

Original Research Article

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Effect of Various Method of Weed Management on Growth and Yield of Vegetable Pea (*Pisum sativum*. spp. Hortense. L) Involving the Use of Implements and Herbicides

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ABSTRACT

Keywords

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Vegetable pea (*Pisum sativum* spp. *Hortense* L.) is an important pulse crop. In the present investigation, a field experiment was laid out in randomized block design in three replication Variety - Azad Pea-3, keeping pre-emergence application of pendimethalin (stamp extra 38.7%) @ 0.75 kg a.i./ha, stale seed bed glyphosate @1.00 kg a.i./ha, mulching and hand weeding in plot. This field experiment was carried out at Kalayanpur, Kanpur during *Rabi* season 2014-15 and laboratory test were also conducted. Data display that the weed free check method treatment yielded. The highest seed yield of vegetable pea closely followed by hand weeding at 20, 40 and 60 DAS. The lowest seed yield was found in weedy check (no weeding). The seed yield of vegetable pea in other treatment was recorded in between these two limits. The growth and yield trials were supported to the seed yield but the maximum BCR was computed under pre-emergence application of pendimethalin (stamp extra 38.7%) @ 0.75 kg a.i./ha.

Introduction

Vegetables are richest source of nutrition of the large part of vegetarian demography at the global level. In India, vegetable contribute about 8-10% edible food intake which is distressingly low as compared to Japan where its share is about 45%. The estimated availability of vegetable in India is around

145-185 gram per capita per day while neutralist advocate 285-300 gram of vegetable in the balance diet. Pulses are gaining more important position in Indian agriculture. After the Green Revolution, India became self sufficient in food grain production. However, India is still lagging behind in pulses production and is dependent on imports for domestic consumption in present days. As

there is little scope to increase area under pulses, the production can be increased by enhancing the productivity by various agrotechniques. Pea contains nutritional value per 100gram (3.5 oz) energy 339 kJ (81kcal), carbohydrates 14.45 g, sugars 5.67g, Dietary fiber 5.1 gram, fat 0.4g, protein 5.42 g, Vitamin A equiv. 38 µg, beta carotene 449 µg, lutein zeaxanthin 2.477µg, Thiamine (B1) 0.266 mg, Riboflavin (B2) 0.132 mg, Niacin (B3) 2.09mg, Vitamin (B6) 0.169mg, Folate (B9) 65 µg, Vitamin C 40 mg, Vitamin E 0.13mg, Vitamin K 24.8 µg, Calcium 25 mg, Iron 1.47 mg, Magnesium 33 mg, Manganese 0.41mg, Phosphorus 108 mg, Potassium 244mg, Sodium 5 mg and zinc 1.24 mg. (USDA Nutrient Database). Integrated approach of weed management is always welcomed. Chemical control integrated with cultivations, rotation and hand weeding increase crop yield (Tu *et al.*, 1993). Pre-emergence of application 0.5 kg/ ha pendimethalin + hand weeding (30DAS) or 0.5 kg fluchloralin as pre sowing + hand weeding (30 DAS) have been found better for weed control and pea yield as compared to herbicides alone (Sharma and Vats 1986).

Materials and Methods

The experiment was carried out at department of vegetable science Kalyanpur, C. S. Azad University of Agriculture and Technology Kanpur during the year 2015-2016. Field experiment was laid out in R.B.D, having three replication and nine treatments and Variety - Azad Pea-3, keeping pre-emergence application of pendimethalin (stamp extra 38.7%)@ 0.75 kg a.i./ha, stale seed bed glyphosate @1.00 kg a.i./ha, mulching and hand weeding in plot. T₁ – Pre-emergence (PE) application of pendimethalin (stamp extra 38.7%) @ 0.75 kg a.i./ha.T₂- Pre-emergence (PE) application of pendimethalin (stamp extra) 0.75 kg a.i./ha Followed by one hand weeding at 40DAS.T₃- Stale seed bed by

glyphosate @ 1.00 kg a.i./ha at (15 days before sowing because sowing time for all the treatment will same). T₄- Stale seed bed by glyphosate @ 1.00 kg a.i./ha Followed by one hand weeding at 40DAS. T₅-Mulching with Black polythene.T₆-Straw mulch or grass mulch.T₇- Hand weeding at 20, 40 and 60 days after sowing.T₈-Weed free check method. T₉-Weedy check (No weeding) The highest seed yield of vegetable pea closely followed by hand weeding at 20, 40 and 60 DAS. The vegetable research farm is about 10 km away from Kanpur central railway station in the north western part of the Kanpur city. It is situated in the front of Indian institute of Pulse Research Geographically, Kanpur is situated in gangatic alluvial belt of Central Uttar Pradesh and located between 25°26'to26°28'north latitude and 79°31'to 80°34' East longitude at elevation of 127.00meters above mean sea level.

Results and Discussion

The relevant research studies on improvement of production potential in pea in respect of integrated weed management are meagre and hence the present investigation is aimed to increase the growth and yield attributes in pea with use of chemical, mulching and hand weeding.

Height of plant

Effect of different treatments on height of the plants has been presented from sowing date to maturity of plants from table 1. Observation pertaining to the height of plant since very beginning was affected by the treatments had manifested the maximum height of the vegetable pea at all the stages of observation. It was clearly indicated that the height of plant mainly governed by weed free check method. Such result is in the conformity with the work of. (Rana *et al.*,2007, Channappagoudar and Birader *et al.*, 2007, Yousefi *et al.*,

2007, Travlos *et al.*, 2014 and Shiv Chandrakar *et al.*, 2015) (Fig. 1).

Seed weight per plant

It is clear from the data that the seed weight per plant, from table 1. Increased significantly in weed free check method followed by hand weeding at 20, 40 and 60 days after sowing. Seed weight per plant is the resultant growth of plant. Data represented for these characters in previous chapter also showed that this treatment has shown its superiority with respect to over all other treatments. The result obtained in this investigation was supported by (Ved Prakash *et al.*, 2000, Emenky *et al.*, 2010, Olorunmaiye, 2010, Brij Bhooshan and Singh, 2014 and Onuh *et al.*, 2015)

Number of seeds per pod

Number of seeds per pod as affected by the treatments has been presented in table 2. It is clear from the table the superiority of weed free check similar followed by pre emergence application of pendimethalin (stamp extra) @0.75kg a.i./ha followed by one hand weeding at 40 DAS. Other treatments which

are alone could not make any marked differences in results. Number of seeds per pod character is a dependant on length of pods of Vegetable Pea here it is clear that sufficient number of seeds per pod is available on plant according to plant growth. Weed free check method clearly indicates that besides pre emergence application of pendimethalin (stamp extra) @0.75kg a.i./ha followed by one hand weeding at 40 DAS plays the role in increasing the number of seeds per pod. This result has also corroborated Ramesh Verma *et al.*, (2014) (Fig. 2).

100 Seed weight (gm)

100 seed weight as recorded in this experiment has been presented in table 2. This indicate that weed free check method has over all superior over other treatments. Although there was no much difference among the treatments over this characters. The higher 100 seed weight (gm) of treatment weed free check method is only because of the bigger seed size. Results also conform with the result of Gutiérrez *et al.*, (2001), Emenky *et al.*, (2010) and Madukwe *et al.*, (2012).

Table.1 plant height and seed weight/plant recorded under different treatments

Treatments	Plant height (cm)	Seed weight/plant(gm)
Pre-emergence (PE) application of pendimethalin(stamp extra 38.7%)@0.75 kg a.i./ha .	53	12.05
Pre-emergence (PE) application of pendimethalin(stamp extra 38.7%)@0.75 kg a.i./ha . Followed by one hand weeding	58	12.20
Stale seed bed by glyphosate @1.00kg a.i./ha at 15 days before sowing	50	9.60
Stale seed bed by glyphosate @1.00kg a.i./ha Followed by one hand weeding at 40 DAS	47	10.20
Mulching with black polythene.	54	12.20
Straw mulch/ or grass mulch.	53	12.35
Hand weeding at 20, 40 and 60 DAS	58	12.80
Weed free check method	60	13.45
Weedy check (no weeding)	49	7.90
CD 5%	4.48	1.01
CV%	3.51	3.72

Table.2 No. of seeds /pod and 100 seed weight (gm)

Treatment	No. of seeds /pod	100 Seed weight (gm)
Pre-emergence (PE) application of pendimethalin(stamp extra 38.7%)@0.75 kg a.i./ha .	6.45	30.20
Pre-emergence (PE) application of pendimethalin(stamp extra 38.7%)@0.75 kg a.i./ha . Followed by one hand weeding	6.50	30.55
Stale seed bed by glyphosate @1.00kg a.i./ha at 15 days before sowing	4.55	24.10
Stale seed bed by glyphosate @1.00kg a.i./ha Followed by one hand weeding at 40 DAS	4.76	25.53
Mulching with black polythene.	6.35	30.52
Straw mulch/ or grass mulch.	6.26	30.95
Hand weeding at 20, 40 and 60 DAS	6.46	32.05
Weed free check method.	6.56	33.82
Weedy check (no weeding)	4.75	19.75
CD 5%	0.16	1.24
CV%	1.12	1.82

Table.3 Seed yield (Q/ha)

Treatment	Seed yield (Q/ha.)
Pre-emergence (PE) application of pendimethalin(stamp extra 38.7%)@0.75 kg a.i./ha .	14.98
Pre-emergence (PE) application of pendimethalin(stamp extra 38.7%)@0.75 kg a.i./ha . Followed by one hand weeding	15.17
Stale seed bed by glyphosate @1.00kg a.i./ha at 15 days before sowing	11.93
Stale seed bed by glyphosate @1.00kg a.i./ha Followed by one hand weeding at 40 DAS	12.65
Mulching with black polythene.	15.15
Straw mulch/ or grass mulch.	15.35
Hand weeding at 20, 40 and 60 DAS	15.93
Weed free check method	16.75
Weedy check (no weeding)	9.76
CD 5%	0.55
CV%	1.63

Fig.1 Plant height (cm) and seed weight/plant (gm) influenced by different treatments

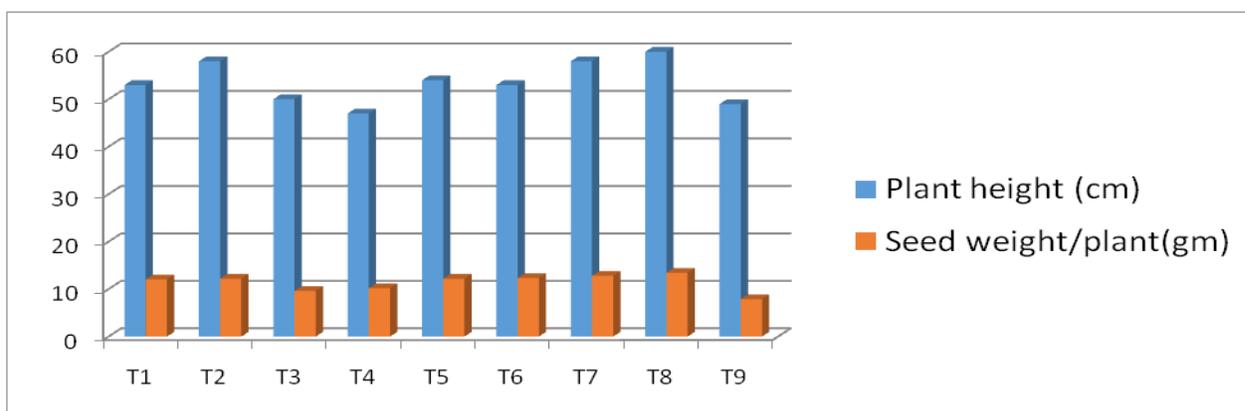


Fig.2 No. of seeds/pod and 100 seed weight (gm) recorded under different treatments

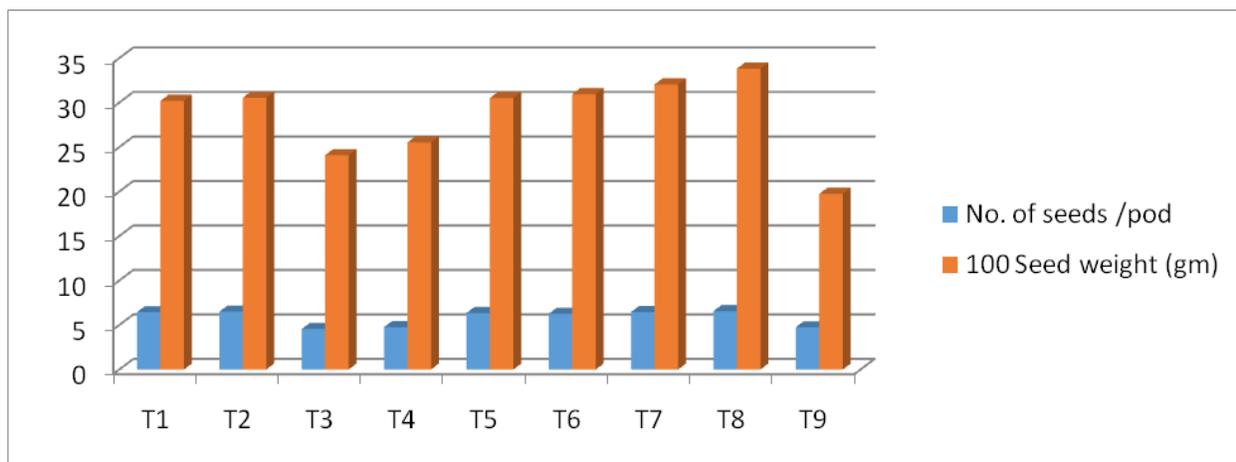
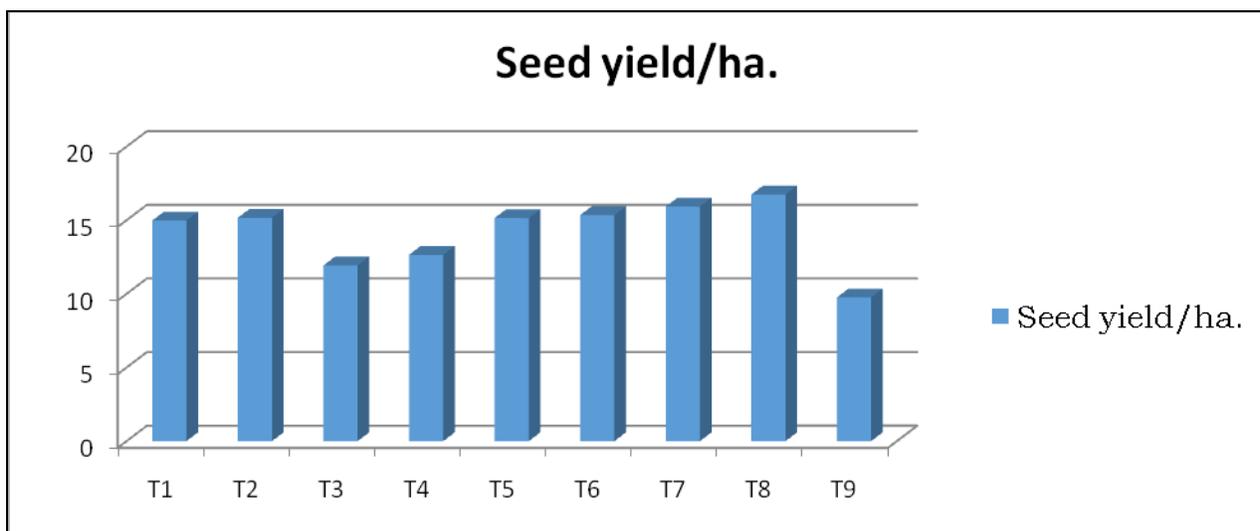


Fig.3 Seed yield/ha



Seed yield per hectare

The seed yield per hectare as affected by the different treatments have been presented in table 3 observation pertaining to the highest seed yield per hectare was found in the treatment of weed free check method (Fig. 3).

It was clearly indicated that the seed yield per hectare mainly governed weed free check method. It was also clear that the lowest seed yield per hectare in weedy check (no weeding). Such results were in the conformity

with the work of Vaishya *et al.*, (1999), Tiwari and Tiwari (2002) and Muhammad *et al.*, (2014).

In conclusion, on the basis of result of the present investigation made during winter season 2014-15, the following conclusion may be drawn as per objective. Plant height effected by the treatments had manifested the maximum height of the vegetable plant indicate that the height of plant was maximum in weed free check method. Seed weight showed that this treatment has sown its

superiority with respect to all other treatments. Number of seeds per pod clearly indicates that besides pre emergence application of pendimethalin (stamp extra) @0.75kg a.i. /ha followed by one hand weeding at 40 DAS, plays the role in increasing the number of seeds per pod. Seed yield clearly indicate that the seed yield per hectare mainly governed weed free check method. It was also clear that the lowest seed yield per hectare in weedy check (no weeding). Observation represented that the weed free check method treatment yielded. Highest kernel yield of vegetable pea closely followed by hand weeding at 20, 40 and 60 DAS. The growth and yield trial were supported to the yield but the maximum BCR was computed under pre-emergence application of pendimethalin (stamp extra 38.7% @ 0.75 kg a.i./ha).

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