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Salinity tolerance of new tilapia hybrid at varying salinity levels

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Abstract
The study was conducted to determine the salinity tolerance of a new tilapia hybrid from the cross of *Oreochromis aureus* x *Oreochromis mossambicus*. A total of 144 new hybrid (1.2g) were used in the study. One hundred twenty (120) of which were directly stocked in 20 pieces plastic container (5L capacity) at different salinity levels (0, 3, 5, 10 and 15ppt) and tested for 96 hours. Some 24 pieces were subjected to increasing salinity levels (from 3ppt and increased of 3ppt daily until 30ppt) for 216 hrs. The same sizes and stocking density (2pcs/L) were used in the study. The new hybrid were fed with fry mash at a rate of 5% BW.
Results of the study revealed that the new hybrid have high tolerance to salinity. For the whole duration of the experiment, only one (1) mortality was noted (T6, 15ppt). The rest (143 or 99.31%) of the new hybrids in all treatments including those tested for increasing salinity levels (up to 30ppt) survived until the last day of the experiment.

Keywords: Salinity tolerance, tilapia hybrid

Introduction
In the fishery sector, production of marketable fish has expanded from freshwater and brackishwater fishponds to cages installed in marine waters. With this, fish production in the aquaculture sector increased tremendously from 997,841MT in 1998 to 2,407,697.92 MT in 2008 (BAS, 2008) then to 2,541,965.4 in 2012. The increase, even when enhanced by the catch in the municipal and commercial fishing, is not enough to supply the demand. Culture of economically valuable species other than milkfish (grouper, siganids, snapper, shrimps and even catfish) have also been intensified, but the prices of marketable fishes remain high. This scenario poses a great challenge to producers/aquaculturists to develop new technology or search for new candidate species for aquaculture. Hence, the development of the new hybrid tilapia.

Objectives
Generally, the study was conducted to develop saline tolerant tilapia for brackishwater culture.
Specifically it aimed to:
1. Test the tolerance of new tilapia hybrid following direct transfer to water with different levels of salinity; and
2. Determine the effect of increasing salinity on the survival of new tilapia hybrid.

Methodology
A total of 144 new tilapia hybrid were collected from the breeding tanks and conditioned for one week in glass aquaria. After 7 days of conditioning, 10% of the total number to be stocked was subjected individually to weight measurement using a digital weighing balance. The fishes were stocked correspondingly in containers filled with water at different levels of salinity, i.e. 0, 3, 3 (increasing), 5, 10 and 15ppt. Stocking density was uniform at 2 fish/L.
The new tilapia hybrid were fed every 10:00am. daily with commercial diet at 5% of their body weight. Each container was provided with aeration and one half of the water was siphoned out daily. Water temperature and dissolved oxygen (DO) were monitored using YSI DO meter Model 55. Likewise, pH was monitored in-situ using Toshiba digital pH meter. Monitoring was done daily every 7:00am.

Using refractometer, water salinity was maintained in T_1 (0ppt), T_2 (3ppt), T_3 (5ppt), T_5 (10 ppt) and T_6 (15ppt). For Treatment 3, the salinity was increased daily by 3ppt until it reached 30ppt.

Results and Discussion

For 96 hours of testing at different salinity levels the new tilapia hybrid of *O. mossambicus* and *O. aureus* showed very high tolerance. A hundred percent (100%) survival was obtained with direct exposure from 0ppt to 3, 5, 10 and in increasing salinity of 3ppt daily. Only one (1) mortality was recorded during the 89^{th} hr in in the direct transfer of F1 hybrid to 15 ppt salinity (T_6). The death may not be due to salinity stress but to aggression by other fishes inside the container, as per ocular observation during the experiment proper. Examination of the fish, though showed no external lesion and the intestines are still intact.

The survival of the new tilapia hybrid in all treatments was not affected by water quality even at colder temperature (23.2 ^{o}C).

Conclusions

Based on the results of the study, the following conclusions were drawn

1. The new tilapia hybrid can tolerate higher level of salinity up to 15ppt following direct transfer from 0ppt for 96 hours.
2. Survival of new tilapia hybrid is not affected by the increasing salinity, from 0ppt up to 30 ppt.

Recommendations

Based on the findings of the study, the following are recommended:

1. Further study to determine the salinity tolerance at direct transfer to salinities higher than 30ppt.
2. Evaluate the growth performance of the new tilapia hybrid in brackishwater ponds.

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