

EXISTENTIAL BEHAVIOR OF A DOG**Ezgi Ergen¹, Ibrahim Akyazi²**¹*Graduate Education Institute, Istanbul University-Cerrahpasa, Istanbul, Turkey.*²*Department of Physiology, Istanbul University-Cerrahpasa, Veterinary Faculty, Istanbul, Turkey.*

Livestock guarding dogs (LGD) are selected according to their behavioral characteristics and performances rather than their morphological characteristics. In order to be able to protect the livestock, the dog must have certain behavioral patterns. These guarding behaviors are largely instinctive and require relatively little training other than timely correction of undesirable behaviors. The basis of the LGD guarding behavior is their strong attachment to the sheep, and their success is the result of a qualified genetic background consolidated by proper breeding. Artificial selection, which they have been exposed for thousands of years, has put pressure on their predatory motor patterns. Suppression of genetic sequences has blurred the congener recognition, enabling them to develop social patterns across species. Therefore livestock guarding dogs tend to perceive sheep as dogs and accept them into their herds under appropriate breeding methods. Such attachment enables livestock guarding dogs to protect sheep against external threats without human manipulation. In this context, dogs without the right genes cannot be trained to be successful guardians regardless of the breeding method. Livestock guarding dogs are selected for displaying non-threatening submissive behaviors towards the livestock. It is necessary that the LGD, which accepts the sheep as the same species, should not have predatory behaviors towards them. Under proper breeding conditions, the LGD is expected to attach, follow and stay with the livestock he is guarding. The working methods of livestock guarding dogs are not based on hunting predators; livestock protection is usually a preventive defense without physical contact between the LGD and the predator. An attentive LGD should withdraw to the livestock when threatened and stay with the sheep. A properly bred LGD with the right genes does not leave the livestock when threatened; it barks loudly and increases the odor signals by urinating. As a result of such threatening social responses, the predator's hunting behavior may be impaired or the predator may be discouraged from attacking the livestock. Protective behaviors are difficult to observe because livestock guarding dogs only become protective in the presence of a threat, whereas trustworthy and attentive behaviors can be consistently seen when the LGD is in the vicinity of the livestock. Guarding also depends on the dog's aggressive temperament, the species and number of predators, the size of the livestock, and the number of livestock guarding dogs. However, the presence of attentiveness deficiency in the dog will be reflected in the dog's protective behavior.

Key words: behavior, LGD, guarding, attachment, livestock, dog.

The domestic dogs are reported to have originated in Europe, Eurasia, the Middle East and the Far East about 15,000 years ago [1], and one of the oldest groups of dogs classified according to their role in society is working dogs [2]. The livestock guarding dogs (LGD), which are included in the working dog class, were used in a wide area from the Tibetan plateau to Mesopotamia in the prehistoric period [3]. Today, more than 50 dog breeds from the LGD class are used worldwide [4]. Although LGD are defined as sheep dogs, they are also used for guarding different types of livestock. They protect goat herds and also they take part in the protection of cattle herds with the right breeding methods [5]. Due to the increasing number of large carnivores with wildlife protection programs, the use of LGD is also increasing worldwide [3].

The primary duty of LGD is to protect livestock from predator attacks. Traditionally they have been used against large predators such as brown bears and wolves in Europe and Eurasia, they are also effective in reducing the attacks of many predators such as wild boar, jackal, dingo, and cheetah [6]. In addition of reducing livestock loss, they increase the duration of pasture grazing and forage efficiency with active night protection [7].

Another danger that livestock are exposed to in pastures or in barns is disease agents. In countries where livestock breeding is common, many wild animal species play a vector role in the diseases. Rabies is common in wild carnivores [8, 9, 10], and animals such as deer and wild boar play a vector role in tuberculosis and brucellosis [5]. Forage and water resources accessible to wild animals are potential contamination areas. As livestock guarding dogs deter predators and other wildlife with urine marking and barking [11], they prevent pathogen transmission by reducing contact with wildlife [5].

The human-wild carnivore conflict is mostly emerging in livestock breeding with the aim of preventing animal losses [6]. Wild carnivores, whose ecological value has been increasingly emphasized, have begun to be protected by various programs and organizations [12]. Reducing carnivore populations by lethal methods can lead to unforeseen negative ecological consequences due to the complex roles they play in the food chain [9]. In addition, lethal methods used against wild carnivores are unethical, and their effectiveness is controversial [13]. It is known that killing large carnivores increases the number of medium and small carnivores [14]. Local elimination of wild animals as well as stray animals will increase individual migration from adjacent areas. Lethal management can therefore reduce livestock loss for a short period, but is not effective in the long run [15]. Livestock guarding dogs can alleviate human-carnivore conflict by reducing livestock loss. Therefore it is considered to be a valid method for the protection of large carnivores [12]. Breeder survey studies in areas where livestock guarding dogs are used, report that use of LGD reduces the need for lethal management [16].

Livestock guarding dogs are large breed dogs in accordance with the task they are used in. They weigh approximately 35-45 kg and have a shoulder height of over 60 cm [7]. Their fur color matches the color of the livestock they protect: it can be white, brown, gray or biscuit. This adaptation facilitates the acceptance of the dog by

the livestock and also helps the shepherd to separate the predator from the dog [10]. However, livestock guarding dogs are selected according to their behavioral characteristics and performances rather than their morphological characteristics [17]. Some behaviors required for the LGD to be able to protect are specific to livestock guarding dogs [7]. These guarding behaviors are largely instinctive and require relatively little training other than timely correction of undesirable behaviors [18]. Each LGD breed has a behavioral phenotype [2]. Knowing the breed tendencies is important so that the breeder can choose the right LGD for their needs [11]. When livestock guarding dogs are raised with the appropriate method, they become attached and feel belonging to the livestock and will protect the livestock [10]. However, various factors such as the geography where dogs live, climate, food sources or diseases can affect behavior [19]. For this reason, individual variations can be seen in these behavioral traits that are genetically transmitted and unique to livestock guarding dogs [2].

The basis of the LGD guarding behavior is their strong attachment to the sheep, and their success is the result of a qualified genetic background consolidated by proper breeding [19]. Artificial selection, which they have been exposed for thousands of years, has put pressure on their predatory motor patterns. Suppression of genetic sequences has blurred the congener recognition, enabling them to develop social patterns across species [20]. Therefore livestock guarding dogs tend to perceive sheep as dog and accept them into their herds under appropriate breeding methods [11]. Such attachment enables livestock guarding dogs to protect sheep against external threats without human manipulation [21]. In this context, dogs without the right genes cannot be trained to be successful guardians regardless of the breeding method [11].

The working methods of livestock guarding dogs are not based on hunting predators; livestock protection is usually a preventive defense without physical contact between the LGD and the predator [22]. They usually take action quickly by responding to perceived threats, but then withdraw to the livestock they are protecting [5]. A properly bred LGD with the right genes does not leave the livestock when threatened; it barks loudly and increases the odor signals by urinating [7]. In active livestock protection observations, it has been observed that LGD start to bark and chase at the time of contact with the predator, and return to the herd 15-20 minutes after leaving [21]. As a result of such threatening social responses, the predator's hunting behavior may be impaired or the predator may be discouraged from attacking the livestock [11].

A LGD's ability to confront predators and keep them away from the livestock is affected by age and physical maturity. It is accepted that livestock guarding dogs reach physical and behavioral maturity at about two years old. Animals younger than two years of age tend to be underperforming and more likely to make mistakes [23]. Despite their experience, animals that are aged or worked in harsh conditions for a long time show a decrease in their performances [18]. Since the most important principle of livestock protection is strong loyalty to the sheep, the offspring should be brought into proper breeding before they are 2 months old [2] in order to increase

their adult performances. Furthermore there are natural behavioral differences that races have; Komondors have been reported to bite more people than the Pyrenean, Akbash, or Anatolian Shepherd, while the Pyrenees injure fewer sheep than the Komondor, Akbash, or Anatolian Shepherd [18].

According to Andelt, one or two LGD can be used in herds with less than 200 sheep. In herds with approximately 1000 sheep, the number of livestock guarding dogs can be increased to five. The number of dogs to be used generally depends on the amount of attack by predators, the distribution of sheep and the geographical difficulty of the area [7]. It is known that an increase in the number of sheep in a flock increases the risk of predator attacks, and wolves prefer larger flocks [24]. For each added sheep, the effectiveness of LGD decreases [6]. Although multiple dogs are recommended for large herds, the individual characteristics of LGD are critical to their ability to work together as a team. It has been reported that when five or more dogs are used per herd of sheep, dogs are more interested in socializing with each other rather than guarding the sheep [19]. It is also possible that the presence of too many dogs in the herd can lead to “boredom” and roaming behavior among dogs, which will reduce guarding effectiveness [6].

Livestock guarding dogs instinctively protect the herd. Education only strengthens the behaviors and corrects behavioral problems [20]. Observational learning of pups from trained individuals can be used in the training practices [25]. Compared to adult individual training, it has been observed that pup training based on maternal observation can increase task-specific abilities [26]. However, a method based on socialization of the offspring only with the livestock by disabling observational learning is widely used in the United States [10]. Breeding method, grazing area and grazing time, topography of the area, species and number of predators, species and number of livestock, number of LGD used and the age of the dogs directly affect the success of the livestock guarding dog [23]. The impact of these factors should be balanced with managerial actions such as dividing or grouping sheep, changing pasture and grazing times, or reviewing the LGD breeding process [27].

The livestock guarding dog pup should be treated like a working dog [7]. When the pups are 6-8 weeks old, they should stay in a small isolated area with the livestock, which they will protect [11]. Intense human contact during the 3 to 12 weeks period, when the pup is sensitive to interspecies social interaction, may cause him to become attached to humans instead of to the sheep [28]. A dog with increased devotion to human can easily leave the sheep. In order to avoid this mistake that may occur during the breeding period, the pup can be isolated from the human. However, it has been reported that the aggression towards human in LGD bred with this classical method is much higher than in LGD bred by contact with human [29].

The behavior of livestock guarding dogs is evaluated in 3 important patterns [2;11;20];

Trustworthiness

Livestock guarding dogs are selected for displaying non-threatening submissive behaviors towards the livestock. It is necessary that the LGD, which accepts the sheep as the same species, should not have predatory behaviors towards them [10]. Repelling sheep from the forage, acting aggressively towards rams or displaying dominance over sheep are considered destructive or untrustworthy behaviors [11]. Untrustworthy behavior, which usually starts with play, can become an even bigger problem when the sheep is afraid or flees [20]. Or sometimes dogs with trustworthy tendency may attack sick or old sheep. In such cases, the dog should be removed from the duty of protection [10].

Attentiveness

Under proper breeding conditions, the LGD is expected to attach, follow and stay with the livestock he is guarding. An attentive LGD should withdraw to the livestock when threatened and stay with the sheep. Decrease in livestock loss has been reported when attention to the sheep increases and the dog remains with the livestock [10]. Staying in the barn with the sheep indicates dogs attentiveness [11]. However, dogs cannot show the same attention at all times of the day. The basic needs of livestock guarding dogs should be provided in order for them to perform their duties [30]. Factors such as health status, hunger, thirst or bad weather conditions may cause the LGD to abandon the livestock [10]. In addition, it is recommended to neutered the active livestock guarding dogs in order to minimize the problems of abandoning the livestock and roaming [31].

Protectiveness

Protectiveness can be defined as the ability of the livestock guarding dogs to react to the threat. LGD are expected to bark, jog, and return to the herd in a suspicious situation [20]. Predators usually avoid the threatening approach-withdrawal behavior of the livestock guarding dogs. However, this behavior of the dog can easily turn into a dominance display and attacking the predator [10]. Protective behaviors are difficult to observe because livestock guarding dogs only become protective in the presence of a threat, whereas trustworthy and attentive behaviors can be consistently seen when the LGD is in the vicinity of the livestock [32]. However, the presence of attentiveness deficiency in the dog will be reflected in the dog's protective behavior. Protectiveness also depends on the dog's aggressive temperament, the species and number of predators, the size of the livestock, and the number of livestock guarding dogs [10]. While success rates are very high against small-sized predators such as coyotes, their chances of success are relatively low against large predators such as bears, wolves, and cheetahs [33].

REFERENCES

1. Larson, G., Karlsson, E. K., Perri, A., Webster, M. T., Ho, S. Y., Peters, J., ... & Lindblad-Toh, K. (2012). Rethinking dog domestication by integrating genetics, archeology, and biogeography. *Proceedings of the National Academy of Sciences*, 109(23), 8878-8883.
2. Coppinger: predatory motor pattern : Coppinger, R., & Schneider, R. (1995). Evolution of working dogs. In Serpell, J (Ed.). *The domestic dog: Its evolution, behaviour and interactions with people* (pp 21-47). University Press, Cambridge
3. Gehring, T. M., VerCauteren, K. C., & Landry, J. M. (2010). Livestock protection dogs in the 21st century: is an ancient tool relevant to modern conservation challenges?. *BioScience*, 60(4), 299-308.
4. Livestock guardian dog. (2022, January 11). In Wikipedia. https://en.wikipedia.org/wiki/Livestock_guardian_dog
5. VerCauteren, K. C., Lavelle, M. J., Gehring, T. M., & Landry, J. M. (2012). Cow dogs: use of livestock protection dogs for reducing predation and transmission of pathogens from wildlife to cattle. *Applied Animal Behaviour Science*, 140(3-4), 128-136.
6. Kinka, D., & Young, J. K. (2019). Evaluating domestic sheep survival with different breeds of livestock guardian dogs. *Rangeland Ecology & Management*, 72(6), 923-932.
7. Andelt, W. F. (2004). Use of livestock guarding animals to reduce predation on livestock. *Sheep & Goat Research Journal*, 3.
8. Ambarlı, H. (2019). Analysis of wolf–human conflicts: Implications for damage mitigation measures. *European Journal of Wildlife Research*, 65(6), 1-9.
9. Potgieter, G. C., Kerley, G. I., & Marker, L. L. (2016). More bark than bite? The role of livestock guarding dogs in predator control on Namibian farmlands. *Oryx*, 50(3), 514-522.
10. Rigg, R. (2001). *Livestock guarding dogs: their current use world wide* (Vol. 1). Oxford: Canid Specialist Group.
11. Coppinger, R., Coppinger, L., Langeloh, G., Gettler, L., & Lorenz, J. (1988, March). A decade of use of livestock guarding dogs. In *Proceedings of the Thirteenth Vertebrate Pest Conference* (1988) (p. 43).
12. Spencer, K., Sambrook, M., Bremner-Harrison, S., Cilliers, D., Yarnell, R. W., Brummer, R., & Whitehouse-Tedd, K. (2020). Livestock guarding dogs enable human-carnivore coexistence: First evidence of equivalent carnivore occupancy on guarded and unguarded farms. *Biological Conservation*, 241, 108256.
13. Moreira-Arce, D., Ugarte, C. S., Zorondo-Rodríguez, F., & Simonetti, J. A. (2018). Management tools to reduce carnivore-livestock conflicts: current gap and future challenges. *Rangeland Ecology & Management*, 71(3), 389-394.
14. Rust, N. A., Whitehouse-Tedd, K. M., & MacMillan, D. C. (2013). Perceived efficacy of livestock-guarding dogs in South Africa: implications for cheetah conservation. *Wildlife Society Bulletin*, 37(4), 690-697.

15. Smith, B. P., & Appleby, R. G. (2018). Promoting human–dingo co-existence in Australia: moving towards more innovative methods of protecting livestock rather than killing dingoes (*Canis dingo*). *Wildlife Research*, 45(1), 1-15.

16. Kinka, D., & Young, J. K. (2019). The tail wagging the dog: positive attitude towards livestock guarding dogs do not mitigate pastoralists' opinions of wolves or grizzly bears. *Palgrave Communications*, 5(1), 1-9.

17. Turcsán, B., Kubinyi, E., & Miklósi, Á. (2011). Trainability and boldness traits differ between dog breed clusters based on conventional breed categories and genetic relatedness. *Applied Animal Behaviour Science*, 132(1-2), 61-70.

18. Green, J. S., & Woodruff, R. A. (1988). Breed comparisons and characteristics of use of livestock guarding dogs. *Rangeland Ecology & Management/Journal of Range Management Archives*, 41(3), 249-251.

19. Stone, H. R., McGreevy, P. D., Starling, M. J., & Forkman, B. (2016). Associations between domestic-dog morphology and behaviour scores in the dog mentality assessment. *PloS one*, 11(2), e0149403.

20. Coppinger, R., & Coppinger, L. (2001). *Dogs: A startling new understanding of canine origin, behavior & evolution* (pp 101-117). Simon and Schuster.

21. Hansen, I., Staaland, T., & Ringsø, A. (2002). Patrolling with livestock guard dogs: a potential method to reduce predation on sheep. *Acta Agriculturae Scandinavica, Section A-Animal Science*, 52(1), 43-48.

22. Hansen, I., & Bakken, M. (1999). Livestock-guarding dogs in Norway. 1. Interactions. *Rangeland Ecology & Management/Journal of Range Management Archives*, 52(1), 2-6.

23. Green, J. S., Woodruff, R. A., & Andelt, W. F. (1994). Do livestock guarding dogs lose their effectiveness over time?.

24. Vos, J. (2000). Food habits and livestock depredation of two Iberian wolf packs (*Canis lupus signatus*) in the north of Portugal. *Journal of zoology*, 251(4), 457-462.

25. Hall, N. J., Johnston, A. M., Bray, E. E., Otto, C. M., MacLean, E. L., & Udell, M. A. (2021). Working dog training for the twenty-first century. *Frontiers in Veterinary Science*, 834.

26. Slabbert, J. M., & Rasa, O. A. E. (1997). Observational learning of an acquired maternal behaviour pattern by working dog pups: an alternative training method?. *Applied Animal Behaviour Science*, 53(4), 309-316.

27. Green, J. S., & Woodruff, R. A. (1990). ADC guarding dog program update: a focus on managing dogs.

28. Howell, T. J., King, T., & Bennett, P. C. (2015). Puppy parties and beyond: the role of early age socialization practices on adult dog behavior. *Veterinary Medicine: Research and Reports*, 6, 143.

29. Marion, M., Béata, C., Sarcey, G., Delfante, S., & Marlois, N. (2018). Study of aggressiveness in livestock-guarding dogs based on rearing method. *Journal of Veterinary Behavior*, 25, 14-16.

30.Lorenz, J. R., & Coppinger, L. (1996). Raising and training a livestock-guarding dog. Oregon State University, Extension Service.

31.Kinka, D., & Young, J. K. (2018). A livestock guardian dog by any other name: similar response to wolves across livestock guardian dog breeds. *Rangeland Ecology & Management*, 71(4), 509-517.

32.Potgieter, G. C., Marker, L. L., Avenant, N. L., & Kerley, G. I. (2013). Why Namibian farmers are satisfied with the performance of their livestock guarding dogs. *Human Dimensions of Wildlife*, 18(6), 403-415.

33.Smith, M. E., Linnell, J. D., Odden, J., & Swenson, J. E. (2000). Review of methods to reduce livestock depreddation: I. Guardian animals. *Acta Agriculturae Scandinavica, Section A-Animal Science*, 50(4), 279-290.

ЕКЗИСТЕНЦІАЛЬНА ПОВЕДІНКА СОБАКИ

Езгі Ерген, Ібрагім Акязи

Собаки-охоронці худоби (Livestock guarding dogs - LGD) відбираються відповідно до їхніх поведінкових особливостей та продуктивності, а не морфологічних характеристик. Щоб мати можливість захистити худобу, собака повинна мати певні моделі поведінки. Ця охоронна поведінка в основному інстинктивна і потребує відносно невеликої підготовки, крім своєчасної корекції небажаної поведінки. Основою сторожової поведінки LGD є їхня сильна прихильність до овець, а їхній успіх є результатом кваліфікованого генетичного фону, закріпленого належним розведенням. Штучний відбір, якому вони піддавалися протягом тисячоліть, тиснув на їхні хижі рухові моделі. Придушення генетичних послідовностей розмило розпізнавання конгенерів, дозволивши їм розвивати соціальні моделі між видами. Тому собаки-охоронці худоби схильні сприймати овець як собак і приймати їх у свої стада за відповідних методів розведення. Таке кріплення дозволяє собакам-охоронцям захищати овець від зовнішніх загроз без маніпуляцій з боку людини. У цьому контексті собак без відповідних генів неможливо навчити бути успішними захисниками незалежно від методу розведення. Собаки-охоронці худоби вибираються так, щоб проявляти покірливу поведінку, що не загрожує худобі. Необхідно, щоб LGD, який приймає овець як один вид, не мав хижацької поведінки щодо них. За належних умов розведення, очікується, що LGD буде прихильна до тварин, стежити та залишатися з худобою, яку охороняє. Методи роботи тваринницьких собак не засновані на полюванні на хижаків; Захист худоби зазвичай є превентивним захистом без фізичного контакту між LGD і хижаком. Уважний LGD повинен піти до худоби, якій щось загрожує, і залишитися з нею. Правильно вирощений LGD з потрібними генами не залишає поголів'я під загрозою; він голосно гавкає і посилює сигнали запаху при сечовипусканні.

В результаті таких загрозових соціальних реакцій мисливська поведінка хижака може бути порушена або у хижака може відпасти бажання нападати на худобу. Захисну поведінку важко спостерігати, тому що собаки-охоронці худоби стають захисниками лише за наявності загрози, тоді як надійну та уважну поведінку можна постійно спостерігати, коли LGD знаходиться поблизу худоби. Охорона також залежить від агресивного темпераменту собаки, виду і чисельності хижаків, чисельності поголів'я і кількості охоронних собак. Однак наявність у собаки дефіциту уваги відобразиться на захисній поведінці собаки.

Ключові слова: поведінка, LGD, охорона, прихильність, худоба, собака.