

Bonding of Sheep to Cattle as an Effective Technique for Predation Control

C.V. HULET, D.M. ANDERSON, J.N. SMITH and W.L. SHUPE

Jornada Experimental Range, Agriculture Research Service, U.S. Department of Agriculture, Box 30003-NMSU, Las Cruces, NM 88003-0003 (U.S.A.)

Cooperative investigations of the Agricultural Research Service, U.S. Department of Agriculture and the New Mexico Agricultural Experiment Station. Journal Article 1298, Agricultural Experiment Station, New Mexico State University, Las Cruces, NM, U.S.A.

(Accepted for publication 10 September 1987)

ABSTRACT

Hulet, C.V., Anderson, D.M., Smith, J.N. and Shupe, W.L., 1987. Bonding of sheep to cattle as an effective technique for predation control. *Appl. Anim. Behav. Sci.*, 19: 19-25.

Nine lambs that had been bonded to cattle were placed with 7 heifers in pastures frequented by coyotes (*Canis latrans*) to determine whether multi-species grazing with bonded lambs would reduce predation. Unbonded lambs were grazed alone in a nearby pasture. Bonded lambs with cattle and unbonded lambs were rotated among pastures to reduce pasture bias. None of the bonded lambs were lost to predation during the entire 163-day study (Trials 1, 2 and 3). Four of 8 unbonded lambs were lost, presumably to predators, during a 19-day period, and 9 of 15 unbonded lambs and ewes were lost to predation during a later 43-day period. Bonding sheep to cattle may be an effective method for reducing coyote depredation on sheep.

INTRODUCTION

Predation has long been a problem to sheep producers (Terrill, 1975; Wade, 1982). Dogs inflict serious losses to farm flocks near towns and cities. Coyotes (*Canis latrans*) have dramatically extended their range in recent years and are a source of loss to farm flocks in the country and near towns and cities. They are also a serious source of loss to range flocks in western states and continue to be the chief cause, in many instances, of the termination of range flock enterprises (Wade, 1982). Golden eagles (*Aquila chrysaetos*), bears (*Ursus* spp.) and cougar (*Felis concolor*) also cause serious loss in specific situations.

Many devices and techniques have been used, with varying degrees of success, to protect sheep from predation. Lethal techniques are fraught with technical, legal, humanitarian and management problems, and are often expensive,

ineffective or slow to become effective. The cost of constructing electric fences on the range is prohibitive, and fence maintenance in range country is difficult and expensive. However, fences can be cost-effective where high-density stocking is possible. Guard dogs offer an attractive alternative. However, not all breeds work equally well (Green et al., 1984) and there is a high probability of pre-senile mortality (Lorenz et al., 1986). The initial cost of dogs bred for guarding is high, and patience and skill in management of dogs is required, in addition to substantial food and veterinary-care costs. Sheep must stay relatively near the dog and not leave the main flock or they become vulnerable to predator attack.

Recent studies on the Jornada Experimental Range in southwestern New Mexico support the consensus that the greatest deterrent to the economically attractive proposition of grazing sheep and cattle on the same property was coyote predation to the sheep (Meyer, 1985; Merrill, 1985; Essig, 1985; Glimp, 1985; Etchepare, 1985). Anderson et al. (1985) found that mature sheep and cattle grazing the same 690-ha pasture normally remained widely separated, and coyote predation of the sheep was a serious problem. However, in a preliminary study, when young lambs (75 days old) were placed in a 405-ha native range pasture with heifers and with a common water trough, the lambs formed a loose bond with the cattle and were soon following them. Blackford (1985), Umberger et al. (1985) and Schuster (1985) have all suggested from practical experience that cattle might give some protection to sheep when they are kept together in the same area, but in our experience it appears that sheep must be close to the cattle to afford protection. This close association can be achieved by procedures to encourage bonding of young sheep with cattle (Anderson et al., 1987).

Nursing calves are seldom killed by predators while with their mothers, presumably because of the aggressiveness of cattle toward predators (Blackford, 1985). We asked the question, can bonding of lambs to cattle be an effective deterrent against coyote predation?

Our preliminary studies on bonding lambs to heifers (Anderson et al., 1987) demonstrated that a strong attachment or bond can be effected when 45-day-old lambs are kept with yearling heifers in close confinement. The objective of this study was to test the effectiveness of this bond of lambs to heifers (Fig. 1) in providing protection from predation.

METHODS

A 2400-ha (6000-acre), arid, brush-infested, rangeland pasture on the Jornada Experimental Range in southwest New Mexico was the study site. The pasture was enclosed by an anti-predator electric fence that had become infiltrated with a population of 6–9 adult coyotes, estimated from tracks, scat and numerous sightings.



Fig. 1. Lambs, bonded to cattle when young, stay close to cattle under open-range management.

Trial 1 took place between 13 March and 1 May 1986. Nine Rambouillet \times Polypay crossbred lambs weighing an average of 35 kg (78 lbs), that had been penned with heifers for 60 days, were placed in Pasture A (122 ha, 300 acres) with seven Brangus and Angus \times Hereford crossbred heifers, and then rotated between Pastures B (405 ha) and C (243 ha) within the electric fence. The livestock were observed daily for 50 days to locate the sheep with respect to the cattle, and to detect any sheep losses. A bell was put on one heifer in an attempt to help the lambs locate the heifers if sight contact with the cattle was lost in tall brush. These heifers initially weighed an average of 223 kg (491 lbs), and had been used in the bonding procedure and tolerated the presence of sheep. This trial was exploratory and there was no control group.

Trial 2 began on 2 May, when a group of 8 control lambs similar in age and breeding to the bonded group was placed in a nearby 689-ha pasture (Pasture E, 688 ha) within the study enclosure. Both the bonded and control animals were observed daily for location and for possible losses. When a loss occurred, a search was made to find the missing lamb(s) to verify cause of loss. Tracks and characteristics of the remains of the carcass, especially the throat area, were used to verify cause of death. Observations on the controls were terminated on 20 May when half of the lambs had been lost.

Trial 3 began on 18 June and was designed as a critical test to establish conclusively that lambs that had been bonded to heifers could be consistently

protected from habitual killer coyotes. The bonded group of 9 lambs and 7 heifers and a new group of 15 control sheep (4 lambs and 11 mature range ewes) were randomized to Pastures E and B within the 2400-ha enclosure. The two groups were then rotated between pastures at 2-week intervals, or whenever a sheep was missing from either group, whichever occurred first. Following any loss, a search was made for the carcass to verify cause of death. It was predetermined that the trial would terminate after the loss of 8 sheep. The trial was extended for 3 weeks after the surviving control sheep had been removed from the study area to more critically evaluate predation control in the absence of the control lambs. The bonded group was rotated between experimental Pastures E and B at weekly intervals for another 3 weeks. The study was terminated on 22 August 1986 after 163 days from the start of Trial 1.

RESULTS

Trial 1

Only once during the 50-day trial period (13 March–1 May) were bonded lambs observed voluntarily separated from the heifers by more than 91 m (100 yards). The separation of 6 of the 9 lambs was observed on 13 April after a dust storm. The next day, the lambs had reunited spontaneously with the heifers. Although coyotes were sighted and signs were observed within the study area, none of the bonded lambs were lost over the 50-day observation period.

In Trial 2, 4 of 8 control lambs were lost over a 19-day observation period (2–21 May). The first confirmed coyote kill (a coyote was observed near a freshly killed lamb) occurred on 15 May, 13 days after the trial began. Two more lambs were missing 3 days later. One of the missing lambs was found dead on 21 May. The appearance and distribution of the skeleton and the remaining parts of the skin and wool were typical of coyote kills. The carcass was so completely consumed it was not possible to determine the cause of death. The fourth lamb was missing on 21 May. This lamb and the third missing lamb were never found due to the brushy conditions and large size (689 ha) of Pasture E. Daily observation of the lambs gave no evidence of illness or debilitation to account for the sudden disappearance of these lambs. The pattern and circumstances of the loss strongly support the contention that all 4 lambs were lost because they were killed by coyotes. None of the 9 bonded lambs in an adjoining pasture were lost during this 19-day trial.

As planned, the 4 surviving control lambs were removed from the trial when half of the lambs had been lost. The heifer-bonded lambs remained in the same pasture exposed to possible predation for 6 more days with no loss. This bonded group was moved to Pasture D in another area, while a previously scheduled grazing study was conducted in Pasture E. The bonded group was maintained

without any lamb loss for 24 days in the new area. A coyote was seen in the pasture during the trial.

In Trial 3, conducted over a 43-day period, coyotes selectively killed only sheep that were not with cattle. A total of 9 (3 lambs and 6 ewes) of 15 control sheep were lost. Carcasses of 5 of the 9 missing sheep were found. All had been gutted and fed upon in a manner typical of coyotes. Two of the five were relatively fresh kills. They had bloody wounds and bruises on the neck. No bonded lambs were lost during the 3-week period after the control sheep were removed from the study.

None of the lambs in the bonded group was lost to predation or any other cause during the 163-day study covering Trials 1, 2 and 3. Thirteen of 23 sheep (57%) in two control groups were lost in only 63 days, an average loss of 1 sheep every 5 days. If bonded lambs had been lost at the same rate over the 163 days, a total of 34 bonded lambs would have been lost.

DISCUSSION

The control and bonded group in Trial 3 were rotated between Pastures E and B each time a sheep was lost, and because only control sheep were killed, it is clear that the coyotes selectively went to a different pasture, away from the heifers with the bonded lambs, to make the next kill.

After 9 sheep had been lost, all of the surviving control sheep were removed from the trial, leaving the bonded lambs as the only source of sheep available to the coyotes for 21 more days. The trial coincided with the pup-rearing season for coyotes. A pair of coyotes with pups could account for the heavy, consistent loss to predation. However, once the control sheep were removed, sheep losses ceased.

The length of time between kills was characteristically longer when the control sheep were in Pasture B. When the control sheep were shifted to Pasture E, the coyotes killed again quickly. This suggests that the coyotes' home territory or den was centered in Pasture E. The kill pattern is further evidence that the close proximity of the bonded lambs to the heifers deterred predation by coyotes.

It is possible that the cattle in this study were more effective deterrents to predation on the bonded lambs than a guard dog would have been under similar circumstances. Guard dogs (Green and Woodruff, 1983) are known to leave sheep periodically to patrol, seek food, chase rabbits or seek other diversion, whereas the bonded lambs seek the constant companionship of cattle (Anderson et al., 1987). An ideal form of biological protection for sheep may be a combination of sheep bonded to cattle and guard dogs bonded to both sheep and cattle. Under such conditions, coyotes would have to prey on rabbits and other small rodents. This may increase the carrying capacity of the range at specific locations for domestic ruminants.

Blackford (1985), who runs sheep and cattle together in the same pastures

in California, believes that mature cows with calves work best in providing protection for sheep. He observed a cow with a young calf chase a coyote. He also suggested that cows without Brahman blood are more suited to grazing with sheep. It is not known how the sheep were protected during this trial. However, when a sheep-herding dog came close to the bonded lambs, the lambs were frightened and ran in among the heifers, as may happen when a coyote approaches bonded lambs.

There are no research data available on the ratio of cattle to sheep, or the size of bonded groups required to realize optimum protection from coyotes or other predators. We also need to know if bonding can be accomplished on the range or pasture by adding weanling lambs to an initial bonded group. This technique appears to offer possibilities for combining the ecologically sound concept of multispecies grazing with a cost-effective method of predator control to increase both cattle and sheep production efficiency. The bonding technique may also reduce fencing requirements for confining sheep to specific areas because bonded sheep stay with the cattle.

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