Int.J.Curr.Microbiol.App.Sci (2017) *6*(11): 3237-3245

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 6 Number 11 (2017) pp. 3237-3245**
Journal homepage: http://www.ijcmas.com

Original Research Article https://doi.org/10.20546/ijcmas.2017.611.379

Influence of Weed Management on Weed Dynamics and Yield of Machine Sown Pigeonpea [*Cajanus cajan* (l.) Millsp.] Under Dryland Conditions

P. Kathirvelan*

Tapioca and Castor Research Station, Tamil Nadu Agricultural University, P.G. Palayam, Yethapur – 636 119, Salem, Tamil Nadu, India
**Corresponding author*

Keywords

Influence of weed management, Weed dynamics.

Article Info

Accepted:
24 September 2017
Available Online:
10 November 2017

A B S T R A C T

Field experiments were conducted in rainfed alfisol at Dryland Agricultural Research Station Experimental Farm, Chettinad during Kharif 2013 and 2014 season, to find out the effect of different weed management practices in machine sown pigeon pea (var. VBN 2) under dry land conditions. The experiment consisted of following treatments viz., power weeder weeding once at 20 DAS, power weeder weeding twice at 20 and 40 DAS, power weeder weeding once at 20 DAS + one hand weeding, power weeder weeding twice (20 DAS and 40 DAS) + one hand weeding, mulching with cumbu napier trash @ 5 t/ha, imazethapyr @ 50 g a.i ha^{-1} and quizalofop ethyl @ 50 g a.i ha^{-1} at 15 DAS, hand weeding at 20 and 40 DAS and these treatments were compared with unweeded control. The trial was laid out in randomized block design with three replications. The results revealed that power weeder weeding twice at 20 and 40 DAS in integration with one hand weeding effectively controlled all kinds of weed flora which were present in both inter and intra row spacing which reflected in higher mean grain yield of 922 kg ha^{-1} which might be due to better weed control as reflected in lower weed density (12.1), weed dry weight (14.5) and higher weed control efficiency (WCE) of 79.5 per cent. Early post emergence application of imazethapyr @ 50 g a.i ha^{-1} at 15 DAS had effectively controlled broad leaved weeds and sedges whereas, quizalofop ethyl @ 50 g a.i ha^{-1} at 15 DAS was effective against grasses.

Introduction

Pigeonpea is an important multipurpose legume crop mainly cultivated under rainfed ecosystem. It is short lived perennial shrub which is traditional cultivated as annual crop during Kharif season in India. It is a good source of protein (20-22 %), vitamins (thiamine, riboflavin, niacin and choline) and minerals (Fe, Ca, P, S and K). Hence, it is gaining worldwide importance and can be used as food, fodder and fuel besides it enriches the soil through symbiotic nitrogen fixation, releases soil bound phosphorus, recycles the soil nutrients and add organic matter which make pigeonpea ideal crop for sustainable agriculture (Saxena, 2008). It has wider adaptability with drought tolerance owing to its deep root system and performs very well even under moisture stress condition. Since the scope for increasing the area of pigeonpea in the country is very limited and increasing its productivity is the only viable option through managing various

biotic and abiotic stresses. Among the various biotic factors limiting the production and productivity of pigeonpea, weeds are of prime importance. In general, pigeonpea is cultivated with wider inter row spacing and slow initial growth, weeds such as cyperaceous, narrow and broad leaved weeds pose a serious threat to its productivity which may leads to severe yield reduction even up to 80 per cent (Talnikar *et al.,* 2008). The critical period is during the first eight weeks after sowing. Losses in grain yield caused by the weeds in pigeonpea are reported to the extent of 60 per cent (Kandasamy, 1999). Hence, timely weed control is very important for realizing higher productivity in pigeon pea under rainfed condition.

Though manual method of weed control is quite effective, but it is laborious, time consuming and cumbersome now a days. Hence, effective weed management strategy with new molecules of pre and early post and post emergence herbicide application in integration with agronomic practices *viz*., power weeding is pivotal for obtaining higher yield. With this view, present field experiment was undertaken to find out the effect of different weed management practices on growth, yield and economics of pigeonpea under rainfed condition.

Materials and Methods

Field experiments were conducted at Dryland Agricultural Research Station Experimental Farm, Chettinad during Kharif 2013 and 2014 season, to find out the effect of different weed management practices in machine sown pigeon pea (var. VBN 2) under dry land conditions. The experiment consisted of following treatments viz., power weeder weeding once at 20 DAS, power weeder weeding twice at 20 and 40 DAS, power weeder weeding once at 20 DAS + one hand weeding, power weeder weeding twice (20 DAS and 40 DAS) + one hand weeding, mulching with cumbu napier trash @ 5 t/ha, imazethapyr @ 50 g a.i ha^{-1} and quizalofop ethyl @ 50 g a.i ha^{-1} at 15 DAS, hand weeding at 20 and 40 DAS and these treatments were compared with unweeded control. The trial was laid out in randomized block design with three replications. The long duration variety VBN 2 was chosen and sowing was done by tractor drawn seed drill with a spacing of 90 cm X 30 cm. The soils of experimental field represent red sandy loam type. The available nutrient status of the field was low in N (212 kg ha^{-1}), medium in phosphorus (21 kg ha^{-1}) and low in potash (148 kg ha^{-1}).

The physic-chemical properties of soil are furnished in table 1. The germination percentage of seed was 98 and the required plant population per unit area as per the treatment was maintained with thinning which was carried out on 15 days after sowing. The recommended doses of inorganic fertilizers (12.5:25:12.5 kg NPK ha^{-1}) were applied along the planting rows as urea, DAP and Muriate of Potash and covered with soil. All other plant protection measures were adopted as per the technical programme.

The total number of matured pods from the five plants was counted and mean arrived. Pods from each treatment were randomly selected and shelled. From this, a representative sample of 100 grains was randomly picked out and weighed by using an electronic balance and expressed in g 100^{-1} grains. The harvested pods from the net plot were sun dried, cleaned and the pod yield was recorded for the individual treatment after drying to 12 per cent seed moisture and expressed in kg ha^{-1}. Dry matter of weeds was recorded at harvest on plot basis after sun-drying for about 7 days and then converted into kg ha^{-1}. Weed control efficiency (WCE) was calculated using the following formula

WCE (%) = [(Dry matter of weeds in unweeded control - Dry matter of weeds in treated plot) × 100] / Dry matter of weeds in unweeded control plot

Results and Discussion

Predominant weed flora in the experimental field

The predominant weed flora observed in the experimental site were *Brachiaria reptans, Dactyloctinium aegyptium, Cynodon dactylon, Perotis indica, Panicum javanicum* under grass weed category, sedges such as *Cyperus difformis, Cyperus rotundus, Fimbristylis argentea* and broad leaf weeds *viz., Commelina benghalensis, Abutilon indicum, Borreria hispida, Corchorus tridens, Cyanotis cucullata, Indigofera trita* and *Mollugo sp*.

Soil moisture under varied weed management practices

Soil moisture was measured using soil moisture pulse meter (Model MPM-160 B) at 15 cm soil depth. The data recorded on soil moisture at 15 cm soil depth during the critical period of crop growth (*Kharif* 2013 and 2014) revealed that the highest soil moisture was observed at 75 and 45 DAS followed by 105 and 60 DAS, respectively and the lowest values were observed at 45 and 90 DAS, respectively. With regard to effect of different weed management practices on soil moisture conservation, invariably at all the stages of crop growth, the highest soil moisture retention capacity was registered in mulched plot @ 5.0 t ha^{-1}. The soil moisture retention capacity ranged from 0.1 per cent to 18.9 per cent and the highest soil moisture of 18.9 per cent was recorded at vegetative stage of the crop growth under mulched treatment. The details of soil moisture recorded at 15 cm soil depth are given in table 2.

Effect of treatment on weed density, weed dry weight and weed control efficiency

Between the two years of study, higher weed density was observed during 2013-14 year as compared to 2014-15. The mean data on weed density recorded during flowering stage of the crop showed that lower weed density was recorded under power weeder weeding twice at 20 and 40 DAS + hand weeding which was statistically on par with hand weeding twice at 20 and 40 DAS and power weeder weeding once at 20 DAS coupled with hand weeding.

Table.1 Physico-chemical properties of the experimental field

Particulars	Value
P^H	6.5
EC (dS m^{-1})	4.0
Organic carbon (%)	0.38
Nitrogen (kg ha^{-1})	212 kg ha^{-1}
Phosphorus (kg ha^{-1})	21 kg ha^{-1}
Potassium (kg ha^{-1})	148 kg ha^{-1}
Textural class	Red sandy loam
Bulk density (g CC-1)	1.48

Table.2 Soil moisture (per cent) recorded at 15 cm depth during the cropping period (*Kharif* 2013 and 2014)

Stage DAS	T_1		T_2		T_3		T_4		T_5		T_6		T_7		T_8	
	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014	2013	2014
15	0	3.5	0	3.4	0	3.5	0	3.7	1.7	7.5	0	4.1	3.6	0	0.2	3.8
30	0	0.8	0	1.0	0	0.8	0	0.7	0	3.6	0	0.8	0.7	0	0	0.8
45	0	13.6	0	13.5	0	13.2	0	13.4	0	18.9	0	13.7	13.2	0	0	14.1
60	7.5	9.2	7.6	9.1	6.9	9.4	6.5	8.9	9.6	14.5	7.8	9.1	9.2	6.4	6.9	8.5
75	12.9	4.5	13.1	4.7	13.4	4.8	13.2	5.0	14.1	7.8	12.5	4.8	5.0	12.8	12.4	4.9
90	5.8	0.5	5.6	0.4	6.2	0.2	6.1	0.1	6.7	3.5	5.2	0.5	0.4	6.1	5.0	0.5
105	9.2	3.2	8.8	3.5	9.2	3.3	9.5	3.5	10.2	8.7	8.2	3.2	3.4	7.9	7.8	3.3
120	4.2	0	4.1	0	4.6	0	4.4	0	5.1	0.4	1.5	0	0	3.5	1.8	0
135	6.1	0	5.9	0	6.4	0	6.8	0	8.7	0	4.6	0	0	6.2	4.0	0
150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table.3 Effect of different weed management practices on weed density, dry weight and WCE in machine sown pigeonpea at flowering stage

Treatments	Weed density m^{-2}			Weed dry weight (g m^{-2})			WCE (%)		
	2013-14	2014-15	Mean	2013-14	2014-15	Mean	2013-14	2014-15	Mean
T_1. Power weeder weeding at 20 DAS	8.29 (68.2)	4.64 (21.0)	6.72 (44.6)	7.87 (61.4)	6.21 (38.1)	7.09 (49.8)	32.9	23.8	28.4
T_2. Power weeder weeding at 20 and 40 DAS	7.99 (63.4)	4.14(16.6)	6.36 (40.0)	6.54 (42.3)	5.38 (28.4)	5.99 (35.4)	53.7	43.2	48.5
T_3. Power weeder weeding at 20 DAS + hand weeding	4.75 (22.1)	3.99 (15.4)	4.39 (18.8)	5.63 (31.2)	4.01 (15.6)	4.89 (23.4)	65.9	68.8	67.4
T_4. Power weeder weeding at 20 and 40 DAS + hand weeding	3.71 (13.3)	3.36 (10.8)	3.55 (12.1)	4.38 (18.7)	3.29 (10.3)	3.87 (14.5)	79.6	79.4	79.5
T_5. Mulching @ 5 t/ha	7.54 (56.4)	4.69 (21.5)	6.28 (39.0)	6.25 (38.6)	4.76 (22.2)	5.56 (30.4)	57.8	55.6	56.7
T_6. Imazethapyr @ 50 g a.i / ha and Quizalofop ethyl @ 50 g a.i / ha at 15 DAS	7.22 (51.7)	4.30 (18.0)	5.95 (34.9)	5.92 (34.5)	4.55 (20.2)	5.27 (27.3)	62.3	59.7	61.0
T_7. Hand weeding at 20 and 40 DAS	4.57 (20.4)	3.65 (12.8)	4.14 (16.6)	4.69 (21.5)	3.61 (12.5)	4.18 (17.0)	76.5	75.0	75.8
T_8. Unweeded control	9.06 (81.5)	6.04 (36.0)	7.70 (58.8)	9.59 (91.5)	7.11 (50.0)	8.44 (70.8)	0.0	0.0	0.0
S.Ed	7.9	3.1	5.5	7.6	4.2	5.7	-	-	-
CD(P=0.05)	16.8	6.5	11.6	15.4	8.9	12.1	-	-	-

Values in parentheses are original and data are transformed to square root transformation (x+0.5)

Table.4 Effect of different weed management practices on plant height, primary and secondary branches plant^{-1} of pigeonpea

Treatments	Plant Height (cm) at harvest			Primary Branches Plant^{-1}			Secondary Branches Plant^{-1}		
	2013-14	2014-15	Mean	2013-14	2014-15	Mean	2013-14	2014-15	Mean
T_1. Power weeder weeding at 20 DAS	140.5	180.2	160.4	3.2	15.75	9.5	23.0	23.0	23.0
T_2. Power weeder weeding at 20 and 40 DAS	146.6	187.2	166.9	4.0	16.25	10.1	24.8	25.0	24.9
T_3. Power weeder weeding at 20 DAS + hand weeding	165.2	196.5	180.9	4.2	18.00	11.1	32.4	26.7	29.6
T_4. Power weeder weeding at 20 and 40 DAS + hand weeding	171.2	204.5	187.9	5.0	20.75	12.9	37.4	35.5	36.5
T_5. Mulching @ 5 t/ha	147.6	217.0	182.3	4.2	18.75	11.5	26.8	33.7	30.3
T_6. Imazethapyr @ 50 g a.i / ha and Quizalofop ethyl @ 50 g a.i / ha at 15 DAS	155.9	178.5	167.2	4.2	16.00	10.1	28.9	25.2	27.1
T_7. Hand weeding at 20 and 40 DAS	167.6	194.7	181.2	4.4	18.25	11.3	35.4	32.1	33.8
T_8. Unweeded control	133.8	177.2	155.5	3.0	14.00	8.5	17.6	16.2	16.9
S.Ed	7.5	7.4	7.4	0.28	1.01	0.6	1.68	1.19	1.43
CD(P=0.05)	15.3	15.3	15.3	0.14	2.09	1.1	3.43	2.48	2.95

Table.5 Effect of different weed management practices on pods plant^{-1}, test weight and grain yield of pigeonpea

Treatments	No. of pods plant^{-1}			Test weight (g)			Grain yield (kg ha^{-1})		
	2013-14	2014-15	Mean	2013-14	2014-15	Mean	2013-14	2014-15	Mean
T_1. Power weeder weeding at 20 DAS	95.7	173.3	134.5	6.85	8.33	7.59	385	653	519
T_2. Power weeder weeding at 20 and 40 DAS	145.9	199.3	172.6	7.01	8.79	7.90	580	728	654
T_3. Power weeder weeding at 20 DAS + hand weeding	188.8	204.2	196.5	7.04	8.84	7.94	864	779	822
T_4. Power weeder weeding at 20 and 40 DAS + hand weeding	250.8	229.8	240.3	7.07	9.69	8.38	950	894	922
T_5. Mulching @ 5 t/ha	167.0	200.5	183.7	7.00	8.75	7.87	752	795	774
T_6. Imazethapyr @ 50 g a.i / ha and Quizalofop ethyl @ 50 g a.i / ha at 15 DAS	166.3	192.8	179.5	6.98	8.66	7.82	781	679	730
T_7. Hand weeding at 20 and 40 DAS	221.8	221.7	221.7	7.02	9.10	8.06	905	843	874
T_8. Unweeded control	65.3	129.2	97.2	6.45	8.17	7.31	243	355	299
S.Ed	11.8	10.8	11.3	0.14	0.08	0.11	20.0	58	39
CD(P=0.05)	24.6	22.4	23.5	NS	0.17	0.17	40.4	120	80

Table.6 Effect of different weed management practices on stalk yield, cost of cultivation and gross return of pigeonpea

Treatments	Stalk yield (kg ha^{-1})			Cost of cultivation (Rs ha^{-1})			Gross return (Rs ha^{-1})		
	2013-14	2014-15	Mean	2013-14	2014-15	Mean	2013-14	2014-15	Mean
T_1. Power weeder weeding at 20 DAS	3138	5698	4418	16370	19475	17923	21164	39180	30172
T_2. Power weeder weeding at 20 and 40 DAS	3913	8025	5969	16790	20600	18695	31909	43680	37795
T_3. Power weeder weeding at 20 DAS + hand weeding	4677	8506	6592	18870	23225	21048	47538	46740	47139
T_4. Power weeder weeding at 20 and 40 DAS + hand weeding	6098	8827	7463	19290	24350	21820	54725	53640	54183
T_5. Mulching @ 5 t/ha	4511	9148	6830	19950	23350	21650	41351	47700	44526
T_6. Imazethapyr @ 50 g a.i / ha and Quizalofop ethyl @ 50 g a.i / ha at 15 DAS	3647	7019	5333	18825	21575	20200	42979	40740	41860
T_7. Hand weeding at 20 and 40 DAS	5979	8747	7363	21450	24600	23025	51975	50580	51278
T_8. Unweeded control	2202	3815	3009	15950	18350	17150	13350	21300	17325
S.Ed	81.2	423	252	-	-	-	-	-	-
CD(P=0.05)	166.4	877	522	-	-	-	-	-	-

Table.7 Effect of different weed management practices on net return and benefit cost ratio of pigeonpea

Treatments	Net Return (Rs ha^{-1})			BCR		
	2013-14	2014-15	Mean	2013-14	2014-15	Mean
T_1. Power weeder weeding at 20 DAS	4794	19705	12250	1.3	2.01	1.66
T_2. Power weeder weeding at 20 and 40 DAS	15119	23080	19100	1.9	2.12	2.01
T_3. Power weeder weeding at 20 DAS + hand weeding	28668	23515	26092	2.5	2.01	2.26
T_4. Power weeder weeding at 20 and 40 DAS + hand weeding	35435	29290	32363	2.8	2.20	2.50
T_5. Mulching @ 5 t/ha	21401	24350	22876	2.1	2.04	2.07
T_6. Imazethapyr @ 50 g a.i / ha and Quizalofop ethyl @ 50 g a.i / ha at 15 DAS	24154	19165	21660	2.3	1.89	2.10
T_7. Hand weeding at 20 and 40 DAS	30525	25980	28253	2.4	2.06	2.23
T_8. Unweeded control	-2600	2950	175	0.8	1.16	0.98
S.Ed	-	-	-	-	-	-
CD(P=0.05)	-	-	-	-	-	-

H.W-Hand weeding

The next best treatment was imazethapyr @ 50 g a.i ha^{-1} and quizalofop ethyl @ 50 g a.i ha^{-1} at 15 DAS. More over, early post emergence application of imazethapyr @ 50 g a.i ha^{-1} at 15 DAS had effectively controlled broad leaved weeds and sedges whereas, quizalofop ethyl @ 50 g a.i ha^{-1} at 15 DAS was effective against grasses. The higher number of weeds per unit area at flowering stage was noticed under unweeded control treatment.

The same trend was noticed during 2013-14 and 2014-15. Weed dry weight recorded at flowering stage revealed that the lowest weed dry weight of 14.5 g m^{-2} was recorded in power weeder weeding twice at 20 and 40 DAS + hand weeding treatment which was observed to be on par with hand weeding twice at 20 and 40 DAS and power weeder weeding at 20 DAS + hand weeding.

The highest weed dry weight was recorded in unweeded control treatment. Similar findings are in accordance with Guriqbal Singh and H.S. Sekhon (2013). With respect to mean data on weed control index (WCI), power weeder weeding at 20 DAS alone and 20 and 40 DAS did not control weeds which were occupied in the intra row spacing and adjacent to the pigeonpea stump which reflected in lower WCI of 28.4 and 48.5 percent, respectively.

Whereas, power weeder weeding twice at 20 and 40 DAS in integration with one hand weeding effectively controlled all kinds of weed flora which were present in both inter and intra row spacing which resulted in higher WCI of 79.5 per cent. The next best treatment was hand weeding twice at 20 and 40 DAS. Application of imazethapyr @ 50 g a.i ha^{-1} and quizalofop ethyl @ 50 g a.i ha^{-1} at 15 DAS as early post emergence did not produce higher WCI of 61.0 per cent owing to lower weed control efficiency.

Effect of treatment on growth, yield attributes, grain and straw yield of Pigeon pea

Two power weeder weeding at 20 and 40 DAS in integration with one hand weeding had registered higher plant height of 187.9 cm which was observed to be on par with mulching @ 5 t ha^{-1}, hand weeding twice at 20 and 40 DAS and power weeder weeding at 20 DAS + hand weeding treatments. The lowest plant height was recorded under unweeded control and power weeder weeding at 20 DAS alone and 20 and 40 DAS treatments. With respect to number of primary branches $plant^{-1}$, higher value was (12.9) recorded with power weeder weeding at 20 and 40 DAS + one hand weeding and the next best treatments were mulching @ 5 t ha^{-1} (11.5), hand weeding twice at 20 and 40 DAS (11.3) and power weeder weeding at 20 DAS + hand weeding (11.1) which were on par with each other. Regarding secondary branches $plant^{-1}$, higher branches of 36.5 was registered under power weeder weeding at 20 and 40 DAS + one hand weeding treatment which was on par with hand weeding twice at 20 and 40 DAS (33.8). The lowest value of this parameter was recorded with unweededed control treatment (16.9).

The higher number of pods $plant^{-1}$ was noticed under power weeder weeding at 20 and 40 DAS + one hand weeding (240.3) which was observed to be at par with hand weeding twice at 20 and 40 DAS (221.7). This was followed by power weeder weeding at 20 DAS + one hand weeding, mulching @ 5 t ha^{-1} and application of imazethapyr @ 50 g a.i ha^{-1} and quizalofop ethyl @ 50 g a.i ha^{-1} at 15 DAS which were on par with each other. Regarding test weight, significant difference was noticed among the treatments and the highest value of this parameter was recorded in power weeder weeding at 20 and 40 DAS + one hand weeding treatment (8.38 g) and this

was followed by hand weeding twice at 20 and 40 DAS (8.06 g). The lowest test weight was recorded under unweeded control treatment (7.31 g). Power weeder weeding at 20 and 40 DAS + one hand weeding had registered higher mean grain yield of 922 kg ha^{-1} which might be due to better weed control as reflected in lower weed density (12.1), weed dry weight (14.5) and higher weed control efficiency (WCE) of 79.5 per cent (Table 3) and better plant growth and yield attributing characters (Table 2 and 3). This was observed to be on par with hand weeding twice at 20 and 40 DAS (874 kg ha^{-1}). The next best treatment was mulching @ 5 t ha^{-1} (774 kg ha^{-1}). One power weeder weeding gave lower grain yield than two power weeder weeding which might be due to poor weed control as reflected in higher weed dry weight of 49.8 gm^{-2} and lower WCE of 28.4 per cent.

Imazethapyr is a systemic herbicide, absorbed by the roots and foliage, with translocation in the xylem and phloem, and accumulations in the merristamatic region. It inhibits synthesis of amino acids leading to disruption of protein and DNA synthesis. Whereas, the active principle of quizolofop ethyl is applied on the foliage, it is absorbed through ruderal green top and transmits up and down inside frond and when it is accumulated in apical and intercalary meristems, it will prevent composition of cells' aliphatic acid and ultimately the weeds which are present in the top most layer will die.

Higher weed density and weed dry matter noticed in the later stage of crop growth under imazethapyr @ 50 g a.i ha^{-1} and quizalofop ethyl @ 50 g a.i ha^{-1} at 15 DAS was due to regeneration of dormant weed seeds (in deeper soil profile), resulted in lower grain yield of 730 kg ha^{-1}. However, lower grain yields in case of power weeder weeding once at 20 DAS was due to severe crop weed competition during critical crop growth period 45 days by the time weeds had already caused great losses due to their competition with crop plants for nutrients, moisture and light. As the dry weight of weeds increased, the grain yields of pigeonpea decreased, thus emphasizing the need to control weeds during critical period of crop growth for obtaining high grain yields.

The results are in concordance with the findings of Gupta *et al.*, (2013). Though, the treatment mulching @ 5.0 t ha^{-1} had recorded the highest soil moisture retention capacity at all the stages of crop growth over other treatments, it failed to produce higher pod yield (774 kg ha^{-1}) over power weeder weeding twice at 20 and 40 DAS with one hand weeding and hand weeding twice at 20 and 40 DAS (922 and 874 kg ha^{-1}, respectively) due to its poor weed control efficiency and higher crop weed competition during critical period.

Cost of cultivation, gross returns, net returns and benefit cost ratio varied among the different weed management practices (Table 4 and 5) and the results revealed that the lowest cost of cultivation of Rs. 21820 ha^{-1}, higher gross returns (Rs 54183 ha^{-1}), returns above variable cost (Rs. 32363 ha^{-1}) with a benefit cost ratio of 2.5 were recorded with power weeder weeding twice at 20 and 40 DAS with one hand weeding (Tables 6 and 7). The next best treatment was hand weeding twice at 20 and 40 DAS which recorded cost of cultivation of Rs. 23025 ha^{-1}, gross returns of Rs 51278 ha^{-1}, net returns of Rs. 28253 ha^{-1} with a benefit cost ratio of 2.23. Lowest values of these parameters were noticed under power weeder weeding once at 20 DAS. From this study, it could be concluded that power weeder weeding twice at 20 and 40 DAS in integration with one hand weeding for effective weed control, higher grain yield and economic returns.

References

Gupta, Vikas, Mahendra, Kumar, Anil, Sharma, B.C., Kher and Deepak. 2013. Influence of weed management practices on weed dynamics and yield of urd bean under rainfed conditions of Jammu. Indian Journal of Agronomy. 58 (2):220-225.

Guriqbal Singh and H.S. Sekhon. 2013. Integrated Weed Management in Pigeonpea (*Cajanus cajan*) World Journal of Agricultural Sciences. 9 (1): 86-91.

Kandasamy, O.S., 1999. Effect of herbicides with and without manual weeding on weeds and yield of rainfed pigeonpea (*Cajanus cajan* L. Millsp.). Legume Res., 22(3): 172-176.

Saxena, K.B. 2008. Genetic improvement of pigeonpea - A review. Tropical plant biology.1 (2): 159-178.

Talnikar, A.S., Kaam, D.R., Karande, D.R., and Jogdand, P.B. 2008. Integrated weed management in pigeonpea. International Journal of Agricultural Sciences. 4:363-370.

How to cite this article:

Kathirvelan, P. 2017. Influence of Weed Management on Weed Dynamics and Yield of Machine Sown Pigeonpea [*Cajanus cajan* (L.) Millsp.] Under Dryland Conditions. *Int.J.Curr.Microbiol.App.Sci.* 6(11): 3237-3245. doi: https://doi.org/10.20546/ijcmas.2017.611.379