

Commentary

Livestock guardian dogs and cattle protection: opportunities, challenges, and methods

CAT D. URBIGKIT, P.O. Box 1663, Pinedale, WY 82941-1663, USA catu2@mac.com

Abstract: Producer interest in using livestock guardian dogs (*Canis lupus familiaris*; LGDs) to protect domestic cattle (*Bos taurus*) is driven by expanding large carnivore predator populations and increased public concerns regarding lethal predator control in North America. However, few resources exist to guide livestock producers regarding the use of LGDs to protect cattle. This paper summarizes published information and personal ranch experiences regarding the use of LGDs to protect cattle, describes livestock-producer identified challenges to more widespread adoption of this method to deter predators, and provides guidelines for introducing pups to LGD-naïve cattle herds. I recommend more extensive research on the use of LGDs with cattle, increased development of programs to place LGDs with cattle herds, as well as educational efforts targeting resource managers, livestock producers, and the general public.

Key words: *Bos taurus*, *Canis lupus familiaris*, *C. lupus*, cattle, gray wolves, grizzly bears, large carnivores, livestock guardian dog, livestock–predator conflicts, livestock protection, *Ursus arctos*

THE USE OF livestock guardian dogs (*Canis lupus familiaris*; LGDs) to protect domestic sheep (*Ovis* spp.), goats (*Capra* spp.), and a variety of other social species has gained widespread adoption on numerous farms and ranches throughout North America (VerCauteren et al. 2014). Recent recovery and expansion of large carnivore populations and an increase in livestock–predator conflicts have prompted interest by cattle (*Bos taurus*) producers in utilizing LGDs in areas of the western United States that are inhabited by gray wolves (*C. lupus*), grizzly bears (*Ursus arctos*), and other predator species. Unfortunately, little attention has been given to using LGDs to protect cattle, and thus producers have few resources readily available as guidance (VerCauteren et al. 2012). Most research papers on LGDs that do make mention of cattle provide few details on LGD use with this livestock species, with the exception of Gehring et al. (2010b), Gehring et al. (2011), and VerCauteren et al. (2012), and manuals developed by Carbonell and Cortés (2009) and van Bommel (2010).

The use of LGDs to protect cattle from large carnivore predators is more common in areas of Europe and Asia where guardian dogs originated. Thus, these areas have long histories of traditional use (Rigg 2001). Guardian dogs

are used to protect cattle in Turkey (Figures 1 and 2), in the Abruzzo region of Italy (C. Urbigkit, personal observation), and Spain and Portugal to protect unattended cattle in a variety of operations, from small pastures to large forested grazing areas (Álvares and Blanco 2014). More recently, LGDs have been deployed to protect cattle herds in Africa (Leijenaar et al. 2015), Poland (Nowak and Myslajek 2005), and Finland (Otstavel et al. 2009). In Australia, a ranch used 11 LGDs to protect 2,000 head of Brahman-cross steers from packs of wild dogs, while also keeping kangaroos (*Macropus* spp.) out of the cattle allotments (van Bommel 2010).

Some range sheep operators in America that also own cattle herds have deployed Akbash and Central Asian Ovcharka LGDs to protect both livestock species (Urbigkit 2016; Figure 3). The dogs have proven especially valuable during calving and lambing seasons, keeping newborns protected from predators and cleaning up afterbirth, ridding pastures of this predator attractant (P. R. Arambel, Midland Ranch, personal communication). Great Pyrenees LGDs have also been successfully socialized and bonded to cattle in the Great Lakes region of the United States and elsewhere, demonstrating their use to reduce predation and disease transmission (VerCauteren et al. 2008, Gehring



Figure 1. In October 2010, in a village in the Mus Province of eastern Turkey, cattle (*Bos taurus*) and their guardian dogs (*Canis lupus familiaris*) are released from paddocks in the morning, and the cattle and dogs from various owners are combined as they exit the village for day grazing, usually accompanied by 1 drover. The herd returns to the village at night, and the animals separate off to their own corrals (photo courtesy of C. Urbigkit).



Figure 2. As shown in this October 2010 photo, cattle (*Bos taurus*) are moved to the high country for summer and fall grazing in the Erzincan Province of northeast Turkey, similar to migratory herd movements on the western range in the United States. The livestock guardian dogs (*Canis lupus familiaris*; LGDs) stay with the cattle, while the drovers stay in encampments, visiting the cattle and feeding the LGDs every few days. The LGDs do not accompany the drovers back to cow camp but stay with livestock in the mountains until the cattle are moved to lower elevations before winter (photo courtesy of C. Urbigkit).



Figure 3. An adult Akbash livestock guardian dog (*Canis lupus familiaris*) with juvenile Central Asian Ovcharkas guarding beef calves (*Bos taurus*) in Sublette County, Wyoming, USA in 2018 (photo courtesy of C. Urbigkit).

et al. 2010b, VerCauteren et al. 2012).

In the above cases cited, LGDs have proven to be a cost-effective method to deter predation on livestock, with an annual maintenance cost for 1 LGD in the range of \$240–\$1,000 (Smith et al. 2000). Thus, the annual upkeep of 1 dog is generally compensated if it saves the life of 1–2 beef calves a year (van Bommel 2010). While LGDs alone will not prevent depredation, their use can lower livestock loss risk, making them an economic asset for livestock operations (Breitenmoser et al. 2005).

Challenges

Because of my family's personal experiences in utilizing LGDs with both cattle and sheep during the last 20 years, I am frequently asked to speak at producer workshops about that experience, as well as observations from our international travels to learn more about LGD use in various regions of the world. In discussions at grazing association and agency-sponsored workshops with western U.S. and Canadian cattle producers held 2010–2017, the participants voiced their concerns regarding the impediments to the adoption of LGD use with cattle. Their concerns can be sorted into 4 general categories: cultural, managerial, logistical, and structural.

Cultural

The LGDs are viewed as “sheep” dogs, and there is no cultural history or tradition of use within the cattle industry. Popular culture references LGDs as “sheepdogs.” See, for example, a Colorado newspaper headline, “A simple solution to sheepdog encounters?” (Rodebaugh 2012). Cattle producers in North America have the benefit of traditional knowledge in managing their cattle herds, but unfortunately, they do not have this tradition of knowledge exchange with LGD use (Ribeiro et al. 2017).

Managerial

Producers voiced concerns for conflicts with herding dogs, wildlife, and people, and they questioned how to deal with other dog behavioral issues. These are common concerns for producers new to using LGDs, whether with cattle, sheep, or other species (Ribeiro et al. 2017). The management and care of a domestic

species with unique behavioral traits requires practices for which these producers have little or no experience. In addition, cattle producers using public lands grazing allotments are wary of the risk of any conflicts involving their livestock operations on public lands in addition to concerns over liability.

Logistical

Cattle producers do not know how to get started with LGDs and how the dogs might be incorporated into their operations, especially in range production systems (Ribeiro et al. 2017). This appears to be among the most significant impediments to adoption of LGDs to deter predators from cattle.

Structural

There is no organized effort to place LGDs with cattle, as well as a lack of demonstration projects, in addition to agency opposition to the use of LGDs. For example, the Bridger-Teton National Forest rejected a grazing management strategy that would have included the use of LGDs to protect cattle, stating: “The Forest Service considered the use of guardian dogs to protect livestock and reduce grizzly bear–livestock conflicts. However, guardian dogs are more effective in guarding sheep that can be penned at night, rather than cattle that roam free. In addition, guardian dogs are aggressive and can pose a threat to recreationists and their dogs” (U.S. Department of Agriculture Forest Service 2017).

While these challenges are not insurmountable, I contend that without a concerted effort on the part of producers, state and federal agencies, and land-grant universities to address these issues, few producers can be expected to deploy LGDs to protect their cattle herds.

Recommendations

Cultural

To address the lack of cultural history or tradition of use of LGDs within the cattle industry, Ribeiro et al. (2017) recommended that information, training, and technical support be provided to producers new to guardian dogs. I also recommend that a concerted effort be made by federal agencies and land-grant universities to collect information and case studies (both from within North America and within other

regions of the world) on the use of LGDs with cattle for dissemination to cattle producers and grazing system managers.

An international information exchange program would be beneficial, such as a livestock-producer symposium designed for this information exchange between cattle producers. One such example is the Bovines & Bears Conference: An International Information Exchange on Reducing Conflicts Between Carnivores and Livestock, proposed by the Western Landowners Alliance. As proposed, this conference will bring together cattle producers from Eurasia and the Rocky Mountains to discuss reducing conflicts between brown bears and cattle, with special emphasis on transhumance grazing systems and the use of LGDs in those systems (C. Mannix, Western Landowners Alliance, personal communication).

Managerial

Management concerns such as conflicts with herding dogs, wildlife, people, and other dog behavioral issues can be addressed by a combination of providing relevant resources (see VerCauteren et al. 2012) to cattle producers and creation of guides to LGD management that are specifically targeted to cattle production. In addition, producers would benefit from knowledge-sharing with their peers who use LGDs (Ribeiro et al. 2017).

Logistical

Because the logistics of incorporating an LGD into a cattle operation appear to be among the greatest hurdles for producers, this is the area where I provide the most extensive recommendations. These recommendations are based on my 2 decades of experience in utilizing LGDs, as well as observations and interviews with producers in Europe and Asia.

The preferred LGD breed and timing to begin placement of pups with a naïve cattle herd are issues to be considered by the producer. Great Pyrenees dogs are a viable option for those new to raising LGDs because they have a strong protective instinct but are not aggressive toward people or livestock (Redden et al. 2015). For many cattle ranches, late fall and winter are ideal because cattle may be kept closer for winter feeding, giving the producer the ability to



Figure 4. Penning livestock guardian dog pup (*Canis lupus familiaris*) with orphan calves (*Bos taurus*) that must be bottle-fed offers optimal bonding conditions, as young animals from both species are curious and will explore each other in their enclosure (photo courtesy of C. Urbigkit).

supervise the socialization and bonding process. I contend that heavy predator pressure will require ≥ 1 LGD, and most producers will find that raising a second dog is easier than the first.

Because of unique field conditions of each ranch, I offer broad guidance on LGD use and management with cattle, while recommending each producer work with their animals to adapt to specific circumstances. With variations in acreage and terrain, cattle breed characteristics, husbandry practices, whether the herd is stationary or migratory, changing predator pressure associated with seasons, grazing patterns, and predator population fluctuations, there is no one-size-fits-all formula for incorporating LGDs into a working livestock operation. In addition, LGD behavior can vary not just within a breed but within a single litter, and behavioral changes may also occur with the age of the dog, its physical condition, and its experience with various predators.

There are numerous strategies for bonding pups with cattle, but I recommend placing young calves (or replacement heifers at weaning) in a pen or corral with pups as a first step for livestock producers (Figure 4). Within a few months, the calves and their guardians may be incorporated into a larger group of cattle, and the herd will begin to adjust to the presence of their new guardians. Younger cattle seem to adjust more quickly to the presence of LGDs than do older cattle, especially if older cattle have experienced chasing or attacks from canine predators in the past. Adult cattle can be socialized to LGDs by placing pups inside hay feeders inside a large pen or arena,

so when cattle reach through to graze, the dogs can sniff their heads and lick their faces. Some cattle accept this affectionate contact, but others remain more aloof. Once a herd becomes familiar with the presence of livestock guardian dogs, the dynamics of the LGD–herd interactions improve, since mature guardian dogs will help to raise the next generation of pups with proper behavior for that herd. Based on my own experience, as well as interviews with other livestock producers, and reviewing the existing literature, I propose the following guidelines for cattle producers interested in getting started using LGDs with their cattle herds.

Keys to success for producers

1. Purchase pups from working parents. Many producers using guardian dogs will have litters of pups available on occasion, and it is advisable to find pups that come from farms or ranches raising the same livestock species as the prospective guardian. A producer may have a preference for purebred dogs or for crosses between 2 guardian breeds but should not purchase a pup resulting from a cross with a non-guardian breed.

2. It is important that pups be placed with the livestock species they will grow up to guard during the pup's primary bonding period between the ages of 8 and 16 weeks. Producers new to raising LGDs are advised to raise a single pup, but with more experience, producers may feel comfortable in raising multiple pups at a time.

3. Start the pup in a bonding pen with a few calm and gentle calves, yearlings, or cows, with a protected area for the pup where it can access the livestock but can also escape to safety. Present the pup to the livestock under supervision, but give the pup quiet time where it can watch the stock. The pup will get to know its livestock first through watching and sniffing noses, followed by gentle exploration. Producers should visit often to supervise but should let the pup spend the majority of its time with its livestock. It's important that the livestock penned with the pup are calm animals that will not harm the pup. Producers can also add more cattle or rotate cattle through the pen, letting small groups of cattle become familiar with the pup as it grows.



Figure 5. Secure the livestock guardian dog (*Canis lupus familiaris*) pup's food so it can eat without competition from livestock. Allowing stock to eat the dog's food creates unnecessary conflict that can escalate as the dog grows in size (photo courtesy of C. Urbigit).

4. As the pup gains confidence in being in the company of the cattle, the group can be released into a larger area and with additional members of the herd. A gradual process of adding animals and range allows for the pup to become accustomed to its larger herd and landscape to develop more self-confidence in its guardian duties as its body grows. Make sure the pup is agile enough to avoid injury before placing it with LGD-naïve adult cattle. Adult cattle should be able to observe the pup for an extended period before the pup is released with the cattle.

5. Producers should give the pup attention and praise while it is with livestock. Producers must be able to call and handle their guardians for care, so it is important to establish a human–dog connection, ensuring the dog is comfortable and content as a working partner.

6. Be clear in teaching the pup what is expected from it, including staying within its territory. If the pup strays from the herd or follows a person to the house, it should be returned to the livestock. Begin teaching verbal commands at an early age, including coming when called, “No,” and “Go to the cows.”

7. Give the dog the benefit of training and experience. Train the pup to a few commands, to wear a collar, walk on a leash, be tethered on a cable, and be held in a crate or kennel. Walk the pup into buildings and stock trailers, take it for rides in the farm truck, and let the pup learn what it feels like to be examined, brushed, and restrained. Introduce the pup to other farm animals (including other species of livestock, herding dogs, chickens, etc.) that it will need to be familiar with as it matures.

8. Expose the pup to a variety of experiences it will be expected to understand later in life. From learning the dangers of vehicles and farm equipment, to encounters with people riding bicycles and motorcycles, early exposure to new experiences will aide the dog in its future success.

9. Provide human supervision, correcting bad behaviors early on so they are not repeated. Since LGDs are naturally independent in their decision-making rather than waiting for a human command to take action, it is important to provide guidance while the pup is young. VerCauteren et al. (2012) provide an excellent summary of problem behaviors, their causes, possible solutions, and references for more details.

10. Feeding routines are important. Feed the pup near the livestock (not at the ranch house), preferably at the same time every day (Figure 5). Provide adequate nutrition to the pup but be careful not to overfeed or underfeed.

11. Make overall care a routine. An LGD is a valuable working animal that needs regular veterinary care, from keeping updated on vaccinations to ensuring the animal is not wounded or needing other care.

12. Until the pup has proven its reliability, use caution during the livestock-birthing season. Guardian dogs may want to clean newborns or may show such an interest in a newborn calf that it disrupts the mothering process. When a dog reaches the point it lounges nearby without interfering, it is well on its way to being an effective herd protector.

Structural

Without institutional support for cattle producers to utilize LGDs, few producers will be willing to try this method to protect their cattle. Structural support should include the following:

1. Workshops should be available for cattle producers, introducing them to the concept and practices involved in placing LGDs with their cattle. In addition, nongovernmental and governmental organizations should work with cattle industry trade groups in organizing and funding an international livestock-producer symposium designed for information exchange between cattle producers about the use of LGDs in protecting their herds.



Figure 6. There are 3 primary behaviors exhibited by successful livestock guardian dogs (*Canis lupus familiaris*): attentiveness to livestock by maintaining a close association with stock, following and loafing inside the herd or nearby; demonstrating trustworthiness by not disturbing or attacking livestock and displaying submissive or investigatory behaviors; and exhibiting protectiveness by reacting to intrusions and disrupting potential attacks (Lorenz and Coppinger 1996; *photo courtesy of C. Urbigkit*).



Figure 7. The animals learn to read each other's body language, and cattle (*Bos taurus*) learn to take behavioral cues from their livestock guardian dog (*Canis lupus familiaris*), as do these Hereford cows with Akbash guardians in Wyoming, USA in 2013 (*photo courtesy of C. Urbigkit*).



Figure 8. Use smaller pastures with younger dogs, realizing that it takes a livestock guardian dog (*Canis lupus familiaris*) 2 years to fully mature (*photo courtesy of C. Urbigkit*).

2. Creation of an education manual and other resources for cattle producers should address management concerns such as successful bonding, correcting problem behavior, and best management practices for LGDs (Figures 6 and 7).

3. Demonstration projects in which LGDs are placed with willing cattle producers as well as support and guidance should be provided to producers as the pups mature (Figure 8). In some cases, resource teams should be created to assist the producer or grazing association in development of an LGD program specific to individual ranches and grazing systems, such as migratory cattle operations involving federal land or common grazing allotments, and in areas where ≥ 1 large carnivore species is present. Documentation and information sharing from these projects would then benefit other interested producers.

Creation of federal and/or state funding programs for LGD placement would provide the cost of purchasing and placing pups, microchip and vet care, dog food and supplies, spay or neuter if desired by the producer, and cost-sharing in liability insurance.

Educational campaigns should target 3 primary audiences: cattle producers, as discussed above; resource managers, to increase agency knowledge of state of the LGD science; and the general public, so that the public can understand why LGDs are used and appropriate human behavior to minimize conflicts.

There should be increased effort to document specific training strategies for bonding LGDs to cattle in varied production systems, with evaluation of effectiveness, limitations, etc.

Conclusions

The use of LGDs has continued and expanded globally because of flexibility and versatility of the animals, providing for use with a variety of species, grazing systems, and predator challenges (Gehring et al. 2010a). The cultural, managerial, logistical, and structural issues identified in this paper point to a combination of both LGD-naïve livestock owners and cattle herds, providing justification to initiate efforts to develop programs and conduct research on the placement of LGDs with cattle herds, as well as creation and distribution of educational materials for targeted audiences including resource managers, livestock producers, and the general public.

Acknowledgments

The author thanks the Wyoming Animal Damage Management Board, Wyoming Wool Growers Association, Green River Valley Cattlemen's Association, and the Wyoming Stock Growers Association for supporting her research on successful livestock guardian dog traditions. Comments provided by J. Tomeček, HWI associate editor, and 3 anonymous reviewers greatly improved earlier versions of this manuscript.

Literature cited

- Álvares, F., and J. C. Blanco. 2014. Recovering traditional husbandry practices to reduce wolf predation on free-ranging cattle in Iberia. *Carnivore Damage Prevention News* 10:4–9.
- Breitenmoser, U., C. Angst, J-M. Landry, C. Breitenmoser-Würsten, J. D. C. Linnell, and J. Weber. 2005. Non-lethal techniques for reducing depredation. Pages 49–71 in R. Woodroffe, S. Thirgood, and A. Rabinowitz, editors. *People and wildlife, conflict or co-existence?* Cambridge University Press, Cambridge, United Kingdom.
- Carbonell, I., and Y. Cortés. 2009. The mastiff: a rancher's best friend. A mastiff education and care manual. Fundación Oso Pardo, Cantabria, Spain.
- Gehring, T. M., K. C. VerCauteren, and A. C. Cellar. 2011. Good fences make good neighbors: implementation of electric fencing for establishing effective livestock protection dogs. *Human–Wildlife Interactions* 4:144–149.
- Gehring, T. M., K. C. VerCauteren, and J-M. Landry, 2010*b*. Livestock protection dogs in the 21st century: is an ancient tool relevant to modern conservation challenges? *Bioscience* 60:299–308.
- Gehring, T. M., K.C. VerCauteren, M. L. Provost, and A. C. Cellar. 2010*a*. Utility of livestock-protection dogs for deterring wildlife from cattle farms. *Wildlife Research* 37:715–721.
- Leijenaar, S., D. Cilliers, and K. Whitehouse-Tedd. 2015. Reduction in livestock losses following placement of livestock guarding dogs and the impact of herd species and dog sex. *Journal of Agriculture and Biodiversity Research* 4:9–15.
- Lorenz, J. R., and L. Coppinger. 1996. Raising and training a livestock-guarding dog. Oregon State University Extension, Circular 1238, Corvallis, Oregon, USA.
- Nowak, S., and R. W. Myslajek. 2005. Livestock guarding dogs in the western part of the Polish Carpathians. *Carnivore Damage Prevention News* 8:13–17.
- Ostavel, T., K. Vuoric, D. Sims, A. Valrosa, O. Vainioe, and H. Saloniemia. 2009. The first experience of livestock guarding dogs preventing large carnivore damages in Finland. *Estonian Journal of Ecology* 58:216–224.
- Redden, R. R., J. M. Tomeček, and J. W. Walker. 2015. Livestock guardian dogs. Texas A&M AgriLife Extension, EWF-028, College Station, Texas, USA.
- Ribeiro, S., J. Dornig, A. Guerra, J. Jeremic, J-M. Landry, D. Mettler, V. Palacios, U. Pfister, S. Ricci, R. Rigg, V. Salvatori, S. Sedefchev, E. Tsingarska, L. van Bommel, L. Vielmi, J. Young, and M. Zingaro. 2017. Livestock guarding dogs today: possible solutions to perceived limitations. *Carnivore Damage Prevention News Summer* 15:36–53.
- Rigg, R. 2001. Livestock guardian dogs: their current use world wide. IUCN/SSC Canid Specialist Group Occasional Paper No. 1.
- Rodebaugh, D. 2012. A simple solution to sheepdog encounters? *The Durango Herald*. February 8, 2012.
- Smith, M. E., J. D. C. Linnell, J. Odden, and J. E. Swenson. 2000. Review of methods to reduce livestock depredation: I. guardian animals. *Acta Agriculturae Scandinavica, Section A—Animal Science* 50:279–290.
- Urbigit, C. 2016. *Brave and loyal: an illustrated celebration of livestock guardian dogs*. Skyhorse Publishing, New York, New York, USA.
- U.S. Department of Agriculture Forest Service. 2017. Draft record of decision Upper Green River Area Rangeland Project. Pinedale Ranger District, Bridger-Teton National Forest. Pinedale, Wyoming, USA.
- van Bommel, L. 2010. *Guardian dogs: best practice manual for the use of livestock guardian dogs*. Invasive Animals Cooperative Research Centre, Canberra, Australia.
- VerCauteren, K. C., M. J. Lavelle, and G. E. Phillips. 2008. Livestock protection dogs for deterring deer from cattle and feed. *Journal of Wildlife Management* 72:1443–1448.
- VerCauteren, K. C., M. J. Lavelle, T. M. Gehring, and J-M. Landry. 2012. Cow dogs: use of live-

stock protection dogs for reducing predation and transmission of pathogens from wildlife to cattle. *Applied Animal Behaviour Science* 40:128–36.

VerCauteren, K. C., M. J. Lavelle, T. M. Gehring, J-M. Landry, and L. Marker. 2014. Dogs as mediators of conservation conflicts. Pages 211–238 in M. E. Gompper, editor. *Free-ranging dogs and wildlife conservation*. Oxford University Press, Oxford, United Kingdom.

Associate Editor: John Tomeček

CAT D. URBIGKIT is a western Wyoming rancher who uses livestock guardian dogs with sheep and cattle and has traveled throughout Europe, Asia, and Africa to learn about guardian dog use with livestock. She is the author of numerous books on livestock guardian dogs, predators, and pastoralism, including *Brave and loyal: an illustrated celebration of livestock guardian dogs*.

