

MARKING LARGE NUMBERS OF STABLE  
FLIES *STOMOXYS CALCITRANS* (L.) FOR A  
STERILE RELEASE PROGRAM

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The techniques used to mark or tag insects for use in studies of dispersal, migration, population density, and longevity should be easy to apply, have little or no detrimental effects on the insects and be permanent. A variety of methods has been reported in the literature, but the two most common techniques used with flies are fluorescent powders and radioisotopes. For example, Eddy et al. (1962) and Bailey et al. (1973) used <sup>32</sup>P and fluorescent dyes for their dispersal studies, but specialized equipment is needed for use of the radioisotopes and this is not always available. Fluorescent dyes have been used by many investigators (LaBrecque et al. 1972, LaBrecque et al. 1975, and Williams et al. 1977), but these dyes can reduce survival of the flies.

Most insects that are used in a sterile male release are marked so they can be differentiated from the native insects. This makes possible evaluation of sterility and determination of sterile to normal ratios. Thus in the St. Croix integrated pest management studies, the sterile stable flies were initially irradiated as pupae and then marked by allowing the eclosing adults to migrate upward through vermiculite coated with fluorescent dust. However, pupal irradiation had a deleterious effect on the vigor of the flies, and there was high mortality during the marking process. Subsequently pupal irradiation was discontinued, and only adult flies 24 to 48 hr old were exposed to the gamma irradiation. The vigor of these irradiated flies was excellent; however, when they were heavily dusted with the fluorescent powders, their behavior was altered. Thus we needed a method of marking the recently irradiated adults that was fast and simple and would not cause undue harm or produce more than 10% mortality.

The technique developed was as follows. After irradiation, all sterile flies were placed, depending on the number of flies, in paper

release bags or in cages that contained screened sides (Skov et al. 1978). These were placed in a dusting chamber (Figure 1), a box 61 cm wide, 61 cm long, and 122 cm high constructed of 1.27 cm (=½ in.) exterior plywood. The front of the chamber (61 × 102 cm) opened as a drop door and was held closed by 2 latches at the top. A strip 1 cm wide × 1.27 cm thick of foam weather stripping was attached to the inside edge of the door to ensure a tight seal. A wooden rack, two 2 × 4 × 60 cm strips, inside the chamber held the cages and bags 20 cm above the floor below the door. A squirrel-cage ¼ hp, 120 vac electric motor with unattached blower was placed below the door so the blower protruded into the chamber through a hole in the center of the front panel. The motor, which was outside the chamber was attached to the chamber on its side so that the fluorescent dust (3 g) could be poured easily into the squirrel cage fan. When the motor was operated for 10 sec, the dust was blown all over inside the chamber and completely dusted all flies in the bags and cages.

The chamber held 3 bags or 1 cage. Initially, samples of ca. 100 dusted flies were checked daily under a UV long wavelength light for positive marking. After a month of finding only marked flies in the samples, we began checking samples only once a week. During the entire period of marking stable flies on St. Croix (16 months), we did not find unmarked flies in any samples marked in this way. In addition, one employee could use different colors of dusts (to indicate different release locations) and mark all the sterile flies (250,000 to 300,000) needed for each day's release within 15 min.

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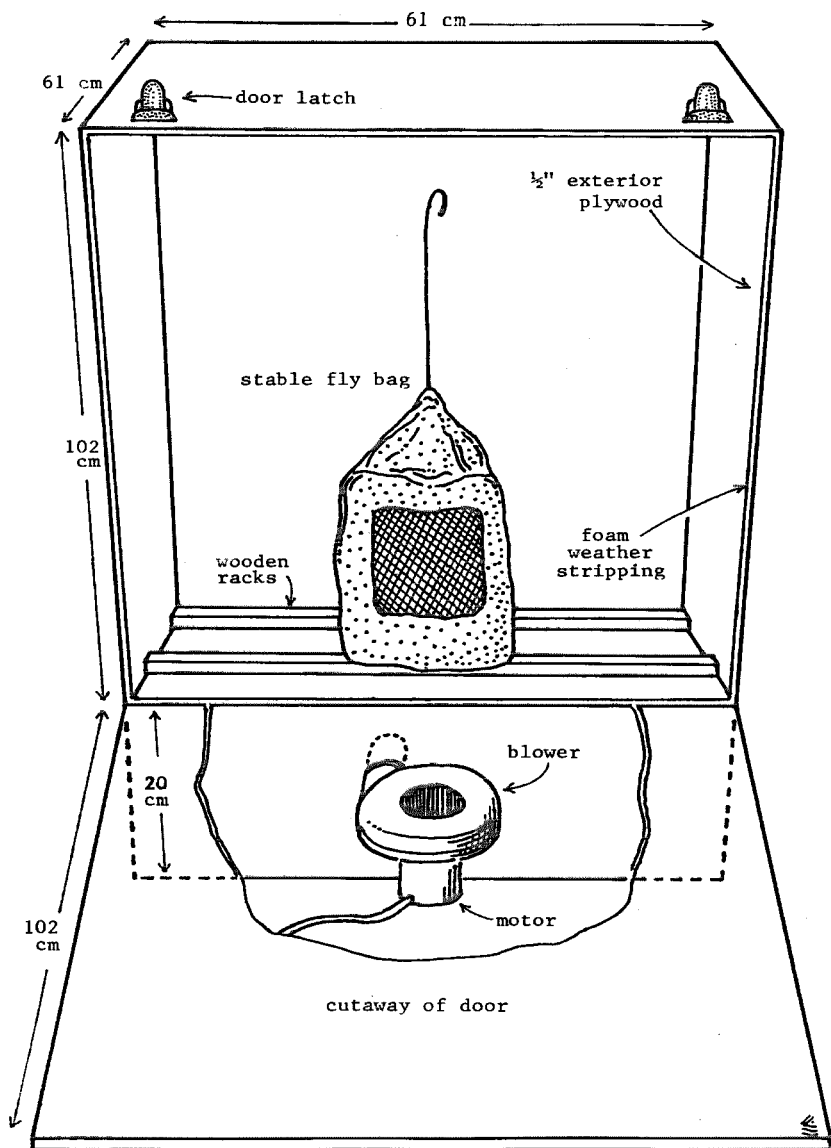


Figure 1.—Dusting chamber.

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#### ENCEPHALITIS SURVEILLANCE: A ONE-MAN OPERATION

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The encephalitis surveillance program has progressed steadily in the Calcasieu Parish Mosquito Control District during the 2 years that the district has been in operation. A one-man surveillance program was developed which could be operated effectively while requiring a minimum amount of manpower.

To transport the necessary equipment to the field, we have outfitted a vehicle to be used as a portable laboratory. This vehicle is a 1971 Ford 6-cylinder postal delivery van having a 250 cm<sup>3</sup> engine with an automatic transmission and right-hand drive. Previously used standard size pickups did an adequate job, but most of the surveillance equipment was exposed and subject to damage during inclement weather. The van was equipped with work tables and storage cabinets. For transporting the birding nets, 2 brackets were bolted on the outside of the van, and a bungee cord was used to secure them.

The most difficult problem has been the one-man use of the mist nets. The nets measure 12m x 12m with a mesh size of 3.2cm.

iron was brazed to the base of each, with a smaller piece of iron brazed onto the spike for use as a heel to drive the spike into the ground.

Once the nets have been placed on the pipes, they are not removed from the pipes except for repair or replacement. When the net is picked up after use, it is rolled onto one of the pipes and the pipes are tied together. From this point on, to use it again, all one has to do is place one pipe in the ground and unroll the net while walking with the other pipe. Once it is unrolled, the net is then spread out onto the pipes and is ready for use in a matter of minutes.

**RESULTS.** The total surveillance activity conducted by Calcasieu Parish Mosquito Control District during the past 2 years is shown in Table 1. More birds were bled in 1976 than in 1977. It was necessary to obtain more samples in 1976 because there were more positive results (percent positive birds) in the titers tested for encephalitis. This was also evident in the number of days that trapping procedures were conducted as well as the man hours spent on encephalitis surveillance. The average number of hr/day and the average number of birds netted/day varied the least from 1976 to 1977. Included in the 7 hr/day was the time spent traveling to and from collection areas, setting up the nets, bleeding and banding the birds, recording information, centrifuging the blood, and shipping blood samples to the State Regional Laboratory in New Orleans, Louisiana.

The results of our surveillance program over a 2-year period indicate that it is both efficient and economical. If 2 men were utilized in the program, the figures would be the same except for the man hours and cost factor (these figures would have to be doubled). Therefore, when efficiency and economy are considered, our encephalitis program is ideal for mosquito

Table 1. Results of Calcasieu Parish Encephalitis surveillance activities.

Year	No. of Birds Bled	Man Hours (cost)	No. of Days Trapped	Average Hrs/Day	Av. No. Of Birds/Day
1976	1,200	379 (\$1,250)	55	7	25
1977	653	198 (\$653)	29	7	23

Each net is divided into 4 stages with each stage having loose mesh at its base forming a pocket to entangle the birds.

Two conduit pipes 2.44 m long were used for extending the nets. For supporting the pipes, a 4.75 cm long spike-like piece of angle-

control districts or county health units that must operate on small budgets.

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