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PESTICIDAL EFFECT OF MADHUCA INDICA LATEX ON SOME LARVAE OF CROP DAMAGINING PESTS

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ABSTRACT: Plants have been an essential part of human society, science the belonging of civilization when the hunter became the cultivator in the Indian subcontinent as well. During the vedic period, great importance was given to the plants as a source of almost all the essentials of life such as food, clothing, medicines and shelter. Some plants provide there extracts as the 'Rash' plant extract which are used as a medicine, as antibiotic, insecticides and pesticides. Presently our country is passing through agriculture revolution or green revolution. Such the plants are not important only for medicinal use, but they are also important in the prevention of dangerous insects , pests , fungus and other harmful biotics for crops, vegetables ,other stored food materials and animals .

The present study is based on the pesticidal effects of *Madhuca indica*, latex and its effect on some agricultural larvae of pest *Raphidopalpa forcicollis* which are harmful to the crops. The different diluted concentrations were spread over pest larvae for 12 hrs, 24 hrs and 48 hrs. The above cited concentration of *Madhuca indica, were spread over the larvae of pests Raphidopalpa forcicollis.* Ten indiuals of each larvae of pests were kept in each patrydishes with triplicates against the control. *Madhuca indica* the pest mortality was recorded 0% at 0% concentration(control) of plant latex, after 12 hrs, 24 hrs and 48 hrs. at 25% conc. The pest mortality was recorded 22.15%, after 12 hrs, 24.44% after 24 hrs and 27.44% after 48hrs. At 50% conc. It was 34.02 % after 12 hrs, 29.21% after 24 hrs and 31.22% after 48hrs. In case of 75% conc. Of plant extract it was 44.08% after 12 hrs, 47.92% after 24 hrs and 47.92% after 48 hrs. Where in case of 100% conc. of plant latex mortality was recorded 62.22% after 12 hrs, 72.23% after 24 hrs and 64.93% after 48 hrs.

KEYWORDS: - Pesticidal effects, Agricultural pest Larvae , Plant Latex, Mortality rates.

INTRODUCTION:-

Since the beginning of civilization human being have invented various medicines and pesticides from nature. In this regard the human beings have invented various natural insecticidal and pesticidal compounds from plants also. An old Indian test book of Ayurveda (Bhavprakash Nighantu) has described these aspects in a very good manner. Today pest control is a serious problem of developing countries. It is projected that world population will increase to 8.5 billion by the year 2025 (Agrios, 1997). The problem of feeding this expanding world population and improving the present diet of man is always considered in terms of increasing food production. Providing adequate food entitlements, safeguarding public health, meeting fuel and firewood needs, preventing deforestation and conserving the environment, and slowing down population growth will be daunting challenges in the developing world.

Significant losses in grain, both quantitative and qualitative occur during storage. The factors of losses may be biological (Insects, rodents, birds etc.) or physical (temperature, relative humidity, grain moisture, storage structure etc.).

Insects often cause extensive damage to stored grains and grain products, amounting to 5-10% loss in temperate regions and 20-30% in the tropical regions (Nakakita, 1998). In India, post-harvest losses caused exclusively by insect pests is 12% (Mohan, 2003). At present pest control measures in storage rely heavily on the use of synthetic insecticides and fumigants. Their indiscriminate use in storage, however, has sometimes led to a number of problems including toxic residues in food grains (Fishwick, 1988) and environmental pollution (Wright *et al*., 1993). These problems together with the development of insect resistance have made the problem much more complicated. The use of insecticides of natural origin are therefore an important development in storage pest control as they have short residual action, low mammalian toxicity and reduced environmental pollution.

To a great extent, future food security and economic independence of developing countries would depend on improving the productivity of biophysical resources through the application of sustainable production methods, reducing crop and post harvest crop and post harvest losses. Appropriate technologies which do not assault the nature, would have key role to play in ensuring food security, improving human health, and rehabilitating and conserving the environment to safeguard the wellbeing and prosperity. Instead for more "green revolutions" with emphasis on miracle seeds, hard-hunting, synthetic and engineered insecticides, and increased use of fertilizers, in future must look into natural ways and processes for augmenting agricultural productivity.

Grainge and Ahmed, 1988 reported more than 2400 plant species possessing pest control properties. Some traditional used promising plants in India subcontinent are Mahuwa (*Madhuca indica*). It is only in the last two decades that pest control potential of some promising plants was unveiled. Effects of these plants as repellent, anti-feedant, oviposition deterrent, growth regulator and chemo-sterillant as alternative considerations are far more desirable than a quick knock-down effect on insects in an IPM Program.

Aims and objectives of the study

To prevent above cited harmful effect of chemical pesticides it become essential to search the alternate natural pesticides which may not be toxic for animals, human beings or agricultural crops. Therefore some plant extract containing plants are chosen to observe their pesticidal effects on some agricultural pests in our present study.

Plan of work

The following aspect have been studied in the present investigation.

1. Several plant parts taken for the study have been extracted by the method described by Annapurna (1989).
2. Efficacy of some of these latex also tested against some pests of some common crops.

MATERIAL AND METHODS:-

All type of research work depends upon the tools and material and methods, which are the most important part of the study. During our research work following methods and tools has been used.

Selection of plants for study-:

The selection of plants for our research purpose we have discussed with local villagers especially with tribals, some Aurvedic vaidya and other peoples. An *Madhuca indica* plant has been selected due to their various important characters, such as availability and ethnobotanical impotence.

Identification of plants-:

Identification of selected plants conducted according to instruction of modern taxonomy. *Madhuca indica* is large tree which is found at every part of India. Formers of our country in north India used it for the formation of fence around their crop lands, house and gardens.

Classification of Neem

Kingdom	-	Plantae
Division	-	Magnoliaphyta
Class	-	Magnoliopsida
Order	-	Ericolos
Family	-	Sapotaceae
Genus	-	*Madhuca*
Species	-	*indica*
Local name	-	Mahuwa

Preparation of plant latex-:

In the present investigation the latex was prepared with organic solvent ethanol (Annapurna 1989). The air dried plant materials have been powdered mechanically. The dry powder (100 gm.) was extracted thoroughly with dry ethanol and kept aside overnight to settle the main pigment at the bottom leaving brown liquid. The extract was kept in vacuum desiccators for dryness the ethanol was evaporated completely to dryness under vacuum leaving brown powder, which re-dissolved in ethanol. This latex was then used for further investigations.

1. Collection of pests and their identification -:

During the present study one agricultural pest larvae *Raphidipulpa foveicollis* (Luthear) Red pumpkin beetle have been selected, collected and identified of pest was done with the help of Entomology department Agricultural College Rewa.

Classification of Red pumpkin beetle

Order	-	Coleoptera
Family	-	Chrysolelidera
Genus	-	*Raphidipulpa*
Species	-	*foveicollis*
Local name	-	Red pumkin beetle

Preparation of dilutions of collected plant latex-:

The dilutions of latex have been prepared by adding the distilled water. 0%, 25%, 50%, 75% and 100% of dilutions have been made by the mixing of distilled water in following manner-

(1) 0 ml. (control) no extracts have been added there is only distilled water.
(2) 25 ml. of extracts and 75 ml. of distilled water used as 25%.
(3) 50 ml. of extracts and 50 ml. of distilled water used as 50%
(4) 75 ml. of extracts and 25 ml. of distilled water used as 75%
(5) 100 ml. of extracts and 0 ml. of distilled water used as 100%

The various concentrations of diluted latex have been spread over the collected pest larvae. In the glass petrydishes counted numbers of ten pest larvae have been kept in the triplicate to get proper results, with a control.

Observation-:
The different type of plant solution has sprayed on pest larvae of crop and observation of motility has been recorded. The experiment replicated during three different duration 12 hrs, 24 hrs and 48 hrs in data sheet.

RESULTS :-

1- Mortality of *Raphidopalpa foveicollis* larvae with plant latex (Mahuwa):-
In the case of Raphidipulpa Foveicollis Red pumpkin beetle larvae mortality recorded were 32.05% (Table No.1).

Table No. (1) - Mortality of *Raphidipulpa Foveicollis* larvae with plant latex.

Plant Name	Mortality Mean Value (in %)
Madhuca indica	32.05%

2- Mortality (Mean value in %) of *Raphidipulpa Foveicollis* larvae in relation to different concentration-

The mortality recorded at different concentration of plant extract were as at 0% concentration (Control) mortality was 0%, at 2% extract conc. It was 20.99 %, at 50% conc. It was 33.13 %, at 75% conc. Mortality was 46.31% and at 100% latex con. 62.76% mortality has been recorded.

The highest average pest mortality was recorded 62.76% in case of 100% extracts conc. and lowest at 0% Conc. It was 0% Table no. 2).

Table no. 2 -Mortality (in %) of *Raphidopalpa foveicollis* larvae in different concentration of plant latex.

Concentration	0%	25%	50%	75%	100%
Mean Mortality	0	20.99	33.13	46.31	62.76

3- Mortality (Mean value in %) of larvae *Raphidopalpa foveicollis* at different duration-:

The mortality in relation to different duration were recorded as 32.72% after 12 hrs time span. 32.53% after 24hrs and 34.46% after 48 hrs. The highest average pest mortality percentage has been recorded after 48 hrs as it was 34.46% and lowest 32.53% after 24 hrs time span (Table No. 3).

Table no. 3 - Mortality (Mean value in %) of *Raphidopalpa fovecollis* larvae at different duration.

Serial No.	Duration (In hrs)	Pest mortality (In %)
1.	12	32.72
2.	24	32.53
3.	48	34.46

4- Effect of different concentration of plant latex *Madhuca indica* on larvae of *Raphidopalpa foveicollis*.

Where the treatment combination were concerned with plant species latex and their different concentrations, the 0% mortality obtained at 0% concentration (control), at 25% conc. of plant extract conc. It was 22.68% at 50% extract conc. It was 31.48% at 75% extract conc. It was 46.64% and at 100% plant extract conc. Mortality was recorded 66.46%.

Serial No.	Concentration (%)	Mortality (%)
1.	0	0
2.	25	22.68
3.	50	31.48
4.	75	46.64
5.	100	66.46

5- Effect of *Madhuca indica* plant latex on *Raphidopalpa fovecollis* larvae at different duration.

In the case of plant species *Madhuca indica* pest mortality were recorded 32.59 after 12 hrs, it was 34.96% after 24 hrs and it was 34.50% after 48 hrs.(Table no.5).

Table No. 5 - Effect of plant species *Madhuca indica* latex on *Raphidopalpa foveicollis* larvae at different duration.

Plant species	**12 Hours**	**24 Hours**	**48 Hours**
Madhuca indica	32.59	34.96	34.50

6- The effect of plant species *Madhuca indica* latex and their different concentration at different duration on *Raphidopalpa fovecollis* larvae mortality-: In the case of *Madhuca indica* the pest mortality was recorded 0% at 0% concentration(control) of plant latex, after 12 hrs, 24 hrs and 48 hrs. at 25% conc. The pest mortality was recorded 22.15%, after 12 hrs, 24.44% after 24 hrs and 27.44% after 48hrs. At 50% conc. It was 34.02 % after 12 hrs, 29.21% after 24 hrs and 31.22% after 48hrs. In case of 75% conc. Of plant extract it was 44.08% after 12 hrs, 47.92% after 24 hrs and 47.92% after 48 hrs. Where in case of 100% conc. of plant latex mortality was recorded 62.22% after 12 hrs, 72.23% after 24 hrs and 64.93% after 48 hrs.

The highest average mortality obtained 72.23% at 100% conc. of plant latex after 24 hrs time span and lowest was 0% in case of all duration.

Table No. 6- The effect of plant latex of *Madhuca indica* and their different concentration at different duration on *Raphidopalpa foveicollis* larvae mortality.

Plant species	**Concentrations (%)**	**Duration-12 hrs.**	**Duration-24 hrs**	**Duration-48hrs**
Madhuca indica	0%	0.0	0.0	0.0
	25%	22.15	24.44	27.44
	50%	34.02	29.21	31.22
	75%	44.08	47.92	47.92
	100%	62.22	72.23	64.93

DISCUSSION:-

Agriculture in India has been long history dating back to ten thousand years. Today, India rank second worldwide in farm output and about 70% of Indian are directly or indirectly associated with agriculture. Several pressures have accelerated the search for more environmentally and toxicologically safe and more selective and efficacious pesticides. Most commercially successful pesticides have been discovered by screening compounds synthesized in the laboratory for pesticidal properties. The average number of compounds that must be screened to discover a commercially viable pesticide has increased dramatically, so that new discovery strategies must be considered. Increased emphasis on reduced-tillage agriculture will make adequate control of weeds more dependent on chemical control. New herbicides will be needed to fully meet this challenge. The increasing incidence of pesticides resistance is also fueling the need for new pesticides. Furthermore, most synthetic chemicals that have been commercialized as herbicides are halogenated hydrocarbon with relatively long environmental half-lives and more suspect toxicological properties than most natural compounds. Thus, natural compounds have increasingly become the focus of those interested in discovery of pesticides.

Natural products, mainly plants and their derivatives are gaining importance in the recent past for use against noxious insect pests due to reason not only the resistance against conventional synthetic insecticides but also problems like environmental pollution, toxicity, bioaccumulation & biomagnifications especially through different trophic levels in the ecosystem. Some plants and their products have insecticidal, larvicidal and insect growth regulatory effects which are introduced in the pest control strategy (Jamil et. Al. 1988, Chiranjivi & Shudhakar 1996, Omotoso 2004, Sharma et. al. 2008).

CONCLUSION:-

The relationship between life and disease the plant is older as the history of mankind itself, plant play vital role for existences of life in the universe. It is evident that human being started using plant part from the very beginning and found that majority of plants was suitable as food as well as various needs of life. But present scenario need extensive research for search of novel herbal pesticides which can replace older plant product and the synthetic products and which can increase the possibility to vanish the hunger from the earth. Botanical pesticides are good alternative to chemical pesticides, because botanical pesticides are ecofriendly, economic, target specific and biodegradable. The use of botanicals in pest management is not only useful for suspension of pest population but will be also helpful to maintain the sound ecological balance, which will help mankind to

cope with the threat to Global warming. To prevent above cited harmful effect of chemical pesticides it become essential to search the alternate natural pesticides which may not be toxic for animals, human beings or agricultural crops. Therefore some latex containing plants are chosen to observe their pesticidal effects on some agricultural pests in our present study. In this context we have found above cited results in our study.

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