PRO 2644

Project Report

Immunity Test of Guppy with Different Feeding Method (By Inoculating Pathogen)

TSK 4693

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1. Introduction

Diseases exert heavy economic losses in fish cultural facilities due to mortality, morbidity, poor product quality and costs associated with chemotherapy.

Good nutrition in animal production systems is essential to economically produce a healthy, high quality product.

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

Feeding rates and frequencies are in part a function of fish size. Small larval fish and fry need to be fed a high protein diet frequently and usually in excess. Small fish have a high energy demand and must eat nearly continuously and be fed almost hourly. 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.

The interaction between the maintenance and production requirements of the animals, the need to meet the nutrient demands of the immune system and the nutrient supply is highly dynamic and cannot be met with classical demand-and-supply ration calculations.

To assure maximal production and well-being of the Animal the dynamic nutrient needs of the immune system should be taken into consideration. These are not constant but depend on conditions of production and (environmental or health) challenges.

1.1 Columnaris Disease

Figure 1: Columnaris diseased fish

Names: Columnaris, Cotton-Wool, Cotton-Mouth, False Neon Disease, Flavobacterium Columnare, Flexibacter, Guppy Disease, Mouth Fungus, Mouth-Rot, Saddle Back

Disease Type: Bacterial (gram negative rods)

Cause / Organism: *Flexibacter columnaris*

Columnaris is a common bacterial infection in aquarium fish. Its name is derived from columnar shaped bacteria, which are present in virtually all aquarium environments.

The columnaris bacteria are most likely to infect fish that have been stressed by conditions such as

- poor water quality,
- inadequate diet,
- Stress from handling and shipping.

Columnaris can enter into the fish through the gills, mouth, or via small wounds on the skin.

The disease is highly contagious and may be spread through contaminated nets, specimen containers, and even food. For this reason it is important to use sterile techniques to avoid contaminating other tanks.

Prophylactic treatment of all other tanks is wise, and is mandatory if they share a common filtration system.

Columnaris can be external or internal and may follow a chronic or acute course.

Lesions in chronic cases progress slowly, taking many days before culminating in fish death. In acute cases the lesions spread quickly, often wiping out entire populations of fish within hours.

High water temperature accelerate the progression of the disease; however lowering the water temp will not affect the outcome of the disease.

Symptoms:

- White spots on mouth, edges of scales, and fins
- Cottony growth that eats away at the mouth
- Fins disintegrate beginning at the edges
- 'Saddleback' lesion near the dorsal fin
- Fungus often invades the affected skin
- Rapid gilling in cases where gills are infected

Treatment:

- Change water
- Vacuum gravel
- Add aquarium salt
- Treat with copper sulfate or antibiotic
- Discontinue carbon filtration during treatment

Prevention:

- Quarantine new fish for two weeks
- Maintain high water quality
- Provide fish with a nutritionally balanced diet
- Medicate fish prophylactically before moving them
- Disinfect nets and other equipment before using.

2. Objective

To test the immunity of guppy with different feeding method (by inoculating pathogen)

3. Methodology

Three nursery tanks of Guppy fish were selected for the experiment as mentioned below.

Tank size: 5*10 feet

Number of fry: 2500

Three nursery tanks were selected. 60 G tank was fed with the normal dry feed amount given by workers.

Table 1: current practices

Time	Feed
8.00 a.m.	Prima 0
10.00 a.m.	Brine shrimp
1.30 p.m.	Prima 0
3.30 p.m.	Brine shrimp

Another tanks (61 G and 63 G) were fed with Prima 0 and 999 feed. In here, 999 feed was blended well and mixed with Prima 0 feed with 2:1 ratio. Different feed amounts were provided to those tanks. In here, one tank was fed with half amount of feed from the amount which is provided to another tank.

3.1 Provided feeds for 61 G tank and 63 G tank

Table 2: Provided feeds for 61 G tank and 63 G tank

Date		Tank 1 - 61 G (2016/7/27)				Date	Tank 2 -63G (2016/7/29)			
No.		Feeding	Feed form	Water Level(cm)	DOH		Feeding	Feed form	Water Level(cm)	DOH
1	27/7/2016	6 g	Powder	14	No	29/7/2016	6 g	Powder	14	No
2	28/7/2016	6 g	Powder	14	No	30/7/2016	6 g	Powder	14	No
3	29/7/2016	14 g	Powder	14	No	31/7/2016	7 g	Powder	14	No
4	30/7/2017	16 g	Powder	15	No	1/8/2016	8 g	Powder	14	No
5	31/7/2017	18 g	Powder	18	No	2/8/2016	9 g	Powder	15	No
6	1/8/2016	18 g	Solid	19	No	3/8/2016	9 g	Solid	19	No
7	2/8/2016	20 g	Solid	23	No	4/8/2016	10 g	Solid	22	No
8	3/8/2016	20 g	Solid	22	No	5/8/2016	10 g	Solid	23	No
9	4/8/2016	20 g	Solid	22	No	6/8/2016	10 g	Solid	22	No
10	5/8/2016	20 g	Solid	22	No	7/8/2016	10 g	Solid	22	No
11	6/8/2016	20 g	Solid	22	No	8/8/2016	12 g	Solid	22	No
12	7/8/2016	20 g	Solid	22	No	9/8/2016	12 g	Solid	22	No
13	8/8/2016	20 g	Solid	22	No	10/8/2016	12 g	Solid	22	No
14	9/8/2016	20 g	Solid	22	No	11/8/2016	12 g	Solid	22	No
15	9/8/2016	SORTED				12/8/2016	12 g	Solid	22	No
16						13/8/2016	SORTED			
17										
18										

After sorting the three tanks, 25 of female guppy fish will be selected and kept them in separate three tanks.

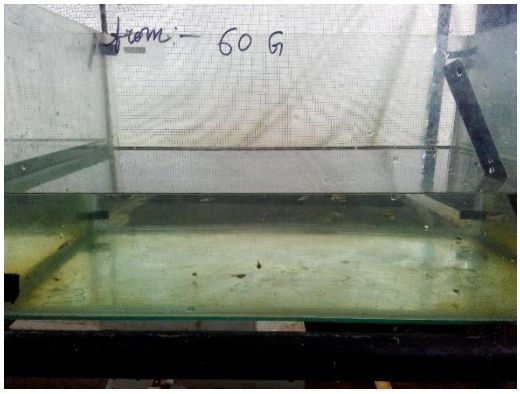

Figure 2: tank with selected fish from 60 G tank

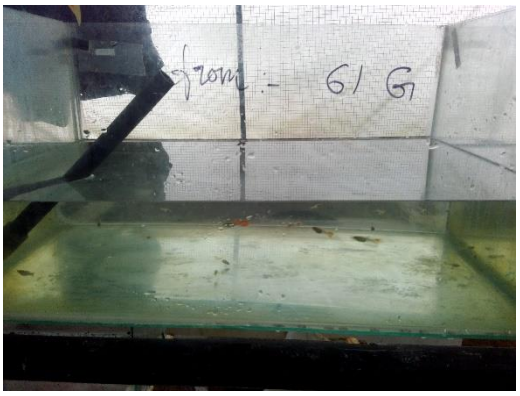

Figure 3: tank with selected fish from 61 G tank

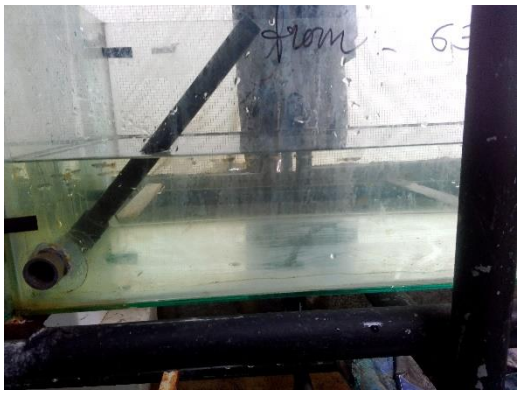

Figure 4: tank with selected fish from 63 G tank

After that, allow them to eat aquamaster feed balls five times per day during one week period.

Then, Columnaris diseased fish (live) were collected and six diseased fish per one tank was introduced into the three tanks of female guppy fish.

Figure 5: Selected columnaris diseased fish

Finally, fish behavior and DOH were observed.

4. Observation

4.1 Observations of pathogen fish which are introduced into the experiment tanks

Table 3: Observations of pathogen fish which are introduced into the experiment tanks

	DOH of Diseased fish		
Nu. of Date after inoculating pathogen	**61 G tank**	**63 G tank**	**60 G tank**
1	1	1	0
2	2	1	2
3	1	2	2
4	2	2	1
5	0	0	1
Total DOH	**6**	**6**	**6**

Within five days after inoculating pathogen, diseased fish in all tanks were dead.

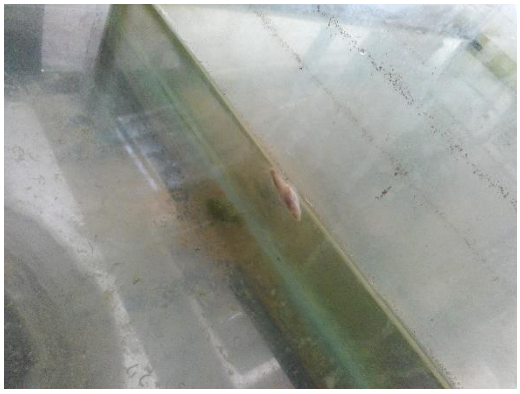

Figure 6: Dead diseased fish

4.2 Observations of selected female fish in experiment tanks

Table 4: Observations of selected female fish in experiment tanks

Nu. of Date	DOH and Diseased fish in experiment tanks					
	61 G		63 G		60 G	
	Nu. of Diseased fish	DOH	Nu. of Diseased fish	DOH	Nu. of Diseased fish	DOH
1	0	0	0	0	2	0
2	1	0	1	0	3	0
3	3	0	3	0	6	0
4	4	0	5	0	10	0
5	8	0	10	0	12	0
6	10	0	11	0	15	0
7	13	1	15	1	16	3
8	16	0	16	1	20	2
9	17	2	17	3	17	3

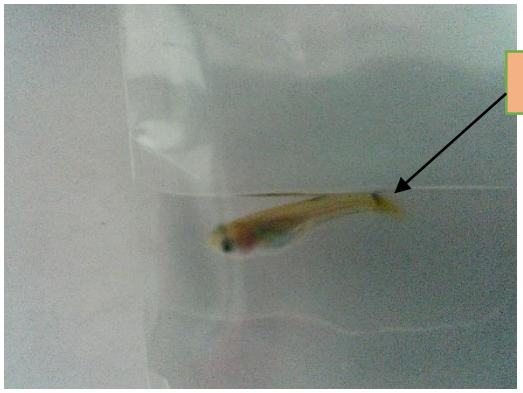

Figure 7: Columnaris disease infected fish

Figure 8: Fish affected by fin rot

4.3 Number of remaining fish not having rot at the end of the experiment

Table 5: Number of remaining fish not having rot at the end of the experiment

61 G tank	63 G tank	60 G tank
5	3	0

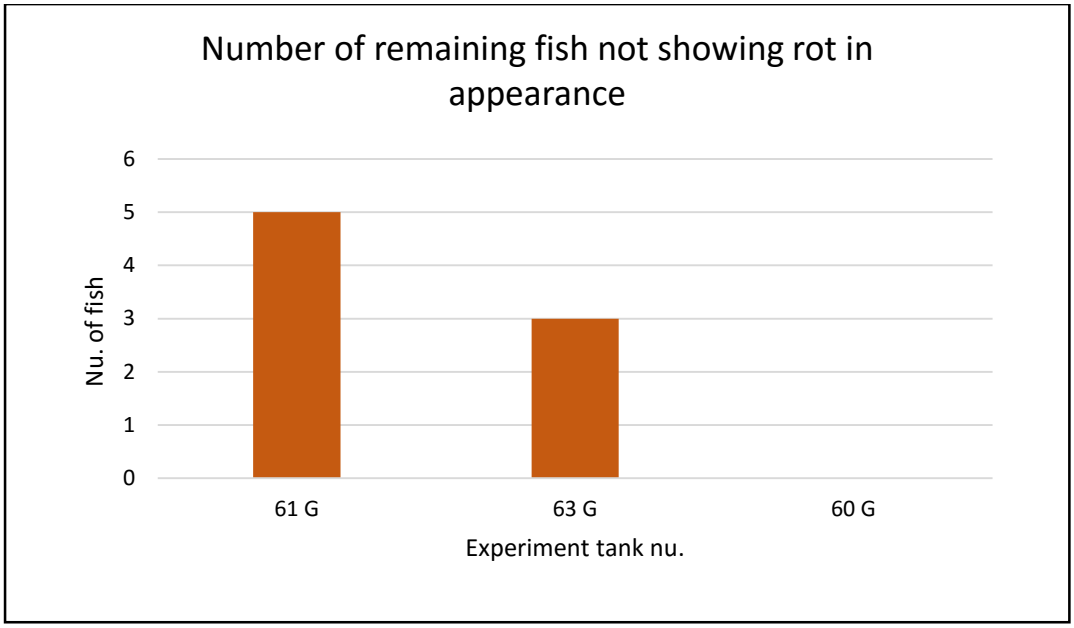

Figure 9: Number of remaining fish not having rot at the end of the experiment

4.4 Total DOH in experiment tanks during the experiment

Table 6: Total DOH in experiment tanks during the experiment

Tank No.	61 G	63 G	60 G
Total DOH	3	5	8

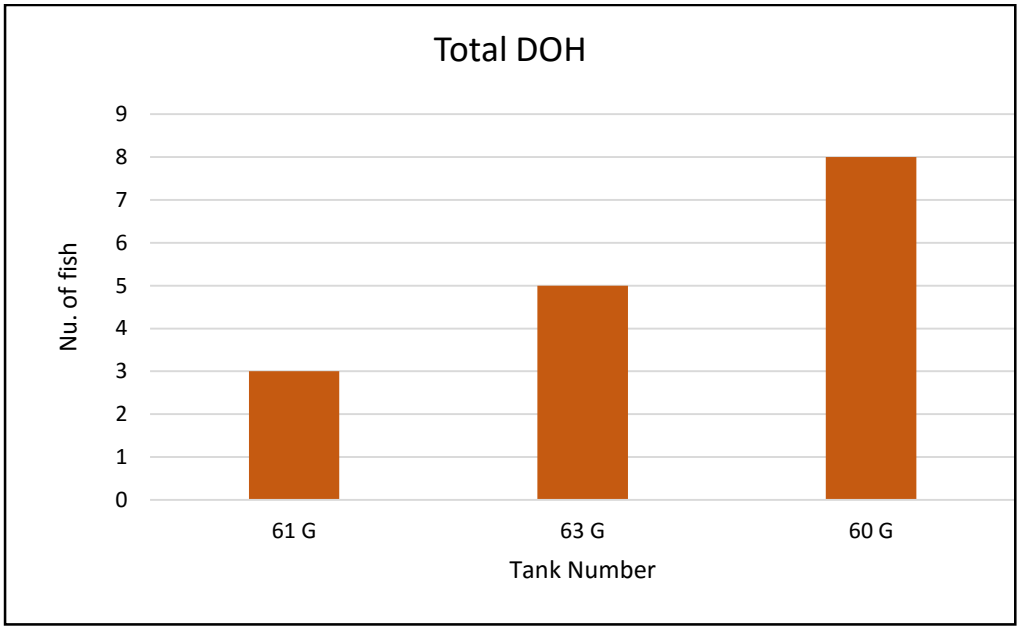

Figure 10: Total DOH in experiment tanks during the experiment

Figure 11: DOHs in experiment tanks

Figure 12: Observed DOH in experiment tank

Fish did not feed well and did not very active. They moved into the corners of the tank.

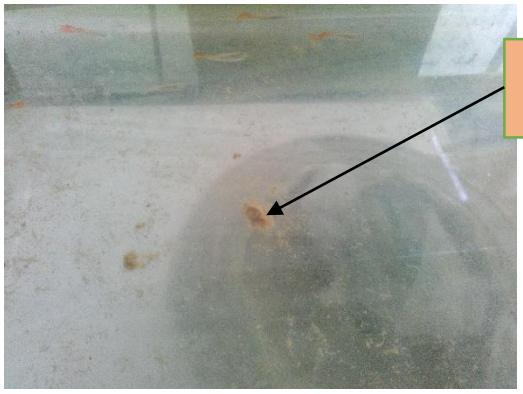

Figure 13: Fish with less of appetite

Figure 14: Lethargy fish did not swim actively

Figure 15: moved fish towards the tank corners

5. Discussion

61 G tank was fed with maximum amount of feed with high nutrition while providing lower amount of feed for other experiment tanks.

63 G tank was fed with high nutritional feed (because of the combination of triple nine powder feed) than the 60 G tank.

Total DOHs were higher in 60 G tank while it was lower in 61 G tank.

Number of remaining fish which are not affected by Columnaris disease was higher in 61 G tank while it was zero in 60 G tank after 9 days of the experiment.

Fish which were fed with high amount of feed, rich in nutrition were able to survive in Columnaris diseased environment than other fish.

Without proper treatments, it can be spread Columnaris disease rapidly. But the fish which was fed well with high nutritional feed were strong enough to slow the spreading speed of Columnaris disease.

6. Conclusion

Adequate nutritional feeds help to increase the immunity of guppy fish.

It helps to make fish strong enough to slower the spreading speed of Columnaris disease.

It is necessary to treat the fish affected by Columnaris disease immediately.

Beside the treatments, it should be provided adequate nutritional feed to minimize the number of dead fish and slower the spreading spread of Columnaris disease.

7. Literature Review

https://appliedecology.cals.ncsu.edu/wp-content/uploads/479.pdf

https://en.wikipedia.org/wiki/Columnaris

http://www.animalfeedscience.com/article/S0377-8401(11)00504-9/abstract

http://allnaturalpetcare.com/blog/2012/01/31/natural-prevention-and-treatment-of-aquarium-fish-parasites/

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