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## Managment of defolistors on groundnut through newer insecticides

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**Abstract**

A field experiment on bio-efficacy of newer chemical insecticides against defoliator pests was carried out at Oilseeds Research Station, Latur, Maharashtra during *kharif*, 2012 in randomized block design (R.B.D.) with eight treat ments *Viz.*, Rynaxypr 20 SC (100 ml/ha), Flubendiamide 480 SC (150 ml/ha), Spinosad 45 SC (175 ml/ha), Thiodicarb 80 DF (1000 ml/ha), Novaluran 10EC (1000 ml/ha), Dichlorvos 76 WSC (625ml/ha), Chlorpyrifos 20 EC (1500 ml/10 lit) and untreated Control. The experimental results indicated that Spinosad 45 SC @175 ml/ha was found significantly superior for control of defoliators was followed by the treatment of Rynaxypr 20 SC @100 ml/ha and Novaluran 10EC @1000 ml/ha. The highest pod yield was recorded by Spinosad 45 SC @175 ml/ha *i.e.* 3931kg/ha and was followed by Rynaxypr 20 SC@100 ml/ha (3382 kg/ha).

**Keywords:** Managment, defolistors, groundnut through newer insecticides

**Introduction**

Groundnut (*Arachis hypogaea* Linnaeus) is a leguminous oilseed crop and its native is South America. It was first found in Brazil or Peru as early as 950 BC and later spread to Africa, North America, Europe and Asia. The major groundnut producing countries are China, Nigeria, USA, Taiwan, Indonesia, Senegal, Ghana, Argentina and Brazil. It is the most important commercial oilseed crop mostly grown in the semi-arid tropical region like India. In India during 2015 groundnut crop was grown on 37.054 lakh hectares area with 57.289 lakh tons of production and 1546 kg per hectare productivity. In Maharashtra, the area under groundnut cultivation was 1.86lakh hectare with production of 1.89 lakh metric tons and productivity comprises 1016 kg per hectare (Annonymous, 2015).

One of the major constraints that limit groundnut productivity is the excessive damage caused by lepidopteran pests, the major ones being tobacco caterpillar, *Spodoptera litura* F. (Noctuidae: Lepidoptera) and pod borer, *Helicoverpa armigera* (Noctuidae: Lepidoptera). Both caterpillar are active during the vegetative stage and over 50% defoliation is common in certain favourable years. The avoidable yield loss due to major insect -pests of groundnut was recorded to the tune of 48.57 per cent in pod and 42.11 per cent in fodder (Dabhade *et al.*, 2012) [4]. Significant yield reduction to the extent of 26.74 per cent was recorded in groundnut due to pest (Jayewar *et al.*, 2017) [6]. Various methods have been tried for the management of defoliator pests but use of chemical method is an important approach for their management because of its quick action, effectiveness and adaptability to various situations.

In this context, label claimed insecticides with some new insecticides were evaluated against defoliator pests of groundnut.

**Materials and Methods**

Field experiment was conducted during *Kharif* season of the year 2012 to evaluate bio-efficacy of newer chemical insecticides against defoliator at Oilseeds Research Station, Latur, Maharashtra with eight treat ments *Viz.*, Rynaxypr 20 SC (100 ml/ha), Flubendiamide 480 SC (150 ml/ha), Spinosad 45 SC (175 ml/ha), Thiodicarb 80 DF (1000 ml/ha), Novaluran 10EC (1000 ml/ha), Dichlorvos 76 WSC (625ml/ha), Chlorpyrifos 20 EC (1500 ml/10 lit) in Randomized Block Design with three replications. The crop was sown at the spacing of 30 cm x 10 cm having gross and net plot size was 5 x 4.2 m<sup>2</sup> and 4.8 x 3.6 m<sup>2</sup>, respectively. All the agronomical practices were followed as per recommendations. Spray of insecticides with help of manually operated knapsack sprayer was given after the appearance of the pests.

**Preparation and application of spray liquid**

The spray liquid of chemical insecticides of desired concentrations were freshly prepared in the field before spraying operation.

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The quantity of spray material required for coverage of crop was gradually increased as the stage of crop advanced. The desired concentration of insecticide was prepared by using the following formula

$$V = \frac{C \times A}{\% \text{ a.i.}} \times 10000$$

Where,

V = Volume of commercial insecticide

C = Concentration of the spray liquid required

A = Amount of spray solution needed

% a.i. = % of active ingredient in commercial product of insecticide

Calculated quantity of insecticides and biopesticides was added in measured quantity of water as per their required concentrations to be used in the experiments. The solutions were thoroughly mixed in the plastic buckets and then poured in the sprayer for application. Before application of another insecticide, sprayer was washed by flushing sufficient clean water. Moreover, in untreated plots plain water was sprayed. Spraying was done during morning hours.

### Methods of recording observations

Ten plants were selected randomly from each plot and the defoliator population was recorded 1 day before and 1,7 and 15 days after each spraying. In order to compare the treatment effect based on generated data of field experiments, the natural counts were subjected to transformation as per the statistical methods suggested by Panse and Sukhatme, 1967. The data obtained in number was transformed using Poisson formula ( $\sqrt{x+0.5}$ ) and subjected to further analysis.

The yield data was recorded from all the treatments and subjected to statistical analysis for interpretation of results

### Results and Discussion

Data recorded before spray suggest uniform distribution of the pest as there was no significant difference was observed among treatments (Table 01). Whereas after spray data shows significant differences in defoliators population in all treatments due to the effect of various insecticides. Plots treated with Spinosad 45 SC @175 ml/ha registered least number of defoliators (0.00, 0.13 and 0.33 defoliators/plant) at 1, 7, and 15 DAS respectively which was sharply followed by Rynaxypr 20 SC @100 ml/ha (0.57, 0.33 and 0.47 defoliators/plant). The next best treatments in order of effectiveness at one day after spray were Thiodicarb 80 DF @1000 ml/ha, Novaluran 10EC (1000 ml/ha). Dichlorvos 76 WSC (625ml/ha), Chlorpyrifos 20 EC (1500 ml/10 lit) and Flubendiamide 480 SC (150 ml/ha) proved least effective against defoliators but still these treatments were significantly superior over untreated control (water spray) in defoliators management. Whereas trend of effectiveness of insecticides noticed at seven and fifteen days after sprays was Spinosad 45 SC, Rynaxypr 20 SC, Novaluran 10EC, Thiodicarb 80 DF. These treatments were followed by Chlorpyrifos 20 EC, Dichlorvos 76 WSC and Flubendiamide 480 SC which were found equally effective in suppressing the defoliators population (Table 01). Similarly highest pod yield was recorded by Spinosad 45 SC @175 ml/ha i.e. 3931kg/ha and was followed by Rynaxypr 20 SC @100 ml/ha (3382 kg/ha). Earlier, Similar result of efficacy of chlorpyrifos against *Spodoptera litura* are reported by Harish *et al.*, (2009) [5], Chauhan *et al.*, (2015) [3], Nukala *et al.* (2015) [7] and Bhadane *et al.*, (2016) [2] and Vummadisetty *et al.* (2010) [9] who stated that Spinosad 0.018% and indoxacarb 0.015% proved their superiority over other treatments in efficacy against both defoliators and capsule borers as well as in resulting higher yields.

**Table 1:** Evaluation of new molecules for the control of defoliators of groundnut

Treatments	Defoliators / 10 plants				
	B.S.	One DAS	Seven DAS	Fifteen DAS	Yield Kg/Ha
Rynaxypr 20 SC 100 ml/ha	6.87(2.71)	0.57(1.03)	0.33(0.91)	0.47(0.98)	3382
Flubendiamide 480 SC (150 ml/ha)	6.73(2.69)	3.60(2.02)	3.60(2.02)	3.23(1.93)	2868
Spinosad 45 SC 175 ml/ha	6.47(2.64)	0.00(0.71)	0.13(0.80)	0.33(0.91)	3931
Thiodicarb 80DF 1000ml/ha	7.27(2.79)	1.97(1.57)	1.83 (1.53)	1.83 (1.53)	3054
Novaluran 10EC (1000 ml/ha)	6.67(2.68)	2.67(1.78)	1.47(1.40)	1.30(1.34)	3240
Dichlorvos 76 WSC (625ml/ha)	6.73(2.69)	3.33(1.96)	2.57(1.75)	3.13(1.91)	2895
Chlorpyrifos 20 EC (1500 ml/10 lit)	7.33(2.80)	3.47(1.99)	2.27(1.66)	2.57(1.75)	3002
Control	6.60(2.66)	7.40(2.81)	8.33(2.97)	8.33(2.97)	2782
S.E. ±	NS	0.06	0.08	0.09	147
C.D. at 5 %		0.18	0.24	0.28	445
C.V. %		6.03	8.37	9.78	8.08

Figures in the paranthesis are square root transformed values

### Conclusion

On the basis of results obtained in the present investigation Spinosad 45 SC @175 ml/ha Rynaxypr 20 SC @100 ml/ha and Novaluran 10EC @1000 ml/ha were found most effective in defoliators management and given highest yield.

However, these findings are based upon one years studies and for confirmation and validation of results further studies are necessary.

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