7-methyljuglone (plumbagin) as well as vitamin K_3 was even more active and killed the snails at concentrations of 2 and 3 ppm, respectively. Fungicidal activity by TLC assay using *Cladosporium cucumerium* (an assay for biologically active compounds) was detected at 0.0025 µg/ml of 7-methyljuglone. Plant species which biosynthesize naphthoquinones are worth investigating for their molluscicidal activity (Marston et al. 1984a).

The roots of *Clerodendrum uncinatum* (Verbenaceae) have a reputation among traditional healers in Malawi as a cure for bilharzia and intestinal parasites. The infusion of the roots has a very bitter taste. Screening for biologically active compounds showed that the lipophilic extracts of *Clerodendrum uncinatum* had antifungal activity against *Cladosporium cucumerium*. Fractionation of active petroleum ether and chloroform extracts led to the isolation of a hydroquinone diterpene, uncinatone. Uncinatone inhibited the growth of *Cladosporium cucumerium* spores on a TLC bioassay at a minimum concentration of 0.5 µg/ml. In addition to further studies on the strong fungicidal activity of uncinatone, tests are underway to evaluate its possible *in vitro* and *in vivo* effects against schistosomes in humans (Dorsaz et al. 1985).

The tubers of *Talinum tenuissimum* (Portulacaceae) are used in Malawi, according to traditional healers, for the treatment of bilharzia. Aqueous extracts of *Talinum tenuissimum* also kill *Biomphalaria glabrata* within 24 hours, at concentrations as low as 25 ppm. This observation led to the isolation of a monodesmosidic saponin of oleanolic acid with a xylosyl (glucosyl uronic acid) moiety identified as 3-0-(O-β-D-xylopyranosyl)-(1>3)-0-(β-D-glucopyranosylcuronic acid) oleanolic acid. The methanol extract of the fresh tubers was suspended in water and partitioned with chloroform and n-butanol. The active butanol extract was submitted to flash chromatography on silica gel with $CHCl_3$/MeOH/H_2O 65:40:5, followed by preparative reversed-phase chromatography on RP-8 with methanol/water mixtures to yield the active saponin. The saponin killed *Biomphalaria glabrata* at a concentration of 1.5 ppm within 24 hours. Direct water extraction afforded a highly active solution killing the snails at a concentration of 25 ppm. The water extract contained mainly saponin and only traces of the saponin-oleanolate were detected. Thus the molluscicidal activity of saponin-containing plants depends essentially on the extraction process since the genuine inactive bidesmosidic saponins are easily base-hydrolyzed to very active monodesmosidic saponins in the course of the water extraction (Gafner et al. 1985).

The leaves and seeds of *Tephrosia vogelii* (Leguminosae) are used in Malawi to stupefy fish. The plant could also be investigated as a molluscicide. The petroleum ether extract of *Tephrosia vogelii* leaves was active against *Biomphalaria glabrata* snails at 400 ppm. After flash chromatography and low pressure chromatography (both on silica gel), two rotenoids, dequelin and tephrosin, were isolated. However, due to insolubility in water, the pure rotenoids were both inactive as molluscicides (Marston et al. 1984b).

Researchers in Malawi are currently screening medicinal plants for molluscicidal activity and many plants show activity against *Bulinus (Physopis) globusus* (see box) (Kamwendo et al. 1985; Msonthi and Chiotha 1986; Chiotha and Msonthi 1986).

Further phytochemical studies to isolate the active compounds from these plants are underway.

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Constraints to Aquaculture Extension in Rural Africa

JASTON MUTAMBO
Malawi Department of Fisheries
c/o MAGFAD, P.O. Box 206
Zomba, Malawi

The Learning Process: Constraints to a Participatory Approach to Extension

Recently, there was a strong advocacy for a participatory approach to aquaculture extension. In this, we may be chasing an illusion because of the structure and function of a farming society. Malawi affords an example. There is a traditional social structure at both village and higher levels with clearly defined lines of command and communication. People expect information and instructions to come from a particular source through some customary or approved route.

Education in Malawi's large rural population is traditionally passive at lower levels. Pupils receive information from teachers, and have little active

participation. The teacher has the knowledge and the skills. The pupils' main task is to absorb and conform to teachers' instructions by passing examinations. The teacher alone determines success criteria. Such education systems emphasize that the young and the inexperienced must be guided by persons with the right experience, knowledge, skills and authority.

This has important implications for involving target populations in participatory decisionmaking. Those steeped in the passive modes of education will find it difficult to participate. Similarly, traditional educators will find it difficult to foster participation.

Where such structures exist in traditional villages in Africa, a participatory approach in its strictest perspective may be too idealistic. It would be more appropriate to be sensitive and analyze societal structures and traditions before adopting a participatory approach derived from a different culture (see below). Thereafter, a new, more sensitive approach could be developed.

Foreign Experts in Extension

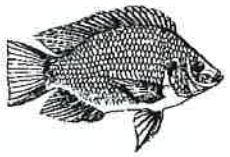
Aquaculture is relatively new in Malawi and is quite different from indigenous crop farming and animal husbandry. Aquaculture requires technical support from very competent personnel who are highly trained in specialized institutions, often including training abroad.

Aquaculture extension depends upon effective communication. In human communication, transfers of new ideas, knowledge gains, attitude formation and change, and overt behavioral changes occur most frequently and effectively between similar individuals who share common traditions and a mutual subcultural language; and are alike in personal and social characteristics. However, agents of change are usually dissimilar from their clients, for instance, more technically competent. Differences often lead to ineffective communication. They simply do not talk the same language.

There is a very frequent participation of foreign experts in aquaculture extension in Africa, including Malawi. Many come as well-intentioned professional advisors or voluntary workers. However, their results are often ineffectual and unsustainable. This is likely due to a communication gap, which derives particularly from the legacy of former colonial times. The majority of fish farmers have experienced the rule of a 'Whiteman', young or old. In colonial times, the 'Whiteman' was accorded supremacy and did not share anything with local villagers. To involve such individuals, perceived and regarded in reverence, in extension, may be counter-productive. We probably need to reconsider the role of foreign extensionists in effective aquaculture development in Africa.

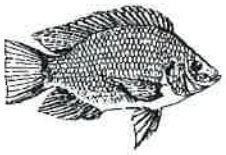
Editor's comment: The views expressed here are the author's own views. Aquabyte welcomes further comments on these issues. On the effects of traditional educational methods on new participatory approaches to extension, a similar view has recently been expressed by Bunker Roy in his article "The Literate Uneducated: Grass without Roots", India Today, 15 September 1990, p. 143. The article carries the summary statements "Employing highly literate people in rural areas does more harm than good," and "It is an open question as far as the poor are concerned who is backward and who is primitive." Strong stuff! Anyone seeking more details of this article should write to me.

On the foreign involvement in extension, the need for change in many of the 'agents of change', both national and foreign, is clear. Many mistakes have been made. It would, however, be a council of despair to advocate that those in need will only ever be able to learn from fellow human beings within a shared culture. The world is going to need the best ideas from all cultures to confront its worsening environmental crises and effective cross-cultural communication is a key issue.



Reproduction in Fish. Basic and Applied Aspects in Endocrinology and Genetics. Reproduction chez les poissons. Bases fondamentales et appliquées en endocrinologie et génétique. Y. Zohar and B. Breton (eds.) 1988. Institut National De La Recherche Agronomique (INRA) Publications, Rte de St-Cyr, F-78026 Versailles Cedex, France. 236 p. 16 x 24 cm. ISBN 2-7380-0027-4. Price: US$23.76.

This book documents the proceedings of the French-Israeli Symposium, held in Tel-Aviv, Israel on 10-12 November 1986. The proceedings contain 31 technical papers authored by French and Israeli scientists involved in different aspects of fish reproduction and genetics research. The major topics covered by this publication are gametogenesis, endocrine-regulation, role of environmental factors, sex differentiation, exogenous manipulation of the reproductive cycle, genetic improvement, and chromosome and gene manipulation. French translations of the Contents, Preface and Summary of research papers are provided.



Ms. Grace L. Asheri, Research Fisheries Officer, Regional Fisheries Office, P.O. Box 3012, Arusha, Tanzania.

Change of Address

I have changed my address from the Tanzania Research Institute to the Regional Fisheries Office, Arusha. This region is the most active in aquaculture in Tanzania.

In Tanzania, aquaculture development has been generally declining in past years. People were discouraged by the stunting behavior of tilapia. The introduction of Nile tilapia (*Oreochromis niloticus*) has revived people's interest in fish farming and its taste is appreciated.

During my recent survey, I was impressed by the attitude of farmers having new hope for farming this new introduced species.

Thank you.

Editor's note: The revival of interest in Tanzania tilapia culture is good news. However in all areas where there are possibilities of escapees of introduced species mixing with wild genetic resources of other species, great care should be taken. For all countries, exhaustive evaluation of the culture performance of native species should be made before introducing exotics new to the country or specific watersheds, and then the introduction should be made only with a strong rationale and in accordance with established International Codes of Practice.