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SPECIES COMPOSITION AND SIZE FREQUENCY DATA BASED ON CHINESE OBSERVER PROGRAM IN CENTRAL PACIFIC OCEAN IN 2008

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Xiao-jie Dai and Jiang-feng Zhu [1]

[1] Shanghai Ocean University, Shanghai, P. R. China

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Xiao-jie DAI AND Jiang-feng ZHU [1]

Shanghai Ocean University, Shanghai, P. R. China

1. Introduction

Pelagic longline vessels operating in the Pacific Ocean captured not only the target tuna species, but many other ecologically related marine animals (bycatch). Unlike the target species, the bycatch species were not well recorded on logbook because of various factors. Therefore, biological information for bycatch species was generally collected by longline observer onboard. China began the longline observer work in the Pacific Ocean since 2003. In this short paper, we reported the species composition and size distribution for target tunas and commonly caught non-target marine fishes based on a Chinese observer trip in central Pacific Ocean.

2. Materials and Methods

All data analyzed in this paper were collected by a trained onboard observer within the area of 2 ºN~12 ºN, 178 ºE~165 ºW between 27 May and 9 July 2008. A total of 34 sets (totally 96070 hooks deployed) were operated and observed during this period of time. The longline vessel was a frozen tuna longliner “Dayang 11” (overall length of 43.86 m and 378 GT) targeting bigeye tuna and yellowfin tuna. For each basket, length of floating line was 40 m, and length of branch line was 44 or 48 m. Distance between two branch lines was 47 m. Number of branch lines for each basket varied between 16 and 17. The standard Japanese tuna hook was used. Three genera of fish were used as baits during the observation period, i.e., jack mackerel, mackerel scad and Argentina shortfin squid. Generally, each setting started early in the morning and hauling started in the afternoon.

When an animal was hauled onboard, species identification was made immediately and biological information was then collected for randomly selected individuals. The biological information collected included length to the nearest centimeter (cm), weight to the nearest kilogram (kg), sex, and maturity if possible. Length and weight, the round weight for most species, were recorded using Code referred to Brogan et al. (2006).

3. Results

3.1 Species composition

A total of 31 species captured were observed during the trip, including 30 species of fishes and 1 species of sea turtle (Table. 1). Among tunas, albacore and skipjack were

infrequently caught during the observation period. Blue marlin and swordfish were two relatively frequently caught billfishes. And for sharks, silky shark was the most frequently caught species, while shortfin mako, longfin mako, crocodile shark and velvet dogfish were seldom caught. Among the total of 34 sets, only one sea turtle, a leatherback turtle, was captured (hooked in mouth) and released alive by cutting the line before hauled onboard. No sea bird was hooked during the trip, although interactions occurred occasionally when setting or hauling.

3.2 Length and weight distribution

Table 2 showed the minimum, maximum, and mean of length and weight for randomly selected individuals for all species caught during the observer trip. And Figure 1 to Figure 8 showed the length and weight frequency for commonly caught species.

4. Discussions

Species composition of the catch of longline fishery varied largely with factors such as fishing season, latitude and longitude. To mitigate the bycatch, species composition and interactions of non-target species with longline fishing should be well understood. And species composition of catch, especially the discarded species (e.g., longnose lancetfish and velvet dogfish) can be used in ecological risk assessment (ERA), such as proposed by Kirby (2006). Many of these should be further investigated in the future observer work.

Because of scarcity of fishery and biological data, full stock assessments were difficult to conduct for many bycatch species. Scientists were seeking alternative approaches to evaluate the effects of fishing on these fishes stocks. Size composition of fish captured was an important source of information which related to the stock structure. For example, average weight of fish in the catch may be investigated as an indicator to assess the stock status.

5. Acknowledgement

Great thanks were given to the captain and other fishermen of longliner “xxx” for their supports and assistances during the observer work.

6. References

Brogan D, Fukofuka S, Sharples P. Longline Observer Guide. Secretariat of the Pacific Community, Noumea, New Caledonia, 2006

Kirby D. S. Ecological risk assessment for species caught in WCPO tuna fisheries: inherent risk as

determined by productivity-susceptibility analysis. 2006, WCPFC-SC2-EB WP-1, Manila, Philippines

Table 1: Species of fishes caught by Chinese longliner "Dayang 11" in central Pacific Ocean, 27 May – 9 July 2008

	English name	Scientific name	FAO Code
Tunas	Bigeye tuna	*Thunnus obesus*	BET
	Yellowfin tuna	*Thunnus albacares*	YFT
	Albocore tuna	*Thunnus alalunga*	ALB
	Skipjack tuna	*Katsuwonus pelamis*	SJK
	Blue marlin	*Makaira mazara*	BUM
Billfishes	Striped marlin	*Tetrapturus audax*	MLS
	Swordfish	*Xiphias gladius*	SWO
	Shortbill spearfish	*Tetrapturus angustirostris*	SSP
	Indo-Pacific sailfish	*Istiophorus platypterus*	SFA
Sharks	Silky shark	*Carcharhinus falciformis*	FAL
	Oceanic whitetip shark	*Carcharhinus longimanus*	OCS
	Blue shark	*Prionace glauca*	BSH
	Shortfin mako	*Isurus oxyrinchus*	SMA
	Longfin mako	*Isurus paucus*	LMA
	Bigeye thresher	*Alopias superciliosus*	BTH
	Crocodile shark	*Pseudocarcharias kamoharai*	PSK
	Velvet dogfish	*Scymnodon squamulosus*	SSQ
Other fishes	Pelagic stingray	*Dasyatis violacea*	PLS
	Longnose lancetfish	*Alepisaurus ferox*	ALX
	Wahoo	*Acanthocybiu, solandri*	WAH
	Escolar	*Lepidocybium flavobrunneum*	LEC
	Common dolphinfish	*Coryphaena hippurus*	DOL
	Opah	*Lampris guttatus*	LAG
	Sickle pomfret	*Taractichthys steindachneri*	TST
	Snake mackerel	*Gempylus serpens*	GES
	Dealfish	*Desmodema polystictum*	DSM
	Dagger pomfret	*Taractes rubescens*	TCR
	Sharptail sunfish	*Masturus lanceolatus*	MRW
	Ocean sunfish	*Mola mola*	MOX
	Spinetail mobula	*Mobula japanica*	RMJ
Sea turtle	Leatherback turtle	*Dermochelys coriacea*	DKK

Table 2: Length and weight for pelagic species caught by Chinese longliner "Dayang 11" in central Pacific Ocean, 27 May – 9 July 2008

Species name	Length (cm)				Weight (kg)			
				Length				Weight
	Min.	Max.	Mean	Code	Min.	Max.	Mean	Code
Bigeye tuna	91	187	134	UF	5	97	38	GT
Yellowfin tuna	86	151	124	UF	10	65	29	GT
Albocore tuna	100	118	107	UF	13	26	19	WW
Skipjack tuna	71	78	73	UF	5	8	6.5	WW
Blue marlin	160	302	195	LJFL	14	180	52	GX
Striped marlin	131	213	188	LJFL	10	55	41	GT
Swordfish	67	255	131	LJFL	2	120	30	GX
Shortbill spearfish	148	165	157	LJFL	5	10	8	GX
Indo-Pacific sailfish	192	192	192	LJFL	22	22	22	GX
Silky shark	67	192	121	FL	1.5	37	12	GX
Oceanic whitetip shark	71	210	117	FL	2.8	62	11	GX
Blue shark	140	224	181	FL				
Shortfin mako	250	250	250	FL	103	103	103	GX
Longfin mako	110	110	110	FL	14	14	14	GX
Bigeye thresher	79	207	127	PCL				
Crocodile shark	68	86	78	FL	2	4.9	3.6	WW
Velvet dogfish	26	74	60	FL	0.1	2.8	2	WW
Pelagic stingray	30	49	41	TW				
Longnose lancetfish	50	176	107	TL				
Wahoo	60	130	105	FL	7	17	11	WW
Escolar	60	90	78	FL	3.6	11	6.6	WW
Common dolphinfish					4	14	9	WW
Opah	110	110	110	FL	20	20	20	GX
Sickle pomfret	52	67	57	FL				
Snake mackerel	50	98	82	FL				
Dealfish	180	180	180	TL				
Dagger pomfret	45	75	57	FL				
Sharptail sunfish	70	70	70	TW				
Ocean sunfish	80	80	80	TW				
Spinetail mobula	*95*	*95*	*95*	TW				
leatherback turtle	*80*	*80*	*80*	CL				

Note:

1. The italic number indicated these data were approximately measured by naked eye, and blanks indicated these items were not measured.

2. Length Codes and Weight Codes were referred to Brogan et al. (2006). UF-upper jaw to fork length; LJFL-lower jaw to fork length; FL-fork length; TL-total length; PCL-pre-caudal fin length; CL-carapace length; TW-total width; WW-whole weight; GT-gilled, gutted and tailed; GX-gutted, headed and tailed.

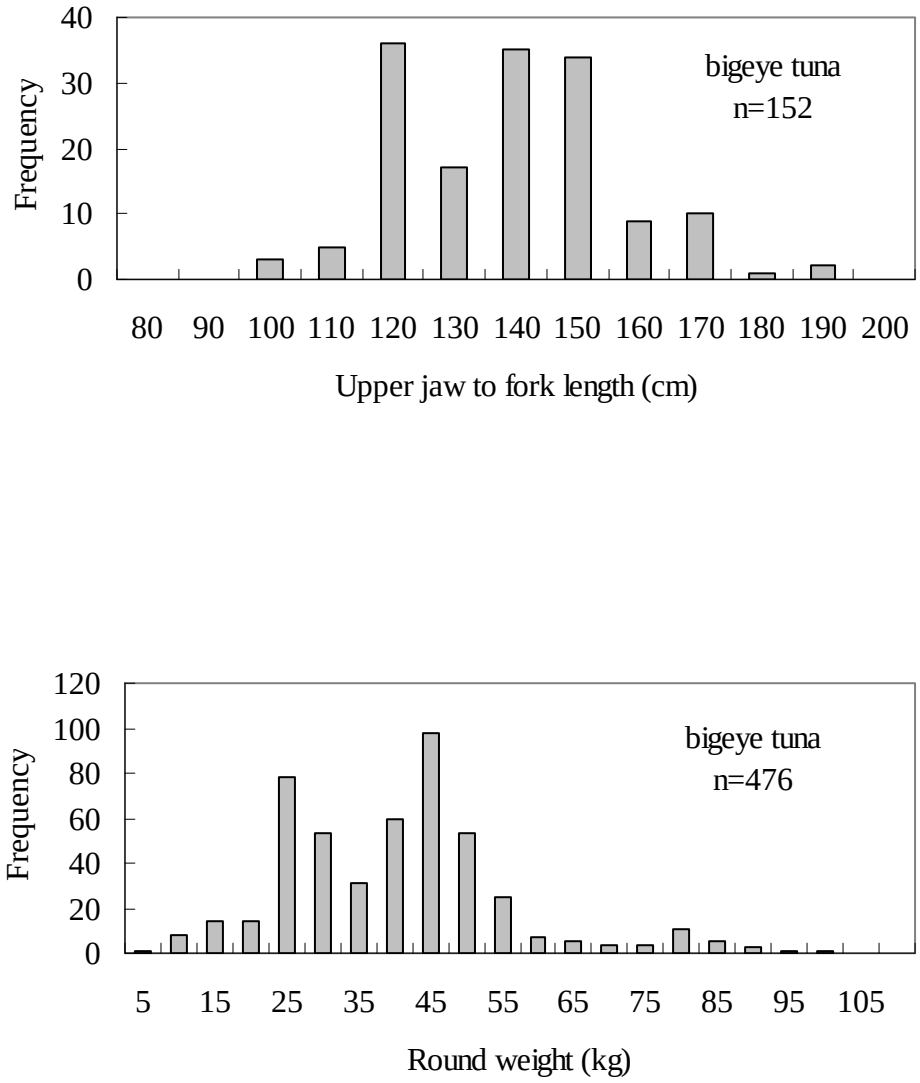
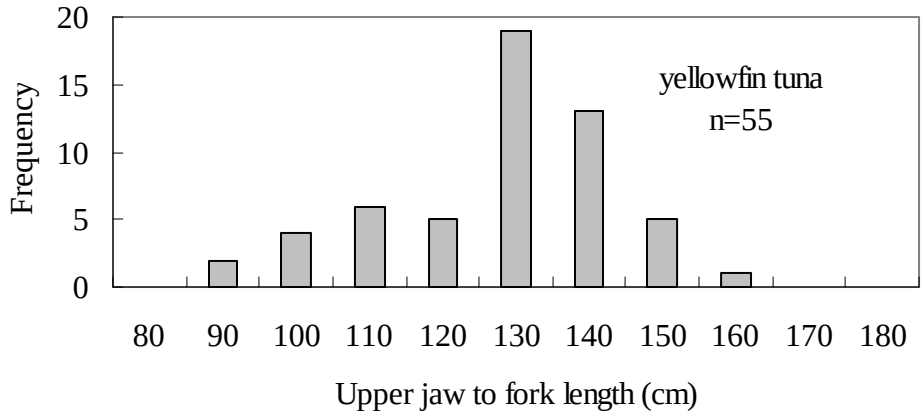


Figure 1: Upper jaw to fork length distribution and round weight distribution for bigeye tuna (combined sexes) caught by Chinese longliner “Dayang 11” in central Pacific Ocean, 27 May – 9 July 2008



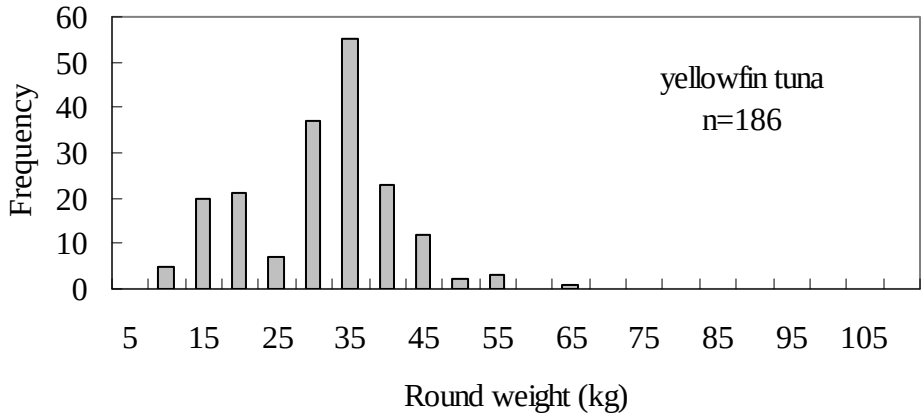
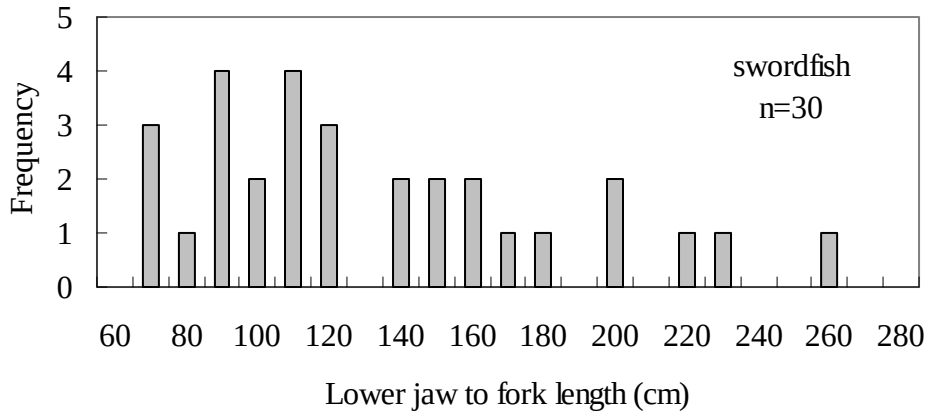


Figure 2: Upper jaw to fork length and round weight distribution for yellowfin tuna (combined sexes) caught by Chinese longliner "Dayang 11" in central Pacific Ocean, 27 May – 9 July 2008



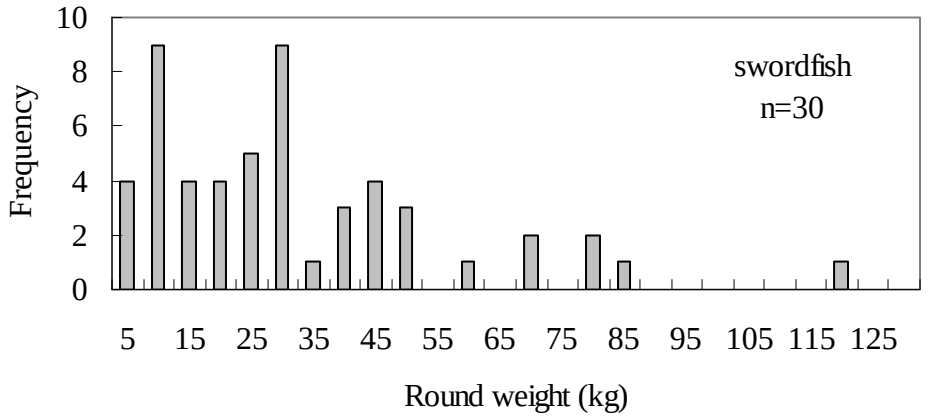
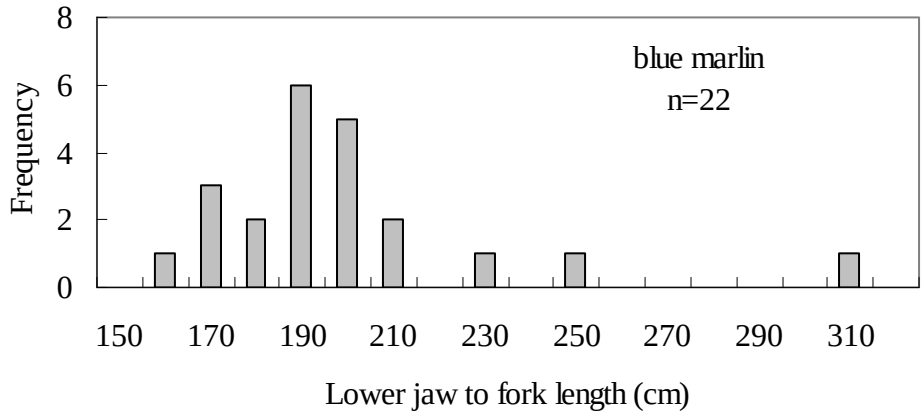


Figure 3: Lower jaw to fork length distribution and round weight distribution for swordfish (combined sexes) caught by Chinese longliner “Dayang 11” in central Pacific Ocean, 27 May – 9 July 2008



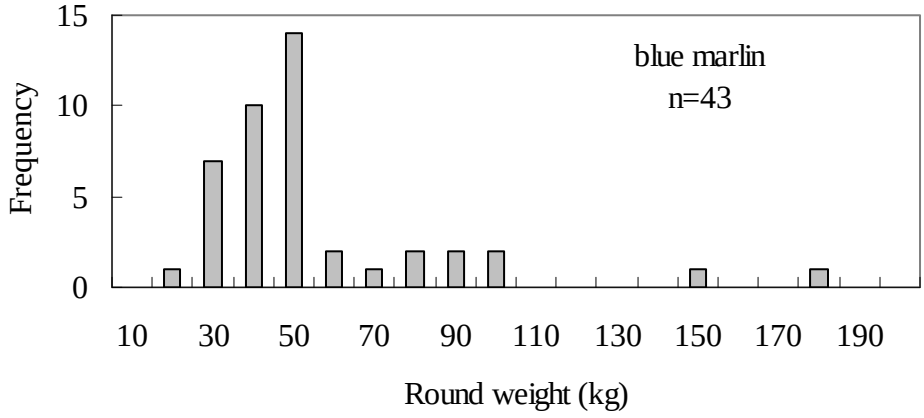
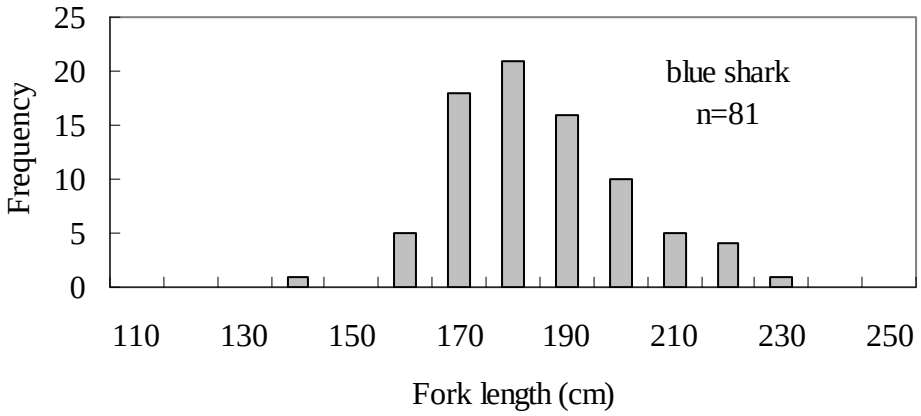


Figure 4: Lower jaw to fork length distribution and round weight distribution for blue marlin (combined sexes) caught by Chinese longliner “Dayang 11” in central Pacific Ocean, 27 May – 9 July 2008



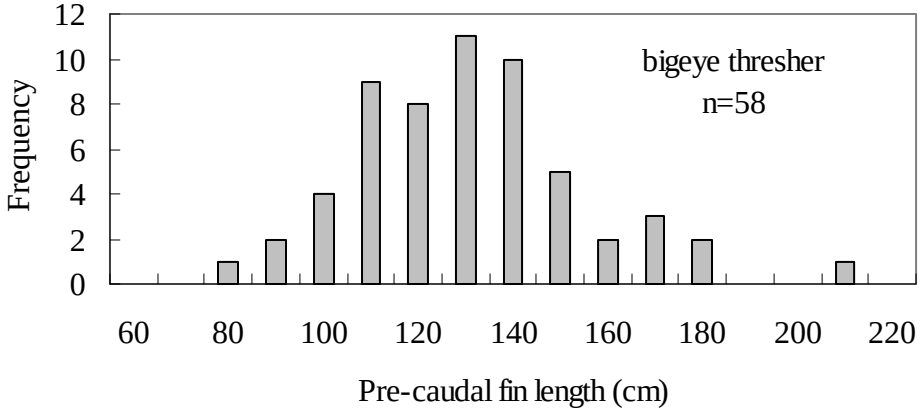
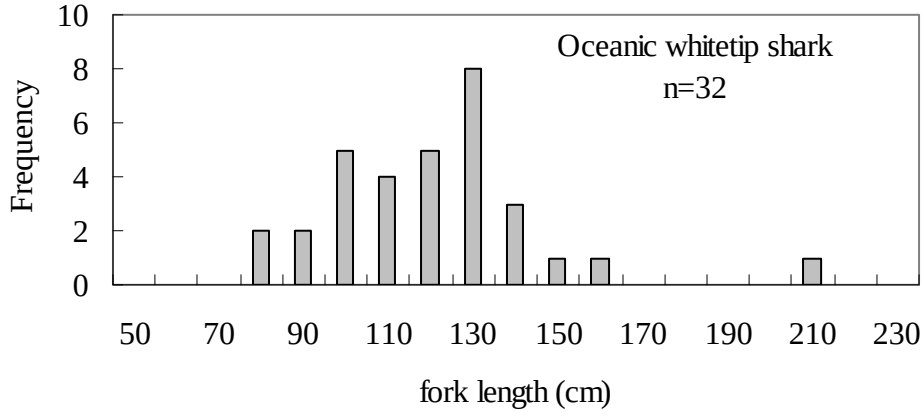


Figure 5: Fork length distribution for blue shark and pre-caudal fin length (PCL) distribution for bigeye thresher shark (combined sexes) caught by Chinese longliner “Dayang 11” in central Pacific Ocean, 27 May – 9 July 2008



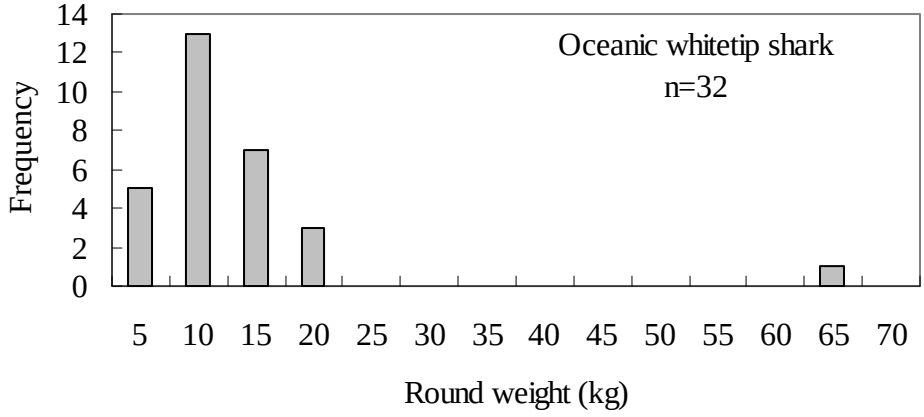
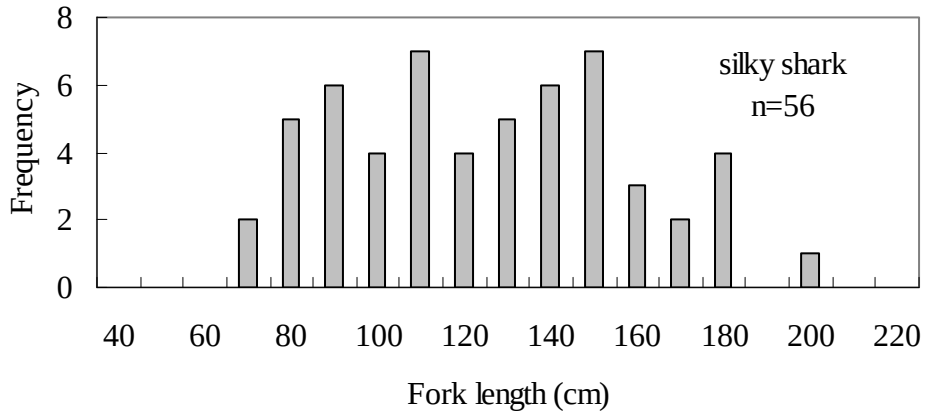


Figure 6: Fork length distribution and round weight distribution for oceanic whitetip shark (combined sexes) caught by Chinese longliner “Dayang 11” in central Pacific Ocean, 27 May – 9 July 2008



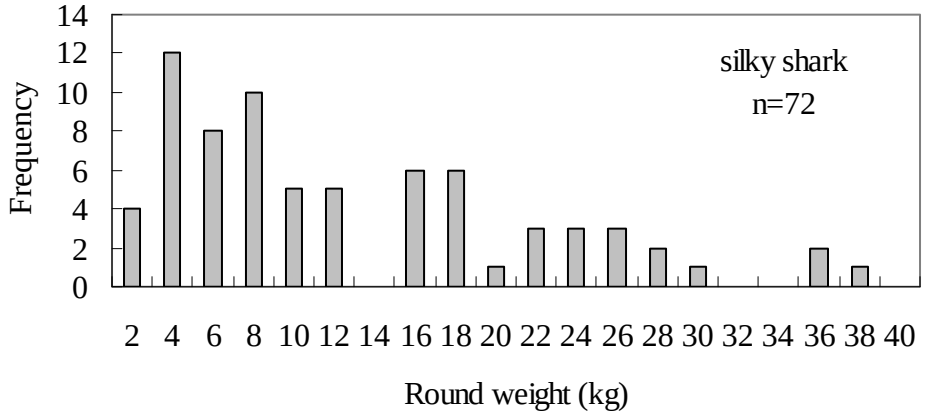


Figure 7: Fork length distribution and round weight distribution for silky shark (combined sexes) caught by Chinese longliner "Dayang 11" in central Pacific Ocean, 27 May – 9 July 2008

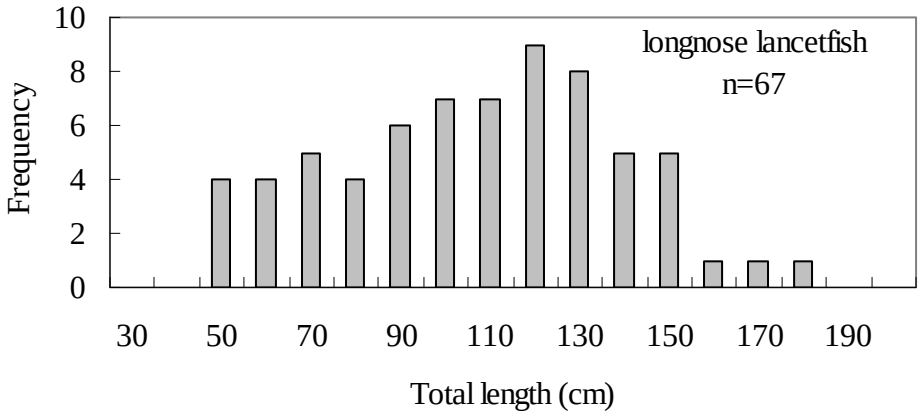


Figure 8: Total length distribution for longnose lancefish (combined sexes) caught by Chinese longliner "Dayang 11" in central Pacific Ocean, 27 May – 9 July 2008