Plant Archives Volume 20 No. 2, 2020 pp. 5724-5726 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

EFFECT OF WEED MANAGEMENT PRACTICES ON DRYMATTER YIELD AND NUTRIENT UPTAKE OF IRRIGATED GROUNDNUT

K. Suseendran, D. Kalai Selvi, C. Kalaiyarasan, S. Jawahar, G. Murugan and S.R. Vinod Kumar

Department of Agronomy, Faculty of Agriculture, Annamalai University,
Annamalai Nagar-608 002 (Tamil Nadu), India.

Abstract

Field investigations were carried out at the farmer's field, Echanampatti village, Palacode Taluk, Dharmapuri district during *Kharif* Season, 2017 to study the effect of weed management on dry matter yield and nutrient uptake of irrigated groundnut. The experiment was laid out in randomized block design and replicated thrice. The experiment comprised of ten treatments. The results revealed that hand weeding twice at 20 and 40 DAS (T_9) recorded higher dry matter production yield of 2506.41 and 4985.61 kg ha^{-1} at 30 and 60 DAS, respectively which was statistically on par with T_7- pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} (2476.20 and 4939.61 kg ha^{-1}) and the nutrient uptake was higher under T_9- hand weeding twice at 20 and 40 DAS (112.14 kg N, 26.19 kg P and 91.85 kg K ha^{-1}) which remained on par with T_7- pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE of sodium acifluorfen + clodinofop propergyl 900g ha^{-1} (107.79 kg N, 24.05 kg P and 88.27 kg K ha^{-1}) was found to be effective and economically feasible for weed management in groundnut. The treatment (T_{10}) unweeded control recorded the least DMP and Nutrient uptake at 30 and 60 DAS, respectively.

Key words: *Arachis hypogaea*, dry matter, nutrient uptake, Weed management.

Introduction

Groundnut (*Arachis hypogaea* L.) is known as the KING OF OILSEEDS. It is considered to be one of the most important food legume and oilseed crops of India. Commercially and nutritionally it is very important source of oil (49%) and protein (26%). Globally, India ranks first in area and second in production after china. It is cultivated in 5.31 million ha area with the production of 6.96 million tonnes and average productivity of 1.31 tonnes ha^{-1} (DES, 2013). The principle reason for lower productivity was losses of commodity during various stages of crop production. Cultivation of groundnut as rainfed crop, lack of knowledge among the farmers about cultivation of groundnut with modern technology, lack of unawareness of improved varieties and improper fertilization etc. are some causes of lower productivity of groundnut in India. Along with these, the major cause of minimizing production is severe weed infestation during cropping. Weeds compete with crops for the resources like sunlight, space, moisture and nutrients not only throughout the growing season, but also create problem during digging and inverting procedures and reduced harvesting efficiency. Groundnut having less crop canopy during the first 6 weeks of crop growth favours strong competition with weeds and cause substantial yield loss. Therefore, timely weed control during this critical period become necessary for attaining maximum yield. (Etejere *et al*., 2013).

Pre-plant or pre emergence chemical weed management using selective herbicides like fluchloralin and pendimethalin followed by one hand weeding is a common practice in groundnut. However, disturbing the soil during manual weeding, in the early stages, exposes the groundnut crop to new flushes of weeds. These late emerging weeds seriously affect the pegging and pod development and disrupt digging and harvesting operations and difficult to strip the pods from vines. Apart from competition for nutrients and other inputs, these late emerging weeds infest the land with weed seeds and make the land less productive in the subsequent seasons. Subrahmaniyan *et al*., (2007) who reported that the widest spacing recorded a lower total dry matter output as a result of less plant population per unit area. Kathirvelan and Kalaiselvan (2007) who concluded that total dry matter production of groundnut generally increased with

***Author for correspondence :** E-mail : lenasusee@gmail.com

narrow spacing (20cm × 20cm) due to higher plant population and reduced space for weeds emergence. Kumar (2009) reported that higher weed control efficiency (rice straw mulch + one hand weeding at 6 WAS, two hand weeding at 3 and 6 WAS and pendimethalin at 1.5 l ha^{-1} + one hand weeding at 6 WAS) had higher LAI as compared to those with low weed control efficiency (sole rice straw mulch and sole pendimethalin). There also exists another situation where in the pre emergence application could not be done owing to continuous rains or for other reasons. Early post mergence herbicides offer great scope to tide over these situations.

Materials and Methods

The field experiment entitled "Impact of weed flora in groundnut (*Arachis hypogaea* L.) In clay loam soils of Dharmapuri District" was conducted during Kharif 2017 at farmers field of Echanampatti village of palacode taluk, Dharmapuri district of Tamil nadu. The soils of field experiment was clay loam having pH (7.8), available N (70 kg ha^{-1}), P_2O_5 (20 kg ha^{-1}) and K_2O (130 kg ha^{-1}). Ten treatment combinations *viz.,* T_1 – pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb post emergence application of quizalofop ethyl 100 g ha^{-1}, T_2- pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb hand weeding on 45 DAS, T_3- EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 15 DAS, T_{4-} EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 15 DAS, T_{5-} EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 15 DAS fb hand weeding on 45 DAS, T_6- EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 15 DAS fb hand weeding on 45 DAS, T_7- pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 25 DAS,T_8- pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 25 DAS, T_9-Two hand weedings (20 and 40 DAS) and T_{10}- Unweeded control were tested in a Randomized Block Design (RBD) with three replications. Groundnut variety '*TMV 7* 'was sown with spacing of 30 × 10cm. The crop was fertilized with 17:34:54 kg NPK ha^{-1} under surface irrigation. Herbicides were applied using manually operated knapsack sprayer fitted with flat fan nozzle using spray volume of 500 l ha^{-1}. Observations were taken at 30 and 60 DAS and at maturity.

Results and Discussion

Dry matter production

The hand weeding twice at 20 and 40 DAS (T_9) recorded higher dry matter production of 2506.41 and 4985.61 kg ha^{-1} at 30 and 60 DAS, respectively which was statistically on par with T_7- pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} (2476.20 and 4939.61 kg ha^{-1}). The next best was T_8- pre emergence application of pendimethalin 1.0 kg ha^{-1}. at 3 DAS fb EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 25 DAS (2422.94 and 4825.80 kg ha^{-1}) and it was on par with T_1- pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb post emergence application of quizalofop ethyl 100 g ha^{-1} (2394.88 and 4780.80 kg ha^{-1}) at 30 and 60 DAS, respectively The dry weight of weeds was reduced by hand weeding due to elimination of all sorts of weeds. Similar research finding are also reported

Table 1: Effect of weed management practices on Dry matter production (kg ha^{-1}) by weeds at 30 and 60 DAS.

T. No.	Treatments	Dry matter production of groundnut (kg ha^{-1})	
		30 DAS	60 DAS
T_1	PE application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb PoE application of quizalofop ethyl 100 g ha^{-1}.	2394.88	4780.80
T_2	PE application of pendimethalin 1.0 kg ha^{-1} at 3DAS fb hand weeding on 45 DAS.	2334.29	4670.11
T_3	EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 15 DAS.	2132.83	4389.38
T_4	EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 15 DAS.	2148.06	4409.90
T_5	EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 15 DAS fb hand weeding on 45 DAS.	2248.06	4523.55
T_6	EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 15 DAS fb hand weeding on 45 DAS.	2314.14	4631.81
T_7	PE application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 25 DAS.	2476.20	4939.61
T_8	PE application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 25 DAS.	2422.94	4825.80
T_9	Two hand weedings (20 and 40 DAS).	2506.41	4985.61
T_{10}	Unweeded control.	1932.83	4239.15
	S. Ed	21.10	22.19
	CD (p=0.05)	44.33	46.63

Table 2: Nutrient uptake by groundnut (kg ha^{-1}) as influenced by weed management practices.

T. No.	Treatments	Nutrient uptake by crop (kg ha^{-1})		
		N	P	K
T_1	PE application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb PoE application of quizalofop ethyl 100 g ha^{-1}.	85.89	18.73	77.11
T_2	PE application of pendimethalin 1.0 kg ha^{-1} at 3DAS fb hand weeding on 45 DAS.	70.64	14.88	68.55
T_3	EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 15 DAS.	37.68	6.32	36.41
T_4	EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 15 DAS.	39.76	6.53	38.45
T_5	EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 15 DAS fb hand weeding on 45 DAS.	52.95	10.33	54.34
T_6	EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 15 DAS fb hand weeding on 45 DAS.	67.13	14.12	65.98
T_7	PE application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} at 25 DAS.	107.79	24.05	88.27
T_8	PE application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE quizalofop ethyl + imazethapyr 100 g ha^{-1} at 25 DAS.	90.15	20.27	80.18
T_9	Two hand weedings (20 and 40 DAS).	112.14	26.19	91.85
T_{10}	Unweeded control.	24.40	3.50	20.17
	S. Ed	2.08	1.18	2.09
	CD (p=0.05)	4.38	2.49	4.40

by Bhagat *et al*., (2002); Kumar *et al*., (2004) and Ahmed *et al.,* (2008). The herbicide treatment recorded lower dry weight per unit area in plot due to the less number of weeds by rapid depletion of carbohydrate reserve of weeds, rapid respiration and also due to inhibition of photosynthetic activity. The treatment (T_{10}) unweeed control recorded the least DMP of 1932.83 and 4239.15 kg ha^{-1} at 30 and 60 DAS, respectively.

Nutrient uptake

The N, P and K uptake of groundnut was marked significant variation due to different weed management practices. Among the various weed management practices tried, the nutrient uptake was higher under T_9- hand weeding twice at 20 and 40 DAS (112.14 kg N, 26.19 kg P and 91.85 kg K ha^{-1}) which remained on par with T_7- pre emergence application of pendimethalin 1.0 kg ha^{-1} at 3 DAS fb EPOE of sodium acifluorfen + clodinofop propergyl 900 g ha^{-1} (107.79 kg N, 24.05 kg P and 88.27 kg K ha^{-1}). The higher nutrient uptake by crop in this treatment was due to lower weed population and dry weight which helped the crop to grow luxuriantly in weed free environment and absorb more nutrients from soil reported by Jat *et al*., (2011). The significantly higher nutrient uptake by weeds was noticed in unweeded control due to more weed density and dry weight.

Conclusion

Based on this findings, it may be concluded that, pre emergence application of pendimethalin @ 1.0 kg a.i ha^{-1} at 3 DAS + early post emergence application of sodium acifluorfen + clodinofop propergyl @ 900 g ha^{-1} at 25 DAS gave recorded higher dry matter production and nutrient uptake. Chemical method of weed control was a cheaper and economical. It is also a best option during constraints of labour scarcity in Indian agriculture.

References

Ahmed, Y.M., A.S. Mostafa, L.A. Reda, A.M. Khozimy and Y.Y. Mosleh (2008). Efficacy of the selected herbicides in controlling weeds and their side effects on peanut. *J. Pl. Prot. Res.,* **48(3):** 355-364.

Bhagat, P.S., H.N. Sethi, A.P. Karunagar and D.J. Jiotode (2002). Efficacy of herbicides for weed control in groundnut. *Res. on Crop.,* **3(3):** 542-545.

Etejere, E.O., B.U. Olayinka and A.J. Wuraola (2013). Comparative economic efficacy of different weed control methods in groundnut. *European J. Bio Sci.,* **7(1):** 10-18.

Jat, R.S., H.N. Meena, A.L. Singh, J.N. Surya and J.B. Misra (2011). Weed management in groundnut (*Arachis hypogaea* L.) in india – a review. *Agric. Rev.,* **32(3):** 155-171.

Kathirvelan, P. and P. Kalaiselvan (2007). Studies on agro management technique for confectionary groundnut under irrigated conditions. *Res. J. Agric. and Biological Sci.,* **3(1):** 52-58.

Kumar, N.S. (2009). Effect of plant density and weed management practices on production potential of groundnut (*Arachis hypogaea* L.). *Ind. J. Agric Res.,* **43:** 1.

Kumar, N.S., S. Natarajan, A. Veeramani and P.S. Kumar (2004). Integrated weed management in groundnut under varying plant densities. *Ind. J. Weed Sci.,* **36(1&2):** 144-145.

Subrahmaniyan, K., P. Kalaiselvan, G. Manickam and N. Arulmozhi (2007). Spacing and fertilizer requirement for confectionary groundnut varieties. *Crop Res.,* **19:** 210-212.