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Litchi stink bug in Bihar: Status, threats and management strategy

Generally, low incidence of litchi stink bug had been recorded from different regions of India. But its incidence has increased in recent years especially in Jharkhand and the North-Eastern states. In 2018, this pest was seen in litchi orchards of Bihar for the first time. During last two years, damage in the orchards of Bihar was up to 100% where this pest attacked. The threats from this pest are so serious that it has the potential to completely eliminate litchi cultivation. Management of this pest requires an immediate action plan as well as long-term strategy which are being done by National Research Centre on Litchi in coordination with Horticulture Department, Government of Bihar. A detailed discussion of the current status, threats and management strategy of the stink bug is provided in this article.

LITCHI stink bug (LSB) (*Tessaratoma javanica*) recently invaded the litchi orchards of Bihar where it has potential to completely wipe out litchi cultivation from the state. Pest found its way to get introduced in Bihar in 2018 when it was observed in some orchards in Damodarapur and Mirzapur village of Mehsi block in East Champaran district of Bihar. From few orchards in the beginning years, the area of infestation increased nearly 3 km in 2021 during litchi season (February-June 2021). In the month of August-September, litchi is in vegetative phase and stink bug infestation is discernible in orchards in adjoining area like Chakiya, Madhuban and Kalyanpur blocks of East Champaran.

Litchi stink bug (LSB) possibly got entry in Bihar from neighboring state Jharkhand, most likely carried through logwood transported in Lowry or some private vehicles coming from Jharkhand. Jharkhand has kusum trees (*Schleichera oleosa*; Family Sapindaceae; the same family to which litchi belongs) which is a natural host of the stink bug and is abundantly found in Ranchi and adjoining districts of Jharkhand where LSB is reported to be the major pest of litchi.

Litchi stink bug

Though a regular pest of litchi in North Eastern states, usually a low incidence is reported from different regions of India. However in recent years, incidence of *T. javanica* has increased particularly in Jharkhand and the north eastern states. The peak incidence of the pest was 1.21-4.09 bugs (nymphs and adults) per shoot during 2008 in north-western India. An outbreak of *T. javanica* in the Chhotanagpur plateau region of Jharkhand during February-March 2012 was also reported, causing severe losses (up to 80%) to litchi fruits. Pest found its way to

get introduced in Bihar (2018). It has been reported on Mahua (*Maduca indica*) tree from Chhattisgarh and on longan (*Dimocarpus longan*; Sapindaceae) and rambutan (*Nephelium lappaceum*; Sapindaceae) by various workers from China, Thailand and other countries.

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, tender shoots and ultimately fruit drop off. In the north-western part of India, infestation of *T. javanica* occurs on litchi from the last week of April to the last week of August after which it undergoes hibernation in adult stages on litchi trees. The bug lays globular and off pink eggs, mostly in bunch of fourteen on lower surface of leaves. The insect passes through five instars, which are sub-rectangular and dark brick red



Litchi stink bug affected area on the map of East Champaran district of Bihar



Kusum tree

except first instar. Newly emerged adult is dirty white and soft bodied insect but colour changes to yellow red after few days. The average duration of male and female adults is 43.2 ± 7.7 and 47.2 ± 9.5 days, respectively. Life cycle is completed in about 80 days. Both adults and nymphs are able to expel offensive odours when disturbed. The head, pronotum, scutellum and elytra of the adult bug are light brown in colour. The underside of the body is white. The size of the bug is close to 15-20 mm, plus it has small triangular head. When people find a stink bug, their first instinct is to squish them. However, when disturbed or crushed, stink bugs have a tendency to release a bad-odour

chemical from pores on the sides of their bodies. This is how the pest earned its name. This causes the problem of blisters on the body.

Invasiveness and threats of the pest

Invasive species are organisms that are introduced to an area where they are not known to occur. When a non-native organism is released into a new area, it will arrive without its natural enemies and the population can explode without anything standing in the way. This is the reason of worry about litchi stink bug. Some of the points that should be considered in favour of threats include: Longer life cycle and high fecundity of pest; quick buildup of pest population which coinciding flowering and fruit set in litchi and continuing till fruit matures; contiguous and abundant availability of host tree to a introduced invasive pest; though insecticidal spray has a quick 'knock down' effect, but even if a few insects escapes/ avoid insecticidal spray (say 5%) on a single tree, it will be sufficient to build up its population to a level enabling infestation of complete orchard.

Management strategy

Current management strategies rely on insecticide sprays. Two sprays of any of the following insecticide combinations are recommended by the National Research Center for Litchi, Muzaffarpur:

- Triazophos 40% E.C (1.5 ml/L) + Thiacloprid 21.7% SC (0.5 ml/L)
- Thiacloprid 21.7% SC (0.5 ml/L) + Lambda Cyhalothrin 5% E.C (1.0 ml/L)



1. Litchi stink bug sucking sap from a soft twig, 2. Close-up view of bug on fruits, 3. Adult bug, 4-5. Bug infested panicles and fruits, and 6. Signs of damage on fruits due to feeding of bugs



1. Mating pair, 2. Freshly laid eggs, 3. Egg clusters, 4. Nymphal stages in gregarious phase

- Thiacloprid 21.7% SC (0.5 ml/L) + Fipronil 5% SC (1.5 ml/L)
- Dimethoate 30% SC (1.5 ml/L) + Lambda Cyhalothrin 5% E.C (1.0 ml/L)
- Dimethoate 30% SC (1.5 ml/L) + Cypermethrin 5% E.C (1.0 ml/L)
- Combi-product [Triazophos (35%) + Deltamethrin (1%) EC] – 2.0 ml/L

First spray should be done between 10th to 15th February and second spray between 25th to 28th February. Whenever an insecticidal spray is taken up, the fallen down insects on ground must be collected/ swept-off by a broom and destroyed manually by putting in a pit and covering with soils. Besides insecticidal spray, tree banding (putting sticky bands on tree trunk) may be done in the month of March-April after spraying of insecticides to prevent the nymphs to crawl up on trees. Use sticker in insecticide solution @ 0.4 ml/litre.

Action plan for prevention

In background of the threats explained, an action plan similar to managing ‘COVID-19’ pandemic is required for stink bug to save litchi orchards in Bihar and livelihood of litchi farmers. Like ‘mass vaccination’ against COVID-19, we need to have wide area management through ‘mass insecticidal spray’ or ‘community spay’ for all the orchards in the identified containment zone. We need to have an immediate action plan as well as a long-term strategy too for this pest. Immediate action plan includes quarantine and mass insecticidal spray as the pest needs to be quarantined in its current area of infestation by any means. This will involve continuous survey and surveillance in the current area of infestation and the adjoining areas as well, on a war-footing basis and containment zone may be declared. In this containment zone, immediate action plan will be to undertake two insecticidal sprays at 15 days interval in September-October i.e. before the pest undergo winter hibernation on litchi trees. Not a single orchard should be missed for insecticidal spray. An organophosphate group of insecticide such as Triazophos (Triazophos 40% EC @1.5 ml/L), Profenphos (Profenfos 50 EC @ 2.0 ml/L water) or quinalphos (Quinalphos 25% EC @ 2.0 ml/L) will be appropriate at this phase. Further at the time of panicle initiation (but before flower opening), two insecticidal sprays (mass spray) need to be undertaken. At that time, combination of insecticides rather than single (as given under management strategy) may be undertaken. All these need to be done by the Department of Agriculture, Government of Bihar as individual farmer neither will

be able to afford it nor the objective of community spray be fulfilled if left to farmers. An additional fund by the government may be earmarked to implement the action plan.

The long term strategy to manage the pest will involve reasearch on eco-biology of the pest and alternative management options involving use of proven parasitoid like *Anastatus bangalorensis* and *Anastatus acherontiae*. Mass rearing and release of parasitoid of the pest is to be undertaken at local level. This parasitoid and the technology for mass rearing is available with ‘National Bureau of Agricultural Insect Resources’, Bengaluru. Funding of the the project for mass rearing and release of this parasitoid at local level can be made under *Rashtriya Krishi Vikas Yojana (RKVY)* or under State Horticulture Mission.

Complexities involved in adopting the management strategy for quick know-down

- This pest is so sensitive to disturbances and sound that once a spraying operation is going to start, it flies away to another trees and after sometime when effect of insecticidal spray lessens, it again settle down on sprayed trees.
- The female lay eggs in batches that hatches on different time so one spray is not sufficient to kill the population of nymps.
- Though insecticidal spray has a quick knock down effect, some individual may escape (say 2-5%) and from the small population can again build up population in large numbers because of high fecundity of female and longer life cycle, that are capable of infesting whole orchard.
- There are no natural enemies of the pest because of being an introduced pest in the region.
- During flowering and fruit-set, population builds up very fast and no insecticidal spray can be done during this time. Hence, farmer just have to wait and watch their litchi crop being damaged by this dreaded pest.
- Another dimension is that the pest emits bad odour and the body fluid are toxic causing blisters on skin of human being. Even if there are fruits on tree, it becomes difficult to harvest fruits as skin of the body of labourers get blisters once the insect come in their contact that is inevitable to happen during the process.

For further interaction, please write to:

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