

Profitability of nipping in cultivation of pea (*Pisum sativum*)—an indigenous agro-technique in Manipur

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Received : August 2005

ABSTRACT

A field experiment was conducted during the winter (*rabi*) seasons of 2002–03 and 2003–04 at the experimental field of Agronomy, College of Agriculture, Central Agricultural University, Imphal, to evaluate the profitability of nipping in Makhayatmubi pea (*Pisum sativum* sub sp. *arvensis* L.) cultivation. There were 8 treatments nipping at 15, 20, 25, 30, 35, 40 and 45 days after sowing and a without nipping (control). Among different treatment combinations, nipping at 30 days after sowing (T_4) produced significantly higher number of branches/plant, pods/plant, seed and stover yield than control. The highest net return (Rs 13,799.5/ha) was obtained from the treatment T_4 and followed by that at 35 days (T_5) Rs 13,759.5/ha. While lowest net return of Rs 5254.9/ha was observed in the control.

Key words : Nipping, Pea, *Rabi*, *Rhizobium leguminosarum*

Field pea is an important pulse of India grown during winter (*rabi*) season. In Manipur, since time immemorial peas have been grown for use as *dal* or other items. Nipping of pea is a traditional practice in the state. The young shoots are mainly used as vegetable in curry and fresh chutney. The pods are eaten raw, boiled or cooked as vegetable. The pea shoots are also consumed in Hungary and Shanghai. The shoots form an excellent tasty vegetable of high nutritive value. Patel and Patel (1990) reported that nipping of chickpea increases the number of pods/plant and 1,000-seed weight which results in high yields when compared with no nipping. So far no much research work has been done on nipping. This is an indigenous agro-technique to increase pea production along with extra income out of nipped shoots. Therefore, a study was conducted to find out the profitability of nipping in pea cultivation – an indigenous agro-technique in Manipur.

MATERIALS AND METHODS

The experiment was conducted during the winter (*rabi*) seasons of 2002–03 and 2003–04 at the research farm of the College of Agriculture, Central Agricultural University, Imphal (24° 51' N, 93° 56' E and at an altitude of 790 m above mean sea-level). The soil was clay with pH 5.3, organic carbon 3.30%, available nitrogen 454.98 kg/ha, and available potassium 415.67 kg/ha. The average rainfall during the crop season was 112.4 mm, with average sunshine hours 69.5 and average humidity 70.1 (at 8.30 am)

and 60.72% (at 5.30 PM). The experiment was laid out in randomized block design with 3 replications. There were 8 treatments, viz. T_1 , nipping at 15 days after sowing (DAS); T_2 , nipping at 20 DAS; T_3 , nipping at 25 DAS; T_4 , nipping at 30 DAS; T_5 , nipping at 35 DAS; T_6 , nipping at 40 DAS; T_7 , nipping at 45 DAS; and T_8 , control (without nipping). The variety used was 'Makhayatmubi', a local one cultivated in kitchen garden in general. The seeds were treated with *Rhizobium leguminosarum* @ 20 g/kg seed. The seed rate was 75 kg/ha. The light hoeings with *khuripi* were done at 15 and 30 DAS to remove weeds along with thinning operations maintaining a plant spacing of 30 cm × 10 cm. The later operation was done at 60 DAS. Nipping was carried out by keeping a standard height of 6 cm above ground.

RESULTS AND DISCUSSION

The length of nipped shoots was significantly influenced by different nipping treatments (Table 1). Treatment T_7 (nipping at 45 DAS) recorded longest shoot (7.3 cm), while the shortest shoot was recorded with treatment T_1 (3.4 cm). The longest shoot in T_7 might be due to the advancement of days of nipping. The dry weight of nipped shoots also increased with the advancement of growth stage (Table 1). The maximum dry weight was obtained with treatment T_2 (1.4 g) and was significantly higher than T_1 (0.4 g). The higher dry weight in treatment T_7 might be due to increase in the length of shoot and number of leaflets/plant with the advanced stage in nipping,

which was supported by the findings of Kathiresan and Duraisamy (2001) on *dhaincha*. The fresh shoot yield was observed maximum with the treatment T_7 (2.6 q/ha) and lowest with treatment T_1 (1.1 q/ha). This might be due to increase in foliage part of the plant.

The plant height at different stages of plant growth was affected by nipping viz., 60, 75, 90 DAS and harvesting (Table 1). The maximum height at harvest was with treatment T_8 (116.9 cm), i.e. control (without nipping), while the minimum under T_7 (104.5 cm) treatment. Nipping reduced the plant height compared with the control which clearly indicated that the energy which was previously used by the plant was diverted towards branching and higher pod formation. Similar findings were reported by Badiyala and Saroch (1995) in buckwheat and Bharatha *et al.* (1995) in roselle. Nipping significantly increased the number of branches/plant compared with the control (Table 1). Maximum branching was observed with treatment T_4 (3.4) and minimum with T_8 (2.9). Increase in branches might be due to activation of lateral dormant buds because of check in the terminal growth through nipping of tender shoots. Singh and Singh (1992) also observed similar effect in pea. There was significant difference in number of pods/plant between nipping and control treatment (Table 1). Nipping at 30 DAS (T_4) recorded the highest number of pods/plant (12.3), being highly significant over the control treatment (T_8) with the value of 9.8. The increase in pods/plant in T_4 treatment might be due to production of more branches/plant under this treatment. Similar findings were reported by Huang (1987) in *Vicia faba*, Heyer *et al.* (1989) in beans, Patel and Patel (1990) and Aziz (2000) in chickpea. The different treatments could not bring any significant influence on the length of pod. The number of seeds/pod was also not significant among different treatments. The test weight (1,000-seed weight) showed no significant difference among different treatments. There was significant difference in seed yield of pea between nipping and the control treatments (Table

2). The maximum seed yield was obtained with treatment T_4 (22.9 q/ha) and minimum with treatment T_8 (19.1 q/ha). Maximum seed yield in the treatment T_4 might be owing to higher number of branches and pods/plant. The results confirm the findings of Heyer *et al.* (1989) in beans, Patel and Patel (1990) in gram and Singh and Singh (1992) in pea crops.

The stover yield showed significant difference between the control and nipping treatments (Table 2). Treatment T_4 resulted in the maximum stover yield (22.9 q/ha), which was significantly higher over the control (T_8) with the value of 19.1 q/ha. The increase in stover might be owing to higher number of branches/plant. The different treatments did not affect the harvest index of pea.

The cost of cultivation (Rs 16,507/ha) was enhanced by Rs 126/ha due to nipping. Therefore, the total cost of cultivation for all treatments was Rs 17,880.48/ha in case of nipping and that of control it was Rs 17,745.0 including the interest on working capital for 5 months @ 18% per annum. The maximum shoot yield was found with the treatment T_7 (i.e. nipping at 45 DAS with the value of 2.6 q/ha), followed by T_6 (nipping at 40 DAS, 2.3 q/ha)

Table 2. Effect of nipping on seed yield, stover yield, net return and benefit : cost ratio of pea (pooled data)

Treatment	Seed yield (q/ha)	Stover yield (q/ha)	Net return (Rs)	Benefit : cost ratio
T_1	12.8	21.3	10,019.5	1.56
T_2	13.1	21.9	10,019.5	1.60
T_3	13.4	22.3	10,019.5	1.68
T_4	13.9	22.9	10,019.5	1.77
T_5	13.6	22.5	10,019.5	1.76
T_6	13.2	22.1	10,019.5	1.74
T_7	12.7	20.5	10,019.5	1.72
T_8	11.5	19.1	5,254.9	1.29
CD (P=0.05)	0.8	1.2		

Details of treatments are given in text

Table 1. Effect of nipping on shoot length, dry weight of 10 nipped shoots and fresh shoot yield, plant height, number of branches and number of pods/plant in pea (pooled data)

Treatment	Shoot length (cm)	Dry weight of 10 nipped shoots	Fresh shoot yield (q/ha)	Plant height at 60 days (cm)	Plant height at harvest (cm)	Branches/plant	Pods/plant
T_1	3.4	0.4	1.1	31.6	114.4	3.2	10.1
T_2	4.1	0.4	1.2	30.0	112.9	3.2	10.5
T_3	5.2	0.8	1.6	29.5	111.2	3.3	10.7
T_4	5.8	0.9	1.9	28.3	108.5	3.4	12.5
T_5	6.2	1.0	2.1	26.5	106.3	3.2	11.5
T_6	6.8	1.2	2.3	24.4	106.7	3.3	10.4
T_7	7.3	1.4	2.6	22.2	104.5	3.1	10.1
T_8				36.9	116.9	2.9	9.8
CD (P=0.05)	0.6	0.1	0.1	2.2	2.0	0.1	1.0

(Table 2). It was observed that the earlier the nipping (days after sowing), the lesser the shoot yield. The minimum yield of shoot was found with the treatment T_1 (nipping at 15 DAS, 1.1 q/ha). When the shoots were sold at most minimum price @ Rs 20/kg, the maximum gross return was found with treatment T_2 , i.e. Rs 5,380 and minimum with treatment T_1 , i.e. Rs 2,200 (Table 2). Seed yield was maximum with T_4 by giving 13.9 q/ha and minimum with T_8 , i.e. control (11.5 q/ha). When the seeds were sold @ Rs 20/kg, the maximum gross return was observed with T_4 (Rs 27,860), followed by T_5 (Rs 27,260). The minimum was with control, i.e. T_8 (Rs 23,000). The grand gross return was found with T_4 (Rs 13,799.5), followed by T_5 (Rs 13,759.5) and minimum with the control (Rs 5,254.9/ha). The highest benefit : cost ratio was exhibited by T_4 , i.e. 1:1.77 and followed by T_5 , i.e. 1:1.76 and the lowest was associated with T_8 (control), i.e. 1:1.29 (Table 2).

Thus nipping should be practised in the cultivation of peas mainly the variety 'Makhyatmubi' to get more yield. This is an indigenous agro-technique, which is practice in the state of Manipur in common to increase pea production along with extra income out of nipped shoots.

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