



# PD/A CRSP SIXTEENTH ANNUAL TECHNICAL REPORT

## GLOBAL EXPERIMENT: OPTIMIZATION OF NITROGEN FERTILIZATION RATE IN FRESHWATER TILAPIA PRODUCTION PONDS

*Eighth Work Plan, Kenya Feeds and Fertilizers Research 1 (FFR1K)*

*Abstract*

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### ABSTRACT

The Global Experiment for the prime Africa site (Sagana Fish Farm, Sagana, Kenya) was initiated by starting fertilization for the cool season experiment on 29 April 1998. Ponds were stocked on 13 May, and the experiment will continue through June, July, and August, which are the only three months of the year that can be considered "cool" at Sagana. Prior to filling, 100 kg of TSP (250 kg ha<sup>-1</sup> P) was broadcast over the bottom of each pond. The ponds were stocked with all-male Nile tilapia at an initial density of 1 t fish ha<sup>-1</sup>, and an average weight of 17 g. Nitrogen, as urea and DAP, is being added to ponds at rates of 0, 10, 20, and 30 kg N<sup>-1</sup> ha<sup>-1</sup> wk<sup>-1</sup>. Phosphorus, as triple superphosphate, is being added to zero-N ponds at a rate of 8 kg P<sup>-1</sup> ha<sup>-1</sup> wk<sup>-1</sup>, whereas DAP is used to provide phosphorus for all other treatments, also at a rate of 8 kg P<sup>-1</sup> ha<sup>-1</sup> wk<sup>-1</sup>. Alkalinity is being maintained at or above 70 mg l<sup>-1</sup> as CaCO<sub>3</sub>, by adding sodium carbonate (soda ash). Preliminary observations after the first month of the experiment include very high nitrite levels (> 0.5 mg l<sup>-1</sup>) in the highest-N treatment and a high mortality rate (almost 25%) in one pond of the high-N treatment. No mortalities have been observed in the other two ponds of this treatment. Morning and afternoon DO and temperature are measured weekly at four depths (5, 25, 50, and 75 cm), pH is measured weekly at 5 cm, and column total alkalinity is measured weekly; chlorophyll *a*, nitrates, nitrites, TAN, and soluble reactive P on column samples are measured biweekly, and total N, total P, total suspended solids, and total volatile solids will be measured on the days of the diurnal oxygen samplings (three times during the experiment). The sampling protocol is much more intensive than that called for in the work plan, but is necessary to be able to draw conclusions on the fate of N added to the ponds. It also serves to train the lab staff in intensive sampling and analysis of water quality parameters that is anticipated for the Global Experiment for the Ninth Work Plan. The warm season experiment was scheduled for the Spring of 1998, but is being postponed until the Fall of 1998 because of the late completion of the feed study ("Relative Contributions of Supplemental Feed and Inorganic Fertilizers in Semi-Intensive Tilapia Production," KR3, harvested the last week of March), which resulted in there being insufficient time to complete the warm-season experiment before the beginning of the cool-season phase of the Global Experiment. The cool-season phase must be conducted during the period from June through August, whereas the warm-season phase can be conducted almost any time during the remainder of the year, although December, November, and January are the most reliably warm months.

