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## Pred-X Field Test Results

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During the spring and summer of 1992, a number of sheep producers used Pred-X ear tags to guard against predation by coyotes. We were able to contact 20 of these producers through the help of the Wyoming Wool Growers Association, county agents and companies who sold the tags. Sheep producers in other states also used the tags and we were able to contact 21 of these producers through the cooperation of the American Sheep Industry Association whose representatives printed a short letter and a survey form in the October 1992 National Wool Grower Magazine. Phone calls were made to many of the producers in Wyoming and in other states to obtain more detail on their experience with the tags.

In most cases lambs were tagged at birth or at docking by attaching a bright orange PredX tag approximately 1 1/2 inches square and 3/16 of an inch thick to the middle third of the ear. The tags gave off a strong odor similar to that of butyric acid. The Predex Corp., 700 Garfield Ave., Duluth, MN 55802 claims that limited field tests in 1991 proved this tag was effective against coyote predation because the odor is similar to a human odor. We were interested in surveying those using this olfactory method of reducing lamb losses because coyote predation is an increasingly serious problem for sheep producers throughout the U.S.

### Results

Table 1 briefly summarizes observations of producers who used Pred-X tags. The great majority of the producers felt the tags were totally ineffective and a few believed that the odor of the tags actually attracted coyotes to their sheep. A few producers clearly felt that the tags were effective in stopping or controlling coyote predation. The 41 producers tagged a total of 23,453 lambs and lost 1,742 of these to coyotes. This amounts to 7.4%.

The most likely reasons for the apparent success of a few producers with the tags may have been related to fewer coyotes in the area, a greater abundance of other food sources for coyotes, and/or the simultaneous use of other predator control measures. Most producers agree that early in the spring when there are dens of pups to feed and later in the fall and winter when rabbits, rodents, birds and other sources of food for coyotes decrease is the time when predation is the highest.

Previous studies using gustatory or olfactory coyote repellents have been discussed by Lehner (1987) and Botkin (1977). None of the repellents they used including cinamaldehyde, cresol, cyclohexyl mercaptan, naphthalene, capsaicin and norcapsaicin had long-term and widespread efficacy for control of coyote predation. It was observed that in areas with less coyote predation or an abundance of other food

sources, the compounds tested as repellents might successfully deter coyotes from attacking sheep. We concluded that the foregoing statement applies to the Pred-X tag.

In order for nonlethal repellents or guard animals such as dogs, donkeys, llamas or cattle bonded to sheep to be effective over a long period of time, total number of coyotes must be controlled. Today animal damage control experts using approved methods are essential for survival of the sheep business because they help control coyote numbers. In the future, methods of controlling coyote reproduction must be developed. These methods could include developing an oral vaccine that when eaten in tallow balls would prevent spermatogenesis and oogenesis in coyotes. Animal Scientists at the University of Wyoming believe that developing this type of vaccine is possible if funds for research can be made available. The need for controlling coyote numbers is immediate if the sheep industry is to survive. When coyote numbers are controlled, food sources for coyotes will increase and it is possible that under these conditions an improved Pred-X tag or some other olfactory method can be used to furnish protection for sheep and lambs.

Table 1. Responses from Producers Using Pred-X Ear Tags to Control Losses from Coyotes.

Producer number and	No. of lambs	No. of tagged	
1 SD	557	0	Red Fox but few coyotes in area. Used tags 3 yrs. 1st yr on ewes, 2nd yr on lambs with no losses either year. In 1992 a few lambs without tags were killed by fox. These lambs were in the same pasture as lambs with tags.
2 WY	435	0	
3 WY	158	2	This ranch had another band with 1763 lambs in surrounding pastures. There were no confirmed coyote kills in the band. Good guard dogs were with the bands and a lot of time was spent flying for coyote control. In two other pastures a few miles away there were 1068/1578 lambs without tags or guard dogs. 82 lambs were killed by coyotes in each of these pastures.
4 WY	432	115	The losses were not coyote kills. A llama and a donkey were with the sheep.  There were no coyote kills for 30 days after tagging. Then coyote kills started.
5 MT	35	6	These lambs were put in a corral every night except one when coyotes killed 5 lambs with tags. 1 coyote kill occurred in the day and one coyote attack with no kills also occurred. Two lambs without tags were never touched.
6 WY	390	12	None of the 12 lambs were confirmed coyote kills. Last year there was 30% of the lambs in the same area killed by coyotes. 37 coyotes were killed in this area January to October 1992. In addition, this ranch was in the middle of several surrounding sheep ranches where coyote control was practiced.

Table I. (Continued)

7 WY	453	14	<p>Eight missing lambs with tags were not accounted for. The 453 tagged lambs were in a band of 1047 lambs. 42 lambs without tags were missing. During one night 4 lambs with tags and an equal number without tags were confirmed coyote kills. Guard dogs were with this band of sheep from July to weaning. This ranch had three other bands with about 1000 lambs each where the kill was "a little" higher than in this band. Therefore, some reduction with tags was possible. In a separate group of 20 ewes, 20 lambs were tagged at birth. Over half of these unattended lambs were killed by coyotes.</p> <p>Losses started 30 days after tagging lambs. Weaning percentage was lower this year than in previous years without tags. This individual has sold all his sheep because of losses from coyotes.</p>
8 WY	350	60	
9 WY	1000	175	<p>First night after tagging there were 5 confirmed coyote kills and one tag had been chewed by a coyote. The pasture this band was in historically had higher kills than those in other pastures. This year there were approximately 100 kills in each of three other pastures with 1000 untagged lambs each. Coyote control in all pastures included ADC and an airplane.</p>
10 WY	1500	0	<p>There were no confirmed coyote kills on lambs with tags. No dogs, llamas or donkeys were with these sheep. In September a lion killed 7 lambs with tags. As soon as lambs with tags were shipped, 10 replacement ewe lambs without tags were killed by coyotes. 250 yearling ewes were tagged and placed in a pasture adjacent to 300 yearling ewes without tags. Twelve yearling ewes in the pasture without tags were killed in September but there were no kills among the tagged ewes.</p>

Table 1. (Continued)

11 WY	1000	162	Tags were placed on ewes before lambing. 150 lambs were lost to coyotes during lambing in May. A donkey was with the sheep when they went to the mountain and losses were minimized. Twelve lambs were lost to coyotes after sheep came off the mountain in September.
12 WY	1300	210	Lambs were tagged at docking in June. There were no losses for 2 weeks. No donkeys or dogs were with the sheep. Lambs were weaned the 16th of September. Most of the losses were due to coyotes.
13 WY	1800	?	These lambs were mixed with 2200 more lambs without tags. 250 ewes lambbed early and lambs were tagged at birth. The loss was approximately 10% to coyotes up to docking. 5000 total ewes produced 4000 lambs docked and 3000 lambs weaned. Percentages for lambs weaned were lower (down 10 to 15%) than in previous years. An argument resulted in no ADC control from June to August. From August to October, 30 coyotes were shot by ADC. The rancher believes that a llama helped in one small bunch but no dogs or donkeys were used in other bands of sheep.
14 WY	504	24	Tags were placed on lambs at docking. The 24 lambs lost were confirmed coyote kills. 17 additional lambs without tags were killed by coyotes.
15 WY	2000	200	All lambs in the flock were tagged at docking in June. Kills started almost immediately. The 10% loss is similar to that in previous years. No dogs, donkeys or llamas were used but ADC people helped. .
16 MT	100	15	These tagged lambs were lost to coyotes during a two week period in May. After that, lambs were penned every night. A brother also used 100 tags and penned lambs every night with no losses.

Table 1. (Continued)

17 MT	40 year-rams	4	Prior to tagging 5 rams were lost to coyotes and after tagging (July to August) four were lost with tags. An extremely large coyote was shot in August and killing stopped.
18 MT	1000	50	Lambs were tagged at docking. The 50 losses were confirmed coyote kills on lambs with tags. ADC and other trappers helped to keep losses down. This rancher has a llama with 1000 sheep but he doesn't stay with the sheep and the rancher feels that he doesn't help.
19 WY	900	40	About 450 lambs were tagged in each of two bands. Half of the lambs in each band were not tagged. There were an equal number of kills by coyotes on lambs with and without tags. During August a llama was pastured with 900 ewes and lambs and the killing stopped. The sheep are in the habit of bedding down together and this may be one reason why the llama helped.
20 WY	2000	50	50 tagged lambs were killed by coyotes. Between 150 to 200 tags pulled out of the lambs ears and were lost. Other producers had the same comment about the tags coming off.
21 WY	1000	50	500 lambs were tagged in each of two bands of 1000 lambs. Documented coyote kills in band 1 were: 17 lambs with tags, 20 without tags; band 2, 16 with tags, 18 without tags. Two additional bands of 1000 ewes each where no lambs were tagged were used for comparison. One of these bands had good guard dogs and only 4 lambs were lost. The other band had 24 losses from coyotes. All bands had guard dogs but the dogs in the band with 4 losses were more effective.
22 wy	60	2	30 ewes and 30 lambs were tagged. 2 older ewes were killed. Coyote signs were present when carcasses were found. Two untagged lambs running with these sheep were killed by coyotes. Other

Table 1. (Continued)

			sheep with tags were attacked but not killed. 7 coyotes in the immediate area where the sheep were pastured were shot by ADC personnel during the summer.
23	SD	153	12
			120 lambs and 33 yearling ewes tagged. 8 of the lambs and 4 of the ewes were confirmed coyote kills. 9 additional kills were probably due to coyotes. There were ewes and lambs on each side of this pasture without tags. This producer felt the tags attracted coyotes to his sheep when compared to the neighbors.
24	WY	1000	18
			750 lambs in one band had 6 confirmed coyote kills. 250 tagged lambs in another band had 12 confirmed coyote kills. A third band of 400 lambs had a guard dog but no tags and 4 lambs were lost to coyotes.
25	MT	9	0
			6 lambs and 3 ewes tagged. There were coyotes all around but no sheep were lost. This producer was pleased with the tags.
26	WV	90	26
			All 26 kills were within 15 days and were clearly coyote kills. This West Virginia producer says that coyotes are putting them out of business and he is extremely disappointed with the tags.
27	TX	181	23
			Tags were used on 61 lambs and 120 goat kids. Kids were lost to coyotes the first night the tags were used. Several neighbors who used the tags had losses from coyotes.
28	NV	1430	37
			Coyote kills started 8 days after docking and tagging. Aerial hunting was suspended for a while when the lambs were first tagged.
29	MT	1433	65
			Two guard dogs were with this flock of sheep in addition to ADC. Losses were clearly due to coyotes.

Table 1. (Continued)

This information came from a county agent in West Virginia who distributed tags to two producers and who had talked to several others who used the tags. Coyote kills started immediately after lambs were tagged. He reports that the same number of lambs were killed in flocks with tags as in those without tags.

This band of lambs was on one side of the ridge and 1788 lambs without tags were with a similar group of ewes was on the other side. 150 lambs were killed in the band without tags (8.3% without tags vs. 19.7% loss with tags). Neighbors on the side with tags had guard dogs with their sheep and the dogs may have run the coyotes to the lambs with tags. Losses of tagged lambs were from lions and bears in addition to coyotes.

This producer was experiencing coyote kills before the tags were put in ears of lambs and the tags did not stop the killing. Tags on dead lamb sometimes had teeth marks in them.

This predator management agent from Powder River County in Montana wrote a letter to Agri-News on 9/11/92 listing four producers who had lambs with tags killed by coyotes.

The U.S. Sheep Experiment Station, Dubois, ID had 8 pastures with 27 weaned ewe lambs in each pasture. 12 of the 27 in each pasture had tags. Between September 28 and October 3, 9 lambs with tags and 9 without tags were killed by coyotes. Station personnel found a tag 1/2 mile from the pasture and they believe it was carried that far in the mouth of a coyote.

Ewes were tagged after lambs were weaned and there were no coyote kills. His neighbor 1.5 miles away had 300 ewes without tags and 4 were lost to coyotes.

Table 1. (Continued)

The tags were put in the ears of St. Croix ewe lambs and pastured with 491 ewe lambs with woc One tagged St. Croix ewe lamb was killed the ne., night. Overall, 9 tagged St. Croix lambs and 3 untagged lambs with wool were killed by coyotes.

The tagged lambs were mixed with four bands of 1000 lambs each. 50 lambs lost their tags but ears were examined at shipping to confirm that these lambs had been tagged. 427 lambs with tags or lambs that had been tagged were shipped. Therefore, the loss of tagged lambs was 18%. Loss of untagged lambs from the four bands was 14%. Most of these losses were coyote kills. Guard dogs were with the sheep. In some previous years the loss was 7-8% with guard dogs.

Tagged lambs born in May were pastured with 800 more born in March without tags. 18 lambs without tags were lost by August 15. 3 of the 57 lambs lost with tags were confirmed coyote kills and others were probably coyote kills.

Some of the 20 losses were confirmed coyote kills and the producer believes that all the losses were from coyotes. This producer tagged 175 ewes last year and they were with 170 lambs without tags. Last year (1991) only one lamb that strayed far from the sheep was killed by a coyote. The producer believes that the odor on the tags was much stronger in 1991 than in 1992.

Lambs were with 590 ewes under range conditions. Guard dogs were with the band but no other coyote control methods were used. This producer felt that the odor of the tags attracted coyotes.

Coyote problems started 2 years ago. This lady complained that baby pigs, cats and even a small pony have been killed by coyotes in their area.

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