

# Prevent Damage to Beehives with an Energized Fence



*A beekeeper's guide to developing a cost-effective, energized fence to protect beehives from black bears.*

**E**

each year, the Minnesota Department of Natural Resources (DNR) receives complaints from beekeepers whose beehives have been damaged by black bears. Killing bears that cause damage does not protect the beekeeper from financial loss nor does it prevent subsequent losses from other bears. By contrast, energized fence designs have been tested and proven effective in *preventing* bear damage to beehives. Energized fences should be considered for protection of all beehives in areas that have the potential for bear damage.

## Fence Design

A basic fence design is shown in the illustration on page 3. The four critical components to an effective energized fence are: 1. a high voltage, low impedance energizer capable of delivering a minimum of 4,000 volts under all conditions, 2. an adequate

electrical grounding system, 3. proper wire and post spacing, and 4. monitoring of fence status with a voltmeter.

### 1. Energizer

- A high voltage, low impedance energizer delivers a short (.0003 second), painful, but safe shock to bears. The short pulse will not set fire to grass contacting the wires, nor will it injure humans or animals.



- Energizers may be powered by a 6 or 12-volt battery, D-cell alkaline batteries, or 110-volt AC current.
- Deep cycle marine or gell cell batteries are recommended for 12-volt energizers.

- Energizers may be attached to the outside of a hive or hidden in a false hive. Some D-cell chargers may be hung directly from the fence wire.
- Batteries must be insulated from the ground.
- The fence must always be energized. The energizer and grounding system should be installed and operational prior to installing posts and wire. **All fence wires should be energized.**
- Coated underground cable may be buried as a lead out wire from the energizer to the fence and from the energizer to the ground rods.

- Remember, the shocking power of the fence deters the bear. The posts and wires are the delivery system; it is not a physical barrier, and will not be effective unless it is constantly energized.

### 2. Grounding

- Use a minimum of three 6 foot ground rods. Additional or longer ground rods may be



necessary on sandy soils or during dry conditions. Ground rods should be driven into the ground so that approximately 3 inches remain above the surface to attach the cable from the energizer.

- Ground rods should be galvanized steel; avoid copper.
- Ground rods should be placed 10 feet apart.

### 3. Wire and Posts

- Fiberglass, plastic, or wooden posts with insulators are recommended. Steel posts with insulators may leak voltage and should not be used.
- Seventeen gauge, smooth steel wire, poly wire or light gauge steel cable may be used. Many growers prefer steel cable. Poly wire is not as durable as steel wire or cable. Do not use barbed wire.
- Wire tension is adjusted by hand-pulling to tighten, and held with knots on the end. Spring-type gate handles also serve to maintain tension. Use small tension springs with light gauge steel cable.
- Place in-line posts 10 feet apart. It is important to maintain the wire spacing shown in the illustration on page 3.
- If skunks are an additional problem, an extra energized wire may be added 4 inches above the ground.
- Corner posts may be 8-foot long, 4-inch diameter, pressure

treated wood or 7 to 8-foot long, 1 1/4-inch diameter fiberglass rod. Place the wide end of the wooden post into the ground. Angle corner posts slightly away from the corner. In light or sandy soil, longer corner posts or an anchor post may be necessary. You will need about 4 feet of post above the ground.

- Use high density plastic or porcelain insulators with wooden corner posts. Avoid wraparound and tube insulators.

### 4. Voltmeter

- A voltmeter is critical for monitoring voltage and for trouble shooting. Voltmeters are available from energized fence manufacturers.

### Other Considerations

Baiting the wire is not generally recommended. Baiting may serve as an attractant where bears have not been a problem.

Spring loaded gate handles may serve as the entrance to the beeyard. The width of the gate may be customized to each operator's needs. Some operators may prefer more than one gate. As an alternative, all fence wires may be attached to a single fiberglass or plastic rod so all wires may be opened simultaneously.

Locate hives at least 3 feet inside the wires. If hives are close to the wire, a bear may reach through and tip the hive over.

Locate the hives away from over hanging trees and large branches.

### Maintenance

Monitor voltage weekly. Charge or change batteries as required, usually every 3 to 4 weeks. Some energizers may be equipped with solar panels to recharge the battery. Vegetation must not contact the fence. Mowing, weed whipping, herbicides or soil sterilants may be used to control vegetation on an 18-inch wide strip under the fence. Apply herbicides according to label instructions.

Fences around beeyards that have hives only in the summer should be taken down during winter months to reduce wear. Corner posts may be left in the ground over winter. Ear tags used by cattle farmers to control face flies may be placed in the energizer to reduce ant nest building. With proper care, fences should last 10 or more years.

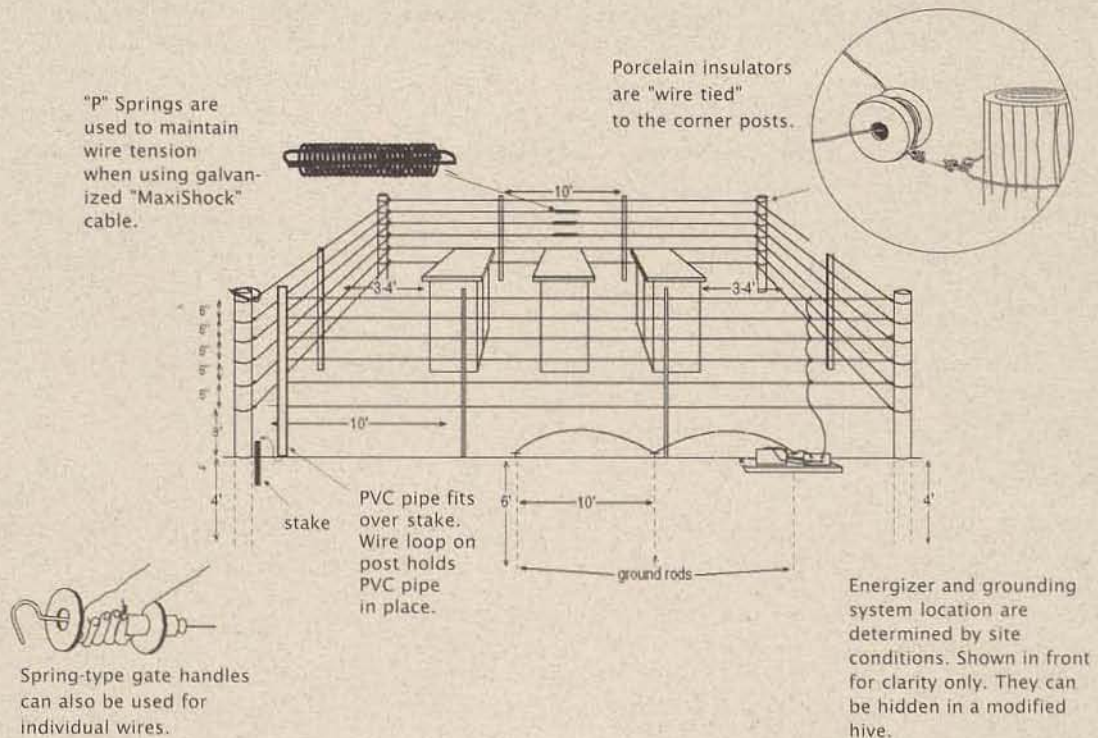
For further details, trouble-shooting information, or if you have questions contact your local DNR wildlife manager.

### Safety

Safety is a primary concern when using energized fencing systems. The beekeeper is responsible for protecting others from injury. Use energized fence warning signs and an unaltered energizer, listed with a qualified electrical testing laboratory, to protect yourself and others. *Always* follow the manufacturer safety recommendations.



# Illustration of Energized Fence—Modified New York Design (not to scale)



## Materials List for Energized Fence - Modified New York Design (See illustration above)

Materials list and price estimate (2003) for a 20' by 30' energized enclosure to exclude bear:

Quantity	Source	Description	Unit Cost	Total Cost
1	G	Energizer (at least .7 joule)	\$110.00	\$110.00
3	G	6' galvanized ground rods with clamps	10.00	30.00
1	G	Digital voltmeter	60.00	60.00
4	F	8' x 4" round treated posts	7.00	28.00
1/2 lb.	F	Galvanized fence staples	0.50	0.50
125'	F	12.5 or 14 gauge steel wire to attach porcelain insulators to wood posts		4.00
24	G	Porcelain doughnut insulators	0.30	7.20
As needed	G	12.5 gauge insulated underground cable (65')	24.00	24.00
8	F	3/8" x 48" fiberrad posts	0.80	4.80
48	F	3/8" post clips	0.25	9.00
4	G	Fence warning signs	2.00	8.00
2	G	Poly wire (655' roll)	16.00	32.00
1	F	3/4" x 36" stake	4.00	4.00
1	F	1-1/4" x 4" schedule 80 pvc	4.00	4.00
1	G	MaxiShock steel cable (optional wire)	46.00	46.00*
6	G	"P" springs (necessary with "MaxiShock")	3.20	19.20*

Source: G-Energized fence supplier    F-Farm supply store    Estimated total cost    \$325.50

\*optional wire and springs were not figured in total cost

## Fence Material Sources

UAP Great Lakes  
PO Box 143  
101 South Chestnut  
LaCrescent, MN 55947  
(507) 895-2103

Shepard's Hill Farm  
Dave Deutschlander  
Rt. 4, Box 43  
Pine City, MN 55063  
(320) 629-2744

K-Fence Systems  
Rt. 1 Box 195  
Zumbro Falls, MN 55991  
(507) 753-2943  
[www.kfence.com](http://www.kfence.com)

Premier 1  
2031 300th St.  
Washington, IA 52353  
(800) 282-6631  
[www.premier1supplies.com](http://www.premier1supplies.com)

Kencove Farm Fence Supplies  
344 Kendall Road  
Blairsville, PA 15717-8707  
(800) 536-2683  
[www.kencove.com](http://www.kencove.com)

Midwest Fence  
5201 St. Paul Rd.  
Medford, MN 55049  
(507) 451-8657

Eikmeier Livestock Systems  
48737 237th St.  
Pipestone, MN 56164  
(605) 997-2022

Waconia Farm Supply  
801 S. Hwy. 284  
Waconia, MN 55387  
(952) 442-2126  
(888) 741-3276  
[www.waconiafarm.com](http://www.waconiafarm.com)

David McIver  
15624 340th Avenue  
Farwell, MN 56372  
(320) 283-5776

For more information call:  
(651) 296-6157 (Metro Area)  
1-888-646-6367 (MN Toll-free)  
Telecommunication Device for the Deaf  
(651) 296-5484 (Metro Area)  
1-800-657-3929 (MN Toll-free)

© Copyright 2003, State of Minnesota, Department of Natural Resources.

Equal opportunity to participate in and benefit from programs of the Minnesota Department of Natural Resources is available to all individuals regardless of race, color, creed, religion, national origin, sex, marital status, status with regard to public assistance, age, sexual orientation or disability. Discrimination inquiries should be sent to: MN/DNR, 500 Lafayette Road, St. Paul, MN 55155-4049; or the Equal Opportunity Office, Department of the Interior, Washington, DC 20240.

This information is available in an alternative format upon request.

Listing of company names is for the readers convenience and is not considered comprehensive. The State of Minnesota neither recommends nor endorses specific products or companies.



Printed on recycled paper containing a minimum of 10% post-consumer waste.

Department of Natural Resources  
Wildlife Damage Management Program  
1601 Minnesota Drive  
Brainerd, MN 56401

