

# Navajo Use of Mixed-breed Dogs for Management of Predators

HAL L. BLACK AND JEFFREY S. GREEN

## Abstract

Seventy-two Navajo ranchers were questioned about the role of mixed-breed dogs with their flocks. Navajos call their dogs "sheep dogs" but, unlike sheep dogs used by other ranchers to assist in herding and moving the flocks, Navajo dogs function primarily as guardians of sheep and goats to whom they have developed social bonds. This attraction is a result of raising dogs essentially from birth in visual, olfactory, auditory, and tactile association with sheep and goats. A minimum of handling of pups reduces the likelihood that they will bond strongly to humans. Mixed-breed dogs of the Navajo appear to exhibit all behavioral traits believed to be important in protecting flocks from predators, especially coyotes: they are attentive, defensive, and trustworthy. If ranchers choose to employ dogs, the rather simple Navajo recipe for training may serve them well. Mixed-breed dogs could be quickly deployed in a variety of ranching situations to help reduce predation on livestock.

Coyote (*Canis latrans*) predation on sheep (*Ovis aries*) and goats (*Capra hircus*) continues to be a source of economic concern throughout much of North America (Gee et al. 1977, U.S. Dept. of Interior 1978). Since the mid-1970's, scientists have trained, deployed, and evaluated the performance of several introduced breeds of Eurasian dogs (*Canis familiaris*) (Linhart et al. 1979; Coppinger and Coppinger 1980a, 1980b; McGrew and Blakesley 1982; Green and Woodruff 1980, 1983b) that have been used to protect livestock in various parts of the Old World for centuries (Bordeaux 1974, Breber 1977). In the southwestern United States, the Navajo keep mixed-breed (mongrel) dogs with flocks of sheep and goats as protectors (Downs 1964, Black 1981). In this paper, we report results of a questionnaire administered verbally in 1981 to Navajo Indians on the role of dogs in their ranching operations and conclude with a discussion of implications of Navajo practices.

## Methodology and Procedures

A pilot study of Navajo livestock protection dogs (Black 1981) suggested that there may be regional variation in attitudes and practices among Navajo ranchers on keeping dogs with their sheep and goat herds. Therefore, the sample for this study was obtained throughout the Navajo Reservation. Figure 1 indicates the general locations of the 72 Navajo ranches visited during the summer of 1981.

Based on experiences which occurred during the pilot study

Authors are associate professor of multicultural education and zoology, Brigham Young University, Provo, Utah 84602; and research wildlife biologist U.S. Department of Agriculture, Agricultural Research Service, U.S. Sheep Experiment Station, Dubois, Ida. 83423.

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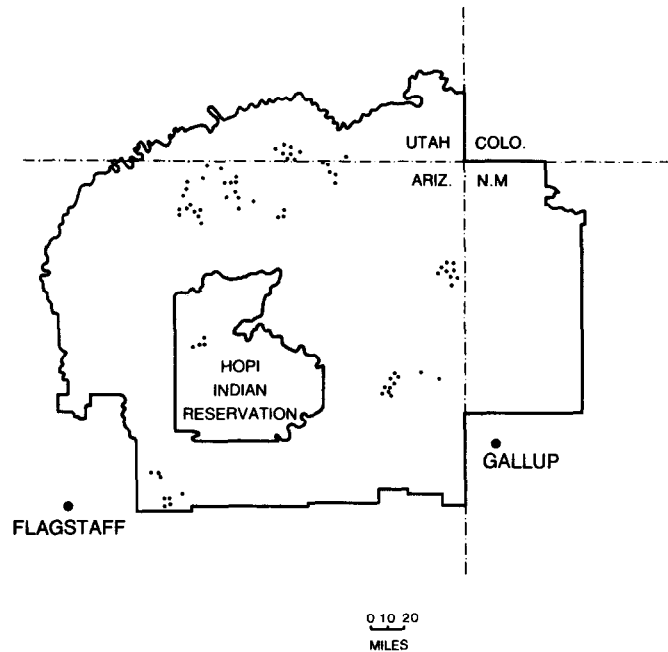


Fig. 1. Map of the Navajo reservation (excluding the small Ramah, Canonicito and Alamo reserves) with dots indicating the general location of ranches visited in 1981. The ranches indicated in the Hopi reservation are Navajos operating in what was formerly a Hopi-Navajo joint-use area.

(Black 1981), it was apparent that many of the older Navajos—those most likely to be engaged in traditional livestock operations—would be reluctant to speak into a recorder or respond to formal questioning. Therefore, our approach was relatively casual, and we carried no recorders or clipboards. In addition, most of our respondents neither spoke nor read English. For this reason, a Navajo student served as an interpreter during the 7 trips to the reservation (total = 35 days). Interviews varied in length from 10 minutes to several hours, depending upon the attitude of the ranchers. Most interviews lasted less than 1 hour.

A questionnaire based on Black's (1981) study was developed to reveal basic practices and philosophies in 4 general areas: (1) general livestock operations related to sheep and goat herds, (2) dog care, (3) dog training, and (4) dog-coyote-sheep interactions. The questionnaire initially contained 72 questions, but, since this proved to be impossible to administer, it was modified following the first trip into the field to a realistic length. Questions were asked from memory, and responses recorded on data sheets immediately following the interviews. After each interview, miscellaneous comments from respondents were tape-recorded. Because questions were asked from memory, sample size varied between respondents. We developed additional questions part way through the study; consequently, the sample size for those questions is

relatively small. Questions asked are listed in Table 1.

As opportunity and time allowed, interviewers accompanied herders onto the range and made general observations. At 13 homesteads interviewers were able to observe the behavior of the dogs and dog-sheep interactions.

## Results and Discussion

### The Sheep and Goat Flocks

Fifty-three of the flocks encountered were mixtures of sheep and goats, 2 were sheep only, and 3 were goats only. The largest flock numbered 300 and the smallest 17 individuals ( $x = 107$ ). With the exception of 15 milk goats, all appeared to be Spanish goats or Spanish-Angora crosses kept primarily for their mohair. The sheep were primarily mixed breeds kept as a source of meat and wool. Sixty ranchers said they always corralled their herds at night, and 4 said they usually did. Nineteen corrals were less than 200 m from the hogan (house), one was within 30 m, and the most distant one was 1,600 m. Corrals effectively contained sheep and adult goats, but young goats and the attending livestock guarding dogs entered and left at will. Eighty-eight percent of the 51 ranchers questioned said they usually herded their sheep for several hours in the morning and evening. Twelve percent said they usually herded their sheep throughout the day. Between these 2 foraging periods, the herds were returned to the corral or kept near the homestead for 3-4 hours before the evening foraging period.

Herding always took place on open rangeland with no fencing except right-of-way fences along highways. On several occasions interviewers walked with herders and herds 6-7 km during morning or evening foraging. Essentially all family members, 10-year-olds up to 70+-year old men and women, participated at one time or another in herding duties. From a sample of 64, 22% said herds were sometimes turned out of the corrals and left alone to graze, 14% said their flocks were often allowed to graze unattended, and 64% said that someone always accompanied the herd.

The herder did not devote constant attention to the animals but intervened as necessary to change direction of the herd toward a

desired grazing location, a water hole, or toward the homestead. Individual members of the flock, and on occasion the entire flock, would not be visible to the herder for periods of several minutes to 0.5 hr. Horses used in herding duties were available on most ranches, but a combination of walking and riding appeared to be the usual method of accompanying the herd.

### Care of the Livestock Protection Dogs

On the homesteads visited, 230 mixed-breed dogs were used as livestock protection dogs, hereafter referred to as LPD's (not to be confused with the house dog and stray population of dogs observed throughout the reservation). Navajos refer to LPD's simply as sheepdogs (Fig. 2). Of the 200 dogs in which sex was determined,



Fig. 2. Two mixed-breed Navajo dogs at rest with corralled Spanish goats on a homestead on the Navajo Reservation.

males represented 77% and females 23%. We initially hoped to weigh all dogs but found this difficult because of their wariness.

Table 1. Responses of Navajo ranchers to questions on the role of mixed-breed dogs with their livestock.

Question	Sample size	Yes (%)	No (%)	Sometimes (%)
1. Are children allowed to play with pups being raised to protect livestock?	55	7	71	22
2. Do your dogs have to be commanded to go with the sheep?	56	2	89	9
3. Is it ever necessary to tie or restrain dogs at the corral during their training?	46	35	52	13
4. Do you ever tie pups to sheep?	41	15	78	7
5. Do your dogs always accompany the flocks onto the range?	64	94	—	6
6. Do you destroy livestock dogs that consistently bother or kill your sheep?	45	84	16	—
7. Have you lost sheep to coyotes?	60	65	27	8
8. Are coyotes a serious predation problem?	66	17	48	35
9. Do you lose more sheep to coyotes when you don't have good dogs?	35	86	9	5*
10. Do your dogs chase coyotes?	53	91	9	—
11. Do your dogs dislike or show aggression towards coyotes?	52	92	1	7(*)
12. Do you know of dogs that have killed coyotes?	67	21	79	—
13. Have coyotes ever killed your sheep dogs?	62	8	92	—
14. Would you buy a good sheep dog?	17	12	88	—
15. Would you sell a good sheep dog?	27	14	86	(+)

\*Five percent said that losses were the same whether they had dogs or not.

(\*) Three ranchers said their dogs were afraid of coyotes, and I said to his knowledge his dogs had no experience with them.

(+) One man told us he would trade a dog for some item of value but he would not sell it.

Mean weight of 17 adults was 17 kg (range 7–27). Estimated weights on 69 adults averaged 15 kg. About half of the ranchers fed their dogs a mixture of dog food and table scraps; the others fed either dog food or scraps exclusively. Most of the feeding was done once a day near the corrals.

Downs (1964) said Navajo dogs were “forever hungry,” an apt description verified by how quickly food was consumed from the communal feeding dish. Since sheep and goats will eat dry dog food, care was taken to isolate the feeding dogs from livestock. On most of the ranches, dogs were fed after the flock had been corralled. At feeding time dogs ran from the corral towards the individual carrying the food or simply congregated at the traditional feeding location near the corral.

Forty-four (19%) of the 230 dogs were tailless. Some were born with short tails; others had been docked with knives, axes, or elastrators. Reasons given for docking the tails were (1) to make them look like Navajo dogs, (2) a dislike of wagging tails, (3) punishment for chasing sheep, and (4) to prevent the dog from being mistaken for a coyote. The tips of the ears of 1 dog were cut off as punishment.

Forty-five (29%) of the 154 males had been castrated. Ranchers said they castrated them to reduce their interest for bitches in heat, to keep them from urinating on objects around the homestead, and to reduce the frequency of litters.

As a group, the LPD's were associated with herds throughout the year and were not excluded from any animal husbandry practices such as annual shearing, dipping, and lambing. Ninety-eight percent of 51 ranchers questioned said they made no effort to exclude their dogs from lambing areas or sheds.

### Training and Imprinting of Dogs to Flocks

Pups destined to be flock guardians were born on the homestead, obtained from neighboring ranchers, friends, relatives, or found abandoned along highways. Ranchers said the simplest and best method of training pups to guard the sheep was to raise them with an experienced sheepdog, preferably their mother. In a sample of 41 ranchers, 26 (63%) said puppies were usually born at or in the corral where they were allowed to remain. Twelve said pups should be placed at the corral at about 4 weeks and 3 said at 6 weeks. Depressions in the ground were regularly seen within or near the corrals where the dogs slept. Shelters built for pups and/or dogs were observed on only 2 occasions.

The interviewers observed a rancher place a 4 to 5-week-old pup in a corral at dusk with his dogless flocks of goats. The pup had been raised with litter mates and a working mother at a distant homestead. The pup did not whine or exhibit any behaviors indicative of loneliness or fear, and it licked the noses of the goats that sniffed at him. The corral was not puppy-proof. After approximately 15 minutes, the pup was lying near a goat inside the corral. Two hours later it was again observed lying among the goats. On a subsequent visit interviewers learned that the puppy had disappeared. Several ranchers stated that young pups were sometimes lost or killed by hawks, eagles, or coyotes. One rancher said his last good sheepdog was killed by his German Shepherd house dog.

A majority of the ranchers said children were not allowed to play with the pups during their training (Table 1) because handling reduced the likelihood of pups learning to stay with the sheep.

Frequently hogans and corrals are within 100 m or less of each other. Under these conditions, pups left alone at the corral are under rather constant observation of the children and adults. Ranchers stated that yelling at the pups, throwing stones or other objects at them, and physically returning the pups to the corrals serves to condition them to remaining near the corral. Pups so raised and treated would be expected to form site attachments to the corral area and imprint to other dogs, sheep, and goats. Minimal human handling does not, however, preclude imprinting to individuals living at the homestead. In spite of a general wariness towards humans, both pups and adult dogs appeared to recognize

those who they regularly associated with and displayed behaviors towards them typically observed in dogs. Some dogs were shy and appeared fearful of human handling or approach.

Most ranchers said that commanding their dogs to accompany sheep was unnecessary (Table 1). The Navajo command for moving the dogs to attend the herd is *dibe*, which means sheep. This, sometimes given along with arm gestures, was the only command the interviewers witnessed. It was given when dogs lingered at the feeding dish as the livestock were leaving the corral, when dogs were asleep near the corral as the sheep left, or when dogs approached the herder on the rangeland. Occasionally, the command *dibe* was accompanied by a rock or stick casually thrown in the direction of the dog.

Thirty-nine ranchers were asked at what age it was best to train an LPD, and all said it was important to start with pups. Fifty ranchers were asked if they every tried to train older dogs. Only 6% said they had tried to do so but without success. Some ranchers said restraining dogs at the corral during training was unnecessary, while others found it necessary (Table 1). On 1 occasion, a 4-5 month old pup was observed wired to a corral fence. The owner said he was teaching him to “stay with the sheep.” Few ranchers indicated they had ever tied pups to sheep or goats (Table 1). Most ranchers said their dogs were attentive while the sheep were on open range (Table 1). Most said dogs that persisted in harassing or perhaps killing sheep were shot (Table 1). Some said offending dogs would be severely punished; others said they were given away or dropped off along a highway. Punishment consisted of cutting off tails and tips of ears, beating, scolding or throwing objects at the dogs, tying up and starving the dogs, and/or tying heavy objects around their necks. An adult LPD near Chinle, Ariz., was observed with a 3-foot length of chain around its neck as punishment for chasing sheep.

One would expect that some selective breeding of good performing dogs would be practiced. However, as previously noted, many male dogs were castrated. Thirty-four ranchers said if they had an especially good dog they tried to raise puppies from it. An older man had a mixed-breed male dog with some greyhound ancestry that had killed a coyote in early 1981. This dog sired at least 1 litter, and the rancher said the pups were sought after by friends and neighbors.

### Dog-Sheep-Predator Interactions

A majority of the ranchers experienced losses of livestock to coyotes (Table 1). However, less than 20% considered their losses unacceptable (Table 1). Most believed losses would increase without the protection of dogs (Table 1).

Most ranchers reported that their dogs would chase coyotes that approached the flocks (Table 1). On 1 homestead, Black accompanied an old woman's mixed-flock of goats and sheep onto the range in the early morning. He had traveled approximately 500 m from the corral when 1 of the 2 LPD's, a 4-year-old German Shepherd-type, ran from the middle of the flock to a position in front. Individual members of the flock were distributed over about 1 ha. The dog paused and then, without barking, chased after a coyote that, when first observed, was approximately 75 m from the nearest member of the flock. A second dog, a 10-year-old arthritic male that was trailing along behind the herd, became alert and looked in the direction of the chase but did not participate. The dog chased the coyote about 300 m, then stopped and barked for 20-30 sec before trotting back. On another occasion, 2 dogs at a corral reacted to the howling of a coyote by chasing the coyote about 200 m through pinyon-juniper woodland. They returned to the corral 2-3 min later.

A majority of the ranchers indicated that their dogs dislike coyotes (Table 1), but few knew of coyotes that had been killed by dogs (Table 1). Most ranchers said their dogs could not catch coyotes but kept them away by chasing and barking. Few ranchers had lost their LPD's to coyotes (Table 1).

While no specific question was asked about the temporal and seasonal aspects of predation, it seemed that the most frequent occurrences of coyote attacks occurred when stray animals were inadvertently left behind on the rangeland. Only 2% of 41 ranchers had experienced predation while flocks were corralled. As noted previously, the average distance between corrals and hogan was not great. This probably decreased the likelihood of attacks by coyotes as was reported by Meduna (1977) for ranchers in Kansas. Increased territorial defense by the dogs is probably enhanced near the familiar surroundings of hogan and corral.

#### **LPD Responses to Taped Coyote Vocalizations**

On several occasions interviewers spent the night at the corrals. The normal noises associated with getting in and out of the van and the music on the radio were essentially ignored by the livestock and the dogs. They were apparently habituated to these sounds.

A tape-recording of coyotes howling was played after dark. This elicited responses in 4-5 sec from the dogs resting or sleeping in or near the corrals. Dogs responded by sitting alert, whining, barking, growling, and running various distances in the perceived direction of the sound.

Whatever the stimulus, individual sheep, goat, and flock responses to the movements and barking of the accompanying dogs, both on the range and at the corrals were frequently observed. It appeared that the sheep and goats had learned that the behavior of the dogs indicated potential danger. Also, sleeping dogs were aroused by sudden movements of the livestock, and dogs were also seen to run in the direction of a belled sheep or goat that was startled. McGrew and Blakesley (1982) reported similar interspecies communication between sheep and dogs.

#### **General Observations**

As a group, the Navajo livestock protection dogs were typically mixed-breed. This is not to suggest that there was unlimited variety but rather that it was difficult to recognize any particular breed of dog. Several ranchers said their dogs were "just Navajo dogs." When asked what that meant, they said the dogs were "not too big and not too small." There was no discernible morphological differences that distinguished the house dogs from LPD's. There were types of dogs that were often singled out by Navajos as being "no good," such as "German Shepherds," because they "bothered or chased the sheep." No short-haired dogs such as pointers were observed.

Within a given homestead variation among dogs in size, color, shape, and behavior was the rule. One rancher had 5 dogs, all of which had different parentage. A 2-year-old castrated male, weighing about 25 kg, was tannish-brown and appeared to have a preponderance of greyhound genes. He remained just outside the fence at night. The owner said he was "keeping his eye on things and looking out for coyotes." This dog caught a large male coyote in the spring of 1981 and broke the coyote's leg in a fight. The other dogs caught up with the fighting pair and helped kill the coyote. This greyhound-like dog was purchased outside the reservation. A 5 to 6-month-old female, sired by the above male prior to his castration, was being raised with the flocks. She spent the night inside the corral. These dogs never barked during the interview, which lasted about 45 minutes, and both were wary and difficult to approach. A 3 to 4-month-old pup with greyish hair, a docked tail, and incessant barking abilities remained within the corral during the interview. The dog's tail had been cut off to keep him from being mistaken for a coyote. He, along with a greyhound-like pup, were born at another homestead. A 4-year-old male remained near the corral during the interview. He was called a typical Navajo dog by the rancher. He said this dog "has a real good nose and it hunts around trying to smell for coyotes. If he smells them, he goes looking for them." A short-legged, black male dog 1 or 2 years old was the fifth dog on the ranch. The rancher said that the latter dogs

always slept inside the corral with the flock.

#### **Behavioral Profile of LPD's**

In spite of behavioral variation among dogs, results of direct observations and the questionnaire allow presentation of a generalized behavioral profile of mixed-breed livestock protection dogs. They are attentive to sheep and goats. They make short sallies to obtain food and water or to chase an occasional rabbit or ground squirrel but return to the corral or flock following these activities. They bark at other flocks and dogs encountered on open rangeland. They bark at and chase horses, burros, or cows when encountered. They are not aggressive towards flock members of any age but are submissive and perform appeasement gestures toward sheep and goats that on occasion threaten them. They lick and groom the facial areas, ears, and perineal regions of sheep and lambs but rarely those of goats and kids. They walk, rest, and sleep among the flock while corralled or foraging on the range without alarming the flock members. They do not aggregate at the corrals or on the range but maintain a random dispersion among the flock. They respond as a group to intruding, unfamiliar dogs. They respond by barking, growling, and running in the direction of taped coyote vocalizations. They bark at, chase, and may occasionally kill coyotes. They are wary of their owners and some are difficult to approach depending upon the degree of socialization to humans. They may approach, bark at, and show aggression toward strange human intruders both at the corral and on the range. They know few commands but will approach someone bringing food and will return to the flock voluntarily or when given the command *dibe*.

#### **Navajo Recipe for Creating an LPD**

The methods or procedures to create an effective livestock protection dog appeared to be rather simple and required little effort. Training in the usual sense of the word was not evident. By habit and cultural tradition, the Navajo simply places the dog in an environment where imprinting (bonding) to the flock is obligatory. It is largely the absence of interaction between rancher and dog that creates a dog attentive towards sheep. A dog raised in typical Navajo fashion will require minimal human involvement. It is essentially a hands-off-the-dog policy. The stronger the bond between the dog and the flock, the less likely the rancher is to interact with the dog. The recipe that the Navajo employs in creating an LPD is time-tested and has apparently served well over a 200-year period. Its power and utility apparently rests in its simplicity. The recipe:

Raise or place mixed-breed pups in corrals with sheep, lambs, goats, and kids at 4-5 weeks of age. Feed the pups dog food and table scraps. Provide no particular shelters such as dugouts or dog houses (the pups will sleep among the sheep and will dig their own dirt beds). Minimize handling and petting. Show no overt affection. Return pups that stray to the corral (chase them, scold them, toss objects at them). Allow pups to accompany the herds onto the rangeland as age permits. Punish bad behavior such as biting or chasing the sheep or goats, and pulling wool by scolding and spanking. Dispose of dogs that persist in chasing, biting, or killing sheep.

#### **Concluding Remarks**

These data suggest that the Navajo have a time-tested procedure that, if employed by other ranchers, may reduce predation on sheep and goats. The use of mixed-breed dogs to protect livestock is not unique, however, to the Navajo. Raymond Coppinger (New England Farm Center, School of Natural Science, Hampshire College, Amherst, Massachusetts) observed a large, 34 kg mongrel dog working with a flock in Turkey (pers. comm to Black). In Uruguay, Orbigny (1826) observed a large dog that both herded and defended members of the flock from large avian predators and human intruders. Bendure (1948) also described the value of a mongrel dog in predator control.

There has been criticism of the feasibility of using large Eurasian

dogs because of their rarity and because of the preconceived notion that there are limited situations in which the dogs can effectively be utilized (Wade 1978, 1982). However, mixed-breed dogs are never rare, and literally thousands of mixed-breed pups could conceivably be deployed throughout the United States by ranchers willing to apply the Navajo recipe. This study and others suggest that mixed-breed and traditional breeds can be effectively conditioned to provide protection against predators in diverse ranching situations including farm and open range flocks (Orbigny 1826; Darwin 1839; Bendure 1948; Breber 1978; Linhart et al. 1979; Coppinger and Coppinger 1980a, 1980b; Green et al. 1980; Green and Woodruff 1980, 1983a,b; Coppinger and Coppinger 1981; Coppinger and Coppinger 1982; McGrew and Blakesley 1982).

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