Advances in Bioresearch
Adv. Biores., Vol4 (3) September 2013: 79-81
©2013 Society of Education, India
Print ISSN 0976-4585; Online ISSN 2277-1573
Journal's URL:http://www.soeagra.com/abr/abr.htm
CODEN: ABRDC3

ORIGINAL ARTICLE

Lethal Toxicity of Paclitaxel and its Study on Reproductive Performance, Mortality and Survivality of *Lymnaea stagnails*

P. Mahobiya
Assistant Professor, Department of Zoology, Dr. H. S. Gour (Central) University, Sagar (M.P.)
E- mail: chitrapayal@gmail.com

ABSTRACT
Lymnaea stagnalis is a prolific breeder and it is commonly known as pond snail and found in all type of fresh water bodies. These snails are pest of aquatic vegetation and also herbivorous. In the present investigation alkaloid of taxol was tested for lethal toxicity against Lymnaea stagnalis. In the present investigation has also been taken to study the effect of alkaloid of paclitaxel on the life cycle of Lymnaea stagnalis. It is very essential to control the fertility, hatchability, viability by increasing the rate of mortality and decline the rate of longevity of these snails, so this investigation was made to know about the intoxication of alkaloid on the mortality and reproductive performance of this experimental pest snail.
Key words: *Lymnaea stagnalis, Fertility, Toxicity, pacletaxel.*

Received 23/05/2013; Accepted 18/07/2013

INTRODUCTION

Lymnaeids are distributed worldwide [1]. This snail act as the intermediate hosts of trematode parasite, the causative agent of helminthes diseases. These snails are not only prolific breeders but they are also harmful pests of aquatic vegetation and they are found in fresh water lake and ponds. Is is hermaphrodite and oviparous and their normal developmental stages are well documented, they are easy to observe under standard laboratory conditions.

These snails are harmful pests of various valuable crops and directly decline the productivity/acre (hectare) area and indirectly decline the economy of the country. Severe damage caused to standing crops resulted into scarcity of raw material and create serious problem of food scarcity in that particular area. To save our valuable crops from the disaster of these pestiferous snails it is very essential to control their fecundity and viability.

A lot of research work has been done on the neurons of *Lymnaea stagnails* by using antitubulin drug but nobody has paid any attention on the development and reproductive performance of pond snail *Lymnaea stagnalis* with the effect of plant alkaloid. So, the main objective of this investigation is to find out that antifertility agents of antitubulin drug play or not play important role in the fertility and reproductive performance and achieved high rate of fecundity or not and also tried to investigate that treatment of antifertility agents would resulted into partial or nil percentage of fecundity of the respective experimental possible or not to control the fertility of experimental snail e. g. *Lymnaea stagnalis.*

MATERIALS AND METHOD

The materials and methods used in this present investigation are as follows:

1% stock solution was prepared in distilled water and kept in dark coloured tightly closed glass bottles and stored in refrigerator (at 4^0C).The stock solution was further diluted and used at room temperature for the detection of LC values and after calculated the sublethal concentrating the experiments were done in triplicate.

Procurement and rearing of Snail:

Sexually mature *Lymnaea stagnails* were collected from Botanical garden of Dr. H.S. Gour University, Sagar and Sagar lake by net. They were reared in troughs and fed regularly with aquatic vegetation e.g. *Hydrilla* to avoid the stress of starvation. The collected snails were acclimatized for 7 days under laboratory conditions [2].The young ones hatched from egg masses of *Lymnaea stagnalis* were used for

the experimental purpose. The young ones snails were introduced to different concentration of plant alkaloid through media. Each group was in triplicate of 50 snails.

Experiments with different dosage of plant glycoside: Newly young *Lymnaea stagnalis* were introduced via media to different concentrations of plant alkaloid and data was summarized in Table no1 [3].

RESULTS AND DISCUSSION

Behaviour in the control groups:

In control group after immersion in water the snails *Lymnaea stagnalis retracted* body inside the shell. After a lapse of 3.5 minutes they extended the foot and body and crawled along the bottom and the walls of the container. While crawling the foot was well expanded, probasis and epipodial as well as tentacles were completely protruded out of the shell. The snails in this condition showed the movement of radula for feeding and a current of water through epipodial lobe for respiratory purposes.

Behaviour in Experimental Groups:

Marked behavioural changes were observed when adult snails were introduced to the higher concentration of the antitubulin drug as follows.

(i) After immersion the gastropods retracted the body in the shell.

(ii) The snails slightly protruded foot.

The treated snails showed dullness throughout the experimental duration. They were apathetic during the experimental period.

Mortality:

In the present investigation in the control group mortality started on 25th days and the percentage of mortality ranged from 8% to 12%. However, mortality started on 5th day in all treated groups.

Shell, Visceral Hump and Respiration:

The control snails were found submerged while the treated snails showed only pulmonary respiration. The shell became thin, fragile and semi-transparent owing to decalcification.

Mating and Oviposition:

There was no hard and fast rule regarding the start of mating, while in the control group mating started after 1 or 2 days and it ranged from 6-30 hrs. However, it varied in mating snails treated with different concentrations of the antitubulin drug.

Ovulation, Egg Masses and Egg Capsules:

Ovulation took place but the egg masses showed fewer egg capsules in treated groups in comparison to the control groups where the number of egg capsules was generally 50-60 in *Lymnaea stagnalis* with some amount of gelatinous substance.

Fecundity

The dose and duration of treatment dependent decrease in the rate of fecundity was observed in case of all the treated groups.

Percentage Viability

In the control group percentage viability was 96-98% in *Lymnaea stagnalis.* But it decreases with the increase in concentration of antitubulin drug intoxication. The data on fecundity, viability and mortality were recorded and summarized in Table 2.

Table1: Data on Toxicity of Paclitaxel on the Adult Specimens of *Lymnaea stagnalis.*

S.No.	Name of the antitubulin drug	Conc. of the antitubulin drug	Duration (hrs.)	Mortality (%)	Lethal conc. value
1.	Paclitaxel	1.0 ml/l	72	100%	LC_{100}
2.		0.7 ml/l	72	50%	LC_{50}
3.		0.3 ml/l	72	Nil	LC_0
4.		0.2 ml/l	72	Nil	Sublethal concentration

Result: 0.4 ml/l Concentration of paclitaxel was considered as sublethal concentration value.

In the present investigation the snails were apathetic during the experimental period and showed decline in growth as reported [4]. In *Lymnaea luteola* is hampered significantly by more than 25% at 1 ppb and more than 50% at 5% and 1 ppb of DDT was reported [5]. The decline in growth has been executed by the thinning of shell as the flesh weight did not differ significantly in the control and treated groups. It was observed that in the higher concentration of antitubulin drug the fecundity and viability was zero percent. In *Lymnaea stagnalis* after thiourea, nuvan, methyl parathion exposure made similar observation [6]. In

Lymnaea spp. after pesticide exposure showed similar result [7]. In *Lymnaea* spp. and *Gyraulus* spp. after pesticide exposure [8] and in *Lymnaea* spp. after antitubulin drug exposure was observed [9].
It could be the suggested that different antitubulin drugs act as antifertility agents for decreased the fecundity of the snails. The strategy may be adopted to control the population of snail pest after a detailed research.

Table 2: Percentage mortality and reproductive performance of *Lymnaea stagnalis* after paclitaxel treatment

Kinds of antitubulin drug	Conc. of the antitubulin drug	Total No. of snails	No. of snails survived	Percentage mortality	Day on which mortality started	Day on which mating started	Mating period	Oviposition period	Fecundity		Viability
									*	**	
Control	No trace of antitubulin drug	50	44±46	8±12%	25th	After 1 day	6-30 hrs	After 24 hrs	12±14	50±60	48±58
Paclitaxel	1.0 ml/l. (LC_{100})	50	All died								
	0.7 ml/l. (LC_{50})	50	22±26	45±50%	5th	Varies in different mates	5-6 hrs	After 8 hrs.	2±3	10±12	4±6
	0.3 ml/l. (LC_0)	50	30±34	24±26%	6th	-do-	-do-	-do-	4±5	15±20	16±18
	0.2 ml/l. (Sublethal Conc.)	50	34±38	22±24%	7th	-do-	-do-	-do-	5±6	20±22	18±21

Fecundity: * No. of egg masses laid by experimental snails and control snails groups.
** No. of egg capsules/egg mass during the experimental period..
Note: The data is presented on mean basis.

REFERENCES

1. Godan, D. (1983). Pest slugs ans snails, Biology and Control. Springer-Verlag, Berlin, 443.
2. Subbarao, N. V. (1989). Handbook fresh water molluscs of India. Radiant Process Pvt. Ltd. Calcutta, India.
3. Finney, D. J. (1971). Probit analysis. 3rd Edn. Cambridge University Press, London.
4. Subbarao, N. V. (1975). Handbook fresh water molluscs of India. Radiant Process Pvt. Ltd. Calcutta, India.
5. Joshi, H. C. (1987). Effect of Low levels of DDT on a Gastropod mollusk. *Lymnaea luteola*. Trends in Environmental Pollution and Pesticide Toxicology, Proceedings of the 8th Annual Session of Academy of Environmental Biology, Jagminder Book Agency, New Delhi, 349 - 354.
6. Bhide, M. (1998). Effect of Nuvan, Methyl parathion and thimet on the mortality behavior and reproductive performance of fresh water mollusc, *Lymnaea stagnalis*. *J. Environmental Biology*, 19 (4): 325-332.
7. Nema, P. (2005). Effect of some plant extracts on the development of *Lymnaea* spp. Ph. D. Thesis, Dr. H.S. Gour University, Sagar (M. P.).
8. Jain, S. (2007). Effect of molluscicides of plant origin on the reproductive performance of *Lymnaea* spp. and *Gyralulus* spp. Ph. D. Thesis, Dr. H. S. Gour University, Sagar (M. P.).
9. Mahobiya. P. (2013). Study on reproductive performance, survivality mortality of plant glycoside of Abrus precatrious, *J. Asian Resonance* 2(1):50-52

Citation of This Article
P. Mahobiya. Lethal Toxicity of Paclitaxel and its Study on Reproductive Performance, Mortality and Survivality of *Lymnaea stagnails*. Adv. Biores., Vol4 (3) September 2013: 79-81.