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A TECHNOLOGY FOR MANAGEMENT OF LITCHI MITE USING IPM MODULES UNDER SUBTROPICS OF BIHAR

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ABSTRACT : Litchi mite is the threat to litchi growers as both nymphs and adults damage the leaves, inflorescence and young developing fruits. Therefore, keeping in view the importance of litchi mite, Aceria litchii field trial was conducted at ICAR-NRCL, Muzaffarpur to manage the pest. Experiment was laid out in RBD design with seven treatments comprised of pruning of affected twigs (July & October) and miticides (chlorfenapyr & propargite) sprayed twice in July and once in October months to evaluate the efficacy of various integrated approaches. Results revealed that initial mite infestation ranged from 97.33 to 98.80%. No mite infestation was recorded at flowering stage in pruning and removal of affected twigs followed by two spraying of chlorfenapyr 10 EC (0.03%) at 15 days interval during July and again pruning in October with one spraying of Chlorfenapyr followed by spraying of propargite 57 EC (0.17%) with 1.33% mite infestation. The higher mite infestation was noticed during August (50.00) to November (80.00) and again the population start increasing from February onwards on new shoots.

Key words : *IPM, chlorfenapyr, propargite, litchi mite, weather factors*

Litchi (*Litchi chinensis* Sonn) is an important subtropical evergreen fruit crop belongs to family Sapindaceae. It has high nutritive value and refreshing taste. Litchi is consumed as fresh fruit, pulp and various processed products like squash, RTS, wine etc (Kumar *et al.,* 2). Litchi appears to be native of the area, near Southern province of China and northern Vietnam from where it was introduced into India during the 18th century in the North East region (Tripura) and over the period of time to eastern states and percolated in the northern states. It is now an important commercial fruit crop in India due to its export potentiality. Cultivation of litchi is widely spread in eastern India which provides livelihood opportunities to millions of people in the region. It is commercially grown in Bihar, Uttarakhand, West Bengal and Jharkhand (Rai and Kumar, 5). Due to its high economic returns and ever increasing demand in the domestic markets, the crop is also gaining momentum in Punjab, Himachal Pradesh, Assam, Tripura, and Orissa. Considering the importance of this fruit crop in the region, efforts are made to provide technological support through research and promoting production, post-harvest management and marketing. The litchi growers are facing serious problem of many insects pests like fruit borer, litchi mite, shoot borer, bark borer, leaf minor, leaf webber etc, and as such the production is reduced drastically with marketability (Kumar *et al.,* 4 and Srivastava *et al.,* 7). Litchi mite is the threat to litchi growers as both nymphs and adults damage the leaves, inflorescence and young developing fruits through sucking of sap form newly emerged shoots. Due to continuous sucking of sap by the nymphs and adults, leaf tissues become aggravated and formed erinium. The symptom occurs as velvety growth on the lower side of leaf surface which enlarge and turn to chocolate colour with deep lesion resulting in reduced photosynthesis. In severe cases particularly in unmanaged orchards the infestation level is very high and spread of the infestation takes place from the neighbouring plants and orchards. In such orchard very poor flowering and fruiting takes place and growers suffers from huge economical losses. The maximum incidence of the mite seen during the October - November month especially in unprunned orchard (Kumar *et al.,* 1). Therefore, keeping in view the importance of litchi mite a field trial was conducted to evaluate the different IPM modules against litchi mite.

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MATERIALS AND METHODS

Present study was conducted at Research Farm, ICAR-NRC on Litchi, Muzaffarpur, Bihar during 2015-16. Experiment was laid out in RBD design with seven treatments *viz.,* T_1- Pruning of affected twigs in July; T_2 - T_1 + Pruning in October; T_3 - T_1 + chlorfenapyr 10 EC (0.03%); T_4 - T_1 + propargite 57 EC (0.17%); T_5 - T_2 + chlorfenapyr 10 EC (0.03%); T_6 - T_2 + propargite 57 EC (0.17%) and T_7 - control (without pruning and spray) in three replications to evaluate the

efficacy of different IPM modules to manage litchi mite. Good horticultural practices were performed as per recommended package of practices for litchi cv. Shahi under the trials (Kumar *et al.,* 1). Pruning and removal of infested twigs/ shoots was done just after harvesting of the fruit before new flush emergence. Two sprays were applied at fifteen day interval in the month of July and subsequently pruning of newly infested twigs was performed during October followed by spraying of chemicals. Spraying was given from outer as well as inner canopy of all the direction of the tree with the help of power sprayer having hollow cone nozzles. Observation on seasonal incidence of mite infestation was recorded on monthly interval from randomly selected shoots covering one sq. m canopy area of all side of the tree. Per cent mite infestation was calculated on the basis of number of infested shoots divided by total number of shoots in per unit area (m^2) and multiplied by 100.

RESULTS AND DISCUSSION

Litchi mite infestation on shoots was recorded at initial stage and after imposition of the treatments (Table 1). Mite infestation ranged between 88.23 to 98.68% at initial stage of observation before imposing treatments. Results revealed that all the treatments are significantly superior over control. Significant reduction of litchi mite infestation was noticed in treatments T_4 (2.33%), T_3 (2.63%), T_5 (2.67%) and T_6 (3.78%) comprised with pruning of affected portion and spraying of miticide (chlorfenapyr, propergite) during July month observation after 15 days of spray schedule against pruning alone (10.33 and 10.68) and control (99.0%). Least infestation under the treatments of pruning of infested shoot along with chemical spray proved their efficacy to check the further spread of mite population.

The observation in the month of October revealed that litchi mite infestation was gradually increased over July infestation (Table 1). The infestation level was remain highest (99.5%) in untreated plant (control) followed by pruning treatment alone (34.25 & 31.93%) with lowest level in treatments namely, treatments T_5 (5.93%), T_3 (6.18%), T_6 (8.66%) and T_4 (9.67%) before imposition of treatments in October month. Increase in level of mite infestation during October month over July under all the treatments might be due to population of mite left over coupled with prevalence of favourable weather condition along with emergence of new flush resulted in higher infestation.

At 15 days after management schedule followed in October, no further infestation of litchi mite was noticed in T_5 and T_6. No mite infestation was recorded at flowering stage in T_5 (pruning of affected twigs + two spray of chlorfenapyr 10 EC @ 0.03% at 15 days interval during July+ pruning in October with one spray of Chlorfenapyr) which was closely followed by T_6 (pruning of affected twigs + two spray of propergite 57 EC @ 0.17% at 15 days interval during July+ pruning in October with one spray of propargite) with 1.33% mite infestation. These findings are in close confirmatory with the finding of Kumar (3) who has also reported that litchi mite infestation was reduced by using of mechanical approaches followed by spraying of Dicofol 0.05%. Kumar *et al.* (1) also recorded 98.0% reduction

Table 1: Efficacy of different IPM modules against litchi mite, *Aceria litchii*

Treatments	% litchi mite infestation				
	July	October			
	1st day before treatment (initial)	15th day after 2nd treatment	1st day before treatment	15th day after treatment	At flowering stage
T_1	88.23	10.33	31.93	32.68	44.33
T_2	89.27	10.68	34.25	4.67	12.00
T_3	98.34	2.63	6.18	7.27	18.34
T_4	97.33	2.33	9.67	10.48	20.27
T_5	98.50	2.67	5.93	0.00	0.00
T_6	98.80	3.78	8.66	0.00	1.33
T_7 (control)	99.68	99.00	99.5	100	100
CD (P = 0.05)	NS	1.34	3.72	1.69	2.19

T_1- Pruning of affected twigs in July; T_2 - T_1 + Pruning in October; T_3 - T_1 + chlorfenapyr 10 EC (0.03%); T_4 - T_1 + propargite 57 EC (0.17%); T_5 - T_2 + chlorfenapyr 10 EC (0.03%); T_6 - T_2 + propargite 57 EC (0.17%) and T_7 - control (without pruning and spray)

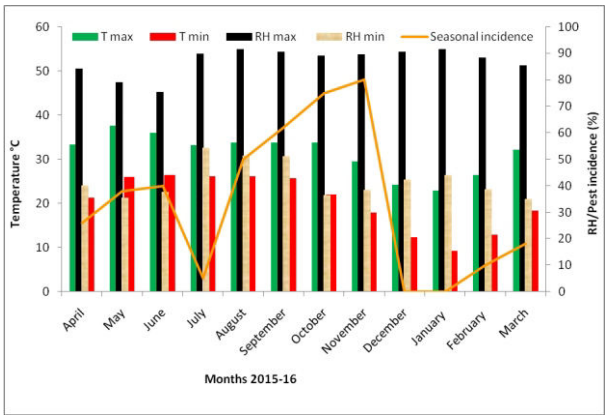

Fig.1.Influence of weather parameters on seasonal incidence of litchi mite

in mite population with pruning of affected twigs in June + pruning in October followed by spraying of Profenofos 0.05%. It was also observed that untreated plants did not bear any flowering and fruiting in litchi which turned to huge loss to the growers. However, very good flowering and fruiting was noticed under the pruning along with spray of miticides.

Seasonal incidence of litchi mite and weather parameters was also recorded at monthly interval from April, 2015 to March, 2016 (Fig.1). The higher mite infestation was noticed during August (50.00) to November (80.00) and again the population start increasing from February onwards on new shoots. The higher infestation during August to November month may be due to moderate temperature coupled with higher relative humidity created congenial environmental condition for litchi mite.

The finding of present investigation holds a good promise in litchi mite management and it showed that pruning of affected twigs followed by two spraying of chlorfenapyr 10 EC (0.03%) or propargite 57 EC (0.17%) at 15 days interval during July and one pruning in October with one spraying of any one above chemical may be recommended for litchi mite management under the subtropics of Bihar and other litchi growing states.

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Table 2. Seasonal incidence of litchi mite during 2015-16.

Month	Temperature		Relative Humidity		
	Max.	Min.	Max.	Min.	Seasonal incidence
April	33.29	21.22	84.22	40.11	26.00
May	37.53	25.92	79.15	35.53	38.00
June	36.03	26.50	75.39	37.64	40.00
July	33.25	26.09	89.87	54.35	5.00
August	33.75	26.10	91.42	51.39	50.00
September	33.80	25.71	90.47	51.23	62.00
October	33.71	22.00	89.00	36.54	75.00
November	29.52	17.86	89.56	38.43	80.00
December	24.27	12.38	90.58	42.41	0.00
January	22.89	9.27	91.62	43.96	0.00
February	26.40	12.96	88.40	38.62	10.00
March	32.22	18.37	85.48	34.92	18.00

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