

CHAPTER 13

INDIGENOUS SPECIES FOR AFRICAN AQUACULTURE DEVELOPMENT

RANDALL E. BRUMMETT, Ph.D.

*WorldFish Center, c/o ITTA Humid Forest Station, BP 2008 (Messa), Yaoundé, Cameroun, Africa
(E-mail: R.Brummett@cgiar.org)*

Abstract: From the history of introductions and the development of successful aquaculture elsewhere, it appears that the use of exotic species to speed up the rate of aquaculture development in Africa is unlikely to be an efficacious strategy. The major sustained aquaculture industries worldwide evolved from close working relationships between pioneering investors and local research-and-development institutions. The use of indigenous species avoids many environmental risks, facilitates broodstock and hatchery management at the farm level, and can increase the effectiveness of selective breeding programs. Public-sector involvement in the domestication and marketing of indigenous species can strengthen research, development, and education; broaden the range of investors; create more jobs; and increase the social benefits accruing as a result of aquaculture development.

Key words: Africa, alien species, aquaculture, Cameroon, ecosystem, environment, ecological impacts, indigenous species, introduction, Malawi

1. INTRODUCTION

Aquaculture has made steady progress over the past 40 years, but environmental constraints are now being imposed either by natural ecosystems or man-made regulation. While many negative environmental impacts can be ameliorated through improvements in fish feeds, facility design, and waste processing technology (Boyd, 1995; Mires, 1995a), the impact of escapees from aquaculture on indigenous biodiversity is, in almost all cases, unavoidable (Shelton and Smitherman, 1984; Beveridge and Phillips, 1993).

In this article, I examine the context and history of aquaculture-related introductions of exotic freshwater finfishes into Africa and propose that an

emphasis on the domestication of indigenous species can decrease environmental consequences of escapement while simultaneously stabilizing and diversifying the industry and ensuring the equitable distribution of benefits. Although many of the comments made here may be broadly applicable, the author's experience is predominantly in African systems and it is these to which the following arguments specifically apply.

2. HISTORY OF AQUACULTURE INTRODUCTIONS IN AFRICA

Increasing poverty and human population sizes in developing countries increases the pressure on governments to maximize food production as rapidly and as cheaply as possible. Urgency often results in a failure to carefully review costs and benefits. Policy-makers trying to feed hungry people and investors seeking quick returns are strongly compelled by the perceived magic bullet of importing for aquaculture an alien species that has proven its worth in aquaculture in other countries or regions (New, 1999).

The track record of aquaculture-related introductions (Table 1) shows that bringing in exotic species to get quick results seldom produces the desired outcome (Satia, 1991). In reviewing 212¹ international² introductions of freshwater fishes into Africa for aquaculture, only 33 (16%) were found to have resulted in the establishment of an industry with output of more than 10 metric tons (t) per year in 1997 (FishBase, 1998; FAO, 1999). Of these, 10 (30%) were of common carp (*Cyprinus carpio*) from Asia and Europe and 7 (21%) were of Nile tilapia (*Oreochromis niloticus*) from other African countries. The balance was of mixed cyprinids and rainbow trout (*Oncorhynchus mykiss*). Typical is the case of Zambia, where 39 introductions resulted in sustained aquaculture of only Nile tilapia and common carp (Thys van den Audenaerde, 1994; FAO, 1999). Production of these two species in 1997 was only 133 and 275 t, respectively, compared to 2680 and 1010 t for the indigenous *Oreochromis andersonii* and *Tilapia rendalli*, respectively (Table 2).

In terms of weight produced, over 99% of the total production of exotic species in Africa was of common carp in only two countries: Egypt (22,000 t) and Madagascar (6,000 t).³ Currently, the common carp industry in Egypt is in serious decline due to the reduction of government subsidies and consumer preference for the indigenous Nile tilapia. In total, exotic species account for only 15% of African aquaculture output (Garibaldi, 1996; Bartley and Casal, 1998). In Asia, the powerhouse of world aquaculture, 517 introductions of primary and secondary freshwater species have resulted in a total contribution of only 5% to total output (Garibaldi, 1996).

¹ FAO (1999) reports a total of 470 freshwater and marine introductions to Africa.

² Most available datasets do not permit the comparison of production statistics with species translocation within a country.

³ Recently, two projects in Zimbabwe have started operating at a combined output of 6,000 t per annum of Nile tilapia (Cecil Machena, Africa Resources Trust, personal communication, November 1999).