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ECOLOGICAL AND FISHERIES MANAGEMENT OF EDKU LAKE 5. EFFICIENCY AND SELECTIVE ACTION OF MONOFILAMENT NYLON TRAMMEL NETS AT EDKU LAKE

BY

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ABSTRACT

There is no fishing gear that may exhibit equal chances for catching all the sizes of fish. For proper management of fisheries in Edku Lake it is attempted in the present paper to define the selective action of trammel net which is the most common fishing gear in this lake.

Monofilament nylon trammel nets with various mesh sizes were experimentally used for fishing in Edku Lake during the period form Nov. 1999 to March 2001.

Baranov's and Holt's methods were used to calculate the selective factor of trammel net for Oreochromis niloticus, Oreochromis aureus, Tilapia zillii and Sarotherodon galilaeus. The average lengths and 50% retention lengths were also calculated for the different meshes used.

It was found that although the narrow meshes used were able to catch high numbers of O. aureus and Tilapia zillii representing 41.21% and 21.03 of the total number of fish caught in cases of meshes having 3.33cm and 3.85cm stretched mesh size respectively, their catch comprised only 26.24% and 15.57% of the weight of fish caught. On the other hand, the wide mesh used (6.85cm stretched mesh size) was able to catch 10.89% of the total number of fish caught, which comprised 19.99% of its total weight.

For proper management of fisheries in Edku Lake it is recommended that the monofilament nylon trammel net must not be used with meshes of the inner layer less than 6.0cm stretched measure.

INTRODUCTION

Chance plays a big part in the capture of fish from a natural population. If any one individual were as likely to be captured as any other, and if the capture of an individual were not dependent in any way on those already captured the method of capture would be nonselective. Processes, which cause a departure from this situation, are defined as selective ones. It is a characteristic of most fishing operations that they are selective with the result that the catch is not representive of the population as a whole in one or more of its aspects, and the effect of the method of fishing on the population is not uniform over all sub-divisions of the population.

The selectivity of any method of capture depends on the type of gear employed, the way the gear is operated, where and when it is used and the behaviour of the individuals in the population.

The ability of a fish to escape through or be held by mesh during fishing depends on its dimensions in relation to the opening of mesh. For round fish the relevant dimension is the maximum girth while for flat fish such relevant dimensions will be related to the breadth of fish.

These dimensions are highly positively correlated with the length of fish and so the ability of fish to escape may be regarded as being dependant on its length, although the dependence is not direct. Thus because of the case with which fish lengths can usually be measured, it is customary to relate selection directly to length rather than to any other dimension.

The relationship between the probability of relation and the length, when presented graphically, is termed as length selection curve. The first aim in evaluating the selectivity of a net is to estimate in a precise manner the length selection curve.

Trammel net is the most common fishing gear widely used in the Egyptian delta lakes namely Manzalah, Borollus and Edku.

During the last ten years monofilament nylon materials has been introduced to replace the multifilament twines in Egypt. Such replacement is expected to act significantly in changing the selective action of trammel net in catching tilapia fish which constitute about 70% of the fish populations in the delta lakes of Egypt. Questions are raised by fishermen from time to time about the effect of such replacement on the fish population at the lakes.

The present paper deals with the selectivity and catchability of monofilament nylon trammel nets in one of the delta lakes namely Edku Lake.

Such study will contribute in suggesting the regulation rules that may be necessary for proper fisheries management of trammel net in this lake. This study is a part of the first phase of the scientific research plan of the Fisheries Division, belonging to the National Institute of Oceanography and Fisheries (Egypt). This plan aims to develop the fisheries in north Delta lakes of Egypt (Edku, Borollus, and Manzala). This plan is proposed to be carried out during the years 2000-2003.

MATERIALS AND METHODS

Experimental fishing operations were carried out at various localities of the open water of Edku Lake during the period from Nov. 1999 to March 2001. These localities were distributed in a way that they may cover the whole fishing area of the lake as represented in Fig. (1).

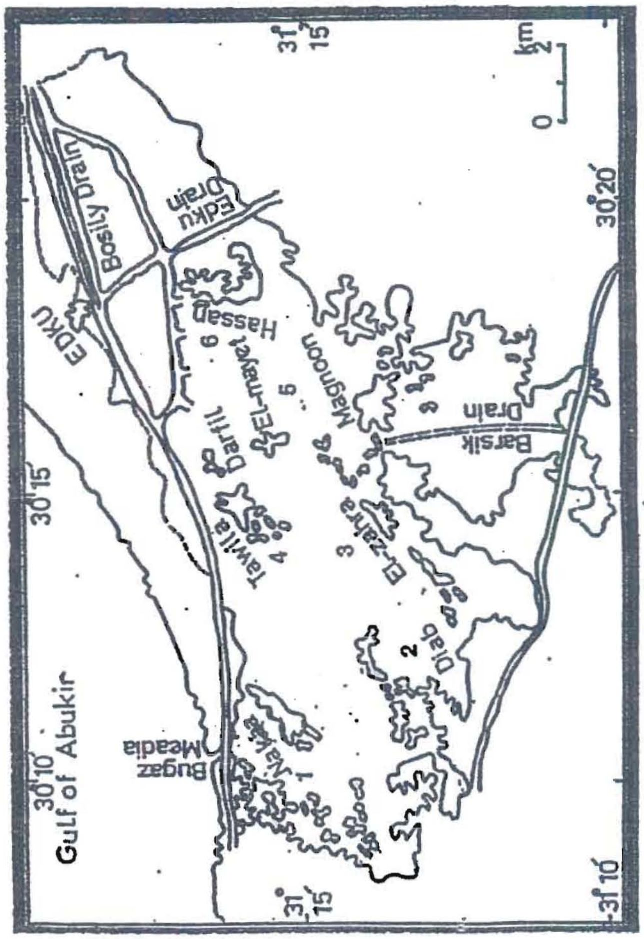


Fig.(1): The Location map of sampling stations in Lake Edku.

Monofilament nylon trammel nets having various mesh sizes were used in the present investigation. The design characters of these experimental nets are shown in Table (1). The experimental fishing was carried out three times weekly. Such fishing operations used to start by sunset and durate through the night time till the sunrise.

In order to avoid that the nets do not meet statistically reliable conditions, the positions of the nets were changed symmetrically during each fishing operation so as to give equal chances for the net to catch fish.

Table 1: Design characters of the experimental units of trammel nets.

Specification	Unit A	Unit B	Unit C	Unit D	Unit E
Stretched mesh size (cm):					
Inner layer	3.33	3.85	4.35	5.04	6.85
Outer layer	10.45	12.24	13.51	15.85	21.33
Depth of net (cm)	90	90	90	90	90
Length of net (m)	28	28	28	28	28
Thickness of net Material (mm):					
Inner layer	0.12	0.12	0.12	0.12	0.12
Outer layer	0.18	0.18	0.18	0.18	0.18
Hanging coefficient:					
Inner layer	0.512	0.515	0.510	0.515	0.505
Outer layer	0.495	0.492	0.490	0.495	0.490
Number of units	5	5	5	5	5
Distance between Floats (cm)	41	42	42	40	38
Distance between Lead pieces (cm)	12.0	12.4	13.0	14.0	15

RESULTS AND DISCUSSION

A. Catching efficiency of various meshes of trammel nets:

The weights of different fish species caught by the various experimental trammel net units from Edku Lake are given in Table (2) and graphically represented in Fig. (2).

The effect of the different mesh sizes of trammel net on the catching efficiency of these nets at the lake can be indicated from the weights of fish caught by each mesh as shown in Table (2).

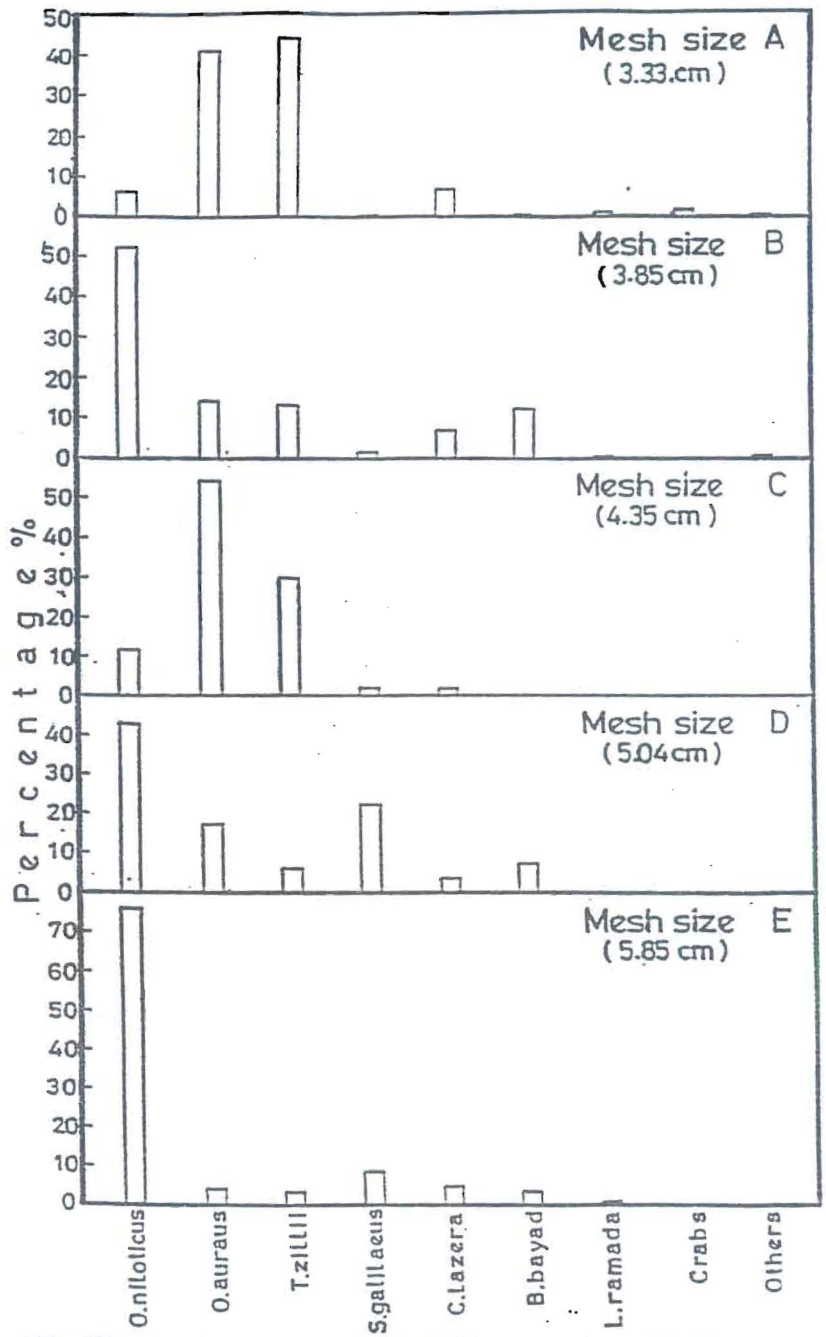


Fig.(2):Species composition of the experimental catch taken by various meshes of trammel net.

It may be obvious that *O.niloticus* was the main fish species in the catch of mesh (E) comprising 75.83% of such catch. This is due to the fact that most of the other Tilapia fish species - according to their smaller average sizes in comparison with *O.niloticus* - are less vulnerable to be caught with the relatively large meshes of net (E). On the other hand the dominance of *T.zillii* in the catch of mesh (A) (43.85%) is due the small average length of such species, which is optimum to be fished with the mesh size of the unit (A).

As Tilapia comprises the main and dominant fish in the catch of trammel net, the total numbers and weights caught by each of the experimental meshes can be indicated as follows:

Net mesh	Total and % number		Total and % weight (Kg)	
(A)	1893	(21.03 %)	60.76	(15.57 %)
(B)	3710	(41.21 %)	102.37	(26.24 %)
(C)	1455	(16.16 %)	98.74	(25.31 %)
(D)	965	(10.72 %)	50.29	(12.89 %)
(E)	980	(10.89 %)	77.99	(19.99 %)

It appears that although the net units (D) and (E) caught fish with comparatively low percentages in number, their catch comprised high weight percentage of the total experimental catch. This is due to the fact that the average weights of fish taken by this mesh were high if compared with the average weights of fish caught by smaller mesh sizes.

If the prices of the various classes of Tilapia are taken in consideration, which give the advantage of the class of fish caught by the net unit (E), it can be indicated that higher income may be attained if trammel nets with larger mesh sizes are used for commercial fishing in Edku Lake.

B. Selective action of trammel net meshes:

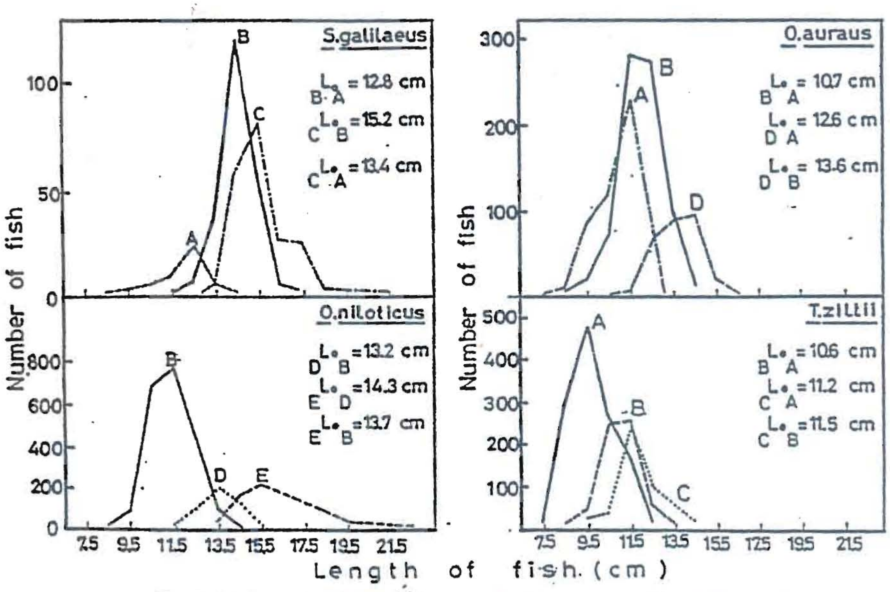
From the standpoint of conservation of population, the selective action of the meshes in gill and trammel nets has been studied by many authors. Among these authors are; Baranov, 1948; Holt, 1957; Regier and Robson, 1966; El-Zarka *et al*, 1970; Alsayes, 1976; Winters and Wheeter, 1990; Henderson and Wong, 1991 and Montano 1995.

The principle to study the trammel net selectivity can be based on the assumption that the inner layer of trammel net acts as a gill net for most of the fish caught while other fish are entangled. Alsayes (1976) pointed out that, in case of trammel net having inner layer with large meshes, the large fish were not able to see or distinguish the net while being set vertically in water. Therefore the fish pushes its head through such meshes and are entangled in the net while struggling for escapement. Such large sized fish were able to distinguish and avoid the trammel nets having inner layer with smaller meshes.

It seems therefore that the entanglement of fish in the trammel nets is carried out in a way that the size of fish is in fact proportional to the mesh size of the inner layer of trammel net.

Hashem *et al* (1973) used Branov's (1948) and Holt's (1957) equations to study the selectivity of gill and trammel nets for fresh water fishes in the Nozha Hydrodrome. Alsayes (1976) indicated that the equations given by Branov (1948), Holt (1957) and Olsen (1959) were valid for studying the trammel net selectivity for Tilapia fish in Borollus Lake.

Elzarka *et al* (1970) and Alsayes (1984) used the equations suggested by Baranov (1948) and Holt (1957) to study the mesh selection of wire basket traps for Tilapia fish in Mariut and Borollus lakes respectively. Both of these two authors pointed out that either Baranov's or Holt's equations are valid for investigating the mesh selection of wire basket traps. It is attempted in the present paper to use equations suggested by Baranov (1948) and Holt (1957) to calculate the selectivity coefficient of monofilament trammel nets for the four species of Tilapia caught from Edku Lake. Tables 3,4,5 and 6 indicate the length distribution of *O.niliticus*, *O.aureus*, *T.zillii* and *S.galilaeus* caught by various meshes of trammel nets respectively. The date given in these tables are graphically represented in Fig. (3).



Eig.(3): Length frequency of fish caught by different mesh sizes of trammel net.

1. Calculation of selection factors according to Baranov's method:

According to the method suggested by Baranov (1948), the mesh size of the net is proportional to the modal length of the fish caught. Such proportionality can be expressed by the equation:

$m = KL$ where

m = mesh size (in cm).

L = modal length (in cm).

K = selectivity factor.

The factor (K) is calculated from the equation:

$$K = \frac{2m_1 m_2}{L_o(m_1 + m_2)}$$ where

m_1 is the mesh size of net (1).

m_2 is the mesh size of net (2).

L_o is the optimum size of fish caught by both nets.

The selectivity factors were calculated according to Baranov's method for the various species of Tilapia and found as follows:

For:	*O.niliticus.*	K = 0.3494
	O.aureus.	K = 0.3243
	T.zillii.	K = 0.3365
	S.galilaeus.	K = 0.2772

The mean selection lengths of the four fish species caught by the various meshes of trammel net are therefore given in Table (7).

Table 3 : Length distribution of *Oreochromis niloticus* caught by different meshes of trammel nets.

Length (cm)	Number of fish caught by				
	A	B	C	D	E
7.5		1			
8.5		5			
9.5	2	89			
10.5	16	665	9		
11.5	15	772	31	13	1
12.5	9	401	59	100	1
13.5	1	106	31	202	49
14.5		3	3	128	169
15.5				13	212
16.5		1		1	168
17.5				3	128
18.5				1	82
19.5					39
20.5					27
21.5					16
22.5					11
23.5					3
24.5					5
25.5					2
26.5					
Number of fish caught	43	2043	133	461	913
Average length (cm)	11.29	11.38	12.41	13.60	16.54
Standard deviation	0.914	0.973	0.908	0.943	2.103

Table 4 : Length distribution of *Oreochromis aureus* caught by different meshes of trammel nets.

Length (cm)	Number of fish caught by				
	A	B	C	D	E
6.5					
7.5	1	1			
8.5	12	5			
9.5	88	18	2		
10.5	126	73	13	1	
11.5	231	284	276	4	
12.5	96	276	302	68	
13.5	7	103	163	77	2
14.5		14	46	53	6
15.5			22	20	6
16.5			6	6	10
17.5					2
18.5					
19.5					1
20.5					1
Number of fish caught	561	774	830	229	28
Average length (cm)	11.09	12.01	12.54	13.64	15.96
Standard deviation	1.061	1.028	1.090	1.099	1.575

Table 5 : Length distribution of *Tilapia zillii* caught by different meshes of trammel nets.

Length (cm)	Number of fish caught by				
	A	B	C	D	E
6.5					
7.5	17	4			
8.5	300	11			
9.5	478	55	27		
10.5	262	249	36	1	
11.5	160	270	232	20	
12.5	22	59	100	26	
13.5	1	13	63	19	6
14.5		1	24	14	13
15.5			8	3	10
16.5	1		2		6
17.5					4
Number of fish caught	1241	662	492	83	39
Average length (cm)	9.76	11.02	12.01	12.91	15.22
Standard deviation	1.081	0.951	1.247	1.169	1.212

Table 6 : Length distribution of *Sarotherodon galilaeus* caught by different meshes of trammel nets.

Length (cm)	Number of fish caught by		
	A	B	D
7.5			
8.5	1		
9.5	3		
10.5	5		
11.5	9	1	
12.5	23	7	
13.5	5	46	6
14.5	2	119	58
15.5		51	70
16.5		5	26
17.5		2	25
18.5			3
19.5			3
20.5			
21.5			1
Number of fish caught	48	231	192
Average length (cm)	12.02	14.52	15.67
Standard deviation	1.255	0.865	1.281

Table 7 :The mean selection lengths (cm) of fish caught by various meshes of trammel nets according to Baranov's method.

Species	Mean selection length for meshes				
	A=(3.33cm)	B=(3.85cm)	C=(4.35cm)	D=(5.04cm)	E=(5.85cm)
O.niloticus	9.53	11.02	12.45	14.42	16.74
O.auraus	10.26	11.87	13.41	15.54	18.04
T.zillii	9.90	11.44	12.93	14.98	17.38
S.galilaeus	12.01	13.89	15.69	18.18	21.10

2. <u>Calculation of selection factors according to Holt's method</u>:

According to Holt's method the selectivity may be estimated by comparing catches of two meshes. It is assumed that when two net units are fishing simultaneously, the logarithms of the ratios of catches at successive length groups in the two units will have a linear relationship. The selection factor (K) is calculated as follows:

$$K = \frac{-2b}{a(M_1 + M_2)} \text{ where.}$$

a = intercept

b = slope in the linear relationship equation

M_1 and M_2 are the two meshes compared.

The regression equations for the logarithm ratios of *O.niloticus, O. aureus, T.zillii and S.galilaeus* at different lengths for the meshes used (A, B, C, D and E) are given in Table (8). The mean selection lengths of the four fish species caught by the experimental meshes used in the present investigation are given in Table (9).

Comparing the mean selection lengths calculated according to Baranov's and Holt's methods it can be pointed out that, although Baranov's method has an advantage that it is simple and direct method, the calculated selection lengths may differ slightly from those calculated according to Holt's method. Such differences may be due to the fact that the selection factors are calculated from hand fitted selection curves in case of Baranov's method. On the other hand these factors are calculated according to Holt's method in dependence on straight lines regression equations between the logarithms of ratios of catches taken by two meshes and the successive lengths of the fish caught.

Table 8 : Selection factors of various experimental meshes for different fish species.

Species	Meshes Compared	Function equation	Selection factor	Mean Selection factor
O.niloticus	C/B	Y = 0.994 X - 14.550	3.5702	2.9750
	D/C	Y = 1.359 X - 16.487	2.9589	
	E/D	Y = 2.132 X - 30.362	2.3960	
O.auraus	B/A	Y = 0.7597 X - 8.1994	3.0064	2.9024
	C/B	Y = 0.0613 X -7.8953	3.0503	
	D/C	Y = 0.8165 X -10.3218	2.6506	
T.zillii	B/A	Y = 1.3861 X -15.3595	3.0866	3.1340
	C/B	Y = 0.7036 X -8.7804	3.0437	
	D/C	Y = 0.5863 X -9.0059	3.2717	
S.galilaeus	D/B	Y = 1.1493 X -16.0840	3.1485	3.1485

Table 9 : The mean selection lengths (cm) of fish caught by various meshes of trammel nets according to Holt's method.

Species	Mean selection length for meshes				
	A= (3.33cm)	B= (3.85cm)	C= (4.35cm)	D= (5.04cm)	E= (5.85cm)
O.niloticus	9.91	11.45	12.94	14.99	17.40
O.auraus	9.66	11.17	12.63	14.63	16.98
T.zillii	10.42	12.05	13.62	15.78	18.31
S.galilaeus	10.48	12.12	13.70	15.87	18.42

Normal selection curves of fish caught by different meshes:

When only a limited number of observations are available, the frequency distribution compiled from them is generally irregular in form. If the observations are increased sharply the distribution will show a tendency to eliminate irregularities and be smoothed.

The fish samples collected by various meshes in the present paper may be used to give general information about the population and therefore it is desirable to smooth the irregular curves obtained from the samples. By smoothing the curve the sample is put into the more general form of the population or in other words into an ideal distribution. Such ideal distribution represents the distribution, which would appear if an infinite number of cases were used rather than a sample.

The normal selection curves of the various meshes used to catch different fish species from Edku Lake are shown in Fig. (4). These curves appear to be more or less sharply peaked and slightly skewed.

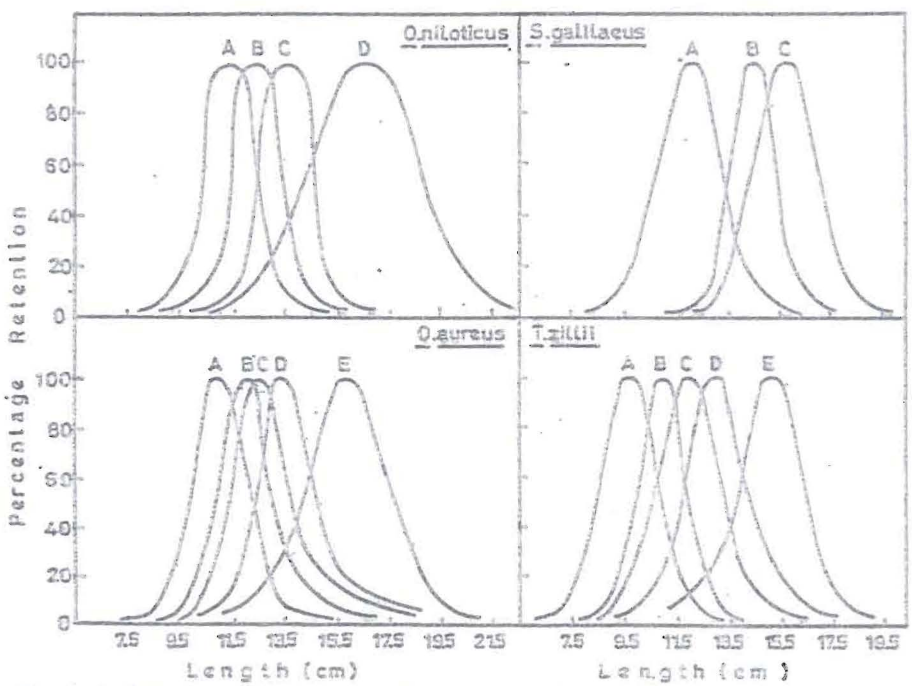


Fig.(4):Normal selection curves of various fish species caught by trammel nets.

3. 50% retention lengths of fish caught by various meshes:

It is a matter of fact that the 50% retention length of fish caught by the meshes of a net can be considered as a very convenient measure to its selective action. This for any mesh size and fish species corresponds to the fish length at which half escape through the meshes and half are retained.

Pope *et al* (1975) pointed out that if the selection curve is truly symmetrical the 50% retention length will be so about the 50% point which will then also represent the mean selection length.

The cumulative frequency distribution curves of the four fish species *O.niloticus O. aureus, T.zillii and S.galilaeus* caught by the various meshes are shown in Figs. 5,6,7 and 8 respectively. The 50% retention lengths of such fish species are given in these figures.

Comparing the 50% retention lengths of the various fish species with the mean selection lengths calculated by either Baranov's or Holt's method for the different experimental meshes used, it can be pointed out that slight differences occurred between these values. Especially in the cases of meshes (D) and (E). These differences may have risen as a result from the asymmetry of the selection curves of these two meshes.

Therefore it may be more convincing to calculate average values of the mean selection lengths carried out according to the two methods that been used in the present investigation namely Baranov's and Holt's as well as considering the calculated average and 50% retention lengths of the four fish species caught by the various experimental meshes. These average values are given in Table (10).

The mean selection lengths calculated according to Holt's method (1957) did not differ significantly from those calculated according to Baranov's method (1948). This means that both are valid for the calculation of mean selection length for trammel net.

Optimum mesh size for catching Tilapia fish from Edku Lake:

The fisheries biology studies carried out in the north delta lakes indicated that Tilapia fish are caught with an overage length of 11.0cm. This size does not affect the breeding success of Tilapia because this fish reaches its first maturity at this size and even at smaller sizes (El-Zarka *et al* 1970).

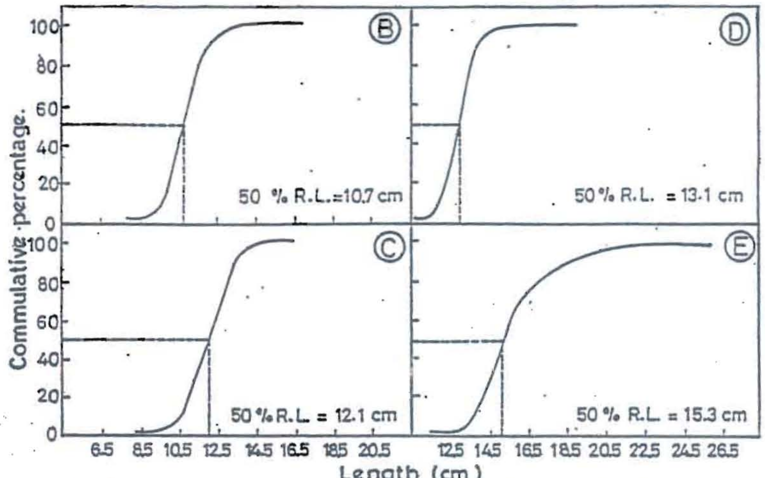


Fig.(5): 50 percent retention length of O.niloticus caught by various meshes of trammel nets.

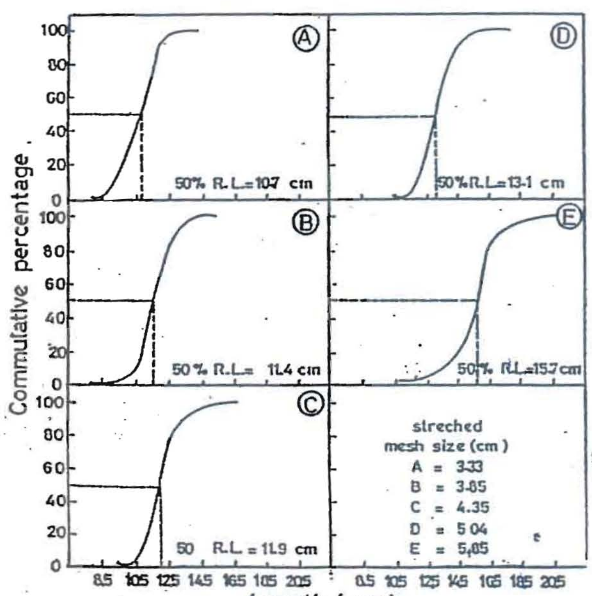


Fig.(6): 50 percent retention length of O.aureus caught by various meshes of trammel nets.

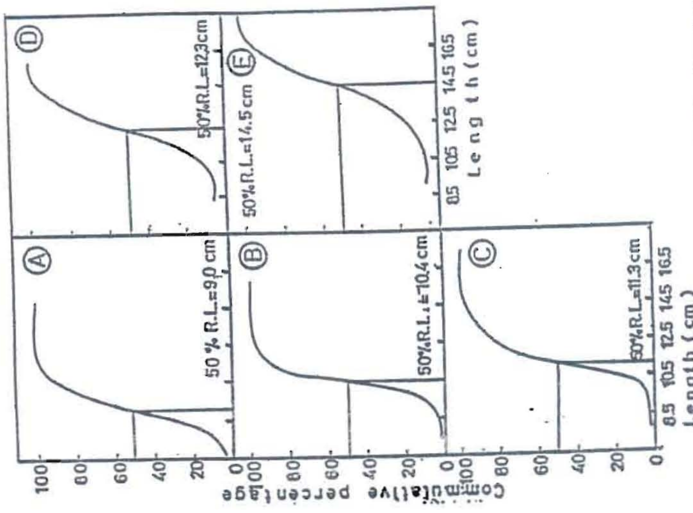


Fig.(7):50% Retention Length of Tilapia zillii caught by various meshes of trammel nets.

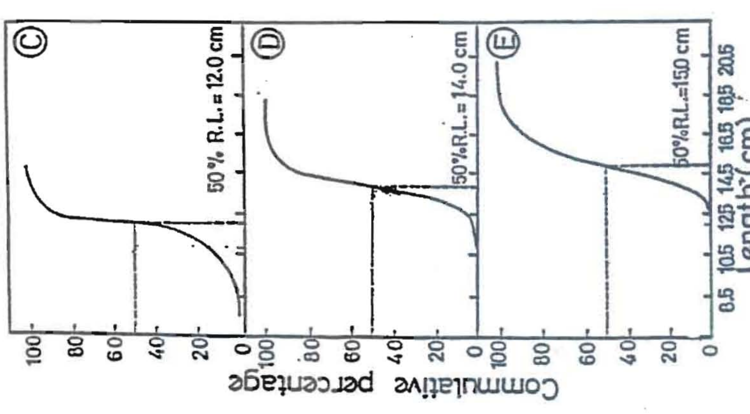


Fig.(6):50 percent retention length of S.galilaeus caught by various meshes of trammel nets.

Table 10 : Average and selection lengths of various fish species caught by different meshes of trammel net from lake Edku.

Species	Mesh size (cm)		Average length (cm)	Selection length		50% R. Length	Average selection length
				Baranov	Holt		
O.niloticus	A	3.33	11.29	9.53	9.91	--	10.24
	B	3.85	11.38	11.02	11.45	10.70	11.14
	C	4.35	12.41	12.45	12.94	12.10	12.48
	D	5.04	13.60	14.42	14.99	13.10	14.03
	E	5.85	16.54	16.74	17.40	15.30	16.50
O.aureus	A	3.33	11.09	10.26	9.66	10.70	10.43
	B	3.85	12.01	11.87	11.17	11.40	11.61
	C	4.35	12.54	13.41	12.63	11.90	12.62
	D	5.04	13.64	15.54	14.63	13.10	14.23
	E	5.85	15.96	18.04	16.98	15.70	16.67
T.zillii	A	3.33	9.76	9.90	10.42	9.00	9.77
	B	3.85	11.02	11.44	12.05	10.40	11.23
	C	4.35	12.01	12.93	13.62	11.30	12.47
	D	5.04	12.91	14.98	15.78	12.30	13.99
	E	5.85	15.22	17.38	18.31	14.50	16.35
S.galilaeus	A	3.33	12.02	12.01	10.48	--	11.50
	B	4.85	14.52	13.89	12.12	--	13.51
	C	4.35	--	15.69	13.70	12.00	13.80
	D	5.04	15.67	18.18	15.87	14.00	15.93
	E	5.85	--	21.10	18.42	15.00	18.17

The present investigation indicates that the average lengths of the various species of Tilapia at Edku Lake are as follows:

13.01 ± 2.180 cm for *O.niloticus*.
12.01 ± 0.869 cm for *O.aureus*.
10.72 ± 1.130 cm for *T.zillii*.
14.73 ± 1.064 cm for *S.galilaeus*.

This means that in most cases the average length of the commercial catch of Tilapia, which is 11.0cm, as given by El-Zarka 1970 is below the average lengths of the different Tilapia populations living at Edku Lake.

There fore the fisheries management of Tilapia in Edku Lake can be based on the criterion of gaining extra weight.

Talaat and Abdulla (2001) described the relation between length and weight of various Tilapia fish as follows:

$W = 0.01702.\ L^{3.03264}$ for *O.niloticus*.

$W = 0.03260.\ L^{2.75284}$ for *O.aureus*.

$W = 0.04005.\ L^{2.68754}$ for *T.zillii*.

$W = 0.01727.\ L^{3.04138}$ for *S.galilaeus*.

This indicates that the average weights of the fish, having an average length of 11.0cm in their commercial catch, are as follows:

24.50 gm for *O.niloticus*
25.20 gm for *O. aureus*.
23.99 gm for *T.zillii* and
25.38 gm for *S.galilaeus*.

Since it has been recommended by El-Zarka *et al* (1970) and Alsayes (1976) that the management of Tilapia fishery must be based on the criterion of gaining extra weight and that fish must be caught with an average length of 15.0cm instead of 11.0cm, it is expected that the average weights of fish caught will be:

62.75 gm for *O.niloticus*.
56.34 gm for *O.aureus*.
57.99 gm for *T.zillii* and
65.20 gm for *S.galilaeus*.

The present investigation indicates that to catch Tilapia fish with a mean selection length above 15.0cm, the mesh size of the inner layer of trammel nets must not be less than 6.0cm stretched measures. In such a case the various fish species will be caught having the following average sizes and average weights:

- 16.50 cm average length and 83.78 gm average weight for *O.niloticus*.
- 16.67 cm average length and 75.33 gm average weight for *O. aureus*.
- 16.35 cm average length and 73.11 gm average weight for *T.zillii*.
- 18.17 cm average length and 116.81 gm average weight for *S.galilaeus*.

By this approach it is expected to increase the total yield of Tilapia from Edku Lake.

Summary and Conclusions:

Trammel net is an important fishing gear used in the inland water of Egypt on a wide scale to catch Tilapia which constitute more than 80% of the fish populations in the northern delta lakes. Experimental trammel net fishing using nets with various mesh

This means that in most cases the average length of the commercial catch of Tilapia, which is 11.0cm, as given by El-Zarka 1970 is below the average lengths of the different Tilapia populations living at Edku Lake.

There fore the fisheries management of Tilapia in Edku Lake can be based on the criterion of gaining extra weight.

Talaat and Abdulla (2001) described the relation between length and weight of various Tilapia fish as follows:

$W = 0.01702. L^{3.03264}$ for *O.niloticus*.
$W = 0.03260. L^{2.75284}$ for *O.aureus*.
$W = 0.04005. L^{2.68754}$ for *T.zillii*.
$W = 0.01727. L^{3.04138}$ for *S.galilaeus*.

This indicates that the average weights of the fish, having an average length of 11.0cm in their commercial catch, are as follows:

24.50 gm for *O.niloticus*
25.20 gm for *O. aureus*.
23.99 gm for *T.zillii* and
25.38 gm for *S.galilaeus*.

Since it has been recommended by El-Zarka *et al* (1970) and Alsayes (1976) that the management of Tilapia fishery must be based on the criterion of gaining extra weight and that fish must be caught with an average length of 15.0cm instead of 11.0cm, it is expected that the average weights of fish caught will be:

62.75 gm for *O.niloticus*.
56.34 gm for *O.aureus*.
57.99 gm for *T.zillii* and
65.20 gm for *S.galilaeus*.

The present investigation indicates that to catch Tilapia fish with a mean selection length above 15.0cm, the mesh size of the inner layer of trammel nets must not be less than 6.0cm stretched measures. In such a case the various fish species will be caught having the following average sizes and average weights:

- 16.50 cm average length and 83.78 gm average weight for *O.niloticus*.
- 16.67 cm average length and 75.33 gm average weight for *O. aureus*.
- 16.35 cm average length and 73.11 gm average weight for *T.zillii*.
- 18.17 cm average length and 116.81 gm average weight for *S.galilaeus*.

By this approach it is expected to increase the total yield of Tilapia from Edku Lake.

Summary and Conclusions:

Trammel net is an important fishing gear used in the inland water of Egypt on a wide scale to catch Tilapia which constitute more than 80% of the fish populations in the northern delta lakes. Experimental trammel net fishing using nets with various mesh

size was carried out at Edku Lake with the aim of studying the efficiency and selectivity of such important fishing gear.

The following points could be concluded from the present investigation:
(1) As for the fishing efficiency of the various meshes used in the experiment; the narrow meshes (A) and (B) caught large numbers of Tilapia comprising 41.21% and 21.03% of the total number of fish caught of the various species for the units (B) and (A) respectively. The corresponding percentage weights were only 26.24% and 15.57 % for these two meshes in respective.

On the other hand the wide meshes (D) and (E) caught 10.72% and 10.89% of the total number caught through the experiment respectively. These fish comprised 12.89% and 19.99% of the total weight of fish caught.

This leads us to conclude that fishing with wide meshes of trammel nets contributes in catching fish with higher average weights; therefore having the advantage that it belongs to higher classes of fish, which leads to better income for the fisherman.

(2) The mean selection lengths of *O.niloticus, O.aureus, T.zillii and S.galilaeus* were calculated according to Baranov's and Holt's methods for the various meshes used in the course of the present investigation. The 50% retention lengths of the four fish species were also calculated with the aim of suggesting the optimum mesh size of monofilament nylon trammel net to be used at Edku Lake.

It was found that the optimum mesh size recommended for use must not be less than 6.0cm stretched measure in such a case the average mean selection lengths and weight of the various fish species in the commercial catch will be:

- 16.50 cm average length and 83.78 gm average weight for *O.niloticus*.
- 16.76 cm average length and 75.33 gm average weight for *O.aureus*.
- 16.35 cm average length and 73.11 gm average weight for *T.zillii*.
- 18.17 cm average length and 116.81 average weight for *S.galilaeus*.

By this approach it is expected to in crease the annual fish production of Edku Lake.

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