BIO EFFICACY OF BOTANICALS AGAINST MAJOR INSECT PESTS OF SESAME

Abstract

Sesame *Sesamum indicum* Linn. is the oldest oilseed crop cultivated in semi-arid tropics and sub-tropics to temperate regions in India. It is grown in 17.14 lakh hectares area with production of 7.84 lakh tnones and productivity of 457 kg/ha. One of the major constraints in sesame production is the damage caused by insect pests. Among the various insect pests of sesame, shoot webber and capsule borer, *Antigastra catalaunalis* Duphonchel and leafhopper *Orosius albicinctus* Distant, are considered to be the most important in causing economic damage. Keeping this in view, investigations were undertaken to manage sesame pests at Regional Research Station, Vriddhachalam during 2019-2020. Field experiments were conducted to assess the bio efficacy of botanicals especially pungam and neem products in comparison with inorganic insecticide on sesame insect pests. The treatments were azadirachtin 10000 ppm @ 1.5 ml/lit, PODF @ 1 ml, 2 ml and 3ml/lit, quinalphos 25 EC @ 2ml/lit and untreated check. The six treatments were replicated four times in a Randomized Block Design with a plot size of 5.4 x 4 m. The study results revealed that quinalphos 25 EC@ 2 ml/lit recorded lowest mean population of shoot webber (0.91 no./plant) followed by azadirachtin 10000 ppm @ 1.5 ml/lit and PODF@ 3 ml/lit (1.03 &1.05 no./plant), respectively. The same trend was observed in leaf hopper also (1.15, 1.28 &1.33 no./plant), respectively. Regarding plant damage, quinalphos 25 EC@ 2 ml/lit recorded lowest mean damage of 9 per cent followed by azadirachtin 10000 ppm @ 1.5 ml/lit (11.7%). Azadirachtin was found on par with PODF@3 ml/lit. Botanicals should not be considered as an independent tool, but adequately implemented in an integrated management framework.

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

Introduction

Sesame, *Sesamum indicum* Linn. is the most indigenous oilseed crop of the world and also a major oilseed crop of India. One of the major constraints in sesame production is the colossal damage caused by insect pests. Among the various insect pests of sesame, shoot webber and capsule borer, *Antigastra catalaunalis* Duphonchel and leafhopper *Orosius albicinctus* Distant, are considered to be the most important in causing economic damage. *Antigastra* causes damage starting from second week of sowing to capsule stage. Nymphs and adults of leaf hopper suck the cell sap from leaves, flowers and pods. Due to this curling of leaf margins downward, reddening of leaf margins, stunted growth of the plants, sickly appearance of the crop and subnormal growth of the leaf tissue occur. Eco friendly method of insect pest management involving botanicals enhance pest control to achieve sustainable yield and quality as well as monitory benefits to farmers and brings out green environment. Keeping this in view, investigations were undertaken to manage sesame pests at Regional Research Station, Vriddhachalam.

Materials and Methods

Field experiments were conducted to assess the bio efficacy of botanicals especially pungam and neem products in comparison with inorganic insecticide on sesame insect pests. The treatments were azadirachtin 10000 ppm @ 1.5 ml/lit, PODF @ 1 ml, 2 ml and 3ml/lit, quinalphos 25 EC @ 2ml/lit and untreated check. The six treatments were replicated four times in a Randomized Block Design with a plot size of 5.4 x 4 m. All the recommended package of practices was followed except plant protection measures. In all the seven treatments, ten plants were selected randomly for observation during vegetative, flowering and capsule stages in each replication. Observations on the incidence of *Antigastra* population, and its damage (%), leaf hopper population were recorded. Pooled mean was worked out. Seed yield was recorded while harvesting to calculate the cost economics.

Comment [T1]: Place and permission to carry out the experiment to be mentioned

Comment [T2]: Statistical anay sis to be included

Results and Discussion

The results revealed that quinalphos 25 EC@ 2 ml/lit recorded lowest mean population of shoot webber (0.91 no./plant) followed by azadirachtin 10000 ppm @ 1.5 ml/lit and PODF@ 3 ml/lit (1.03 &1.05 no./plant), respectively. The same trend was observed in leaf hopper also (1.15, 1.28 &1.33 no./plant), respectively. Regarding plant damage, quinalphos 25 EC@ 2 ml/lit recorded lowest mean damage of 9 per cent followed by azadirachtin 10000 ppm @ 1.5 ml/lit (11.7%). Azadirachtin was found on par with PODF@3 ml/lit.

Comment [T3]: Tabulation of results will be more clear to explain

Efficacy of some indigenous products formulations were tested against sesame pests especially sucking pests. Ahirwar and co-workers (2010) reported that the incidence of sucking pests of sesame, jassid, mirid bug and whitefly may be effectively, economically and safely managed by two foliar sprays of natural and indigenous products, *viz*. 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. Farmers of sesame under rainfed condition are advised to give two sprays of Neem Seed Kernel Extract 3% (300 g / 10 lit water) for effective and economic control of the leaf webber (JAU, 2013). Oil formulation of PONNEEM (Pungam and neem) exhibited good antifeedant and growth regulation activities against *Spodoptera litura* larvae (Soosaimanickam and Ignacimuthu).Pavela and Herda (2007) reported that pongam oil was an effective repellent against the common greenhouse whitefly (*Trialeurodes vaporariorum* Westwood).

References

Comment [T4]: More refrences to be included

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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

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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

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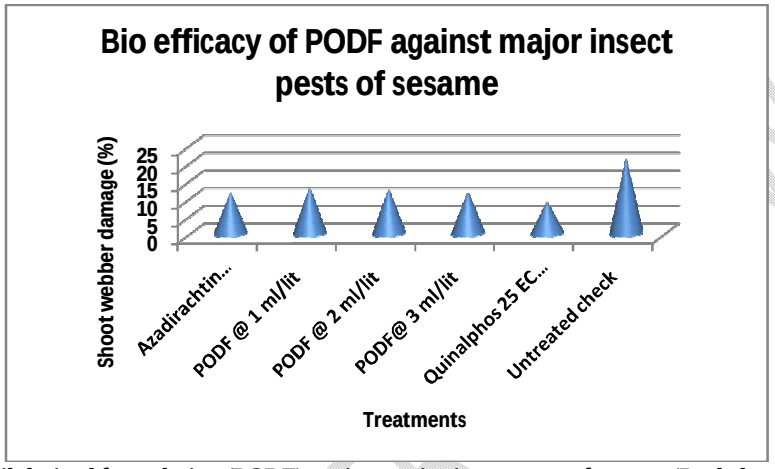

Fig 1. Bio efficacy of Pongamia oil derived formulation (PODF) against major insect pests of sesame (Pooled mean of *kharif* 2019 and *rabi* 2020)

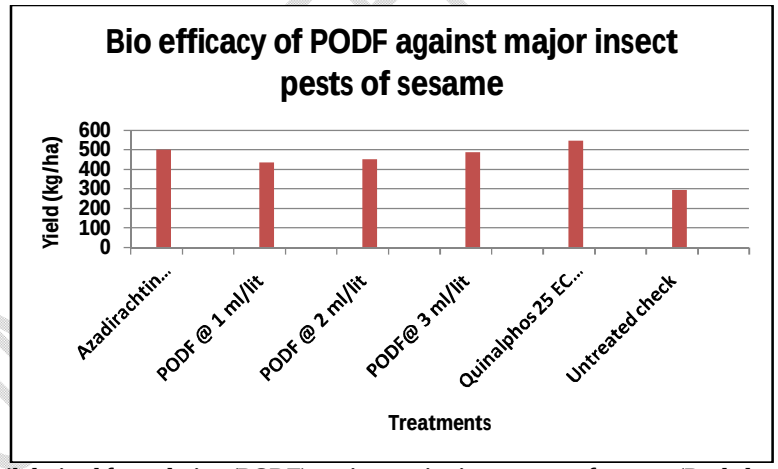

Fig 2. Bio efficacy of Pongamia oil derived formulation (PODF) against major insect pests of sesame (Pooled mean of *kharif* 2019 and *rabi* 2020)