AN IMPROVED METHOD FOR REARING *WYEOMYIA SMITHII*

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Wyeomyia smithii (Coquillett) is an interesting inhabitant of bogs in the United States east of the Mississippi River and north of the 39th parallel and in Canada from Saskatchewan to Labrador and Newfoundland (Darsie and Ward 1981). Larvae develop in water which collects in the leaf of the pitcher plant, *Sarracenia purpurea* L. Autogenous development of the eggs of *Wy. smithii* as well as the tolerance of its larvae to a wide variety of conditions make the species a useful laboratory animal. It has been the subject of studies in physiology (Bradshaw 1980, Lillie and Nakasone 1982), ecology (Addicott 1974,

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Mogi and Mokry 1980) and environmental contamination (Lillie et al. 1980).

Previous methods of rearing in this laboratory (Lillie et al. 1980) have been simple but time consuming. The most labor intensive steps have been feeding of larvae in at least 9 separate pans and transfer of pupae from larval pans to cups of water in the adult cage. This paper describes a method for rearing *Wy. smithii* which requires only a single larval feeding each time the colony is serviced and no transfer of pupae.

The outline of the rearing method is as follows. Larvae develop to late first or early second instar in the same beaker in which eggs were deposited. After 7 days, larvae are transferred to a bucket located directly beneath a cage of adults. Adults emerging from pupae in the bucket fly up a screen cone and into the adult cage. The flight of adults back into the bucket is discouraged by a screen cone above the hole in the floor of the cage. In the cage, adults have access to a wick with 10% sucrose solution, a wick with water and an oviposition cup. The oviposition cup is removed from the cage each time the colony is serviced. Eggs in the cup hatch and the cycle, which requires approximately 25 days, begins again. All rearing is performed in an environmental chamber with 16 hr of illumination from cool-white fluorescent tubes. Temperature is maintained at 27°C with occasional descents to 21°C.

Materials for the rearing apparatus are inexpensive and readily available. Plastic window screen (16 × 16 mesh), an ice-cream bucket with snap-on lid, disposable 250 ml beakers and urine cups are easy to cut with scissors or soldering iron and can be glued with silicone rubber sealant (Dow Corning Corp., Midland, MI). The threaded tops and lids of plastic urine cups (120 ml capacity) are useful as connectors. Lids are prepared by cutting out their centers, leaving a ring with female threads (hereafter referred to as "female ring"). The urine cups themselves are cut across the top leaving a ring with male threads (hereafter referred to as "male ring").

The oviposition and early larval rearing cups are 250 ml beakers. A glass petri dish covers each cup during rearing. The bucket (4 liter capacity) in which older larvae develop rests on a laboratory jack. A truncated screen cone (Fig. 1E) rests on top of the bucket. The base of the cone (21 cm diam) is glued to the bucket's snap-on lid, the center of which was cut away. The apex of the cone (6 cm diam) is glued to a male ring. A port made from plastic pipe (1.5 cm diam) penetrates the cone near its base to allow easy access to the bucket. The port is stopped with a cork.

The cubical adult cage (30 cm on a side) (Cornell Chemical and Equipment Co., Baltimore, MD) is placed so that its solid metal side forms the back wall and the stockinet sleeve forms the left wall. Plastic food wrap covering screen sides of the cage traps humidity necessary for adult survival (Wallis and Frempong-Boadu 1967). A plexiglass floor (0.4 cm thick, Fig. 1C) replaces the screen panel at the bottom

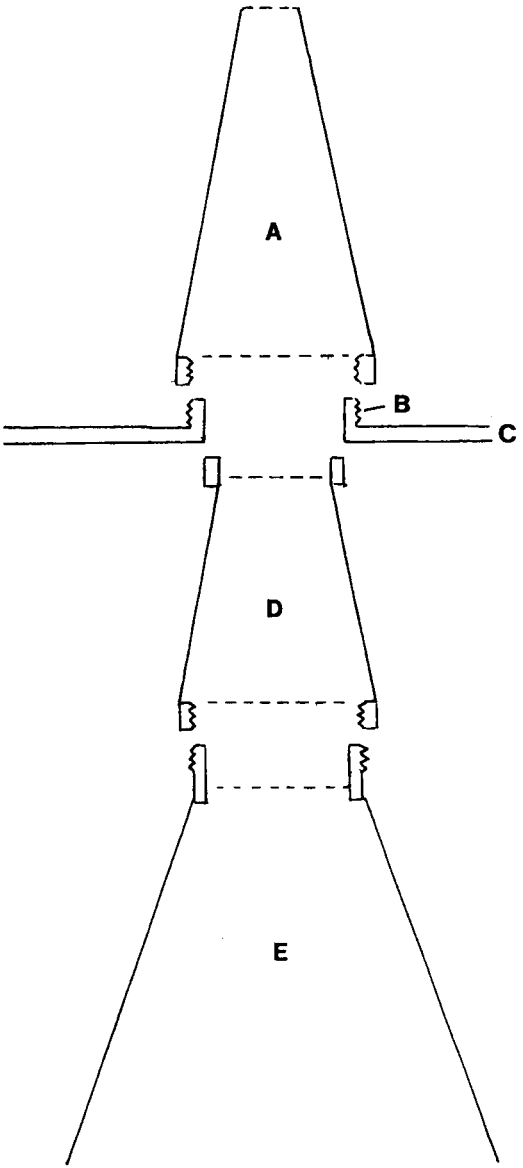

Fig. 1. Cross sectional diagram of detail from rearing apparatus. A, cone of cage; B, male ring glued to cage floor; C, cage floor; D, connector between adults cage and cone of bucket; E, cone of bucket.

of the cage. Mosquitoes emerging from the bucket gain access to the cage through a hole (5.5 cm diameter) in the cage floor. Adults are prevented from flying back down the hole by a truncated screen cone (1 cm diam at its apex, 6 cm diam at its base, Fig. 1A). The base of the cage's cone is glued to a female ring. This ring is screwed onto a male ring (Fig. 1B) which is glued above the hole in the cage floor. The connector (Fig.1D) between the top of the bucket's cone and the adult cage is formed by a female ring connected to an unthreaded ring of plastic cut from a urine cup. The connection is a shallowly-tapered, truncated, screen cone (5 cm diam at its apex, 6 cm diam at its base). The female ring of the connector is located below the cage floor and screwed onto the male ring at the top of the bucket's cone. The unthreaded ring is located above the cage floor. This arrangement makes it possible to screw the connector onto the bucket's cone, then raise or lower the bucket on the laboratory jack until the unthreaded ring rests snuggly within the male ring glued to the cage floor.

Within the cage, the oviposition cup is located at a rear corner shaded by a piece of cardboard on top of the cage. The sugar wick and water wick are placed in more brightly lighted portions of the cage. The sugar wick is a single piece of dental wick that protrudes 1 to 3 cm above a small hole in the snap-on cap of a 60 ml plastic medicine bottle. The water wick, 7 dental wicks wrapped in plastic screen secured with rubber bands, is placed in a flask so that the mouth of the flask fits tightly around the wick (Fig. 2).

The colony is serviced 3 times weekly as follows: The oviposition cup is removed from the cage and covered with a petri dish. Early-instar larvae from the previous 2 dates of servicing are fed small portions of a slurry of ground Tetra-Min Baby Fish Food "E" (Tetra Werke Mille, West Germany) in water. One-hundred fifty to 200 of the larvae from the week-old rearing cup are poured through the port into the rearing bucket. Larvae are fed 0.25 g of ground TetraMin Staple Food in a slurry of water. A fresh oviposition cup filled with tap water is placed in the cage and the flask containing the water wick is replenished. Occasional tasks include adjusting the level of the larval bucket with deionized water once per week and biweekly replacement of the sugar wick. The larval bucket is cleaned every few months.

The new method of rearing *Wy. smithii* provides an efficient means of colonizing this useful mosquito. The new colony requires less than an hour of maintenance per week, occupies less than 3 cubic feet, and is very simple to maintain.

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Fig. 2. Rearing apparatus in operation.

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