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Short Communication

Impact of foliar spray of nutrients and seed treatment on uptake of phosphorus of plant and seed of lathyrus (*Lathyrus sativus* L.) Under relay cropping system

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Abstract

Field experiment was conducted at the Agronomy Research Farm of IGKV, Raipur, during the Rabi season of 2016. The experiment was laid out in Factorial Randomized Block Design with twelve treatments replicated thrice. As respect to phosphorus uptake significantly maximum phosphorus uptake in seeds (3.6) and stover (4.9) as well as total (8.5) were recorded with the F₅: 0.5% NPK (19:19:19) spray at branching and 15 days after 1st spray as compared to other foliar nutrient sprays and among seed treatment S₂: Seed treatment with Sodium molybdate @ 0.5 g kg⁻¹ seed recorded significantly maximum phosphorus uptake in seeds (3.2) and stover (4.4) as well as total (7.6).

Keywords: Phosphorus, lathyrus, foliar spray, seed treatment, Utera

Introduction

Pulses are produced on 12-15 per cent of global arable land and their contribution to total human dietary protein nitrogen requirement is 30% (Graham and Vance, 2003) [1]. Grass pea (*Lathyrus sativus*) is commonly known as, chickling pea, chickling vetch, dogtooth pea, grass pea vine, Indian pea, Riga pea, wedge pea vine etc. The dried seeds of lathyrus contain 31.9% protein, 53.9% carbohydrates, 0.9% oil and 3.2% ash (Tomar *et al.*, 2011) [2]. In Chhattisgarh it is cultivated in 358.22 thousand hectares with the productivity of 660 kg ha⁻¹ (Anonymous, 2016) [3]. The nutritional management for maximizing yield in pulses is the need of the day to overcome the malnutrition of the people in the developing countries. Since grass legumes generally require higher amount of phosphorus as the process of symbiotic nitrogen fixation consumes a lot of energy. Apart from being a constituent of certain malic acids, phosphorus stimulates root, seed and fruit development as well as aids in vital metabolic functions. Under *utera* condition, foliar application would be more appropriate, efficient and economical than the soil application.

Material and methods

The experiment was conducted in *rabi* season of 2016 at Instructional cum Research Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India. The experiment was laid out in Factorial Randomized Block Design having the combination of twelve treatments and three replications. The treatment consisted of six foliar nutrients spray and two seed treatments. The experiment was comprised of factor A. Foliar nutrients, F₁: Control (No foliar nutrients spray), F₂: 2% Neem Coated Urea spray at branching, F₃: 2% Neem coated urea spray at branching and 15 days after 1st spray, F₄: 0.5% NPK (19:19:19) spray at branching, F₅: 0.5% NPK (19:19:19) spray at branching & 15 days after 1st spray, F₆: 2% DAP spray at branching & 15 days after 1st spray, and next factor B. Seed Treatments, S₁: Control (No seed treatment) and S₂: Seed treatment with Sodium molybdate @ 0.5 g kg⁻¹ seed. Lathyrus (*Lathyrus sativus* L.) variety Prateek was used in the experiment as test crop. The data obtained were statistically analyzed by Analysis of variance method (Gomez and Gomez, 1984) [6].

Results and Discussion

The effect of foliar spray and seed treatment on uptake of phosphorus in plant and seeds of lathyrus under relay cropping system are summarized under following heads:

Phosphorus uptake by lathyrus: Phosphorus uptake in grain, stover and in total were observed significant due to different foliar nutrient sprays and seed treatments. The treatment F₅: 0.5% NPK (19:19:19) spray at branching and 15 days after 1st spray as compared to other foliar nutrient sprays recorded more uptake of phosphorus in seeds (2.39), stover (3.57) and in total (5.47). However, it was at par with F₆: 2% DAP spray at branching & 15 days after 1st spray and F₄:

0.5% NPK (19:19:19) spray at branching. In case of P uptake among seed treatment, S₂: Seed treatment with Sodium molybdate @ 0.5g kg⁻¹ seed recorded significantly higher uptake of phosphorus in seeds (1.48) and stover (3.21) as well as in total (4.62) over S₁: Control (No seed treatment). Gowda *et al.* (2015) [5] found foliar spray of 19:19:19 @ 0.4% recorded significantly higher uptake of nitrogen, phosphorus and potassium (126.66, 28.79 and 47.02 kg ha⁻¹). A repeated application of small units of foliar fertilizers stimulates plant metabolism and increased nutrient uptake via the roots can be observed. Found result is corroborated by Yadav and Choudhary (2012) [6].

Table: Phosphorus uptake by lathyrus seed and Stover as influenced by different foliar nutrients spray and seed treatments

Treatments	Phosphorus uptake (kg ha ⁻¹)		
	seed	Stover	Total
A. Foliar nutrients Spray			
F ₁ : Control (No foliar nutrients spray)	2.2	2.6	4.8
F ₂ : 2% Neem coated urea spray at branching	2.4	3.1	5.5
F ₃ : 2% Neem coated urea spray at branching and 15 days after 1 st spray	2.9	4.2	7.0
F ₄ : 0.5% NPK (19:19:19) spray at branching	3.0	4.2	7.2
F ₅ : 0.5% NPK (19:19:19) spray at branching and 15 days after 1 st spray	3.6	4.9	8.5
F ₆ : 2 % DAP spray at branching and 15 days after 1 st spray	3.4	4.4	7.8
SEm±	0.2	0.5	0.6
CD (P = 0.05)	0.6	1.6	1.7
B. Seed Treatments			
S ₁ : Control (No seed treatment)	2.6	3.4	6.0
S ₂ : Seed treatment with Sodium moly date @ 0.5 g kg ⁻¹ seed	3.2	4.4	7.6
SEm±	0.1	0.3	0.3
CD (P= 0.05)	0.4	0.9	1.0
Interaction (F x S)	NS	NS	NS

Conclusion

The results in present has revealed that treatment F₅: 0.5% NPK (19:19:19) spray at branching and 15 days after 1st spray and treatment S₂: Seed treatment with Sodium moly date @ 0.5g kg⁻¹ will higher the uptake of phosphorus in stover as well as in seeds. Interaction effects of different treatments of both factors were found to be non significant.

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