PROCEDURE FOR MIXING PYRETHRUM ADULTICIDING MATERIALS USED BY THE METROPOLITAN MOSQUITO CONTROL DISTRICT

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The following mixing procedure was developed to prepare properly mixed ULV adulticiding material for our 6-county district. In 1971, '72, and '73 we purchased pyrethrum concentrate in 5-gallon containers. These containers were ideal for reuse to distribute the final mix to the counties. This year we are ordering pyrethrum concentrate in 55-gallon drums because we have accumulated an adequate supply of 5-gallon pails from previous years to use for delivery of the mixed solution. The toxicant used was pyrethrum synergized with piperonyl butoxide. Application rate was 0.004 pound actual pyrethrins per acre. The diluent was agricultural spray oil, a white base mineral oil (W B oil) that is 80 neutral, non-phytotoxic, with excellent mixing qualities. This W B oil has always been purchased in 55-gallon drums which contain 54 gallons of oil.

Separate mixtures were made, one for use in the Hudson ULV back packs and the other for the Leco machines. Final concentrations differ because of differences in delivery rates.

HUDSON ULV BACK PACK SPRAY MIX Four gallons of pyrethrum concentrate +50 gallons W B oil were rapidly mixed for 10 minutes giving 54 gallons of mix of proper concentration. The following procedure was used: One gallon of concentrate was poured from the 5-gallon container into an empty container. This amount was held in reserve until the required 4 gallons had accumulated. Since there were 54 gallons of oil in the 55-gallon drum, it was necessary to draw off 4 gallons and pour into an empty drum. A record was kept each time and the amount of oil was held in reserve until the necessary 50 gallons had accumulated for a full mixing. A full 54 gallons was mixed each time.

LECO SPRAY MIX Nine gallons of pyrethrum concentrate +45 gallons W B oil were rapidly mixed for 10 minutes giving 54 gallons of proper concentration. The same procedure was used as for the Hudson mix by reserving extra concentrate and oil and accumulating until the required amounts were present for a full mix. Each 5-gallon mixed spray container and the 55-gallon mixing drum must be clearly marked as to which finished solution it contains—the spray for Leco or for Hudson.

A rotary hand pump was used to draw off the W B oil to reduce the amount in the full barrel to either the 50 or 45 gallons of oil for the start of mixing, and also to draw out the finished spray after it was mixed. The mixing was done by a "Lightnin Mixer," model NS-1, powered by a 1/3 HP motor. The shaft for agitating was 36" long and 1/2" diameter, with a 4" diameter folding propeller. The motor was clamped to a 2" x 4" wood frame (similar to one used to store an out-board motor). This frame was pushed up next to the barrel so that the motor was directly above the bung hole. The detached shaft was inserted through the bung hole and then attached firmly to the motor with an Allen key. The blades of the propeller open when the shaft spins and drop down (close) when the spinning stops so that the shaft can be withdrawn through the bung hole.

The rotary hand pump was used to draw off the finished mix into the empty, legibly marked, 5-gallon concentrate pails for delivery to the various counties. These pails are sturdy, substantial containers which are rather easily handled. In the course of the 1973 season 1,160 gallons of finished spray for our Leco machines and 1,367 gallons of finished spray for our 98 Hudson ULV back packs were mixed and delivered. Exact records of gallons delivered and dates of delivery were kept. By using the same person for mixing, good control of the distribution was maintained as well as greater efficiency and less confusion.

It is essential that the mixed spray be drawn into the smaller containers immediately after mixing, the mixing barrel emptied, and the mix delivered on the same day of the mixing, otherwise the pyrethrum concentrate settles out and the spray has to be remixed before it can be used. The barrel must be emptied because the mixer shaft does not reach all the way to the bottom and any remaining spray could not be remixed without raising the barrel—an awkward job.

All in all, this procedure proved to be a cheap, effective, and efficient method for mixing and distributing spray material. Total expenditure for rotary pump, mixer, and lumber to mount the mixer was $300.00. A single mixer supplied our very large district with all of this pyrethrum ULV spray material.

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MOUTH ASPIRATOR WITH HOLDING CAGE FOR COLLECTING MOSQUITOES AND OTHER INSECTS [1,2]

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To evaluate the effectiveness of repellent-treated, wide-mesh bed nets and net jackets, collections are made of mosquitoes and other biting flies that successfully penetrate or bite through the netting. A simple but effective aspirator whose operation can be easily and quickly understood is needed by local help employed for these studies in remote areas of Ethiopia. Furthermore, live collections are needed for arbovirus determinations. Mechanical aspirators made from portable vacuum cleaners were considered, but adequate numbers of the vacuum cleaner units were not available. The standard tube aspirator was found awkward to use by our local helpers, and specimens were lost or stressed when transferred to holding cages. A sucking aspirator derived from the modified aquarium dip tube used as a collecting cage by Jackson and Grothaus (1971) was found, however, to be highly acceptable. This aspirator is inexpensive, easily constructed and effective for collecting a variety of biting flies including species of *Culicoides, Simulium* and *Phlebotomus.* It is particularly useful in collecting stronger fliers which often may be missed when using mechanical aspirators with their uncontrolled suction.

DESCRIPTION. The unit is basically a plastic aquarium dip tube of the type used by tropical fish hobbyists for removing organic sediment. The dip tube is modified by reducing the flared end to a diameter of 2 cm and cutting the intake tube (inside the bulb section) to a length of 4 cm. To inhibit the escape of captured specimens, a 1.5 cm square plastic plate is attached at an angle to this cut end (Figure 1). A piece of organdy cloth is glued to the inside of the opposite opening of the bulb to prevent inhalation of the specimens. Organdy is used so that smaller insects will be retained. A 75 cm length of 7 mm rubber tubing with mouth piece is attached to a 4 cm length of plastic tubing cut from the detachable handle which comes with the dip tube. The latter attaches to the "organdy end" of the bulb cage and is held by friction; the cages thereby may be quickly changed as necessary. If the specimens are to be held alive overnight, the flared end is stoppered with cotton or tissue to prevent escape. Gummed labels on the cages facilitate recording of collection data.

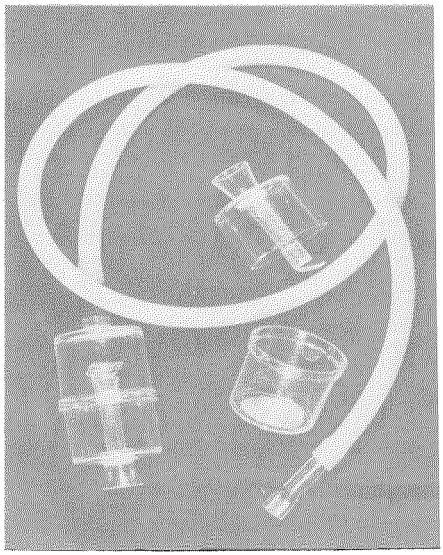

FIGURE 1. Mouth aspirator with holding cage.

[1] The opinions and assertions contained herein are the private ones of the authors and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

[2] This study was conducted under Bureau of Medicine and Surgery, Navy Department work unit MF 51.524.009-0029BF61.

Literature Cited

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