INGA News

Newsletter of the International Network on Genetics in Aquaculture

EDITORIAL

In many developing countries, availability of suitable tags for use in genetics and aquaculture research has been a problem as they are often expensive and have to be imported from other countries. A simple and inexpensive method used by scientists in Ghana that can be tried and improved by others is described below. Members of INGA are encouraged to report any innovative research methods they might have developed through the Newsletter to inform others engaged in similar research.

There is a brief description of the aquaculture genetics research being conducted by some of the INGA member institutions. All members and Associate Members of INGA are invited to share with others the results/progress of research being conducted by them. Research papers/articles are also welcome and will be published in The Features or Aquabyte sections of the *Naga*.

M.V. Gupta

A Simple and Inexpensive Fish Tagging Method

Introduction

Historically, several methods have been employed to 'mark' animals as individuals or groups of individuals. These have included markings with dyes, branding, tattooing and clipping of various parts of the animal. Where applicable, tags have also been fastened or stuck to animals as a 'mark'. Irrespective of whether animals are marked or tagged, the objective of doing so is to identify an individual or a group of individuals at a later date.

Laird and Scott (1978) categorized the methods employed for marking fish into group marking and individual marking. Under group marking, they considered fin clipping, branding and marking with dyes or stains. For individual fish marking, they considered tagging as the approach, although tagging is also appropriate for fish group marking. It is important that the marking or tag does not unduly influence fish behavior, movement, growth or make it more prone to capture. To achieve both permanent labelling and reduce the adverse effects of a tag, several developments have taken place. These include the use of electronic/radioactive tagging materials.

The two basic studies requiring the use of permanent labelling of fish include: (i) mark and recapture studies for fish movement (migration) and stock estimation; and (ii) comparative estimation of fish growth or culture performance of different stocks or populations under communal testing conditions. Marking is especially important where the test fish are different populations of the same species. In both cases, the inclusion of different size fish groups can give more comprehensive conclusions. Therefore, the desirable characteristics of tagging materials would be a combination of availability, affordability, simplicity, ease of identification, light weight, high retention capacity and wide size ranges (to suit different sizes of fish).

To achieve a combination of the above features in a tagging material, the authors have used a set of simple materials for tagging in a study undertaken to evaluate the culture performance of three populations of Nile tilapia (*Oreochromis niloticus*) in Ghana.

The materials used to prepare the disc tags and the tagging procedures are described below. These could be usefully adopted in other developing countries where availability, affordability and/or importation of tags are a constraint.

Materials and Methods

The materials needed to prepare the disc tags are: polyvinyl sheets (as many colors as may be required); perforator of different sizes and shapes (e.g., paper puncher); monofilament nylon fishing twine/string; and an injection needle.

The procedure is:

- Use a perforator(s) to punch through polyvinyl sheets to produce discs (disc sizes and shapes may be varied by use of different perforators).
- Make a hole in the center of each disc by using an injection needle.
- Pass a length of nylon fishing string through the hole in the disc and tie one end of string to secure disc.
- Use an appropriate sized injection needle to pierce through fish and leave it in place. (In our study the point of piercing was between the posterior end of dorsal fin and the lateral lines).
- Insert string attached to disc

through the cavity of the injection needle and push string to the other side of fish.

- Withdraw needle.
- Secure another disc on the emerging end of string leaving between 2 and 5 cm of string depending on size of fish (the second disc can be of a different color if necessary).
- Tagging is completed with the two discs on either side of fish. The size, color(s) and shape(s) of discs constitute the 'label' on a number of fish or group of fishes.

Tagging of Nile tilapia fingerling using disc tag.

Assessment

The tags were assessed with respect to their retention and their effect on growth and mortality of fish.

The fish used in the evaluation of the tags were Nile tilapia fingerlings produced from broodstocks of the fish collected from three localities in the Volta system of Ghana (Kpando, Kpong and farm stock from the Institute's Station at Akosombo). The average weight of fingerlings used ranged from 4.3 to 6.5 g. The study was undertaken in six tanks of 2.5 x 0.6 x 6 m each. Ten tagged fish of each strain were compared with ten untagged fish as control, with two replications. Different colors of polyvinyl material were used to make the tags for different strains of fish.

The duration of the study was six weeks. Weight and length measurements of individual fish in all tanks were taken weekly. Tank water was partially replaced daily and completely every four days. All fish were fed the same diet, under same regime.

Observations and Comments

Tagging was accomplished at an average rate of 60 fish per person-hour which may be considered labor intensive. However, the advantages of the method outweighs this cost.

Initial results indicate that incremental growth trends were identical for the untagged fish of the three populations. The growth performance of the three tagged populations was lower than that of the untagged population. Observations of the tagged populations showed a relatively higher growth rate for the Kapong stock and the farmstock as compared to the Kapandu stock. Growth differences between the tagged stocks, were, however, not significant ($P>0.050$).

The general trend indicated that untagged tilapia fingerlings (average of controls of three strains) performed marginally better in growth (Fig. 1) than tagged ones, although the differences were not significant ($P>0.05$). Tagging appears to influence growth in smaller fish weighing less than 5 g. This was evident in the performance of the Kapandu population. Despite the lower starting weight (less than 5 g) for both tagged and untagged fish of this population, the growth trend in untagged controls was high and close to the controls of other populations with initial weight above 5 g.

Untagged fish had a slightly higher survival (96%) than the tagged fish (90%). Among the tagged

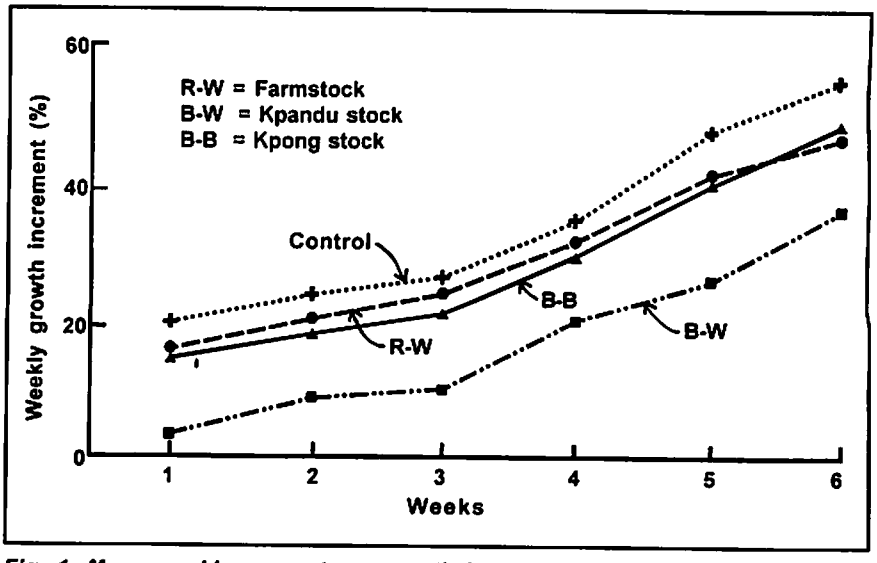

Fig. 1. Mean weekly percentage growth increment of untagged control and three tagged populations of O. niloticus from Volta Lake.

populations, Kpandu fish had the highest survival rate (92%), while the Kpong population recorded the lowest survival of 78%. Observed mortality was generally low and tag retention was high (86-98%) at low to moderate holding density. A comparative retention of the disc and Dennison tags at varying holding densities in a previous study (Ofori, unpublished) showed that although disc tag retention is negatively correlated with high holding density, it was found superior to the Dennison tag for 5 g fish.

Reference

Laird, L.M. and B. Scott. 1978. Marking and tagging, p. 84-100. *In* T. Bagenal (ed.) Methods of assessment of fish production in freshwater. Blackwell Scientific Publications Ltd., Oxford, London, Edinburgh.

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NEWS ITEMS

INGA Coordinator in African Member-Countries

INGA Research Coordinator, Dr. Modadugu V. Gupta, accompanied by Dr. Rex Dunham visited Côte d'Ivoire, Ghana and Egypt on 1-11 November 1998 and held discussions with the senior officials of the INGA nodal institutions and national team leaders to review progress of the ongoing collaborative genetics research and finalize work plans for the next year. In Côte d'Ivoire they visited the Fish Culture station at Bouake and held discussions with senior officials of the reorganized Centre Nationale Recherche Agronomique and Université d'Abobo Adjame in Abidjan. In Ghana, visits were made to the Water Research Institute in Accra, the fish culture station at Akasombo and some farmers' ponds. In Egypt, discussions were held with the staff of CLAR and the ICLARM Centre for Africa and West Asia.

Dr. M.V. Gupta and Dr. R. Dunham with aquaculture/fisheries scientists in Ghana.

Proceedings of Genetic Improvement of Carps Workshop

The Proceedings of the Genetic Improvement of Carps Workshop, held in Bangalore, India on 3-4 October 1996, have recently been published by the Hesaraghatta Fisheries Research Station, University of Agricultural Sciences, Bangalore, India in collaboration with the DFID Fish Genetics Programme, University of Wales, Swansea, UK. The publication (edited by Y. Basavaraju, G.C. Mair and D.J. Penman) summarizes the presentations made during the Workshop. The papers presented focus on the progress made during Phase I of the project on the genetic improvement of the prime Indian major carp, Catla, and the planned programs for Phase II. The Proceedings provide important reference material for fish genetic improvement programs.

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