

Sampler No. I (Fig. 1) is a very compact one, made of 1/20 G. I. sheet. It consists of a streamlined metallic float with a stabilizing keel and a small conical net. The net is fitted to a rectangular metallic frame, which is fixed on the float. The length of the float measures 32 cm, with tapering ends, the broader portion being 20 cm in width. The length of the net is 50 cm and is made of monofilament gauze with a mesh width of 0.33 mm. The net has a rectangular mouth area of 5 cm x 20 cm. A plastic bucket is fitted tightly to the end of the net. The sampler floated over the surface of water and was found to be very good for sampling from slow-speed boats. The great advantage of the sampler is its smaller size and that it can be operated even from unequipped country boats.

Sampler No. II (Fig. 2) is a modified form of the earlier one. In this case the mouth area of the net is increased to 8 cm x 30 cm. The weight of the sampler is also added by removing the float and slightly increasing the thickness of the metal sheet (12 gauge). The first sampler had a tendency to jump over the water if the speed was increased. This defect was overcome by slightly increasing the weight of the sampler (using heavier metal). Provision was also made for further increase in weight of the sampler by adding suitable weights to the keel. With these modifications this sampler could be operated from motor boats up to a speed of 2 knots.

Sampler No. III (Fig. 3) is yet another modification of sampler No. 1. This was suitably modified for more stability and to operate at higher speeds. Here the metallic float is replaced by two streamlined wooden planks of 60 cm length and 12 cm width, fixed one on either side of the rectangular frame, to which the net is attached. The length of the net is 60 cm and mouth area 18 cm x 30 cm. The net is attached to the metallic frame in such a way that its position is adjustable within the rectangular frame. The sampler could be operated satisfactorily up to a speed of 3 knots.

The above samplers were used in Laccadive cruises. Fish eggs and larvae, ostracods, decapods and marine insects were the major groups in the plankton collected.

References

- David, P. M. 1965. The Neuston net, a device for sampling the surface fauna of the ocean, *J. mar. biol. Ass. U. K.* 45: 313-320.
- Sund, P. M. and Richards, W. J. 1965. Results of trials with a neuston net in the Gulf of Guinea. *Ocean Science and Ocean Engineering*, 516-523.
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9. Plankton pump — S. C. Goswami.

The pump (3 HP) used was a local make and was coupled to the velocity reduction drum (Aron 1958). Two drums placed concentrically function as the main filtering apparatus (Fig. 1). The outer drum (Dia. 22") serves as a collector for the sea water. The inner drum (Dia. 16") is welded inside the outer drum with a separate bottom. The outer drum receives sea water through an inlet (dia. 3½") by means of a pipe connected and worked by the petrol pump. Actual filtration takes place in the inner drum having a capacity of 65

FIG-1

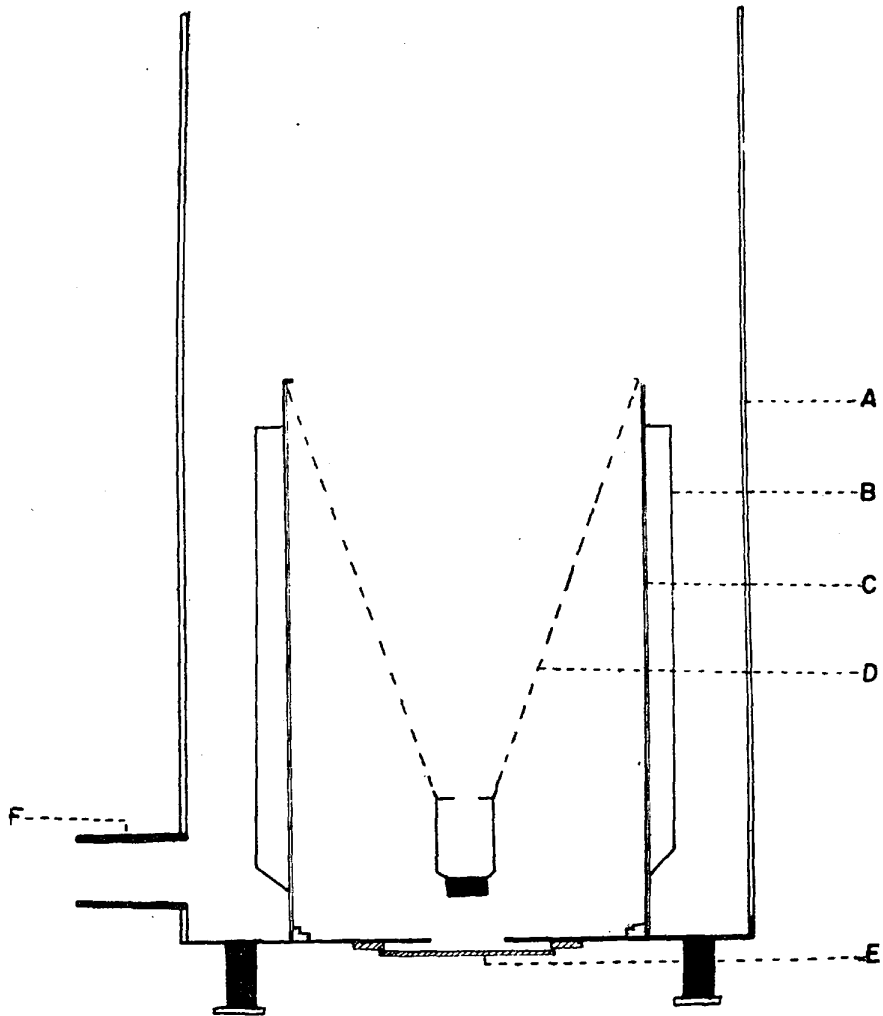


Fig. 1 Filtering Apparatus

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|-----------------|-----------------------|---------------|
| A. Outer drum | B. Welded iron plate | C. Inner Drum |
| D. Plankton Net | E. Quick release gate | F. Inlet |

liters. The pumping rate of the petrol pump is about six thousand gallons per hour. A quick release gate consisting of an iron plate and a handle has been incorporated at the bottom for controlling the flow of water and for effective calibration. The calibration was done by closing the outlet and noting the time required for filling up the inner drum. The

sea water intake was about a metre beneath the sea surface. The water comes with speed, fills up the outer drum and then over-flows into the inner drum which is slightly more than $\frac{1}{2}$ of the height of the outer drum. The velocity and rotation of the water is reduced by the increased diameter of the outer drum and the rectangular iron plates welded on to the outer sides of the inner drum. It was estimated that the water passes into the filtration unit at about $\frac{1}{25}$ th of the original velocity. A small conical net fixed tightly at the mouth of the inner drum filters the water efficiently at the reduced rate causing little damage to the plankton. The samples for the present study were taken on board 'Laccadives' a passenger ship to the Laccadive Islands. The speed of the ship at the time of collection averaged 2 kts and the duration of the pump sampling varied from 10-30 minutes. Tow net sampling was done from about a meter beneath the surface using a square mouthed version of the WP-2 (UNESCO, 1968) ie. H. T. net having a mouth area of 0.25 m². A calibrated Rigsocha flow meter was used. The duration of the net sampling varied from 2-5 minutes with the speed of tow fixed at 2 kts. 10 samples were taken simultaneously using both the pump and net from the sides of the vessel. Nets were made of nylon multifilament gauze of 0.2 mm mesh width. At the end of each haul the sides of the nets were rinsed and catch collected in the metal caps. Collections were preserved on board the ship in 4% formalin (neutralized) and stored in labelled glass-jars.

In the present study, the samplers were sorted and analysed according to the procedure adopted at the IOBC for the International Collections, and averaged mean values were converted into 100 m³.

TABLE

COMPARISON OF PUMP AND NET CATCHES, ADJUSTED TO NUMBER/100 M³

SR. No.	Planktonic Groups	Pump	Net
1	Copepoda	5841	3382
2	Ostracoda	1781	1205
3	Chaetognatha	144	146
4	Euphausiids	246	182
5	Gastropod larva	68	20
6	Mysids	0	9
7	Decapod larvae	12	8
8	Sergestids	0	20
9	Ceratium	0	58
10	Atlantids	0	14
11	Hydro-medusae	9	5
12	Amphipoda	0	7
13	Anthozoan larvae	0	4
14	Fish eggs	3	9

Table shows the important planktonic group sorted out and the difference in catch seems to be due to gear selectivity. Fig. 2 represents the number / 100 m³ as well as the maximum and the minimum measurements of the five dominant copepod species taken in the pump and the net samples. The copepod species taken were; *Oncea venusta*, (Philippi) *Oithona plumifera* (Baird), *Temora turbinata* (Dana), *Eucalanus subcrassus* (Giesbrecht) and *Eucalanus elongatus* (Dana). The size range shown is from the minimum to the maximum. The average number is based on the identification and counting of each of the five types, the values being converted into number per 100 m³.

FIG - 2

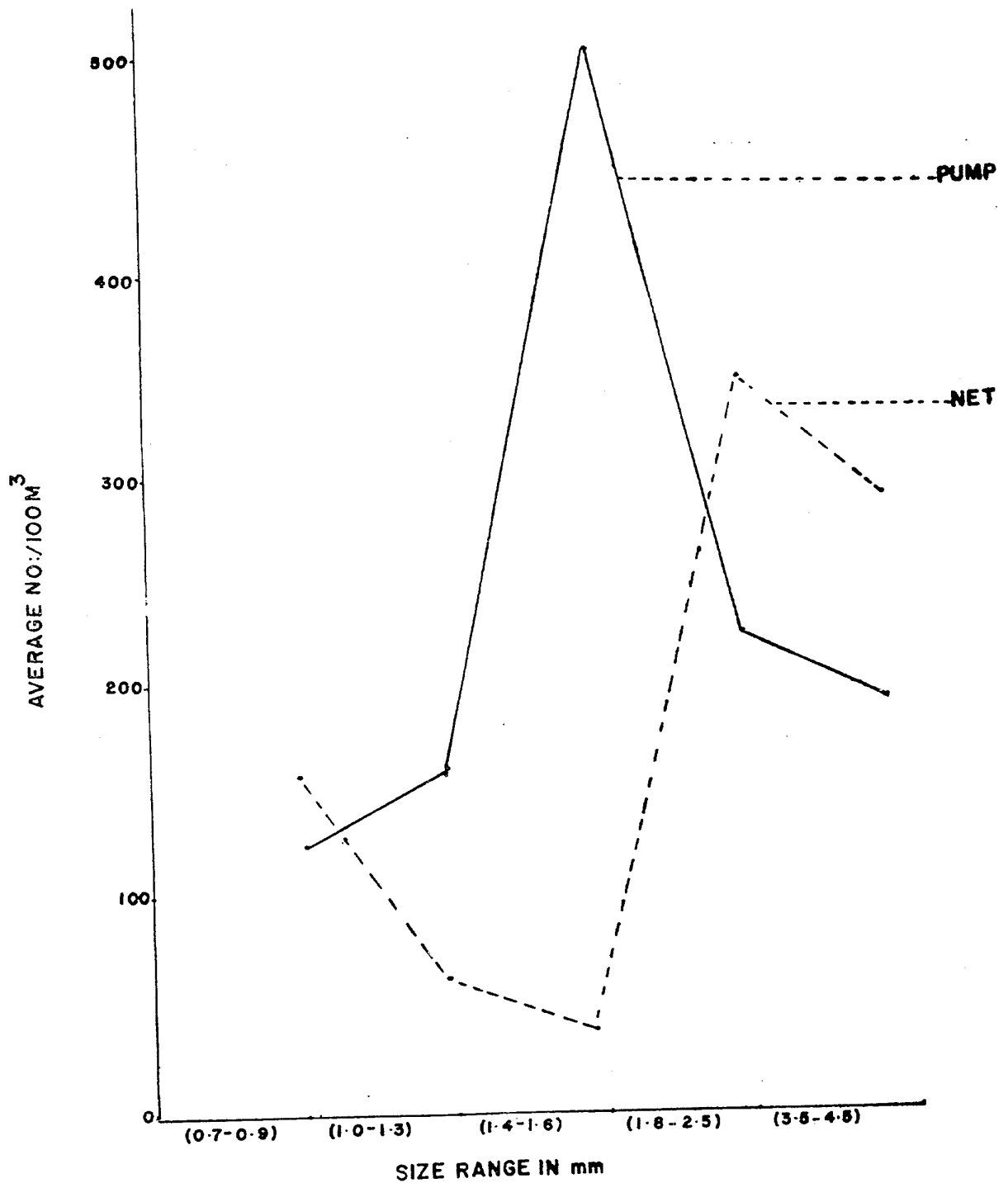


Fig. 2. Relationship between average number and size range of five dominant copepod species in two types of gear.

The Fig. 2 shows some differences between catches by the two types of sampling gear. The copepods of the smallest size (0.7 - 0.9 mm) show little difference. Pump appears to be a better gear for copepods for the size range between (1.0 - 1.6 mm). These observations are in agreement with Aron (1958). It would appear that the two gears have collected different numbers and varieties of copepods. The discrepancy in the catch may be attributed to gear selectivity or plankton patchiness.

References

- Aron, W. (1958) The use of large capacity portable pump for plankton sampling with notes on plankton patchiness. *J. Mar. Res.* Vol. 16, pp. 158-72.
- Unesco (1968) Zooplankton sampling. Monograph on Oceanographic methodology Vol. 2. 174 P.

10. *The Japanese Jet Net* — M. Anraku.

M. Anraku gave a talk on the methods of handling and towing the Japanese Jet Net (Tanaka *et al* 1968). This is a high speed sampler and can be conveniently hauled horizontally at 100 m depth at a towing speed of 12 knots. This is a highly sophisticated net, and marks a new step towards high speed sampling.

Reference

- Tanaka, H., Imayama, Y., (1968) A hydrodynamic study of a modified model of Azeta, M., Anraku, M. the Clarke Jet Net. *Marine Biol.* 1 (3), 204-207.

11. *Fixation and preservation of plankton samples* — C. B. Lalithambika Devi.

Zooplankton samples were taken from Ernakulam Channel (Cochin Harbour). Representative groups of organisms were sorted out and their body proportions were measured using ocular and stage micrometers, when they were alive and then preserved in different concentrations of formaldehyde. The body proportions were measured after first, second, seventh and thirtieth day for each individual specimen. The figures shown in table I indicate the average for each group. To eliminate possible errors due to variations in salinity, different grades of formaldehyde (1.6, 4.0, 5.0 and 10.0 per cent) were prepared in sea water taken at the time of collection. One set of samples was preserved in 4% stock solution of formaldehyde, which is prepared in sea water and kept over a period of six to seven months. Another set of samples was preserved in 4% hexamine buffered formaldehyde prepared in tap water. The preservatives were added to the specimen in small quantities at a time, to avoid distortion. Percentage reduction in standard length of the material in different grades of the preservatives were calculated.

1. Fish larvae (Forms with endoskeleton). The shrinkage values of fish larvae varied with concentration of the formaldehyde used. The maximum total shrinkage after 30 days (at the end of the experiment) of 8.22 per cent was found in 10% and a minimum of 3.9 per cent in 5% formaldehyde (Table 1, Fig. 1). The shrinkage was uneven in 1.6% and in 4% hexamine buffered formaldehyde and in both cases the percentage of shrinkage was low after some days. The shrinkage was 5 times greater in early stages than in advanced forms (Table 5, Fig. 5).