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## Effect of weed control measures on weeds, yield and economic of Potato

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### Abstract

The present investigation entitled “Effect of weed control measures on weeds, yield and economic of potato” carried out at Main Experiment Station, Vegetable Farm of Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.) during Rabi season 2019-2020. The experiment was laid out in Randomized Block Design with three replications. There were eight treatments viz., T1 control (Recommended dose of N: P2O5 K2O @ 150:100:120 kg ha<sup>-1</sup>), T2 (T1+Eucalyptus leaf @ 5t/ha), T3 (T1+Mahua leaf @ 5t/ha), T4 (T1+Rice straw @ 5t/ha), T5 (T1+Water hyacinth @ 5 t/ha), T6 (T1 + Neem leaf @ 5t/ha), T7 (T1+Metribuzin @ 0.35 kg/ha PE), T8 (T1+ Two hand weeding at 20 and 40 DAS). The soil of the experimental field was silt loam in texture, having Ph 8.2, organic carbon 3.1 g/kg, available N 142 kg/ha, available P 14.9 kg/ha, available K 241.0 kg/ha and available Zn 0.41 ppm. The potato variety Kufri Neelkanth was shown on 16/11/2019 at spacing 60 cm x 20 cm. Leaf mulches (Eucalyptus, Mahua, Rice straw, water hyacinth and neem @ 5t/ha and Metribuzin @ 0.35 kg/ha PE (pre emergence) were applied as per treatment. Among the various weed control measures, water hyacinth @ 5t/ha was found better to control the weeds and increase the yield and economics of potato.

**Keywords:** Potato, weed controls measures and economics

### Introduction

The productivity of Potato in eastern Uttar Pradesh is very low which might be due to the non-adoption of cropping system, poor irrigation, weed management practices and soil health. Weed reduce wheat yield it not controlled in the critical stages of crop and may cause yield reduction up to 60%. Weeds are the major threat in harnessing the full potential of applied and native plant nutrients. They remove considerable amount of nutrients and adversely affect the yield of crops (Kumar *et al.*, 2015)<sup>[1]</sup>. Weeds are considered as one of the major constraints in Potato cultivation, which comparatively require larger amount of water and fertilizers, have created conducive condition for luxuriant growth of weeds with high density.

The prominent weeds noted in potato are *Phalaris minor*, *Cynodon dactylon*, *Cyperus rotundus*, *Anagallis arvensis*, *Chenopodium album*, *Polygonum spp.*, *Vicia sativa* and *Melilotus indica*. Weed infestation in potato causes heavy reduction in crop yield ranging from 15 to 50% (Gill and Brar, 1975), which may be minimized to a greater extent simply by adopting an appropriate weed management practices. Mulching has smothering effects on weeds by restricting the photosynthesis. It is effective against annual weed and some perennial weeds. Mulching with leaf straw material when applied on soil surface does not allow weeds to germinate as light does not reach in the soil. Mulches not only ensure moisture but impact beneficial effect like suppression of extreme fluctuations of soil temperature, reduce water loss through evaporation, decomposition of leaf straw resulting more stored soil moisture and improve soil health (Bhullan *et al.*, 2015)<sup>[8]</sup>. Therefore, different weed management strategies were evaluated for managing the weed spectrum with higher efficacy for Sustainable potato production.

### Materials and Methods

The present investigation entitled Effect of weed control measures on weeds, yield and economic of potato was carried out at Main Experiment Station, Vegetable Farm of Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.) during Rabi season 2019-2020. The experiment was laid out in Randomized Block Design with three replications.

There were eight treatments *viz.*, T1 control (Recommended dose of N: P2O5 K2O @ 150:100:120 kg ha<sup>-1</sup>), T2 (T1+Eucalyptus leaf @ 5t/ha), T3 (T1+Mahua leaf @ 5t/ha), T4 (T1+Rice straw @ 5t/ha), T5 (T1+Water hyacinth @ 5 t/ha), T6 (T1 + Neem leaf @ 5t/ha), T7 (T1+Metribuzin @ 0.35 kg/ha PE), T8 (T1+ Two hand weeding at 20 and 40 DAS). The soil of the experimental field was silt loam in texture, having Ph 8.2, organic carbon 3.1 g/kg, available N 142 kg/ha, available P 14.9 kg/ha, available K 241.0 kg/ha and available Zn 0.41 ppm. The potato variety Kufri Neelkanth was shown on 16/11/2019 with spacing 60 cm x 20 cm. Leaf mulches (Eucalyptus, Mahua, Rice straw, water hyacinth and neem @ 5t/ha and Metribuzin @ 0.35 kg/ha PE (pre emergence) were applied as per treatment.

### Result and Discussion

Weed population at 30, 60 DAS and harvest have been presented in Table 1 clearly reveals that the weed population increased with the advancement in the age of crop. Due to application of different treatments the weed population decreased significantly over control at 30, 60 DAS and at harvest stages, minimum weed population were observed (3.00, 3.15 and 1.4 m<sup>-2</sup>) under T<sub>5</sub> treatment (water hyacinth applied @ 5t/ha) which was significantly superior over control. However, maximum weed population at 30, 60 DAS and at harvest were found under control. Weed population decreased with the application of various treatments over control. This might be due to suppression of weeds by better mulching weed management practices. Maximum weed improvement (minimum weed population) at both stages was observed under water hyacinth application. Water hyacinth

reduces weed infestation, soil moisture depletion and amelioration of soil temperature. Similar results have been reported by Chethan *et al.* (2019)<sup>[5]</sup>.

### Tuber and haulm yield (t/ha)

The data pertaining to haulm and tuber yield of potato have been presented in Table 1 the critical examination of data clearly revealed that all the mulching treatments resulted significant increase in the potato tuber and haulm yields as compared to control. The maximum tuber and haulm yield (36.90 and 63.98 t/ha, respectively) were recorded under T<sub>5</sub> (water hyacinth applied @ 5t/ha) which was significantly superior over control and at par with rest of the treatments. No significant variation was observed within the treatments. Minimum tuber and haulm yield (24.50 and 39.60 t/ha, respectively) was observed under control. Among different weed management practices, water hyacinth @ 5t/ha followed by straw mulch @ 5t/ha and neem leaf @ 5t/ha produced the better yield (potato tuber and haulm) as compared with other mulching treatments. Metribuzin PE @ 0.35 kg/ha and two hand weeding also produced better yield and it was *at par* with water hyacinth (5 t/ha) treatment. The above findings might be attributes to adequate weed management practices which contributed to better growth parameters and yield attributes. Better vegetative growth coupled with higher yield attributes resulted in higher tuber yield over control. Besides these, mulching provides very low degree of crop weed competition for light, moisture and nutrients. Due to less number of weeds, the potato crop received congenial condition for the proper growth.

**Table 1:** Effect of different weed control measures on weed populations Potato yield and B:C ratio

Treatments	Weed population (m <sup>-2</sup> )			Yield (t/ha)		B:C Ratio
	30 DAS	60 DAS	At Harvest	Tuber	Haulm	
T <sub>1</sub> Control	10.25	18.68	8.44	24.50	39.60	1.56
T <sub>2</sub> Eucalyptus leaf @ 5.0t/ha	6.15	10.20	3.15	35.60	61.23	2.68
T <sub>3</sub> Mahua leaf @ 5.0t/ha	5.25	9.54	3.00	35.70	61.40	2.69
T <sub>4</sub> Rice straw @ 5.0t/ha	3.30	4.50	2.10	35.72	61.45	2.69
T <sub>5</sub> Water Hyacinth @ 5.0t/ha	3.00	3.15	1.4	36.90	63.98	2.81
T <sub>6</sub> Neem leaf @ 5.0t/ha	3.20	3.25	1.7	35.70	61.40	2.68
T <sub>7</sub> Metribuzin @ 0.35t/ha	2.70	3.00	2.10	36.32	62.50	2.63
T <sub>8</sub> Hand weeding (2)	2.20	3.86	1.0	36.85	63.38	2.14
SEm+	1.01	1.47	1.31	0.93	2.37	
C.D. at 5%	3.06	4.46	3.95	2.80	7.21	

Development and also enhanced the availability of nutrients. The similar results have been reported by Kaur *et al.* (2020)<sup>[4]</sup>.

### Economics

The maximum B:C ratio 2.81 was obtained with T<sub>5</sub> treatments (water hyacinth applied @ 5t/ha) while minimum was observed under T<sub>1</sub> (1.56) control plot.

### Conclusion

Thus, it may be concluded that among different weed control measures, water hyacinth @ 5 t/ha was found most effective and suitable for controlling weeds, increasing yield, and economics of potato.

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