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Breeding systems and dog health and welfare

Position of the FCI Scientific Commission

This paper is dedicated to the memory of our colleague Ana Eugenia Vázquez Liévano, a great person, a friend whose invaluable contributions, vision, and dedication have been instrumental for the work of this commission.

This document follows a request from the FCI General Committee regarding the current state of knowledge on the impact of different breeding systems on the present and future health and welfare of puppies intended for future owners, with a specific focus on pedigree breeders. In other words, from a buyer's perspective, what are the potential benefits and issues associated with purchasing a pedigree dog compared to a puppy from other breeding systems? This brief paper first presents the main factors affecting health and welfare in dogs. It then examines the relationship between these factors and breeding systems in dogs. Finally, some proposals are discussed to improve the sustainability of pedigree breeding in terms of health and welfare.

I. Factors impacting health and welfare in dogs

Over the past few decades, animal health and welfare have become significant concerns, particularly for animals living in close proximity to humans, such as dogs. The factors influencing the raising of these animals can be divided into two categories: those related to the environment in which they are raised, and those linked to their genetic makeup. Both of these factors are shaped by the decisions and practices of dog breeders.

I.1 Factors related to environment

The environment in which a puppy is raised plays a crucial role in determining its future health and welfare. From the prenatal stage through to the critical socialization period, various environmental factors can profoundly influence the puppy's development (Dendoncker, 2019). During this time, the care and handling practices implemented by breeders are pivotal in shaping the puppy's physical, emotional, and behavioural well-being. For instance, the quality of prenatal care, including the mother's nutrition, stress levels, and overall health, can have lasting effects on the puppy's development. Inadequate prenatal care may lead to issues such as low birth weight, developmental delays, and a predisposition to certain health conditions. Post-birth, the environment crafted by the breeder, including socialization practices and the timing of the homing period, continues to impact the puppy on multiple levels. Proper socialization during the early weeks of life is essential for fostering well-adjusted behaviour in adult dogs. Puppies exposed to a variety of stimuli, including different people, other animals, and various environments, are more likely to develop into confident and well-behaved adults. Conversely, insufficient socialization can result in undesirable behaviours like anxiety, fear, and aggression, which may negatively impact the dog's long-term well-being and its relationship with future owners. In some cases, this could even lead to the dog being given up (Kwan & Bain, 2013; Eagan et al., 2022).

Moreover, the physical environment where puppies are raised can introduce potential zoonotic risks, such as exposure to parasites, bacteria, and viruses that can adversely affect their health. Poor sanitation, overcrowding, and inadequate healthcare practices can exacerbate these risks, leading to long-term health issues that may impair the dog's future life. However, when breeders adhere to rigorous healthcare protocols, including timely vaccinations, deworming, and regular veterinary check-ups, these risks can be significantly mitigated. This proactive approach not only ensures the immediate well-being of the puppies but also sets the foundation for a healthier and more resilient adult dog.

I.2 Genetic factors

A dog's genetic background significantly influences not only its behaviour but also its health and overall welfare. Hundreds of diseases are either directly determined or influenced by genetic factors. Some inherited disorders are linked to specific phenotypic traits in dogs (Asher et al., 2009), while others are inherited independently of the carrier's morphology (Summers et al., 2010). In dogs, breed differentiation plays a crucial role in shaping individual differences in morphology, behaviour, and health. There are significant variations across breeds in terms of morbidity and the risk of developing certain disorders. The concept of a breed is complex, even in the dog world, where purebreeding—breeding within a closed population known as a breed—has been considered the standard for many decades (Leroy et al., 2023). According to the FCI, a dog is considered purebred when its pedigree includes a minimum of 3 complete generations registered in FCI recognized studbooks or appendices to the studbooks. However, this definition can be misleading in the context of this discussion, as two puppies from the same litter may share the same genetic background, yet one may not be considered purebred if it has not been registered. For simplicity, we will differentiate between pedigree dogs (i.e., purebred dogs as defined by the FCI), look-a-likes, and crossbreds. A look-a-like is defined here as a dog that matches a breed-specific morphology but does not have a pedigree (Van Zeeland & Beerda, 2015). This category includes actual purebred dogs without papers and crossbreds that resemble a specific breed. Crossbred dogs can also include designer dogs, which result from intentional mating between two different breeds, as well as undetermined crossbred individuals.

Since breeds are the result of multiple generations of selective breeding aimed at achieving specific goals (Pongrácz & Dobos, 2024), the behaviour of a pedigree dog is generally expected to be more predictable than that of a crossbred dog. In terms of health, comparative studies have shown that certain breeds are at a higher risk for specific disorders when compared to crossbred dogs (Bellumori et al., 2013; Donner et al., 2018; Forsyth et al., 2023).

This increased risk may be due to the breed's particular morphology or the random spread of a specific disorder within the breed. However, these studies suggest that being a purebred or pedigree dog is not necessarily associated with an overall higher prevalence of disorders. When comparing pedigree dogs with look-alikes, Van Zeeland & Beerda (2015) did not find that look-a-likes were less affected by certain genetic disorders, such as hip dysplasia (HD) and elbow dysplasia (ED), than their pedigree counterparts. This suggests that look-a-like dogs may share the same genetic issues as pedigree dogs.

In addition to its role in the spread of inherited disorders, the impact of inbreeding on health and welfare can be assessed at multiple levels. Bannasch et al. (2021) demonstrated that breeds with higher levels of inbreeding exhibit greater morbidity compared to those with lower inbreeding levels. On an individual level, research by Leroy et al. (2015) has shown that inbred dogs tend to have reduced longevity. This suggests that, from a buyer's perspective, puppies with lower levels of inbreeding should be preferred.

When considering either behaviour or health, there is generally some heterogeneity in trait expression within a given breed. This is an important consideration because, depending on the modes of inheritance and expression, as well as the tools available (such as behavioural assessments, health phenotypic or genetic tests), reputable breeders can work to reduce the risk of a puppy developing undesirable traits in the future.

II. Breeding systems and their relations with factors affecting health and welfare

In differentiating breeding systems, the literature often contrasts small-scale producers (occasional or hobby breeders) with more intensive producers, such as professional or commercial breeders, whose kennels are often referred to as puppy farms or puppy mills (McMillan et al., 2011; Wauthier & Williams, 2018; Dendoncker, 2019). It is challenging to assess the relative importance of small-scale versus large-scale breeders, both in terms of the number of breeders and the number of puppies produced. Several studies suggest that while breeding is a hobby or sporadic activity for the majority of breeders (IBF et al., 2021; Santos et al., 2021), the significance of large-scale breeders in terms of the number of dogs produced tends to be underestimated, especially when accounting for unregistered or illegal breeders. It is important to note that both small- and large-scale breeders encompass a wide range of production practices and profiles. However, studies generally indicate that puppies raised in commercial establishments are more likely to suffer from illnesses and poor socialization (McMillan, 2017; Wauthier et al., 2018). Examining practices beyond the scale of production, Dendoncker (2019) found that while large-scale breeders typically provide a less enriched environment for puppies, they tend to be more rigorous in biosecurity measures, including vaccination, pest control, quarantine, and facility hygiene. This may eventually be linked to the fact that incidence and morbidity for parasitic and infectious diseases may increase with animal density (Grellet et al., 2014), thereby raising awareness among large-scale breeders about these issues.

Another way to classify dog breeders is by considering their breeding practices and the use of pedigree dogs. Blackman et al. (2020) proposed differentiating between commercial breeders, pedigree hobby dog breeders, and occasional breeders. Pedigree breeders are primarily defined by their production of pedigree dogs, meaning dogs registered under a recognized studbook. While the majority of pedigree breeders are non-commercial, this is not always the case (Leroy et al., 2007), and not all occasional or hobby breeders are necessarily pedigree breeders. Registration under a studbook facilitates the quantification of pedigree breeders. For instance, Wang et al. (2018) found that among a sample of 50 countries, pedigree breeders contribute between 0% and nearly 80% of the total dog population, depending on the country, with an average contribution of 20%. Aside from providing certification of breed origin, sourcing a puppy from a pedigree breeder does not, in theory, guarantee the health or behaviour of the dog.

However, several national canine organisations either record information on certain health conditions or behavioural tests in the pedigree or impose specific requirements for breeding, such as health screenings or inbreeding limits (Wang et al., 2018). In general, pedigree breeders are not required to apply specific practices for the environment where puppies are raised besides the ones imposed by national legislation. Outside of pedigree dogs, it is relatively easy for buyers to find a look-alike puppy that resembles a specific breed type (IBF et al., 2015). Therefore, sourcing a non-pedigree dog should not be expected to offer particular advantages in terms of health.

III. Discussion

From a buyer's perspective, several factors must be considered to ensure that a puppy has the potential to exhibit optimal behaviour, health, and welfare. One of the most significant decisions is whether to choose a crossbred puppy or one that matches a specific breed phenotype (whether pedigree or look-alike). Selecting a breed-specific phenotype increases predictability regarding both adult morphology and behaviour. However, while current literature suggests that a purebred or pedigree dog is not inherently associated with health issues, many breeds are known to have higher prevalences of specific diseases. Therefore, it is crucial for prospective owners to verify that the breeder has taken necessary precautions to minimize the risk of these diseases, such as requesting up-to-date health certificates when available. Choosing a crossbred dog can help reduce the risk of inbreeding depression, as crossbreeds generally have a more diverse genetic background. On the other hand, opting for a pedigree dog over a look-alike typically provides assurance regarding the genetic origins of the puppy and its predictability in terms of phenotype expression. While pedigree breeders are often not large-scale producers, registration with a recognized studbook does not generally guarantee specific health and welfare practices (IBF et al., 2015), unless the corresponding National Canine Organisation has implemented stringent rules and quality standards.

From the perspective of an FCI national canine organisation, if the goal is to demonstrate that pedigree puppies have a higher likelihood of better health in their future lives compared to non-pedigree dogs, then specific measures must be implemented to ensure this. Provision of information about the health and behaviour of the dog and its relatives, whether in the pedigree or online, can offer some degree of assurance. It is essential that this information, along with the associated rules and requirements, be presented to the public clearly and transparently to avoid any confusion. The National Canine Organisation can effectively provide training for pedigree breeders to ensure they have basic knowledge of breeding systems, as well as the necessary requirements for maintaining a healthy, socially appropriate, and well-managed breeding environment. Ultimately, ensuring robust quality standards and transparent communication, along with implementing effective breeding schemes aimed at improving health, will help build trust and enhance the well-being of pedigree dogs.

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