Durable Ichthyoplankton Sampler for Small Boats[1]

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ABSTRACT: Half-meter ichthyoplankton sampling gear for simultaneous two-level sampling is described and illustrated. The gear is designed for use with boats up to 8 m long, at speeds less than 2.5 m/s. The gear is light and durable, and can be transported easily without disassembly.

Published descriptions of ichthyoplankton collecting gear have been largely limited to high-speed samplers (Ahlstrom et al. 1958; Smith et al. 1964; Noble 1970; and others). Few published descriptions of low-speed sampling gear are available that include methodology for their use and the illustrations necessary to construct similar systems (Brown and Langford 1975; Dovel 1964).

A plankton sled and surface sampler were designed for simultaneous use in boats up to 8 m long and at speeds less than 2.5 m/s. The design was modified after Dovel (1964) and was similar to that used by Johnson and Koo (1975). The following descriptions should enable construction of a similar system.

A crossbar of galvanized steel pipe, 4.8 cm in diameter, provided a base for the support wires and nylon control lines for the sampling gear. Steel bars, 0.9 cm in diameter, strengthened the crossbar, which was supported by two steel plates bolted to the deck. Two U-shaped brackets held the crossbar to the gunwales. Four 0.9-cm diameter holes in the crossbar were fitted with steel eyebolts for two support wires and two blocks for retrieving the plankton sled and surface sampler (Figs. 1A, B).

The plankton sled framework was constructed from flat steel 0.3 × 3.8 cm with 0.6-cm steel rod braces (Fig. 2). The net ring and runners were also made of flat steel 0.3 × 3.8 cm and all joints in the sled were welded. The towing bridle was made from three 60-cm lengths of galvanized steel wire 0.6 cm in diameter. The bridle was shackled through three holes equally spaced around the net ring. The plankton sled towing wire was held near the boat with a nylon rope and pulley.

The surface sampler frame was constructed of flat steel 0.3 × 3.8 cm (Fig. 3A) and all joints were welded. The surface sampler was mounted to a hinge (Fig. 3B) on the crossbar. The hinge was made from a 15.2-cm section of galvanized steel pipe 5.7 cm in diameter welded to two parallel flat steel plates 0.3 cm thick, and was supported on the crossbar with a steel bolt 1.3 cm in diameter.

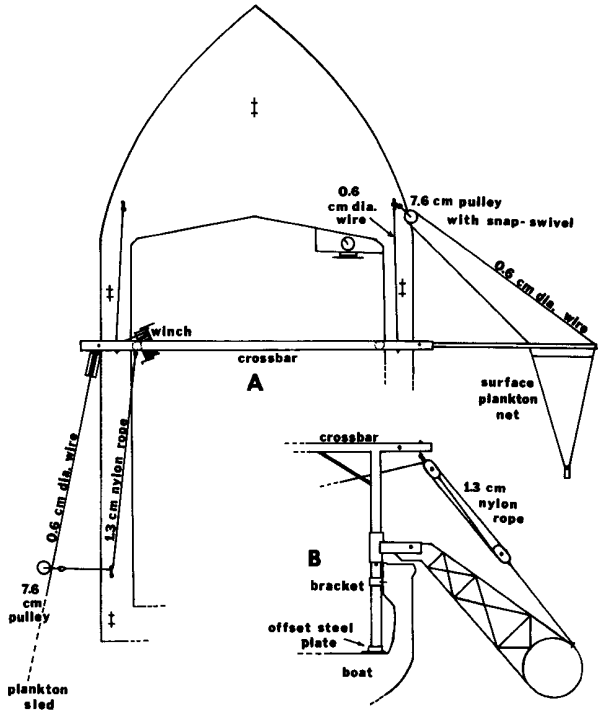

Fig. 1. Diagram of boat rigging for the plankton samplers: (A) top view of rigging, showing attachment points for support wires and towing lines; (B) stern view of surface sampler mounted to hinge.

Half-meter plankton nets (505-μm mesh) were fitted at the cod end with polyvinyl chloride pipe 7.6 cm in diameter, threaded internally to accept a 0.5-liter sample bottle. The pipe was secured in the net with a stainless steel hose clamp. Flowmeters were mounted in each net with galvanized wire 0.3 cm in diameter.

The gear described was used successfully to collect ichthyoplankton for two seasons in Lake Erie. (Data from

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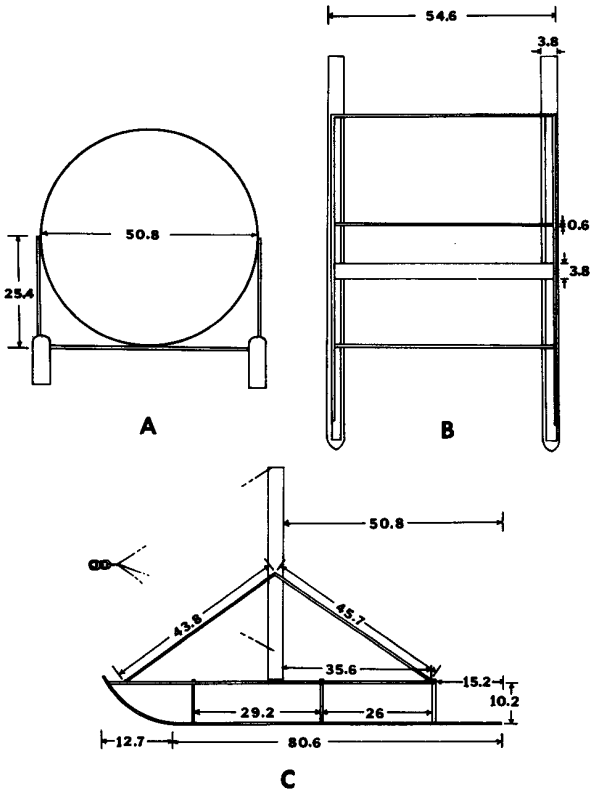

Fig. 2. Plankton sled: (A) end view, (B) top view, (C) side view with attachment points for towing bridle. Measurements are in centimeters.

these efforts are not presented here, for proprietary reasons.)

At the end of a sampling period, the plankton sled was winched to the surface while the boat was under way. The nylon rope and pulley kept the towing wire at an oblique angle to the winch, preventing the sled from falling in the water column as the boat circled the sled. The sled was lifted on board when it came alongside the boat. The surface sampler was raised and the bridle unsnapped at the bow, allowing the sampler to swing toward the stern. Both nets were then washed in the stern, using a bilge pump.

The intake hose of the bilge pump was fitted with a metal screen and mounted on the transom, and a 1.5-cm section of hose was attached to the discharge. Water was directed through the net and slightly downward, washing the collected organisms into the sample bottle. A section of net was folded over the mouth of the bottle and the bottle inverted to eliminate excess water. Sampling bottles with screened openings were not used, since some fish larvae may be extruded through the openings during towing (Vannucci 1968).

A similar system was used by Johnson and Koo (1975) in the Chesapeake and Delaware Canal and their results were similar to those obtained with the present gear.

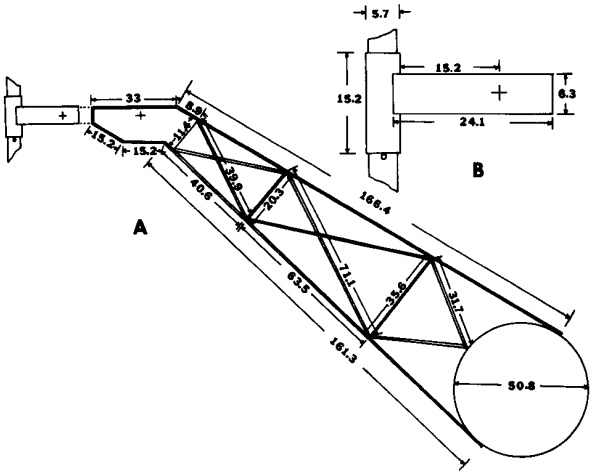

Fig. 3. Surface sampler frame and hinge: (A) sampler showing position of hinge; (B) side view of hinge mounted on crossbar. Measurements are in centimeters.

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