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(57) Abstract :

The present invention describes the isolation and characterization of the novel biopesticide compositions and formulations obtained from tumba {Citrullus colocynthis) with desi cow urine effective against pest management and capable of surviving as effective biocontrol agent. The invention focuses on the isolation of this biopesticide compositions and formulations that are known to possess pesticidal properties and are derived from natural sources having biological origin. This biopesticide compositions and formulation controlling the insects (Helicoverpa armigera, Spodoptera exigua, Diphania indica etc.) and vectors (Aphid and white fly) through repellent, deterrent, antifeedent and stopped the respiration. This biopesticide compositions and formulation containing botanical plant (tumba) and deshi cow urine which is eco-friendly and safety for environment.

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DEVELOPMENT OF AN ORGANIC INTEGRATED PEST MANAGEMENT (IPM) MODULE AGAINST INSECT-PESTS OF MUSKMELON IN ARID REGION OF RAJASTHAN, INDIA

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IPM

Melon aphid

Leaf eating caterpillar

Hadda beetle

Cucurbit fruit fly

Economics

ABSTRACT

Four different muskmelon production systems (two conventional, one conventional IPM, and one organic IPM) were compared in field experiments at the Central Institute for Arid Horticulture, Bikaner for two years. The organic IPM system proved to be the most effective and economical approach (B: C ratio 8.80:1) against melon aphid (*Aphis gossypii*), leaf eating caterpillar (*Diaphania indica*), hadda beetle (*Epilachna vigintioquatuorvittata*) and cucurbit fruit fly (*Bactrocera cucurbitae*) in which the lowest incidence was recorded as compared to other modules. The organic IPM module-III comprised of growing resistant genotype (RM-50), spray of neem oil at 20 DAS, installation of pheromone trap (10/ hectare) at 42 DAS, spray of tumba fruit extract (TFE 5%) at 50 DAS and spray of spinosad 46 SC at 60 DAS was the most effective. The conventional I (farmer's practices) was the second most effective system against major pests during both years. The benefit-cost ratio of the tested muskmelon production systems in the control of insect-pests decreased in the following order: module-III (B: C ratio 8.80:1) > module-I (B: C ratio 7.74:1) > module-IV (B: C ratio 6.60:1) > module-II (B: C ratio 3.56:1).



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Research Article

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Do bottom-up effects (resistance) of different accessions of Indian cherry (*Cordia myxa* L.) help against tingid bug [*Dictyla cheriani* (Drake)] attack?

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Abstract

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Key Words: *Dictyla cheriani*, *Cordia myxa*, Bottom-up effect, antixenotic, allelochemical, resistance.

The tingid bug, *Dictyla cheriani* (Drake) [Hemiptera: Tingidae] is an important pest of Indian cherry (*Cordia myxa* L.), leading to significant losses in yield in the hot arid agro-climate of India. The objectives of this study were to identify and categorize sources of resistance in India cherry accessions to *D. cheriani* from the arid region of India. We found that: three accessions were resistant; 3 accessions were moderately resistant; 2 accessions were moderately susceptible; 2 accessions were susceptible and three accessions were highly susceptible to *D. cheriani* infestation. Free amino acid had positive correlation with infestation, whereas phenols, tannin, alkaloid and flavonoid contents had significant negative correlation with infestation. The infestation had significant negative correlation with leaf length and width. Phenols and flavonoid contents explained (96.9 and 96.1%, respectively) of the total variation in bug infestation and in bug density per leaf. One principal component was extracted explaining cumulative variation of 90.07% in infestation. The flavonoid, alkaloid, tannins, phenols content, roughness and hairiness were the novel antibiosis and antixenotic characters found in Indian cherry accessions, which were resistant to *D. cheriani*. Growers can adopt potential accessions of Indian cherry (*Cordia myxa* L.) as identified for resistance (AHCM-22-1, AHCM-25 and AHCM-34 accessions) with minimal financial investment for obtaining higher yields. The bio-physical traits linked to resistance of Indian cherry against *D. cheriani* could be used as marker traits in plant breeding programmes to develop resistant cultivars.

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Introduction

Cordia myxa (syn. *C. domestica* Roth and *C. sebestena* Forssk.), commonly known as Indian cherry (folk names: *clammy chery*, *franrant maniack*, *lasora*, *shelu*,

cinnanakkeru, *bahubara*, *chokri*, *lahsoda*, *lahsua*, *gonda*, *gondi*) belongs to the family Boraginaceae. It matures in about 50 to 60 years when its girth height is about 1 to 1.5 m. Its main trunk is generally straight and

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Attachments: ARIS-4612A.htm



Sir

Please find attachment of IC no. of AHCM-22-1 germplasm of *Cordia myxa*.

With best regards...

Pavan Kumar Malav
Scientist
Division of Plant Exploration and Germplasm Collection
ICAR-NBPGR
New Delhi-110012

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Fig.: Field view of Palak genotype AHLPI

Identification of advanced lines of brinjal: Twenty lines were collected from CHES, Godhra, Gujarat. These twenty lines of brinjal (*Solanum melongena*) were denoted as T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20 and were screened against heat tolerance. Among them, six lines such as T1, T3, T13, T15, T17 and T18 were identified as advanced lines on the basis of yield (245-324 q/ha.), colour, shape (oval, round and oblong) and weight (25-175g). Advanced lines T3 and T17 were found superior in terms of yield characters (Dr. P.P.Singh).

Evaluation of Date palm germplasm: Conservation and evaluation of sixty four germplasm of date palm was done under hot arid environment. Fruiting was observed in 30 cultivars /genotypes during the year. Three germplasm (MINI, MRKS, MHN/B) were introduced from ICARDA, Jordan was established and growing well under field conditions. Early maturity was recorded in cv. Nagal and its doka fruits were harvested in middle of June month. The average weight of berry was 11.9g, TSS 34.8° brix and weight of stone 1.7g. The berry colour was yellow and sweet in taste.

A late maturing and rain tolerant germplasm was marked of which fruits were red in colour, slight astringent in taste at doka stage and harvested at end of August month. The weight of berry was 10.4g, number of berries/strand were 22-24, TSS 28.0° brix and yield 38kg per tree (Dr. R. S. Singh)

Report of beet armyworm (*Spodoptera exigua*) in ridge gourd: Beet armyworm was observed a new pest on ridge gourd (*Luffa acutangula*) in the hot arid region of north-western India, (i.e. Thar Desert) and identified as *Spodoptera exigua*. Beet armyworm is a polyphagous pest and serious pest of ridge gourd causes damages to leaves, flowers and fruits. Smaller larvae devour the parenchyma of leaves, so all that remains is the thin epidermis and veins. Larger larvae tend to burrow holes through thick areas of plants. Ridge gourd fruits are the most susceptible to injury, starting from young developing fruit to maturity of fruits. The beet armyworm damages summer as well as rainy season crops but more incidences was recorded in the rainy season crop.



Fig.: Larvae and adult moth of beet armyworm

Eggs are laid in clusters of 50 to 150 eggs per mass. Eggs are usually deposited on the lower surface of the leaf and often near blossoms and the tip of the branch. The larvae are pale green or yellow in color during the first and second instars, but acquire pale stripes during the third instar. During the fourth instar, larvae are darker dorsally and possess a dark lateral stripe. Larvae during the fifth instar are quite variable in appearance, tending to be green dorsally with pink or yellow color ventrally and a white stripe laterally. Pupation takes place in soil. The moths are moderately sized, the wing span measuring 25 to 30 mm. The forewings are mottled gray brown and normally with an irregular banding pattern and a light colored bean-shaped spot (Dr. S. M. Haldhar).

Standardization of dry date (*chhuhara*) making: The date fruits cv. Medjool were harvested at fresh doka stage, followed by stripping from the strands, washing under running water to remove the traces of dust and dirt. Later the fruits were dipped in boiling water ($80 \pm 2^\circ\text{C}$) for different time periods (5, 10 and 20 minutes). Later they were dried in air circulating tray drier at a temperature of 70°C for 30 to 35 hours. Among different time periods of hot water dipping, 10 minute dipping was found to be optimum for the Medjool fruits in preparation of dry dates (*chhuhara*). The recovery percentage was in the range of 55 to 56 per cent (Dr. S.V.R. Reddy, Dr. R.K. Meena, Dr. R. S. Singh and Dr. S. R. Meena)



Fig. Hot water dip treatment of date fruits cv. Medjool



Fig. Air drying of dates



Fig. Drying of dates in air circulating tray drier

Fig. Dry date (*Chhuhara*)

isoform 1, multidrug resistance protein, pectin methyl esterase 3 and ABC transporter B family. Similarly some of the up regulated transcripts are: otokeratin, raffinose synthase family protein, wall associated receptor kinase like, acyl transferase like protein, cadmium/zinc transporting ATPase 3 like, sucrose synthase 6-like, cytochrome P-450 like, phosphatase 2C family protein and TT12-2 MATE transporter (Dr. P.N. Sivalingam, Dr. Dhurendra Singh and Dr. R. Bhargava)

Morphological characterization of mulberry: In order to allow effective use of plant genetic resources for the purpose of improved crop productivity and to develop new varieties more adapted to abiotic and biotic challenges under changing environmental conditions, breeders must have essential information about them. Therefore, mulberry (*Morus* sp.) genotypes viz., CIAH-1, CIAH-2, CIAH-3, Delhi Local, Gurgaon Local, SL-1, Ajmer, MI-315 and MI-380, available at Germplasm Block were characterized morphologically for qualitative and quantitative characters, during the period reported. Distinct variations have been noted in leaf lobes and leaf size. However, shape of leaf and leaf base were found to be cordate in all the studied varieties. Similarly, leaf arrangement, petiole attachment and second order vein was noted to be alternate, marginal and brochidodromous, respectively. Nature of leaf base varied from acute to acuminate. Likewise, leaf margin found to be coarse or fine serrated. Fruit colour varied from white, green to red. Highest average fruit weight was recorded in Delhi Local followed by Gurgaon Local and CIAH-1 (Dr. Hare Krishna, Dr. Dhurendra Singh and Dr. R.S. Singh)



Fig. : Variations in leaf and fruit morphology of mulberry genotypes

Record of moth, *Anarsia triaenota* Meyrick, on khejri: The khejri, *Prosopis cineraria*, is also known as "Queen of the Desert" and a predominant constituent of the vegetation complex in the arid region of Rajasthan. The Khejri is an integral part of the life support systems of rural communities. This moth, *A. triaenota* (Gelechiidae: Lepidoptera), was recorded on khejri in the month of April to September, 2013 at experimental farm of ICAR-Central Institute for Arid Horticulture, Bikaner.



Fig. : Damage by *Anarsia triaenota* in khejri plant

This moth seems to be a new threat to arid ecosystem and caused severe problem during this year. The larvae damages new leaves and make the gallery inside the leaves of the khejri plant. Due to attack of this pest, the growth of khejri plant is suppressed and new leaves dry out. Larval and pupal development took place inside gallery of leaves. The incidence of moth was recorded from 14.67 % to 80.33 %. The incidence started from the month of April to end of September and highest intensity was recorded in the month of June to July.

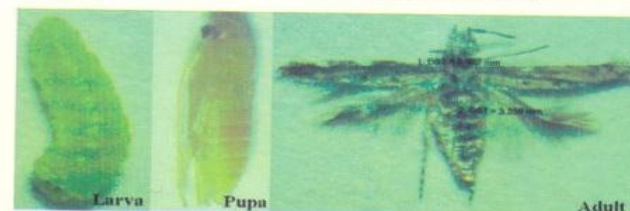


Fig. : Larva, Pupa and Adult of *Anarsia triaenota*

The adult body is brownish-black color. Labial palpus second segment covered with long or small scales; antenna filiform and length of antenna is 2.18 mm; metathoracic legs with hair like scales on hind tibia. The female was distinctly bigger than the male. The length and width with wing expand of adult body was 3.26 mm and 6.82 mm, respectively (Dr. S. M. Haldhar and Dr. V. Karuppaiah)

Bael as a host for citrus leaf miner, *Phyllocnistis citrella* Stainton : Incidence of citrus leaf miner, *Phyllocnistis citrella* Stainton (Lepidoptera: Gracillariidae) has been noticed on bael, *Aegel marmelos* Linn, which is one of the important Rutacea family fruit crop grown widely in arid, semi-arid and other subtropical regions of India. The incidence was observed during second fortnight of March at CIAH experimental farm. The minute caterpillar mines the leaves superficially on the epidermis of tender leaves especially at new sprout stage and infestation was about 2% of leaves. The damage of mining gives serpentine appearance and silvery look. Affected leaves also curled up from margin and turn to pale colour. (Dr. V. Karuppaiah, Dr. S. M Haldhar and Dr. R.S. Singh)