Electric Fencing for Predator Protection in Alberta

by
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Electric fencing and electrification of barrier fences began in Alberta nearly thirty years ago when Alberta Agriculture developed several electric fence designs to protect sheep from coyote predation.

During the development and research for a coyote-proof fence, Alberta Agriculture, Food and Rural Development (AAFRD) identified four essential components deemed essential to successful fence operation and performance: (1) minimal guard voltage, (2) critical overall fence height, (3) wire/mesh configuration and (4) ground return.

Several trial sites were located throughout the province to test the performance of various fence designs. All test farms currently experienced coyote predation on lambs or ewes at or exceeding the provincial average of 1.5% (of total flock size) and each test site had a minimum flock size of 100 breeding ewes with lambs at side. Also, during the entire twenty four month test period no other form of coyote protection was undertaken and producers maintained a detailed log documenting losses of all types.

All fence wires were 12.5 gauge (ca. 2 mm), high tensile strength, galvanized steel wire and the minimum enclosure size was 65 ha (160 acres). Many fence configurations were tested, however, the three designs that proved most successful were: (1) multi-strand seven wire, 55 inches (140 cm), (2) multi-strand nine wire, 54 inches (137 cm, Fig. 1) and (3)

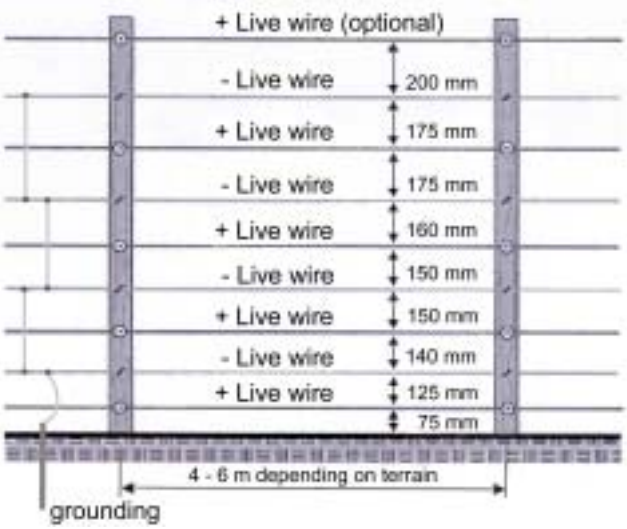

Fig. 1: Multi-strand nine wire fence (137 mm) with alternating charged and grounded wires.

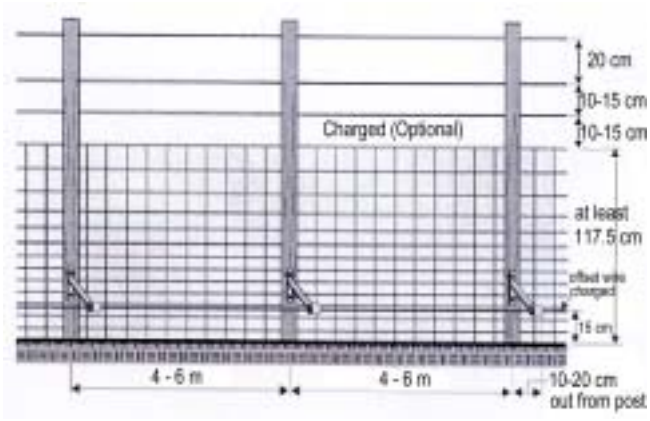

Fig. 2: An electrified, high tensile mesh-wire fence, viewed from outside the enclosure.

single outside off set wire on barrier mesh, 44 inches (112 cm, Fig. 2).

Through direct observation (and by communicating with other coyote researchers) AAFRD learned that over 80% of fence penetrations by coyotes (free choice) is accomplished by crawling under the lowest portion of the fence, next to the ground surface. The second choice of penetration (approximately 10-15%) is between ground level and shoulder height of the coyote (coyote does not leave its feet). Coyotes rarely jump over fences (<5%).

By using a metal replica of an adult sized coyote with approximately the same weight, body resistance to electricity, and contact surface area (of coyotes feet), AAFRD determined minimal guard voltage at approximately 3'500 volts to obtain 80% coyote repulsion on dry ground surface. All fence energizers were 110 volt plug-in.

The fence energizers first used in the trials were quite basic, very sensitive to lightning (and other power surges) with a very inefficient pulse output that resulted in poor performance beyond two - five km of fence. Today, fence energizers are equipped with powerful generating capacitance, low impedance and high voltage ratings of over 10'000 volt. Many multi strand fences with four or five hot wires can conduct 5'000 to 7'500 volt over 10 km of fence on 110 volt or 12 volt battery.

Also, many fence energizers on electric fences today are powered by a deep cycle 60 amp battery assisted by 130 to 150 watt solar panel to consistently produce 5'000 volt over a several km long fence.

Following two years of continuous performance, the seven strand multi-wire fence reduced coyote predation by 70%, the nine strand multi-wire fence

reduced coyote predation by over 80% and the off set single strand fence reduced predation by 65%.

The greatest problems in western Canada to fence construction and performance are post damage at corners, electricity drain due to "shorting out" caused by vegetation growth and other wire cross-over interference and inadequate grounding. High tensile steel wire (recommended tensile pull 85 kg) can cause severe corner post damage if line wire tension is not adequately adjusted (see tension adjusters) prior to onset of cold temperatures (i.e. colder than –15° C).

We recommend fence-lines be treated with a quick knockdown herbicide (i.e. glyphosate) prior to fence construction to reduce vegetation growth that will interfere with electricity flow.

Also, steel ground rods (2.0 - 2.5 cm diameter) need to be submerged three to four meters into the ground at each corner or every 0.5 km for adequate electricity return, during dry conditions in areas of light, sandy type soil.

AAFRD experienced only occasional wire breakage due to other wild life such as moose (*Alces alces*), white tailed deer (*Odocoileus virginianus*) or American black bear (*Ursus americanus*). Where large wild animals roam, fences should be flagged or identified to minimize accidental encounters.

The success of electric fences AAFRD developed has immensely benefited the livestock industry; in many cases producers altered fence designs/ configuration to meet personal farm requirements and conditions. Nonetheless, the use of electricity has greatly improved the protection capabilities of Alberta livestock producers, particularly those whose property overlaps the natural occurrence of coyotes. Unfortunately, electric fencing is not for everyone and/or for every type of livestock operation; in those cases, other control strategies or agents must be incorporated into livestock management plans to prevent and control coyote predation.

AAFRD website:
http://www.agric.gov.ab.ca

Information on electric fencing on:
http://www.agric.gov.ab.ca/agdex/600/684-7.html

Electric Fencing and Carnivore Damage Prevention

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Electric fencing is usually a well-accepted method for constraining livestock movements. It is fairly simple to use but it presents nearly no physical barrier, relying almost entirely on the fact that the animal receives a painful shock whenever it touches the fence. The goal of this article is to point out some remarks and ideas of what you have to note and what can help to achieve better protection of livestock against predators by using electric fences.

Carnivore damage prevention (CDP) fence

Livestock are easy to train to electric fences because they are calm animals, they usually have enough food and water on their pastures and they have learned to respect electric fences since the beginning of their life. Therefore, the motivation to escape is very low and they will stay on the same enclosure for several days. However, the fence must always be properly electrified. With predators the situation is quite different. They can penetrate the fence by accidental wandering, especially if the pen is located on traditional movement routes (e.g. bears). In the search for food predators have a higher motivation to try to penetrate the enclosure to get at the livestock. There are still very few electric fences designed for predator exclusion on a year round basis, decreasing the chance for large carnivores to be taught to respect electric fences. Moreover, livestock fences are usually switched off when livestock are not inside. Consequently, predators do not learn from the beginning to be fearful of electric fences, especially in areas where predators are recolonising. There are some basic rules when building the electric fence as well as conventional electric fencing for controlling livestock and electric fencing for CDP: design, visibility, high power, maintenance and training.

Design

The fence should be specifically designed to be predator-proof, especially adapted to increase the chance that the predator will receive its first electric shock through the head which is more severe than through other parts of the body. Like this, the electricity passes through the longer part of the body, increasing the effect. A fence will be tested continu-