WRP Technical Note FW-EV-3.1
May 1994

Design and Application of a Larval Fish Trap

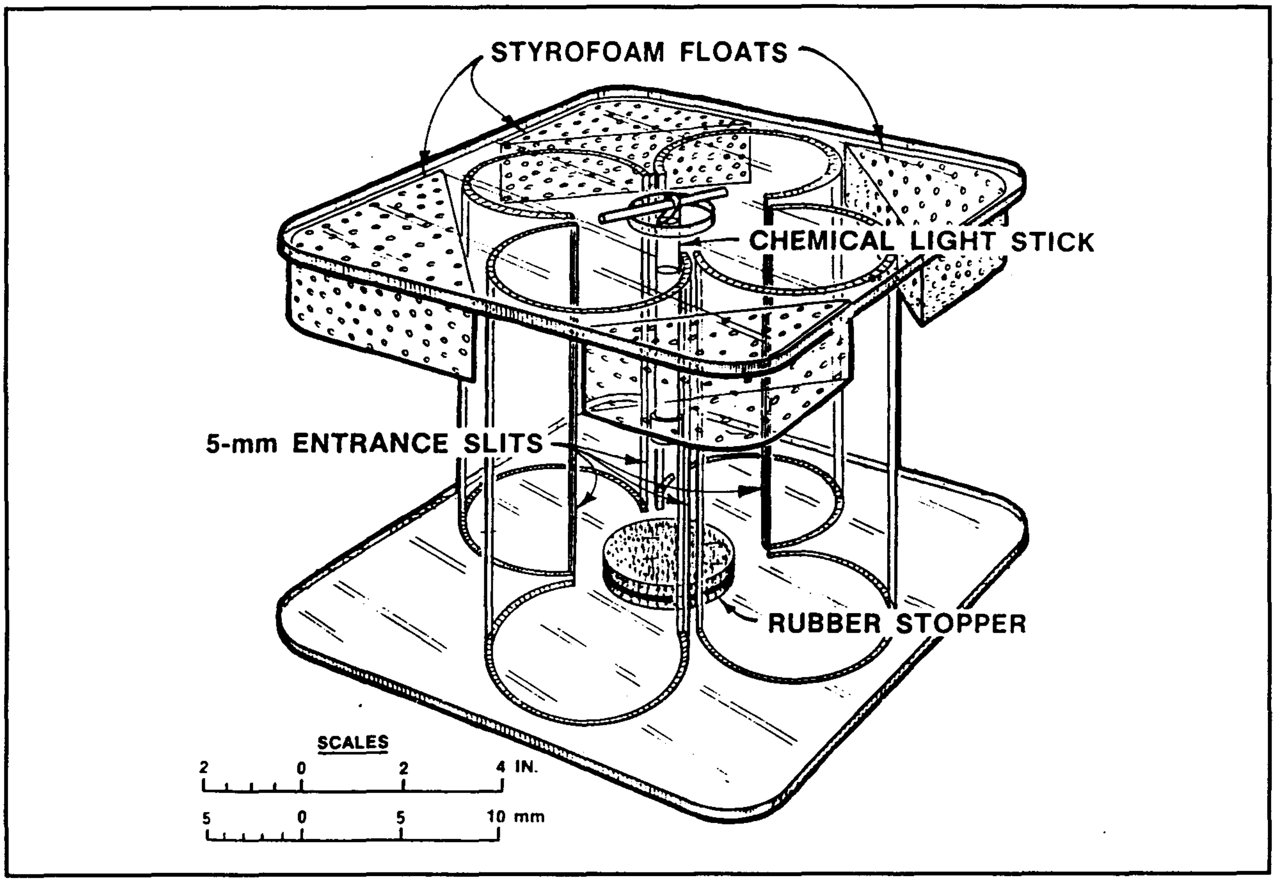

Figure 1. Larval Fish Trap

PURPOSE: This technical note describes construction of a light-activated Plexiglas trap used to collect larval fish. Since many fish are attracted to light, this type of collection method is useful to estimate abundance and to examine species composition of larval fishes. Light traps are ideal for sampling vegetated habitats such as wetlands and can be constructed in the laboratory or workshop.

DESIGN: The plan for the light trap (Fig. 1) is a modification of the Quatrefoil trap designed by Floyd et al. (1984). It is based on a slotted trapping system where four 5-mm entrance slots allow larval fish to enter the inner chamber. Once fishes are inside, they find it difficult to escape back through the narrow slots. One of the primary modifications to the original design is the use of a 12-hour, yellow Cyalume chemical lightstick for attracting fishes. This device eliminates the need for electrical power.

The base and top of the trap are solid pieces of 64 mm thick Plexiglas measuring 30.5 by 30.5 cm. A 2.5-cm hole is cut into the top plate for inserting the chemical light stick. The hole also provides an area where the trap can be grasped with a finger during retrieval. A 10.2 cm hole is cut in the bottom plate where a rubber stopper or cod end bucket is inserted. A removable rubber flange stopper is most efficient because it provides a tight seal, is easily removed for quick retrieval of larval fishes, and is readily available from plumbing supply stores. Four Plexiglas cylinders are cut longitudinally. Each tube is made of 64 mm thick Plexiglas and is 15- to 30 cm long. All four cylinders are glued to the top and bottom plates of Plexiglas with epoxy, allowing a 5 mm entrance slit between each cylinder.

Styrofoam is affixed to each corner of the top plate with epoxy, allowing the submersed trap to float on the water surface. A 2 mm hole is drilled into the top plate and a string is tied to the trap. The string is attached to a tree or stake to prevent the trap from floating away. If the trap cannot be tied off, an anchor line can be attached through a small hole drilled into the bottom plate. The cost per trap is relatively low (approximately $50).

TRAP APPLICATION: At least 30 traps can be transported to a sampling site in a 3-m canoe or flat bottom boat. Light traps are usually set at dusk and fished for predetermined time periods in order to derive catch per unit effort (CPUE). Traps are placed in the water with the activated light stick inserted into the trap.

After a preset time period, the boat is carefully brought up to the light trap and a plankton net is slowly positioned under the trap. The trap is gently lifted and the stopper removed. After the trap is washed several times to transfer fishes into the plankton net, it can be stored on the boat or placed back into the water for later pickup or resetting. The contents of the trap are washed through the plankton net into a cod end bucket attached to the net and fishes are transferred into a jar for preservation.

Depending on the needs of the experiment, light traps can be set a discrete depths to determine vertical occurrence of fishes. Dimensions of the trap and width of the entrance slits can be modified to meet various experimental requirements. For example, shorter traps (e.g., 15 cm long) are easier to transport in small boats and to sample shallow water.

SAMPLING CONSIDERATIONS: Light traps are a passive capture technique in that they remain stationary during the sampling period. If there is no water flowing through the trap, the water volume sampled is equivalent to the transmittance of light through the water column that is detectable and recognized by a stationary or moving phototactic fish. Turbidity and meteorological conditions affects light transmission. In addition, the phototactic behavior of larval fish, their temporal and spatial abundance, and the type of hydraulic regime in the sampling area directly influence encounter and collection rates. These factors result in considerable variation in catch using light traps and high sample sizes are required to reduce the variance.

Darters (*Family Percidae*), pirate perch (*Aphredoderidae*), minnows and shiners (*Cyprinidae*), and sunfishes (*Centrarchidae*) are best represented in light trap catches overall. The maximum number of larval fish collected in any one trap was over 2,000. Light traps have been successfully used to collect larval fish in riverine floodplains and littoral zones of reservoirs colonized by submersed aquatic plants. When spawning and rearing of fishes are components of environmental studies, light traps can provide life history data for many species of fish.

CONCLUSION: The information presented allows construction of light attributed fish traps and explains the best methods for their use in data collection/sampling.

REFERENCES:

Floyd, K. B., R. D. Hoyt, and S. Pimbrook. 1984. Chronology of appearance and habitat partitioning by stream larval fishes. Transactions of the American Fisheries Society 112: 280-285.

Killgore, K. J. and R. P. Morgan II. 1993. "Easily constructed light trap helps scientists collect larval fishes in wetlands." WRP Bulletin, Vol 3, No. 4, pp 1-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

POINT OF CONTACT FOR ADDITIONAL INFORMATION: Mr. Jack Killgore, U.S. Army Engineer Waterways Experiment Station, ATTN: CEWES-ER-A, 3909 Halls Ferry Road, Vicksburg, MS 39180-6199, phone: (601) 634-3397, author.