



## Note

# Length-weight relationship of oval pompano, *Trachinotus ovatus* (Linnaeus 1758) (Pisces: Carangidae) cultured in open sea floating sea cages in South China Sea

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## ABSTRACT

Length-weight relationship of oval pompano, *Trachinotus ovatus* (Linnaeus, 1758) cultured in floating sea cages off south-east coast of Hainan Province, P. R. China was estimated in the present study. The length-weight relationship in pre-sexually mature oval pompano was  $W_{psm} = 0.0640 \times L^{2.5349}$  whereas in sexually mature fishes it was  $W_{sm} = 0.1198 \times L^{2.5248}$ . Results from the present study suggested that the growth of oval pompano follows negative allometric trend.

Keywords: Allometry, Floating sea cage, Growth, Length-weight relationship, *Trachinotus ovatus*

Length-weight relationships have important implications for fisheries science and population dynamics (Erzini, 1994). When the length-frequency distribution is known, length-weight relationship can be used to estimate weight from length for individual fish, fish length classes, and the standing-crop biomass (Anderson and Gutreuter, 1983; Petrakis and Stergiou, 1995; Goncalves *et al.*, 1997). Length-weight relationship can also be used to calculate the condition index of selected species as well as to compare the life history and morphological difference between populations from different regions (Petrakis and Stergiou, 1995; Nie *et al.*, 2013). Apart from being used in fisheries sciences, length-weight relationships are also useful for assessing the growth and population parameters of fish cultured in open sea rearing systems for selected species (Philipose *et al.*, 2013).

Oval pompano *Trachinotus ovatus* (Linnaeus, 1758) belonging to the family Carangidae, is distributed in the Indian Ocean, temperate zone of Mediterranean Sea, and western coast of Africa (Chen *et al.*, 2007). Artificial breeding of this species has been successfully carried out since 2006 in Hainan Province, P. R. China. Owing to its fast growth and good flesh quality, the oval pompano is considered as a good candidate for culture in floating sea cage in China. In this study, length-weight relationship of the oval pompano grown in floating sea cages at two sites located in south-east coast of Hainan Province, P. R. China was estimated.

A total of 401 pre-sexually mature fish and 55 sexually mature fish were measured. According to the farm records, all

the fish sampled in the present study were hatchery produced. Growth data were collected during routine cage transfers, between May 2012 and March 2013. Water samples were collected daily from floating sea cage culture site and analysed for parameters including temperature, pH, dissolved oxygen and salinity. The age of pre-sexually mature pompano was between 3 and 10 months, while that of the sexually mature fish (broodstock) was between 5 and 8 years (including 28 females and 27 males). The size of floating sea cage used for grow-out culture was 3 × 3 × 3 m (length × width × height) and broodstocks were kept in 3 × 6 × 3 m (length × width × height) floating sea cages. The stocking density used in grow-out culture (around 500 g per fish) was 500 fish per cage, while broodstocks were stocked at 60 fish per cage. Fish from grow-out system were fed three times per day with floating pellets at 5-8% of the total biomass. Broodstocks were fed one time per day with fresh chopped fish and squids at 7% of the total biomass.

The lengths of the fish were measured using flexible ruler (accurate to ± 0.1 mm) and wet weights were obtained by using an electronic balance (accurate to ± 0.1 g). Total length was taken from the tip of the jaw to the end of the caudal fin tip. The relationship between total length (L, cm) and wet weight (W, g) were calculated by the power regression  $W = a \times L^b$  (PASW Statistics 20.0). The association degree between L and W was calculated by the determination coefficient (R<sup>2</sup>). Value of the exponent b provide information on fish growth. When b = 3, the increase in weight is isometric, otherwise it is allometric (positive allometric if b > 3, negative allometric if b < 3) (Morey *et al.*, 2003).

The water quality recorded at sampling sites was within the optimum range for pompano culture. Temperature ranged from  $20.43 \pm 0.57$  °C to  $29.83 \pm 0.76$  °C with a mean value of  $26.13$  °C (Fig.1), dissolved oxygen levels ranged from  $5.12$ - $7.2$  mg l<sup>-1</sup> (mean  $6.32$  mg l<sup>-1</sup>), salinity ranged between  $30$ - $35$ ‰ (mean  $32.67$ ‰, Fig.1), and pH between  $8.0$  and  $8.5$ .

Total length of pre-sexually mature fish collected in the present study varied from  $8$  to  $34.85$  cm with the wet weight ranging from  $12.63$  to  $396.49$  g (Fig. 2). The total length of broodstock ranged from  $50.8$  to  $100$  cm and the wet weight between  $3200$  and  $13250$  g, respectively (Fig.3). The relationship between fish length and wet weight of pre-sexually mature fish was derived as:  $W_{psm} = 0.0640 \times L^{2.534}$  ( $r^2 = 0.9740$ ,  $n = 401$ , Fig. 2), while the length-weight relationship of broodstock was derived as:  $W_{sm} = 0.1198 \times L^{2.5248}$  ( $r^2 = 0.7815$ ,  $n = 55$ , Fig. 3). The value of  $b < 3$ , obtained in the present study indicates that the growth of oval pompano cultured in floating sea cages follows negative allometric trend. This result is consistent with studies on wild caught pompano. The growth of pompano collected from both north-eastern Atlantic and western Mediterranean follow negative allometric trend though the  $b$  value differed slightly (Morato *et al.*, 2001; Morey *et al.*, 2003). The observed difference could be caused by factors such as geographic difference, sample size, length range or differences in environmental or habitat conditions, like differences in water thermal regime (Jobling, 1997) and food availability (Mommensen, 1998) which are known to influence fish growth. The results of this study can be used for assessing the growth and population parameters of oval pompano in floating sea cage rearing system.

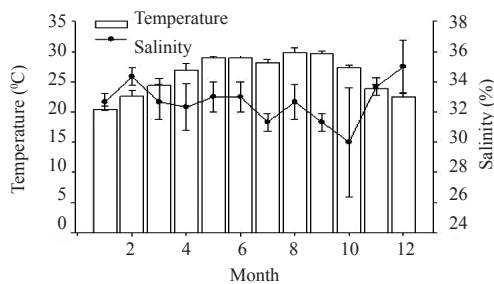


Fig.1. Annual temperature and salinity in the culture site of south-east coast of Hainan Province, P. R. China (mean  $\pm$  SD).

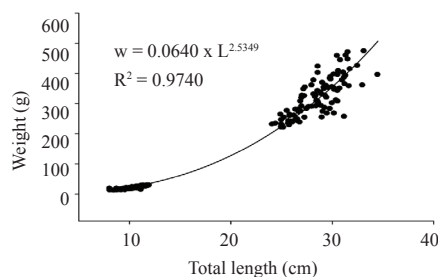


Fig.2. Length-weight relationship of pre-sexually mature oval pompano *Trachinotus ovatus* ( $n = 401$ )

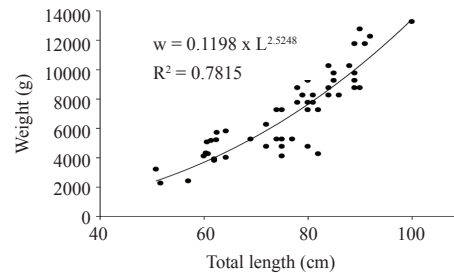


Fig.3. Length-weight relationship of sexually mature oval pompano *Trachinotus ovatus* ( $n = 55$ ).

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