



THE KENNEL CLUB
DOG HEALTH

Breed Health and Conservation Plan



Bearded Collie
2019

INTRODUCTION

The Kennel Club launched a dynamic 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 holistic 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 (Section 1 of the BHCP) 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 Coordinator and breed health committee or representatives if applicable. Priorities are agreed and laid out in Section 2. A collaborative action plan for the health of the breed is then agreed and incorporated as Section 3 of the BHCP. This will be monitored and reviewed.

SECTION 1: EVIDENCE BASE

Demographics

The Bearded Collie has been categorised as a vulnerable native breed, defined as a breed with fewer than 300 new registrations a year. The numbers of new registrations of the breed per year are shown in Figure 1, and indicate a slight decrease over this time period.

The number of Bearded Collies registered by year of birth between 1980 and 2018 are shown in Figure 1. The trend of registrations over year of birth (1980-2018) was -29.20 per year (with a 95% confidence interval of -38.77 to -19.63), as this does not cross zero the trend is significant, reflecting the decrease in registrations.

[Put simply, 95% confidence intervals (C.I.s) indicate that we are 95% confident that the true estimate of a parameter lies between the lower and upper number stated.]

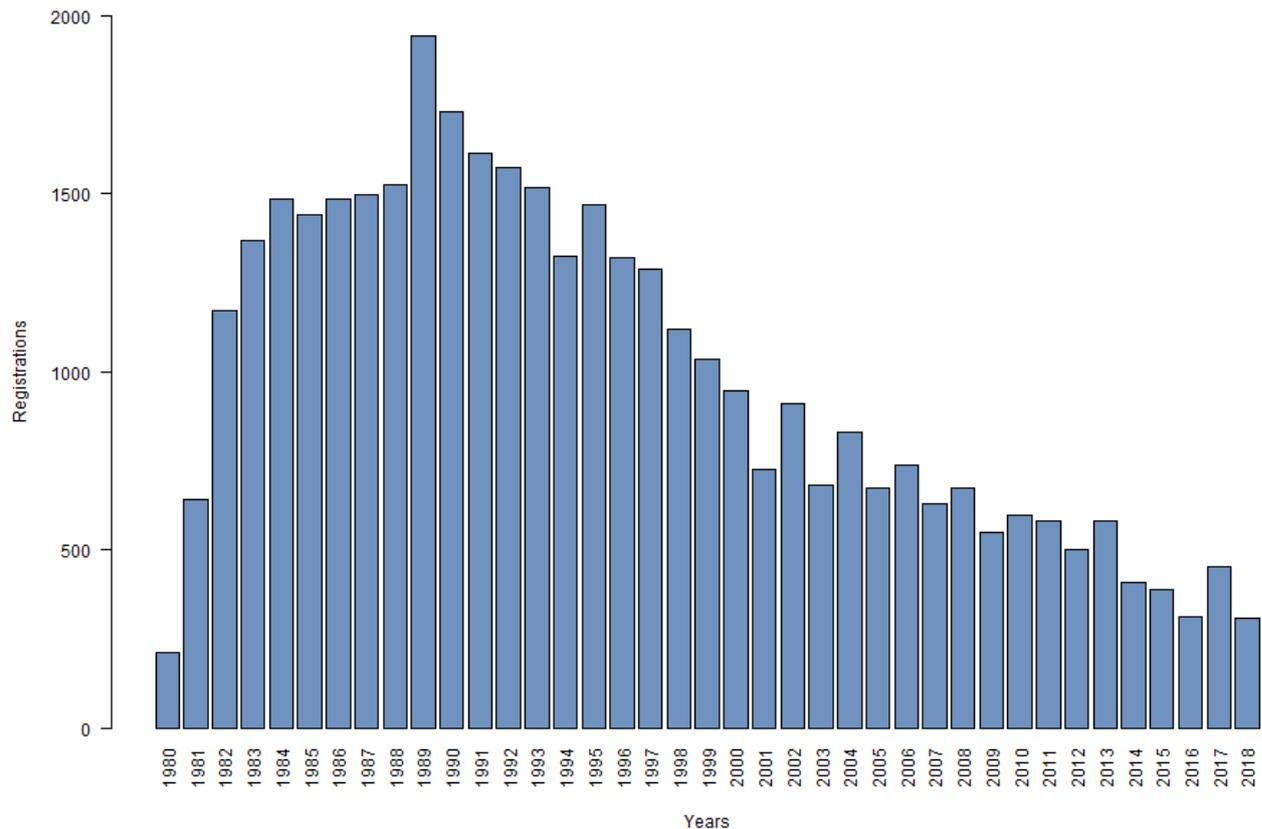


Figure 1: Number of registrations of breed per year of birth, 1980 – 2018

Breed Health Co-ordinator Annual Report

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':

1. Addison's disease
2. Symmetrical lupoid onychodystrophy (SLO)
3. Autoimmune haemolytic anaemia
4. Collie eye anomaly (CEA)

Actions reported over the year were holding breeders meetings to try and tackle their concerns, drawing up a breed health strategy and funding sequencing of a normal Bearded Collie and one with Addison's disease as part of Give a Dog a Genome.

The 2018 conditions reported by the BHC were:

1. SLO
2. Addison's disease
3. CEA

Actions to tackle these problems included launching the first of an annual breed health survey, publishing guidance on the use of popular sires and monitoring the

breed's strategy in tackling this, and continuing to fund research into autoimmune concerns (specifically with Professor Brian Catchpole).

Purebred/Pedigree Dog Health Survey Results

2004 Morbidity results: Health information was collected for 563 live Bearded Collies of which 324 (58%) were healthy and 239 (42%) had at least one reported health condition. The top categories of diagnosis were musculoskeletal (14.4%, 63 of 437 reported conditions), gastrointestinal (12.6%, 55 of 437 reported conditions), urologic (9.8%, 43 of 437 reported conditions), reproductive (9.6%, 42 of 437 reported conditions) and dermatologic (9.4%, 41 of 437 reported conditions). The most frequently reported specific conditions were chronic colitis (4.6% prevalence, 26 cases), kennel cough (4.3% prevalence, 24 cases), cystitis (3.7% prevalence, 21 cases), pyometra (3.3%, 11 cases in the 334 female Bearded Collies in the dataset), urinary incontinence (2.5% prevalence, 14 cases) and hypothyroidism (2.5% prevalence, 14 cases).

2004 Mortality results: A total of 278 deaths were reported for the breed. The median age at death for Bearded Collies was 13 years and 6 months (min = 4 months, max = 19 years and 6 months). The most frequently reported causes of death by organ system or category were old age (25.9%, 72 of 278 deaths), cancer (19.4%, 54 deaths), cerebral vascular (9.4%, 26 deaths) and urologic (7.9%, 22 deaths). The most frequently reported specific causes of death were old age (25.9%, 72 deaths), cancer (19.4%, 54 deaths), stroke (9.4%, 26 deaths) and chronic renal failure (6.8%, 19 deaths).

2014 Morbidity results: Health information was collected for 226 live Bearded Collies of which 146 (64.6%) had no reported conditions and 80 (35.4%) were reported affected by at least one condition. The most frequently reported specific conditions were skin (cutaneous) cyst (8.4% prevalence, 19 cases), arthritis (4.9%, 11 cases), lipoma (4.0%, 9 cases) and skin lump (3.1%, 7 cases). Regarding other conditions mentioned in the literature review above, the prevalence of urinary incontinence was 2.2% (5 cases), and the prevalence of SLO was also 2.2% (5 cases).

2014 Mortality results: A total of 52 deaths were reported for the breed. The median age at death for Bearded Collies was 12.5 years (min = 2 years, max = 18 years). The most frequently reported causes of death were old age (25%, 13 deaths) and old age combinations (9.6%, 5 deaths).

VetCompass results

No VetCompass data relating to the Bearded Collie were available.

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 UK insured population.
- Only clinical events that are not excluded and where the cost exceeds the deductible excess are included (O'Neill et al, 2014)

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 (Egenvall et al, 2009).

UK Agria data

Insurance data were available for Bearded Collies insured with Agria UK. 'Exposures' are equivalent to one full policy year; in 2017 there were 16 free exposures, 250 full exposures and 195 claims, in 2018 these figures were 23, 258 and 273 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.

Conditions by number of settlements, for authorised claims where treatments started between July 2017 and June 2018, are shown in Table 1 below.

Table 1: Top 10 conditions and number of settlements for each condition between 1st July 2017 and 31st June 2018 for Bearded Collies insured on full policies with Agria UK

Condition	Number of settlements
Onychodystrophy unspecified	22
Sarcoma - soft tissue	17
Hypothyroidism	13
Renal (kidney) disorder	12
Stifle disorder finding	11
Addison's disease (primary hypoadrenocorticism)	11
Bronchitis (unspecified)	7
Elbow dysplasia (canine)	7
Lameness finding	6
Noise phobia (unspecified)	5

No Swedish insurance data were available for the Bearded Collie.

Breed-Specific Health Surveys

Bearded Collie Health Survey 2012

A breed health survey was conducted by the University of Southampton in 2012, about dogs owned in the period 1st January 2007 to 1st January 2012 (Kershaw et al, 2015). The survey was part funded by a grant from the Kennel Club Charitable Trust. In total, data were collected for 789 dogs, of which 700 were registered with the Kennel Club and it is this registered population that comprised the analysed sample. The full results of the survey can be found here:

http://www.beardedcollieclub.co.uk/docs/health_survey_report2015.pdf; however, some particularly interesting results are shown below.

A total of 188 deaths were reported in the survey, and the mean age at death was 13 years and 2 months (minimum 1 year and 5 months, maximum 19 years and 11 months).

Considering all 700 registered Bearded Collies in the survey population, 75.9% (527 dogs) were reported to have been affected by at least one health condition not including parasitic infection. Reported cases of different categories of disease condition are shown in Figure 2.

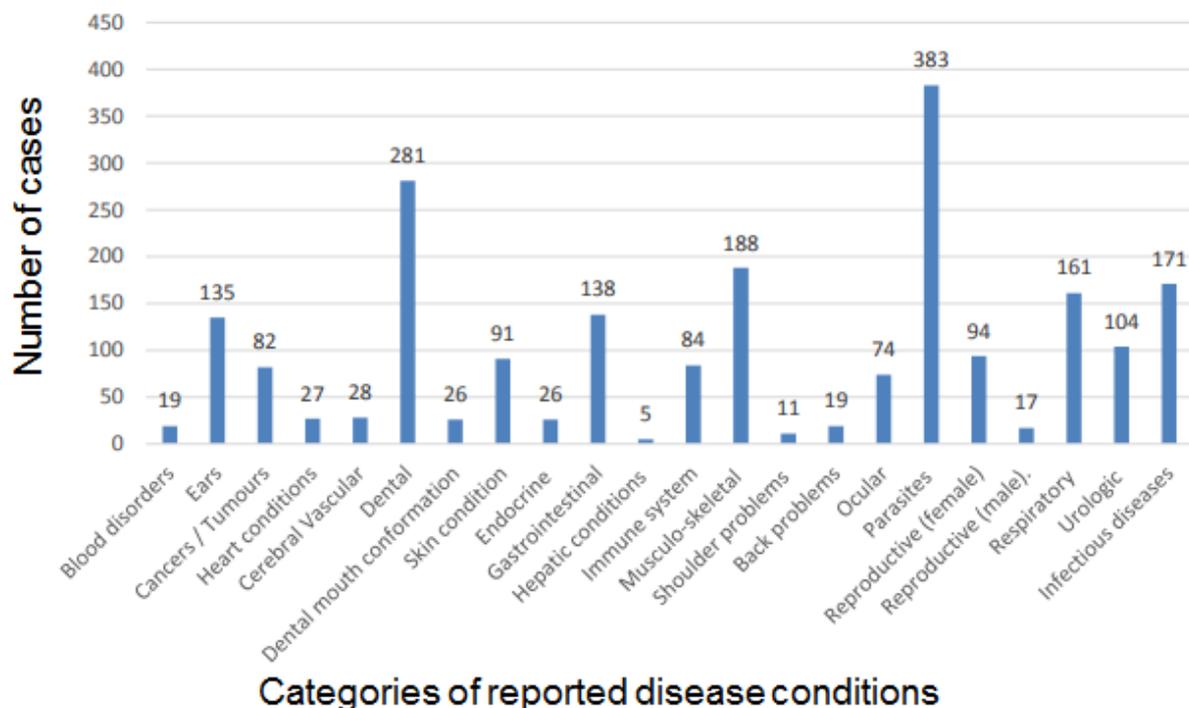


Figure 2: Number of cases in the different categories of reported disease conditions for 700 registered Bearded Collies in the 2012 breed health survey.

Given the findings of the literature review, reports of autoimmune disorders are of particular interest. Overall, 10.3% (73 dogs) were reported to have at least one

autoimmune disorder, with the breakdown of disease conditions in this category shown in Figure 3.

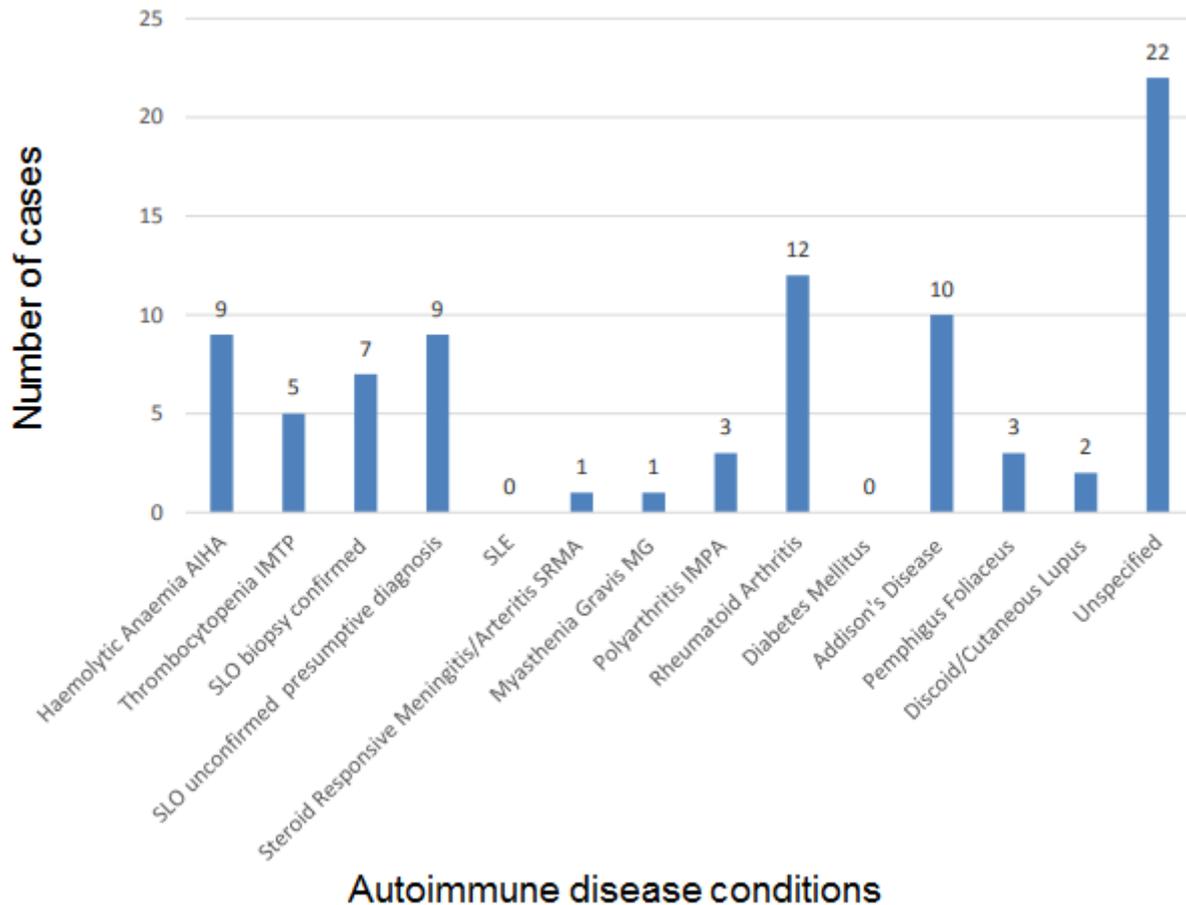


Figure 3: Reported cases of autoimmune disease conditions for 700 registered Bearded Collies in the 2012 breed health survey.

Bearded Collie Health Survey 2018

A survey was undertaken with the aim of obtaining health data on as many dogs as possible for the year ending 28th February 2018 and then to repeat the survey on an annual basis. This would allow trends to be monitored and action to be taken as needed. The final survey consisted of twelve questions with either Yes/No answers or short answers and was designed to be user-friendly.

Data were received on 1,132 dogs of which five dogs had died in the year leading up to February 2018. The full survey report is available from the Breed Health Coordinator, but some findings are summarised here.

In total 231 dogs (20.4%) were reported to have received veterinary attention for one or more new condition in the previous 12 months. Reported conditions or categories of condition are shown in Figure 4 below. The category of condition most frequently

reported was musculoskeletal, with 48 instances reported; 30 of these cases were arthritis.

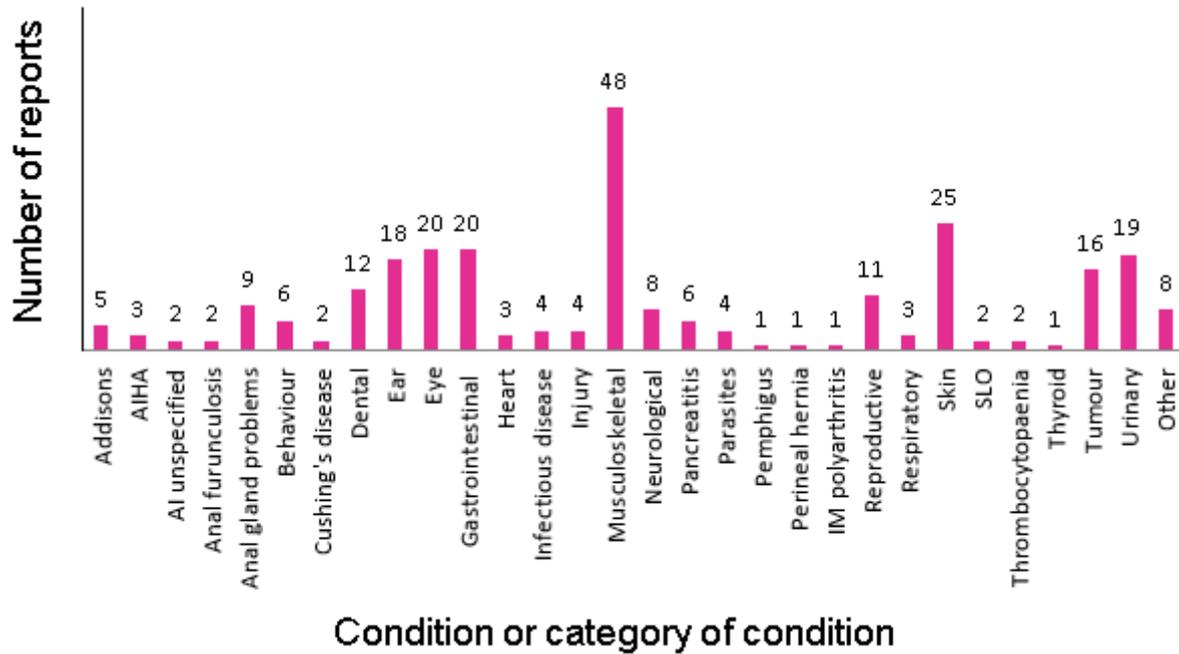


Figure 4: New conditions or categories of condition reported to have necessitated dogs receiving veterinary attention in the previous 12 months in the 2018 survey.

Some 196 Bearded Collies (17.3%) were reported to be affected by one or more long term health condition. Long term health conditions reported are shown in Figure 5. Again, the category of condition most frequently reported was musculoskeletal, with 76 instances reported; 47 of these cases were arthritis and 13 were elbow dysplasia.

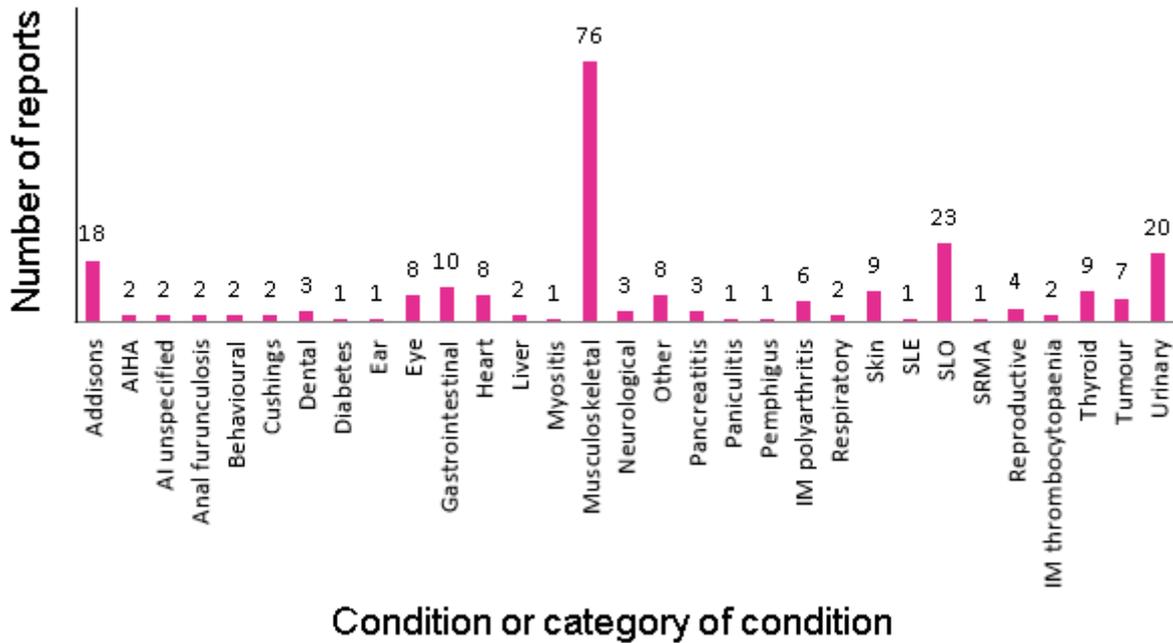


Figure 5: Chronic conditions or categories of condition reported in the 2018 survey.

Bearded Collie Health Survey 2019

This was the second year that the annual survey was run, with data received for 1,150 dogs in total, of which 18 had died in the year leading up to February 2019.

Of the dogs that died the range of death was 7 to 16 years of age, with four individuals dying under the age of 10 – of which three were due to nasal tumour, autoimmune haemolytic anaemia and fibrocartilagenous embolism, and one of haemangiosarcoma. Of the over 10 deaths cause of death was brain tumour (suspected), heart tumour, stroke, bladder tumour, cancer unspecified, pancreatitis, old age and renal failure.

In total, 283 (24.6%) were reported to have received some form of veterinary attention during the last 12 months, accounting to 324 problems, of which the most commonly affected system was musculoskeletal (Figure 6). Within this category arthritis (n=30) was the most commonly reported problem.

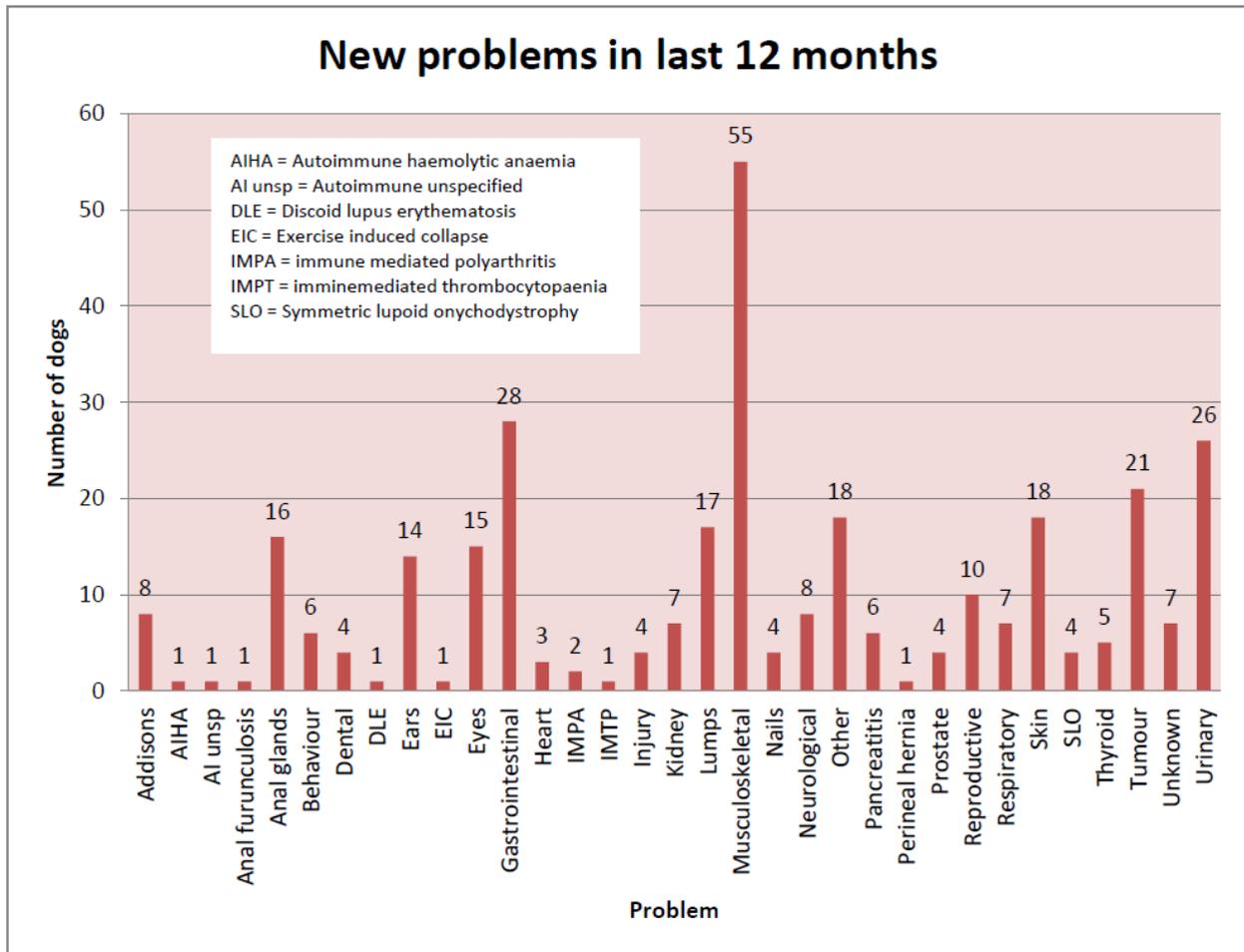


Figure 6: New conditions or categories of condition reported to have necessitated dogs receiving veterinary attention in the previous 12 months in the 2019 survey.

Overall, 234 dogs (20.3%) were reported to be affected by a long-term or chronic condition, which represented a total of 276 problems. Again, the most commonly affected system was musculoskeletal, with 63 dogs affected by arthritis.

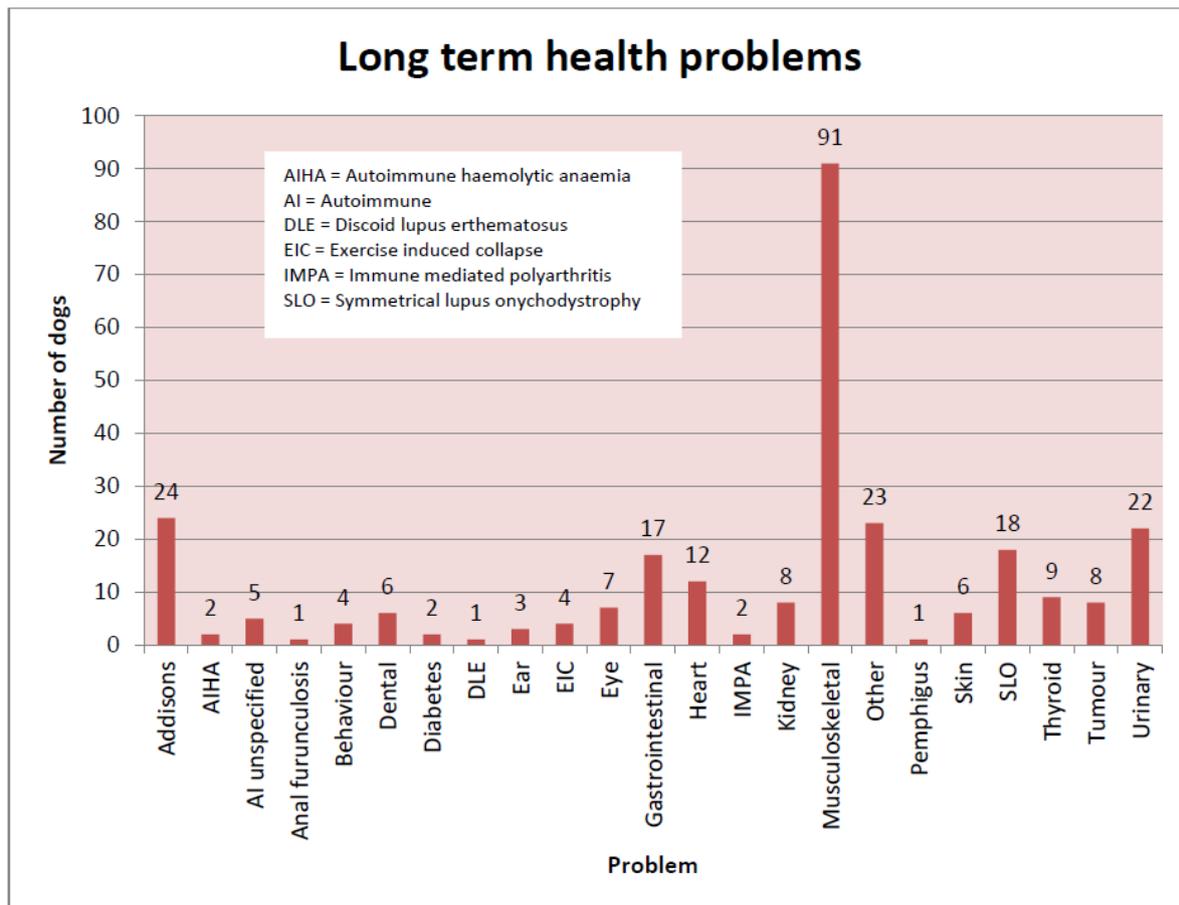


Figure 7: Chronic conditions or categories of condition reported in the 2019 survey.

The breed also added a question on dental concerns in the breed for the 2019 survey, of which 45 individuals (3.9%) were reported to be affected by a condition that affected the jaw. The most commonly reported issues were overshot jaws (n=13) and narrow jaws (n=6).

Breed Watch: Visual health check reports/clinical reports/judges' health monitoring

Judges' health monitoring forms are not mandatory for the breed as they are currently a Breed Watch category 1 breed. An optional form was received in 2017, noting a number of dogs of the breed with dirty teeth.

Breed Club Health Activities

The breed has a health committee (the Joint Breed Liaison Committee, JBLC), an active Breed Health Coordinator (BHC) and a dedicated health section on the Bearded Collie Club's website <http://www.beardedcollieclub.co.uk>.

There is also an American website relating to the health of the breed, which includes an international open health registry: <http://www.beaconforhealth.org> . This is being used as an ongoing health data collection point by the UK breed clubs.

Assured Breeder Scheme

It is currently required that Assured Breeders complete the following prior to breeding:

- Hip scoring under the British Veterinary Association (BVA)/Kennel Club (KC) Hip Dysplasia Scheme

It is also recommended that breeding stock are:

- DNA tested for CEA
- Eye tested under the BVA/KC/International Society for Sheepdogs (ISDS) annually

DNA Test Results

Results of the CEA DNA test have been recorded since February 2014 and it was made an ABS recommendation in July 2016. The results for dogs which had been DNA tested up to 27th June 2019 are shown in Table 2.

Table 2: CEA/CH DNA test results held by the Kennel Club for Bearded Collies up to 27/06/2019.

Total number of results	Clear	Carrier	Affected	Hereditarily clear
1312	250 (19.1%)	7 (0.5%)	1 (0.1%)	1054 (80.3%)

Canine Health Scheme results and EBVs

All BVA/KC Health Schemes are open to dogs of any breed, and the results for Bearded Collies which have been presented for assessment under the schemes are shown below.

HIPS

In total 3,072 Bearded Collies have participated in the BVA/KC Hip Dysplasia Scheme to date (27/06/2019), and the 15 year and 5 year median hip scores received were 9 (range 0-70 and 0-53 respectively).

Hip score categories received by Bearded Collies which participated in the BVA/KC Hip Dysplasia Scheme between 1990 and 2016 are shown in five year blocks (which can be considered to approximate to a generation) in Figure 8 below. The categories correspond to those assigned under the FCI (Europe)'s hip grading scheme; for one hip, a 'normal' hip scores 0-3, borderline scores 4-8, mild HD scores 9-18, moderate HD scores 19-30 and severe HD represents a score greater

than 30. Further information on these categories can be found here: <https://www.bva.co.uk/uploadedFiles/Content/Canine Health Schemes/chs-comparison-of-hd-schemes.pdf> . Over this time period there appears to be a definite reduction in the proportion of Bearded Collies with mild to severe hip dysplasia and an increase in those with borderline and normal scores.

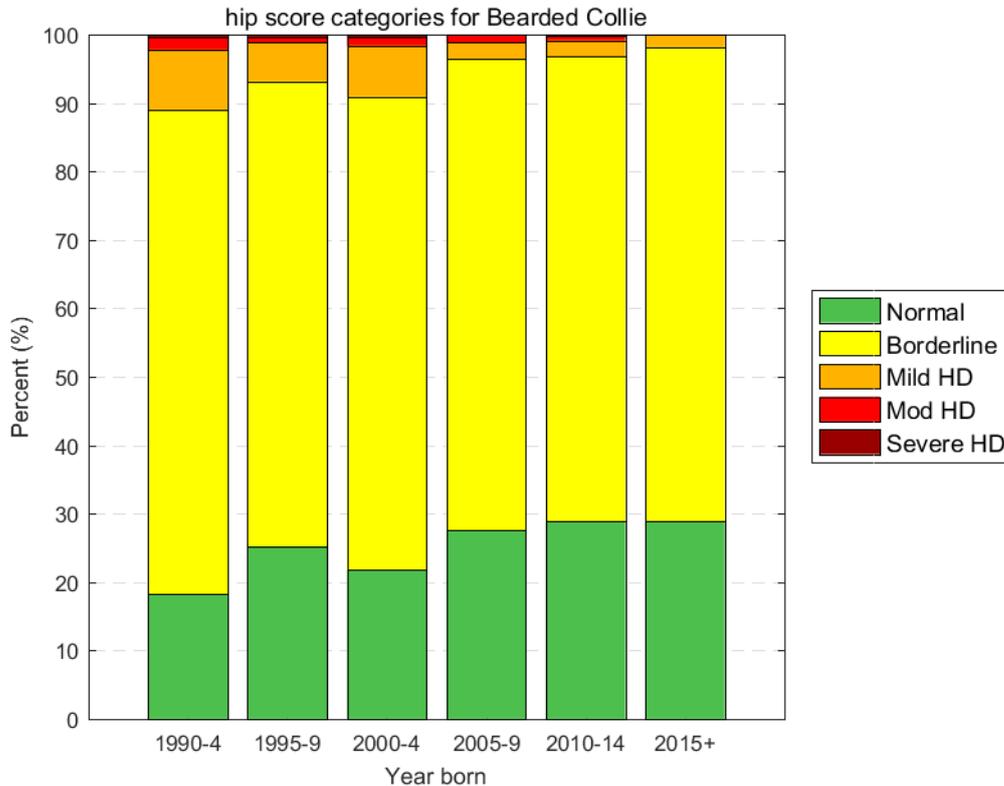


Figure 8: Hip score categories for Bearded Collies which participated in the BVA/KC Hip Dysplasia Scheme between 1990 and 2016, in 5-year blocks.

Estimated Breeding Values (EBVs) are available for hip scores in this breed. Figure 9 shows the five year rolling trend in EBVs by year of birth in the Bearded Collie. It appears that EBVs have generally decreased since 1990, although there may have been a slight upturn in the most recent years. This indicates a generally improving (lowering) genetic risk of hip dysplasia as determined by the BVA/KC hip score, most likely as a result of selection.

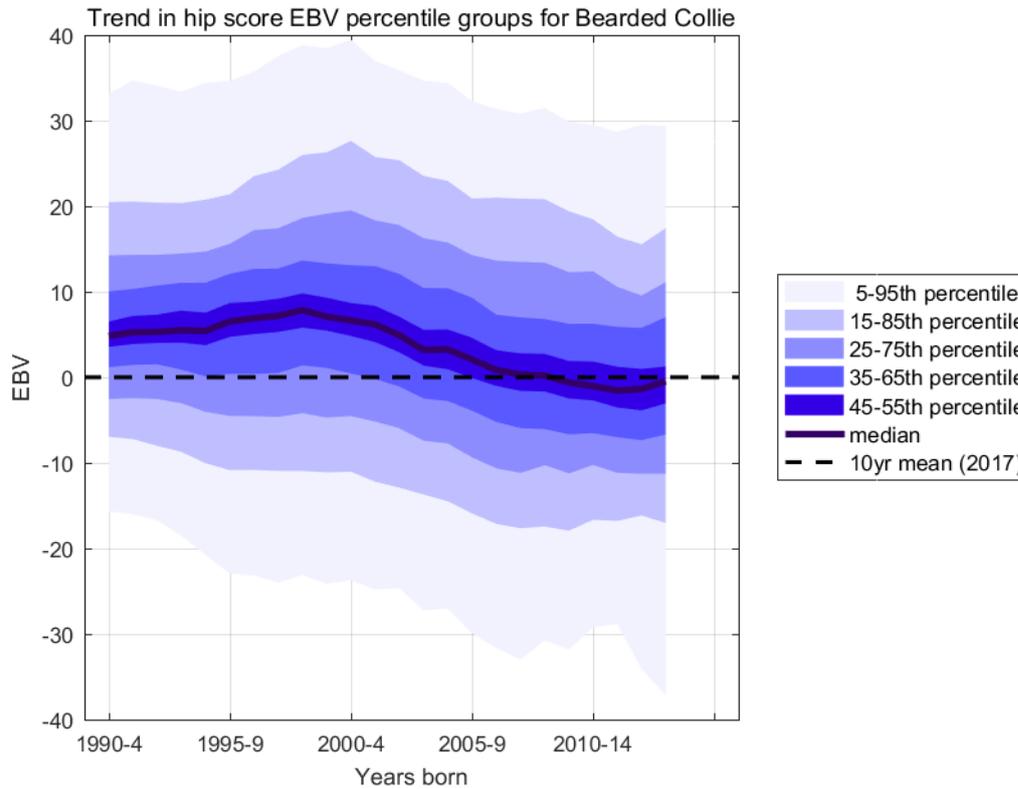


Figure 9: Trend in hip score EBV, with percentile groups, for the Bearded Collie for years of birth since 1990.

ELBOWS

Although participation in the BVA/KC Elbow Dysplasia Scheme is neither an ABS requirement nor recommendation, participation in the schemes is open to dogs of any breed. Elbow scores received by the 268 Bearded Collies scored since the Scheme launched in 1998 are shown in Table 3. Some 7.5% (20 of 268 Bearded Collies) of dogs of the breed participating in the Scheme were diagnosed with some degree of elbow dysplasia.

Table 3: Elbow scores and number of dogs receiving those scores since 1998 for the 268 Bearded Collies which have participated in the BVA/KC Elbow Dysplasia Scheme.

Elbow score	Number of dogs	Proportion
0	248	92.5%
1	12	4.5%
2	4	1.5%
3	4	1.5%

EYES

The breed is not currently on Schedule A or B for any condition under the BVA/KC/International Sheep Dog Society (ISDS) Eye Scheme. Schedule A lists the known inherited eye conditions in the breeds where there is enough scientific information to show that the condition is inherited in the breed, often including the actual mode of inheritance and in some cases even a DNA test. Schedule B lists those breeds in which the conditions are, at this stage, only suspected of being inherited. However, the BVA still records the results of dogs of other breeds which have participated in the scheme. The results of Eye Scheme examinations of Bearded Collies which have taken place since 2007 are shown in Table 4.

Table 4: Reports on Bearded Collies which have participated in the BVA/KC/ISDS Eye Scheme 2007-2016

Year	Number seen	Comments
2007	6 adults 0 litters	No conditions noted
2008	24 adults 1litter	No conditions noted
2009	38 adults 0 litters	4 – equatorial cataracts
2010	19 adults 2 litters	No conditions noted
2011	80 adults 1litter	No conditions noted
2012	14 adults 1 litter	1 – distichiasis 3 – PPM 2 – CEA/CH
2013	11 adults 1 litter	2 – cataract 1 - microphthalmos
2014	34 adults 2 litters	No conditions noted
2015	5 adults 5 litters	No conditions noted
2016	17 adults 0 litters	No conditions noted
2017	19 adults 0 litters	3 – post cataract 1 – nuclear cataract

In addition to these sightings report figures, the results of a BVA/KC/ISDS eye testing session held at the Bearded Collie Club Open Show on 7th April 2018 were available. In total 35 Bearded Collies were examined, of which 17 were over eight years of age. No cases of CEA were seen. Five cases of cataract were seen in dogs aged over eight years; it was considered most likely that these were age-related rather than hereditary.

American College of Veterinary Ophthalmologists

The American College of Veterinary Ophthalmologists (ACVO) consider the Bearded Collie to be predisposed to distichiasis, CEA/ (choroidal hypoplasia), corneal dystrophy, persistent pupillary membranes, cataract and retinal dysplasia (Genetics Committee of the ACVO, 2017). Between 2010 and 2018, 865 dogs of the breed were examined by the ACVO with prevalence data are shown in Table 5 alongside data from previous years. Overall, 74.9% (648 of 865) of dogs of the breed examined during this time had healthy eyes unaffected by any disease conditions. However, it is important to consider that the sample was quite small and the dogs were from America.

Table 5: ACVO examination results for the Bearded Collie, 1991 - 2018

Disease Category/Name	Percentage of Dogs Affected		
	1991-1999 (n= 1485)	2000-2009 (n=1733)	2010-2018 (n= 865)
Eyelids			
Distichiasis	0.5%	0.6%	1.4%
Cornea			
Corneal dystrophy	1.2%	1.3%	1.4%
Uvea			
Persistent pupillary membranes (iris to iris)	3.0%	4.6%	5.1%
Lens			
Cataract (significant)	8.1%	6.5%	7.1%
Retina			
Retinal dysplasia (folds)	1.4%	1.5%	0.6%

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

Breed Club Recommendations

There are not currently any Breed Club breeding recommendations listed on the Kennel Club's website for the breed.

Reported Caesarean Sections

When breeders register a litter of puppies, they are required 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 be an underrepresentation of the true proportion of caesarean sections undertaken in each breed
- It is accepted that the practise of reporting has generally increased in awareness since 2012, which correlates with the rise in caesarean sections across all breeds
- These data do not indicate whether the caesarean sections were emergency or elective

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 Bearded Collies registered per year and number of caesarean sections reported per year, 2008 to 2018.

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)
2008	104	0	0.00%	0.05%
2009	90	0	0.00%	0.15%
2010	98	1	1.02%	0.35%
2011	94	1	1.06%	1.64%
2012	74	3	4.05%	8.69%
2013	86	7	8.14%	9.96%
2014	64	8	12.5%	10.63%
2015	51	10	19.61%	11.68%
2016	52	6	11.54%	13.89%
2017	55	6	10.91%	15.00%
2018	42	6	14.29%	17.21%

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 23.9 was

reported (estimated using the rate of inbreeding over the period 1980-2014). An effective population size below 50 indicates the future of the breed may be considered to be at risk (Food & Agriculture Organisation of the United Nations, “Breeding strategies for sustainable management of animal genetic resources”, 2010).

Annual mean observed inbreeding coefficient (showing loss of genetic diversity) and mean expected inbreeding coefficient (from simulated ‘random mating’) over the period 1980-2014 are shown in Figure 10. As with most breeds, the rate of inbreeding was at its highest in this breed in the 1980s and 1990s. This represents a ‘genetic bottleneck’, with genetic variation lost from the population. However, since 2000 the rate of inbreeding has decreased, implying a slowdown in the rate of loss of genetic diversity (possibly through the use of imported animals). 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://cgjournal.biomedcentral.com/articles/10.1186/s40575-015-0027-4>.

The current breed average inbreeding coefficient is 15.0%.

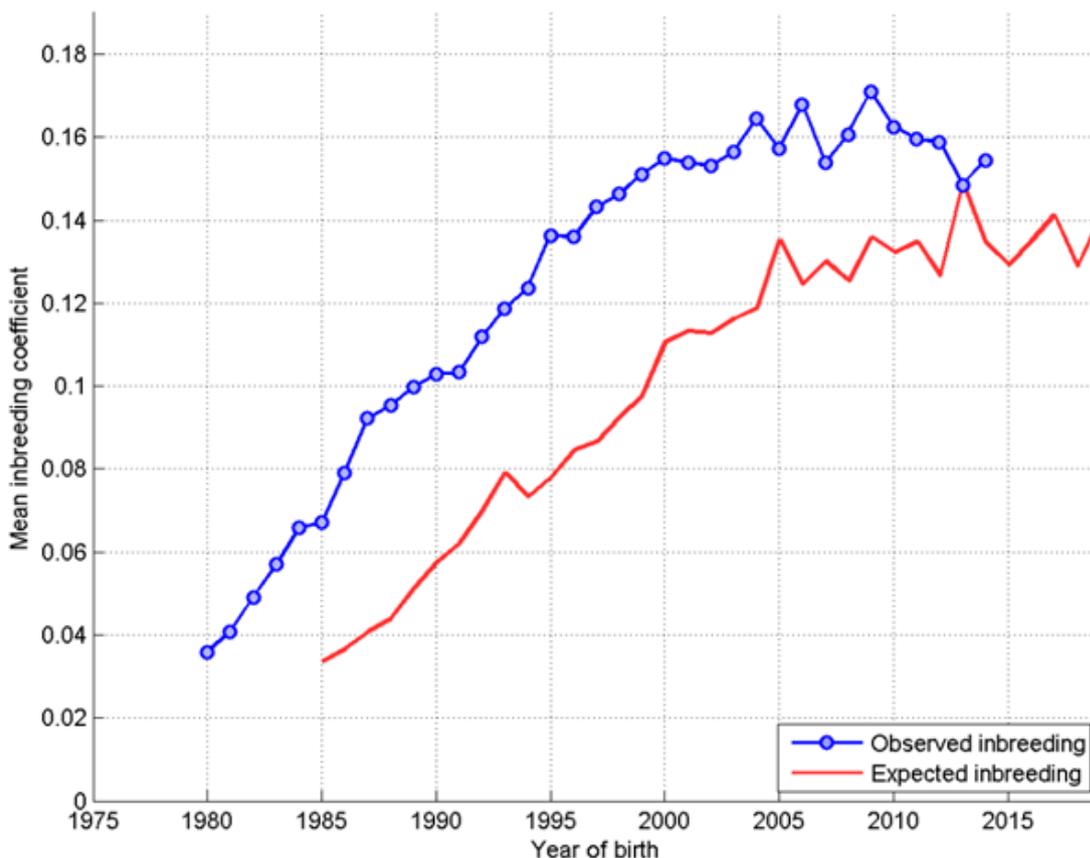


Figure 10: Annual mean observed and expected inbreeding coefficients.

Below is a histogram ('tally' distribution) of number of progeny per sire and dam over each of seven five-year blocks (Figure 11). 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 extensive use of popular dogs as sires in this breed.

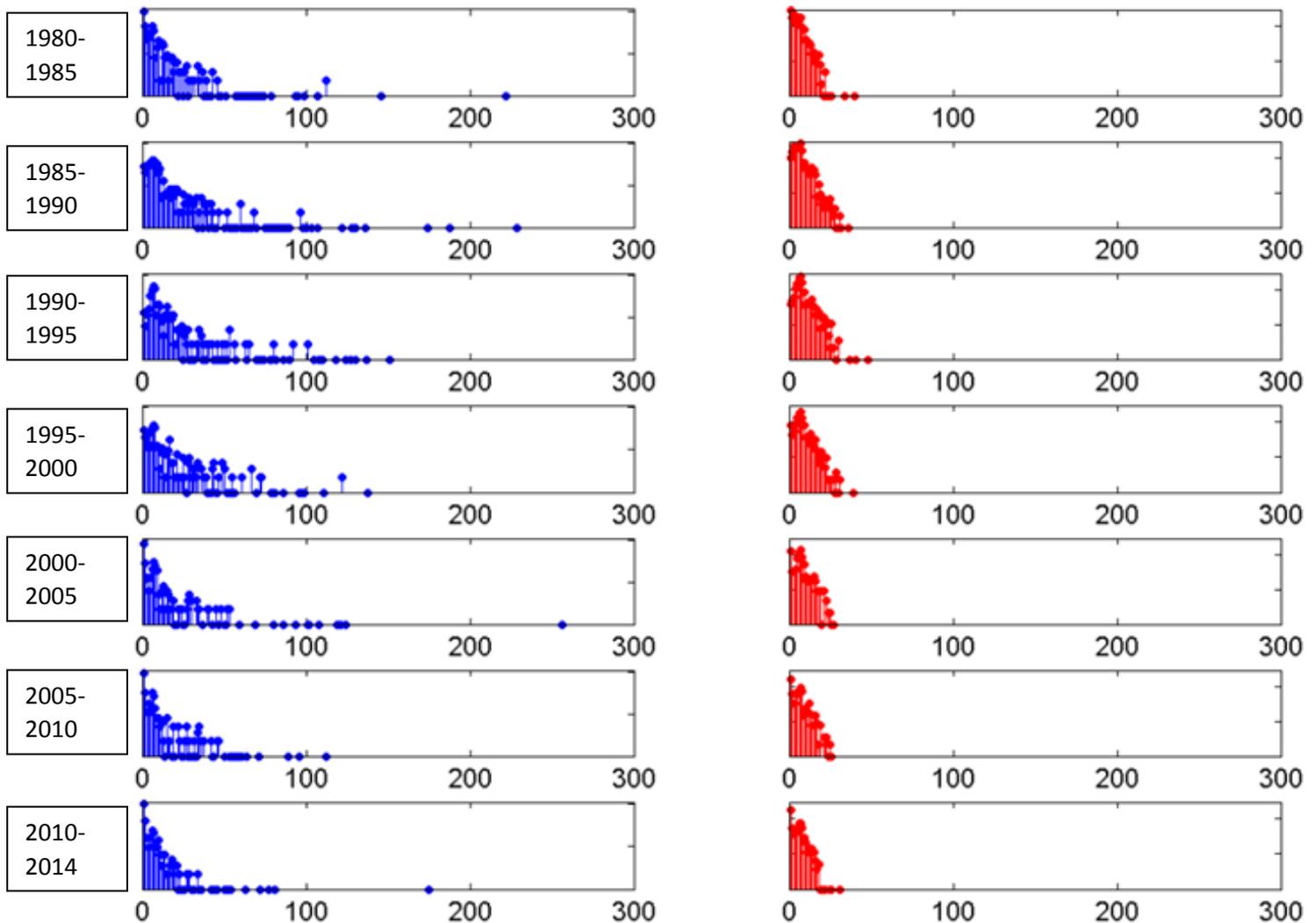


Figure 11: Distribution of progeny per sire (blue) and per dam (red) over 5-year blocks (1980-4 top, 2010-14 bottom). Vertical axis is a logarithmic scale.

Current research projects

The Bearded Collie is one of the breeds in the AHT's Give a Dog a Genome project; the health conditions given as concerns in the breed were Addison's disease, autoimmune haemolytic anaemia and SLO. An affected dog with Addison's disease

has been sequenced (the sample was provided by Professor Brian Catchpole at the RVC) and the RVC will be undertaking the data analysis.

Professor Catchpole at the RVC is leading research into Addison's disease in the breed, particularly looking at autoantibodies in the blood to see whether they can be used as part of diagnostic testing and potentially to identify dogs that have an autoimmune reaction before they develop clinical signs.

SECTION 2: PRIORITIES

A meeting was held with Bearded Collie breed club representatives on 1st June 2018 to discuss Section 1 of the BHCP and agree the priority issues for the health of the breed.

Reports of dermatological conditions in the Bearded Collie in the scientific literature were discussed. Three conditions were listed of which one, SLO, has been seen in the UK population. Although this has no prevalence estimates, SLO does appear in multiple evidence sources. The only endocrine condition listed was Addison's disease; as with SLO, it is considered to have an immune-mediated aetiology.

The musculoskeletal condition found for Bearded Collies in the literature review was hip dysplasia; there has been improvement in the hip scores received (figure 4) and in the EBVs of hip score (figure 5) showing that genetic progress has been made by the breed in the UK.

There were four neoplastic conditions; however there were no prevalence estimates for these. Considering ocular conditions, the American College of Veterinary Ophthalmologists describe the Bearded Collie as susceptible to a number of conditions, the results of their screening programme were included in the literature review for information. However nothing appears to have been reported at particularly high levels. Finally, urological conditions listed for the Bearded Collie were chronic kidney disease and urinary incontinence.

The 2004 and 2014 Purebred and Pedigree Breed Health Survey results were then reviewed and largely supported the findings of the literature review. The insurance data also supported the other evidence sources, with onychodystrophy, incontinence and Addison's disease as the top three conditions. The two breed health surveys, undertaken in 2012, 2018 and 2019, further backed up the findings mentioned elsewhere.

Genetic diversity measures were discussed in the group as the Bearded Collie has an estimated effective population of 23.9, however, when viewed in five year blocks there does appear to be a decrease in the rate of inbreeding, thus meaning a decreased rate of loss of genetic diversity. Nevertheless, this remains a priority for the breed at the moment with both a small gene pool and actual population. The most significant way to reduce the inbreeding coefficient is a reduction in the use of popular sires. This was discussed and the breed clubs have recently recommended that sires are to be used a maximum of twice per year to try and tackle this issue.

The group agreed from the information provided and their own experience that immune-mediated conditions, including Addison's and SLO, genetic diversity and CEA were the priorities for the Bearded Collie.

A meeting was held between the Breed Health Co-ordinator and Health & Research Co-ordinator on the 15th July 2019 to discuss the actions in the breed and health changes that have occurred following the last meeting. It was agreed that the priorities raised before were still a concern for the breed and that the breed and KC

are to continue the actions agreed upon last time, in particular monitoring research into Addison's and SLO, as well as monitoring elbow dysplasia and genetic diversity. Unfortunately the University of California Davis research into SLO and Addison's has not yet identified all of the causative regions for the disease, but has identified four risk haplotypes which suggest a link to disease manifestation, with the requirement for further investigation to identify the remaining loci, particularly within the UK population (Gershony et al, 2019). The breed will also continue to work alongside Dr Tom Lewis to establish appropriate breeding limits for the use of sires to combat any further reduction in genetic diversity.

SECTION 3: ACTION PLAN

- The breed clubs to continue to monitor the incidence of elbow dysplasia in the breed
- The breed clubs to repeat the breed health survey in 2020, with the Kennel Club to assist in dissemination
- The Kennel Club to monitor the Royal Veterinary College's Addison's research
- The breed clubs to encourage veterans to participate in the BVA/KC/ISDS Eye Scheme, with the potential to provide subsidisation for these individuals
- The Kennel Club to assist the breed clubs in determining sire usage limits for the current population size
- The Kennel Club will review progress with the breed representatives in July 2021