# RECENT TRENDS IN THE FISHERIES OF THE NORTHERN PORTION OF LAKE VICTORIA (UGANDA)

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## ABSTRACT

A study on the fish stocks and feeding habits of *Lates niloticus* in the northern portion of Lake Victoria (Uganda) was conducted during the period 1981 to 1985. A general decline in catch rates and total landings was observed. This was due to, among other factors, overfishing, use of beach seines and smaller mesh gill nets and predation on some of the species by *L. niloticus*. The most notable changes during the period were a sharp decline of the haplochromines and an increase of *Rastrineobola argentea* in commercial landings and a change in the feeding habits of *L. niloticus* from haplochromines to *Caridina* and juvenile *L. niloticus*. There was also a decline in average weight of *L. niloticus* in both trawl catches and commercial landings.

The objective of introducing *L. niloticus* into L. Victoria has, therefore, so far been achieved: the haplochromines have drastically been reduced while the fleshy *L. niloticus* has increased. Recommendations on management strategies are proposed.

## INTRODUCTION

Research findings during the 1950s indicated that the fish stocks of Lake Victoria had been and were evidently and drastically declining (BEAUCHAMP, 1955; GARROD 1961). This was due to overfishing. Around the same time *Lates niloticus* (Nile perch) got its way into Lake Victoria firstly by accident, having been stocked in a dam in Luwala near Nyenga and secondly by purposely being introduced in the early 1960s in Entebbe and then the Kenya waters. The purpose of the introduction was to increase fish production and to convert the then trash haplochromines into more palatable flesh.

During 1968-71 a lake wide survey was conducted on Lake Victoria and this revealed that at least 80% of the fish stocks by weight was contributed by the haplochromines and *L. niloticus* contributed less than 1% (BERGSTRAND and CORDONE, 1971; KUDHONGANIA and CORDONE. 1974). Since this survey, research work to study the fish stocks of the lake has been going on especially in the Kenya and Tanzania waters. An attempt in 1981 to survey the whole of the Uganda part of the lake was not possible, thus the limitation of the study to the northern part (Fig. 1).

The objective of this study was to monitor any changes in the fish stocks since the KUDHONGANIA and CORDONE (1974) report, and to assess the progress of the introduced *L. niloticus*. In particular, the objective was to study (a) the species composition and distribution, (b) the relative abundance of the fish stocks, (c) changes (if any) in the size of fish exploited and (d) other food of *L. niloticus*. The study in the northern part of Lake Victoria (Uganda started in 1981 and part of the study has already been reported (OKARONON, *et al*, 1984).

## MATERIALS AND METHODS

Data was obtained from trawl catches using the research vessel IBIS and commercial landing records from Masese Fish Landing. Specifications of the research vessel and trawl nets used during the study remain as reported by OKARONON, *et al* (1984).

The codend used during the study was of 19 mm mesh and trawling was done (at least once a week) along the same transects during daylight hours. A maximum of five hauls of approximately one hour duration each were made in a day.

The data processed is based on fresh weight. The commercial data from Masese was for both fresh and processed fish. The processed fish weight was, therefore, converted to fresh weight. Most of the fish landed at Masese comes from the areas covered by this study. Commercial landing records from some other landings on L. Victoria (Uganda) were analysed for trends and these are shown in Appendix A.

## RESULTS

### Species Composition

The fish species encountered in the trawl catches and commercial landings during the period 1981 to 1985 are shown in Table 1. In the trawl catches, the decline of the haplochromine species and the increase of *Lates niloticus* were the major notable changes. The haplochromines drastically declined from 91% to 2.1% while on the contrary *L. niloticus* drastically increased from 0.9% to 95.7% of the total catch by weight from 1981 to 1985, respectively.

A similar trend was observed in commercial landings. the haplochromine species declined from 96% in 1981 to 0.4% by 1984. *L. niloticus* increased from 0.4% in 1981 to 62.7% in 1983 before beginning to decline in favour of *Rastrineobola argentea* whose landings rose from 0.5 in 1981 to 72% in 1985. However, by 1985 commercial landings of *L. niloticus* and *Oreochromis* species were about the same, namely 13% and 11.8% of the total catch by weight, respectively. The trend followed by the four major groups of fish, namely the haplochromine species, *Oreochromis* species, *L. niloticus* and *R. argentea*, is shown in Figure 2.

### Species Distribution

Table 2 shows the percentage of frequency of occurrence of the fish species recorded in the trawl catches in the study area during 1981 to 1985. All these species were represented in Lingira Bay in 1981 to 1983. The haplochromine species occurred in all the hauls while *L. niloticus* registered 100 occurrence during 1984-1985 period. *Labeo victorianus*, *Mastacembelus frenatus*, *Astatoreochromis* species, *Oreochromis esculentus* and *O. leucostictus* were very rarely caught. The occurrence of *Oreochromis* species excepting *O. niloticus edualrdianus* in the study area was drastically reduced during 1984 to 1985.

### Relative Abundance of Fish Stocks

The mean catch rates for the various fish species in the trawl catches (in 743 hauls in 803 hours) and commercial landings in the northern part of Lake Victoria, during the period 1981 to 1985 are presented in Table 3. the trend followed by the four major fish groups, namely haplochromine species, *Oreochromis* species *L. niloticus* and *R. argentea* is shown in Figure 3.

In the trawl, the catch for all species declined 3 times from 574.8kg/hr in 1981 to 193.6 kg/hr in 1985. The haplochromines and *Oreochromis* species declined 131 and 20.8 times from 523 and 22.9 kg/hr in 1981 to 4.0 and 3.3 kg/hr in 1985, respectively. On the contrary, *L. niloticus* recorded a 40 fold increase from 5.3 kg/hr in 1981 to 1985.3 kg/hr in 1985. *Bagrus docmac*, *Mormyrus kannume* and *Barbus altianalis* showed an upward trend up to 1983 then declined while the catch rates of *Clarias mossambicus*, *Protopterus aethiopicus* and *Synodontis* species dropped during the period.

More or less similar trends were indicated in the commercial landings where catch rates for all species declined 115.4 times from 5147.3 metric tons/month in 1981 to 35.6 tons/month in 1983 before registering a gradual increase to 71.7 tons/month in 1985. The haplochromine species, *C. mossambicus* and *P. aethiopicus* catch rates went down 1055, 3.6 and 18 times from 527.5, 1.1 and 1.8 tons/month to 0.5, 0.3 and 0.1 tons/month during the study period, respectively. *Oreochromis* species, *B. docmac* and *M. kannume* fluctuated around 10, 0.2 and 0.2 tons/month, respectively. However, *L. niloticus* increased 12.9 times from 2.2 tons/month in 1981 to 28.2 tons/month in 1985 before it declined to 9.1

tons/month in 1985 in favour of *R. argentea* whose landings increased about 20 times from 2.6 tons/month in 1981 to 51.7 tons/month in 1985.

### Size of Fish

The average weight of fish from the trawl catches and commercial landings is presented in Table 4. In the trawl catches, *L. niloticus* showed a general decline in average weight from about 5 kg in 1981 to 1.3 kg in 1985, especially in Lingira Bay where the average weight declined from 4.6 kg in 1981 to 0.5 kg by 1984. There was no significant change in the average weight for other species during the period.

In the commercial landings there was a general decline in average weight of *C. mossambicus*, *P. aethiopicus*, *L. niloticus* and *B. altianalis* from about 6, 9,8 and 3 kg to 2.6, 6.6, 1.6 and 0.9 kg, respectively, during the period of study, while the average weight of the other species remained relatively the same.

### The Food of *Lates niloticus*

The abrupt increase of *L. niloticus* corresponding to the decline of haplochromine species necessitated the analysis of the food items consumed by *Lates*. The frequency of occurrence of the different food items found in the stomachs of *L. niloticus* are shown in Table 5. the major food items found in the stomachs during the period included haplochromine species, *R.argentea*, *Xenoclarias* species, *Caridina* species and juvenile *L. niloticus*. In 1981/82 (though not included in table) almost all stomach contents of *L. niloticus* analysed consisted of haplochromine species as a major food item and *R. argentea* also occurred in relatively high frequencies. Both these two groups of fish prey have since declined in frequency of occurrence while *Caridina* species and juvenile *L. niloticus* were recorded in relatively higher frequencies in 1985. A relatively large proportion of the stomachs examined in 1985 contained exclusively *Caridina* species.

## DISCUSSION

The most notable changes in the fisheries of the northern portion of Lake Victoria (Uganda) during the period 1981-85, have been the sharp decline of the haplochromines and an abrupt increase of *L. niloticus* in both the trawl catches and commercial landings, and an increase of *R. argentea* in commercial landings. There was also a decline in the catch rates for all fish species combined in both the trawl catches and commercial landings.

During the 1968-1971 lake wide survey, at least 80% of the ichthyomass for the whole Lake Victoria was composed of haplochromines (KUDHONGANIA and CORDONE, 19784). In the northern part of L. Victoria (Uganda), the composition of the haplochromines declined from 91.1 and 96.4% in 1981 to 2.1% and NIL in 1985 in the trawl catches and commercial landings, respectively. Similarly, catch rates of haplochromines which stood at 797 kg/hr and 527.5 tons/month in 1981 declined to 4 kg/hr and NIL in 1985 in the trawl catches and commercial landings, respectively. This drastic decline of the haplochromines in the area of study could be due to overfishing coupled with predation by *L. niloticus*. During this period, the area was heavily fished by the research vessel IBIS and almost all stomachs of *L. niloticus* examined contained the haplochromines as a major food item, especially so in 1981/82. The decline of haplochromines due to heavy predation by *L. niloticus* has also been reported in both the Kenya waters (OGARI, 1984) and the Tanzania waters (GOUDSWAARD and WITTE, 1984; KATUNZI, 1984) of L. Victoria.

In the commercial landings, the contribution of *R. argentea* rose from 0.5% in 1981 to 72.1% in 1985. This rise was, however, very drastic between 1983 and 1985 when it increased from 11.9% in 1984 to 72.1% in 1985. This increase of *R. argentea* in commercial landings, is most probably due to changes in fishing habits of the fishermen in the area. It is most likely that the fishermen previously engaged in the haplochromine fishery had to turn to *R. argentea* when the haplochromine catches had declined to non-profitable levels. This change could have started early in 1983 during which year the haplochromines composed only 1.4% of the commercial landings.

The contribution of *L. niloticus* to the Lake Victoria fishery increased from less than 1% in both the trawl catches and commercial landings in 1981 to 95.7% in 1985 and 62.7% in 1983 in the trawl catches and commercial landings, respectively. This increase is due to a combination of low fishing pressure for the species in the early years and abundance of haplochromines as prey in those early years. It is also probably because the species has firmly established itself in the area. Presently the fishing pressure on *L. niloticus* seems to be on the increase and the species has started feeding on itself. With cannibalism setting in, we expect *L. niloticus* will be self regulating.

The above trends in the Lake Victoria fishery in particular reference to the haplochromines and *L. niloticus* were not confined to the area of study. Similar situations were obtaining for commercial catches landed in Kasenyi, Kigungu, Katosi and Kiyindi fish landings on Lake Victoria (Uganda). During the period the contribution of *L. niloticus* in the commercial catches landed in these fish landings rose from less than 1% in 1981 to 89.5% in 1985 (Appendix A).

Other species of fish in the study area disappeared or declined. This maybe due to localised overfishing especially so for *Oreochromis* species whose distribution is so restricted (by habitat and depth) that once overfished migration from other areas may not be possible to replenish the stocks.

Another notable observation was the decline in the average weight of *L. niloticus* in both the trawl catches and commercial landings. The average weight of the species dropped from about 5 kg in 1981 to less than 2 kg in 1985 in both the trawl catches due to increased numbers of smaller sizes observed during 1984/85 period. In the commercial landings this decline may be due to increased exploitation of this small-size group by the beach seine and commercial gear meant for *Oreochromis* species.

The feeding habits of *L. niloticus* underwent a change during the period. The decline in the frequency of occurrence of haplochromines in the stomachs of *L. niloticus* was definitely due to the reduction in the relative abundance of the haplochromine species. *L. niloticus* was forced to look for alternative food sources thus the increase in the frequency of occurrence of *Caridina* species and juvenile *L. niloticus*.

From the management point of view, the introduction of *L. niloticus* into L. Victoria was to increase fish production and to feed on and convert the then trash haplochromine species into more palatable flesh. So far this objective has been achieved: the haplochromine species have been depleted and the relatively fleshy *L. niloticus* has increased. However, the decline of the haplochromines from 523 kg/hr in 1981 to 4 kg/hr in 1985 greatly contributing to the decline in catch rates for all species combined from 574.8g kg/hr in 1981 to 193.6 kg/hr in 1985 (a drop of about 66%) is not compensated for by the increase of *L. niloticus* catches from 5.3 kg/hr in 1981 to 1985.3 kg/hr in 1985.

Although for the time being a strong increase of *L. niloticus* seems a favourable development, the final consequences may be serious for fish production of the lake. WITTE and GOUDSWAARD (1984) observed that adding one step to a food chain generally causes an energy loss of 80% and that in L. Victoria a large number of haplochromines are primary consumers (detritus and phytoplankton). When these (detritus and phytoplankton) feeders are depleted a major part of the energy input in the lake may be cut off for fish production. The same holds for food sources such as molluscs, that are fed on by specialised haplochromines. These effects, they observed, may finally result in a strong decrease of the total yield of the lake. These observations may be obtaining in the northern part of L. Victoria (Uganda) where *Lates niloticus* was introduced to feed on the haplochromines and so the haplochromines are now almost depleted.

## RECOMMENDATIONS

1. The use of seine nets should be restricted (if not banned) to larger meshed (127 mm and above) nets to avoid catching the now abundant juvenile *L. niloticus* and to allow other species to recover.

These larger meshed seines if operated along the beaches and in bays may, however, disturb breeding and nursery grounds for most of the species.

2. There should be selective fishing for large sizes of *L. niloticus* to reduce the predation pressure on other species. According to OGUTU-OHWAYO (1984) the Nile perch of greater than 80 cm standard length in L. Kyoga have the greatest impact on predation, especially on *O. niloticus* and that gill nets more than 203.3 mm (8 inch) mesh predominantly catch Nile perch. Observations made in L. Tanganyika (COULTER, 1976) showed that the abundance of prey can be increased following intensive exploitation of the predator and similarly, in Lake Victoria, MARTEN (1979) observed that fish catches can be improved by reducing the populations of the predator through fishing.

3. Increased catches of *L. niloticus* will require immediate markets for the fresh fish proper processing and storage facilities pending marketing. This increased catches may also call for feasibility studies in the utilization of the fisheries resources other than for direct human consumption.

4. The number of canoes licensed to operate in given fishing grounds should be limited and adhered to. The number of nets per canoe should also be limited to a set ceiling but the effect of this restriction will depend on the fishing method. For example having ten nets per canoe where fishing is by beating the water to drive the fish into stationary nets may certainly be more destructive than having 30-50 set nets per canoe.

5. A lake wide survey to cover the Uganda waters (if not the whole lake) should be carried out soon to ascertain the exact status of fish stocks of the lake and studies to monitor any changes thereafter should continue.

6. Data collection by the Fisheries Department field staff should be standardized nationally. It is common practice that on various landings on L. Victoria, records of numbers without weights and vice versa are taken. Other officers inconsistently take records of samples of fish landed for non-randomly selected days of the week/month. Gear specifications are often omitted in these records.

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**APPENDIX A : Percentage species composition (by weight) of various fish species landed at some of the major landings on Lake Victoria (Uganda)**

| | KASENYI | | | KIGUNGU | | | KATOSI | | KIYINDI | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1984 | 1985 | 1980 | 1984 | 1985 | 1980 | 1984 | 1980 | 1984 |
| *Haplochromis* species | 3.4 | 0.4 | | 0.3 | 3.6 | | | | 0.1 | |
| *Oreochromis esculentus* | | | | 29.1 | | | | | | |
| *O. variabilis* | 0.6 | 1.1 | 0.3 | 7.8 | 6.5 | 1 | 5.8 | 0.4 | 1.7 | 2.4 |
| *O. niloticus eduardianus* | 0.7 | 0.9 | 1 | 3.5 | 6.3 | 4.4 | 3.7 | | 3.3 | 7.7 |
| *Tilapia zilli* | | | | | | | | | 0.4 | 0 |
| *Bagrus docmac* | 45.3 | 54.5 | 45.1 | 43.5 | 37.6 | 4.2 | 72.8 | 72.3 | 31.5 | 20.3 |
| *Clarias mossambicus* | 3.5 | 1.7 | 1.7 | 8.3 | 1.5 | 0.2 | 10.5 | 1.5 | 58.4 | 2.4 |
| *Lates niloticus* | 0.1 | 38.4 | 50.8 | 0.8 | 42.4 | 89.5 | 0.9 | 25.4 | 1.1 | 64.7 |
| *Mormyrus kannume* | 1.9 | 0.2 | 0.1 | 1.2 | 0.1 | | 0.6 | 0.1 | 0.2 | 0.5 |
| *Barbus altianalis* | 0.2 | 0.3 | 0.2 | 0.5 | 0.4 | 0.2 | 1 | 0.2 | 0.4 | 0.8 |
| *Synodontis species* | 42.7 | 2.5 | 0.7 | 0.3 | 0 | 0.4 | 1.5 | 0.1 | 2.8 | 1.5 |
| *Protopterus aethiopicus* | 1.6 | 0 | 0.1 | 4.8 | 1.7 | 0.3 | 3.2 | 0 | 0.4 | |
| *Labeo victorianus* | | | | | | | | | | |

**TABLE 1 : Percentage species composition (by weight) of various fish species in the trawl catches and commercial landings in the northern part of Lake Victoria, Uganda.**

| | TRAWL | | | | | COMMERCIAL | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1982 | 1983 | 1984 | 1985 | 1981 | 1982 | 1983 | 1984 | 1985 |
| *Haplochromis species* | 91.1 | 81 | 6.2 | 42.6 | 2.1 | 96.4 | 65.8 | 1.4 | 0.4 | |
| *Rastrineobola argentea* | | | | | | 0.5 | 3.3 | 9.1 | 11.9 | 72.1 |
| *Oreochromis esculentus* | 0 | 0 | 0 | | | 0 | 0 | 0.1 | | |
| *O. variabilis* | 1.8 | 0.5 | 0.3 | 0 | 0 | 0.6 | 1.1 | 1.6 | 3.1 | 1.3 |
| *O. niloticus eduardianus* | 2.1 | 1.8 | 1.4 | 0.7 | 0.6 | 1.5 | 5.5 | 14 | 21.7 | 10.4 |
| *O. leucostictus* | 0 | 0 | 0 | 0 | | 0 | 0.1 | 0.1 | 0.3 | 0.1 |
| *Tilapia zilli* | | | | | | 0 | 0.1 | 0.2 | 8.5 | 2.6 |
| *Bagrus docmac* | 0.7 | 2.3 | 3.2 | 1.7 | 1.2 | 0.2 | 0.6 | 0.7 | 0.4 | 0.4 |
| *Clarias mossambicus* | 2.6 | 2 | 1.2 | 0.8 | | 0.1 | 1 | 2 | 0.6 | 0.4 |
| *Protopterus aethiopicus* | 0.4 | 0.3 | 0.6 | 0.2 | 0.3 | 0.3 | 1.3 | 5.1 | 2.1 | 0.1 |
| *Lates niloticus* | 0.9 | 11.6 | 16.2 | 53.7 | 95.7 | 0.4 | 20.3 | 62.7 | 50.5 | 13 |
| *Synodontis victoriae* | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | | | | |
| *S. afrofischeri* | 0 | 0 | 0 | 0 | | | | | | |
| *Mormyrus kannume* | | | | | | 0 | 0.2 | 0.8 | 0.4 | 0.1 |
| *Barbus altianalis* | | | | | | 0 | 0.8 | 1.2 | 0.3 | 0.1 |
| *Xenoclarias species* | | | | | | | | | | |
| *Labeo victorianus* | 0 | 0.4 | 0.8 | 0.2 | 0 | | | | | |
| *Schilbe mystus* | | | | | | | | | | |
| *Barbus species* | | | | | | | | | | |
| *Astatoreochromis species* | | | | | | | | | | |
| *Mastacembelus frenatus* | | | | | | | | | | |

**TABLE 2 : Percentage frequency occurrance of fishes caught during trawling in the northern part of Lake Victoria, Uganda.**

| | LINGIRA BAY 3-12 m | | NAPOLEON GULF 6-24 m | | BUVUMA CHANNEL 10-27 m | |
|---|---|---|---|---|---|---|
| | 1981-1983 183 Hauls | 1984-1985 16 Hauls | 1981-1983 137 Hauls | 1984-1985 68 Hauls | 1981-1983 142 Hauls | 1984-1985 51 Hauls |
| *Haplochromis* species | 100 | 100 | 100 | 100 | 100 | 100 |
| *Rastrineobola argentea* | 12.6 | 43.8 | 41.1 | 58.8 | 6.5 | 19.6 |
| *Oreochromis esculentus* | 10.9 | - | 11.7 | 5.9 | 10.6 | - |
| *O. niloticus eduardianus* | 74.5 | 62.5 | 80.3 | 63.2 | 12 | - |
| *O. leucostictus* | 2.2 | - | - | - | - | 2 |
| *Tilapia zilli* | 22.3 | - | 6.6 | - | - | - |
| *Bagrus docmac* | 71.2 | 31.3 | 92.7 | 92.6 | 93 | 68.6 |
| *Clarias mossambicus* | 58.2 | - | 29.9 | 8.8 | 64.8 | 35.3 |
| *Xenoclarias* species | 15.3 | 6.3 | 1.5 | 1.5 | 16.9 | - |
| *Protopterus aethiopicus* | 32.6 | 100 | 13.1 | 5.9 | 12.7 | 3.9 |
| *Lates niloticus* | 68.5 | - | 78.1 | 100 | 72.5 | 100 |
| *Synodontis victoriae* | 22.8 | - | 2.9 | 35.5 | 45.1 | 19.6 |
| *S. afrofischeri* | 3.8 | - | 4.4 | 10.3 | 6.3 | 3.9 |
| *Mormyrus kannume* | 2.7 | - | 11 | 7.4 | 1.4 | - |
| *Barbus altianalis* | 11.4 | - | 81 | 25 | 4.2 | - |
| *Labeo victorianus* | 1.1 | - | - | 1.5 | 0.7 | - |
| *Schilbe mystus* | 2.2 | 12.5 | 7.3 | 29.4 | 7.3 | 7.8 |
| *Barbus* species | 3.4 | 37.5 | 5.7 | 48.5 | 1.1 | 3.9 |
| *Astatoreochromis* species | 0 | - | 0 | - | - | - |
| *Mastacembelus frenatus* | 0 | - | 0 | - | 0 | - |

**TABLE 3 : Mean catch rates for various fish species in the trawl catches and commercial landings in the northern part of Lake Victoria, Uganda.**

| | TRAWL CATCHES (kg/hr) | | | | | COMMERCIAL LANDINGS (tons/month) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | 1981 | 1982 | 1983 | 1984 | 1985 | 1981 | 1982 | 1983 | 1984 | 1985 |
| Hauls | 146 | 191 | 263 | 110 | 33 | | | | | |
| Hours | 165.8 | 223.4 | 269.5 | 113.3 | 32.3 | | | | | |
| *Haplochromis* species | 523 | 294.3 | 270.8 | 108.5 | 4 | 257.5 | 77.7 | 0.5 | 0.2 | |
| *Rastrineobola argentea* | | | | | | 2.6 | 3.9 | 3.2 | 6.7 | 51.7 |
| *Oreochromis esculentus* | 0.1 | 0 | 0 | | | 0 | 0 | 0 | | |
| *O. variabilis* | 10.4 | 2 | 1.1 | 0 | 0 | 3.5 | 1.3 | 0.6 | 1.8 | 0.9 |
| *O. niloticus eduardianus* | 12.3 | 6 | 5 | 1.8 | 1.1 | 8.1 | 6.5 | 5 | 12.1 | 7.5 |
| *O. leucostictus* | 0.1 | 0 | 0 | 0 | | 0.1 | 0.1 | 0 | 0.2 | 0.1 |
| *Tilapia zilli* | | | | | | 0.1 | 0.1 | 0.4 | 4.8 | 1.9 |
| *Bagrus docmac* | 4.2 | 8.4 | 11.2 | 4.2 | | 1 | 0.7 | 0.2 | 0.2 | 0.1 |
| *Clarias mossambicus* | 15 | 7.2 | 4.2 | 2.1 | 2.3 | 0.5 | 1.1 | 0.7 | 0.3 | 0.3 |
| *Protopterus aethiopicus* | 2.4 | 1.1 | 2.2 | 0.4 | 0.6 | 1.5 | 1.6 | 1.8 | 1.2 | 0.1 |
| *Lates niloticus* | 5.3 | 42.1 | 57.5 | 136.7 | 185.3 | 2.2 | 24.1 | 22.3 | 28.3 | 9.1 |
| *Synodontis victoriae* | 0.8 | 0.3 | 0.4 | 0.2 | 0.2 | | | | | |
| *S. afrofischeri* | 0 | 0 | 0 | 0 | 0 | | | | | |
| *Mormyrus kannume* | 0.2 | 1.4 | 2.8 | 0.5 | 0 | 0.1 | 0.2 | 0.3 | 0.2 | 0.1 |
| *Barbus altianalis* | | | | | | 0.1 | 0.9 | 0.4 | 0.1 | 0 |
| | 573.8 | 362.8 | 355.2 | 254.4 | 193.5 | 277.3 | 118.2 | 35.4 | 56.1 | 71.8 |

**TABLE 4 : The average weight (kg) of the various fish species from the trawl catches and commercial landings in the northern portion of Lake Victoria, Uganda.**

| | TRAWL | | | | | COMMERCIAL | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1981 | 1982 | 1983 | 1984 | 1985 | 1981 | 1982 | 1983 | 1984 | 1985 |
| *Oreochromis esculentus* | 0.4 | 0.3 | 0.4 | | | 0.4 | 0.3 | 0.4 | | |
| *O. variabilis* | 0.4 | 0.2 | 0.3 | 0.8 | 0.2 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 |
| *O. niloticus* | 0.7 | 0.6 | 0.8 | 0.9 | 1 | 1.2 | 1 | 1 | 1.4 | 1.4 |
| *O. leucostictus* | 0.2 | 0.1 | 0.1 | 0.1 | | 0.3 | 0.5 | 0.6 | 0.6 | 0.3 |
| *Tilapia zilli* | | | | | | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 |
| *Bagrus docmac* | 0.7 | 0.8 | 1 | 1 | 1 | 1 | 0.6 | 0.7 | 1.4 | 1.7 |
| *Clarias mossambicus* | 4.8 | 5 | 4.7 | 4.7 | | 5.4 | 5.9 | 3.8 | 3.7 | 2.6 |
| *Protopterus aethiopicus* | 5.3 | 5.2 | 6.5 | 7.6 | 7.8 | 9.2 | 7.8 | 8.6 | 8 | 6.6 |
| *Lates niloticus* | 4.3 | 5.3 | 5.1 | 2.3 | 1.3 | 4.8 | 8.4 | 4.5 | 5.3 | 1.6 |
| *Synodontis victoriae* | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | | | | | |
| *S. afrofischeri* | 0.1 | 0.1 | 0.1 | 0.1 | | | | | | |
| *Mormyrus kannume* | 0.1 | 0.4 | 0.4 | 0.4 | 0.1 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 |
| *Barbus altianalis* | | | | | | 2.3 | 3 | 3.6 | 1.5 | 0.9 |

**TABLE 5 : Percentage frequency of occurrence of food items in the stomachs of *Lates niloticus* caught in the trawl in the northern part of Lake Victoria, Uganda.**

| | 1983 178 stomachs | 1984 358 stomachs | 1985 93 stomachs |
|---|---|---|---|
| *Haplochromis* species | 93 | 91.9 | 89.5 |
| *Rastrineobola argentea* | 15.1 | 6.1 | 5.4 |
| *Lates niloticus* | - | - | 4.3 |
| *Xenoclarias* species | 1.1 | 1.7 | 3.2 |
| *Cardina* species | - | - | 25.9 |
| Other items | 5 | 3.4 | 2.2 |

N.B. Other items include *Barbus* species, *Mastacembelus frenatus*, *Oreochromis* species, *Tilapia zillii*, *Bagrus docmac*, *Mormyrus kannume*, *Gnathernomus* species, insects and gastopodes.