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Growth and Yield Attributes, Quality Parameters and Seed Cotton Yield of Hybrid Cotton (*Gossypium spp*) as Influenced by Weed Management Practices in Southern Dry Zone of Karnataka

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ABSTRACT

A field experiment was conducted at ZARS, V. C. Farm, Mandya during Kharif season of 2016 in Southern Dry Zone of Karnataka to identify suitable herbicide for effective and economical weed management in hybrid cotton. The experiment comprised of 13 treatments having two pre-emergence herbicides (alachlor and pendimethalin) applied at 3 DAS and three early post emergence herbicides (pyrithiobac sodium, fenoxaprop p-ethyl, quizalofop ethyl) applied at 2 to 4 leaf stage of weeds alone or in combination with pre-emergence herbicides and compared with hand weeding and weedy check. Among herbicides treatments Pendimethalin 38.75 EC @ 0.75 kg a.i. ha^{-1} as pre-emergence spray applied at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g a.i. ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g a.i. ha^{-1} at 2 to 4 leaf stage of weeds has recorded significantly higher dry matter accumulation (408.80 g plant^{-1}), seed cotton yield (2201 kg ha^{-1}), boll weight (3.72 g) and harvested bolls (37.65 No. Plant^{-1}) as compared to other herbicide treatments. The weedy check recorded lower dry matter accumulation (246.24 g plant^{-1}), seed cotton yield (1278 kg ha^{-1}), boll weight (2.43 g) and harvested bolls (29.00 No. Plant^{-1}).

Key words: *Hybrid cotton, Herbicides, Seed cotton yield, Dry matter accumulation, Boll weight and Harvested bolls*

INTRODUCTION

COTTON (*Gossypium spp*) is considered as the king of fibre crops and popularly known as white gold. It is being cultivated in more than 70 countries with an area of 34.14 m.ha and production of 480 lakh bales. India ranks first in an area and second in production next to china. In India, cotton is cultivated in an area of 12.70 m.ha with a production of 30.50 million bales and productivity of 494 kg ha^{-1} lint.

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The productivity is lower in the country compared to world (725 kg ha^{-1} lint). In Karnataka, it is growing an area of 4.85 lakh hectare with a production of 15.90 lakh bales and productivity of 596 kg ha^{-1} lint[2].

As per the estimates, 47.5 m bales of lint are required to meet the domestic and export requirements by 2020 AD. To fulfill this projected requirement the cotton productivity has to be increased considerably. Yield level of crop keeps fluctuating year after year depending upon the prevailing climatic conditions and managerial issues such as weed, sucking pest and disease incidence. Since, the crop has long growth cycle, weed problem is a serious production constraint during the early growth stages. The loss caused by weeds in cotton ranges from 50 to 85 per cent depending upon the nature and intensity of weeds. Weeds primarily compete for nutrients, moisture and sunlight during the early crop growth period and reduces quality due to additional trash and staining of fibres leading to low grades and prices besides harboring crop pests. At present day the scarce availability of labours, hike in wages and limited moisture availability under rainfed conditions and also application of single herbicide may not manage the diversity of weeds. Therefore, application of more than one herbicide either in combination or sequence proved more effective and economical in controlling weeds. Hence, keeping these things in view the present investigation was carried out to identify suitable herbicides for effective and economic weed management in hybrid cotton.

MATERIAL AND METHODS

An investigation entitled **''**Seed cotton yield and economics of hybrid cotton (*Gossypium spp*) as influenced by weed management practices in Southern Dry Zone of Karnataka'' was conducted during *Kharif* season of 2016 at Zonal Agricultural Research Station, Vishweshwaraiah Canal Farm, Mandya. The soil of the experimental site is sandy loam in texture and neutral in reaction with a pH of 7.27 and normal in electrical conductivity (0.38 dS m^{-1}). The organic carbon content was 0.46 per cent and low in available N (210.54 kg ha^{-1}), medium in available phosphorus (27.48 kg ha^{-1}) and available potassium (152.20 kg/ha). The trail was laid out in Randomized Complete Block Design (RCBD) and replicated thrice. The experiment comprised of 13 treatments *viz*., T_1 : Alachlor 50 EC@1 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS, T_2: Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS, T_3: Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds, T_4: Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (tank mixture), T_5: Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (tank mixture), T_6: Alachlor 50 EC @1 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds, T_7: Alachlor 50 EC @1 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (tank mixture), T_8: Alachlor 50 EC @ 1 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (tank mixture), T_9: Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds, T_{10} :Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (tank mixture), T_{11}: Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (tank mixture), T_{12}: 2 Hand weedings at 20 and 50 DAS and T_{13}: Weedy check. The cotton hybrid (DCH - 32) was sown on 16th July 2016 with a spacing of 90 cm × 60 cm. The recommended dose of

fertilizer -150:75:75 N:P_2O_5:K_2O kg ha^{-1} was applied uniformly to all the treatments in the form of urea, SSP and MOP, respectively. The 50 per cent of N, 100 per cent P and K was applied as basal dose at the time of sowing and remaining 50 per cent of nitrogen was top dressed in two splits 25 per cent at 50 DAS and 25 per cent at 75 DAS.The observations on seed cotton yield of cotton, boll weight, harvested bolls, ginning percentage, seed index and quality parameters are recorded at harvest of the crop. Plant height, monopodial and sympodial branches, dry matter accumulation were recorded at 60, 90, 120 DAS and at harvest. Seed cotton yield recorded at harvest and calculated based on the yield obtained from each net plot and converted to kg ha^{-1}. The data was statistically analyzed by following the method of Gomez and Gomez[6].

RESULTS AND DISCUSSION

Effect of weed management practices on seed cotton yield

The seed cotton yield significantly influenced by weed management practices (Table I). Among herbicidal treatments, Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds recorded significantly higher seed cotton yield (2201 kg ha^{-1}) which was found on par with Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (2195 kg ha^{-1}) and weedy check recorded lower seed cotton yield (1278 kg ha^{-1}). Ginning percentage and seed index found non significant due to weed management practices (Table I). In weedy check competition of weeds prevailed for the entire season resulted in reduction of seed cotton yield. The increased seed cotton yield in sequential herbicidal applications can be attributed to low weed competition during initial stage and further control of new growth of weeds by application of early post emergence herbicides at 20-25 DAS followed by hoeing at 60 DAS resulted better weed control in the early as well as later stages of crop. This improvement in turn was due to improved growth attributes such as higher total dry matter production and distribution in different parts, higher leaf area and leaf area index. Thus the improvement in crop growth and yield components was the consequence of lower crop weed competition, which shifted the balance in favour of crop in the utilization of nutrients, moisture, light and space. These results are in conformity with the findings of Panwar *et al.*[11], Vivek *et al.*[15], Moolchand *et al.*[9,13], and Patel *et al.*[12].

Table I: Seed cotton yield, ginning percentage and seed index of hybrid cotton as influenced by weed management practices

Treatments		Seed cotton yield (kg ha^{-1})	Ginning percentage (%)	Seed index (g)
T_1	Alachlor 50 EC@1 kg *a.i.* ha^{-1} – as pre-emergence spray (3 DAS)	1368	34.16	12.10
T_2	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} – as pre-emergence spray (3 DAS)	1608	36.45	12.31
T_3	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	1494	36.41	12.14
T_4	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	1727	36.54	12.43
T_5	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	1793	36.67	12.78
T_6	Alachlor 50 EC @1 kg *a.i.* ha^{-1} as pre-emergence spray (3	1829	36.92	12.98

	DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i. ha*$^{-1}$ at 2 to 4 leaf stage of weeds			
T_7	Alachlor 50 EC@1 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	1897	37.13	13.68
T_8	Alachlor 50 EC@1 kg *a.i. ha*$^{-1}$ as pre-emergence spray (3 DAS) fb Pyrithiobac sodium10 SC @ 62.5g *a.i. ha*$^{-1}$ + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i. ha*$^{-1}$ at 2 to 4 leaf stage of weeds	1936	37.31	14.02
T_9	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	1862	37.00	13.51
T_{10}	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	2195	37.44	14.26
T_{11}	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	2201	37.68	14.32
T_{12}	Hand weedings at 20 and 50 DAS	2269	37.75	14.38
T_{13}	Weedy check	1278	32.21	12.02
SEm±		87.10	1.77	0.64
CD at 5 %		254.20	NS	NS

Note : fb= Followed by, One hoeing at 60 DAS is common for all the treatments
DAS: Days after sowing, SC: Soluble concentrate and EC: Emulsifiable concentrate

Effect of weed management practices on growth attributes

The plant height, monopodial and sympodial branches and dry matter accumulation were significantly varied due to different weed control treatments recorded at harvest (Table 2). The pre requisite for getting higher yield in any crop is higher total dry matter production and it's partitioning into various plant parts coupled with maximum translocation of photosynthates to the sink. Total dry matter accumulation is the sum of dry matter accumulation in individual plant parts which depends on the moisture, nutrient and availability of sun light. The significantly higher plant height (160.34 cm), monopodial branches (3.2 No. Plant^{-1}), sympodial branches (29.80 No. Plant^{-1}) and dry matter accumulation (413.40 g plant^{-1}) were observed in weed free check (2 hand weeding at 20 and 50 DAS). Among herbicide treatments Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds was recorded significantly higher plant height (158.23 cm), monopodial branches (3.1 No. Plant^{-1}), sympodial branches (28.40 No. Plant^{-1}) and dry matter accumulation (408.80 g plant^{-1}) which was on par with Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (155.57 cm, 3.0 No. Plant^{-1}, 27.60 No. Plant^{-1} and 394.02 g plant^{-1}, respectively) and superior over weedy check (106.47 cm, 1.4 No. Plant^{-1}, 20.30 No. Plant^{-1} and 246.24 g plant^{-1}, respectively). The higher growth attributes in these treatments was mainly due to effective control of weeds in the early and later stages of crop by the sequential application of herbicides. Similar results were reported by Arun[3], Tarlok Singh *et al.*[14], Deshpande *et al.*[4], Gnanavel and Babu[5], Muhammad *et al.*[10], and Jyotsana[8].

Table 2: Growth attributes of hybrid cotton as influenced by weed management practices at 90 days after sowing

Treatments		Plant height (cm)	Monopodial branches (No. Plant^{-1})	Sympodial branches (No. Plant^{-1})	Dry matter accumulation (g plant^{-1})
T_1	Alachlor 50 EC@1 kg *a.i.* ha^{-1} – as pre-emergence spray (3 DAS)	119.64	1.7	22.50	277.04
T_2	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} – as pre-emergence spray (3 DAS)	124.35	2.0	24.90	298.50
T_3	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	121.64	1.8	23.40	290.74
T_4	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	126.94	2.1	25.20	306.60
T_5	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	129.37	2.3	25.50	315.38
T_6	Alachlor 50 EC @1 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i. ha^{-1}* at 2 to 4 leaf stage of weeds	131.28	2.4	25.70	323.87
T_7	Alachlor 50 EC@1 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	137.58	2.7	26.50	340.15
T_8	Alachlor 50 EC@1 kg *a.i. ha^{-1}* as pre-emergence spray (3 DAS) fb Pyrithiobac sodium10 SC @ 62.5g *a.i. ha^{-1}* + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i. ha^{-1}* at 2 to 4 leaf stage of weeds	139.42	2.9	26.70	346.14
T_9	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	134.67	2.5	26.20	333.54
T_{10}	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	155.57	3.0	27.60	394.02
T_{11}	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	158.23	3.1	28.40	408.80
T_{12}	Hand weedings at 20 and 50 DAS	160.34	3.2	29.80	413.40
T_{13}	Weedy check	106.47	1.4	20.30	246.24
SEm±		6.48	0.1	1.23	15.94
CD at 5 %		18.92	0.3	3.60	46.52

Note : fb= Followed by, One hoeing at 60 DAS is common for all the treatments, DAS: Days after sowing, SC: Soluble concentrate and EC: Emulsifiable concentrate, * Figures in the parenthesis are original values and data subjected to for transformation using $\sqrt{(x + 0.5)}$, where x is the weed dry matter.

Effect of weed management practices on yield attributes

The gross returns, net returns and benefit cost ratio varied due to weed control treatment (Table 3). Among herbicide treatments Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds recorded higher seed cotton yield (123.79 g plant^{-1}), boll weight (3.72 g) and harvested bolls (37.65 No. Plant^{-1}) which was on par with Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds (123.46 g plant^{-1}, 3.52 g and 37.00 No. Plant^{-1}, respectively) and superior over weedy check (73.14 g plant^{-1}, 2.43 g and 29.00 No. Plant^{-1}, respectively). The improvement in crop growth and yield components was the consequence of lower crop weed competition, which shifted the balance in favour of crop in the utilization of nutrients, moisture, light and space. Similar results are obtained by Vivek *et al.*[15], Anjum *et al.*[1], Moolchand *et al.*[9], Patel *et al.*[12], Hiremath[7] and Jyotsana[8].

Table 3: Yield attributes of hybrid cotton as influenced by weed management practices

Treatments		Seed cotton yield (g plant)	Boll weight (g)	Harvested bolls (No. Plant^{-1})
T_1	Alachlor 50 EC@1 kg *a.i.* ha^{-1} – as pre-emergence spray (3 DAS)	78.07	2.57	30.13
T_2	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} – as pre-emergence spray (3 DAS)	91.24	2.92	32.24
T_3	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	84.99	2.69	31.12
T_4	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	97.78	3.00	32.35
T_5	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	101.40	3.15	32.95
T_6	Alachlor 50 EC @1 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i. ha^{-1}* at 2 to 4 leaf stage of weeds	103.37	3.24	33.00
T_7	Alachlor 50 EC@1 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	107.10	3.25	33.35
T_8	Alachlor 50 EC@1 kg *a.i. ha^{-1}* as pre-emergence spray (3 DAS) fb Pyrithiobac sodium10 SC @ 62.5g *a.i. ha^{-1}* + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i. ha^{-1}* at 2 to 4 leaf stage of weeds	109.25	3.26	33.56
T_9	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	105.18	3.25	33.10
T_{10}	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	123.46	3.52	37.00
T_{11}	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	123.79	3.72	37.65
T_{12}	Hand weedings at 20 and 50 DAS	127.52	3.78	37.80
T_{13}	Weedy check	73.14	2.43	29.00
SEm±		4.93	0.15	1.62
CD at 5 %		14.38	0.44	4.71

Note : fb= Followed by, One hoeing at 60 DAS is common for all the treatments, DAS: Days after sowing, SC: Soluble concentrate and EC: Emulsifiable concentrate, * Figures in the parenthesis are original values and data subjected to for transformation using $\sqrt{(x + 0.5)}$, where x is the weed dry matter.

Effect of weed management practices on fibre quality parameters of hybrid cotton

The data on fibre quality parameters at harvest of crop as influenced by weed management practices are presented in Table 4. Fibre quality parameters of hybrid cotton are non-significantly differed due to different weed management practices. However, Numerically higher 2.5 span length (33.60 mm), fibre strength (30.60 g tex^{-1}), uniformity ratio (88.00%), and fibre elongation (6.60 %) are recorded in application of Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS *fb* tank mix of Pyrithiobac sodium 10 SC @ 62.5 g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds as compared to weedy check (32.30 mm, 29.20 g tex^{-1}, 77.80 %, 5.40 %, respectively). This might be due to these quality parameters are not significantly affected by agronomic and climatic factors. These results were in line with the findings of Hiremath[7] and Jyotsana[8].

Based on these results it can be inferred that sequential application of Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray at 3 DAS fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} or Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as

pre-emergence spray 3 DAS fb Pyrithiobac sodium 10 SC @62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds coupled with one hoeing at 60 DAS recorded higher growth and yield attributes and seed cotton yield.

Table 4: 2.5 % span length, fibre strength, uniformity ratio and fibre elongation of hybrid cotton as influenced by different weed management practices recorded at harvest of the crop

Treatments		*2.5 % span length*	*Fibre strength*	*Uniformity ratio*	*Fibre elongation*
T_1	Alachlor 50 EC@1 kg *a.i.* ha^{-1} – as pre-emergence spray (3 DAS)	32.30	29.40	82.30	5.90
T_2	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} – as pre-emergence spray (3 DAS)	32.40	29.70	84.40	6.10
T_3	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	32.40	29.40	84.30	6.10
T_4	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	32.60	30.00	84.70	6.20
T_5	Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	32.70	30.20	85.00	6.30
T_6	Alachlor 50 EC @1 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i. ha^{-1}* at 2 to 4 leaf stage of weeds	32.80	30.20	85.30	6.30
T_7	Alachlor 50 EC@1 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	33.30	30.40	85.30	6.40
T_8	Alachlor 50 EC@1 kg *a.i. ha^{-1}* as pre-emergence spray (3 DAS) fb Pyrithiobac sodium10 SC @ 62.5g *a.i. ha^{-1}* + Fenoxaprop p ethyl 9 EC @ 62.5g *a.i. ha^{-1}* at 2 to 4 leaf stage of weeds	33.40	30.40	87.10	6.50
T_9	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	33.10	30.40	85.30	6.40
T_{10}	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Quizalofop ethyl 5 EC @ 37.5g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	33.40	30.50	88.00	6.60
T_{11}	Pendimethalin 38.75 EC @ 0.75 kg *a.i.* ha^{-1} as pre-emergence spray (3 DAS) fb Pyrithiobac sodium 10 SC @ 62.5g *a.i.* ha^{-1} + Fenoxaprop p ethyl 9 EC @ 62.5 g *a.i.* ha^{-1} at 2 to 4 leaf stage of weeds	33.60	30.60	88.00	6.60
T_{12}	Hand weedings at 20 and 50 DAS	34.60	30.90	89.00	6.90
T_{13}	Weedy check	32.30	29.20	77.80	5.40
SEm±		1.62	1.47	4.14	0.30
CD at 5 %		NS	NS	NS	NS

Note: fb= Followed by, One hoeing at 60 DAS is common for all the treatments
DAS: Days after sowing, SC: Soluble concentrate and EC: Emulsifiable concentrate

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