
Lowbush Blueberry Fact Sheet

Use of Alfalfa Leafcutting Bees in Wild Blueberry Pollination

Alfalfa leafcutting bees (ALBs) (Fig. 1 a & b) are used for commercial pollination of alfalfa and other forage seed crops in Western Canada. They were first brought to the Maritimes in 1992 to assess their usefulness in pollinating wild blueberries. Research by Steve Javorek showed that they forage on blueberry for pollen and nectar and improved blueberry set by as much as 25% over background levels. Commercial use of these bees began soon after, and today they are used on thousands of acres in New Brunswick, Prince Edward Island and Nova Scotia. The biology and management of ALBs is quite different from honey bees and requires knowledge of management beyond this fact sheet. Anyone interested in pursuing the use of ALBs in their fields should contact established users for advice or consult reference material for management details.

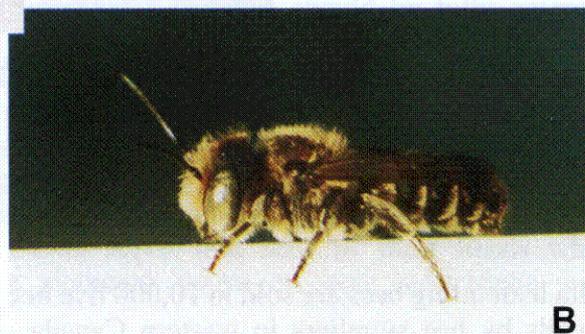


Figure 1. Alfalfa Leafcutting Bees: a) female b) male



ALB biology

ALBs are solitary; each female in the population looks after nest construction, cell provisioning and egg laying by herself, without the assistance of others. ALBs are cavity nesters and in nature use hollow stems, burrows of wood boring insects and any cracks and crevices of the appropriate size they find. They build cells using leaf pieces, provision them with pollen and nectar, lay an egg and then seal them up with more leaf pieces. ALBs over winter as mature larvae called prepupae (Fig. 2). In the spring, they pupate and mature into adult bees over a period of 3 to 4 weeks. The population is composed of about 2/3 males and 1/3 females. Females live about 60 days and can produce 12-15 offspring during that period. It is possible to have two generations per year. ALBs have their own set of pests including parasites, molds and a devastating disease, chalkbrood. All bees brought into Nova Scotia from western Canadian should be guaranteed Chalkbrood-Free.

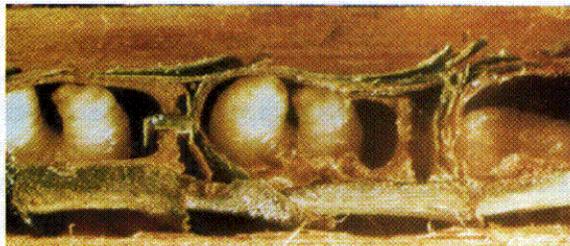


Figure 2. ALB prepupae in nest tunnel



Figure 3. Prepupae in tray

ALB management

Alfalfa leafcutting bees are sold in 10,000 live bee units called 'gallons' as prepupae (Fig 3) in the leaf cells by bee suppliers in western Canada. Bee suppliers should supply a "Bee Quality Assessment" report for each lot sold. There is specialized management and equipment for ALBs as well. The important components of ALB management are:

1. Incubation. Bee cells are put in trays without tops and placed in incubators at 30°C and 60-70% RH for 2-1/2 weeks. Tops are put on the trays about half way through incubation when parasitic wasps and some native leafcutting bees have left the trays. After 18 to 19 days of incubation, males begin to emerge while females start at days 21 to 22. Almost all emergence will be complete after 24 days. It is important to be able to cool bees in the incubator (at 10-15°C for up to 14 days), between day 14 and 22, to slow down their development and synchronize their emergence with blueberry bloom. The incubation period should be timed to coincide with the predicted bloom in the target fields.

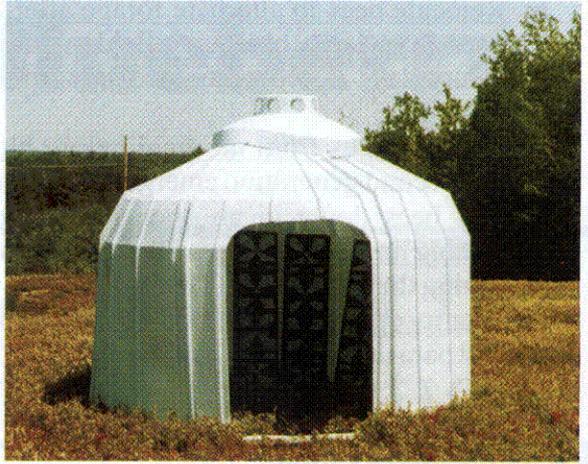


Figure 4. Plastic dome shelter with nesting blocks

2. Field setup and release. Artificial bee nests are placed in fields in shelters (Fig 4) that protect ALBs from the elements. Fields should be set up in advance of full incubation with one shelter every 4 to 5 acres. Bees will fly within 100 m of the shelter. Shelters should be well secured, with openings facing southeast. Bees are placed in the field at early bloom (10-15%) and left there throughout the bloom. If possible, the bees should be released in the morning of a warm sunny day so they leave the trays that day. A stocking rate of 2 gallons (20,000 live bees) per acre is recommended.
3. Pollination period. ALBs move out from the shelters as bloom progresses and flowers are pollinated. They forage best when it is warm (above 18°C) and sunny. As ALBs live longer than the blueberry flowering period, they should be moved after bloom unless other forage is available near the field.
4. Field removal and winter storage. When there are few bees left in the shelters, usually late July or early August, before blueberry harvest, nests are removed from the fields and dried out. Once dried, the bee cells are placed in cold storage at 5°C and 50% RH. They can be removed from the nests after drying or later in the winter.

Tips for using ALBs in Wild Blueberry

1. Bee Purchase. When purchasing bees from western Canada, be sure that the seller provides a quality assessment report showing live bee counts and ensuring no chalkbrood.
2. Fully incubate bees before putting out in the field. Females should be fully emerged before trays are moved out for pollination.
3. Release on warm, sunny days. Bees should be removed from the incubator and kept cool in the dark to move them to the field. The morning of a warm, sunny bright day is best for release because it encourages the bees to leave the cells and go to flowers for nectar.
4. Use shelters that provide maximum protection and warmth for the bees. There are many different shelters that vary in cost, durability and amount of protection provided to the bees and nests. Growers should choose shelter types that best fit their needs while providing ALBs with protection from the elements, warm up well and reduce wind movement in the shelter.
5. Once bees have left the trays, remove the trays from the field. The bee cells in the trays are a source of wasp parasites and bees may go back into them. Once the bees have left the trays (after a few days), remove the trays from the field and discard the cells elsewhere. Do not dump cells on the side of the field.

6. Relocate bees to alternate forage after blueberry bloom is finished. It is advisable to move bees from large blueberry fields with little alternate forage. Do this at night after a clear sunny day. Keep nests face side up and replace in the shelter in the original order they were in.
7. Remove bees from the field before blueberry harvest. When most of the bees have died and second generation emergence begins (see males again), remove the bees from the field.
8. Dry bees down in an open room and allow second generation bees to emerge before putting in cold storage. Bee cells can be harvested from the nests after drying or later during the fall.
9. Quality Assessment. Once bees have been harvested, assess bee quality for live prepupae and parasitism rates to assist in planning for the following season.

Recommended Reading:

Homan, H., L.P Kish, C.R. Baird, R. Bitner and N. Waters (updated by K. Strickler) 2000. Alfalfa Leafcutting Bee Management in Idaho. [Online]. Available:

<http://www.pollinatorparadise.com/beemanage/Beemanage.htm>. [1 June 2004]

Murrell, D. 1997. Alfalfa seed and leafcutting bee production in Saskatchewan. Saskatchewan Alfalfa Seed Producers Association. [Online] Available:

http://www.aginonet.com/aglibrary/content/sk_alfalfa_prod_assoc/production.html. [1 June 2004]

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