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Mealy Bugs (*Megapulvinaria* Species) Insect on Ber Fruit Plant in Southern Rajasthan

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Introduction:

The ber (*Ziziphus mauritiana* L.) belongs to the family of Rhamnaceae, is an important fruit plant of arid region of India. According to De Candole (1886) the centre of the origin of ber is Central Asia. Ber is an ancient and indigenous fruit of India, China and Malaysia region. It is found widely as well as cultivated in the states of Rajasthan, Haryana, Maharashtra, Gujarat, Punjab, Madhya Pradesh, Bihar, Andhra Pradesh, Telangana and Tamil Nadu.It is quite common fruit in India being also known as poor man's fruit. It is hardy fruit tree and performs well under adverse climate and poor soil conditions. Apart from it can be successfully be grown in tropical and sub-tropical climate. Apart from being cultivated for its fruit, it serves as a major good host for rearing of lac insect. Ber trees are used for rearing lac insect, the leaves along with tender shoots are used as fodder, wood is used as fuel and for medicinal purposes. The fruits are eaten as fresh and as well as dried and processed into the products like Candy, Jelly, Jam, morabba and squash.

The major insect pests recorded in ber plantation are, leaf-eating caterpillars, fruit fly, fruit borer, mealy bug, scale insect and thrips. Till now the infestation of the mealybugs have been recorded on different orchard fruits *viz*., mango, papaya, grapes, pineapple, cassava, mulberry etc. The introduction of new susceptible varieties of ber in the region havefavoured the incidence of mealy bugs causing heavy quantity and qualityeconomic loss to the ber growers of the region. Therefore it is necessary to understand and create awareness about the identification, bio-ecology and formerly management of the noxious pest, as its management is very tedious after the wide distribution and infestation in the orchards.

What's Mealybugs (*Megapulvinaria* species)

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Mealy bugs are insects of the order Hemiptera belonging to family Coccidae. They are tiny white bugs that look like fuzzy white stuff in colonies on plant stems and leaves. They look similar to other scale insects but do not have a hard shell to cover their soft bodies. They are also flat and waxy, with segmented bodies and an oval shape.Mealybugs are white to pink in colour and measure about 2.00-4.00 mm long.

Mealy bugs are a type of unarmored scale insect found in warm, moist habitats all around the world on a variety of host plants dwelling indoors, outdoors, and in greenhouses. They also transmit plant diseases; inject plant toxins, cause deformity, leaf drop, and sooty mold as they feed off plant sap. The most commonly known fruit hosts are mango, papaya, grapes, ber, pineapple, cassava, mulberry etc. Mealy bugs create colonies in somewhat sheltered areas such as the base of stems, between the stem and touching leaves, branch crotches, plant crowns, or between two touching fruits. Their eggs remains attached to twigs, leaves, or bark.

Nature of Damage

Mealy bugs are important pest feeding on wide range of cultivated and ornamental crops of agriculture and horticulture ecosystem. Their incidence in ber orchards can be recorded throughout the year. They over-winter in the soil, on roots or on the plant and the hide in crevices in the bark, under loose bark and other protected areas such as curled leaves. Populations begin to increase from September with the peak in late December or early January and begin to decline towards the end of February to March, depending on temperature and level of parasitism.

- ✓ Both nymphs and adults of mealy bug suck the cell sap from flowering panicle, fruit pedicel and leave, causing withering, yellowing and dropping of flowers and fruits. Plants become stunted and swollen when infested on the growing tip of young plants.
- ✓ Heavy clustering of mealy bugs can be seen on fruit panicle and under leaf surface giving the appearance of a thick mat with a waxy secretion.
- ✓ They also excrete a large amount of honeydew that attract ants and on which development of black sooty mold can be seen.
- ✓ A high incidence of sooty moud growth on leaves will negatively affect photosynthesis, by reducing the amount of light entering the leaf cells.
- ✓ Severe infestation can cause defoliation and even death of the plant.

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- ✓ Infested fruits can be entirely covered with the white, waxy coating of the mealybugs and they do not fetch a good market price.

The prominent method of mealy bug identification is the presence cottony, wax-like residue on the leaves of the plants or on the soil or presence of a sooty black mold developed in the honeydew secreted by mealy bugs. The clumps of waxy-covered eggs, group of ants crawling up the plants, along with stunted growth, wilting, colour loss by plant, leaf drop or yellowing of the plant and bluish tint of soil are also the important marks of infestation by the pest.



Management of Mealy Bugs

Mealy Bugs and other types of soft scales are difficult to control once populations have ballooned to large numbers. Small populations and immature stages of Mealy Bugs are usually easy to control with regular monitoring and treatment.The management often involves the control of caretaking ants that are important for the transmission of mealy bugs. Without the ants, mealy bugs populations are not able or slow to invade new areas and the field would be free of a serious mealy bug's infestation. Therefore, management of mealy bugs often includes the control of ant species. For management of mealy bugs, it is important to know the species present as management programs for the various mealy bugs differ.

1. Cultural management:

- ❖ The field should be free from weeds and ber plant residues as they serve as an alternative host for ant populations during the periods where mealy bug infestations are less.
- ❖ All ber plant residues of previously infested fields should be removed and burnt as if left in the field may harbor mealy bug populations to invade the new plants.

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- ❖ Field borders should be free from weeds and debris supporting mealy bug population.
- ❖ Remove alternate host plants in and nearby orchards.
- ❖ Do not transfer any plant material with suspected mealy bugs infestation.
- ❖ All the equipment should be thoroughly washed before using and moving to a new plant or new field.
- ❖ Destroy the ant colonies during land preparation.
- ❖ Ploughing the orchards in summer to exposes the eggs to sun's heat.
- ❖ Collection and proper destruction of the pruned material from mealy bug infested plants.
- ❖ After pruning, the cuttings of infested shrubs, plants or trees lying around must be immediately burnt to control further dissemination of mealy bugs.
- ❖ Growing of cover crop plants between and under rows of fruit crops will provide alternative habitats and hosts, and pollen and nectar as alternative food sources for parasites and predators and help in maintaining the beneficial populations when mealy bug numbers are low.

2. Mechanical and Physical management:

- ❖ Manual picking of bugs can be done from the plants which are not severely infested in small conservatory or ber nurseries or apply strong jet of water to remove bugs (avoid the damage to plants).
- ❖ Flooding of orchards with water kills the eggs.
- ❖ Physical barriers such as ant fences parallel to the field periphery keeps ants away from field, and subsequently help in controlling mealy bug populations.
- ❖ Fasten 400 gauge alkathene sheets of 25 cm width to the tree trunk besides raking the soil around the tree trunk induces the infestation.

3. Biological management:

- ❖ Release of lady bird beetle adult/grub *Cryptolaemusmontrouzieri* @ 5,000 beetles/ha, twice in a season especially during August–September and December–January.

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- ❖ Foliar spray of *Verticilliumlecanii* / *Beauveriabassiana* (2×10^8 cfu/ml) @ 5 g/ml/l of water after 90–105 days of pruning during high humid months to reduce the population of mealy bugs.

4. Chemical management :

Chemicals are not very effective against mealy bug because of its habit of hiding in crevices and the waxy covering of its body which protect mealy bug as the pesticides cannot penetrate the heavy waxy layer of waxes that shield the body. Systemic insecticides are used to control heavy infestations, whereas most of the granular pesticides are not effective. Any insecticides used against mealy bugs should be carefully selected to avoid injury to natural enemies. Crawler (mealy bug) is the most susceptible stage to identify the crawlers in earlier stage easily to manage the insecticides under field conditions.

- ❖ Removal and destruction of loose bark after pruning and swabbing of stem and arms with 2 ml of dichlorvos 76 EC + 2 g of fish oil resin soap in a litre of water to expose hiding population of mealybugs and destroy them.
- ❖ Locating ant colonies and destroy them with drenching of chlorpyriphos 20 EC @ 2.5 ml/l of water, should be doneround the year.
- ❖ Foliar spray of azadirachtin 1% @ 2 ml/l of water of 120–135 days after pruning.
- ❖ Soil drenching with imidacloprid 200 SL @1.5 ml/l of water/plant in the base of the plant around the trunk.
- ❖ Spraying of buprofezin 25 SC @ 1.0-1.25 ml/ha 45–60 days after pruning.
- ❖ Spray of Profenophos 50 EC @ 2 ml/l or Chlorpyriphos 20 EC @ 2ml/l or Imidacloprid 17.8 SL @ 0.5 ml/l or Thiamethoxam 25 WDG @ 0.5 ml/l of water at 15 days interval.