



Universal Impact
Factor 0.9285:2012;

1.2210:2013

Index Copernicus

ICV 2011: 5.09,
2012: 6.42, 2013:
15.8, 2014:89.16,
2015:78.30

NAAS Rating

2012 : 1.3;

2013-16:2.69

2017: 3.98

SJIF 2012: 3.947,

2013: 4.802

Infobase Index

2015:4.56

Cosmos Impact Factor

2015: 4.366

Received on:

1st April 2017

Revised on:

24th April 2017

Accepted on:

28th April 2017

Published on:

1st May 2017

Volume No.

Online & Print

87 (2017)

Page No.

16 to 20

Life Sciences Leaflets is a international open access print & e journal, peer reviewed, worldwide abstract listed, published every month with ISSN, RNI Free- membership, downloads and access.

PROBLEM OF LEAF CURLING OF TEAK SEEDLINGS IN FOREST NURSERY

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ABSTRACT:

Leaf curling problem was observed in teak seedlings in forest nursery, Khakarapura (Hoshangabad, Madhya Pradesh). The symptoms like shortened inter-node, leaf roll, necrosis, puckering, mottling of leaf blade and gradual reduction in size were recorded. The teak seedlings were damaged by phytoplasmas and spread principally by insect of the families Cicadellidae (leafhoppers) which feed on the phloem of plants, ingesting phytoplasma and transmitting them to the next plant on which they feed. On the basis of the nature of damage, the insect pest- jassids suck the sap from leaves. They cause characteristics hopper burn i.e. yellowing of leaves all along the leaf margin in the final stage of attack and leaf becomes cup shaped. The incidence of leaf curling ranges from 39.00 to 77.65 per cent were recorded in different beds and sectors. The possible control measures to encounter the present problem are: installation of light trap for collection of the jassids or use yellow sticky traps 50 nos./ ha ; spray combination like imidachloprid 17.8 EC @ 0.1% 0.5 ml or monocrotophos 36 E.C. @ 0.05% streptomycin (plant antibiotic) 0.1% 1.5 ml per lit of water after 15 days interval and as a preventive measure, spray this combination in next year after rainy season for protection of teak seedlings.

KEY WORD: Teak seedlings, Leaf Curling, Leafhoppers, Jassids, symptoms, Control measures.

INTRODUCTION:

Teak (*Tectona grandis* Linn. f., Family Verbeanaceae) is a major tropical timber yielding species distributed in India and South-East Asian regions. Owing to its good quality timber, teak is widely planted throughout its geographical range as well as other countries of tropical Asia, Africa and Latin America. *Tectona grandis* has a worldwide reputation as a quality timber trees on account of its remarkable physical and mechanical properties, particularly elasticity, strength and durability. Indian teak varies greatly from locality to locality in timber characteristics such as color, grain, texture and figure. According to an estimate (Prasad, 1986), teak is annually being raised over an estimated area of 15,000 hectares and for this, plantation target about 500 tones of teak seeds are required. In productive nurseries, large number of seedlings are raised for further plantations programmes. Due to the climatic change, the insect pests and diseases are prone to the seedlings of teak in nurseries. Such an economically important forest tree species is attacked by the viruli-form sap suckers which affect the growth of plants. Jassids or leaf hoppers are polyphagous and feed on the plants including *Santalum album* and cause spike disease (Pruthi, 1936; Rangaswami & Griffith, 1940; Beeson, 1941; and Brown, 1968). The present paper deals with the leaf curling of teak seedlings in forest nursery at Khakarapura (Hoshangabad), Madhya Pradesh.

With reference to the letter no. vyay /2016/2234/ November 18, 2016 regarding the leaf curling in teak seedlings in forest nursery, Khakarapura and instruction of Director, TFRI, Jabalpur, a team of Scientists of this institute visited to Khakarapura on December 10, 2016 to record the observations on pest status and to discuss with Chief Conservator of Forest, Research & Extension Circle, Betul and staff of Khakarapura in order to know the details of leaf curling of teak seedlings.

MATERIALS AND METHODS:

Forest Nursery, Khakarapura (Hoshangabad) has raised by Research & Extension Circle, Betul, Madhya Pradesh in area 18.50 ha. Teak (*Tectona grandis*) seedlings were grown in 3000 beds (size- 10x1 m) during 2016. The teak seeds were sown during May-June, 2016. Neem cake 2kg, FYM 15 kg, vermicompost 2 kg and BHC (Lindane) powder 50 g per bed were applied at the time of sowing. The average seedlings per bed were 600. As per the information given by the staff, the incidence of leaf curling was started from October, 2016. For protection of the seedlings, they applied omite (propargite) 25 ml, chlorpyrifos 20 ml, organic plant growth promoter (Bhalla) 30 ml, Imidacloprid (Bullet) 70% 10 ml in 15 lit of water.

RESULTS AND DISCUSSION:

Survey was conducted in forest nursery at Khakarapura in different sectors and beds. It was observed that the teak seedlings attacked by leaf curling. The symptoms of leaf curling are the shortened inter-

node, leaf roll and necrosis were observed. Puckering and mottling of leaf blade and gradual reduction in size were also observed. Curling leaves, thickening, swelling of veins and affected seedlings appear busy with stunted growth (Figs.1-3) The disease possibly caused by viruses / phytoplasma. Generally leaf curling virus transmitted by viruliform insects i.e. sap suckers (jassids). In Tropical Forest Research Institute, Jabalpur, no any virologists are working. Therefore, the present problem of leaf curling was referred to the Virologist Dr. G.P.Rao, Principal Scientist, Division of Pathology and Dr. N.M.Meshram, Scientist (Taxonomist-Hemiptera), Division of Entomology, Indian Agricultural Research Institute (ICAR), New Delhi for further diagnosis and actual cause of leaf curling in teak seedlings. As per the information given by the scientists, there was no any virus, the teak seedlings damaged by Phytoplasmas. Phytoplasmas are spread principally by insect of the families Cicadellidae (leafhoppers) which feed on the phloem of infected plants, ingesting phytoplasma and transmitting them to the next plant on which they feed. Thus, the host range of phytophagous is strongly dependent upon that of the insect vector. The observations on the incidence of leaf curling in teak seedlings are summarized in Table 1. The incidence of leaf curling ranges from 39.00 to 77.65 per cent in different beds and sectors of forest nursery. The average incidence of leaf curling was recorded 55.37 per cent. On the basis of the nature of damage, the insect pest i.e. jassids suck sap from leaves and cause characteristics hopper burn (figs.2-3) i.e. yellowing of leaves all along the leaf margin in the final stage of attack, the leaf becomes cup shaped.

Control measure

1. Installation of light trap for collection of the jassids or use yellow sticky traps 50 nos./ ha.
2. For protection of seedlings against leaf curling insecticide combination like imidachlopid 17.8 EC @ 0.1% 0.5 ml or monocrotophos 36 E.C. @ 0.05% 1.5 ml + plant antibiotic Streptocyclin (plant antibiotic) 0.1% 1.5 ml per lit of water should be sprayed after 15 days interval.
3. As a preventive measure, in next year this combination should be sprayed after rainy season for protection of teak seedlings.

The insect pest i.e. jassids occur throughout in cultivated land and fairly commonly in forests, frequently several species. They occurs from November to February. Both adults and nymphs jump very actively and move side ways. Most obvious sign of the injury is the reduced stem height (Beeson, 1941 and Browne,1968). This is the first report of leaf curling of teak seedlings due to the phytoplasma transmitted by the jassids in forest nursery.

CONCLUSION:

It can be concluded that teak seedlings were damaged by phytoplasmas and spread principally by insect of the families Cicadellidae (leafhoppers) which feed on the phloem of plants, ingesting

phytoplasma and transmitting them to the next plant on which they feed. On the basis of the nature of damage, the insect pest- jassids suck the sap from leaves and cause characteristics hopper burn i.e. yellowing of leaves all along the leaf margin in the final stage of attack and leaf becomes cup shaped.

ACKNOWLEDGEMENT:

Authors are thankful to Dr. U. Prakasham, IFS, Director and Shri P. Subramanyam, IFS Head of Office, Tropical Forest Research Institute, Jabalpur, for providing the necessary facilities for carrying out the study. Authors are grateful to Dr. G.P. Rao, Principal Scientist (Virologist), Division of Pathology and Dr. N.M.Meshram, Scientist (Taxonomist-Hemiptera), Division of Entomology, Indian Agricultural Research Institute (ICAR), New Delhi for further diagnosis and actual cause of leaf curling in teak seedlings. We are also thankful to the Chief Conservator of Forest, Research & Extension Circle, Betul and staff of Khakarapura (Hoshangabad) for providing the necessary field facilities.

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Table 1: Observations on the incidence of leaf curling in teak seedlings

Sl. No.	Total seedlings	Affected seedlings	% incidence
1	650	285	43.84
2	485	190	39.12
3	592	308	52.02
4	465	361	77.65
5	676	434	64.20
Average			55.37

**Fig. 1: Teak seedlings raised in beds in forest nursery, Khakrapura(Hoshangabad)****Fig.2: Teak seedlings damaged by leaf curling****Fig. 3: Teak Leaves Curling**