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Length-Weight Relationship, Condition Factor, Gonads Index, and Visceral Mass Index of Golden Pompano (*Trachinotus Ovatus*) (Pisces: Carangidae) from South China Sea

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Abstract: *The present study evaluated the length-weight relationship (LWR), condition factor (K), gonads index (GI), and visceral mass index (VMI) of golden pompano Trachinotus ovatus from South China Sea. A total of 90 males and 101 females were collected from offshore sea cagesfrom Hainan Province. The LWR of male golden pompano can be expressed as* $W = 0.1158L^{2.6391}$*, while the LWR of female golden pompano can be expressed as* $W = 0.0736L^{2.778}$*. The K, GI and VMI of male golden pompano were 11.47 ± 0.82, 0.12 ± 0.08, and 5.91 ± 0.75, respectively. The K, GI and VMI of female golden pompano were 14.31 ± 9.81, 0.29 ± 0.16, and 6.22 ± 0.84, respectively. Results from the present study provide biological information on the broodstocks culture of golden pompano, which could be useful in the practices of broodstocks management.*

Keywords: *Length-weight relationship, condition factor, gonads index, visceral mass index, Trachinotus ovatusbroodstocks.*

Abbreviations: *Length-weight relationship (LWR); condition factor (K);gonads index (GI);visceral mass index (VMI).*

1. INTRODUCTION

Golden pompano *Trachinotus ovatus* (Linnaeus, 1758) belongs to the family of Carangidae and is widely cultured in the Asian-Pacific region (Ma *et al*., 2014a). Due to fast growth, high flesh quality and suitability for cage culture, golden pompano has been considered as a good aquaculture candidate (Guo *et al*., 2014). As a result of increasing domestic and international market in 2015, the total production of golden pompano has reached to 140,000 MT in China.Although artificial breeding of this species has been successfully carried out, and hatchery rearing practices have been well established (Ma *et al*., 2014a, b, c, d; Ma *et al*., 2015a, b), documented biological information relating to the broodstocks rearing and management is rare. In this study, length-weight relationship, gonads index, and visceral mass index of golden pompano were estimated, and aiming to provide fundamental information on the broodstocks rearing of golden pompano.

2. MATERIALS AND METHODS

A total of 90 males and 101 females were collected from offshore sea cages located in Hainan Province, P.R. China during the spawning season (April).According to farm records, fish sampled in this study were artificial produced offspring, and were cultured in 30 m diameters HDPE offshore sea cages. After collecting from sea cages, fish were killed using a lethal dose of anaesthetic (AQUI-S®, New Zealand Ltd., Lower Hutt, New Zealand; 200 mg L^{-1}), dissected and measured directly. The lengths of fish were measured by flexible ruler (accurate to ± 0.1 mm), and body and organs were weighted by an electronic balance (accurate to ± 0.1 g). Body length was measured from the tip of the jaw to the end of the caudal fin. The length-weight relationship were estimated by the power regression $W = a \times L^b$ (PASW Statistics 20.0). The determination coefficient (R^2) was used to calculate the association degree between *L* and *W*. Value of the exponent *b* provided information on fish growth: $b = 3$ indicate the increase of weight is isometric, $b < 3$ indicate negative allometric, $b > 3$ indicate positive allometric.

Condition factor of fish was calculated based on the equation: $K = 100 \times W/L^b$, where K was the condition factor, W was the wet weight of the fish (g), L was the body length of fish (cm), and b was the value obtained from the length-weight relationship. Gonads index and visceral mass index were calculated by the following equations:

Gonads index (GI) = 100 × (weight of gonad) / (weigh of fish);

Visceral mass index (VMI) = 100× (weight of visceral mass) / (weigh of fish).

3. RESULTS AND DISCUSSION

The body length of male fish collected in this study varied from 24.49 to 42.41 cm with the wet weight ranging from 580.0 to 2,120.0 g (Fig. 1). The body length of female fish observed in the present study ranged from 25.13 to 44.44 cm, and the body weight followed into the range of 520 – 2,631.1 g (Fig. 2). The length-weight relationship of male golden pompano can be expressed as $W = 0.1158L^{2.6391}$ (r^2 = 0.9741, n = 90, Fig.1), while the length-weight relationship of female golden pompano was derived as $W = 0.0736L^{2.778}$ (r^2 = 0.9805, n = 101, Fig. 2). The value of b< 3 observed in the present study suggests that the growth of both male and female golden pompano reared in offshore sea cages following negative allometric trend. These results are consistent with our previous study in floating sea cage cultured golden pompano (Guo*et al.*, 2014), and wild caught golden pompano from north-eastern Atlantic and western Mediterranean (Morato*et al.*, 2001; Morey *et al.*, 2003). The observed difference between present studies and other studies may due to sex-ration, development stages, geographic difference, sample size,and habitat conditions (Jobling, 1997; Mommsen, 1998; Mortuza and Al-Misned, 2013).

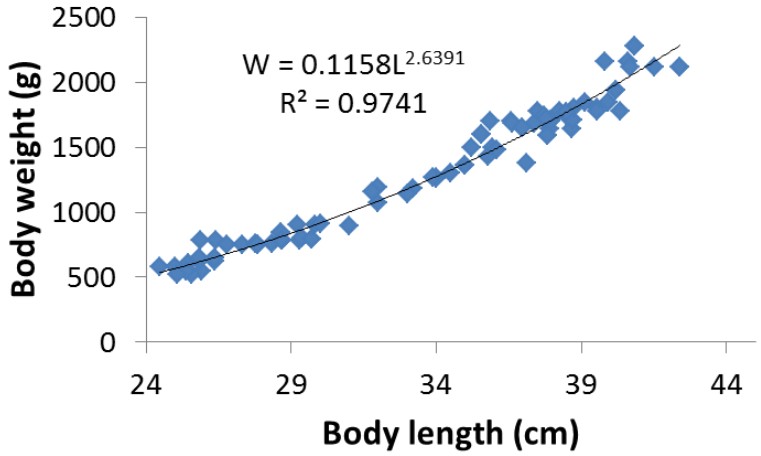

Fig 1. *Length-weight relationship of male golden pompano Trachinotus ovatus(n = 90)*

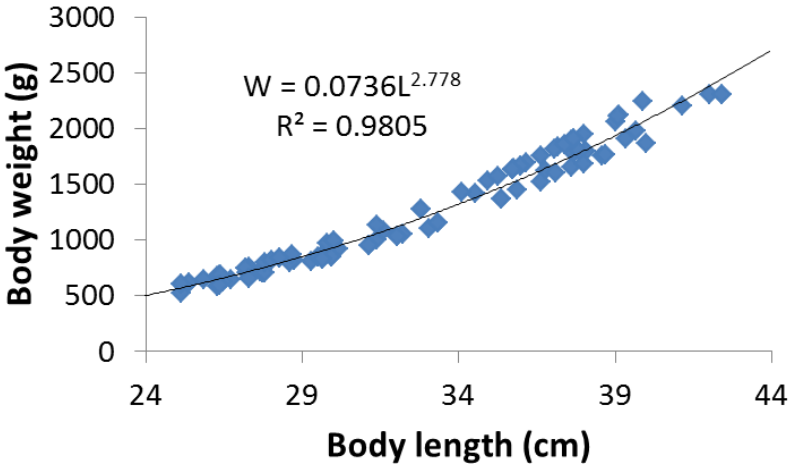

Fig 2. *Length-weight relationship of female golden pompano Trachinotus ovatus (n = 101)*

In the present study, the K, GI and VMI of male golden pompano were 11.47 ± 0.82, 0.12 ± 0.08, and 5.91 ± 0.75, respectively (Table 1). The K, GI and VMI of female golden pompano were 14.31 ± 9.81, 0.29 ± 0.16, and 6.22 ± 0.84, respectively (Table 1). The condition factor or condition coefficient is

normally used to evaluate the correlation expresses the condition of a fish, such as the degree of well-being, relative robustness, or fatness in numerical terms. From the nutrient aspect, the condition factor reflects the accumulation of fat and gonad development (Laleye, 2000), and can be affected by factors such as sex, seasons, environmental conditions, stress, feeds (Mortuza and Al-Misned, 2013). In the present study, the mean body weight of male golden pompano was 1332.02 ± 571.05 g, and the mean body weight of female golden pompano was 1311.77 ± 573.59 g. Although there was no significantly different in the body weight of male and female golden pompano, a higher K, GI, and VMI were observed in females.These results are consistent with the general developmental pattern of marine fish (Ross, 1984; Malison *et al*., 1988).The results of this study can be used for assessing the growth and population parameters of golden pompano in the offshore sea cage rearing system, and provide valuable biological information on the management of the broodstocks in practices.

Table1.*Condition factor, gonads index and visceral mass index of male and female golden pompanoTrachinotus ovatus*

	Condition factor	**Gonads index**	**Visceral mass index**
Male	11.47 ± 0.82	0.12 ± 0.08	5.91 ± 0.75
Female	14.31 ± 9.81	0.29 ± 0.16	6.22 ± 0.84

4. CONCLUSIONS

In this study, length-weight relationship, gonads index, and visceral mass index of golden pompano with the body length of 24.49 to 42.41 cm were estimated during the spawning season. The LWR of male golden pompano can be expressed as $W = 0.1158L^{2.6391}$, while the LWR of female golden pompano can be expressed as $W = 0.0736L^{2.778}$. Results from the present study provide the first reference on the reproduction biology of golden pompano.

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REFERENCES

Guo, H., Ma, Z., Jiang, S., Zhang, S., Zhang, D., Zhang, N. and Li, Y. 2014. Length-weight relationship of oval pompano, *Trachinotus ovatus* (Linnaeus 1758) cultured in open sea floating sea cages in South China Sea. *Indian J. Fish*., 61(1): 93-95.

Jobling, M. 1997. Temperatureand growth: modulation of growth rate via temperature change. In: Wood, C. M. and Mcdonald, D. G. (eds.), *Global Warming: Implications for freshwater and marine fish*, Cambridge University Press, Cambridge, p. 225-253.

Laleye, P.A. 2000. Length-weight and length-length relationships of fishes from the Oue'me' River in Be'nin (West Africa).*J. Appl. Itchthol*., 22: 330-333.

Ma, Z., Guo, H., Zheng, P., Wang L., Jiang, S., Qin J.G. and Zhang, D. 2014a. Ontogenetic development of digestive functionality in golden pompano *Trachinotus ovatus* (Linnaeus 1758). *Fish. Physiol. Biochem*., 40: 1157-1167.

Ma, Z., Zheng, P., Guo, H., Jiang, S., Qin, J.G., Zhang, D. and Liu X. 2014b. Salinity regulates antioxidant enzyme and Na+K+-ATPase activities of juvenile golden pompano *Trachinotus ovatus* (Linnaeus 1758). *Aquacult. Res.*, DOI：10.1111/are.12606.

Ma, Z., Guo, H., Zheng, P., Wang, L., Jiang, S. and Zhang, D. 2014c. Effect of salinity on the rearing performance of juvenile golden pompano *Trachinotus ovatus* (Linnaeus 1758). *Aquacult. Res.*, DOI：10.1111/are.12633.

Ma, Z., Zheng, P., Guo, H., Zhang, N., Jiang, S., Zhang, D. and Qin, J.G. 2014d. Jaw malformation of hatchery reared golden pompano *Trachinotus ovatus* (Linnaeus 1758) larvae. *Aquacult. Res.*, DOI：10.1111/are.12569.

Ma, Z., Guo, H., Zhang, D., Hu C. and Jiang, S. 2015a. Food ingestion, consumption, and selectivity

of pompano, *Trachinotus ovatus* (Linnaeus 1758) under different rotifer densities. *Aquacult. Res.*, 46: 2593-2603

Ma, Z., Zheng, P., Guo, H., Zhang, N., Wang, L., Jiang, S., Qin, J.G. and Zhang, D. 2015b. Effect of weaning time on the performance of *Trachinotus ovatus* (Linnaeus 1758) larvae. *Aquacult.Nutr*., 21: 670-678.

Malison, J.A., Kayes, T.B., Wentworth, B.C. and Amundson, C.H. 1988. Growth and feeding responses of male versus female Yellow Perch (*Percaflavescens*) treated with estradiol-17ß. *Canadian J. Fish.Aqua. Sci*., 45: 1942-1948.

Mommsen, T. P. 1998. Growth and metabolism.In: Evans, D. H. (ed.), *Physiology of fishes*. 2nd edn., CRC Press, New York, p. 65-97.

Morato, T., Afonso, P., Lourinho, P., Barreiros, J.P., Santos, R.S. and Nash, R.D.M. 2001. Length-weight relationships for 21 costal fish species of the Azores, north-eastern Atlantic. *Fish. Res.*, 50: 297-302.

Morey, G., Moranta, J., Massuti, E., Grau, A., Linde, M., Riera, F. and Morales-Nin, B. 2003.Weight-length relationships of littoral to lower slope fishes from the western Mediterranean. *Fish. Res*., 62: 89-96.

Mortuza, M.G. and Al-Misned, F.A. 2013.Length-weight relationships, condition factor and sex-ratio of Nile tilapia Oreochromisniloticus in WadiHanifah, Riyadh Arabia.*World J. Zool*., 8(1): 106-109.

Ross, R. M. 1984. Catheterization: a non-harmful method of sex identification for sexually monomorphic fishes. Progr. Fish-Culturist, 46: 151-152.