



## UNIQUE JOURNAL OF PHARMACEUTICAL AND BIOLOGICAL SCIENCES

Available online: [www.ujconline.net](http://www.ujconline.net)

Research Article

## THE RELATIONSHIP BETWEEN THE NUMBER OF FISH OFFSPRING AND WATER TEMPERATURE AND ALSO THE STUDY OF DIFFERENT BEHAVIORS OF LIVE BEARING AQUARIUM GUPPY FISH SPECIES

Sadeghi Limanjoob Reza<sup>1\*</sup>, Pourdavood Mahdi<sup>2</sup>, Kargar Jahromi Hossein<sup>3,4</sup>, Syahmard Nahid<sup>5</sup>, Bathaee Seyed Hamid<sup>6</sup>, Mahmoudi Teimourabad Saeid<sup>6</sup>, Farzam Mohammad<sup>7</sup>

<sup>1</sup>Department of Aquatic Animal Health, Veterinary School, Kazerun Branch, Islamic Azad University, Kazerun, Iran

<sup>2</sup>Agricultural Education Center, Fars, Iran

<sup>3</sup>Zoonoses research center, Jahrom University of Medical Sciences, Jahrom, Iran

<sup>4</sup>Young Researchers Club Elite, Jahrom Branch, Islamic Azad University, Jahrom, Iran

<sup>5</sup>Department of Physiology, International Branch, Shiraz University, Shiraz, Iran

<sup>6</sup>Department of science, Institution of Supreme Education and Industry of Maragheh, Maragheh, Iran

<sup>7</sup>Department of Anatomy and Embryology, International Branch, Shiraz University, Shiraz, Iran

Received 20-01-2014; Revised 18-02-2014; Accepted 17-03-2014

\*Corresponding Author: **Sadeghi Limanjoob Reza,**

Department of Aquatic Animal Health, Veterinary School, Kazerun Branch, Islamic Azad University, Kazerun, Iran. Tel: +989173243418 E-mail: [dr.r.s.limanjoob@gmail.com](mailto:dr.r.s.limanjoob@gmail.com)

### ABSTRACT

**Introduction:** Different factors such as physical and chemical factors of water will affect the survival and the growth of fish because fish lives in water. The most important factors are included temperature, density, and soluble Oxygen. The increase in density and temperature will affect the growth of fish in an undesirable way. In this research, we want to increase the efficiency and the number of fish newborns by surviving and conducting tentative actions, temperature variations, and nutrition diets.

**Research process:** present research was conducted on two Aquariums in spring, summer and fall of 1392. Aquariums were included eighty live bearing Aquarium Guppy fish species. This research was conducted within ninety days. Researchers divided these two Aquariums into four parts. Researchers inserted heaters in each part of these two Aquariums to adjust the temperature of these parts. Researchers regulated the temperature of these parts on 23, 25, 28 and 32 ° C. Also results were shown on the tables and graphs. Also, the behavior of fish was surveyed with watching the Aquariums.

**Results:** We expect that the increase in temperature between 23 to 28 ° C will increase the number of full grown newborns in Guppy species based on the observations. Also, we expect that the increase in temperature between 28 to 32 ° C will decrease the number of full-grown newborns in Guppy species.

**Discuss and Deduction:** With regard to the above results, we can say that the relative increase in temperature will affect the evolution process of growing newborns in a positive way. In contrast, great increase in temperature will affect the evolution process of growing newborns in a negative way. Based on the results of behavioral observations in Guppy fish, we expected that there were no social relations between Guppy fish species in the case of nutrition and swimming. In fact, Guppy fish species are mobile and sociable at the time of swimming and make a good social relationship with their species and the environment of the Aquarium.

**Keywords:** Fish Newborns, Live Bearing, Guppy, Evolution, Temperature.

### INTRODUCTION

People should buy one Aquarium for their house due to the extension of urbanity and the occurrence of psychological diseases. So, people become familiar with their nature and their environment. Fish is the only living creature that does not make any noise or disturbance for the people in the house. The first Aquarium was built in 1819 by British Bips. Live bearing fish species were one of the most beautiful and cheapest Aquarium fish species. The maintenance and the reproduction

of live bearing fish species were simple. The most important live bearing fish species were Guppy, Plotty, Molly, and swordtail fish. Live bearing fish species are from the family of colorful fish. In addition, live bearing fish species are small fish that have a close kinship with kapours and killies. In contrast to Kapoor and Killifish species, live bearing fish species give birth to live babies and not eggs. Colorful fish species inhabited more in Southern America which their domains prolonged from Mexico and Central America to Southern America. Aquarium fish species are not located in all

the continents of the world. The history of this kind of fish turned back to 44 or 38 million years ago. Asia and America (such as eastern part of the United States, eastern north of Argentina, Guatemala, Mexico, and Panama) and small parts of Africa (Madagascar) were natural inhabitants of Aquarium fish species. Fish-keepers with every level of experience like this colorful and mobile fish species. Although Aquarium fish species were hardy, they had a delicate body. Since the maintenance of Aquarium fish species were easy, people bought them to make their house or office more beautiful. We understood that live bearing fish species gave birth to live babies (these fish babies could swim from the birth). Since live bearing fish species could grow in water in different conditions, they could grow in herbaceous Aquariums very well. The average life span of live bearing fish species was between five to seven years. Enthusiasts observed the babies of these live bearing fish species for several generations<sup>1</sup>. Guppy fish species were the most popular colorful fish species. Guppy fish species are live bearers and it means that they give birth to babies. Since live bearing fish species could live together, we could maintain them in one Aquarium without any risk. Guppy fish species were found out in 1866 by Robert Gohn Guppy. Guppy fish species was one of the beautiful fresh water fish species. Male Guppies have longer fins and beautiful colors and the rest of their features are like female Guppies. Female Guppies are bigger than Male Guppies. If Guppy fish species lived in clean water and ate nutritious foods, they would be healthier than those fish species lived in dirty water. An appropriate nutrition will make a healthier environment for Guppies along with the clean water<sup>2-4</sup>. The anal fin of male Guppies was long. Male Guppies were slimmer than female Guppies. Male Guppies were more colorful than female Guppies. The fin under the belly of female Guppies were wide, big, and rounded. The body of female Guppies did not have any patterns and also they have a black spot under their belly that shows the situation of babies<sup>5</sup>. We divided Guppy fish species into three groups based on the forms of their fins. The first group of Guppy fish species had long tail fins. The second group of Guppy fish species had sword-like tail fins. The third group of Guppy fish species had small tails<sup>5-7</sup>. Male Guppies extend their anal fins to fertilize female Guppies. The body and the anal vent of female pregnant Guppies were inflated and became bigger. In addition, pregnant Guppies had dark spots under their anal vents. The growth period of fetus depends on the water temperature and it is usually one month at the temperature of 22 to 25 °C. Researchers said that pregnant Guppies which inhabited in cold water had longer pregnancy periods<sup>5</sup>. The pregnancy period of female Guppies depended on various conditions such as water temperature. When water temperature is low, the pregnancy period will become longer and vice versa. The color of anal vent of pregnant Guppies will become darker and blacker at the time of giving birth to their babies. Also, the belly of pregnant Guppies will become bigger at the time of giving birth to their babies. Female Guppies give birth to live babies at the temperature of 27 °C once in a month. The number of newborns was depended on the size of the belly of female Guppies. Female Guppies give birth to five or one hundred

and fifty babies each month. Female Guppies will become pregnant three or four times in a year and the length of their babies is six or seven mm<sup>8,9</sup>. Some factors like temperature, light, the attendance of opposite sex, and nutrition were effective in the maturity of Guppies. Temperature had an important role in the maturity of Guppies. When temperature is appropriate, Guppies will mature biologically and physiologically very soon. Guppies can mature physiologically within five months at the temperature of 26 °C based on the experience. The decrease in temperature can increase the time of maturity<sup>5</sup>. Temperature will affect the metabolism and the physiology of these living creatures. When temperature was increased 10 °C, the speed of physiological activities of Guppies became twice. Researchers increased temperature until it was bearable for these living creatures. The increase in temperature will make the growth process of Guppies faster (birth, fetus, youth, maturity and death). So, Guppies will get into the end of their life earlier. The variable factors of population will also be changed. This rule is true more in cold-blooded animals which their activities are depended on the environment. Temperature can affect the life of aquatic creatures, the breath and the swim of creatures indirectly with the change in soluble gases, and other features of water. Biological, physical, and chemical factors were the most important factors which affected the life of nurturing aquatic creatures and also improved the quality of aquatic creatures. In fact, the increase or decrease in the aforesaid factors will make some disorders in the natural cycle of aquatic creatures<sup>10</sup>. With regard to the importance role of temperature on fish newborns and the occurrence of social behaviors in fish species, the most important purpose of present research was surveying the effects of temperature variations on the number of fish newborns and the occurrence of social behaviors in fish species.

## MATERIALS AND METHODS

Aquariums were built in two ways. In the first way, glasses were installed in sequence. In the second way, horizontal glasses will be inserted between linear glasses. Nowadays, most Aquarium builders use the second way because it is simple. Aquariums which were built in the first way were more stable and could bear more pressure than Aquariums which were built in a sequential way based on the experience. In this research, researchers used two Aquariums which were built in the first way. We needed two Aquariums to conduct particular conditions on them. The length, width, and height of these two Aquariums were 100, 25, and 40 cm. Also, researchers placed one glass in each 25 cm of Aquariums. Scholars divided Aquariums into four parts with the use of glasses. The glue of these glasses was dried after forty eight hours and became ready for use after the Aquarium builders built the Aquariums<sup>11</sup>. There are some ways that you can keep your Aquarium water clean. Aquarium builders used two filters in order to keep Aquarium water clean. Filter was effective in decreasing water pollution. Filters and activated Carbons were placed in the Aquariums by researchers. Sand which was at the bottom of the Aquariums helped to decrease in water pollution. Sand was available in packages.

The Aquariums of research were built within three days by Aquarium builders. Researchers determined the place of Aquariums on the table of laboratory. The transmission of the Aquariums should be done carefully. Researchers put Aquariums on the Yonolit sheets to decrease the pressure and probable risks on Aquariums. The gauge of these Yonolit sheets was 5 cm. Researchers put oxygen cylinder, and heaters at their appropriate place. Oxygen cylinders should be placed above the Aquariums. Thermometers should be put in a place that have the most distance with the heaters. Heaters should be placed under water except their 3 cm. The upper parts of heaters should be out of water. The lower parts of the heaters which are included the element and the heating part should be always placed completely in water. The lower parts of heaters should be in water when we want to link the heaters into the electricity. We can take out heaters from water when they are not linked into the electricity. If we do not do the above affairs, the glass which is surrounded the element will be broken due to the instant temperature variations. Researchers filled Aquariums with the water of city. Scholars conducted the following steps for transmitting and adopting Guppy fish species. First, researchers took some water from the Aquarium and poured it into the clean kit. Then they took some Guppy fish species with the use of creel and transmitted them into the kit. Researchers put some pieces of ice into one plastic. Then they put this plastic in that kit. Water temperature and the mobility of Guppies were decreased due to those pieces of ice. When researchers arrived into the laboratory, they opened the closure of that kit and poured some Aquarium water into that kit. Then they transmitted Guppies with the use of creel into the Aquarium after four minutes and also they did not transmit the water of kit into the Aquariums. Researchers did not feed Guppies for one day. Eighty Guppies were divided into the Aquariums based on their density and their temperature. Researchers put eighty Guppies in each Aquarium. Then they divided each Aquarium into four parts. One part of the Aquarium was assigned to the control group. The temperature of the control group was set on 25 °C. Researchers inserted other groups in the rest parts of the Aquarium and called experimental groups. Researchers set the temperature of experimental groups on 23 °C, 28 °C, and 32 °C. Guppies were divided based on the size of their bodies. So, bigger Guppies were divided into different groups. Researchers put 20 Guppies in each part of the Aquariums. Each part of the Aquarium was contained fifteen female and five male Guppies. Researchers supplied dried foods for Guppies. Researchers made dried foods from died fish species. Dried foods smell like fish. In this research, the density of the Oxygen of Aquariums was measured with the use of Oxygen meter. Researchers put the bar of Oxygen meter in the water to measure the density of soluble Oxygen. The density of soluble Oxygen was determined with Oxygen meter after four minutes. The density of Oxygen was different in all parts of the Aquarium due to the different temperatures of each part of Aquariums. The density of Oxygen was measured and recorded for each part of the Aquariums separately. In this research, researchers used heaters to adjust the water temperature of each part of the Aquariums. Every heater has grade. We can change the temperature of water with the grade

of heaters. We needed four heaters for each Aquarium to adjust the temperature of water and also make a suitable situation for Guppies. The highest temperature of these heaters was 32 °C. We should consider this point that the density of soluble Oxygen will be decreased with the increase in temperature. Researchers used air conditioners to make a balance between temperature and Oxygen at the time of increase in temperature. Researchers measured water temperature of each Aquarium with the use of a digital thermometer within two minutes. Researchers put the bar-like sensor of the digital thermometer in the water of Aquarium for two minutes. The temperature which was shown by the digital thermometer was recorded as a water temperature of Aquarium. The accuracy of the thermometers was 0.01 °C. Researchers put mercury thermometers into the each part of the Aquariums after placing the Aquariums in the laboratory. We can see and record the water temperature of Aquariums with the grade of thermometers. In this research, effective indexes such as the length and the weight of Guppies were measured by researchers. These indexes are effective in the maturity and the number of pregnancy of Guppies. Researchers took five Guppies from each part of the Aquariums with the use of creel randomly to measure the length and the weight of the Guppies. Researchers took one clean plastic and one digital scale to measure the weight of Guppies. Researchers used one clean plastic and poured some water into it and then measured the length of Guppies which were picked up randomly from the Aquariums with the use of Culis. The accuracy of Culis was 0.1 mm. The size of Guppies was recorded based on mm. Research was done within ninety days. Researchers gathered data about different cases. Moreover, researchers surveyed and recorded the behavior of Guppies a long with the reproduction and the physiology of Guppies and categorized them as the specific behaviors of Guppies.

## RESULTS

In the recent research, the effects of the temperature on fish newborns were shown in the tables (1 and 2). Also, Researchers surveyed the behaviors of Guppies. The results are stated at the following parts.

### **The Results of Behavioral Observations in Guppy fish species**

#### **Social Behaviors of Guppies**

Researchers understood that Guppies were very active socially and mobile based on the studies in Guppies. Guppies became familiar with the researchers and gathered around them. Guppies became conditional very fast. Guppies had a lot of mobility at the time of swimming. Guppies showed a lot of motions from themselves at the time of swimming. Guppies swam very fast and moved from up to down and down to up. Guppies usually swim individually unless they want to show mating behaviors from themselves. Guppies are very sociable and irenic. Guppies take food in a mobile state and do not have special order.

#### **Nutrition Behaviors of Guppies**

Guppies continue their activity and mobility at the time of taking food. Guppies come on the surface of water and attempt

for finding food. Guppies do not have special order at the time of taking food.

#### **The behaviors of Guppies in their inhabitants**

Guppies were in all parts of the Aquarium. Researchers found out that Guppies were in motion more at the bottom and on the surface of water based on the observations. So, Guppies move and swim between the surface and the bottom of Aquariums Alternatively. When Guppies were at the bottom and on the surface of water, they were in motion in all parts of the Aquarium and swam in all directions. Guppies were usually playful and swam in a circular or rotatory way. Guppies played with bubbles which were exited from Oxygen pipes. Sometimes, Guppies jumped out of the Aquariums. Guppies usually jump near the Oxygen pipes.

The Behaviors of Guppies at the Time of Choosing Their Mates

Guppies were very mobile and beautiful. Guppies swam very fast. Male Guppies usually pursue female Guppies most of the time except at the time of finding food. This behavior makes male Guppies very tired. Male Guppies are smaller than female Guppies. Male Guppies have bigger and more beautiful fins.

#### **Mating Behaviors of Guppies**

Male Guppies swim with female Guppies at the time of mating. Male Guppies follow female Guppies very fast. This pursuance was hard and energetic for male Guppies. Sometimes, this process is very dangerous for male Guppies and leads them to death. Male Guppies extended their anal fins toward the anal vents of female Guppies and poured their sperms into the body of female Guppies at the time of pursuing.

The Behaviors of Guppies at the Time of Pregnancy

Guppies had their activity at the time of pregnancy and tried to find more foods.

Female Behaviors before Giving Birth to their Babies

The Behaviors of Female Guppies before Giving Birth to their Babies

Pregnant Female Guppies got away from other Guppies before giving birth to their babies. We did not see any considerable decrease in their activity and in their nutrition. Female Guppies only became dissociable a few minutes before giving birth to their babies and did not eat a lot of foods. Female Guppies were at the bottom of Aquariums at the time of giving birth to their babies.

The Behaviors of Female Guppies after Giving Birth to their Babies

Female Guppies were calm one or two hours after giving birth to their babies. When the stress was removed from female Guppies, female Guppies tried to find food. In one case, fish newborns stayed hungry and their mother ate them.

The Behaviors of Fish Newborns after the Birth

Fish newborns were born in a loop way and became normal after on jump. These fish newborns got away from their mother and hid themselves between the spalls which were at the bottom of Aquariums.

#### **The Nutrition of Fish Newborns after the Birth**

Fish newborns hid themselves for one hour. Then they came out from their sanctuary and started finding food. Fish newborns usually took food very fast and turned back to the depth of water and placed between stones.

The Nutrition of Fish Newborns during the Growth Period

If fish newborns are not in a dangerous situation, they will look for food on the stones of the Aquariums. Then they swim more space to find food. It takes a lot of time for Guppies to find food. Fish newborns are very mobile and eat a lot of foods.

#### **The Inhabitation of Fish Newborns**

Bigger fish newborns were usually on the surface of water but smaller fish newborns were usually at the bottom of Aquariums and on the stones. Medium fish newborns were usually in the midden of Aquariums.

**Table 1: Number of Guppy newborns at different temperatures**

Guppy	Weight	Temperature	The Number of fish newborns
1	24.1	23	10
2	26.1	23	12
3	3.1	23	13
4	4.1	23	14
5	45.1	23	30
6	5.1	23	28
7	9.1	23	14
8	4.1	23	12
9	5.1	23	21
10	6.1	23	10
11	45.1	23	11
12	24.1	23	23
13	3.1	23	28
14	5.1	23	30
15	09.1	23	30
16	7.1	23	12
17	85.1	23	24
18	9.1	23	25
19	7.1	23	18

20	4.1	23	19
21	45.1	25	15
22	4.1	25	16
23	5.1	25	60
24	24.1	25	12
25	25.1	25	24
26	36.1	25	26
27	4.1	25	34
28	7.1	25	38
29	73.1	25	60
30	25.1	25	46
31	15.1	25	55
32	4.1	25	59
33	92.1	25	18
34	4.1	25	46
35	42.1	25	57
36	46.1	25	29
37	20.1	25	30
38	71.1	25	25
39	72.1	25	55
40	78.1	25	59
41	9.1	28	3
42	92.1	28	4
43	4.1	28	5
44	24.1	28	8
45	72.1	28	19
46	24.1	28	20
47	28.1	28	3
48	2	28	4
49	92.1	28	18
50	78.1	28	5
51	5.1	28	6
52	5.1	28	9
53	46.1	28	11
54	41.1	28	12
55	72.1	28	18
56	82.1	28	19
57	9.1	28	13
58	5.1	28	12
59	9.0	28	3
60	21.1	28	7
61	22.1	32	3
62	4.1	32	3
63	5.1	32	4
64	8.1	32	6
65	9.1	32	6
66	11.1	32	8
67	4.1	32	8
68	2.1	32	19
69	24.1	32	14
70	89.1	32	15
71	9.1	32	20

72	2	32	18
73	1.2	32	16
74	3.2	32	13
75	75.1	32	2
76	45.1	32	3
77	98.2	32	4
78	1.2	32	9
79	01.2	32	17
80	99.1	32	9

Table 2: Guppies which were under laboratorial conditions

day	The weight of food	pH	O <sub>2</sub>	Co <sub>2</sub>	The number of male fish fatalities	The number of female fish fatalities
1	5.0	1.7	8.9	48		
2	5.0	2.7	4.9	48		
3	5.0	2.7	5.9	49		
4	6.0	3.7	8.9	48		2
5	5.0	3.7	6.9	49		2
6	5.0	4.7	5.9	48		
7	6.0	2.7	5.9	48	1	
8	5.0	2.7	6.9	47		1
9	5.0	2.7	6.9	47		
10	6.0	2.7	5.9	47		
11	5.0	3.7	6.9	48		
12	5.0	3.7	6.9	48		1
13	6.0	3.7	6.9	48		
14	6.0	3.7	7.9	48	1	
15	5.0	2.7	7.9	49		
16	5.0	2.7	7.9	49		
17	5.0	3.7	7.9	49	1	
18	5.0	3.7	8.9	49		
19	5.0	2.7	4.9	49		
20	6.0	3.7	5.9	49		
21	6.0	2.7	8.9	49		
22	5.0	2.7	5.9	49	1	1
23	5.0	2.7	8.9	49		
24	5.0	2.7	8.9	50		
25	5.0	3.7	5.9	50		
26	5.0	3.7	8.9	50		
27	5.0	3.7	6.9	50		
28	5.0	1.7	6.9	49		
29	5.0	7.1	9.6	49		1
30	6.0	7.1	9.6	49		
31	0.55.0	1.7	6.9	49		1
32	5.0	2.7	6.9	49		
33	5.0	1.7	6.9	48		1
34	5.0	2.7	7.9	48		
35	5.0	3.7	7.9	48		
36	5.0	3.7	6.9	48		
37	5.0	1.7	7.9	48		
38	5.0	1.7	7.9	49		
39	5.0	2.7	7.9	50		
40	5.0	3.7	7.9	50		
41	5.0	2.7	8.9	50		
42	5.0	2.7	6.9	50		

43	5.0	1.7	6.9	50		
44	5.0	3.7	6.9	49		
45	6.0	3.7	6.9	49		
46	6.0	3.7	6.9	49		
47	5.0	2.7	7.9	48		
48	6.0	1.7	6.9	48		
49	5.0	2.7	8.9	48		
50	5.0	7	7.9	49		
51	5.0	7	7.9	49		
52	5.0	3.7	6.9	49		
53	5.0	3.7	6.9	49		
54	5.0	2.7	6.9	50		
55	5.0	1.7	5.9	50		
56	5.0	3.7	6.9	50		
57	5.0	2.7	7.9	50		
58	5.0	3.7	8.9	51		1
59	5.0	2.7	7.9	51		
60	5.0	3.7	7.9	51		
61	5.0	3.7	7.9	51		
62	5.0	3.7	6.9	51		
63	5.0	2.7	6.9	51		
64	5.0	3.7	6.9	49		1
65	5.0	2.7	7.9	49		4
66	5.0	3.7	6.9	50	2	7
67	5.0	3.7	5.9	49		
68	5.0	3.7	5.9	50		2
69	5.0	3.7	8.9	50	1	1
70	5.0	2.7	6.9	50		
71	5.0	2.7	6.9	49		
72	5.0	3.7	6.9	49		
73	5.0	3.7	6.9	49		
74	5.0	3.7	6.9	49		
75	5.0	2.7	5.9	48		
76	5.0	2.7	5.9	48		
77	5.0	2.7	5.9	48		
78	5.0	3.7	5.9	48		
79	5.0	2.7	5.9	48		
80	5.0	4.7	6.9	49		
81	5.0	2.7	6.9	49		
82	5.0	2.7	7.9	49		
83	5.0	2.7	7.9	49		
84	5.0	7	7.9	50		
85	5.0	7	8.9	50		
86	5.0	7	8.9	50		
87	5.0	7	7.9	50		
88	5.0	7	7.9	49		
89	5.0	7	6.9	49		
90	5.0	1.7	8.9	49		

## DISCUSSION

Guppies give birth to babies more at the temperature of 23 to 27 ° C. The results of research which was conducted In 1390 by Mr. Naderi and his co-workers was similar to the results of present research<sup>12</sup>. Researchers found out that Guppies were very sociable and mobile and able in making a good relationship with their species and the environment based on the behavioral observations which lasted for ninety days.

K.Hakan Oslen(2013), P.Guevara-Fiore(2012),and Victoria R.Franks(2013) showed similar results and studied on Guppies and found out that the social behaviors of Guppies were useful for their mating<sup>13-15</sup>. In addition, Guppies came on the surface of water individually for the purpose of finding food. Victoria R.Franks agreed with that point. Learning has an important role in taking food in Guppies based on the studies. Also, the behavioral observations showed that Guppies were more on the surface and at the bottom of water. Guppies swam

alternatively between the bottom and the surface of water. It seemed that Victoria R. Franks (2013) agreed with that point. Since Guppies were mobile in all parts of the Aquariums, Victoria R. Franks disagreed with that point<sup>14, 16</sup>. Most male Guppies have big fins and colorful bodies. These features are very effective at the time of mating and choosing male Guppies. These features make male Guppies more attractive. So these male Guppies have more chance at the time of mating. P. Guevara-Fiore (2012), P. Guevara – Fiore (2010), and M. Edenbrow (2011) agreed with that point<sup>5, 15, 17, 18</sup>. At the time of mating, male and female Guppies swim together. Male Guppies pursue female Guppies very fast. In addition, researchers observed the behaviors of pregnant Guppies and found out that female Guppies were also mobile during the period of their pregnancy and they were willing to eat more foods. Mr. Stacey (1983) disagreed with the above results and stated that female Guppies were calm during the period of their pregnancy<sup>5, 19, 20</sup>. Pregnant female Guppies were not mobile a lot before giving birth to their babies. Dr. Hossein Emadi (1389) agreed with this case<sup>19, 21</sup>. Pregnant Guppies were calm one hour after giving birth to their babies. Then these Guppies turned back to their previous state. If fish newborns stayed aside their mothers, their mothers would eat them. Dr. Ali Farshchi agreed with this case<sup>5</sup>. Fish newborns got away from their mothers and hid themselves after the birth. Dr. Ali Farshchi agreed with this case. Fish newborns hid themselves a few hours after the birth and then they came on the surface of water to find food. These fish newborns hid themselves again after eating food. Mr. Larissa Tromf (2014) and Victoria R. Franks (2013) agreed with this case. Learning has an important role in taking food in Guppy species based on the studies of Larissa Tromf (2014)<sup>14, 16</sup>. Fish newborns had more willingness to find food. These fish newborns find food near the surface and the bottom of water. Fish newborns swim at the bottom and on the surface of water. Bigger fish newborns were more on the surface of water and smaller fish newborns were more at the bottom of the Aquariums and on the spalls. It seemed that Victoria R. Franks (2013) and Larissa Tromf (2014) agreed with this case. Since Victoria and Larissa said that Guppies were mobile in all parts of the Aquariums, their results are not completely similar to the results of recent research<sup>14, 16</sup>. We expect that the relative increase in temperature will increase the number of growing Guppy fetus species based on the gathered information. We expect that the increase in temperature will improve the evolution process of fetus to some extent. When temperature is increased a lot; the number of fish newborns will be decreased. Researchers found out that the number of growing fish fetus and fish newborns species would be decreased at the temperature of more than 28 °C. In addition, the increase in temperature will increase the mobility of swordtail fish and Guppy fish based on the gathered information resulting from behavioral observations. We expect that the increase in temperature will increase the activity of swordtail fish and Guppy fish and these two fish species spend a lot of energy and they need more food. The aquatic fish species need more oxygen after the temperature and their willingness to take food is increased. The increase in temperature will make environment more appropriate for other pollutions. So, people will be stricken to ringworm and

toxoplasmosis. Since Researchers were not in the laboratory all of the time, Guppies were stricken to ringworm for two days and most of them died. So, we expect that Guppies will be stricken to ringworm due to pollution, high water temperature, external material based on the conditions of Aquarium environment. In general, we can say that it is not right to transmit immigrant fish species to the new environment and non-native environment because it is probably followed with some outcomes. We can say that it is better not to transmit the place of living creatures to another place because every living creature is adopted with its primary eco-system physiologically and transmitting these living creatures is dangerous for them because new environment will injure these living creatures or in a broad level it will injure and weaken the living creatures which accepted these immigrant living creatures into their environment.

## CONCLUSION

With regard to the mentioned things, we can say that the increase in temperature will decrease the reproduction of Guppies.

## REFERENCES

1. Joseph S. Nelson, Ph.D. and William N. Eschmeyer, Ph.D., freshwater fish distribution. 2002. p. 337-34-2
2. Emadi H. Systematics and taxonomy of fish. 1387
3. Common Names of *Poecilia reticulata*. 2013
4. Magurran, Anne E., Evolutionary Ecology : The Trinidadian Guppy. 2005
5. Farshchi A. Freshwater aquarium fish. Printing Sepehr Tehran: Organization of research; 1361
6. Griffiths, Tony, Endler's livebearer" Aquaworld Aquarium. 2013.
7. Griffiths, Tony. Endler's livebearer : It's a Guppy Aquaworld Aquarium. 2011
8. Winge, Ö. "Succession of broods in lebistes". 1937.
9. Barbosa, Miguel; Magurran., Evidence of female-promoted polyandry in Trinidadian guppies." Environmental Biology of fishes. 2011. p95-102.
10. Askarian F. Kousha F. Complex physiology of fish and aquatic. 1385
11. Makki Mahmoud. Examine the impact of changes in water temperature and density of fish on growth Sychlayd zebra fish in the aquarium. Islamic Azad University of Kazeroon: 1391
12. Naderi and colleagues. Standards in the breeding aquarium fish pathogenic role of nutrition in improving survival 1390. Journal - Promoting Iranian Fisheries (Aquaculture); pages 21 to 28
13. Hakan Olsen K, Katarina ASK, Hanna Olesn, Inger porsch- Hallstrom, Stefan Hllgren., EFFECTS of the SSRI citalopram on behaviours connected to stress and reproduction in Endler Guppy, *poecilia Wingei*. January 2013
14. Victoria RF, Rupertc. Marshall., Animal Behaviour, Mechanisms and extent of information transfer in socially foraging guppies, *Poecilia reticulata*. January 2013. pages 103-108

15. Guevara-Fiore P, Early social experience significantly affects sexual Behaviour in male guppies. *Animal Behaviour*. July 2012. pages 191-195
16. Larissa Tromb, Culum Brown., Personality affect learning and tradeoffs between private and social information in guppies, *Poecilia reticulata*. *Animal Behaviour*. February 2014, pages 99-106.
17. Edens M, Darden SK, Ramnarine IW, Evans JP, R.James, D.P.Croft. Environmental effects on Social interaction networks and male reproductive behavior in guppies *Poecilia reticulata*. March 2011
18. Guevara-Fiore P, Stapley J, Krause J, Ramnarine IW, Watt PJ., Male Mate-searching strategies and Female cues: how do male guppies find receptive females. June 2010
19. Emadi H. Creation of live animals. Printed. *Scientific Aquaculture* 1385
20. Lily NR, Stacey NE. Hormones, pheromones, and Reproductive Behavior fish. *fish physiology*., 1983, pages 1-63
21. Emadi H. Aquarium freshwater aquarium fish growth and reproduction. Third edition. *Publications Aquaculture*, 1389

Source of support: Nil, Conflict of interest: None Declared