RETRIEVAL OF GREATER WAX MOTH[1] LARVAE FROM COMBS OF HONEY BEES[2]

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The larvae of the greater wax moth, (*Galleria mellonella* L.), which eats and destroys combs of honey bees, *Apis mellifera* L., is a major pest of bees OERTEL (1962). Maintenance of strong bee colonies seems to be the most effective way of combating these pests. However, combs removed from bee colonies must be protected in some other way. This is generally done by fumigating the combs, WHITCOMB (1965), although the pests can also be killed by freezing. To supplement these methods we designed a device that causes living wax moth larvae to crowl from the comb they are infesting so they can be captured or killed.

This device is not meant to be used as it is presented here for large-scale bee equipment storage practices. The important consideration is that it presents a concept that vibration with a certain intensity and repetition rate causes wax moth larvae to leave honey bee combs. Theoretically, it may be possible to transmit such vibration within storage areas so as to reduce infestation by wax moth larvae.

While the device will not replace any of the conventional methods used for controlling wax moths, it should prove useful when chemical control is impractical or when it is desired to capture wax moth larvae in living condition, such as for use in research or as fish bait. It also may be useful in determining the infestation of combs to evaluate other control techniques.

Methods and materials

Figure 1 is a photograph of the apparatus (wax moth larvae remover) and Fig. 2 shows side and top drawings. The device operates on the principle that continuous tapping on the frame supporting the comb transmits vibration that causes wax moth larvae to crawl from the combs. It is simply a method of providing this tapping while the frame is supported. A pan is provided for catching the larvae.

A wooden motor support was attached to a plywood base (Fig. 2). A motor (with pivot block) was attached to a steel plate that was attached to the top of the motor support. A 4-point cam mounted on the electric motor turned at a rate of 1 revolution/sec. Points on the cam depressed the arm of the tapper and released it 4 time/sec. When a comb was suspended between the wire frame supports by resting the ends of the

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[1] *Lepidoptera : Pyralidae*
[2] *Hymenoptera : Apidae*

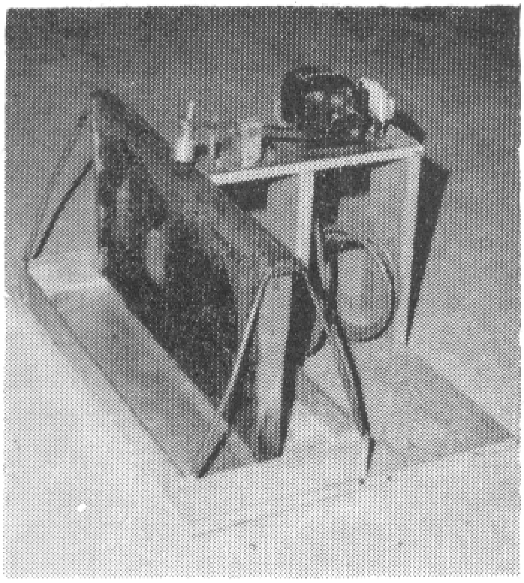
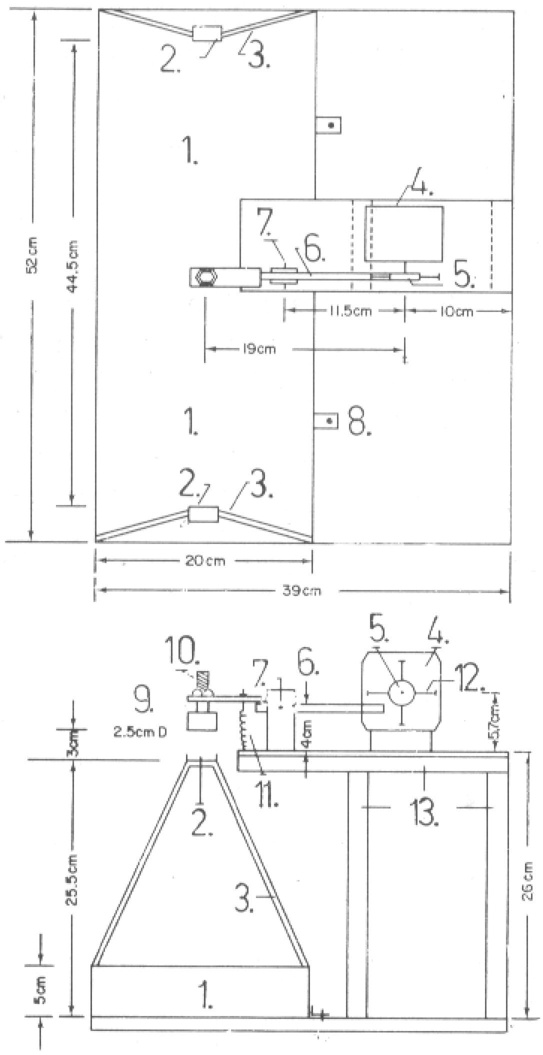


Fig. 1. The wax moth larvae remover.



→ *Fig. 2. Top and side view drawing giving the dimensions of the wax moth larvae remover.*

top bar on the frame holders, release by the cam allowed the tapper head to strike the center of the top bar resulting in shock throughout the comb. A force of 1.7 kg was required to move the tapper head against spring tension the 1.25 cm that the cam lifted it.

The wax moth larvae responded to shocks by emerging from their protected tunnels within the comb and crawling onto the surface of the comb where many of them fell into the pan. Those that held the surface of the comb could be removed by using a brush or could be picked off with forceps. Water and toxic material could be placed in the pan to kill the larvae if desired.

Results and discussion

After the device was designed and built, it was tested. Ten combs in a hive were exposed to adult greater wax moth so as to establish an infestation of larvae in them. Then, combs were removed from the hive one at a time and placed on the supports of the wax moth larvae remover. The motor was turned on and the tapper was activated for 1-min periods. All larvae that fell from the comb or became accessible so they could be pulled or knocked from the comb were counted after each of 10 successive 1-min periods. Fig. 3 shows average numbers removed after each interval. For example, during the 1st min, an average of 8.5 larvae was removed while during the 2nd min 5.1 was removed. The number continued to decrease over the remaining 8 min until the average fell below one (0.8) after the 10th min. The average total number of larvae removed from each of the ten combs was 32 (range 19—61). Few if any larvae would fall from an untreated comb.

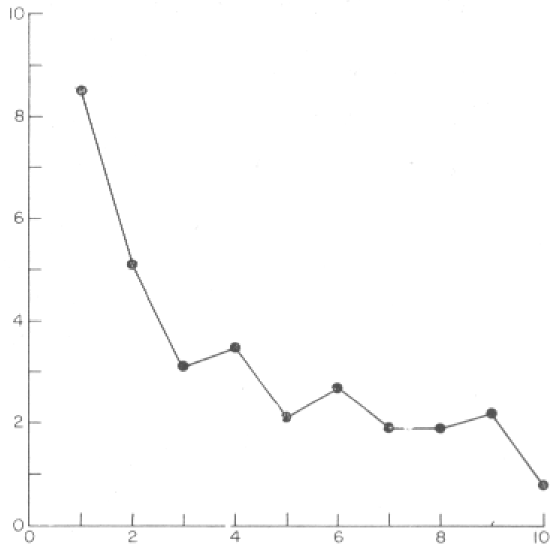


Fig. 3. The average number of wax moth larvae removed per minute from each of 10 combs over a 10-min. period.

To determine whether the wax moth larvae remover might be harmful to bees, we took a comb containing eggs, all stages of larvae, and capped brood cells from a colony and removed all adult workers. This comb was placed on the wax moth larvae remover and tapped for 10 min. Then, bees were placed back on the comb, and it was placed in an observation hive. All stages continued to develop and emerge, and no harmful effects of the tapping were detected.

Obviously there is no assurance that all wax moth larvae are removed from a comb. Some small larvae may remain, and if webbing is severe, some larvae may remain behind it. However, most larger larvae ordinarily can be removed. The device might prove particularly useful when pesticides and freezing are not practical for killing the wax moth larvae or when one wishes to capture healthy larvae.

LITERATURE CITED

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WHITCOMB, W., Jr., 1965. — Controlling the greater wax moth... a pest of honeycombs. USDA Farmers Bull. 2217 : 12 pp.