Journal of Fisheries & Livestock Production

Short Communication Open Access

Efficiency of Noxious Algae Removal by Juvenile Blue Tilapia (*Oreochromis Aureus*)

Peter Perschbacher*

Department of Aquaculture/Fisheries, University of Arkansas at Pine Bluff, AR, USA

Abstract

The Blue Tilapia (*Oreochromis aureus*) is an important food fish and aquaculture species, very similar in appearance and food habits with Nile Tilapia (*Oreochromis niloticus*), distinguished primarily by lack of banding on the tail, and consuming by filtration primarily phytoplankton and zooplankton, depending on availability . Due to its ability to utilize algae, Blue Tilapia was the object of an intensive study of their impact and production in fertilized, freshwater ponds by the author. In 3-l jars, 9 g Blue Tilapia were highly efficient in removal (80-100%) of noxious algae (primarily cyanobacteria) in 24 h. This rate is similar to the efficiency of Nile Tilapia in a later similar study by the author.

Keywords: Blue Tilapia; Nile Tilapia; Noxious algae control

Introduction

The Blue Tilapia (*Oreochromis aureus*) is an important food fish and aquaculture species, primarily used to make monosex populations of hybrids with Nile Tilapia (*Oreochromis niloticus*) in China [1]. Juveniles are very similar to Nile Tilapia juveniles distinguished primarily by lack of banding on the tail [2] and have been confused with Nile Tilapia in early introductions to the U.S. It is also is similar in food habits, consuming primarily phytoplankton and zooplankton, depending on availability [3]. Due to its ability to utilize algae, Blue Tilapia was the object of an intensive study of their impact and production in fertilized, freshwater ponds by the author [4]. Changes in all measured parameters were observed compared to fishless control ponds, and especially in plankton. This study also determined efficiency of removal of some noxious algal species in the laboratory. A follow up study repeated this approach with Nile Tilapia fingerlings [5] to compare with the Blue Tilapia study.

Materials and Methods

Studies with the two species were conducted in laboratory tanks, filled with fresh pond water containing problem levels of noxious algae. The following algae are responsible for off-flavors and surface blooms, which eventually die and reduce oxygen to lethal levels for cultured fish [6]. *Oscillatoria chalybea* is a large, planktonic, filamentous cyano bacterium, which is the major pond cause of musty off-flavor by their MIB production. *Anabaena spp* are large, planktonic chain cyanobacteria, which are the major pond cause of earthy off-flavor by their geosmin production. *Microcystis spp.* are large (visible), planktonic cyanobacteria colonies of irregular shape that in addition to forming floating scums (blooms) have been noted to produce toxins to mammals and humans. *Pithophora sp.* is filamentous macroscopic green algae that may overrun the pond bottom and lead to clearing of the pond water and elimination of beneficial planktonic algae communities, as well as difficulty netting.

Laboratory studies used 2; 3-L jars with one, unfed 9 g Blue Tilapia each [4]. Pond water with problem levels of noxious algae was added. After 24 h, plankton samples were counted and identified and compared with those taken from an equal number of fish less controls. A Sedgwick-Rafter counting cell under 150X was used in all studies. Student's t test was used to determine differences at the 0.05 level. At a later date 4, 15-L aquaria with one unfed 30 g Nile Tilapia in each were similarly evaluated [5].

Results

Results from tank studies are presented in Table 1. All percentage change was significantly different from controls for Blue and Nile Tilapia fingerlings and no significant differences existed between the two species.

Discussion

Both Blue and Nile Tilapia evidenced high mean removals (80-100%) in the tanks; however tilapia biomass levels ranged from 10,000 kg/ha to 27,000 kg/ha. In pond polyculture production trials, highest tilapia biomass levels at harvest were 2,243 kg/ha with Blue Tilapia [7]. The lowest removal of 80% was found when Nile Tilapia was presented with bloom levels of *Microcystis spp.*

In 0.05 ha polyculture pond production trials, 550 juvenile, fed, free-roaming Channel Catfish (*Ictalurus punctatus*) were cultured with 100 juvenile, unfed Blue Tilapia confined in four cages [8]. *O. chalybea* was spiked in each pond, and after 41 days was eliminated in polyculture ponds, while causing off-flavors in the monoculture ponds (Perschbacher, unpublished data). In similar trials with 440 Channel Catfish fingerings and 100 juvenile Nile Tilapia, control of these major MIB-producing algae was found after one month [9]. This indicates that although Blue Tilapia is effective in control, the reduction to levels below off-flavor takes 25% longer than with Nile Tilapia. Blue Tilapia have production advantages of greater cold tolerance and faster growth attributed to consumption of a wider variety of natural foods,

***Corresponding author:** Peter Perschbacher, Department of Aquaculture/Fisheries, University of Arkansas at Pine Bluff, AR, USA,Current Address: 210 River Gate Lane, Wilmington, NC USA; Tel: 251931337855, E-mail: pwpersch@gmail.com

Received: 23-Sep-2022, Manuscript No: JFLP-22-75766, **Editor assigned:** 26-Sep-2022, PreQC No: JFLP-22-75766(PQ), **Reviewed:** 10-Oct-2022, QC No: JFLP-22-75766, **Revised:** 14-Oct-2022, Manuscript No: JFLP-22-75766(R), **Published:** 21-Oct-2022, DOI: 10.4172/2332-2608.1000369

Citation: Perschbacher P (2022) Efficiency of Noxious Algae Removal by Juvenile Blue Tilapia (*Oreochromis Aureus*). J Fisheries Livest Prod 10: 369.

Table 1: 24-h Removal of Noxious Pond Algae by Juvenile Blue and Nile Tilapia.

Algae	Blue Tilapia		Nile Tilapia	
	Mean Initial Algae	Mean Final Algae	Mean Initial Algae	Mean Final Algae
	(No. Colonies/ml)	(% Change)	(No. Colonies/ml)	(% Change)
O. chalybea			7,395	-94
Anabaena spp.	290	-100	640	-94
Microcystis spp.	720	-89	474	-100
Microcystis spp			7,109*	-80
Pithophora spp.	30 g dry wt.	-97		
*Represents bloom levels as the dominant algae.				

attaining 0.48 kg at harvest on Oct. 23. Nile Tilapia which consumes phytoplankton attained 0.23 kg at harvest on Oct 11 [7]. Some impinged catfish feed was also consumed by both caged species. Nile Tilapia however, attains a larger maximum size [10].

Conflict of Interest

No conflict of interest exists.

References

1. Wang M, M Lu (2016) Tilapia polyculture: a global review. Aquaculture Research 47: 2363-2374.
2. Hepher B, Pruginin Y (1981) Commercial Fish Farming, with Special Reference to Fish Culture in Israel. John Wiley Sons NY 261.
3. Spataru P (1976) Natural feed of Tilapia aurea Steindachner in polyculture, with supplementary feeding and intensive manuring. Bamidgeh 28: 57-63.
4. Perschbacher PW (1975) The Effect of an Herbivorous Fish, Tilapia aurea (Steindachner), on the Phytoplankton Community of Fertilized Ponds. MS Thesis, Auburn University, Auburn, AL.
5. Perschbacher PW, WJ Lorio (1993) Filtration rates of catfish pond phytoplankton by Nile tilapia (*Oreochromis niloticus*). JWAS 24: 434-437.
6. Schrader KK, Rimando AM (2003) Off-flavor in aquaculture: an overview. In: Off-Flavors in Aquaculture. AM Rimando and KK Schrader (Editors). ACS Symposium Series 848. American Chemical Society, Washington, DC. 1-12.
7. Perschbacher PW (2017) Pond co-culture with catfish research in the Americas, with emphasis on cage-confined tilapia. Tilapia in Intensive Co-culture 129-147.
8. Perschbacher PW (2011) Experimental partitioned co-culture of channel catfish *Ictalurus punctatus* and blue tilapia *Oreochromis aurea*. Asian Fish Sci 24:88-95.
9. Perschbacher PW (2003) Biological control of off-flavor cyanobacteria. In: Off-Flavors in Aquaculture. AM Rimando, Schrader KK (Editors). ACS Symposium Series 848. American Chemical Society, Washington, DC. 167-177.
10. Perschbacher PW (2017) Field key to the commonly cultured tilapias, with species synopses. 319-323. In: Tilapia in Intensive Co-Culture, PW Perschbacher and RR Stickney (Editors). John Wiley Sons Chichester UK 344.