A TEST CHAMBER FOR THE EVALUATION OF INSECTICIDE DISPERSING EQUIPMENT[1]

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In order that the effects of naled (Dibrom®) on the Beecomist model 350 sprayhead might be evaluated, a self-contained system was necessary. This system would eliminate the need for flying time with its consequent reliance on the weather and the need to expend large amounts of pesticide. (Figure 1.)

Since droplet size determinations would not be made, the size of the chamber did not need to be large. Thus, a 2 × 2 × 2-ft box was made of ¼-in plexiglass. The removable top had ¼-in ¼-in plexiglass rod cemented ¼ in inboard from the edges to serve as a locator for the top and as a seal to keep the aerosol droplets within the box. Six feet (1-½ × 2 × 3 in) were cemented to the bottom of the box to raise it off the work bench and to allow space for the drainage fitting.

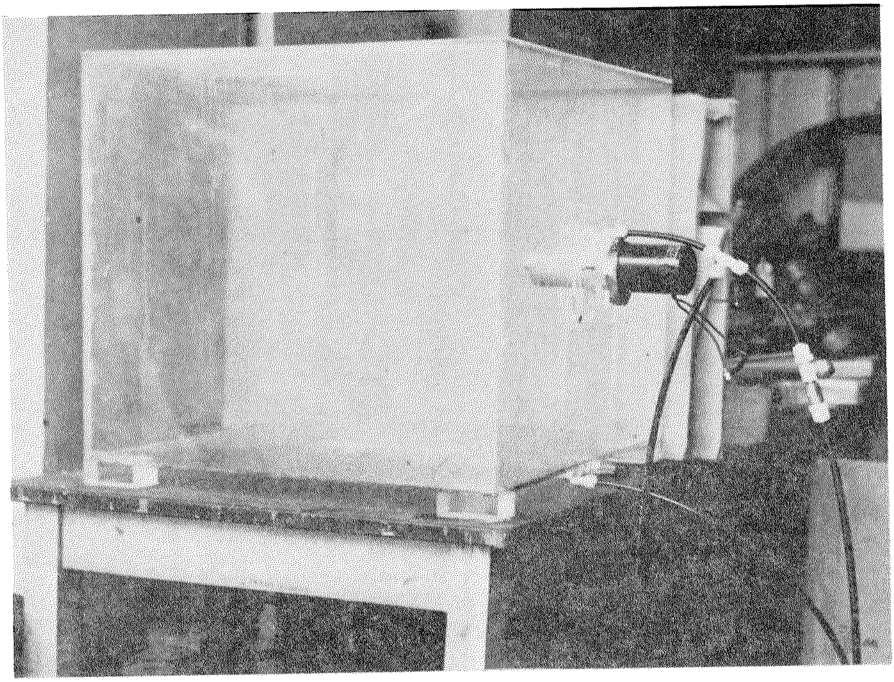

Figure 1. The self-contained test chamber.

[1]Presented at the New Orleans meeting, April 1977.

[2]The work was done while the author was a member of the Mosquito Research and Control staff at the New Jersey Agricultural Experiment Station, Rutgers, the State University, New Brunswick, NJ.

Since only the sleeve of the Beeco was to be exposed to the naled, a port large enough to admit the feed tube/drive shaft housing was drilled in a 6 × 7-in sheet of 5/16-in plexiglass. This sheet was cemented over a 5-in hole on the outside of the front of the box. To support the Beeco, 1 × 1 × 4-½-in supports were cemented

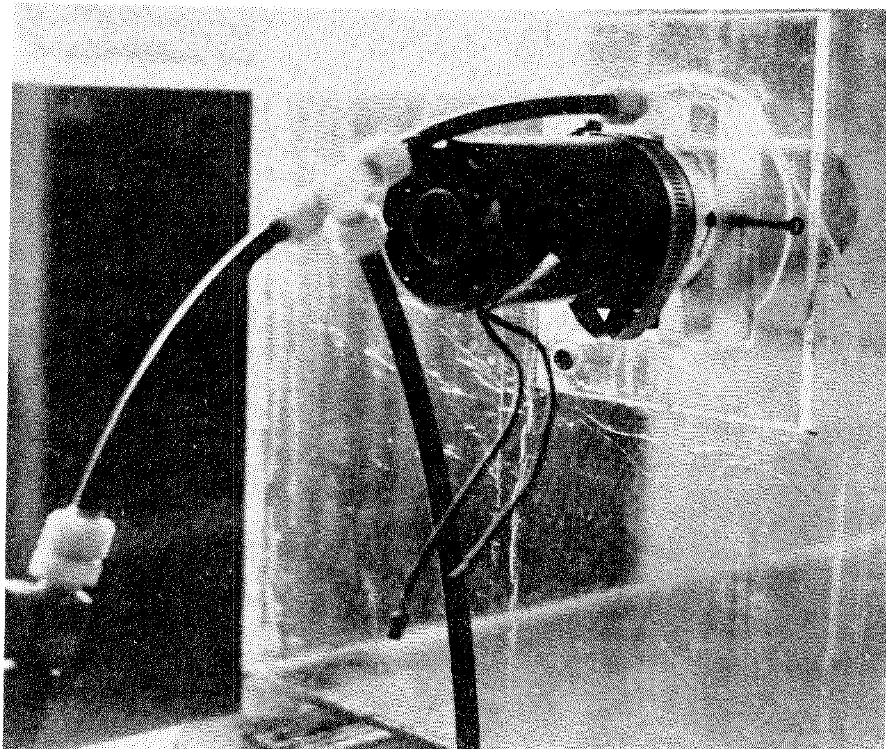

Figure 2. The mounting of the Beecomist sprayhead.

to the 5/16-in sheet after they had been cut to fit the curvature of the Beeco drive shaft housing/feed tube assembly base. The supports were drilled so that 3/16-in stainless steel machine screws could be screwed into the sides of the Beeco to keep it firmly in position. Once the motor was in place outside the box, the sleeve was mounted inside the box (Figure 2).

To keep the drain fitting below the level of the bottom of the box and for added strength, a 3 × 4-in piece of ⅜-in plexiglass was cemented to the bottom of the box beneath the Beeco port, and then a hole was drilled and tapped for the fitting so that the naled could drain back into the container from which it was being pumped and thus make for a closed system with minimal material losses. The Beeco was hooked up to the pump unit to make the system operational.

Preliminary tests indicated that the aerosol droplets collected above the sleeve and dripped back onto it, an effect deemed adverse for other testing procedures planned. To relocate the drips, a 45°-angle roof was located inside the box above the sleeve. Further observation showed that the spray ran down the inside of the front of the box and onto the Beeco sleeve. To remedy this design flaw, a piece of ¼-in plexiglass rod was shaped into a wide U and cemented, upside down, around the sleeve so that the material would be deflected away from the sleeve.

Savings achieved through the use of the box were $4,880. The box was used for 12 hrs of testing time. At an estimated $180./hr for helicopter time, this represents $2,160. Of the 12 hrs, 10 were spent spraying Dibrom at 15 fl oz/min (7 gal/hr). This is a saving of $2,720

($2,800. for 70 gal less $80. for 2 gal actually used in the testing). Further, no time was lost because of unfavorable weather or the lack of flying time.

Use of the box indicated that it should be made of heavier material (⅜ or ½-in plexiglass) for greater structural strength. The top of the box should slope to the rear to eliminate the need for the internal roof, and slanting the bottom of the box to the front would facilitate draining. Of greater importance is the need to remount the motor at a point closer to its center of gravity to lessen stress on the support brackets. Finally, there should be an effective cooling system for the motor since stress on the motor was indicated by an increase in the amperage that it drew.

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DISPERSAL OF MOSQUITOFISH, *GAMBUSIA AFFINIS*, IN ARKANSAS RICE FIELD[1]

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Among reports on the use of mosquitofish, *Gambusia affinis* (Baird and Girard), as predators of mosquito larvae in rice fields are those of Craven and Steelman 1968, Hoy and Reed 1971, Hoy et al. 1971; Meisch and Coombes 1974, and Davey et al. 1974. There are, however, few records of fish dispersal within a rice field. Hoy and Reed (1970) and Hoy et al. (1971) described stocking procedures for mosquitofish in California rice fields from a helicopter or by manually emptying fish from buckets into the field. However, speed of dispersal after stocking was not considered. Reed and Bryant (1974) stocked mosquitofish in alternate paddies within a rice field. Minnow traps were placed at the opposite end of both stocked and unstocked paddies from where the fish were released. They reported that 90% of all mosquitofish captured after 24 hr were in stocked paddies, thus indicating movement of fish the length of the paddy. After 3 days, 59% of the fish captured were in stocked paddies, indicating further movement downstream from the stocking and some possible movement upstream. This is a report on studies to determine the dispersal of mosquitofish in rice fields. The effect of parathion application on dispersal was also observed.

Studies were conducted during the summers of 1974–76 in privately owned rice fields near Stuttgart, AR. All fields tested were constructed in the following manner: rice was planted on flat pan areas which were bordered by raised earthen dikes (levees) which retained the flood water. The trenched areas on either side of the levees formed levee ditches. Access between pan areas was made by cutting gates in the earthen levees, thus allowing water to flow from the high end of the field to the low end. Mosquitofish were stocked in rice fields and Gee's Improved Wire Minnow Traps® were placed at various points within the fields. Traps were placed in levee ditches so that ca two-thirds of the trap was below water level. No traps were placed on the pan since water was not deep enough to facilitate trap placement; however, observations on the presence of mosquitofish on the pan were recorded.

Preliminary investigations were made in 1974 in 0.5 acre rice plots. Fish were stocked at 1 end of each plot and records were taken to determine the time required for the fish to disperse throughout the plot. Four minnow traps were placed in the levee ditches at 200 ft intervals from the point at which fish were stocked. Further investigations were conducted in 1974 in a rice field of ca 100 acres. Three hundred lbs of mosquitofish were stocked in 50 lb increments at 6 different locations within the field. Fish were released in 3 different pan areas along the western boundary and 3 different pan areas along the eastern boundary. Six minnow traps were placed within the field (3 along the northern boundary and 3 along the southern boundary). The traps were monitored for 14 days after stocking.

In 1975 a 30 acre rice field was used to determine the rapidity of fish dispersal as the field was being flooded and also to determine if fish would disperse across the levee gates. Approximately 40 lbs of mosquitofish were stocked in the field at the point where water entered. There was only 1 water source for the entire field. Minnow traps were placed on either side of the levee gate on the downstream side in the levee ditches. Fish dispersal was observed as water moved from pan to pan. The field contained 16 pans and 15 levee gates.

Parathion commonly is used in Arkansas rice

[1]Approved for Publication by the Director, Ark. Agric. Exp. Stn.