

THE EFFECT OF TRANSPORT DURATION ON THE PERCENT  
MORTALITY OF BLOOD PARROT CICHLIDS.

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“The Effect of Transport Duration on the Percent Mortality of Blood Parrot Cichlids”

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### LITERATURE CITED

## ABSTRACT

This research, entitled "The Effect of Transport Duration on the Percent Mortality of Blood Parrot Cichlids" is an experimental research. It aims to acquire information on how fish (for this case, the blood parrot cichlid) can handle stress if they are exposed to different time durations of actual road transport. The specimens in this research were subjected to three different time durations of actual road transport (one, two, and three hours). There were three replicates each duration to get the mean. The fishes were then observed for one week after transportation. It was observed that there was a high percent mortality on the fishes transported for only one hour compared to those transported for two and three hours. The final conclusion, based on the One-way ANOVA result of 0.054, shows that there is no significant difference in the percent mortality of cichlids subjected to different transport duration.

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## CHAPTER 1

### INTRODUCTION

#### A. BACKGROUND OF THE STUDY

The keeping of fishes not only as food but also as pets and household beautifiers dates back up to Ancient China and Japan, wherein carps and goldfishes originated. New but not recent additions to the world of aqua enthusiasts are the cichlids (Louise, 1987).

Cichlids, or *Cichlidae*, is the family name of a group of fishes to which the common tilapia and the Blood parrot cichlids, our test organisms, belong. Blood parrot cichlids are hybrids of fishes from this family. They can grow up to eight inches or more. Because they are man-made specimens, naturally, they do not have a scientific name or an original habitat (Coleman, 1998).

This study was undertaken because of the need of information to know the stress capacity of fishes if they are exposed to actual road transport. Ornamental fishes are often transported from breeding ponds to pet stores and up to an owner's home. Thus, the lack of information of road stress capacity might give financial and beneficial loss to the owners.



The blood parrot cichlids were chosen as our test organisms due to their abundance in stock, their popularity as pets, and of their low price.

This study can contribute to how other fishes will deal with road stress. This study can also give other researchers into a related study some reference.

## B. STATEMENT OF THE STUDY

Will there be a significant effect on the percent mortality of Blood parrot cichlids exposed to different durations of actual road transport?

## C. HYPOTHESIS

There will be no significant difference on the percent mortality of Blood parrot cichlids subjected to different durations of actual road transport.

## D. OBJECTIVES OF THE STUDY

To determine the percent mortality of blood parrot cichlids subjected to different durations of actual road transport within a week culture period.

## E. SIGNIFICANCE OF THE STUDY

It's always seen that live fish is transported from one place to another. Fish farmers always have to change their location of stocks so that the fish will grow much bigger and faster. Frequently, the fishes become stress out because of transportation, and this stress might be the cause of a high mortality rate in stocks.

The information derived from this study will be beneficial to fish farmers, goldfish breeders, fish mongers and pet owners alike. The result of this study will serve as a reference to know the stress capacity of the fishes, as not to create much loss in money and of stock of live fish.

## F. SCOPE AND LIMITATION

this study was conducted on the Science Research Laboratory of Philippine Science High School Western Visayas Campus. It was conducted for one week , for the transporting of fish was done on September 28, 2002, and the observing was done up to October 4, 2002. It was made up of three different treatments, each having five test organisms. Each treatment had three replicates to get the average yield. The organisms

were then exposed to time durations of one, two, and three hours respectively for each treatment.

#### G. DEFINITION OF TERMS

**Blood parrot cichlids.** 3-month-old juvenile blood parrot cichlids that were used as test organisms.

**Road stress-** the stress the organisms were exposed to; its the stress that comes from being transported in a road vehicle

**Transport duration-** the time it took the organisms to be inside a moving vehicle

- used as a factor in determining percent mortality
- the study used one, two, three hours of actual road transportation
- one hour was from Philippine Science High School Western Visayas Campus to Dumangas, Iloilo, and back to the campus.
- two hours was of the former voyage, plus going to Pavia, Iloilo, and back to the campus

- Three hours was of the former two voyages, plus going to Pototan, Iloilo, and back to the campus

Aerator- an electronic device used to give air to the organisms while they are not being transported

Air diffusers- also known as air stones. They are connected to a thin tube connected to the aerator. They make sure that the tube won't float.

*Cichlidae*, but they do not have a scientific name. They are man-made hybrids. They seem to be a combination of the Secretary Cichlid (*Heros severus*) and the Red devil cichlid (*Crotaphytus sulcatus*). They have an elliptical-shaped body. Their color will range from deep red, to yellow, to white. They have this small mouth, which is an evidence of human intervention w/ nature. They cannot feed properly with this mouth (Higgins, 1998). They can tolerate water pH from 4.9 to 7. Blood parrot fish have an average adult size of seven inches in length, yet records of thirteen inches in length have been reported (Coburn, 1998).

## A2. BSEJ HONG

Blood parrot, like most cichlids, will establish a domain in the aquarium, especially during mating season (Lowe, 1997).

## CHAPTER II

### REVIEW OF RELATED LITERATURE

#### A. BLOOD PARROT CICHLIDS

##### A1. BIOLOGY

The Blood parrot cichlid belongs to the family *Cichlidae*, but they do not have a scientific name. They are man-made hybrids. They seem to be a combination of the Severum cichlid (*Heros severus*) and the Red devil cichlid (*Amphilophus labrum*). They have an elliptical-shaped body. Their color will range from deep red, to yellow, to white. They have this small mouth, which is an evidence of human intervention with nature. They cannot feed properly with this mouth (Heggins, 1998). They can tolerate water pH from 4.9 to 7. Blood parrots have an average adult size of seven inches in length, yet records of thirteen inches in length have been reported (Coleman, 1998).

##### A2. BREEDING

Blood parrots, like most cichlids, will establish a domain in the aquarium, especially during mating season (Louise, 1987).

Being hybrids, they can sometimes crossbreed with other species, notably the species to which they originated. They will build a nest in the gravel, on which they will deposit the eggs. Mostly, the eggs will not hatch. The parents would then eat the eggs, for unhatched eggs would be accumulated by fungus. In the past, it would require artificial insemination to produce these fishes, but recent strains of these "species" are found to produce offspring (Heggins, 1998).

#### B. PREPARATION OF FISH FOR TRANSPORTATION

Fishes should be kept in clean water in separate tanks a few days before transport. Weak, injured, and diseased fishes have to be replaced. The fishes should not be fed for some days before transport. Withholding feeding allows it to pass out in the digestive tract, reducing waste buildup during transportation. It already been established that starvation for only a few days will not affect the metabolic rate of fishes. Holding facility must be provided with continuous aeration through air-diffusers by aerator. Size and counting take place during pre-transport maintenance (Mohamed and Deveraj, 1997).

## CAUSES OF MORTALITY IN TRANSPORT OPERATIONS

According to Ramachandran (1969), mortality of live fish at all stages during and immediately after transport may be caused by the following : a) Oxygen starvation of blood and tissues; b) accumulation of toxins in transport water; c) Hyperactivity; d) Disease acquired during transport; and e) Physical injuries caused by jolting, and aggressive predatory attempts or accidents due to overcrowding and starvation. These causes may be exclusive or contributing, hence, remedial measures are chiefly coinciding in their effects of course with differing importance (Amor and Taleon, 2002).

## D. FACTORS TO CONSIDER IN TRANSPORTING FISHES

Transportation of live fish from one area to another in aquaculture is unavoidable- from hatcheries to fish farms, fish farms to markets, and other destinations. However, to minimize deaths and loss during and after transport, it is necessary to take precautions and consider factors during transportation.

### D1. Oxygen

The most Crucial factor to consider in the transportation of live fishes is an adequate supply of dissolved oxygen (DO). A suitable physiological standard for the oxygen consumption rate of respiration a fish is capable of beyond the level of necessary for subsistence in the resting condition (Pin, 1986).

#### D2. Water Temperature and pH

Another important factor is the water temperature. The lower the temperature, the higher is the DO level and the lower is the oxygen consumption. Furthermore, lower temperature reduces stress to fish (Pin, 1986). Carbon dioxide and ammonia are more damaging at higher temperatures. Excessive, and particularly sudden, changes in temperature will not allow the body function of a fish to adapt before severe stress and body changes happen (Johnson, 1979). pH of water is also essential. the pH of water between 6.5- 8.5, based on experiments done, is absolute for most fishes (Pin, 1986).



### D3. Carbon Dioxide

As a result of metabolic excretion, fish transported are subjected to increased carbon dioxide concentration. High dissolved oxygen levels inflict stress on the oxygen transport system of a fish.  $\text{CO}_2$  interaction with ammonia has significant effect. As the  $\text{CO}_2$  concentration increases, pH decreases and the percent of toxic unionized ammonia decreases. Nevertheless, if the concentration of the unionized ammonia is held steady, increase in  $\text{CO}_2$  level increases the toxicity level of ammonia (Mohamed and Devaraj, 1997).

### E. Closed System of Fish Transport

**G. Sucking** Represented by polyethylene bags, and other sealed transport units, the closed systems are used mainly for transport. The transport of fry in polyethylene bags with oxygen is a very efficient method. Thus, it is particularly widely accepted in.

## F. Polyethylene Bags

Produced from a thin or thicker translucent polyethylene foil, these bags used for fish transport in water with oxygen atmosphere usually have the shape of a sack. For security reasons, the bags are sometimes doubled. A thin bag is enclosed inside another thin bag.

The polyethylene bags with fry are placed in outer cases during transport to ensure them against mechanical and technical infliction, principally tearing and punching. The case keeps the bags in the desire positions, providing thermal insulation and enables handling efficiently (Berka, 1986).

## G. Stocking

The most critical stage of the transportation can happen in the release of fish at their destination area. The fish are already stressed in the transportation and their sudden exposure of diverse and poor quality will further stress the fish. Different characteristics of water, like pH, temperature, and gas saturation, will affect the metabolic rate of the stressed out fishes. The receiving water may be inappropriate for fish life.

## CHAPTER III

## METHODOLOGY

## A. Materials

Three aerators

Thermometer

Nine candy containers

pH meter

Three long plastic tubes

Polyethylene bags

Three basins

Three cross-tubing

45 blood parrot cichlids

nine airstones

## B. Experimental Methods

## B1. Preparation of containers

Each long tube was cut into three equal parts. One part of each long tube was then connected into the aerator. Cross tubing was inserted into the cut tube. The other tubes were connect to the crosses. Airstones were then placed in the tubes. Each time duration has three replicates. Each replicate has five fishes. If the specimens are not yet present, do not turn on the aerator yet.

## B2. Experiment

There were three time durations: one hour, two hours, and three hours. The organisms for each time duration were randomly selected. These were stocked at a density of five Blood parrot cichlids per replicate. Water in each replicate was measured for its temperature, to see if the temperature of the replicates are somewhat near each other's readings. The oxygen level, because it was hard to control, is the same as the surrounding air oxygen content. pH was also measured. These bags were then tightly sealed and labeled with their respective time duration. The basins were then transported using a private vehicle.

All of the replicates were loaded into the vehicle. The vehicle was made to run at an average speed of 50 kph. For the first hour, the vehicle traveled from Philippine Science High School Western Visayas campus to Dumangas, Iloilo and back to the campus. The fishes for the first hour were then hurriedly released to their respective aerated containers at the science research laboratory of the school.

The two hour duration was of the former voyage plus going to Pavia, Iloilo, and back to the campus. The fishes were also released at their respective containers.

for the third hour, the vehicle, after the former two voyages, traveled to Pototan, Iloilo and back again to the campus. The final fishes were then released into their containers.

The pH and the temperature, after the experiment, was again measured.

Water was changed every two days for each setup. The specimens were fed once a day after the experiment.

Transport Duration	pH					
	B	A	B	A	B	A
1	5.0	5.1	5.1	5.1	5.2	5.3
2	5.2	5.2	5.1	5.4	5.1	5.3
3	4.9	5.2	5.0	5.3	5.0	5.2

Table 2. Temperature reading before and after transport.

Transport Duration	Temperature (Celsius degree)					
	t1		t2			
	B	A	B	A	B	A
1	25.7	25.5	25.9	25.8	26.1	26.1
2	25.1	25.3	25.1	25.1	26.1	25.7
3	25.1	25.1	25.4	25.4	25.2	24.9

Table 3. Percent mortality of cichlids subjected to different transport durations after one week culture period (n=9)

Transport duration	Percent Mortality						
	r1		r2		r3		$\bar{x} \pm sd$
one hour	3/5	60%	4/5	80%	4/5	80%	73.4% $\pm$ 9.4%
two hours	0/5	0%	1/5	20%	2/5	40%	20% $\pm$ 16.4%
three hours	3/5	60%	0/5	0%	0/5	0%	20% $\pm$ 28.2%

Table 3 shows the percent mortality of Blood parrot cichlids subjected to one hour, two hours and three hours transport durations. Results showed that each duration can cause the fishes to die. It also shows that many fishes died during the one hour duration.

Table 4. One way Analysis of Variance

Treatment	Sum of Squares	df	Mean Square	F	Significance
Between groups	14.222	2	7.111	4.923	0.054
Within groups	8.667	6	1.444		
Total	22.889	8			

## Discussions

According to the results, putting in that pH and temperature of water is not significant due to there is only minimal difference in them before and after transport, many fishes died on the one-hour duration. Only a few died in the two and three hour duration. This could be because the fishes during the two and three hour duration were able to adapt to the shaking motion of the vehicle.

## Recommendations

According to the results, we recommend that people should not travel from buying fish from far away places. We also recommend that further study should be made, for the results seem to contradict the common belief that only hours of transport is a safe transport time. We also recommend that further studies should experiment with longer shaking duration.

## CHAPTER V

## CONCLUSIONS AND RECOMMENDATIONS

## Conclusions

The one-way ANOVA show that the significance is 0.054 with this data, the researchers were able to conclude that there is no significant difference in the percent mortality of cichlids subjected to different transport durations since only results with a significance of 0.058 below would have a significant difference.

## Recommendations

According to our results, we recommend that people should not hinder from buying fish from far away places. We also recommend that further study should be made, for the results seem to contradict to common belief that long hours of transportation can kill transported fishes. We also recommend that further studies should experiment with larger stoking densities.



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