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Effect of different weed management practices on growth parameter of cotton under irrigated conditions of Haryana

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Abstract

To study the effect of different weed management practices, combination with intercropping operation and pre and post emergence herbicides on weeds and growth parameter of cotton, a field experiment was conducted during two consecutive seasons of *kharif* 2021 and 2022 at CCS Haryana Agricultural University, Hisar. The experimental field was pre dominantly infested with natural population of *Trianthema portulacastrum* (carpet weed), *Digera arvensis* (*Digera*), *Echinochloa colona* (wild rice) and *Cyperus rotundus* (Purple nutsedge). Two hoeing (25-30 DAS and 40-45 DAS) being at par with application of pendimethalin 1000 g/ha pre emergence at 35-40 DAS and pendimethalin 1000 g/ha pre emergence *fb* one hoeing after intercrop harvest, caused significant reduction in density, dry wt. of weeds and maximum plant height, dry matter accumulation and sympodial branches per plant as compared to weedy check up to harvest in both the years. Uncontrolled weeds reduced about 15% plant height and about 50% sympodial branches and plant dry matter accumulation of cotton as compared to weed free conditions.

Keywords: *Echinochloa colona*, *Cyperus rotundus*, *Trianthema portulacastrum*

Introduction

Cotton (*Gossypium* spp.) is one of the most important fibre and cash crop in India which belongs to Malvaceae family and is known as “White Gold”. It plays a vital role in the rural, national and international economy and its contribution in the foreign exchange is tremendous. Cotton is the backbone of textile industry contributing nearly 80% basic raw material for textile based industries not only for India, but for entire world, hence its fibre unique quality it is also known as the “King of appraisal fibre”. Cotton seed is the world (10%) second most important oilseed. In India cotton occupies 65% area under irrigated condition and 35% under rainfed condition. Area under cotton in India is about 12.37 m ha along with production of 311 lakh bales and productivity of 428 kg ha⁻¹ (Anonymous, 2022) ^[1]. Around 6.36 lakh ha area and production 13.16 lakh bales (170 kg) along with the productivity of 352 kg ha⁻¹ in Haryana. (Anonymous, 2022) ^[1]. Major cultivable districts of cotton in the state are Sirsa, Fatehabad, Hisar, Jind, Bhiwani, Rohtak and Charkhi Dadri and also known as cotton belt.

Weeds are major biological constraints that reduce the crop productivity, since they are highly competitive with crop for the natural and applied resources such as minerals/nutrients, soil moisture, space and solar radiation (Rao *et al.*, 2015) ^[11]. Weeds have greater persistence in soil due to their wider adaptability and ability to produce a large number of seeds of excellent viability. Weeds compete for moisture and nutrients to main crop, harbour insects-pest and diseases, therefore drastically reduction in cotton growth and yield. According to Ayyadurai, *et al.* (2013) ^[16] cotton is highly vulnerable to weed competition especially at initial growth stages and yield reduction due to weed in cotton varies from 30 to 60 days of crop growth periods. Due to the competition of weeds for nutrients, light and space, the cotton growth and seed cotton yield was adversely affected. Poor crop stand due to weed competition has been found the lower growth and seed yield upto 30-90% depending upon weed infestation (Singh, 2014) ^[14].

Materials and methods

A field experiment was conducted during the *kharif* 2021 and 2022 at Research Farm of Department of Agronomy, Chaudhary Charan Singh Haryana Agricultural University, Hisar under irrigated conditions. The soil of the experimental site was sandy loam in texture and slightly alkaline (pH 7.9 - 8.0) in nature and low in organic carbon (0.43-0.44), low in available nitrogen (124.29-125.63 kg/ha), medium in available phosphorus (14.78-15.84 kg/ha) and high in available potassium (260.81-262.47 kg/ha). Eleven treatments were tried split plot design replicated thrice in a plot size of 9 x 2.7 m with two cropping system, sole cotton and intercrop (cotton + green gram). The treatments were (Pendimethalin 1000 g/ha pre emergence, Pendimethalin 1000 g/ha PE *fb* one hoeing at 35-40 DAS, Pendimethalin 1000 g/ha PE *fb* one hoeing after intercrop harvest, Pendimethalin 1000 g/ha PE *fb* paraquat 0.3% post emergence (PoE, protected spray) after intercrop harvest, Pendimethalin 1000 g/ha PE *fb* glyphosate 0.5% PoE (protected spray) after intercrop harvest, Pendimethalin 1000 g/ha PE *fb* quizalofop-ethyl 60 g/ha PoE after intercrop harvest, Pendimethalin 1000 g/ha PE *fb* fenoxaprop 67.5 g/ha PoE after intercrop harvest, Pendimethalin 1000 g/ha PE *fb* pyriithiobac-sodium 62.5 g/ha PoE after intercrop harvest, Two hoeing (25-30 DAS and 40-45 DAS), Weed free, Weedy check). The cotton hybrid, Rasi - 773 (BG-II) was sown at about 4-5 cm depth by seed cotton drill with 100 x 45 cm spacing on 1st May and 2nd May during 2020 and 2021, respectively. The standard package of practices other than weed control treatments recommended for cotton were adopted. Rainfall received during May to October during cotton growing period was 773.2 mm in 2021 and 591.9 mm in 2022. Data on plant height (cm) and dry matter accumulation (g/plant) were recorded at 30 DAS, 60 DAS, 90 DAS, 120 DAS, 150 DAS and at harvest while sympodial branches per plant of cotton was recorded at 90 DAS, 120 DAS and at harvest.

Results and discussion

Cotton growth parameters

1. Plant height (cm)

In the cropping systems, significantly taller plants were observed in sole cotton as compared to intercrop (cotton + green gram) at all the growth stages during both years. About ten percent plant height of cotton was reduced at maturity by intercropping of green gram as compared to sole cotton during both the years of study (Table 1 and 2).

Different weed management practices, weed free treatment resulted in higher plant height as compared to other weed management treatments at various growth stages of the crop during both years of study (Table 1 and 2). At 30, 60, 90, 120, 150 DAS and at harvest, plant height differed significantly due to different weed management practices and significantly lower plant height of cotton plants was observed under weedy check treatment as compared to all other treatments during both years. During *kharif* 2021 and 2022 at 30 and 60 DAS, significantly taller plants of cotton were observed under weed free treatment being at par with two hoeing (25-30 DAS and 40-45 DAS) and pendimethalin 1000 g/ha PE *fb* one hoeing at 35-40 DAS as compared to all other treatments which remained at par with each other except weedy check treatment (Mahar *et al.*, 2007; Rani *et al.*, 2016) ^[5, 10]. Maximum increase in plant height was observed between 30 to 60 DAS during both years study. At 90, 120, 150 DAS and at harvest, pendimethalin 1000 g/ha as pre emergence resulted in significantly lower plant height of cotton as compared to other

herbicide treatments, but significantly higher than weedy check treatment. At 90, 120, 150 DAS and at harvest, weed free treatment observed significantly taller plants as compared to all other treatments while weedy check treatment and pendimethalin 1000 g/ha pre emergence recorded significantly shorter plants as compared to other herbicide treatments which were at par with each other during first and second year of study (Table 1 and 2). Uncontrolled weeds reduced about 15.6 and 15.8% plant height of cotton plants at harvest stage as compared to weed free conditions. Similar results were also observed by Singh *et al.* (2015) ^[12], Singh and Rathod (2015) ^[12] and Singh *et al.* (2016) ^[13].

2. Dry matter accumulation (g/plant)

Among cropping systems, significantly greater dry matter accumulation was observed in sole cotton as compared to intercrop (cotton + green gram) at all the growth stages during both years. More dry matter accumulation was recorded during second year in comparison to first year. Maximum increase in dry matter accumulation was observed between 90 to 120 DAS. About sixteen percent dry matter accumulation of cotton was reduced at maturity by intercropping of green gram as compared to sole cotton during both the years of study (Table 3 and 4).

Various weed management practices, weed free treatment resulted in higher dry matter accumulation (g/plant) as compared to other weed management treatments at different growth stages of the crop during both years of study (Table 3 and 4). At 30, 60, 90, 120, 150 DAS and at harvest, dry matter accumulation differed significantly due to different weed management practices and significantly lower dry matter accumulation of cotton was observed under weedy check treatment as compared to all other treatments during both years. During *kharif* 2021 and 2022 at 30 DAS, significantly lower dry matter accumulation (g/plant) of cotton was observed under weedy check treatment as compared to all other treatments (Table 3 and 4). At 60 DAS, significantly higher dry matter accumulation of cotton was observed under weed free treatment being at par with two hoeing (25-30 DAS and 40-45 DAS) and pendimethalin 1000 g/ha pre emergence *fb* one hoeing at 35-40 DAS as compared to all other treatments which remained at par with each other except weedy check treatment. At 90 DAS, weed free treatment recorded significantly higher dry matter accumulation of cotton as compared to all other treatments followed by two hoeing (25-30 DAS and 40-45 DAS) being at par with pendimethalin 1000 g/ha pre emergence *fb* one hoeing at 35-40 DAS and pendimethalin 1000 g/ha pre emergence *fb* one hoeing after intercrop harvest but significantly higher than all other treatments during both years. At 120, 150 DAS and at harvest, weed free treatment observed significantly greater dry matter accumulation as compared to all other treatments followed by two hoeing (25-30 DAS and 40-45 DAS) and pendimethalin 1000 g/ha pre emergence *fb* one hoeing at 35-40 DAS which remained at par with each other, while weedy check treatment and pendimethalin 1000 g/ha pre emergence recorded significantly lesser dry matter accumulation as compared to other herbicide treatments which were at par with each other during first and second year of crop study. At 90, 120, 150 DAS and at harvest, application of pendimethalin 1000 g/ha as pre emergence resulted in significantly higher dry matter accumulation than weedy check treatment but significantly lower dry matter accumulation as compared to sequential application of pendimethalin 1000 g/ha as pre emergence *fb* post emergence herbicides application after intercrop harvest and pendimethalin 1000 g/ha as pre emergence and one hoeing. Similar result was found by Patel *et al.* (2013) ^[8], Singh

(2014) [13], Rani *et al.* (2016) [10]. Uncontrolled weeds reduced about 50% plant dry matter accumulation of cotton as compared to weed free conditions during *kharif* 2021 and 2022.

3. Number of sympodial branches per plant

Cropping system had significant effect on number of sympodial branches per plant at different crop stages. Sole cotton resulted in significantly higher number of sympodial branches per plant as compared to intercropping system (cotton + green gram) at various growth stages during both the years of experimentation (Table 5 and 6). Sole cotton crop resulted in 11.0, 22.9 and 15.8 percent higher sympodial branches per plant as compared to intercropping system during *kharif* 2021, whereas, 10.8, 23.5 and 15.7 percent higher sympodial branches per plant as compared to intercropping system during *kharif* 2022 at 90, 120 DAS and at harvest, respectively (Table 5 and 6).

Among various weed management practices, weed free treatment resulted in significantly higher number of sympodial branches per plant as compared to all other treatments while the weedy check treatment resulted in lowest sympodial branches during both the years of study at 90 and

120 DAS and at harvest (Table 5 and 6). At 90, 120 DAS and at harvest, weed free treatment observed significantly greater number of sympodial branches per plant as compared to all other treatments followed by two hoeing (25-30 DAS and 40-45 DAS) and pendimethalin 1000 g/ha pre emergence *fb* one hoeing at 35-40 DAS which remained at par with each other (Nithya *et al.*, 2013; and Veeraputhiran and Srinivasan, 2017) [7, 15]. While weedy check treatment and pendimethalin 1000 g/ha pre emergence recorded significantly lesser number of sympodial branches per plant as compared to other herbicide treatments which were at par with each other during both the year of study (Table 5 and 6). At 90, 120 DAS and at harvest, application of pendimethalin 1000 g/ha as pre emergence resulted in significantly higher number of sympodial branches per plant than weedy check treatment but significantly lower number of sympodial branches per plant as compared to sequential application of pendimethalin 1000 g/ha as pre emergence *fb* post emergence herbicides application after intercrop harvest and pendimethalin 1000 g/ha as pre emergence and one hoeing. Uncontrolled weeds reduced about 50% numbers of sympodial branches per plant of cotton as compared to weed free conditions (Table 5 and 6), Nalini *et al.* (2019) [6], Punia *et al.* (2019) [9] and Devi (2022) [3].

Table 1: Effect of cropping system and different weed management practices on plant height (cm) of cotton during *kharif* 2021

Treatments	30 DAS	60 DAS	90 DAS	120 DAS	150 DAS	At harvest
1. Main plot – Cropping system						
A. Sole cotton	32.2	84.1	114.8	141.1	165.0	174.3
B. Intercrop - Cotton + Green gram	30.0	78.4	106.5	128.9	150.8	157.4
S.Em±	0.3	0.4	0.9	1.0	1.2	1.2
C.D at 5%	1.2	1.6	4.0	4.1	4.9	5.1
2. Sub plots - Weed management practices						
T1: Pendimethalin 1000 g/ha pre emergence (PE)	30.9	80.7	106.2	127.9	149.7	157.2
T2: Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing at 35-40 DAS	31.3	83.7	113.3	139.0	161.3	170.3
T3: Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing after intercrop harvest	31.2	81.5	111.2	135.8	159.1	167.1
T4: Pendimethalin 1000 g/ha PE <i>fb</i> paraquat 0.3% post emergence (protected spray) after intercrop harvest	31.2	81.4	110.5	135.8	159.9	166.9
T5: Pendimethalin 1000 g/ha PE <i>fb</i> glyphosate 0.5% post emergence (protected spray) after intercrop harvest	31.3	81.5	111.6	135.2	159.3	166.3
T6: Pendimethalin 1000 g/ha PE <i>fb</i> quizalofop-ethyl 60 g/ha post emergence after intercrop harvest	30.8	80.2	110.3	134.9	157.2	165.9
T7: Pendimethalin 1000 g/ha PE <i>fb</i> fenoxaprop 67.5 g/ha post emergence after intercrop harvest	30.9	80.3	110.3	135.2	158.2	166.2
T8: Pendimethalin 1000 g/ha PE <i>fb</i> pyriithiobac-sodium 62.5 g/ha post emergence after intercrop harvest	31.2	81.4	111.2	136.1	158.2	167.2
T9: Two hoeing (25-30 DAS and 40-45 DAS)	31.5	83.4	113.5	139.2	163.4	170.7
T10: Weed free	32.7	84.4	117.8	143.9	168.7	176.9
T11: Weedy check	29.1	75.0	101.0	121.5	142.1	149.2
S.Em±	0.5	0.6	1.4	1.5	1.7	2.1
C.D at 5%	1.5	1.8	4.1	4.7	5.2	6.1

Table 2: Effect of cropping system and different weed management practices on plant height (cm) of cotton during *kharif* 2022

Treatments	30 DAS	60 DAS	90 DAS	120 DAS	150 DAS	At harvest
1. Main plot - Cropping system						
A. Sole cotton	33.0	86.4	118.1	145.3	170.2	179.8
B. Intercrop - Cotton + Green gram	30.8	80.5	109.6	132.8	155.5	162.3
S.Em±	0.3	0.4	1.0	1.1	1.2	1.3
C.D at 5%	1.2	1.6	4.1	4.2	5.1	5.3
2. Sub plots - Weed management practices						
T1: Pendimethalin 1000 g/ha pre emergence (PE)	31.7	82.9	109.3	131.8	154.3	162.1
T2: Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing at 35-40 DAS	32.1	85.9	116.6	143.2	166.3	175.7
T3: Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing after intercrop harvest	32.0	83.7	114.4	140.1	164.0	172.3
T4: Pendimethalin 1000 g/ha PE <i>fb</i> paraquat 0.3% post emergence (protected spray) after intercrop harvest	32.0	83.6	113.7	139.7	164.9	172.1
T5: Pendimethalin 1000 g/ha PE <i>fb</i> glyphosate 0.5% post emergence (protected spray) after intercrop harvest	32.1	83.8	114.9	139.4	164.3	171.5
T6: Pendimethalin 1000 g/ha PE <i>fb</i> quizalofop-ethyl 60 g/ha post emergence after intercrop harvest	31.6	82.4	113.5	139.0	162.1	170.9
T7: Pendimethalin 1000 g/ha PE <i>fb</i> fenoxaprop 67.5 g/ha post emergence after intercrop harvest	31.7	82.5	113.5	139.3	163.1	171.7
T8: Pendimethalin 1000 g/ha PE <i>fb</i> pyriithiobac-sodium 62.5 g/ha post emergence after intercrop harvest	32.0	83.6	114.4	140.0	163.1	172.4
T9: Two hoeing (25-30 DAS and 40-45 DAS)	32.3	85.7	116.8	143.4	168.5	176.1
T10: Weed free	33.5	86.7	121.2	148.3	173.9	182.5
T11: Weedy check	29.8	77.0	104.0	125.1	146.5	153.9
S.Em±	0.5	0.6	1.4	1.7	1.8	2.1
C.D at 5%	1.5	1.8	4.2	4.8	5.4	6.3

Table 3: Effect of cropping system and different weed management practices on dry matter accumulation (g/plant) of cotton during *kharif* 2021

Treatments	30 DAS	60 DAS	90 DAS	120 DAS	150 DAS	At harvest
1. Main plot – Cropping system						
A. Sole cotton	3.6	55.0	102.0	306.5	333.7	409.0
B. Intercrop - Cotton + Green gram	3.4	51.3	91.3	236.5	280.6	343.9
S.Em±	0.0	0.2	0.7	2.1	2.7	3.4
C.D at 5%	0.1	1.0	3.6	10.0	17.9	21.9
2. Sub plots - Weed management practices						
T ₁ : Pendimethalin 1000 g/ha pre emergence (PE)	3.5	52.8	89.9	232.6	253.9	311.2
T ₂ : Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing at 35-40 DAS	3.5	54.7	102.1	310.8	356.3	436.6
T ₃ : Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing after intercrop harvest	3.5	53.3	100.0	276.9	317.8	389.4
T ₄ : Pendimethalin 1000 g/ha PE <i>fb</i> paraquat 0.3% post emergence (protected spray) after intercrop harvest	3.5	53.2	96.7	261.8	301.1	369.0
T ₅ : Pendimethalin 1000 g/ha PE <i>fb</i> glyphosate 0.5% post emergence (protected spray) after intercrop harvest	3.5	53.3	98.4	266.4	312.7	383.2
T ₆ : Pendimethalin 1000 g/ha PE <i>fb</i> quizalofop-ethyl 60 g/ha post emergence after intercrop harvest	3.5	52.5	96.1	259.9	295.8	362.5
T ₇ : Pendimethalin 1000 g/ha PE <i>fb</i> fenoxaprop 67.5 g/ha post emergence after intercrop harvest	3.5	52.5	95.4	258.1	293.8	360.0
T ₈ : Pendimethalin 1000 g/ha PE <i>fb</i> pyriithiobac-sodium 62.5 g/ha post emergence after intercrop harvest	3.5	53.2	94.1	258.3	292.7	358.7
T ₉ : Two hoeing (25-30 DAS and 40-45 DAS)	3.6	54.6	103.0	315.3	359.1	440.1
T ₁₀ : Weed free	3.7	55.2	114.4	351.5	395.5	484.6
T ₁₁ : Weedy check	3.3	49.1	72.9	194.9	200.0	245.1
S.Em±	0.1	0.4	1.3	12.3	12.6	15.4
C.D at 5%	0.2	1.1	4.1	33.1	36.1	44.3

Table 4: Effect of cropping system and different weed management practices on dry matter accumulation (g/plant) of cotton during *kharif* 2022

Treatments	30 DAS	60 DAS	90 DAS	120 DAS	150 DAS	At harvest
1. Main plot - Cropping system						
A. Sole cotton	3.8	58.3	108.6	328.0	362.1	445.8
B. Intercrop - Cotton + Green gram	3.6	54.3	97.2	253.0	304.4	374.8
S.Em±	0.0	0.3	0.8	2.2	3.0	3.7
C.D at 5%	0.2	1.1	3.8	10.7	19.4	23.9
2. Sub plots - Weed management practices						
T ₁ : Pendimethalin 1000 g/ha pre emergence (PE)	3.7	56.0	95.7	248.9	275.5	339.2
T ₂ : Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing at 35-40 DAS	3.7	58.0	108.7	332.6	386.6	475.9
T ₃ : Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing after intercrop harvest	3.7	56.5	106.5	296.3	344.8	424.5
T ₄ : Pendimethalin 1000 g/ha PE <i>fb</i> paraquat 0.3% post emergence (protected spray) after intercrop harvest	3.7	56.4	103.0	280.1	326.7	402.2
T ₅ : Pendimethalin 1000 g/ha PE <i>fb</i> glyphosate 0.5% post emergence (protected spray) after intercrop harvest	3.7	56.5	104.7	285.0	339.2	417.6
T ₆ : Pendimethalin 1000 g/ha PE <i>fb</i> quizalofop-ethyl 60 g/ha post emergence after intercrop harvest	3.7	55.6	102.3	278.1	321.0	395.2
T ₇ : Pendimethalin 1000 g/ha PE <i>fb</i> fenoxaprop 67.5 g/ha post emergence after intercrop harvest	3.7	55.7	101.6	276.2	318.8	392.4
T ₈ : Pendimethalin 1000 g/ha PE <i>fb</i> pyriithiobac-sodium 62.5 g/ha post emergence after intercrop harvest	3.7	56.4	100.2	276.4	317.6	391.0
T ₉ : Two hoeing (25-30 DAS and 40-45 DAS)	3.7	57.8	109.7	337.4	389.6	479.7
T ₁₀ : Weed free	3.9	58.5	121.8	376.1	429.1	528.3
T ₁₁ : Weedy check	3.4	52.0	77.7	208.5	217.0	267.2
S.Em±	0.1	0.4	1.4	13.2	13.7	16.8
C.D at 5%	0.2	1.2	4.3	35.4	39.2	48.3

Table 5: Effect of cropping system and different weed management practices on number of sympodial branches per plant of cotton during *kharif* 2021

Treatments	90 DAS	120 DAS	At harvest
1. Main plot - Cropping system			
A. Sole cotton	10.9	17.0	21.5
B. Intercrop - Cotton + Green gram	9.7	13.1	18.1
S.Em±	0.1	0.1	0.2
C.D at 5%	0.4	0.6	1.2
2. Sub plots - Weed management practices			
T ₁ : Pendimethalin 1000 g/ha pre emergence (PE)	9.6	12.9	16.4
T ₂ : Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing at 35-40 DAS	10.9	17.2	22.9
T ₃ : Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing after intercrop harvest	10.7	15.4	20.5
T ₄ : Pendimethalin 1000 g/ha PE <i>fb</i> paraquat 0.3% post emergence (protected spray) after intercrop harvest	10.3	14.5	19.4
T ₅ : Pendimethalin 1000 g/ha PE <i>fb</i> glyphosate 0.5% post emergence (protected spray) after intercrop harvest	10.5	14.8	20.1
T ₆ : Pendimethalin 1000 g/ha PE <i>fb</i> quizalofop-ethyl 60 g/ha post emergence after intercrop harvest	10.2	14.4	19.1
T ₇ : Pendimethalin 1000 g/ha PE <i>fb</i> fenoxaprop 67.5 g/ha post emergence after intercrop harvest	10.2	14.3	18.9
T ₈ : Pendimethalin 1000 g/ha PE <i>fb</i> pyriithiobac-sodium 62.5 g/ha post emergence after intercrop harvest	10.0	14.3	18.8
T ₉ : Two hoeing (25-30 DAS and 40-45 DAS)	11.0	17.5	23.1
T ₁₀ : Weed free	12.2	19.5	25.5
T ₁₁ : Weedy check	7.8	10.8	12.9
S.Em±	0.1	0.7	0.8
C.D at 5%	0.4	1.8	2.3

Table 6: Effect of cropping system and different weed management practices on number of sympodial branches per plant of cotton during *kharif* 2022

Treatments	90 DAS	120 DAS	At harvest
1. Main plot – Cropping system			
A. Sole cotton	11.1	17.4	22.1
B. Intercrop - Cotton + Green gram	9.9	13.4	18.6
S.Em±	0.1	0.1	0.2
C.D at 5%	0.4	0.6	1.2
2. Sub plots - Weed management practices			
T ₁ : Pendimethalin 1000 g/ha pre emergence (PE)	9.8	13.2	16.8
T ₂ : Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing at 35-40 DAS	11.1	17.7	23.6
T ₃ : Pendimethalin 1000 g/ha PE <i>fb</i> one hoeing after intercrop harvest	10.9	15.7	21.0
T ₄ : Pendimethalin 1000 g/ha PE <i>fb</i> paraquat 0.3% post emergence (protected spray) after intercrop harvest	10.5	14.9	19.9
T ₅ : Pendimethalin 1000 g/ha PE <i>fb</i> glyphosate 0.5% post emergence (protected spray) after intercrop harvest	10.7	15.1	20.7
T ₆ : Pendimethalin 1000 g/ha PE <i>fb</i> quizalofop-ethyl 60 g/ha post emergence after intercrop harvest	10.5	14.8	19.6
T ₇ : Pendimethalin 1000 g/ha PE <i>fb</i> fenoxaprop 67.5 g/ha post emergence after intercrop harvest	10.4	14.7	19.4
T ₈ : Pendimethalin 1000 g/ha PE <i>fb</i> pyriithiobac-sodium 62.5 g/ha post emergence after intercrop harvest	10.2	14.7	19.4
T ₉ : Two hoeing (25-30 DAS and 40-45 DAS)	11.2	17.9	23.8
T ₁₀ : Weed free	12.5	20.0	26.3
T ₁₁ : Weedy check	7.9	11.1	13.2
S.Em±	0.2	0.7	0.8
C.D at 5%	0.4	1.9	2.4

Conclusion

Sole cotton, produced significantly taller plants, higher dry matter accumulation and greater number of sympodial branches per plant as compared to (cotton + green gram) intercropping system during both years of study. Among different weed management practices, were recorded significantly taller plants, more dry matter accumulation and greater number of sympodial branches per plant of cotton throughout crop growing season as compared to weedy check treatments during both years cop experimentations. Among the various weed management treatments, significantly lower plant height, dry matter accumulation and lower number of sympodial branches per plant were observed in weedy check treatments as compared to other treatments during both years. Uncontrolled weeds reduced about 15% plant height and about 50% sympodial branches and plant dry matter accumulation of cotton as compared to weed free conditions.

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