Small Marine Animal Collector for Use by Divers

In quantitative studies of small rocky shore fishes it is necessary to make thorough collections of fishes from small areas. The conventional technique for making these collections involves the use of rotenone and hand nets by divers. However, this technique has several disadvantages, among which are the possible loss of fish from the net during continuous collecting or when transferring fish to a collecting bag, difficulty in collecting fish from structurally heterogeneous substrates, and waste of air reserve when the diver repeatedly returns to the surface to deposit the fish. Therefore, I designed a hand-held piston device (similar to what SCUBA divers will recognize as a "slurp gun") with a collecting bag attached, to collect fish more efficiently. This paper describes the construction, use, and advantages of this "small marine animal collector" (SMAC) and compares it with other collecting methods.

Design and Construction

In 1975, the material cost for SMAC was about $20. A list of materials is given in Table 1 and specifications for construction in Fig. 1.

The body of SMAC is a plexiglass tube and piston with a smaller tube adapted to the intake end. A rubber flap valve (Fig. 2a) between the large and small tube sections allows water to enter the main tube on the intake stroke of the piston and prevents reverse flow on the outstroke (Fig. 2b). A similar valve in the side of the main tube allows water to pass into a net bag attached to the outside of the tube on the outstroke and prevents its return on the intake stroke (Fig. 2a-b).

Methylene chloride was used to bond the plexiglass and a commercial silicone sealer to reinforce the junction of the intake and main tubes. The outside front piece (Fig. 1) is cut to the outside diameter (OD) of the main tube and the hole is cut to the OD of the inlet tube. The inside front piece is cut to the inside diameter (ID) of the main tube and the hole is cut to the ID of the inlet tube. The front rubber valve is fastened with noncorrosive wood screws to the predrilled inside front piece. The second valve is made by cutting a square hole in the side of the main tube adjacent to the direction of flow from the first valve. The rubber flap is cut slightly larger than the hole on the two lateral sides and attached in the same manner as the first valve. The relative inflexibility of the ¼-in. rubber gasket material prevents it from being sucked inward on the intake stroke. The piston is made by sandwiching a piece of thin soft leather cut to the ID of the main tube between two pieces of plexiglass that are ¼-in. smaller than the ID of the main tube. These are attached to a ⅛-in. hardwood dowel by a large noncorrosive wood screw.

A fine-mesh net, with wire rim made to conform to the curvature of the main tube, can be attached to the main body by screws and heavy duty elastic bands. These screws also serve to prevent the piston from traveling forward into the second valve.

The SMAC was used successfully over a 6-wk period in 1975 in the Gulf of California at depths of not more than 10 m to collect more than 5,000 small fish. After the fishes were immobilized by a fish toxicant, they were retrieved from the water column, sand bottom,
rocks, and small crevices with the SMAC. For 14 of these collections, in which 473.2 ml (1 pt) of rotenone was used per collection, the mean number of individuals was 352.6 and the mean number of species was 18.9.

The SMAC has several advantages over conventional hand-net methods: (1) the probability of specimen loss is reduced because a net need not be opened underwater; (2) collecting time is reduced because specimens need not be handled or brought to the surface after each capture; (3) animals can easily be withdrawn from small interstices, clumps of algae, and heterogeneous substrates; and (4) large samples (several hundred small specimens) can be collected at one time. SMAC can also be used as a conventional “slurp gun” for live collection of many small invertebrates and reef fishes.

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Gas Bubble Disease in Fry of Channel Catfish (*Ictalurus punctatus*)

Gas bubble disease was recently observed in channel catfish fry being maintained in intensively aerated water at 22-25°C. Presumably hyperaeration was responsible for the condition.

About 15,000 channel catfish fry 6-8 wk old were being maintained in a 400-liter culture unit (Living Stream, Heath Tecna Corporation, Kent, Washington). Aeration was supplied by two air pumps, each of which delivered air at the rate of 4.4 l/min, and by a 110-V agitator (“minnow saver”). One week after the fry were placed in the unit, 85% of them died. The fry had large air emboli lodged in the peritoneal cavity (Fig. 1). Some of the bubbles were large enough to interfere with equilibrium and cause the fry to swim on their back. The fry were not dissected to determine other sites where emboli might have occurred.

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![Fig. 1. Gas bubbles in peritoneal cavity of channel catfish fry (total length, about 15 mm).](image-url)