



Effect of Different Dietary Lipid Levels on Spawning Performance and Egg Quality of *Pangasianodon hypophthalmus* (Sauvage, 1878)

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Abstract

Dietary lipid manipulation of broodstock diet offers a strategy for improving spawning performance and egg quality of broodstock fish. Although many studies were conducted on basic nutrient requirements for fingerlings and juveniles of *Pangasianodon hypophthalmus* (Sauvage, 1878); the artificial feed for *P. hypophthalmus* broodstock is still lacking. This study analysed the effect of different levels of lipid in the diet on spawning performance and egg quality of female *P. hypophthalmus* broodstock. Three test diets were formulated containing 1:1 ratio of palm oil and fish oil blends at the level of 60, 90 and 120 g.kg⁻¹ with a constant 300 g.kg⁻¹ protein and fed to triplicate groups of female broodstock for 150 days at the rate of 20 g.kg⁻¹ body weight twice daily. The ovary weight, gonadosomatic index, fecundity, egg weight and diameter and egg fertilisation rate were significantly ($P < 0.05$) increased for fish fed with 90 and 120 g.kg⁻¹ lipid diet compared to 60 g.kg⁻¹ lipid diet. However, there was no significant difference between fish fed with 90 and 120 g.kg⁻¹ lipid diet; thus an increase in dietary lipid above 90 g.kg⁻¹ would not make any significant contribution. The increased performance of female broodstock fed with higher dietary lipid and fish oil at the ratio of 1:1 for crude palm oil and fish oil up to 90 g.kg⁻¹ contributed in the enhancement of the reproductive performance and egg quality of *P. hypophthalmus*.

Keywords: broodstock nutrition, crude palm oil, fatty acids, fecundity, reproductive performance

Introduction

Broodstock conditioning is one of the principal components in aquaculture, and this is mandatory if the fish species has a high market value. The omnivores *Pangasianodon hypophthalmus* (Sauvage, 1878) is a significant export commodity in Asia (Ahmed and Hasan, 2007; Asdari et al., 2011; Phumee et al., 2011). Biologically, the fish has an attribute of faster growth that requires lower management cost compared to other fish species. The availability of continued quality seed production is reported as one of the major constraints in the farming of *P. hypophthalmus*. Furthermore, the scarcity of information on this fish broodstock's diet that focuses on triggering faster fish maturation has become a key limiting factor for consistent supply of quality seed of this species (Kabir et al., 2015). Lipids and its fatty acids in the dietary component influence the reproductive

development (Ghaedi et al., 2016; Nzohabonayo et al., 2017; Sotoudeh and Yeganeh, 2017), spawning performance (Zakeri et al., 2011) and quality eggs as well as larvae supply (Noori et al., 2019).

The broodstock nutrition plays an important role because every essential nutrient that is needed before the exogenous feeding begins are supplied maternally and incorporated during vitellogenesis into the oocyte (Brooks et al., 1997). The quality of fish egg and reproductive performance has been related to the existence of dietary docosahexaenoic acid (DHA), arachidonic acid (ARA) and eicosapentaenoic acid (EPA), highly unsaturated fatty acids (HUFA) and their ratios (Sargent, 1995; El-Sayed et al., 2005; Nguyen et al., 2010; Zakeri et al., 2011; Ghaedi et al., 2016; Nzohabonayo et al., 2017). Numerous studies have demonstrated that dietary lipid and its fatty acid profile provides a strategy for enhancing the performance of