

Print ISSN : 0972-8813
e-ISSN : 2582-2780

[Vol. 22(2) May-August 2024]

Pantnagar Journal of Research

(Formerly International Journal of Basic and
Applied Agricultural Research ISSN : 2349-8765)



G.B. Pant University of Agriculture & Technology, Pantnagar



CONTENTS

Impact of <i>Zea nicaraguensis</i> introgression on Kernel Trait Variability in maize lines	231
SENTHILKUMAR V., PRIYA GARKOTI., THOTLA NARESH, MAYANK TIWARI, ANIRUDH T. V. and NARENDRA KUMAR SINGH	
Improving <i>Brassica juncea</i> performance through hybrid breeding strategies: a focus on combining ability and heterosis analysis	244
ANU SINGH, USHA PANT, PREETI LOHANI, A. S. JEENA and ANIL KUMAR	
Study of Nano Urea application under graded n rates on growth, productivity and nitrogen use efficiency of transplanted rice (<i>Oryza sativa</i> L.)	251
S.K.YADAV , D.K.SINGH, PRATIMA ARYA and YUVRAJ SINGH	
Isolation, screening and characterization of Drought tolerant Plant Growth Promoting bacteria from Indian Himalayas	261
PRIYANKA KHATI, PANKAJ KUMAR MISHRA and LAKSHMI KANT	
Impact of Glomalin-Related Soil Proteins on <i>in vitro</i> Finger Millet (<i>Eleusine coracana</i> (L.) Gaertn.) seed germination	272
AMIT SINGH RANA, SUGANDHA PANT, ASHOK KUMAR VERMA and ASHUTOSH DUBEY	
Rating scale of pedological development in humid moisture regime of guava growing soils in north-east region of Haryana	279
DHARAM PAL and DINESH	
Coating micronized elemental sulphur powder on prilled urea: process and product evaluation	286
P. O. SURESH, N. R. PATEL, R. JAT, R. A. PANIA, A. K. MISHRA, P. B. VAISHNAV	
Multi-year temporal analysis of sheath blight incidence in rice using geostatistical technique	297
AMIT BIJLWAN, RAJEEV RANJAN, MANENDRA SINGH, RAJ KUMAR SINGH, RAJEEV KUMAR SRIVASTAVA, KRISHNA PRATAP SINGH and RAVINDRA KUMAR SINGH RAJPUT	
Efficiency assessment of classifiers for sugarcane area mapping: A machine learning approach with Google Earth Engine	305
POOJA YADAV, AJEET SINGH NAIN and SHIVANK DEVLIAL	
Calibration and performance evaluation of the APSIM and CERES-Wheat model in the foot hills of Western Himalayas	319
NEHA PAREEK, A.S. NAIN, P. K. SINGH, HEMANT KUMAR, SHRUTI V. SINGH, MANJARI SINGH, PRIYANKA SWAMI and SANTOSH KUMAR	
Population dynamics of major insect pests of sesame and their correlation with meteorological factors	330
BHUMIKA RAWAT, M. S. KHAN, ASHUTOSH and DEEPIKA JEENGAR	
<i>In-vitro</i> screening of <i>Trichoderma</i> isolates for their antagonistic potential against <i>Rhizoctonia solani</i> causing aerial blight of Soybean	335
ARUNKUMAR, BHUPESH CHANDRA KABDWAL and ROOPALI SHARMA	
Physiological and biochemical responses of okra seed (<i>Abelmoschus esculentus</i> L.) to botanicals and containers during storage	350
SUNIL KUMAR, S. S. JAKHAR, ANIL KUMAR MALIK and AXAY BHUKER	
Effect of integrated weed management practices on growth parameters in vegetable pea (<i>Pisum sativum</i> L.)	357
NEELIMA RAWAT, MANOJ RAGHAV, DHIRENDRA SINGH, ALKA VERMA, NAVNEET PAREEK, HITAISHI KURIYAL and IMAMUDDIN SHAH	

Maximizing Chrysanthemum (<i>Dendranthema gradiflora</i>T.) growth and yield: Unveiling the superiority of Black Polythene Mulch	360
HARSHITA BORA, MAMTA BOHRA and K. C. SINGH	
Utilization of ultrasonicated edible coating to prolong shelf life of fresh cut- onion	368
NEHA RAWAT, SATISH KUMAR SHARMA, ANIL KUMAR, NAVIN CHANDRA SHAHI, ASHUTOSH DUBEY, CHARU BISHT, ARCHANA GANGWAR	
Effect of cooperative societies on food security status of cassava farming households in delta state, Nigeria	378
IZEKOR, O.Band OKOROR O.T.	
Strategies for Improving Agricultural practices: A case study of tomato growers from Uttarakhand	388
TAMANNA JOSHI and ASHUTOSH SINGH	
Physico-functional and sensory qualities of instant custard powder incorporated with resistant starch from Grand Naine banana	398
SRUTHY. P. M., SHARON. C. L., SEEJA THOMACHAN PANJIKKARAN, A. N. JYOTHI, ANEENA E. R.and LAKSHMI P. S.	
Development and quality evaluation of rice-based meal replacer with chocolate flavour for adults	404
ATHIRA RAJ, SUMAN K.T., BEENA A. K., SEEJA THOMACHAN PANJIKKARAN, SHARON C. L., LAKSHMY P. S., DELGI JOSEPH C.and SREELAKSHMI A. S.	
Effect of bleaching on optical properties of <i>dhaincha</i> (<i>Sesbania aculeata</i>) pulp	411
SURABHI DAS, ANITA RANI, MANISHA GAHLOT, SAKSHI and NIDHI SISODIA	
Evaluation of genetic and non-genetic factors affecting first lactation traits in crossbred cattle	421
NAYLA FRAZ, B. N. SHAHI, R. S. BARWAL, C. V. SINGH and A. K. GHOSH	
Mushroom (<i>Agaricus bisporus</i>) waste as a replacement for deoiled rice bran and its impact on immunocompetence against Ranikhet (Newcastle) disease virus in Rhode Island Red Chicken	426
MANAS ARORA, R. KUMAR, A. TEWARI, A. KUMAR, J. PALOD and B.C MONDAL	
Effect of <i>Aloe vera</i> leaf extract on pathological lesions of <i>Escherichia coli</i> infected broiler chickens	433
MAMTA KUMARI, RAJENDAR P. GUPTA, DEEPIKA LATHER, PREETI BAGRI, RENU SINGH, SARVAN KUMARand KOMAL	
Effect of metronidazole on hematological parameters in Common Carp (<i>Cyprinus carpio</i>)	443
ANIKA SHARMA, MADHU SHARMA, TARANG SHAH and PRASANJIT DHAR	
Reproductive and productive performances of Japanese Quails (<i>Coturnix japonica</i>) under agro-climatic conditions of Assam	449
DEBAJIT DEKA, ARFAN ALI, ASHIM KUMAR SAIKIA, MRIDUL DEKA, UTPAL JYOTI SARMA, MANORANJAN NEOG and RANJIT KUMAR SAUD	
Performances of Turkey birds under backyard system in agro-climatic condition of Assam	454
DEBAJIT DEKA, ARFAN ALI, ASHIM KUMAR SAIKIA, MRIDUL DEKA, MANORANJAN NEOG, RANJIT KUMAR SAUD and UTPAL JYOTI SARMA	
Nutraceutical supplements for managing pain and inflammation: A special focus on palmitoylethanolamide and astaxanthin	459
AKHTER RASOOL, DIVYA CHAVAN, PULI VISHNUVARDHAN REDDY, JAN MOHD MUNEEB and IRTIQA MANZOOR	
Characterization and use of hydrochars from wheat straw, fruit peels, and sewage sludge: A potential biofuel source	470
KARAN SATHISH and SHWETA SARASWAT	
Battery assisted single wheel weeder for medicinal plants	479
SANDEEP KUMAR SAROJ and JAYANT SINGH	
Chat GPT: Perception of students towards AI tool	486
ARPITA SHARMA KANDPAL and POOJA GOSWAMI	

Effect of integrated weed management practices on growth parameters in vegetable pea (*Pisum sativum* L.)

NEELIMA RAWAT¹, MANOJ RAGHAV^{1*}, DHIRENDRA SINGH¹, ALKA VERMA¹, NAVNEET PAREEK², HITASHI KURIYAL¹ and IMAMUDDIN SHAH¹

¹Department of Vegetable Science, ²Department of Soil Science, College of Agriculture, G.B. Pant University of Agriculture and Technology, Pantnagar-263145 (U.S. Nagar, Uttarakhand)

*Corresponding author's email id: raghav1963@yahoo.co.in

ABSTRACT: The present investigation was performed to study the effect of integrated weed management practices on growth parameters in vegetable pea (*Pisum sativum* L.) at Vegetable Research Centre, Govind Ballabh Pant university of Agriculture and Technology during *rabi* season of 2022-23. The experiment was set out in randomized block design along with three replications. During this research, the major weed species that were observed in the experimental plot were *viz.*, *Eleusine indica* L., *Cynodon dactylon* L., *Sorghum halepense* L., *Chenopodium album* L. and *Cyperus rotundus* L. The experiment comprised of data on growth parameters were collected and analysed using analysis of variance (ANOVA). The results revealed that the performance of the growth parameters *i.e.*, days to 50 % germination and days to 50 % flowering of vegetable pea was significantly influenced by different weed management treatments. Among herbicidal treatments, T₃ (Pre emergence application of pinoxaden 5.1 EC @ 70 ml/ha was found to be the best with respect days to 50 % germination and T₄ (Pre emergence application of pendimethalin 30 EC @ 1.0 kg a.i./ha with respect to days to 50 % flowering.

Key words: Growth, herbicide, vegetable pea, weed

Pea (*Pisum sativum* L.) is an annual self-pollinated diploid (2n=2x=14), temperate legume, belongs to family fabaceae. In India, pea is grown over an area of 567 thousand hectare with the annual production of 5846 thousand metric tons. While in the region of Uttarakhand, it is grown over an area of 13.62 thousand hectare with an annual production of 102.98 thousand metric tons. Globally, in agricultural crops weeds caused the highest potential loss (34 %). In India, weeds generally reduce crop yield by 36.5 % in rainy season and 22.7 % during winter season. It was proved that weeds are economically more important than insect-pests, fungi or other pest organisms (Savary *et al.*, 1997). In pea, weeds cause 37.3 to 64.4 % reduction in yield (Harker, 2001). Yield of any crop decline in the absence of weed control and this reduction depends on the weed species and the quantum of weed flora. Several types of weeds are associated with peas. In general, the yield loss due to weeds is almost always caused by a group of different weed species, and these species can differ considerably in competitive ability (Weaver and Ivany, 1998). The most important weeds of pea crop are *Anagallis arvensis*,

Chenopodium album, *Convolvulus arvensis*, *Cyperus rotundus*, *Cirsium arvense*, *Cynodon dactylon*, *Melilotus alba*, *etc.* Herbicides contribute effectively and profitably to weed control, environmental protection, and at the same time, saving labour necessary for weed control practices, reducing soil erosion, saving energy, increasing production and reducing the cost of farming. Therefore, herbicides benefit society as a whole. The importance of herbicides in modern weed management is underscored by the estimates that losses in the agricultural sector would increase to about 500 % without the use of herbicides (Bridges, 1992). The main objective is to study the influence of integrated weed management practices on growth parameters of vegetable pea.

MATERIALS AND METHODS

The field experiment was conducted to assess the effect of integrated weed management practices on growth parameters of vegetable pea (*Pisum sativum* L.) at Vegetable Research Centre, G. B. Pant University of Agriculture and Technology, Pantnagar

during *rabi* season of 2022-23. Pantnagar lies in the humid sub-tropical zone and situated in the Tarai region at the foothills of Shivalik range of Himalayas. It is located at an altitude of 243.84 meters above mean sea level and geographically, it falls in 29° N latitude and 79.30° E longitude. The experiment was designed in randomized block design with three replications. The experiment comprised of nine treatments and 3 replications viz. T₁ (Pre emergence application of metribuzin 70 WP @ 0.75 kg a.i./ha), T₂ (Pre emergence application of metribuzin 70 WP @ 1.0 kg a.i./ha), T₃ (Pre emergence application of pendimethalin 30 EC @ 0.75 kg a.i./ha + 1 hand weeding at 40 DAS), T₄ (Pre emergence application of pendimethalin 30 EC @ 1.0 kg a.i./ha), T₅ (Pre emergence application of pinoxaden 5.1 EC @ 70 ml/ha), T₆ (Pre emergence application of pinoxaden 5.1 EC @ 100 ml/ha), T₇ (Weed Free), T₈ (Hand Weeding at 20 and 40 DAS) and T₉ (Weedy check). All the herbicidal treatments were at pre-emergence. The observations were made on growth parameters and these observations were taken from five randomly selected plants of each treatment and in each replication.

RESULTS AND DISCUSSION

Days to 50 % germination

The result presented in Table 1 showed that, the minimum days to 50 % germination was recorded in T₅ (Pre emergence application of pinoxaden 5.1 EC @ 70 ml/ha) which was statistically at par with T₄ (Pre emergence application of pendimethalin 30

EC @ 1.0 kg a.i./ha), T₃ (Pre emergence application of pendimethalin 30 EC @ 0.75 kg a.i. /ha + 1 hand weeding at 40 DAS), and T₆ (Pre emergence application of pinoxaden 5.1 EC @ 100 ml/ha) and the maximum days was recorded in T₉ (Weedy check). It is observed from the data that the minimum days to 50 % germination was recorded under the T₅ (Pre emergence application of pinoxaden 5.1 EC @ 70 ml/ha) as pinoxaden is known for its effectiveness in controlling grassy weeds. By reducing the competition from grassy weeds in the experimental plot, pea seeds might have encountered fewer obstacles in terms of nutrient availability, water uptake, light interception as well as space. This provides the congenial atmosphere for faster and uniform germination of pea seeds. The results are also in agreement with findings of Nirala *et al.* (2020) and Chauhan *et al.* (2019).

Days to 50 % flowering

The result presented in Table 1 showed that the minimum days to 50 % flowering was recorded in T₇ (Weed free) which was statistically at par with T₄ (Pre emergence application of pendimethalin 30 EC @ 1.0 kg a.i./ha), respectively. Whereas, maximum days to 50 % flowering was recorded in T₉ (Weedy check). It is observed from the data that the minimum days to 50 % flowering were found under the T₇ (Weed free). It might be due to hand weeding at weekly intervals to create weed free condition during entire growth period which provides a suitable atmosphere to plants for their proper growth and development. The results are also in agreement with

Table 1: Effect of integrated weed management practices on days to 50% germination and days to 50% flowering in vegetable pea (*Pisum sativum* L.)

Treatments	Days to 50% germination	Days to 50% flowering
Metribuzin 70 WP @ 0.75 kg a.i./ha	14.33	47.67
Metribuzin 70 WP @ 1.0 kg a.i./ha	13.67	46.33
Pendimethalin 30 EC @ 0.75 kg a.i./ha + 1 hand weeding at 40 DAS)	12.33	39.67
Pendimethalin 30 EC @ 1.0 kg a.i./ha	11.67	37.67
Pinoxaden 5.1 EC @ 70 ml/ha	11.33	45.67
Pinoxaden 5.1 EC @ 100 ml/ha	12.67	42.33
Weed Free	13.67	37.00
Hand Weeding at 20 and 40 DAS	14.67	48.00
Weedy Check	16.33	50.33
C.D. (0.05)	1.42	2.53
SEm±	0.47	0.83

findings of Dubey *et al.* (2018) and Yousuf *et al.* (2023).

CONCLUSION

On the basis of this investigation, it was concluded that among all the treatments, the minimum days to 50 % germination was recorded under the T₅ (Pre emergence application of pinoxaden 5.1 EC @ 70 ml/ha and the minimum days to 50 % flowering were found under T₇ (Weed free) which was statistically at par with T₄ (Pre emergence application of pendimethalin 30 EC @ 1.0 kg a.i./ha). Therefore, these treatments were found suitable for cultivation of vegetable pea under tarai conditions.

REFERENCES

- Bridges, D. C. (1992). Crops losses due to weeds in the United States. *Weeds Sci. Soc. Am.*, Champaign, 2: 403.
- Chauhan, A., Chourasiya, A., Singh, P. and Jha, A. (2019). Effect of Different Tillage and Weed Management Practices on Growth and Yield of Chickpea (*Cicer Arietinum* L.). *J. Plant Dev.*, 11(5): 273-279.
- Dubey, S. K., Kumar, A., Singh, D., Pratap, T. and Chaurasiya, A. (2018). Effect of Different Weed Control Measures on Performance of Chickpea under Irrigated Condition. *Int. J. Curr. Microbiol. App. Sci.*, 7(5): 3103-3111.
- Harker, K. N. (2001). Survey of yield losses due to weeds in central Alberta. *Can. J. Plant Sci.*, 81: 339-342.
- Nirala, T., Jha, A. K., Verma, B., Yadav, P. S., Anjna, M. and Bhalse, L. (2020). Bioefficacy of Pinoxaden on Weed Flora and Yield of Wheat (*Triticum aestivum* L.). *Biol. Forum.*, 14(4): 558-561.
- Savary, S., Srivastava, R. K., Singh, H. M. and Elazegui, F. A. (1997). A characterisation of rice pests and quantification of yield losses in the rice-wheat system of India. *Crop Prot.*, 16: 387-398.
- Weaver, S. E. and Ivany, J. A. (1998). Economic thresholds for wild radish, wild oat, hempnettle and corn spurry in spring barley. *Can. J. Plant Sci.*, 78: 357-361.
- Yousuf, M., Sharma, R. K., Sirazuddin, Negi, V., Mishra, R. K. and Raju, T. R. (2023). Evaluation of Pre and Post Emergence Herbicides for Weed Control on Growth and Yield in Chickpea. *Int. J. Environ. Clim.*, 13(11): 932-936.

Received: August 7, 2024

Accepted: August 15, 2024