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Title: Effects of feeding, stocking density and water-flow rate on fecundity, spawning frequency and egg quality of Nile tilapia, *Oreochromis niloticus* (L.)

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Abstract: This study investigated the effects of two levels of feeding (1 or 4% BW day⁻¹), two levels of stocking densities (3 or 10 female m⁻²) and two levels of water-flow rates (0.06±0.00 or 0.35±0.04 L s⁻¹) on the fecundity, relative fecundity, spawning frequency and egg quality of Nile tilapia, *Oreochromis niloticus* (L.) with the goal of improving hatchery seed production. Males and females, 125 days of age, were stocked in recirculating concrete tanks. Eggs were collected every four days directly from the mouths of incubating females. Fecundity (eggs spawn⁻¹), body weight gain (g day⁻¹) and egg diameter (mm) and weight (mg), percent protein and lipid, fertilization and hatchability were measured over 120 days. Higher eggs kg female⁻¹ day⁻¹ (312±36) was observed in treatments with lower levels of stocking density (3 female m⁻²) and water-flow rate (0.06±0.00 L s⁻¹) under both feeding rates. The rate was 2 to 4 fold higher than the others. Overall, high feeding level (4% BW day⁻¹) increased growth (g day⁻¹) by 35% and eggs spawn⁻¹ by 18% and did not affect eggs kg female⁻¹ day⁻¹, spawn female⁻¹ and eggs m⁻² day⁻¹. Higher stocking density (10 female m⁻²) lowered eggs spawn⁻¹ by 19%, eggs kg female⁻¹ day⁻¹ by 52% and spawn female⁻¹ by 40%. Higher water-flow rate (0.35±0.04 L s⁻¹) increased growth (g day⁻¹) by 33%, and lowered eggs kg female⁻¹ day⁻¹ by 51%. The variables also did not affect percent egg fertilization, hatchability, crude lipid and protein or egg diameter (mm). However, egg weight (mg) was higher in groups fed a lower ration (1% BW day⁻¹) with higher stocking density (10 female m⁻²) and higher water-flow rates (0.35±0.04 L s⁻¹). Feeding levels interacted with water-flow rates in improving growth (g day⁻¹) while stocking density interacted with water-flow rates in lowering eggs kg female⁻¹ day⁻¹ and spawn female⁻¹. The eggs kg female⁻¹ day⁻¹ obtained in this study from the best treatments is comparable with the highest egg production rates reported by others for *O. niloticus*. This suggests that lower feeding level (1% BW day⁻¹), lower stocking density (3 female m⁻²) and lower water-flow rate (0.06±0.00 L s⁻¹) could be adopted as a management strategy to improve current tilapia hatchery seed

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production, although, optimum water flow-related stocking density needs further investigation.

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