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Major Insect Pest of Litchi and their Management

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INTRODUCTION

The Litchi (*Litchi chinensis* Sonn.) belongs to the Sapindaceae family and well known as the 'Queen of fruits'. Litchi was originated in near South China and North Vietnam in the year 1500 BC but has now spread to different countries. Globally, South-East Asian countries including China, India, Vietnam and Thailand are the largest producers of litchi, but the fruit is also famous in Africa (South Africa and Madagascar), Australia, Indonesia, Spain, USA, Mexico, and Israel (Menzel, 2000; Rajwanshi et al., 2017). The fruit was introduced in India about 100 years later through Burma, from which it has spread to other parts of the tropical and subtropical areas of the country (Ghosh, 2000). Litchi crop is very specific to the climate requirement; Litchi is a popular subtropical fruit crop in India. It is the most delicious, juicy and nutritious fruit and mostly grown in Eastern India. Litchi cultivation is a source of livelihood security for a large population in litchi growing states as it provides both on-farm and off-farm employment. The world scenario of litchi cultivation reveals that India is the second-largest producer of litchi after China with a total avreage over 93,300 ha and a yearly. Bihar is the leading litchi producing state followed by West Bengal, Jharkhand Assam and Chhattisgarh. Litchi varieties cultivated in India are highly diverse due to different climate and soil conditions. Major varieties are Shahi, China, Elaichi, Rose Scented, Bedana and Bombai. Litchi cultivation provides food, nutrition, employment opportunity, generate income, improve the socio-economic condition and poverty alleviation in rural areas of the different states of India.

Its commercial cultivation is limited to few tropical and subtropical countries. India is the 2nd largest producer of litchi in the world after China. It is one of the most famous fruit crops and mostly cultivated in the Eastern part of the country.

In India, 568,200 metric tons of litchis are produced annually from 93,300 hectares (Anonymous, 2018). . Litchi being specific to the climatic requirement, it is restricted to only a few states with 66% of the total production of the country is recorded in Bihar, West Bengal and Jharkhand. Litchi crop mainly helps small and marginal farmers to get some additional income from their homesteads. Litchi cultivation is livelihood security for a large population in the litchi growing states as it offers both on-farm and off-farm employment opportunity. In the present study, the status of litchi cultivation in India has been reviewed. The trends in litchi cultivation In India.

Major insect pests & Management:-

Several insects and mite species attack trees and fruits of litchi at different growth stages. Earlier, only two species, namely, erineum mite and bark-eating caterpillar were reported causing serious damage to litchi trees. Recently, litchi fruit borer and litchi leaf roller have acquired the status of major pest

1-**Erinose mite(Aceria litchi Keifer) :-** Erinose mite is a major litchi pest. The incidence of litchi mite is seen during March which remains active up to June-July. Severe infestation has been observed in Bihar during March-September and its population decline from November-February. However, mites remain active throughout the year in one stage or the other. It is found active on litchi trees from January to October and under hibernation in adult stage under the hairy and velvety growth (erineum) from November to December on the under surface of the leaf. The adults start multiplying from the end of March and the peak activity is noticed around July. The female adults lay eggs singly at the base of the hair on the lower surface of the leaves. The eggs hatch within 2-3 days and newly emerged nymphs feed on soft leaves Both nymphs and adults damage the leaves, inflorescence and young developing fruits. They puncture and lacerate the tissues of the leaves with their stout rostrum and suck the cell sap. As a result of its infestation, undersurfaces of the infested leaves show abnormal growth of epidermal cells in the form of hair like velvety growth of chocolate brown colour. In some cases, the mites cause galls or wart-like swellings or depressions on the upper surface of the infested leaves. Chocolate-brown velvety growth on the ventral surface of leaves indicates the presence of this pest. The attacked leaves become thick, curl, wither and ultimately fall off

Management:-

1. Litchi mite control measures must be preventive.
2. Once the mite is established, it is almost impossible to eradicate, hence depending upon infestation it is recommended.
3. that Layers should be prepared only from non-infested plants
4. Layer saplings may be sprayed with 0.05 per cent dimethoate when they leave the nursery.
5. Prior to planting out, the operation should be repeated twice at 10-14 day intervals.
6. The leaves should be checked regularly for symptoms over summer and autumn.
7. All trees in an orchard are not to be flushed or infested at the same time.
8. Therefore, branches infested with the mite should be cut off and burnt.
9. In September-October, trees must be treated just prior to vegetative flushing with 0.05 per cent dimethoate either alone or in combination with 0.12 per cent dicofol. Spraying should be repeated two weeks later and monthly thereafter until new growth is free of all symptoms of infestation.
10- Infested leaves should be gathered and burnt or buried deeply into the ground.l In December-January, just before flush/flower buds, the affected shoots must be removed and spraying of 0.15% kelethane may be done. In the month of Feb., two sprays, one

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2. Bark Eating Caterpillar:-

Litchi is damaged to a considerable extent by the bark-eating caterpillars, which attack trees of all ages, particularly the older ones, lowering their vitality. They bore into trunk, main stems and thick branches of litchi trees They have a wide range of host plants including litchi. The old, shady and neglected orchards are more prone to attack by this pest. When severely infested, the entire branch or tree may die. The female moth lays eggs in cuts and crevices in the bark in cluster in early June. Egg hatches in 8 to 10 days and newly emerged caterpillars come out. The newly emerged caterpillars start nibbling at the bark. The attack by this pest is characterized by the presence of long-winding, thick, blackish or brownish ribbon-like masses composed of small chips of wood and excreta, both of which intermix with the help of adhesive material secreted by the caterpillar. After 2-3 days, larvae bore into the trunk or main branches usually at the forking place and make tunnel downwards. There is only one larva in each hole, and there may be 2-16 holes in each tree, depending upon the intensity of infestation and age of the tree. By continuously devouring the tissues, it tunnels through the stem and brancheseach before and after flowering have been found useful.

Management:-

1.The caterpillars can be killed by inserting an iron spoke into the tunnels.

2.This insect has also been successfully controlled by injecting kerosene oil into the tunnel by means of a syringe and then sealing the opening of the tunnel with mud.

3.Another method of control is dipping a small piece of cotton in any of the fumigants, like carbon bisulphide, chlorosal or even petrol and introducing it into the tunnel and sealing the opening with clay or mud.

4.Remove the webs from tree trunks and put emulsion of DDVP (0.05%) in each hole and

plug them with mud. Mix chlorpyrphos 2 ml per litre of water and apply the bark eating caterpillar infested area with a brush at 15 days interval.

5.As a preventive measure, spraying of the attacked trunk and branches with 0.05%DDVP may be done.

3. Litchi Leaf Roller(Dudua aprobola Meyreck)

The incidence of leaf roller is reported during July to February. The number of larvae is the highest during December to February, preceding flowering season of litchi. The breeding season of the leaf roller on litchi leaves is from August to February when new leaf flush is available and restricted breeding takes place during off-season (March to July) on alternate hosts such as kath-jamun (Eugenia jambolana) and chhota amaltas (Cassia tora) growing around litchi orchards. It may attack flower also. The female moth lays eggs under the surface of newly emerged tender leaves which hatch within 2-8 days. The last instar larvae pupate in larval clip, a small portion of the leaf on the margin, both anteriorly and posteriorly and conceal themselves by bending and sealing the clipped piece of the leaf The symptoms of leaf injury by the larvae are manifested through rolling of tender leaves and feeding inside.

Management:-

1.The damage caused by leaf rollers is tolerated as long as it is restricted to the foliage and unlikely to affect flower initiation.

2. The rolled leaves that contain larvae may be removed manually during light infestations.

3.If necessary, carbaryl 2g/l can be applied when 20 per cent of leaf flushes are infested to 4.minimize damage to young trees or at critical periods of leaf growth in older trees.

4- Semilooper:-

In addition to above, foliage defoliating semi-looper (castor semilooper/stick worms) have been reported occasionally . These semiloopers attack tender leaves en mass and defoliate the new shoots.

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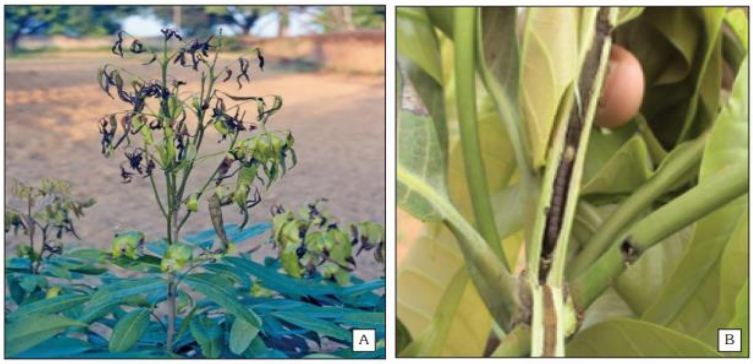
Management:-

1. Spray of Quanoalphos or chlorpyriphos @ 1.5-2.0 ml per litre water.

2.Alternatively delta-Sypermethrin @ 1 ml per litre can be sprayed.

Shoot borer (Chlumetia transversa W.)

The caterpillars bore inside the newly growing shoot and feed innerpats resulting in drying of the twigs. In case of severe infestation the sapmovement is interrupted and the tree ceases to flush.



Litchi shoot borer. (A) Damage by shoot borer on new flush, (B) Larva of shoot borer

Management:-

1.Pruning and burning of affected twigs minimize its infestation.

2.Spraying of carbosulfan 0.05% or quinalphos 0.05% is found quiteeffective to control this pest.

Fruit borer (Conopomorpha cramerella Snaller)

It is a mojor pest of litchi, causes maximum damage during fruitdevelopmental stage. The small caterpillars bore through the stalk end of the fruit feed on the seed and skin of the fruit. As a result fruits become stalk end of the fruit. High humidity and intermittent rains favour its infestation. This pest also causes fruit drop.

Fruit borer in litchi. Adult moth (left) and larvae (inset), Affected fruits (right)

Management:-

1.Regular ploughing, removal of wrapping materials, weed destruction,burying of damaged fruits help in controlling the incidence of thispest. Spray neembicidine or Kamcthenu Keet Niyantrak (4-5 ml/litre)two times at 7 days interval at colour break stage to minimize the

incidence of borer:-

Application of imidachlorpid 0.05% gives good result. First sprayingshould be done at pea stage and second, 15-20 days after first spray.

7. Litchi Bugs :-

There are many species of bugs that attack litchi. Bug (Tessaratoma javanica) is the most destructive . It lays globular and off pink eggs, mostly in bunch of fourteen on lower surface of leaves. Newly emerged nymph is dirty white and soft bodied insect but colour changes to yellow red after few days. Both adults and nymph feed mostly on tender plant parts such as growing buds, leaf petioles, fruit

stalks and tender branches of litchi tree. Excessive feeding causes drying of growing buds and tender shoots and ultimately fruit drop. The bugs when feed on the developing fruit, it causes the fruits to fall a couple of days later.

Management:-

1.This pest is combated by shaking the trees in winter, collecting and dropping them into kerosene.

2. The eggs of T. javanica are in group and visible which can be removed and destroyed.

3.There are natural enemies which parasitize 70 to 90 per cent of eggs laid late in the season. The adults are attacked by several fungi, birds and red ants may also be used as biological means of control.

4. If chemicals are used, the timing of sprays is critical because the bugs vary in their susceptibility to insecticide at different times of the year, depending on body fat content and its nature. Many of these bugs may be controlled with dimethoate and fenthion.

8. Leaf Eating Weevils :-

Grey weevil is a polyphagus pest. Adult has long snout with grey color, though poor flier but very active feeder on the leaves of litchi. It attacks leaves, shoot and flower. Adult weevils congregate on the tender leaves and nibble irregular holes on the leaves and sometimes consume the entire leaf leaving the midrib only Another weevil recorded recently at NRC Litchi, so far not properly identified, feeds on tender leaves. The damage of this weevil is more severe at the time of shoot emergence.

Management :-

1. The grubs of these weevils feed on organic matter in the soil below the canopy, hence, ploughing and exposing these grubs reduces the problem.

2.Hand picking of the adult weevils reduces their problem to some extent.

3. When severe damage is seen, spraying of Carbaryl 2ml/l may be done.