

Laboratory Assessment of the Molluscicidal Against the Fish in (Irrigated Canal) Wad Medani Gezira State- Sudan (2013)

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Abstract: Study aimed to assess the molluscicidal against Fish *Gambusia affinis*.

Methods: Extracts of Bayluscide 83.1% WP were activities against adult *Gambusia affinis*. Then a fish was considered dead when motionless, bloating and/ or its colour change and examined under a dissecting microscope at 30x magnification, and the LC50 value for the molluscicidal tested were computed.

Result: for the molluscicidal activities of Bayluscide 83.1% WP, the LC50 value against *Gambusia affinis* was 640 ppm.

Keywords: Mosquito, fish, *Gambusia affinis*, molluscicidal.

1. INTRODUCTION

Gambusia affinis common known as the western mosquito fish, is a small viviparous fish found in shallow freshwater habitats at or near the surface. However, can be reach reproductive maturity in approximately 30 days, females can have two to six broods per reproductive season, with 14 to 18 embryos per brood (1). Mosquito fish *Gambusia affinis* have been used as a biological control agent for mosquitoes more than 100 years and, then used under appropriate conditions, remain one of the best candidates for biological control programs against mosquitoes It's found in a variety of habitats including both lotic (flowing) and lentic (still) freshwater. They can survive water temperature ranging from near freezing to 41degree centigrade and dissolved oxygen content as low as 0.18 ppm, under natural conditions the gestation period is about 30 to 60 days (2). The field efficacy experiment showed that the *Gambusia affinis* at rate of fish/m² resulted in more than 84% reduction for 12 month of *Anopheles arabiensis*, *Culex* spp. Larvae (3). Pervious study showed that the Lc50 of profenofos was (640 ppm) (4) and Carbofuran was (636 ppm) (5). So, the Lc 50 of the Deltamethrin was (90.076 ppm) and Diazinon (9.10 ppm) (6). And Chlorpyrifos was (85 ppm); the mixture of Chlorpyrifos with Glyphosate was (11 ppm) (5). Mosquitofish (*Gambusia affinis*) was selected for use as test organism due to its widespread occurrence in irrigated canal in the Gezira State- Sudan, it's easy culture in laboratory, and its potential for use as a regional bioindicator of environmental contamination.

2. STUDY METHODS AND MATERIAL

2.1 Collection of Fish *Gambusia affinis*:

Five field- trips were executed for collection of Fish *Gambusia affinis* from small drain for broken pipes of domestic water at workshops area, Wad- Medani, Sudan, during the period from June to September 2013). It has been collected by scooping method as stated in 3.6 above. The collected fish were transported to the Insectary set at 25 degree centigrade

and 75% Rh in the Blue Nile National Institute for Communicable Diseases, University of Gezira. For homogeneity in term of fitness, fish were separated from other aquatic funa and flora and placed in container (10 litres) filled to half with dechlorinated tap-water for 24 hrs.

2.2 Bayluscide test against Fish Gambusia:

affinis: The fish were put into plastic cups (140 ml) covered with muslin which fixed in position using a rubber band to avoid jumping of the fish out of the cup. The cups filled to 1/5 with water to keep them fresh. Each cup supported 20 fish. From each cup water was discarded and fish were unloaded separately into Bayluscide 83.1% WP concentrations of 0.00, 330, 480, 630, 720, 780, 930, 1080 ppm. Concentrations were kept in plastic containers. They were covered with muslin which fixed in position using a rubber band again to avoid fish jumping. Fish were left in these concentrations for 24 hrs. Then a fish was considered dead when motionless, bloating and/ or its colour change.

2.3 Data Analysis:

Probit analysis programme was used; the Lc50 of the population was recorded in twenty four hours.

3. RESULTS

Table (1) The sensitivity of Gambusia affinis Population against Molluscicide (Bayluscide 83.1% WP) in the study area.

n= (40- 80).

dose/ppm	1	2	3	4	5	6	7
	330	480	630	720	780	930	1080
Log10 Dose	2.52	2.68	2.78	2.86	2.89	2.97	3.03
Mortality Rate %	13	20	45	50	62	74	95
Probit	3.87	4.16	4.87	5	5.31	5.64	6.64

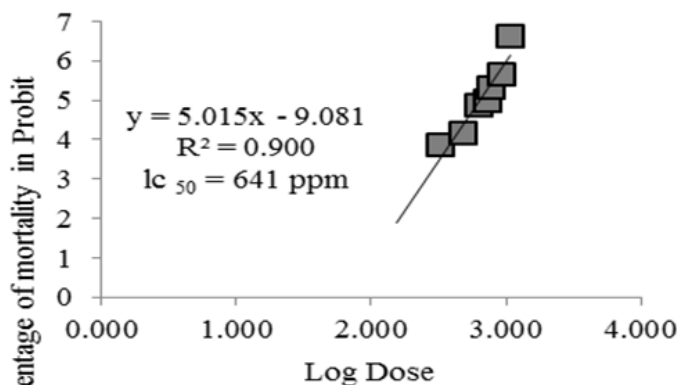


Fig (1) The response of Gambusia affinis population to Molluscicide (Bayluscide pw 83.1 %) after 24 hrs exposure, n= (40 - 80).

4. DISCUSSION

Biological control is expected to play an increasing role in vector management strategies of the future. The technology is challenging as well as difficult. Unlike the chemical pesticides, the results are often unpredictable with biological agents. This calls for a better understanding of the biological interactions with the environment (7). However, pesticides are useful tools for pest control, but they are toxic to aquatic species, particularly fish (4). It was known that fish such as Gambusia affinis, predator of mosquitoes larvae, was encouraged to be established in Irrigated Schemes to control Malaria (3), which is the most important socioeconomically devastating parasitic diseases (8). Hence, control of schistosomiasis through pesticides use should consider the Malaria control environment including the fish Gambusia affinis. But unfortunately Gambusia affinis was so sensitive to insecticides used to control adult mosquitoes such as

Deltamethrin. It was reported that Lc50 for Deltamethrin against *Gambusia* was (0.076 ppm) (6). In Sudan Malaria is a serious disease and the Sugarcane plantation environment furnish a suitable presence for it. At the same time pests in Sugarcane, Insects and weeds, were controlled with Chlorpyrifos and Glyphosate, respectively (9) (10). Again *Gambusia* fish was sensitive to Chlorpyrifos (Lc50 85 ppm) and when used with Glyphosate the sensitivity increased (Lc50 11 ppm) (5). Having said that the use of Molluscicide, Bayluscide 83.1% wp was so mild on *Gambusia* fish where the Lc 50 (640 ppm). This result indicates that no interference, will take place, with Malaria control when the molluscicide was used to control the snail spp.

5. CONCLUSION

The aqueous extract of Bayluscide 83.1% WP is exhibited reasonable molluscicidal activity against the *Gambusia affinis*. However, comprehensive laboratory evaluation is recommended prior to field tests of the molluscicidal since their impact on other aquatic biota is not known.

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