Research Note

Hydraulic based sampling equipment for under-ice fauna

ARNE VOLLAN AARSET AND F. V. WILLUMSEN

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Equipment for sampling under-ice fauna is described. The sampler is based on a hydraulic suction pump which makes it possible to collect invertebrates from brine channels in the ice. The equipment can be operated by one or two SCUBA divers.

Arne Vollan Aarset and F. V. Willumsen, Department of Zoology, University of Trondheim, N-7055 Dragvoll, Norway.

The abundance and distribution of organisms living in sea ice has been well documented in recent years (see Horner 1976 for ref.). 'Under-ice (or epontic) fauna', the amphipods, seem to be the most conspicuous invertebrates both in Arctic and Antarctic waters (Andriashev 1967; Gruzov et al. 1967; Gulliksen 1984). They are common on the undersurface of the sea ice, in shallow burrows

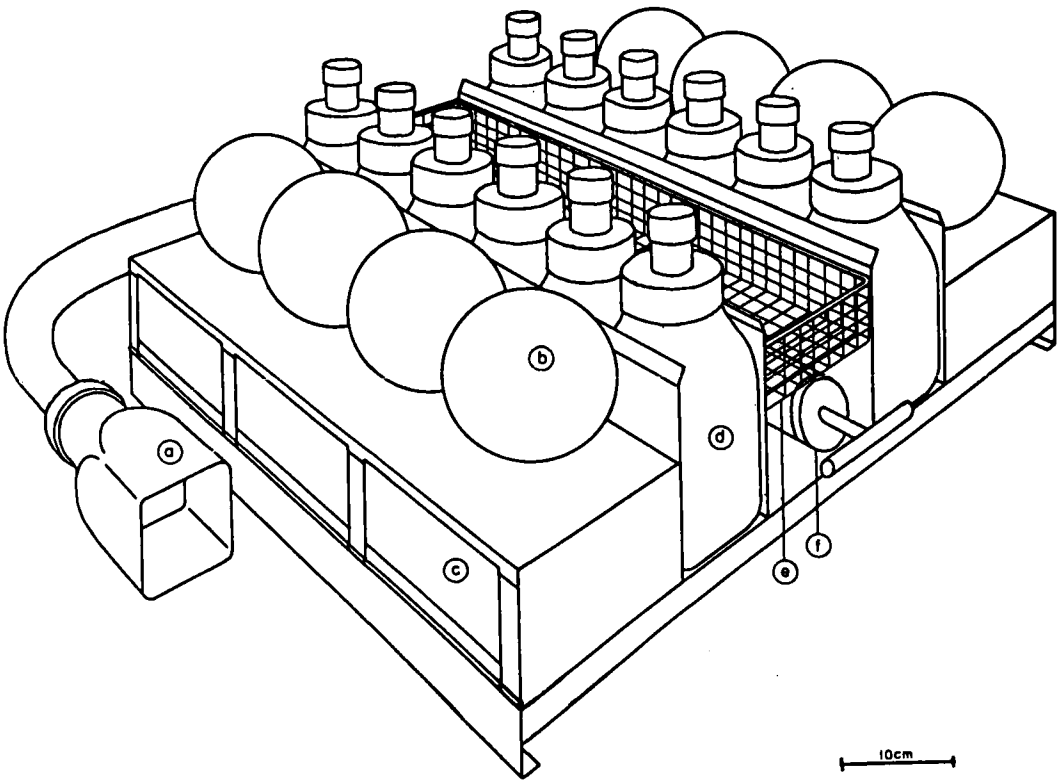
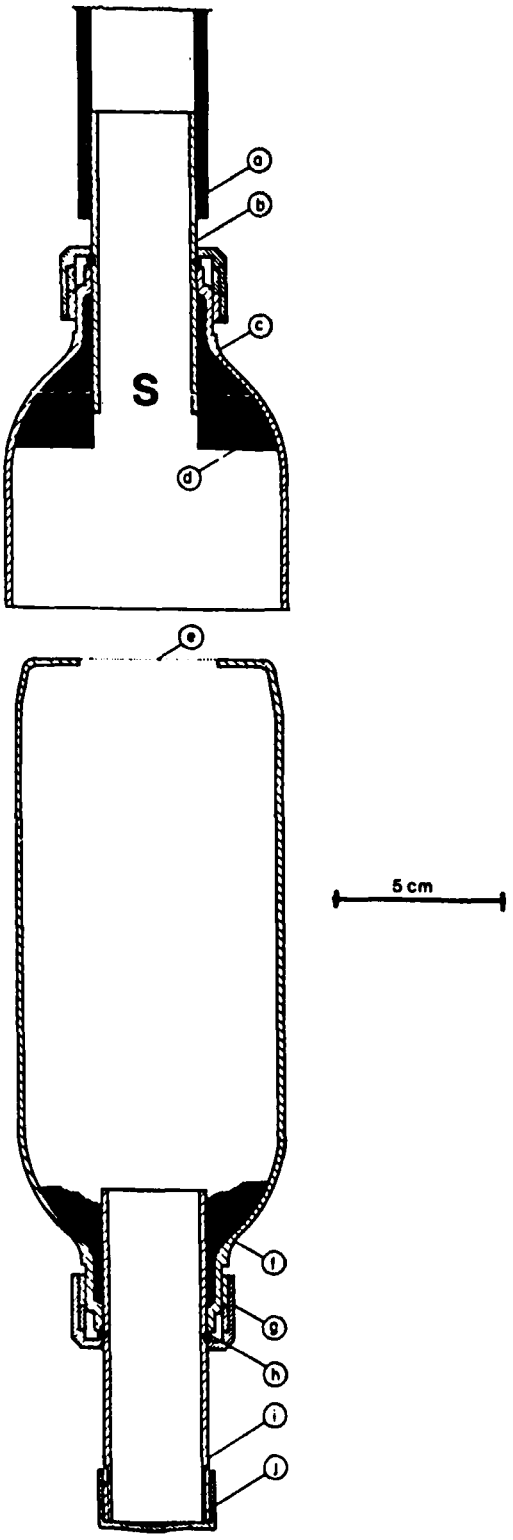


Fig. 1. Sampling equipment for under-ice fauna. a. Unit for sampling bottles; b. buoy; c. compartment; d. sampling bottle; e. brass basket; f. suction pump.



and in brine channels in the bottom layers of the ice (Cross 1982; Newbury 1983; Gulliksen 1984). These amphipods may vary in size from about 10 to 60 mm in total length, with *Gammarus wilkitzkii* being the largest species in the Arctic.

In order to collect these animals, sampling techniques like grabs, nets and corers have been used with varying success. However, animals living on hard ice or in brine channels have been difficult to capture (Gruzov et al. 1967; Gulliksen 1984).

During an expedition organized by the Norwegian Research Programme for Marine Arctic Ecology (PRO MARE) to Svalbard waters in July–August 1984, it was desirable to capture healthy animals for experimental purposes. To do this, we chose a sampling technique based on a hydraulic suction pump. This is a modified version of a suction sampler for fauna on rocky bottoms, and is described by Gulliksen & Derås (1975).

Method

The sampling equipment (Fig. 1) consists of twelve plastic bottles (d) arranged in two lines on an aluminium frame with a suction pump (f) of brass placed between the lines. At each end, a flexible hose is connected to the suction pump and to a unit (a) that fits the bottom of each plastic bottle. A brass basket (e) for keeping different instruments, photo-equipment, etc. is mounted at the top of the suction pump. Outside the lines of bottles are three compartments (c) on each side, closed by doors of plexiglass. These compartments may be used as lockers for sea-water sampling bottles or for other convenient equipment needed. In order to give the sampling unit neutral buoyancy in water, buoys (b) are attached to the roof of the compartments.

Part of the bottom of each sampling bottle (Fig. 2f) is replaced by a mesh (e) (size 0.5 mm). At the neck of the bottle, a brass pipe (i) is put through a plastic stopper (g) and tightened to the bottle by an o-ring (h). The pipe protrudes a few centimetres into the bottle in order to prevent loss of animals when the bottle is turned upside down. When not in use, the bottles may be closed by a stopper (j) at the top of the pipe. The brass

Fig. 2. Sampling bottle and unit connected to flexible hose. S. unit; a. flexible hose from suction pump; b. brass pipe; c. a half sampling bottle with plastic stopper; d. rubber seal; e. mesh; f. sampling bottle; g. plastic stopper; h. o-ring; i. brass pipe; j. plastic stopper.

pipe with the stoppers can easily be twisted off when samples are to be taken out of the bottles.

The unit (S) connected to the flexible hose (a) is made like the top part of a sampling bottle. In addition, a seal of rubber (d) lines the inside of the pipe and functions as a platform for the sampling bottles when they are put into the unit.

Results and discussion

The sampling equipment was used by one or two divers underneath the sea ice. When sampling, the suction pump worked very well, even when amphipods were far away in brine channels and difficult to get by other means. A large pumping capacity and a brass pipe of wide diameter make it possible to sample large volumes of water with little effort. Currents created by the sampling procedure could be regulated manually to prevent unwanted material from entering the sampling bottles. All animals collected appeared to be unharmed by the sampling method.

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