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# 5.8 EPIPHYTIC INVERTEBRATE FAUNA
(by E. Weigand)

## 5.8.1 Introduction

For the collection of the epiphytic invertebrate fauna, the sampling-device and the regression method according to Downing (1986) were chosen. This method combines gentle collection of epiphytic invertebrate fauna with a regression population estimation technique to produce population estimates of high precision and accuracy. Also this sampling-device provides vertical zoning of the invertebrate fauna.

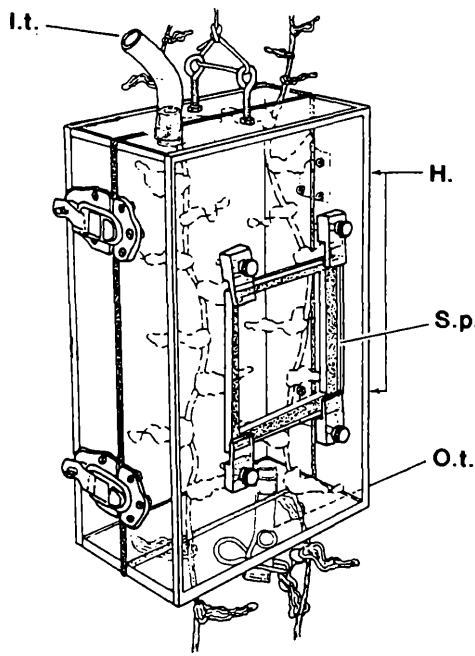


Fig. 5.8.1 General arangement of the sampler. The chamber encloses macrophytes which are sealed from the exterior by 7 x 7 mm strips of closed-pore neoprene. The inside dimensions are 30 x 20 x 10 cm (six litre volume). The box is made from 7 mm Plexiglas TM (adapted from a figure in Downing, 1986. I.t. = inlet tube; H. = hinges; S.p. = sampling part; O.t. = outer tube.

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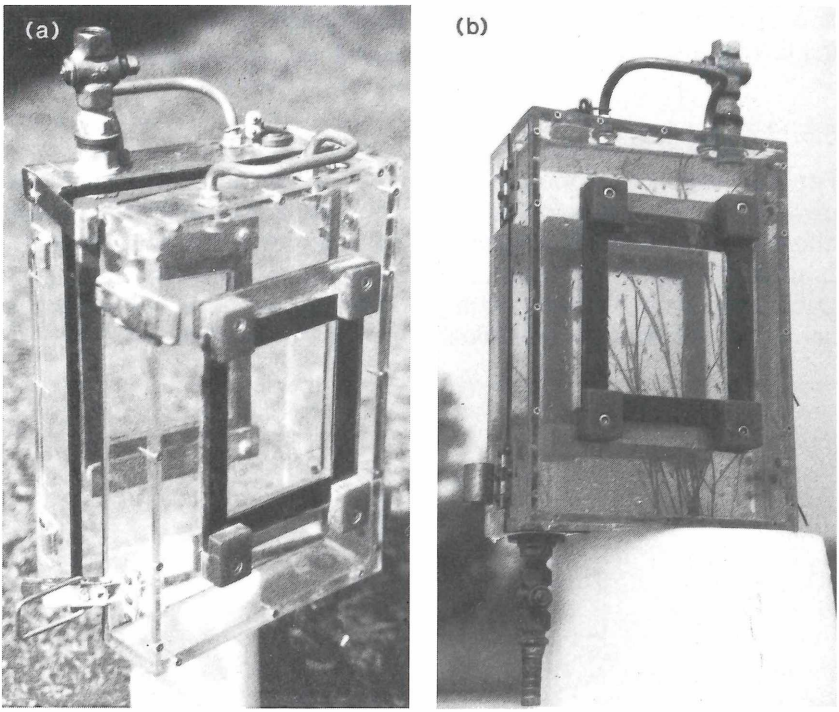


Plate 5.8.1 Transparent plastic box for the enclosure and collection of macrophyte dwelling invertebrates. (a) Before using in the field. (b) After the sample was taken (with macrophytes inside).

### 5.8.2 Equipment and general performance of the sampler (Fig. 5.8.1; Plate 5.8.1).

This sampling-device was slightly modified according to the conditions in the litoral zone of the backwater-area:
On the lower end, a distance-holder was mounted in order to obtain samples just above the sediment surface without collecting the sediment itself. A vertically adjustable measuring-pole enables samples to be taken from different, well defined depths. The two sampling-ports are not in use. In this way the box is absolutely tight and complete gathering of organisms and inorganic matter is possible.
Such a rigid enclosure can be used to take small samples of macrophytes and invertebrates. These boxes enclose even mobile organisms

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without disturbance and enable the collection of organisms swimming within the plants.
Quadrat samples of macrophytes are taken to estimate macrophyte biomass per unit area, and these figures are multiplied by invertebrate densities per unit macrophyte to provide estimates of invertebrate density per unit area.
The plastic box was gently closed around the macrophytes and the unenclosed stems were cut off (Plate 5.8.1). Samples were sealed in plastic bags and preserved in 4 % formaldehyde or frozen for further chemical analysis. The organisms were removed from the macrophyte surface by gentle washing with water and sieving through a 100 $\mu$m nylon mesh. All samples were counted and sorted under a microscope at 25 x magnification. Macrophytes collected in the samples were dried to constant weight and then weighed. All attached organic and inorganic matter was determined by filtering through a Whatman GF/C – glass-fibre-filter (1.2 $\mu$m), drying to constant weight and weighing.
The organic content was determined by using the weight loss on ignition-technique (ash free dry weight; 500 °C, 5h). A repeated chemical analysis of total organic carbon (TOC), nitrogen (TON) and phosphorus (TOP) was performed and the quality of food was determined by calculating the relationship C/N.
Quadrat samples (30 x 30 cm) were taken at the same time to estimate the standing biomass of macrophytes per unit bottom area. These samples were dried to constant weight (90 °C), and weighed to provide estimates of total biomass (g dry wt $m^{-2}$).

### 5.8.3 Conclusion

The application of the sampling-device and the regression population estimation technique to littoral invertebrates is simple and has proven to be very successful in the backwater-area.
For the abundant groups of invertebrates (Oligochaeta and Chironomidae) of the macrophyte stands of the Danube- backwater-area Altenwörth, a sample-number of four is sufficient to keep the stochastic variance below 20 %.

## Reference

Downing, J.A. (1986): A regression technique for the estimation of epiphytic invertebrate populations. – Freshwat. Biol. 16, 161-173.

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