



Insects and Mites Infesting Plants Used In Unani System of Medicines With Assessing Bioefficacy of Some Green Pesticides Towards Control of a Pest Species , *Ferrisia Virgata*, Homoptera:pseudococcidae.

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ABSTRACT

This paper reports 8 species of Insects and 22 species of mites infesting plants used in unani system of medicine. The results of the bio-efficacy of 3 green pesticides along with a conventional synthetic pyrethroid compound are also included highlighting good performance of the extracts of *Pongamia pinnata* and *Butea monosperma*.

KEYWORDS : Unani medicinal plants, mites, insects, diversity, bio-efficacy.

Introduction:

In the recent years importance has been attached globally on use of medicinal plants not only as herbal drugs but also as various herbal products as cosmetics, nutraceuticals , colouring, dyeing and flavouring agents, bio pesticides etc. Due to these the cultivation of medicinal plants is receiving incentives especially from Government of India which is trying to increase the use of medicinal plants in various facets of life. With the increase in cultivation of medicinal plants, the pest problems especially of insects and mites are also increasing. The Narendrapur campus of Ramakrishna Mission is maintaining a wide range of medicinal plants including trees, herbs, shrubs, trailers or climbers etc which are regularly used in Unani system of medicines. It was therefore intended to take up a preliminary study on insects and mites infesting these plants and evaluate efficacy of some botanical pesticides towards management of an important insect pest, *Ferrisia virgata* occurring on *Datura metel*. Some of the earlier workers who contributed on exploration on insects and mites fauna are Gupta(2005,2005a) , Gupta & Ghosh (2003), Ghosh (2004) Gupta *et al.*2007, Gupta(2012), Ghosh & Singh(2004) etc.The present paper shows results of preliminary study which includes 8 species of insects under 8 genera , 8 families and 2 orders and in case of mites 22 species of mites belonging to 7 families, 10 genera and 3 orders. There were 2 species the occurrence of which was earlier unknown from India.

Materials and Methods:

(a) **Survey and Documentation:** For conducting survey of insects and mites infesting plants used in preparation of unani medicine, the medicinal plant garden of Ramakrishna Mission Ashrama, Narendrapur, Kolkata was selected as there are over 380 species of plants used in I.S.M. (Indian System of medicine) for preparing AY-

USH drugs. The collection was made during January 2014 to June 2015. Over and above the medicinal plants found in adjoining districts were also examined for occurrence of mites. The mites were collected in the field itself with the help of a brush moistened with alcohol and mounted in hoyer's medium. The specimens were examined under research microscope for identification.

(b) **Assessment of Bio-efficacy with green pesticides:** For assessment of Bio-efficacy, the pest species which was selected was *Ferrisia virgata* infesting *Datura metel* , an important medicinal plant used in unani medicine preparation. The extracts of the plants which were prepared were Black tulsii(*Ocimum tenuiflorum*), Karanja(*Pongamia pinnata*), Palash(*Butea monosperma*). In all cases 2.5% concentration was taken. In addition a conventional pesticide like fenvalerate 0.5% was taken for comparison purpose. The extracts were prepared following Gupta *et al.*(2007). For assessing bio-efficacy leaf dip technique of Helle and Savelis(1985) was followed. The observations towards mortality were recorded at intervals of 24hrs, 48hrs, 72 hrs, 96hrs and the data collected was subjected to statistical analysis.

Results and discussion:

(a) **Survey and Documentation:** The insects and mites infesting plants of unani medicine system were identified and those belong to 8 genera , 8 families and 2 orders in case of insects and in case of mites 22 species belonging to 7 families, 10 genera and 3 orders and all these have been indicated in Table 1 and table 2 which also provides information regarding localities, period of maximum occurrence ,status as pests/predators and their economic importance. There are 2 species viz. *Brevipalpus araucanus* and *Brevipalpus dipholisi*, the occurrence of which was earlier unknown from India

Table 1: Diversity of mites infesting medicinal plants used in unani system of medicine.

Species name	Hosts/habitat	Period of maximum occurrence	Status	Remarks
1.Order-Prostigmata A Family-Tenupalpidae a. Sp- <i>Brevipalpus lewisi</i> McGregor	<i>Aeole marmelos</i>	September	C	Rare occurrence.no damage
b. <i>Brevipalpus phoenicis</i> Geij.	<i>Aeole marmelos</i>	September	A	Quite dominant. Infestation caused appearance of brown spots on leaves.

<u><i>c. Brevipalpus obovatus</i></u> Donnadieu	<u><i>Ocimum tenuiflorum</i></u>	September	A	Regular occurrence, severe damage not noticed.
<u><i>d. Brevipalpus cucurbitae</i></u> Mohanasundaram	<u><i>Ocimum tenuiflorum</i></u>	November	B	Regular occurrence but no specific damage observed.
<u><i>e. Brevipalpus araucanus</i></u> Gonzalez	<u><i>Mentha arvensis</i></u>	February	C	New record from India.
<u><i>f. Brevipalpus californicus</i></u> (Banks)	<u><i>Mentha arvensis</i></u>	November	C	Rare occurrence
<u><i>g. Brevipalpus dipholisi</i></u> De Leon	<u><i>Mentha arvensis</i></u>	March	A	New record from India.
<u><i>h. Brevipalpus crotoni</i></u> De Leon	<u><i>Punica granatum</i></u>	March	C	Accidental occurrence
B. Family- Tetranychidae				
<u><i>a. Oligonychus biharensis</i></u> (Hirst)	<u><i>Phyllanthus emblica</i></u>	October	A	New host record. No specific damage.
<u><i>b. Oligonychus mangiferus</i></u> (Rahman & Sapra)	<u><i>Aeale marmelos</i></u>	January	B	Accidental occurrence, moderate in number.
<u><i>c. Tetranychus savedii</i></u> Baker	<u><i>Mentha arvensis</i></u>	January	C	New host record
<u><i>d. Tetranychus ludeni</i></u> Zacher	<u><i>Aeale marmelos</i></u>	November	B	Occasional occurrence.
<u><i>e. Tetranychus neocaledonicus</i></u> Andre	<u><i>Mentha arvensis</i></u>	January	C	Rare occurrence.
<u><i>f. Tetranychus urticae</i></u> Koch	<u><i>Punica granatum</i></u>	March	C	New host record.
<u><i>g. Eotetranychus suainamensis</i></u> (Yokoyama)	<u><i>Phyllanthus emblica</i></u>	January	C	Rare occurrence
C. Family-Tydeidae				
<u><i>a. Tydeus sp</i></u>	<u><i>Phyllanthus emblica</i></u>	October	A	Regular occurrence causing chlorosis of leaves.
D. Family-Trombiculidae				
<u><i>a. Trombicula sp.</i></u>	<u><i>Mentha arvensis</i></u>	October	C	Rare occurrence. Predatory in nature.
E. Family-Cunixidae				
<u><i>a. Cunixa mangiferae</i></u> Gupta	<u><i>Ocimum tenuiflorum</i></u>	February	B	Accidental occurrence
2. Order-Mesostigmata				
A. Family-Phytoseiidae				
<u><i>a. Paraphytoseius multidentatus</i></u> Swirski & Shechter	<u><i>Ocimum tenuiflorum/Aeale marmelos</i></u>	October	A	Regular occurrence. Moderate in number.
<u><i>b. Amblyseius orientalis</i></u> Ehara	<u><i>Aeale marmelos/Ocimum tenuiflorum</i></u>	December	A	Good predator. Predominant, caused severe damage.

3. Order-Astigmata A family-Acaridae a. <i>Suidasia nesbitti</i> <i>Oudenams</i>	<i>Aeale marmelos</i>	February	C	Rare occurrence
4. Order-Cryptostigmata a. Oribated mite	<i>Aeale marmelos</i>	December	C	Rare occurrence.

Table 2: Diversity of insects infesting medicinal plants used in unani system of medicine.

Species Name	Hosts	Period of maximum occurrence	Status	Remarks
<i>Ceroplaster cerefirus</i> (Fab.) Order-Hemiptera Family-Coccidae	<i>Ocimum tenuiflorum</i>	September , October, November, February	B	Regularly occurring causing yellowing of leaves.
<i>Aphis craccivora</i> Koch Order-Hemiptera Family- Aphididae	<i>Mentha arvensis</i>	October, November, December	A	Regular occurrence causing mottled leaves and browning.
<i>Urentius sentis</i> Dist. Order- Hemiptera Family-Tingidae	<i>Ocimum tenuiflorum</i>	December, January, February	A	Serious pest of <i>Ocimum tenuiflorum</i> congregating on underside of leaves causing yellowing at the point of petiolar attachment.
<i>Coccidohystrix insolita</i> (Green) Order-Hemiptera Family- Pseudococcidae	<i>Datura metel</i>	February, march	A	Seriously attacking leaves and twigs often killing plants.
<i>Thrips</i> sp Order- Thysanoptera Family- Thripidae	<i>Aeale marmelos</i>	December, January, February, march October,	B	Predatory in nature. Regularly attacking the plant causing serious damage.
<i>Bagrada</i> sp Order- Hemiptera Family-Pentatomidae	<i>Bacopa monnieri</i>	November	C	Causes serious damage to the leaves reducing its vitality.
Scale insect Order- Hemiptera Family- Diaspididae	<i>Phyllanthus emblica, Mentha arvensis</i>	October, November, December	B	They suck the plant fluid making them juiceless.
<i>Ferrisia virgata</i> (Cockrell) Order-Hemiptera Family- Pseudococcidae	<i>Datura metel</i>	October ,November, December, February, March	A	Serious pest causing severe damage to host plants, often killed.

(b) **Assessment of Bio-efficacy of green pesticides on *Ferrisia virgata* (mealy bug):**

The mortality achieved in different treatment at different levels are as below:

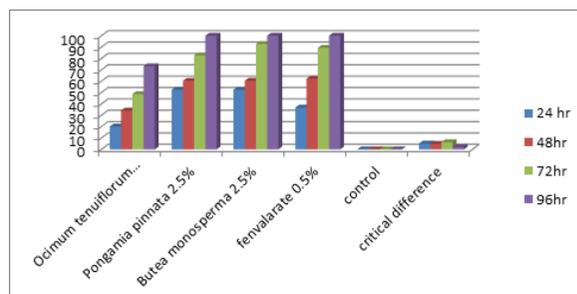
24hrs.-: At this interval the mortality of the bug ranged between 20.14% to 52.40%. The highest mortality was 52.40% which could be registered in case of both *Pongamia pinnata* and *Butea monosperma* and both were statistically at par and both were significantly superior to all other treatments including fenvalerate, a synthetic pyrethroid compound. It was observed that fenvalerate was though inferior to *Pongamia pinnata* and *Butea monosperma* but was superior to *Ocimum tenuiflorum* extract. There was no mortality in case of control trial. It can be inferred that all the treatments had shown insecticidal property.

48 hrs.-: At this interval the percentage mortality increased in all treatments, the highest being 62.19% in case of fenvalerate but it was at par with both the botanical pesticides, *Butea monosperma* and *Pongamia pinnata* where the percent mortality was 60.40% and 60.31%. *Ocimum tenuiflorum* was significantly inferior to all treatments registering 34.10% mortality.

72hrs.-: The percent mortality increased further in all the treatments at this interval. The highest being 92.73% in case of *Butea monosperma* and that was at par with fenvalerate which registered 89.34% mortality. Both of these were significantly superior to *Pongamia pinnata* and *Ocimum tenuiflorum* where the percent mortality was 82.60% and 48.60%, respectively, the former being superior to the latter.

96hrs.-: At this interval the percent mortality became 100% in case of all treatments excepting *Ocimum tenuiflorum* where it was 73.10%. Therefore, except *Ocimum tenuiflorum* all other treatments were at par showing 100% mortality and significantly superior to *Ocimum tenuiflorum*.

(c) **Conclusion :-** From the overall result it can be concluded that all the botanical extracts which were tested had shown the insecticidal property registering mortality from 73.10% to 100% at 96hrs after application. It was further observed that the botanical pesticides especially *Pongamia pinnata* and *Butea monosperma* were as good as fenvalerate. Hence for control of mealybug the leaf extracts of *Pongamia pinnata* and *Butea monosperma* can be used as a substitute of synthetic chemical pesticides as those will prove as effective as the latter.



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