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Jumalon, N. A.

Aquaculture Department, Southeast Asian Fisheries Development Center

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Selection and application of a suitable sampling method for quantitative and qualitative evaluation of lab-lab

N. A. Jumalon

Milkfish and prawn nursery pond operation in the Philippines is often associated with lab-lab culture. 'Lab-lab' is a biological complex of blue-green algae, diatoms, bacteria and various animals which form a mat at the bottom of nursery ponds or floating patches along the margins of ponds (Rabanal, 1966). This complex is considered the most favorable food of milkfish in brackishwater ponds as evidenced by its wide acceptance among fish culturists in the country.

Variations in the quantity and quality of lab-lab between and within areas of a 1,000 sq. m. pond was determined over two culture periods (six-month duration) and the applicability and suitability of stratified random sampling as a method of sampling lab-lab was evaluated. Division of the pond into areas was based on soil differences. A sampler that enables quantitative collection of both floating and attached lab-lab was devised to help solve lab-lab sampling problem. This sampler consists of a removable net frame to trap floating lab-lab coming from a buried PVC pipe which contains the soil that serves as substrate for lab-lab growth (Figure 1).

Ash-free dry weight (Schneider and Flatt, 1975), count of organisms, plant pigment concentration (Lorenzen, 1967) and caloric content (Crisp, 1971) were used as measures of lab-lab quantity while ash (Schneider and Flatt, 1975), protein (Lovell, 1974, unpublished), lipid (Bligh and Dyer, 1959) and cellulose (Lovell, 1974, unpublished) contents were used as measures of lab-lab quality. The different methods of analysis involved were compared to determine the most suitable method for evaluating lab-lab.

Soil differences between strata did not always affect the quantity or quality of lab-lab, so that pond stratification is not considered necessary when sampling lab-lab except perhaps when differences are extremely great. It is believed that proper pond management may compensate for some differences in the sediment within one pond. Accumulation of floating lab-lab on one side of the pond as an effect of the wind may cause complications in sampling lab-lab. Removal of these accumulated lab-lab is found advantageous for easier and more accurate sampling.

Marked differences in quantity and quality are observed between floating and attached lab-lab. Table 1 gives the range and means of the different measures for lab-lab quantity and quality obtained in a two-month period with weekly sampling frequency.

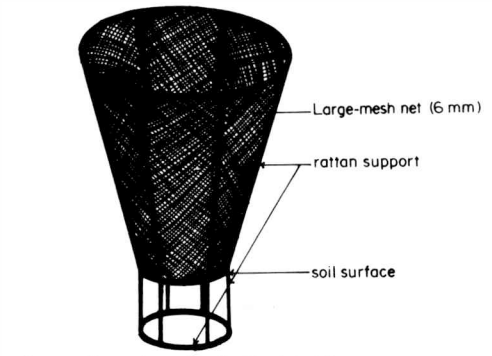
Floating lab-lab shows a much lower degree of degradation, which seems to be associated with its lower ash content, than attached lab-lab. Also attributed to the lower ash content of floating lab-lab are its significantly higher number of organisms, chlorophyll a concentration, caloric content, protein and cellulose content compared to those of attached lab-lab. Marked differences in lipid content is not observed among samples possibly because lipid constitutes only a very minor fraction of the biochemical component of lab-lab.

Number of organisms in lab-lab is significantly correlated to biomass when there is dominance by macroorganisms but shows no correlation when the smaller meio- and microorganisms dominate. The plant component of lab-lab is made up only of filamentous blue-green algae and diatoms, with the former group dominating, while the animal component which forms a much smaller fraction of the total count is composed of several groups, including nematodes, copepods, annelids, rotifers, coelenterates, protozoans and others.

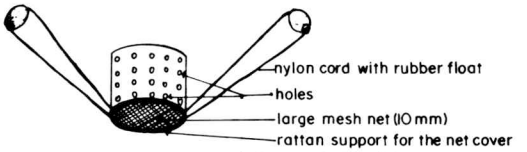
Chlorophyll a and pheopigment showed no definite correlation with other quantitative measures of lab-lab probably because of their small quantity, especially in blue-green algae which are the predominant components of lab-lab. This algal group contains several other pigments with a masking effect on the chlorophyll, particularly the biliproteins (phycoerythrins and phycocyanins) which often represent 1-10 percent of the algal cell dry weight and are the principal pigments of the photosynthetic lamellar system (Chapman, 1973).

Ash content of lab-lab is generally high compared to that of many fish feeds which is usually below 20 percent when converted to a moisture-free basis (Ling, 1966) due to incorporation of inorganic matter/sediments into the lab-lab mats and also because of the predominance of blue-green algae and diatoms. The high ash values suggest that milkfish and other species of fish feeding chiefly on lab-lab must have some mechanism that enables them to subsist on high ash food.

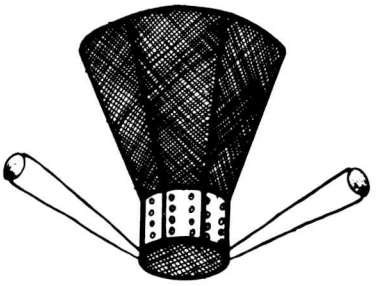
Of the four methods used to quantify lab-lab, ash-free dry weight analysis is found to be the most suitable in terms of efficiency, consistency of results and applicability. For qualitative evaluation of lab-lab, on the other hand, ash analysis and protein analysis appear to be the most suitable methods.



a. Removable net frame for floating lab-lab
(height: 65 cm from soil surface,
inside diameter of topmost portion: 62 cm)



b. Burried bottom collector (PVC pipe) for attached lab-lab
(inside diameter: 25.32 cm, height: 12.70 cm)



c. General view of the lab-lab sampler

Figure 1. The Lab-lab Sampler.

Table 1. Range and means of the different measures for lab-lab quantity and quality.
(All values are expressed on a moisture-free basis.)

	Range		Mean	
	Floating lab-lab	Attached lab-lab	Floating lab-lab	Attached lab-lab
Ash-free dry weight	32.94 – 70.41%	18.52 – 26.75%	47.18%	23.37%
Number of organisms				
Plants	3,882,192 – 18,722,090/g	1,471,955 – 7,687,658/g	10,289,996/g	3,753,016/g
Animals	233,466 – 1,067,845/	149,681 – 1,001,247/g	578,663/g	349,793/g
Plant pigment concentration				
Chlorophyll a	0.14 – 0.94 mg/g	0.09 – 0.47 mg/g	0.38 mg/g	0.19 mg/g
Pheopigment	0.003 – 0.37 mg/g	0.09 – 0.39 mg/g	0.11 mg/g	0.26 mg/g
Gross energy	1.18 – 3.22 kcal/g	0.71 – 1.18 kcal/g	2.07 kcal/g	1.00 kcal/g
Ash	32.44 – 75.10%	75.96 – 85.38%	56.98%	79.54%
Crude protein	6.70 – 28.48%	3.38 – 7.71.%	14.98%	5.99%
Lipid	0.75 – 2.42%	0.74 – 1.63%	1.52%	1.20%
Cellulose	6.13 – 15.24%	0.94 – 8.33%	9.18%	4.35%

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