THE KENNEL CLUB
DOG HEALTH

Breed Health and Conservation Plan

Hungarian Vizsla

Evidence Base

BHCP/Version 1/April 2021

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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 number of Hungarian Vizslas registered by year of birth between 1990 and 2020 are shown in Figure 1. The trend of registrations over year of birth (1990-2020) was +91.7 per year (the mean number of registration increase per year, spread over this time period - with a 95% confidence interval of +81.7 to +101.8), reflecting the rapid rise in the breed's population during this time.

[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.]

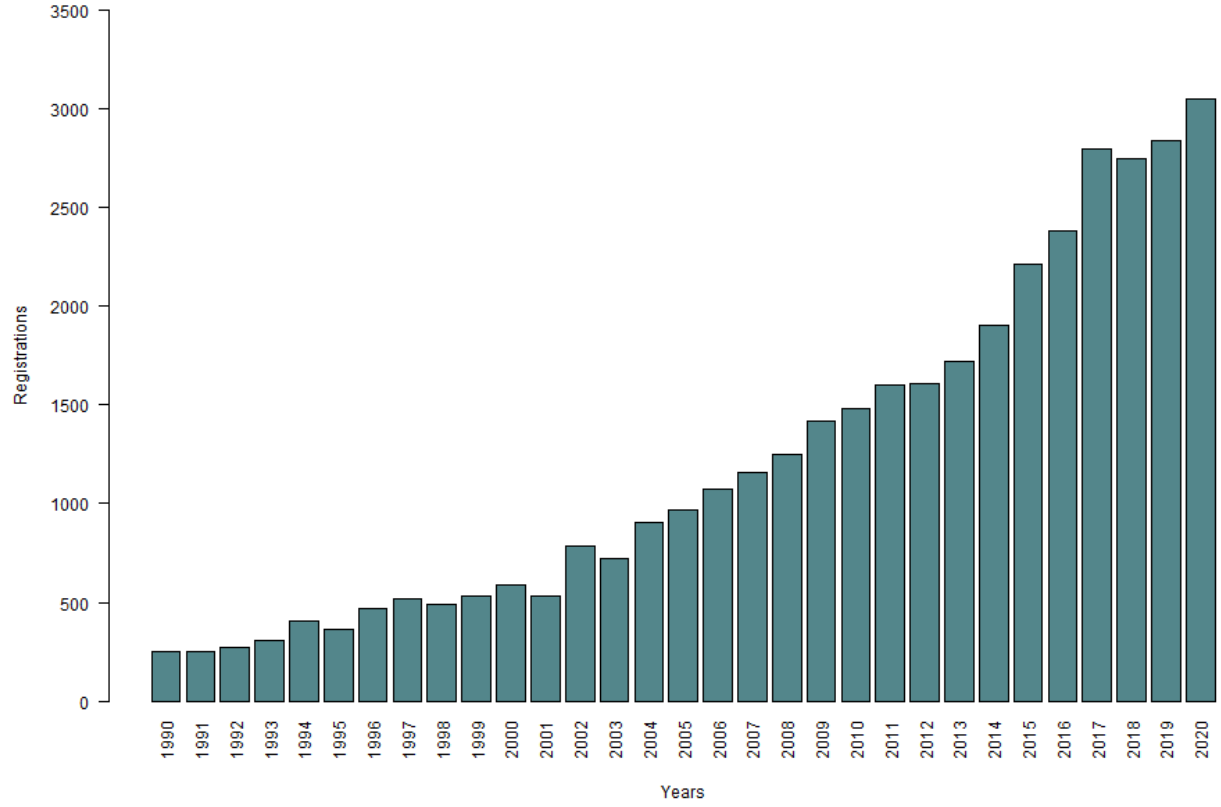

Figure 1: Number of registrations of Hungarian Vizslas per year of birth, 1990 - 2020

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 last Breed Health Coordinators' Annual Health Report was received in 2020 and yielded the following top health concerns:

1. Autoimmune disease
2. Cancers
3. Epilepsy

In terms of what the breed have done to tackle these health concerns, the breed had developed a working party of the clubs and rescue organisations, continued to collect data and supporting research being undertaken at the University of Manchester, and collecting and storing health data into a central database.

BREED CLUB HEALTH ACTIVITIES

The breed do not have a breed council but both breed club's websites give comprehensive health information on a number of conditions that can affect the breed:

- https://www.hungarianvizslaclub.org.uk/health/health-overview/
- https://www.vizsla.org.uk/health-information.html

A specific open register for Vizsla inflammatory polymyopathy (VIP – more information on page 7) has also been developed, which details the pedigrees of affected individuals and additional analysis: https://www.vizslahealth.net/polymyositis/pedigrees/

A trust fund has been recently developed, with the aim to further research understanding for genetic conditions affecting the breed, particularly immune-mediated: https://vizslahealthtrust.org.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 for all of the recognised Kennel Club breeds.

2004 Morbidity results: Health information was reported for 123 live Hungarian Vizslas of which 69 (56%) were healthy and 54 (44%) had at least one reported health condition. The most frequently reported specific conditions were lipoma (5 cases, 4.1% of all dogs), kennel cough/ infectious tracheobronchitis (5 cases, 4.1%), hair loss or alopecia (4 cases, 3.3%), dental disease (4 cases, 3.3%) and pyometra (3 cases, 2.4%).

2004 Mortality results: A total of 38 Hungarian Vizsla deaths were reported. The median age of death was 12 years and 11 months (min = 6 months, max = 17 years). The top causes of death by organ system/category for the breed were: cancer (28.9%, 11 deaths), old age (26.3%, 10 deaths), combinations (7.9%, 3 deaths) and behavioural (5.3%, 2 deaths).

2014 Morbidity results: Health information was reported for 441 live Hungarian Vizslas of which 229 (51.9%) reported no conditions and 142 (48.1%) had at least one reported health condition. The most frequently reported specific conditions were lipoma (23 cases, 5.2% prevalence), skin (cutaneous) cyst (18 cases, 4.1%), hypersensitivity (allergic) skin disorder (10 cases, 2.3%), skin lump/ lipoma (9 cases, 2.0%), skin cancer/ tumour (8 cases, 1.8%) and unspecified cancer (8 cases, 1.8%).

2014 Mortality results: A total of 49 deaths were reported for the breed, with a median longevity of 11 years. The most common causes of death were cancer – unspecified (7 deaths, 14.3%), liver tumour (7 deaths, 14.3%), unknown (4 deaths, 8.2%), old age (3 deaths, 6.1%) and old age combinations (3 deaths, 6.1%).

Vizsla Health Reporting Survey

A breed initiative has been in place for several years to allow owners to report any immune-mediated diseases affecting their dogs. A link to the survey can be found below, with analysis in the current data soon to be undertaken.

https://www.vizslahealth.net/online-survey/

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.

Cancer conditions

General: A literature review of breed predispositions to cancers and cancer-related mortality established the Hungarian Vizsla as having a high percentage of deaths due to cancer, with one study finding 46.7% (of just 15 dogs) of the breed dying due to cancer (95% CI 21.4 – 71.9) with a median age at death of 9.83 years (Dobson, 2013).

A further retrospective study on a large-scale looked at 2,505 Vizslas born between 1992 and 2008 to establish any risk between cancer and behavioural disorders with neutering status (Zink et al, 2014). The authors found that neutered dogs (both sexes) had a significantly increased odds of developing mast cell tumours (3.5 (95% CI 2.3 – 5.4)), lymphoma (4.3 (95% CI 1.9 – 9.7)), other cancers (5.0 (95% CI 3.6 – 6.8)) and fear of storms (4.1 (95% CI 2.8 – 6.0)). Similarly, females neutered under the age of 12 months had higher odds of developing haemangiosarcoma (11.5 (95% CI 3.5 – 38.5)), although females had a higher risk in general. The earlier the age at which a dog was neutered, the earlier the mean age of mast cell cancers, haemangiosarcoma, lymphoma, combinations of cancer, and behavioural disorders. However, it is important to remember that this study does not imply causation, and there are a number of confounding factors that lead to the progression of these cancers and behaviours. Similarly, neutering status has not been found to be associated with mast cell tumours in the breed in other large-scale studies (Shoop et al, 2015).

Lymphoma: An Australian study of 6,201 cases of lymphoma established the Hungarian Vizsla as having a slightly increased risk of disease, with an odds ratio of 1.9 (95% CI 1.2 – 2.9) (Bennett et al, 2018). However, no further papers supporting an increased risk in the breed could be found.

Dermatological conditions

Atopic dermatitis: A Hungarian study investigated the prevalence of atopic dermatitis in 600 dogs, using samples submitted to a veterinary hospital, of which 36 (6%) were

made up of Vizslas (Tarpataki et al, 2006). Of these 36 dogs, 22 showed a positive response to an intradermal allergy test (61.1%). Given that the breed made up 3.6% of the population of dogs in the city at the time of the study, and 6.0% of dogs in the patient population, the authors noted an over-representation of the breed. Regarding features of the disease in the breed, the majority of dogs showed clinical signs between the age of 6 and 12 months, with the most common signs being otitis externa, conjunctivitis and facial erythema (redness). Overall, 83.3% responded well to an elimination diet to identify the allergen responsible.

Immunological conditions

Immune-mediated haemolytic anaemia (IMHA): IMHA is a form of anaemia brought about through an inappropriate reaction of the immune system upon red blood cells, leading to clinical signs such as pale or yellow-tinged gums, fast breathing, weakness and lethargy, and collapse. An Australian study investigated several factors, including breed predisposition, for 110 dogs affected by the disease (McAlees, 2010). The Hungarian Vizsla was found to be over-represented, making up 2.7% (n=3) of affected dogs, and having an odds ratio for disease of 10.0 (95% CI 1.3 – 74.7).

Polymyositis/ Vizsla idiopathic inflammatory polymyopathy (VIP): This idiopathic (unknown cause) condition is characterised by clinical signs such as difficulties in swallowing, consequentially causing problems in drinking and eating, drooling, megaesophagus, significantly high levels of creatine kinase (an enzyme that is released from damaged muscles) masticatory muscle atrophy (loss of muscles around the jaw and head), and regurgitation (Haley et al, 2011; Tauro et al, 2015). The condition appears to be specific to Hungarian Vizslas and has been proposed to be due to an immune-mediated pathogenesis, with the first UK reports being published in 2008 (Foale et al, 2008). A larger UK study of 369 Vizslas (both from the UK and abroad) established 77 with a case history consistent with VIP, with a mean age of onset of 2.4 years (range 0.2 – 10.3 years) (Tauro et al, 2015). There appeared to be a slight over-representation of male dogs, but this was not found to be statistically significant. Concurrent immune-mediated diseases included atopic dermatitis (n=17), inflammatory bowel disease (n=9), keratoconjunctivitis sicca/ dry eye (n=3), immune-mediated polyarthritis (n=2), and one case of sebaceous adenitis and steroid-responsive meningitis arteritis (SRMA), respectively, further supporting the suggestion of an immune-mediated origin.

Regarding treatment, the authors stated that immunosuppressive treatment appeared to be effective in affected dogs, but inappropriate tapering of treatment due to a lessening in clinical signs resulted in an earlier relapse and mortality in 23% of treated cases. Earlier diagnosis appeared to improve the chance of successful treatment. Further, feeding little and often from raised bowls with appropriate food lessened the risk of aspiration pneumonia. However, the mean age at death for affected dogs was 6.4 years and survival time following diagnosis 3.9 years, with recurrence of clinical signs and aspiration pneumonia common causes for euthanasia/ death. The authors noted further work is needed to explore efficacy and limitations of different medications.

The authors also looked at breeding advice with respect to lowering the incidence of disease, and concluded that first-degree relatives of affected dogs should be avoided for breeding purposes. Further, association between expression of dog leukocyte antigen class II haplotypes (DLA – a set of genes responsible for the maintenance of the immune system) and disease in affected dogs was investigated, with the authors finding one particular DLA (DRB1*02001/DQA1*00401/DQB1*01303) to be significantly higher in affected dogs. Additionally, an association between increased haplotype frequency and degree of relatedness between dogs was found, with the authors advising that breeders should look to mate dogs with a lower inbreeding coefficient to lower risk in producing affected puppies.

A further study investigated any association between a DLA class II haplotype and risk of disease in the breed (Massey et al, 2013). A subset of dogs, including 29 cases, 93 unaffected dogs with a first degree affected relative, 44 dogs with a second degree affected relative and 46 dogs with no known affected relatives were included to scan for any frequent specific DLA haplotypes. One particular haplotype (DRB1*02001/DQA1*00401/DQB1*01303) was found to be significantly more frequent in cases (60%) compared to controls (52%), with an odds ratio of 1.92 (95% CI 1.05 – 3.50); which was further strengthened when compared with controls with no known history of disease (27%) (4.08, 95% CI 1.92 – 8.74). Over a third of affected dogs (34.5%) were homozygous for this DLA compared to just 8.7% of controls. The authors noted that the low penetrance of the risk haplotype indicated further environmental or genetic risk factors, and so should not be selected against in singularity, to prevent loss of diversity in an already restricted population.

Neurological conditions

Cerebellar cortical degeneration: This condition has been characterised in a number of breeds and results in progressive clinical signs such as cerebellar ataxia, tremors, response deficits and dysfunction in the central vestibular region (apparatus within the inner eye that helps maintain balance) – leading to signs such as nystagmus (involuntary eye movements) and loss of balance (Fenn et al, 2016). A UK study investigated samples from two 3-month old affected siblings and analysed using whole genome sequencing to establish any causative mutation. A variant in the *SNX14* gene was established in these dogs, and proposed as inherited in an autosomal recessive mode of inheritance. A further 133 dogs of the breed were sequenced, with three heterozygotes (carriers) identified, supporting this inheritance pattern. A DNA test is available for this condition in the breed.

Idiopathic epilepsy: An American study investigated the clinical characteristics and inheritance of idiopathic epilepsy in the breed, based on the medical records and owner survey of 29 affected dogs, 74 unaffected siblings and 41 parents (Patterson et al, 2003). In total, 79% of affected dogs showed partial onset seizures, with clinical signs including limb tremors (96% of 23 dogs), staring (70%), pupil dilatation (57%), salivation (52%), head tremors (31%), and facial twitching (19%). Dogs had a median age of onset of 3 years. Pre-ictal behaviour (before onset of a seizure) included restlessness and attention seeking up to a day before onset; similarly, post-ictal included disorientation, weakness, and wandering, with some in combination

lasting up to 20 minutes. The authors noted a pronounced familial aggregation, with the estimated segregation frequency suggesting an autosomal recessive mode of inheritance, but could not rule out polygenic inheritance.

Ocular conditions

Pectinate ligament dysplasia (PLD)/ goniodysgenesis: PLD is due to abnormalities in the tissues surrounding the iridocorneal angle, leading to a restriction in the flow of aqueous fluid and a consequential rise in pressure, leading to vision deterioration and pain. To determine the prevalence of PLD in the breed within the UK, 112 Hungarian Vizslas were examined, of which 77 (68.8%) were female and 35 (31.3%) male. In total 38 dogs were found to have some degree of dysplasia, with 22 (19.6%) grade 1, 14 (12.5%) grade 2 and 2 (1.8%) grade 3. A weak association was found between PLD and age.

VETCOMPASS

The Kennel Club work closely with VetCompass at the Royal Veterinary College. VetCompass is a broad welfare research programme that collects anonymised clinical information from more than 1800 UK veterinary practices and includes over 7.5 million dogs. VetCompass research can be used to identify common breed-specific conditions, or condition-specific concerns which affect a range of breeds. A breed specific VetCompass paper has not been published for the Hungarian Vizsla, however the breed was included in the study shown below.

Renal Conditions

Alabama rot: Whilst the aetiology behind cutaneous and renal glomerular vasculopathy (otherwise known as Alabama rot) has not yet been confirmed, cases affecting the Hungarian Vizsla have made up 5.9% (n=6) of the total cases. In a paper investigating VetCompass data between 2012 and 2017 the breed was proposed as being at a higher risk of contracting the disease (Stevens et al, 2018), with an odds ratio of 40.98 (95% CI 16.34 – 102.75). However, it is important to consider that only a very small number of dogs were included in this study (n=103), so the results should be interpreted cautiously, and the confidence interval for the breed is incredibly vast, with the true odds ratio lying anywhere between the upper and lower interval.

Urinary incontinence: A case-control study looked at the relationship between spaying and urinary incontinence in 333,910 bitches (Pegram et al, 2019). The authors found the Hungarian Vizsla to have the highest odds of disease, with this being 11.40 (95% CI 1.43 – 90.97), however this was based on just one control and six cases. The authors noted that the findings supported spaying as a major risk factor for urinary incontinence, but that the age at which the spay occurs does not appear to have as much clinical importance.

INSURANCE DATA

UK Agria 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.

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.

Insurance data were available for Hungarian Vizslas insured with Agria UK. 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. 'Exposures' are equivalent to one full policy year; in 2017 (June 2016 – July 2017) there were 2,022 free exposures, 842 full exposures and 651 claims, in 2018 (July 2017 – June 2018) these figures were 2,451, 939 and 718 respectively.

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 Hungarian Vizslas insured on full policies with Agria UK

Condition	**Number of settlements**
Hypersensitivity (allergic) skin disorder (unspecified)	33
Atopy finding	33
Lameness finding	21
Gastroenteritis	20
Tail injury	17
Adenocarcinoma - apocrine adenocarcinoma of anal sac	16
Foreign body - intestinal small	11
Foreign body - gastric (stomach)	10
Intussusception intestinal (unspecified)	8
Cruciate ligament rupture - caudal and cranial	4

Swedish Agria Data

Swedish morbidity and mortality insurance data was also available from Agria for the Hungarian Vizsla. Reported rates are based on dog-years-at-risk (DYAR) which take into account the actual time each dog was insured during the period (2011-2016), for example one DYAR equates to one full year of insurance. The number of DYAR for Hungarian Vizslas in Sweden during this period was 500 < 1,000 so the results should be interpreted with caution.

The full Swedish insurance results are available through https://dogwellnet.com/, but key findings are reported below.

Swedish Agria insurance morbidity data

The most common specific causes of veterinary care episodes (VCEs) for Agria-insured Hungarian Vizslas in Sweden between 2011 and 2016 are shown in Figure 2. The top five specific causes of VCEs were vomiting/ diarrhoea/ gastroenteritis, clinical signs of pain during locomotion, skin tumours, teeth disorder and skin trauma.

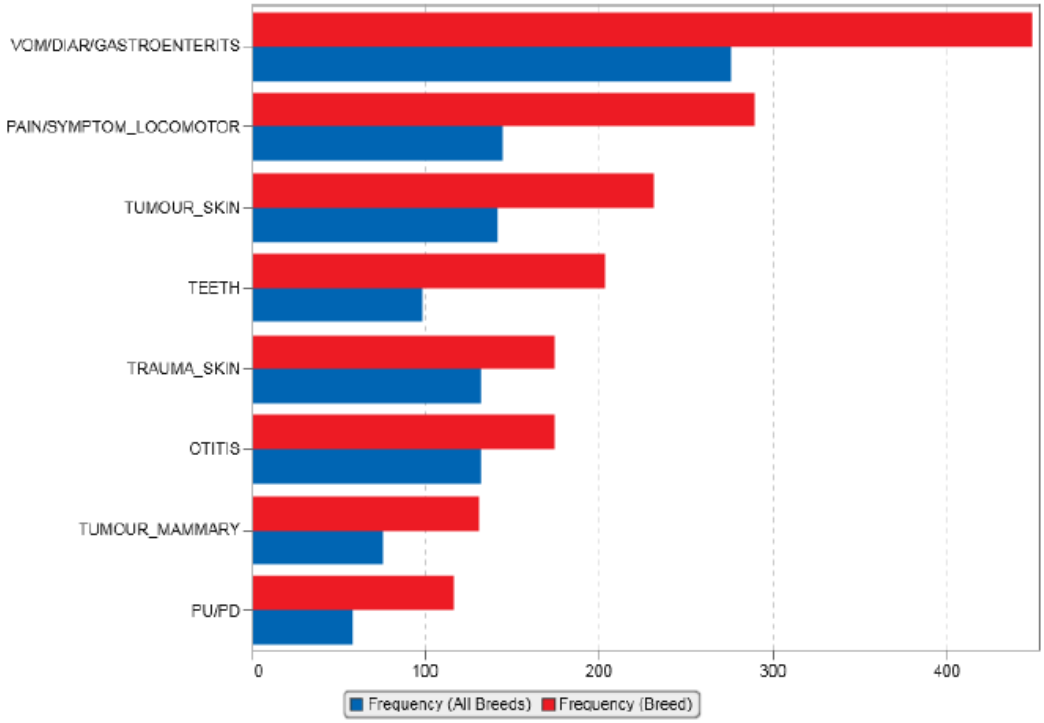

Figure 2: The most common specific causes of VCEs for the Hungarian Vizsla compared to all breeds in Sweden between 2011 and 2016, from Swedish Agria insurance data.

The specific causes of VCEs ordered by relative risk are shown in Figure 3 for the Hungarian Vizslas. In this analysis, the top five specific causes of VCEs ordered by relative risk were teeth disorder, polyuria/ polydipsia, locomotory pain, mammary tumour and skin tumour. Rare conditions that occur sporadically may appear as a high relative risk; which may apply to some of these conditions.

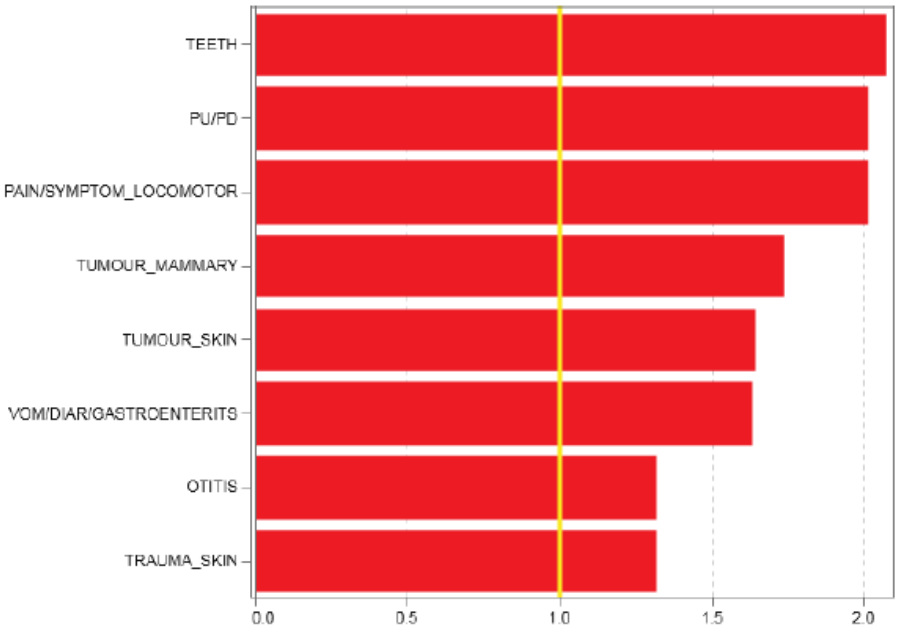

Figure 3: The specific causes of VCEs for the Hungarian Vizsla ordered by relative risk compared to all breeds in Sweden between 2011 and 2016, from Swedish Agria insurance data. The yellow line indicates the baseline risk for all breeds.

BREED WATCH

The Hungarian Vizsla is a category 1 breed, therefore it is not currently mandatory for judges to submit a health monitoring form when judging this breed at championship certificate level. No optional health reports have been received for the breed.

PERMISSION TO SHOW

As of the 1st January 2020 exhibits for which permission to show (PTS) following surgical intervention has been requested will no longer be published in the Breed Record Supplement and instead will be detailed in BHCPs, and a yearly report will be collated for the BHC. The PTS received in the past five years (excluding neutering) are shown in Table 2 below.

Table 2: Permission to show granted for Hungarian Vizsla between 2015 and 2019.

Surgical alteration	2015	2016	2017	2018	2019
Cruciate Ligament (rupture)		3			
Full tail amputation		1			
Tail Docked Overseas			1		
Tail Partially Amputated			1		
To have the Working Dog's Tail Legally Docked		6		3	3
Umbilical Hernia		1			

ASSURED BREEDER SCHEME

Currently within the Kennel Club (KC)'s Assured Breeders Scheme it is required that all breeding stock undergo the following prior to breeding:

- Hip tested under the British Veterinary Association (BVA)/ Kennel Club (KC) Hip Dysplasia Scheme
- Eye testing under the BVA/KC/ International Sheepdog Society Eye Scheme

There are also the following recommendations currently available for the breed:

- Bitches under two years not to produce a litter
- Bitches not to produce more than one litter within a 12-month period

The breed clubs also recommend elbow scoring under BVA/KC Elbow Dysplasia Scheme.

DNA TEST RESULTS

There is a DNA test for Cerebellar Ataxia (CA), however at this time results are not recorded by the Kennel Club.

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 involves collaboration between the breed clubs and the Kennel Club in order to validate the test's accuracy.

CANINE HEALTH SCHEME RESULTS AND ESTIMATED BREEDING VALUES

Participation in the BVA/KC Canine Health Schemes are open to dogs of any breeds regardless of whether the scheme comes under an ABS requirement or recommendation.

HIPS

In the past 20 years, 3,465 dogs of the breed have been hip scored under the scheme, with a 15-year and 5-year median hip score of 11 (range 0-95 and 4-95 respectively). The mean hip score for the breed is shown in Figure 4 below, with a very slight improvement seen during this period of time.

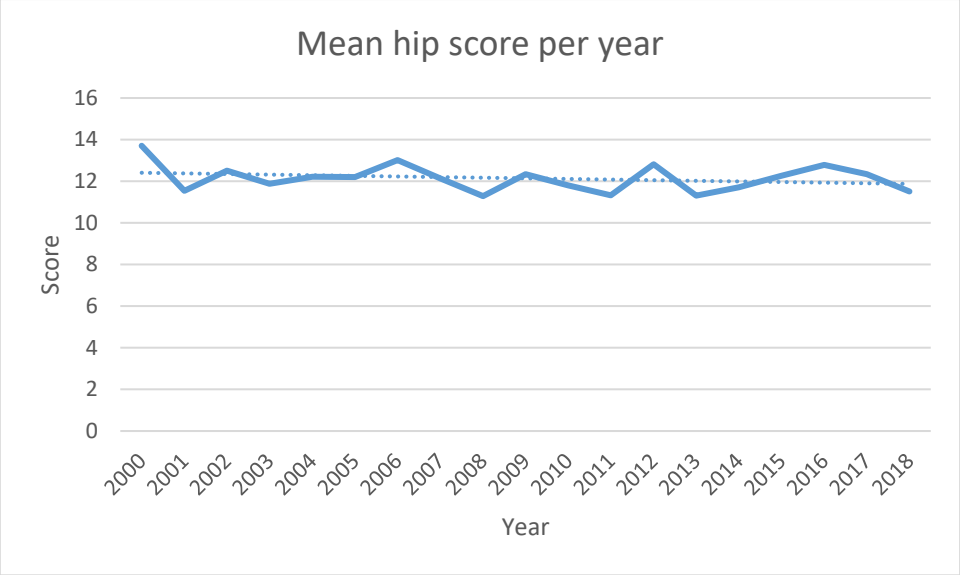

Figure 4: The mean hip score for the Hungarian Vizsla between 2000 and 2018.

Similarly, the proportion of registered dogs with a known hip score was analysed over time, with this having notably decreased (Figure 5). This could be due to the relatively fast growth in the breed's population and the rise in inexperienced or unscrupulous breeders using untested dogs to suit demand.

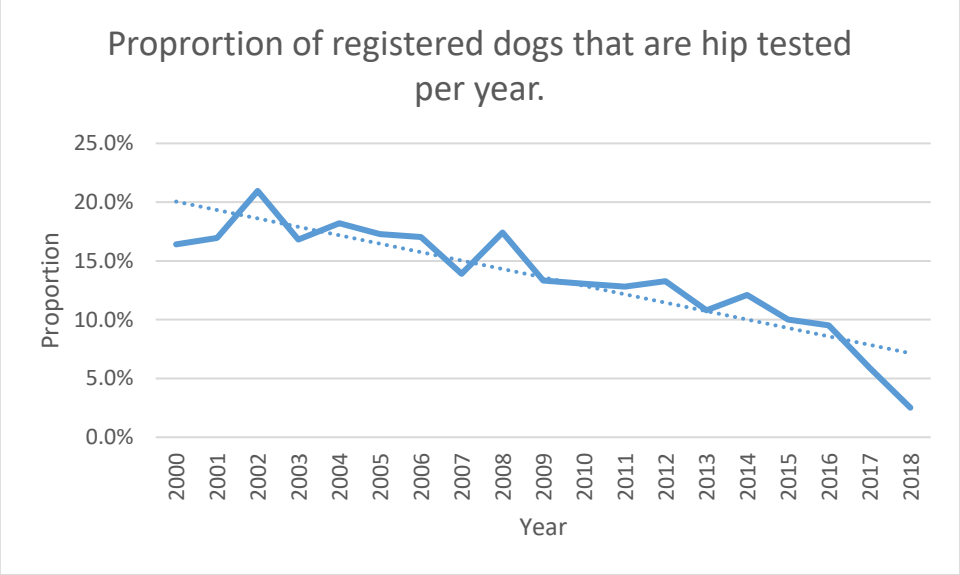

Figure 5: The proportion of registered Hungarian Vizslas with a known hip score per year.

EBVs are available for hip scores in this breed. Figure 6 shows the five year rolling trend in EBVs by year of birth in the Hungarian Vizsla. During this period the EBVs have increased, indicating an increase in genetic risk of hip dysplasia, as determined by the BVA/KC hip score, which as noted above, could be due to the rapid increase in popularity of the breed and unscrupulous breeders using untested or poorly tested dogs to suit demand.

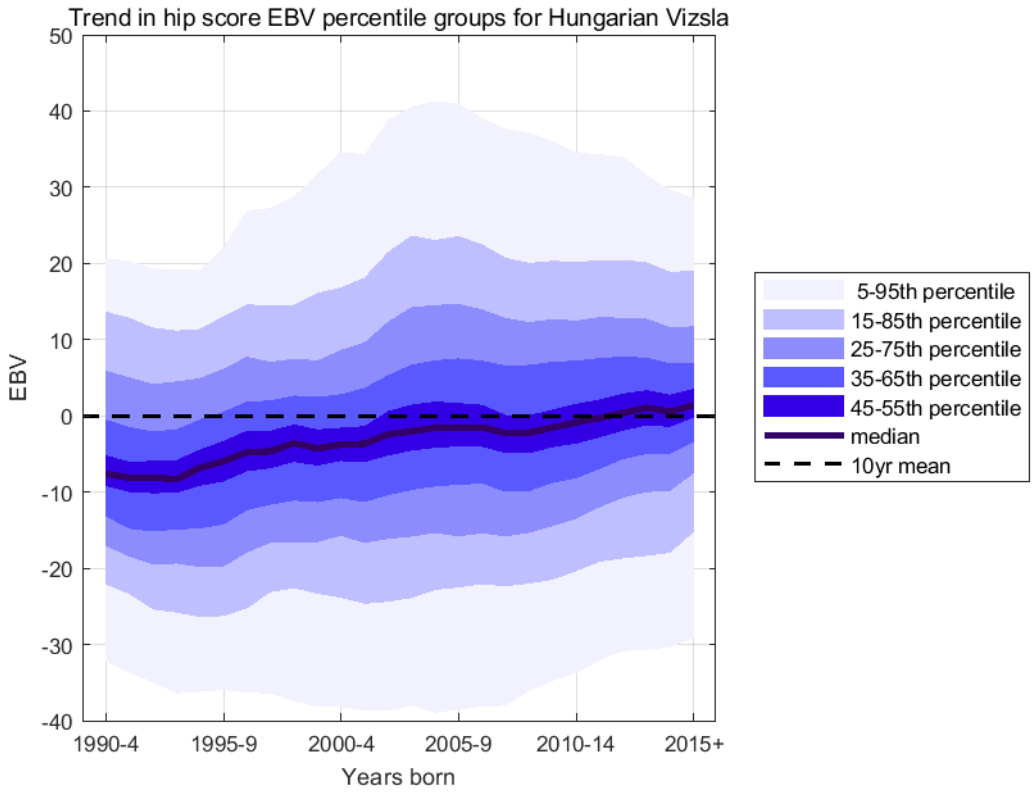

Figure 6. A diagram portraying the trend in hip Estimated Breeding Values for Hungarian Vizslas between 1990 and 2015.

ELBOWS

A total of 419 Hungarian Vizslas have been tested in the past 20 years (as of August 2020), with the count of dogs and their respective scores given in Figure 7 below. In total, some 7.2% of dogs (n=30) were graded with a dysplastic score (grade 1 or above).

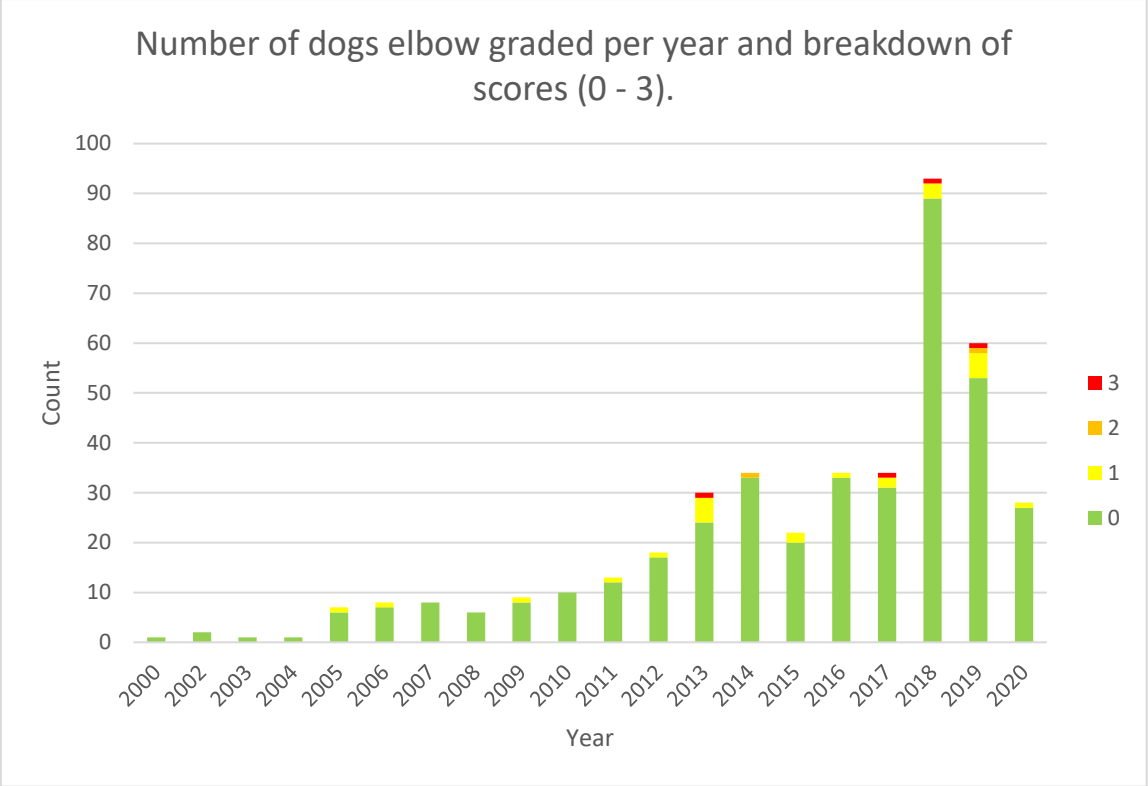

Figure 7: Number of Hungarian Vizslas elbow graded per year and the respective elbow scores (green = grade 0, yellow = 1, amber = 2, and red = 3). Note that this report was produced in August 2020 and does not portray the full year.

EYES

The Hungarian Vizsla is currently on the BVA/KC/International Sheepdog Society (ISDS) Known Inherited Ocular Disease List (KIOD - formally known as Schedule A) for the following condition:

- Pectinate ligament abnormality (PLA)/ goniodysgenesis/ primary glaucoma

KIOD 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.

The breed was only added to KIOD in January 2020, therefore to date only 16 dogs have undergone gonioscopy to test for this condition. Of these dogs, 10 (58.8%) were grade 0, four (23.5%) grade 1 and two (11.8%) grade 2.

As well as this, the scheme is open to dogs of any breed and the findings are recorded in the annual sightings report. The comments made by ophthalmologists to since 2012 are shown in Table 3 below.

Table 3: Sightings reports for Hungarian Vizslas examined since 2012.

Year	Number examined	Comments
2012	26 adults	3 – goniodysgenesis
2013	31 adults	3 – persistent pupillary membranes (PPM) 1 – goniodysgenesis
2014	28 adults 1 litter	2 – PPM 2 – goniodysgenesis Litter – no comments
2015	64 adults	1 – PPM 2 – other cataract
2016	50 adults	No comments
2017	42 adults	3 – PPM 2 – persistent hyperplastic primary vitreous (PHPV) 1 –posterior polar subcapsular (PPSC) cataract 2 – post cataract
2018	72 adults 1 litter	No comments
2019	*Awaiting report*	

AMERICAN COLLEGE OF VETERINARY OPHTHALMOLOGISTS (AVCO)

Throughout 2015 to 2019, 1,322 Hungarian Vizslas were examined for ocular disorders under AVCO. The resultant prevalence data is shown in Table 4 below, alongside that for previous time periods, for conditions affecting more than 1% of the examined population. Overall, 81.2% (1,074 of 1,322 dogs) of Hungarian Vizslas examined between this time had normal eyes unaffected by any condition.

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

Table 4: ACVO examination results for the Hungarian Vizsla, 1991 - 2019

Disease Category/Name	Percentage of Dogs Affected	
	1991-2014 (n=2,672)	**2015-2019** (n=1,322)
CORNEA		
Corneal dystrophy	1.4%	1.4%
UVEA		
Persistent pupillary membranes (iris to iris)	2.1%	1.7%
Persistent pupillary membranes (lens pigment foci/ no strands)	2.6%	7.0%
LENS		
Significant cataracts (summary)	3.9%	3.6%

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

REPORTED CAESEAREAN 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.
- In all breeds, there was an increase in the number of caesarean sections reported from 2012 onwards, as the Kennel Club publicised the procedure to vets.

The number of litters registered per year for the Hungarian Vizsla breed for the past 10 years are shown in Table 5.

Table 5: Number and percentage of litters of Hungarian Vizslas registered per year and number of caesarean sections reported per year, 2009 to 2019.

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)*
2009	203	0	0.00%	0.15%
2010	211	0	0.00%	0.35%
2011	217	0	0.00%	1.64%
2012	222	13	5.86%	8.69%
2013	228	14	6.14%	9.96%
2014	256	16	6.25%	10.63%
2015	300	18	6.00%	11.68%
2016	309	13	4.21%	13.89%
2017	379	19	5.01%	15.00%
2018	375	21	5.60%	17.21%
2019	375	21	5.60%	15.70%

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 2020, an estimated effective population size of **N/A** was reported (estimated using the rate of inbreeding over the period 1980-2020), implying an increase in genetic diversity during this time.

Annual mean observed inbreeding coefficients (showing loss of genetic diversity) and mean expected inbreeding coefficients (from simulated 'random mating') over the period 1980-2020 are shown in Figure 8. The rate of inbreeding for the breed appears to have peaked from 2000, and has rapidly decreased since, possibly due to the rapid rise in the breed's numbers. The blurred region of the graph depicts that the true value lies within this area.

For full interpretation see Lewis et al, 2015 https://cgejournal.biomedcentral.com/articles/10.1186/s40575-015-0027-4.

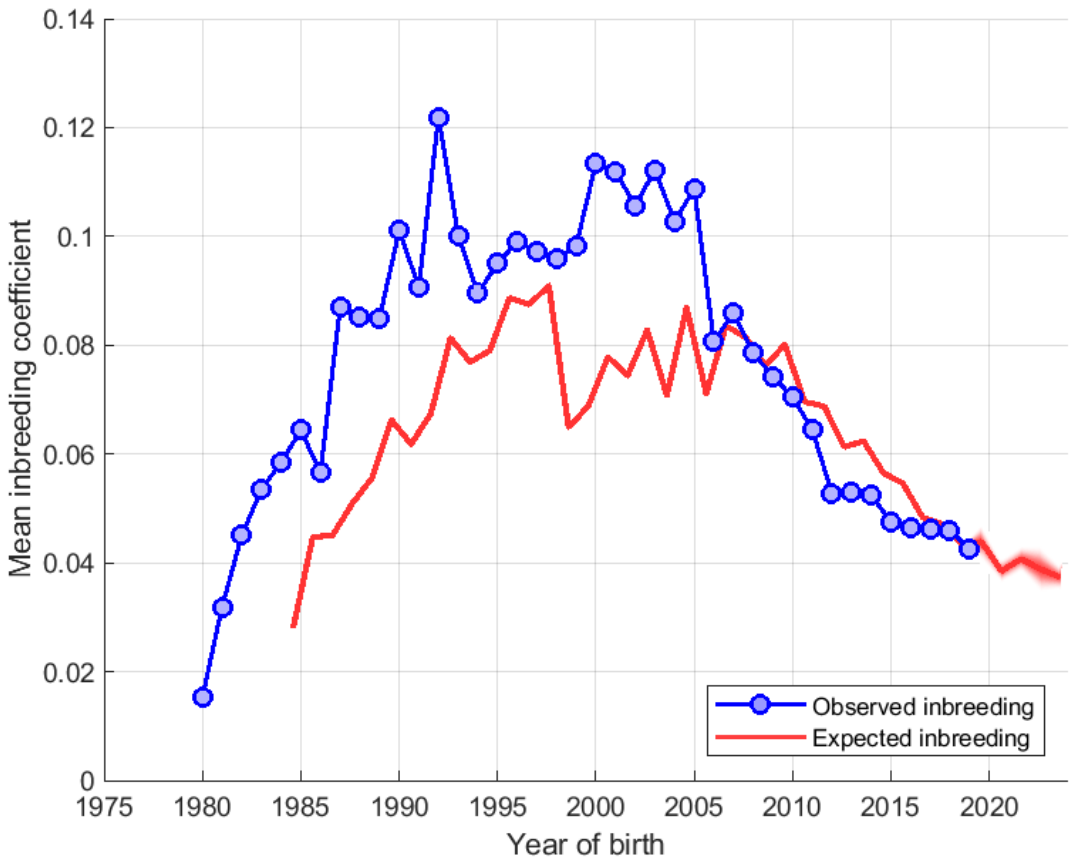

Figure 8: Annual mean observed and expected inbreeding coefficients

Below is a histogram ('tally' distribution) of number of progeny per sire and dam over each of eight 5-year blocks (Figure 9). 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 is only mild use of popular sires in the breed at this time.

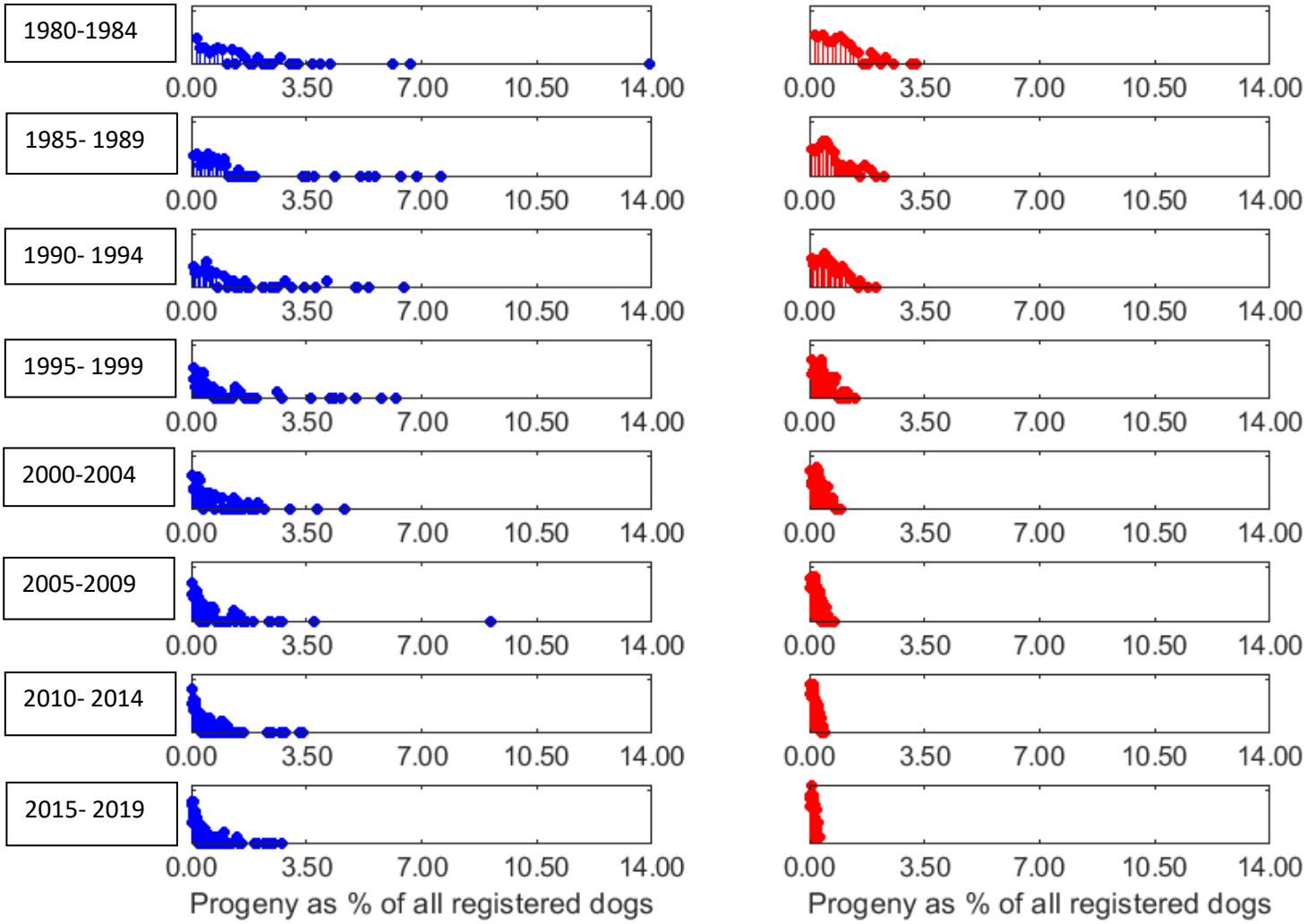

Figure 9: Distribution of progeny per sire (blue) and per dam (red) over 5-year blocks (1980-4 top, 2010-14 bottom). Vertical axis is a logarithmic scale.

CURRENT RESEARCH PROJECTS

The breed have been collaborating with the Animal Health Trust to try to determine the genetic basis for epilepsy in the breed, following the closure of the trust it is hoped that this work can be continued at the University of Cambridge.

International work has also been underway to collect samples from VIP affected dogs, with the aim to identify genetic markers for disease. An ongoing study is being undertaken at the University of Manchester (Centre for Integrated Genomic Medical Research) which has been supported by the Hungarian Vizsla Welfare Charity. DNA samples can be submitted here: https://www.veterinary-neurologist.co.uk/Vizsla_Polymyosits/

The breed has also been working with the University of Nottingham regarding autoimmune conditions.

PRIORITIES

Correspondence between the breed representatives and the Kennel Club was undertaken in January 2021 to discuss the evidence base of the BHCP and agree the priority issues for the health of the breed. The group agreed from the evidence base that the priorities for the Hungarian Vizsla were:

- Unregulated over breeding
- Autoimmune illnesses
- Epilepsy

ACTION PLAN

Following the 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 Hungarian Vizsla. Both partners are expected to begin to action these points prior to the next review.

Breed Club actions include:

- The Breed Clubs to continue to engage in research regarding VIP and autoimmune disease, with the Kennel Club to assist in recruitment of dogs where needed.

- The Breed Clubs to continue to collect information for dogs affected by VIP into a central database.

- The Breed Clubs to continue to encourage hip and elbow scoring in breeding stock.

Kennel Club actions include:

- The Kennel Club to continue to monitor epilepsy and autoimmune disease research and any projects where the breed could be included.

- The Kennel Club to keep the breed informed as to the breed-specific epilepsy research, now hoped to be undertaken at the University of Cambridge.

- The Kennel Club to share the reporting database for immune-mediated concerns on its website.

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