BIO EFFICACY OF BOTANICALS AGAINST MAJOR INSECT PESTS OF SESAME

Abstract

The oldest oil seed crop in India is sesame, which is grown in semi-arid tropical, subtropical, and temperate climates. It is produced over an area of 17.14 million hectares, yielding 7.84 million tonnes, at a productivity of 457 kg/ha. The harm caused by insect pests is one of the main obstacles to sesame production. Shoot webber and capsule borer, *Antigastracatalaunalis*Duphonchel, and leafhopper, *Orosiusalbicinctus* Distant, are two of the insect pests of sesame that are regarded as being the most significant in terms of inflicting economic harm. In light of this, research was done to control sesame pests at Regional Research Station, Vriddhachalam in 2019–2020. The bioefficacy of botanicals, particularly pungam and neem products, in comparison to inorganic pesticide on pest insects that damage sesame was tested in the field. Azadirachtin 10000 ppm at 1.5 ml/lit, PODF at 1 ml, 2 ml, and 3 ml/lit, quinalphos 25 EC at 2 ml/lit, and untreated check were the treatments. Four times each of the six treatments were reproduced in a Randomised Block Design with a 5.4 × 4 m plot size. The study's findings showed that the lowest mean population of shoot webber was obtained by quinalphos 25 EC@ 2 ml/lit (0.91 no./plant), followed by azadirachtin 10000 ppm @ 1.5 ml/lit and PODF@ 3 ml/lit (1.03 &1.05 no./plant), in that order. The leaf hopper (1.15, 1.28, &1.33 no./plant, respectively) showed the similar pattern. Quinalphos 25 EC@ 2 ml/lit caused the least amount of plant damage (9%) followed by azadirachtin 10000 ppm @ 1.5 ml/lit (11.7%). Azadirachtin compared favourably to PODF@3 ml/lit. Instead than being used alone, botanicals should be properly incorporated into a management system.

Key Words: *Botanicals, Bio Efficacy, Shoot webber, Leaf hopper, Sesame, Pest Suppression*

Introduction

The most native oilseed crop in the world and a significant oilseed crop in India is sesame, SesamumindicumLinn (Biswas*et al*., 2018). The enormous damage caused by insect pests is one of the main obstacles to the production of sesame. Shoot webber and capsule borer, AntigastracatalaunalisDuphonchel, and leafhopper, Orosiusalbicinctus Distant, are two of the insect pests of sesame that are regarded as being the most significant in terms of inflicting economic harm. Damage from antigastra occurs from the second week of planting till the capsule stage. Leaf hopper nymphs and adults ingest the cell sap from leaves, flowers, and pods (Mohamed *et al*., 2022). This downward curling of the leaf edges causes the margins to turn red, hinder the growth of the plants, give the crop a sickly look, and cause the leaf tissue to grow abnormally (Stevens *et al*., 2018). The use of botanicals in eco-friendly insect pest management techniques improves pest control to produce production and quality that are sustainable, as well as monitoring advantages for farmers and a more environmentally friendly world (Tennhardt*et al*., 2022). In light of this, research was done to control sesame pests at Regional Research Station, Vriddhachalam.

Materials and Methods

The bioefficacy of botanicals, particularly pungam and neem products, in comparison to inorganic pesticide on pest insects that damage sesame was tested in the field. Azadirachtin 10000 ppm at 1.5 ml/lit, PODF at 1 ml, 2 ml, and 3 ml/lit, quinalphos 25 EC at 2 ml/lit, and untreated check were the treatments. Four times each of the six treatments were reproduced in a Randomised Block Design with a 5.4 × 4 m plot size. With the exception of plant protection measures, the whole suggested package of practises was followed. Ten plants from each replication of each of the seven treatments were randomly chosen for observation during the vegetative, blooming, and capsule periods. Observations on leaf hopper population, incidence of Antigastra population, and damage (%) were made. The pooled mean was calculated. While harvesting, seed yield was noted in order to compute cost economics.

Results and Discussion

The findings showed that the lowest mean population of shoot webber was observed by quinalphos 25 EC@ 2 ml/lit (0.91 no./plant), followed by azadirachtin 10000 ppm @ 1.5 ml/lit and PODF@ 3 ml/lit (1.03 &1.05 no./plant), in that order. The leaf hopper (1.15, 1.28, &1.33 no./plant, respectively) showed the similar pattern. Quinalphos 25 EC@ 2 ml/lit caused the least amount of plant damage (9%) followed by azadirachtin 10000 ppm @ 1.5 ml/lit (11.7%). Azadirachtin compared favourably to PODF@3 ml/lit.

The effectiveness of certain indigenous product compositions against sesame pests, particularly sucking pests, was examined. According to Ahirwar and colleagues (2010), two foliar sprays of natural and indigenous products, namely neem seed kernel extract (in cow urine) @ 30 ml/l, neem oil @ 10 ml/l, and neem leaf extract (in cow urine) @ 30 ml/l, may be used to manage the incidence of sucking pests of sesame, jassid, mirid bug, and whitefly. For efficient and cost-effective management of the leaf webber, farmers of sesame grown under rainfed conditions are suggested to use two sprays of 3% Neem Seed Kernel Extract (300 g/ 10 lit water) (JAU, 2013). The Spodopteralitura larvae (Soosaimanickam and Ignacimuthu) were subjected to an oil formulation of PONNEEM (Pungam and Neem), which demonstrated effective antifeedant and growth control actions.According to Pavela and Herda (2007), pongam oil works well to ward off the common greenhouse whitefly (Trialeurodesvaporariorum Westwood).

Conclusion

Quinalphos 25 EC@ 2 ml/lit caused the least amount of plant damage (9%) followed by azadirachtin 10000 ppm @ 1.5 ml/lit (11.7%). Azadirachtin compared favourably to PODF@3 ml/lit. Instead than being used alone, botanicals should be properly incorporated into a management system to bring out best results.

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Table 1. Bio efficacy of Pongamia oil derived formulation (PODF) against major insect pests of sesame (Pooled mean of *kharif* 2019 and *rabi* 2020)

S.No.	Treatments	Shoot webber, *Antigastra catalaunalis*									
		Population/plant					Per cent damage				
		PTC (30 DAS)	Plant (37 DAS)	Flower (45 DAS)	Capsule (70 DAS)	Mean	PTC (30 DAS)	Plant (37 DAS)	Flower (45 DAS)	Capsule (70 DAS)	Mean
T_1	Azadirachtin 10000 ppm @ 1.5 ml/lit	1.80 (1.67)	1.15 (1.46)	1.08 (1.44)	0.85 (1.36)	1.03 (1.42)	17.53 (24.70)	14.19 (22.07)	15.54 (23.16)	5.41 (13.17)	11.71 (19.93)
T_2	PODF @ 1 ml/lit	1.70 (1.64)	1.38 (1.54)	1.33 (1.52)	1.03 (1.42)	1.25 (1.50)	18.61 (25.51)	15.03 (22.75)	17.43 (24.63)	6.64 (14.73)	13.03 (21.09)
T_3	PODF @ 2 ml/lit	1.65 (1.63)	1.25 (1.50)	1.25 (1.50)	0.93 (1.39)	1.14 (1.46)	19.33 (26.04)	14.35 (22.20)	16.14 (23.63)	7.12 (15.30)	12.54 (20.66)
T_4	PODF@ 3 ml/lit	1.60 (1.61)	0.98 (1.40)	1.18 (1.47)	1.00 (1.41)	1.05 (1.43)	18.16 (25.18)	16.00 (23.52)	14.86 (22.61)	4.51 (11.87)	11.79 (20.00)
T_5	Quinalphos 25 EC @ 2ml/lit	1.70 (1.64)	0.85 (1.36)	1.08 (1.44)	0.80 (1.34)	0.91 (1.38)	16.54 (23.95)	11.00 (19.28)	12.06 (20.24)	3.94 (10.93)	9.00 (17.33)
T_6	Untreated check	1.90 (1.70)	2.18 (1.78)	2.85 (1.96)	3.33 (2.08)	2.79 (1.94)	17.99 (25.05)	24.79 (29.83)	26.03 (30.65)	13.26 (21.28)	21.36 (27.49)
	C.D.	0.003	0.013	0.015	0.022	0.022	0.059	0.313	0.284	1.049	0.38
	SE(m)	0.001	0.004	0.005	0.007	0.007	0.02	0.103	0.093	0.345	0.125
	SE(d)	0.001	0.006	0.007	0.01	0.01	0.028	0.146	0.132	0.488	0.177
	C.V.	0.104	0.585	0.651	0.965	0.943	0.156	0.885	0.773	4.74	1.186

*Figures in parenthesis are square root/arc sin transformed values

Table 2. Bio efficacy of Pongamia oil derived formulation (PODF) against major insect pests of sesame (Pooled mean of *kharif* 2019 and *rabi* 2020)

S.No.	Treatments	Leaf Hopper Population/plant				Yield (Kg/ha)
		PTC (30 DAS)	Plant (37 DAS)	Flower (45 DAS)	Mean	
T_1	Azadirachtin 10000 ppm @ 1.5 ml/lit	1.90 (1.70)	1.05 (1.43)	1.50 (1.58)	1.28 (1.50)	504
T_2	PODF @ 1 ml/lit	1.75 (1.66)	1.20 (1.48)	2.20 (1.75)	1.70 (1.64)	436
T_3	PODF @ 2 ml/lit	1.78 (1.66)	0.95 (1.39)	1.80 (1.64)	1.38 (1.54)	454
T_4	PODF@ 3 ml/lit	1.60 (1.61)	0.95 (1.39)	1.70 (1.62)	1.33 (1.52)	488
T_5	Quinalphos 25 EC @ 2ml/lit	1.85 (1.69)	0.90 (1.37)	1.40 (1.55)	1.15 (1.46)	547
T_6	Untreated check	1.83 (1.68)	2.60 (1.90)	6.00 (2.48)	4.30 (2.30)	295
	C.D.	0.00	0.02	0.16	0.03	-
	SE(m)	0.00	0.01	0.05	0.01	-
	SE(d)	0.00	0.01	0.08	0.01	-
	C.V.	0.15	1.06	5.97	1.15	-

*Figures in parenthesis are square root/arc sin transformed values

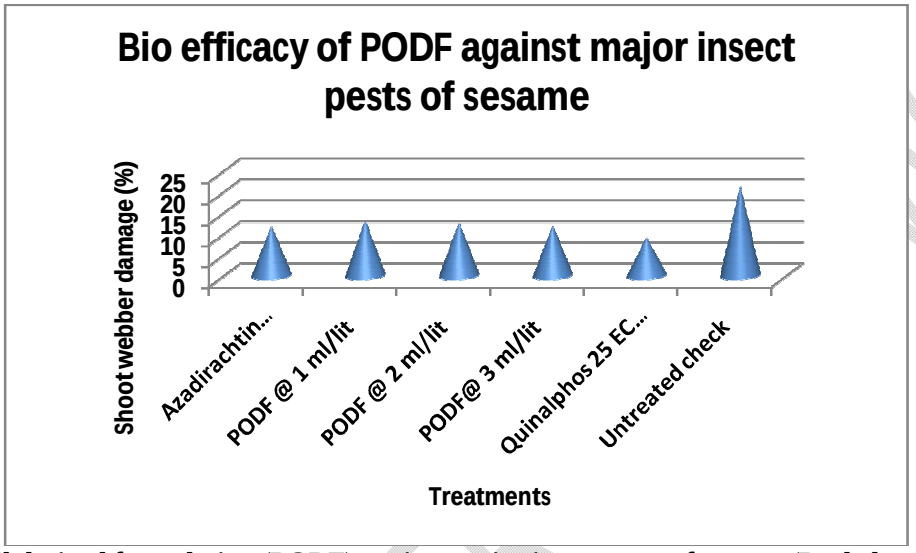

Fig 1.Bio efficacy of Pongamia oil derived formulation (PODF) against major insect pests of sesame (Pooled mean of *kharif* 2019 and *rabi* 2020)

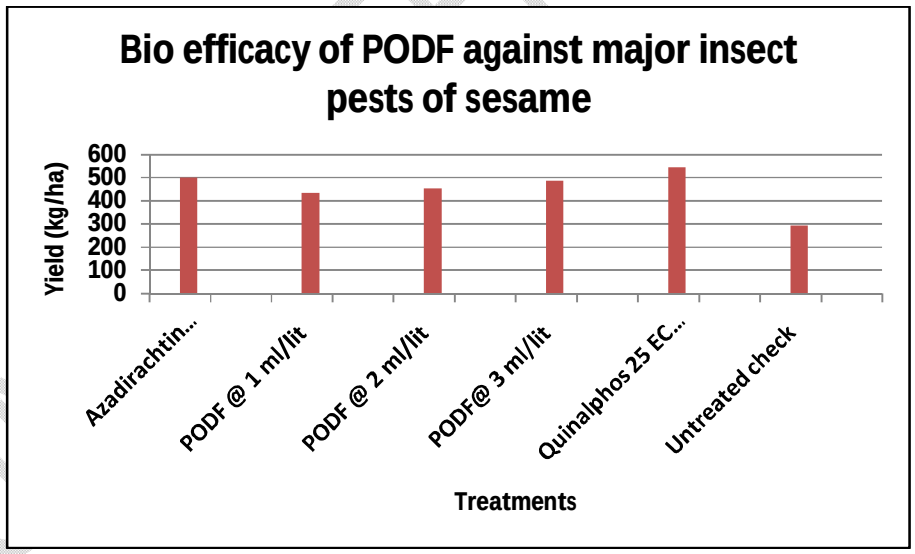

Fig 2.Bio efficacy of Pongamia oil derived formulation (PODF) against major insect pests of sesame (Pooled mean of *kharif* 2019 and *rabi* 2020)