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Effect of fertigation levels and weed management practices on weed flora and seed cotton yield of *Bt* cotton

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Abstract
A field investigation "Effect of fertigation levels and weed management practices on weed flora and seed cotton yield of *Bt* cotton" 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% RDNK/ha 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 yield attributes *viz*. bolls picked and seed cotton yield plant^{-1}, seed cotton yield kg ha^{-1} 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. The lowest weed control efficiency was recorded at 100 percent RDF through soil application as compared to different level of drip level of fertigation. In cotton yield attributes *viz.* bolls picked and seed cotton yield plant^{-1} were substantially enhanced by drip fertigation level at 125% RDNK/ha than lower fertigation levels 75%, 100% and over conventional soil application with 100% RDF. As a consequence of better yield attributes, drip fertigation at 125% RDNK/ha had recorded higher seed cotton yield of 2640 kg ha^{-1}. Among the 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 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. Which ultimate resulted in maximum seed cotton yield.

Keywords: Fertigation, practices *Gossypium hirsutum* L. *Bt* cotton

Introduction
Cotton (*Gossypium hirsutum* L.) as a white gold and king of fibre is the nature's gift to mankind and is mainly cultivated for its lint from time immemorial and also aptly called as "white gold". 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 10.5 M ha., but productivity as low as 505 Kg lint ha^{-1} as compared to global average of 735 Kg lint ha^{-1} (Anonymous 2017) [1]. Among the many strategies to improve the cotton productivity, split application of fertilizers especially nitrogen and potassium has proven more productive and profitable (Mahmood-ul-Hasan *et al*. 2003) [5].

Fertilizer use efficiency up to 95% can be achieved through drip fertigation. Studies revealed significant fertilizer savings of 20-60% and 8-41% increase in yields of field and vegetable crops due to fertigation. Nitrogen and potassium fertilizers are water soluble and play a major role in the growth and development of Cotton. Fertigation gives flexibility of fertilizer application, which enables the specific nutritional requirement of the crop to be met at different stages of its growth. Split application of nitrogen and potash ensures required nutrients in right time and in right quantity for getting higher yield with minimum loss of nutrients. Cotton, particularly *Bt* hybrids being exhaustive, draw plenty of soil nutrients and thus under continuous planting of cotton, proper nutrient management through split application of N and K fertilizers through fertigation assumes importance.

Weed management in *Bt* cotton have significant effect on growth and yield of cotton. The critical period of weed competition in cotton was found to be 15 to 60 days (Rajiv Sharma, 2008) [8]. 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 growth and yield of *Bt* cotton. Supply of sufficient amount of nutrient through fertigation in split application have significant effect on crop growth and they can reduce weeds infestation by restricting the availability of moisture and nutrient for the growth of weeds (Soils between rows are not supplied with water or fertilizer, reducing weed growth) and integration of weed management practices in fertigation can minimise weed infestation and reduce the losses due to weeds particularly reduction in yield and enhance water and nutrient use efficiency.

Materials and Methods

A field investigation entitled "Effect of fertigation levels and weed management practices on weed flora and yield of *Bt* cotton" 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 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 RDF through soil application i.e 120:60:60 kg NPK/ha. 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 procumbens* and *Celosia argentea, Ipomea sp., Sorghum halpenses, Euphorbia hirta, Alternanathera sessile and Phyllanthus niruri* were found during study.

Table 1: Show the Quantity of fertilizer to be applied in five splits Stage of Crop (DAS)

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

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) [4].

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 Guriqbal Singh *et al.* (2016) [2], Patel *et al.* (2013) [6].

Weed control efficiency (%) and weed index

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.

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) [2], Patel *et al.* (2013) [6], Sadangi *et al.* (2006) [9].

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) [2], Hiremath *et al.* (2013) [3].

Yield attributes and seed cotton yield

The yield attributing characters like number of bolls picked per plant and seed cotton yield per plant influenced significantly due to split application of RDNK ha^{-1} through fertigation and higher level of RDNK ha^{-1} through fertigation at 125 per cent recommended dose of N and K favourably increased these yield attributes than other lower level of fertigation and soil application method of applying fertilizers. However, 75 per cent fertigation and 100 per cent soil application of recommended N and K ha^{-1} were equally effective in enhancing number of picked bolls per plant and seed cotton yield per plant. The seed cotton yield linearly increased with increasing levels of fertilizers applied through fertigation. Drip fertigation at 125 per cent RDNK ha^{-1} had recorded higher seed cotton yield of 2640 kg ha^{-1} which was followed by 100 per cent drip fertigation of RDNK ha^{-1} with seed cotton yield of 2321 kg ha^{-1}. Drip fertigation at 75 per cent RDNK ha^{-1} recorded comparable yield with 100 per cent recommended dose of fertilizers applied through soil by conventional method indicating 25 per cent fertilizer saving through fertigation when compared to conventional soil application of fertilizers. The saving of fertilizers might be due to reduction in losses of nutrients through volatilization and leaching and better movement of nutrients under drip fertigation as against soil application of fertilizers as reported by Yende *et al.* (2003) [10] and Pawar *et al.* (2013) [7].

In different weed management treatments yield contributory characters like number of bolls, weight of seed cotton picked plant^{-1} and boll weight were recorded significantly higher under farmers practice (3 hoeing 15-20 days interval after sowing *fb* 3 HW) was recorded the highest number of bolls picked per plant (63.47). Among the 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 was recorded maximum number of bolls plant^{-1} (59.48). Significantly lowest number (25.16) of picked bolls plant^{-1} was in weedy check. Seed cotton yield was highest under farmers practice (3 hoeing 15-20 days interval after sowing *fb* 3 HW) recorded significantly higher seed cotton yield (2684 kg ha^{-1}). Among 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 60 DAS *fb* 1 HW 15 days after spraying recorded significantly seed cotton highest yield (2531 kg ha^{-1}). The lowest seed cotton yield of cotton (905 kg ha^{-1}) was recorded with weedy check. + Two hand weeding at 30 and 45 DAS (2.56 t/ ha). This might be due to low weedy situation during initial stage and further control of latter germinated of weeds by directed application of non selective herbicides (paraquat) at 30 and 60 DAS with supplemented 2 hand weeding 15 days after each spraying and thus, reducing the weed competition during critical initial to peak growth period of the crop. In fact, inter cultivation operation carried out at 75 DAS almost maintained weed free condition throughout remaining period of crop growth period, which resulted into better seed cotton yield. These results were in conformity with those reported by Hiremath *et al.* (2013) [3].

Interaction

Interaction between different fertigation levels and weed management practices in respect of number of bolls picked plant^{-1}, seed cotton yield plant^{-1} (g), seed cotton yield (kg ha^{-1}) was found to be significant and data in this respect given in Table The combination of F_4W_4 (Drip fertigation at 125 per cent RDNK ha^{-1} with farmers practice of weed management) recorded significantly maximum number of bolls picked plant^{-1} (75.53), seed cotton yield plant^{-1} (236.49 g), seed cotton yield 3291 kg ha^{-1} in but it was at with F_4W_3 (Drip fertigation at 125 per cent RDNK ha^{-1} with 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 of weed management).

Table 2: Effect of different fertigation levels and weed management practices on weed density and weed dry weight in 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 3: Effect of different fertigation levels and weed management practices on weed control efficiency and weed index in 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 4: Effect of different fertigation levels and weed management practices on yield attributes and yield of cotton

Treatments	No. of picked bolls plant^{-1}	Seed cotton yield plant^{-1} (g)	Average boll weight (g)	Seed cotton yield (kg ha^{-1})
Fertigation levels				
F_1-100% RDF soil application	37.98	126.64	4.33	1736
F_2-75% RDNK in 5 Splits	50.59	142.77	4.38	1959
F_3-100% RDNK in 5 Splits	55.56	166.95	4.43	2321
F_4-125% RDNK in 5 Splits	63.47	189.75	4.45	2640
SE (m) ±	1.19	3.41	0.06	60
CD at 5%	4.10	11.82	NS	206
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	58.36	175.60	4.37	2427
W_2- Pendimethalin @ 1 kg a.i/ha PE *fb* paraquat @ 0.6 kg a.i/ha at 40-50 DAS.	54.58	164.38	4.33	2272
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	59.48	183.14	4.44	2531
W_4- Farmers practice– 3 hoeing 15-20 days interval after sowing *fb* 3 HW	61.92	194.11	4.55	2684
W_5- Weedy check	25.16	65.41	4.30	905
SE (m) ±	0.98	1.84	0.07	33
CD at 5%	2.96	5.31	NS	94
Levels of interaction				
F x W				
SE (m) ±	2.13	3.69	0.12	65
CD at 5%	6.14	10.63	NS	188
GM	51.90	156.53	4.40	2164

Table 5: Number of bolls picked plant^{-1}, seed cotton yield plant^{-1} (g), seed cotton yield (kg ha^{-1}) as influenced by F X W interaction in cotton during 2017-18

F/W	Number of bolls picked plant^{-1}					seed cotton yield plant^{-1} (g)					seed cotton yield (kg ha^{-1})				
	W_1	W_2	W_3	W_4	W_5	W_1	W_2	W_3	W_4	W_5	W_1	W_2	W_3	W_4	W_5
F_1	41.47	39.60	42.80	46.40	19.63	142.14	134.72	146.77	155.73	53.82	1948	1846	2012	2136	737
F_2	56.67	52.53	58.53	59.60	25.60	158.66	144.79	167.73	177.73	64.93	2175	1985	2300	2437	899
F_3	62.65	59.64	63.23	66.13	26.13	188.17	176.33	194.11	206.49	69.67	2616	2451	2699	2874	966
F_4	72.67	66.53	73.33	75.53	29.27	213.44	201.66	223.96	236.49	73.21	2969	2807	3115	3291	1017
SE (m) ±	2.13					3.69					65				
CD at 5%	6.14					10.63					188				

Conclusions

Based on the results of the study conducted to evaluate effect of fertigation levels and weed management practices on weed flora and productivity of *Bt* cotton, 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 productivity of cotton under split application of nutrients through drip irrigation and different weed management practices.

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