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Knowledge and adoption of herbicides application by the soybean growers

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Abstract

The present study was carried out in the Akola district of Maharashtra's Vidarbha region to assess knowledge and adoption of herbicides application by the soybean growers. A total of 120 farmers were purposively selected from two tehsils known for maximum area covered under soybean cultivation. An exploratory research design was used to evaluate their responses. Results indicated that majority of soybean growers (75%) had a medium level of knowledge regarding herbicidal application practices. High awareness was observed in practices such as weather condition during spraying of herbicide (98%), soil conditions for application of herbicides (98%), precautionary measures to be followed during spraying (95%), quality of water to be used for spraying of herbicides (95%), span of gap required for intercultural operation after spraying of herbicides (93%), time of application of herbicides (90%), quantity of water required for spraying of herbicides (90%). Despite this, limited understanding was found for certain aspects like recommended dose of herbicide in soybean crop, calibration of spray pump time to time, type of nozzle used for spraying of herbicides. In terms of adoption, 72.5% of respondents were categorized under the medium adoption category. Practices such as weather condition during spraying of herbicide, span of gap required for intercultural operation after spraying of herbicides, quality of water to be used for spraying of herbicides showed high levels of adoption, while the calibration of spray pump time to time, precautionary measures to be followed during spraying, quantity of water required for spraying of herbicides had relatively lower adoption rates although adequate knowledge among farmers.

So the awareness and practical application highlights the need for more targeted extension services. Strengthening farmer training, demonstration programmes, and hands-on experience can enhance the actual implementation of recommended practices, thereby improving herbicidal application practices or raising the production and reducing losses caused by weed infestation

Keywords: Knowledge, adoption, herbicides, soybean growers

Introduction

The soybean (*Glycine max* L. Merrill), often known as "soya" or "pearl of oil", has emerged as the world's miracle crop of the twenty-first century. Soybean crop is the largest single source of edible oil and accounts 59.00 per cent of world's oilseed production. Other key benefits are related to excellent protein content of about 40% containing all 8 amino acids, high levels of essential fatty acids, numerous vitamins and minerals, isoflavones and fibres. Soybean is an important crop globally, and effective weed management is critical for maximizing yields and profitability. Herbicides are a key component of weed management in soybean cultivation and their judicious use is essential for sustainability and minimizing environmental Impacts. Inadequate weed control is one of the main factors related to decrease in soybean production. The grain yield reduction due to the weed infestation in soybean may be up to 31-84 percent. Herbicides are playing increasingly important role in the modern scientific agriculture which cannot be overestimated. The herbicides are more important inputs for improving agricultural production.

Objectives

1. To study knowledge and adoption of herbicide application practices by the soybean growers.

Methodology

The study was conducted in Akola district in Vidarbha region of Maharashtra's state, all two tehsils were selected purposively on the basis of maximum area covered under soybean cultivation. An exploratory research design was used to analyze the data. The list of beneficiaries was obtained from Talathi office and sarpanch. Among these a total of 120 soybean growers were selected. Thus, the study included a total of 120 beneficiary farmers for data collection and analysis.

Results and Discussion

Table 1: Distribution of the respondents according to their practice wise knowledge of herbicide application

Sr. No.	Statement	Respondents (n=120)	
		Yes	No
1	Recommended herbicides for soybean crop (Diclosulam, Imazythapyr + Imazamox, Propaquizafop +Imazethapyr)	105 (87.50)	69 (12.50)
2	Recommended dose of herbicide in soybean crop (Diclosulam 84% WDG @ 12.4 gm/acre, Imazythapyr + Imazamox 70 WDG @0.070 kg ai./ha, Propaquizafop @ 0.50 kg a.i. +Imazethapyr @ 0.075 kg a.i. 800ml / acre)	51 (42.50)	69 (57.50)
3	Time of application of herbicide (Pre-emergence: After 0-3 days of sowing before germination of seed, post-emergence: 2-4 leaf stage of weed and crop is 15-20 DAS)	108 (90.00)	12 (10.00)
4	Spray pump for spraying of herbicides (Knapsack)	87 (72.50)	33 (27.50)
5	Calibration of spray pump is necessary time to time	35 (29.26)	85 (70.83)
6	Quantity of water required for spraying of herbicide (200 lit/acre or 500 lit/ha)	108 (90.00)	12 (10.00)
7	Weather condition during spraying of herbicide (Avoid spraying in windy condition can cause herbicide drift, avoid spraying immediately after it rains)	118 (98.33)	02 (01.67)
8	Type of nozzle used for spraying of herbicide (Flat fan)	82 (68.33)	38 (31.67)
9	Quality of water to be used for spraying of herbicide (Clean water)	114 (95.00)	06 (05.00)
10	Soil conditions for application of herbicide (Sufficient moisture condition required)	117 (71.67)	03 (02.50)
11	For spraying of herbicide separate pump need to be used	86 (71.67)	34 (28.33)
12	Span of gap required for intercultural operation after spraying of herbicide (4-5 Days)	111 (92.50)	09 (07.50)
13	Precautionary measure to be followed during spraying (Mask, cloth, gloves)	114 (95.00)	06 (05.00)

A detail probing practice wise knowledge possessed by the soybean grower in the table revealed that, 98.00 per cent of respondents had knowledge about weather condition during spraying of herbicide, quality of water i.e., clean water used for spraying of herbicide this practice was known to majority (95%) respondents. 95.00 per cent of the respondents had knowledge regarding precautionary measure to be followed during spraying. 93.00 per cent of the respondents had knowledge regarding Span of gap required for intercultural operation after spraying of herbicide. As regards 90.00 per cent of the respondents had knowledge about time of application of herbicide, 90.00 per cent of the respondents had knowledge regarding quantity of water required for spraying of herbicide.

However, 88.00 per cent of the respondents had knowledge regarding recommended herbicides for soybean crop (88.00), 73.00 per cent of the respondents had knowledge regarding spray pump for spraying of herbicides (Knapsack), 72.00 per cent of the respondents had knowledge regarding soil conditions for application of herbicide i.e., sufficient moisture present in soil, separate spray pump required for spraying of herbicide was known to 72.00 per cent growers.

Type of nozzle used for spraying of herbicide in Soybean crop i.e. flat fan or flood jet was not known to 32.00 per cent soybean growers, this may be due to use of power sprayer used for herbicide application by these group of growers.

Calibration of spray pump is necessary time to time was not known to 71.00 per cent growers. Recommended dose of herbicide in soybean crop was not known to 58.00 per cent growers. Type of nozzle used for spraying of herbicide was not known to 32.00 per cent growers. Separate spray pump required for spraying of herbicide was not known to 28.00 per cent growers.

Table 2: Distribution of the soybean growers according to their knowledge levels was ascertained and presented in table

Sr. No	Knowledge level	Respondents (n=120)	
		Frequency	Percentage
1	Low	12	10.00
2	Medium	90	75.00
3	High	18	15.00
Total		120	100
Mean=66.09		SD= 15.56	

It was observed from Table 2 that, more than half (75.00%) of the respondents have observed in medium level of knowledge about selected herbicide application practices in soybean crop followed by 15.00 per cent respondents had high level of knowledge and remaining 10.00 per cent growers noted in low level knowledge. This group may be the non-adopters of herbicide application practices.

Thus, it could be concluded that majority (75.00%) of respondents had medium to high knowledge about pre-emergence herbicide application practices.

This study is in agreement with the finding of Deogirkar (2014) [2] stated that, majority of the respondents had medium level of knowledge about herbicide application practices followed by high level of knowledge.

Adoption

Adoption indicates the present state use of adoption in recommended practices by the soybean growers. The results obtained after analysis of data about adoption in recommended practices by the soybean growers are presented.

Table 3: Distribution of respondents to the their adoption of recommended practices of soybean growers

Sr. No	Statement	Adoption		
		Complete Adoption	Partial Adoption	No. Adoption
1	Recommended herbicides for soybean crop (Diclosulam, Imazythapyr + Imazamox, Propaquizafop +Imazethapyr)	79 (65.83)	28 (23.33)	13 (10.83)
2	Recommended dose of herbicide in soybean crop (Diclosulam 84% WDG @ 12.4 gm/acre, Imazythapyr + Imazamox 70 WDG @0.070 kg ai./ha, Propaquizafop @ 0.50 kg a.i. + Imazethapyr @ 0.075 kg a.i. 800ml / acre)	40 (33.33)	35 (29.17)	45 (37.50)
3	Time of application of herbicide (Pre-emergence: After 0-3 days of sowing before germination of seed, post-emergence: 2-4 leaf stage of weed and crop is 15-20 DAS)	85 (70.83)	27 (22.50)	08 (06.67)
4	Spray pump for spraying of herbicides (Knapsack)	68 (56.67)	19 (15.83)	33 (27.50)
5	Calibration of spray pump is necessary time to time	06 (05.00)	--	114 (95.00)
6	Quantity of water required for spraying of herbicide (200 lit/acre or 500 lit/ha)	07 (05.83)	02 (01.67)	111 (92.50)
7	Weather condition during spraying of herbicide (Avoid spraying in windy condition can cause herbicide drift, avoid spraying immediately after it rains)	116 (96.67)	02 (01.67)	02 (01.67)
8	Type of nozzle used for spraying of herbicide (Flat fan)	67 (55.83)	27 (22.50)	26 (21.67)
9	Quality of water to be used for spraying of herbicide (Clean water)	106 (88.33)	08 (06.67)	06 (05.00)
10	Soil conditions for application of herbicide (Sufficient moisture condition required)	99 (82.50)	04 (03.33)	17 (14.17)
11	For spraying of herbicide separate pump need to be used	20 (16.67)	08 (06.67)	92 (76.67)
12	Span of gap required for intercultural operation after spraying of herbicide (4-5 Days)	107 (89.17)	04 (03.33)	09 (07.50)
13	Precautionary measure to be followed during spraying (Mask, cloth, gloves)	06 (05.00)	--	114 (95.00)

From table no. 3, it was revealed that, in case of complete adoption 97.00 per cent soybean growers had adopted weather condition during spraying of herbicide (avoid spraying in windy condition can cause herbicide drift, avoid spraying immediately after it rains), followed by Span of gap required for intercultural operation after spraying of herbicide (4-5 Days) (89.00) per cent, quality of water to be used for spraying of herbicide (88.00) per cent, Soil conditions for application of herbicide (83.00) per cent.

It was also revealed that, 71.00 per cent soybean growers had adopted completely time of application of herbicide (Pre-emergence: After 0-3 days of sowing before germination of seed, post-emergence: 2-4 leaf stage of weed and crop is 15-20 DAS), followed by 66.00 per cent soybean growers had adopted completely recommended herbicides for soybean crop, 57.00 per cent soybean growers had adopted completely spray pump for spraying of herbicides (Knapsack), 56.00 per cent soybean growers had adopted completely the practice type of nozzle used for spraying of herbicide (Flat fan).

Table 4: Distribution of the soybean growers according to their adoption levels was ascertained and presented in table

Sr. No	Adoption level	Respondents (n=120)	
		Frequency	Percentage
1	Low	13	10.83
2	Medium	92	76.67
3	High	15	12.50
	Total	120	100.00
Mean= 56.92		SD=14.71	

From the table 4 it was revealed that, majority 76.67 per cent of soybean growers had medium level of adoption, followed by 12.50 per cent of soybean growers had high level of adoption and 10.83 per cent of soybean growers had low level of adoption of recommended herbicidal application practices. Thus, it was found that majority 76.67 per cent of soybean growers had medium level of adoption. Similar types of findings were observed by Deogirkar (2014) [2] who stated that majority of respondents had medium level of adoption.

Conclusion

The findings indicate that while soybean growers demonstrated high levels of knowledge in practices like weather condition during spraying of herbicide (Avoid spraying in windy condition can cause herbicide drift, avoid spraying immediately after it rains) (98.33%), precautionary measure to be followed during spraying (Mask, cloth, gloves) (95.00%), quality of water to be used for spraying of herbicide (Clean water) (95.00%), span of gap required for intercultural operation after spraying of herbicide (4-5 Days) (92.50%), time of application of herbicide (90.00%), quantity of water required for spraying of herbicide (200 lit/acre or 500 lit/ha) (90.00%), recommended herbicides for soybean crop (87.50%). However, the adoption of practices such as calibration of spray pump is necessary time to time, quantity of water required for spraying of herbicide, precautionary measure to be followed during spraying (Mask, cloth, gloves), for spraying of herbicide separate pump need to be used was relatively low, despite growers being aware of them. This indicates that while awareness is present, the dissemination of knowledge into reliable practice remains limited in certain areas. In such cases, extension strategies must focus not only on creating

awareness but also on enabling farmers to adopt the right practices more effectively and efficiently.

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