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OF THE FISHERIES ON LAKE
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ZOOPLANKTON SAMPLING ON BOARD
R/V TANGANYIKA EXPLORER

by

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PREFACE

The Research for the Management of the Fisheries on Lake Tanganyika project (LTR) became fully operational in January 1992. It is executed by the Food and Agriculture Organization of the United Nations (FAO) and funded by the Finnish International Development Agency (FINNIDA).

LTR's objective is the determination of the biological basis for fish production on Lake Tanganyika, in order to permit the formulation of a coherent lake-wide fisheries management policy for the four riparian States (Burundi, Tanzania, Zaïre and Zambia)

Particular attention is given to the reinforcement of the skills and physical facilities of the fisheries research units in all four beneficiary countries as well as to the buildup of effective coordination mechanisms to ensure full collaboration between the Governments concerned.

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1. INTRODUCTION

These short notes give instructions for zooplankton sampling on board *R/V Tanganyika Explorer*. The instructions are brief since the work on board is limited to sampling and preservation. Zooplankton counting and other laboratory work are done at LTR Bujumbura, Kigoma, Mpulungu and in Finland.

Zooplankton data are gathered during fish cruises so that trophic relationships may be investigated. For example the link between pelagic zooplankton abundance and species composition to the feeding regimes of the pelagic clupeids, *Stolothrissa tanganicae* and *Limnothrissa miodon* and the juveniles of *Lates stappersii* can be established. Torpedo samples give information on availability of zooplankton for fish. Gulf samples collect shrimps and fish larvae including *S. tanganicae*, *L. miodon*, *L. stappersii*, *Lates mariae*, *Lates angustifrons* and *Lates microlepis*. Until now little has been known about shrimp abundance and composition due mainly to inappropriate sampling gears. Gulf net samples should give more information on shrimps whose role in the pelagic ecosystem may be of more importance than previously thought.

Joint cruises combine different components of the project. Proposals are given below for zooplankton sampling during such combined cruises. The instructions can be changed according to the needs and specific expertise available.

2. SAMPLING DURING FISH CRUISES

To date there have been two combined hydroacoustic, trawling and zooplankton cruises (cruise numbers 2 and 5) and a good working routine has been established. A brief summary of zooplankton sampling and instructions for work are given below.

2.1 PLANKTON NET SAMPLING

Plankton net sampling from lake-wide cruises gives information on the horizontal distribution of zooplankton over the whole lake within a short time period. Three vertical hauls from 100 m to the surface are made before fish trawling starts unless otherwise instructed.

Equipment and materials required:

100 µm plankton net
110 m rope
weight
250 ml bottles
40 % formaldehyde solution
syringe
bucket
pen
record sheets

Sampling method:

Date, time, position, sampling depth and bottom depth are

recorded on the form.

After a haul the plankton net must be rinsed 6 times. This is done by dipping the net in a bucket full of water. The rim of the net should not go under the water. The water must be changed between each sample collection. The sample is preserved in 4% formaldehyde solution by adding stock formaldehyde solution of volume equal to approximately one tenth of the sample volume.

Coding of the sample bottle:

Survey number: yy/number of the survey
PN100
station number: 1,2,3, etc
date: dd mm yy
replicate number: I,II or III

IT IS IMPORTANT TO CLEAN THE NET PROPERLY BETWEEN SAMPLING. THE NET MUST NEVER BE LEFT IN THE SUN. DEPOSITS OF PHYTOPLANKTON, ALGAE AND ZOOPLANKTON DRY ON THE NET AND CLOG IT.

2.2 TORPEDO SAMPLING

Two torpedoes of mesh size 100 µm are attached to both wings of the trawl and the torpedoes collect zooplankton during the fish trawl haul. Thus the sampling depth, speed, and duration are the same in both cases. This information is recorded in a "haul summary" sheet (for detailed instructions see "Guidelines for catch handling on board *R/V Tanganyika Explorer*", FM No. 19).

Equipment and materials required:

Two torpedoes attached to the trawl, mesh size 100 µm
40% formaldehyde solution
250 ml bottles

Sampling method:

Two torpedoes are attached to the trawl, one on each wing. After the trawl net is hauled onto the deck the torpedoes are detached from the trawl. The torpedo is rinsed from the outside with a hosepipe. The cod-end is unscrewed and emptied into the sample bottle. The cod-end is rinsed several times and the washings emptied into the sample bottle. The net should be properly rinsed to extract all the specimens which it has collected during the haul. The samples from the two torpedoes are preserved in separate bottles. 250 ml bottles must be used because the sample may be very concentrated (usually the length of the haul is 6-7 km).

Coding of the sample bottle:

Survey number: yy/number
TO
trawl haul number (station number): 1, 2, 3 etc.
date: dd mm yy

*torpedo number a or b:

* As you look from the deck the torpedo on the right of the trawl wing is 'a' and on the left 'b'.

2.3 GULF NET SAMPLING

Gulf nets are used to collect macrozooplankton such as shrimps and fish larvae especially of the target species, *S. tanganicae*, *L. miodon*, *L. stappersii*, *L. mariae*, *L. angustifrons*, and *L. microlepis*. Usually gulf net sampling is carried out after the trawl haul.

Equipment and materials required:

Gulf nets, one net of 100 µm and one net of 250 µm.
40 % formaldehyde solution (The sample is stored in 4 % solution see page 2)
250 ml sample bottles

Sampling method:

The reading of the flowmeter which is attached to the gulf net is recorded. The position of the boat and the time are noted. Then the gulf net is released into the water to a cable length of 300 m and a depth of 90-100 m. The gradual release of the cable takes 34 min. When all the cable is out the net is hauled back again to the vessel. The end position of the boat, the time and the reading of the flowmeter are recorded.

The gulf net is handled in the same way as the torpedo sample. The net is properly rinsed from the outside, the cod-end is unscrewed, the contents are emptied into the sample bottle and the cod-end rinsed several times. The samples from different mesh sizes are treated separately.

Coding:

GN100 or GN250
Gulf net sampling station: 1,2,3, etc
date: dd mm yy

Note: Gulf net sampling does not have the same station number as vertical plankton net and torpedo sampling thus it is important to be very clear with the coding.

3. JOINT CRUISES

Joint cruises enable sampling for a number of different components e.g. hydrodynamics, limnology and zooplankton, to be carried out simultaneously.

3.1 VERTICAL SAMPLING WITH THE PLANKTON NET

The 100 μm plankton net which is used during routine sampling at fixed stations and during trawl-surveys has limitations but is a fast method. Replicate samples give information on variability and the data collected by the two methods can be compared.

Samples should be collected at the same sites where limnological variables are measured.

For equipment and materials required, sampling methods and coding see Section 1.1.

3.2 ZOOPLANKTON SAMPLES FOR CARBON CONTENT

(See Järvinen *et al.*, 1996).

The collection of zooplankton for carbon content should be done at the request of Mr Järvinen or Dr Salonen.

4. RESPONSIBILITIES

An experienced 'zooplankton sampler' (researcher or technician) should be designated leader at the start of the cruise and should be responsible for the samples and for accurate records. The samples and records should be safely deposited where the samples will be counted. If possible the bottles should be stored in a dark place until the counting. The samples should not be thrown away before the field co-ordinator of the zooplankton component has checked the results.

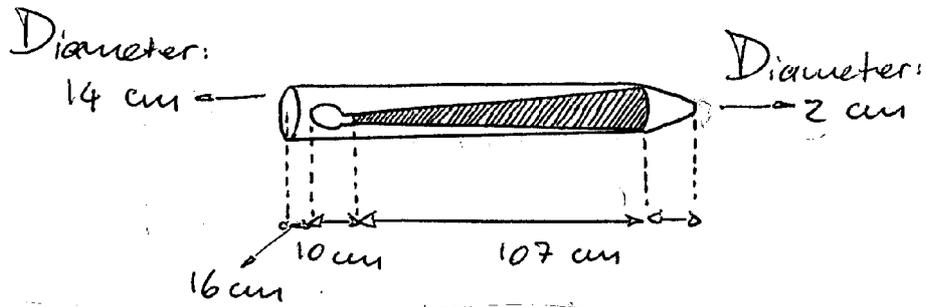
REFERENCES

Mannini, P. and E. Aro, Guidelines for catch handling on board
1995 *R/V Tanganyika Explorer*. FAO/FINNIDA Research for the
Management of the fisheries on Lake Tanganyika.
GCP/RAF/271/FIN-FM/19 (En):27 p.

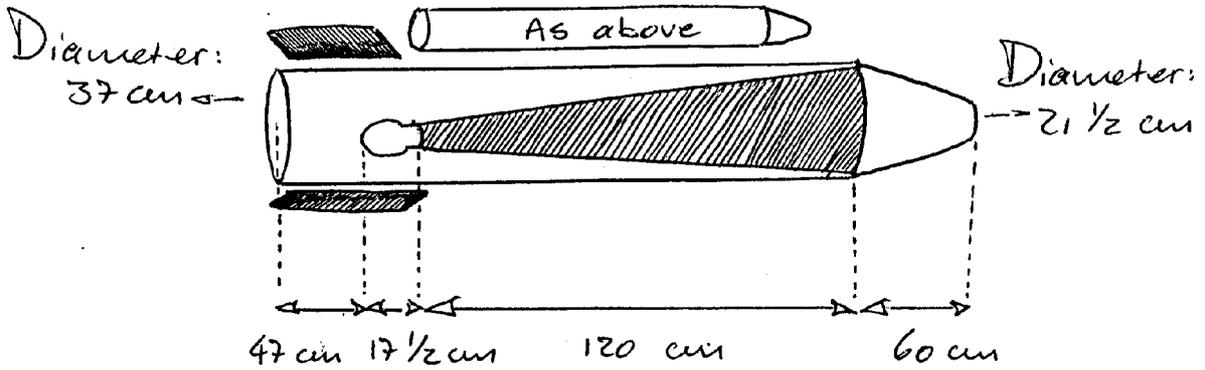
Järvinen, M., Salonen, K. and J. Sarvala, Experiments on
1996 phytoplankton and bacterial production ecology in Lake
Tanganyika: The results of the first lake-wide research
cruise on *R/V Tanganyika Explorer*.
GCP/RAF/271/FIN-TD/44 (En):43 p.

Appendix 1

NORMAL TORPEDOES (100 μm mesh)



GULF TORPEDOES (Small net - 100 μm mesh and large net 250 μm mesh)



NET FOR VERTICAL HAULS (100 μm mesh)

