WILDLIFE

Managing Bear Damage to Beehives no 6.519

by L.E. Meadows, W.F. Andelt, and T.D.I. Beck [1]

Quick Facts...

Avoid placing beeyards near areas frequently used by bears.

Electric fences effectively prevent black bear damage to beehives and are relatively inexpensive and easy to install.

The Colorado Division of Wildlife compensates beekeepers for bear damage and assists with damage prevention.

In Colorado, beekeeping generated $1.8 million in 1996 through the sale of honey. In addition, bees provide a valuable service to agriculture and homeowners by pollinating crops and gardens.

Locate beeyards in a protected area near water and flowering crops or wild flowers. Mountain meadows and agricultural lands along the foothills meet these criteria, and most Colorado beeyards are located along the Front Range and in the western part of the state.

The majority of Colorado's black bears (*Ursus americanus*) live in western Colorado. Black bears require forested areas to find adequate food, water and cover.

The typical bear diet consists of forbs, berries, nuts, insects and carrion. To build fat reserves for winter hibernation, bears feed heavily on berries and nuts in late summer and early fall. When these foods are in short supply, as in drought years or in areas where human development has encroached on their habitat, bears may turn to other sources of food such as honey and bee brood.

Economic Effects of Bear Damage

The amount of black bear damage to beehives in Colorado varies each year, possibly reflecting fluctuations in food supply.

For example, in 1988 11 damage claims totaling $5,700 were filed with the Colorado Division of Wildlife (CDOW). The following year Colorado had an unusually dry summer, and CDOW received 31 claims worth $30,100. In 1990, adequate moisture provided sufficient natural food, and claims decreased to 12 and $12,100. During 1996, natural food for bears was again scarce, and CDOW paid $35,000 in claims.

Identifying Bear Damage

Signs of black bear foraging in beeyards include broken and scattered frames, and supers bearing tooth or claw marks. Tracks and dark scat about 1 3/8 inches in diameter and containing berries and other vegetation may also be found in the area. A path may be noticeable if the bear has been feeding at the same beeyard for several nights.

Damage Control Methods

Black bear damage to beehives has a relatively minor impact on the overall beekeeping industry. Bears can, however, cause significant damage to individual beeyards.

Once a bear develops a taste for honey and bee brood, it will likely continue to raid beeyards and methods to dissuade it become less effective. Therefore, it is important to prevent bear damage before it begins.

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Beeyard Location

Avoid placing beeyards near areas frequently used by bears, such as berry patches, garbage dumps, heavily forested areas, riparian corridors, ravines, forested ridges and game trails. Bear use of an area can change depending on season, food availability and human disturbance. For example, during August and September black bears intensely forage on ripening nuts and berries in oakbrush habitat along the lower foothills of southcentral and southwestern Colorado. To avoid bear damage, remove beehives from this habitat before the bears arrive. If you are unsure about bear patterns in your area, contact your regional CDOW office for more information.

Bears prefer to stay where they have adequate cover. Placing beeyards in the open, away from forest edges and other cover, may discourage bears from approaching. One study found that beeyards located less than 300 feet from forest edges received an average of 4.5 visits from bears, whereas those located more than 300 feet away received an average of 1.9 bear visits. The study also found that beeyards located within 300 feet of a ravine received over twice as many bear visits as those located more than 300 feet from it.

Most Successful Control Methods:

Hive location is effective and inexpensive. Avoid placing beeyards near areas frequently used by bears, and near forest edges and other cover.

Solar-charged or 110 volt electric fencing is one of the most effective methods to reduce black bear damage.

Least Successful Control Methods:

Elevated platforms are effective but generally impractical.

Some aversive conditioning techniques have been successful but they are difficult to employ.

Trapping and relocating bears is expensive and suitable release sites are difficult to find.

Electric Fences

Solar-charged or 110 volt electric fencing is one of the most effective methods to reduce black bear damage. An electric fence must be well grounded, sufficiently charged at all times, and maintained on a regular basis.

Maintenance includes clipping or applying herbicide to vegetation growing under the fence and ground mat, recharging the battery, and checking wire voltage with a voltmeter. If proper maintenance or constant electrification is not possible, remove the fence immediately. Once a bear penetrates a fence, it will likely challenge fences in the future.

Permanent and semi-permanent electric fences can be made from multiple strands of electric wire or woven wire attached to wood, steel or fiberglass posts. An electric or solar charger, an energizer and a battery are required to charge the fence. One example of an effective permanent electric fence measures 50 feet x 50 feet (often smaller) and costs approximately $1,200 (Figures 1 and 2).

CDOW has successfully used two designs for **temporary electric fences**. A temporary 30 x 42 foot electric fence can hold 32 colonies and costs approximately $300 (Figure 3). A woven-wire electric fence is built with nine steel T-posts driven vertically into the ground (Figure 4). If the soil is sandy or soft and wet, substitute wooden posts in the corners.

Put 1 1/2 inch PVC pipe over the steel posts as an insulator. Secure 32-inch high woven wire 6 to 8 inches above the ground outside the enclosure. Use a loop of baling wire at the top and bottom of the wire to attach it to the PVC pipe. Four strands of high tensile wire, spaced at 6, 16, 28 and 40 inches above the ground, can be used instead of woven wire (Figure 5). Place an energizer cut-off switch on one of the posts to allow easier access to the hives. However, it may encourage tampering with the hives.

Other temporary fences can be constructed with electroplastic netting, electrified twine or hot tape attached to posts or trees. Costs range from $200 for fences using hot tape to $750 for electroplastic netting. Effectiveness often reflects price.

Key features of fence design are strand spacing, energizer type and grounding effectiveness. Wire strands on a permanent fence should be no more than 8 inches apart, and no more than 12 inches apart on a temporary fence. For both types, the bottom wire should be no more than 8 inches above the ground. The top wire does not need to be more than 3 1/2 feet high.

A New Zealand style energizer provides a stronger shock (at least 4,000 to 5,000 volts is needed) than a strip grazing energizer. It also decreases maintenance by reducing the need to clip vegetation growing under the fence. Ground the energizer by connecting it with a wire and a ground connector clamp to a half-inch by 6-foot rod driven into the ground.

A chicken wire mat 3 feet wide can be placed around the perimeter of the fence to ensure that the bear is grounded when it touches the fence. Connect the chicken wire to the grounding rod and pin it to the ground to prevent wind from blowing it into the fence. The chicken wire mat is difficult to pick up if beehives are moved frequently or if a lot of vegetation grows through it. Under these conditions, as well as when livestock are present, the mat can be omitted.

To protect the energizer and battery from theft and from damage by animals, place them inside the fence. To provide additional protection against theft, put them in a hive body modified to exclude bees. Place active hive bodies above the one containing the electronic equipment.

Although bears seldom break through a properly constructed and maintained fence, some failures have occurred when hives were placed close to the fence. Therefore, locate beehives at least 3 feet from the fence.

Beekeepers who qualify for damage payments and submit the necessary request form can receive fencing materials from CDOW at no cost. A district wildlife manager can request electric fencing materials for beehives that are placed in vulnerable areas.

Assistance

Colorado Division of Wildlife provides monetary compensation for black bear damage as well as funding for prevention. They prefer to fund prevention rather than compensation. For more information, contact a regional CDOW office:

Northeast Region Service Center, 317 W. Prospect St., Ft. Collins, CO 80526. (970) 484-2836.

West Region Service Center, 711 Independent Ave., Grand Junction, CO 81505. (970) 248-7175.

Southeast Region Service Center, 2126 N. Weber St., Colorado Springs, CO 80907. (719) 473-2945.

or

State Director, USDA/APHIS Wildlife Services, 12345 W. Alameda Pkwy, Suite 210, Lakewood, CO 80228. (303) 969-5775.

Elevated Platforms

Elevated platforms are effective at eliminating bear damage to beehives, but generally are impractical because they are expensive, relatively immobile, and present difficulties when working with the colonies. Platforms can be wood or steel and should raise the colonies at least 8 feet above the ground. Black bears are excellent climbers, so install a 2-foot overhang around the edges of the platform.

Aversive Conditioning

Aversive conditioning involves associating a negative experience with a food, area or event to develop future avoidance. Lithium chloride, a taste aversion chemical, has been added to honey, broodcomb or honeycomb in an attempt to create an aversion to beehives by causing temporary sickness when eaten. This technique generally has not been effective.

A second method involves wildlife agency personnel capturing bears near beeyards with leg-hold snares and then tranquilizing, handling and releasing them at the capture site. The theory is that this treatment will cause the bears to avoid the area in the future. This technique is difficult to employ but has been moderately successful in the past. One study found that only nine of 63 bears captured and released at a beeyard were recaptured after causing additional beehive damage.

Trapping and Removal

When preventive methods fail, it may be necessary to trap the bear and remove it from the area. This often involves relocating the animal to an area where it is less likely to cause further damage.

Relocating bears is expensive and it is difficult to find suitable release sites. Relocated bears often create problems at their new locations and occasionally return to their capture site and cause further damage. When relocation is not a viable option, the bear is destroyed.

Trapping and removal must be done in cooperation with local wildlife agency personnel after other control methods have failed to reduce bear damage.

Materials for Permanent Electric Fence

1	*New Zealand style 12 volt energizer*
1	*85 amp-hour deep-cycle battery*
1	*20-watt solar panel*
1	*Lightning arrestor*
13	*9 foot x 6 inch wood corner posts (CCA treated)*
8	*9 foot x 4 inch wood top rails (CCA treated)*
11	*7 foot x 1.2 inch fiberglass line posts*
1	*1,500 foot coil 12 1/2 gauge high-tensile wire*
70 ft	*1 x 19 galvanized aircraft cable*
100 ft	*12 1/2 gauge insulated wire*
100 ft	*Insulated tubing*
7	*Heavy-duty gate handles*
7	*In-line strainers (ratchet-type)*
7	*In-line tension springs*
1 bag	*12 1/2 gauge compression sleeves*
1 box	*3-4 Nicotap sleeves*
20	*10 inch x 3/8 inch H-brace pins*
5 lbs	*2 inch zinc barbed staples*
240 ft	*36-inch wide chicken wire*
40	*Metal tent stakes or home-made no. 9 wire pins*
1	*6 foot x 1/2 inch ground rod and clamp*

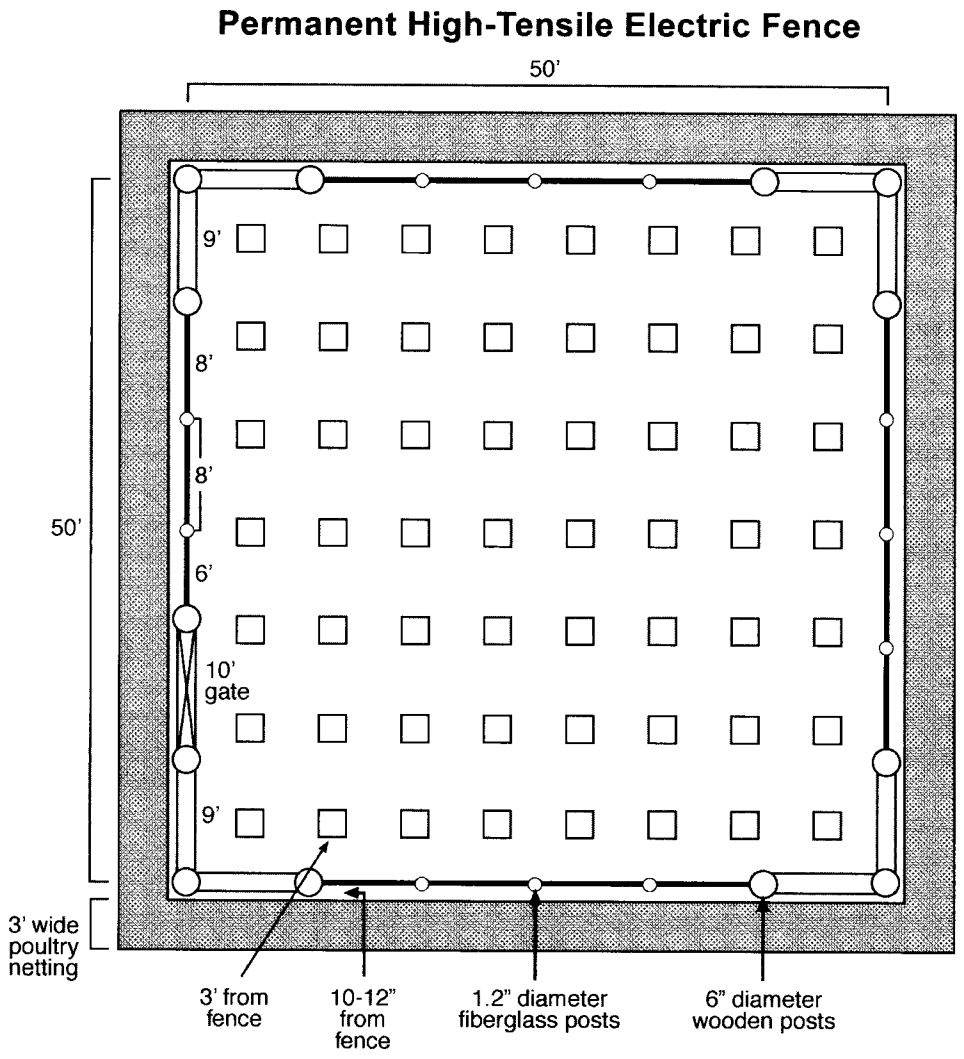

Figure 1: A permanent high-tensile electric wire fence designed to protect beehives from bears, showing spacing of posts and the position of beehives and chicken wire grounding apron relative to the fence.

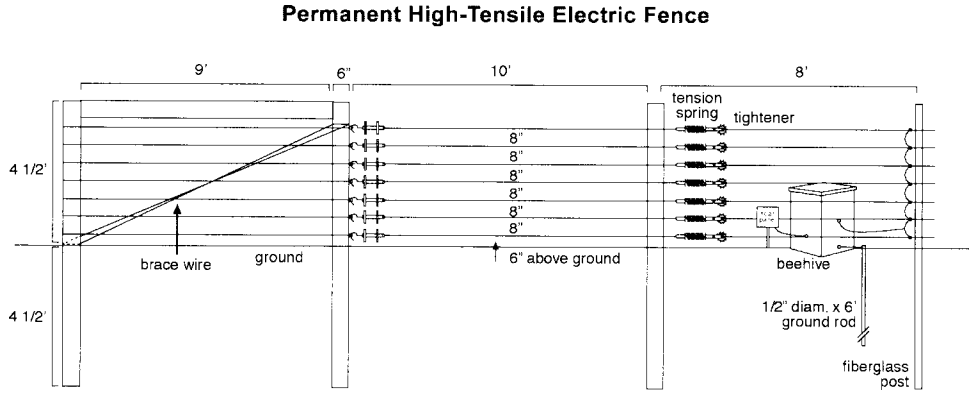

Figure 2: Spacing of wires and gate, and location of beehive, solar panel and grounding rod behind the fence.

Materials for a Temporary Woven-Wire Electric Fence

1	*Solar charger and a 5.5 watt solar panel*
1	*Interstate PC1270 jell cell battery*
15 ft	*Insulated cable*
3	*Insulated gate handles*
9	*1 1/2 inch x 4 foot PVC pipes*
150 ft	*32 inch wide light (about 18 gauge) woven wire with square mesh and wire spacing ranging from 2 inches on the bottom to 5 inches on top.*
9	*6 1/2 foot steel "T" posts*
150 ft	*36 inch wide chicken wire*
40	*Metal tent stakes or home-made no. 9 wire pins*
1	*6 foot by 1/2 inch ground rod and clamp*

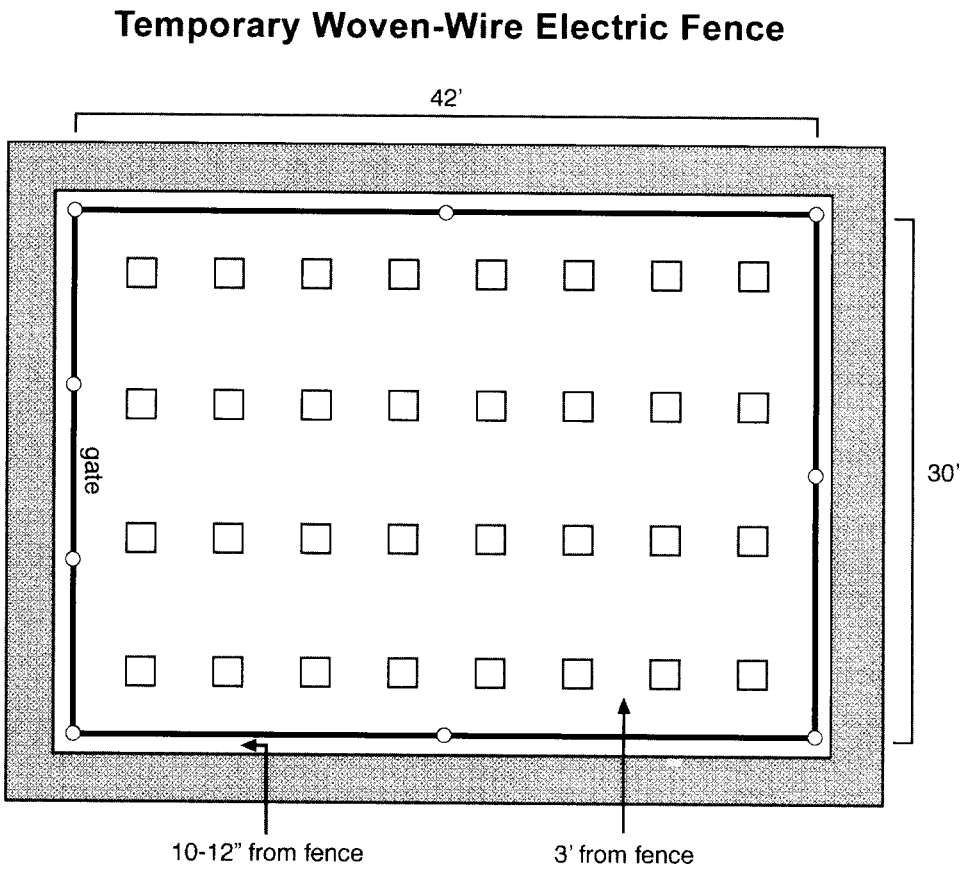

Figure 3: A temporary woven-wire electric fence and a temporary high-tensile electric fence designed to protect beehives from bears, showing spacing of posts and the position of beehives and chicken wire grounding apron relative to the woven-wire electric fence. Another "T" post is added to each of the longer sides of the temporary high-tensile electric fence.

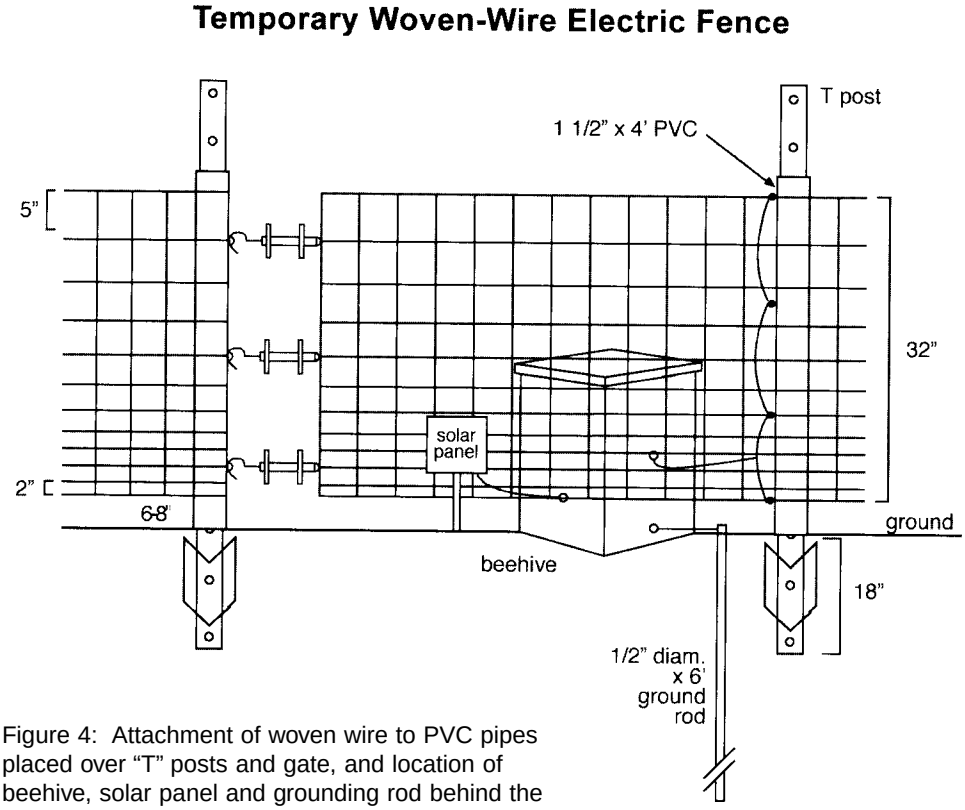

Figure 4: Attachment of woven wire to PVC pipes placed over "T" posts and gate, and location of beehive, solar panel and grounding rod behind the fence.

Materials for a Temporary High-Tensile Electric Wire Fence

1	*Solar charger and a 5.5 watt solar panel*
1	*Interstate PC1270 jell cell battery*
15 ft	*Insulated cable*
4	*Insulated gate handles*
4	*Heavy duty tension springs*
4	*In-line strainers (wire tighteners)*
600 ft	*17 gauge high-tensile wire*
11	*6 1/2 foot steel "T" posts*
48	*"T" post insulators*
150 ft	*36-inch wide chicken wire*
40	*Metal tent stakes or home-made no. 9 wire pins*
1	*6 foot by 1/2 inch ground rod and clamp*

Temporary High-Tensile Electric Fence

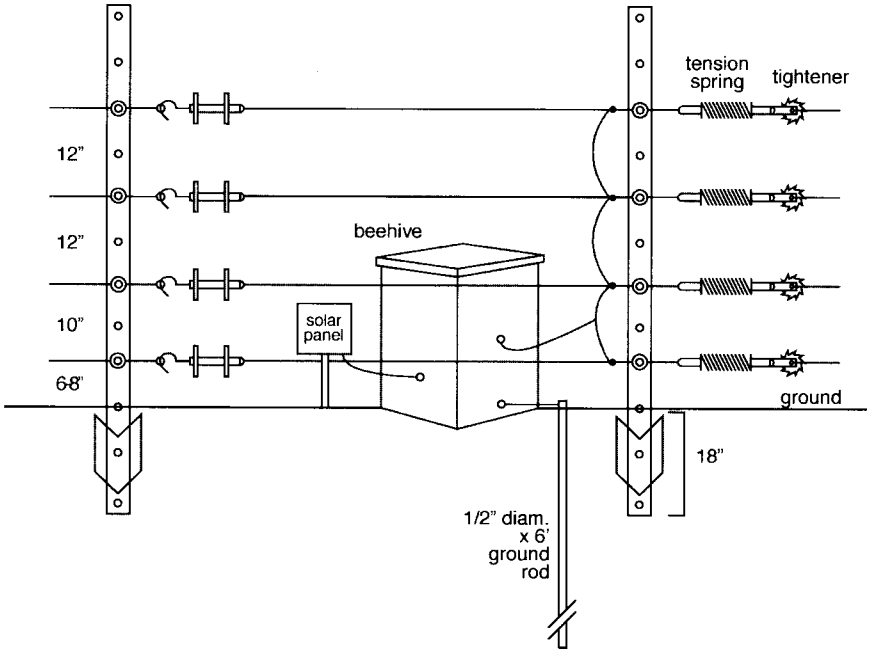

Figure 5: Spacing of electric high-tensile wires and gate, and location of beehive, solar panel and grounding rod behind the fence.

[1]*L.E. Meadows, former undergraduate student; W.F. Andelt, Colorado State University Cooperative Extension wildlife specialist and associate professor; fishery and wildlife biology; and T.D.I. Beck, Colorado Division of Wildlife, Dolores, CO.*

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