

## Effect of pre and post-emergence herbicides on *Dactyloctenium aegyptium* infestation in groundnut (*Arachis hypogaea* L.)

RAHUL DHANKAR<sup>1</sup>, SUSHIL KUMAR SINGH\* TODARMAL, PARVEEN KUMAR<sup>1</sup>, M.D PARIHAR AND PREETI DHANKAR

Department of Soil Science, CCS Haryana Agricultural University, Hisar, Haryana 125 004

\*Corresponding address- [up808074@gmail.com](mailto:up808074@gmail.com)

### Abstract

Weed infestation is one of the prominent factors for the reduction in crop yield. In view of these facts, The present study entitled “Effect of pre and post-emergence herbicides on *Dactyloctenium aegyptium* infestation in groundnut (*Arachis hypogaea* L.)” was conducted at Agronomy Research Farm, CCS Haryana Agricultural University, Hisar during Kharif 2020. The experiment comprising sixteen treatments was laid out in randomized block design with three replications. Treatments consisted of weed management viz., were imazethapyr + pendimethalin (RM) at 1000 g/ha, 1250 g/ha, 1500 g/ha and 1000 g/ha with one hoeing at 30 DAS, pendimethalin at 1000 g/ha and 1000 g/ha with one hoeing at 30 DAS, imazethapyr at 70g/ha and 70g/ha with one hoeing at 30 DAS, imazethapyr + imazamox (RM) at 70g/ha, imazethapyr + imazamox (RM) at 70g/ha pre-emergence with one hoeing at 30 DAS as pre-emergence application and imazethapyr + quizalofop 70+50 g/ha, imazethapyr + imazamox (RM) + quizalofop 70+50, Acifluorfen+clodinafop (RM) at 305g/ha as post-emergence and two hoeing compared with weed free and weedy checks. The results of the experiment indicated that different herbicide applied as pre or post-emergence during cropping season control the population of *Dactyloctenium aegyptium*. By applying different dose of imazethapyr + pendimethalin (RM) 1000g ha<sup>-1</sup>, 1250 g ha<sup>-1</sup>, 1500 g ha<sup>-1</sup>, 1000g ha with one hoeing at 30 DAS no weed population of *Dactyloctenium aegyptium* was recorded at 30 DAS was applied as pre-emergence application. At 60 DAS use of imazethapyr + pendimethalin (RM) was applied as pre-emergence @ 1000g ha<sup>-1</sup> fb one hoeing at 30 DAS recorded significantly lower density (2.0 m<sup>-2</sup>) of *Dactyloctenium aegyptium* which was at par with the treatments in which imazethapyr + pendimethalin (RM) was applied as pre-emergence at different doses 1000g ha<sup>-1</sup>, 1250 g ha<sup>-1</sup>, 1500 g ha<sup>-1</sup> with weed density 3.33 m<sup>-2</sup>, 2.67 m<sup>-2</sup> and 2.67 m<sup>-2</sup> respectively. The application of imazethapyr + pendimethalin (RM) was applied as pre-emergence @ 1000g ha<sup>-1</sup> fb one hoeing at 30 DAS was provided significantly lower density (3.33m<sup>-2</sup>) of *Dactyloctenium aegyptium* at 90 DAS.

**Keywords:** Groundnut, Herbicides, *Dactyloctenium aegyptium*

### Introduction

India is the largest producer of oilseeds in the world. The country produces groundnut, soybean, sunflower, sesamum, niger seed, mustard and safflower oilseeds and oilseed sector occupies an important position in the country's economy. Groundnut or peanut (*Arachis hypogaea* L.) is also known as the 'king' of all oil seeds, is one of the supreme food as well as

cash crop of our country. Groundnut is well accepted under the name wonder nut and poor men's cashew nut. The nut plays a vital role as resource in the dietary requirement of poor women and children. It is also known as peanut, earthnut, monkey nut or goobers. The crop is well grown in both tropical, sub-tropical regions and in the continental part of temperate countries. India stands first in terms of area and second in production rate after China. In India, the total area

<sup>1</sup>Department of Agronomy, CCS Haryana Agricultural University, Hisar, Haryana 125 004

under groundnut crop is of 4.91 m ha with a total production of 9.18 m tonne and productivity of 1868 kg ha<sup>-1</sup> (Anonymous, 2018). The major groundnut growing states of India are Gujarat (42.88%), Rajasthan (13.72%), Andhra Pradesh (11.43%), Tamil Nadu (10.61%), Karnataka (6.08%). In terms of area, more than 80% of groundnut crop is grown in the kharif season. It is a rich source of protein (26%) and being an oil seed crop, it constitutes of 40 to 49 % of oil (Saturated 7%, Mono unsaturated 24% and Polyunsaturated 16%), so it is one of the most important crops for producing edible oil.

The oil is composed of mixed glycerides and a very high proportion of unsaturated fatty acids, particularly, oleic (50-65%) and linoleic (18-30%) (Naim *et al.*, 2010). Moreover, it is also a huge source of calcium, phosphorus, iron, zinc and boron. Groundnut also encompasses two vitamins namely, Vitamin E and Vitamin B. It also serves as a valuable crop for crop rotation and hence, improves the fertility of soil. The crop is also highly valued for its high calorie content (calorific value of 567). Unlike other crops, the major factor that decides the growth and yield of groundnut is the critical period of crop weed competition. Weeds cause much harm to the groundnut crop during the initial 45 days of growth period. The critical period of crop-weed competition is evaluated to be 2-6 weeks after sowing (Singh *et al.*, 2014). Groundnut is highly susceptible to weed infestation because of its slow growth in the initial stages and weed infestation is one of the most prominent cause of lower yield of Groundnut.

*The Dactyloctenium aegyptium* is one of major weed flora associated with the crop in groundnut growing zones of Haryana state (Punia *et al.*, 2010). The *Dactyloctenium aegyptium* weed interfere with pegging, pod development and harvesting of groundnut during different stages of crop growth besides competing for essential resources. Weed infestation is one of the prominent factors for the reduction in crop yield and control of weed infestation in groundnut crop in kharif with hand weeding and chemical was reduced weed density and increase pod yield (Sharma *et al.*, 2015).

Groundnuts improve soil fertility through fixing nitrogen and thereby increasing the productivity of other crops when used in rotation or in intercropping (Ajeigbe *et al.*, 2015).

## Methods and Materials

The study was conducted entitled “Effect of pre and post-emergence herbicides on *Dactyloctenium aegyptium* infestation in groundnut (*Arachis hypogaea* L.)” at Research farm of Agronomy, CCS Haryana Agriculture University, Hisar under irrigated condition. Sowing was done on 24-06-2019 during *kharif season* 2019. The experiment comprising sixteen treatments was laid out in randomized block design with three replications. Treatments consisted of weed management viz., were imazethapyr + pendimethalin (RM) at 1000 g/ha, 1250 g/ha, 1500 g/ha and 1000 g/ha with one hoeing at 30 DAS, pendimethalin at 1000 g/ha and 1000 g/ha with one hoeing at 30 DAS, as imazethapyr at 70g/ha and 70g/ha with one hoeing at 30 DAS, imazethapyr + imazamox (RM) at 70g/ha, imazethapyr + imazamox (RM) at 70g/ha pre-emergence with one hoeing at 30 DAS and imazethapyr + quizalofop 70+50 g/ha, imazethapyr + imazamox (RM) + quizalofop 70+50 post-emergence, Two hoeing and compared with weed free and weedy checks Post emergence herbicides were applied at 20 DAS (2-3 leaf stages of weeds) by knapsack sprayer fitted with flat fan nozzle using with 375 liter/ha. Groundnut crop was harvesting on last week in October. Crop was raised according to package of practices of CCS HAU, Hisar. Observation of *echinochloa colona* density were recorded at 30, 60 and 90 DAS by using quadrant of 0.5 x 0.5 m<sup>2</sup> and then those values were converted to per m<sup>2</sup>. In this experiment was used GNH 804 Variety with spacing of 30 × 15 cm.

## Results and Discussion

*Density of Dactyloctenium aegyptium* (no. m<sup>-2</sup>):

Weed free plots were an unbroken weed free throughout the crop season so weed density in weed free treatment taken as zero. Weedy check plots recorded the maximum weed density irrespective of the stages of crop growth. All the weed management treatments had considerably reduced the weed population at varied stages of crop growth as compared to the weedy check.

The results of the experiment indicated that different herbicide applied as pre or post-emergence during cropping season control the weed population of *Dactyloctenium aegyptium* over weedy check at 30, 60 & 90 DAS. By applying different dose of imazethapyr + pendimethalin (RM) 1000g ha<sup>-1</sup>, 1250 g ha<sup>-1</sup>, 1500 g ha<sup>-1</sup>, 1000g ha with one hoeing at 30 DAS

Table 1: Effect of different herbicide treatments on density (no.m<sup>2</sup>) of *Dactyloctenium aegyptium* at different crop growth stages and Pod yield

S.No.	Herbicides	Dose (g/ha)	Time of application	<i>Dactyloctenium aegyptium</i> (no. m <sup>2</sup> )			Pod yield (kg ha <sup>-1</sup> )
				30DAS	60DAS	90DAS	
1	Imazethapyr + pendimethalin (RM)	1000	PRE	1.0(0)	2.02(3.33)	2.24(4.33)	2265
2	Imazethapyr + pendimethalin (RM)	1250	PRE	1.0(0)	1.79(2.67)	2.19(4.33)	2310
3	Imazethapyr + pendimethalin(RM)	1500	PRE	1.0(0)	1.82(2.67)	2.13(3.67)	2370
4	Imazethapyr + pendimethalin (RM)fb one hoeing	1000	PRE,30DAS	1.00(0)	1.69(2.0)	2.06(3.33)	2385
5	Pendimethalin	1000	PRE	2.02(3.33)	3.27(10.33)	3.58(12.33)	1980
6	Pendimethalin fb one hoeing	1000	PRE,30DAS	1.0(0)	2.71(7.33)	3.52(11.67)	2070
7	Imazethapyr	70	PRE	2.73(6.67)	3.92(15.33)	4.18(17.33)	1370
8	Imazethapyr + imazamox (RM)	70	PRE	2.43(5.33)	3.24(10.33)	3.45(11.00)	1680
9	Imazethapyr fb one hoeing	70	PRE	2.14(3.67)	3.08(9.33)	3.90(14.33)	1530
10	Imazethapyr + imazamox (RM)fb one hoeing	70	PRE,30DAS	2.36(4.67)	3.05(9.0)	3.88(14.33)	1590
11	Imazethapyr + quizalofop	70	POST	1.67(1.63)	1.79(2.33)	2.37(4.67)	1360
12	Imazethapyr + imazamox (RM) + quizalofop	70+50	POST	1.33(1.52)	1.87(2.67)	2.29(4.33)	1440
13	Acifluorfen+clodinafop	305	POST	4.05(16.67)	3.72(13.33)	4.49(19.33)	1530
14	Two hoeings	-	25&45DAS	1.72(2.0)	2.29(4.33)	4.05(16.33)	1860
15	Weed free	-	-	1.0(0)	1.0(0)	1.0(0)	2490
16	Weedy check	-	-	4.17(17.0)	5.14(26.66)	5.98(35.33)	1205
	S.Em±	-	-	0.25	0.26	0.25	69.06
	LSD(P=0.05)	-	-	0.74	0.75	0.73	200.43

Figures in parenthesis are original value

no weed population of *Dactyloctenium aegyptium* was recorded at 30 DAS was applied as pre-emergence application.

Spray of imazethapyr + pendimethalin (RM) was applied as pre- emergence @ 1000 g ha<sup>1</sup> fb one hoeing at 30 DAS recorded significantly lower density (2.00 m<sup>2</sup>) of *Dactyloctenium aegyptium* which was at par with the treatments in which imazethapyr + pendimethalin (RM) was applied as pre-emergence at different doses {(T1) (1000g ha<sup>-1</sup>), T2 (1250 g ha<sup>-1</sup>), T3 (500 g ha<sup>-1</sup>)} with weed density 3.33 m<sup>2</sup>, 2.67 m<sup>2</sup> and 2.67 m<sup>2</sup> respectively post- emergence application imazethapyr + quizalofop @ 70 g ha<sup>-1</sup> and imazethapyr + imazamox (RM) @ 70 g ha<sup>-1</sup> + quizalofop @ 50 g ha<sup>-1</sup> at 60 DAS.

At 90 DAS application of pendimethalin (RM) was applied as pre -emergence @ 1000 g ha<sup>1</sup> fb one hoeing at 30 DAS was reported the minimum weed density 3.33 m<sup>2</sup> of *Dactyloctenium aegyptium* which was at par with treatments in which imazethapyr + pendimethalin (RM) was applied as PRE at different doses (1000g ha<sup>-1</sup>,1250g ha<sup>-1</sup> and 1500g ha<sup>-1</sup>)having respective weed density of 3.67m<sup>2</sup>, 4.33m<sup>2</sup> and 4.33m<sup>2</sup>. These results are conformity support by Kalpana and Velayuthum (2004).

#### Pod yield (kg ha<sup>-1</sup>)

It is observed from the data in table 1 that different herbicidal on groundnut significantly influenced of pod yield. Significant differences were observed in pod yield of groundnut due to various herbicide. Weed free plot provided a favorable environment provided registered the maximum pod yield (2490 kg ha<sup>-1</sup>). An increased pod yield of 1285 kg ha<sup>1</sup> over weedy check was obtained with free. Results revealed that the pod yield (kg ha<sup>-1</sup>) among various treatments ranged from 1205 to 2490 kg ha<sup>-1</sup>. The maximum pod yield was obtained under weed free treatment (2490 kg ha<sup>-1</sup>), which was significantly at par with imazethapyr + pendimethalin (RM) 1000g ha<sup>-1</sup> with one hoeing at 30 DAS (2385 kg ha<sup>-1</sup>) and imazethapyr + pendimethalin (RM) 1500g ha<sup>-1</sup> (2370 kg ha<sup>-1</sup>). Among herbicide, minimum pod yield (1360 kg ha<sup>-1</sup>) was recorded with use of Imazethapyr + quizalofop (70+50)g ha<sup>-1</sup> which was even higher than weedy check. These results were in close conformity with Mahajan *et al.* (2020) and Singh *et al.* (2017).

#### Conclusion

Based on the above discussion, it is concluded that pre-emergence application of imazethapyr + pendimethalin (RM) @ 1000 g ha<sup>-1</sup> fb one hoeing at 30

DAS was effective control of *Dactyloctenium aegyptium* and provided highest pod yield of groundnut.

### References

- Anonymous, (2018). Agricultural Statistics at a Glance. Government of India Ministry of Agriculture & Farmers Welfare Department of Agriculture, Cooperation & Farmers Welfare Directorate of Economics and Statistics, pp.107-109.
- Naim, El. A.M.; Eldoma, M.A. and Abdalla, A.E. (2010). Effect of weeding frequencies and plant density on vegetative growth characteristic of groundnut (*Arachis hypogaea* L.) in North Kordofan of Sudan. *International Journal of Applied Biology and Pharmaceutical Technology*, 1(3): 1188-1193.
- Singh, R.K.; Verma, S.K. and Singh, R.P. (2014). Weed management in groundnut with imazethapyr + surfactant. *Indian Journal of Weed Science*, 46(3): 302-304.
- Punia, S.S.; Yadav, D. and Singh, S. (2010). Weed flora of groundnut in Haryana. *Haryana Journal of Agronomy*, 26(1 & 2):60-61.
- Sharma, S.; Jat, R.A. and Sagarka, B.K. (2015). Effect of weed management practices on weed dynamics, yield and economics of groundnut (*Arachis hypogaea* L.) in black calcareous soil. *Indian Journal of Agronomy*, 60(2):312-317.
- Ajeigbe, H. A.; Waliyar, F.; Echekewu, C.A.; Kuniya, A.; Motagi, B.N.; Eniayeju, D. and Inuwa, A. (2015). A farmer's guide to profitable groundnut production in Nigeria (Technical Report). Patancheru. ICRISAT.
- Kalpana, R. and Velayuthum, A. (2004). Effect of herbicides on weed control and yield of soybean. *Indian Journal of Weed Science*, 36(1 and 2):138-140.
- Mahajan, Amit.; Kumar, Anil.; Puniya, R. and Stanzen, Lobzang (2020). Pre- and post-emergence herbicides effect on weed dynamics, microbial population and yield of summer blackgram. *Indian Journal of Weed Science*, 52(4): 340-345.
- Singh, Guriqbal.; K. V. Harpreet and Sharma, Poonam (2017). Efficacy of pre- and post-emergence herbicides for weed control in green gram. *Indian Journal of Weed Science*, 49(3): 252-255.