

AN ALL-PURPOSE FIELD KIT FOR COLLECTING AND TRANSPORTING AQUATIC INSECTS

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One of the major problems associated with collecting immature aquatic insects is maintaining the specimens in an environment which will enable them to reach the laboratory insectary alive. While a variety of insect collecting kits exists there are none described which provide equally for maintaining and transporting live specimens. The kit described in this paper incorporates features which were found by one of us (Nowell) to be effective during extensive collecting trips made in Turkey and the Philippine Islands. It includes the basic insect collecting equipment, and it will maintain a relatively constant environment for the immature insects during the period of survey and the return trip to the laboratory.

Immature forms of most aquatic insects cannot withstand excessive increases in their environmental temperatures, and even a small increase in water temperature is detrimental to some groups. Outside air temperatures in desert and tropical areas are usually higher than those of the living habitats, and the temperature of the small amounts of water in the collection tubes will increase as the day goes on if they are not protected.

An all-purpose kit was developed that would satisfy the demands of collecting and shipping activities. Utilization criteria required that the basic unit be an insulated, light-weight container of sufficient size to maintain over 30 immature aquatic insect collections. These collections would be made during surveys lasting two or more days in areas at least 12 driving hours away from a base labora-

tory. The container would have to be sturdy enough to withstand field use and handling during transport and maintain an inside temperature below 70° F.

A proprietary cooler box was selected with inside dimensions 11½ inches wide, 20½ inches long and 13½ inches deep (Fig. 1). A single-piece, molded plastic insulator lines the inside. This liner is stiffened with vertical ribs, the wide tops of which are squared off on a horizontal line located a few inches below the top. This flat lip can support a heavy tray. The insulation locks in the cold and holds it while sealing out moisture and heat. An all plastic drain empties the container rapidly. Heavy duty handles are recessed at each end. The hinged lid with an inner lid lining seals in cold. A chrome-plated cam-type latch which cannot be jarred open insures cooling security. Steel-toed boot caps on the base corners prevent crushing and give durability to the corners, while a permanent baked enamel finish over zinc-coated steel protects the outside of the cooler box against rust and corrosion.

A rack is constructed of plastic to hold the collection receptacles (Fig. 2). The materials required are:

- (one) sheet ¼ inch plastic 21x24 inches
- 1 6-inch plastic handle with 2 aluminum screws
- 1 24-inch length ½ inch-square plastic bar
- 18 1-inch aluminum or brass screws

The construction steps are:

1. Cut two pieces out of the ¼ inch plastic sheet which will fit inside the box. The top piece (11½ x 20½) fits over the narrow lip formed by the top of the ribbing of the plastic insulating liner. The lower sheet is smaller (10⅝ x 19⅝) to allow for the descending angle of the in-

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FIG. 1 (Left).—Field kit components displayed.

sulating liner and to insure a tight fit against it.

2. Bevel the sides of the two plastic sheets and round the corners to protect the liner from abrasion or puncture.

3. Cut nine $2\frac{1}{2}$ inch lengths from the $\frac{1}{2}$ inch square plastic bar. These will be the support and separating posts. Drill and tap both ends of each of the nine pieces.

4. Match the two plastic sheets and drill receptacle holes and seats of the following numbers and diameters: $8\text{--}3\frac{1}{2}$ inches; $10\text{--}2$ inches; $16\text{--}1\frac{1}{2}$ inches. Drill the seats only partially through the lower sheet. The seats are countersunk in the lower sheet to hold the bottles in place and prevent their slipping during transport. Ream the center of each seat to permit drainage. This will keep the

container rack relatively dry and facilitate cleaning.

5. Match the two plastic sheets and drill screw holes for the 9 support and separating posts. Drill 2 screw holes for the handle on a longitudinal line at the center of the top sheet.

6. Assemble the rack by attaching the posts to the plastic sheets at the 9 points, and screwing the handle onto the top sheet.

Plastic bottles are suggested for the specimen containers. They are unbreakable and they are lighter than glass. The 3-inch mason jar type bottles of 1 pint capacity must be wide-mouthed to facilitate storage and removal of the immature forms. The $1\frac{1}{2}$ inch ($2\frac{1}{2}$ ounce) and 2 inch (4 ounce) bottles should be transparent because these will normally be

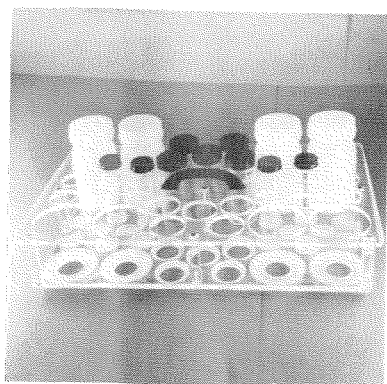


FIG. 2. (Center).—Receptacle rack.

used for the pupal forms or for collections of tree-hole mosquitoes or other animals which do not require large amounts of water for development. All containers must be at least $3\frac{1}{2}$ inches tall to fit into the plastic rack and allow room for finger pickup at the top. The maximum height is $5\frac{1}{2}$ inches. Plastic clip-on or screw caps are preferred because they will not rust or corrode.

Two of the 3-inch containers can be used to store small items. These include rubber bands, 2x2 and 4x4 gauze pads, two medicine droppers, and a dozen round, 9ml screw cap specimen vials.

The plastic receptacle rack has been constructed to fit tightly in the cooler box and to rest atop the ribbing of the plastic liner (Fig. 3). If the rack does not fit snugly, an effective bumper can be prepared by slitting lengthwise $\frac{1}{4}$ inch rubber tubing and fitting it around the perimeter of either or both of the plastic sheets. The space beneath the rack is open and will contain the coolant. Bulk ice, ice cubes or ice crush in plastic bags, or even refreezable containers (plastic bags or tins) may be used. All accumulated water can be flushed through the bottom drain.

The insect collecting equipment and items for recording collection data are assembled in canvas pouches cemented on the outside of the cooler chest (Fig. 3). Two sets of these pockets, one each side,

will accommodate all of the items that the average collector might need. The pockets are made of canvas or sail cloth. One piece is cut to the measurement of the side of the chest. The equipment items are laid out on it in the order desired. A second sheet of material is folded around each item and pinned to the under piece so that the pocket will be of the proper size and fit for the item. After all of the items have been pocketed, the excess material is trimmed. The two pieces of material may be stitched several times along each seam to insure seam strength. The maps and clip board require at least 20 inches of space, so a double pouch is made for the other side of the chest: the under pocket is for the maps and clip board, and the upper pocket is for the equipment items.

After the pouches and hems are sewn the entire canvas sheet is painted with a strong contact cement and glued on the outside of the chest, as shown in the figure.

A list of conventional collecting and recording items follows:

Side 1 (collecting)

Enamel dipper (it helps to cut the handle off near the bowl. One end of the tubular handle can be opened so that it will fit tightly over the stub left on the bowl. The enameled bowl can be stored inside the box and beneath the rack).

Kill tubes (2)

Forceps, 10 inch (for picking up reptiles or venomous arthropods)

Knife (multiple blade, pocket type)

Aspirator (for adult insect collection)

Bulb syringe (for immature insect collection)

Flashlight (for checking tree holes and other dark breeding areas)

Side 2 (recording)

Under pocket

Map space
Thermometer
Clip board (9x12) with collec-
tion data forms
Upper pocket
Nylon filament tape (roll)

Forceps, 4 inch
Insect repellent (liquid)
Snake bite kit
Self-adhesive blank labels
Notebook (6x9)
Pencils and iris forceps



FIG. 3 (Right).—Field kit components assembled.

A cooler box with a rack of similar design was used during surveys in the deserts and littoral plains of Turkey and the jungle on Luzon. The receptacles were removed from the plastic rack in the evenings and placed in streams near the encampments. The screw cap lids were replaced for the night with 4x4 gauze pads held in place over the top by a rubber band. Water in the larval containers was replaced at 2-day intervals following the collection date. Pupae were removed from the larval storage containers and placed on damp sheets of toilet paper folded loosely in the 2½ ounce containers. All adults along with the cast pupal cases were removed from their pupal containers and placed in vials filled with 70 percent alcohol.

The bottles were taken from the

streams in the mornings and placed in the rack. The gauze pads were replaced with lids. Pupae which had developed during the night were removed and placed in 2½ ounce containers. All adult insects which had emerged during the night were placed in vials filled with 70 percent alcohol. After all collection data had been recorded, the plastic rack was placed inside the cooler box and the box put inside the vehicle. Small blocks of ice were bought at the first opportunity and placed inside the box. So long as ice was available there was no loss of specimens.

This modified cooler box is an adequate collecting and transporting kit for field collection of aquatic insects, and it is offered as a supplement to the other collecting kits and equipment available to the general collector.