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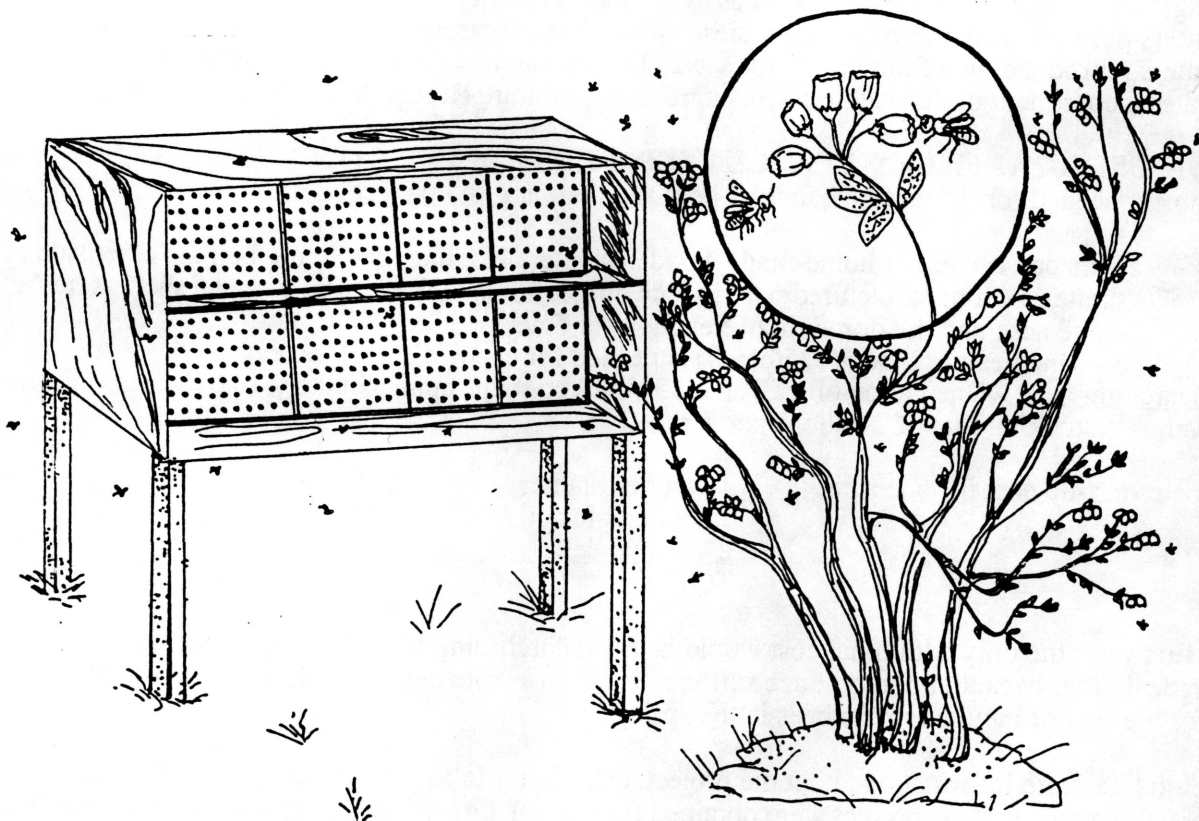
ALFALFA LEAFCUTTER BEES AS POLLINATORS OF Highbush BLUEBERRIES IN MAINE

This summer, Carl Estes and other highbush blueberry growers in his area had the help of twenty-thousand alfalfa leafcutter bees to produce their blueberry crops. These highbush blueberry growers are collaborating with Dr. Connie Stubbs, Dr. Frank Drummond and Ellen Mallory, from the University of Maine at Orono, on a project looking at how well the leafcutter bees pollinate and reproduce on highbush blueberries. The performance of the leafcutters is being compared to that of honey bees.

BACKGROUND

Alfalfa leafcutter bees are about half the size of honey bees and are a solitary species; unlike the honey bee, they do not organize to form a colony. However, they are gregarious and the females tend to nest closely together. The leafcutter's name comes from the fact that the females cut small pieces of leaves, from the crop or wild plants, to make little thimble-shaped cells inside holes in wood (or in nesting blocks provided by a beekeeper). They provision the cells with nectar and pollen, lay one egg in the cell, cap it with more leaf pieces and then start on the next cell, laying up to 7 cells end to end. One female can complete 12-16 cells in her lifetime. It is during this nesting process that the female bee pollinates the crop, moving pollen from one flower to another as she collects pollen and nectar to provision the leaf cells.

The leafcutters overwinter as larvae in these leaf cells. However, in Maine and other northern states, the winters are too extreme for the alfalfa leafcutters to overwinter naturally. Instead, a beekeeper can collect the leaf cells in the fall, place them in a moderately cold area of a barn or garage, and then heat them up the following spring to bring about the pupation and emergence of adult leafcutters.



Alfalfa leafcutter bees pollinate highbush blueberries while collecting pollen and nectar from the flowers. They nest in shelters provided for them in the field. (sketch by Kirsten Hill)

CURRENT USES OF ALFALFA LEAFCUTTER BEE

The alfalfa leafcutter bee is used extensively for pollination of seed alfalfa in the western U.S. and Canada. Because of its size, the leafcutter is well suited to collecting pollen and nectar from the small alfalfa flowers. Alfalfa seed producers either manage the bees year-to-year themselves, or order them from a number of suppliers who are located in the western states and Canada. Leafcutter bees have a number of characteristics that make them easy to manage:

- Their emergence can be controlled to coincide with crop bloom.
- They forage close to home and are therefore more faithful to the blooming crop than honey or bumble bees which can travel great distances to forage.
- They will use human-made nesting sites, nesting close to one another. This makes servicing and moving the bees easy.
- They are not aggressive and can be handled without any protective clothing.

RESEARCH ON THE ALFALFA LEAFCUTTER IN MAINE

In Maine, work with alfalfa leafcutter bees began in 1992 when Drs. Stubbs and Drummond recognized a growing concern that Maine fruit growers rely almost exclusively on one species of bee, the honey bee, for the pollination of their crops. This may not be sustainable since the availability and cost of honey bees has become uncertain due to increasing problems with disease, parasites and Africanization.

The researchers' first work with the alfalfa leafcutter bees was in lowbush blueberries and yielded promising results: the leafcutters collected lowbush blueberry pollen and significantly increased the fruit set of the crop. Similar results have been found in Nova Scotia. In fact, a number of lowbush blueberry growers in Eastern Canada are currently using leafcutters because of the low availability of honey bees in their areas. There are even two custom pollinators who rent out leafcutters, just as honey bees are rented, to lowbush growers in Nova Scotia and New Brunswick.

Encouraged by the results in lowbush blueberries, Stubbs and Drummond decided to introduce leafcutters to other small fruit crops in Maine. Last year they began working with the highbush blueberry growers mentioned above, as well as Washington County cranberry growers to see how well the leafcutters pollinated and reproduced on these crops. The researchers are also looking at how well the leafcutters reproduce on alfalfa grown for seed. This research is supported by a grant from the United States Department of Agriculture's Sustainable Agriculture Research and Education Program.

COST OF USING ALFALFA LEAFCUTTER BEES

The equipment needed for the alfalfa leafcutter bees and their approximate costs are:

- Shelters - growers can use either home-made wooden shelters like the one pictured on the other side of this page (\$20/shelter) or a manufactured polyethylene dome (\$300/shelter). The wooden shelters house enough bees for one acre and the domes house enough for 5 acres.
- Nesting blocks - One nesting block (\$25/block) is needed for each gallon of leafcells.
- Alfalfa leafcutter bees - One gallon of leafcells (\$50/gal.) contains approximately 10,000 bees. We are recommending a stocking rate of 2 gallons per acre.

Approximate start-up cost for one acre:	1 wooden shelter	\$20
	2 nesting blocks	\$50
	<u>2 gal. leaf cells</u>	<u>\$100</u>
	TOTAL	\$170

After the first year, the only additional cost would be for repurchasing leaf cells in the case that the pollinating leafcutter bees do not reproduce sufficiently. Please note that this calculation does not account for the cost of incubating the bees in the spring.

If you would like more information about the project, call Ellen Mallory, UMaine-Orono (207) 581-2961. Leafcutter bees for this project were obtained from Wolf-Eggerman Enterprises of Saskatchewan, Canada. Contact them at (306) 287-3780 or Northstar Seed Ltd. in Manitoba (204) 476-5241 for information about obtaining leafcutter bees and their management.

- Ellen Mallory