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Influence of Broodstock Size and Feeding Regime on Reproductive Performance and Seed Quality of Nile Tilapia *Oreochromis niloticus* under the Conditions of Hapa-in-Pond Hatchery System

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THE OBJECTIVE of this study was to evaluate the effects of different broodstock sizes and feeding regime on seed production and quality of Nile tilapia *Oreochromis niloticus* broodstock reared under the conditions of hapa-in-pond tilapia hatchery system. Three feeding regimes were tested in combination with two different Nile tilapia broodstock sizes (Small size:- ♂:87.17± 1.81 and ♀: 69.31± 0.90g and large size:- ♂:166.28± 1.49 and ♀:143.81± 1.32g). In the1st feeding regime, broodstock were fed diet No.1 (25%CP/ 3434 Kcal ME/kg diet) throughout the whole experimental period (120 days) while, in the2nd feeding regime, broodstock were fed diet No.1 until spawning batch and thereafter fed diet No.2, which contained 30% CP/ 3533 Kcal/kg diet for a period of 7 days. Form the 8th day after seed harvesting, brood-fish were fed again diet No.1 until the subsequent spawning and so on until the end of the experimental course. In the 3rd feeding regime, fish were fed diet No.2 until spawning batch and thereafter fed diet No.3, which contained (35%CP/ 3760 Kcal/kg diet) for 7 days. Form the 8th day after seed harvesting, the brood-fish were fed again the diet No.2 until the subsequent spawning and so on throughout the whole experimental period. The three feeding regimes were tested in combination with the two sizes to obtain 6 experimental treatments. The treatments were assigned according to 3×2 factorial design with three replicates/ treatment giving total number of 18 spawning happas. There were significant (P≤0.05) differences among different feeding regimes and broodstock sizes throughout the subsequent clutches (4 seed collections). The 3rd feeding regime had the highest feeding regime followed by the 2nd (1145± 53.87) and the 1st (1048± 45.83 seeds) feeding regimes. The larger females produced more seeds (1255± 43.88) as compared to the smaller (1063±39.17) class. The absolute seed production (seed/ female/ day) and (seed/ day) were in favour of larger females fed according the third feeding regime, while the smaller female at the 1st feeding regime. Regardless of broodstock sizes, it was found that broodstock feeding regime affected the seed/ g

female, seed/ female / day and seed/ day. They were (9.15± 0.91, 9.75±0.86 and 11.16± 1.19), (10.25± 0.53, 11.66± 0.68 and 13.40± 0.67) and (40.99± 2.13, 46.62± 2.67 and 53.60± 2.80 seeds), respectively for the 1^{st}, 2^{nd} and 3^{rd} feeding regimes. Fry growth performance, feed intake and feed conversion ratio were significantly ($P \leq 0.05$) affected by broodstock size and feeding regime. The larger females at the 3^{rd} feeding regime recorded the highest fry growth performance while, the worst values were recorded for smaller females at the 1^{st} feeding regime. The fry survival rates were significantly affected ($P \leq 0.05$) by the experimental treatments and ranged between 95.97± 1.20 (T6) and 92.33± 1.45 (T1). The previous results indicated that, there is a considerable difference in feed requirements before and after ovulation. Excellent egg and fry production can be obtained using the third feeding regime. Shortly, after ovulation a protein and energy rich diet should be used to accelerate the egg development.

Keywords: Nile tilapia, Broodstock size, Broodstock feeding regime, Reproductive performance and seed quality.

Broodstock nutrition is still poorly understood due to difficulties in conducting studies involving proper feeding and reproduction of broodstock (Izquierdo *et al.*, 2001, Chong *et al.*, 2004, Tahoun, 2007, Hammouda *et al.*, 2008 and Ibrahim *et al.*, 2008). Seed production in tilapia decreases with time (Behrends *et al.*, 1993) despite providing favorable environmental conditions for spawning (Mires, 1982 and Ridha & Cruz, 1998). To alleviate these problems, a number of broodstock management strategies were adopted by many workers to optimize seed production and breeding synchrony (Bhujel, 2000), such as broodstock density (Little, 1989 & Ridha & Cruz, 1999 and Tahoun, 2007), frequency of seed collection (Little *et al.*, 1993), brood fish age and size (Ridha & Cruz, 1989 and Smith *et al.*, 1991 and Tahoun, 2007) and broodstock exchange and conditioning technique (Abella & Batao, 1989 and Little *et al.*, 1993). for fish culture activities in Egypt as in many parts of the world, the necessity of dependable supply of Nile tilapia, *Oreochromis niloticus*, fry is therefore imperative, but the problem of mass production is still remains. There are many possible reasons for the low production of tilapia fry. These include too low density of broodstock, inappropriate sex ratios, inadequate spawning techniques, broodstock nutrition and high fry mortality (Salama, 1996). This experiment was undertaken to evaluate the influence of broodstock size and feeding regime on reproductive performance, seed out-put and the maternal effect on fry growth and quality of Nile tilapia.