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Title: The influence of social status on the rate of growth, eye color pattern and Insulin-like Growth Factor-I gene expression in Nile tilapia, *Oreochromis niloticus*

Author(s): Emmanuel M. Vera Cruz, and Christopher L. Brown

Date: 27 June 2007

Publication Number: CRSP Research Report 07-221

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Abstract: Many aspects of teleost physiology are subject to regulation by social interactions. To evaluate the relationship of social status with growth, eye color pattern and hepatic insulin-like Growth Factor-I (IGF-I) mRNA expression, 30 *Oreochromis niloticus* were isolated for 10 days and were used in a social pair study. Results revealed that growth of both dominant (except 1 day after social interaction) and subordinate individuals was suppressed, but growth suppression was greater in the subordinates. The dominant fish completely inhibited the feeding of the subordinate individuals during and 1 day after they were introduced into the aquaria together. After that, a pattern of highly aggressive attacks by dominant fish only partially inhibited feeding by the subordinates. Differential alterations in growth rate between dominants and subordinates were attributed more to behavioral changes (i.e., feeding) as transduced by physiological regulators (i.e., IGF-I level and possibly serotonin and/or neuropeptide Y) but may also be due to changes in metabolism. The fish's relative position in the social hierarchy consistently influenced the levels of IGF-I mRNA in the liver and the previous termeye color pattern. Lower social status depressed hepatic IGF-I levels while dominant status stimulated hepatic IGF-I production, possibly in response to inhibition of somatostatin release in the hypothalamus, leading to greater secretion of pituitary growth hormone (GH). A significant positive association was detected between the IGF-I mRNA expression of the dominant fish and the level of aggression (number of attacks) during the encounter. Social status also influenced the eye color pattern of the fish. During aggressive interactions, most of the fish (22 out of 24) displayed decreased eye darkening. At the later part of the encounter, all subsequent subordinates displayed eye-darkening patterns which acted as a social signal announcing social submission. After the encounter dominant fish had paler eye color pattern than subordinates.

This abstract was excerpted from the original paper, which was in *Hormones and Behavior* 51(4):611-619

CRSP RESEARCH REPORTS are published as occasional papers by the Program Management Office, Aquaculture Collaborative Research Support Program, Oregon State University, 418 Snell Hall, Corvallis, Oregon 97331-1643 USA. The Aquaculture CRSP is supported by the US Agency for International Development under CRSP Grant No.: LAG-G-00-96-90015-00 and by collaborating institutions. <http://pdacrsp.oregonstate.edu>