Trapping Small Hive Beetles Inside Honey Bee Colonies

Project No.: 06-POLL4-Hood

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Interpretive Summary:

The Hood Small Hive Beetle Trap was modified in winter 2006 to include two interiorbrace walls to provide support and prevent warpage of the plastic box during use and storage. The brace walls created an additional benefit of providing three separate compartments inside the plastic box trap which allows the application of multi attractants or lethal agents, simultaneously. The trap lid opening was modified also, by adding an extra ridgeline along the longitudinal opening to allow beetle entry but prevent bees from pushing through and entering the trap. As of Spring 2006, the Hood beetle trap is distributed and sold by Brushy Mountain Bee Farm, Moravian Falls, North Carolina 28654 (for catalog, ph. 1-800-233-7929, email: sales@brushymountainbeefarm.com, website: www.brushymountainbeefarm.com.)

In spring-fall 2006, the recently patented USDA yeast-based small hive beetle attractant was compared in field tests with cider vinegar using the Hood trap. The USDA yeast-based attractant proved to be a better small hive beetle attractant in warmer months of the year, July and August. There was no difference found in the two attractants in the cooler months. The USDA yeast-based attractant proved to be a more stable material than cider vinegar which had a tendency to evaporate quickly in hot weather. Test colonies having traps with no attractant (controls) had more small hive beetles than test colonies having either attractant in July and August which indicates that trapping efforts resulted in maintaining a lower beetle population at a critical time of year.

The mark-release-recapture investigations begun on 18-19 May 2006, resulted in a 16% recovery rate within the initial 2-day period. A much reduced recovery rate occurred following the initial 2 days. Only four of the color-coded beetles were recovered in test colonies from which they were not released through 4 August 2006.

Objectives:

1. Develop an effective inside-hive trap for small hive beetles.

2. Investigate inter-colony movement of small hive beetles to study their activities relative to colonial fidelity.

Materials and Methods:

Objective 1. Eight honey bee colonies were established on 1-2 April 2006 with .9 kg (2 lb) package bees in each of four apiaries located in Anderson, Bamberg, Barnwell, and Pickens Counties, South Carolina, where beetles were present at various levels. Colonies were allowed to become naturally infested with small hive beetles from nearby colonies and on 18-19 May, 100 beetle adults were released inside each test colony near the colony entrance and traps were installed. Colonies were randomly selected to receive one of three treatments in the Hood beetle traps: USDA yeast-based attractant in the middle compartment and mineral oil in the two side compartments (11), cider vinegar in the middle compartment and mineral oil in the two side compartments (11), or trap only as a control (10). The trap middle compartment was 80% filled with attractant and the side compartments one-half filled with mineral oil. The traps were placed in hive body position number one or number ten. Colonies were serviced at 3-week intervals through 13-14 November to remove and replace traps with fresh attractant and mineral oil. At each service visit, colony strength was measured by counting the number of 25cm^2 capped bee brood and the colony small hive beetle population was surveyed by adding the number of beetles counted under the colony inner cover to the number of beetles counted on the three exposed vertical hive body surfaces and hive floor, following removal of five frames.

Objective 2. One-hundred color-coded small hive beetles (paint on rear of abdomen) were released into each test colony on 18-19 May 2006. These were the same 32 test colonies used in objective 1. Traps were serviced on 21-22 May, 13-14 June, 5-6 July, and 15-16 August.

Results and Discussion:

Objective 1. The number of dead small hive beetle adults counted in traps containing the USDA yeast-based attractant was significantly greater ($P = 0.02$) on one (15 August) of the nine sampling dates. Although there was no significant difference in beetles sampled in colonies having the two attractants, the control colonies had significantly more ($P < 0.04$) beetles than colonies having either attractant on two sampling dates (24 July and 15 August) during the six months test period. The amount of capped bee brood did not vary by treatment.

When used in the Hood trap, the USDA yeast-based attractant proved to be a better

small hive beetle attractant in warmer months of the year, July and August. There was no difference found in the two attractants in the cooler months. The USDA yeast-based attractant proved to be a more stable material than cider vinegar which had a tendency to evaporate quickly in hot weather. Test colonies having traps with no attractant (controls) had more small hive beetles than test colonies having either attractant in July and August which indicates that trapping efforts resulted in maintaining a lower beetle population at a critical time of year.

Objective 2. A 16% recapture rate (512 of the 3,200) of marked beetles was recorded after 2-days (21-22 May). All 512 beetles captured during these 2 days were recovered from the same colonies from which they were released. Apparently no beetle movement occurred during the approximate 2-day initial period. A total of 115 more small hive beetles were recovered: 13-14 June (55), 5-6 July (25), 25-26 July (31), and 15-16 August (4). No small hive beetles were recovered in test colonies past the 4 August trapping date. Only four small hive beetles were recovered in test colonies from which they were not released. These results are preliminary and additional mark, release, and recapture trials are planned for spring and summer 2007.

Recent Publications:

Hood, W.M. 2006. Evaluation of Two Small Hive Beetle Traps in Honey Bee Colonies. American Bee Journal: 146, No. 10, pp 873-876.

Hood, W.M. & M. Nolan. 2007. A Comparison of Two Small Hive Beetle Attractants Inside Honey Bee Colonies. In Proceedings of the American Bee Research Conference held on 8-13 January 2007, Phoenix, Arizona. Published in the American Bee Journal: 147, No. 5: p. 440.