FRESHWATER BIOLOGICAL ASSOCIATION

A SUPPLEMENT TO
A BIBLIOGRAPHY OF SAMPLERS FOR BENTHIC INVERTEBRATES

J. M. ELLIOTT & P. A. TULLETT

Grab

Air-lift

Corer

Dredge

OCCASIONAL PUBLICATION No. 20
A SUPPLEMENT TO

A BIBLIOGRAPHY OF

SAMPLERS

FOR BENTHIC INVERTEBRATES

compiled by

J.M. Elliott & P.A. Tullett

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Introduction

This supplement to the bibliography compiled by Elliott & Tullett (1978) covers the literature from the end of November 1977 to the end of December 1982 and includes references to samplers that could be used for the rapid removal of benthic invertebrates from the natural substrate of rivers and streams. The supplement includes marine samplers that have been, or could be, used in freshwater. We will continue collecting references and will be pleased to receive copies or notifications of papers omitted and new publications.

We have seen nearly all the publications in this supplement and the brief annotations include information on sampling area, mode of operation, or any other characteristics that we consider important. References to samplers are divided into the following major categories: net and quadrat samplers; scoops, shovels and dredges; grabs; corers; suction and airlift samplers; electroshocking samplers. They have also been classified according to the mode of operation of the sampler (S = sampler limited to shallow water of wadeable depth; D = diver-operated sampler; R = sampler operated by remote control from above water surface), the type of substratum on which the sampler can be used (M = mud and soft sediments; C = coarse gravel; L = large stones; P = macrophytes), and the origin of the sampler (Mar = marine; FW = freshwater). This classification is based on the information supplied by the authors and we have assumed that the information is correct. All the foreign titles have been translated into English.

The summary table in Elliott & Tullett (1978) has been revised to include the references in this supplement. Corrections to the original bibliography are given at the end of this supplement, together with a list of suppliers.

We are pleased to acknowledge the help of Mr J.E.M. Horne who has checked all the references and has translated the titles of Russian publications. We also thank Mrs J. Hawksford for her care and patience in typing this supplement. Most of the cost of the research involved in the preparation of this supplement has been met by the Department of the Environment as part of a contract to the Association (Contract No. DGR 480/329).
1. REVIEWS

1.1. FRESHWATER

Elliott, J.M., Drake, G.M., & Tullett, P.A. (1980). The choice of a suitable sampler for benthic macroinvertebrates in deep rivers. Pollut. Rep. Dep. Environ. U.K. No. 8, 36-44. [The advantages and disadvantages of drift samplers, emergence traps, colonisation samplers, grabs, dredges, corers and air-lift samplers used for the collection of invertebrates in deep rivers (depth > 1 m) are discussed. The objectives of the investigation are the most important criteria in the choice of a sampler]


1.2. MARINE


1.3. FRESHWATER/MARINE

CONCARE (1982). Ecological monitoring of aqueous effluents from petroleum refineries. CONCARE Report No. 8/82. Den Haag. 56 pp. [Sections on objectives, sampling methods, data analysis and case studies of six ecological surveys]


2. NETS AND QUADRAT SAMPLERS

2.1. SIMPLE

2.1 a) Invertebrates in mud and on stones


Doeg, Y., & Lake, P.S. (1981). A technique for assessing the composition and density of the macroinvertebrate fauna of large stones in streams. Hydrobiologia, 80, 3-6. [Square-quadrat box sampler with sampling area of 0.05 m2. Detachable top unit enables the sampler to be used in deeper water (up to 1 m)]

Niley, P.D., Wright, J.F., & Berrie, A.D. (1981). A new sampler for stream benthos, epiphytic macroflora and aquatic macrophytes. Freshwat. Biol. II, 79-85. ["Lambourn" sampler, a shallow water (< 0.5 m) quadrat box sampler with a sampling area of 0.05 m2. Disposable top unit enables the sampler to be used in deeper water (up to 1 m)]

Jacobi, G.Z. (1978). An inexpensive circular sampler for collecting benthic macroinvertebrates in streams. Arch. Hydrobiol. 88, 126-131. [Cylindrical sampler, sampling area 295 cm2, with net attached (aperture 0.75 mm)]


2.1 b) Invertebrates on macrophytes

Amoros, C. (1980). A simple device for quantitative pseudoperiphyton sampling. _Hydrobiologia_, 68, 243-246. [Cylindrical sampler, internal diameter 5 cm, with clear upper tube attached to sharpened iron collar at lower end] S, P, FW


Stark, J.D. (1980). A cylinder sampler for collecting the invertebrate fauna from submerged aquatic vegetation. _Mauri Ora_, 8, 45-54. [Pole-mounted cylinder sampler; sampling area 0.008 m², with jaws at lower end. Use limited to macrophyte beds where plant growth is upright and water depth < 4 m] S, P, FW

2.2. DIVER-OPERATED


Ratchen, R.L. & Frey, P.J. (1981). Monthly Dune (sed) sampler. _Peaque Fish-Cult._, 42, 56-7. [Adaptation of dome sampler of Gale & Thompson 1975; sampling area 0.25 m²; sharp stainless steel bend around the lower edge cuts into the substratum] D, MCP, FW

3. SCOOPS, SHOVELS AND DREDGES

3.3 DREDGES


3.5 DIVER-OPERATED DREDGE

4. GRABS

[Samplers with jaws that are forced shut by weights, lever arms, springs, or cords]

4.1. EKMAN-TYPE

[Box-shaped sampler with two scoop-like jaws]


4.6. OTHER GRABS


Ott, J.A. & Losert, A. (1979). A new quantitative sampler for submerged macrophytes, especially seagrass. *Senckenbergiana marit.* 17, 39-45. ['Riedl' grab with sharpened prongs on the biting edge of both jaws; penetrates and grasps the rhizomes and roots of seagrass beds; sampling area 0.12 m², weight 50 kg] R, MC, FW

5. CORERS

[Tubes that are driven vertically into the sediment]

5.1. REVIEWS


5.2. SMALL DIAMETER CORERS


5.3. LARGE DIAMETER CORERS

[Diameter greater than 10 cm]


Veíšer, S. (1979). Metoda kombinovaného vzorování bentoček v náctíske frakcií makrofauny na mělkavém dnu. (Method of combined sampling of benthic and nektonic fraction of macrofauna on muddy bottoms) (In Serbo-Croat). Prot. Přev. 27, 87-89. [Diameter 10 cm; lower half of sampler is a manual corer with rotating flat bars to retain core; upper half of sampler used to sample nekton] S, M, FW


5.4. MULTIPLE TUBE CORERS

[Weighted frames holding more than one core barrel]


5.5. DIVER-OPERATED CORERS


6. SUCTION AND AIR-LIFT SAMPLERS

6.1. MUD SUCKERS

[Samplers that suck in sediment by vacuum or by pressure difference between air within the sampler and the surrounding water; all these samplers take a very small sample]


6.2. HYDRAULIC SUCTION SAMPLERS

[Samplers that use pumped water, often through a venturi tube, to suck sample up a tube]


6.3. AIR-LIFT SAMPLERS

[Samplers that use air under pressure to lift substratum and animals from the bottom and into a collecting net]


Verollet, G. & Tachet, H. (1978). Un échantillonneur à succion pour le prélèvement du zoobenthos fluvial. (A suction sampler for sampling benthic macroinvertebrates in large rivers) (In French). Arch. Hydro-biol. 84, 55-64. (A series of air jets open into a circular head with a sampling area of 0.1 m²; sample sucked up flexible tube of 4.2 cm internal diameter; used in water depths of 3 - 6 m) R, MC, FW

6.4. DIVER OPERATED HAND SUCKERS

[Suction samplers with a small mouth; they can be used to remove animals from a defined area of bottom, but latter must be disturbed by hand if invertebrates are not on the surface of the substratum]


6.5. DIVER OPERATED HYDRAULIC SUCTION SAMPLERS

[Samplers that use pumped water, often through a venturi tube, to suck sample up a tube]

Brook, I.M. (1979). A portable suction dredge for quantitative sampling in difficult substrates. Estuaries. 2, 34-58. (Describes lightweight suction dredge based on Venturi principle; diver operated in water deeper than 1.5 m) SD, MCP, Mar
7. ELECTROSHOCKING SAMPLERS


8. EFFICIENCIES AND COMPARISONS

Andersin, A.-B. & Sandler, H. (1981). Comparison of the sampling efficiency of two van Veen grabs. *Finn. mar. Res.* No. 248, 137-142. [Efficiency of grab with large mesh 'windows' on upper surface was c. 50% higher than that of grab with small 'window'] Mar


Ankar, S. (1977). Digging profile and penetration of the van Veen grab in different sediment types. *Contr. Asko Lab. Univ. Stockholm,* No. 16, 22 pp. [Digging profiles and volume of sediment taken by weighted (45 kg) and unweighted (25 kg) versions of the van Veen grab were compared on five different substrata. Penetration of the weighted grab doubled in sandy sediments] Mar

Ankar, S., Cederwall, H., Lagzdins, G. & Norling, L. (1978). Comparison between Soviet and Swedish methods of sampling and treating soft bottom macrofauna. Final report from the Soviet-Swedish Expert Meeting on InterCalibration of Biological Methods and Analyses Asko, July 5-12, 1975. *Contr. Asko Lab. Univ. Stockholm,* No. 23, 38 pp. [Soviet "Okean" grab (sampling area 0.08 m², weight 40 kg) and the Swedish van Veen grab (sampling area 0.1 m², weight 25 kg) were compared on mud bottom. The van Veen grab was more efficient. Soviet and Swedish benthic sieving methods were found to be equally efficient] Mar


Ceccorelli, V.D. & Fabbri, G.G. (1978). Sampling efficiency of three different types of corers on meiofauna of muddy bottom. *Arch. Hydrobiol. Limnol.* 19, 83-96. [Compares multiple corer, diameter of each tube 1.5 cm, and single corers with diameters of 6 cm and 10 cm respectively] Mar

16


Duke, C.M. & Elliott, J.M. (1980). The Ponar grab as a marine pollution technique for sampling benthic macroinvertebrates in field and laboratory trials. Summarises evaluation of seven grabs, four dredges and three air-lift samplers


[See section 6.3.: modified air-lift sampler compared with Barber sampler; number of species and taxa caught were similar but air-lift samples were more rapidly collected and sorted] FW


[Examines effects of different mesh sizes (range 0.27 - 0.82 mm) on estimates of numbers of T. tubifex and its cocoons] FW


[See section 6.3.: modified air-lift sampler compared with Barber sampler; number of species and taxa caught were similar but air-lift samples were more rapidly collected and sorted] FW


[See section 6.3.: modified air-lift sampler compared with Barber sampler; number of species and taxa caught were similar but air-lift samples were more rapidly collected and sorted] FW
By first author only. References are to sections: within each section references are arranged alphabetically by author.

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<td>Methods for the Examination of Waters and Associated Materials, 1979, 1982</td>
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<td>Elmgren, R.</td>
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LIST OF SUPPLIERS

The following may be able to supply some of the samplers listed in the bibliography of Elliott & Tullett (1978) and this supplement. The names of these suppliers are given for the convenience of readers of the bibliography and do not imply official recommendation of their products. Equipment of similar specifications by other manufacturers may be equally effective.

Hydro-Bios Apparatabau GmbH,
P.O. Box 8008,
2300 Kiel-Holtenau,
West Germany.

Their U.K. Agents are:
Technation Ltd.,
58 Edgware Way,
Middlesex HA8 8JT

Kahlsico International Corp.,
P.O. Box 1166,
Offshore Environmental Systems Ltd.,
El Cajon, 17 West Street,
California 92022 Parnham, Surrey GU9 7DR

Wildco Instruments,
301 Cass Street,
Saginaw, Michigan 48602,
U.S.A.

A limited range of pond nets and simpler equipment can be obtained from:

Antox (UK) Ltd.,
Swallincote,
Derbyshire.

J.M. Davis,
25, Guest Hills Road,
Milton, Worcester WR14 1B7

T. Gerrard and Co.,
Division of Griffin Biological Laboratories,
Gerrard House, Worthing Road,
E. Preston,
W. Sussex BN16 1AS
Naturalist's dredges and anchor dredges of various sizes and van Veen grab can be obtained from:

Marine Biological Association,
The Laboratory,
Citadel Hill,
Plymouth, PL1 2PB.

 Corrections to bibliography of Elliott & Tullett (1978)
(occasional Publication No. 4)

Page 29. Kabinov to Kudinov.
Page 41. Pearson, Litterick & Jones (1973); initials of Jones should be N.V.
Page 46. Chutter & Noble (1966); pg. 59 should be 95.
Page 46. Emig & Liebrand (1971); "Principle" should be "principle".
Page 52. Note that the Freshwater Biological Association can no longer supply a "Gilson corer / F.B.A. automatic mud sampler".
Note that the G.M. Mfg. Co. is no longer in New York and has been consolidated with Kahlsico (see list of suppliers).
Page 54. "Haywood" should be "Hayward".
Add "Muus dredge (Maus 1964) 3.3".
Page 57. Gale & Thompson (1975); 6.6 should be 6.5.