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Jawaharlal Nehru Krishi VishwaVidyalaya
Jabalpur M.P.

Product Testing Report
Evaluation trial for insect & Predator on standing crop and Bio-efficacy of PSAP on Soybean

Sponsored By
ISHA AGRO INDIA
Kothrud Pune (Mha.)

Submitted by
Dr.Yogesh Patel
Assistant Professor, College of Agriculture,
Ganj Basoda, Distt. Vidisha M.P.
(2018-2019)

Project Title: Evaluation trial for insect & Predator on standing crop and Bio-efficacy of PSAP on Soybean.

Experimental Site:

The field experiment was conducted at Farm "B" College of Agriculture, Ganj Basoda (23^0 85' N latitude, 77^0 92' E longitude) and an average elevation of 399 meters.

Climatic condition

The total rainfall received during experiment is 778.8mm.

Name and address of Sponsor:

M/s. ISHA Agro India, Malati Complex, Kothrud,, Pune 411038

Details of Experiment:

Crop	: Soybean
Variety	: JS 20-63
Soil type	: Medium black
Year of Experiment	: 2018
Plot size	: 27 sqm
Spacing	: 45 cm
Design	: RBD
Treatment	: Seven
Replication	: Three
Date of Sowing	: 4/7/2018
Spraying Technique	: High Volume Spray
Spray Equipment	: Hand operated knapsack sprayer, hollow cone nozzle
Water volume used	: 500l/ha

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture

Treatments Details:

T_1: Recommended dose of N, P & K and recommended plant protection measures without foliar spray of PSAP

T_2: Recommended dose of N, P & K and recommended plant protection measures with foliar spray of PSAP @ $4gl^{-1}$

T_3: Recommended dose of N, P & K and 50% of plant protection measures (Number sprays of chemical insecticides, pesticides and fungicides to 50%) without foliar sprays of PSAP @ 4 gL^{-1}

T_4: Recommended dose of N, P & K and 50% of plant protection measures (Number sprays of chemical insecticides, pesticides and fungicides to 50%) with foliar sprays of PSAP @ 4 gL^{-1}

T_5: Recommended dose of N, 50% of P & K and recommended plant protection measures without foliar spray of PSAP

T_6: Recommended dose of N, 50% of P & K and recommended plant protection measures with foliar spray of PSAP @ 4 gL^{-1}

T_7: Recommended dose of N, 50% of P & K and 50% of plant protection measures (Number sprays of chemical insecticides, pesticides and fungicides to 50%) with foliar sprays of PSAP @ 4 gL^{-1}

Details of observations recorded

1. Plant growth and yield contributing parameters
   a. Plant height and spread (East X west and North X South) cm^{-2}
   b. Number and weight of pods $plant^{-1}$
   c. Number and weight of grains/seeds $plant^{-1}$
2. Yield per plot and per ha
3. Disease intensity: PDI of major diseases (leaf spot/blight, virus disease)
4. Insect Pests: Count of major sucking and lepidopteron pests.
5. Residue analysis
6. Nutritional data like Protein, Trypsin inhibitor & oil contents from treatments
7. Phytotoxicity in 1 to 10 scale under separate sprays of PSAP @ 8 & 12 g L^{-1} on the following parameters viz. leaf injury on tips/surface*, wilting, vein clearing, necrosis, epinasty and hyponastyafter application based on the given scale for PSAP @ 8 & 12 g

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Ganj Basoda, Distt. Vidisha (M.P.) 464221

L^{-1}. (*based on 1 – 10 scale: 1 = 0-10%, 2 = 11-20%, 3 = 21-30%, 4 = 31-40%, 5 = 41-50%, 6 = 51-60%, 7 = 61-70%, 8 = 71-80%, 9 = 81-90%, 10 = 91-100%).

8. Count on natural enemies (predators and parasites)

Methodology

A field experiment for evaluation of PSAP (Potassium salt Active Phosphorous) was conducted at research field of College of Agriculture, Ganj Basoda during Kharip season of year 2018. The variety JS- 20-63 sown in the month of July 2018 in randomized block design (RBD) with seven treatments and three replications. All the recommended Agronomical practices were followed properly in the experimental plots to ensure the proper growth of the crop.

Application of Treatments:

The test chemical, PSAP (Potassium salt Active Phosphorous) was evaluated at 1 Kg PSAP / Acre / spray. Foliar spray solutions were prepared by using the water as diluents at the rate of 500 liters per hectare for every treatment. The treatment was applied as spray with the help of a knapsack sprayer fitted with hollow cone nozzle targeted against all vegetative parts of soybean crop up to the point of runoff. Based on the observations, mean insect population was worked out and statistically analysed after transforming them.

Product application: Foliar sprays at

(1) Pre-flowering 40 days after sowing
(2) 55 days after sowing
(3) 70 days after sowing
@ 4 gm PSAP / liter of water.
250 liter PSAP solution/ acre / Spray

Dose : 2.5 Kg PSAP / Hec. / Spray

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Ganj Basoda, Distt. Vidisha (M.P.) 464221

Results:

a. Effect of PSAP on the yield attributing character of Soybean

The data pertaining to the effect of different treatments on the yield attributing character of soybean are presented in table 1&2. The data of height of soybean plant was non-significant. However, numerically higher height of soybean plant was recorded in T2 (39.45 cm). Similarly, Other parameters of yield attributing character *i.e.* Spread of plant, number of pods par plants, weight of pods par plant , number of grains par plant, weight of grain par plant were showing non-significant differences.

b. Effect of PSAP on the grain yield of Soybean

The data pertaining to the effect of different treatments on the grain yield of soybean are presented in table 2. Statically, the data of grain yield of soybean was show non-significant difference. However, numerically comparatively higher yield of soybean was recorded in T2 (19.45 quintal/ ha.). Whenever lowest yield of soybean grain was found in the plot treated with T5 (15.38 quintal/ ha.)

c. Effect of PSAP in the population of Green Semiloopar, *Chrysodeixis acuta*

The data pertaining to the effect of different treatments on the population of green semiloopar, *Chrysodexis acuta* are presented in table 3. The pre treatment data of Green semiloopar population were showed non-significant difference. In 3DAS Minimum population of Green semiloopar was recorded in T2 (4.85 pmrl) and maximum in T5 (9.45 pmrl) . Similar trend was observed in 7 and 10 DAS. Overall minimum mean population was observed in T2 (6.44 pmrl), which was at par with T4 and T7. However maximum insect population was observed in T5 (13.17 pmrl).

d. Effect of PSAP in the population of *Spodoptera litura*

The data pertaining to the effect of different treatments on the population of tobacco catterpillar, *Spodoptera litura* are presented in table 4. The pre treatment data of population were showed non-significant difference. Whenever, 3 DAS Minimum population was recorded in T2 (5.94 pmrl) which was at par with T4 & T6 and maximum in T5 (10.89 pmrl). Similar trend was observed in 7 and 10 DAS. The overall minimum mean population was observed in T2 (7.51 pmrl), which was at par with T4 and T7. However maximum insect population was observed in T5 (13.22 pmrl).

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Ganj Basoda, Distt. Vidisha (M.P.) 464221

e. Effect of PSAP in the population of White fly

The data pertaining to the effect of different treatments on the population of white fly, *Bamasia tabaci* are presented in table 5. The pre treatment data of population were showed non-significant difference. Whenever, 3 DAS Minimum population was recorded in T2 (7.25 ptl) which was at par with T4 & T6 and maximum in T5 (12.65 ptl). Similarly, 10 DAS Minimum population was recorded in T2 (9.86 ptl) which was at par with T4 & T6 and maximum in T5 (18.02 ptl). Similarly trend was observed in 10 DAS. The overall minimum mean population was observed in T2 (8.34 ptl), which was at par with T4 and T7. However maximum insect population was observed in T5 (14.99 ptl).

f. Effect of PSAP on the natural enemies population

The data pertaining to the effect of different treatments on the population of natural enemies are presented in table 6. The test product did not showed any significant effect on the population of natural enemies i.e. Lady Bird beetle in soybean ecosystem. The results showed statistically on par in all the treatments.

g. Phytotoxicity effect of PSAB on the Soybean crop

The data pertaining to the phototoxic effect of different treatments on the population of natural enemies are presented in table 7. There is no phytotoxicity symptoms were observed in any treatement during the experiment.

Conclusion:

The results obtained in the field trials conducted at JNKVV, College of Agriculture, Ganj Basoda, Dist. Vidisha M.P. during the year of 2018 it is concluded that treatment T2 *i.e.* recommended dose of N, P & K and recommended plant protection measures with foliar spray of PSAP @ $4gl^{-1}$ was found most effective treatment. The plot treated with T2 get significantly higher yield with compratevielly high yield-attributing- character and it is also found superior for control of test insect's population.

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Ganj Basoda, Distt. Vidisha (M.P.) 464221

Table: 1 Effect of PSAP on the yield attributing character in Soybean during the year of 2018

S. No.	Treatment	Height (cm)	Spread (sqcm)	Pods (par plant)	Weight of pods par plants (gm)
1	T_1	35.27	488	33.54	22.14
2	T_2	39.45	620	38.58	24.46
3	T_3	36.42	450	31.25	20.63
4	T_4	38.39	590	37.58	23.80
5	T_5	36.53	412	31.28	19.64
6	T_6	37.38	575	36.84	24.31
7	T_7	36.42	501	34.75	22.94
SEm					
CD (P= 0.05%)		NS	NS	NS	NS

Table: 2 Effect of PSAP on the yield attributing character in Soybean during the year of 2018

S. No.	Treatment	Grains (par plant)	Weight of grains par plants (gm)	Yield (qu/ha)
1	T_1	102.66	11.29	17.05
2	T_2	114.84	12.60	19.45
3	T_3	97.31	10.70	15.55
4	T_4	109.63	12.01	18.65
5	T_5	95.41	10.49	15.38
6	T_6	108.26	11.24	18.12
7	T_7	106.55	11.72	17.27
SEm				1.66
CD (P= 0.05%)		NS	NS	5.11

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Garj Basoda, Distt. Vidisha (M.P.) 464221

Table: 3 Effect of PSAP in the population of Green Semiloopar, *Chrysodeixis acuta* on Soybean during the year of 2018

S. No.	Treatment	Number of larvae par meter row length				
		PT	3 DAS	7DAS	10 DAS	Mean
1	T_1	8.14 (2.94)	7.46 (2.82)	10.47 (3.35)	13.19 (3.70)	10.46 (3.31)
2	T_2	7.92 (2.90)	4.85 (2.30)	6.25 (2.59)	8.22 (2.95)	6.44 (2.63)
3	T_3	7.46 (2.82)	8.43 (2.99)	12.15 (3.54)	14.95 (3.92)	11.85 (3.51)
4	T_4	8.16 (2.94)	5.42 (2.42)	7.13 (2.76)	9.60 (3.18)	7.38 (2.80)
5	T_5	8.47 (2.99)	9.45 (3.15)	13.59 (3.74)	16.45 (4.11)	13.17 (3.68)
6	T_6	7.45 (2.82)	5.65 (2.47)	8.13 (2.94)	10.01 (3.24)	7.92 (2.90)
7	T_7	8.47 (2.99)	6.45 (2.63)	9.28 (3.12)	11.21 (3.42)	8.98 (3.06)
SEm			0.14	0.18	0.15	0.17
CD (P= 0.05%)		NS	0.44	0.54	0.47	0.52

PT= Pre treatment, DAS: Days after spray, Values in parentheses are $\sqrt{X} + 0.5$ transformed values

Table: 4 Effect of PSAP in the population of *Spodoptera litura* on Soybean during the year of 2018

S. No.	Treatment	Number of larvae par meter row length				
		PT	3 DAS	7DAS	10 DAS	Mean
1	T_1	9.41 (3.15)	8.90 (3.06)	11.30 (3.43)	13.22 (3.70)	11.14 (3.40)
2	T_2	8.24 (2.95)	5.94 (2.53)	7.24 (2.78)	9.36 (3.14)	7.51 (2.82)
3	T_3	8.47 (2.99)	9.88 (3.22)	12.56 (3.60)	14.70 (3.89)	12.38 (3.59)
4	T_4	8.34 (2.97)	6.87 (2.71)	8.43 (2.99)	10.21 (3.27)	8.49 (2.99)
5	T_5	9.88 (3.22)	10.89 (3.37)	12.89 (3.64)	16.18 (4.08)	13.32 (3.70)
6	T_6	9.99 (3.23)	7.10 (2.75)	9.02 (3.08)	10.56 (3.32)	8.88 (3.06)
7	T_7	10.44 (3.31)	7.90 (2.89)	9.98 (3.23)	11.74 (3.49)	9.87 (3.21)
SEm			0.13	0.17	0.15	0.18
CD (P= 0.05%)		NS	0.41	0.53	0.47	0.56

PT= Pre treatment, DAS: Days after spray, Values in parentheses are $\sqrt{X} + 0.5$ transformed values

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Garj Basoda, Distt. Vidisha (M.P.) 464221

Table: 5 Effect of PSAP in the population of White fly on Soybean during the year of 2018

S. No.	Treatment	Population of white fly par three leaves				
		PT	3 DAS	7DAS	10 DAS	Mean
1	T_1	11.23 (3.42)	10.30 (3.28)	12.77 (3.64)	13.58 (3.75)	12.55 (3.60)
2	T_2	10.45 (3.31)	7.25 (2.78)	7.94 (2.90)	9.86 (3.21)	8.34 (2.97)
3	T_3	9.58 (3.17)	12.11 (3.55)	13.70 (3.75)	17.26 (4.21)	14.36 (3.85)
4	T_4	8.45 (2.99)	8.42 (2.98)	9.27 (3.12)	11.24 (3.42)	9.63 (3.18)
5	T_5	9.65 (3.18)	12.65 (3.62)	14.27 (3.83)	18.02 (4.29)	14.99 (3.92)
6	T_6	11.45 (3.44)	9.02 (3.08)	10.19 (3.27)	12.83 (3.65)	10.67 (3.34)
7	T_7	9.56 (3.17)	9.43 (3.14)	11.77 (3.50)	12.57 (3.61)	11.59 (3.47)
SEm			0.15	0.17	0.16	0.17
CD (P= 0.05%)		NS	0.48	0.52	0.50	0.52

PT= Pre treatment, DAS: Days after spray, Values in parentheses are $\sqrt{X} + 0.5$ transformed values

Table: 6 Effect of PSAP on the natural enemies population in Soybean during the year of 2018

S. No.	Treatment	**Number of Coccinellid grubs/plant**		
		DBS	**5DAS**	**10DAS**
1	T_1	1.25 (1.32)	1.20 (1.30)	1.25 (1.32)
2	T_2	1.15 (1.28)	1.32 (1.34)	1.33 (1.35)
3	T_3	1.50 (1.41)	1.25 (1.32)	1.44 (1.39)
4	T_4	1.55 (1.34)	1.21 (1.30)	1.45 (1.39)
5	T_5	1.50 (1.41)	1.35 (1.36)	1.36 (1.36)
6	T_6	1.32 (1.34)	1.20 (1.30)	1.25 (1.32)
7	T_7	1.26 (1.32)	1.30 (1.34)	1.45 (1.39)
SEm		NS	NS	NS
CD (P= 0.05%)				

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Garj Basoda, Distt. Vidisha (M.P.) 464221

Table-7: Phytotoxicity effect of PSAB on the Soybean crop

Treatments	Symptoms	Phytotoxicity at different intervals of application (DAS)				
		1	3	5	7	10
PSAP @ 8 gm L^{-1}	Epinasty	0	0	0	0	0
	Hyponasty	0	0	0	0	0
	Necrosis	0	0	0	0	0
	Vein Clearing	0	0	0	0	0
	Wilting	0	0	0	0	0
PSAP @ 12 gm L^{-1}	Epinasty	0	0	0	0	0
	Hyponasty	0	0	0	0	0
	Necrosis	0	0	0	0	0
	Vein Clearing	0	0	0	0	0
	Wilting	0	0	0	0	0

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Ganj Basoda, Distt. Vidisha (M.P.) 464221

It is certified that the information given in the report is based on the trial conducted as per the given protocol and critically analyzed data. No part of the data has been utilized for non-official purpose.

Vinita Parte
Co-PI

Yogesh Patel
PI

Dr. Yogesh Patel, Scientist
Department of Entomology, College of Agriculture
Ganj Basoda, Distt. Vidisha (M.P.) 464221

Dean
College of Agriculture, Ganj Basoda

Dean
College of Agriculture
Ganj Basoda, Distt. Vidisha

Director Research Services
JNKVV, Jabalpur

Director Research Services
J.N. Krishi Vishwa Vidyalaya
Jabalpur (M.P.)