PROCEEDINGS of The First Eastern Wildlife Damage Control Conference

SK
352
.E27
1983

Edited by
Daniel J. Decker

September 27-30, 1983
Sheraton Conference Center
Ithaca, New York

Library

Sponsored by

Cooperative Extension
Department of Natural Resources
New York State College of Agriculture and Life Sciences
Cornell University

In cooperation with

State University of New York College of Environmental Science and Forestry at Syracuse

New York State Department of Environmental Conservation

Natural Resources and Rural Development Unit, Extension Service, U. S. Department of Agriculture

Library
USDA APHIS Wildlife Services
National Wildlife Research Center
4101 LaPorte Avenue
Fort Collins, CO 80521-2154

CORNELL COOPERATIVE EXTENSION

Price $10.00

WILDLIFE RESEARCH CENTER LIBRARY
90012482

THE USE OF EURASIAN DOGS TO PROTECT SHEEP FROM PREDATORS IN NORTH AMERICA: A SUMMARY OF RESEARCH AT THE U.S. SHEEP EXPERIMENT STATION

Jeffrey S. Green, Research Wildlife Biologist, U.S. Department of Agriculture, Agricultural Research Service, U.S. Sheep Experiment Station, Dubois, Idaho 83423 and Roger A. Woodruff, Wildlife Biologist, University of Idaho, U.S. Sheep Experiment Station, Dubois, Idaho 83423

The authors thank the sheep producers who cooperated in the study. R. Harman, R. VanHorn, S. Ecret, K. Havelock, J. Geiser, W. Bowers, G. Pendleton, D. Johnson, and C. Schwartz helped with the care and evaluation of the dogs.

In the search for methods to reduce coyote *(Canis latrans)* predation on sheep, livestock guarding dogs have been found to be a relatively successful technique in a variety of conditions including open rangeland (Green and Woodruff in press) and fenced pastures (Linhart et al. 1979, McGrew and Bakesley 1982, Pfeifer and Goos 1982, Green et al. In Press a). Eurasian dogs (Coppinger and Coppinger 1980b) and mongrel dogs (Black 1981) reared from puppyhood with sheep become attentive to the flock, generally remain with sheep, and subsequently help to reduce predation (Coppinger et al. 1983).

Although an initial investment averaging approximately $850 is required to purchase and maintain a guarding dog for the first year, with subsequent yearly maintenance costs of approximately $274, many livestock producers feel the benefits exceed the cost (Green et al. In Press b). The use of guarding dogs has appeal for a variety of reasons. However, the method is not free from problems, some of which can significantly outweigh the benefits (Green and Woodruff 1983, Green et al. 1983).

In this paper we summarize the results of nearly 6 years of research with traditional breed livestock guarding dogs and detail the advantages and disadvantages of the technique, as well as considerations that have not been discussed sufficiently in other papers.

METHODS

Details of the dog rearing and socialization process were presented previously (Green and Woodruff 1983, In Press; Green et al. In Press a). Briefly, the majority of the dogs were purchased from commercial kennels at approximately 8 weeks of age and were reared with lambs at the U.S. Sheep Experiment Station (USSES) near Dubois, Idaho. Some of the dogs were evaluated at the USSES while others were observed and evaluated by private sheep producers.

The following criteria were used to rate the dogs: the degree of predation during the trial compared to predation previous to the trial, comparison of predation in flocks with a dog to predation in nearby flocks not attended by a dog, evidence of encounters between the dog and potential predators, the ease with which the dog became integrated into the livestock operation, evidence of the dog displaying guarding behaviors (i.e., barking, patrolling, remaining near the sheep), the frequency of occurrence of significant problems (i.e., dog wandering excessively; dog harassing, injuring, or killing livestock; dog posing a serious threat to people), and the producer's subjective evaluation of the effectiveness of his dog. The following ratings were given: GOOD-dog generally remained near sheep, incidents of predation markedly reduced or kept to a minimum; FAIR-dog had potential, predation somewhat reduced, benefits outweighed problems, or POOR-dog had no influence on predation, major problems outweighing benefits. A dog was judged successful when it received either a good or fair rating and was judged unsuccessful when it received a poor rating. Data were analyzed using Chi-square, and P values <0.05 were considered significant.

RESULTS AND DISCUSSION

EVALUATION

The combined most recent ratings for 63 dogs were as follows: GOOD 67%, FAIR 13%, and POOR 20% (Table 1). The rate of success among breeds differed significantly. Great Pyrenees were significantly more successful on rangeland ($P<0.001$) and in pastures ($P<0.05$) than either Komondorok or Akbash Dogs. An insufficient number of Shars were evaluated to allow meaningful comparisons with the other breeds. Komondorok were significantly ($P<0.001$) the least successful breed on rangeland, and Akbash Dogs were significantly ($P<0.01$) the least successful breed on pastures. There was no significant difference between the success rates of male and female dogs.

The success rates of dogs in their first and succeeding trials are detailed in Table 2. Overall, 76% ($n=49$) of the dogs were successful in their first pasture trial, and 51% ($n=39$) were successful in their first rangeland trial. Results of second, third, and fourth trials indicate that dogs that fail in one situation may succeed in another. However, the reverse can also be true; 2 dogs that passed their first tests failed their second. When breeds were compared, a significantly

Table 1. Most current rating of livestock guarding dogs reared at the U.S. Sheep Experiment Station.

	Komondor			Great Pyrenees			Akbash Dog			Shars			Total		
	G*	F	P	G	F	P	G	F	P	G	F	P	G	F	P
asture	62	19	19	75	25		43	14	43	100			62	22	16
	(n=16)			(n=12)			(n=7)			(n=2)			(n=37)		
ange	20		80	90		10	67		33				67		33
	(n=5)			(n=10)			(n=6)						(n=21)		
ange-asture				100			100						100		
				(n=4)			(n=1)						(n=5)		
Total	53	14	33	81	15	4	57	7	36	100			67	13	20
	(n=21)			(n=26)			(n=14)			(n=2)			(n=63)		

*G = Good - dog generally remains near sheep, incidents of predation markedly reduced or kept to a minimum
F = Fair - dog has potential, predation somewhat reduced, benefits outweigh problems
P = Poor - dog has no influence on predation, major problems that outweigh benefits

($P < 0.05$) lower percentage of Komondorok were successful in their first pasture trials than Great Pyrenees and Akbash Dogs. Great Pyrenees were the most successful breed ($P < 0.001$) in their first range trials.

It is important here to note that as our research progressed, we became more proficient in predicting the type of conditions under which an individual dog might be successful or unsuccessful. Since our goal was to determine where a dog would and would not succeed, both successes and failures were meaningful. Therefore, each breed was tested in both rangeland and pasture conditions, and some individual dogs were also tested in both conditions. Our ultimate objective was to determine where each individual dog would be successful. However, since many dogs died prematurely, some were not available to be retested after a failure. Thus the final rating for these animals was lower than may have been achieved if they had been retested.

In most instances ranchers have either a range or pasture operation, and once they purchase a guarding dog, do not have the option of testing it under different conditions if it is unsuccessful. A dog may fail for a number of reasons including behavioral problems (i.e., chasing livestock, wandering excessively, lack of key guarding traits), less than adequate early socialization and training, and poor management or supervision.

Sixty-eight percent of the cooperating sheep producers (n = 40) were successful in their first trial with dogs in pastures, and 47% (n = 15) were successful in their first trial with dogs on rangeland (Table 3). Cooperators who used Komondorok, Great Pyrenees, and Akbash Dogs were equally successful in pastures, but those who used Great Pyrenees had more success on rangeland (75%). However, sample size was small for all 3 breeds on rangeland.

Some cooperators who experienced failure with their first dog later used other dogs with success. Seventy-eight percent of pasture cooperators (n = 40) and 57% of range cooperators (n = 14) (overall 72%) ultimately were successful in using dogs as a part of their predator control program.

DOG RESPONSE TO FRIGHTENING EXPERIENCES

Certain conditions may cause even effective guard dogs to leave the sheep or otherwise temporarily interrupt their guarding behaviors. Intense rain storms or continual rain for 1 or more days has resulted in dogs at the USSES leaving the sheep and returning to headquarters. This problem may be less likely to occur in pastures where a dog may retreat to a shelter during prolonged rains. In a range operation where no shelter is provided, a dog may leave the sheep in search of a dry place.

We have observed a small percentage of dogs abandon the sheep because of thunder, lightning, and other loud noises such as gun shots. Some noise-shy dogs will become familiar with these sounds over time, but others may continue to leave the sheep despite their experience with frightening noises.

KENNELLING DOGS THROUGH WINTER

At the outset of our research, we were concerned with the possible adverse effects of kennelling dogs for a prolonged period during winter when the sheep were in a feed lot. Since we housed up to 15 dogs at a time, it was impractical to give them free access to the sheep pens. Private sheep producers who have only 1 or 2 dogs would likely leave the dogs loose most of the time. However, if kennelling is deemed appropriate, the following may be of interest.

We speculated that a relatively long period of removal from the sheep would result in a decrease or loss of the dog's bond to sheep. Several years of experience with this condition has revealed that, for most dogs, the bond to sheep remains and may even be intensified with periods of separation. The period of isolation in the kennel appears to enhance the dog's desire and enthusiasm for the freedom of being with sheep. (This presumes that the dogs have been socialized to sheep for at least several months prior to kennelling.) Almost without exception, when we released a dog after it had been apart from sheep for any length of time, it quickly sought the scent and trailed off in the direction of the sheep. The bond between dog and sheep is established as the pup is raised with lambs, and appears to endure even though the dog is separated from the sheep for up to 6 months.

Table 2. Success rates of guarding dogs in pasture and rangeland trials.

	Komondor		Great Pyrenees		Akbash Dog		Shars		Total	
Success of dogs in first trial	S*	U	S	U	S	U	S	U	S	U
Pasture	62%	38%	84%	16%	75%	25%	100%		76%	44%
	(n=16)		(n=19)		(n=12)		(n=2)		(n=49)	
Range	9%	91%	78%	22%	56%	44%		100%	51%	49%
	(n=11)		(n=18)		(n=9)		(n=1)		(n=39)	
Success of dogs in later trials										
Pasture	56%	44%	43%	57%		100%			47%	53%
	(n=9)		(n=7)		(n=1)				(n=17)	
Range		100%	100%						71%	29%
	(n=2)		(n=5)						(n=7)	
Dogs that failed: *0 trials*	28%		73%		57%		50%		54%	
1 trial	52%**		19%		29%		50%		33%	
2 trials	10%		4%		14%				8%	
>2 trials	10%		4%						5%	
n =	21		26		14		2		63	

* S = successful, U = unsuccessful
** 8 of 11 failures were on rangeland

Table 3. Success rates of cooperating sheep producers on their first attempt using a livestock guarding dog reared at the U.S. Sheep Experiment Station. (values expressed as percentage)

	Komondor		Great Pyrenees		Akbash Dog		Shars		Total	
	S*	U	S	U	S	U	S	U	S	U
Pasture	62	38	69	31	67	33	100		67	33
	(n=16)		(n=16)		(n=6)		(n=1)		(n=39)	
Range	25	75	75	25%		100		100	47	53
	(n=4)		(n=8)		(n=2)		(n=1)		(n=15)	
Overall:	S = 61%, U = 39% (n=54)									

* S = successful, U = unsuccessful

PAIRS VS SINGLE DOGS

The number of dogs that will provide the greatest degree of protection varies depending on several factors including: 1) the extent of gregarious behavior of the sheep (often related to the breed of sheep and whether the flock is rams, ewes, ewes with lambs, or lambs alone), 2) not only the size of the pasture, but also the terrain and vegetation features of the pasture, 3) the type of predators and the intensity of predation, and 4) the disposition of the dogs (if more than one dog is used).

We have used 1 or 2 dogs with range bands and 3 dogs in the same 100-acre pasture with sheep. Provided that the dogs were compatible, 2 or more dogs provided better protection for the sheep than a single dog. Often guarding behaviors of dogs complement each other. For instance, one dog may remain close to the sheep during a disturbance while the other investigates and confronts the predator. With our range bands, 2 dogs often positioned themselves on opposite sides of the flock of bedded or grazing sheep.

When establishing 2 dogs with a range flock, we prefer to place the more experienced dog with the sheep first and add a second dog after the first is well established (in about 1 week). This method is also appropriate for training young inexperienced dogs for use on rangeland. Furthermore, a dog that does not remain with sheep may be persuaded to do so when placed with an experienced dog. Close observation is important to ensure that the 2 dogs are compatible and that they do not harass the sheep.

ADVANTAGES AND DISADVANTAGES

The majority of ranchers who are using dogs to protect their sheep have said that benefits outweigh any disadvantages or problems caused by their dog. Some benefits are obvious, and others are more subtle and include:

1. A decrease or elimination of predation resulting in an increase in potential profits.

2. Reduced labor (i.e., no longer confining or coralling sheep nightly, sheep graze in a tighter flock thus are easier to monitor).

3. Pastures are more efficiently utilized and condition of sheep may be improved.

4. Increased utilization of pasturage where grazing was prohibitive prior to the use of dogs.

5. Dog alerts owner to disturbances (predators) in the flock.

6. Opportunity to increase the size of the flock.

7. Increased self-reliance, not as dependent on other and perhaps less desirable methods of predator control.

8. Protection for family members and farm property.

9. Peace of mind.

Although the majority of dogs that are reared to protect sheep are ultimately successful, there are potential problems during the adolescent period of the dog as well as problems that may develop with an experienced dog. Many of the problems are considered to be minor by most producers, but others are serious. We have identified the following problems:

1. Dog harasses sheep (usually play behavior) resulting in injury or death.

2. Dog does not remain with sheep.

3. Dog overly aggressive to people.

4. Dog harasses other animals (livestock and wildlife, may result in the dog being shot).

5. Expediture of labor to train and supervise the dog.

6. Dog destroys property (chewing objects, unwanted digging).

7. Dog is subject to illness, injury, premature death.

8. Dog leaves farm boundaries, problems with neighbors, liability for damage to neighbor's property.

9. Financial expenditure with no guarantee of the dog being successful.

10. Dog causes problems when sheep are moved (interferes with herd dog).

It is unlikely that 1 person will experience all of the potential problems or all of the potential benefits of using a dog. For most, the benefit of reduced predation is sufficient, and for others a single problem may be 1 too many.

TRANSFERABILITY

During the rearing process, we emphasized socialization of dogs to sheep and attempted to avoid conditions that would allow a dog to bond strongly to humans. Under the constraints of our research situation where individual dogs were moved not only between locations at the USSES but also among different private sheep producers, we viewed bonding to anything other than sheep as a potential disadvantage. As the research progressed, we noted that, although most dogs required some period of adjustment following placement in a new situation, they sought out the sheep almost immediately. It appeared as though sheep were a common denominator in the trials, and indeed, the most successful dogs were those that were bonded to sheep and remained with them most frequently.

We conclude that if a dog is properly socialized to sheep from an early age (approximately 6 to 10 weeks), there is a high probability that it will successfully guard sheep in a variety of conditions. Such a dog can also be moved from 1 area to another, even with strange people and surroundings, and its bond to sheep will help make the transfer successful. In small farm-flock conditions where the sheep are not far removed from the headquarters and people, the bond of the dog to sheep may not need to be as strong for success to be realized.

Although we have observed that transferring dogs from 1 situation to another is usually successful, the success of a dog is usually enhanced as it becomes more familiar with a particular set of conditions.

DOG MORTALITY

Twenty-two of the 63 (35%) working guard dogs at the USSES died, and 1 (2%) was destroyed intentionally because it was untrustworthy. The percentage of the deaths by category are: 26% maliciously shot, 22% hit by vehicle, 22% miscellaneous (i.e., caught in trap, strangled), 22% health problems (i.e., congenital defects, surgical complications), 4% unknown, and 4% untrustworthy. The mean age at death for the dogs was 21 months (SE 10, range 8-54 months). The percentages and causes of death are similar to those experienced in the guard dog research at the New England Farm Center (R. Coppinger, personal comm.).

The probability of losing a dog to premature death can be decreased by taking certain precautions. The general health of the dog should be checked routinely, and a veterinarian should be consulted if problems are found. A complete immunization program is also important. Neighbors should be notified that a guard dog is nearby and that it may wander, especially to other sheep or livestock. A dog should not be chained near fences or other objects that may entangle it. Traps, M44's, or any other potentially harmful situations should be noted. Dogs should be discouraged from wandering onto roads or highways and should not be permitted to chase vehicles.

DOGS AS MANAGEMENT TOOLS

The degree of success when using a livestock guarding dog may be enhanced by viewing it as a tool to be incorporated into the overall management of a sheep operation. Dogs do not perform automatically like a piece of machinery, and their behavior is variable. Producers who successfully use a dog may need to slightly alter their management routine to take advantage of the traits of the dog. This may include grazing sheep in different pastures, separating or grouping sheep, moving supplemental feeds or sources of water, changing fence design and configuration, and altering schedules of inspecting the flock.

DOG AGGRESSIVENESS

It is relatively common for guarding dogs to become excessively playful with sheep during puppyhood and adolescence. Young lambs are vulnerable to injury or death when engaged in exhuberant playful activities by a 25-35 kg puppy. Usually the dog outgrows its desire to play roughly with sheep, but some dogs can become habitual sheep killers, especially if playing with livestock is not appropriately discouraged.

Nine of 63 (14%) dogs evaluated in this study killed sheep or were suspected of killing them. Two of 26 (8%) Great Pyrenees killed sheep, and a third Pyrenees was suspected of being involved in a killing. The first 2 dogs later became trusted livestock guardians, and the third dog died before it could be evaluated further. An additional 4 of 26 (15%) Great Pyrenees juveniles were excessively playful, but this behavior abated with maturity.

Three of 21 (14%) Komondorok killed sheep, and 1 additional dog was suspected of killing lambs. One of the 3 appeared to kill sheep in an aggressive manner with a bite to the back of the head and neck, much like a predator. This dog was destroyed. The attacks on sheep by a second dog appeared to be less predatory, but the dog injured and killed several sheep over a period of 2.5 years. The dog was also judged a habitual sheep killer and was destroyed. The third dog appeared to be guilty of killing 5 or 6 lambs, although it was never observed in the act. The adolescent behavior of this dog and the condition of the carcasses suggested the lambs were killed during playful maulings. Later this dog was successful protecting a small farm-flock.

As pups and juveniles, an additional 7 of 21 (33%) Komondorok exhibited excessive playful behavior with sheep. Five chased sheep with greater intensity than the others, and injuries resulted. However, 4 of the 7 matured into reliable guardians. Two died before reaching maturity, and the remaining dog ceased harassing sheep but failed its first trial for other reasons.

Four of 14 (29%) Akbash Dogs killed sheep. Three of the 4 dogs were closely related. Currently, none of the 4 dogs are successful guardians. Excessive playful behavior with sheep was also more common in Akbash Dogs than in the other breeds examined. As pups and juveniles, an additional 7 of 14 (50%) Akbash Dogs played roughly with sheep, and 2 of the 7 injured sheep. All 7 became successful guardians following maturity.

Although the breeds studied were large, powerful, and protective dogs, relatively few incidents of dogs biting humans were documented. Five of 63 (8%) dogs bit humans. Three of 21 (14%) Komondorok inflicted bite wounds on strangers who approached them or entered the property. All 3 bites were on the hand, and none required medical attention. Two of 14 (14%) Akbash Dogs bit their owners during reprimands. The hand wound sustained by 1 owner was serious. None of the 26 Pyrenees nor 2 Shars bit humans.

Although biting may be relatively uncommon, confrontations with strangers are more common and should be anticipated by owners, especially if the dog's territory includes the house or other areas where contact with strangers is likely.

POSSIBLE LIMITATIONS

Although we have observed dogs working successfully in a variety of conditions, we suspect that there are limits to the type of conditions under which even a good dog will be a significant benefit. In particular, some pastures may be up to 5 sections large. When combined with an arid climate, sheep or goats may have to travel a considerable distance during a bout of foraging. Under these conditions, the livestock are generally widely scattered, and the terrain may often be rough with thick brush. Even several good dogs would have trouble adequately patrolling such a pasture, particularly if predators were abundant and predation pressure were severe.

Generally, a better dog is required in large pastures or on open rangeland where the sheep move frequently and when they are removed from the ranch headquarters. In such circumstances, bonding of the dog to the sheep is critical. Under conditions where the sheep are near the ranch, a dog need not have such a strong bond to sheep. Indeed, the dog may even be treated more like a pet than a work animal. Usually even "pet" guard dogs are alert to disturbances at dawn and dusk when predation may be most severe, and their barking and patrolling may deter predators from preying on the flock.

CONCLUSION

Eighty percent of 63 traditional Eurasian breed livestock guarding dogs were judged successful in protecting sheep from predators, and 72% of the private sheep producers who used dogs in this study used them successfully as part of their predator management program. Although the rate of success was greater in pasture conditions, dogs also reduced depredation in rangeland bands of sheep. The Great Pyrenees was

the most successful of the breeds tested, and Komondor dogs were significantly more successful on pastures than they were on rangeland. Overall, each of the breeds had a rate of success >60%. There are a variety of potential problems when using dogs. However, the benefits are generally sufficient to make this method of reducing depredation of sheep a useful management approach.

LITERATURE CITED

Black, H.L. 1981. Navajo sheep and goat-guarding dogs: a New World solution to the coyote problem. Rangelands 6:235-37.

Coppinger, R.P., J.R. Lorenz, J.I. Glendinning, and P.D. Pinardi. 1983. Attentiveness of guarding dogs for reducing predation on domestic sheep. J. Range Manage. 36:275-79.

Green, J.S. and R.A. Woodruff. 1983. Guarding dogs protect sheep from predators. U.S. Dept. Agric., Agric. Info. Bull. No. 455.

——— In Press. The use of three breeds of dog to protect rangeland sheep from predators. Appl. Anim. Ethol.

Green, J.S., R.A. Woodruff, and R. Harman. 1983. Livestock guarding dogs and predator control: a solution or just another tool? Sheep Prod. 2:17-20.

——— In Press a. Effectiveness of Eurasian livestock guarding dogs for protecting pastured sheep from predators. Int. Goat and Sheep Res.

Green, J.S., R.A. Woodruff, and T.T. Tueller. In Press b. Livestock guarding dogs for predator control: costs, benefits, and practicality. Wildl. Soc. Bull.

Linhart, S.B., R.T. Sterner, T.C. Carrigan, and D.R. Henne. 1979. Komondor guard dogs reduce sheep losses to coyotes: a preliminary evaluation. J. Range Manage. 32:238-41.

McGrew, J.S. and C.S. Blakesley. 1982. How Komondor dogs reduce sheep losses to coyotes. J. Range Manage. 35:693-96.

Pfeifer, W.K. and M.W. Goos. 1982. Guard dogs and gas exploders as coyote depredation control tools in North Dakota. p. 55-61. *In* Proc. Tenth Vert. Pest Conf., Monterey, CA.