PRODUCTIVE PERFORMANCE OF SEX REVERSED TILAPIA

By

SARA SHAHAT GOUDA HALABY EL NAHAL

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الأداء الإنتاجى لأسماك البلطى المحولة جنسياً

رسالة مقدمة من

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ABSTRACT

Sara Shahat Gouda Halaby El Nahal. Productive Performance of Sex Reversed Tilapia. Un-published MSc. thesis, Department of Animal Production, Faculty of Agriculture, Ain Shams University, 2019.

This study was carried out in Fish Production Branch, Department of Animal Production, Faculty of Agriculture, Ain Shams University, Shoubra El-Kheima, Egypt. The study was designed in two experiments to evaluate the effect of feeding on follow-up growth performance and development of sexual glands of Nile tilapia (*Oreochromis niloticus*). The objective of the first experiment was to follow up the growth performance and gonads development of sex reversed Nile tilapia male. Fish were fed commercial diet contained 30% crude protein at a rate of 3% of the body biomass. Ten fish were randomly taken biweekly during the experimental period (17 weeks). Growth performance, feed utilization and survival rate were calculated. Histological examination of the gonads was done every two weeks to follow up the growth and development of the gonads.

The second experiment was designed to assess the effects of different levels of fish meal (FM) replaced by soybean meal (SBM) in the diet of mixed sex Nile tilapia (*O. niloticus*) on their productive performance and gonads development. Fish fed diet contained 30% crude protein at a rate of 3% of the body biomass, the growth parameters were calculated biweekly during the experimental period (26 weeks). Growth performance, feed utilization and survival rate were calculated. Histological examination of the gonads was done every two months to follow the growth and development of the gonads. The main goal was to identify the best replacement level suitable for the productive performance without any defect on reproductive potential of mixed sex Nile tilapia.

Experiment I: Fish were cultured in outdoor concrete pond (32m x 13m x 1.5m depth) belong to Fish Production Branch. Fish with

an average initial body weight (BW) was 16.33 ± 0.71 g, average initial total length (TL) was 9.30 ± 0.14 cm, initial thickness 1.50 ±0.0 cm and width was 3.16 ± 0.06 cm were selected for 120 days' experiment. Ten fish were taken as a random sample biweekly throughout the experimental period. The measurements taken were total weight gain, average daily gain (ADG), specific growth rate (SGR), total length, thickness, width, feed conversion ratio (FCR), protein efficiency ratio (PER), protein productive value (PPV) and histological measurements of fish gonads. Results showed positive interactions between growth parameters and reproductive development during different periods of fish productive cycle. Histological examination illustrated that during early ages, testicular sections of mono sex male's tilapia had abnormal architecture with deterioration of germinative tissue. Despite abnormal testis texture, fish started spermatogenesis, a step toward puberty when their body weight reached 29.16g. As fish reached 4-5 months, male start to recover their testes normal structures and at age of 5.5-6 months, testicular sections appeared normally as pointed out by firmed testicular lobules, existence of all germ cell types and the intensively stored spermatozoa in testicular lumen and testicular ducts, confirming the full maturity of males.

Experiment II: Fish were cultured in close system in quadrate fiber glass tanks (60 cm × 60 cm × 50 cm depth) in triplicate to each treatment (20 fish/pond) of mixed Nile tilapia with an average initial body weight of replicate 2.36 ± 0.26 g/fish, for 26 weeks. Fish were fed isonitrogenous (30% crude protein) diets containing FM and SBM as protein sources in four experimental diets, where 20,30,40 and 50% of fishmeal were replaced by SBM. The measurements of productive performance taken were total weight gain, average daily gain (ADG), specific growth rate (SGR), feed conversion ratio (FCR), protein efficiency ratio (PER), protein productive value (PPV), chemical composition of fish body and histological examination of fish gonads.

Results showed that productive performance such as (AWG, SGR, ADG, FCR, PER, PPV) were not affected significantly ($P>0.05$) by the partially replacement of FM with SBM up to 50%; except chemical composition of fish body revealed significantly that protein, lipid and Ash were significantly ($p<0.05$). The results showed that although the soybean meal contains high levels of phytoestrogen, but there was no defect in the gonad (testes, ovary) when replacing the fishmeal with soybean meal by 30%, but when replacing more than 30% showed a defect in gonad (testes and ovary) and significantly ($p<0.05$) in gonadosomatic index (GSI). The best results were recorded for fish fed 30% soybean meal.

Key words: Nile tilapia, *Oreochromis niloticus*, growth rate, gonads, mono sex, soybean meal, phytoestrogen.

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