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EFFICACY ASSESSMENT OF SYNTHETIC INSECTICIDES AGAINST MAJOR SUCKING PESTS OF CLUSTER BEAN

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ABSTRACT:

An investigation on evaluation of various synthetic insecticides against sucking insect pests of cluster bean was carried out at College of Agriculture Business management, Narayangaon during summer 2025. Among the tested nine synthetic insecticide, the higher effectiveness was observed with the application of clothianidin 50 WDG (0.025%) and thiamethoxam 25 WG (0.0125%) against jassid and whitefly, and with imidacloprid 70 WG (0.015%) against jassids and spiromesifen 240 SC (0.0192%) against whitefly. Fipronil 5 SC (0.005%), acephate 75 SP (0.075%) and carbosulfan 25 EC (0.025%) effectively managed thrips on cluster bean.

KEYWORDS: Synthetic insecticides, sucking insect pests, cluster bean

INTRODUCTION:

The cluster bean, *Cyamopsis tetragonoloba* (Linnaeus) Taubert is an important seed as well as vegetable crop, which belongs to family fabaceae. The crop regularly damaged by jassid (*Empoasca kerri* Pruthi), whitefly (*Bemisia tabaci* Gennadius) and thrips (*Megaleurothrips distalis* Karny) like sucking insect pests in Gujarat, Butani (1979). The information on efficacy of synthetic insecticides against sucking insect pests of cluster bean is scanty in maharashtra. Therefore to find out the effect of synthetic insecticides on sucking insect pests of cluster bean, the present study was carried out.

OBJECTIVE OF STUDY

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1. To evaluate and compare the bio-efficacy of various synthetic insecticides against major sucking insect pests (jassid, whitefly, and thrips) infesting cluster bean (Cyamopsis tetragonoloba) under field conditions during the summer season.
2. To identify the most effective synthetic insecticides for the management of sucking insect pests in cluster bean, aiming to recommend appropriate chemical control measures to reduce pest incidence and enhance crop protection.

MATERIALS AND METHODS

In order to study the bio-efficacy of newer insecticides (Table 1) against sucking insect pests of cluster bean, a field experiment was laid out during the 2nd week of February in a Randomized Block Design, with three replication having plot size of 3.00 X 2.25 m during summer 2010 at College Farm, CABM, Narayangaon. Cluster bean variety Pusa Navbahar was sown at a distance of 45 x 15 cm.

First spray application of newer insecticides was applied on the crop at appearance of the pest and subsequently two spray were given at 10 day interval using manually operated knapsack sprayer having duromist nozzle.

For recording observations, 10 plant were selected randomly and tagged in each net plot area per replication. The observations on sucking insect pests (jassid, whitefly, thrips and aphid) were recorded prior to spray as well as 3, 7, 10 and 15 day after each spray.

RESULTS AND DISCUSSION

Nine different synthetic insecticides were evaluated for their bio-efficacy against sucking insect pests (jassid, whitefly and thrips) of cluster bean. Pest population recorded before the application of insecticides showed non-significant results indicating uniform distribution of insect pests in all the experimental plots. Further, the results also revealed that the pest incidence was significantly reduced in all the plots treated with synthetic insecticides as compared to control up to 15 day of spray and pooled over period and sprays during summer season.

Jassid (*E. kerri*)

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The higher effectiveness was noted in the treatment of clothianidin (1.38) and it was at par with thiamethoxam (1.96) and imidacloprid (2.06) after 3 day of spray (Table 2). Thiacloprid, acephate and carbosulfan treated plots exhibited 3.00 to 3.10 jassid per 3 leaves and they were equally effective as thiamethoxam and imidacloprid. The higher (3.62) incidence was recorded in the treatment of ethion and it was at par with spiromesifen (3.46) and fipronil (3.38). After 7 day of spray, clothianidin (1.04) showed higher effectiveness against *E. kerri* followed by thiacloprid (1.40), thiamethoxam (1.54) and spiromesifen (1.60). Acephate and ethion registered 2.16 and 2.53 jassid per 3 leaves, respectively and they were equally effective as spiromesifen. The highest (3.03) incidence was noticed in the treatment of carbosulfan followed by fipronil (3.00) and imidacloprid (3.00).

The lowest *E. kerri* population was noticed in the treatment of clothianidin after 10 (0.54) and 15 day of spray (0.27) and it was at par with thiamethoxam and imidacloprid (Table 2). Carbosulfan, thiacloprid and acephate treated plots exhibited 2.09 to 2.32 jassid per 3 leaves after 10 day of spray and 1.81 to 2.03 jassid per 3 leaves after 15 day of spray. Ethion treated plots recorded higher incidence of *E. kerri* followed by spiromesifen, fipronil and acephate.

Pooled over period and sprays results (Table 2) revealed significantly higher (0.80 jassids/3 leaves) effectiveness of clothianidin than rest of the insecticidal treatments except thiamethoxam (Fig. 1). Imidacloprid (1.81), thiacloprid (2.12), acephate (2.36), carbosulfan (2.46) and spiromesifen (2.49) were equally effective as thiamethoxam in checking the pest incidence on cluster bean. The higher (2.89) population of *E. kerri* was registered in the plots treated with ethion followed by fipronil (2.81) and spiromesifen (2.49).

Whitefly (*B. tabaci*)

Plots treated with spiromesifen registered lowest (1.61) population of *B. tabaci* on cluster bean and it was at par with clothianidin (1.81) after 3 day of spray (Table 3). Thiamethoxam (2.53) and thiacloprid (1.78) were equally effective as clothianidin in checking the incidence of *B. tabaci*. Acephate and imidacloprid treated plots recorded 3.00 and 3.46 whitefly per three leaves. The highest (4.21) incidence of *B. tabaci* was noted in the plots treated with carbosulfan followed by ethion(3.87), fipronil (3.74) and imidacloprid (3.46). After 7 day of spray, spiromesifen (1.09) stood first in controlling the pest and it was

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at par with clothianidin (1.30). Thiamethoxam (2.00), thiacloprid (2.12), acephate (2.46) and imidacloprid (2.89) were equally effective in checking the *B. tabaci* incidence. Among the evaluated insecticidal treatments, carbosulfan registered higher (3.68) incidence of *B. tabaci* followed by ethion (3.34) and fipronil (3.19).

The lowest (0.78) whitefly population was found in plots treated with spiromesifen and it was at par with clothianidin (1.04) after 10 days of spray (Table 3). Thiamethoxam (1.72) and thiacloprid (1.87) were equally effective as clothianidin as well as at par with acephate and imidacloprid in checking *B. tabaci* incidence on cluster bean. Higher (3.42) population of *B. tabaci* recorded in plots treated with carbosulfan followed by ethion, fipronil and imidacloprid. More or less similar trend of effectiveness was observed after 15 day of spray. Spiromesifen treated plots recorded 0.58 whitefly per 3 leaves and it was at par with clothianidin (0.82) and thiamethoxam (1.43). Thiacloprid (1.84), acephate (2.00) and imidacloprid (2.46) were equally effective as thiamethoxam in checking *B. tabaci* incidence. Higher (3.22) population of *B. tabaci* was found in plots treated with carbosulfan followed by ethion and fipronil.

Pooled over period and sprays results (Table 3 and Fig. 1) showed higher effectiveness of spiromesifen (0.99) and it was at par with clothianidin (1.22). These two insecticides were significantly more effective than rest of the insecticidal treatments. Thiamethoxam (1.90) and thiacloprid (2.12) were at par in checking the *B. tabaci* incidence on cluster bean crop. Acephate (2.39) was equally effective as thiacloprid as well as at par with imidacloprid (2.85) in reducing the whitefly population. The highest (3.62) population of whitefly was recorded in plots treated with carbosulfan and it was at par with ethion and fipronil.

Thrips (*M. distalis*)

The treatments of fipronil registered lowest (1.57) population of *M. distalis* and it was at par with acephate (1.90) and carbosulfan (1.96) after 3 day of spray (Table 4). Clothianidin (2.46) treated plots were found equally effective as acephate and carbosulfan. The higher (3.38) incidence of *M. distalis* was noted in the treatment of spiromesifen followed by thiacloprid (3.07), thiamethoxam (2.96) and imidacloprid (2.89). After 7 day of spray, fipronil (0.52) stood first in controlling the *M. distalis* population and it was at par with

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acephate (0.82) and carbosulfan (1.04). These three treatments were significantly superior to rest of the insecticidal treatments. Ethion, thiamethoxam and spiromesifen treated plots noticed thrips population between 2.50 and 2.70 per 3 leaves. Among the evaluated insecticidal treatments, thiacloprid registered higher (2.89) population of *M. distalis* followed by clothianidin (2.78) and imidacloprid (2.78).

Fipronil (0.09), acephate (0.46) and carbosulfan (0.52) were equally effective in reducing the incidence of *M. distalis* and they were significantly superior to rest of the insecticidal treatments after 10 day of spray (Table 4). Ethion, clothianidin and thiamethoxam treated cluster bean plots registered 2.00, 2.06 and 2.12 thrips per 3 leaves, respectively. The higher (2.78) population of *M. distalis* was found in plots treated with spiromesifen followed by thiacloprid (2.49) and imidacloprid (2.29). More or less similar trend of effectiveness was noticed after 15 day of spray. Fipronil (0.08), acephate (0.17) and carbosulfan (0.27) were more effective against thrips on cluster bean. Imidacloprid, ethion, thiamethoxam and spiromesifen treated plots exhibited 1.96 to 2.32 thrips per 3 leaves. Clothianidin and thiacloprid treated plots registered higher (2.49) population of the pest.

Pooled over period and sprays results (Table 4 and Fig. 1) showed higher effectiveness of fipronil (0.50) and it was at par with acephate (0.75) and carbosulfan (0.87) in controlling the *M. distalis* incidence on cluster bean crop. These three insecticidal treatments were found significantly superior to rest of the insecticidal treatments. Ethion, thiamethoxam, clothianidin and imidacloprid treatments recorded 2.36 to 2.46 thrips per 3 leaves. The higher (2.78) population of *M. Distalis* was noticed in the treatment of spiromesifen followed by thiacloprid (2.74).

CONCLUSION

The higher effectiveness was observed with the application of clothianidin 50 WDG (0.025%) and thiamethoxam 25 WG (0.0125%) against jassid and whitefly, whereas imidacloprid 70 WG (0.015%) against jassids and spiromesifen 240 SC (0.0192 %) against whitefly. Fipronil 5 SC (0.005%), acephate 75 SP (0.075%) and carbosulfan 25 EC (0.025%) effectively managed thrips on cluster bean. Thiacloprid 48 SC (0.012%) and ethion 50 EC (0.05%) were found less effective against sucking insect pests of cluster bean. Carbosulfan, acephate and fipronil were observed comparatively less effective against jassid and whitefly

on cluster bean. Spiromesifen was noticed poor in suppressing the jassid and thrips, whereas imidacloprid against whitefly and thrips. Clothianidin and thiamethoxam were observed less effective against thrips on cluster bean.

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