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Effect of rice husk mulching on growth and yield of local variety pea (*Makhyatmubi*) *Pisum sativum* L.

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Abstract

A field experiment entitled “Effect of rice husk mulching on the yield of local variety pea (*Makhyatmubi*) *Pisum sativum* L.” was conducted during the rabi season of 2017-2018 in the research farm of College of Agriculture, Central Agricultural University, Imphal. The treatments comprised of one control (T₁) and six levels of rice husk mulching viz, T₂, T₃, T₄, T₅, T₆ and T₇ with 10q/ha, 20q/ha, 30q/ha, 40q/ha, 50q/ha and 60q/ha respectively which were laid out in RBD with three replications. The different levels of rice husk mulching in the experiment had shown significant effects on the growth parameters. Among them, rice husk mulching with 60q/ha (T₇) had shown the most significant effect on growth parameters such as plant height, number of branches and yield except days to 50% flowering.

Keywords: Rice husk, pea, mulching, branches, yield

Introduction

The grain seed of legumes are generally known as pulse. The term “pulse” as used by the United Nations Food and Agriculture Organisation (FAO), is crops grown in the world. The symbiotic association between leguminous crop plants and root nodule bacteria has been estimated to fix approximately 80% of the biologically fixed nitrogen in agriculture (Burns and Hardy, 1975). India is the world largest producer and the consumer of pulses. Pea is an important crop grown in Manipur. There are different types of peas grown in Manipur. Among them, Makhyatmubi is one of the most popular local cultivars under garden pea (*Pisum sativum* L. sub sp. hortense). During peak period, the market rate of green pods of *Makhyatmubi* is high (Rs.80-100/kg) and the seed is Rs. 300/kg and even more during off seasons.

The word mulch has been probably derived from the German word “molsch” means soft to decay, which apparently referred to the use of straw and leaves by gardeners as a spread over the ground as mulch (Jacks *et al.*,1955) ^[5]. Mulch facilitates more retention of soil moisture and helps in control of temperature fluctuations, improves physical, chemical and biological properties of soil as it adds nutrients to the soil and ultimately enhances the growth and yield of crops (Dilipkumar *et al.*,1990) ^[2]. In addition, mulch can effectively minimize water vapour loss, soil erosion, weed problems and nutrient loss (Van Dermerken and Wilcox,1988) ^[13]. Organic mulches are efficient in reduction of nitrates leaching, improve soil physical properties, prevent erosion, supply organic matter, regulate temperature, water retention and improve nitrogen balance take part in nutrient cycle as well as increase the biological activity (Hooks and Johson, 2003, Pervaiz *et al.*, 2009) ^[4, 9], Kumar and Lal, 2012) ^[6]. Many researches had been done on pea on nutrient management and improved agronomic practices in India but mulching in pea has really not been explored and researched. Therefore, keeping in view the above aspects the present investigation “Effect of rice husk mulching on the yield of local variety pea (*Makhyatmubi*) *Pisum sativum* L.” Is done.

Methodology

The experiment was carried out during the rabi season of 2017-18 at the experiment field of College of Agriculture, Central Agricultural University, Imphal. The soil was clayed, acidic (pH 5.5) and available N, P₂O₅ and K₂O (254.24, 12.17, 221.41 kg/ha) are all medium. The organic carbon content was high (1.3%). The experiment was laid out in RBD with three replications. The treatments were T₁-without rice husk mulching (control), T₂, T₃, T₄, T₅, T₆ and T₇ with rice husk mulching of 10q/ha, 20q/ha, 30q/ha, 40q/ha, 50q/ha and 60q/ha respectively. The selected seed for the experiment was garden pea (*Pisum sativum* L. subsp.

hortense, local cultivar-*Makhyatmubi*. During the period of experimentation, a total of 212.4mm rainfall was received. The range of monthly maximum and minimum temperature during the crop growth period was 27°C to 21.8°C and 13.5°C to 6.5°C respectively.

Results and Discussion

The observations on plant height had significant influence by rice husk mulching throughout the growth period of pea (Table-1). Rice husk mulching with T₇-60q/ha gave the maximum plant height (26.67cm, 41.41cm, 77.73cm and 84.67cm) followed by T₆-50q/ha (25.17cm, 40.45cm, 76.14cm and 83.27cm) and T₅-40q/ha (24.33cm, 38.22cm, 75.11cm and 81.37cm) and they were all at par throughout the

growing period. However, significantly shorter plant height was observed in the treatment with no mulching T₁ (16.67cm, 33.04cm, 62.12cm and 70.13cm) and T₂-10q/ha (17.33cm, 34.67cm, 66.06cm and 74.43cm) mulching throughout the growing period (Table 1). The result is in line with Sajid *et al.*, (2013) [11] who noted tallest plant height were observed in pea crop mulched with sugarcane leaves. Similar results were also obtained by Lourduraj *et al.*, (1996) [7] in tomato and Shinde *et al.*, (1999) [10] in chilli. The result is also in agreement with Makus *et al.*, (1994) [8] who reported that mulch application increased plant height while reducing weeds competition, data on number of branches per plant were recorded at different stages of the crop growth (Table 1).

Table 1: Effect of rice husk mulching on plant height, number of branches, number of days to 50% flowering and yield

Treatment	Plant height (cm)				No. of branches		No. of days to 50% flowering	Yield (q/ha)
	30DAS	60DAS	90DAS	HARVEST	30DAS	60DAS		
T ₁	16.67	33.04	62.12	70.13	0.81	1.04	67.31	10.30
T ₂	17.33	34.67	66.06	74.43	0.84	1.22	68.13	11.75
T ₃	19.67	35.54	68.87	76.07	0.87	1.56	67.74	12.05
T ₄	21.33	36.40	72.67	77.13	0.98	1.70	68.61	12.65
T ₅	24.33	38.22	75.11	81.37	1.13	1.89	69.45	13.09
T ₆	25.17	40.45	76.14	83.27	1.27	1.99	68.05	14.13
T ₇	26.67	41.41	77.73	84.67	1.44	2.12	67.09	14.74
S.Ed(±)	1.24	2.05	3.50	2.37	0.07	0.09	1.14	0.38
CD (at 5%)	2.70	4.46	7.62	5.17	0.15	0.20	NS	0.82

T₁-Without rice husk mulching (control), T₂-10 q/ha of rice husk, T₃-20 q/ha of rice husk, T₄-30 q/ha of rice husk, T₅-40 q/ha of rice husk, T₆-50 q/ha of rice husk, T₇-60 q/ha of rice husk

It was observed that rice husk mulching had significant effect on the number of branches per plant throughout the crop duration. It was observed that T₇, mulching with rice husk of 60q/ha gave the maximum number of branches which was at par with T₆. However, significantly lowest number of branches were recorded in no mulch condition. Similar results were reported by Srivastava *et al.*, (1994) [12], Gandhi and Bains (2006) [3], Daleshwar *et al.*, (2017) [11] that mulched tomato plants had more branches than that of unmulched plants. The result on days to 50% flowering in pea did not differ significantly between the treatments due to rice husk mulching as presented in Table 1. However, 50% flowering was early (67.09 days) with the rice husk mulching of T₇-60q/ha as compared with the other treatments while the treatment T₁ with no mulching recorded the delayed flowering (69.65 days). The yield varied significantly due to rice husk mulching in pea. Among the treatments, rice husk mulching of T₇-60q/ha recorded the highest yield (14.74q/ha) which was at par with mulching of T₆-50q/ha with the yield 14.13q/ha. However, the lowest grain yield (10.30q/ha) was recorded in the treatment T₁ with no mulching. The results were in agreement with Sajid *et al.* (2013) [11], who reported that application of organic mulches conserved moisture and increase the soil temperature and also control weed thereby, enhancing the yield in pea.

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