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George E. Bohart
Utah State University

George F. Knowlton

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MANAGING THE LEAF-CUTTING BEE FOR HIGHER ALFALFA SEED YIELDS



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Fig. 1 Leaf-cutting bee tripping alfalfa flowers.

MANAGING THE LEAF-CUTTING BEE FOR HIGHER ALFALFA SEED YIELDS

George E. Bohart

Entomology Research Division
Agricultural Research Service, USDA

George F. Knowlton

Utah State University
Extension Entomologist

The alfalfa leaf-cutting bee (*Megachile rotundata* F.) has become an important ally to our alfalfa seed growers since its accidental introduction into Utah about nine or ten years ago.

This bee "trips" and cross pollinates alfalfa blossoms. It pays little attention to plants other than alfalfa, sweet clover, Dutch clover, and a few of the wild mints. Unlike many other species of leaf-cutters, it causes little damage to garden shrubs and nursery stock because it confines its leaf-cutting to alfalfa and similar plants. Populations build up rapidly in June and early July and thereafter remain quite constant until early September.



Fig. 2 Bee cutting cell lining pieces from alfalfa.

One female leaf-cutting bee in every 5 square yards of bloom appears to be adequate for good pollination. This means that about 1,000 bees per acre should be present some time before the crop reaches full bloom. On this basis, 100,000 nesting females should be able to pollinate a 50-acre alfalfa field.

Since the alfalfa leaf-cutting bee has a short foraging range (most of them only range a few hundred feet into the alfalfa), it is necessary to scatter nesting shelters for the bees throughout the field. Twenty shelters, each with nesting units containing 5,000 nesting females, spaced at about 400-foot intervals should result in adequate pollination of a 50-acre field. If control of grasshoppers along the field borders is likely to be necessary, the shelters should be at least 200 feet inside the border.

Obtaining Bees

These bees are now present in most agricultural areas of Utah. Examination of old nail holes in outbuildings and insect burrows in dead trees and posts will likely disclose their presence. Where many nests are present, or where later observations show many nesting adults, prepared containers of straws or 4 x 4's drilled with holes can be made available near the first of June. Nests obtained in this way can be used as nuclei for a population increase in field shelters the following year. There are, as indicated at the end of this leaflet, a few commercial sources of leaf-cutter bees and more may develop in the future.

Care

Alfalfa leaf-cutting bees prefer to nest in darkened, smooth-walled, tubular holes about 3/16 inches in diameter. Light should enter the nests only at the entrances. Early work showed that 4 x 4 timbers drilled with 3/16-inch holes about 3 1/2 inches deep were most readily accepted as nesting places. A high speed drilling bit for wood facilitates smooth-walled holes.

Timbers drilled with 3/16-inch holes are now available commercially. Holes in wood can also be prepared by grooving boards and stacking them together. Planer blades can be modified to cut a

series of 3/16-inch grooves in boards which can then be strapped tightly together. The principal advantage of using the latter type of unit is to be found in the smooth-walled holes resulting from grooving the boards parallel with the grain.



Fig. 3 Bee finishing her nest in a straw.

Soda straws should have an inside diameter of 5/32, 6/32, or 7/32-inch. The 6/32-inch straw is the most desirable size but is not generally available. The straws should be packed into sturdy containers such as coffee cans or wooden boxes. Half-length straws are more efficiently occupied than full-length ones. When straws are sawed to shorter lengths, always present the unsawed ends to the bees. It is well to set the straws in rubber cement or a layer of plaster-of-paris at the bottom (back) of the container so they will not fall out or be pulled out by birds and other animals.

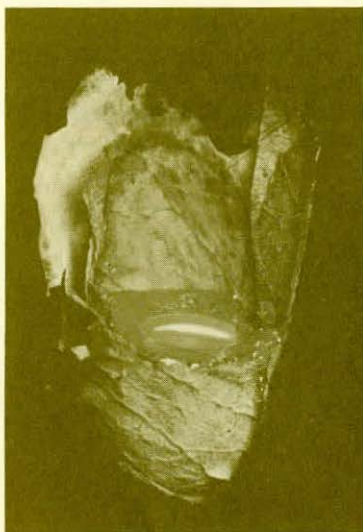


Fig. 4 Egg on pollen and honey in leaf-lined cell.

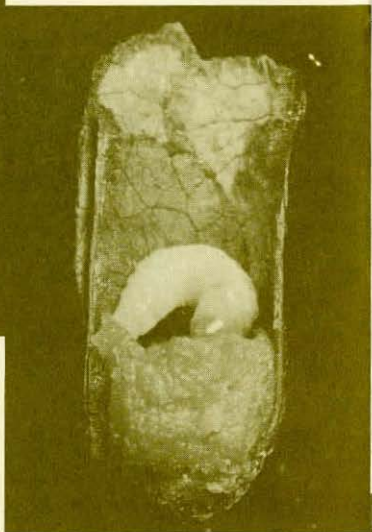


Fig. 5 Larva developing on food in cell.

Corrugated cardboard with large flutes (called bottle wrap) can be used as a nesting unit by rolling it into any diameter preferred. A 6-inch roll offers a potential for at least 600 nests. Sheets of another type, called build-up corrugated paper, can be cut and glued on top of one another into any size block by the paper company. The larger flute diameter, about 3/16-inch and lengths ranging from 4 to 6 inches, should be used in either case. Cardboard should be securely glued to the back of each roll or block. Corrugated cardboard is not as attractive to the bees as soda straws or holes in wood and is usually accepted only when the population is exceptionally high.

Alfalfa leaf-cutting bees are gregarious and prefer to nest near the hole from which they emerge. Placing an occupied 4 x 4 nesting block among the new nesting materials encourages nesting in the new material. Straws already filled with nests arranged among the empty straws, inserted in the corrugated cardboard flutes, or placed in drilled holes, also encourages nesting in the surrounding materials.

Shelters

Build shelters that seem to meet your conditions and facilities. A good shelter should provide:

1. Protection of nesting holes against noon-day and afternoon sun.
2. Easterly exposure to catch the morning sun.
3. Protection from wind and rain.
4. Ventilation.
5. Surplus of nesting holes to allow for population growth.
6. Elevation 2 1/2 feet or more above ground.
7. Provision for screens across face of nesting units or shelters to prevent predation by birds.
8. Provision for covering for protection against pesticides.

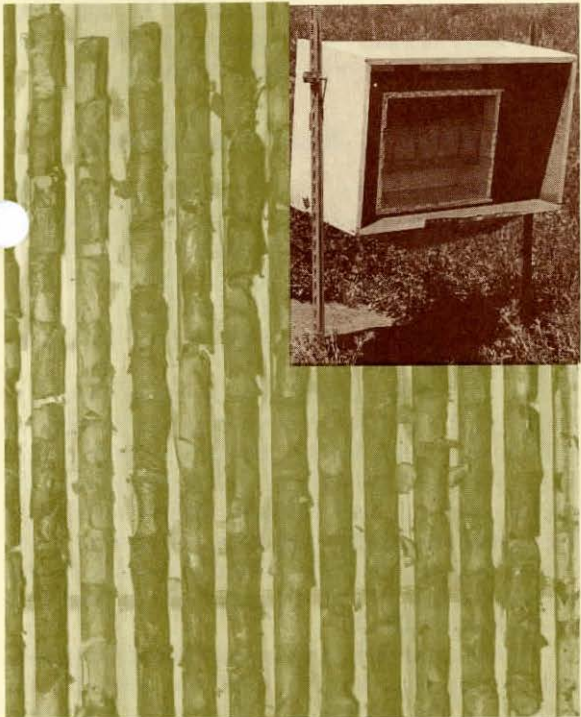


Fig. 6 Shelter for leaf-cutting bees.

Fig. 7 Leaf-cutter bee cells from shelter (fig. 6).

A shelter made of a box or cupboard supported on two or more legs, well protected by shadeboard roof, is satisfactory. A box within a box, in which there are several inches of space between boxes, is also a practical design. At the back of the cupboard or outer box, screened slots should be provided for ventilation. The open side should be so built that it can be covered with rabbit wire to keep out birds, or covered to confine the bees for a short time during insecticide applications. Painting the shelter white helps to protect the nests from excessive summer heat.

Moving Bees

In October or November the dormant larval bees may be moved in their nests to an unheated room or cellar. Place the overwintered bees back in their summer shelters by late April or early May. If the bees are needed to pollinate first crop alfalfa, the shelters should be oriented at first to receive maximum sun exposure. By the time the daytime air temperatures reach 95°F., the open faces of the shelters can be oriented to the east and protected from noonday and afternoon sun.

Protection from Insecticides

Apply insecticides only in the evening or early morning. Leaf-cutting bees are more readily killed than honey bees with some commonly used insecticides such as toxaphene, but less readily killed by carbaryl (Sevin) or trichlorofon (Dylox) used at 1 pound or less per acre results in only light mortality of either species.

To the extent possible, a demeton (Systox), trichlorofon (Dylox) control program should be used in seed fields having leaf-cutting bees as the major source of pollination. Cloth covers may be placed over the nest shelters during insecticide application to confine the bees. However, these should be removed before the temperature in the shelter reaches 105°F. or many of the bees and young larvae will die.

Known commercial sources of leaf-cutting bees and nesting materials for them are available on request at the Utah State University Extension Services Office and offices of the county agricultural agents.