FISH PRODUCTION FROM AQUATIC WEEDS

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ABSTRACT

The Nigerian fish demand is increasing tremendously and possibly has to be met by aquaculture. Irrigation in the eleven River Basin Authorities and in particular in the South Chad Irrigation Project and the Baga Polder Project is also increasing and demands high yearly investments for aquatic weed control in canals and drains. If the weeds are biologically controlled by the grass carp (Ctenopharyngodon idella Val.), the costs will be turned into profit, particularly when the fish production (resident fish plus grass carp) is harvested and sold for food. The use of irrigation canals and drains for aquaculture in the form of fish polyculture will be a wise step towards increased fish production. This paper highlights the concept of fish production from aquatic weed control and concludes that it is a proven profitable venture in several countries.

INTRODUCTION

In most river basin irrigation schemes in Nigeria, many of the kilometers of ditches, canals and reservoirs are known to be overgrown with submerged, emerged and floating weeds and by filamentous algae partly due to increasing eutrophication. In order to maintain water flow and irrigation, most of the weeds in these waterways have to be removed by one method or by a combination of methods.

All weed control practices can be broadly classified into three (Akobundu, 1980). These are chemical, cultural and biocontrol methods.

CHEMICAL CONTROL METHOD

Although submerged, emerged and floating weeds in the waterways could be removed by chemical means, many chemical control methods are hazardous to ecological balance of the aquatic ecosystems and to the farmer himself.

CULTURAL CONTROL METHOD

The traditional method of removing water weeds is cuttingby hand and raking out. However, hand weeding cannot be applicable in channels filled up by dense masses of submerged filamentous algae and species like Ceratophyllum demersum L. This weed has been reported to be present in Lake Chad (Okafor, 1980). The usual thing will be to employ a system of mechanical cutting from a boat.

Both hand and mechanical cutting have the serious disadvantage in that weeds begin to grow again as soon as they are cut, and with many water weeds regrowth can be rapid. Vegetative fragments of most aquatic weeds will grow rapidly if they are left in the water unless removal operations are very thorough. Indeed attempts at mechanical control may merely serve to spread the infestation. Such work is very time-consuming particularly in raking out cut weeds, and arduous. It is therefore becoming increasingly difficult to find men willing to undertake work of this nature and the cost of employing them is rising continually.

BIOCONTROL METHOD

It is recognised that grass carp (Ctenopharyngodon idella Val.) a herbivorous fish can control growth of aquatic plants. It has been successfully used in the Netherlands (Boquet, 1977; Van Zon, 1977; Riemens, 1982), Switzerland (Muller, 1979), United Kingdom (Scott and Robson, 1970; Scott et al, 1971 and Buckley, 1981), East Germany (Janichen, 1973), the Soviet Union (Allev, 1976) and Egypt (Gharably et al, 1982).

Reasons for the considerable interest in this Asiatic herbivorous fish or phytophagous fish all over the world include:-

(a) First of all, and what seems to be of essential importance is the fact that it is a plant-feeding species. The grass carp feeds on macrophytes and algae and is not a highly selective consumer for it eats quite a number of aquatic weeds.

(b) Another important thing is its ability to adapt to various climatic conditions since it comes from a continental zone with hot summers and severe winter conditions.

Other important factors are:

(c) its fast rate of growth

(d) its big size

(e) its resistance to handling

(f) easy to culture including artificial propagation

(g) its good taste when used for food.

It is primarily used for biological control of the overgrowing water reservoirs, canals and channels.

In Egypt, Gharably et al (1982) demonstrated that the use of grass carp for the control of weeds in canals and drains forms an attractive alternative to the traditional means of weed control: manual, mechanical and chemical; and is indeed more economical; and that the growth of grass carp stocked in canals and drains enables a considerable annual harvest to be cropped without affecting the capacity needed for proper weed control. In this way the grass carp can contribute to the protein consumption of the people. Van Zon (1980) reported that the grass carp shows most perspective because of its fast growth and good marketability, and that it is not bound to one food source but it is a polyphagous, non-selective feeder, especially in temperatures over 20°C.

FISH PRODUCTION/HECTARE

Maembe (1981) reported that Lake Chad is one of the richest fishing grounds in the world with 80-100 kg/ha yield. However, it has been shown in Egypt that growth of grass carp will result in a yield of 360 kg/ha/year (Khattab et al, 1982) for human consumption without interfering with the control of aquatic weeds. Van Zon et al (1982) reported that even if the purpose of grass carp production in irrigation systems will be limited to weed control and some extra protein production, the yield could easily be around 500 kg/ha/year (without additional feeding or fertilization).

ECONOMIC GROWTH

The grass carp obtains its nutrient requirements completely from eating aquatic plants and does not require any expensive dry pelleted fish-food.

DANGER IF ANY

In some countries, the method of biological control with grass carp is not allowed because of the danger of the possible reproduction and naturalisation of the species, following introduction. In 1975, a new triploid sterile hybrid of grass carp and bighead (Aristichthya nobilis Rich.) was developed (Marian and Krasznai, 1978) which can be used for the control of aquatic vegetation without the risk of unwanted overpopulation. This is cheaper, more effective and more acceptable in view point of environmental protection.

SUMMARY

In the river basin schemes of Nigeria, it is common practice to control aquatic weeds in irrigation canals, channels and drains manually and mechanically. In order to avoid the hazards of cheaper chemical weed control on human health, fish production and the quality of irrigation water, and to reduce costs and increase the efficiency of aquatic weed control, the grass carp could be introduced as an alternative method. The development of a sound weed control programme with grass carp, adjusted to the specific conditions existing in most river basin irrigation systems will result in enormous increases in fish production. This will be a desirable situation as the strongly increasing Nigerian fish demand has largely to be met by aquaculture. This successful venture has been found profitable even in African countries.

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