# ANALYSIS OF LOSSES IN BIOMASS AND INCOME FROM THE FISHING GEARS USED IN MEDITERRANEAN COAST OF SINAI EGYPT DURING 2016.

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### Abstract

The negative impact of the Purse – seine, Trammel net and Trowel net on the Mediterranean catch on the Sinai coast was studied by taking monthly samples of 20 kg of each type of catch within each fishing methods during 2016. Fish were distributed to small fish and mature fish according to length and weight at maturity according to previous studies of these species in the same area or adjacent areas. The results showed that the percentage of small fish 55% of the production of the Purse – seine and 27.5% of the production of the Trammel net and 42.2% of the Trowel net. The negative impact on the biomass was 923.2, 1061.7 and 160.8 tons for each of the Purse – seine , Trammel net and Trowel net respectively, with a total of 2145.4 tons in one fishing season 2016 and 212 million pounds in the Mediterranean of coast Sinai.

## **INTRODUCTION**

The underestimation of fisheries removals is a global issue that spans countries from different continents and different socio-economic situations. Underestimation of catches is especially important in countries where fishing fleets are highly diversified, the enforcement of fishing management is low, data availability is poor, and there is high demand for fish products in local markets (Marta *et al.*, 2015).

This area is high depth and a low level of biological productivity due to the low nutrient composition of the water. The last few decades have seen a significant number of Red Sea species entering in this area, increasing the biodiversity and changing the fishery status in the Egypt. Small scale and medium size vessels exploiting inshore grounds dominate the fleets of Cuprus, Israel, Lebanon, Syria, Egypt and Turkey, with some larger trawls and purse seines in the last two countries Syria and Egypt (Papaconstantion and Farrugio, 2000).

El-Dakar *et al.* (2011) Fishing boats using the Purse – seine method were operating in the Mediterranean coast of Sinai. They represent about 60% of the total catch.

EL-Aiatt (2004) stated that the catch of Mediterranean coast of Sinai fishery during the period from 1989 to 2001 was composed of Sardines (86.51%), shrimp scad (1.81%), cattle fish (1.33%), Spanish mackerel (0.68%), Groupers (0.66%), Crabs (0.28%), White sea bream (0.19%), Meager (0.11%), Kawa kawa (0.21%) and others (8.22%). These fish groups were greatly varied according to their important.

El-karashily and Saleh (1986), mentioned that trawl nets, purse-sein nets, and long line are the dominant gears used in Mediterranean Sea in front of Egypt. However, trawl nets may be considered as the principal fishing gear. Their catch contributes about 80% of the total catch in the period 1966-1968 and about 50% of the total catch in the period 1982-1984.

Machias *et al.* (2001) stated that the main problem in the Mediterranean was the absence of monitoring the discard fractions of catches. These results can be used effectively as baseline findings for management when trying to introduce more selective gear for regional resources, and may contribute to discard monitoring studies of other SSF in the Mediterranean.

El-Dakara *et al.* (2011) estimated the amount of by catch (trash fish) in the Mediterranean cost of Sinai and they represent a large proportion of production (43.1% of the Purse seine boats and 48.8% of trawl boats).

By-catch and discards are major problems in the world fisheries. Some incidentally caught organisms are protected species such as marine mammals, marine turtles, and seabirds (Diamond, 2003). Detailed information on the historic dimen- sions of by-catch is lacking for many fisheries and continued

monitoring is thus necessary to assess trends and the effectiveness of new technologies to minimize by-catch (Saila, 1983 and Alverson *et al.*, 1994).

Gaber (2010) stated that the negative impact of the presence of fish waste in the production of boats Purse seine 1401.9 tons and 31.4 million LE losses in one fishing season, 2009, while El-Dakar *et al.* (2011) stated that the negative impact of the presence of fish waste in the production of boats Purse seine 2154.1 tons and 30.5 million LE losses during seasons 2009 and 2010. But Gaber (2010) stated that the presence of fish waste in the production of Trawl net estimated at about 45.2 % of the total production of these vessels and the losses of stock biomass which formed 1269.9 tons and 93.3 million LE losses in one fishing season, 2009, While El-Dakar *et al.* (2011) showing that the negative impact of the presence of fish waste in the production of boats Trawl net 4186 tons and 175.9 million LE losses during seasons 2009 and 2010.

The aim of work studding the negative impact of the Purse – seine, Trammel net and Trowel net on the catch in Mediterranean coast of Sinai during 2016.

### **MATERIALS AND METHODS**

The fish resource of the Mediterranean coast of Sinai is exploited by three main fishing gears, the Purse - seine nets (52 units), Trammel nets (157 units) and long line gear (11 units).

- a) Trammel net (locally named DABBA).
- b) The Purse seine (Locally named CHNCHOLLA).
- c) Long line with hooks and bits (Locally name Sinar).
- d) Trowel net (locally name El Gar). This boat comes from Damietta and Port Said and there are no fishing licenses for trawlers in El Arish.

240 kg Samples were taken during the period from January to December 2016 for each species from the production (Purse-seine, Trawl net, Trammel net and Long line) (20 kg/monthly).

The others varieties in the production of Trowel net called ELafsha was taken 80 kg monthly sample of them and classified and know the proportion of each type in the sample and thus the production of each type of ELafsha monthly.

According to size valuation, average juvenile and adult catches weighting from total monthly samples .

- 1- Classification of fish in each sample (juvenile fish or adult fish),
- 2- Calculating the percentage of juvenile fish within the sample for each species of fish.
- 3- Calculating total juvenile fish in the total catch for each species of fish.
- 4- Calculating the average one fish weight per each species of juvenile fish
- 5- Calculating the natural mortality by Ursin (1967) from equation M=W (-1/3).

Where: W= average weight, M= Natural mortality.

- 6- Catches were sorting and identification were done as juveniles and adult based on length at first maturity (Lm) collected from published papers for each species in the same area or areas nearby, hence, marketabl importance as economic and non-economic according to fish size and prices with a market size of each grade. Table (1) illustrated the maturity stages and prices of different species.
- 7- To determine the loss of biomass in live biomass as a result of fishing for small fish, the equation of Najmudeen and Sathiadas (2008) was used.

	_			P	Price (1	1000 L	.E / to	n )
s	cm		<b>A</b>		Juve	enile		
Fish specie	Length at fi maturity L <sub>m</sub>	length -weight relationship	Reference	Purse – seine	Trammel net	Trowel net	El afsha	Adult
Grey-mullet,	31	W= 0.0226L <sup>2.7528</sup>	Attia, (2013)	25	30			55
Seabream,	24.5	W= 0.0248L 2.8219	Mehanna,( 2007)		40			140
Crab,	10.2	$W= 0.0420 \text{ CW}^{3.2505}$	Wiame, (2010)		30	20	20	80
Cattle fish	13	W=0.1821336L <sup>2.8011</sup>	Manmeet <i>et al</i> .(2005)		50	60	10	150
Sigans	14.4	W= 0.0163L <sup>2.8971</sup>	Smah ( 2015)	5				40
Shrimp Scad	18.5	Log W =53 + 3.084 LogTL	Nasir and Zarrien (2011)	12	20			55
Sardinella spp	14	W=0.0149 L <sup>2.7006</sup>	EL-Aiatt, (2004)	7	9			30
Spanish mackerel	43	W= 0.0076L <sup>2.982</sup>	Mehdi et al (2007)	15	25			70
Atlantic mackerel	18	W= 0.00218L <sup>3.4</sup>	Vasconcelos <i>et al</i> (2011)	10				45
Snapper	13.2	W= 0.0165 L <sup>2.8298</sup>	Smah (2017)	3				25
Kawakawa	43	W= 0.0000068L <sup>3.163</sup>	Sallehudin (2016)	15				40
Whit sea bream	23	W=0.011L <sup>3.165</sup>	Al-Beak <i>et al</i> (2015)		30			70
Atlantic Lizard fish	14.5	W= $0.0055$ L <sup>3.7</sup>	Mehanna (2014)			25	15	70
Red porgy	31.3	W= 0.000033L <sup>2.928</sup>	Vasslopoulo, and Papa. (1992)			25	15	70
Red mullte	12.4 3	W= 0.0058L <sup>3.188</sup>	Rsha ( 2016)			50	25	100
Shrimp	5.8	W= 0.16CL <sup>2.6723</sup>	Ameran, M.A, (2004)					200
groper	47.1	W= 0.00692TL <sup>3.222</sup>	Rafail et al., (1969)				50	240
Bogue	11.5	W= 0.05L <sup>2.90066</sup>	Mostafa et al (2015)				10	70
Grey Gurnard	17	$W = 0.0095 L^{2.99}$	Ali and PÝnar 2004)				15	80

**Table 1.** Length at first maturity length -weight relationship and average annual prices.

Adult quantity corresponding to 1 kg of juveniles landed was worked out by the formula given by Najmudeen and Sathiadas (2008).

$$Q_{\rm A} = \left(\frac{(1000/w)W}{1000}\right)(1-M)$$

QA = adult fish quantity corresponding to 1 kg of juvenile fish after a period of t years

W= weight of the individual adult fish after a period of t years

 $\omega$ = individual weight of juvenile of the species in gram.

M= Natural mortality

Natural mortality was calculated from mean fish weights by Ursin (1967).

Losses of biomass = output of the equation X the product from the small fish of each species.

Total income losses million LE=Losses of biomass x mean price.

# RESULTS

The weight of individuals at capture of juveniles and the increasing of weight at the length at first maturity and percentage of juvenile of samples and total juvenile (ton) in Purse seine catch in Mediterranean coast of Sinai, 2016 were shown in Table (2). Table (2) shows the negative impact of the presence of juveniles fish in the production of boats Purse seine a result of poor handling of fish on the boat after fishing or illegal fishing nets Results indicated that, the landing of juvenile leads to more losses of stock biomass which formed 923.2 tons and 52.8 million LE losses in one fishing season, 2016 (Table 2).

The weight of individuals at capture of juveniles and the increasing of weight at the length at first maturity and percentage of juvenile of samples and total juvenile (ton )5.37,16.24,6.44,6.18,4.55,2.18,31.9 and 2.18 ton of Shrimp Scad, Sardinella spp, Spanish mackerel, F. Mullets, Cattle fish, Whit sea bream, Crabs and sea bream respectively in Trammel net catch in Mediterranean coast of Sinai, 2016 were shown in Table (3). Table (3) shows the negative impact of the presence of juveniles fish in the production of boats Trammel net a result of poor handling of fish on the boat after fishing or illegal fishing nets Results indicated that, the landing of juvenile leads to more losses of stock biomass which formed 160.8. Tons and 13.8 million LE losses in one fishing season, 2016.

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	Sardinella spp	Shrimp Scad	Sigans	Spanish mackerel	Atlantic mackerel	F. Mullets	Snapper	Kawakawa
Total sample kg	240	240	240	240	240	240	240	240
Adult fish of sample kg	110	97	82	90	100	109	60	160
Juveniles of sample kg	130	143	158	150	140	131	180	80
% of adult fish	45.8	40.4	34.2	37.5	41.7	45.4	25.0	66.7
% of juveniles fish	54.2	59.6	65.8	62.5	58.3	54.6	75.0	33.3
Total catch(ton)	437.5	51.6	44.1	45.1	20.7	22.2	6.8	24.1
Juveniles (ton)	236.9	30.7	29.0	28.17	12.10	12.1	5.12	8.04
Av. Price juveniles (1000 le /ton)	7	12	5	20	10	25	3	15
Total price juveniles mil (LE)	1.66	0.37	0.15	0.56	0.12	0.30	0.02	0.12
Av. Weight one fish gm	4	15	9	50	10	50	5	140
Length at first maturity $L_m$ cm	14	18.5	14.4	43	18	31	13.2	430
Weight at first maturity gm	18.6	56.9	37.0	566.0	40.4	288	24.5	1453
Natural mortality (M )	0.63	0.41	0.48	0.27	0.46	0.27	0.58	0.19
Formula Najmudeen and Sathiadas	1.72	2.25	2.13	8.22	2.16	4.18	2.02	8.32
Biomass losses(ton)	406.7	69.2	61.8	231.6	26.1	50.7	10.3	66.9
Mean price (1000LE/ton)	35	75	45	85	60	90	40	65
Total price mil LE	14.2	5.2	2.8	19.7	1.6	4.6	0.4	4.3
Total biomass losses(ton)				923	3.2			
Total incom losses million LE				52	.8			

**Table 2.** Purse seine fishery losses for different species in Mediterranean coast of Sinai, during 2016.

Table (4) shows the samples that were collected from the production of Trowel net boats and classified depending weight to adult fish and juvenile fish . The proportion of fish waste represents 42.2 % of the production Trowel net boats.

Table (5) shows the negative impact of the presence of juvenile fish in the production of boats Trowel net a result of poor handling of fish on the boat after fishing or illegal fishing nets.

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Table	3.	Trammel	net	fishery	losses	for	different	species	in	Mediterranean
		coast of Si	inai,	during	2016.					

	Shrimp Scad	Sardinella spp	Spanish mackerel	F. Mullets	Cattle fish	Whit sea bream	Crabs	seabream
Total sample Kg	240	240	240	240	240	240	240	240
Adult fish of sample Kg	140	160	160	140	180	140	180	140
Juvenile fish of sample Kg	100	80	80	100	60	100	60	100
% Of adult fis	58.3	66.7	66.7	58.3	75.0	58.3	75.0	58.3
% Of juvenile fish	41.7	33.3	33.3	41.7	25.0	41.7	25.0	41.7
Total catch(ton)	12.9	48.7	19.3	14.8	18.2	5.24	127.6	5.2
Juvenile fish (ton)	5.37	16.24	6.44	6.18	4.55	2.18	31.9	2.18
Av. Price of ton juvenile (1000le)	20	9	25	30	50	30	30	40
Total price juvenile fish mil (LE)	0.11	0.15	0.16	0.19	0.23	0.07	0.96	0.09
Av. Weight one fish gm	25	8	70	100	100	50	30	50
Length at first maturity L <sub>m</sub>	18.5	14	43	31	15	23	10.2	24.5
Weight at first maturity	56.9	18.6	566	288.1	262	224.5	79.7	206.3
Natural mortality (M )	0.34	0.50	0.24	0.22	0.22	0.27	0.32	0.27
Formula Najmudeen and Sathiadas	1.50	1.16	6.12	2.26	2.06	3.27	1.80	3.01
Biomass losses (ton)	8.04	18.88	39.44	13.97	9.35	7.13	57.47	6.55
Mean price (1000LE/ton)	75	35	85	90	180	90	80	150
Total price mil LE	0.6	0.7	3.4	1.3	1.7	0.6	4.6	1.0
Total biomass losses(ton	160.8							
Total incom LE	13.8							

Results indicated that, the landing of juvenile leads to more losses of stock biomass which formed 523.6 tons and 53.9 million LE losses in one fishing season, 2016 (Table 5). The catch composition from ELafsha (The Others from Trowel net). Collected 80 kg sample from Elafsha per month was studied and the composition of the sample and the weight of each type were observed in the sample. Table 6 shows the monthly composition of the ELafsha of boats trawlers in the Mediterranean coast of Sinai during fishing season 2016.

	Total sample kg	Adult fish of sample kg	Juvenile fish of sample kg	% of adult fish	% of Juvenile fish	total catch ton	Adult Fish ton	Juvenile Fish ton
Crabs	240	180	60	75	25	297.78	223.3	74.45
Cattle fish	240	130	110	54.2	45.8	42.39	22.96	19.43
Shrimp	240	160	80	66.7	33.3	58.21	38.81	19.4
Red mullte	240	115	125	47.9	52.1	1.58	0.757	0.823
Red porgy	240	125	115	52.1	47.9	15.81	8.234	7.576
Atlantic Lizard fish	240	130	110	54.2	45.8	2.98	1.614	1.366
Others						92.6		92.6
total						511.35		215.6
% total trash fish				215.6/511	.35*100 =	42.2		

**Table 4.** Adult and Juvenile fish from the production Trowel net boats during<br/>season 2016.

**Table 5.** Trowel net fishery losses for different species in Mediterranean coast of Sinai, during 2016.

	Crabs	Cattle fish	Shrimp	Red mullte	Red porgy	Atlantic Lizard fish
Total sample (kg)	240	240	240	240	240	240
Adult fish of sample kg	180	130	160	115	125	130
Juvenile fish of sample kg	60	110	80	125	115	110
% of Adult fish	75.0	54.2	66.7	47.9	52.1	54.2
% of Juvenile fish	25.0	45.8	33.3	52.1	47.9	45.8
Total catch (ton)	297.8	42.4	58.2	1.58	15.81	2.98
Juvenile fish (ton)	74.4	19.4	19.4	0.8	7.6	1.4
Av. Price of ton trash fish(1000le)	20	60	100	50	25	25
Total price trash fish mil (LE)	1.489	1.166	1.940	0.041	0.189	0.034
Av. Weight one fish gm	8	70	6.0	5	10	12
Length at first maturity LM gm	9305.6	277.6	3233.9	164.6	757.6	113.8
Weight at first maturity gm	10.2	15	5.8	12.43	24.5	14.5
Formula Najmudeen and Sathiadas	79.7	262.0	17.5	17.9	170.6	22.9
Biomass losses(ton)	5.0	2.8	1.3	1.5	9.1	1.1
Mean price (1000LE/ton)	371.0	55.1	25.5	1.2	69.3	1.5
Total price mil LE	80	180	300	200	90	90
Total biomass losses(ton			523	3.6		
Total incom losses million LE			53	.9		

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Months	Red Mullte ton	Red Porgy ton	Atlantic Lizard fish ton	Groper (small) ton	Grey Gurnard ton	Cattle Fish ton	Crabs ton	Bogue ton	Total (ton )
Jan.	0.41	1.54	1.63	0.41	0.45	0.81	0.41	0.85	6.50
Feb.	0.20	5.80	2.61	1.21	1.99	8.47	3.58	2.22	26.06
Mar.	0.60	2.58	3.39	0.71	0.89	2.50	2.50	1.03	14.21
Apr.	0.40	1.00	0.90	0.40	0.60	0.20	0.90	0.64	5.04
May	0.30	0.41	1.40	0.30	0.40	0.80	1.20	0.60	5.41
June	0.60	1.40	1.20	0.60	0.60	0.20	2.10	0.95	7.65
July	0.20	1.50	1.50	0.50	0.40	0.20	2.20	1.54	8.04
Aug.	0.40	1.00	1.40	0.50	0.60	0.20	1.70	1.25	7.05
Sep.	0.30	0.40	1.00	0.50	0.40	0.40	0.20	0.63	3.83
Oct.	0.40	0.00	0.00	0.00	0.50	0.10	1.00	0.45	2.45
Nov.	0.10	0.00	0.00	0.50	0.00	0.00	0.00	0.04	0.64
Dec.	0.10	0.50	0.10	0.40	0.40	3.00	0.40	0.82	5.72
Total ton	4.00	16.11	15.11	6.04	7.22	16.90	16.20	11.00	92.60
%	4.3	17.4	16.3	6.5	7.8	18.3	17.5	11.9	100

 Table 6. The monthly catch composition for different species of ELafsha during season 2016.

Table (7) shows the negative impact of the presence of ELafsha of boats Trowel net a result of poor handling of fish on the boat after fishing or illegal fishing nets. Results indicated that, the landing of juvenile leads to more losses of stock biomass which formed 538.1 tons and 91.5 million LE losses in one fishing season, 2016 (Table 7).

In the present study, small fish whose length is less than the length at maturity (Lm) were reached with the trammel net method 27.5%, with the Purse seine 55.6% and with Trawl net 42.2% in the Sinai catch in 2016. The loss of

these ratios was 2145.7 tons in biomass and 212 million as a material loss (Fig. 1 and 2).

	Red mullte	Red porgy	Atlantic Lizard fish	Groper (small)	Grey gurnard	Crabs	Cattle fish	Bogue
ELafsha (ton)	4	16.11	15.11	6.04	7.22	16.9	16.2	11
av. Weight one fish g	5	10	8	40	10	8	50	8
av. Price of ton trash fish (1000LE)	25	15	15	50	15	20	10	10
Total price trash fish (1000LE)	0.1	0.24	0.23	0.3	0.11	0.34	0.16	0.11
Length at first maturity LM gm	12.45	24.5	14.5	47	17	10.2	15	11.5
Weight at first maturity gm	17.9	170	22.9	1700	40	79.7	262	30
Formula Najmudeen and Sathiadas	1.49	9.11	1.4	30.1	2.14	5.0	3.82	1.9
biomass losses(ton)	5.95	146.8	21.6	181.6	15.5	84.2	61.8	20.6
Mean price (1000LE/ton)	200	90	90	300	90	80	180	70
Total price mil LE	1.2	13.2	1.9	54.5	1.4	6.7	11.1	1.4
Total biomass losses (ton)				538	8.1			
Total incom losses million LE				91	.5			

Table 7. Negative impact of the presence of El afsha.



Fig 1. Total biomass losses (ton) cached by different gears during 2016.



Fig 2. Total income losses million LE for different gears during 2016.

### DISCUSSION

From the previous results the catch from Purse seine gears in Mediterranean coast of Sinai during 2016 *sardinella spp* 200.5 and 236.9 tons for adult and juvenile(Smaller than Lm) respectively; Shrimp Scad 20.8, 30.7 tons for adult , juvenile respectively; Sigans 15.1, 29 tons adult , juvenile respectively; Narrow bared Spanish mackerel 16.9, 28.2 tons adult , juvenile respectively; Mullets 10.1 and 12.0 tons adult and juvenile respectively and Atlantic mackerel 8.6, 12.1 tons adult , juvenile respectively; Snapper 1.7, 5.1 tons adult , juvenile respectively and finally Kawakawa 16.1, 8.0 tons adult, juvenile respectively.

In this study, the Purse- seine methods in the Mediterranean coast of Sinai fishery may lead to loss a large amount of fish stock in the form of juvenile. The biological losses were estimated at least 923.2 ton annually. Results indicated that, the landing of juvenile leads to more losses of stock biomass which formed 923.2tons and 52.8 million LE losses in one fishing season, 2016.These results are higher than that obtain by Gaber (2010) who mentioned that the negative impact of the presence of fish waste in the production of boats Purse seine 1401.9 tons and 31.4 million LE losses in one fishing season, 2009

in the same area and El-Dakar *et al* (2011) who stated that the negative impact of the presence of fish waste in the production of boats Purse seine 2154.1 tons and 30.5 million LE losses during seasons 2009 and 2010 in the same area.

El-Haweet (2001) reported that the increasing attention has been paid over recent years to the economic performance of fisheries. Inshore seine fishery should be controlled. Increasing juvenile catches in the inshore seine fishery will decrease the total catch and intensify the effect of the trawl fisheries.

Gaber (2010) pointed that the presence of fish waste in the production of Trawl net estimated at about 45.2 % of the total production of these vessels and the losses of stock biomass which formed 1269.9 tons and 93.3 million LE losses in one fishing season, 2009.

Also El-Dakar *et al* (2011) mentioned that the negative impact of the presence of fish waste in the production of boats Trawl net 4186 tons and 175.9 million LE losses during seasons 2009 and 2010.

To end, results indicated that, the landing of juvenile leads to more losses of stock biomass which formed 2145.7 tons and 212 million LE losses in one fishing season, 2016. In the present study, small fish whose length is less than the length at maturity (Lm) were reached with the trammel net method 27.5%, with the Purse seine 55.6% and with Trawl net 42.2% in the Sinai catch in 2016. The loss of these ratios was 2145.7 tons in biomass and 212 million as a material loss. Nothing was mentioned about the discarded fish, which are returned to the sea again, such as sea turtles and many fish, most of them dead because the results obtained in this study were from boats after they left the sea. Many scientists have studied these quantities discarded in the Mediterranean Sea, especially the Purse seine and Trowel net such as.

Discard rates geographically estimated ranged from 23 to 67 %, and belong to different Mediterranean Sea habitats (Al sayes and Fatthouh, 2009). Also, in the Turkish Seas, research has been focused on studies concerning discard catch in the last decade, and most of these studies were carried out using beam trawls (Gökçe and Metin, 2006). Gurbet *et al.* (2013) mentioned that the total discard biomass ratio was 30.5 % in the trawl fisheries of Izmir Bay (Aegean Sea). Gucu (2012) pointed out the status of bottom trawl fisheries from 1980s onwards in Levantine Sea, and compared data considering temporal and depth differences.

Studies off the south coast of Portugal (Algarve) by Borges *et al.* (2001) have shown that the mean discard rate of purse seiners varies between 20 and 30% of the total catch

## RECOMMENDATION

All the results obtained by the previous scientists are derived from the results obtained in this study and the losses of stock biomass is more than double. We must follow the vessels in the sea during the fishing process to reduce this loss and preserve fish stocks. It is necessary to conduct educational guidance courses for the fishermen of this region and present the results of this study to them to know the amount of loss suffered by the catch and they are the first losers due to the wrong practices in the process of fishing and the use of illegal fishing nets.

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تحليل الخسائر في الكتلة الحيوية والدخل من معدات الصيد المستخدمة في ساحل البحر المتوسط في سيناء مصر خلال 2016

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## الملخسص العربسي

تم دراسة التأثير السلبى لمراكب الشانشولا والدبة والجر على مصيد البحر المتوسط على ساحل تم . سيناء وذلك عن طريق اخذ عينات شهرية ٢٠ كجم من كل نوع من المصيد داخل كل حرفة صيد توزيع الاسماك الى اسماك صغيرة واسماك ناضجة حسب الطول والوزن عند النضج الجنسي تبعا اوضحت النتائج ان نسبة . لدراسات سابقة على هذه الانواع في نفس المنطقة او المناطق المجاورة الاسماك الصغيرة 55% من انتاج الشانشولا و2.52% من انتاج الدبة و 42.2 % من انتاج الجر. وكان الانتاج السلبى على الكتلة الحية 2.923 و1061.7 و 160.8 طن لكل من الشانشولا والجر ولادبة على التوالي بإجمالي ٢١٤٥.5 طن في موسم صيد واحد ٢٠١٦ وبقية ٢١٢ مليون جنيه