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Reproductive information of silky shark (*Carcharhinus falciformis*) in the central and eastern Pacific Ocean

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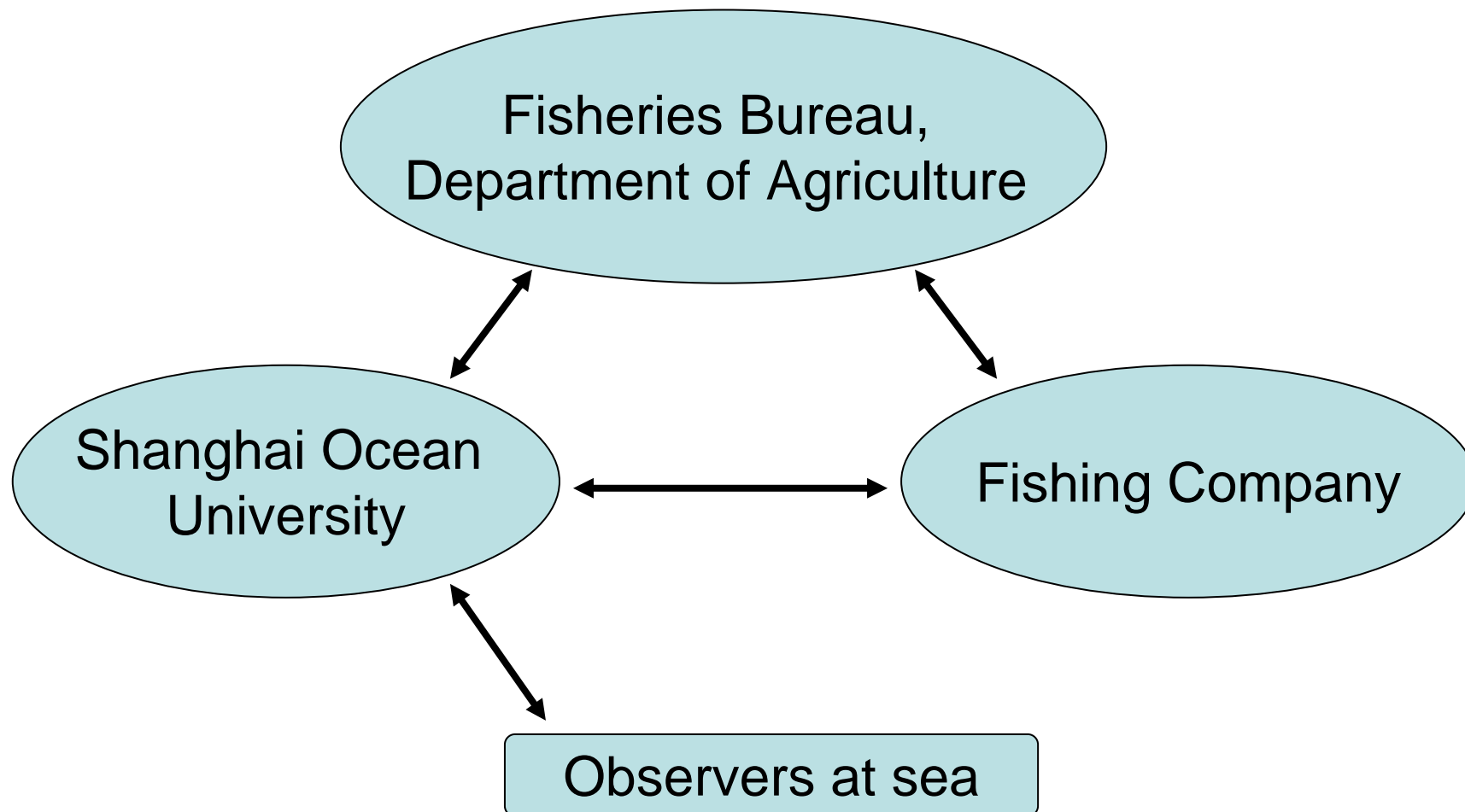


Outline

- Introduction
- Material and methods
- Results

Introduction

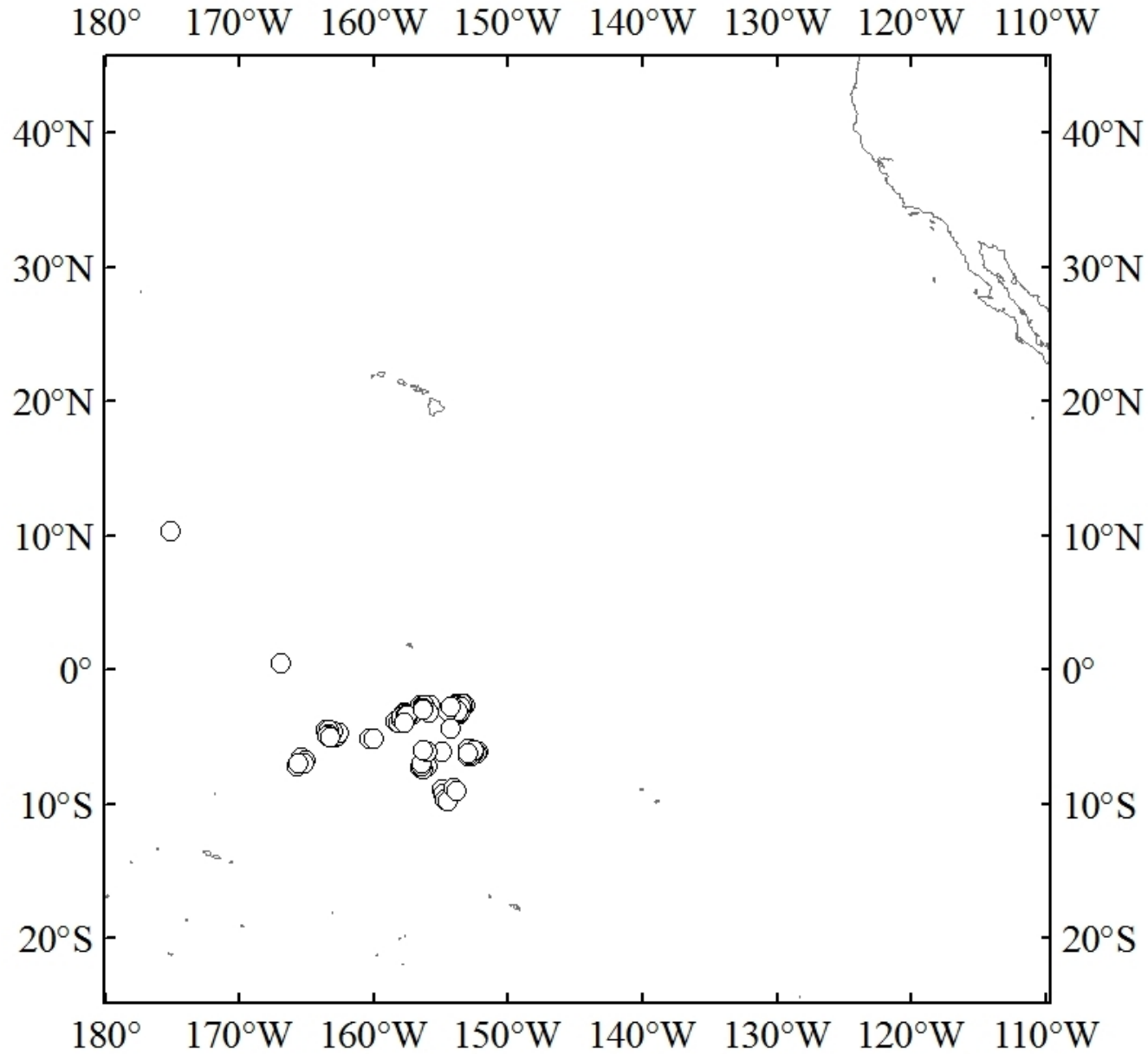
- China longline observer program



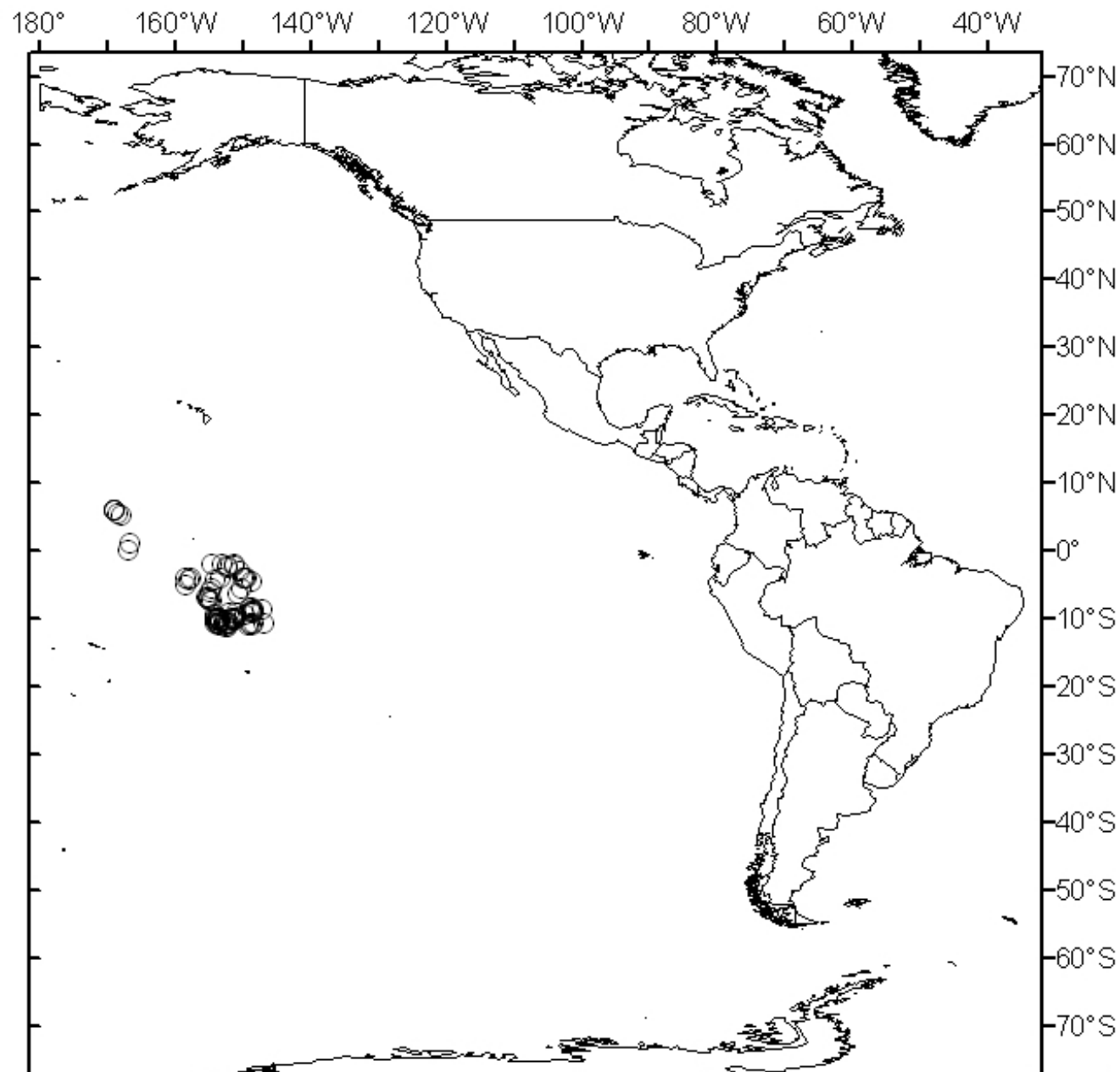
Material and methods

- Silky shark sample source:
2 observer trips in the central and eastern Pacific Ocean in 2010;
- One onboard observer per trip;
- Simple random sampling;
- Biological measurements;
- Onboard macroscopic inspection of reproductive organs.

Sampling stations: Aug - Dec 2010 (Trip 1)



Sampling stations: Oct 2010 - Jan 2011 (Trip 2)



Methods

- Inferences on stages of maturation (Pratt, 1979; Branstetter, 1987). **Females** were separated into 4 stages:
- Juvenile (Stage 1): with undeveloped sexual organs, filiform uteri, and no vitellogenic activity in their ovaries;
- Maturing (Stage 2): with enlarged oviducal glands and showed evidence of vitellogenesis;
- Ovulating (Stage 3): with uterine eggs and mature oocytes in their ovaries;
- Pregnant (Stage 4): with ovulation completed and embryos or pups found in uteri.
- Specimens in Stages 3 and 4 were defined as mature sharks

Methods

- **Males** were only classified as juvenile or adult, based on development of testes and calcification of claspers.

Individuals with relatively short and flexible claspers were considered juvenile.

Adults were characterized by elongated and calcified claspers.

Size distribution, Aug. 2010 - Jan. 2011, Trip 1 + 2

Size range of specimens:

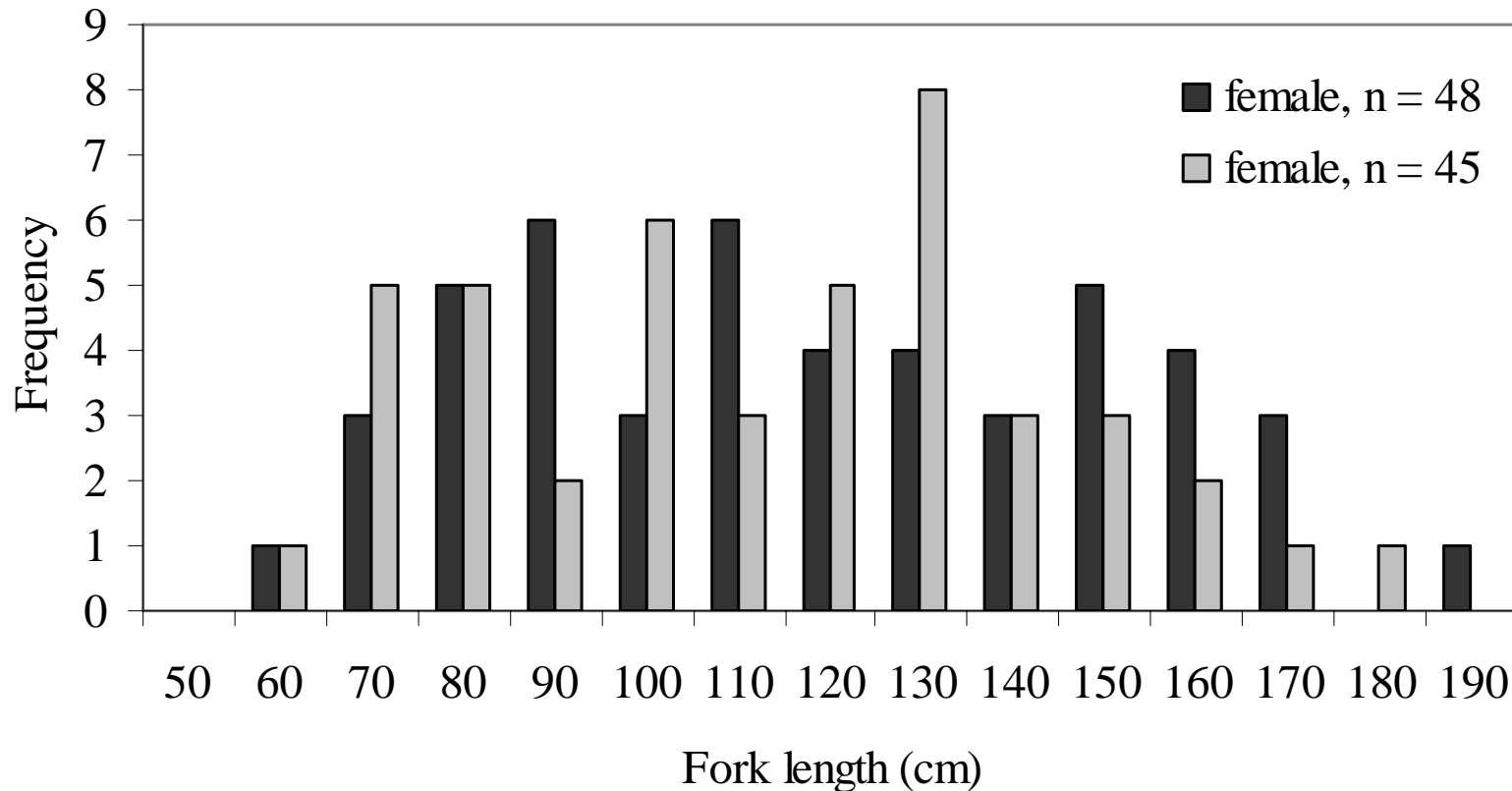
Females: 60 ~ 185 cm FL (mean = 112.8 cm, S.D. = 33.0 cm, $n = 48$);

Males: 60 ~ 173 cm FL (mean = 109.1 cm, S.D. = 30.4 cm, $n = 45$)

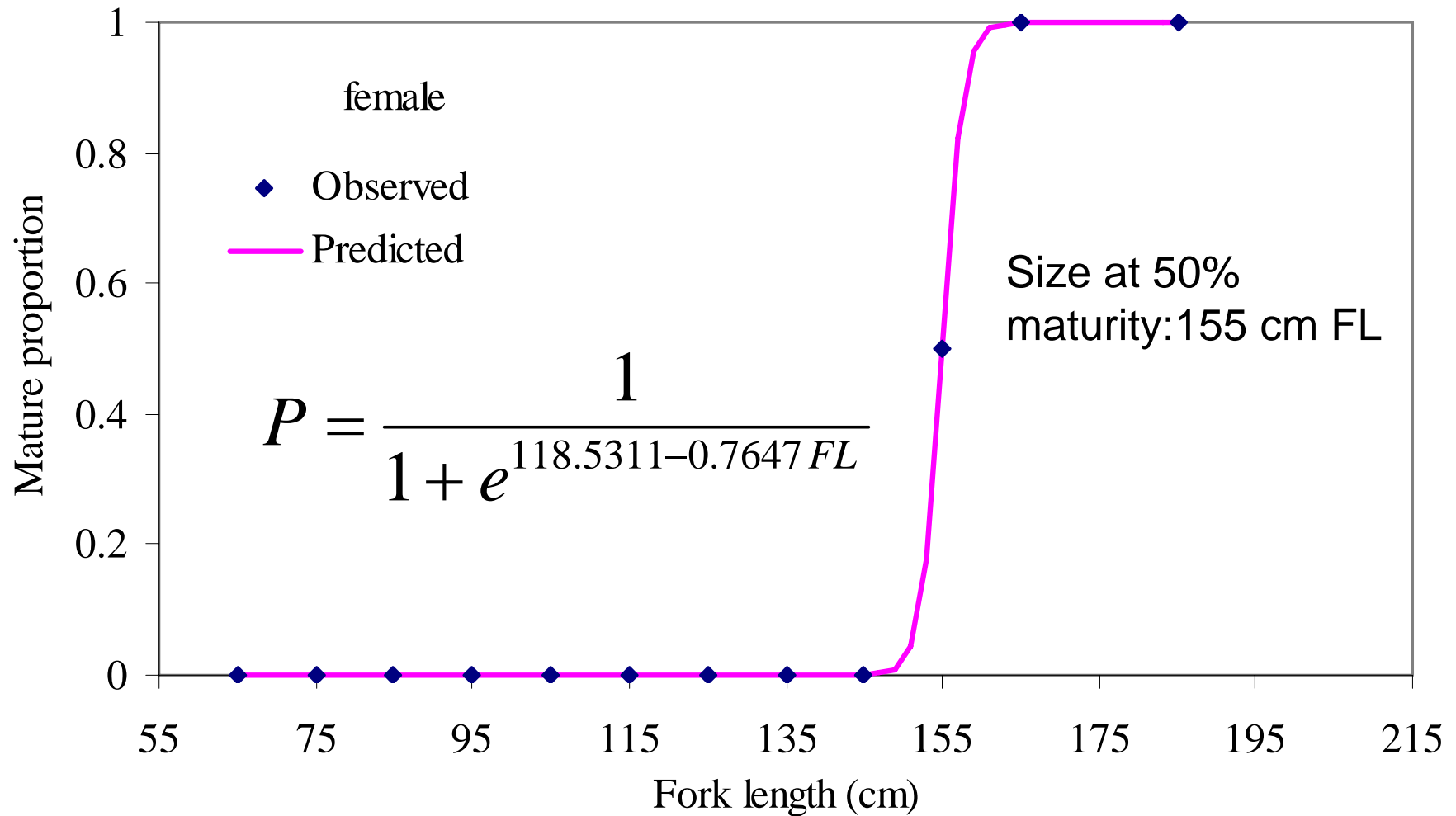
Size distribution, Aug. 2010 - Jan. 2011, Trip 1 + 2

No difference in mean length between female and male (t -test, $P > 0.05$)

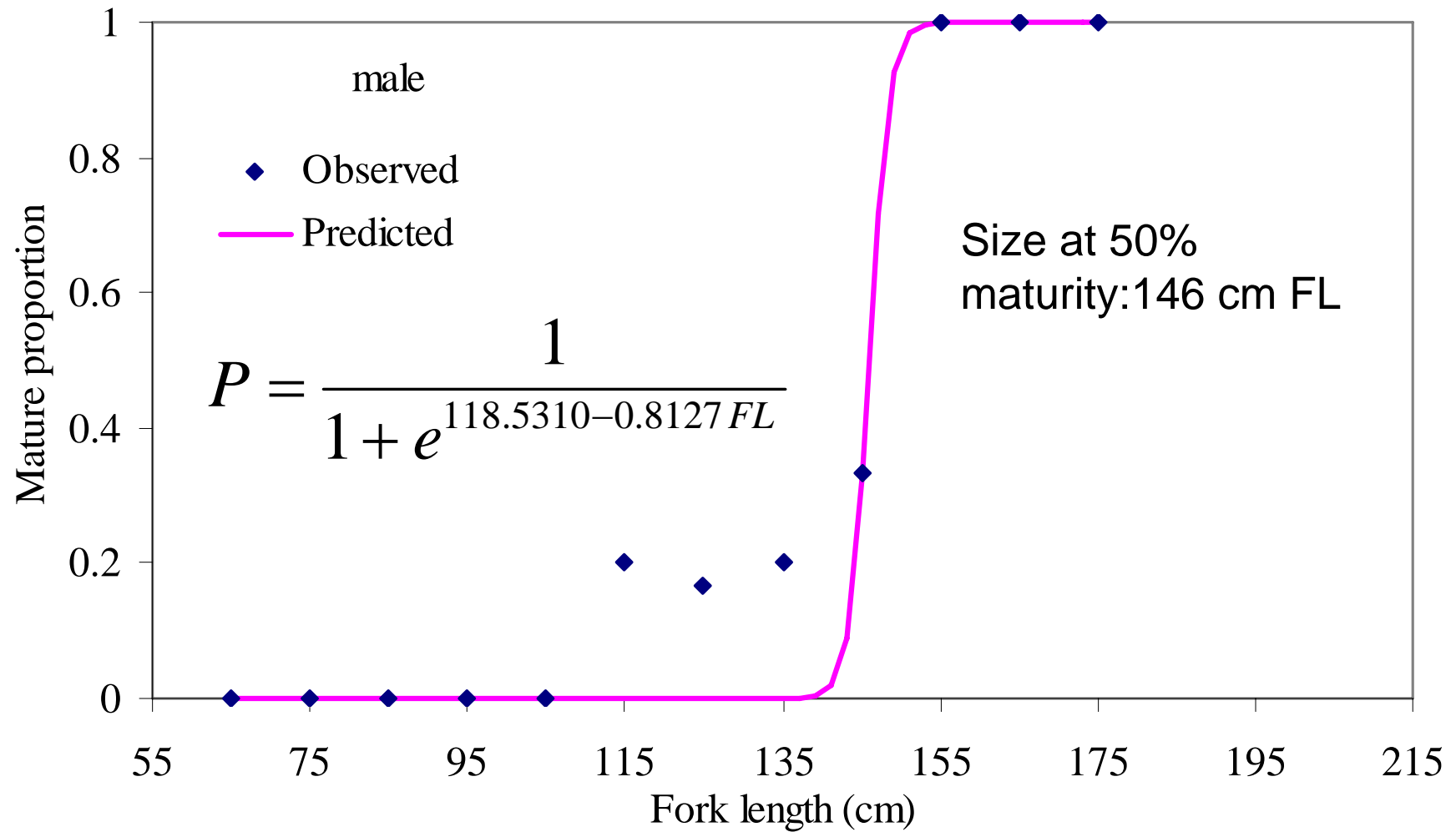
Sex ratio not significantly different from 1:1 (Chi-square = 0.097, $P > 0.05$).



Maturity curve: females



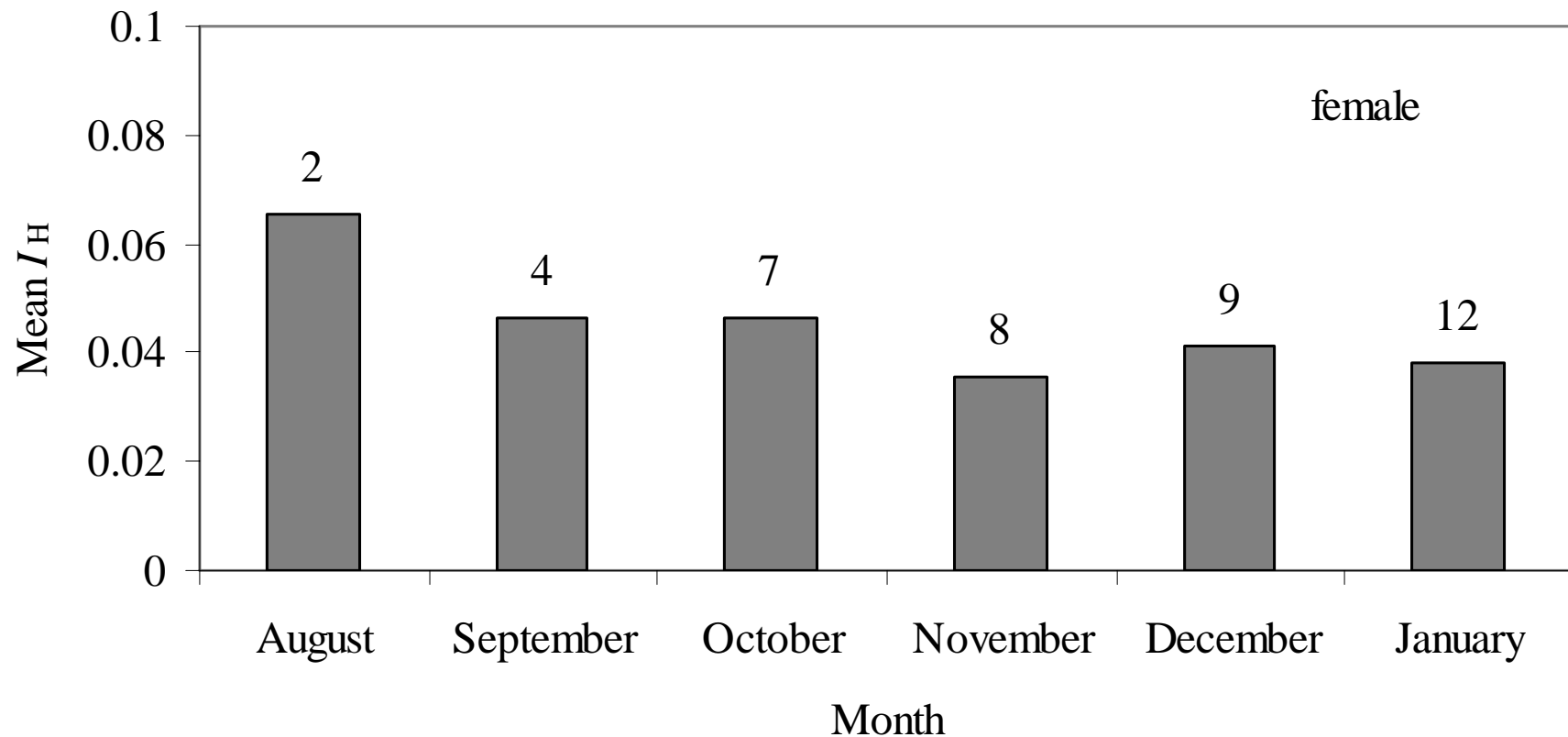
Maturity curve: males



Hepatosomatic indices (I_H): females

$$I_H = LW / (FL)^3 \times 100$$

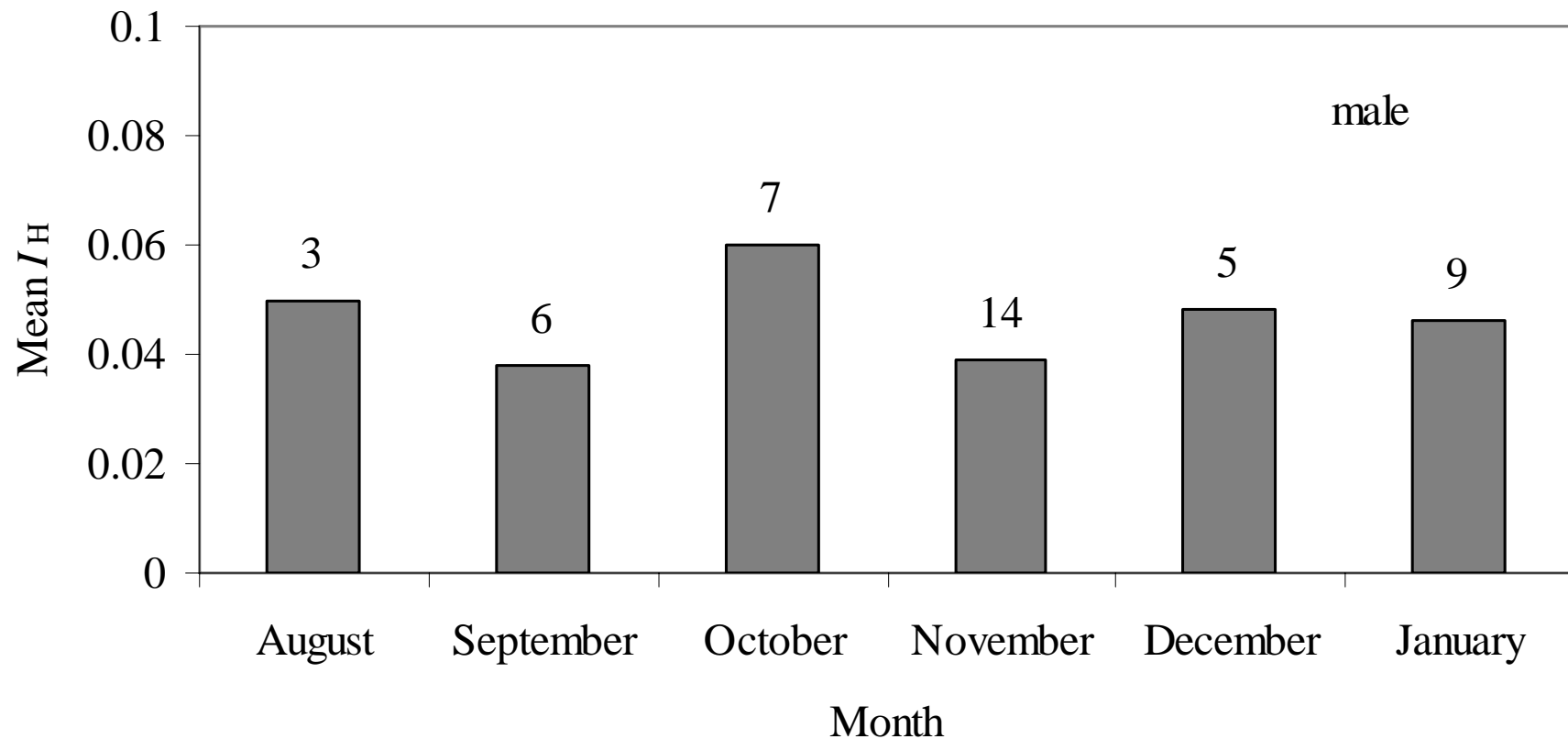
No significant monthly change (ANOVA, $P > 0.05$).



Hepatosomatic indices (I_H): males

$$I_H = LW / (FL)^3 \times 100$$

No significant monthly change (ANOVA, $P > 0.05$).



Litter size

Two pregnant silky sharks observed:

- One in October (164 cm FL):
6 pups (1 ♀, 5 ♂);
- The other in December (152 cm FL):
4 pups (3 ♀, 1 ♂).

Litter size recorded from China observer trips before 2010

Time	Area	Size (cm)	Litter size	Sex ratio
June 2008	3° 09' N, 168° 43' W	172 FL	5	1 ♀ : 4 ♂
July 2008	2° 17' N, 166° 28' W	180 FL	5	2 ♀ : 3 ♂
July-December 2009	1° S-16° S, 125° W-142° W	232 TL	9	3 ♀ : 6 ♂
April 2006	2° 30' S, 166° 25' W	189 FL	5	
April 2006	2° 30' S, 166° 25' W		6	
May 2006	3° 00' S, 136° 00' W	181 FL	6	
July 2006	8° 46' S, 146° 47' W	187 FL	8	
September 2003	9° 35' S, 128° 56' W	181 FL	4	
November 2003	9° 45' S, 127° 53' W	190 FL	10	5 ♀ : 5 ♂
November 2003	10° 21' S, 144° 53' W	187 FL	6	4 ♀ : 2 ♂