

SHORT COMMUNICATION

PROBLEMS IN COOPERATION WITH BREEDERS AND DOG OWNERS ON THE EXAMPLE OF ENTROPION FREQUENCY ESTIMATION IN POLISH HOUNDS

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Abstract. Entropion is a rolling of the eyelid inward toward the eye. It is fairly common condition in a wide variety of dog breeds and its mode of inheritance is not well understood. Entropion has been also documented in the population of Polish Hounds. The current size of the population is estimated at 1000 dogs. The Polish Hound is a breed with low genetic variation and high imbalance of founder contributions to the gene pool of the present population. The first study on entropion in Polish Hounds performed in Poland in 2002 showed that only 29 out of 100 dogs examined were healthy. Further studies revealed that 17 out of 74 dogs had entropion. The aim of this research was to analyze the incidence of entropion in the population of Polish Hounds. In total, 158 letters were sent out to the breeders and owners of Polish Hounds to solicit medical information about the condition of dogs' eyelids. Overall, we only obtained information on 19 dogs from 18 persons. The conclusion is that Polish Hound breeders and owners, and even the management of the Polish Hound Club are not interested in giving information about the cases of entropion and probably for economic reasons, elimination of affected animals from breeding. Lack of interest of breeders and dog owners in cooperation in this area makes the studies on tracing this defect inheritance in Polish Hounds impossible.

Key words: *Canis lupus familiaris*, dog, entropion, Polish Hound

INTRODUCTION

The Polish Hound is one of the five Polish breeds of dogs. It is a breed of hunting dogs (FCI No 52), but the majority of representatives are used as a companion dog. The current population of Polish Hounds is estimated at 1000 animals, and is relatively highly inbred [Pyziak 2006, Głazewska 2008]. The breed descended from just 21 founders, but not all founder lines are still represented in the population; only 4 female lines (out of 15) and 2 male lines (out of 6) are continued [Pyziak 2006].

The recent history of the breed began in 1959 when Piotr Kartawik brought 4 dogs (Bartek, Burzan, Zorka and Czita) from the vicinity of Nowogródek to Wrocław and established the kennel from the Eastern borderlands of Poland. A dog from his breeding stock, Obal, was used by Jerzy Dylewski in 1964 to create the breed standard. In 1964 the Polish Hound breed was recognized by FCI (FCI no 52) [Kaźmiński 2009], and the breed standard was updated in 1980. In 1967, Kartawik's kennel had 9 dogs, which exhibited stronger build than the present representatives of the breed. After Kartawik's tragic death in the late 1960 his dogs went into the hands of hunters [Musiał 2013]. The next matings were improperly performed. In 1967, 42 dogs and 59 bitches were registered, but dentition defects, atypical heads or coat colour, and excessive nervousness were quite common [Ściesiński 2009]. The Polish Hound and Polish Hunting Dog Club was established in the late 1970s. The Introductory Registry for the Polish Hound has been kept since 1959 to 24 October 2010 in aim to enrich the gene pool of the breed. In the Introductory Registry were entered dogs judged by an international judge and with confirmed breed requirements.

The actual number of Polish Hounds is not easy to determine due to the lack of a Poland-wide database, managed by the Polish Kennel Club and available to all. Another difficulty is that not all dogs from a litter are registered by the Club. However, data of the Polish Kennel Club indicate that about 530 animals were registered between 1970 and 2002 [Pyziak 2006]. The current number of hounds is estimated at 1000 and puppies are born in 10 to 20 litters per year (Polish Hound and Polish Hunting Dog Club, <http://www.ogaryigoncze.pl>). Between 2000 and 2012, a total of 216 litters were born. The number of dogs with stud rights varied from 60 (Polish Kennel Club, <http://www.zkwp.pl>) to 62 (bulletin of the Polish Hound and Polish Hunting Dog, 2012). In Poland the majority of hounds are kept in the vicinity of Warsaw, Rzeszów, Poznań, Kraków and Łódź [Pyziak 2006]. The Polish Hound dogs are bred/kept in most European countries, and as far as in Canada, Mexico, Argentina, and the United States. The largest number of Polish Hounds kept abroad, around 100 is found in Germany.

Entropion refers to inversion of the eyelid margin, and results from relaxation of the tarsus and palpebral ligaments. This leads to chronic irritation of the

eyeball and causes ulcerations, pain and lacrimation [Renwick 2007, Read and Broun 2007]. The condition has been observed in humans and also in other animal species [Allbaugh and Davidson 2009, Williams and Kim 2009, Donnelly et al. 2014]. It is common to many breeds of dogs, including the Polish Hound. Entropion is a genetically determined defect with clear breed predispositions, but its mode of inheritance is complex [Gelatt 1991, Bedford 1999]. Depending on the breed, entropion is usually diagnosed before the dog reaches its first birthday. Turner [2011] reports that the condition usually occurs in dogs between 4 and 12 months of age, but in the Shar Pei the onset may be soon after the eyelids open (2–3 weeks of age). According to Barnett [1976], the first symptoms of entropion appear between a few weeks and a few months of age, sporadically later than in the first year of life. Turner [2011] reports the case of a litter of Bloodhound puppies, in which changes were observed right after the eyelids opened and the puppies needed a correction at the age of 5 weeks. Ceregrzyn [2008] reports that the condition is usually present by six months of age or between the first and second year of life. According to Niemand and Suter [2003] entropion occurs during the first year of life or early in the second year. Typically, entropion is treated by surgical correction of the eyelids [Gelatt 1991].

Occurrence of entropion condition in Polish Hounds has been discussed on various message boards for many years. Łuczak [2002] showed that out of 100 of examined Polish Hounds, over 70% were affected with entropion. A later study revealed entropion in 17 out of 74 examined dogs [Balicki 2012]. Considering the seriousness of the problem, the present study was performed with the largest possible number of Polish Hounds to analyze the incidence of entropion in the population of Polish Hounds.

MATERIAL AND METHODS

Questionnaire survey of Polish Hound owners

In order to investigate the incidence of entropion in the population of Polish Hound dogs, a total of 158 letters were sent out to breeders and owners of this breed. The owners came mainly from Poland, but also from Germany, Slovakia, and the Czech Republic. The owners were asked (in their native language) to provide information if their dog has normal/abnormal eyelids and has undergone eyelid correction; this information had to be confirmed in writing by a veterinary doctor. The dog breeders and owners were also asked to send the pedigrees and photographs of their Polish Hounds. The requests were sent in July 2012 and the addresses of dog breeders and owners were obtained from exhibition catalogues. On 5 July 2012, the letter was additionally published on the Polish Hound forum

[<http://www.ogarkowo.pl>] and handed to Polish Hound breeders and owners during the International Dog Show held in Warsaw between 7 and 8 July 2012. The letter was also sent to the Polish Hound and Polish Hunting Dog Club with a request to provide statistical information concerning the number of dogs that were registered in the past 10 years, the number of litters born in the past 10 years, the number of dogs registered in the Introductory Registry, and the number of litters sired by the dogs from the Introductory Registry.

Data analysis

It was also planned to prepare a pedigree database of Polish Hound dogs using Microsoft Excel (2010). It was our intention to create the database based on the pedigrees sent by dog owners and the information from the pedigree database created by the breeders and owners, which is available at <http://ogarpolski.info.pl>

RESULTS AND DISCUSSION

Evaluation of entropion incidence in Polish Hounds

The information on Polish Hounds received back from dog owners and breeders was scarce. No response was obtained from the Polish Hound and Polish Hunting Dog Club despite repeated requests. Overall, we obtained the data only on 19 dogs of which 4 have undergone eyelid correction. Information about one dog affected with entropion came from the owner, while the data on three dogs were provided by veterinarians. Information about eyelid condition in the other seven dogs were provided by veterinary doctors, but 2 dogs had an invalid eye examination certificate (the certificate expires after one year). The current normal condition of the eyelids was confirmed by the owners. At the time of the eye examination, one of the dogs with invalid certificate was older than two years, while the second was around one year old. The data on 8 dogs without entropion were provided by the owners.

It is difficult to assess the incidence of entropion in the Polish Hound breed for the lack of the database and due to the unwillingness to provide information by breeders and dog owners. In consequence, scarce or no information on the health of dogs impedes breeding work. For the same reasons our attempt to perform the present study also ended in failure, and analysis of the mode of entropion inheritance in Polish Hounds was in fact not possible. In earlier studies on incidence of entropion in Polish Hounds, Łuczak [2002] reported high incidence of entropion in Polish Hounds (24 kennels and 39 litters, sired by 22 dogs and born to 27 dams were analyzed). Also, among the 50 youngest dogs only 7 were in good condi-

tion. Moreover, puppies with entropion were born to dogs without entropion, and completely healthy litters were born to dogs affected with entropion.

Research on congenital eye defects in Polish Hunting Dog, Polish Greyhound, and Polish Hound is currently conducted by the Department and Clinic of Animal Surgery together with the Department of Pet Breeding and Wildlife Management of the University of Life Sciences in Lublin in collaboration with the Polish Hound and Polish Hunting Dog Club. The objective of this ongoing research is to identify the frequency of congenital eye defects and to confirm their genetic background in analyzed dog breeds, and to determine the time of onset of the first symptoms in Polish Hound dogs. The genetic tests in aim to analyze the genetic basis and frequency variation of retinal deformation in the three Polish dog breeds will be also carried out [Balicki 2012]. To date, 74 Polish Hounds have been examined, of which 17 were affected with medium and advanced stage entropion. In addition, 30 Polish Hounds had extra eyelashes, 4 had a cataract, and 4 had retinopathy, of which one was suspected to have progressive retinal atrophy (PRA) and another had suspected retinal dysplasia [Balicki 2012]. It is important to mention that eyelid correction in Polish Hounds is not recorded, which gives a false picture of the population's health condition in terms of entropion. The problems of the Polish Hound breed arise from the peculiar nature of dog breeding. Breeders usually have 1 or 2 brood bitches, a considerable part of the litter is not registered in the Polish Kennel Club, the information about a large number of puppies is lost and the number of animals available for reproduction is limited.

Genetic diversity of the Polish Hound breed

The genetic consequence of inbreeding is an increase in the number of homozygous genotypes that leads to increased risk of genetic defects, diseases (most determined by recessive genes) and accumulation in population of semi-lethal and lethal genes. The degree of population inbreeding can be estimated, but it is not possible to reliably predict all negative effects.

The mean coefficient of inbreeding in Polish Hounds was estimated at 7.1% in 1960–1964 and as much as 37% in 2000–2004 [Głazewska 2013]. Such a high increase in inbreeding resulted from limited use of the dogs in breeding, inbreeding matings, (even e.g. sire – daughter), repeated matings, and unwillingness to use the dogs from the Introductory Registry (KW) [Głazewska 2013]. High mean coefficient of inbreeding in the population of this breed was also reported by Pyziak [2006] and estimated at $17.64\% \pm 9.45$ ($n = 530$ Polish Hounds born in 1970–2002): $17.9\% \pm 8.72$ for males and $17.37\% \pm 9.99$ for females). A study by Głazewska [2008] based on pedigrees collected in 1960–2004 demonstrates that the level of inbreeding in over 20% of the litters was very high (>40%). The

low level of genetic variation in the Polish Hound population may result from the limited use of dogs for reproduction, with some of the stud dogs being used very often and others very infrequently [Pyziak 2006]. In the years 1992–2002, only 35 stud dogs and 62 bitches were used for reproduction. Of the 13 stud dogs that were most often used in 1992–2002, three were derived from one female and their male offspring was also extensively used in breeding for reproduction [Pyziak 2006]. A similar situation occurred also for bitches. During 1960–2004, 63.1% of the bitches gave birth to only one litter, 158 litters came from 52 bitches, and only 7 bitches had 5–7 litters [Głazewska 2013].

Another reason for the low genetic variation in the Polish Hound population is the small number of founders and a high imbalance of founder contributions to the gene pool [Głazewska 2008]. The current population originates from 4 Kartawik's dogs, (Burzan, Bartek, Zorka, Czita) and from other 17 dogs (4 male and 13 female) of unknown pedigree (pedigree dogs without papers, representatives of other breeds, or Polish Hound crossbreds) [Głazewska and Prusak 2012]. The longest female line of 12 generations originates from Czita [Głazewska 2008]. During 1960–2004 a total of 247 litters were born, which can be divided into 2 groups: 210 litters continue the line of dogs from the Eastern borderlands of Poland kennel (of which 208 are Czita line) and 37 litters are derived from the other 12 female founders [Głazewska 2008]. During 1960–2004, 4 founders dominated: Czita, Zorka, Bartek and Burzan. The contributions ranged from 30.1 to 39.3% for Burzan and Czita respectively, and from 10.2 to 12.5% for Bartek and Zorka respectively [Głazewska 2013]. In the years 1960–2008, a total of 310 litters were born. Pedigree analysis shows that the 17 founders registered in the Introductory Registry had little success. Of the 15 female lines only 4 are continued and this is mainly the Czita line (259 litters). Only 49 litters were obtained from 13 founders and the KW line was 1 to 6 generations long, with the greatest contribution from Yuma Strapczyzna (17 litters) [Głazewska and Prusak 2012]. Over the years, founder contribution to the population structure changed – the number of founders ranged from 4 to 14 in 1960–2004 and the increase in the number of founders observed in the population structure in the years 1975–1979 did not reduce the inbreeding level [Głazewska 2008]. Although 80.9% of Polish Hounds are derived from founders registered in the Introductory Registry, their contribution to the gene pool is only 18.2%, of which 14.3% are females and 4.7% are males [Głazewska and Prusak 2012]. This may be due to the low scores awarded at the shows to the dogs from the Introductory Registry, the main reason being their unsatisfactory conformation [Ściesiński 2009], and the low prices for puppies originating from the dogs registered in the Introductory Registry [Głazewska 2008]. The Polish Hound population is highly inbred, and the inequity in founder contributions to the breed [Głazewska and Prusak 2012] and the observation

that animals living in proximity are closely related [Pyziak 2006] reflect badly on the genetic structure of the population. The present situation reminds of the wild populations that are close to extinction [Brzeski et al. 2014, Kenney et al. 2014]. Pyziak [2006] recommends regular monitoring of the level of population inbred and closing the Introductory Registry to avoid the blood of other breeds. In addition, it would be also advisable for the Polish Kennel Club more often agree to a single mating of dogs whose pedigrees are known and documented. Pyziak [2006] also notes that no preference should be given to a particular animal, the same matings should not be repeated, the same number of litters should be maintained from each animal, and also rotational matings should be introduced. Contrary, Głażewska [2005] argues for the need to increase genetic variation in the population, suggesting a wider use of the dogs from the Introductory Registry and import of Polish Hound-type dogs from the eastern borderline, and considers introducing another breed into the Polish Hound population.

It is doubtful that the dogs produced from the controversial mating of Polish Hound females and Black and Tan Coonhound males have a breeding success. Black and Tan Coonhound, a tracking dog from the United States, is mainly used for trailing raccoons, but also for hunting big game. The breed is more often affected by hip dysplasia, thyroid problems, cataract, as well as ectropion, entropion, hemophilia B, and Coonhound paralysis [Mosier et al. 1984, Slatter 1993, Martinez 1997, Ackerman 1999, Sargan 2004, Kim et al. 2009]. The GENESIS MAN IN THE MOON male was mated to three Polish Hound females: FUGA Galicyjska Sfora, ŁAPA Ze Stadniny Cisowiec, and MACIERZANKA Ze Stadniny Cisowiec. Unfortunately, the Polish Kennel Club provides no other information (e.g. results of genetic tests) about the American Black and Tan Coonhound that had been used for crossbreeding. In 2009, first generation crosses produced 18 crossbred puppies. Coogar crossbreds with breeding tests passed can be registered in the Introductory Registry but they are not allowed to take part in the shows [Gazda 2012]. Breeding plan elaborated by the Main Breeding Commission allows the crossing of hybrids with full pedigree (three-generation) Polish Hounds; the crosses can be used for breeding only twice and repeated matings are not permitted. At least 50% of the litter from Coogar – Polish Hound must be submitted to a breeding test, otherwise a breeder will not obtain a consent for repeated mating. The breeding test is repeated at the age of at least 15 months and then the dogs are eligible for entry in the Introductory Registry. Third generation dogs will have the chance of being recognized as the Polish Hound. However, according to Pyziak [2006] and also in our opinion the introduction of genes from a foreign breed into the Polish Hound breed may be extremely risky.

Another problem is the lack of widely available information, for example about the pedigrees of Polish Hound dogs. The Polish Kennel Club does not ma-

nage a database available to everyone, while the existing internet pedigree database was created by dog owners and breeders. It is difficult to obtain information about possible stud dogs and there is a risk that the owner of a brood bitch will be misinformed. Dog owners are unwilling to talk about the behavioural problems of their animals, much less about their genetic defects, such as entropion. The establishment of a reliable database of Polish Hounds can help in developing an effective mating programme. The specific nature of dog breeding, which involves the existence of many small kennels and the loss of a large number of animals from reproduction has been detrimental to the current breeding status of Polish Hounds.

The problem of entropion has affected the Polish Hound breed for a long time, and discussions among dog breeders and owners concerning this disease have been going on for years. Thus one can expect that breeders are interested as much as researchers in solving the entropion problem in this breed. However, in the light of the results of our survey, a conclusion arises that the Polish Hound breeders and owners, and even the management of the Polish Hound Club are not determined enough to engage in the research on different aspects of entropion.

Authors recommend to create a pedigree database of all dogs of Polish Hound breed and to design the mating plan on this basis to allow the regular monitoring of the population inbred level and preserving the breed purity. In addition, the breeders should not hide from other breeders the fact of entropion in their dogs and use for matings only perfectly healthy animals, which also are not carriers of genetic diseases.

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PROBLEMY WE WSPÓŁPRACY Z HODOWCAMI I WŁAŚCICIELAMI PSÓW NA PRZYKŁADZIE PRÓBY OSZACOWANIA CZĘSTOŚCI ENTROPIUM U PSÓW RASY OGAR POLSKI

Streszczenie. Entropium objawiające się podwinięciem powiek dotyczy wielu ras psów, jednakże charakter dziedziczenia tego schorzenia nie został jeszcze poznany. U psów rasy ogar polski schorzenie to wydaje się być poważnym problemem. Rasa ta liczy obecnie 1000 osobników, odznacza się małą zmiennością genetyczną, oraz nierównym bilansem udziału członków założycieli w populacji. Pierwsze badania entropium u psów rasy ogar polski w Polsce przeprowadziła Łuczak w 2002 roku i stwierdzono, że wśród 100 przebadanych psów tylko 29 było zdrowych. Dalsze badania wykazały, iż z 74 psów u 17 stwierdzono entropium. Celem niniejszej pracy było zbadanie występowania entropium w populacji psów – ogar polski. Do hodowców i właścicieli psów rasy ogar polski w 2012 r. wysłano 158 listów z prośbą o informacje na temat stanu powiek psów, przekazano je wyżej wspomnianym osobom podczas Międzynarodowej Wystawy Psów Rasowych w Warszawie (lipiec 2012 r.). Pismo to zostało także umieszczone na forum rasy ogar polski (<http://www.ogarkowo.pl>). Mimo tak usilnych starań, autorki otrzymały jedynie informacje dotyczące 19 psów od 18 osób. W świetle uzyskanych wyników, nasuwa się wniosek, że hodowcy i właściciele psów rasy ogar polski, a nawet zarząd klubu tej rasy nie byli lub nie są zainteresowani podawaniem informacji na temat przypadków wystąpienia entropium u psów, które hodują, oraz – prawdopodobnie ze względów ekonomicznych – eliminowaniem z hodowli osobników chorych. Brak zainteresowania hodowców i właścicieli psów współpracą w tym zakresie uniemożliwia prowadzenie badań dotyczących prześledzenia dziedziczenia tej wady u psów rasy ogar polski.

Słowa kluczowe: *Canis lupus familiaris*, entropium, ogar polski

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