



IMPROVED FROMMER UPDRAFT GRAVID TRAP

MODEL 1719

Instructions

Background

The original updraft gravid trap was designed by Dr. Paul Reiter in the early 1980s at the Centers for Disease Control, Division of Vector-Borne Disease for the selective capture of gravid *Culex* mosquitoes. By limiting captures to gravid females, problems associated with calculation of minimum virus infection rates were reduced (see references below). The trap attracted females by means of an oviposition medium contained in a pan below the trap. We adapted his design to produce the Improved Frommer Updraft Gravid Trap, Model 1719.

The Improved Frommer Updraft Gravid

Trap (Fig. 1) Model 1719 operates in a fashion similar to the CDC version by creating an upward current of air from within the confines of the oviposition pan, so that the mosquitoes are drawn into the unit during their pre-oviposition examination of the medium. The chief advantage of the 1719 over the 1712 trap is that the Improved Frommer version has a collection chamber below the



Figure 1. The Improved Frommer Updraft Gravid Trap Model 1719 incorporates all of the features of the original CDC Gravid Trap (our Model 1712) with an important modification—the collection chamber is below the aspiration fan. Not shown here is the black pan for holding the oviposition media (see Fig. 3)

fan and the adults are not exposed to the aspiration fan resulting in pristine specimens (Fig. 1 & 2) greatly facilitating specimen identification. The aspirator motor, fan, and collection cup are in the upper section of the 3" OD black ABS tube attached to the rainshield. The upper section is inserted into an ABS half-couple that is permanently attached to the black powder-coated bench; the bench holds the bottom intake ca. 1" above the hay-infusion water in a large black plastic pan (supplied). To remove the collection cup in the morning, you simply pull the upper aspiration tube upwards while the fan is still running, screw on the lid to the collection cup, and then remove the cup from the aspiration tube.

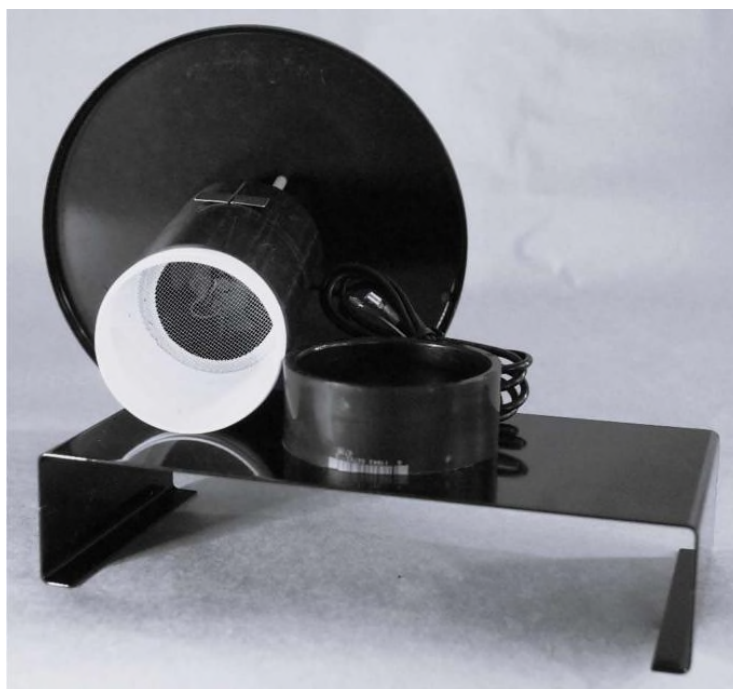


Figure 2. The Improved Frommer Updraft Gravid Trap showing the screened collection cup and mounting bench. Remember to leave the trap running and the cup inserted into the aspiration housing until the lid is attached to the collection cup.

This trap was developed and evaluated with the aid of Dr. Robert Frommer, formerly with the Manatee Mosquito Control District of Florida.

Operational Details

Oviposition Attractant and Site Selection

The hay infusion is made by adding 1 lb (0.5 kg) of hay to 30 gal (114 liters) of tap water and allowing the infusion to incubate for 5 or more days. The trap is placed at the desired collection site at least one hour before sunset and the pan is filled to a depth of 1" such that the level of infusion solution is near the 4 notches on the black powder coated base or bench. Captured mosquitoes are removed early the following morning to ensure maximum survival of the insects and any virus that may be present. For additional information on hay infusions, see endnote.ⁱ

Electrical Requirements

Voltage, current, batteries, and run times:

The Improved Frommer Updraft Gravid Trap (Model 1719) requires ca. 0.125 Amp per hour to operate at 6.0-6.3 VDC. Four D size flash-light batteries (preferably alkaline) in series will provide power for several nights of operation

(optionally available: External 4D-Cell Battery Holder-

PN: 1.50). Our Sealed, Gelled-Electrolyte Battery, 6 V, 12 Amp Hrs (PN: 2.3) will operate the trap for more than 72 hours without recharging. You can estimate the maximum run time for a fully charged and new battery by dividing the AmpHr rating of the battery by the power consumption of the Model 1719, ca. 0.125 Amps/Hr. Please note, older batteries, even though fully charged, will provide substantially less run time.

Excellent automatic chargers for this 6-volt gel battery are the Automatic charger for one 6 Volt battery. Input 115VAC, 50/60Hz. Output 3A 6V. For use in USA (Model 7.10) or the Automatic charger for one 6 Volt battery. Dual input 115/240VAC, 50/60Hz. Output 3A 6V. Intended for sale/use outside USA (Model 7.30). Both 6- and 12-volt gel batteries can be charged with the Auto-sensing solar-powered charger for 6- and 12-volt batteries (Model 2.55).

Battery polarity:

As DC motors reverse their direction of rotation with voltage polarity changes, the battery leads are coded: the red or copper lead goes to the (+) and the black or tinned lead goes to the (-) terminals on the battery.



Figure 3. The complete Improved Frommer Gravid Updraft Trap shown in the pan holding the oviposition solution. The required battery is not shown.

Useful References

- Burkett, D. A., Kelly, R., Porter, C. H., Wirtz, R. A. 2004. Commercial mosquito trap and gravid trap oviposition media evaluation, Atlanta, Georgia. *J. Am. Mosq. Control Assoc.* Sep;20(3):233-8. PMID: 15532919.
- Mboera, L. E., Takken, W., Mdira, K. Y., Pickett, J.A. 2000. Sampling gravid *Culex quinquefasciatus* (Diptera: Culicidae) in Tanzania with traps baited with synthetic ovi-position pheromone and grass infusions. *J. Med. Entomol.* Jan;37(1):172-6. doi: 10.1603/0022-2585-37.1.172. PMID: 15218923.
- Muturi, E.J., Mwangangi, J., Shililu, J., Muriu, S., Jacob, B., Mbogo, C. M. , John, G., Novak, R. 2007. Evaluation of four sampling techniques for surveillance of *Culex quinquefasciatus* (Diptera: Culicidae) and other mosquitoes in African rice agroecosystems. *J. Med. Entomol.* May;44(3):503-8. doi: 10.1603/0022-2585(2007)44[503:eof-stf]2.0.co;2. PMID: 17547238.
- Lee, Joon-Hak and Kokas, John E. 2004. Field evaluation of CDC gravid trap attractants to primary West Nile virus vectors, *Culex* mosquitoes in New York State. *J. Am. Mosquito Control Assoc.* 20(3): 248-253.
- Reiter, Paul. 1983. A portable, battery powered trap for collecting gravid *Culex* mosquitoes. *Mosquito News* 43:496-498.
- Service, M. W. 1976. *Mosquito Ecology- Field Sampling Methods*. John Wiley and Sons. New York.

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ⁱ Practical preparation: Put hay in a mesh bag, paint-strainer bag, or loose in a bucket/barrel. Fill with water, cover loosely to keep debris out but allow fermentation gases to escape, and keep it outdoors or in a ventilated area. After 5 days, pour or dip the brownish infusion into the trap pan. For *Culex*, you want it organic and fermented, but not so putrid that it is dominated by anaerobic sludge. If it smells lightly barnyard/swampy, that is normal. If it is black, septic, and rotten-egg foul, dilute it or start over.

Additional notes: (1.) Alfalfa hay, grass hay, or mixed hay can work. Some programs also use fish-emulsion infusion, cattail infusion, rabbit-pellet/alfalfa-type infusions, or other organic substrates, but hay infusion remains one of the standard *Culex* gravid-trap attractants. A Louisiana comparison paper notes that both hay and fish-emulsion-infused water are used in U.S. *Culex* CDC gravid-trap surveillance (Reference: McNamara TD, Healy K. A Comparison of Hay and Fish Emulsion-Infused Water as Oviposition Attractants for the CDC Gravid Trap. *J Med Entomol.* 2022 Mar 16;59(2):779-783. doi: 10.1093/jme/tjab203. PMID: 34927201). (2.) Do not leave open infusion water sitting where mosquitoes can complete development. Either use it in a trap, screen it, treat/dispose of it, or dump it before larvae can mature. (3.) See Useful References for additional citations.