SOME BIOLOGICAL STUDIES OF THE NILE PERCH *(LATES NILOTICUS C; & V.)* IN THE NOZHA-HYDRODROME

BY

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INTRODUCTION

In actual practice, the application of the essential biological studies to fishery management have been well established in many countries. However, for our fishes, the available basic information are so scanty, that we are unable to perform a better exploitation of the existing fishery. So, the present paper is a contribution to the available information on the growth and certain other biological studies of *Lates niloticus* of the Nozha-Hydrodrome in the period 1955—1964.

Lates niloticus, sometimes known by the name of "Nile Perch" is a member of Family Serranidae. It has a wide distribution in Africa, found throughout the whole Nile system, in the Chad Basin, in the Senegal, the Niger and the Congo (Boulenger, 1907). The Nile Perch is essentially carnivorous, feeding on Tilapia and many other fishes including their own young. It attains great sizes and may reach more than 180 cm. in length and about 100 kgm. in weight. In Egypt, the Nile Perch is one of the most highly prized of the fresh water fishes, because of its excellent quality, the fish taken in commercial catch ordinarily find a ready market, at a good price.

The Hydrodrome

All materials concerned in this study were collected from the Nozha Hydrodrome (Fig. 1), which is an isolated part of Lake Mariut, having an area of 504 hectars (1200 feddans) and an average water depth of about six meters. It is regularly supplied with fresh water from the Nile through the Mahmoudia Canal.

Fishing was prohibited in the Hydrodrome from the time of its construction (during the second World War) till January 1954, when the Alexandria Institute of Oceanography and Fisheries started its first study on it. The commercial catch was mostly of the Nile fishes. The dominant species were *Barbus bynni, Tilapia nilotica, T. galilaea, T. zillii, Anguillo vulgaris, Mugil capito, Lates niloticus* and various cat-fishes of the genera *Clarias, Bagrus* and *Synodontis.*

The presence of a high percentage of different species of carnivorous fishes affected the fish production of the hydrodrome. In order to deminish the percentage of predaters, the hydrodrome was nearly drained, and extensive fishing operations were carried out during the period from the begining of June 1964 to the end of January 1965. The amount of predators caught (*Anguilla, Bagrus, Clarias* and *Lates*), was about 17688 kg. and this represented about 36% of the total fish yield of the Hydrodrome.

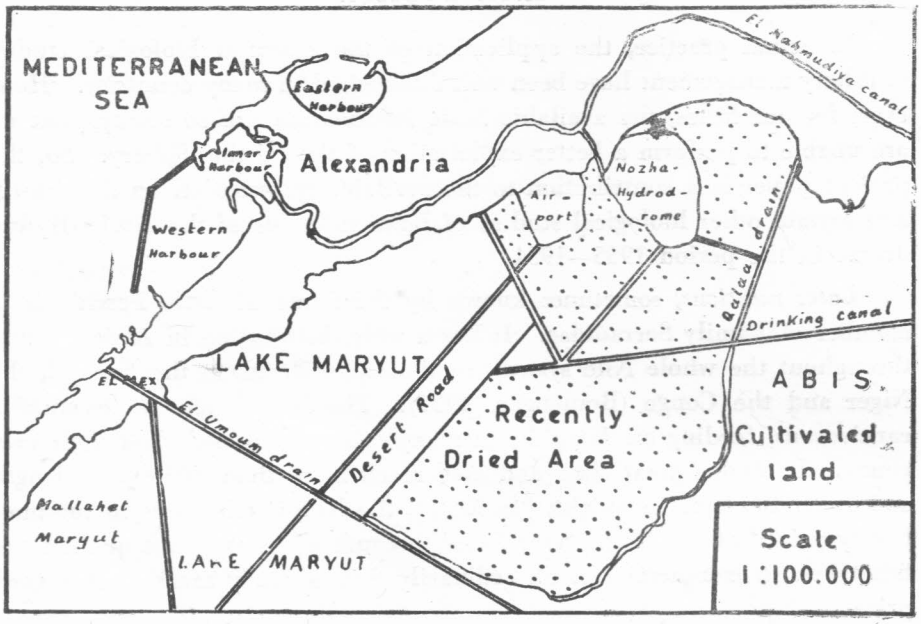

Figure 1-Position of the Nozha-Hydrodrome

MATERIALS AND METHODS

The present study of the Nile Perch is based on materials collected by the fishery laboratory from the Nozha Hydrodrome during the period from 1955 to 1964. In all the years (with the exception of 1964) fishes were caught by nets (gill, trammel, and seines) in a commercial fishery. Small fish were also caught in wire traps. Big fishes, collected in 1964 were obtained when the Hydrodrome was nearly drained. The number of individulas (968) employed in this study are listed in Table (1) according to the month and year of capture.

All length measurements were taken on a measuring board, marked in centimeters. Small fishes were weighed on a gram balance. Fishes heavier than 2 killigrams were weighed by a spring balance of 15 kg. capacity. Bigger fishes were weighed on a platform balance of 100 kg. capacity. All measurements were carried out on fresh materials.

For age determination, the scales of 694 fish were taken from behind the pectoral fin, on the left side of the fish below the lateral line. The examination and measurement of the scales were made by means of a binocular microscope at a magnification of X 10.

The samples of 1964 included a number of large fishes, the age, length and weight of which were recorded. These data provided some idea of the maximum age and size attained by *Lates niloticus* in the Nozha Hydrodrome. The largest fish captured was a single specimen with a total body length of 173 cm. and weight of 68 kg. This fish was caught at the end of September, 1964 and belonged to age-group XI.

TABLE 1.—Number of *Lates niloticus* collected from the Nozha Hydrodrome and employed for the study of age and growth.

Month \ Year	1955	1956	1957	1958	1961	1964
January	15	79	30	—	—	—
February	13	41	24	29	—	—
March	36	11	12	—	13	2
April	2	—	1	—	—	—
May	10	4	11	—	12	—
June	21	—	6	25	4	—
July	6	2	—	98	8	1
August	17	3	4	—	32	41
September	9	2	13	—	22	51
October	5	—	1	—	3	23
November	40	9	—	5	2	2
December	84	39	—	—	42	3
Total . . .	258	190	102	157	138	123

ACKNOWLEDGEMENT

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Size - and Age -Composition of the Catch

The length frequency distribution of *Lates niloticus* from the commercial catch of the Nozha Hydrodrome in the years 1955, 1956, 1957 and 1958 is shown in Fig. (2). In all collections the lengths lay within the range of 7—65 cm., but the most common was 16—50 cm.

The 1955 collection was typically bimodal. Two size-groups were found in the catch, one with 21—30 cm. and the other with 36—40 cm. as the most common lengths. All the fishes in the first size-group were in their first year of life, while fishes in the second size-group had one ring in their scales, i.e., in their second year. Fishes in the third year of life were very rare in the commercial catch.

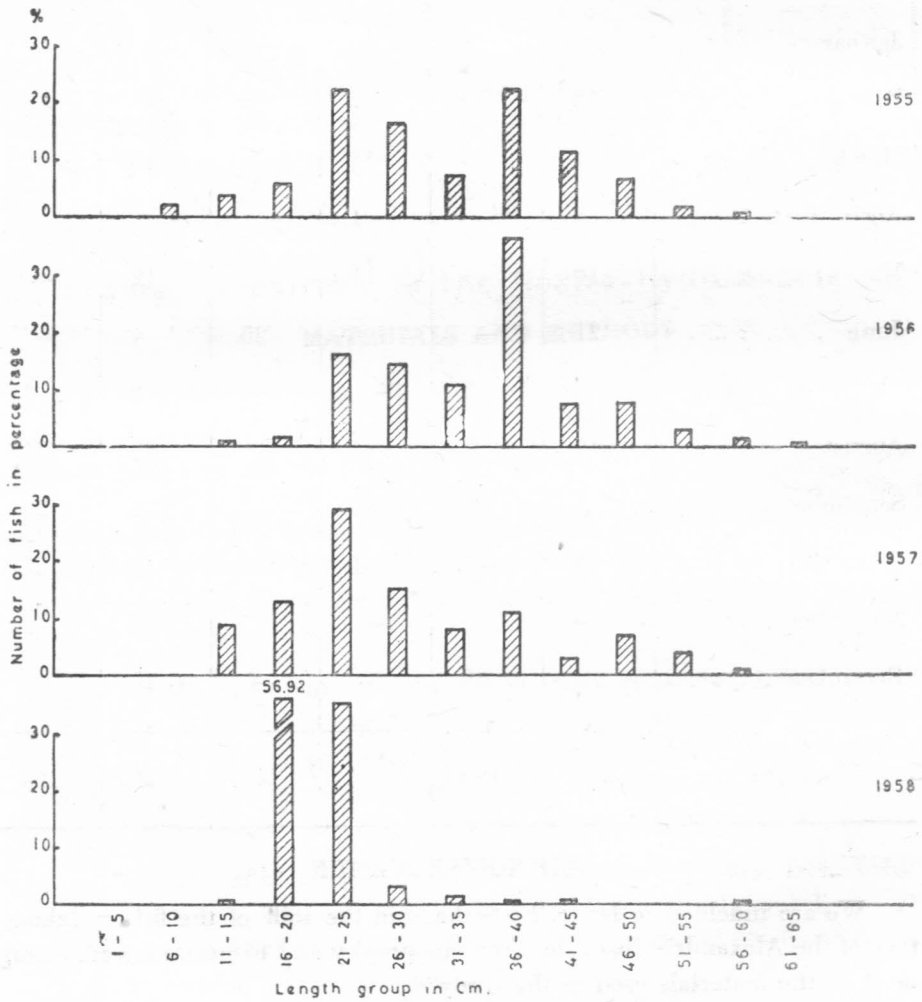

FIG. 2.—Length - frequency distribution of *Lates niloticus* in the commercial catch of the Nozha Hydrodrome during 1955-1958.

The 1956 and 1957 collections showed some tendency towards the above mentioned bimodality described for 1955 collection. On the other hand, the 1958 collection was typically unimodal. Only one size-group (16—25 cm) as the most common length, was found in the catch of this year. The average length of this size-group was less than that in the foregoing years, because the majority of the fish in this year was taken in July. This annual variation in the modality of length distribution of the catch may be attributed largely to fluctuautions in the age composition of the stock. It may also be due to the effect of selectivity of the different kinds of nets used in different years (Jobes, 1952). The small number of fish taken in the samples may be another cause of this variation.

Age Determination

The examination of the scales of *Lates niloticus* revealed the presence of a very clear annulus or year-mark. It consists of the usual interrupted ridges or circuli followed by a complete circulus which is laid down as growth resumes in spring. The "cutting over" created by this pattern of growth is most apparent on the anterior part of the scale. False or accessory annuli, which cause so much difficulties in the interpretation of the age of some fish, are of rare occurrence in the scales of the Nile perch.

The age determination of *Lates niloticus* was obtained from scale examination by counting the number of annuli or lines of discontinuity between the growth areas of successive years. Age groups are designated by Roman numerals corresponding to the nuber of annuli. All fishes were considered to become a year older on January 1 ; an annulus was credited at the edge of the scale from that date until the current-season annulus was completed (Hile, 1948).

Body Scale Relationship

A study of the relationship between the length of the body and the magnified radius (X 10) of the scales was undertaken to determine whether or not there was a necessity for correcting the direct-proportion calculated lengths. The average scale measurements and the body-scale ratio (L/Sc) were determined (Table 2). It was found that the L/Sc ratio tends to decrease (scale became relatively larger) with the increase in the length of the fish. This progressive increase in the relative size of the scale makes necessary a correction of the direct-proportion calculoted lengths to obtain accurate results.

The method for correcting the direct-proportion computed lengths was determined by plotting the means of the scale measurements against the total length of the fish. A straight line having an intercept of 98 mm. and a slope of 2,436 was found to fit the plotted data over the ranges to which it was applied (Fig. 3).

Growth in Length

The growth in the previous years of life was calculater from the relationship of the scale measurements to the total body length. For each age group, the average measurements were computed for the distance from the focus of the scale to each annulus, the length of the scale radius and the total length of the fish at the time of capture. Then a direct-proportion calculation was made using the intercept 98 mm. as a correction factor, to find the average length for each age group at the end of each year of

TABLE 2.—Body-scale Relationship of *Lates niloticus* from the Nozha-Hydrodrome in 1955–1964.

Total Length (mm)	Number of Fish	Average Scale Radius (X 10)	L/Sc Ratio	Total length (mm)	Number of Fish	Average Scale Radius (X 10)	L/Sc Ratio
80	1	16.50	4.85	350	15	103.37	3.59
90	2	18.25	4.93	360	16	110.60	3.25
100	2	20.25	4.94	370	19	120.02	3.08
110	2	24.00	4.58	380	20	118.23	3.21
120	1	27.50	4.36	390	15	122.09	3.19
130	2	30.50	4.26	400	18	130.78	3.06
140	5	35.10	3.99	410	15	131.50	3.12
150	7	39.49	3.80	420	12	135.17	3.11
160	6	43.00	3.72	430	9	133.44	3.22
170	11	44.25	3.84	440	12	137.87	3.19
180	11	49.00	3.67	450	14	142.97	3.15
190	9	49.05	3.87	460	14	144.50	3.18
200	15	53.07	3.77	470	13	147.14	3.19
210	16	58.18	3.61	480	12	152.71	3.14
220	16	61.90	3.55	490	8	159.75	3.07
230	17	63.87	3.60	500	13	155.70	3.21
240	14	66.18	3.63	510	4	157.25	3.24
250	19	71.49	3.50	520	4	171.25	3.07
260	20	75.35	3.45	530	4	156.00	3.40
270	18	77.72	3.47	540	4	154.63	3.49
280	17	82.18	3.41	550	6	173.58	3.17
290	10	81.45	3.56	560	2	155.57	3.60
300	9	84.55	3.55	570	3	166.00	3.43
310	12	83.87	3.70	580	6	185.50	3.13
320	10	89.46	3.58	590	5	189.50	3.11
330	11	94.32	3.50	600	2	172.75	3.47
340	10	99.50	3.42	610	2	174.00	3.51