A CAGE FOR USE WITH SMALL AQUATIC ANIMALS IN FIELD STUDIES[1]

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Various cages are frequently used in assessing the effects of pesticides on non-target animals. In some cases, small animals offer advantages over larger ones because they may be more economical to raise in the laboratory or to purchase; immature stages often are more sensitive to toxicants, and small animals and their cages may be easier to transport to remote locations.

Our cage, designed for small animals and used in several estuarine field studies, is a modification of incubation cups routinely used in laboratory toxicity tests with larval saltwater fish (Hansen et al. 1975) and invertebrates (Nimmo et al. 1977). The cage is constructed by cutting the bottom 2 cm and the upper 3.5 cm off of a wide-mouthed screw-top polypropylene jar for use as ends attached to a tube formed using nylon mesh screen and clear silicone adhesive (Fig. 1). Enough of the original jar must remain below the threads for grasping when turning the lid. A variety of jars and mesh sizes may be used. To improve bonding, the inside walls of the polypropylene components are roughened prior to attaching them around the ends of the mesh tube with silicone adhesive. A small hole is drilled in the side of the lid for use in tethering the cage with a string. The materials are noncorrosive, relatively inert, and will withstand cleaning with acetone and a dilute bleach solution. Because the cage orients with the lid facing the current, it offers the animals some refuge from impingement in an area of slack water behind the lid. Cages float on their sides and can be deployed at the water's surface or submerged at varying depths. When removed from the water, the cage bottom retains a small volume of water so that the animals are not unduly stressed during examination and enumeration.

In field studies to investigate effects of aerially applied fenthion (20:1 mixture of diesel fuel and Baytex®[2] liquid concentrate applied as thermal fog at a nominal rate of 32.5 g active ingredient per hectare) on estuarine animals (Clark et al., in press and unpublished data), we used cages constructed from 8-cm (inside diameter) translucent polypropylene jars and with 14-cm high mesh tubes with mesh openings of 450 μm for juvenile mysids (*Mysidopsis bahia*) (Crustacea; Mysidacea) and 600 μm for juvenile sheepshead minnows (*Cyprinodon variegatus*) (Pisces: Cyprinodontidae); a brass fishing swivel was attached to the lid and each cage was tethered with a nylon cord to a weight on the bottom so that the cage floated with its upper side flush with the surface of the water. The white lid was placed underneath the translucent bottom to provide a contrasting background color when counting the test animals. Survival of juvenile sheepshead minnows (10 fish per cage) was 100% after 72 hours (9 cages) and 114 hours (8 other cages). Survival of caged mysids (8–10 mysids per cage) at sites where no pesticide-related mortality occurred averaged 90% after deployment for 72 hours (33 cages). Although not done in our study, the caged animals may be fed by squirting brine shrimp nauplii through the mesh with a pipette.

In addition to field tests, we have found these cages useful in static tests of new components of our laboratory seawater system to determine whether acutely toxic compounds are leaching from the construction materials.

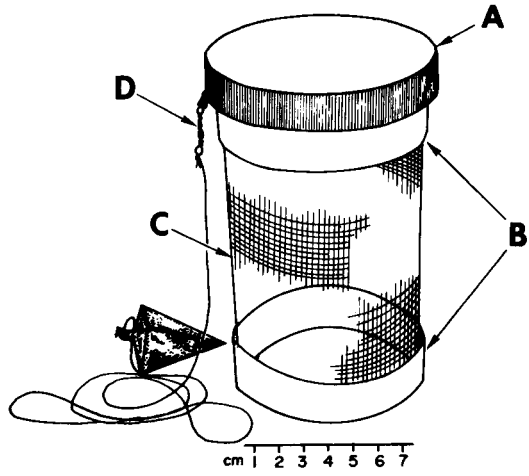

Fig. 1. Cage for small aquatic animals: (A) polypropylene lid; (B) threaded rim and bottom from polypropylene jar; (C) nylon mesh (not drawn to scale); (D) snap swivel, nylon string and weight for use in tethering cage.

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[2] ®Registered Trademark, Mobay Chemical Co., P. O. Box 4913, Hawthorn Rd., Kansas City, MO 64120. Mention of trade names or commercial products does not constitute endorsement by the U. S. Environmental Protection Agency.

The 450 μm screening had two disadvantages; the screen became clogged after a few days and the cages retained water that would rush out when the lid was loosened. The fouling was reduced by gently brushing the screen to remove debris and the water retention problem was overcome by slightly loosening the lid before lifting the cage from the water.

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