7 WATER MANAGEMENT

Keep at 30 cm deep during the first 30-45 days with lablab. Increase to 50-100 cm when fish are bigger and supplemental feeding starts. Pumping may be necessary to keep the pond water at a higher level than outside. Monitor dissolved oxygen at 6-8 AM and 2-4 PM as often as possible. Do not disturb the fish or feed the fish when dissolved oxygen is less than 2 ppm. Aeration may become necessary when dissolved oxygen goes below 1 ppm at night or early morning.

AQD has earlier recommended the modular pond culture method for milkfish. [REFERENCE: Agbayani RF, DD Baliao, NM Franco, RB Ticar, NG Guanzon. 1989. *An economic analysis of the modular pond system in milkfish production in the Philippines*. **Aquaculture** 83: 249-259]

AQD Scientist Dr. Relicardo Coloso (right most) tests a highly selective molluscicide that degrades rapidly to control the mud snail population.

Solution to the snail problem is at hand

By **M Castaños**

Milkfish pond owners would be relieved to know that an alternative to Brestan, Aquatin, and Telustan — the banned organotin pesticides that have been used by fishfarmers to control mud snails in brackishwater ponds — is on its final stages of field trial.

The alternative is a metaldehyde formulation (10% active ingredient). According to AQD Scientist Dr. Relicardo Coloso, metaldehyde is a highly selective molluscicide. It has been used since the 1930s against terrestrial or garden slugs and snails, but it is only recently that it is being tested on aquatic snails. META® metaldehyde fulfills the requirements of integrated pest management because of its efficacy and environmental acceptability. Within the European Union, it is even allowed in organic farming.

Several field trials were conducted by SEAFDEC /AQD in Luzon, Visayas, and Mindanao in collaboration with Lonza Ltd, a chemical company based in Basel, Switzerland.

Dr. Coloso reports that the brackishwater mud snail (scientific name,*Cerithidea cingulata*) has become a pest in brackishwater milkfish ponds in the Philippines. Infestation can reach more than 5,000 snails per square meter These snails destroy the *lab-lab*, a mat of algae and bacteria on the pond bottom that milkfish graze upon. The milkfish stock suffers especially during the early days of pond culture. This reduces production and causes losses to milkfish farmers.

The mud snail is bitter and non-edible unlike the *bagongon* and *saka saka* which are delicacies in western Visayas. At present, fishfarmers either remove the snails by hand — a laborious work which does not remove the eggs and small snails — or use plant-derived pesticides like tobacco dust, derris root or teaseed cake. But these plant-derived pesticides are expensive because supply is limited. The use of organotin pesticides is no longer allowed by the Philippines' Fertilizer and Pesticide Authority.

Organotin pesticides bioaccumulate, are non-biodegradable, and have hazardous effects on humans (damage to the immune system, cause birth defects, cause severe eye damage). These also render the soil sterile.

The metaldehyde formulation on the other hand is rapidly degraded, Dr Coloso said, with 60 to 70% decomposed into acetaldehyde then to carbon dioxide and water by aerobic as well as anaerobic microorganisms in the soil. It is also not toxic to milkfish juveniles even after 8 days of exposure, and milkfish juveniles can tolerate up to 175 kg per hectare of metaldehyde without showing adverse effects. META® metaldehyde is non-carcinogenic, non-teratogenic (in rat or rabbit), and there is no indication of mutagenic potential.

Metaldehyde (10% formulation) can be applied at 80 to 120 kg per hectare depending on snail infestation and weather conditions. It can kill 70-80% of the mud snails in the first three days after application and greater than 90% after seven days. Metaldehyde appears to damage the guts (snails eat them) and causes irritation (snails produce excessive mucus).

Dr. Coloso, however, cautions that more studies are needed to verify these results. The mode of action of metaldehyde must be clarified with histological studies, and the influence of environmental factors — water depth, rainfall, water seepage, snail density, salinity, temperature — on its efficacy determined.