FISHERIES RESOURCES RESEARCH INSTITUTE

NATIONAL AGRICULTURAL RESEARCH ORGANISATION

WORKSHOP REPORT

ON

THE FISHERIES RESEARCH ON LAKE NABISOJJO – LUWERO DISTRICT

LUWERO COUNCIL HALL: 14 December, 2000

DECEMBER, 2000

ANNEX 3: PAPERS PRESENTED

A3.1 THE FISHERY POTENTIAL OF THE MINOR LAKE (NABISOJJO) – LUWERO DISTRICT

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Introduction

Luwero district before the creation of Nakasongola District had a share of south-western portion of Lake Kyoga. After loosing the portion of the lake, they want to resort to the minor lake (Nabisojjo) for supply of fish at least to the population around this lake. The plans are to start commercial fishing. The lake is 45 km from Luwero town adjacent to the road going to Ngoma town. River Nabisojjo, a tributary of R. Mayanja flows through the lake on its way to R.Kafu.

In August 2000 there was one fishing canoe using one old gillnet of 3" mesh size. The fishing was for subsistence. It was reported that the presence of the lake was noted as early as 1950s but there has been no study conducted to establish the status of the fishery. The local authorities reported that 18,000 Tilapia fry from Lake Kyoga were stocked in the lake in May 1999 and expected the first harvest in June 2000.
The main objective of the scientific field study on L.Nabisojjo was therefore to generate information on the status of the lake fishery and recommend to the local authorities the next line of action.

Methodology

Two fleets of gillnets of 1 – 8" were used to sample the fish population of the lake. 1" – 5.5" mesh size nets were at 0.5' intervals and 6'-8" at 1" interval. One fleet was set along the shoreline and a second fleet set offshore during the night. Day catches were very poor and will not be discussed in the results. The fish catches were sorted according to the mesh size and location of setting. Fish were identified, sexed assigned gonadal state and biometric measurements were taken. Where possible stomach contents were identified in the field and for the tilapiines the contents were preserved in 5% formalin for subsequent analysis in the laboratory.

Results

Fish species identified in the gillnet fishery.

8 species were identified namely: *Astatotilapia nubila, Gnathonemus vitoriae, Oreochromis niloticus, Oreochromis leucostictus, Oreochromis esculentus, Protopterus aethiopicus, Clarias gariepinus* and *Barbus casterni.*

Fish species composition, abundance and distribution in the gillnet fishery.

The most dominant fish species was *O.esculentus* contributing 60.6% of the total weight of the catch in the offshore waters (Table1a) and 19.8% along the shore line (Table 1b) based on total fresh weight of all the species caught.
The species was caught more efficiently in the 3" mesh size gillnets both offshore (92.4%) and along the shoreline (45.8%). The second in importance was *C.gariepinus* (29.6%) over all contribution off shore and 31.9% along the shoreline.
G.victoriae was abundant (22% over all) along the shore line, mainly in 2" mesh size nets (Table 1b) and catches offshore were very low(2%) over all contribution in experimental catches.

Table 1 a and Table 1b summarises the distribution of different fish species in the various gillnet mesh size nets along the shoreline and offshore in the gillnet fishery.
The highest mean catch rate of 10.550kg per net per night was recorded in the 3" mesh size nets offshore as a result of high catches of *O.esculentus* (92.4%) of the catch. Along the shoreline, the highest catch rates of 3.6kg per net per night and 3.5 kg per net per night were contributed by mainly *G.victoriae* in the 2.5"mesh size (88.1% by weight) and *O.esculentus* in the 3" mesh size nets (45.8%) of the catch respectively.
The major gillnet fishery was therefore *O.esculentus* offshore. All the species caught seem to be indigenous with the exception of *O.niloticus* and *O.leucostictus*, which probably could have been the ones introduced from L.Kyoga. Only one *O.niloticus* was caught and had a total length of 36 cm and weighed 975 g. Eight *O.leucostictus* had an average weight of 200.6g and a size range of 16.7 - 28.6 cm TL.

Size structure of the major fish species

The size structure of *O.esculentus* in the gillnet fishery is shown in Figure 1. The fish had a size range of 6 – 27 cm TL with the mode at 20 – 21 cmTL.

Clarias gariepinus size range was 30 – 99 m TL with a mode at 40 - 44 cm TL(Fig.2)
Though *G.victoriae* appeared abundant in the 2" mesh size nets along the shore line, it is a small fish and exploitation will interfere with the juveniles of important fish species. The species from the 1.5 – 2" gill net mesh size nets were all mature.

Size at first maturity for *O.esculentus*

The size at first maturity for *O.esculentus* was determined as 19 cm TL for combined sexes and all fish were mature at 22cm TL and sex ratio was 2:1(males: females).

Gillnet selectivity of *O.esculentus*

The selectivity of gillnets on *O.esculentus* is shown in Figure 3. The 3" mesh size nets harvested mature fish. This mesh size can therefore be used to harvest the fish offshore with little interference on other species.

Food and feeding

A total of 84 *O. esculentus* stomachs examined, detritus material was the most important food item (79.2%), followed by algae Nitzchia, (8.7%), *Cyclotella* (8.5%), *Aulacosire* (1.5%) and *Anabaena* (1%). *C. gariepinnus* fed on termites and fish especially *O. esculentus* and haplochromines.

Sex ratio

The sex ratio of *O. esculentus* (males: female) was 1:0.7 based on 421 fish examined.

Fecundity

From the 29 mature *O. esculentus* specimen ranging from 21.8 – 24.3 cm total length the egg count ranged from 317 to 562 with a mean of 429 eggs. The bigger the fish the more the eggs that were counted.

Predators and other big animals in the lake

The communities reported the presence of Otters, which are predators in the lake though they were not seen physically. They also reported the presence of Hippopotami whose population was not known.

Discussion

The lake fishery is viable when exploitation of the dominant *O. esculentus* is carried out using gill net mesh size fished passively and not below 3" and a few boats preferably 4 and not more than four gill nets per canoe for the beginning. Since the *O. esculentus* is mainly dominant offshore (>30m from shoreline) the fishing should be restricted offshore. The fishing activity could be followed to observe the changes in catch per unit of effort with time and recommend appropriately. There is potential for a recreative hook fishery for *P. aethiopicus* (Mamba) and *C. gariepinus* (Male).

The stocked fish from L. Kyoga which, probably composed of *O. niloticus* and *O. leucostictus* did not do well probably because the lake already had enough fish. It has been noted (Welcomme, 1998) that when fish are stocked into populations where natural reproduction occurs, the dynamics of the process becomes uncertain. Impacts could be anticipated particularly on density dependant factors such as feeding and population density where mortality would increase due to addition of excess elements to the stock.

Natural reproduction may also be inhibited where the fish used for stocking are drawn from a strain not adapted to the recipient water body. Such problem could have led to present low catches of the introduced species from Lake Kyoga.

Tentative conclusion

- There is a potential fishery on the lake
- The size of mature *O. esculentus* is normal as has been noted for some of the other minor lakes in Uganda (Nagayi, 2000)
- L. Nabisojjo has *O. esculentus* as the dominant fish species which can be exploited using a minimum gillnet of 3" mesh size offshore.
- The hook fishery for *C.gariepinus* and *P. aethiopicus* could be explored.

Tentative recommendations

- Exploit *O.esculentus* offshore using a minimum gill net of 3' mesh size nets.
- Exploit of *P. aethiopicus* and *C. gariepinus* using size 9 hooks as minimum.
- Start exploitation of the fishery with low fishing effort and increase gradually as catch per unit effort CPUE is being monitored.
- Continue monitoring the changes in the fishery.

Reference:

Welcome R.L and D.M.Bartley 1998. An evaluation of present techniques for the Enhancement of fisheries: Inland fishery enhancement *Vol.374: 1 – 37*

Nagayi J, 2000. The population characteristics of *Oreochromis esculentus* in the Victoria and Kyoga lake basins MSc thesis, 2000.

Table 1(a). Fish species composition, abundance and distribution by weight (g) in offshore experimental gillnet mesh size nets of 1" – 8" on Lake Nabisojjo (August 2000). The figures in brackets indicate percentage contribution by weight of individual fish species to the total weight of fish caught in each gillnet mesh size of net.

	Mesh size (inches)														
Taxa	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	7	8	Total (g)	Overall % in catch
A.nubila	52 (8.0)	20 (1.8)												72	01
G.victoriae			900 (17.9)	220 (3.2)										1120	2.0
O.leucostictus					700 (3.3)		750 (77.3)							1450	2.5
O.esculentus	574 (88.2)	930 (82.3)	5025 (84.4)	5950 (86.7)	19500 (92.4)	2680 (42.5)	220 (22.7)							34879	60.6
O.niloticus														0	0.0
P.aethiopicus				450 (6.6)		2500 (39.7)								2950	5.1
C.gariepinus		180 (15.9)		245 (3.6)	900 (4.3)	1125 (17.8)			400 (100)			6000 (100.0)	6500 (100.0)	17050	29.6
B.casterni	25 (3.8)													25	0.04
Total(g)	651	1130	5925	6865	21100	6305	970		2100			6000	6500	57546	
Mean catch(g) per net per night	325.5	565.0	2962.5	3432.5	10550.0	3152.5	485.5		1050.0			3000.0	3250.0		

Table 1(b). Fish species composition, abundance and distribution by weight(g) at the shoreline in experimental gillnet mesh size nets of 1"-8 on lake Nabisojjo (August 2000). The figures in brackets indicate percentage contribution by weight of individual fish species to the total weight of fish caught in each gillnet mesh size of net.

	Mesh sizes (inches)														
Taxa	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	7	8	Total (g)	Overall % in catch
A.nubila	240 (90.9)	606 (79.1)	25 (0.3)											871	2.9
G.victoriae		65 (8.5)	6360 (88.1)	230 (10.2)										6655	22.0
O.leucostictus				75 (3.3)	200 (2.8)									275	0.9
O.esculentus	24 (9.1)	88 (11.5)	165 (2.3)	555 (24.7)	3240 (45.8)	1930 (35.0)								6002	19.8
O.niloticus											975 (100.0)			975	3.2
P.aethiopicus			370 (5.1)	579 (25.5)	2655 (37.5)	2250 (40.8)								5854	19.3
C.gariepinus			300 (4.2)	810 (36.0)	985 (13.9)	1330 (24.1)	1100 (100.0)	1140 (100.0)		4000 (100.0)				9665	31.9
B.casterni		7 (0.9)												7	0.02
Total (g)	264	766	7220	2249	7080	5510	1100	1140		4000	975			30304	
Mean catch (g) per net per night	132.0	383.0	3610.0	1124.5	3540.0	2755.0	550.0	570.0		2000.0	487.5				

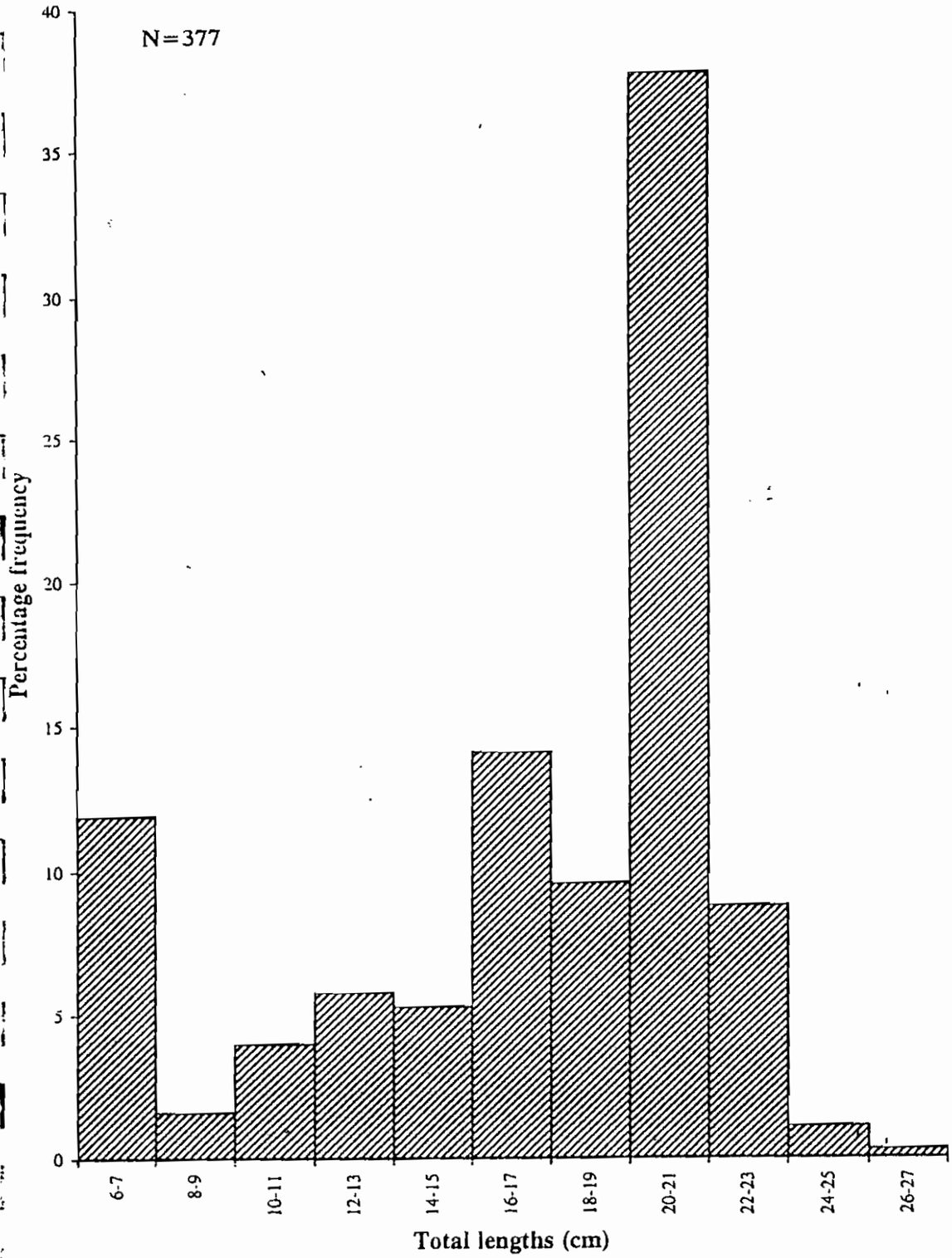
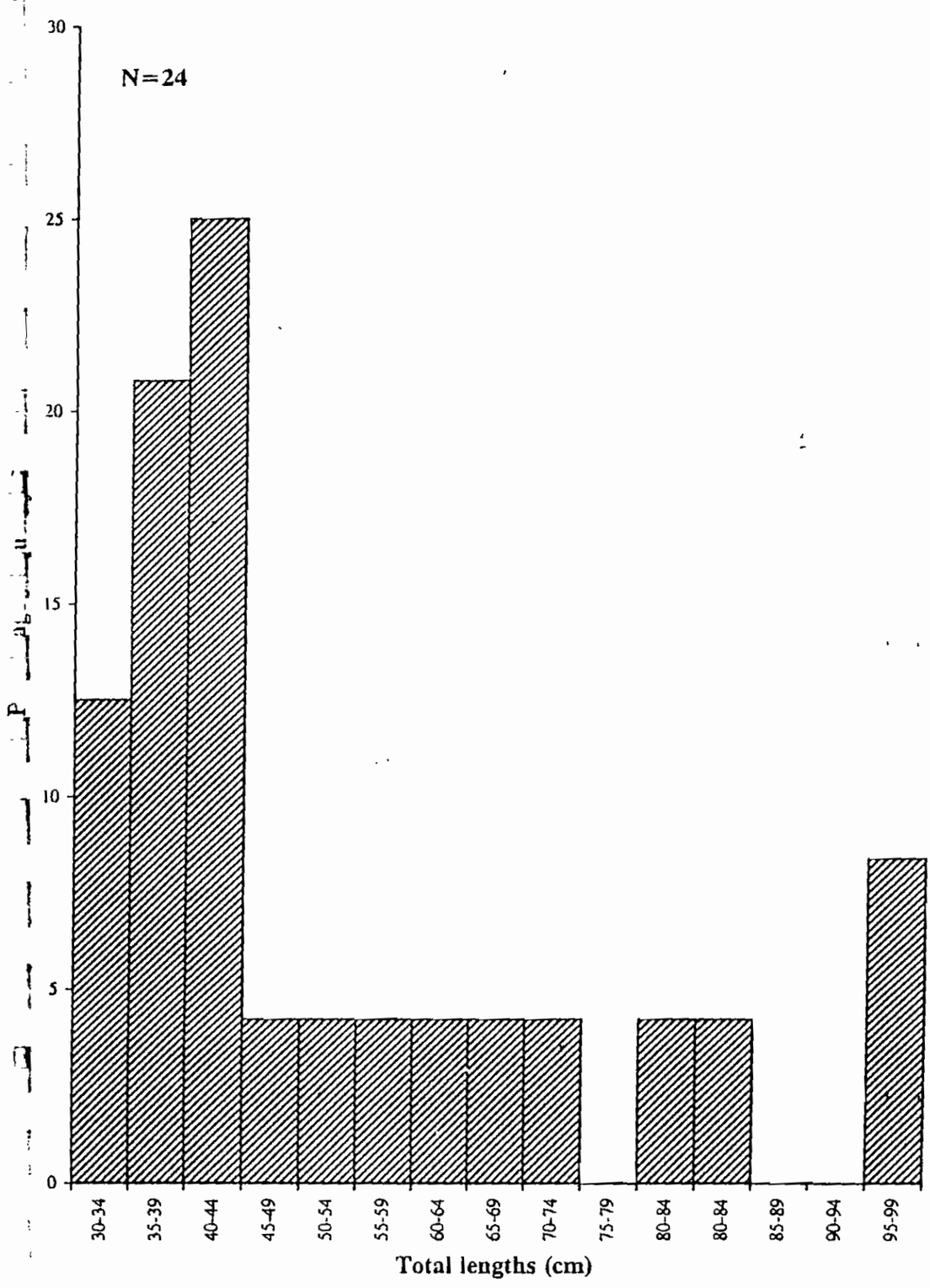
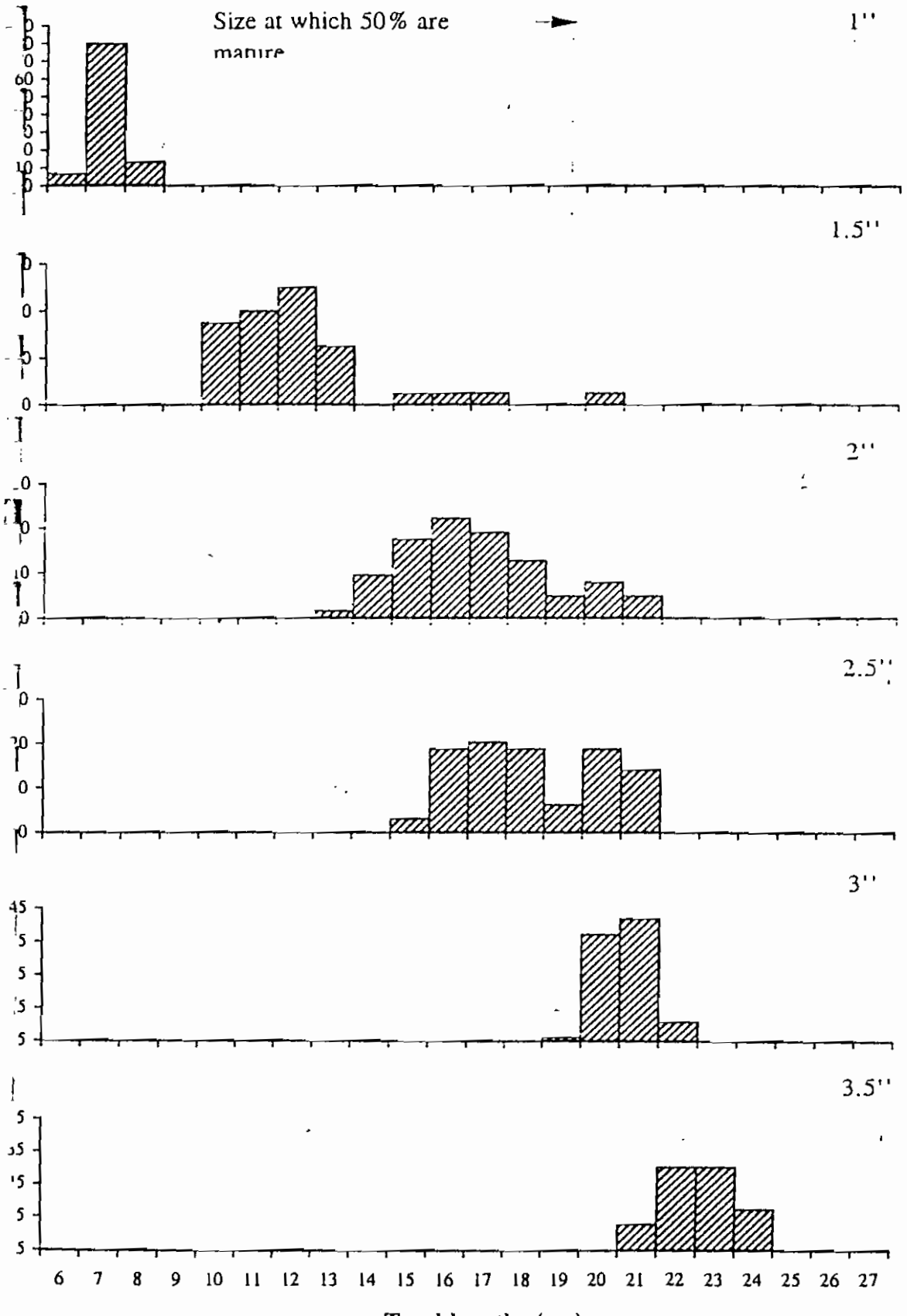


Fig. 1 Size distribution of *Oreochromis esculentus* in the gill net fishery on Lake Nabisojjo (August 2000) -2 cm intervals.



ig 2. Size distribution of *Clarias gariepinus* in the gill net fishery on Lake Nabisojjo August 2000) -2 cm intervals.



. . Gill net Selectivity of *Oreochromis esculentus* from Lake Nabisojjo (August
00). intervals.