

Effect of Seaweed Extract and Phosphorous Application on Growth and Yield of Pea Plant

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Key words: seaweed, kelp40, phosphorous, pea, cultivar

Abstract

Effect of seaweed extract "Kelp 40" and phosphorous application on two pea cultivars was investigated during the growing season 2011-2012. Pea Pisum sativum L. cultivars namely "Little Marvel" and "Fabreca" were cultivated and sprayed twice at 3-5 true leaf stage and after two weeks later with "Kelp 40" at three concentrations (0, 2 and 4 ml/L). Phosphorous as P₂O₅ at two levels (0 and 160 kg. P₂O₅/ha) added two weeks after seed germination. Data obtained indicated that the seaweed extract "Kelp 40" had a significant effect on some growth and yield parameters of two pea cultivars. A positive correlation noticed between seaweed effect and concentration. Data indicated that "Kelp 40" gave the better values in all parameters studied.

Introduction

The statistical data by Iraqi Agricultural Ministry explain that the productivity of pea plant is very low as compared with international average production (AOAD, 2006) therefore, attention should be paid to improve the productivity of this important crop by applying a new agricultural techniques such as using organic fertilizers and natural extracts which may work as growth and yield promoters (Potter, 2005) for the many crops. Seaweed extracts widely used as organic fertilizers and natural promoters to enhance vegetative growth and increase yield of many horticultural crop, furthermore, these natural products and organic fertilizers very cheap and more safety for ecology and human as compared with chemical products and plant growth regulators. The aim of this study was to improve the vegetative and productivity of two pea cultivars by using the natural seaweed extract (Kelp 40) and phosphorous fertilizer under the conditions of north region (Mosul city) of Iraq.

Material and methods

A field experiment was carried out during the growing season 2011-2012 in vegetable farm research horticulture and landscape design department/College of Agriculture and Forestry/ Mosul University/ Mosul/Iraq. Seeds of two pea cultivars (little marvel and fabreca) were sown in 16/11/2011 the distance between plants were 30 cm and 75 cm between the rows. The commercial product seaweed extract "Kelp 40" was natural organic extract from seaweed which contains some growth regulators and nutrient elements Ca 0.03%, Mg 0.008% and Fe 0.005% (Agrochem Company, Australia). Growing plants treated with three concentrations (0, 2 and 4 ml/L) of seaweed "Kelp 40" until runoff, using tween-80 as separating agent. The first spray of "Kelp 40" was applied at 3-5 true leaf stage, while the second spray was applied after two weeks later. Phosphorous fertilizer added to soil at two levels (0 and 160 kg. P₂O₅/ha) two weeks after seed germination in banding method. The studied parameters included number of leaves/plant, number of branches/plant at the end of the experiment, number of days until the first pod maturity and dry seeds yield/plant. Factorial experiment in a randomized complete blocks design with three replicates used to carry this experiment. Statistical analysis of data was done by using (SAS, 1996).

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Results

Data in Table 1 showed that the number of leaves and branches/plant, number of days to first pod maturity and dry seeds yield/plant responded positively and significantly increased by application of all "Kelp 40" treatments with a gradual effect relative to concentrations applied as compared with control treatment. Phosphorous application caused a positive response in all parameters studied. Data revealed different results between two tested cultivars, where "little marvel" cv. was superior than "Fabreca" cv.

Table 1: Effect of seaweed extract and phosphorous on pea plant 2011-2012

	Seaweed (ml/l)			Phosphorous kgP ₂ O ₅ /ha		Cultivar		
	0	2	4	0	160	Little marvel	Fabreca	
No. of Leaves/plant	144.16	152.36	157.45	145.43	157.22	153.07	149.58	*
No. of Branches/ plant	1.624	1.992	2.083	1.823	1.976	2.013	1.786	*
No. of days to maturity	178.10	176.75	176.26	177.43	176.65	175.96	178.12	*
Dry seeds yield gm/plant	53.88	60.01	66.52	56.55	63.72	63.20	57.08	*

* significant at P < 0.05

Discussion

From this present study it's seem to be clear that "Kelp 40" was the most effective especially at the high concentration (4 ml/L), that may be due to that seaweed extract as a natural product containing organic matter, a lot of macro and micro elements and some plant growth regulators (Gallen and Hemingway, 1965) which induce the plant to grow well, faster and early maturity leading to high plant productivity. Early maturity in pea plant is very important because it might avoid the crop from diseases, (Potter , 2005) which consider the main problem facing crop cultivation in the world. Seaweed extract has an important role to make the plant immunity system stronger, so that may lead to give healthy plant with high production. Some reports have indicated enhanced plant yield and health in different crops following application of the seaweed *Ascophyllum nodosum*, although the mechanism of action have not been determined (Calapietra and Alexander, 2006, Sivasankari, et al., 2006). From this could be concluded that the twice foliar application of "Kelp 40" at 4 ml was the most effective concentration. So we can recommend to use "Kelp 40" as organic fertilizer to get more in safety organic culture for human health and ecology.

References

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