International Journal of Entomology Research
www.entomologyjournals.com
ISSN: 2455-4758
Received: 09-01-2023, Accepted: 26-01-2023, Published: 11-02-2023
Volume 8, Issue 2, 2023, Page No. 60-62

Insecticidal effects of diospyros chloroxylon and mundulae sericae against spiral white fly (*Aleurodicus disperses*) in Telangana, Hyderabad, India

Zakkum Grace Beena[1], M Madhavi[2]
[1] Research Scholar, Department of Zoology, Faculty, St. Pious X Degree College for Women, Osmania University, Hyderabad, Telangana, India
[2] Professor, Head Department of Zoology, Osmania University, Telangana, India

Abstract
Insect-Plant interactions reflect astounding diversity. The insects exhibit behavioural and an array of adaptive changes to suit their niche. The species Aleurodicus disperses, the spiraling Whitefly is a plant eating insect and is widely distributed in many parts of the World including India, Sri Lanka and Thailand. The spiralling whitefly, A. disperses Russell (Hemiptera: Aleyrodidae), is a destructive invasive pest in many parts of the world. The spread of the insect pest is connected to human traffics. The horticultural and ornamental plants are affected by spiral white fly and in particular the Guava fruit, which is a horticultural crop, and its leaves are known for their Nutritional Value specially during the COVID -19 period. The Presence of Aleurodicus disperses on Psidium guajava (guava) tree shows infestation, which reduces the over vitality of the plant and cause distorted or damaged leaves, yellowing or silvering of leaves, slow growth of plants and premature dropping of leaves and reduction in the fruit yield. The use of chemical control agents has been prohibited for environmental and health reasons. Plant extracts of Diospyros chloroxylon, Mundulea sericae and Tagetes patula were treated on Aleurodicus disperisus. on experimental basis. Diospyros chloroxylon and Mundulae sericae is found to have scientific evidence in its treatment towards reducing diseases/ disorders and Insecticidal activity**.** The results from the investigation revealed that the extracts from Diospyros chloroxylon and Mundulae serica are potential alternatives due to their high toxicity to insects, low development cost and found to be safety to people and sustainable. The review of the literature reflected very little research was conducted on species of Ebenacea (Diospyros chloroxylon) and Fabaceae (Mundulae sericae) in Telangana, India.

Keywords: Interactions, nature, extracts, infestation, reduction

Introduction
Human welfare depends on the exobiological sources. The damage caused by spiral whitefly has caused heavy loss in the production of horticultural and ornamental crops. The spiraling whitefly, Aleurodicus dispersus Russell (Hemiptera: Aleyrodidae), cause immense damage across different crop varieties owing to their voracious food habits. (Bryne *et al*. 1990; Aiswariaya *et al*. 2007). The use of plant products and chemical insecticides are most popular, insect pest have developed resistance to numerous conventional insecticides throughout the world (Denholm *et al*. 1996) [12]. Severe infestations of this pest are a serious threat to Jackfruit, Banana, Custard apple, Papaya and in particular guava production directly damaging the plant by removing sap from leaves, which reduces growth, weakens plants, and reduces crop yield (Nasruddin& Stocks 2014). Whiteflies also reduce the photosynthetic area of the leaves and disrupt photosynthetic activity.and in turn lowers the market value of fruit due to damage from sooty mold (Bryne *et al*. 1990; Liu *et al*. 2007) Globally many plants species are yet to be investigated phytochemically. Out of the total 5,00,000 plant species, roughly 2 % have been phytochemically investigated. Therefore, there is an urgent need to carry out phytochemical analysis of plant species to discover many phytochemicals. Diospyros is the principal genus of family Ebeanceae with more than 500 species. Of these nearly 60 species occure in India out of which 11 species found in Andhra Pradesh state. The species of Diospyros are with multiple uses best cure for various ailments and pharmacologically importance. There are very few research studies on Diospyros species from Andhra Pradesh state. Hence the present study is aimed at qualitative phytochemical screening of Diospyros chloroxylon and Mundulae sericae leaves, and bark extracts from Telangana region.

Materials and Methods
The leaf and the bark of Diospyros Chloroxylon and Mundulaeserica are collected from Kandukur, Rangareddydistrict, Telangana. The parts of plants (bark and leaves) contai n a wider variety of compounds and foremost authenticated by the Taxonomist and Botanist at the department of Botany, Agricultural University, Rajendranagar Telangana. Additionally, most of the plant leaves produce secondary metabolities.

Plant material extraction
The leaves of Diospyros chloroxylon, Mundulea sericae and Tagetes patula were allowed to dry in the shade at room temperature after removing impurities by rinsing in tap water. The plant material,3 samples each weighing 200 gms was chopped into was weighed and prepared an aqueous solution,200gms dissolved in 1Lt of distilled water. 10ml of the sample is taken into each petridish to evaluate the mortality of the pest Aleurodicus.

Aleurodicus dispersuses Culture for insecticidal activity

The spiralling whitefly, was First reported in 1994 December in Trivandrum.The geographic source and colonization process of the original population are still unknown. Russell (1965) described *A. dispersus* for the first time. *A.dispersus* was first recorded in Hawaii in 1978**,** after which it spread rapidly to other countries. Reported for the first time in 2000 in Telangana. A. dispersus, the spiralling whitefly is a species of small, white sap-sucking insect, a true bug in the order Hemiptera. Female lays eggs in a spiral way hence the name. The adult flies are collected from the infested tree and are treated with plant extracts.

Fig 1: Spiralling whitefly has a high reproduction and dispersal rate.

***In vitro* Studies of Two Medicinal Plants**

Literature survey, Interview, Interactions from local people, based on information selection of plants and authentication by Department of Botany, Osmania University. The leafs of Diospyros chloroxylon and Mundulea sericea were collected from chittapur district of Telangana, India in the month of November 2021**.** The plant was taxonomically identified and authenticated by a taxonomist and Botanist at the Dept of Botany. Rajendranagar.

Spiraling whitefly causes three types of damage: 1) direct damage and 2) indirect damage It has posed a major threat to banana, tropical fruit tree, vegetable and ornamental industries. There are no published measurements of yield losses**.** Damage is due to direct feeding, cosmetic damage due to the white spirals, and indirect damage from excreted honeydew that encourages sooty moulds, are all to result in economic impacts**.** high level of sooty mould of the crop has caused premature leaf-drop and has been related to reduced yields.

Screening of medicinal plants for insecticidal activity

Diospyros chloroxylon is known as Ullantha and found to have scientific evidence in its treatment towards reducing diseases/ disorders and Insecticidal activity. M.serica is known as Neelimarri in Telugu language,it is a shrub that flowers twice a year and also known for corky bark for chemo preventive and chemotherapeutic agent against inflammatory diseases and Insecticial activity.

Fig 2: *Diospyros chloroxylon*

Fig 3: *Mundulea sericea*

Extraction of plant material-Phytochemical extraction

Primary phytochemical extraction using different solvents/isolation of active compounds from crude extracts soxhlet extraction the apparatus is made up of glass, round bottom flask, extraction chamber, siphon tube and a top mounted condenser. The plant material to be extracted is dried and grinded and placed indide porous bag (Thimble). The extraction solvent 70ml of methanol is poured into bottom flask, evaporates and passes through condenser. The solvent and the extracted plant material flow back to flask, evaporates and condenses. The process is
repeated until the drug is extracted. The extracted plant material is allowed to air dry and further used for Insecticidal effects.

Studies on the insecticidal effects-Bioassay test.

20 adult spiral white flies were collected from highly infested guava tree and were placed in petridish. The insecticidal activity of the plant extracts was determined by direct contact application Method using filter paper. I gm of the extracted plant material was dissolved in I Lt of distilled water and prepared the stock. From the stock 10 ml of the sample was placed in a petridish and 20 adults of Aleurodicus dispersus were placed in each petridish and covered with a lid. A control batch to be kept for the determination of environmental effects. All these were kept without food for 24 hours. The number of survivals and % mortality was calculated according to percent mortality.

Table 1: Scientific names of plants with Insecticidal effects

Sr. No	Popular Name	Scientific Name	Source of Supply	Part of the plant tested
1	Ullantha	*Diospyros chloroxylon*	Chittapur, Ranga Reddy District	Leaves
2	Neelimarri	*Mundulea serica*	Chittapur, Ranga Reddy Dstrict	Leaves
3	Marrigold	*Tagetes patula*	Ayur Vista Medicinal Garde, Nacharm HydDist	Leaves and Flowers

Table 2: Observation–Treatment with plant extracts

Sr. No	Samples	Part of the plant used	Dosage	Time Taken for Mortality	Percentage of Mortality
1	A	leaves	10ml/L	24hrs	80%
2	B	leaves	10ml/L	48hrs	40 %
3	C	Leaves and flower	10ml/L	48hrs	40%

Result and Discussion

Toxicity of plant extracts on spiral whitefly The mortality of was determined by using crude methanol extracts from different plants under laboratory conditions by contact assays. Botanical extracts exerted adverse effects against this pest at increasing concentrations and prolonged exposure periods.

Discussion

On experimental basis the plant extracts of Diospros chloroxylon, Mundulae sericae and Tagetes patula was sprayed on the highly infested Guava tree I kg of leaves dissolved in 1 Lt of water was sprayed. For 4 days continuously, It was found that population of insect pest was lower in plant products treated compare to untreated samples and the experiment revealed that the plant products were effective tool to manage population of insect pest and gives higher yield compare to untreated.

Conclusion

A decade ago A. dispersus was considered as a minor pest of American, African and Asian countries, but due to seasonal variations and global warming it has become a major threat in all parts of the world. The need of the hour is to Research into novel aspects of insect-plant interaction provide improved alternatives for controlling insect pest population. The outcome of this research is to suggest that using extracts of pesticidal plants to control pests can be as effective in terms of crop yields. Knowledge transfer from Lab to Land, an Indegenous sustainable Management is the need of the hour.

References

1. Abdullah M. Evaluation of tobacco extracts against top shoot borer and stem borer of sugarcane. Indian Sugar,2009:59(9):87-88.
2. Ahirwa RM, Gupta MP. Banerjee S. Field efficacy of natural and indigenous products on sucking pests of sesame. Indian J Natural Products and Resource,2009:1:121-126.
3. Ahirwar RM, Gupta MP, Banerjee S. Field efficacy of natural and indigenous products on sucking pests of sesame. Indian J Natural Products and Resource,2009:1:121-126.
4. Ali SS, Ahmed SS, Rizwana H, Bhatti F, Khoso AG, Mengal MI *et al*. Efficacy of different biopesticides against major sucking pests on brinjal under field conditions. Journal of Basic and Applied Science,2017:13(5):133-138.
5. Anitha KR, Nandihalli BS. Utilization of botanicals and mycopathogens in management of sucking pest of okra. Karnataka J Agri. Sci~ 3071 ~ Journal of Pharmacognosy and Phytochemistry,2008:21(2):231-233.
6. Asalatha R. Seasonal activity and bio - efficacy of some eco-friendly insecticides against the leaf miner Liriomyzatrifolii. M.Sc. (Ag.) Thesis, JNKVV, Jabalpur, 2002.
7. Barde SK. Studies on seasonal incidence of pest complex of tomato and management of fruit borer (Helicoverpaarmigera Hubner.) by use of bio-pesticide. M.Sc. (Ag) (Ent) Thesis JNKVV, Jabalpur, 2006, 1-45.
8. Basukriadi A, Wilkins RM. Ovipostion deterrent activities of Pachyrhizuserosus seed extract and other natural products on Plutellaxylostella (Lepidoptera: Plutellidae). Journal of Insect Science,2014:14(244):1-6.
9. Bharti P, Singh SPN, Kumar N. Efficacy of some inseciticides, bio-products and their phytotonic effect against gram pod borer (Helicoverpaarmigera Hub.) in chickoea. Current Biotica,2015:9(3):247-255.
10. Bijaya P, Subharani S, Singh TK. Bio- efficacy of certain botanical insecticides against green peach aphid, Myzuspersicae (Sulzer) on cabbage. Pestology,2015:29(3):28-31.
11. Cubillo D, Sanabria G, Hilje L. Evaluation of repellency and mortality caused by coercial insecticides and plant extracts on Bemisiatabaci. Manejo-Integrade –dePlagas,1999:53:65-71.
12. Denholm I, Gorman K, Jarvis W, Cahill M. Resolution of baseline responce to buprofezin in Bemisiatabaci (Homoptera: Aleyrodidae). Bulletin of Entomological Research,1996:86(2):117-122.
13. Dikshit AK, Lal OP, Shrivastava YN. Persistance of pyrethroid and nicotinyl insecticides on okra fruits. Pesticides Research Journal,2000:12(2):227-231.
14. eorge DR, Masic D, Sparagano OAE, Guy JH. "Variation in chemical composition and acaricidal activity against *Dermanyssusgallinae* of four eucalyptus essential oils," Experimental and Applied Acarology View at: Publisher Site | Google Scholar,2009:48(1-2)43-50.
15. Pumnuan J, Insung A, Rongpol P. "Effectiveness of medical plant essential oils on pregnant female of *Luciaphoruspernicios*us Rack. (Acari: Pygmephoridae)," *Asian Journal of Food and Agro-Industry* View at: Google Scholar,2009:2:S410-S414.
16. Pumnuan J, Chandrapatya A, Insung A. "Acaricidal activities of plant essential oils from three plants on the mushroom mite, *Luciaphoruspernicios*us Rack (Acari: Pygmephoridae)," Pakistan Journal of Zoology View at: Google Scholar,2010:42(3)247-252.