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STUDY OF THE POPULATION DYNAMICS OF *DOLYCORIS INDICUS* STAL AND THE IMPACT OF INFESTATION ON THE HOST PLANTS

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In *Dolycoris indicus* Stal breeding is maximum in summer months and it appears in early March on *Trifolium alexandrium* Linn. After the crop is over, in the absence of suitable host plant it shifts to *Cannabis sativa* Linn. Due to its polyphagous nature and food preference at the milky stage, it soon migrate on the paddy during rainy season. Its maximum population has been observed on the first *i.e. T. alexandrium* and *Oryza sativa* Linn. plants. Seeds after collection are separated into healthy and infested ones and the percentage damage to each crop is 34.65% (*in T. alexandrium*) and 58.8% (in *O. sativa*).

INTRODUCTION

Dolycoris indicus Stal is a polyphagous bug. It shifts its infestation from one host plant to the other. Breeding is maximum during summer months from June to September on respective host plants *i.e.* in June on berseme and later on in September on paddy, resulting in the steep rise of its population. All the nymphs and adults cover the total field mostly near the apices when the host plant shows inflorescence. Naturally these floral apices, which are likely to produce seeds get damaged due to desapping, which results into the death of the vital parts in the young seeds at dough stage and effect the yield of the crop (Esselbaugh, 1948; Graham *et al.*, 1972; Jones *et al.*, 1979 & 1981; Kissam & Mc Caskill, 1975; Kumar, 1999).

Regarding the polyphagous nature, the other host plants include *Ceresium* and wheat where it appears in early March and continue to the April month till now the climatic conditions do not favour its rapid growth and further it shifts to the *T. alexandrium* (berseme, a fodder plant). It grows upto May and June. When population increases very fast in the month of August it shifts its population on *Cannabis sativum* Linn (bhang), maize, jowar and paddy. Its population is maximum on paddy and *T. alexandrium* plants.

MATERIALS AND METHODS

Survey of the infested fields will be carried out by quadrat method. One square meter area is surveyed on all the four corners of the field (10 x 10 m sq) and one in middle. The total number of nymphs and adults on atleast 10 plants on an average are observed making record of the number of nymphs and adults separately in each of the five quadrats and the number is recorded in Table I. These reading are first collected weekly and then average number of infestation is recorded per month. The total number of fluctuations are also calculated (z-value) by using formulae :

$\mathbf{Z} = x \pm \sigma/\sqrt{\mathbf{n}}$ Where $\mathbf{Z}$ = Standard normal variation; x = Arithmetic mean; σ = Standard deviation; $\sqrt{\mathbf{n}}$ = Number of values.

The statistical analysis is further carried out to detect frequency percentage, density and abundance of the population per month. The data has been recorded on monthly basis. Further to record the damage level %. The count and weight of the infested and uninfested seeds on the basis of the yield in the end of the crop 2001 to 2003 years are taken. The data is recorded in Table II. Meterological data has been collected and placed with the month of infestation of the crops.

Table I : Statistical analysis of the data of the population of *Dolycoris indicus* (Hemiptera : Pentatomidae).

Host Plants	Date of field observation	Av. (±mean) bugs*		Temp. (^{0}C)		RH %		Rainfall	Frequency		Density		Abundance	
		Nymph	Adult	Max.	Min.	Max.	Min.	(mm)	N	A	N	A	N	A
T. alexan-Drium Stal	12.6.2001	39.6±1.0	23.6±1.8	36.4	25.4	67	49	000.0	100	100	39.6	23.6	39.6	23.6
	13.6.2002	32.2±3.6	21.0±1.8	34.1	24.9	82	64	027.7	100	100	32.2	21.0	32.2	21.0
	20.6.2003	28.2±3.9	22.2±2.3	34.4	25.0	74	37	000.0	100	100	23.2	22.2	28.2	22.2
Oryza Sativa L.	20.9.2001	24.6±2.2	37.0±2.7	32.0	23.6	92	72	000.0	100	100	24.6	12.4	24.6	12.4
	20.9.2002	27.4±2.3	17.4±2.2	34.3	20.6	92	41	000.0	100	100	29.4	17.4	29.4	17.4
	01.9.2003	20.4±2.2	16.0±3.9	32.6	23.7	95	93	000.0	100	100	20.4	16.0	20.4	16.0

* = In 5 quadrates.

Table II : Damage level percentage on different host plants.

Date of Collection	No. of Heads	No. of seeds		Weight of seeds (mg)		Damage level (%)	Average (%)
		Healthy	Damaged	Healthy	Damaged		
(a) *T. alexandrium*							
28.5.2001	25	1085	385	2.174	0.765	35.19	34.65
30.5.2002	25	1115	398	2.330	0.746	32.02	
10.6.2003	25	1078	396	2.156	0.792	36.73	
(b) *Oryza sativa*							
20.09.2001	5	2841	481	113.364	67.21	59.29	58.8
26.09.2002	5	2829	478	113.160	66.92	59.14	
08.10.2003	5	3091	492	118.640	68.78	57.97	

RESULTS AND DISCUSSION

Population fluctuations have been carried out firstly on *T. alexandrium* in the month of June. The nymphal population is quite high and so it varies from an average number comes 28 to 39 per plant. While the adult population show variations from 21.0 ± 1.8 to 23.6 ± 1.8 *i.e* the prior in the year 2002 and the latter one in the year 2001 but in June 2003 it comes to 22.2 ± 2.3. During the month of June, the maximum temperature ranges from 34.4 to 36.4^{0}C, rainfall may occur or may not occur, if occurs it is 27.7 mm or no rains, humidity may range upto 82% maximum. Under these conditions the frequency of nymph and adult come to 100 each in all the years with the density from 23.2 to 39.6 and abundance in nymphs 28.2 to 39.6 and 21.0 to 23.6 in adults. Likewise, abundance of nymphs varies from 28.2 (in 2003) to 39.6 (in 2001). Similarly, adults show the fluctuations 21.0 (in 2002), 22.2 (in 2003) and 23.6 (in 2001). The above data shows the population fluctuation on berseme crop.

Likewise on *O. sativa* which shows inflorescence during September show fluctuations in the population of nymphs from 20.4 ± 2.2 (in 2003) to 24.6 ± 2.2 (in 2001) and 27.4 ± 2.3 (in 2002). Similarly adult population fluctuates during the same period have been observed 16.0 ± 3.9 (in 2003 to 17.4 ± 2.2 (in 2002) and 37.0 ± 2.7 (in 2001). This fluctuation in population is dependent on rainfall, temperature and R.H. (%) prevailing therein.

The frequency, density and abundance have been calculated. The nymphal and adult frequency percentage, both comes to 100 each while the density of nymphs is minimum in 2003 *i.e.* 20.4 and maximum in 2002 being 29.4 but the adult population density varies from 12.4 (in 2001), 17.4 (in 2002) and falls to 16 (in 2003). Similar relations have been observed in nymphal density also *viz.* 20.4 (in 2003), 24.6 (in 2001) and 29.4 (in 2002). The abundance of population shows maximum value in 2002 at 29.4 nymph and 17.4 adults. Next observation falls in 2001, 24.6 in nymph and 12.4 in adults. While it is minimum in 2003 *i.e.* 20.4 in nymph and adults 16.0. All these data are dependent upon the meteorological conditions and has been recorded in Table I.

Damage level percentage : To study the damage level percentage of the seed, which are the main produce, the seeds production is collected in the field and above 25 samples were collected in each trip on the first plant berseme. The seeds after collection show damaged and healthy seeds both. The numerical count of the seeds per plant is sorted out into healthy and damaged. Their numbers are counted and then weighed. By this observation the percent damage is calculated. Which varies on the yearly basis and ranges from 32.2 to 73% during these observations. Likewise in *O. sativa* five plants are taken in each case and total number of healthy and damaged rice grains are recorded and weighed separately and damage level varies from 57.97% (in 2003), 59.29% (in 2001) and 59.14% (in 2002) (Table II; Fig. 1).

The infestation recorded in the Table II show slight variations because both the crops are in flowering and fruiting stage in the months of June and September each. The damage level % of the two crops likewise on the basis of their yields have also been recorded showing minor fluctuations on the yearly basis. Thus *D. indicus* caused damage to the produce of the host plants studied. However, actual damage may be quite high, because desapping of the food material from the developing inflorescence make physical impact *i.e.* seeds are shriveled but in the long run when the seeds are sown next year, the cultivator is not sure whether the infested seeds will sprout into seedlings or not. Thus, the impact of heavy infestation of both the host plants by nymphs and adults tell upon the growth of plants and cause economic loss to cultivators.

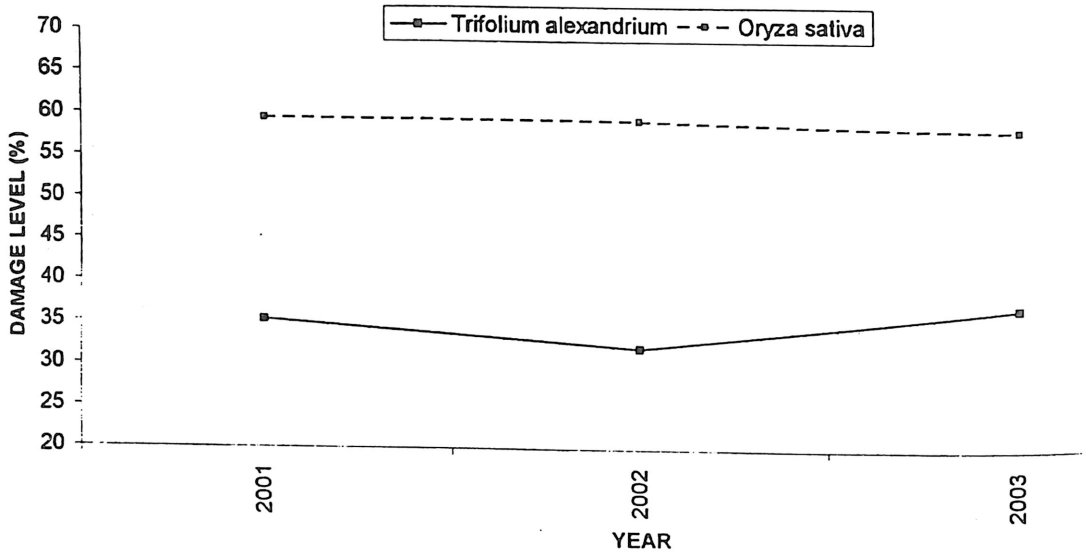

Fig. 1. Graphical representation of the damage level percentage.

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