HEALTH & CONFORMATION POLICY: Bengal Group

INTRODUCTION

The Bengal is generally a healthy cat. They have no known health problems related to their conformation. Pyruvate kinase deficiency has been identified in the breed, as has progressive retinal atrophy and flat chested kitten syndrome. Their susceptibility to infectious diseases is comparable to other domestic breeds. Their vaccination requirements are exactly the same as other breeds.

In the NZCF the Cashmere breed was established from longhair kittens born in Bengal litters due to recessive longhair genes carried since the foundation of the breed, therefore health data for both breeds should be identical.

Neither the Bengal nor the Cashmere has permitted outcrosses in the NZCF.

This policy was approved October 2021, taking effect on 1 June 2022.

HEALTH

ERYTHROCYTE PYRUVATE KINASE DEFICIENCY

SITUATION

- Genetics known or mode of inheritance accepted.
- Rare or only seen in a specific country / group / line.
- DNA test available.

DETAILS

Erythrocyte pyruvate kinase deficiency (PK deficiency or PK-def) is an autosomal recessive inherited haemolytic anaemia that has been identified in a number of cat breeds and in random-bred domestic cats. It has high variability in age of onset and in severity of clinical symptoms.[1] Pyruvate kinase is an enzyme which is important for red blood cells and a deficiency or absence of it can cause anaemia which may range from mild and intermittent to severe and life-threatening.[2] A DNA test is available.

NZCF TESTING REQUIREMENTS

- DNA testing.
- Recommended (where there is reason to suspect the disease is present).

- Identity breeder certified.

Breeding cats that develop symptoms of anaemia, or whose offspring develop symptoms of anaemia must be DNA tested. Cats with two copies of the gene must not be bred from. Cats who are carriers (have one copy of the gene) can only be bred to cats that have been DNA tested and are clear of the gene. Breeders should aim over time to replace carriers with progeny who are clear of the gene.

FLAT CHESTED KITTEN SYNDROME

SITUATION

- Possibly inherited or data is not strong or clearly defined.
- Rare or only seen in a specific country / group / line.
- No tests available or the costs are prohibitive.

DETAILS

An anatomical condition that breeders and buyers need to be aware of which is seen in Bengals is **flat chested kitten syndrome** (FCKS). FCKS is a multi-factorial condition which develops in kittens 5 days after birth. It is caused by abnormal development of the rib cage resulting in a flattened angular appearance. Although death from heart / respiratory failure can occur, affected kittens often survive and grow out of the condition to lead normal lives as pets but should never be used for breeding. Genetic and dietary factors are thought to be involved.

NZCF TESTING REQUIREMENTS

- No testing requirement.
- Reporting to enable tracking of trends.

Breeders should report instances of affected kittens to the BSAC so that any overall trends within the breed can be monitored.

HYPERTROPHIC CARDIOMYOPATHY

SITUATION

- Genetics known or mode of inheritance accepted.
- Recognised or acknowledged within the breed.
- Testing (non-DNA) is available and generally accepted.

DETAILS

Hypertrophic cardiomyopathy (HCM) is a hereditary disease caused by a defect in an autosomal dominant gene that affects many species including man. It is the most common heart disease in cats including non-pedigrees and does occur in some Bengal and Cashmere lines.

The disease shows a highly variable clinical course; in severe cases death from heart failure can occur but some cats with mild HCM never show clinical disease and have a normal life span.

Unfortunately, no commercial DNA test is available in the Bengal or Cashmere. Where HCM is suspected in a line the screening of breeding cats by cardiac ultrasound is recommended with affected cats being removed from the breeding programme.

NZCF TESTING REQUIREMENTS

- Specialist cardiac ultrasound screening at least 2-yearly in all breeding cats from 1 – 7 years old.
- Mandatory where there is reason to suspect the disease is present.
- Identity vet certified.

Breeding cats must be screened if they show signs of cardiac disease or if offspring are diagnosed with or die from confirmed HCM. Screening must be done by a suitably qualified or experienced vet. Cats diagnosed with HCM must not be bred from.

PERIPHERAL NEUROPATHY

SITUATION

- Possibly inherited or data is not strong or clearly defined.
- Rare or only seen in a specific country / group / line.
- No tests available or the costs are prohibitive.

DETAILS

A very rare condition called **peripheral neuropathy** is seen occasionally in kittens and young cats. The symptoms are flaccid paralysis of one or more limbs with the hind legs most commonly affected. Diagnosis can be difficult and is based largely on exclusion of other causes of paralysis. The cause of this condition is unknown, but it responds extremely well to treatment with corticosteroids and most affected kittens make a complete recovery without relapse if treated early in the course of the disease.

NZCF TESTING REQUIREMENTS

- No testing requirement.
- Reporting to enable tracking of trends.

Breeders should report instances of affected kittens to the BSAC so that any overall trends within the breed can be monitored. It is recommended that a mating which has produced affected kittens is not repeated.

BENGAL PROGRESSIVE RETINAL ATROPHY

SITUATION

- Genetics known or mode of inheritance accepted.
- Recognised or acknowledged within the breed.
- DNA test available.

DETAILS

Bengal progressive retinal atrophy (PRA-b) is an autosomal recessive gene which causes blindness in Bengal cats. The disease causes the destruction of the cells that register light (photoreceptors) in the back of the eye (the retina). The loss of the cells begins around 7 weeks of age and slowly progresses until the cat has very compromised vision by approximately 2 years of age.

This particular DNA variant appears to be unique to the Bengal breed and occurred early in a popular lineage of the Bengals and the test developers have had reports of affected cats in the United Kingdom, Europe, and the USA, and expect it to be found world-wide. Carriers of the recessive gene responsible for PRA-b can only be detected by the DNA test but blindness in affected cats can be detected by an eye exam prior to breeding age.

NZCF TESTING REQUIREMENTS

- DNA testing.
- Mandatory (One Parent Rule).
- Identity breeder certified.

To register kittens with the NZCF one parent must either have clear DNA test results recorded with the NZCF or be 'clear by parentage' (where the NZCF holds sufficient ancestor DNA test results to ensure that the parent is itself clear of the gene).

CONFORMATION

ISSUE

None identified.

SOURCES & REFERENCES

SOURCES

- LA Lyons
- UC Davis
- GCCF
- General web searches

REFERENCES

1. Robert A Grahn, Jennifer C Grahn, Maria CT Penedo, Chris R Helps, Leslie A Lyons; Erythrocyte Pyruvate Kinase Deficiency mutation identified in multiple breeds of domestic cats, 30 Oct 2012
2. Langford Vets, Pyruvate Kinase Deficiency, accessed 25 Oct 2016, www.langfordvets.co.uk/

NOTES ON THE POLICY

KEY

SITUATION

UNDERSTANDING

- Genetics known or mode of inheritance accepted.
- Strongly suspected as inherited.
- Possibly inherited or data is not strong or clearly defined.

FREQUENCY

- Recognised or acknowledged within the breed.
- Rare or only seen in a specific country / group / line.
- Managed condition (testing programme in place).

TESTS

- DNA test available.
- Testing (non-DNA) is available and generally accepted.
- No tests available or the costs are prohibitive.

TESTING PROGRAMMES

- International testing programme.
- NZCF testing programme or registration requirement.

NZCF TESTING REQUIREMENTS

COMPLIANCE

- Mandatory (Two Parents Rule).
- Mandatory (One Parent Rule).
- Highly recommended.
- Recommended (where there is reason to suspect the disease is present).
- Voluntary.
- No testing required.

IDENTITY

- Identity vet certified.
- Identity breeder certified.

NZCF TESTING REQUIREMENT OPTIONS

VOLUNTARY DNA TESTING

- **Voluntary**
  NZCF breeders are not required to do this test to register kittens.
- **Breeder Certified**
  The identity of the cat tested can be certified by the breeder.
- **Microchip Not Required**
  It is not required that cats are microchipped for breeder certified tests.
- **NZCF Recording Available**
  Breeders are welcome to submit results to the NZCF for adding to the cat's records.
- **Review**
  Policies of voluntary testing may have a review date set for consideration of an upgrade to mandatory testing.

MANDATORY DNA TESTING - ONE PARENT RULE

- **Mandatory**
  Breeders must do this test for their kittens to be registered in the NZCF.
- **Breeder Certified**
  Individual testing programmes will specify whether the identity of the cat tested may be certified by the breeder, **or** must be

  Vet Certified (Microchip Required)
  Where the test sample must be taken by the vet who will certify the identity of the cat by microchip.
- **NZCF Recording Required**
  Breeders submit results to the NZCF for adding to the cat's records.
- **Breeding Requirements**
  To register kittens with the NZCF, one parent must either have clear DNA test results recorded with the NZCF, or be 'clear by parentage' where ancestor DNA results are recorded with the NZCF.
- **Review**
  Policies of mandatory DNA testing (one parent rule) must have a review date set for consideration of an upgrade to mandatory testing (both parents rule).

MANDATORY DNA TESTING - BOTH PARENTS RULE

- **Mandatory**
  Breeders must do this test for their kittens to be registered in the NZCF.
- **Breeder Certified**
  Individual testing programmes will specify whether the identity of the cat tested may be certified by the breeder, **or** must be

  Vet Certified (Microchip Required)
  Where the test sample must be taken by the vet who will certify the identity of the cat by microchip.
- **NZCF Recording Required**
  Breeders submit results to the NZCF for adding to the cat's records.
- **Breeding Requirements**
  To register kittens with the NZCF, both parents must either have clear DNA test results recorded with the NZCF, or be 'clear by parentage' where ancestor DNA results are recorded with the NZCF.
- **Review**
  Policies of mandatory DNA testing (both parents rule) breeder certified must have a review date set for consideration of an upgrade to mandatory testing (both parents rule) vet certified.

TYPES OF TESTING

DNA TESTING

DNA testing **is a one-off test** - either the harmful gene is present or not.

If the gene is a recessive gene then breeding with heterozygous carriers (one harmful gene, one normal gene) to clear partners is acceptable in the medium term as by doing this no affected cats will be born. However, to clear the harmful gene from the entire breeding population eventually only those cats testing homozygous clear (two normal genes) should be retained for breeding.

HEART SCANNING FOR HCM

In breeds where there is no genetic test for an HCM causing mutation or the test does not identify all cats who will develop HCM (because there's at least one more gene in the gene pool of that breed that causes it), the only means of reducing the likelihood of breeding with affected animals is cardiac ultrasound, preferably done by a specialist cardiologist vet or a radiology specialist vet.

Because HCM can be a slow developing condition **it requires testing at intervals during the cat's life** (for example, every 2 years). For meaningful results, cats should be screened until age 7 which should catch late onset examples of the disease. Although there are documented examples of cats developing HCM later than this the aim is over time to develop a breeding population all of whose recent ancestors have scanned clear to 7, whereupon the likelihood of HCM then becomes much lower.