Farming of tilapia O. niloticus in freshwater or brackish water ponds results commonly in early maturation as low as 70 g fish body weight only. Saponin supplementation can be a good and safe option to keep this problem under control.

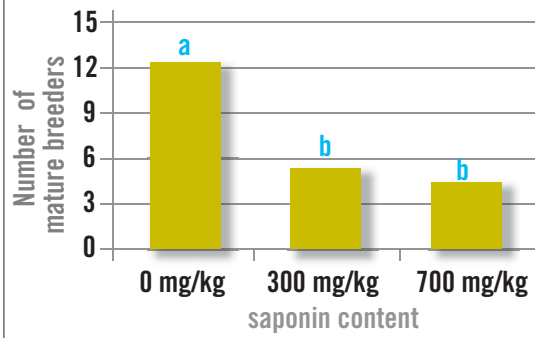
Benefits of saponin supplementation to tilapia

THE NILE TILAPIA IS BY FAR THE MOST COMMONLY USED SPECIES IN FISH FARMING. HOWEVER FARMING OF THIS SPECIES IN PONDS RESULTS COMMONLY IN EARLY MATURATION AS LOW AS 70 G FISH BODY WEIGHT ONLY. HORMONES CAN BE USED TO CONTROL REPRODUCTION TO PRODUCES GOOD-SIZE FISH, ALTHOUGH THEY CAN POSE SOME RISKS TO HUMAN HEALTH. SAPONIN CAN BE A GOOD ALTERNATIVE TO CONTROL REPRODUCTION ACCORDING TO CHRISTIAN LÜCKSTÄDT, PAZ KÜHLMANN **AND** YASMIN PRIMAVERA-TIROL.

Total tilapia production from aquaculture reached nearly 1.5 million ton in 2003. The international trade is growing rapidly and prospect of million-dollar business with these fish is furthermore building up hopes in Asia, Africa and Latin America where more and more countries are producing tilapia. Large-scale commercial culture of tilapia is limited almost exclusively to the culture of three species: *Oreochromis niloticus, O. mossambica* and *O.aureus*. Of the three tilapia species with recognized aquaculture potential, the Nile tilapia, *O. niloticus*, is by far the most commonly used species in fish farming. However farming of tilapia *O. niloticus* in freshwater or brackishwater ponds results commonly in early maturation as low as 70 g fish body weight only.

These early maturation and frequent spawning attributes

FIGURE 1 - NUMBER OF MATURE TILAPIA BREEDERS AFTER 120 DAYS EARTHEN POND CULTURE



a and b differ significantly from each other (p< 0.05)

of tilapia resulting to the production of its unmarketable size prompted several workers to find ways in controlling reproduction in order to produce good-size fish. The technique of using hormones to sexually inverse tilapia to an all male stock has become a common practice in its farm production. The use of hormones however poses apprehension among fish consumers due to its possible negative effect to human health and it is even prohibited in some countries.

Saponin, a glycoside linked to hydrophobic aglycone (sapogenin) that may be a steroid in nature, can be an alternative to androgenic hormone used for tilapia sex inversion and sterility. Studies on the effect of saponin on the reproductive activity of tilapia recently showed possible infertility of females when fed with diet containing 300mg/kg saponin, sex inversion to all male population at 700 mg/kg saponin inclusion, and higher number of males noted in those fish fed with 150-500 mg/kg saponin diet when reared in small glass aquaria. These positive results on saponin in aquaria experiment however may require testing it in large pond production to ascertain its positive effect.

EFFECT OF SAPONIN

It was therefore of general interest to control the fertility and virility of female and male tilapia also under commercial conditions, when fed diet with different levels of saponin supplementation (treatment I: 0 mg/kg, treatment II: 300 mg/kg and treatment III: 700 mg/kg) reared in brackishwater pond. Specifically, a trial carried out at the Aklan State University in the Philippines aimed to determine the effect of saponin supplementation (0, 300 and 700 mg/kg) on the growth (length, weight, specific growth rate), survival, sex ratio, fry count, egg count, number of nests, gonad development (number of mature breeders, egg development stages and egg diameter) and egg production of semi-intensively reared saline tolerant Tilapia.

Commercial feed containing about 25-30% protein and 5-7 % fat supplemented with 0, 300 and 700 mg/kg saponin was fed to saline tolerant tilapia reared in brackishwater ponds with three replicates in a randomized complete block design (RCBD).

After 120 days of culture period the final weight of fish did not differ significantly between treatments (75.3±1.4 g, 71.8±6.2 g and 72.4±1.5 g for I, II and III respectively). Survival was also not different between treatments. The first mature breeders were observed during day 75 of the pond culture period. On day 120, the mean number of mouth brooders in treatment I was significantly highest (12.3 fish per pond, $p<0.05$) compared to treatments II and III (5.3 and 4.5 fish per pond respectively), which did not differ from each other (*Figure 1*). The sex ratio of treatment I tended to be higher than treatment II ($p<0.1$), indicating more males than females in the latter. However, the sex ratio in treatment III did not differ significantly from that of either the control or treatment II. Egg diameter varied from 0.30 mm in treatment II to 0.43 mm and 0.47 mm for treatments I and III respectively, but without statistical significance. Histological analysis of a sub-sample of 21 female tilapia per treatment showed higher numbers of fish with eggs in the vitellogenic stage in the negative control group.

REPRODUCTION CONTROL

The results of this study showed no differences in final weight, thus neither supporting reports of depressed growth nor agreeing with reports on growth promotion due to the application of saponin. However, tilapia in this study indicated lower numbers of mature breeders and of females when fed with saponin-supplemented diets. This confirms the potential of saponin as a substitute to hormones in the control of reproduction to produce good-sized fish and sex inversion of tilapia. The non-detection of significant effects on egg development may have been due to experimental error where sample sizes were too small. It is therefore suggested to repeat trials with saponin application in more than just one growth period. <-

Paz Kühlmann and Yasmin Primavera-Tirol work at the School of Fisheries and Marine Sciences, Aklan State University, New Washington, 5610 Aklan, Philippines
This article has partly been based on a poster presented at the XII. International Symposium on Fish Nutrition and Feeding in Biarritz, May/June 2006.

Dr. Christian Lückstädt's **background in fisheries and aquaculture stems from his upbringing on the Baltic coast of Germany. It continued through to his Ph.D. in feed intake and utilisation of commercially raised juvenile milkfish in the Philippines, which he completed in 2004 at the University of Hohenheim. Since 2003 he has been employed with Biomin Deutschland as product manager, responsible for the acidifier Biotronic.**