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Livestock Guardian Dogs

Photo provided by John Walker

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Domestic livestock, particularly sheep and goats, are susceptible to predation from various wild and domesticated animals. With the proper instinct and training, livestock guardian dogs (LGD) can minimize predation on livestock. Such was the case when Texas A&M AgriLife Research acquired the Carl and Bina Sue Martin Research Ranch in 2009. The ranch weaned only a 20 percent lamb crop that year. Livestock guardian dogs were acquired to reduce predation, and since 2012 the lamb crop has exceeded 100 percent. Other sheep and goat producers have used LGD and have had similar results.

Though common elsewhere for centuries, LGD have only been used commonly in the US since the late 1970s. As a result, many livestock producers are unfamiliar with how best to use these dogs to reduce predation. What follows are the basics of guardian dog behavior, training, and how to integrate them into a livestock operation. This information combines anecdotal experience and scientific research on canine behavior.

How LGD reduce predation

Unlike methods such as hunting and snaring that are used after predation occurs, guardian dogs can prevent predation by deterring predators all the time. This level of security can save you money and increase your peace of mind.

Guardian dogs reduce predation in three major ways: 1) territorial exclusion, 2) disruption, and 3) confrontation. Territorial exclusion is particularly important for protection against other dog like (canid) predators. All dogs, whether wild or domestic, use scent to mark the boundaries of their territory. Other canids, even of different species, recognize these boundaries and tend to seek unoccupied areas rather than risk invading another dog's territory. Disruption is aggressive behavior such as barking and posturing that falls short of direct physical aggression. Finally, confrontation is used when predators are not dissuaded by exclusion or disruption. However, even confrontation is not necessarily lethal to the potential predators.

Properly reared guardian dogs are exposed to livestock from birth. They do not regard livestock animals as competition for territory but rather an extension of their pack. Guardian dogs include livestock within their territory, and they prevent losses by discouraging predators, such as coyotes, from that territory. Ultimately, predators avoid protected pastures and keep safely away from flocks to avoid being detected or confronted by the guard dog.

Competition is common among all canine species (wolves, foxes, coyotes, domestic dogs, etc.), and they will typically harass or kill other canine species in their territory. Canines respond more strongly to other canines than to other species, such as bobcats. For that reason, guardian dogs are considered especially effective at reducing predation by coyotes—the number 1 predator of sheep and goats in the US.

Effective livestock guardian dogs

- bond well to livestock and travel with the herd
- exhibit protective behavior against intruders
- establish areas that predators avoid
- remain on premises

Problem livestock guard dogs

- roam beyond ranch borders
- leave the herd unprotected from dusk to dawn
- are overly aggressive toward humans, livestock, and nonpredatory wildlife
- are ineffective at deterring predators

Finding the right guardian dog

Every dog has its own personality and every ranch has unique livestock protection needs. Some dogs prefer to stay with the livestock all the time, whereas others like to roam the perimeter. Some dogs are very aggressive and chase predators that invade their territory, whereas others dogs would rather remain with flock and bark to warn off predators (Fig. 1). Matching a dog's behavior to the rancher's needs is very important. Take the time to talk to dog breeders and other ranchers before buying a guardian dog.

Some breeders market fully trained or bonded livestock guardian dogs. If you do not have guardian dogs and are suffering heavy predation, this is a good option because trained dogs can begin working immediately. Conversely, it takes 12 to 24 months for puppies to become effective guardians. Trained dogs are more expensive but they are often worth the investment. This is especially true if the breeder offers money back or full replacement guarantees. The risks with purchasing a trained LGD include their running away or failure to bond with new livestock. Discuss these possibilities with the breeder before moving a dog onto your property.

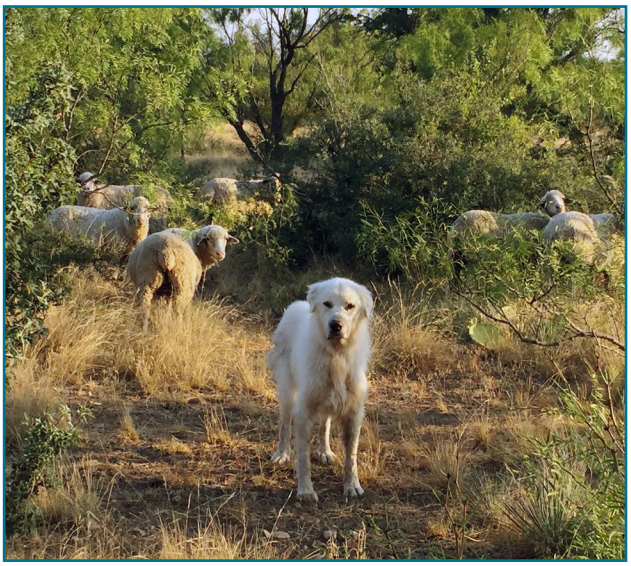

Figure 1. Most often, the dominant guardian dogs will investigate disturbances in a pasture and create a buffer space between themselves and their flock/herd. *Photo provided by Reid Redden*

Before you release a guardian dog, tell your neighbors you are adding a dog or dogs to the ranch and what steps you would prefer they take if your dogs are found off the property. It is wise to use dog tags that include contact information and indicate that the dog is a livestock protection animal. Post signs on the ranch boundary with public roads to inform people that guardian dogs are working (Fig. 2).

Figure 2. Ranchers should use signage that indicates livestock guardian dogs are in the area. This can prevent conflict and provide contact information for people who suspect a problem. *Photo provided by Reid Redden*

Bonding guardian dogs to livestock

Research shows that social bonding between dogs and small ruminants depends on imprinting the puppies when they are roughly four to sixteen weeks old. This developmental stage will "set" the dog's adult behavior. In other words, imprinting changes the dog forever. During this time, the pup has the greatest capacity to learn particular social skills. This is when dominance hierarchies are formed and dogs learn and practice their submissive behaviors. Some people say that the dog thinks it is a sheep, but that is wrong. It knows it is a dog—the social behaviors it directs toward the sheep are typical of dogs, not sheep.

Old world shepherd dogs typically spend their first sixteen weeks with one or two littermates, a few adult dogs including their mother, a few hundred sheep or goats, and a shepherd. After sixteen weeks, the dog has been behaviorally molded in such a way that it prefers to spend the rest of its life with the group. Since most sheep in Texas are not herded, a human is most often absent from the flock social structure. During the bonding phase, modifications must be made to allow the young guardian dogs to bond with small ruminants without constant human supervision.

Guardian dogs are usually trained on the rancher's property with the livestock they will be guarding. Training these dogs is not difficult and is even easier when you understand some basic concepts. Animals respond and learn more quickly when rewarded than when punished. It is more important to stop inappropriate behaviors than to punish them and air horns, such as the ones typically used in boats, are a great training aid. These horns are handy and a short blast or two can usually stop unwanted behavior at a considerable distance. When you disrupt and stop certain behaviors, dogs should ultimately abandon them. There are a few simple guidelines to follow when bonding a dog to livestock.

▸ Start them young

The ideal time to begin bonding guardian dogs to livestock is from 4 to 8 weeks of age, while they are still nursing. Research indicates that dogs might not properly bond with livestock if the bonding phase is started after the dog is 16 weeks old.

Figure 3. This is a bonding pen for young livestock guardian dogs. In this case, a ewe with lambs are being used. It is important to use animals that are accustomed to guardian dogs and include all species of livestock the dog may be required to protect. Do not allow the dog to bite or chew on weak or small animals. The area in the background is blocked off for the guard dog and its feeding station. *Photo provided by John Walker*

▸ Use small bonding pens

Place one or two LGD puppies in small pens (150 square feet) with 3 to 6 livestock animals (Fig. 3). Livestock used for bonding should have previously been socialized with dogs and not be aggressive toward them. Dams and their offspring that have been socialized to guard dogs are excellent candidates. However, you can use dams that do not have experience with dogs as long as you are vigilant and remove animals that are aggressive toward the LGD. Socialized dams and their offspring will provide companionship to the dogs while not tolerating inappropriate behavior from the pup. If possible, puppies should be socialized with hair and wool sheep and lambs, and meat and angora goats. Although you may have only one class of livestock, your neighbors may have different animals. If your dogs have not been socialized broadly, it increases the possibility that they may be blamed for injury to neighboring livestock. The LGD puppies should have an area in the pen where livestock are excluded at feeding time. At around 16 weeks, these LGDs-in-training can be released with their bonded livestock into larger pens or small pastures. They should be monitored closely for the following couple of weeks.

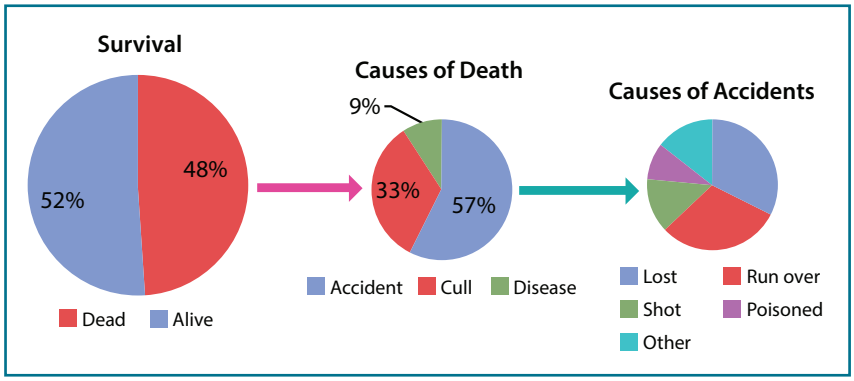

FIGURE 4. Six year survival of LGDs and causes of losses. Most accidents would not have occurred if the LGD had not left the grower's property (Lorenz et al. 1986).

▸ Teach respect for the boundary fence

This is the most important lesson that a guardian dog can learn. Research shows that only 52 percent of guardian dogs live to be 6 years old and that 57 percent of their fatalities occur when they leave the property (Fig. 4). The next highest loss is due to culling because of poor behavior, which includes escaping. The saying "good fences make good neighbors" also applies to livestock and guard dogs. However, on many properties this is not possible and some dogs will find a new hole in the fence each time another is patched. If you observe this behavior during the bonding period, and this is when it usually happens, the dog should be culled. A triangular PVC collar can be used as a training aid to prevent dogs from breaching fences. Some producers also use electric fence to keep livestock and LGD within pastures or bonding pens.

▸ Teach basic commands

The LGD puppies should be taught a "come" command. You can do this when feeding the puppies and the livestock. When feeding or checking on the LGDs in training, mild acts of affection such as petting on the head or scratching their belly, is encouraged to reinforce a "come" command. However, these should be brief to avoid excessive bonding between owner and dog.

LGDs should also be taught a "no" command. Air horns can be very effective for stopping unwanted behaviors. It is common for LGDs to bite or chew on livestock during the bonding phase and it is not necessarily a sign that they will be an ineffective guardian. Correct this behavior immediately. In larger enclosures and 5- to 10-month-old dogs may chase the animals with which they are bonding. You can use a dangle chain with an object such as a short length of 2 by 4 attached to slow the dog and stop this chasing behavior. Livestock that are being chewed on are often the weakest and should be removed from the flock used for the bonding process.

Normal LGD behavior

Ideally, guardian dogs should approach people and animals that come near their herd. A simple pat on the head rewards them for good behavior. However, they should return to the herd shortly after learning that the intruders mean no harm. Some LGDs will spend much of the day sleeping and be alert at dawn and dusk. Good guard dogs often roam the perimeter of the ranch or pasture. It is not necessary that they remain with the herd at all times. However, guardian dogs should not spend too much time away from the herd unless they are patrolling for signs of intruders. Dogs caught roaming off the premises or loitering away from the herd, such as at ranch headquarters, should be disciplined appropriately. They can be given a stern "no" command or blast from an air horn and prompted to return to their herd. If this does not correct the behavior, some breeders have found that kenneling a dog away from their herd for a day or two is enough to keep them from doing it again.

Breeds of LGD

The most common LGDs in Texas are Great Pyrenees, Anatolian Shepherds, Maremma, or Akbash. These or similar guardian dog breeds are highly suggested. Breeds that do not have strong protective instincts are less likely to be effective. Breeds whose instinct is to hunt or herd have behaviors that are counterproductive to guarding small ruminants and rarely become effective LGDs. Survey data indicates that the Great Pyrenees is the

most common guardian dog, primarily because it is a good guardian breed and is the least aggressive towards people and livestock. Since most people who own sheep and goats have small flocks and live in more populated areas, these dogs are a good fit. However, larger range flocks might require a more aggressive breed to control predation. The Akbash is regarded as the most aggressive and protective breed for small ruminants. Regardless of breed, animals within them differ widely and you should pay particular attention to the tendencies of the individual dog.

Sex of LGDs

Either sex can be an effective LGD and spaying or neutering does not seem to decrease a guardian dog's protectiveness. Females tend to stay with the flock/herd and males tend to roam more and protect the perimeter. Some ranchers find that having both provides the best protection. Others prefer only males or females. Neutering males tends to reduce how much they roam and can be beneficial, especially when this roaming conflicts with neighbors. Heat cycles for intact females can disrupt protection by drawing in outside dogs or distracting male LGDs from their duties. In addition, when females whelp and rear a litter of puppies, they are not as effective in their role as protectors.

How many dogs do you need?

The number of dogs required for optimal protection varies according to the size of pasture, number of herd groups, topography, flocking instinct of the livestock, number and species of predators, fencing, and guardian dog behavior. The general recommendation is one dog per 100 ewes or does. However, this number is not absolute. Except for small flocks that are close to the house, two dogs are probably more desirable because if one dog is lost the animals will still be protected. On the other hand, flocks of 1,000 or more seldom have more than six LGDs. Start with one or two dogs and evaluate their effectiveness after they reach maturity. Adding newly bonded dogs to a herd that has a mature and effective LGD already in place, is often more successful than starting with three or more untrained dogs. Younger dogs learn from mature guardians. Add new LGDs periodically to achieve an even age distribution and ensure there are always adequate numbers of mature, effective LGDs with the flock.

Figure 5. This self-feeder is made from three panels arranged as a triangle. The right side of the pen and has a small panel with a 2-foot space at the bottom for dogs to go under. *Photo provided by Reid Redden*

Proper care

Feed your guardian dogs high quality dog food, especially adolescent LGDs. This will help ensure good health and keep dogs from roaming in search of food. Dog food is usually dispensed via self-feeders or daily feeding. If you do not visit the herd daily, you can use self-feeders that exclude the livestock (Fig. 5). However, these self-feeders often draw varmints, such as raccoons. These varmints will greatly increase annual the cost of dog food if they are not dealt with. If you check the livestock daily, LGDs can be fed during normal flock checks. This rewards the dogs for remaining with the herd and provides a structured feeding pattern. Hand feeding eliminates varmint issues and cuts down on waste by reducing overconsumption by the dogs. LGDs often seek out birthing ewes/does to feed on the afterbirth (Fig. 6). Most ranchers allow this because it helps LGDs gain body weight during the lambing/kidding period and they provide added protection from raccoons, skunks, foxes, and crows, etc., that prey on newborns.

FIGURE 6. Dogs are attracted to animals at parturition and provide added protection when small ruminants are most susceptible to predation. *Photo provided by Brian Payne*

Health care for LGDs should be planned carefully in consultation with a licensed veterinarian and include scheduled vaccinations, deworming, and heartworm prevention. You should also control external parasites, such as fleas and ticks. Consider rattlesnake vaccines as added protection for LGDs because they are more likely to encounter rattlesnakes than normal pets. Some breeds of guard dogs require grooming to prevent matted coats and heat stress. On occasion, a dog will need help removing porcupine quills. Longevity is one of the most important ways to reduce LGD cost—good health care is essential.

Additionally, do not let guard dogs eat carcasses. If guardian dogs consume diseased meat, their feces can indirectly infect livestock with diseases such as sheep measles resulting in carcass condemnation.

Limitations when using LGDs

Using guardian dogs limits your ability to use other predator protection measures, such as snares and M44s. However, many producers find that that guard dog benefits outweigh the limitations. In addition, if they respect the boundary fence, you can use lethal protection strategies outside the LGD area. Ideally, an effective guard dog program would preclude the need for other control methods. However, some producers still prefer to use snares for predators in combination with LGDs. Dogs that are caught in snares usually survive if the snares are checked daily. This strategy is risky though, considering the cost and effort needed to train guardian dogs. We recommend conditioning dogs to snares in a controlled setting before using them in the field. You may want to use nonlethal snares during the training period.

Cost of LGDs

Most sheep and goat producers consider their guard dogs an asset to the operation; however, there are significant costs associated with them. Estimated first-year cost for a new guard dogs is at least $1,000. Annual costs thereafter are about $500. Figure 7 shows the importance of LGD longevity of service. The cost of LGD for the initial 3 years is high because of the purchase cost and because they provide limited protection the first year. However, by the time they are 5 years old a guardian dog only has to save 5 lambs per year to cover its cost. Though considerable, no value is assigned to the peace of mind and increased shepherd longevity that a successful LGD program can provide. Local breeders and veterinarians can give you a more accurate assessment of guard dog costs in your area. These costs are often small compared to losses from predation, not to mention the value of peace of mind.

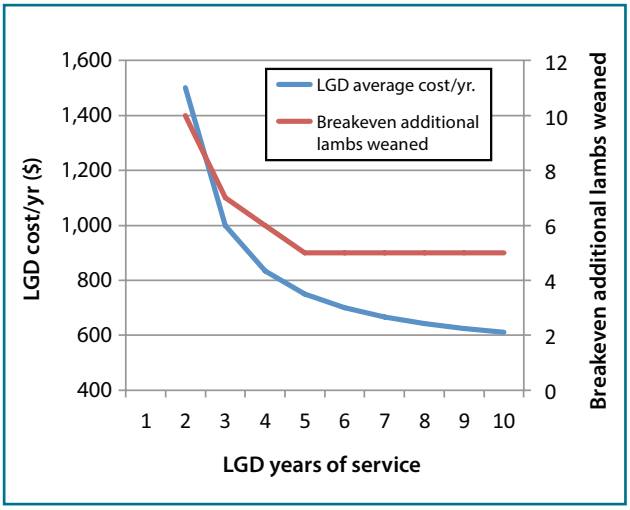

FIGURE 7. Effect of LGD longevity on average annual cost and breakeven additional lambs weaned. Assumes little LGD value for first year—values reflect the end of the second and succeeding years. LGD cost is $1,000 the first year, $500 each succeeding year. Lambs are valued at $140 each.

LGDs and nonpredatory wildlife

When choosing LGDs to manage predators in your livestock operation, you must also consider their effects on nonpredatory wildlife. For many, this wildlife is integral to a sheep or goat producer's income stream. Some wildlife may also have state or federal protection against harassment under the Endangered Species Act or similar statues. Negative guard dog impact on wildlife could have serious economic and legal consequences for the livestock operation. If you or neighbors suspect your dogs of killing nonpredatory wildlife, you must carefully identify the culprit before assigning blame. Although well-trained dogs are unlikely to harass nonpredatory wildlife, you must be aware of the possibility in order to correct them.

▸ Deer

On many sheep and goat operations, fee hunting for whitetail deer is an important revenue source. Small numbers of guard dogs have been documented to chase, harass, and kill deer. In these instances, the guard dog has identified the deer as a trespasser. If this behavior cannot be corrected, the dog might need to be removed or restrained from specific areas at certain times of the year. On the other hand, dogs that do not interfere with deer and keep predators away provide a safe haven for deer to rear their offspring (Fig. 8). Recent reports indicate that captive deer breeders are using LGDs to decrease predation of fawns.

Figure 8. This guardian dog found a newborn fawn hidden in tall grass. The guardian dog provided a safe haven for the deer. In other situations, guardian dogs may prey on newborn fawns. How a dog behaves depends on the dog and its environment during the bonding phase. *Photo provided by Double A Ranch*

▸ Small Game

Small game such as rabbits, squirrels, etc., can have economic value, but they can also be harassed by LGDs or even eaten as a food. Many predators rely on this small game as their primary food source and removal this food source may cause predators to focus attention on livestock for food, when otherwise they might not.

▸ Gamebirds

Bobwhites, turkeys, doves, and other game birds are important to fee hunting operations on agricultural lands in Texas. While doves might easily escape LGD harassment, ground-nesting birds such as quails and turkeys cannot. If stressed repeatedly by LGDs, these game birds can suffer decreased immune system health and even die. Females that are incubating nests in the summer may abandon their nests if disturbed by dogs. This reduces annual bird production and hunting opportunities. Conversely, guardian dogs that do not disturb game birds might reduce predation and improve recruitment of their offspring.

▸ Threatened and endangered species concerns

Although unlikely in most of Texas, LGDs may harass or harm wildlife that is protected under the Endangered Species Act. In some regions of the country, this is already a significant challenge to livestock producers. In the western portion of Texas where sheep and goat production is greatest, several species are currently listed as threatened or endangered, with more under consideration. To avoid legal problems, consult a wildlife biologist about where protected species might live on your property, if interaction with your dogs is a possibility, and how to prevent your dogs from interfering with them. Conversely, LGDs could reduce predation on endangered species. In Australia, guardian dogs are used to protect threatened seabird colonies from predation and are credited with increases in penguins and Australasian gannets.

▸ Varmints

Varmints such as raccoons and opossums, etc., often become an overabundant nuisance for both ranchers and LGDs. This happens most

often at feeders used for LGDs, wildlife such as whitetail deer, or for livestock. Placing dog feeders where they are less likely to be targeted by varmints can sometimes solve the problem. Most varmints move only at night, so placing a feeder near sheep bedding sites or in a large open space away from trees where varmints seek cover will help reduce the problem. If this does not work, you may need to trap them near the LGD feeders. Special dog-proof leg traps should be used if necessary.

LGDs, disease prevention, and non-target wildlife

Although not used extensively in this way, there are opportunities for LGDs to prevent disease in livestock. One disease of particular interest is cattle tick fever, which can be transmitted to beef cattle by whitetail deer and nailgai antelope. Cattle ranchers in South Texas have used LGDs to limit interaction of livestock and wildlife to reduce potential disease transmission. In these situations, LGDs can provide a nonlethal solution to minimize infected livestock without depopulating wildlife.

Conclusions

Properly trained and well-managed livestock guardian dogs can be a very effective method for controlling predation. Sheep and goat ranchers beginning a LGD program should realize that it might take a couple of years for the program to become fully effective. Some dogs do not work out and will need to be replaced. Guardian dogs, like other livestock, must be assessed individually. By observing and selecting them carefully, their effectiveness should improve over time. Trained livestock guardian dogs are often regarded as the primary component of a small ruminant predator management plan.

Photo provided by Hattie Barham

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