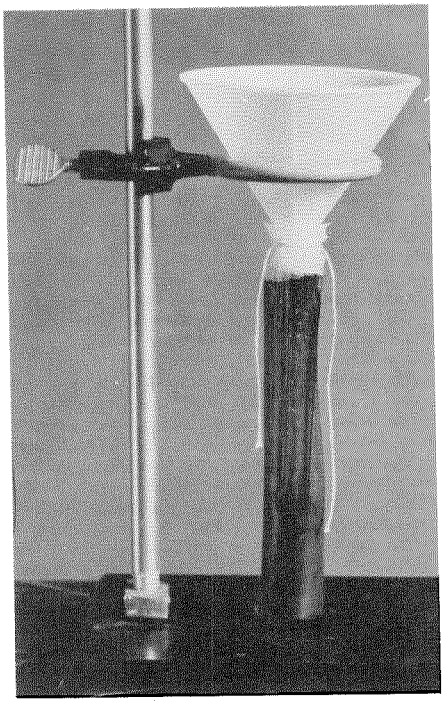

Fig. 1. Apparatus used for filling collagen sausage casings with blood.

fell in 11 of the 14 mosquito strains. Blood-feeding on rabbits was then resumed, and egg production returned to pre-experimental levels in all strains. We did not continue our feeding experiments long enough to observe the results of Bailey et al. (1978) who reported a 58% reduction in egg production after switching *An. albimanus* from feeding on rabbits to feeding on defibrinated bovine blood through sheep intestine membranes. They observed no marked effect on overall colony size, and egg production increased with time, presumably due to selection of an *An. albimanus* strain adapted to membrane feeding.

We used similar feeding methods for the blood-sucking bugs with the exception that smaller 4-inch sections of casing containing 25 ml of blood were used because of the smaller size of the rearing cages. Adult and larval insects of both species readily fed to repletion following these procedures. We did not examine egg production and fecundity in *R. prolixus* and *T. barberi*.

The major advantage of these casings over other membranes used for arthropod blood feeding is their low price. Current prices for casings #300-812-0 and #360-911-0 are $0.0213 and $0.0310 per eight-inch section, respectively (Table 1). Bailey et al. (1978) obtained sheep intestine prophylactics (condoms) for $0.17 to $0.28; these had been cured, dried, and tested for holes, but not lubricated or packaged. These prophylactics can be used repeatedly, which lowers their per use cost; however, this requires that they be washed and stored between feedings. While the collagen casings can also be used repeatedly, washed and stored, their initial low cost makes disposal after a single use a cost effective method of membrane blood-feeding.

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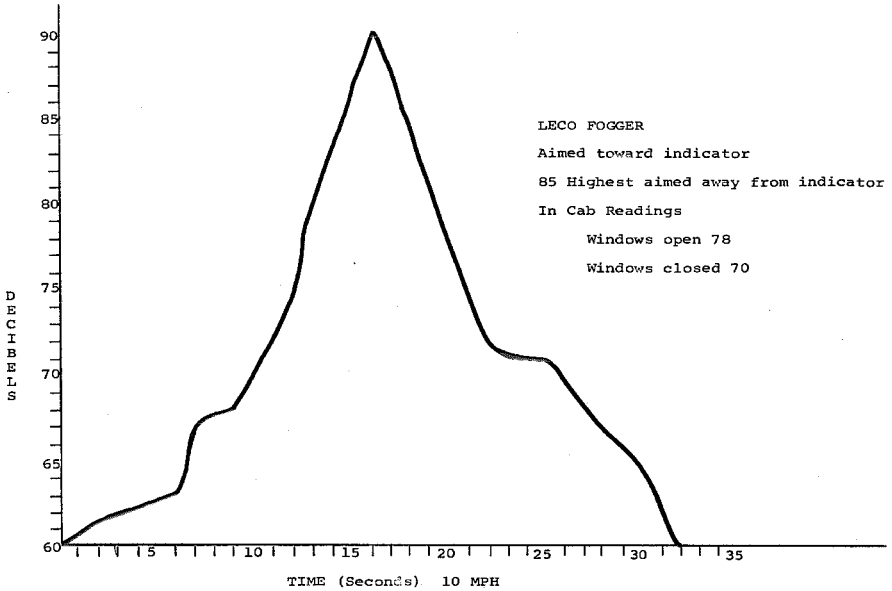
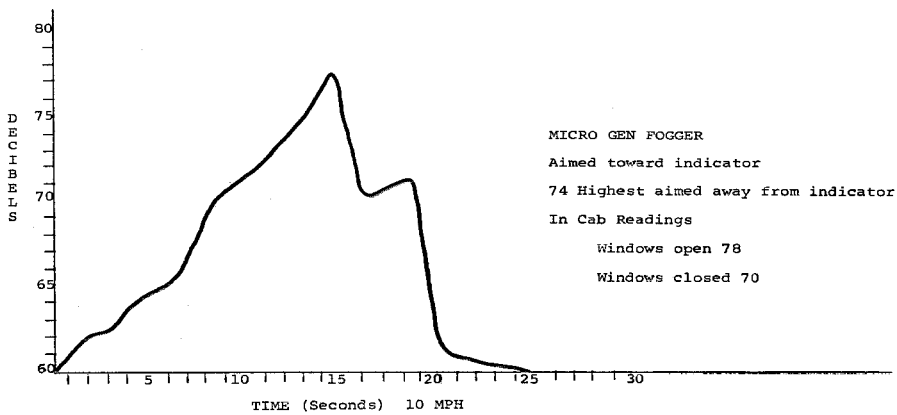
NOISE LEVELS PRODUCED BY THE MICRO-GEN AND LECO ULV FOGGERS

RICHARD D. MORTON

Benton County Mosquito Control District, 6174 Van Giesen, West Richland, Washington 99352

An evaluation of the noise produced by the Leco (Model HD) and the Micro-Gen (Model ED2-20A) Ultra Low Volume Foggers was conducted by the Benton County Mosquito Control District in July of 1979. This study was initiated in view of hearings held by the Department of Ecology on the noise produced by motor boats, and the testimony that was given at these hearings. The decibel level was checked on both machines in a typical residen-





tial area with the foggers passing 50 ft. in front of the indicator microphone. The temperature at the time of the test was 72°F, and the wind was calm. The indicator microphone was placed at the same height above the ground as the exhaust nozzle/nozzles of the machines. Tests were made with the nozzle/nozzles pointed away from the indicator and then pointed towards the indicator. The foggers passed in front of the microphone at a constant speed of 10 mph.

The figures show composite pictures of 6

runs made by each machine. When the nozzle/nozzles were turned away from the microphone the graph was basically the same except for the maximum decibel level reached.

As a result of this evaluation our control operators now have the option of wearing protective hearing devices or of wearing a headset that is connected into the truck radio system. Either of these options reduce the in-cab noise level to a point that no operator discomfort is noted.

SUSCEPTIBILITY OF *AEDES AEGYPTI* TO FOUR VARIETIES OF *BACILLUS THURINGIENSIS*[1]

C. M. IGNOFFO[2], C. GARCIA[2], M. J. KROHA[2] AND T. FUKUDA[3]

U. S. Department of Agriculture, Science and Education Administration, Agricultural Research

More than 20 commercial trade-named products formulated from *Bacillus thuringiensis* Berliner are used today throughout the world (Ignoffo and Anderson 1979), yet none is registered for use against mosquitoes. This is rather surprising, since at least a dozen varieties of *B. thuringiensis* are known to be active against several species of *Aedes, Culex,* and *Anopheles* (Lavrentyev et al. 1965, Reeves and Garcia 1971, Hall et al. 1977). The recent isolation of a new variety of *Bacillus thuringiensis* named *israelensis* by de Barjac (1978), which rapidly kills species of *Aedes, Anopheles, Culex,* and *Uranotaenia* (Goldberg and Margalit 1977, de Barjac 1978, Garcia and Desrochers 1979), has rekindled interest in *B. thuringiensis* as a potential mosquito control agent. Thus we designed studies to compare the extent and rate of mortality of larvae of *Aedes aegypti* (L.) exposed to the following 4 varieties of *B. thuringiensis: galleriae* (International Minerals and Chemical Corp.: IMC-10001.3, a calcium precipitate containing 10.8% Thuringiensin); *israelensis* (Abbott Laboratories: ABG-6108, Lot 6406-106, 10000 IU/mg);[4] *kurstaki* (Abbott Laboratories: Lot 6406-106, ca. 35000 IU/mg),[4] and *thuringiensis* (C. Garcia culture of BA-068).

Four-day-old, 3rd instar larvae of *Ae. aegypti,* reared from eggs at room temperature (24 ± 1°C)[5] were used for all bioassays. We obtained eggs from a rearing colony maintained at the Gulf Coast Mosquito Research Laboratory (USDA, SEA, AR) at Lake Charles, Louisiana. Bioassays were conducted at room temperature (24 ± 1°C) in 8-ounce, waxed ice cream cups (8 S-8G, Lily Corp., Toledo, Ohio 43666) containing the test variety at 90 μg/ml in a total volume of 200 ml/cup. This dosage (ca. 200 × the LC-50 dose against larvae of *Ae. aegypti*) translates to a field rate of 2.7 pounds/acre-ft[3] and a cost of about $25.00/acre-ft[3] (based upon costs of current commercial formulations of *B. thuringiensis*). To each cup we added 50 larvae and recorded mortality at 10-min intervals for 1 hr, 60-min intervals for the next 3 hr, and 24-hr intervals thereafter until all surviving pupae had either died or the adults had emerged. Larvae were fed pulverized Tetramin (TetraWerke, D-452, Melle, West Germany) at 24- to 48-hr intervals. Each varietal treatment, with its untreated control, was replicated 4 times. The data were summarized as percent larval mortality, percent total mortality, and the time required to obtain 50% mortality (LT-50).

Variety *israelensis* was the most active of the 4 tested (Table 1). All larvae were dead after 1 hr of exposure; the LT-50 was 12.2 ± 1.1 min. The next most active variety was *kurstaki,* followed in decreasing order of activity by *galleriae* and *thuringiensis* (Table 1). The LT-50 for the latter 3 varieties was 1.3 ± 0.1, 3.9 ± 0.2, and 3.4 ± 0.2 days, respectively, with initial mortality obtained at 1, 1, and 2 days, respectively. Initial pupation and adult emergence of controls were recorded on day 5 and 7 respectively. In contrast, only 1 of the 200 larvae exposed to var. *galleriae* pupated, and no adult emerged. Initial pupation and adult emergence for var. *thuringiensis* were recorded on day 10 and 12 respectively.

There was an obvious difference in the

[1] This paper reflects the results of research only. Mention of a pesticide or proprietory product in this paper does not constitute a recommendation for use by the USDA nor does it imply registration under FIFRA as amended.

[2] Biological Control of Insects Research Laboratory, Columbia, MO, 65205.

[3] Gulf Coast Mosquito Research Laboratory, Lake Charles, LA, 70601.

[4] IU based on cabbage looper, *Trichoplusia ni* (Hübner) bioassay.

[5] mean ± standard error of the mean.