Ghana J. Sci. **49** (2009), 17-26

COMPARATIVE EVALUATION OF THE NILE TILAPIA, *OREOCHROMIS NILOTICUS* (CICHLIDAE), THE CATFISHES, *CHRYSICHTHYS NIGRODIGITATUS* AND *C. AURATUS* (CLAROTEIDAE) FOR SEMI-INTENSIVE POLYCULTURE IN GHANA

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Abstract

Two separate experiments were conducted in 0.2 ha earthen ponds for 330 and 130 days, respectively, to evaluate culture performance of sex-reversed all-male Nile tilapia (*Oreochromis niloticus*), and Catfishes *(Chrysichthys nigrodigitatus* and *C. auratus)* in polyculture when fed on rice bran and groundnut bran. Stocking rates of the three species ranged from 6,250 to 12,500, 2,500 to 5,000 and 3750 to 7,500 fish ha^{-1} $pond^{-1}$, respectively. In experiment I, mean daily weight gains (g day^{-1}) and survival (%) of Nile tilapia (0.31 ± 0.02 g day^{-1}; 78.1 ± 11.8 %) and *C. nigrodigitatus (*0.27 ± 0.15 g day^{-1}; 76.9 ± 0.4%) were higher ($P < 0.05$) than those for *C. auratus* (0.14 ± 0.01 g day^{-1}; 61.0 ± 0.6%). In experiment II, no differences ($P > 0.05$) in growth and survival performance were observed among the three species. The superior first-year growth performance of *C. nigrodigitatus* compared to that of *C. auratus* suggests higher potential of C. *nigrodigitatus* for improved fish yield in Nile tilapia-based polyculture systems.

Introduction

Aquaculture production in Ghana, estimated at 938 metric tonnes in 2003, is characterized by semi-intensive culture of mainly Nile tilapia (*Oreochromis niloticus*) in mono or polyculture with other endemic fish species (FAO, 1998; Awity, 1998; Hecht *et al*., 2006). However, the relative advantages of the two contrasting Nile tilapia-based culture systems have not been assessed for efficient aquaculture production in the country. Fish yield can be increased in polyculture compared to monoculture, when different fish species are co-stocked for efficient utilization of natural food in ponds (Tang, 1970; Yashouv & Halevy, 1972; Hepher *et al*., 1989). Pond water quality can also be improved in polyculture (Henderson,1979), thereby, enhancing survival of farmed fish. Thus, Nile tilapia polyculture with native fishes may be more advantageous than monoculture for improved farmed fish production in Ghana.

The silver grey catfish, *Chrysichthys nigrodigitatus,* is a highly valued food fish in West Africa (Ezenwa, 1982; Hem, 1986; Anyanwu, 1991), and this species, together with *C. auratus,* support an active capture fisheries in Lake Volta in Ghana (Vanderpuye, 1985; Goudswaad &Avoke, 1992). However, pond culture of the two species is limited to few farms in Ghana because of paucity of information on their culture performance. The catfish, *C. nigrodigitatus,* has been evaluated in monoculture elsewhere (Ezenwa, 1982; Ekanem, 1994) but there is lack of information on performance of *C. nigrodigitatus* in polyculture. Similarly, there is a dearth of information on performance of *C. auratus* in aquaculture settings. Nile tilapia polyculture with the two native catfishes has the potential for increased farmed fish production.The objective of the study was to evaluate performance of Nile tilapia, *C. nigrodigitatus* and *C. auratus* in polyculture for efficient aquaculture production in Ghana.

Experimental

Two separate experiments were conducted to compare performance of Nile tilapia, *C. auratus* and *C. nigrodigitatus* in polyculture for increased fish yield. The trials were conducted at the Aquaculture Research and Development Centre (ARDEC), Water Research Institute, Akosombo, Ghana. Six 0.2 ha, 1.2 m deep, earthen ponds were used for the experiments. All ponds used were limed at a rate of 1200 kg ha^{-1} before filling with freshwater pumped from Lake Volta, Ghana.

Fish used in the experiment

Nile tilapia fingerlings, propagated from parental stocks caught from Lake Volta and, subsequently, maintained at ARDEC were used for the experiments. Nile tilapia swim-up fry (9-11 mm, total length) were produced under hatchery conditions by stocking the wild-caught brooders (50–100 g) in 3×1×1 m^3 outdoor concrete tanks at ARDEC. The fry were sex-reversed to predominantly all-male population (98% males) by incorporation of the hormone, 17-alpha-methyltestoterone, in their feed as described by Shelton *et al*. (1978). The feed had a crude protein composition of 21per cent and was formulated from wheat bran, groundnut bran, and fishmeal with vitamin premix in trace amounts. Nile tilapia fry were nursed in hapas to fingerling stage for use in the trials. In contrast, fiingerlings of *C. nigrodigitatus* and *C. auratus* used for the trials were caught directly from Lake Volta. The two *Chrysichthys* species were quarantined in concrete tanks and were disinfected with potassium permagnate at 2 p.p.m. before stocking in earthen ponds for use in the trials.

Two experiments of different duration were conducted to evaluate Nile tilapia, *C. nigrodigitatus* and *C. auratus* for daily body weight gain, final body weight, specific growth rate, yield and survival in polyculture. The first (Experiment I) lasted 330 days from October 1996 to October 1997. The second (Experimental II) was conducted for 130 days from November 1997 to July 1998.

Experiment I

Experiment 1 was conducted in four 0.2 ha ponds with average depth of 1.2 m from 1 October 1996 to 14 October 1997. Nile tilapia, *C. nigrodigitatus* and *C. auratus* were co-stocked in polyculture and the three species were evaluated for daily body weight gain, final body weight, specific growth rate, yield and survival. Fish yield in this polyculture treatment was compared to that of Nile tilapia stocked in monoculture. The ponds were allocated randomly to the two different culture treatments. In the polyculture treatment, Nile tilapia, *C. nigrodigitatus* and *C. auratus* were co-stocked in duplicate ponds at a combined stocking rate of 25,000 fish ha^{-1} $pond^{-1}$. Individual stocking rates of Nile tilapia, *C. nigrodigitatus* and *C. auratus* were 12,500, 5,000 and 7,500 fish ha^{-1}, respectively, in polyculture. In the monoculture treatment, Nile tilapia was stocked at 25,000 fish ha^{-1} in duplicate ponds. Mean ($\pm$ SE) of initial body weights of Nile tilapia, *C. auratus* and *C. nigrodigitatus* were 0.5 ± 0.2, 2.0 ± 0.2 and 2.8 ± 0.1 g $fish^{-1}$, respectively, in polyculture. The corresponding body weight of Nile tilapia was 0.4 ± 0.1 g $fish^{-1}$ in monoculture.

Fish were fed an all-plant diet with a crude protein composition of 15 per cent. The diet comprised a mixture of rice bran and groundnut bran in a ratio of 2:1. Fish were fed 6 days a week at 10 per cent of fish biomass for the first 60 days. Thereafter, feeding rate was reduced to 5 per cent of fish biomass for the remainder of the trials in accordance to standard grow-out practice. Fish were sampled for growth rate once every 21 days. Ponds were fertilized with dry chicken manure bi-weekly at a rate of 100-300 kg ha^{-1}.

Experiment II

Experiment II was conducted from 28 November 1997 to 4 July 1998 in two earthen ponds of similar size and depth as those used in experiment 1. Nile tilapia, *C. nigrodigitatus* and *C. auratus* were compared in polyculture for daily body weight gain, specific growth rate, yield and survival as in experiment I. Fish used in experiment II represented random samples of fish harvested in experiment I. All three fish species were evaluated at half the stocking rates used in experiment I. Nile tilapia, *C. nigrodigiatus* and *C. auratus* were co-stocked in duplicate ponds at combined stocking rate of 12,500 fish $ha^{-1}pond^{-1}$, and individual species stocking rates of the three species were 6,250, 2,500 and 3,750 fish $ha^{-1}pond^{-1}$, respectively. Pond management in experiment II was similar to that used in experiment I except that fish were fed at uniform rate of 5 per cent of fish biomass throughout the trial. Mean ($\pm$ SE) initial body weights of Nile tilapia, *C. auratus* and *C. nigrodigitatus* were 71.1 $\pm$ 0.0, 53.4 $\pm$ 0.1 and 97.2 $\pm$ 0.1 g $fish^{-1}$, respectively, in experiment II.

*Water quality analysi***s**

Water temperature was measured daily at 07.00 h and 15.00 h using a mercury thermometer. Dissolved oxygen (DO) was monitored three times a week at 07.00 h using a DO meter (model: YSI, Yellow Springs, Ohio) and a HACH test Kit (HACH Company, Loveland, Colorado). Water *p*H, ammonia-N, nitrite-N, nitrate-N, total hardness and alkalinity were measured at 07.00 h using HACH test kit once every 21 days.

Data analysis

Mean, daily body weight gain, final body weight, specific growth rate, yield and survival of Nile tilapia, *C. nigrodigitatus* and *C. auratus* were compared by One-way ANOVA and Student's t-test. Specific growth rate and survival data were arcsine transformed prior to analysis (Zar, 1984), but were presented as original percentage. The Statistical System, SAS, release 6.04 (SAS Institute, 1988) was used for the analysis. When significant differences ($P < 0.05$) were observed, Duncan's multiple range test was used to rank the means.Specific growth rate (SGR) was calculated by the formula:

$$SGR = [(\log_e W_2 - \text{Log}_e W_1) / (T_2 - T_1) \text{ (d)}] \times 100$$ (Ricker, 1975)

and daily weight gain (DWG) was estimated by the formula:

$$DWG = (W_1 - W_2) \text{ (g)} / (T_2 - T_1) \text{ (d)}$$

where W_2 = Final body weight; W_1 = Initial body weight; $T_2 - T_1$ = Duration of grow-out.

Feed conversion ratio (FCR) was calculated as:

$$FCR = WF \text{ (kg)} / NFP \text{ (kg)}$$ (adapted from Boyd, 1990)

where WF = Weight of feed fed and NFP = Total weight of fish harvested - Total weight of fish at stocking. Net yield (NY) was estimated by the formula:

$$NY = [(TWH - TWS) \text{ (kg)} / A \text{ (ha)}] / (T_1 - T_2) \text{ (yr)}$$

and Gross yield (GY) was estimated by the formula:

$$GY = [(TWH \text{ (kg)} / A) \text{ (ha)}] / (T_1 - T_2) \text{ (yr)}$$

where TWH = Total weight of fish at harvest; TWS = Total weight of fish at stocking; A = Area of pond; $T_1 - T_2$ = grow-out period as defined for DWG except unit is expressed in year.

Survival (S) was calculated as:

$$S = [(\text{Number of fish harvested} / \text{Number of fish stocked})] \times 100$$

Results

Mean body weight changes of Nile tilapia, *C. nigrodigitatus* and *C. auratus* in experiment I and II are shown in Fig. 1 and 2, respectively. Growth performance, yield and survival of Nile tilapia in mono- and polyculture with *C. nigrodigitatus* and *C. auratus* in experiment I are presented in Table 1. Growth performance, yield and survival of Nile tilapia in polyculture with *C. nigrodigitatus* and *C. auratus* in experiment II are presented in Table 2. Mean ($\pm$ SE) and range of water quality parameters observed in earthen ponds stocked with Nile tilapia in mono- and polyculture are indicated in Table 3.

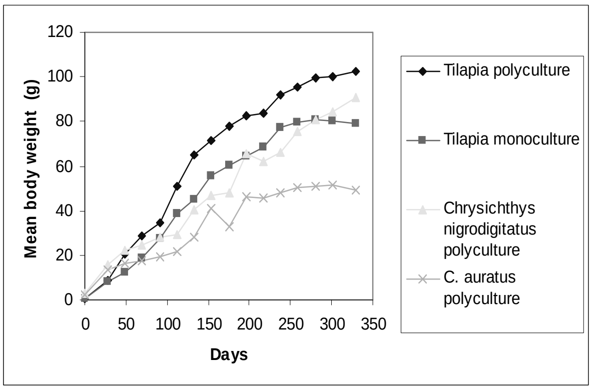

Fig. 1. Mean body weight changes of Nile tilapia (*Oreochromis niloticus*) in monoculture and polyculture with *Chrysichthys nigrodigitatus* and *C. auratus* for 330 days in 0.2 ha earthen ponds.

Experiment I

Mean body weight changes (growth curves) of tilapia stocked in polyculture and monoculture were, generally, similar during the first 250 days of grow-out (Fig. 1). Thereafter, tilapia stocked in monoculture exhibited depressed growth rate. In contrast, Nile tilapia raised in polyculture continued to grow till harvest (Fig. 1). Growth trends of *C. nigrodigitatus* and *C. auratus* were dissimilar except for the first 50 days of culture (Fig. 1). Little growth was observed for *C. auratus* after 200 days in the experiment ponds.

Differences in mean final body weight, daily weight gain and net yield were observed for Nile tilapia, *C. nigrodigitatus* and *C. auratus* stocked in polyculture (Table 1). Mean final body weights, daily weight gains and survival of Nile tilapia and *C. nigrodigitatus* were higher ($P < 0.05$) than those of *C. auratus*. There was no difference ($P > 0.05$) in net yield between *C. auratus* and *C. nigrodigitatus* but net yield performances of these two *Chrysichthys* species were lower ($P < 0.05$) than those of Nile tilapia in polyculture.

Differences ($P < 0.05$) in final body weight and net yield were observed between Nile tilapia stocked in polyculture and same species stocked in monoculture. Mean final body weight of Nile tilapia in polyculture was higher ($P < 0.05$) than that for Nile tilapia stocked in monoculture. However, net yield of tilapia stocked in monoculture was higher ($P < 0.05$) than that for the polyculture system (Table 1).

Mean survival percentage of Nile tilapia was similar to that of *C. nigrodigitatus* but higher ($P < 0.05$) than that of *C. auratus* in polyculture (Table 1). No difference ($P > 0.05$) in survival percentage was observed between tilapia stocked in polyculture and monoculture although tilapia stocked in monoculture had a higher survival (Table 1).

Final body weights of *C. auratus* were more variable than those of Nile tilapia and *C. nigrodigitatus* in polyculture. Coefficient of variation of body weight of Nile tilapia, *C. nigrodigitatus* and *C. auratus* were 22, 32 and 63 per cent, respectively. Fish that attained 100 g were considered marketable. The proportions of marketable Nile tilapia, *C. nigrodigitatus* and *C. auratus* were 54 , 71 and 2 per cent, respectively, at harvest. The yield of marketable fish ($\geq$ 100 g) in polyculture was approximately five times higher compared to monoculture (763 *vs* 160 kg ha^{-1} yr^{-1}). However, no differences ($P > 0.05$) in yield of marketable fish were observed between the two different culture systems. Tilapia reproduction (recruitment) was observed in the experiment ponds where tilapia fingerlings comprised 20 and 22 per cent of net yield in monoculture and polyculture systems, respectively.

In both experiments, the two *Chrysichthys* species were easier to harvest by seining than Nile tilapia. Sixty-seven and 70 per cent of *C. nigrodigitatus* and *C. auratus*, respectively, were seined without draining the ponds at harvest. In

TABLE 1

Mean (± SE) growth, yield and survival of Nile tilapia, Oreochromis niloticus, *stocked in mono- and polyculture with* Chrysichthys nigrodigitatus *and* C. auratus *for 330 days in earthen ponds. Means (± SE) with same superscripts are not significantly different (*P > 0.5*), Duncan's multiple range test.*

Performance measure	*Culture system*			
	Monoculture O. niloticus	*Polyculture* O. niloticus	C. nigrodigitatus	C. auratus
Final body weight (g)	79.1 ± 0.8[b]	103.4 ± 0.8[a]	92.0 ± 2.2[ab]	48.4 ± 2.0[c]
Specific growth rate (g day^{-1} %)	1.58 ± 0.03[a]	1.63 ± 0.02[a]	1.06 ± 0.03 [b]	0.97 ± 0.03[b]
Daily weight gain (g d^{-1})	0.24 ± 0.03[a]	0.31 ± 0.02[a]	0.27 ± 0.15[a]	0.14 ± 0 .01[b]
Net yield (kg ha^{-1} yr^{-1})	2155.1 ± 305.8[a]	1367.9 ± 171.7[b]	217.1 ± 36.2[c]	389.0 ± 72.1[c]
Gross yield (kg ha^{-1} yr^{-1})	2181 ± 301.6[a]	1396.2 ± 171.6[b]	224.1 ± 36.8[c]	412.3 ± 75.0[c]
Survival (%)	80.8 ± 0.6[a]	78.1 ± 11.8[a]	76.9 ± 0.4[a]	61.0 ± 0.6[b]

contrast, only 30-35 per cent of Nile tilapia could be harvested by seining the ponds at harvest. Apparently, morphological factors rendered the two *Chrysichthys* species vulnerable to entanglement in nets during harvesting. These two catfishes possess a prominent dorsal spine and serrated pelvic fins.

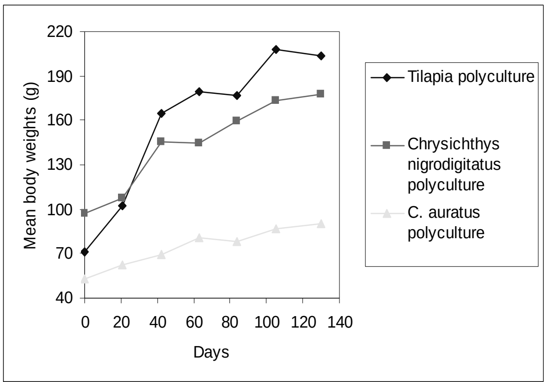

Fig. 2. Mean body weight changes of Nile tilapia (*Oreochromis niloticus*) in polyculture with *Chrysichthys nigrodigitatus* and *C. auratus* for 130 days in 0.2 ha earthen ponds.

Cursory inspection of fish stomach contents indicated that *C. auratus* and *C. nigrodigitatus* accepted artificial diet just as Nile tilapia in polyculture. No differences ($P > 0.05$) in mean feed conversion ratio (FCR) were observed for fish stocked in polyculture and monoculture though fish stocked in polyculture had a slightly lower mean feed conversion. Mean (± SE) FCR of tilapia in monoculture and polyculture of same species were 4.7 ± 0.4 and 4.8 ± 0.5, respectively.

Experiment II

The catfish, *C. auratus*, exihibited little growth compared to *C. nigrodigitatus* and Nile tilapia in experiment II in polyculture (Fig. 2). Growth curves of *C. nigrodigitatus* and Nile tilapia in experiment II (Fig. 2) were generally similar to those observed for the two same species in experiment I under polyculture (Fig. 1).

In experiment II, no differences ($P > 0.05$) in mean final body weight, daily weight gain and net yield were observed for Nile tilapia, *C. nigrodigitatus* and *C. auratus* and stocked in polyculture (Table 2). However, Nile tilapia had the highest performance in mean final body weight, daily weight gain and net yield. No differences ($P > 0.05$) in mean survival was observed for the three species in polyculture although Nile tilapia had the highest survival (Table 2). No tilapia recruitment was observed in experiment II and this may have improved performance of fish relative to experiment I. No differences ($P > 0.05$) in mean yield were observed among the three species evaluated in polyculture. However, yield of Nile tilapia was higher than those for the two *Chrysichthys* species. Mean (± SE) FCR of fish was 3.8 ± 0.1 in experiment II.

Observed diurnal pond water temperatures (range: 25.0–36.6 °C) and *p*H (range: 7.0–8.1) (Table 3) were generally similar to those (25.1–36.0 °C; 6.3–8.11) reported for monoculture of *C. nigrodigitatus* under tropical conditions (Ezenwa, 1982; Ekanem, 1994). All the measured water quality parameters (Table 3) were within the range recommended for aquaculture (Boyd, 1990).

TABLE 2

Mean (± SE) final body weight, specific growth rate, daily weight gain, yield and survival of Nile tilapia, Oreochromis niloticus, Chrysichthys nigrodigitatus *and* C. auratus *stocked in polyculture for 130 day in earthen ponds. Means (± SE) with same superscripts are not significantly different (*P > 0.5*), Duncan's multiple range test.*

Performance measure	*Species*		
	O. niloticus	C. nigrodigitatus	C. auratus
Final body weight (g)	200.3 ± 3.6[a]	170.0 ± 5.5[a]	87.1 ± 3.3[a]
Specific growth rate (g day^{-1} %)	0.81 ± 0.06[a]	0.46 ± 0.85[a]	0.40 ± 0.11[a]
Daily weight gain (g d^{-1})	1.02 ± 0.13[a]	0.62 ± 0.16[a]	0.29 ± 0.16[a]
Net yield (kg ha^{-1} yr^{-1})	2370.5 ± 537.7[a]	402.3 ±168.9[a]	273.7 ± 198.6[a]
Gross yield (kg ha^{-1} yr^{-1})	3386.0 ± 717.7[a]	1055.2 ± 173.6[a]	881.0 ± 90.9[a]
Survival (%)	91.8 ± 1.1[a]	86.7 ± 5.7[a]	68.4 ± 21.9[a]

Discussion

Yield estimates of Nile tilapia in semi-intensive monoculture in tropical countries range from 6.0 to 19.2 kg $ha^{-1}d^{-1}$ (2190–7,008 kg $ha^{-1}yr^{-1}$) (Green *et al.*, 1990; Diana *et al.*, 1991; Knud-Hansen & Lin, 1996). Observed yield of Nile tilapia (2155.1 ± 305.8 kg ha^{-1} yr^{-1}) in monoculture, in the present study, was lower than those reported by these workers. The lack of significant difference in fish yield between Nile tilapia monoculture and polyculture of same species, in the present study, agrees with the findings of other workers (Lovshin *et al.*, 1977; Teichert-Coddington, 1996; Rurangwa, 1997) who evaluated Nile tilapia or its

TABLE 3

Mean (± SE) and range of water quality parameters observed in earthen ponds stocked with Nile tilapia, Oreochromis niloticus, *in mono- and polyculture with* Chrysichthys nigrodigitatus *and* C. auratus *in earthen ponds*

Parameter	*Mean*	*Range*
Temperature (°C)	30.8 ± 3.9	25.0 - 36.6
*p*H	7.6 ± 0.4	7.0 - 8.1
Oxygen (mg l^{-1})	5.3 ± 1.8	2.4 - 8.2
Nitrite- nitrogen (mg l^{-1})	0.01 ± .03	0.00 - 0.12
Nitrate- nitrogen (mg l^{-1})	0 .23 ± .43	0.00 - 1.10
Ammonia- nitrogen (mg l^{-1})	0.38 ± 0.43	0.19 - 0.88
Total alkalinity (mg l^{-1}as $CaCO_3$)	51.7 ± 7.3	46.0 - 62.0
Total hardness (mg l^{-1}as $CaCO_3$)	38.1 ± 7.8	31.0 - 64.0

hybrid (*Sarotherodon* (*Oreochromis*) *mossambicus* × *S*. (*O. hornorum*) in polyculture with different fish species other than those used in the present study. No significant differences in yield were observed between monoculture of all-male Nile tilapia hybrids and polyculture of same species with common carp (*Cyprinus carpio*) (Lovshin *et al*., 1977). Similarly, there were no significant differences in yield between monoculture of Nile tilapia and polyculture of same species with tambaqui (*Colossoma macropomum*) (Teichert-Coddington, 1996) or African catfish (*Clarias gariepinus*) (Rurangwa, 1997). Although fish yields reported by these authors in both monoculture and polyculture: 3567– 3993 kg $ha^{-1}yr^{-1}$ (Lovshin *et al*., 1977); 5089–10559 kg ha^{-1} yr^{-1} (Teichert-Coddington, 1996); 3231–4127 kg $ha^{-1}yr^{-1}$ (Rurangwa, 1997) were higher than those observed in the present study yet the values were within the range of 1334-6391 kg $ha^{-1}yr^{-1}$ for polyculture of Nile tilapia with common carp (*Cyprinus carpio)* and snake head (*Ophiocephalus striatus*) (Cruz & Shehadeh, 1980). Differences in fish species, pond management and environmental factors may account for the differences in yield between the present study and these reports.The significantly lower yield of Nile tilapia in polyculture compared to Nile tilapia monoculture in the first experiment may be attributed to the relatively reduced stocking rate at which Nile tilapia was evaluated in polyculture.

Ezenwa (1982) reported a body weight gain of 858 per cent for supplementally fed *C. nigrodigitatus* under monoculture in brackish water conditions. In the present study, *C. nigrodigitatus* increased its body weight by 745 per cent in the first experiment. This gain in body weight is lower than that reported by Ezenwa (1982). In contrast, observed body weight gain of 3,186 per cent for *C. nigrodigitatus* in the second experiment, in the present study, is higher than that reported by this same worker. Differences in culture environment, pond management and fish strain may account for the differences between the two studies.

Lovshin *et al*. (1990) reported that Nile tilapia recruitment reduced adult tilapia weight by more than half (55%) after 9 months in grow-out ponds. Thus, the generally slow growth rate (0.1– 0.3 g $fish^{-1}d^{-1}$) of fish evaluated in the first experiment may have been caused byNile tilapia recruitment coupled with the long duration of grow-out period of 11 months. Elimination of Nile tilapia females by manual sorting or stocking predatory fish to control fingerling production in the ponds may have improved growth rates of fish. Observed survival of *C. nigrodigitatus* in the present study falls within the range of survival (78–100%) reported for this species in monoculture under freshwater culture conditions (Ekanem, 1994).

The food habits of *C. auratus* and *C. nigrodigitatus* in a tropical lagoon were reported by Laleye *et al*. (1995) as resource partitioning and these workers suggested that both species are benthophagus. The catfish, *C. auratus*, was also reported as feeding mainly on brachiopods, copepods and ostracods. In contrast, *C. nigrodigitatus* is known to feed on decapods, fish eggs and fry in same environment. Nile tilapia was reported as omnivorous (Jauncy & Ross, 1982). Therefore, it is probable that natural food niches of Nile tilapia could overlap with *C. auratus* and *C. nigrodigitatus* in the experimental ponds.

Majority of farm ponds operated by small-scale rural farmers in Ghana are undrainable and, therefore, difficult to totally harvest by seining. Stocking such ponds with *Chrysichthys* species may facilitate harvesting because of the observed high relative seinabilty of these catfish species compared to Nile tilapia.

Conclusion

The silver catfish, *C. nigrodigitatus*, merits adoption for aquaculture in Ghana. Superior first-year culture performance of this catfish compared to *C. auratus* demonstrated in the study when both species were co-stocked with Nile tilapia in polyculure, suggests *C. nigrodigitatus* has the potential for increased fish yield, particularly, in Nile tilapia-based culture systems where production cycles are less than 1 year. However, rationalization of stocking rates of both *C. nigrodigitatus* and Nile tilapia, coupled with improved supplemental diets, is needed to exploit the full potential of these two species for enhanced fish yield above that of Nile tilapia monoculture. Therefore, hatchery propagation of *C. nigrodigitatus* is recommended if this catfish is to be adopted for aquaculture in Ghana.

Acknowledgement

The author is grateful to the following staff at the Aquaculture Research and Development Centre (ARDEC): Messrs Ken Atsakpo, Justus Teye, Simon Dorgbadzi, Richard Amekudzi, Robert Soh, Simon Fumador and the late Godfred Amemoah for technical assistance in maintaining and harvesting fish used for the experiment. He thanks Mrs Patience Atsakpo also of ARDEC for water quality analysis during the study. Funding for the project was provided by the Government of Ghana to CSIR-Water Research Institute, through a grant from the World Bank under the National Agricultural Research Project (NARP), Ghana.

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Recieved 9 Apr 08; revised 16 Jul 08.