FISH SORTING ASSESSMENTS OF CLARIAS GARIEPINUS FINGERLINGS RAISED IN FISH TANKS

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Abstract

Fish sorting assessments of Clarias gariepinus fingerlings stocked and raised in fish tanks were undertaken for a 6-month culture period. Sorting was undertaken as from the first, second, and third months of stocking the fish fingerlings while the control was not sorted at all. The sorting assessments revealed that the twice sorting of fish fingerlings stocked, with a Marginal Rate of Return (MRR) of 3.44 was significantly different ($p>0.05$) from those sorted once with MRR of 0.912, and thrice with MRR of 2.65 respectively, thus making twice sorting most advisable for fish farmers utilizing *Clarias gariepinus* fish fingerlings for tank aquaculture.

Introduction

Aquaculture which has its antecedents in the African traditional fishfolk fish catch keeping practices in beels (Adekoya *et al. 1996)?* creels, pots, cages, and pens, particularly Acadjas (Solarin and Udolisa, *1992;* Hem, et al. 1995) has been known to Ogun State fishers through their indigenous knowledge systems (Adekoya, 1997a) since 10,000 years before present (Adekoya, 1997b).

Recent efforts in Nigeria at promoting productive aquaculture with the support of the research extension system is regaining fresh impetus after its earlier travails (Fish Network, 1997). The result has been the growing trend of stocking fish ponds with fish fingerlings from uncertified sources (Adekoya, 1991). This pressure for fish fingerlings as stocking material as against the use of more cost effective juveniles arose from the increased demands of the growing aquaculture industry in Nigeria which has not been matched by supplies (Oladosu et al, 1993).

Field observations by the research-extension network had included limitations in fish fingerlings supply and its attendant effects on the growth of aquaculture (Olurin et al, 1998). The resultant stress evident from souring fish fingerlings has had as much backlash on the fish breeders as well as the table-fish producing fish farmers (Ayansanwo, 2001). Fish farmers in Ogun State have thus, generally continued to suffer losses on stocked fish fingerlings even at 5/m2 stocking density (Ugwumba, 1994) particularly through the phenomenon of their differential growth which often resulted in some overgrown fish or "shooters" among the stock at test-cropping time which would do better with the sorting of the "shooters: from the "sortees".

Materials and Methods

The following research methods and materials used were Fish tanks with demarcations, Fish Fingerlings of *Clarias gariepinus*, Maggots, Plastic bowls and sieves, weighing – scales, pH paper, Thermometer, Oxygen meter and water.

Treatments employed in this work included:

No sorting
Sorting once
Sorting twice
Sorting thrice.

Each tank was divided into four (4) compartments tagged A, B, C, and D. Partition A served as the control while B, C, and D, served for the three remaining treatments. Each compartment or treatment was replicated twice and stocked with 50 fingerlings (each weighing 5.0± 0.1g)

and the fish were fed with Maggots at 20% body weight of fish stocked daily. The tanks used in this trial were subject of a flush-through trickle tube water supply system. This made it possible for total water replacements every 48 hours.

Partition A (Control) was not sorted at all; Partition B was test cropped and sorted once; while partitions C, and D, were sorted twice and thrice respectively during the trial period. Sorting was done at monthly intervals included;

Number of fish per partition (shooters and sortees)
Average weight of fish
Total weight of fish
pH of water medium
Temperature of water medium
Oxygen concentration of the water medium.

Results and Discussions:

Table 1 below shows the average weight of fish from each treatment while Table 2 shows fish mortality within the trial period. PH of the medium was 8.0 on the average, the average temperature was 29^{oc} while the dissolved Oxygen concentration was *0.6mg/L.*

Mean fish weight at harvest shows that the treatment of sorting twice had the highest average weight gain per fish of 592.75gm. Fishes sorted thrice gained an average of 553.00gm, while those sorted once again 411.55gm where the fishes were not sorted at all the average weight gain was195.75gm.

Table 3: Fish mortality was higher with the no. sorting treatment with a total of 17 and this was closely followed by the thrice sorting treatment where about 10 fishes were lost. The lowest mortality rate was recorded from the twice sorting treatment with only 5 dead fishes. In the treatment where the fish were sorted once there was a loss of 7 fishes.

Table 1: Average Fish Weight Gain(g) at all Zonal Locations

Treatments & Replicates	Loc 1	Loc 2	Loc 3	Loc 4	Total	Mean
A	154	200	208	221	783	195.75
B*	111.3	77.9	170	440	799.2	199.8
B1**	228	226	233	200	887	221.75
C*	276	256	400	371	1303	325.75
C**	183	214	371	300	1068	267
D*	282	290	428	410	1410	325.5
D1**	182	190	200	230	802	200.5
Total	1416.3	1453.9	2010	2172	7052.2	
Mean	202.329	207.7	287.143	310.286		251.864

* Shooters

** Sortees

A→ No Sorting

B→ Sorting once

C→ Sorting twice

D→ Sorting thrice

Average Fish Weight Gain (g)

Treatments	Loc 1	Loc 2	Loc 3	Loc 4	Total	Mean
A	154	200	208	221	783	195.75a
B	169.65	151.95	201.5	320	843.1	210.775ab
C	229.5	230	385.5	335.5	1180.5	295.125c
D	232	240	314	320	1106	276.5bc
Total	785.15	821.95	1109	1196.5	3912.6	
Mean	196.288	205.488	277.25	299.125		244.538

Means with the same alphabet are not significantly different from each other.

CV = 15.58%

Lsd(0.05) 60.934g

ANOVA

S.V	SS	df	MS	F	P value	Fcrit
Sortings	28403.3	3	9467.76	6.52362	0.01231	3.86254
Reps	31611.5	3	10537.2	7.26047	0.00891	3.86254
Error	13061.7	9	1451.3			
Total	73076.5	15				

Table 3: Fish Mortality

	Loc 1	Loc 2	Loc 3	Loc 4	Total	Mean
A	5	5	4	3	17	4.25c
B	3	3	1	0	7	1.75ab
C	2	2	0	1	5	1.25a
D	4	3	2	1	10	2.5b
Total	14	13	7	5	39	
Mean	3.75	3.25	1.75	1.25	2.44	

Treatments	Loc 1	Loc 2	Loc 3	Loc 4	Total	Mean
A	154	200	208	221	783	195.75a
B	169.65	151.95	201.5	320	843.	1210.775ab
C	229.5	230	385.5	335.5	1180.5	295.125c
D	232	240	314	320	1106	276.5bc
Total	785.15	821.95	1109	1196.5	3912.6	
Mean	196.288	205.488	277.25	299.125		244.538

CV = 21.87%

Lsd(0.05) = 0.85

ANOVA

S.V	SS	df	MS	F	P-value	Ferit
Rows	20.6875	3	6.89583	24.2195	0.00012	3.86254
Columns	14.6875	3	4.89583	17.1951	0.00046	3.86254
Error	2.5625	9	0.28472			
Total	37.9375	15				

Table 4: Partial Budget Analysis of the Fish Sorting Assessments.

Parameters	A	B	C	D
Total Fish Harvest (kg)	16.30	18.39	27.10	29.70
Gross Benefit (=N=)	3,200.00	3,678.00	5,420.00	5,940.00
Cost of Sorting (=N=)	-	250.00	500.00	750.00
Total Cost that vary (=N=)	-	250.00	500.00	750.00
Net Benefit (=N=)	3,200.00	3,428.001, 720.00	4,920.00	5,190.00
Gains from Net Benefit (=N=)	-	228	1,720.00	1,990.00
Marginal Rate of Return	-	0.912	3.44	2.65

From the economic analysis of this fish sorting assessments, if a farmer decides to adopt fish sorting once before cropping, he stands to gain an average of =N=0.91 for every =N=1.00 spent. If on the other hand he decides to adopt sorting his fish twice before cropping he stands to gain an additional =N=3.44 for every =N=1.00 spent.

However if he adopts sorting his fish thrice before cropping he stands to gain an additional =N=2.65 for every =N=1.00 spent in the sorting exercise.

Conclusion:

Even though on the surface it seems as if three sorting gives higher profit the MRR shows that the additional gain of =N=270.00 cannot compensate for the additional cost of =N=250.00 spent in the sorting exercise. Furthermore it seems as if the third sorting tend to impose excessive stress on the fish which may account for the heavy loss of fish under this treatment.

Sorting twice is therefore most advisable especially in view of the minimal mortality compared to other treatments and is hereby recommended for fish farmers.

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APPENDIX 1:

FISH SORTING COSTS

	Treatments	Labour costs (N)
1.	No sorting (control)	Nil
2.	Once sorting	250.00
3.	Twice Sorting	500.00
4.	Thrice Sorting	750.00
	Sub-Total (1):	N1,500.00

APPENDIX 2:

FISH FINGERLINGS COSTS:

Treatments		Fingerlings costs (N)	Totals Costs (N)
No sorting	(a) 200 clarias	1,000.00	1,500.00
	(b) Transport, etc	500.00	
Once sorting	(a) 200 clarias	1,000.00	1,500.00
	(b) Transport etc.	500.00	
Twice sorting	(a) 200 clarias	1,000.00	1,500.00
	(b) Transport etc.	500.00	
Thrice sorting	(a) 200 clarias	1,000.00	
Sub Total (ij)	(b) Transport etc.	500.00	1,500.00
			6,000.00

APPENDIX 3:

FEED COSTS (ALL)

Maggots collection (labour, etc)	N600.00 x 4	2,400.00
Sub – Total (iii):-		2,400.00

APPENDIX 4:-
CROPPING COSTS

Cropping net:	N250.00 x 4	1,000.00
Sub – Total (iv):		**1,000.00**

GRAND TOTAL

(I + II + III + IV) = (1,500.00 + 6,000.00 + 2,400.00 + 1,000.00,

N10,900.00

APPENDIX 5

REVENUE SCHEDULE

(Final Harvest)

S/N	Treatments	Fish harvest (kg)	Total harvest (kg)	Rate (N)	Revenue (N)
1.	No sorting (Control)	(16.3)	16.3	200.00	3,200.00
2.	Once sorting	4.49 13.9	18.39	200.00	3,678.00
3.	Twice sorting	18.4 8.7	27.10	200.00	5,420.00
4.	Thrice sorting	26.53 3.17	29.70	200.00	5,940.00
	Total Revenue				**18,238.00**

Thus, Profit (gross) = N(18,238.00 – 10,900.00)

= N7,338.00

APPENDIX 6:

FISH MORTALITY DATA

S/N	Treatments	Mortalities (No)		Total Mortalities (No)
1.	No sorting (control)	4	4	8
2.	Once sorting	-	7	7
3.	Twice sorting	-	5	5
4.	Thrice sorting	3	7	10
Total		7	23	30

Total fish stocked: 800

Total fish mortalities: 30

Balance: 770