East Africa

Currently, sex reversal of tilapia requires the daily application of a medicated feed to hapas or aquaria. An alternative approach was tested by Oregon State University researchers who experimented with a short-term immersion procedure for the masculinization of Nile tilapia (*Oreochromis niloticus*) using two synthetic androgens—17α-methyltestosterone and 17α-methyldihydrotestosterone. Immersions of Nile tilapia in methyldihydrotestosterone at 100 mg/l and methyltestosterone at 500 or 100 mg/l were not successful; however, tilapia immersed in 500 mg/l methyldihydrotestosterone may provide a practical alternative to the use of steroid-treated feed. This short-term immersion technique, when compared with current techniques for steroid-induced sex inversion of tilapia, shortens the hormone treatment period as well as reduces the risk of worker exposure to anabolic steroids.

Previous research has concluded that sub-optimal storage of hormones and hormone treated feed can greatly affect feed efficiency. PD/A CRSP researchers at Auburn University explored how storage conditions affect methyltestosterone-treated feed in terms of fish growth and sex reversal. Feed stored for extended periods of time at ambient tropical temperatures before use was compared with feed stored under refrigeration. Storage conditions did not affect growth, survival, feed conversion efficiency, or sex reversal success of *Oreochromis niloticus* fry fed a hormone prepared diet of 60 mg MT/kg for 28 days.

Fish farmers have reported red tilapia, a synthetic breed derived from *O. niloticus*, *O. aureus*, and *O. mossambicus*, to be more marketable than Nile tilapia. Hence, researchers at Auburn University, conducted an experiment in which they compared the reproductive efficiency, fry growth, survival, feed conversion, and success of sex reversal of Nile tilapia and red tilapia. Red tilapia fecundity was similar to the fecundity of Nile tilapia, and broodstock survival, fry per kg female, and overall numbers of fry produced were comparable. Fry production in both cases increased over time; however, the increase was not correlated with male:female weight ratio, broodstock condition, or female weight. Increased fry production from trial to trial may have been due to decreased territorial conflicts resulting from an already established social hierarchy during previous trials.

A series of experiments designed to evaluate alternative lime requirement determination methods in laboratory microcosms was extended to include the use of artificial enclosures or "isolation columns." Artificial enclosures were investigated as in-pond test units for liming studies. The results obtained from this method were compared with results obtained from laboratory microcosms. Noticeable differences in alkalinity trends in both limed and unlimed microcosms as well as in pond enclosures were detected. Significant differences were observed among all day-28 alkalinities except those in limed microcosms and limed isolation columns. This suggests that results in either the isolation columns, the microcosms, or both may not be representative of the effects of liming in real ponds. Further testing of in-pond enclosures is required. If enclosures that are consistently reliable can be developed, they may be useful for testing a number of different kinds of treatments within a given pond. The use of in-pond enclosures could lead to decreased variability among experimental units and reductions in the amounts of pond space, time, and other costs required to conduct pond-based research.

Pond bottom soils play an important role in determining pond productivity. As part of the CRSP effort to select a new prime site in Africa, soil samples were collected from five potential PD/A CRSP research sites in East Africa during site evaluation visits in 1994 and 1995. Nine soil samples were characterized according to their physical and chemical composition at Oregon State University. Results of the soil characterizations supplemented other information used to evaluate and select the new site for PD/A CRSP research in Africa.

After the PD/A CRSP lost its site at Rwasave, Rwanda, in 1994 due to civil war, a site selection team was appointed to develop a site selection strategy. Fifteen site evaluation criteria were defined with assistance from the Management Entity (ME) and the Technical Committee (TC), and USAID site selection criteria were incorporated

into the evaluation process. PD/A CRSP researchers from Auburn University and Oregon State University visited several potential sites. After evaluating the major sites visited, the committee recommended to the Management Entity and Technical Committee that the Sagana Fish Culture Farm in Kenya be selected as the new Africa site.

Scientists at the University of Arkansas at Pine Bluff developed a mathematical programming model which used survey data from Rwanda to determine farm plans that maximize returns to a representative Rwandan farm family's resources. Study results indicated that the land holding of both individually- and cooperatively-managed farms were too low to meet the minimum nutritional needs of a family—a finding of importance for government policy making. Nevertheless, model results indicated that fish production was a profitable enterprise for subsistence farmers in Rwanda and that they competed well for scarce land resources. Various scenarios were explored. If fingerlings were sold, fish production was the optimal cash enterprise across most regions throughout the year. At a low level of willingness to incur risk, farmers selected as the optimal product mix soybeans and sweet potato production to meet household nutritional requirements and fish production as the principal cash crop. However, even without fingerling sales, fish production was selected over cabbage production. Only if fingerlings could not be sold, and if a higher level of risk was acceptable, cabbage production was preferred over fish production.