

**PRODUCTION OF TILAPIA FOR TILADING PROCESSING
FOLLOWING TWO FEEDING SCHEMES UNDER
SEMI INTENSIVE POND CULTURE
SYSTEM**

By

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An Undergraduate Thesis presented to the faculty of the College of Fisheries in partial fulfillment of the requirements for the degree of

BACHELOR OF SCIENCE IN FISHERIES

**DEPARTMENT OF AQUATIC POST HARVEST
COLLEGE OF FISHERIES
CENTRAL LUZON STATE UNIVERSITY
Science City of Muñoz, Nueva Ecija
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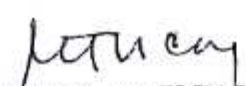
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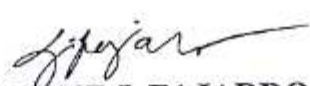
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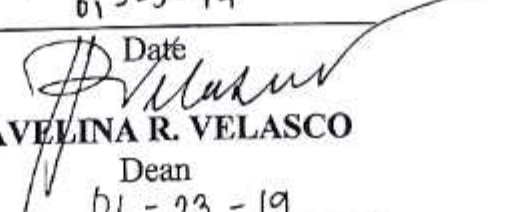
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**PRODUCTION OF TILAPIA FOR TILADING PROCESSING
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ABSTRACT

The study was conducted to evaluate the effect of delayed feeding on the culture of Nile tilapia (*O. niloticus*) for Tilading processing. This study was conducted in six (6) earthen ponds for 52 days.

After the study, the highest final weight was obtained in Treatment 2 (23.02 g). Significant differences were obtained for survival rate, final weight, gain in weight, absolute growth rate and specific growth rate but not for FCR. ($P>0.05$).

Size variability gave different values but no significant difference was observed ($P>0.05$)

Afternoon temperature readings, Treatment 1 (33.54°C) and Treatment 2 (32.98°C) were significantly different ($P<0.05$). Mean pH readings ranged from 7.39 to 7.57 however, significant difference among treatments either morning or afternoon was observed ($P<0.05$). Mean DO reading in the mornings showed significant difference. TAN was not significant.

Generally, based on the result of the experiment, it can be recommended that further study is encouraged to focus on treatment 1 (Fed start after 15 days of stocking).

1/ Undergraduate thesis presented to the faculty of College of Fisheries, Central Luzon State University as a partial fulfillment of the requirements for the degree of Bachelor of Science in Fisheries. Prepared at the Department of Aquatic Post - harvest under the supervision of Prof. Janet O. Saturno.

LITERATURE CITED

- Abdel-Hakim, N.F., H.A. Abo State, A.A. Al-Azab and Kh.F. El-Kholy. 2009. Effect of feeding regimes on growth performance of juvenile hybrid tilapia (*Oreochromis niloticus* x *Oreochromis aureus*). World Journal of Agricultural Sciences, 5(1): 49-54.
- Apan, M. R.O., J.O.Saturno and J.S. Abucay (Unpublished). Poster presentation during the International Conference on Nutrition sensitive Aquaculture and Food Systems held on Nov. 70-10, 2018. DAP Tagaytay City, cavite Philippines.
- Bhatnagar, A. and P. Devi. 2013. Water quality guidelines m Sciences, 3(6): 1-30.
- Borski, R.J., R.B. Bolivar, E.B.T. Jimenez, R.M.V. Sayco, R.L.B. Argueza, C.R. Stark and P.R. Ferket. Undated. Fishmeal-free diets improved the cost effectiveness of culturing Nile tilapia (*Oreochromis niloticus* L.) in ponds under alternate day feeding strategy. Retrieved from www.tysonanimalnutrition.com on June 20, 2015.
- Boyd, E.C. 2004. Farm level issues in aquaculture certification: tilapia. Retrieved from <http://fisheries.tamu.edu/files/2013/09/Farm-Level-Issues-in-Aquaculture-Certification-Tilapia.pdf> on December 10, 2017.
- Bwanuka, G.N., B. Makanga, Y. Kizito, L.J. Chapman and J. Balirwa. 2004. Observation on the biology of Nile tilapia (*Oreochromis niloticus* L.) in two Ugandan crater lakes. African Journal of Ecology, 42: 93-101.
- De Silva, S.S. 1985. Performance of *Oreochromis niloticus* (L.) fry maintained on mixed feeding schedules of differing protein content. Aquaculture Fisheries Management, 16: 331-340.
- De Silva, S.S. 1989. Reducing feed costs in semi-intensive aquaculture system in the tropics. Naga, the ICLARM Quarterly, 12(4): 6-7.
- Dos Santos, J. and M. Jobling. 1995. Test of a food consumption model for the Atlantic cod. ICES J. Mar. Sci., 52: 209-219.
- El-Sayed, A.F.M. 2006. Tilapia Culture. CABI Publishing. Oxford Shire, U.K. 277p.
- FAO, 2012. Cultured aquatic species information programme. *Oreochromis niloticus* Linneus, 1758.. Retrieved from <http://www.fao.org> on Febraury 15, 2018.
- Grove, D.J. and C. Crawford. 1980. Correlation between digestion rate and feeding frequency in stomachless teleost, *Blennius pholis* L. J. Fish Biol, 16: 235-247.

- Grove, D.J., M.A. Moctezuma, H.R.J. Flett, J.S. Foott, T. Watson and M.W. Flowerdew. 1985. Gastric emptying and the return of appetite in juvenile turbot, *Scophthalmus maximus* L., fed on artificial diets. *J. Fish Biol.*, 26: 339-354.
- Hatch, U. and K. Kinnucan. 1993. Introduction. p. 1-16. *In: U. Hatch and H. Kinnucan* editors. *Aquaculture Economics*. Westview Press. Boulder, Colorado. 44 p.
- Holmgren, S., D.J. Grove and D.J. Fletcher. 1983. Digestion and control of gastrointestinal motility. p. 23-40. *In: Rankin, J.C., Pitchr, T.J., Dugan, R.T.* (Eds.). *Control Processes in Fish Physiology*. Wiley, New York, NY, USA. 40p.
- Houlihan, D.F., D. Boujard and M. Jobling. 2001. *Food Intake in Fish*. Blackwell Science. Oxford, U.K. 259 p.
- Jobling, M. 1983. Effect of feeding frequency on food intake and growth of arctic charr, *Salvelinus alpinus* L. *Journal of Fish Biology*, 23: 177-185.
- Kaushik, S.J. 2013. Feed management and on-farm feeding practices of temperate fish with special reference to salmonids. p. 519-551. *In: M.R. Hasan & M.B. New* (eds.). *On-farm feeding and feed management in aquaculture*. FAO Fisheries and Aquaculture Technical Paper No. 583. Rome, Italy. 585 p.
- Lim, C.E. and C.D. Webster (Eds.). 2006. *Tilapia: Biology, Culture, and Nutrition*. Haworth Press Inc. New York, USA. 678 p.
- Liu, F., Liao, I.C., 1999. Effect of feeding regimen on the food consumption, growth, and body composition in hybrid striped bass *Morone saxatilis* × *M. chrysops*. *Fish. Sci.*, 65: 513-519.
- Millamena, O.M. 2002. Introduction to nutrition and tropical aquaculture. p.1-5. *In: Millamena, O.M., R.M. Coloso and F.P. Pascual* (eds.). *Nutrition and Tropical Aquaculture, Essentials of Fish Nutrition, Feeds and Feeding of Tropical Aquatic Species*. Aquaculture Department, Southeast Asian Fisheries Development Center. Tigbauan, Iloilo, Philippines. 232 p.
- Picker, M.D. and C.L. Griffiths. 2011. *Alien and Invasive Animals - A South Africa Perspective*. Random House/Struik. Cape Town, South Africa. 240 p.
- Riche, M.A. 2000. Effect of phytic acid on nitrogen retention in tilapia (*Oreochromis niloticus*). Dissertation. Michigan State University. East Lansing, Michigan, USA. p. 166.
- Singh, R.P. and A.K. Srivastava. 1984. Effect of feeding frequency on the growth, consumption, and gross conversion efficiency in the siluroid catfish, *Heteropneustes fossilis* (Bloch). *Bamidgeh*, 36: 80-91.
- Srikanth, G. K., M. S. Nandeesha, P. Keshavanth, T.J. Varghese, H.P.C. Shetty and N. Basavaraja. 1989. On the applicability of mixed feeding schedules for common

carp, *Cyrinus carpio* var. *communis*. p. 254-260. In: E.A. Huisman, P. Zonneveld and A.H.M. Bownmans (editors). *Aquaculture Research in Asia: Management Techniques and Nutrition*. Center for Agricultural Publishing. Pudoc, Wageningen, The Netherlands. 271 p.

Vera Cruz, E.M., J.S. Abucay, R.A. Delos Trinos, J.O. Saturno, F.L. Porciuncula, M.S. Recto, P.J. Rafael and G.Z. Laggui. 2011. *Tilapia production and entrepreneurship training manual*. Central Luzon State University, Science City of Muñoz. Nueva Ecija: CLARDEC, CVARRD, AND, PCARRD-DOST. 196.p.

Wang, N., R.S. Hayward and D.B. Noltie. 1998. Effect of feeding frequency of food consumption, growth, size variation, and feeding pattern of age-0 hybrid sunfish. *Aquaculture*, 165: 261-267.