Kentucky Department of Fish and Wildlife Resources
Black Bear Program
#1 Sportsman's Lane, Frankfort, Kentucky 40601

Black Bears and Bee Yards

Honey production is both an enjoyable pastime and a significant source of income for many people in the Commonwealth. Over the last 10 years, however, black bears have become a growing threat to many beekeeping operations in eastern Kentucky. As black bears have increased in both numbers and range, so has the potential for human-bear conflicts.

While bears can pose serious threats to honey producers, it is important to know that most damage is preventable. Black bears are opportunistic feeders that will take ready advantage of easily obtainable food sources. Likewise, bears can quickly learn to identify bee yards as a food source- if they are rewarded for their nuisance behavior. So the keys to preventing and avoiding damage to your bee yard are proactive measures that begin *before* you notice a problem.

One of the most important considerations for preventing damage is selection of the apiary site. Black bears travel extraordinary distances within their home ranges, and often use preferred travel corridors. These corridors are often ridge lines, dense river or creek bottoms, or secure ravines. If possible, avoid placing bee yards in those areas if bear sign is suspected. Another consideration should be site selection in relation to the presence of natural bear foods. In summer months black bears feed extensively on soft mast such as black berries, blueberries, and huckleberries. Conversely, fall diets consist primarily of hard mast like acorns and beechnuts. Avoid placing apiaries near seasonal feeding areas and garbage dumpsters as they are strong lures for bears.

Once a general location has been selected, the next consideration is the immediate habitat surrounding the site. Bears are naturally shy and elusive animals, and their travel patterns reflect this. Typically, bears travel in relatively secure

cover such as forests, heavy brush, or dense creek bottoms. Beekeepers can further minimize conflicts by placing colonies in open areas away from heavy cover. Research has demonstrated that bee yards suffer considerably less damage when located farther from forest edges.

Clearly, site selection plays an important role in minimizing the number of bear visits to your apiary. To specifically minimize damage, however, additional measures must be taken. The most effective means to protect bee colonies is by erecting an electric fence- *before* damage has occurred.

Bears are extremely intelligent animals that will quickly identify bee yards as a food source if their efforts are rewarded. It is therefore critical to be proactive and use this deterrent before bears have an opportunity to learn these nuisance behaviors. Electric fences can be relatively inexpensive, but must be reliable and capable of working in sometimes remote areas. Necessary components include an electric fence charger, a power source, posts, high-tensile wire, and insulators. Electric fences can be as simple or as elaborate as your budget will allow- but they are definitely cheaper than the cost of losing a bee colony.

For the price of less than $300, most beekeepers can erect a new electric fence that is fully capable of deterring any bear from inflicting damage to his or her beekeeping operation. Considering the cost of a strong electric fence is roughly the same as one or two new complete hives, this deterrent is definitely worth the time, money, and effort. This is especially true considering the additional monetary losses that will be incurred once the price of honey is included!

Some beekeepers may be hesitant to spend the extra money for a fence and opt for other protective measures. Be aware, however, that black bears are extremely agile and powerful animals. During times when natural foods are scarce, even deterrents such as chain-link fences may not be adequate protection from a determined bear.

A relatively inexpensive electric fence can be erected using 5/8 inch steel concrete reinforcing bars (rebar) cut to lengths of 4–5 feet and driven at least 12 inches into the ground. Rebar posts should be placed approximately 5 feet apart so that wires can be tightened without bending the posts out of shape.

There are many types of electrical wire and selection should be based on budget and desired efficiency. Heavier wire will be more expensive but is more durable and has less resistance to the flow of electricity. While solid aluminum is the most expensive wire- it will never rust, is lighter, and exhibits 4 times the conductivity as steel wire. Galvanized steel wire is the most commonly used, however, and will withstand most conditions well.

For best results, string at least 3 strands high tensile wire to the posts using plastic insulators. The bottom wire needs to be 6–8 inches from the ground to prevent bears from reaching or digging under the fence. The remaining wires should be evenly spaced approximately 12 inches apart. Extra support may be necessary on corner posts so that fence walls remain sturdy. Each corner posts can be secured using 2 stake and guide wires, or by using wooden posts rather than rebar. For a sturdier or permanent fence, beekeepers should use 4- or 5-foot steel t-posts rather than rebar.

Regardless of fence design, the principle component to any electric fence is the power source, or charger. Three types of power sources exist- AC, DC, and solar chargers. Selection of the appropriate charger will be based on location of the bee yard and budgetary constraints. AC chargers operate from a 110-volt power source, and require a local electrical outlet. The obvious limitation of AC chargers, however, is the bee yard must be located near an electrical outlet or within reach via an outdoor extension cord. DC chargers operate from a 6- or 12-volt battery and are more functional for remotely located beekeeping operations. Deep cycle batteries are the preferred power source for DC chargers as these batteries more effectively maintain a constant output. The disadvantages of deep cycle batteries, however, are often price and batter maintenance. Batteries must be checked regularly and charged at least once a month to maintain effectiveness. In addition, batteries should be housed so as to protect the power source from damage associated with weather, animals, or vandalism.

Solar powered chargers are ideal for remotely located bee yards and require very little maintenance. Their disadvantage, however, is the necessary technology often results in higher costs than AC or DC chargers. Fortunately, these costs can be offset as the purchase of a battery is not necessary. Solar chargers should always be situated with a full view of the sun with no obstructions.

Once the type of fence charger has been determined, the next consideration should be power output. This is a critical decision as the charger is responsible for converting the power

source to high voltage charges on the fence line and determining the severity of the shock delivered to an animal. There are 2 basic types of fence charges with regard to how current is delivered- solid state and low impedance. Solid state chargers deliver a medium-amperage shock and are typically used to control short-haired livestock under moderate weed conditions. Conversely, low impedance chargers maintain a high energy level on a fence and are ideal for long, multi-strand fences. In addition, low impedance chargers will increase power output to overcome grounding by contact with weed growth. Generally, low impedance chargers are therefore more effective at deterring bears from a potential food source located in a remote location.

The last consideration when purchasing a charger is the amount of power it will supply to the electric fence, and whether this will be enough to deter bears. Professionals generally agree that chargers should generate at least 0.5–1.0 joules to effectively prevent bear damage to apiaries. While your budget will influence the selection of a charger, it is recommended to select for the highest joule output you can afford. When dealing with black bears, it is critical that a strong negative stimulus is delivered on the very first attempt to investigate a bee yard. Doing so will teach bears to avoid beekeeping operations and prevent potentially significant monetary losses to you and other beekeepers.

The electrical circuit from the power source through the fence is closed once a ground rod is installed. Ground rods must be good conductors and it is recommended they be at least 4-feet long and 5/8-inch in diameter. While solid copper or copper-coated steel will provide the best conductor, those metals may be cost-prohibitive. As such, steel rebar is most often used and will adequately function as a ground rod. In extremely dry or sandy conditions, drive the grounding rod in a low-lying area as these will retain moisture. Doing so will maintain a closed circuit and ensure a powerful shock to bears that come in contact with the fence.

As a matter of convenience we recommend the installation of insulated gate handles to facilitate entry and exit of bee yards. These handles use

interior springs to ensure fence tension when the gate is closed. Because electric chargers used to deter bears often deliver high output shocks, we also recommend hanging warning signs from the fence. Lastly, the purchase of a voltage tester is a relatively inexpensive investment that will allow beekeepers to accurately test fence wires for proper charge.

Remember that maintenance to and around your electric fence is necessary to best protect your investment. Keep overhanging trees cleared as this will prevent fallen limbs from disabling electric fences and keep bears climbing into bee yards. Positioning colonies at least 3 feet from the fence will also prevent bears from reaching through fences and causing damage. It is also recommend to place a minimal amount of bait such as bacon or peanut butter on the electrified fence itself. Doing so will deliver a concentrated shock to the tongue or nose of inquisitive bears, rather than having one crash through a completed fence.

Beekeepers who suffer damage from bears should immediately report the incident to the Kentucky Department of Fish and Wildlife Resources by calling 1-800-858-1549. Due to the opportunistic feeding behavior of black bears, be aware that any delay may result in further damage upon a return visit.

For additional information concerning black bears and bee yards please visit our website at *www.fw.ky.gov*.