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Effect of Different Levels of Phosphorous Fertilization on Growth, and Yieldcomponenets of some Common Vetch (*Vicia Sativa L)* Varieties

ABSTRACT

Four phosphorus fertilizer rates (0, 30, 60, and 90 kg ha-1) were evaluated for the nine common vetches (Vicia sativa) varieties ,Clima, Hanka, Mikaela, Lujiliana, Marrianum, Mery, Beybi, Nigra, and Namoi. Experiments was conducted during the winter season of 2019-2020 in the Sulaimani governorate at Qlyasan locations. The experiment was designed in Factorial and conducted in CRBD (Randomized Complete Block Design) with three replications. Means comparison was carried out by the least significant difference (LSD) at a significant level of 5%.Control treatment (no fertilizer application) results in the best value for the plant height, number of leaves plant-1, and leaf stem ratio with 90.106 cm, 104.156, and 0.810, respectively.The application of 30 kg ha-1for the character 100 seed weight recorded a maximum value of 19.064.While the variety number 4 produced the best values 130.083 for the characters number of leaves plant-1, 4.659 for the characters number of branches plant-1, 93.781 for the characters Days to 50% flowering .However variety number 5 gave the maximum value for the characters dry leaf weight and dry stem weight 3.093(g) and 5.08(g) respectively.Variety number 4 recorded a maximum value for the characters Seed yield reached 6840.425(kg ha-1).The character Dry stem weight (g) showed the highest value with 7.407for variety number 5 by Control treatment (no fertilizer application),followed by variety number 6 with values of 2.031 for the character leaf stem ratio. The application of 30 kg ha-1for the character days to 50% flowering recorded a maximum value of 94.953 days by variety number 6.in which the interactions between variety number 7 and the application of 60 kg ha-1 a maximum value for the character no. of branches plant-1 followed by variety number 2 with values 149.443 for the character days to maturaity . The phosphorus fertilizer application of 90 kg ha-1 showed the maximum number of pod plant-1with 22.073 by variety number 7.The phosphorus fertilizer application of 90 kg ha-1 showed the maximum value for the character no.of Pods plant-1by variety number 7.The character seed yield with 7774.053 kg ha-1 recorded by variety number 6 under the phosphorus fertilizer application of 30 kg ha-1.

INTRODUCTION

Common Vetch (*Vicia sativa L.*) is one of the more economically crucial annual legume crops. Common Vetch has gained acceptance as a forage crop in Europe and other countries as it can be used as hay, fodder, green manure, and seed production.The common Vetch (*Vicia sativa L.*) is one of the essential cool-season legumes, a self-fertilized annual forage crop. (Dong et al., 2016) .Legumes are agronomically beneficial. Plant fixes atmospheric nitrogen (N_2) through a symbiotic relationship with *Rhizobia* bacteria, which form nodules in leguminous roots. These beneficial bacteria enhance soil fertility by increasing N through rhizodeposition, reducing the amount of

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synthetic N fertilizer needed for switchgrass growth (Ashworth et al., 2015).Common Vetch is used as a green fertilizer for soil improvement or cover plant, silage, seed, and coarse feed production, and it is also an ideal plant for rotation or annual grain legume mixtures (Abbasi et al., 2014; Firincioglu, 2014; Kim et al., 2015; Dong et al., 2016). Phosphorus (P) is vital to plant growth and is found in every living plant cell. It is involved in several key plant functions, including energy transfer, photosynthesis, transformation of sugars and starches, nutrient movement within the plant and transfer of genetic characteristics from one generation to the next (Sultenfuss and Doyle, 1999). Phosphorous is the primary constituent of plant and animal life.P always plays a vital role in several metabolic processes.It has structural function in macromolecules, metabolic pathways and degradation.(Bakoglu and Gokkus 1999).Phosphorus (P) is the most limiting nutrient for crop growth and yield in many regions of the world (Rodriguez and Goudriaan, 1999), Phosphorus fertilisation affects dry matter yield and chemical composition of vetch (Bell et al. 2001; Turk 2001) and application of P fertilizer represents an important measure to correct nutrient deficiencies and to replace nutrients having been removed in the products harvested (Dambroth and El-Bassam,1990).Uptake efficiencies of nutrients such as P and K are related to the abilities of plants to produce high yields in low-nutrient conditions (Richardson et al.,2009). Phosphorus (P) and potassium (K) are the most significant macronutrients in the soil ecosystem after nitrogen (N) (Balemi,and Negisho 2012)**.**The present research aimed to determine the effects of different levels of phosphorus fertilization and varieties on forage, growth characters, and yield components of some varieties of common Vetch *(Vicia sativa)*

MATERIALS AND METHODS

Plant Materials and Field Experiment

This study was conducted in the Sulaimani region at the Qlyasan location during the winter season of 2019-2020. Nine common vetches (*Vicia sativa*) varieties Clima, Hanka, Mikaela, Lujiliana, Marrianum, Mery, Beybi, Nigra, and Namoi, have been produced by the International Center for Agricultural Research in the Dry Areas ICARDA as shown in table (1). These common varieties were used to study the effect of different levels of phosphorous fertilization on forage growth, yield, and yield components with four different phosphorus levels (0, 30, 60, and 90 kg ha^{-1}). Levels of phosphorus applied as a triple (tri superphosphate) % 46 P_20_5.The plots were 2x1m and each plots four rows, spaced at 0.25m. The seeding rate was 80 kg ha^{-1}. All required agricultural practices were applied as needed.

Statistical analysis

This experiment was conducted using a factorial experiment based on a randomized complete block design (RCBD) with three replications.All possible comparisons among the means would carry out by using the LSD test (Least Significant Difference) at a significant level of 5%.(Steel and Torrie, 1986)

Plant measurements

Five plants were selected randomly from each net plot and tagged for recording growth, forage yield components, and yield attributing parameters.

Growth and forage yield components:

Plant height (cm), days to 50% flowering, days to 50% maturity, no. of branches $plant^{-1}$, dry leaf weight(g), dry stem weight (g), leaf stem ratio.

Seed Yield Components:

Five matured plants from the central rows in each plot were harvested, and then yield and yield components for each treatment at each replicate were determined. The average values of these five plants were measured for the traits of the number of pods $plant^{-1}$, the number of seed pod^{-1}, 100 seed weight (g), seed yield (kg ha^{-1}),biological yield (kg ha^{-1}), and harvest index.

The equation below for harvest index calculated according to (Rehman et al. 2009):

$$Harvest\ index = \frac{Seed\ yield\ (kg\ ha^{-1})}{Biological\ yield\ (kg\ ha^{-1})}$$

RESULT AND DISCUSSIONS

Table 1 illustrates the effect of different phosphorus fertilizer applications on growth characters. The data variance analysis results show highly significant differences in plant height, the number of leaves plant^{-1}, number of branches plant^{-1}, dry stem weight and dry leaf ratio. No-significant response was recorded for the days to 50% flowering, days to maturity, and dry leaf weight (*See Appendix A.)*. The control treatment (no phosphorus fertilizer application) gave the best value for the plant height and the number of leaves, 90.106 cm and 104.156 leaf, respectively. The maximum value of 3.934 g was recorded by applying 60 kg phosphorus ha^{-1} for the dry stem weight. However, the highest value for the character leaf stem ratio was recorded using 90kg phosphorus ha^{-1} with 0. 953. The minimum plant height reached 59.011 cm with 30 kg phosphorus ha-1. The application of 90 kg phosphorus ha^{-1} showed the highest number, 4.343 of branches plant^{-1}. However, the lowest value of the number of branches, 3.629 ha-1, was recorded under no phosphorus fertilizer use (control). Moreover, the lowest values of the number of leaves plant^{-1} and leaf stem ratio were obtained under 60 kg phosphorus ha^{-1} reached 89.207 and 0.656, respectively. Lastly, applying 90 kg phosphorus ha^{-1} recorded the minimum value of 2.774 g for the dry stem weight. Phosphorus application had a significant effect toward directing the accumulated product more to seed yield. This shifting was cleared more in the application of 60 kg phosphorus ha^{-1} allowing to increase in 100 seed weight of the current study. The increased dry matter of other study (Carpici et al., 2012) compatable with the increased 100 seed weight here are supporting current study result. This trend was also stated clearly in the increased amount of phosphorus application (90 kg phosphorus ha^{-1}) that decreased the dry stem weight. This drast change seems to be refer to the source ans sink shifting in the plant due to the the level of phosphorus level in the plant. Other studies has affirmed the increased dry matter of common vetch with the increased phosphorus application up to 120 kg ha−1 (YILDIZ, and Türk, 2015)

Table (1): Effect of phosphorus fertilizer levels on some growth characters of common Vetch

Phosphorus Fertilization level	Plant height (cm)	No. of leaves plant^{-1}	No. of branches plant^{-1}	Days to 50% flowering	Days to maturity	Dry leaf weight (g)	Dry stem weight (g)	Leaf stem ratio
0.0	90.1	104.2	3.6	92.5	147.6	2.6	3.2	0.8
30.0	59.0	94.7	3.9	92.5	147.9	2.5	3.2	0.8
60.0	73.7	89.2	4.3	92.2	146.8	2.6	3.9	0.7
90.0	81.0	89.9	4.3	92.0	146.2	2.6	2.8	1.0
LSD ($p \leq 0.05$)	5.8	5.6	0.5	N.S	N.S	N.S	0.4	0.2

The results presented in Table 2 show the phosphorus application's effect on common Vetch yield and its components. There were no significant differences between all characters except the 100 seed weight. The maximum value of 100 seeds weight was 19.064 g recorded by 30 kg phosphorous ha^{-1}, while the lowest value of 16.434 g was obtained from the control treatment.

Table (2): Effect of phosphorous fertilizer levels on seed yield and its components of common Vetch

Phosphorus Fertilization level	No. of pods plant^{-1}	No. of seeds pod^{-1}	100 Seed weight (g)	Seed yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Harvest index
0	19.9	4.3	16.4	5802.4	16627.6	0.3
30	19.5	4.6	19.0	5768.6	17416.6	0.3
60	19.8	4.5	18.2	6066.3	17529.1	0.3
90	19.8	4.4	17.4	6181.4	17179.2	0.3
L.S.D. ($p\leq0.05$)	N. S	N.S.	1.3	N.S.	N S.	N.S.

The displayed result in table 3 revealed that the differences among varieties were highly significant for the number of leaves plant^{-1}, days to 50% flowering, dry leaf weight (g), dry stem weight (g), and leaf stem ratio. At the same time, there is a significant difference in the plant height (cm) and the number of branches plant^{-1} (*Appendix B*), regarding the character days to maturity are non-significant. The maximum value for the character plant height of 84.224 cm was produced by the varieties No. 9, in which the lowest value reached 68.095, by the variety No. 8. It was observed that the variety No. 4 recorded the highest value for the characters number of leaves plant^{-1}, the number of the branches plant$^{-1,}$ and days to 50% flowering with 130.083 leaves, 4.659 branches, and 93.781days respectively. Variety No.5 recorded the maximum value for dry leaf and dry stem weights with 3.093 g and 5.080 g, respectively. However, the lowest value of 2.200 g was obtained from variety No. 2 for dry leaf weight. Also, 2.284 g of dry stem weight is the lowest value recorded by variety No. 4. Regarding the variety, No. 6 gave the maximum value for the character leaf stem ratio with 1.210. While the minimum value was 0.722, recorded by the variety No.5. This distortion in behaving different genotypes for different traits studied is refer to genetic architecture of the current vetch varieties (Greveniotis et al., 2021). Different applications of phosphorus fertilizer has created variable environmental condition for the current varieties to express their genetic power (De la Rosa et al., 2021; Dong et al., 2019).

Table (3): Effect of common vetch Varieties on growth characters

Varieties	Plant height (cm)	No. of leaves plant^{-1}	No. of branches plant^{-1}	Days to 50% flowering	Days to maturity	Dry Leaf weight (g)	Dry stem weight (g)	Leaf stem ratio
V1	72.0	104.3	3.5	91.6	146.6	2.4	2.3	1.0
V2	74.6	102.7	4.2	92.0	148.1	2.2	3.4	0.6
V3	74.7	83.3	3.7	91.4	145.6	2.4	2.3	1.0
V4	73.6	130.0	4.6	93.7	147.5	2.2	2.2	0.9
V5	77.8	60.0	3.4	91.9	146.1	3.0	5.0	0.6
V6	78.7	88.7	4.1	91.8	145.3	2.6	3.1	0.8
V7	79.6	110.5	4.2	91.9	146.6	2.9	3.2	0.9
V8	68.0	69.9	3.8	93.4	147.6	2.3	4.1	0.5
V9	84.2	100.8	4.3	92.5	150.2	2.8	3.5	0.8
LSD ($p\leq0.05$)	8.753	8.446	0.752	1.250	N.S.	0.527	0.651	0.288

Data in table 4 confirm the effect of varieties on yield and its components. Common vetch varieties were highly significant for the seeds yield and significant for the character*(Appendix B)*, regarding the maximum value for the character seed yield with 6840.4 kg ha^{-1} produced by the varieties No 4. The lowest value reached 5249.0 kg ha^{-1} recorded by the variety No. 8. However, the number of

seeds pod^{-1} gave 5.3 seeds recorded by the variety No. 5. While the minimum value for the number of seed pod^{-1} was 3.9, recorded by the variety No.3. Dry matter yield of hairy Vetch increased significantly with the phosphorus treatments. Our results confirm those of Turk et al. (2007). This variation between the studied varieties was related to genetic variation and variation in their responses to different phosphorus fertilizer levels, which Banna (2011) and Ryan et al. (2009) reported.

Table (4) : Effect of common vetch varieties on yield components

Varieties	No. of pods plant^{-1}	No. of seeds pod^{-1}	100 Seed Weight (g)	Seed yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Harvest index
V1	20.1	4.0	18.6	6718.2	18537.1	0.3
V2	19.0	4.3	18.0	6162.5	16621.5	0.3
V3	18.3	3.9	18.2	5876.6	16671.0	0,3
V4	19.4	3.9	16.9	6840.4	17708.3	0.3
V5	20.2	5.3	19.6	6285.3	16642.1	0.3
V6	19.3	4.3	17.5	6637.0	17074.3	0.3
V7	20.0	4.5	18.8	5839.3	17549.5	0.3
V8	19.3	5.0	18.8	5249.0	16549.8	0.3
V9	20.0	4.8	17.7	6317.3	17339.5	0.3
LSD ($p \leq 0.05$)	N.S.	0.9	N.S.	909.4	N.S.	N.S.

Data in table 5 explain the interaction effect between varieties and phosphorous fertilizer levels on some growth and forage yield components. The analysis of variance confirmed that the character plant height, number of leaves plant^{-1}, number of branches plant^{-1}, days to 50% flowering, dry leaf weight, dry stem weight, and leaf stem ratio responded high significant difference to this interaction effect (*Appendix A*). At the same time, the character days to maturity responded non significantly. The interaction between the application of 90 kg phosphorus ha^{-1} with variety No.7 produced the highest value of 109.533 cm for plant height. And the lowest value for the interaction between the application of 30 kg phosphorus ha^{-1} with variety No. 2 reached 53.000 cm. The interaction between the application of 90 kg phosphorus ha^{-1} with variety No.7 produced the highest value for plant height of 109.533 cm. The interaction between variety No. 4 and control had the highest value for the number of leaves plant^{-1}, 135. 733 leaves. While the interaction between the applications 90 kg phosphorus ha^{-1}, with variety No. 5 recorded the lowest value of 44.350 leaves for the same trait. The maximum value for the characters number of branches plant^{-1} was 5.933 produced by the interaction of 60 kg phosphorus ha^{-1} with variety No.7. The minimum value produced by the interaction between the application of 30 kg phosphorus plant^{-1} and variety No rea. 6ched 2.283 for the same trait above.

Regarding the character days to 50% flowering, the interaction between 30 kg phosphorus ha^{-1} and No. 6 and 9 varieties recorded the same maximum value at 94.953 days. At the same time, the minimum value was 89.400 days recorded by applying 90 kg phosphorus ha^{-1} with variety No. 6 for the day of 50% flowering. The interaction between the application of 60 kg phosphorus ha^{-1} with variety No. 2 recorded a maximum value for the character dry leaf weight of 4.187g. While the interaction between applying 30 kg phosphorus ha^{-1} with variety No. 2 and the application of 60 kg phosphorus ha^{-1} with variety No. 4 and 8 gave the exact minimum value of 1.220 g of dry leaf weight. The interaction between no phosphorous fertilizers application with variety No. 5 produced the highest value for the dry stem weight with 7.407 g. The application of 90 kg phosphorus ha^{-1} with variety No. 2 gave the lowest value with 1.580 g for the same trait above. The interaction between (control) no phosphorous fertilizers applied with variety No. 8 recorded a higher value, reaching 2.204 for the character leaf stem ratio. The minimum value was 0.195 recorded by the interaction between 60 kg phosphorus ha^{-1} with variety No. 8.

Table (5): Effect of interactions of common vetch varieties and phosphorus fertilization on some growth, characters

Phosphorus Fertilization level	Varieties	Plant height (cm)	No. of leaves plant^{-1}	No. of branches plant^{-1}	Days to 50% flowering	Days to maturity	Dry leaf weight (g)	Dry stem weight (g)	Leaf stem ratio
0	V1	82.3	101.6	2.3	91.0	148.3	2.0	1.7	1.2
	V2	91.6	126	5.1	90.4	149.2	2.1	5.9	0.4
	V3	92.3	126.5	4.3	91.6	146.1	2.4	1.7	1.6
	V4	87.7	135.7	3.1	94.0	149.1	3.3	1.7	1.9
	V5	88.3	75.1	2.7	90.6	145.7	2.8	7.4	0.4
	V6	95.2	126.5	5.5	91.8	144.1	3.4	1.7	2.0
	V7	88.6	72	3.2	94.6	149.0	1.7	3.8	0.4
	V8	97.6	75.1	3	93.6	148.3	3.6	1.6	2.2
	V9	87.1	98.4	2.9	94.7	148.9	2.2	3.5	0.6
30	V1	58.9	126.8	2.9	90.3	144.8	1.8	2.5	0.7
	V2	53	96.1	3.6	94.4	148.3	1.2	4.2	0.3
	V3	58.9	73.6	2.7	90.6	144.7	3.1	2.8	1.2
	V4	59.1	131	5.6	92.1	147.5	1.8	2.3	0.8
	V5	59.8	63	4	90.6	148.6	2.8	3.1	1.1
	V6	64.8	96.1	2.2	95.0	143.9	2.3	2.8	0.8
	V7	61.2	116.7	4.9	91.7	144.6	3.3	2.3	1.5
	V8	56	73.6	3.3	92.7	147.8	2.7	5.1	0.5
	V9	59.2	75.1	5.2	95.0	160.4	3.3	3.5	1.0
60	V1	59.2	72	4.1	94.7	148.9	2.9	2.5	1.2
	V2	59.1	135.4	2.8	91.8	145.7	4.2	2.2	1.9
	V3	59.8	70.3	3.4	90.6	146.7	1.7	1.7	1.0
	V4	87.7	118	5.1	94.6	146.7	1.2	3.1	0.4
	V5	88.3	57.7	4.3	94.4	144.3	2.8	5.3	0.5
	V6	95.2	62.4	3.7	91.2	147.0	2.4	6.3	0.4
	V7	59.1	122.1	5.9	89.6	147.5	3.8	4.0	1.0
	V8	59.8	66	3.4	93.1	149.1	1.2	6.3	0.2
	V9	95.2	98.4	5.4	89.8	145.0	3.0	4.0	0.8
90	V1	87.7	116.7	4.8	90.5	144.7	3.0	2.5	1.5
	V2	94.8	53.1	5.3	91.6	149.4	1.3	1.6	0.8
	V3	87.7	62.8	4.2	92.7	144.9	2.6	3.1	0.9
	V4	59.8	135.4	4.6	94.4	146.7	2.7	2.1	1.3
	V5	74.9	44.3	2.7	92.2	145.8	4.0	4.5	0.9
	V6	59.8	69.6	4.9	89.4	146.4	2.5	1.7	1.6
	V7	109.5	131	3	91.8	145.7	3.0	2.8	1.3
	V8	58.9	65	5.3	94.4	145.5	1.7	3.6	0.6
	V9	95.2	131	3.8	90.6	146.8	3.1	3.1	1.0
LSD ($p \leq 0.05$)		17.5	16.8	1.5	2.5	N.S.	1.1	1.3	0.6

Table (6): Effect of interactions of common vetch varieties and phosphorus fertilization on yield components

Phosphorus Fertilization level	Varieties	No. of Pods plant^{-1}	No. of seeds pod^{-1}	100 Seed weight (g)	Seed Yield (kg ha^{-1})	Biological yield (kg ha^{-1})	Harvest index
0	V1	20.3	3.9	16.4	7189.8	17751.3	0.4
	V2	19.7	4.8	18.2	5161.7	16436.2	0.3
	V3	20.0	3.9	18.0	7243.0	16086.6	0.5
	V4	19.9	4.2	16.5	6946.4	17285.4	0.4
	V5	20.1	5.1	17.5	5045.5	15947.7	0.3
	V6	19.9	4.2	14.4	6502.9	18094.9	0.4
	V7	20.8	4.1	18.1	4898.8	14692.6	0.3
	V8	19.8	5.1	18.4	5800.6	16281.0	0.4
	V9	19.5	3.8	18.3	7100.1	17072.8	0.4
30	V1	19.8	4.3	20.2	6076.3	19546.2	0.3
	V2	19.3	3.8	20.7	5531.3	17128.2	0.3
	V3	20.4	3.9	19.7	5619.5	15487.9	0.4
	V4	19.0	3.7	18.1	7165.9	17047.0	0.4
	V5	19.2	5.0	20.1	5909.6	19083.5	0.5
	V6	20.4	3.4	18.5	7774.1	16831.0	0.5
	V7	18.1	5.0	20.4	5880.0	17987.2	0.3
	V8	20.4	6.1	18.6	5093.3	16362.4	0.3
	V9	19.3	6.2	16.8	6534.6	17276.2	0.4
60	V1	20.7	3.7	18.7	7336.8	19164.6	0.4
	V2	18.8	4.6	17.4	6861.2	16004.9	0.4
	V3	21.5	4.1	15.7	4833.8	17285.4	0.3
	V4	18.8	4.1	16.5	6483.6	17751.3	0.4
	V5	21.6	5.7	20.8	7501.4	18279.4	0.4
	V6	18.3	4.7	18.2	6629.9	17394.5	0.4
	V7	20.7	4.8	19.0	5520.6	18256.7	0.3
	V8	18.5	5.3	19.7	4588.6	15900.6	0.3
	V9	20.2	3.7	18.1	5175.1	17724.9	0.3
90	V1	19.6	4.2	19.4	6270.1	17686.3	0.4
	V2	18.5	4.1	16.0	7096.1	16916.7	0.4
	V3	19.7	3.9	19.4	5810.4	17824.1	0.3
	V4	20.1	3.9	16.5	6765.8	18749.7	0.4
	V5	20.0	5.5	20.1	6684.8	13258.0	0.5
	V6	18.7	5.1	19.1	5641.2	15977.0	0.4
	V7	22.1	4.4	17.8	7058.2	19261.9	0.4
	V8	19.0	3.6	18.8	5513.5	17655.3	0.3
	V9	21.2	5.5	17.9	6459.6	17284.5	0.4
LSD ($p \leq 0.05$)		2.0	N.S.	N.S.	1818.8	N.S.	N.S.

Table 6 illustrate the interaction between verities and phosphorus fertilizers on yield and its components. There was no significant interaction for all studied characters except the number of

pod plant^{-1} and seed yield (kg ha^{-1}) in response to the significance of the number of pod plant^{-1} traits.The interaction between Control treatment (no fertilizer application and variety No.3 obtained the maximum value of 7242.980 (kg ha^{-1}) for the character Seed Yield ,and variety No7 recorded the best no. of Pods plant^{-1} 20.777 . The best seed yield of 7774.053 kg ha^{-1} was obtained by interacting 30 kg phosphorus ha^{-1} with the variety No. 6. At the same time, the lowest value for the seed yield was 4588.600 kg ha^{-1} ,in which the character no. of Pods plant^{-1} produced by the interaction between the application of 30 kg phosphorus plant^{-1} and variety No 3 reached 20.387 for the same trait.

The interaction between the application of 60 kg phosphorus ha^{-1} with variety No.7 produced the highest value for no. of Pods plant^{-1} with 20.713 and variety no 5 reached 7501.447 kg ha^{-1} for thr character seed yield . The height value for the seed yield was 7096.137 kg ha^{-1} when the application of 90 kg phosphorus ha^{-1} interacted with the no. 2 variety,and variety no 7 produced the highest value for no. of Pods plant^{-1} was 22.073.Turk and (Tawaha 2001) concluded that Phosphorus application significantly affects the seed yield and the number of pods plant^{-1} of Vetch. It has been shown that chemical fertilizers containing nitrogen, phosphorus, and potassium are effective in increasing the yield of meadows and pasture plants (Elliott and Abbott, 2003). Productivity in agriculture may affect by many factors, including plant species and cultivars, agronomical technics, soil, and climate factors. Even though all the conditions can be provided, the yield level dramatically depends on climate conditions, especially in dry agricultural areas (Albayrak and Töngel, 2006).

CONCLUSION

From the results obtained in this study, it can be concluded that the variety No 4 gave the best value for the characters number of leaves plant^{-1}, the number of branches plant^{-1}, and days to 50% flowering.The application of 90 kg phosphorus ha^{-1} gave maximum value for the character number of branches.Variety No. 5 gave the maximum value for the dry leaf weight (g) and dry stem weight (g).The interaction between the application of 30 kg phosphorus ha^{-1} with variety No.6 exhibited maximum value for the character seed yield ,and the highest number of pods plant^{-1}produces by variety No. 7 under the application of 90 kg phosphorus ha^{-1}.Our result recommends using variety No.6 with the application of 30 kg phosphorus ha^{-1} for our region.

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تاثير إضافة الفسفور في نمو ومكونات حاصل لتسع أصناف من الكشون (Vicia sativa)

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Vicia sativa ، التنوع ، النمو ، المحصول ، التسميد الفسفوري

الخلاصة

أجريت هذه التجربة خلال فصل الشتاء 2019-2020 في محطة قليسان للبحوث الزراعية ، كلية علوم الهندسة الزراعية ، جامعة السليمانية ، باستخدام تصميم القطع المنشقة، بتطبيق (RCBD) للالواح الرئيسية بثلاث مكررات وبتجربة عاملية ، حيث شمل العامل الاول اربع مستويات الفسفور وهي (0, 30, 60 and 90 kg ha-1) اما العامل الثانى تشمل تسعة تراكيب وراثية من الكشون Clima , Hanka , Mikael , Lujiliana, Marrianum , Mery, Beybi, Nigra, Namoi لغرض تاثير مستويات من الفسفور على صفات النمو و حاصل العلف ومكوناته البذور على التراكيب الوراثية المدروسة . و قد اظهرت نتائج ان معاملة عدم استخدام سماد الفسفور أعطت أفضل قيمة لصفات طول النبات وعدد الأوراق / النبات ونسبة سيقان للاوراق بنسبة 90.106 سم و 104.156 و 1.202 على التوالي . تؤكد نتائج هذا البحث أن صنف Lujiliana أنتج أفضل القيم لصفات الأوراق / نبات (135.733) وزن السيقان الجاف سجلت لصنف Marrianum (7.407) غم . وان الصنف Nigra قد اعطى اعلى معدل لنسبة وزن الاوراق على السيقان قد سجل 2.204 . وان تطبيق 90 كغم (P2O5) \هكتار وجد ليكون أفضل مستوى للعدد القرون/ النبات 22.073)) للصنف Beybi واعلى معدل لحاصل البذور/ النبات 7774.053 سجلت لصنف Beybi عند استخدام 30 كجم (P2O5) هكتار.