Maturation and spawning of Black sea bream, *Acanthopagrus schlegeli*, in Jeonnam marine ranching area

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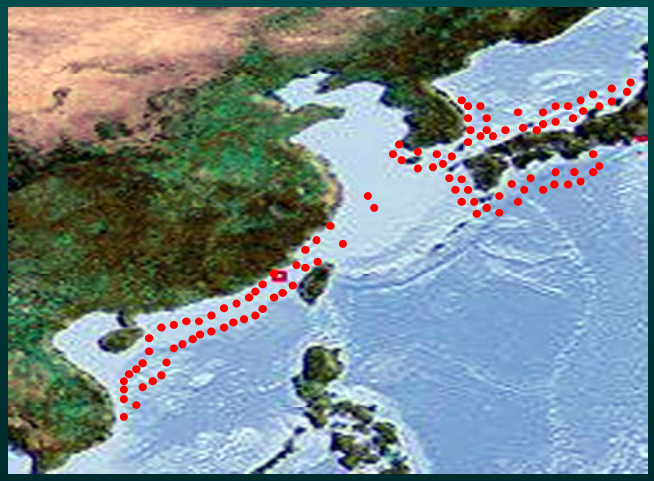
Introduction

- Order : Perciformes
  Family : Sparidae
  Acanthopagrus schlegeli (Black sea bream)

- Distribution : Japan/ East Sea and East China Sea in Korea waters,
  Hokkaido Sea of Japan and Taiwan



- Habitat depth : 50m

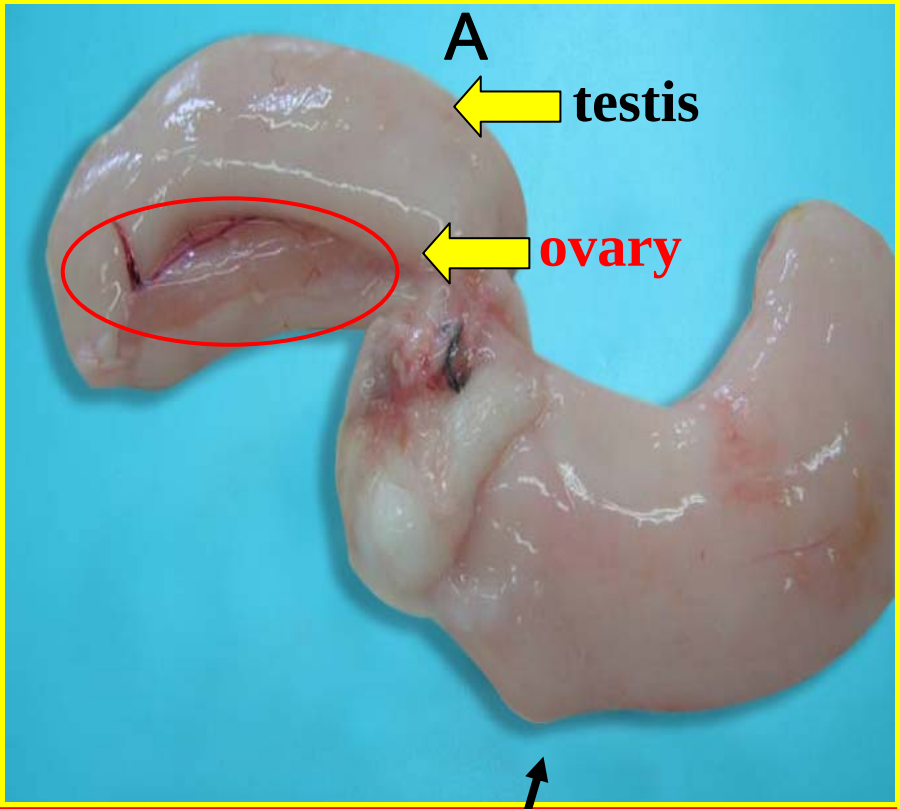
- The objective of this study
  - to examine maturity and spawning of
  Black sea bream in Jeonnam marine ranching area

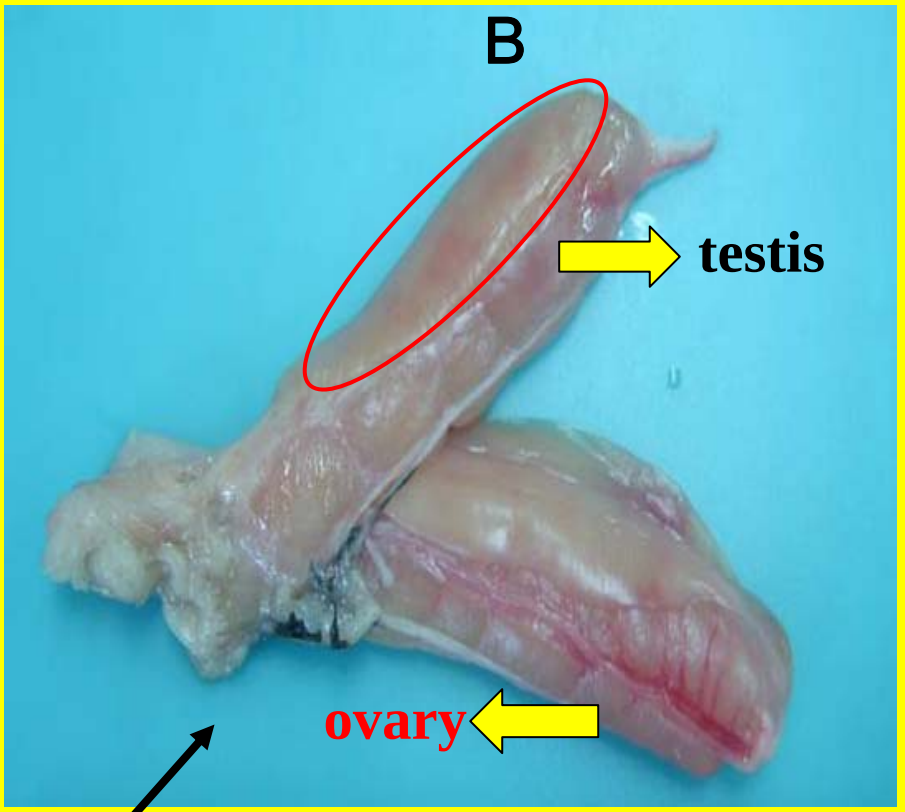
Annual catch of Black sea bream in Jeonnam province, Korea

Protandry fish?

- **The male fish convert into female fish according to growth**

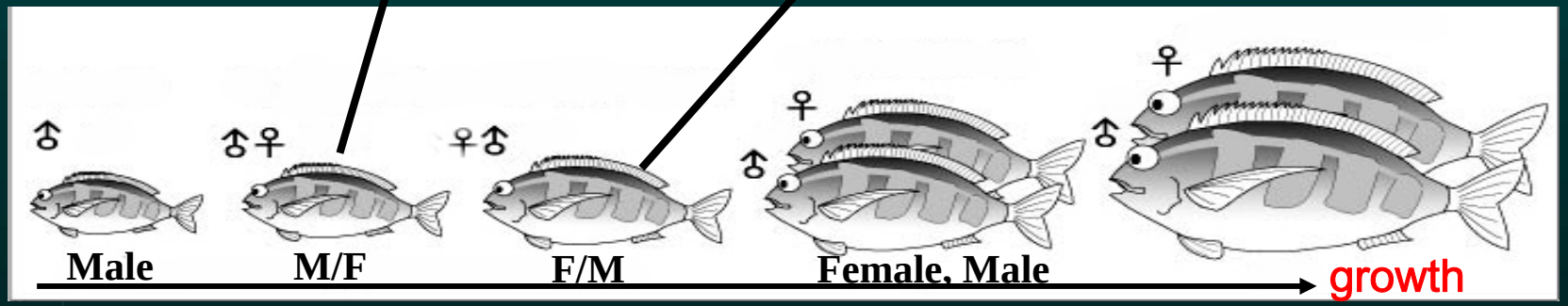
e.g) Black sea bream, Yellow tailed anemone, etc





A picture is <u>early sex-changers</u> conversion of hermaphrodite from female to male

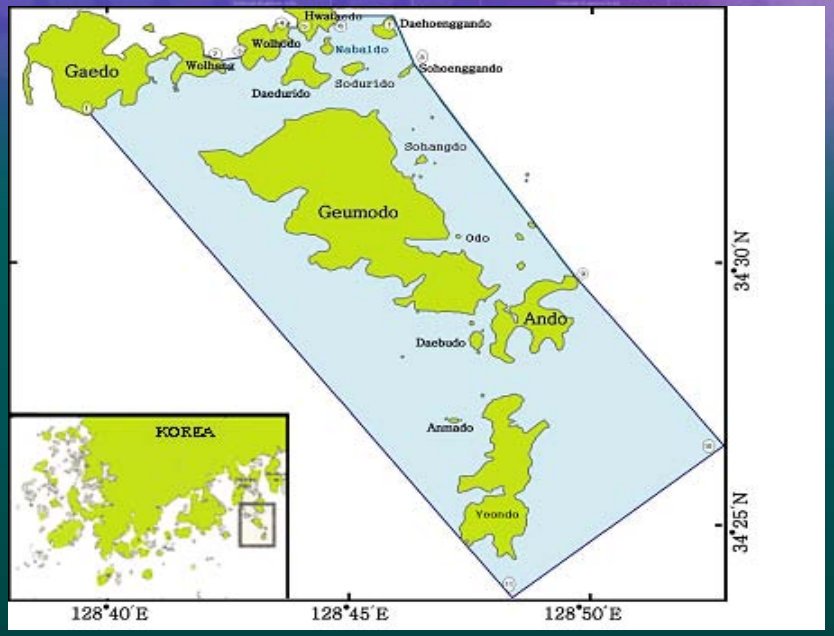
B picture is <u>late sex-changers</u> of hermaphrodite



Material and Method

- **Period : Mar. 2007. ~ Feb. 2008.**
- **Area**

Sampling area of *Acanthopagrus schlegeli* caught by the longline fishery in the Jeonnam marine ranching area.



- **Methods**
  - **Maturity stages**

: divided four stages (immature, maturing, mature, spent)

- **GSI (Gonadosomatic index) :** $GSI = \frac{GW}{BW} \times 10^3$

GW (Gonado Weight), BW (Body Weight)

Material and Method

- **Egg diameter**

- **Fecundity : Wet weight method**

$$F_c = \frac{A - B}{C} \times e$$

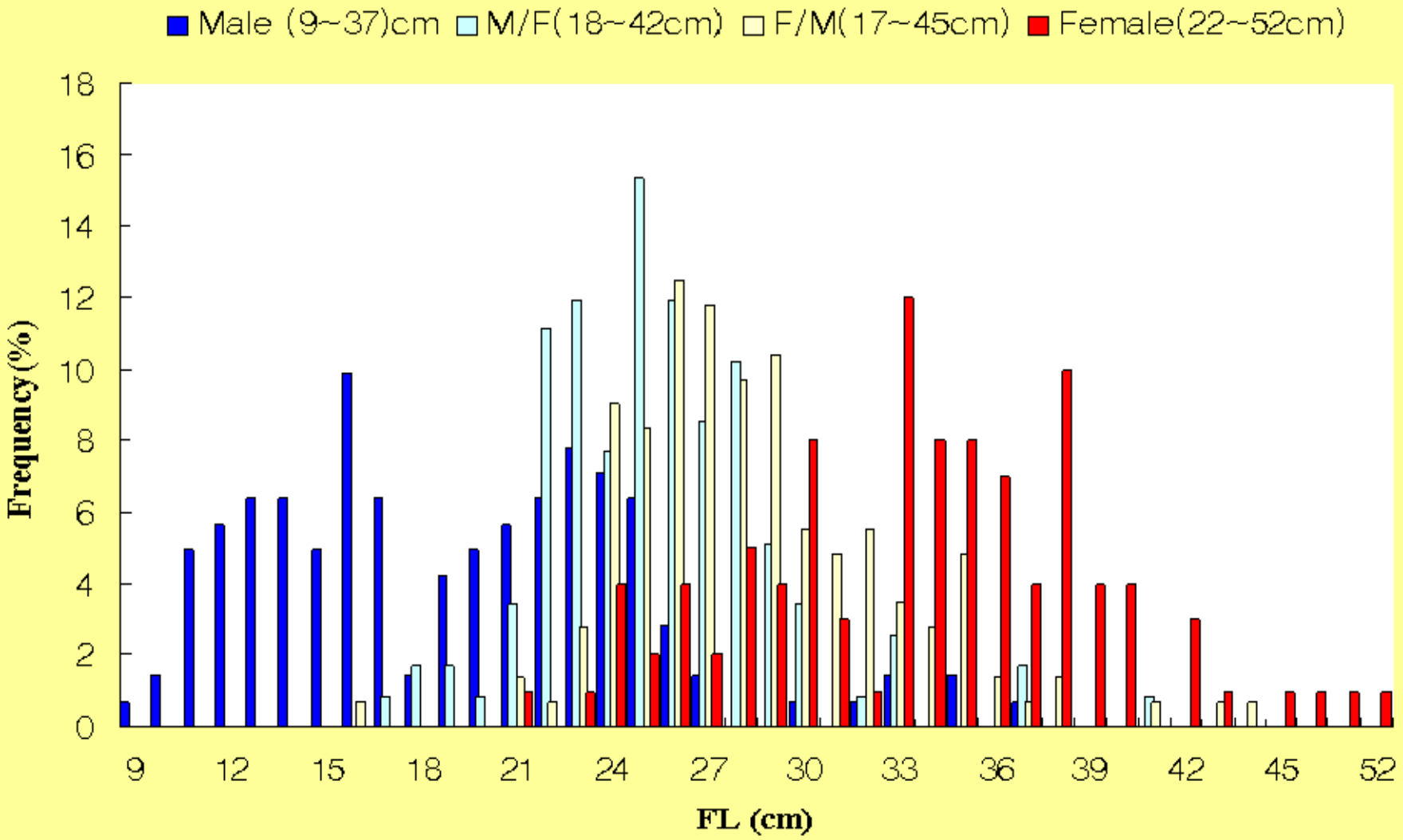
A : Gonado weight, B : Gonado skin weight,
C : Gonado a piece, e : C eggs number

- 50% **sexual maturity :**

$$P = \frac{1}{1 + \exp(a - bFL)}$$

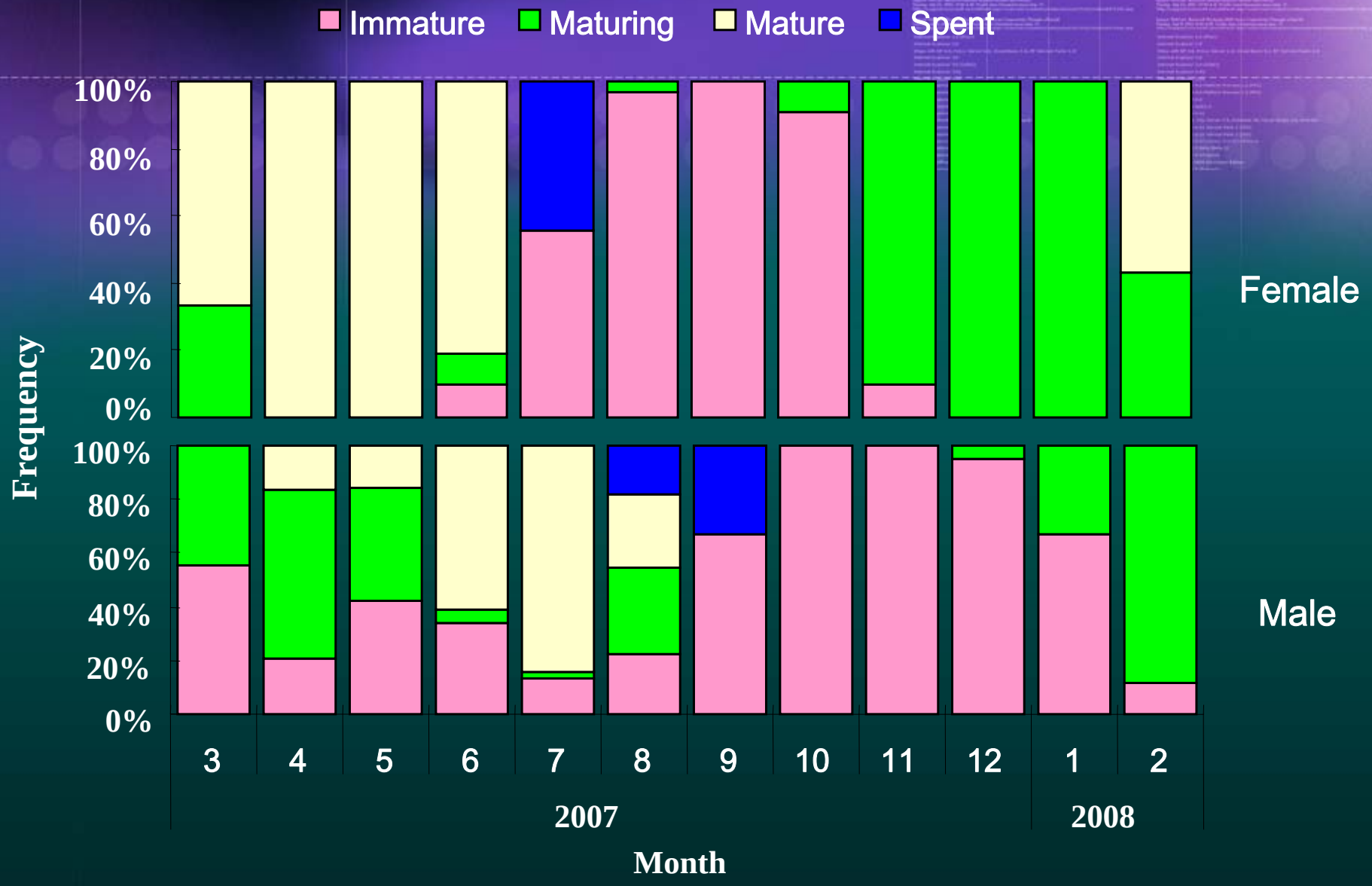
P : predicted mature proportion
a , b : coefficients of the logistic equation

Result



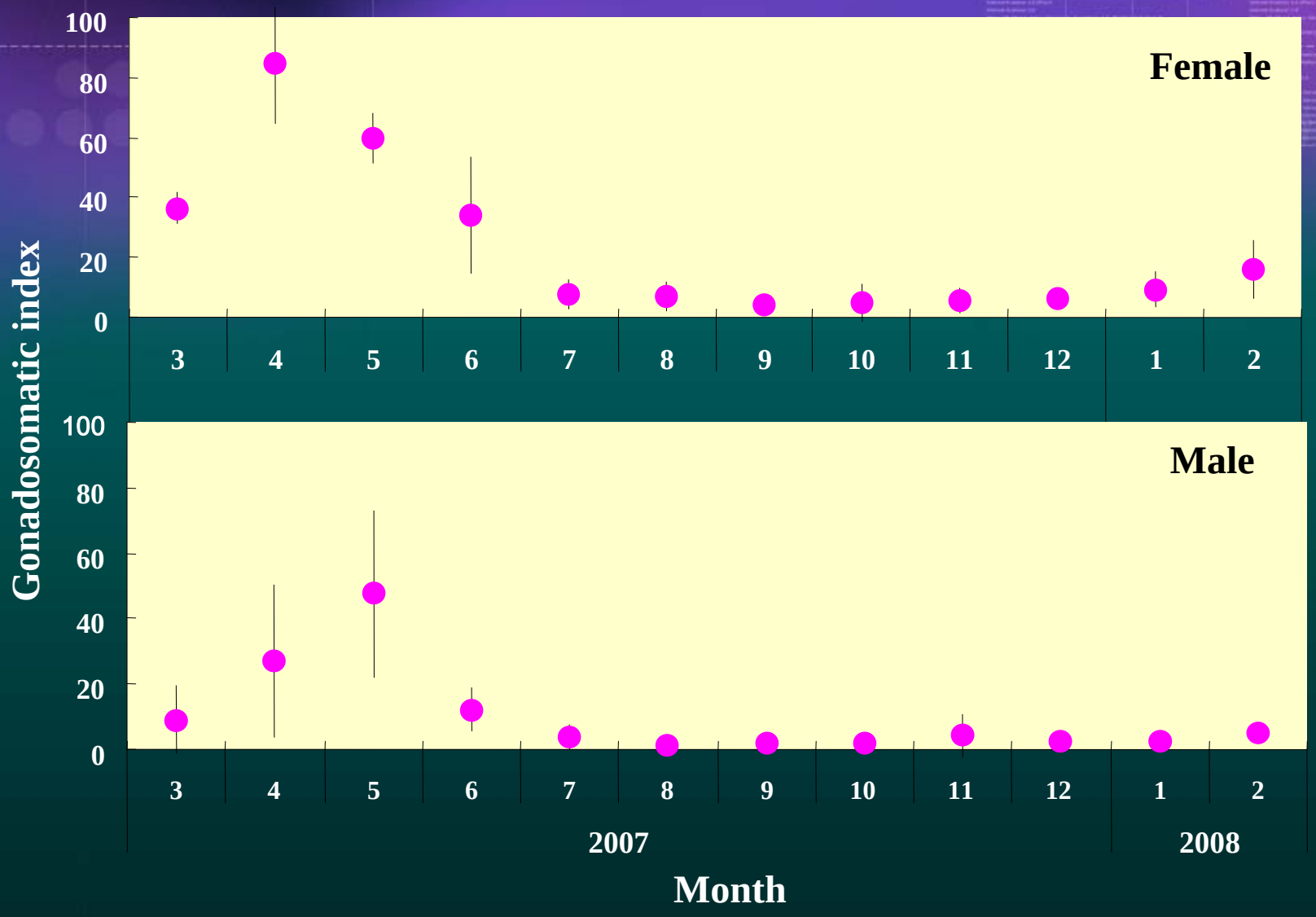
❖ **Hermaphrodite - M/F (early sex-changers), F/M (late sex-changers)**

Length-frequency of Black sea bream in Jeonnam marine ranching area

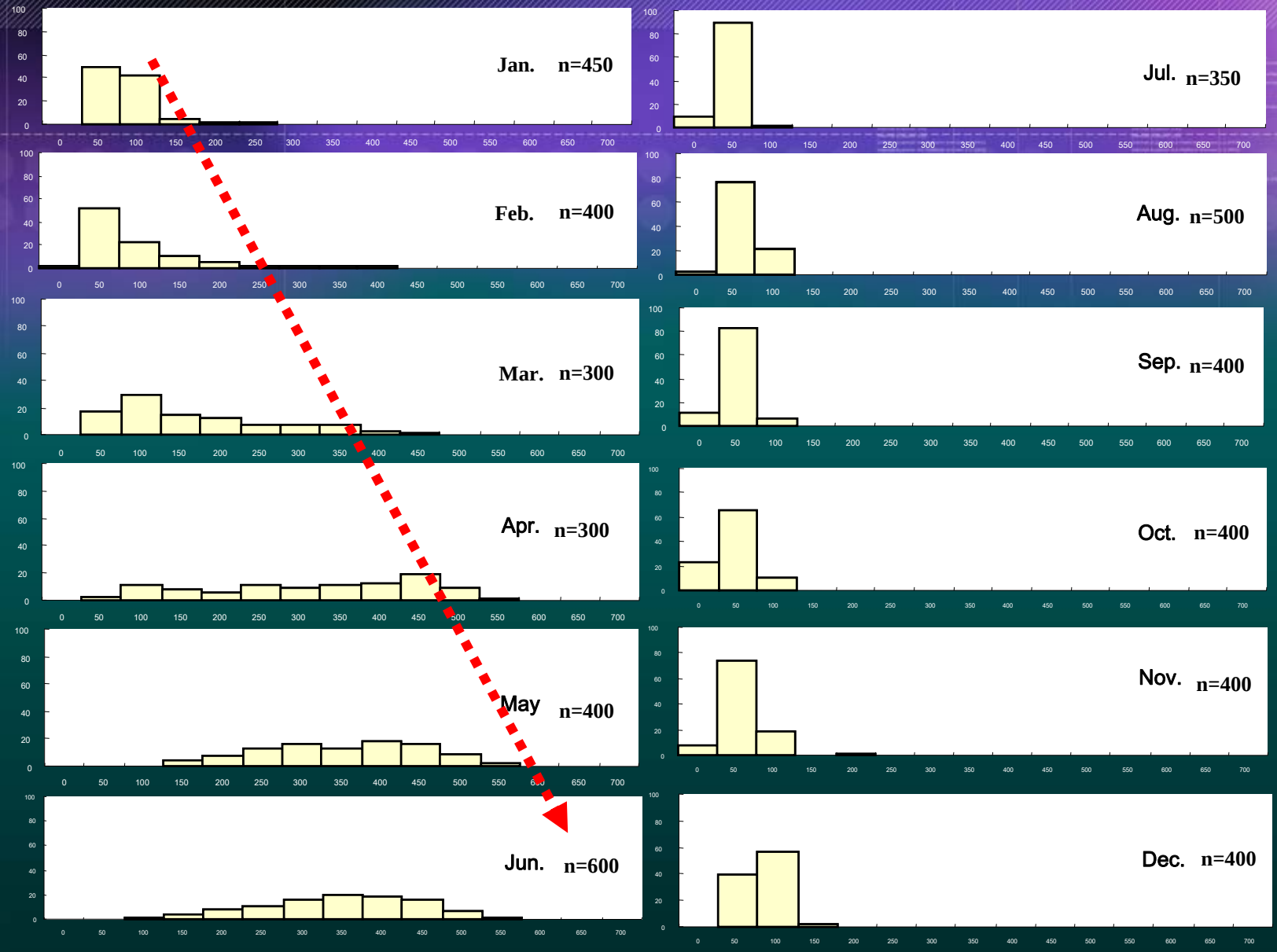


Monthly changes in maturity stages of female and male Black sea bream

❖ Gonadosomatic index(GSI)



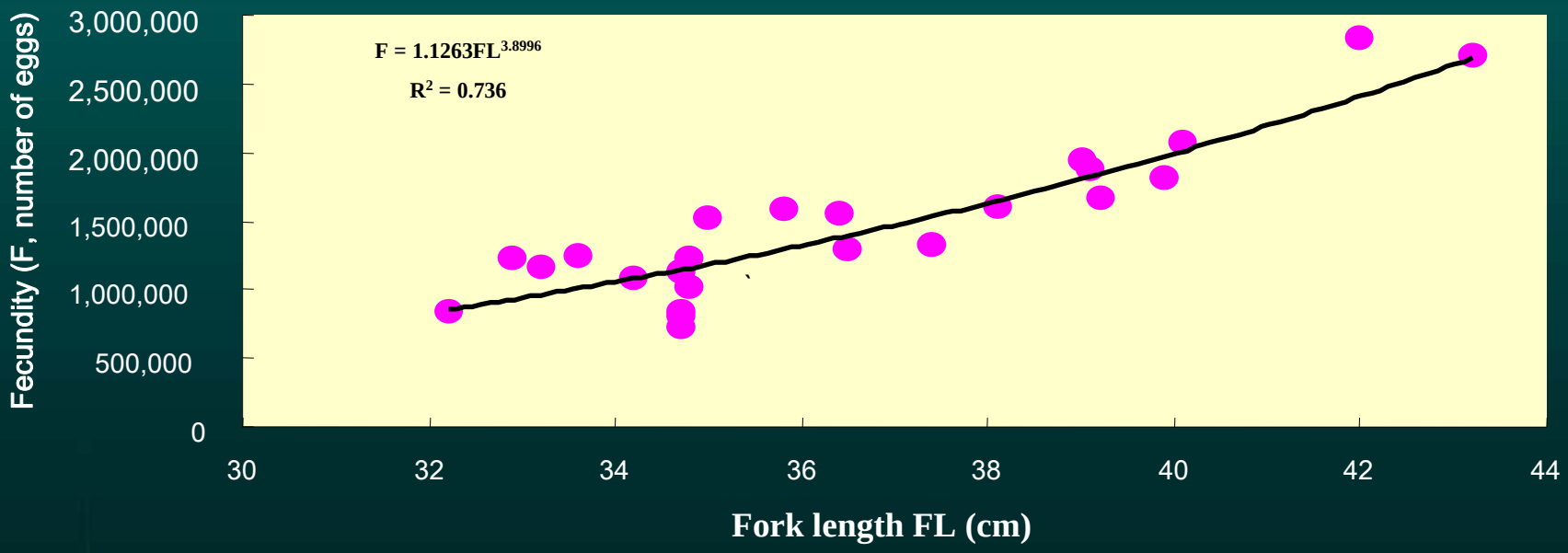
Monthly changes in gonadosomatic index of female and male Black sea bream



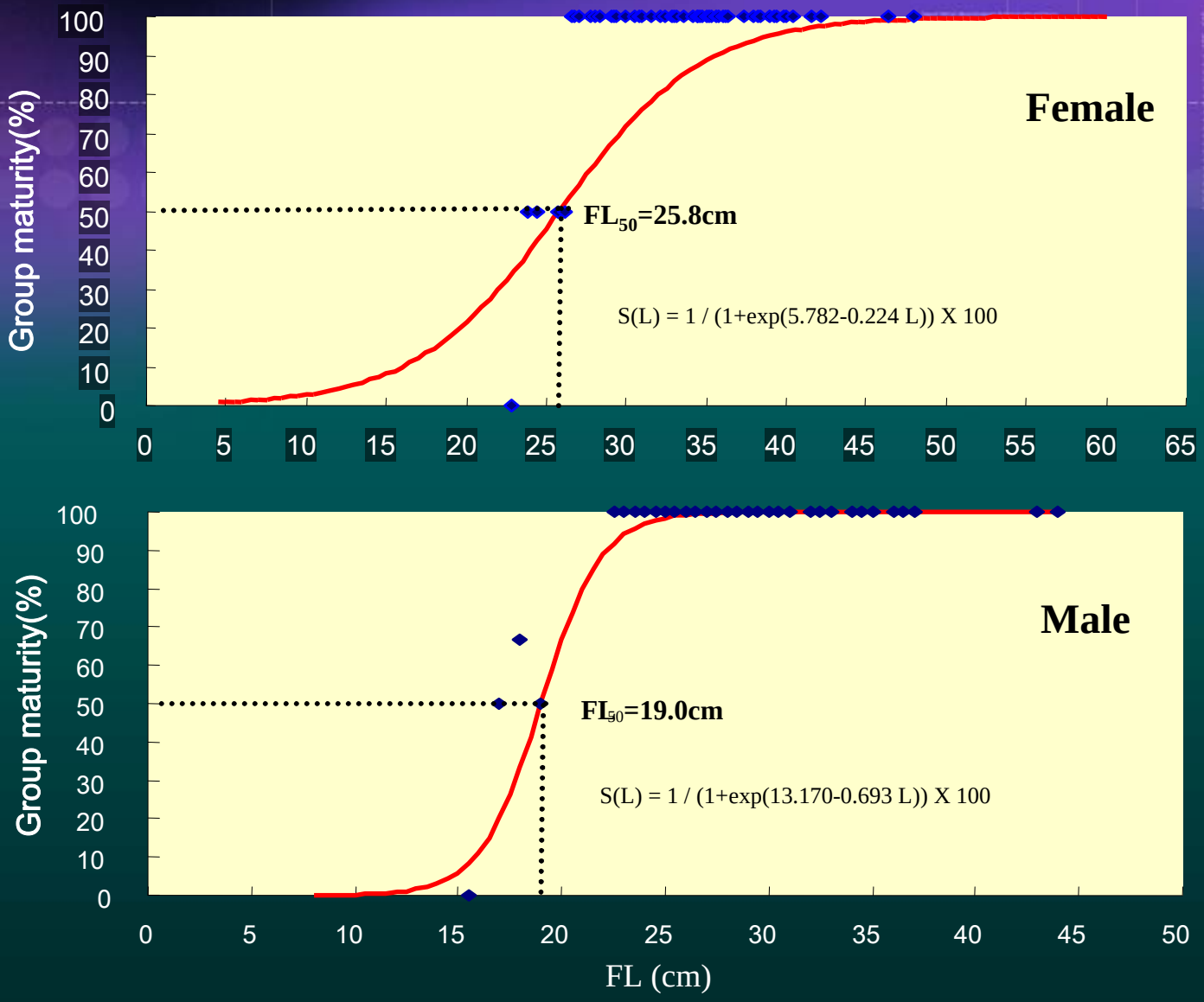
Monthly changes in egg diameter of Black sea bream

Absolute and relative fecundities according to fork length of Black sea bream

Fork length(cm)	Absolute fecundity (eggs)		Relative fecundity (egg/cm)		n
	Range	Mean	Range	Mean	
32.0~33.9	839,596 ~ 1,249,647	1,044,622	26,074 ~37,192	31,633	4
34.0~35.9	813,241 ~ 1,562,674	1,198,910	31,761 ~ 43,650	33,849	9
36.0~37.9	1,291,193 ~ 1,613,035	1,426,934	35,472 ~ 43,129	39,153	3
38.0~39.9	1,874,608 ~ 2,079,899	1,782,405	49,202 ~ 52,128	46,191	5
40.0~41.9	2,079,899 ~ 2,894,913	2,487,406	51,868 ~ 68,927	60,397	3



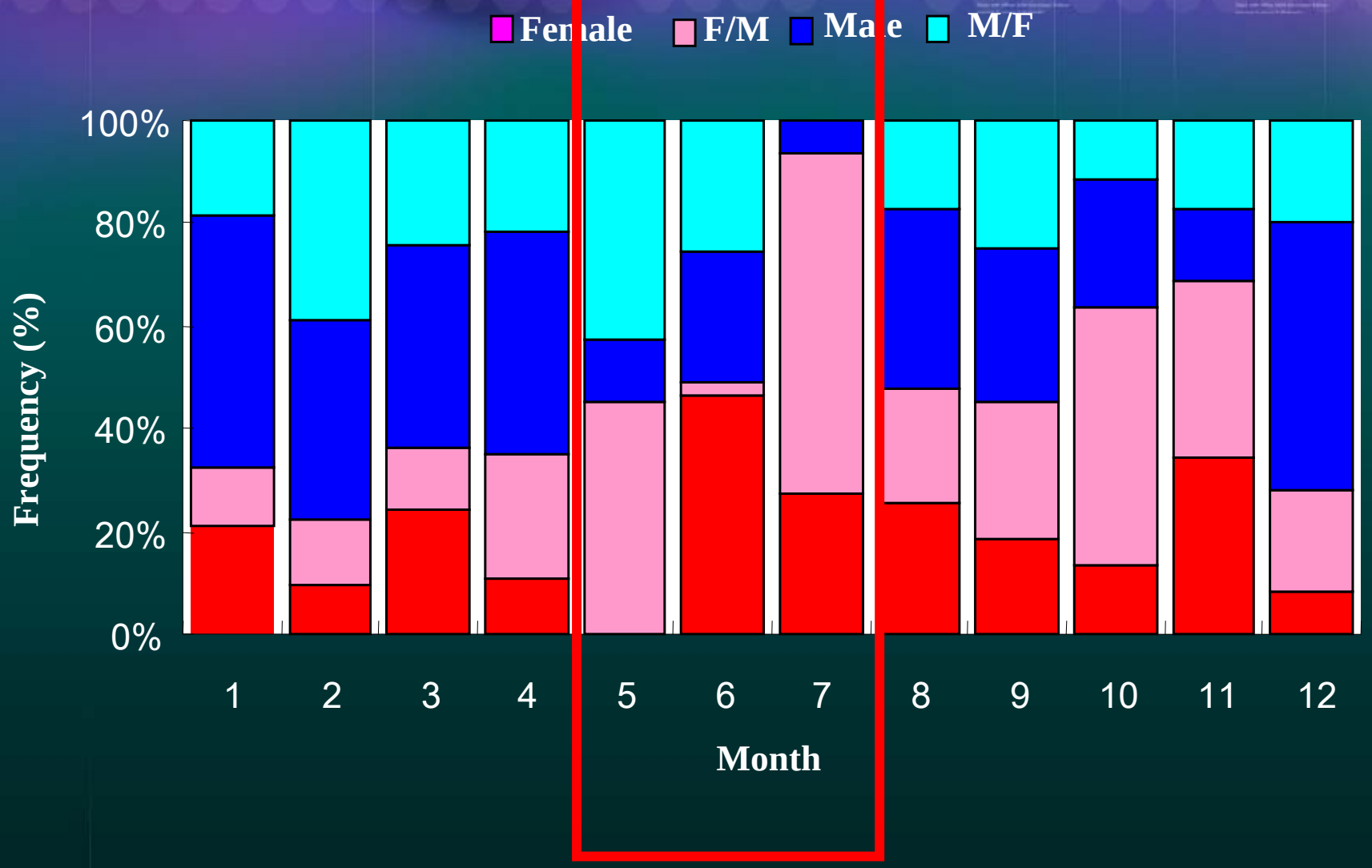
Relationship between fork length and fecundity of Black sea bream



Logistic functions fitting the proportion of maturing and mature female and male of Black sea bream

Spawning season

Monthly sex ratio



Discussion

- **According to the growth, sex ratio of female was increased because male converts into female through sexual conversion**

- **Black sea-bream is protandry fish and they change genders as they grow and mature at the same time**

- **Spawning period : Apr. – Jul. (main spawning period : May – Jun.)**

  - National Fisheries Research and Development Institute (NFRDI,2002)
    - Spawning period : **May ~ Jul.**
  - Leu(1997) - Spawning period : **Feb. ~ Apr.**

Discussion

- **Maturity stages**

  Immature (Jul. – Oct.), Maturing (Nov. – Feb.),

  Mature (Mar.– Jun.) , Spent (Jul.)

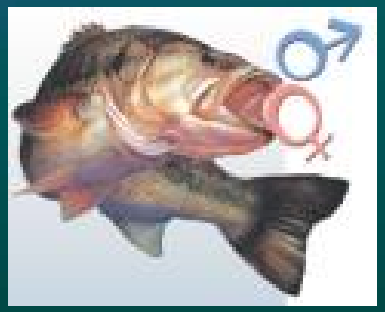
- **Relationship between fecundity and fork length**

  : $F_c = 1.1263\ FL^{3.8996}$ ($R^2 = 0.736$)

- **Fork length at 50% maturity**

  : Female - 25.8cm, Male – 19.0cm

- **Sex ratio of female is higher than male in the spawning season**



Thank you