A REVISED VERSION OF THE CDC GRAVID MOSQUITO TRAP

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The CDC Gravid Mosquito Trap (Reiter 1983), a portable, battery-powered device designed to collect gravid *Culex* mosquitoes, proved highly effective for the collection of St. Louis encephalitis (SLE) vectors in Memphis, Tennessee (Reiter et al. 1986). However, up to 10% of the catch was damaged by the fan blades, and a high proportion (35.6%) of *Culex restuans* Theobald and *Culex pipiens* s.l. were recorded as "*Culex* spp." because they could not be accurately identified. Other problems included desiccation in sunlight, instability in strong wind, attack by ants, and destruction of the net by birds, raccoons, and other animals. To correct these problems, the trap was redesigned, with emphasis on the use of readily available materials.

The new model (Figures 1 and 2) is a rectangular box built of 1.1 cm plywood. It is 41 cm long, 13 cm wide and 27 cm high, and is divided into three horizontal segments which are clamped together with suitcase latches. The upper segment, 11 cm high, has a carrying handle on its roof and an internal shelf for batteries. The middle segment, 4 cm high, has mosquito screen (8 meshes per cm) fastened to its top edge. The lower segment, 12 cm high, has ends that extend down an additional 13 cm; these support the trap when it is not resting on the pan. The combined middle and lower segments constitute the collection chamber.

The device is powered by a 6-volt electric motor (Hausherr's Machine Works, Old Freehold, Tom's River, NJ 08753)[2], which drives a four-bladed fan (7.6 cm diam, 0.2 cm center hole, counter-clockwise; Thorgren Inc., Valparaiso, IN) and is mounted in a bracket that fits into a 9 cm slot cut lengthwise in an 18 cm length of polyvinyl chloride (PVC) pipe (internal diam 7.6 cm, wall thickness 0.65 cm). The motor and bracket are of the type used in the CDC miniature light trap. The PVC pipe, which is the air outlet, projects through a hole in one end of the upper segment of the trap; the outer end of this pipe is cut at an oblique angle to prevent the entry of rain. A pair of thick rubber bands around the pipe on each side of the trap-wall prevent it from sliding in its mounting. The lower segment contains the air inlet tube, also PVC pipe, which projects 10 cm below the floor of the trap and is secured by four screws.

The trap functions in the same manner as the original version: gravid mosquitoes attracted to 4 liters of a standard oviposition medium in a black pan (Reiter 1986) are drawn into the collection chamber by the fan. The dimensions of the pan (47.0 × 36.0 × 16.5 cm) and the distance between the air inlet tube and the surface of the oviposition medium (5 cm) are critical to the effective operation of the trap.

At the end of the collection period, a cover is placed over the inlet tube and the whole device returned to the laboratory. Insects are inactivated by unclamping the upper segment of the trap and laying dry ice or other anesthetic on the screen. The collection chamber is then inverted, tapped sharply to transfer the insects onto the screen, and the middle section unclamped for removal of the catch.

The new features of this trap correct the identified deficiencies of the original model. Mosquitoes do not pass through the fan, they can find shelter from the airstream in the collecting chamber, and they are protected from direct

Fig. 1. Trap in operation at an unshaded site.

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[2] The use of trade names or commercial sources is for identification only and does not constitute endorsement by the Public Health Service or by the U.S. Department of Health and Human Services.

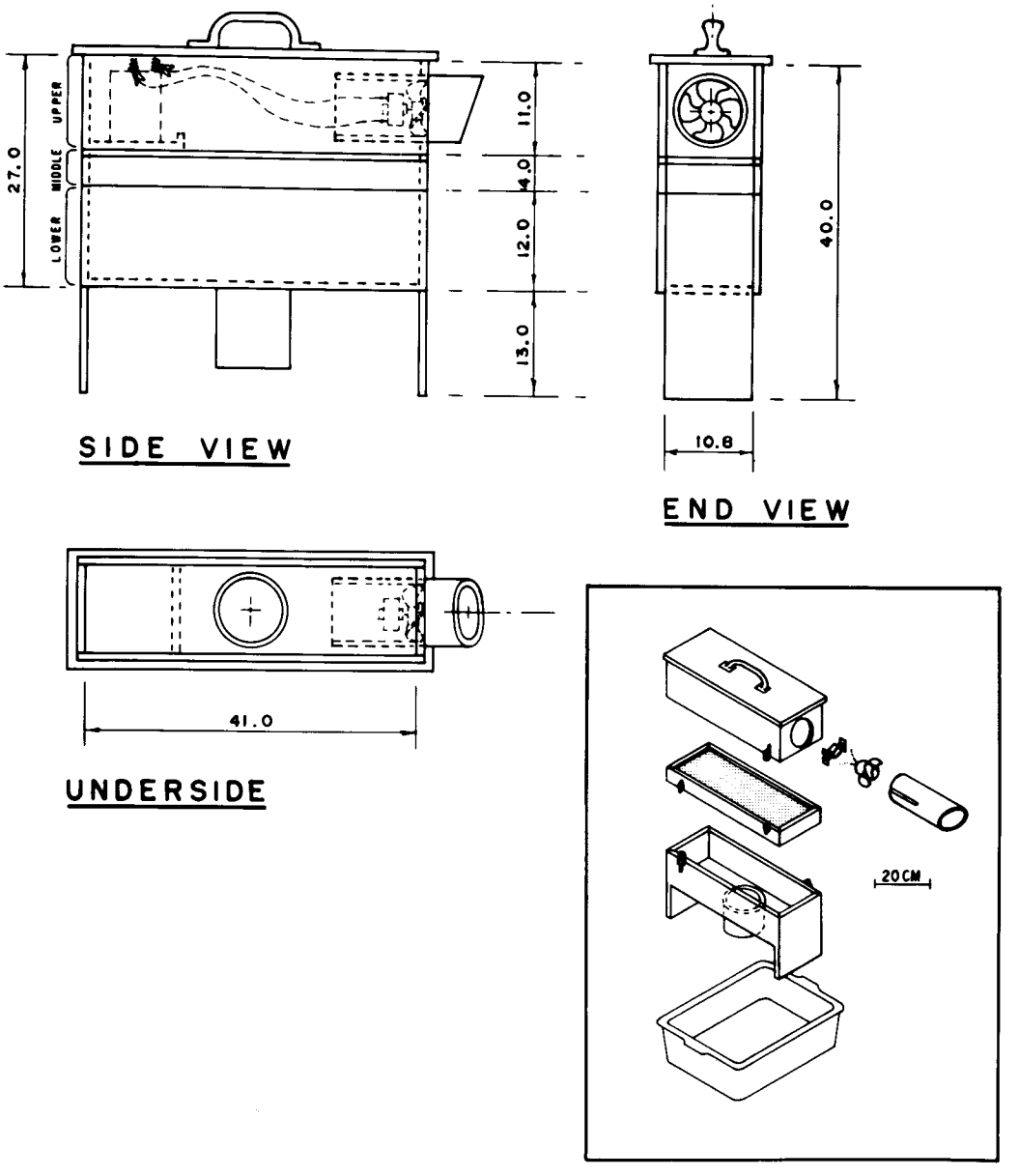

Fig. 2. Design of trap for collecting gravid *Culex* mosquitoes.

sunlight, excessive heat and rainfall. The device is strong, compact, easy to handle, stable in strong winds, and not as susceptible to damage by birds or animals. Motor, fan and batteries are not exposed to rain, sun or insect debris. If water and a carbohydrate source are provided in the collection chamber, the trap can be left for several nights without attention. Transfer of the catch is easy and avoids much of the damage incurred by shaking insects out of flexible nets. The trap is easy to clean and service. A label can be prominently displayed to explain ownership and function. Components are available in most parts of the world, and the trap is easy and inexpensive to build. It can be run from a domestic power-supply by installing a 6 volt transformer, like those sold for portable electronic calculators, in place of the battery.

Twenty traps were operated at urban sites in Memphis, Tennessee, from March through October 1984, using the procedures described by Reiter et al. 1986. In 716 trap-nights, 49,471 mosquitoes were collected (69.1 mosquitoes per night), of which 48,845 (98.7%) were species

considered to be SLE vectors (Bowen and Francy 1980). In most collections at least 95% of the latter were gravid females.

The condition of the catch was consistently good; few insects died, even when traps were left in the field for 48 hours. The number of mosquitoes identified as "*Culex* spp." (10,116) was 20.7% of the total catch of SLE vectors, a 42% reduction of the percentage for 1983 when the original version of the trap was used. The percentage in this category in resting-site collections was similar in both years: 7.8% in 1983 and 8.6% in 1984. Much of the remaining difference in the percentage of "*Culex* spp." in gravid trap and resting site collections is probably attributable to the different age composition of the catches (Reiter et al. 1986).

In conclusion, the new model of the CDC Gravid Mosquito Trap is an improved device for collecting large numbers of live, gravid *Culex* mosquitoes. As a quantitative sampling tool, it provides an efficient means for routine surveillance of urban *Culex* species, and as with the original version, the limited number of species in the catch facilitates rapid processing. The age composition and excellent condition of the catch should be advantageous in the quantitative surveillance of *Culex*-borne pathogens.

I am grateful to Dr. D. Bruce Francy and Mr. Jake Mullenix for encouragement and useful discussions, Mr. W. L. Jakob who identified the mosquitoes, and Mr. Mike Anderson who did most of the field collections.

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