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Evaluation of the insecticides against okra petiole maggot (*Melanagromyza hibisci* Spencer)

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Abstract
The different 7 insecticides *viz*. Fipronil 0.3 G @ 50g a.i./ha, Chlorantraniliprole 0.4 G @ 40 g a.i./ha, Cartap hydrochloride 4 G @ 1000 g a.i./ha, Imidacloprid 17.8 SL @ 22.25 g a.i./ha, Spinosad 45 SC @ 70 g a.i./ha, Deltamethrin 2.8 EC @ 12.5 g a.i./ha, Thiomethoxam 25 WDG @ 25 g a.i./ha were tested against okra petiole maggot, *Melanagromyza hibisci*, at Bilaspur (C.G.). Fipronil 0.3 G @ 50 g a.i./ha applied at the time of sowing was found most effective insecticide against okra petiole maggot based on petiole, stem and petiole + stem damage as it recorded lowest per cent plant infestation based on petiole(03.07%), stem (00.56%) and petiole + stem damage (03.62%) respectively in comparison to control plot. While the Thiomethoxam 25 WDG @ 25 g a.i./ha was found less effective based on petiole damage (07.50%), stem damage (03.62) and petiole + stem damage (10.84%) respectively.

Keywords: *Melanagromyza hibisci* spencer, okra petiole maggot, evaluation insecticides

1. Introduction
Okra *Abelmoschus esculentus* L. (Moench) is one of the most important vegetable crop grown extensively in India. The different insect-pests attacking the okra crop were major constraint in bumper production as the crop get infested by several insect-pests *viz*. *Amarasca biguttula*, *Earia vittella*, *Melanagromyza hibisci*, *Aphis gossypii*, *Bemisia tabaci*, *Nezara viridula*, *Tetranychus telaris*, *Dysdercus koenigii*, *Mylabris postulate*, *Anomis flava*, *Myllocerusundecim pustulanthus* and *Sylepta derogata* (Dhamdhere *et al*. (1984) [1].
The pest was also found to infest the okra crop in Karnataka (Nair, 1986), Kumar and Srinivasan (1987) [2], M.P. (Tomar, 1998) [5], U.P. (Sehgal 1987) [4].
The okra petiole maggot, *Melanagromyza hibisci* Spencer is attaining serious pest status as it causes severe damage to the main stems of young plants leads to swelling in stems due to tunneling by maggots, sometimes causes mortality in plants if they infested in very young stage particularly in okra crop grown during rabi season. Looking to the wide spread and its damage to the crop, the present study was under taken.

2. Materials and Methods
A field experiment was conducted at BTC Cars Bilaspur during rabi 2016-17. The experiment was laid out in Randomized block design, replicated three times with seven insecticide treatments and one untreated control. The variety Super green was sown in a plot size of 4.2×3 m. with planting distance of 30×10 cm, during December, 2016. The granular insecticides were applied at the time of sowing while liquid insecticides after the germination with the help of knapsack sprayer and second spray was done 20 days after the first spray. The post treatment observations were recorded on incidence of okra petiole maggot at 5, 10 and 15 days after treatment on one meter row length in each treatment. Total 3 observations were recorded from each treatment.

3. Results Discussion
Performance of insecticides against okra petiole maggot were evaluated on the basis of following parameters.

3.1 Plant infestation based on petiole damage
No plant infestation based on petiole damage was noticed in any treatment including untreated control at 5 and 10 days after the first spray. The Fipronil 0.3 G @ 50g a.i./ha applied at the time of sowing was found most effective insecticide with lowest plant infestation (03.07%)

and Thiomethoxam 25 WDG @ 25 g a.i./ha (07.50%) were found less effective at 15 days after treatment. The significantly higher damage (13.34%) was observed in untreated control plot.

3.2 Plant infestation based on stem damage

During the observations at 5 and 10 days after first spray no Plant infestation based on stem damage was noticed in any treatment including untreated control. There was significant difference in insecticides evaluated against okra petiole maggot, *M. hibisci* Spencer as far as per cent plant infestation based on stem damage was concerned. The lowest 00.56 per cent plant infestation based on stem damage was observed in Fipronil 0.3 G @ 50g a.i./ha followed by Spinosad 45 SC @ 70 g a.i./ha (01.39 %), Cartap hydrochloride 4 G @ 1000 (01.39 %), Imidacloprid 17.8 SL @ 22.25 g a.i./ha (01.40 %) and Deltamethrin 2.8 EC @ 12.5 g a.i./ha (01.67 %) while the highest 03.62 per cent plant infestation based on stem damage was observed in insecticide Thiomethoxam 25 WDG @25 g a.i./ha among the insecticides evaluated.

Table 1: Effect of different insecticides on Plant infestation based on mean petiole damage, mean stem damage and mean Petiole + Stem damage by *M. hibisci* Spencer

Treatments	Per cent Plant infestation		
	Plant infestation based on petiole	Plant infestation based on stem	Plant infestation based on petiole+stem
Fipronil 0.3 G	03.07 (09.92) ^{d}	00.56 (03.50)^{d}	03.62 (10.72) ^{d}
Chlorantraniliprole 0.4 G	06.39 (14.59) ^{bc}	02.23 (08.54)^{abc}	08.34 (16.76) ^{bc}
Cartap hydrochloride 4 G	05.83 (13.95) ^{bc}	01.39 (05.51)^{cd}	06.95 (15.19) ^{c}
Spinosad 45 SC	04.46 (11.85) ^{cd}	01.39 (05.51)^{cd}	05.85 (13.90)^{cd}
Imidacloprid 17.8 SL	04.73 (12.48) ^{cd}	01.40 (06.54)^{bcd}	06.12 (14.31)^{c}
Thiomethoxam 25 WDG	07.50 (15.84) ^{b}	03.62 (10.85)^{ab}	10.84 (19.16) ^{b}
Deltamethrin 2.8 EC	05.83 (13.95) ^{bc}	01.67 (07.42)^{abcd}	07.22 (15.56) ^{c}
Untreated control	13.34 (21.40)^{a}	04.17 (11.74)^{a}	17.51 (24.72)^{a}
SEm±	01.09	01.61	01.05
CD (5%)	(03.35)	(04.94)	(03.21)

*The data in the parentheses are angular transformed values

Plate 1: Symptoms of petiole infestation by okra petiole maggot, *M. hibisci* Spencer

Plate 2: Healthy and infested Stem of okra showing swelling caused by *M. hibisci* Spencer

3.3 Plant infestation based on petiole+ stem damage

At 5 and 10 days after first spray no plant infestation by *M. hibisci* Spencer was noticed in any treatment including untreated control.

Among the insecticides evaluated, Fipronil 0.3 G @ 50g a.i./ha applied at the time of sowing was the most effective insecticide treatment with 03.62 per cent plant infestation based on petiole + stem damage followed by Spinosad 45 SC @ 70 g a.i./ha (05.85 %) applied after germination. The other insecticides Imidacloprid 17.8 SL @ 22.25 g a.i./ha (06.12 %), Cartap hydrochloride 4 G @ 1000 (06.95 %), Deltamethrin 2.8 EC @ 12.5 g a.i./ha (07.22 %) were found in decreasing order in their efficacy on plant infestation based on petiole + stem damage. The insecticides Chlorantraniliprole 0.4 G @ 40 g a.i./ha (08.34 %) and Thiomethoxam 25 WDG @ 25 g a.i./ha (10.84 %) were found less effective. The maximum 17.51 per cent plant infestation based on petiole + stem damage was recorded in untreated control.

4. Reference

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