

PRO 2646

**Report on Analysis of dry feed usage in
nursery stage fish at Ingiriya by feeding trial**

TSK 4695

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1 Introduction

Growth, health and reproduction of fish and other aquatic animals are primarily dependent upon an adequate supply of nutrient, both in terms of quantity and quality, irrespective of the culture system in which they are grown.

It is essential to have require protein, lipids, energy, vitamins, minerals and other normal physiological functions for the growth of fish.

In fish farming, nutrition is critical because feed represents 40-50% of the production costs.

The development of new species-specific diet formulations supports the aquaculture (fish farming) industry as it expands to satisfy increasing demand for affordable, safe, and high-quality fish.

Prepared or artificial diets may be either complete or supplemental.

Complete diets supply all the ingredients (protein, carbohydrates, fats, vitamins, and minerals) necessary for the optimal growth and health of the fish.

Most fish farmers use complete diets, those containing all the required protein (18-50%), lipid (10-25%), carbohydrate (15-20%), ash (< 8.5%), phosphorus (< 1.5%), water (< 10%), and trace amounts of vitamins, and minerals.

When fish are reared in high density indoor systems or confined in cages and cannot forage freely on natural feeds, they must be provided a complete diet.

Supplemental diets do not contain a full complement of vitamins or minerals, but are used to help fortify the naturally available diet with extra protein, carbohydrate and/or lipid.

Fish, especially when reared in high densities, require a high-quality, nutritionally complete, balanced diet to grow rapidly and remain healthy.

2 Objective

To analyze the dry feed usage in nursery stage fish at Ingiriya by feeding trial.

3 Methodology

As mentioned below, feed amounts were supplied to the guppy fry.

3.1 Feed preparation for first three days

In first three days, guppy fry were fed with Triple nine and Prima note.

Triple nine feed was blended well until become fine powder. Triple nine powder was mixed with Prima note, 2:1 ratio.

Eg;

Triple nine Powder	Prima note
2 g	1 g

3.2 Feed preparation for other days until sorting

Aquamaster feed was given from their fourth day until sorting.

Fish were fed with powder form for first four days. From their fifth days started to feed with solid form (feed balls)

3.2.1 Applicable fish Density

Four tanks; B 28-1, B 28-2, B 20 and B 21 tanks were selected for the experiment.

Tank Size: 10*5 feet

Number of guppy fry: 2000

As mentioned above, selected four tanks were fed with different feed amounts.

In here, feed amounts were adjusted according to the fish palatability. Feed amounts were selected based on the results of the experiment on Study of the Growth of Guppy Fish in Nursery Phase by Feeding Different Feeds.

During the feeding, measured amount of feeds were provided and when it was changed the feeding amounts, it also done with already known amounts.

3.3 Provided feeds and its amounts for the B 28-1, B 28-2 tanks

Table 1: Provided feed and its amounts for B 28-1, B 28-2 tanks

Age (Days)	Feeding Amounts for B 28-1 and B 28-2 tanks					Feed	Feeding Type	Water Level
	at 8.00 am	at 10.00 am	at 12.00 pm	at 2.00 pm	at 4.00 pm			
1	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	999, Prima 0	Powder	12 cm
2	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	999, Prima 0	Powder	12 cm
3	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	999, Prima 0	Powder	14 cm
4	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Powder	14 cm
5	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
6	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
7	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
8	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	Aquamaster	Solid	14 cm
9	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	Aquamaster	Solid	16 cm
10	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
11	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
12	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
13	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
14	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
15	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
16	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
17	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
18	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
19	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
20	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
21	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm

3.4 Provided feeds and its amounts for the B 20 and B 21 tanks

Table 2: Provided feeds and its amounts for the 69 G tank

Age (Days)	Feeding Amounts for B 20 and B 21 tanks					Feed	Feeding Type	Water Level
	at 8.00 am	at 10.00 am	at 12.00 pm	at 2.00 pm	at 4.00 pm			
1	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	999, Prima 0	Powder	12 cm
2	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	999, Prima 0	Powder	12 cm
3	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	999, Prima 0	Powder	14 cm
4	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Powder	14 cm
5	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
6	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
7	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
8	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	Aquamaster	Solid	14 cm
9	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	Aquamaster	Solid	16 cm
10	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
11	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
12	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
13	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
14	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
15	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
16	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
17	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
18	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
19	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
20	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
21	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm

Weight of the fish was measured weekly in all two tanks. From sixth day to tenth day, powder feed consists of 999 and Prima 0 was given except the solid form feed for tanks; B 20 and B 21.

3.5 Feeding Hatched Brine Shrimp cysts

During hatching practices, 5 g of brine shrimp cysts were incubated per 25 liter of salt water. It is lower amount than required amount.

1 l of hatched brine shrimp cysts were given, per each brine shrimp meal. (at 10.00 am and 2.00 pm)

3.6 Feeding experiment tank with corrected feeding procedure

Base on the results had earlier, finally selected another two tanks; B 78 and B 81 as experiment tank.

Tank Size: 10*5 feet

Number of guppy fry: 2000

As mentioned above, selected four tanks were fed with feed amounts as mentioned below.

Table 3: Provided feeds and its amounts for the tank

Age (Days)	Feeding Amounts for B 78 and B 81 tanks					Feed	Feeding Type	Water Level
	at 8.30 am	at 10.00 am	at 12.00 pm	at 1.30 pm	at 4.00 pm			
1	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	999, Prima 0	Powder	12 cm
2	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	999, Prima 0	Powder	12 cm
3	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	999, Prima 0	Powder	14 cm
4	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Powder	14 cm
5	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
6	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
7	6 g	Brine Shrimp	6 g	Brine Shrimp	6 g	Aquamaster	Solid	14 cm
8	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	Aquamaster	Solid	14 cm
9	10 g	Brine Shrimp	10 g	Brine Shrimp	10 g	Aquamaster	Solid	16 cm
10	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
11	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
12	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
13	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
14	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
15	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
16	15 g	Brine Shrimp	15 g	Brine Shrimp	15 g	Aquamaster	Solid	16 cm
17	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
18	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
19	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
20	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm
21	20 g	Brine Shrimp	20 g	Brine Shrimp	20 g	Aquamaster	Solid	16 cm

In here, it was kept only one and half hours gap between dry feed meal and live feed meal.

From fifth day to tenth day, powder feed consists of 999 and Prima 0 was given except the solid form feed.

Brine shrimp was prepared to fulfill the minimal requirement. In here, 80 naupli per guppy fry for a day was considered.

4 Observation



Figure 2: One week old fry in B 20 tank



Figure 1: Two weeks old fry in B 20 tank



Figure 3: Three weeks old fry in B 20 tank



Figure 4: One week old fry in B 21 tank



Figure 5: Two weeks old fry in B 21 tank



Figure 6: Three weeks old fry in B 21 tank



Figure 7: One week old fry in B 28-1 tank



Figure 8: Two weeks old fry in B 28-1 tank



Figure 9: Three weeks old fry in B 28-1 tank



Figure 10: One week old fry in B 28-2 tank

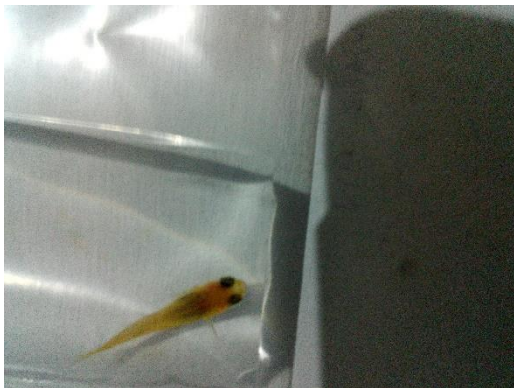


Figure 11: Two weeks old fry in B 28-2 tank



Figure 12: Three weeks old fry in B 28-2 tank

At the first, B 20 and B 21 tanks were fed with higher amount of feed than others. But, that amount was higher than the fish requirement.

Because, floating excess feeds were observed in third day as figure 13.

Then the feed amounts were adjusted accordingly to the feed requirement.



Figure 13: Floating excess feeds

Observed fish weights in experiment tanks

Table 4: Observed fish weights in experiment tanks

Tank No.	Variety	Fish Weight (g)		
		Week 1	Week 2	Week 3
B 28-1	Yellow guppy	0.02	0.032	0.06
	Yellow sunset			
	Pink guppy			
	Red blond			
B 28-2	Black guppy	0.021	0.04	0.07
	Scissor tail			
	Yellow Ribbon			
B 20	Yellow guppy	0.021	0.034	0.06
	Yellow sunset			
	Pink guppy			
	Red blond			
B 21	Black guppy	0.022	0.04	0.07
	Scissor tail			
	Yellow Ribbon			

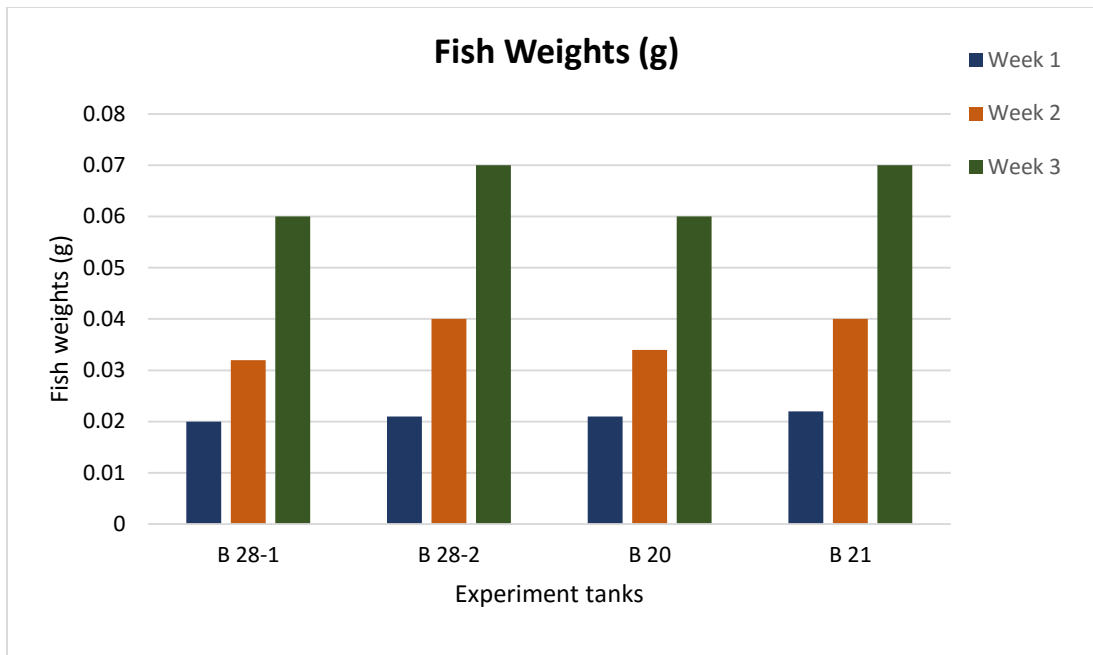


Figure 14: Fish weights during the experiment

Table 5: Weight gain of fish during the experiment

	Weight Gain (g)			
	B 28-1	B 28-2	B 20	B 21
Week 2	0.012	0.019	0.013	0.018
Week 3	0.028	0.03	0.026	0.03

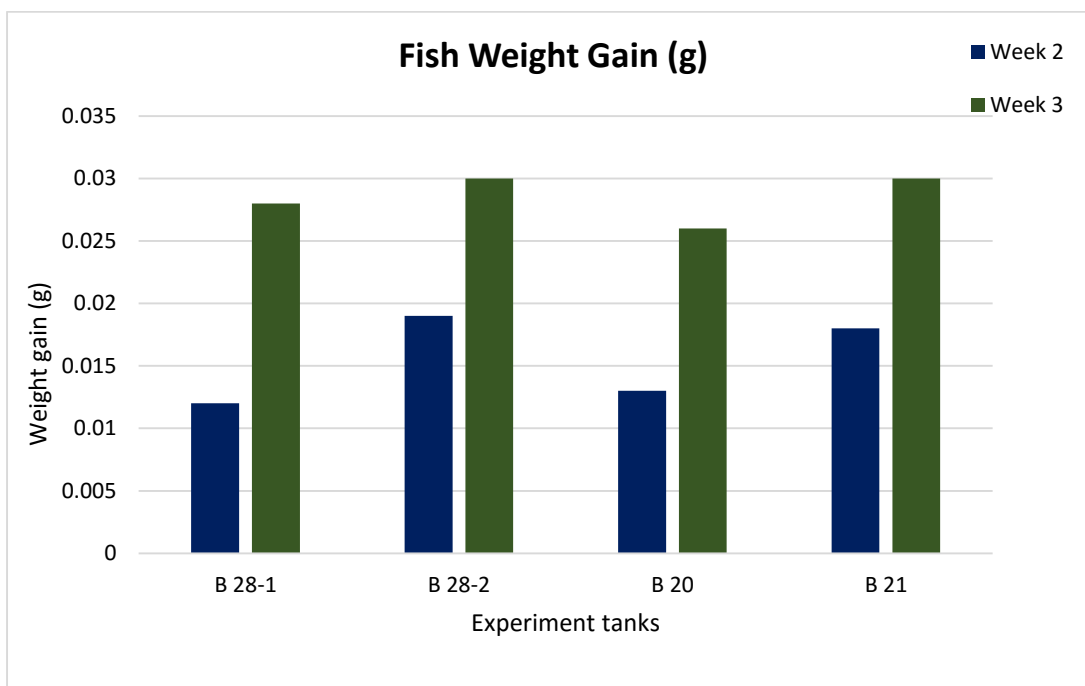


Figure 15: Weight gain of fish during the experiment

Below mentioned weights and lengths can be observed during the nursery phase after feeding fish according to the Table and instructions discussed under topic 3.6.

Table 6: Weight of Guppy fish during the nursery phase

	Fish weights (g)		
	Week 1	Week 2	Week 3
Black Guppy	0.02	0.04	0.07
Yellow Guppy	0.02	0.03	0.06

Table 7: Total Length of Guppy fish during the nursery phase

	Fish Lengths (cm)		
	Week 1	Week 2	Week 3
Black Guppy	1	1.3	1.5
Yellow Guppy	1	1.3	1.5

Sorting Details of experimental tanks

Experiment tanks; B 28-1, B 28-2, B 21 were sorted after three weeks. But, B 20 tank was sorted after 33 days.

Table 8: Sorting Details of experimental tanks

	Tank 28-1	Tank 28-2	Tank 20	Tank 21
Initial count	2000	2000	2000	2000
Male	380	470	740	580
Female	270	420	645	580
Nursery	710	720	250	400
Discard	105	265	130	215
Total Remaining	1465	1875	1765	1775

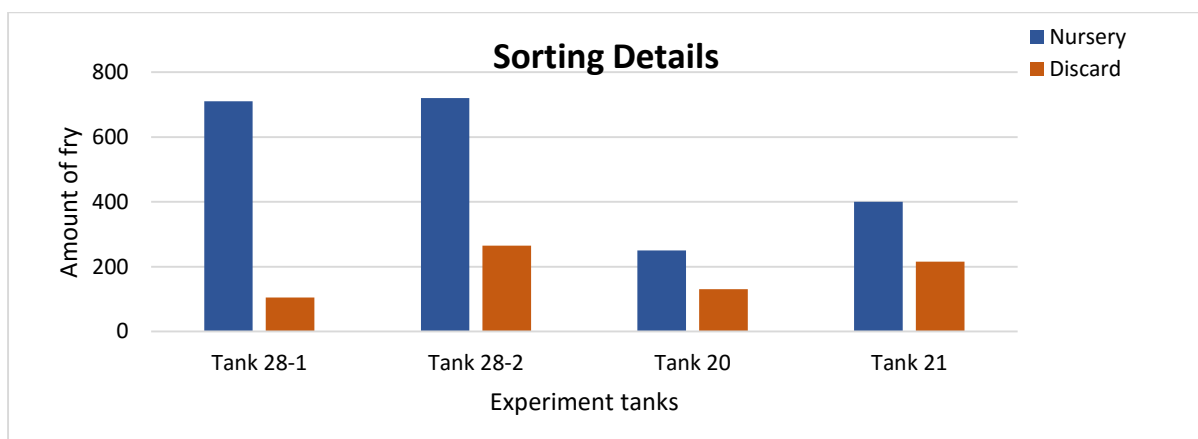


Figure 16: Sorting details

Black guppy fish shows higher growth rate than yellow guppy.

Size differences were highly observed while sorting guppy fish.

Discard and Nursery amounts were higher.

Sorting details of final experiment tanks

B 78 tank was sorted on its 21st day while B 81 was sorted on 25th day.

Table 9: Sorting details of final experiment tanks

	Tank B 78	Tank B 81
Initial count	2000	2000
Male	705	875
Female	790	890
Nursery	310	90
Discard	51	56
Total Remaining	1856	1911

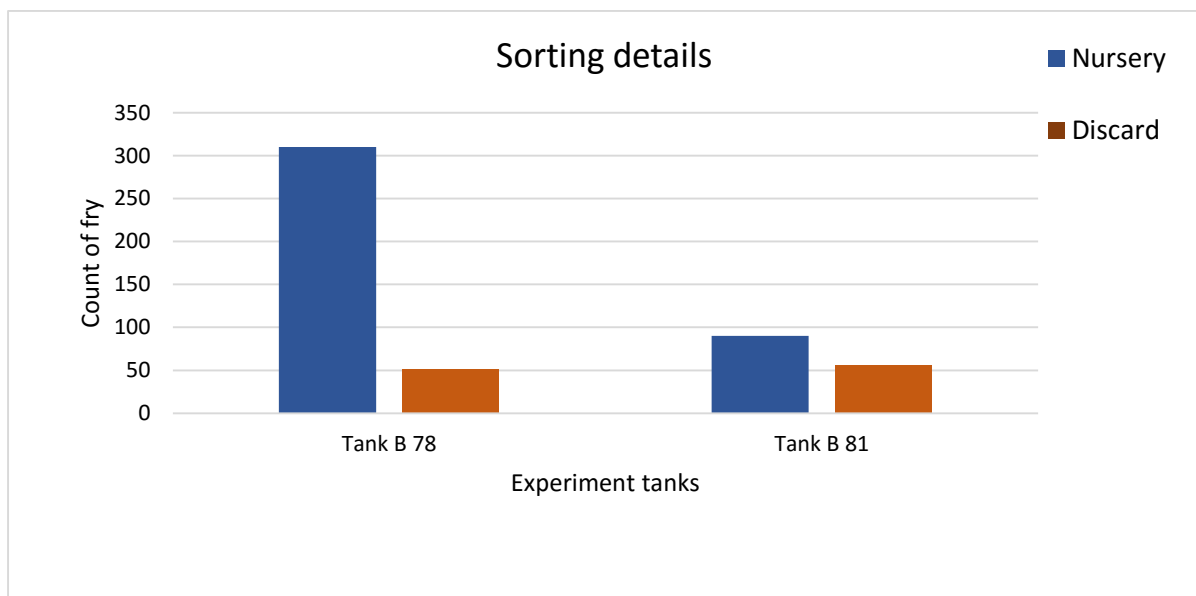


Figure 17: Sorting details of final experiment tanks

Comparison of total discard amount and nursery amount between experiment 1 and 2.

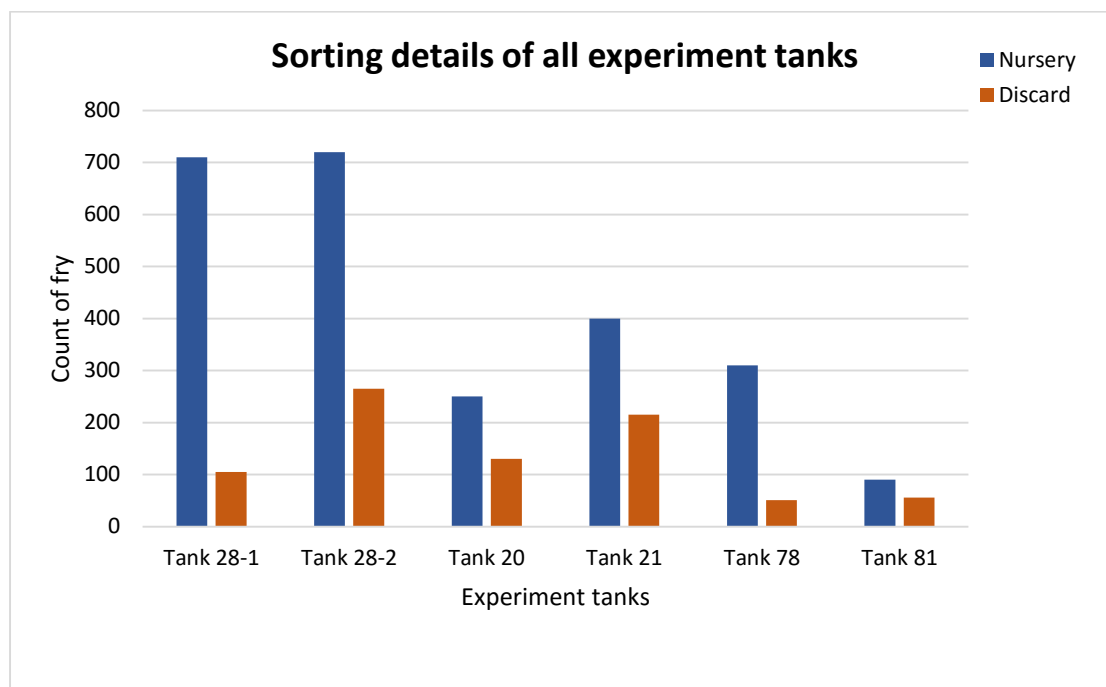


Figure 18: Sorting details of all experiment tanks

Compare to other experiment tanks, lower amount of nursery and discard fish were found in 78, and 81 tanks. In tank 20 also, observed lower amounts, but that tank was sorted after 33 days.

According to the results it can be gained more good results by sorting fish after 25 days than sorting at 21st day.

Nursery feed requirement for nursery tanks in Ingiriya farm for 25 days (until sorting)

Table 10: Monthly Nursery feed requirement for nursery tanks in Ingiriya farm for 25 days (until sorting)

Required feed amounts according to the New feed practices for a month			
Dry Feed	For One tank(g)	For total tanks(g)	Amount (kg)
999, Prima 0	180	14940	14.94
Aquamaster	987	81921	81.921
999			9.96
Prima note			4.98

5 Discussion

Small larval fish and fry need to be fed a high protein diet frequently and usually in excess. Feeding small fish in excess is not as much of a problem as overfeeding larger fish because small fish require only a small amount of feed relative to the volume of water in the culture system.

Fry should be familiar with the feed from their first day. After that they tend to eat well and become strong from their nursery stage. It positively affects their immune system also.

It is better to familiarize the fish with feed balls (solid form) from their nursery phase. In addition to that, always there might be weak fish that do not tend to eat feed balls actively. Then, those fish can be weak due to low nutrition and number of discarded fish and nursery fish amount can be higher during the sorting.

To minimize above issues, enough amount of powder feed should be provided except the feed balls.

Maintain one and half hours gap between dry feed meal and brine shrimp naupli meal is very important to minimize the size variation. Because, it is easy to eat naupli and normally fish likes to eat live feed more.

Fish, eat more are active than others and they tend to eat more than others. When we supply dry feeds, they will eat well. After one and half hours, although we fed with brine shrimp naupli, they cannot eat more due to lack of appetite. Then lethargic fish can eat naupli more. Again it helps to minimize the size variation.

Required brine shrimp naupli should be fed to fry to gain significant growth. It is 80 naupli per fry for day. The amounts should be hatched can be discussed in another trial.

6 Conclusion

According to the feeding amounts mentioned in a Table 3, it can be gained maximum growth of Guppy within short time period in Ingiriya farm. During this process, both weights and total lengths of Guppy fish can be observed as mentioned in Table 6 and 7.

Note: Above mentioned feed amounts (Table 3) can be changed with the weather condition, disease condition and water quality.

To achieve higher growth of guppy fish through the feeding practices, should be followed feeding instructions mentioned below.

6.1 Feeding Instructions

Keep only one and half hours gap between dry feed meal and live feed meal.

From fifth day to tenth day, give powder feed consists of 999 and Prima 0 except the solid form feed.

Brine shrimp was prepared to fulfill the minimal requirement. In here, 80 naupli per guppy fry for a day was considered.

Feed consumption by fish is depend on the fish healthy, water quality and weather condition.

Due to above conditions, fish palatability can be changed. On that time, through the visual observation, be careful to change the feed amount accordingly.

When it is possible, continue the daily syphoning practices.

Maintain the enough aeration to provide good environment for the fish.

7 Recommendation

Feeding hatched brine shrimp and its amounts should be updated. It can be conclude through the future trials.

8 References

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