International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(6): 2381-2386

Received: 21-09-2019
Accepted: 25-10-2019

SS Thakare
Ph.D Scholar, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

AN Paslawar
Professor, Agronomy Section, College of Agriculture, Akola Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

SU Kakade
Assistant Professor, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

MR Deshmukh
Assistant Professor, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

ND Parlawar
Head, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

Corresponding Author:
SS Thakare
Ph.D scholar, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

Nutrient uptake of weeds and *Bt* cotton as influenced by fertigation levels and weed management practices

SS Thakare, AN Paslawar, SU Kakade, MR Deshmukh and ND Parlawar

Abstract
A field investigation "Nutrient uptake of weeds and *Bt* cotton as influenced by fertigation levels and weed management practices" was conducted at AICRP on Weed management farm, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *kharif* season 2017. The experiment was laid out in Split plot design with three replications. The main plot treatments comprised of different levels of fertilizer in five splits at 75%, 100% and 125% of recommended dose of N and K of fertilizers given through fertigation, however P was applied as basal dose and these treatments were compared with 100% soil application of fertilizers. Whereas, sub plot treatments comprised of five weed management practices *viz.* pendimethalin 1 kg a.i/ha PE *fb* pyrithiobac sodium 0.062 kg a.i/ha + propaquizafop 0.075 kg a.i/ha 25-30 DAS + 1 hand weeding at 45-50 DAS, pendimethalin 1 kg a.i/ha PE *fb* paraquat 0.6 kg a.i/ha at 40-50 DAS directed spray of paraquat 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying, Farmer practices (3 hoeing 15-20 days interval after sowing *fb* 3 HW) and weedy check. Results revealed that, highest weed control efficiency and lowest weed index were recorded under drip fertigation with125 percent RDNK in 5 splits followed by 100 and 75 percent RDNK in 5 splits at all growth stages of crop. Higher uptake of N (130.95 kg/ha), P (33.04 kg/ha) and K (92.24 kg/ha) by cotton crop plants were observed at 125 per cent levels of N and K fertigation. Directed spray of paraquat 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat 0.6 kg a.i/ha at 60 DAS *fb* 1 HW 15 days after spraying recorded significant reduction in weed density, weed dry matter, highest weed control efficiency and lowest weed index. Among the different weed control measures weedy check recorded significantly higher N (59.85 kg/ha), P (12.87 kg/ha) and K (29.73 kg/ha) uptake by weed. The herbicidal treatment directed spray of paraquat 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat 0.6 kg a.i/ha at 60 DAS *fb* 1 HW 15 days after spraying recorded lower value of nutrient uptake N (25.60 kg/ha), P (5.82 kg/ha), K (10.30 kg/ha) by weeds than rest of herbicidal treatments. Whereas significantly higher nutrients uptake by crop plants N (122.04 kg/ha), P (32.29 kg/ha) and K (98.60 kg/ha) recorded in treatment directed spray of paraquat 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat 0.6 kg a.i/ha at 60 DAS *fb* 1 HW 15 days after spraying.

Keywords: Nutrient uptake, influenced, fertigation levels, management practices

Introduction
Cotton (*Gossypium hirsutum* L.) has a pride of place among the cultivated plants that satisfy the material need of man because next to food, clothing is the prime need of life. Apart from its fibre, it's an important source of vegetable oil for the preparation of soaps, medicines, cosmetics and seed cake is used as an animal feed. Cotton crop is an important cash crop and are backbone of textile industries mainly because of its lint. India is one of the major producers of cotton in the world with largest acreage of 12.3 M ha., but productivity as low as 527 kg lint ha^{-1} as compared to global average of 735 kg lint ha^{-1} (Anonymous 2018) [2].

The critical period of weed competition in cotton was found to be 15 to 60 days (Rajiv Sharma, 2008) [13]. Timely weed control in early growth period is very important for *Bt* cotton particularly at before and after boll development, which influence ultimately on boll weight and seed cotton yield. Thus, better utilization of resources like moisture, nutrients, space, solar energy *etc* for proper nourishment of *Bt* cotton. The hypothesis of present investigation is to study the effect of fertigation levels and weed management practices on nutrient uptake by weeds and *Bt* cotton. Supply of sufficient amount of nutrient through fertigation in split application have significant effect on weeds infestation by restricting the availability of moisture and nutrient for the growth of weeds and integration of weed management practices

in fertigation can minimise weed infestation and reduce the weeds dry matter and nutrient uptake by weeds.

Materials and Methods

A field investigation entitled "Nutrient uptake of weeds and *Bt* cotton as influenced by fertigation levels and weed management practices" was conducted at AICRP on Weed management farm, Department of Agronomy, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola during *kharif* season 2017-18. The experiment was laid out in Split plot design with three replications. There were twenty treatments having four different of fertigation levels and five weed management practices. The main plot treatments comprised of different levels of fertilizer in five splits at 75 per cent, 100 per cent and 125 per cent of recommended dose of N and K of fertilizers given through fertigation, however P was applied as basal dose and these treatments were compared with 100 per cent soil application of fertilizers. Whereas, sub plot treatments comprised of five weed management practices *viz.*, pendimethalin @ 1 kg a.i/ha PE *fb* pyrithiobac sodium @ 0.062 kg a.i/ha + propaquizafop @ 0.075 kg a.i/ha 25-30 DAS + 1 hand weeding at 45-50 DAS, pendimethalin @ 1 kg a.i/ha PE *fb* paraquat @ 0.6 kg a.i/ha at 40-50 DAS, directed spray of paraquat @ 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying, farmers practice – 3 hoeing 15-20 days interval after sowing *fb* 3 HW and weedy check.

The soil of experimental plot was vertisol. Low in available nitrogen (170.0 kg ha^{-1}), medium in phosphorus (19.16 kg ha^{-1}), organic carbon (0.41%), rich in available potassium (363 kg ha^{-1}) and slightly alkaline in reaction (7.8). Cotton seed variety PDKV JKAL-116 BG II was sown on June 17, 2018 at a spacing 120 x 60 cm. The experimental site was established with inline drip irrigation system (16 mm) lateral laid out at 120 cm with 60 cm dripper spacing. Drip irrigation was given as per requirement of crop. The major weed flora viz; *Cyperus rotundus, Cynodon dactylon Commelina benghalensis, Digera arvensis, Parthenium hysterophorus, Euphorbia geniculata, Tridax procumbense* and *Celosia argentea, Ipomea sp., sorghum halpenses, Euphorbia hirta, Alternanathera sessile and Phyllanthus niruri* were found during study.

Table: Quantity of fertilizer to be applied

Quantity of fertilizer to be applied in five splits	Stage of Crop (DAS)	Quantity of fertilizer to be applied in seven splits	Stage of Crop (DAS)
10 percent RDNK	Basal	10 percent RDNK	Basal
20 percent RDNK	25 DAS	15 percent RDNK	25 DAS
25 percent RDNK	50 DAS	15 percent RDNK	50 DAS
25 percent RDNK	75 DAS	20 percent RDNK	75 DAS
20 percent RDNK	100 DAS	20 percent RDNK	100 DAS
----	---	10 percent RDNK	125 DAS
----	---	10 percent RDNK	150 DAS

DAS: Days after sowing, RDNK: Recommended dose of N & K

Results and Discussion

The results of the present study as well as relevant discussion have been summarized under following heads:

Weed density and weed dry weight

Effect of fertigation levels

Invariably higher weed population was associated with soil application of recommended dose of fertilizers (100 per cent RDNK through soil) compared to fertigation treatments. However, three fertigation levels (75,100 and 125 per cent RDNKha^{-1}) were found comparable in respect of weed density.

Different fertigation levels significantly influenced the total dry matter accumulation by weed. It was observed that all the application of fertilizer through fertigation treatments significantly restricted the weed growth compared to soil application of fertilizers at 30, 60 and 90 DAS. The lowest weed dry matter recorded in three fertigation levels (75,100 and 125 per cent) were on par at different crop stages (30, 60 and 90 DAS). The substantial reduction in weed infestation under drip fertigation as compared to furrow band application was also reported by Kakade *et al*. (2015) [8].

Effect of weed management practices

During the entire crop growth periods weed population of monocot weeds was higher than that of dicot weeds at all the growth stages of crop. The farmers practice - 3 hoeing 15-20 days interval after sowing *fb* 3 HW was recorded less weed intensity and weed dry weight. Among herbicidal treatments directed spray of paraquat @ 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying resulted better in respect of total weeds control and weed dry weight. Highest total weeds were observed in weedy check. Directed spray of paraquat at 30 and 60 DAS might have taken care in controlling most of the later germinated weed species effectively and supplemented with hand weeding resulted in significantly lowering the weed density. These results were in close conformity with the results of Patel *et al.* (2013) [10], Guriqbal Singh *et al.* (2016) [6].

Weed control efficiency (%) and weed index

Effect of fertigation levels

The highest weed control efficiency was recorded under drip fertigation with125 percent RDNK in 5 splits followed by 100 and 75 percent RDNK in 5 splits at all growth stages of crop. The lowest weed control efficiency was recorded at 100 percent RDF through soil application as compared to different level of drip level of fertigation. The more or less identical values of weed index was recorded under different level of fertigation as compared to 100% RDF through soil application.

Effect of weed management practices

At 30 DAS highest weed control efficiency was recorded in farmers practice (3 hoeing 15-20 Days interval after sowing *fb* 3 HW) (86.24 %) followed by pendimethalin @ 1 kg a.i/ha PE *fb* pyrithiobac sodium @ 0.062 Kg a.i/ha + propaquizafop @ 0.075 kg a.i/ha 25-30 DAS + 1 hand weeding at 45-50 DAS (75.35 %). Less weed intensity and its lower biomass in integrated weed control treatments and mechanical weed control treatment compared to weedy check resulted in higher

WCE with these treatments. The results were close conformity with the findings of Guriqbal Singh *et al.* (2016) [6], Patel *et al.* (2013) [10], Sadangi *et al.* (2006) [14].

At 60 DAS upto at harvest highest weed control efficiency was recorded with farmers practice (3 hoeing 15-20 days interval after sowing *fb* 3 HW). Among herbicidal treatments directed spray of paraquat @ 0.3 Kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying recorded highest weed control efficiency at 60 DAS upto at harvest. The highest weed index was recorded in weedy check (65.80 %) and lowest in directed spray of paraquat @ 0.3 Kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying (5.58 %). This might be due to sequential herbicidal application with one supplemented hand weeding. The results were close conformity with the findings of Guriqbal Singh *et al.* (2016) [6], Hiremath *et al.* (2013) [7].

Nutrient uptake by weeds at harvest

The data pertaining to nutrient uptake by weeds at harvest as influenced by different treatments are presented in Table. 3. The mean NPK uptake by weed was 34.23, 7.31 and 14.80 kg ha^{-1} respectively.

Effect of fertigation levels

The nutrient uptake by weeds did not differ significantly due to different fertilizer levels.

Effect of weed management practices

The uptake of nutrients by weeds was differed significantly due to different weed management practices. Treatment farmers practice (3 hoeing 15-20 days interval after sowing *fb* 3 HW) recorded significantly lower NPK uptake by weeds as compared to rest of the treatments, followed by treatments directed spray of paraquat @ 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying, pendimethalin @ 1 kg a.i/ha PE *fb* pyrithiobac sodium @ 0.062 kg a.i/ha + propaquizafop @ 0.075 kg a.i/ha 25-30 DAS + 1 hand weeding at 45-50 DAS, and pendimethalin @ 1 kg a.i/ha PE *fb* paraquat @ 0.6 kg a.i/ha at 40-50 DAS.

Maximum and significantly higher nutrient uptake by weeds was observed with treatment weedy check. The corresponding values of NPK uptake by the weeds were 59.85, 12.87 and 29.73 kg ha^{-1} respectively. There was an inverse relationship between the crop and weeds in respect of nutrient uptake. In weedy check, weed removes significantly higher quantity of nitrogen, phosphorus and potassium, while uptake of nutrient by the crop was minimum. Weed being wild forms have greater competitive ability than domestic crops. The main reason for this kind of behaviour was that the weeds in weedy check were not controlled. The highest weed intensity and biomass in weedy check treatment and its dominance in utilizing sunlight, moisture and Co_2 over plants resulting in accumulation of more dry matter by weeds and thereby absorption of nutrients from soil. These results are in close conformity with these findings of Veeramani *et al.* (2006) [15], Anjum *et al.* (2007) [1] and Prabhu *et al.* (2012) [12].

Interaction

The interaction effect between different fertigation levels and weed management practices on nutrient uptake by weeds was found to be not significant.

Nutrient uptake by cotton

The data pertaining to nutrient uptake by weeds at harvest as influenced by different treatments are presented in Table.4. The mean NPK uptake by weed was 101.06, 26.70 and 73.59 kg ha^{-1} respectively.

Effect of fertigation levels

The uptake of nutrients by *Bt.* cotton was differed significantly due to different fertilizer levels. The maximum uptake of nitrogen, phosphorus and potassium by *Bt.* cotton was recorded with 125 per cent RDNK ha^{-1} through fertigation which was significantly higher than 75 per cent RDNK ha^{-1}. Application of 100 per cent RDNK ha^{-1} was found second best treatment in respect of uptake of plant nutrients during both years. This might be attributed to higher total dry matter production. Higher nutrient uptake with higher level of fertigation over soil application was also reported by Bhalerao *et al.* (2011) [5], Pawar *et al.* (2013) [11] Ayyadurai *et al.* (2014) [3].

Effect of weed management practices

The maximum uptake of nitrogen, phosphorus and potassium by *Bt.* cotton was found with treatment farmers practice (3 hoeing 15-20 days interval after sowing *fb* 3 HW) followed by directed spray of paraquat @ 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying, where biological yield was maximum. Minimum uptake of nitrogen, phosphorus and potassium by crop was recorded with weedy check during both the years, where growth of cotton suppressed by weeds and nutrients diverted to weed growth than cotton growth. These might be due to the higher efficiency of this treatment in suppressing the weeds, which ultimately resulted in reduced competition from weeds for nutrients. Uptake of nutrients by the crop was inversely proportional to the uptake of nutrients by weeds. The results are in conformity with the findings of Kori *et al.* (1997) [9], Bera, S. and Ghosh, R.K. (2013) [4].

Interaction

The interaction effect due to fertigation of levels and different weed management practices on uptake of nutrients by *Bt.* cotton was found to be non significant.

Conclusions

Based on the results of the study conducted to evaluate Nutrient uptake by weeds and *Bt* cotton as influenced by fertigation levels and weed management practices, it could be concluded that application of 125 per cent recommended dose of N and K in five splits (P as basal) and directed spray of paraquat @ 0.3 Kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying found to be best for reducing weed density, weed dry weight and maximizing weed control efficiency and nutrient uptake by cotton and weeds under split application of nutrients through drip fertigation and different weed management practices.

Table 1: Effect of different fertigation levels and weed management practices on weed density and weed dry weight in *Bt* cotton

Treatments	Weed density (no/m^2)					Weed dry weight (g/m^2)				
	30 DAS	60 DAS	90 DAS	120 DAS	At harvest	30 DAS	60 DAS	90 DAS	120 DAS	At harvest
Fertigation levels										
F_1-100% RDF soil application	6.09 (39.65)	5.81 (37.13)	6.78 (49.73)	7.64 (62.73)	8.20 (71.80)	6.48 (45.21)	6.54 (48.29)	6.69 (51.00)	7.85 (68.95)	9.02 (88.73)
F_2-75% RDNK in 5 Splits	5.72 (35.02)	5.37 (31.93)	6.37 (43.58)	7.23 (55.53)	7.81 (64.40)	5.50 (33.60)	5.56 (36.32)	6.54 (48.40)	7.69 (65.63)	8.70 (83.00)
F_3-100% RDNK in 5 Splits	5.82 (36.50)	5.48 (33.40)	6.47 (45.47)	7.37 (58.33)	7.96 (67.93)	5.89 (37.79)	5.84 (39.00)	6.32 (46.76)	7.48 (62.40)	8.57 (81.47)
F_4-125% RDNK in 5 Splits	6.00 (38.83)	5.72 (36.27)	6.69 (48.53)	7.57 (61.60)	8.11 (70.40)	5.96 (39.08)	6.11 (42.02)	6.13 (42.27)	7.44 (61.25)	8.54 (81.13)
SE (m) ±	0.09	0.10	0.11	0.13	0.15	0.12	0.14	0.09	0.11	0.17
CD at 5 %	NS	NS	NS	NS	NS	0.42	0.49	0.30	NS	NS
Weed management Practices										
W_1- Pendimethalin @ 1 kg a.i/ha PE fb Pyrithiobac sodium @ 0.062 Kg a.i/ha + propaquizafop @ 0.075 kg a.i/ha 25-30 DAS + hand weeding at 45-50 DAS	4.01 (15.63)	4.75 (22.17)	5.95 (35.08)	6.91 (47.50)	7.37 (54.09)	4.13 (17.00)	5.03 (25.16)	6.03 (36.17)	7.44 (55.24)	8.34 (69.34)
W_2- Pendimethalin @ 1 kg a.i/ha PE *fb* paraquat @ 0.6 Kg a.i/ha at 40-50 DAS.	6.24 (38.55)	5.18 (26.50)	6.47 (41.50)	7.56 (56.83)	8.29 (68.42)	6.06 (36.50)	5.69 (32.50)	6.34 (40.08)	7.55 (56.57)	8.57 (73.16)
W_3- Directed application of paraquat @ 0.3 Kg a.i/ha at 30 DAS fb 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS fb 1 HW 15 days after spraying	6.64 (43.59)	4.47 (19.58)	5.21 (26.72)	6.03 (36.00)	6.47 (41.38)	7.12 (50.56)	4.65 (21.11)	4.53 (20.25)	5.53 (30.07)	6.44 (41.25)
W_4- Farmers practice – 3 hoeing 15-20 days interval after sowing *fb* 3 HW	3.86 (14.56)	4.23 (17.58)	4.85 (23.50)	5.76 (32.72)	6.11 (36.92)	3.88 (10.39)	4.30 (18.57)	4.07 (16.67)	5.08 (26.32)	6.22 (38.83)
W_5- Weedy check	8.58 (73.36)	9.36 (87.58)	10.33 (106.65)	11.30 (127.67)	11.93 (142.17)	8.72 (75.81)	10.39 (107.83)	11.12 (123.25)	12.40 (153.60)	13.98 (195.34)
SE (m) ±	0.06	0.09	0.13	0.16	0.12	0.11	0.13	0.16	0.18	0.13
CD at 5 %	0.19	0.26	0.39	0.47	0.36	0.30	0.38	0.48	0.51	0.37
Levels of interaction										
F x W										
SE (m) ±	0.13	0.18	0.21	0.23	0.26	0.21	0.26	0.29	0.35	0.26
CD at 5 %	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
GM	5.90	5.60	6.58	7.45	8.02	5.99	6.04	6.42	7.61	8.71

Data are subjected to square root transformation ($\sqrt{x + 0.5}$) and original data presented in parenthesis.

Table 2: Effect of different fertigation levels and weed management practices on weed control efficiency and weed index in *Bt* cotton

Treatments	Weed control Efficiency (%)					Weed index (%)
	30 DAS	60 DAS	90 DAS	120 DAS	At harvest	
Fertigation levels						
F_1-100% RDF soil application	44.42	57.68	60.45	58.13	55.46	18.57
F_2-75% RDNK in 5 Splits	47.06	61.21	60.83	57.76	57.08	19.59
F_3-100% RDNK in 5 Splits	51.96	62.97	61.87	58.31	57.83	18.96
F_4-125% RDNK in 5 Splits	52.97	65.18	63.12	57.05	58.30	19.73
Weed management Practices						
W_1- Pendimethalin @ 1 kg a.i/ha PE *fb* Pyrithiobac sodium @ 0.062 kg a.i/ha + propaquizafop @ 0.075 kg a.i/ha 25-30 DAS + hand weeding at 45-50 DAS	74.35	76.76	70.48	63.75	64.46	9.43
W_2- Pendimethalin @ 1 kg a.i/ha PE *fb* paraquat @ 0.6 kg a.i/ha at 40-50 DAS.	51.71	69.80	67.32	62.93	62.35	15.26
W_3- Directed application of paraquat @ 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying	33.23	79.20	83.60	79.56	78.79	5.58
W_4- Farmers practice– 3 hoeing 15-20 days interval after sowing *fb* 3 HW	86.24	83.04	86.42	82.82	80.24	-
W_5- Weedy check	-	-	-	-	-	65.80

Table 3: Nutrient uptake (N, P and K) by weeds (kg ha^{-1}) as influenced by different fertigation levels and weed management practices in *Bt* cotton

Treatment	N uptake (kg ha^{-1})	P uptake (kg ha^{-1})	K uptake (kg ha^{-1})
Fertigation levels			
F_1-100% RDF soil application	34.23	7.57	15.14
F_2-75% RDNK in 5 Splits	32.47	7.04	14.54
F_3-100% RDNK in 5 Splits	32.89	7.24	14.64
F_4-125% RDNK in 5 Splits	33.50	7.39	14.88
SE (m) ±	1.49	0.32	0.61
CD at 5 %	NS	NS	NS
Weed management Practices			
W1 - Pendimethalin @ 1 kg a.i/ha PE *fb* Pyrithiobac sodium @ 0.062 kg a.i/ha +	28.24	5.94	11.29

propaquizafop @ 0.075 kg a.i/ha 25-30 DAS + hand weeding at 45-50 DAS			
W2 - Pendimethalin @ 1 kg a.i/ha PE *fb* paraquat @ 0.6 kg a.i/ha at 40-50 DAS.	30.62	7.34	14.11
W3 - Directed application of paraquat @ 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying	25.60	5.82	10.30
W_4 - Farmers practice– 3 hoeing 15-20 days interval after sowing *fb* 3 HW	22.06	4.60	8.56
W_5 -Weedy check	59.85	12.87	29.73
SE (m) ±	1.03	0.22	0.47
CD at 5 %	2.96	0.64	1.34
Levels of interaction			
F x W			
SE (m) ±	2.06	0.45	0.93
CD at 5 %	NS	NS	NS
GM	34.23	7.31	14.80

Table 4: Uptake of NPK (kg ha^{-1}) by crop as influenced by different fertigation levels and weed management practices in *Bt* cotton

Treatment	N uptake (kg ha^{-1})	P uptake (kg ha^{-1})	K uptake (kg ha^{-1})
Fertigation levels			
F_1-100% RDF soil application	76.09	21.43	55.26
F_2-75% RDNK in 5 Splits	84.65	23.39	66.49
F_3-100% RDNK in 5 Splits	112.54	28.93	80.38
F_4-125% RDNK in 5 Splits	130.95	33.04	92.24
SE (m) ±	3.09	1.15	2.67
CD at 5 %	8.75	3.33	7.88
Weed management Practices			
W1 - Pendimethalin @ 1 kg a.i/ha PE *fb* Pyrithiobac sodium @ 0.062 kg a.i/ha + propaquizafop @ 0.075 kg a.i/ha 25-30 DAS + hand weeding at 45-50 DAS	109.74	29.41	68.54
W2 - Pendimethalin @ 1 kg a.i/ha PE *fb* paraquat @ 0.6 kg a.i/ha at 40-50 DAS.	99.28	26.52	68.98
W3 - Directed application of paraquat @ 0.3 kg a.i/ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat @ 0.6 kg a.i/ha 60 DAS *fb* 1 HW 15 days after spraying	122.04	32.29	98.60
W_4 - Farmers practice– 3 hoeing 15-20 days interval after sowing *fb* 3 HW	139.51	34.78	103.90
W_5 -Weedy check	34.74	10.50	27.95
SE (m) ±	2.92	0.88	2.83
CD at 5 %	7.96	2.27	8.27
Levels of interaction			
F x W			
SE (m) ±	5.83	1.97	5.45
CD at 5 %	NS	NS	NS
GM	101.06	26.70	73.59

References

1. Anjum FH, Tanveer A, Nadeem MA, Tahir M, Aziz A. Effect of split application of nitrogen and integrated weed management on nutrient up take by *trianthema portulacastrum* (itsit) in cotton. Pak. J. Agri. Sci., 2007, 44(3).
2. Anonymous, http://agricoop.nic.in/all-india-crop-situation, 2018.
3. Ayyadurai P, Manickasundaram P. Growth, nutrient uptake and seed cotton yield as influenced by foliar nutrition and drip fertigation in cotton hybrid. International J. Agric. Sci. 2014; 10(1):276-279.
4. Bera S, Ghosh RK. Effect of integrated weed and nutrient management in green gram-rice-onion cropping sequence on yield and nitrogen balance sheet. Journal of Crop and Weed. 2013; 9(2):159-164.
5. Bhalerao PD, Gaikwad GS, Imade SR. Productivity and nutrient uptake of *Bt*-cotton (*Gossypium hirsutum*) as influenced by precision in application of irrigation and fertilizer. Indian Journal of Agronomy. 2011; 56(2):150-153.
6. Guriqbal Singh, Harpreet Kaur, Veena Khanna. Integration of pre- and post-emergence herbicides for weed management in pigeonpea. Indian J. Weed Sci. 2016; 48(3):336-338.
7. Hiremath R, Yadahalli GS, Chittapur BM, Siddapur AD, Yadahalli VG, Koppalkar BRG. Efficacy of chemical weed management in *Bt* cotton (*Gossypium hirsutum* L.). Acta Biologica Indica. 2013; 2(2):425-429.
8. Kakade SU, Bhale VM, Deshmukh JP, Shingrup PV, Deshmukh MR. Effect of split application of nutrients through fertigation on weed growth and seed cotton yield of *Bt* cotton. In proceeding of 25th Asian-Pacific Weed Science Society Conference on Weed Science for Sustainable Agriculture, Environment and Biodiversity, Hyderabad, India during 13-16 October, 2015, pp.306.
9. Kori RN, Salakinkoppa SR, Potdar MP, Ekbote SD. Effect of weed control on nutrient uptake, weed weight and yield of groundnut. World Weeds. 1997; 4:149-53.
10. Patel BD, Patel RB, Sheta *BT*, Patel VJ, Patel RA, Parmar DJ. Influence of integrated weed management practices on weeds and yield of *Bt* cotton. Research on Crops. 2013; 15(2):503-507.
11. Pawar DD, Dingre SK, Bhakre BD, Surve US. Nutrient and water use by *Bt*. cotton (*Gossypium hirsutum*) under drip fertigation. Indian J. Agronomy. 2013; 58(2):237-242.
12. Prabhu G, Halepyati AS, Pujari *BT*, Desai BK. Weed management in *Bt* cotton (*Gossypium hirsutum* L.) under irrigation. Karnataka Journal of Agriculture Science. 2012; 25(2):183-186.
13. Rajiv Sharma. Integrated weed management in field crops. Crop Care. 2008; 35(4):41-46.

14. Sadangi PK, Barik KC, Mahapatra PK, Rath BS, Gamayak LM. Effect of weed management practices on nutrient depletion by weeds, growth, yield, economics and quality of winter cotton (*Gossypium hirsutum*). Agri. Sci. Digest. 2006; 26(3):203-205.
15. Veeramani A, Prema P, Guru G. Effect of pre and post-sowing weed management on weeds and summer irrigated cotton. Asian Journal of Plant Sciences. 2006; 5:174-178.