



Research Article

BIO-EFFICACY AND PHYTOTOXICITY EFFECT OF DIFFERENT WEEDICIDES IN BT COTTON

JADHAV A.S. *AND BHOSLE G.P.

Cotton Research Scheme, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, 431402, M.S., India

*Corresponding Author: Email- asjadhav31@rediffmail.com

Received: July 02, 2018; Revised: July 11, 2018; Accepted: July 12, 2018; Published: July 15, 2018

Abstract: Field trial was conducted to find out the effect of different doses of weedicide on Bt cotton at Cotton Research Scheme Farm, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, M.S. The result indicated that, weedicide Pendimethalin PE @ 1000 g/ha fb HW/MW at 20, 50 DAS and Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Glyphosate at 60 DAS @ 600 g/ha found most effective in Bt cotton. Based on net monetary return and seed cotton yield the weed control treatment, Pendimethalin PE @ 1000 g/ha fb directed spray of Glyphosate @ 2000 g/ha at 50 DAS was found most effective. B:C ratio was highest with the Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Paraquat at 60 DAS @ 600 g/ha.

Keywords: Bt cotton, weedicide, weed control, seed cotton yield

Citation: Jadhav A.S. and Bhosle G.P. (2018) Bio-efficacy and Phytotoxicity Effect of Different Weedicides in Bt Cotton. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 10, Issue 13, pp.- 6631-6632.

Copyright: Copyright©2018 Jadhav A.S. and Bhosle G.P. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Introduction

Cotton (*Gossypium hirsutum* L.) is one of the major commercial crop called as 'White Gold'. It plays an important role in textile industries and is a mean of livelihood for millions of farmers and those concerned with its trade, processing, manufacturing and other allied industries. In India area under cotton is 115.53 lakh ha with production of 348.90 lakh bales and 552 kg lint ha⁻¹ productivity [5]. Out of many problems faced by the cotton growers, the most troublesome is the control of weeds particularly during early stages of crop growth. Reduction in yield due to weeds in cotton crop to the extent of 15 to 55 percent. Also, the weeds compete with the crop for the nutrient, moisture, space and light, thus, affecting the growth and development of crop during early stages of growth reported that, weeds removed as high as 48-50 kg N, 8-15 kg P and 48-50 kg K ha⁻¹ [1]. Thus, if proper weed control measures are followed, there would be greater availability of nutrients and moisture for the benefit of crop. Pre-emergence use of Pendimethalin and Oxyfluorfen will control the weeds in early stages and thereby ensure efficient utilization of inputs put in by the farmers. The considerable yield losses caused due to persistency of weed in cotton crop has been reported by many earlier workers. To overcome these problems farmers are along or in combination in using the herbicides indecent which are available in market without taking inputs accounts the label claim of herbicides and its safe dose of application, persistency, phyto-toxicity and other technical details which many leads creating problem to other crop or succeeding crop, adverse effect on soil micro flora and fauna and environmental pollution. Considering these facts, the present research project entitled "Studies on Bio-efficacy and phyto-toxicity of different weedicide in Bt Cotton" was conducted.

Materials and Methods

A field experiment was carried out during *kharif* season of 2014-2015 at Cotton Research Scheme farm, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani, M.S. The soil of experimental plot was clayey in texture, low in available nitrogen and available phosphorus and very high in available potash. The experiment was laid out in a Randomized block design with nine treatments, viz. T₁ Pendimethalin PE @ 1000 g/ha fb HW/MW at 20, 50 DAS, T₂-Pendimethalin PE @ 1000 g/ha fb Pyriothibac sodium 10% SL @ 62.5 g a.i. PoE at 30 DAS, T₃-

Pendimethalin PE @ 1000 g/ha fb Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 30 DAS, T₄ -Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 30DAS, T₅ -Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Paraquat at 60 DAS @ 600 g/ha, T₆ -Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Glyphosate at 60 DAS @ 2000 g/ha, T₇ -Pendimethalin PE @ 1000 g/ha fb Glyphosate directed spray @ 2000 g/ha at 50 DAS, T₈ -Mechanical weeding at 20, 40, 60 DAS and T₉ -Weedy check. Sowing was done by dibbling the seed at spacing 120 cm x 30 cm with fertilizer 120:60:60 kg NPK ha⁻¹ was applied

Result and Discussion

The highest seed cotton yield ha⁻¹ (kg) was observed in treatment mechanical weeding at 20, 40, 60 DAS (T₈) i.e. 1399 kg/ha which was followed by Pendimethalin PE @ 1000 g/ha fb HW/MW at 20, 50 DAS (T₁) (1261 kg), Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Paraquat at 60 DAS @ 600 g/ha (T₅) (1257 kg), Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Glyphosate at 60 DAS @ 2000 g/ha (T₆) (1249 kg) and Pendimethalin PE @ 1000 g/ha fb Glyphosate directed spray @ 2000 g/ha at 50 DAS (T₇), (1246 kg) (Panwar et al (2001)[2]. In weedy check lowest seed cotton yield plant⁻¹ (g) were noticed i.e. 773 kg/ha. Gross monetary returns was recorded in treatment mechanical weeding at 20, 40, 60 DAS (T₈) i.e. Rs. 58.29× 103ha⁻¹. Net monetary returns over weedy check treatment (T₉) was highest in Pendimethalin PE @ 1000 g/ha fb directed spray of Glyphosate@ 2000 g/ha at 50 DAS (T₇) i.e. 15.85 × 103 ha⁻¹ (Patel et al. (2013) which was followed by Pyriothibac sodium @ 62.5 g/ha+ Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Paraquat at 60 DAS @ 600 g/ha (T₅) (15.28× 103 ha⁻¹) and Pyriothibac sodium @ 62.5 g/ha+ Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Glyphosate at 60 DAS @ 2000 g/ha (T₆) (15.02× 103 ha⁻¹) [3]. Pendimethalin PE @ 1000 g/ha fb HW/MW at 20, 50 DAS (T₁) and Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Glyphosate at 60 DAS @ 600 g/ha (T₆) found most effective in Bt cotton [4]. No phytotoxic effect of any herbicide on Bt cotton was observed [6].

Table-1 Seed cotton yield, GMR, NMR and B:C ratio as influenced by different treatments

S N	Treatments	Seed cotton yield (kg ha ⁻¹)	Gross monetary returns (₹ha ⁻¹)	Net monetary returns (₹ha ⁻¹)	B:C Ratio
	T ₁ : Pendimethalin PE @ 1000 g/ha fb HW/MW at 20, 50 DAS	1261	52577	9290	1.21
	T ₂ : Pendimethalin PE @ 1000 g/ha fb Pyriothibac sodium 10% SL @ 62.5 g as PoE at 30 DAS	963	40207	2913	1.08
	T ₃ : Pendimethalin PE @ 1000 g/ha fb Pyriothibac sodium @ 62.5 g/ha +Quizalafop ethyl @ 50 g/ha at 30 DAS.	1097	45705	7342	1.19
	T ₄ : Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 30 DAS.	1047	43700	6585	1.18
	T ₅ : Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Paraquat at 60 DAS @ 600 g/ha.	1257	52377	13763	1.36
	T ₆ : Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Glyphosate at 60 DAS @ 2000 g/ha.	1249	52082	13507	1.35
	T ₇ : Pendimethalin PE @ 1000 g/ha fb directed spray of Glyphosate @ 2000 g/ha at 50 DAS.	1246	51994	14332	1.38
	T ₈ : Mechanical weeding at 20, 40, 60DAS.	1399	58290	12317	1.27
	T ₉ : Weedy check	773	32331	-1516	0.95
	SE (m) ±	53.83	2242	491	-
	C.D. (P = 0.05)	162.05	6748	1478	-
	G.M.	1143	47696	8867	1.22

Table-2 Weed control efficiency and weed index as influenced by different treatments at 30, 60 DAS and at harvest

Treatments	30 DAS		60 DAS		At harvest		Weed index (%)
	Mono cot	Dicot	Mono cot	Dicot	Mono cot	Dicot	
T ₁ : Pendimethalin PE @ 1000 g/ha fb HW/MW at 20, 50 DAS	70.97	76.78	91.87	91.89	87.6	88.13	9.84
T ₂ : Pendimethalin PE @ 1000 g/ha fb Pyriothibac sodium 10% SL @ 62.5 g as PoE at 30 DAS	41.94	48.22	53.11	54.06	40.51	41.95	31.19
T ₃ : Pendimethalin PE @ 1000 g/ha fb Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 30 DAS	51.62	60.72	57.9	55.68	38.23	41.69	21.61
T ₄ : Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 30 DAS.	41.94	23.23	58.38	55.14	41.01	40.63	25.16
T ₅ : Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Paraquat at 60 DAS @ 600 g/ha.	27.43	25.01	94.26	94.05	77.98	79.62	10.17
T ₆ : Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Glyphosate at 60 DAS @ 2000 g/ha.	37.11	28.58	96.65	92.97	81.77	80.21	10.72
T ₇ : Pendimethalin PE @ 1000 g/ha fb directed spray of Glyphosate @ 2000 g/ha at 50 DAS.	32.27	44.65	95.69	93.51	81.01	79.68	10.91
T ₈ : Mechanical weeding at 20, 40, 60DAS.	85.49	80.36	97.61	95.68	90.13	89.45	-
T ₉ : Weedy check	-	-	-	-	-	-	44.72
G.M.	48.6	48.45	80.68	79.12	67.28	67.68	18.26

Based on net monetary return and seed cotton yield the weed control treatment, Pendimethalin PE @ 1000 g/ha fb directed spray of Glyphosate @ 2000 g/ha at 50 DAS (T₇) was found most effective B:C ratio of cotton followed by the Pyriothibac sodium @ 62.5 g/ha + Quizalafop ethyl @ 50 g/ha at 20 DAS fb directed spray of Paraquat at 60 DAS @ 600 g/ha (T₅).

Application of research: Proper weed control measures are followed, there would be greater availability of nutrients and moisture for the benefit of crop

Research Category: Weed control

Abbreviations: Bt: *Bacillus thuringiensis*, ₹: Rupee

Acknowledgement / Funding: Author thankful to Cotton Research Scheme, Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani, 431402, M.S., India

***Principle Investigator: Dr A S Jadhav**

University: Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani, 431402

Research project name or number: Project 3

Author Contributions: All author equally contributed

Author statement: All authors read, reviewed, agree and approved the final manuscript

Conflict of Interest: None declared

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

References

- [1] Jain H.K. (1972) *Indian Farming*, 21,527-530.
- [2] Panwar R.S., Malik R.S., Rath S.S., Malik R.K. (2001) *Indian Journal of Weed Science*, 33(3-4),164-167.
- [3] Hallikeri S.S., Halemani H.L. and Nandagavi R.A. (2004) *Karnataka J.Agric.Sci.*,17(4), 663-669.
- [4] Deshpande R.M. Pawar W.S. Mankar P.S., Bobde P.N. and. Chimote A.N. (2006) *Indian J. of Agron.*, 51(1), 68-69.
- [5] Anonymous (2013) <http://www.cotcorp.gov.in>
- [6] Chinnusamy N. and Chinnagounder C. (2013) *Indian J. Appl. Res.*, 3 (6), 2249-555.
- [7] Patel J.G., Raj V.C., Kumar V., Sutaria C.M. and Usadadiya V.P. (2013) *Int. J. Agri. Innovations and Res.*, 2,2.