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RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

Title: Disorders of Development in Fish (Chapter 5)

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Date: 08 August 2017

Publication Number: AquaFish Research Report 10-A08

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Abstract: Among physical deformities in fish, skeletal, gill and fin malformations are most common, and they can range from barely detectable to lethal. With few exceptions, the motivation among fish growers to eliminate physical malformations is strong; at the very least these deformities reduce the market value of aquaculture crops. At worst they can cause the loss of an entire cohort. The search for definitive information about the causes of deformities in fish leads us in several directions – some genetic configurations can increase the susceptibility to physical and developmental malformations, but in other cases morphologically similar deformities are clearly not heritable. Slight aberrations in the rearing environment, e.g. temperature, water flow rate or diet, can trigger high rates of deformities in a clutch of fish. Occasionally, associations are made between handling stress and an elevated incidence of deformities, suggesting that stress can disrupt a genetically predetermined plan of development. The sum of the available evidence suggests that certain fishes are more susceptible to environmentally induced aberrations of development than are others. In other words, some species appear to adapt relatively well to captive rearing and may be more suitable for culture and domestication than others. This is not surprising, considering the widely varying degrees to which other animals adjust to captivity and the relatively small fraction that have adapted well.

AQUAFISH RESEARCH REPORTS are published as occasional papers by the Management Entity, AquaFish Innovation Lab, Oregon State University, Corvallis, Oregon 97331-1643 USA. The AquaFish Innovation Lab is supported by the US Agency for International Development under Grant No. EPP-A-00-06-00012-00. See the website at <aquafishcrsp.oregonstate.edu>.

In the 12 years that have elapsed since the publication of an earlier edition of this volume, the basic assortment of deformities commonly ascribed to fish has not changed appreciably, and to a large extent our understanding of the causes ontogeny of these patterns is not much more detailed than it was then. Some of the patterns of developmental deformities in fish have become clearer, and some associative trends are more apparent than they were earlier. Nevertheless, the differentiation of basic deformities in developing fish is still only superficially understood, in large measure because this remains a relatively poorly studied topic [Note: First two paragraphs of introduction.]

This book chapter section was extracted from the original book chapter in J.F. Leatherland, and P.T.K. Woo (Editors), 2010. *Fish Diseases and Disorders, 2: Non-Infectious Disorders*, 2nd edition. CAB International, Wallingford, 166-181.