4).

Guidelines for assessing leg length and chest ground clearance

The **withers** is the ridge between the shoulder blades of an animal, typically a quadruped and in many species, it is the tallest point of the body. In horses and dogs, it is the standard place to measure the animal's height. The withers has been used by Lyons et al^(Ref: 5) as a point for measuring the height of a Munchkin.



Image, courtesy: <https://www.ponydreams.com/measuring-horse-height/> [Internet]. [7 Jun 2020].

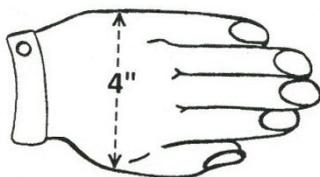
In cats the withers, which is sometimes simply called the “scruff”, is located behind the head in the area where the neck passes into the back. On palpation this area in the cat is at the point of the shoulder blades.

A practical measurement of height is to use the “hand” measurement as is still done today for measure the height of horse. This measurement was originally based on the breadth of a male human hand but has now been standardised to:

1 Hand = 4 inches (10.2 cm)

Another measure that can be used is the distance between the second and third knuckles of the bent first finger is roughly 1 inch (2.5 cm)

It is suggested with these measurement guides that a Judge could use their hands to estimate the height of a Munchkin adult on the judging table. This technique has been used successfully in a pilot study by a breeder to measure the height of Munchkins from ground to withers: 6 to 8 inches (16.5 to 20.5cm) and chest ground clearance: 3 to 4 inches (7.5 to 10.5 cm)^(Ref: 13).



Image, courtesy: <http://walktrot.com/resources/Stables/Worksheets.pdf> [Internet]. [7 Jun 2020].

Exhibiting Munchkin kittens with full-length legs in litter classes

Variant kittens with normal-length legs from Munchkin breeding programs may be shown as part of a complete litter in litter classes at ACF (Inc.) Member Body or Provisional Member Body Shows (see By-law 13.2)^(Ref: 1).

Summary

In summary it is important that breeders comply with all regulatory and legislative requirements^(Ref: 14) and have a well-managed and well-understood breeding program for Munchkin cats. Selection by registered cat breeders and cat show Judges will ultimately control the health and quality of life

of pedigree cats with dwarfism^(Ref: 5). Therefore, it is essential that cat breeders and Judges do not promote or encourage extremes which are not in the best interests of the welfare of the cats when breeding and judging Munchkin cats^(Ref: 2,8). Any defective individual Munchkin cat or outcross cat should clearly not be used for breeding or showing under any circumstances and breeders and owners should immediately seek veterinary advice about managing the health of such cats.

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IMAGES

‘HowHi’ (red tabby and white): First Munchkin cat to be imported into Australia.

First Munchkin kittens bred in Australia. Images, courtesy: A. Joesbury, Abitadbitshort cattery.

