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Effect of pre and post emergence herbicide on growth, yield attributes and yield of groundnut

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Abstract

Groundnut crop is highly susceptible to weed infestation because of its small stature and slow-growing nature. A field experiment was conducted at Regional Research Station, Tamil Nadu Agricultural University, Vriddhachalam during *Kharif* 2023 to evaluate suitable weed management practices for effective weed control and labour saving in groundnut production. The experiment was laid out in a randomized block design with ten treatments replicated thrice. In this field study application of cost-based treatment of hand weeding, intercultivation and combination of pre and post-emergence herbicide practices were followed. Lower weed density (16.89 m⁻² and 15.09 m⁻²) at 30 and 60 DAS and higher weed control efficiency (84.32% and 88.34%) at 30 and 60 DAS were observed in hand weeding at 20 and 40 DAS (T₉) which is on par with the pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS (T₂). As a result of effective weed control, higher pod and haulm yield was observed in hand weeding at 20 and 40 DAS (T₉) (2342 kg ha⁻¹ and 4194 kg ha⁻¹) which is on par with the pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS (T₂).

Keywords: Groundnut, weed control, pre-emergence, post-emergence herbicide, yield

Introduction

Among the oilseed crop, groundnut contributes 67 percent of edible oil to the total production of India. Groundnut (*Arachis hypogaea* L.) “king of oilseed” is also known as monkey nut and peanut and it is widely cultivated in tropical and subtropical region based on the climatic requirement. It contains oil 48 - 50 percent, protein 26 - 28 percent and essential vitamins and minerals. Yield of groundnut is hindered due to the weed infestation, as weeds compete with crop such as moisture, space, nutrient and sunlight. Groundnut attains its slow initial growth in 45 DAS and short stature and the weed population in the growth period was high. The weed infestation hinders the initial flowering, pod and harvest stages. The critical period for crop-weed competition was up to 40 days after sowing and yield losses 57 percent (Pawar *et al.*, 2018) [7] and 70 percent (Prasad *et al.*, 1987) [8]. Reduction in the pod yield due to the competition in the stress of weed in the extent of 17-84% (Priyadarshini *et al.*, 2023) [9]. Traditional practices of hand weeding and hoeing are the best management of controlling weed population and it requires a high cost and labours. Weeding should not be practiced once the peg penetrate in to the soil. Compare to hand weeding and mechanical weeding, spraying of herbicides is an effective method of control weeding and it reduces the cost and saves the time requirement. Early emergence of weeds should be controlled by applying of pre-emergence herbicides and later emergence weeds should be controlled by post-emergence herbicides. Weeds should be free upto 45 DAS, because it reduces the yield of crop. Scientific agriculture should aim to achieve the prior objectives of higher productivity and better resource use efficiency. (Harisudan and Subramaniyan 2020) [2]. Keeping these in view, field experiment was conducted to study the effect of different weed management practices on the growth and yield attributes and yield of groundnut.

Materials and Methods

Field experiment was conducted at Regional Research Station, Tamil Nadu Agricultural University, Vriddhachalam during *Kharif* 2023. The experimental field is located at 11° 30' N latitude, 79° 26' E longitude and at altitude of 46.7 metres above mean sea level (MSL).

The soil of the field experiments is sandy loam in texture with pH (7.7), EC (1.04), organic carbon (0.76), available nitrogen (218 kg ha⁻¹), available phosphorus (21 kg ha⁻¹) and available potassium (196 kg ha⁻¹).

The experiment was laid out in randomized block design with ten treatments and replicated thrice. The treatment involves T₁- Pendimethalin @ 1.0 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS, T₂- Diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS, T₃- Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha⁻¹ on 20 DAS *fb* hand weeding on 40 DAS, T₄- Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08)

kg a.i ha⁻¹ on 20 DAS *fb* hand weeding on 40 DAS, T₅- Pendimethalin @ 1.0 kg a.i ha⁻¹ on 3 DAS *fb* Fomesafen+ Fluazifop-p-butyl @ 0.25 kg a.i ha⁻¹ on 20 DAS, T₆- Pendimethalin @ 1.0 kg a.i ha⁻¹ on 3 DAS *fb* Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08)

kg a.i ha⁻¹ on 20 DAS, T₇- Diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha⁻¹ on 20 DAS, T₈- Diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08)

kg a.i ha⁻¹ on 20 DAS, T₉. hand weeding at 20 and 40 DAS, T₁₀. Unweeded (control). The recommended dose of fertilizer 25:50:75 kg of NPK ha⁻¹ was applied as urea, single super phosphate and muriate of potash. To improve pegging and pod development, gypsum @ 400 kg ha⁻¹ was applied at 45 DAS. Groundnut variety VRI 10 was sown at a spacing of 30 x 10 cm with the recommended seed rate of 125 kg ha⁻¹. Pre-emergence herbicides were applied on the third day after sowing and

post-emergence herbicides were applied on 20 DAS with a spray fluid of 500 liters per hectare. Irrigation was done at 8 to 10 days interval based on the climatic condition. Package of practices was adopted as per schedule. Weed density was recorded by quadrat method of

(4 times = 1m²) 0.25 x 0.25 m. The weed data collected were transformed into square root and analyzed as suggested by Snedecor and Cochran (1967) [11].

Result and Discussion

Weed parameters

Weed species present in the experimental plots comprises of grasses, sedges and broad leaved weeds. Among grasses *Cynodon dactylon*, *Dactyloctenium aegyptium*, *Echinochloa spp.*, *Digitaria sanguinalis*, sedges *Cyperus rotundus* and among broad leaved weeds such as *Cleome viscosa*, *Eclipta alba*, *Boerhaavia diffusa*, *Vernonia cinerea*, *Phyllanthus niruri*, *Tridax procumbens*, *Chenopodium album* were found. Similar weed species were observed by Parthipan and Harisudan

(2020) [6].

Significant weed control was observed by the different weed management practices. The treatment showing the lowest weed density is to be considered as the best treatment. The lower weed density was observed in hand weeding at 20 and 40 DAS (T₉) 16.89 m⁻²

(30 DAS) and 15.09 m⁻² (60 DAS) which is on par with pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS (T₂)

(Table 1.). Wani *et al.* (2010) [12] reported that weed density could lower with hand weeding due to manual removal of weeds. The lowest weed population in diclosulam was due to higher leaching potential index, and lower sorption coefficient, raised of its concentration at deeper layers of the soil, leading to increased control of sedge and broad-leaved weeds (Hornsby *et al.* 1995) [3].

Weed control efficiency was maximum under hand weeding at 20 and 40 DAS (T₉) with 84.32% and 88.34% at 30 and 60 DAS respectively followed by pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS (T₂) with 83.36% and 87.24% at 30 and 60 DAS respectively (Table 2.). The initial emergence of weeds was controlled by application of pre-emergence herbicide diclosulam and later emergence of weeds by the inter-cultivation practices recorded higher weed control efficiency and reduced the crop weed competition. Similar result as reported by (Charitha *et al.*, 2022) [1].

Kundu *et al.*, 2011 [5] reported that application of pre and post-emergence herbicides reduced the weed density at the initial and early growth stage and resulting in higher weed control efficiency.

Growth parameter

Different weed management practices showed a significant effect on the growth parameter of groundnut. Higher plant height, leaf area index and dry matter production at different growth stage was observed in hand weeding at 20 and 45 DAS (T₉), followed by pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS (T₂) and pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* Fomesafen + Fluazifop-p-butyl 0.25 kg a.i ha⁻¹ on 20 DAS (T₇) (Table 3,4 and 5.), This may due to controlling the weeds in a critical period of time, which may increased the availability of resources such as light, moisture and space and it could increase the plant height and production of more number of leaves in large size and increase the leaf area index and dry matter production (Sandil *et al.*, 2015) [10].

Table 1: Effect of weed management practices on total weed density (No.m⁻²) at 30 and 60 DAS in groundnut

Treatments	Total Weed Density (No.m ⁻²)	
	30 DAS	60 DAS
T ₁ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	5.27 (27.29)	4.70 (21.6)
T ₂ - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	4.29 (17.93)	4.12 (16.52)
T ₃ - Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	7.59 (57.19)	5.17 (26.21)
T ₄ - Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	7.91 (62.18)	5.32 (27.88)
T ₅ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	5.97 (35.14)	5.57 (30.73)
T ₆ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08)	6.27	5.86

kg a.i ha ⁻¹ on 20 DAS	(38.79)	(33.88)
T7 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	4.37 (18.58)	4.27 (17.73)
T8 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	5.50 (29.76)	4.96 (24.12)
T9 - Hand weeding at 20 and 40 DAS	4.17 (16.89)	3.95 (15.09)
T10 - Unweeded control	10.36 (107.73)	11.34 (129.47)
S.Ed	0.35	0.41
CD (P=0.05)	0.74	0.86

Table 2: Effect of weed management practices on weed control efficiency (%) at 30 and 60 DAS in groundnut

Treatments	Weed control efficiency (%)	
	30 DAS	60 DAS
T1 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	74.67	83.32
T2 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	83.36	87.24
T3 - Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	46.91	79.76
T4 - Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	42.28	78.47
T5 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	67.38	76.26
T6 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	63.99	73.83
T7 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	82.75	86.31
T8 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	72.38	81.37
T9 - Hand weeding at 20 and 40 DAS	84.32	88.34
T10 - Unweeded control	0.00	0.00

Table 3: Effect of weed management practices on plant height (cm) at 30,60 and 90 DAS in groundnut

Treatments	Plant height (cm)		
	30 DAS	60 DAS	90 DAS
T1 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	26.11	55.54	74.93
T2 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	26.81	56.27	75.93
T3 - Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	24.65	54.71	70.47
T4 - Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	24.51	53.21	69.53
T5 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	25.21	55.03	73.33
T6 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	24.81	54.91	73.07
T7 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	26.68	55.92	75.67
T8 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	25.69	55.17	74.01
T9 - Hand weeding at 20 and 40 DAS	29.53	65.75	84.41
T10 - Unweeded control	23.21	52.71	68.97
SEd	1.37	2.98	3.94
CD(P=0.05)	2.88	6.26	8.27

Table 4: Effect of weed management practices on Leaf area index at 30,60 and 90 DAS in groundnut

Treatments	Leaf area index		
	30 DAS	60 DAS	90 DAS
T1 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	1.09	2.83	3.22
T2 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	1.13	2.93	3.30
T3 - Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	0.90	2.31	2.61
T4 - Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	0.89	2.16	2.55
T5 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	1.02	2.71	3.06
T6 - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	0.91	2.64	3.00
T7 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	1.10	2.91	3.23
T8 - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	1.06	2.73	3.18
T9 - Hand weeding at 20 and 40 DAS	1.31	3.08	3.31
T10 - Unweeded control	0.74	1.53	2.15
SEd	0.05	0.14	0.16
CD(P=0.05)	0.11	0.29	0.33

Table 5: Effect of weed management practices on Dry matter production (kg ha⁻¹) at 30,60 and 90 DAS in groundnut

Treatments	Dry matter production (kg ha ⁻¹)		
	30 DAS	60 DAS	90 DAS
T ₁ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	823	4947	6124
T ₂ - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	917	5205	6845
T ₃ - Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	593	3954	4768
T ₄ - Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	552	3752	4421
T ₅ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	683	4575	5741
T ₆ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	629	4390	5579
T ₇ - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	875	5053	6474
T ₈ - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	708	4756	5978
T ₉ - Hand weeding at 20 and 40 DAS	973	5343	6994
T ₁₀ - Unweeded control	531	2770	3849
SEd	38.49	239.56	301.65
CD(P=0.05)	80.86	503.30	633.75

Yield attributes and yield

The significant differences in number of pods per plant is higher in hand weeding at 20 and 40 DAS (T₉) treatment (27.0) and it was on par with the pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS (T₂) (26.2). Lower number of pods per plant (10.5) was recorded in the unweeded control (T₁₀). Controlling the weeds in a critical period of time, it resulted less weed competition for crop growth establishment to harvest, and it could lead the yield attributing character and resulted in increase the pod and kernel yield (Kundu *et al.*, 2011) [5].

The results of the experiment showed significant differences in groundnut pod yield, haulm yield and harvest index due to different weed management treatments. Higher pod yield (2342 kg ha⁻¹) and haulm yield (4194 kg ha⁻¹) was recorded by the treatment hand weeding at 20 and 40 DAS (T₉) and it

was on par with the treatment pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS (T₂) (2275 kg ha⁻¹) pod yield and (4114 kg ha⁻¹) haulm yield and pre-emergence application of diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha⁻¹ on 20 DAS (T₇) (2160 kg ha⁻¹) pod yield and (4056 kg ha⁻¹). Lower pod yield (1015 kg ha⁻¹) and haulm yield (2393 kg ha⁻¹) was recorded in unweeded control (T₁₀) (Table 6.). Higher yield of groundnut in diclosulam due to lower crop weed competition throughout the growth, decreased weed density and lesser biomass of weeds than it results in decreased competition by weeds for moisture, light and space. Kumar *et al.* 2019 [4] reported that application of diclosulam in combination with hand weeding for effective weed management.

Table 6: Effect of weed management practices on yield parameter and pod yield (kg ha⁻¹) of groundnut

Treatments	Number of pods per plant	Test weight (g)	Dry pod yield (kg ha ⁻¹)	Haulm yield (kg ha ⁻¹)	Harvest index
T ₁ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	24.0	49.53	1914	3738	0.339
T ₂ - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> hand weeding on 40 DAS	26.2	50.90	2275	4114	0.356
T ₃ - Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	21.6	47.70	1594	3536	0.311
T ₄ - Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS <i>fb</i> hand weeding on 40 DAS	21.2	47.20	1543	3496	0.306
T ₅ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	22.6	48.53	1790	3658	0.329
T ₆ - Pendimethalin @ 1.0 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	22.2	48.23	1743	3612	0.325
T ₇ - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Fomesafen + Fluazifop-p-butyl @ 0.25 kg a.i ha ⁻¹ on 20 DAS	25.9	49.90	2160	4056	0.347
T ₈ - Diclosulam @ 0.025 kg a.i ha ⁻¹ on 3 DAS <i>fb</i> Sodium Aciflourfen + Clodinafop Propargyl @ (0.165+0.08) kg a.i ha ⁻¹ on 20 DAS	22.8	48.93	1841	3703	0.332
T ₉ - Hand weeding at 20 and 40 DAS	27.0	51.50	2342	4194	0.358
T ₁₀ - Unweeded control	10.5	47.06	1015	2393	0.298
SEd	1.22	2.60	97.58	196.20	-
CD(P=0.05)	2.56	NS	205.01	412.21	-

Conclusion

The result of the field study indicated that hand weeding at 20 and 40 DAS recorded higher yield attributes and pod yield with lower weed density and higher weed control efficiency and it has on par with diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS. It is revealed that

economics wise diclosulam @ 0.025 kg a.i ha⁻¹ on 3 DAS *fb* hand weeding on 40 DAS is an alternative method for effective weed management practices.

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