

# MEALY BUGS ATTACK ON RAIN TREE

## Geography of Mumbai city

The Deccan region of India, the capital city of Maharashtra and economical capital of country, Mumbai lies on the western coast of India by the bank of Arabian Sea. Mumbai is made from the group of seven islands and is thus called as the Island city. It covers the total area of



603 sq. km. Most of this largest city of India is at sea level and the average altitude ranges from 10-15 metres from MSL. It has a hilly northern part and the highest point of Mumbai is at 450 metres in Sanjay Gandhi National Park. The eastern coast of Island has rows of mangroves, wherein the western coast happens to be sandy and stony. Due to proximity to the sea, the soil cover of this region is sandy to large extent.

The rocks of this area are made up of Black Deccan Basalt pours, its acid and some basic variables.

This island city of Mumbai is divided into two main regions, the city and the suburbs. These suburbs have alluvial soil type.

## Climate of Mumbai

The Climate of Mumbai is a [tropical wet and dry climate](#). [Mumbai](#)'s climate can be best described as moderately hot with high degree of humidity. Its coastal nature and tropical location ensures temperatures won't fluctuate much throughout the year.

The mean average is 27.2 °C and average rainfall is 242.2 cm (95.35 inches).<sup>[1]</sup> The mean maximum average temperatures in about 32 °C (90 °F) in summer and 30 °C (86 °F) in winter, while the average minimums are 25 °C (77 °F) in summer and 20.5 °C (68.9 °F) in winter. Mumbai experiences three distinct seasons: Winter (December–Feb); Summer (March–May); [Monsoon](#) (June–Sep)  
(Ref.-climate of Mumbai-Wikipedia)

## Rain Tree :



Scientific Name :- Albizia saman or Samanea saman  
Family :- Leguminosae  
Origin :- Tropical America

Samanea saman (sometimes treated under the obsolete name Albizia saman) is a species of flowering tree in the pea family, Fabaceae, that is native to the Neotropics. Its range extends from Mexico south to Peru and Brazil, but it has been widely introduced to South and Southeast Asia, as well as the Pacific Islands, including Hawaii. Common names include saman, rain tree and monkeypod. Saman is a wide-canopied tree with a large symmetrical crown. It usually reaches a height of 25 m (82 ft) and a diameter of 40 m. The average Life span of Rain tree is 80 to 100 years. The leaves fold in rainy weather and in the evening, hence the name "rain tree"

Rain Tree Blossom



## Rain Tree Plantation in Mumbai :

Considering the huge evergreen canopy and beautiful flowering of the rain tree MCGM introduced rain tree in Mumbai and took major plantation drive along roadside and Garden plots under CLEAN MUMBAI GREEN MUMBAI programme which was started in the year of 1975.. As per Tree Census 2008 there are 32209 trees existing in Mumbai City and Suburbs area . Presently maximum trees are more than 30 to 40 years old. As the said trees are very old they get easily attacked by pest. Since last year it has been observed that many Rain trees were attacked by mealy bugs.



## **Introduction to mealybug :-**

Mealybugs are small, soft-bodied insects which have sucking mouthparts. The females are oval in shape and can be up to 5mm long. They are white or whitish-pink in colour and are generally covered in a white waxy material. They have filaments around the edge of their bodies and tails. Mealybugs occur in all parts of the world. Most occur naturally only in warmer parts.



**Mealybugs** are insects in the [family Pseudococcidae](#), unarmored [scale insects](#) found in moist, warm climates. They are considered [pests](#) as they feed on plant juices of [greenhouse](#) plants, house plants and subtropical trees and also act as a vector for several plant diseases.

Mealybugs are [sexually dimorphic](#): females appear as nymphs, exhibiting reduced morphology, and lack wings, although unlike many female scale insects, they often retain legs and can move.

Males are smaller, gnat-like and have wings. Since mealybugs (as well as all other [Hemiptera](#)) are [hemimetabolous](#) insects, they do not undergo complete metamorphosis in the true sense of the word. However, male mealybugs do exhibit a radical change during their life cycle, changing from wingless, ovoid nymphs to [wasp](#)-like flying adults.

Mealybug females feed on plant sap, normally in roots or other crevices, leaves, and in a few cases the bottoms of stored fruit. They attach themselves to the plant and secrete a powdery [wax](#) layer (hence the name **mealybug**) used for protection while they suck the plant juices. In Asia, [mango mealybug](#) is considered a major menace for the mango crop. The males on the other hand are short-lived as they do not feed at all as adults and only live to fertilize the females.

Some species of mealybug lay their eggs in the same waxy layer used for protection in quantities of 50–100.

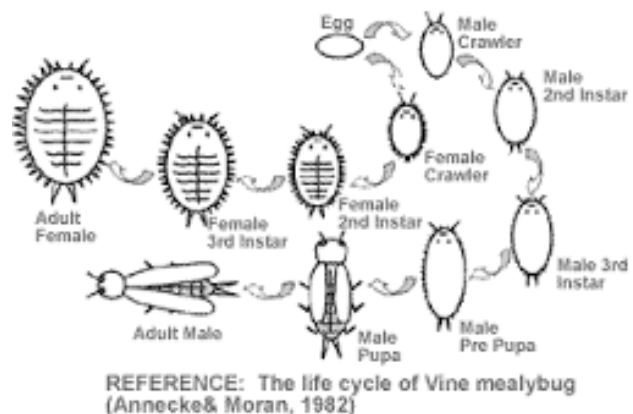
(ref.- Mealybug-Wikipedia)

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### Mealybug Life Cycle:

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Most mealybug species lay eggs. However, the long-tailed mealybug gives birth to live young, while the citrus & vine mealybug produce quantities of "waxy wool" in which they can lay up to 500 eggs. Egg laying may take up to 10 days and reduces the size of the female mealybug considerably. The female dies once she has completed laying her eggs. Once hatched the young, or "crawlers" as they are sometimes called, are very mobile. They disperse rapidly and find suitable sites on which they feed and settle.



The females continue to feed until they are mature enough to lay eggs. The complete life cycle takes approximately 50 days at 20°C (68°F), this is reduced to 25 days at 30°C, higher temperatures may inhibit egg laying.

(ref.- [www.defenders.co.uk/pest-problems/mealybugs.html](http://www.defenders.co.uk/pest-problems/mealybugs.html))

### Mode of Mealybug Damage:

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Mealybugs are often found in clusters on stems and leaf whorls. They produce honeydew like secretion which often leads to sooty mould growth. Large colonies can weaken the plant because of the amount of sap being sucked which can result in yellowing leaves & defoliation.



Mealybugs can build up in huge numbers in a very short time and cause considerable damage. They feed by inserting their straw-like mouthparts, known as 'stylets', into plant tissue. Feeding damage can be either by direct removal of plant fluids and nutrients, and/or by the excretion of toxic salivary compounds into plant tissue.

The waste product of the mealy bug feeding process - is a perfect growth medium for sooty mould fungi.

These moulds/fungus damage plants by covering leaves and reducing light available for photosynthesis resulting the death of plants.

## **Symbiotic (Friendly) Relationship of Ants and Mealy Bugs**

Various species of ants 'farm' mealybugs in much the same way that humans farm cows. In return for honeydew like excreta, the mealybugs are given shelter in the form of 'shelters/ protection from any intruders.



Most species of ants that 'farm' mealybugs also aggressively defend their 'herds' from predators and parasites. Ants 'milk' the mealybugs - when they stroke a mealybug's abdomen it responds by exuding a drop of honeydew like secretion.

## **NATURAL ENEMY OF MEALY BUGS**

Mealybug Ladybird (*Cryptolaemus montrouzieri*) acts as a natural enemy for mealy bird.

The predatory beetle, *Cryptolaemus montrouzieri* (Mealybug Ladybird) of the Coccinellidae family is a general predator of mealybugs. Native of Australia and introduced into several countries such as India, New Zealand, UK, Italy, Spain, Greece, Hawaii, Brazil, Costa Rica, Puerto Rico, USA, Bermuda, Israel, Indonesia, Philippines, Hong Kong, China, Egypt, South Africa, Trinidad, Grenada, Guyana, St. Kitts, and St. Lucia

## **GENERAL INFORMATION OF LADY BIRD BEETLE,** **(*Cryptolaemus montrouzieri*)**



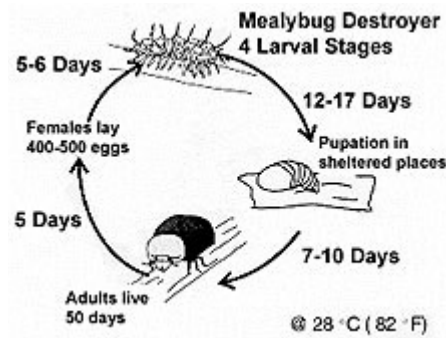
First used as a biological control agent in the late 1800's, both the adult and larval stages of this beneficial insect attack and feed on all stages of mealybugs. The mealybug destroyer (*Cryptolaemus montrouzieri*) is a small (1/5 inch long), reddish-brown lady beetle with dark-brown wing covers.

A voracious feeder, “crypts” as they are often called, will also eat aphids and soft scales making them ideal for use in greenhouses, interior plantscapes, orchards and ornamental gardens.

(Ref.- [www.planetnatural.com](http://www.planetnatural.com) › Beneficial Insects 101)

## Life Cycle of Ladybird Beetle

Adult females lay eggs among the cottony egg sack of adult female mealybugs. Eggs hatch into larvae in about 5 days at 27°C (80°F). The three larval stages last from 12-17 days during which the larvae feed on mealybug eggs, young crawlers, and the honeydew produced by mealybugs.



*Life cycle of Cryptolaemus montrouzieri. Courtesy Applied Bio Pest*

*C. montrouzieri* pupates in sheltered places on stems or on greenhouse structures. Adults emerge after 7-10 days and live four months. Four days after emerging, adult females begin to lay eggs, and the lifetime total may be as many as 400. Adults may live up to 2 months.

(Ref.- [www.biocontrol.entomology.cornell.edu/predators/Cryptolaemus.php](http://www.biocontrol.entomology.cornell.edu/predators/Cryptolaemus.php))

## Mealybug Attack on Rain trees in Mumbai

Since 2010 rain trees in Mumbai are affected by heavy attack of mealy bugs. Several rain trees



in Mumbai especially along the road sides in suburbs are found to be on the verge of death. Extensive survey was carried out by garden department staff and found conclusive data about this epidemic.

## Zones affected by mealy Bugs

Zone no	Name of the road
Z-II Central Mumbai	Marathe Road Road  road Camp Matunga road Road
Z-III <u>Bandra To Andheri</u>	<u>th road Khar</u> <u>Durandar marg</u> <u>Military camp road</u>

Zone no	Name of the road
Z-IV Andheri To Malad	detairoad  road Goregaon (W) , Goregaon (W) , Goregaon (W) road, Malad (E) Malad (W) road, Malad (W)
Z-V Kurlato Mankurd	Purav Road Acharya Road  Nagar Station Road  Barve Road

Zone ID	Name of the road
Z- VII Kandiwali To Dahisar	Road, Charkop Gymkhana Road Kandiwali (W) Nagar Road, Kandiwali (E) Park Road, Kandiwali (E) gorairoad, Boriwali (W) Boriwali (W) Mata Mandirroad, Boriwali (W) Boriwali (W) Road, Dahisar (E) dahisar (W) Dahisar (W)

### **Factors that caused mealybug attack in Mumbai:-**

Mealybug species seems to be introduced from outside Mumbai city area or from other state through transport of various plant saplings from other states by various Private & Government agencies, private nurseries, Institutes & citizens. Mealybug species got favourable environment with huge number of host Raintrees without any natural enemy, predator or parasite present in Mumbai city. Raintree was the only single host plant attacked by mealybugs, no other host plant was available in the city, hence only Raintree has to suffer the attack.

Monotonous plantation of single tree species, Raintree, in a continuous line along long roads with their branches touching each other & cables hanging continuously over the trees helped transmission of pest very rapidly from one tree to another, infesting all trees on continuous road within short time period.



Use of same tree trimming/cutting tools for all trees one after other, infested as well as healthy trees may have also added fast transmission of infestation.

These mealy bugs produce white woolly cover on the body & secrete honeydew like sticky substance which protects them from predators & also makes pesticide spray ineffective. Ants protect these mealy bugs from natural enemies as they harvest honeydew from the pest. Excess use of chemical pesticides in agricultural fields has become resistant to pesticides not responding to insecticidal spray thereby increasing pest population enormously spreading across the districts & states & now reached in Mumbai city.

### **Action taken by Garden Department to control mealy bug attack in Mumbai to save Rain Trees:-**

Garden department of Municipal corporation of Greater Mumbai has taken wide drive to fight with mealy bug and to save rain trees in Mumbai. Samples of mealy bugs with infested leaves and branches were submitted to Biocontrol lab of Entomology department in collage of Agriculture, Pune.



Samples were also sent to National Bureau of Agriculturally Important Insects (NBAII) in Bangalore, for identification of pest and control measure. It was identified as *dysmicocus neobrevipes beardley* species of mealybug.

Dr. Fogro Gomes, head of Entomology deptt. Kokan Krishi Vidhyapeeth, Dapoli also visited and collected samples and gave

valuable instructions to control the pest.. IIT expert Shri. Ganeshan also inspected infested rain trees and gave his recommendations.

As per recommendations given by Entomologist it was decided to follow Integrated Pest Management (IPM) techniques which includes

### 1) **Biological measures –**

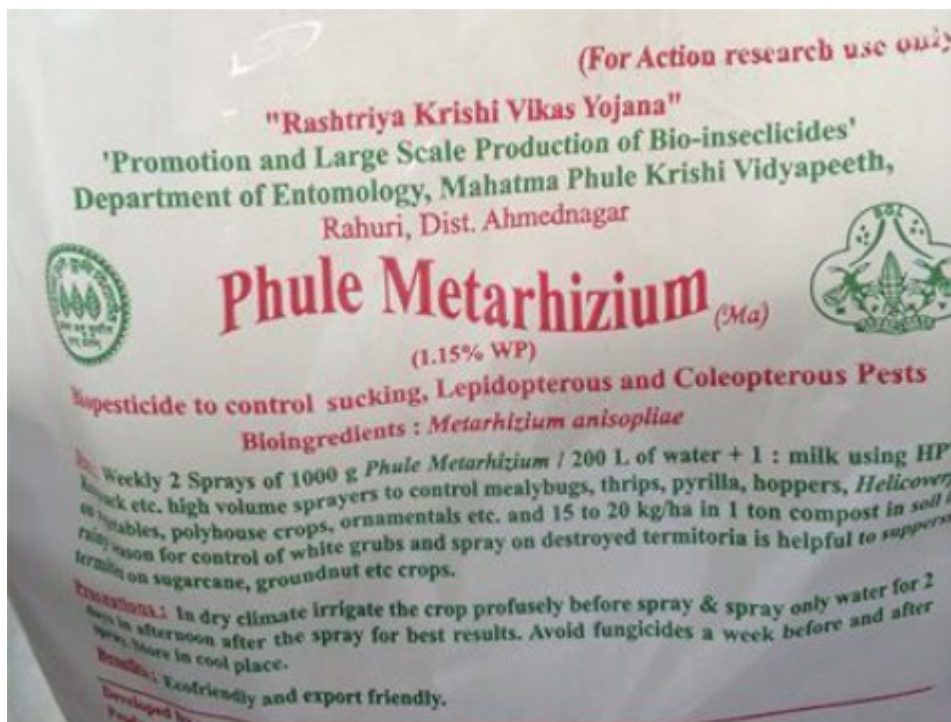
In order to control mealy bUse of predator insects like Australian lady bird beetle (Cryptolemus montezuari) which directly feeds on mealybugs.

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Lady Bird Beetals Released on Infested Raintree at Kadsiddheshwar road, Kandivali west



- b) Dusting or spraying of Biopesticide containing Parasite fungus *Metarhizium Verticillium Lecani*, which creates disease on mealybug & feeds on it.



Chemical measures – Applying systemic pesticide in granular form at root zone level viz. Fertera or Regent which is absorbed by roots and reaches to leaves attacking insect pest from inside.



3) Mechanical measures –

- a) Heavy trimming of infected branches and destroying them.
- b) Applying neem leaves pulp or neem oil around tree trunk and tree basin which acts as repellent to pest avoiding further attack and transmission.

The garden department staff from each ward started these IPM techniques to save the raintrees from mealybug attack. Around 3000 Australian lady bird beetles received from Bio control lab Pune and 2500 beetles received from NBAIL, Bangalore total 5500 beetles were released on infested rain trees in Mumbai city. Biopesticide fungal powder was dusted and sprayed on rain trees. Systemic insecticide Regent granules were mixed to root zone soil around trees, heavy trimming was done to destroy infested branches.

The all over results of effort taken by garden department is as below

Zone No.	No of Trees infested by pest	No of Trees recovered after treatment
Zone – I (south Mumbai)	Nil	--
Zone – II (Central Mumbai)	74	16
Zone – III ( Bandra To Santacruz)	119	64
Zone – IV ( Andheri To Malad)	180	130
Zone – V (Kurla To Mankhurd)	34	18
Zone – VI (Ghatkopar To Mulund)	13	5
Zone – VII (Kandiwali To Dahisar)	80	39
<b>Total</b>	<b>500</b>	<b>272</b>

**contact details to lodge any complaint:-**

Phone-1916

Supdt. Of Gardens - (022)23725799

Dy.Supdt. of Gardens (Zone-I) - (022) 23081471

Dy.Supdt. of Gardens (Zone-II) - (022) 23081471

Dy.Supdt. of Gardens (Zone-III)-(022) 28376512

Dy.Suptd. of Gardens (Zone-IV)- (022) 26281473

Dy.Suptd. of Gardens (Zone-V)- (022)25924648

Dy.Suptd. of Gardens (Zone-VI)-(022) 25924648

Dy.Suptd. of Gardens (Zone-VII)-(022) 28086965