Effects of Water Hardness on the Survival and Growth Performance of Platy fish (*Xiphophorus maculatus*)

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Abstract

A six-week experiment was conducted to evaluate the effects of calcium hardness on survival and growth performance of platy fish (*Xiphophorus maculatus)*. Three calcium hardness levels; 50 mgl^{-1}, 150 mgl^{-1}, and 250 mgl^{-1} were tested with a control and particular water hardness was maintained by adding $CaCl_2$ $2H_2O$ to the water. Twenty-one-day old platy fish (0.032 g and 1.17 ±0.02 cm) were randomly assigned to four treatments in triplicates and kept in a 40 l glass tank (10 fish/tank) for six weeks. They were fed with standard powdered feed twice a day to near satiety. Survival of fish was assessed daily and total length and body weight of fish were measured every two weeks. At the end of the experiment, growth performances were assessed by using % Specific Growth Rate (SGR) and Average Daily Gain (ADG). At the end of the experiment, survival rate was not affected by the treatments and significantly highest body weight (0.31±0.01 g), total length (2.7±0.04 cm), % SGR (5.38±0.06) and ADG (20.43±0.61) were recorded at 150 mg/l hardness level followed by 50 mg/l hardness level. The correlation between the total hardness of water and growth performance of platy fish were examined (R^2 = 0.889) and it clearly showed that 150 mg/l hardness level is more favorable for the growth of platy fish. Moreover, calcium uptake of platy fish reared under different hardness level was evaluated and it has increased with respect to the calcium concentration in the environment**.** It clearly indicated that environmental calcium level highly influenced the whole-body calcium uptake of platy fish in different hardness levels (R^2 = 0.9772). Furthermore, results of this study revealed that calcium hardness level up to 250 mg/l did not alter their survival, but significantly affect the growth. The present study revealed that calcium hardness level of 150 mg/l is the optimum calcium hardness level among the tested hardness levels for platy fish juveniles.

Keywords: Hardness of water, Growth performance, Platy fish, Survival

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