MASS REARING OF *NEOSEIULUS LONGISPINOSUS* (EVANS)(ACARI:PHYTOSEIIDAE) UNDER FIELD AND LABORATORY CONDITIONS IN HIMACHAL PRADESH IN INDIA

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Abstract :

Various vegetables, fruits and ornamentals are being grown in the polyhouses in Himachal Pradesh in India, which experience heavy damage due to the attack of two spotted spider mite *Tetranychus urticae* (Koch). Indiscriminate use of pesticides against this pest has led to development of resistance and residues problems which are harmful to the human health and causing environmental pollution. So the best available option for the management of mite is the use of natural predators and botanicals. *Neoseiulus longispinosus* (Evans) (Acari: Phytoseiidae) is a one of the natural and potential predator of this mite which can be successfully used to control its population. For maintaining culture of prey and *Neoseiulus longispinosus* under laboratory conditions, excised mulberry leaves were used on wet sponge sheet in Petri plates/trays. In the summer months, multiplication of predator was faster than in the winter months. Total life cycle egg to adult of *N. longispinosus* was between 7 and 14 days in the winter months of November and December. During summer, mass multiplication was done on raised potted bean plants. The predator:prey ratio was found to be 1:30 during July-August to wipe out population of *T. urticae* in a week. During winters, when no mulberry leaves are available and bean plants also die due to cold weather, then culture of the predators was multiplied on the strawberry plants. So the present work is an small effort towards developing some of the economical mass rearing methods of this potential predator.

Introduction :

Alternative methods to chemical pesticides for the control of phytophagous mites under polyhouse conditions include the use of natural enemies especially the predatory mites belonging to family Phytoseiidae and pesticides of biological origin. Augmentative releases of *Neoseiulus longispinosus* play an important role for the control of two spotted spider mites in polyhouses.For this purpose mass rearing of the predator is the most important aspect.

Materials and Methods :

•Mass rearing of prey and predatory mite was done under laboratory conditions on :
1. Mulberry leaves on plastic petri plates
2. Potted bean plants
3. Potted Strawberry plants

• Mass rearing of prey and predatory mite was done under field conditions on the :
1. Bean plants
2. Strawberry plants

Predator : Prey ratio was calculated by putting the fix no. of preys and predators on leaves

Predatory Mite

Prey Mite

Results :

Table 1. Maintenance of culture of *Tetranychus urticae* on the bean plants raised in the poly pots in the winter months.

Stage of bean plant	Number of mites recovered					
	Egg		Larvae/nymphs		Adults	
	Range	Mean	Range	Mean	Range	Mean
2 leaf stage: 3 days after germination	Two pairs phytophagous mite released on every plant					
5 leaf stage: 10 days after release	24-32	27.5	18-32	24.7	2-4	2.7
8 leaf stage: 20 days after release	136-170	155.6	84-114	98.5	18-41	29.7

Mass rearing on potted bean plants in Laboratory

Mass rearing on excised mulberryleaves in plastic trays

Table 3: Multiplication rate of *Neoseiulus longispinosus* on mulberry leaves in the months of November-December.

Days	Number of predators recovered per leaf*			
	Eggs		Nymphs and adults	
	Range	Mean	Range	Mean
0 day	20 eggs kept on the Morus leaves containing sufficient population of *Tarticae*			
After 10 days	12-18	15.0	21-26	23.20
After 15 days	54-72	63.0	33-44	38.0

Table 2: Multiplication rate of *Neoseiulus longispinosus* on mulberry leaves in the months of July-August.

Days	Number of predators recovered per leaf*			
	Eggs		Nymphs and adults	
	Range	Mean	Range	Mean
0 day	20 eggs kept on the morus leaves containing sufficient population of *Tarticae*			
After 7 days	38-54	45.8	26-42	36.0
After 11 days	108-134	120.2	62-81	72.6

Mass rearing on excised mulberry leaves on plastic petri plates

Mass rearing on bean plants in field

Table 4. Multiplication rate of *Neoseiulus longispinosus* on bean plants in the months of November December.

Stage of bean plant	Number of mites recovered					
	Egg		Larvae/nymphs		Adults	
	Range	Mean	Range	Mean	Range	Mean
8 leaf stage, 23 days after germination	Two pairs of *A.longispinosus* released on every bean plant infested with *T. urticae* at 2 leaf stage					
8-11 leaf stage, 33 days after germination	7-12	9.2	8-16	11.7	1-4	2.5
11 leaf stage, 38 days after germination.*	28-41	34.5	31-40	35.0	8-12	10.2

*(Leaves turned almost yellow and some had fallen into the pot)

Mass rearing on potted strawberry plants

Mass rearing on mulberry plants in fields

Mass Culturing of Predators

Predators put on infested leaves and packed in Plasti Jars

Predators ready for transportation to fields

Observations

- The prey mite increase its population from one mite to 140(eggs+nymphs+adults) in 30-35 days when raised on potted plants during winter months, whereas this number is recovered in 25 days in summer months.
- If sufficient food is available to predators, it multiplied from one to 5.5 folds during winters and 9.5 folds during summer months in 11to 15 days on mulberry leaves.
- Predatory mite multiplied from one to 40 adults in 38 days on potted bean plants. It means it multiplied from one to 15.5, faster on potted plants then on excised leaves.
- During winters it is difficult to maintain the culture of predatory mite due to lack of mulberry leaves and slow growth of bean plants, so the culture was maintained on strawberry plants under polyhouse conditions.
- Predator to prey ratio was 1:20 during winter and 1:30 during summer months in a week.
- Transportation of predators were done on bunches of mite infested carnation and rose leaves in plastic jars.