THE KENNEL CLUB
DOG HEALTH

Breed Health and Conservation Plan

Russian Black Terrier

Evidence Base

CONTENTS

Agria
Pet Insurance

INTRODUCTION

The Kennel Club launched a new resource for breed clubs and individual breeders – the Breed Health and Conservation Plans (BHCP) project – in September 2016. The purpose of the project is to ensure that all health concerns for a breed are identified through evidence-based criteria, and that breeders are provided with useful information and resources to support them in making balanced breeding decisions that make health a priority.

The Breed Health and Conservation Plans take a complete view of breed health with consideration to the following issues: known inherited conditions, complex conditions (i.e. those involving many genes and environmental effects such as nutrition or exercise levels, for example hip dysplasia), conformational concerns and population genetics.

Sources of evidence and data have been collated into an evidence base which gives clear indications of the most significant health conditions in each breed, in terms of prevalence and impact. Once the evidence base document has been produced it is discussed with the relevant Breed Health Co-ordinator and breed health committee or representatives if applicable. Priorities are agreed based on this data and incorporated into a list of actions between the Kennel Club and the breed to tackle these health concerns. These actions and then monitored and reviewed on a regular basis.

DEMOGRAPHICS

The Russian Black Terrier is a numerically small breed, and has only recently been introduced to the UK in the mid-1990s. The trend of registrations over year of birth (1987-2021) was 0.31 per year (with a 95% confidence interval of -1.71 to +2.32), reflecting that no significant trend in the breed's popularity can be drawn during this time.

[A '95% confidence interval' (C.I.) is a tool used in statistics which shows that we are 95% certain that an estimated number is between the lowest number and the highest number provided.]

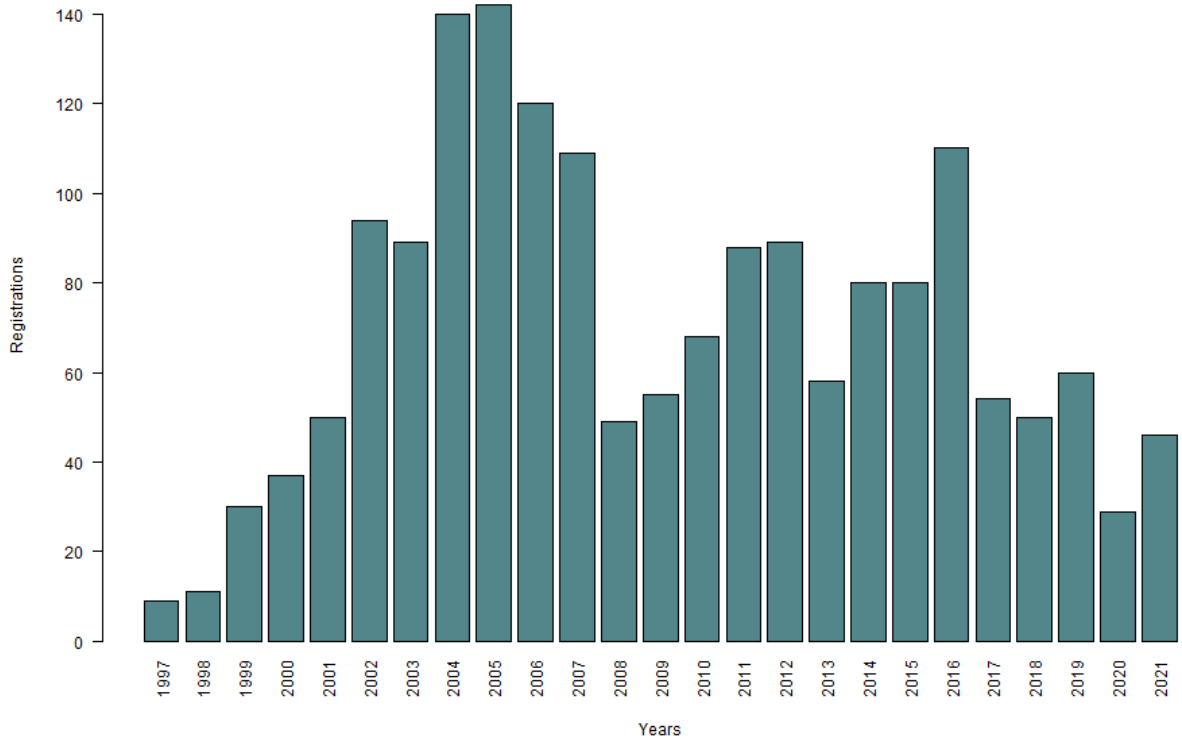

Figure 1: Number of registrations of Russian Black Terriers per year of birth, 1997 – 2021.

BREED HEALTH CO-ORDINATOR ANNUAL HEALTH REPORT

Breed Health Co-ordinators (BHCs) are volunteers nominated by their breed to act as a vital conduit between the Kennel Club and the breed clubs with all matters relating to health.

The Breed Health Coordinators Annual Health Report 2017 yielded the following response to 'please list and rank the three health and welfare conditions that the breed considers to be currently the most important to deal with in your breed':

- Hyperuricosuria (HUU)
- Undiagnosed stomach problems
- Joint problems (hips and elbows)

New actions listed were continuing to educate the public on conditions within the breed, including JLPP, and educating owners and breeding on testing and rearing of puppies.

BREED CLUB HEALTH ACTIVITES

Health information is detailed on the Russian Black Terrier club website:

- https://rbtclub.uk/

BREED SPECIFIC HEALTH SURVEYS

Kennel Club Purebred and Pedigree Dog Health Surveys Results

The Kennel Club Purebred and Pedigree Dog Health Surveys were launched in 2004 and 2014 respectively for all of the recognised breeds at the time, to establish common breed-specific and breed-wide conditions.

2004 Morbidity results: Health information was collected for 36 live Russian Black Terriers, of which 28 (78%) were healthy and 8 (22%) had at least one reported health condition. The top categories of diagnosis were reproductive (36.4%, 4 of 11 reported conditions), musculoskeletal (18.2%, 2 of 11 reported conditions), dermatologic (9.1%, 1 of 11 reported conditions) and gastrointestinal (9.1%, 1 of 11 reported conditions). There was one report each of 11 different conditions.

2004 Mortality results: A total of 4 deaths were reported for the breed. The median age at death for Russian Black Terriers was 1 years and 10 months (min = 3 months, max = 11 years and 6 months). The most frequently reported causes of death by organ system or category were cancer (50.0%, 2 of 4 deaths), and gastrointestinal (50.0%, 2 of 4 deaths).

2014 Morbidity results: Health information was collected for 16 live Russian Black Terrier of which 11 (68.8%) had no reported conditions and 5 (31.2%) were reported to be affected by at least one condition. The most frequently reported specific conditions were aural (ear) haematoma, colitis and hip dysplasia, each with two cases.

2014 Mortality results: A total of 6 deaths were reported for the breed. The range of longevity for Russian Black Terriers was 3 years to 16 years. Reported causes of death were cancer – unspecified, brain tumour, bone tumour, hip dysplasia and ‘unknown’ for two dogs.

LITERATURE REVIEW

The literature review lays out the current scientific knowledge relating to the health of the breed. We have attempted to refer primarily to research which has been published in peer-reviewed scientific journals. We have also incorporated literature that was released relatively recently to try to reflect current publications and research relating to the breed. Whilst there is very little in terms of scientific literature available for the breed, it is important to note the numerically small population of the breed.

Cardiovascular conditions

Subaortic stenosis and mitral valve dysplasia: This combined congenital heart defect was diagnosed in three male Russian Black Terrier littermates at two months of age in the Czech Republic (Pikula et al, 2005). No other reports, nor prevalence estimates, could be found in the literature.

Musculoskeletal conditions

Elbow dysplasia: A Polish retrospective study analysed elbow radiographs of 21,272 dogs taken between 1988 and 2005, some of which had been taken for lameness investigation and others for screening purposes, and found an overall prevalence of elbow dysplasia of 0.7% (150 cases); the prevalence in the Russian Black Terrier was 1.9% (1 case in 53 dogs of the breed), suggesting they might be at increased risk of the condition (Narojek et al, 2008).

Neurological conditions

Polyneuropathy with ocular abnormalities (POANV, also known as Juvenile Laryngeal Paralysis and Polyneuropathy, JLPP): This autosomal recessive condition affecting the breed was previously described as juvenile-onset laryngeal paralysis and polyneuropathy, but researchers have found that affected dogs also exhibit microphthalmia, cataracts and miotic pupils (Mhlanga-Mutangadura et al, 2016). Thirteen affected dogs were found to be homozygous for a *RAB3GAP1:c.743delC* mutation, with 249 unaffected individuals all being heterozygous for the mutation or homozygous wildtype, giving an allele frequency of 0.18; the authors noted that many of the samples came from dogs with POANV-affected close relatives, therefore the allele frequency of the mutation in the general population of the breed is likely to be lower. A DNA test is available for the mutation. No prevalence estimates for the condition could be found in the literature.

Urological conditions

Hyperuricosuria (HUU): The Russian Black Terrier was reported to be at increased risk of urate urolithiasis in a Hungarian study of 277 urinary uroliths submitted to the Budapest Urolith Centre; the breed had the highest prevalence of urate uroliths at 0.032% (4 cases in 125 dogs of the breed) in the 13 breeds with cases (Bende and Németh, 2004). A subsequent American study found that the autosomal recessive mutation associated with HUU, first identified in Dalmatians, also appears to cause the condition in Russian Black Terriers; the allele frequency of the *SLC2A9 Cys181Phe* mutation in 101 dogs of the breed from all over the world was 0.51, suggesting that 27% of the population of the breed were hyperuricosuric (Karmi et al, 2010). A DNA test is available for the mutation.

INSURANCE DATA

There are some important limitations to consider for insurance data:

- Accuracy of diagnosis varies between disorders depending on the ease of clinical diagnosis, clinical acumen of the veterinarian and facilities available at the veterinary practice.
- Younger animals tend to be overrepresented in the insured population.
- Only clinical events that are not excluded and where the cost exceeds the deductible excess are included

However, insurance databases are too useful a resource to ignore as they fill certain gaps left by other types of research; in particular they can highlight common, expensive and severe conditions, especially in breeds of small population sizes, that may not be evident from teaching hospital caseloads.

UK Agria data

Insurance data were available for Russian Black Terriers insured with Agria UK. 'Exposures' are equivalent to one full policy year; in 2016 there were 25 free exposures, 48 full exposures and 66 claims, in 2017 these figures were 64, 55 and 83 respectively. Full policies are available to dogs of any age. Free policies are available to breeders of Kennel Club registered puppies and cover starts from the time the puppy is collected by the new owner; cover under free policies lasts for five weeks from this time. It is possible that one dog could have more than one settlement for a condition within the 12-month period shown. The top 10 conditions by number of settlements, for authorised claims where treatments started between 1st October 2016 and 31st September 2017, are shown in Table 3 below.

Table 3: Top 10 conditions and number of settlements for each condition between 1st October 2016 and 31st September 2017 for Russian Black Terriers insured with Agria UK

Condition	Number of settlements
Elbow dysplasia	17
Acute cystitis	4
Acute gastroenteritis	4
Immune system disorder	3
Haemorrhagic vomiting and diarrhoea	3
Hypothyroidism	3
Acute otitis externa	3
Osteoarthritis / degenerative joint disease	3
Vomiting and diarrhoea	3
Giardia	3

Swedish insurance data were not available for the Russian Black Terrier.

BREED WATCH

The Russian Black Terrier is currently a category one breed, meaning judges judging at championship certificate level are not required to complete mandatory health monitoring forms. No optional health reports have been received for the breed to date.

ASSURED BREEDERS SCHEME

Currently within the Kennel Club (KC)'s Assured Breeders Scheme breeders are required to undertake the following for registration of a litter:

- Hip screening under the BVA/KC Hip Dysplasia Scheme
- Elbow screening under the BVA/KC Elbow Dysplasia Scheme

Breeders are also recommended to:

- Issue grooming advice to puppy buyers
- Bitches not to produce a litter under two years of age
- DNA Test – HUU

BREED CLUB BREEDING RECOMMENDATIONS

The Breed Club recommend that breeders should issue grooming advice with puppies and that bitches under two years are not to produce a litter.

DNA TEST RESULTS

DNA tests are available for the Russian Black Terrier for:

- HUU
- JLPP

Whilst other DNA tests may be available for the breed, results from these will not be accepted by The Kennel Club until the test has been formally recognised, the process of which involves collaboration between the breed clubs and the Kennel Club in order to validate the test's accuracy.

HUU

Results of the HUU DNA test have been recorded for the breed since 2009, with some 284 results having been recorded to date. The results for Russian Black Terriers with DNA test results for HUU to date (Oct 2022) are shown in the table below.

Table 2: HUU DNA test results for Russian Black Terriers to date.

Clear	Carrier	Affected	Hereditarily Clear	Hereditarily Carrier
76 (26.8%)	108 (38.0%)	24 (8.5%)	57 (20.1%)	19 (6.7%)

The 3-year mean mutation frequency for tested dogs is shown in Figure 2 below. The trend has shown a reduction in frequency in tested dogs overtime, with this being at 9.5% as of 2019-21, showing that breeders are selecting against the

mutation and the mutation is now circulating at lower levels. However, in this analysis almost 10% of dogs recorded will be carrying this mutation based on the latest years' averages.

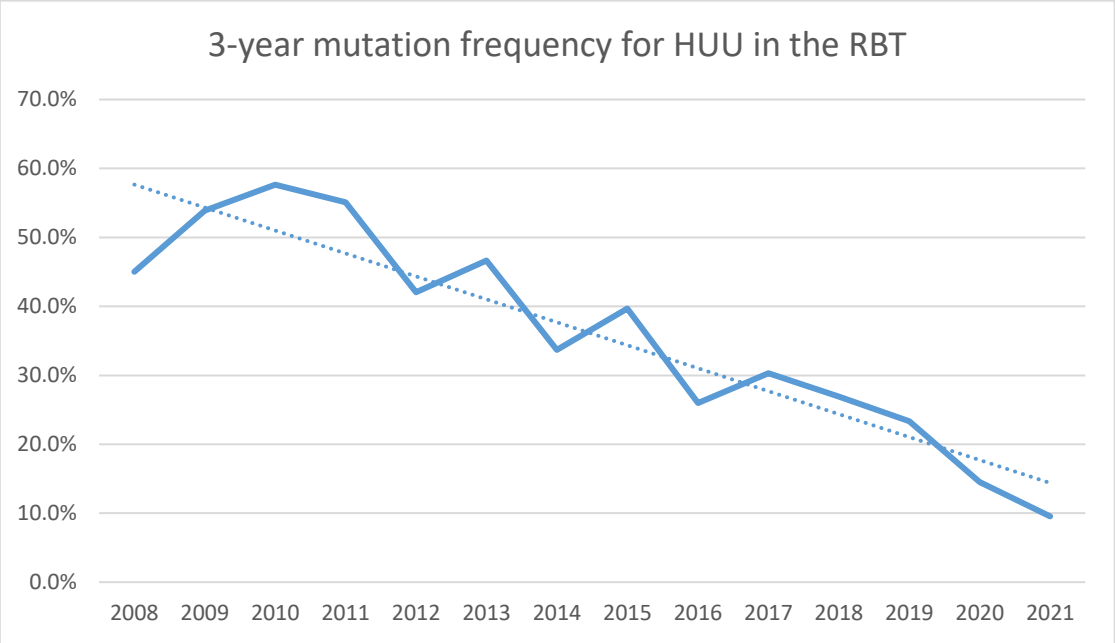

Figure 2: 3-year mean mutation frequency for HUU for dogs born between 2008 and 2021.

However, there is a caveat to consider, in that the presence of dogs with hereditary status, which make up a large proportion of results particularly in later years (average 66% during 2019-21), will cause a downward bias in mutation frequency. Therefore, whilst it is highly likely the frequency has reduced in the tested population, it is important to consider this may change overtime and is not an absolute reflection.

JLPP

Results of the JLPP DNA test have been recorded for the breed since 2017, with 132 dogs having been recorded to date. The results for Russian Black Terriers with DNA test results for JLPP are shown in Table 3.

Table 3: JLPP DNA test results recorded by the Kennel Club for Russian Black Terriers.

Clear	Carrier	Affected	Hereditarily Clear
52 (39.4%)	10 (7.6%)	0 (0.0%)	70 (53.0%)

The 3-year mean mutation frequency for tested dogs between 2019-21 is currently 2.0%, having dropped from 6.5% at the time of the test's introduction. The same caveat mentioned above will apply to dogs recorded during this time period. Given that the test has only been introduced relatively recently a graph has not been produced, but will be once a sufficient number of years have passed to give a meaningful representation of trend.

CANINE HEALTH SCHEMES

All of the British Veterinary Association (BVA)/Kennel Club (KC) Canine Health Schemes are open to dogs of any breed with a summary given of dogs tested to date below.

HIPS

Some 154 Russian Black Terriers have been hip scored between January 2002 and October 2022. Hip scores for the breed ranged from 0-106, with a 5-year mean of 22 (range 0-84). The mean hip score over time by year of birth is shown in the graph below.

It is worth noting that there is a wide degree of fluctuation due to the small number of dogs tested in some years (e.g. only three dogs born in 2020 have yet been hip scored). Overall however, it appears the mean score is gradually declining in the breed, but breeders should continue to test any breeding stock, and avoid using dogs with high hip scores.

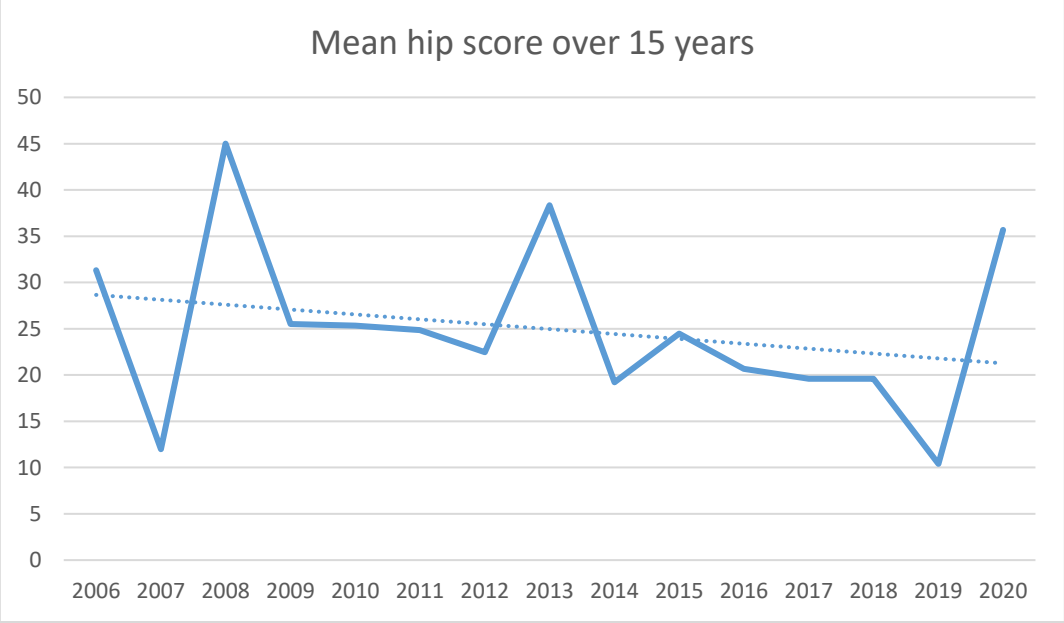

Figure 3: Mean hip score in Russian Black Terriers per year of birth.

The proportion of dogs hip scored per year of birth is also provided below (Figure 4), with this seemingly increasing overtime. Again there will be fluctuation due to the small population of the breed.

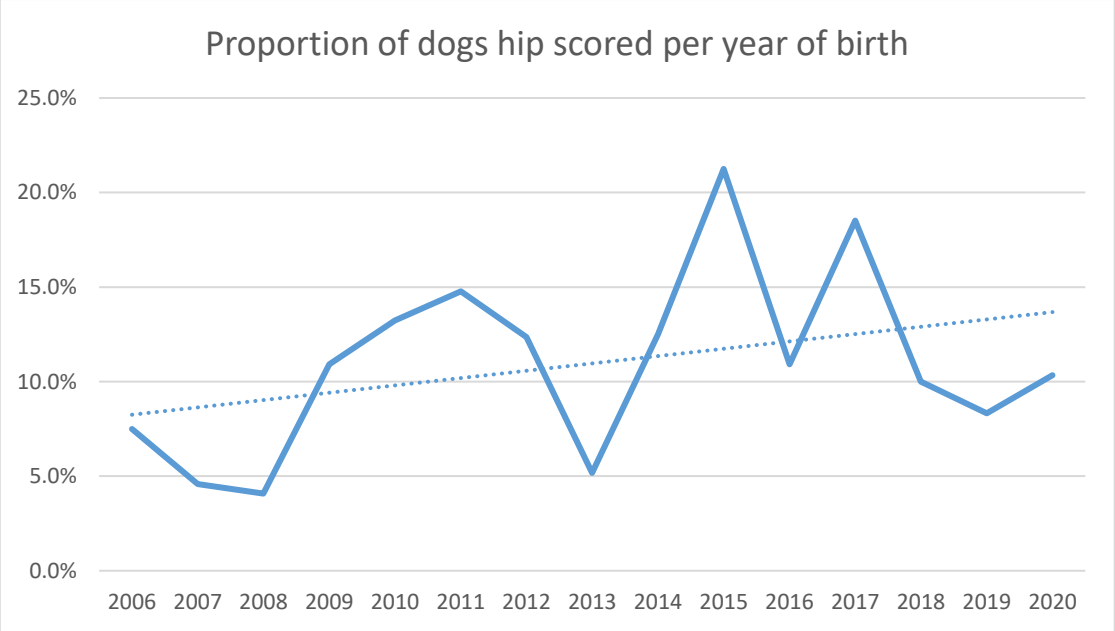

Figure 4: Proportion of Russian Black Terriers that have a recorded hip score by year of birth.

ELBOWS

In total 92 Russian Black Terries have been elbow graded up to October 2022; scores received are shown in Table 4. In total, 40.2% of dogs have been graded with some degree of dysplasia.

Table 4: Elbow grades and number of dogs receiving those grades since 1998 for Russian Black Terriers which have participated in the BVA/KC Elbow Dysplasia Scheme.

Elbow grade	Number of dogs	Proportion
0	55	59.8%
1	16	17.4%
2	16	17.4%
3	5	5.4%

Similarly, the count of grades per year, split by grade, are shown in Figure 5 below. Given the small number of dogs tested per year it is difficult to draw conclusions as to whether the grades are improving overtime, and breeders should continue to test and breed from dogs with lower grades.

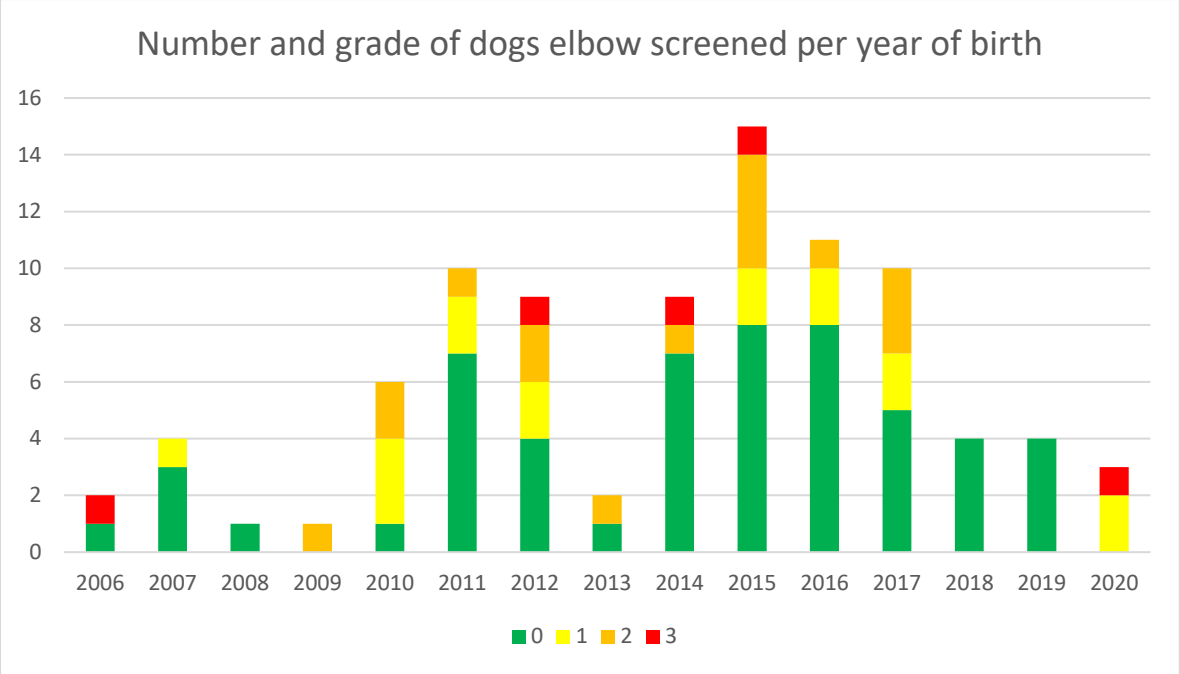

Figure 5: Number and grade of dogs tested per year of birth.

The proportion of dogs that have been elbow graded is also shown below (Figure 6), with this overall increasing overtime.

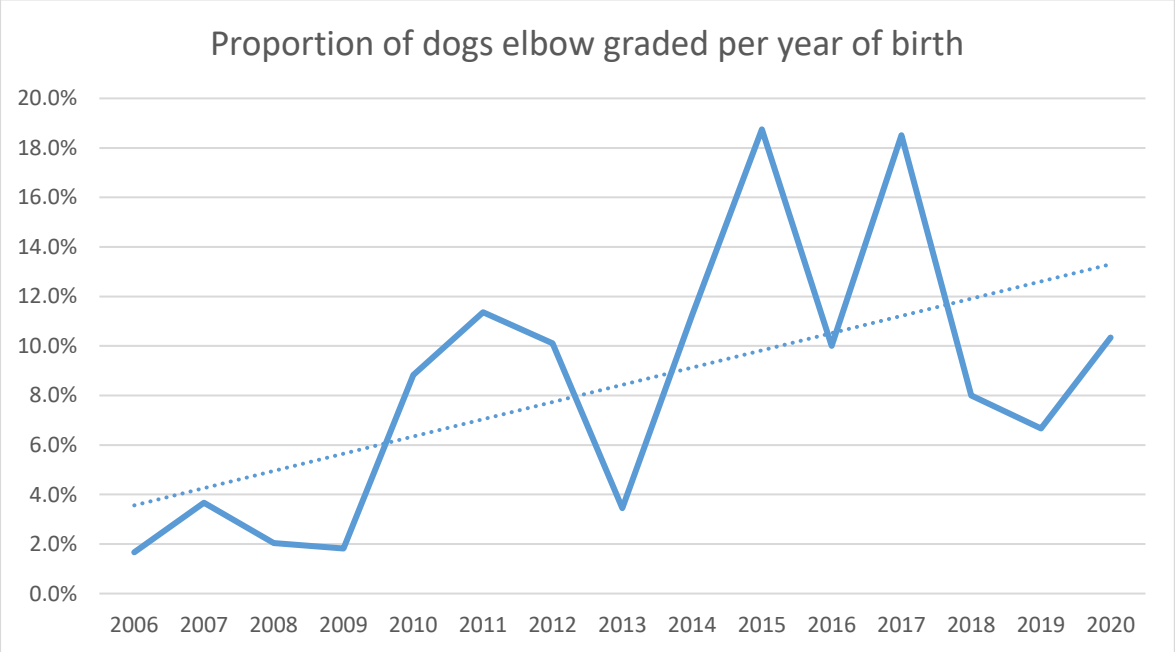

Figure 6: Proportion of Russian Black Terriers elbow graded per year of birth.

EYES

The breed is not currently on the Known Inherited Ocular Disease (KIOD) list for any condition under the BVA/KC/International Sheep Dog Society (ISDS) Eye Scheme.

However, the BVA still records the results of dogs of other breeds which have participated in the scheme. Just five dogs of the breed were presented to an Eye

Panellist for examination under the scheme between 2012 and 2018, and no conditions were noted (please note sightings reports from 2019 onwards are still pending from the BVA).

AMERICAN COLLEGE OF VETERINARY OPHTHALMOLOGISTS (AVCO)

Throughout 2017 to 2021, 330 Russian Black Terriers were examined for ocular disorders under AVCO. The resultant prevalence data for conditions affecting over 1% of the examined population are shown in Table 5 below, alongside that for previous time periods. Overall, 76.4% (252 of 330 dogs) of Russian Black Terriers examined between 2017 and 2021 had normal eyes unaffected by any condition.

However, it is important to note that this data is from dogs in the United States.

Table 5: ACVO examination results for the Russian Black Terrier, 2017 – 2021.

Disease Category/Name	**Percentage of Dogs Affected**	
	1991-2016 (n=618)	**2017-2021** (n=330)
Eyelids		
Distichiasis	1.0%	1.5%
Cornea		
Corneal dystrophy	0.3%	1.2%
Uvea		
Persistent pupillary membranes (iris to iris)	1.8%	3.6%
Lens		
Cataract (significant)	7.0%	14.8%

Adapted from: https://www.ofa.org/diseases/eye-certification/blue-book

REPORTED CAESAREAN SECTIONS

When breeders register a litter of puppies, they are asked to indicate whether the litter was delivered (in whole or in part) by caesarean section. In addition, veterinary surgeons are asked to report caesarean sections they perform on Kennel Club registered bitches. The consent of the Kennel Club registered dog owner releases the veterinary surgeon from the professional obligation to maintain confidentiality (vide the Kennel Club General Code of Ethics (2)).

There are some caveats to the associated data;

- It is doubtful that all caesarean sections are reported, so the number reported each year may not represent the true proportion of caesarean sections undertaken in each breed.
- These data do not indicate whether the caesarean sections were emergency or elective.

- It is acknowledged that the reporting from veterinarians is increasing year on year, which is reflected across all breeds.

The number of litters registered per year for the breed and the number and percentage of reported caesarean sections in the breed for the past 10 years are shown in Table 6.

Table 6: Number and percentage of litters of Russian Black Terriers registered per year and number of caesarean sections reported per year.

Year	Number of Litters Registered	Number of C-sections	Percentage of C-sections	*Percentage of C-sections out of all KC registered litters (all breeds)*
2011	10	0	0.0%	1.6%
2012	8	0	0.0%	8.7%
2013	4	0	0.0%	10.0%
2014	8	1	12.5%	10.6%
2015	7	0	0.0%	11.7%
2016	13	1	7.7%	13.9%
2017	5	0	0.0%	15.0%
2018	5	0	0.0%	17.2%
2019	7	1	14.3%	15.7%
2020	2	0	0.0%	14.4%
2021	8	0	0.0%	16.5%

GENETIC DIVERSITY MEASURES

The effective population size is the number of breeding animals in an idealised, hypothetical population that would be expected to show the same rate of loss of genetic diversity (rate of inbreeding) as the population in question; it can be thought of as the size of the 'gene pool' of the breed. In the population analysis undertaken by the Kennel Club in 2015, an estimated effective population size of 40.1 was reported (estimated using the rate of inbreeding over the period over which the breed has been registered i.e. since 1995 - 2014). An effective population size lower than 50 (inbreeding rate of 1.0% per generation) indicates the future of the breed many be considered to be at risk (Food & Agriculture Organisation of the United Nations, "Breeding strategies for sustainable management of animal genetic resources", 2010). It should be noted that, for the most recent five year block (2010 – 2014) the estimated effective population size was 80.7.

Annual mean observed inbreeding coefficient (showing loss of genetic diversity) and mean expected inbreeding coefficient (from simulated 'random mating') over the period 1980-2014 could not be plotted for breeds which were not registered by the Kennel Club for the entire time period. The number of animals of this breed registered with the Kennel Club has risen markedly since it was recognised in 1998. This increase in numbers is likely to have been accomplished with use of migrant

animals for breeding. The small initial population size and influence of migrant animals mean there may be large fluctuations in the rate of inbreeding and effective population size.

It should be noted that, while animals imported from overseas may appear completely unrelated, this is not always the case. Often the pedigree available to the Kennel Club is limited in the number of generations, hampering the ability to detect true, albeit distant, relationships. For full interpretation see Lewis et al, 2015 https://cgejournal.biomedcentral.com/articles/10.1186/s40575-015-0027-4.

The current annual breed average inbreeding coefficient is **2.7**%. This value is calculated each June and represents the average inbreeding coefficient of all dogs of the breed registered between January and December of the previous year i.e. in 2016.

Below is a histogram ('tally' distribution) of number of progeny per sire and dam over each of seven five-year blocks (Figure 7). A longer 'tail' on the distribution of progeny per sire is indicative of 'popular sires' (few sires with a very large number of offspring, known to be a major contributor to a high rate of inbreeding). There appears to be evidence of popular dogs used as sires in this breed (the 'tail' of the blue distribution in Figure 7).

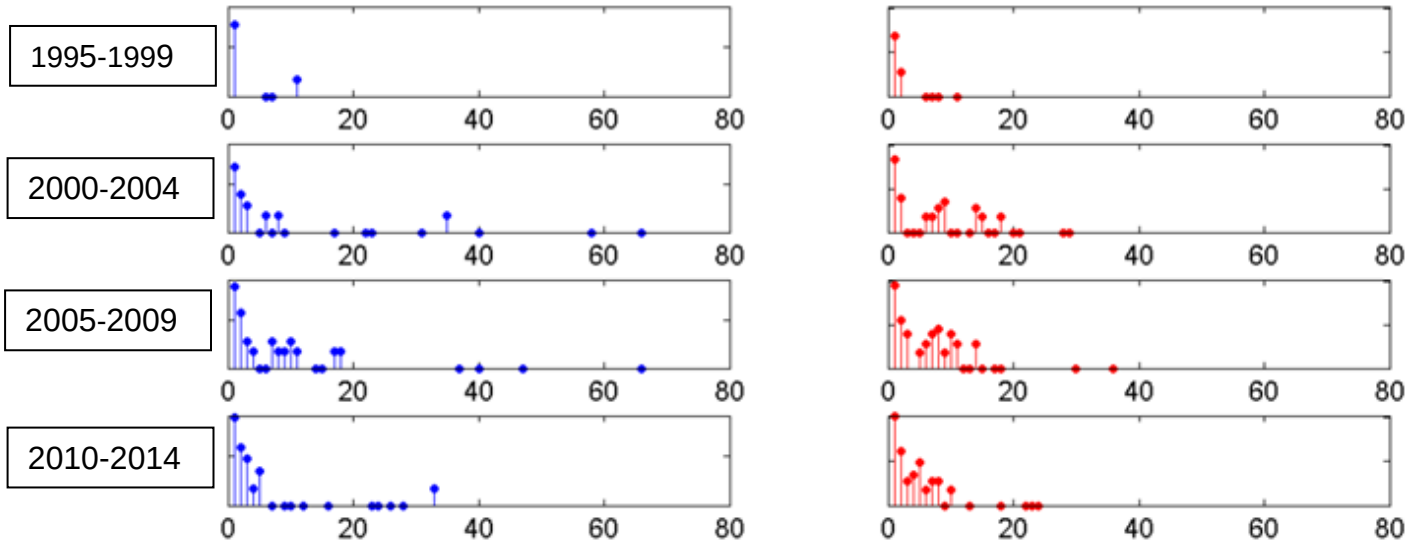

Figure 7: Distribution of progeny per sire (blue) and per dam (red) over 5-year blocks (1995-9 top, 2010-14 bottom). Vertical axis is a logarithmic scale.

CURRENT RESEARCH

The Russian Black Terrier was one of the breeds in the Animal Health Trust's Give a Dog a Genome project; however, unfortunately following the closure of the AHT Give a Dog a Genome has ceased. The samples stored from the breed are still available and can be shared with any new research groups available to take on a project for the breed.

PRIORITIES

Correspondence was undertaken between the Kennel Club and the Breed Club representatives in Oct 2018 to review the evidence base of the BHCP and appropriate actions to tackle the priority issues for the health of the breed. The group agreed from the information provided and their own experience that the priorities for the Russian Black Terrier were:

- JLPP
- HUU
- Stomach problems secondary to HUU
- Hip and elbow dysplasia

At watch: degenerative myelopathy and Addison's disease.

ACTION PLAN

Following correspondence between the Kennel Club and the breed regarding the evidence base of the Breed Health & Conservation Plans, the following actions were agreed to improve the health of the Russian Black Terrier. Both partners are expected to begin to action these points prior to the next review.

Breed Club actions include:

- The Russian Black Terrier Club to review and amend the wording for breed club breeding recommendations.

- The Russian Black Terrier Club to put forward a proposal for JLPP and HUU to be requirements within the ABS.

Kennel Club actions include:

- The Kennel Club to assist in a health survey for the breed.

- The Kennel Club to assess whether the proportion of imports can be incorporated into the registration statistics for the breed.

- The Kennel Club to query the use of hip and elbow scores being sent to America

- The Kennel Club to repeat the population analysis for the breed.

REFERENCES

Bende, B. and Németh, T. (2004) High prevalence of urate urolithiosis in the Russian black terrier. *Veterinary Record* **155**: 239-240

Genetics Committee of the American College of Veterinary Ophthalmologists (2015) Ocular disorders presumed to be inherited in purebred dogs, Ninth Edition. https://www.ofa.org/wp-content/uploads/2018/01/Bluebook-v9-2016.pdf [Accessed 25/07/18]

Karmi, N., Safra, N., Young, A. and Bannasch, D.L. (2010) Validation of a urine test and characterization of the putative genetic mutation for hyperuricosuria in Bulldogs and Black Russian Terriers. *American Journal of Veterinary Research* **71** (8): 909-914

Lewis, T.W., Abhayaratne, B.M. and Blott, S.C. (2015) Trends in genetic diversity for all Kennel Club registered pedigree dog breeds. *Canine Genetics and Epidemiology* **2**:13 https://doi.org/10.1186/s40575-015-0027-4 [Accessed 18/08/2017]

Mhlanga-Mutangadura, T., Johnson, G.S., Schnabel, R.D., Taylor, J.F., Johnson, G.C., Katz, M.L., Shelton, G.D., Lever, T.E., Giuliano, E., Granger, N., Shomper, J. and O'Brien, D.P. (2016) A mutation in the Warburg syndrome gene, *RAB3GAP1*, causes a similar syndrome with polyneuropathy and neuronal vacuolation in Black Russian Terrier dogs. *Neurobiology of Disease* **86**: 75-85

Narojek, T., Fiszdon, K. and Hanysz, E. (2008) Canine elbow dysplasia in different breeds. *Bulletin of the Veterinary Institute in Pulawy* **52**: 169-173

Pikula, J., Pikulova, J., Bandouchova, H., Kohout, P., Najman, K., Tichy, F. and Treml, F. (2005) Subaortic stenosis and mitral valve dysplasia in three Black Russian Terrier puppies. *Veterinární Medicina* **50** (7): 321-326