BUMBLE BEE MANAGEMENT: FIELD HIVES AND COLONY ENEMY STUDIES IN WISCONSIN

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INTRODUCTION

A 1995 survey of 1156 bumble bees on 18 flowering cranberry marshes revealed that the the main species in Wisconsin were *B. impatiens, B. terricola, B. griseocollis, B. ternarius* and *B. vagans* while *B. affinis* and *B. perplexus* were of minor importance. Hence the most important species and those with the largest colonies are underground nesting species (Macfarlane 1995). *B. griseocollis* was the only surface nesting species of importance (3 rd ranked).

1995 Wisconsin studies on field hives and bumble bee enemies clarified greatly the direction of field management of feral bumble bee populations. A paper on food supplies for cranberry pollinating bumble bees has just been written for publication in the 1996 International symposium of pollination, which coauthor Kim Patten (Washington State University) will attend.

RESULTS

Field hives

In the Pacific North west, testing of field hives between 1991-1995 around cranberry marshes verified that the best levels of hive occupation occurs near favourable food sources that flower as nesting begins e.g. evergreen huckle berry, blueberry and rhododendrons. Nest initiation in Wisconsin was 2.5 % for all but the most successful marsh and 5 % for surface hives and 3 % for underground hives. This was poorer than in Washington (Macfarlane *et al.* 1994) despite more water and draft proof hives being used in Wisconsin. 186 hives (121 surface: 65 underground) were tested in 14 sites. Only one site was occupied reasonably well (14 % and all were the small colonied *B. rufocinctus*). A **MAJOR SHORTCOMING** of any colony formed from a queen occupying a hive in central and even more so in northern Wisconsin is that the colonies will still be small (less than 50 workers) and growing by the time cranberry flowering peaks based on work done on their life cycle around central Wisconsin marshes.

Feral queens may occupy field hives for bumble bees, but the use of underground sites remains relatively low compared to the other bumble bee species. Underground sites are strongly preferred by large colonied species, so control of the desirable species with field hives is still poor. This situation will persist until the secret of consistently obtaining equal nest initiation and colony formation in field hives has been resolved. Timing the setting out the hives adds little to the selection of the best species for cranberry pollination. For quality colonies it is desirability to patrol hives 2-4 times in a season. During this surveillance of small colonies food with a sugar solution in feeders can be added, any wasp nests from the lids removed and as many colony enemies killed as is feasible.

The opportunity cost of investment and trial of field hives in much of Wisconsin is poor as long as the prices of reared colonies remain around $ 90 each. Field hive materials for bumble bees cost $10 to $15 even if labour is discounted, but they could last 15 or more years if treated timber is used. Annual replacement of lining cost $0.5 per year too. Users really need 30-50 % of the hives with viable colonies to maintain profitability and continued interest in colony management. I conclude that any testing of hives should be restricted to a few sites and then only where there is a reasonable sequence of flower sources or in sites where there seem to be considerable populations from year to year. Testing of field hives that were made in 1995 may continue to check that 1996 is not a better season. However, at best growers may expect to gradually find the more favourable sites over a number of years and not invest too heavily in hives. Hive placement can be extended to sites where the best occupation is achieved. Advice on hive design remains as presented at the 1995 Wisconsin school (Macfarlane 1995).

Limiting losses from enemies

An account on the potential enemies was given for growers (Macfarlane 1995). Dried fruit moth *Vitula edmandsae* larvae and the Indian meal moth, which was found in some commercially reared colonies act like the wax moths in honey bee combs. I suspect that some commercial rearers of bumble bee colonies use a substance to kill any developing larvae at the base of the colony from observations on reared colonies in Wisconsin.

Racoons caused the loss of developing colonies where hive lids were not latched down or held down with stones. Mice were less of a problem compared to Washington.

CONCLUSION

Overall in the Washington and Wisconsin cranberry growing areas occupation of field hives by bumble bee queens has often been very poor compared with much more favourable results along the margin of the Rocky mountains in southern Alberta (Hobbs 1967, Richards 1978) and in northern Wisconsin (Fye and Medler 1954). Hence the provisional conclusion that food supplies need to receive much more attention ahead of nest sites as suspected (Macfarlane 1995) has proved to be true.

ACKNOWLEDGEMENTS

Bumble bee field management could not have been so thoroughly investigated without outstanding cooperation of seven growers, who made up or modified the field hives that were tested.

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The great end of all human industry is the attainment of happiness. For this were arts invented, sciences cultivated, laws ordained, and societies modelled, by the most profound wisdom of patriots and legislators. Even the lonely savage, who lies exposed to the inclemency of the elements and the fury of wild beasts, forgets not, for a moment, this grand object of his being.

David Hume

ROUNDUP CUT STUMP LABEL

Roundup has a federal 2(ee) label for cut stump applications for control of brush in cranberry beds. The label calls for a 50 to 100% solution of Roundup for application to cut stumps of brush. Clip off the top portion of brushy weeds and then carefully apply the Roundup solution to the cut stump with a small brush or dauber. You may add dye to check on coverage. Care must still be taken to not contact vines and the 30 day PHI must still be strictly observed. This provides another option for controlling brush in beds.

Teryl R. Roper, UW-Madison

EARLY NITROGEN APPLICATIONS

Some growers have been applying nitrogen in an effort to get vines to "green up". The lack of a nice green color in the vines is more likely a result of cold temperatures than from a lack of nitrogen. There are at least two problems associated with applying nitrogen to vines too early. The first is a grower may make an application or two in an effort to get vines to "green up". That nitrogen remains in the soil or in the vines and then when the temperatures do warm up there is excessive nitrogen available and they "blow through the buds" and rank vine growth may result. Second, laboratory research conducted by Dr. Joan Davenport of Ocean Spray has demonstrated that cranberries won't take up nitrogen if the soil temperature is below 50°F. Thus, we recommend **NOT** applying nitrogen fertilizer until the soil temperature (taken at 2 inch depth) is at least 55°F. Nitrogen applied when soils are below 55°F remains in the soil and will not cause vines to become green.

Teryl R. Roper, UW-Extension Horticulturist

RECYCLING PLASTIC PESTICIDE CONTAINERS

The Wisconsin Fertilizer and Chemical Association (WFCA) is again leading the effort to recycle plastic pesticide containers in Wisconsin. The program, now in its fifth year, is funded entirely by the pesticide industry through the Agricultural Container Research Council (ACRC).

WFCA encourages all dealers statewide to collect clean plastic containers from their patrons and bring them to the nearest granulation site. To date, 57 Wisconsin agri-dealers have agreed to accept containers from other dealers and farmers. Farmers and others wanting to recycle their empty, clean plastic containers should contact their local dealer for information as to where and when the containers are collected.

The dealers have specific dates and times they will accept containers from customers or other dealers. Because of the time involved to inspect containers for cleanliness and of possible storage space constraints at a dealership, you'll need to call your host dealer before bringing your containers. Make arrangements to bring your containers before July 22 because that's the date chipping begins in Wisconsin. ***Containers will not be accepted on the day of chipping***.

If you have questions regarding the program, please contact Joe Nagel, Spiritland Agri-service, 715-366-2500 or the WFCA office, 608-249-4070.

Please note that this recycling project is **NOT** an Agricultural Clean Sweep program; only emptied, plastic pesticide containers will be accepted. None of the sites will be equipped to handle disposal of waste pesticides.

The bitterest tears shed over graves are for words left unsaid and deeds left undone.

Harriet Beecher Stowe

CRANBERRY MINI-CLINICS

Final arrangements have been made for cranberry mini-clinics in June. Mini-clinics are informal gatherings where growers and University faculty can gather to discuss areas of current interest. Each session will last about 2 hours. Drs. Dan Mahr, Patty McManus and Teryl Roper will be at each session and will give short presentations followed by time to ask questions, examine samples and discuss needs and ideas. We hope to see ***you*** at one of the mini-clinics. The dates and times are:

Tuesday June 18
10:00 am Rocky Run Cranberry Marsh
Host: Jerry Laux
Directions: Turn west from Hwy 51 onto Rocky Run Road (15 miles north of Tomahawk; 9 miles south of Hazelhurst). Proceed west on Rocky Run Road 2 miles. Turn right onto Cranberry Road and continue to the marsh.

Wednesday June 19
2:00 pm Weatherby Cranberry Co.
Host: Jim and Nodjii Van Wychen
Directions: Weatherby Cranberry Co. is about 6 miles east of Warrens on Cty E. Look for their sign on the south side of the road.

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