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# Effect of Sowing Dates and Potassium Fertilizer Rates on Seed Yield of Lima Bean CV. (*Phaseolus vulgaris* L.)

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## ABSTRACT

To investigate the effect of sowing dates and potassium fertilizer rates on seeds yield and yield component of lima bean. Two field experiments were conducted at Sakha Agricultural Research Station during 2015 and 2016 summer seasons. Four sowing dates (1st May, 15th May, 30th May and 15th June) and potassium fertilizer rates (0, 50, 75, and 100 kg/fed) were used as treatments. The main findings could be summarized as follows:Sowing dates significantly affected seed yield (t/fed), No. of seeds/pod, pod length (cm), No. of pods/plant, pods weight/plant, plant height (cm), stem diameter (cm), No. of branches/plant. Sowing on 1st May significantly exceeded all studied traits compared with other sowing dates and produced the highest yield (2.477 t/fed), while the lowest sowing date on 15th June. The stem diameter increased with sowing late (1.810 t/fed.).Potassium fertilizer rates significantly affected on seed yield (t/fed), No. of seeds/pod, pod length (cm) , No. of pods/plant, pods weight (t/ fed), plant height (cm), stem diameter (cm), No. of branches/ plant. The results indicated that the highest lima bean seed yield was 2.375 (t/fed) when fertilized with100kg $k_2o$/fed and the lowest at control zero fertilizer 1.990 (t/fed).It could be concluded that early sowing on 1st May with addition potassium fertilizer rate at 100 kg $k_2o$/fed were the recommended treatment to produce the highest seed yield production of lima bean at North Delta under the environmental condition of Kafr EL-Sheikh Governorate.

**Keywords:** Forage lima bean – Sowing dates – Potassium fertilizer – Seed yield and Yield components.

## INTRODUCTION

Lima bean can be grown in a wide range of ecological conditions from warm temperate zones as well as arid and semi-arid tropical regions are common in Africa Brink and Belay, (2006). Lima bean (*Phaseolus lunatus,* L.) is a tropical and subtropical legume cultivated for its edible seeds. Cultivar groups have been distinguished according to seed differences. Lima bean is a minor grain legume. Baudoin (2006) Lima beans may be planted as early as on May 5th and as late as on July 20th in the Mid Atlantic. Ford hook lima beans cannot be planted after July 5th , because their longer maturity will not escape frost at the later dates. The earliest plantings are subject to reduced stand due to cold soils. Lima bean grows better in areas where temperatures range from 16 to 27ºc. The optimum range is on May 30th to on July 10th. As indicated earlier, early plantings that mature in August and early September are subject to reduced yields from heat and drought. Extremely dry soils may warrant deeper planting. The soil temperature is 22-35 ºc in different depth of soil Turuko and Mohammed (2014). Lima bean has good potential as a cheap and alternate source of protein. The seeds contain 24% proteins, 61% carbohydrate and minerals elements Heuzé, *et al.,* (2015). One of the constraints to the consumption of Lima beans Giami, (2001). Seed legumes are an excellent source of protein, carbohydrates, dietary fiber, vitamins, minerals and phyto-chemicals Tharanathan and Mahadevamma, (2003) which has led to the increase in consumption worldwide.

Common bean (*Phaseolus vulgaris* L.) is cultivated in nearly all regions of Brazil by small and large producers, in different production systems, Moura and Brito (2015). Land needs to addition potassium fertilizer when potassium exchange less than 150 ppm. The experimental area was moderate, Table 1. The crops which have high storage carbohydrate needs to high potassium fertilizer than others. Lima bean consumption about forty $k_2o$ unit per feddan.

Peoples and Koch (1979) found that potassium (K) deficiency slowed the growth rate of both shoot and root and increased the rate of maturity to first flowering. Erickson *et al.,* (1981) indicated that alfalfa can be used to remove more amount of potassium than other nutrients, in addition to benefits of adding supplemental potash to soils where alfalfa is to be raised. Different physiological functions for potassium in forage legumes were found such as, carbohydrate production, enzyme activity, transport and stomata activities Munson (1985).

Lanyon and Smith (1985) stated that when the concentration of exchangeable potassium is greater than l50 mg K/Kg in the surface soil, the additional potassium is rarely recommended. The presence of potassium decreased common leaf spot diseases and leaf drop as well as increased the yield, leaf/stem ratio and nodulation in alfalfa. On other hand, other nutrients Ca, S, Mg, and Mo for maximum productivity were required. It is essential that soil tests should be taken in alfalfa fields and the proper amounts of nutrients are added to have a successful crop. The concentration of potassium increases progressively near the top of the plant then decreases slightly. The variation in environmental conditions will influence nutrient concentrations in forage Grewal and Williams (2002).

The objectives of this study were aimed to investigate the effect of four sowing dates and four potassium fertilizer rates on seed yield and its components of Lima bean.

## MATERIALS AND METHODS

Two field experiments were conducted at an extension field in Sakha Agricultural Research Station during the two successive summer seasons of 2015 and 2016. The goal of this investigation was aimed to study the effect of sowing dates and potassium fertilizer rates on seed yield and their components of lima bean cv. **(***Phaseolus vulgaris* L.**)**. The experiments were laid – out in a strip plot design with four replications. The horizontal plots were assigned to four sowing dates and four rates potassium fertilizer as follows:

**A. Main plot:** Sowing dates on:
A1- 1st May.
A2- 15th May.
A3- 30th May.
A4- 15th June.

**B. Sup plot:** Potassium fertilizer rates (potassium sulphate, $k_2o$ 48%)
B1- control (without fertilization)
B2- 50 kg $k_2o$ /fed
B3- 75 kg $k_2o$ /fed
B4- 100 kg $k_2o$ /fed.

Four sowing dates (1st May, 15th May, 30th May and 15th June) and four mineral potassium fertilizer rates (control, 50, 75, and 100 kg $k_2o$/fed) were studied and their effect on productivity of seed yield and its components of lima bean under loamy clay soil. The experimental plot measured was 12 $m^2$ (3x4 m). Five rows with long 4 m and width 0.6 m. Seeds were hand drilled in (hills) 20 cm apart at the seeding rate of 30 kg/fed.

Nitrogen fertilizer was applied in the form of ammonium nitrate (33.5% N) at the rate of 150 kg N/ fed and divided into three equal doses. The first dose was added after 21 days from sowing, the second and the third doses were added after 15 days from the first and the second doses, respectively. Soil samples (0-30 cm) depth, were collected from representative spots of the entire experimental field by using diagonal sampling method before land preparation and the composite sample was obtained. The soil analysis was determined in Soil Laboratory at Agricultural Research Station, A. R. C., Egypt in Table 1.

**Table 1. Mechanical and chemical soil analysis at the experimental site during 2015 and 2016 seasons.**

| Soil analysis | 2015 | 2016 |
|---|---|---|
| A: Mechanical properties: | | |
| Sand (%) | 25.78 | 27.30 |
| Silt (%) | 30.97 | 28.64 |
| Clay (%) | 43.25 | 44.06 |
| Texture | Loamy clay | Loamy clay |
| Organic matter | 1.64 | 1.72 |
| B: Chemical properties: | | |
| EC* (ds $m^{-1}$) | 3.67 | 3.35 |
| pH** | 8.04 | 8.10 |
| SAR | 9.25 | 8.89 |
| Available (NPK) (mg $kg^{-1}$) | | |
| Nitrogen (N) | 36.5 | 39.15 |
| Phosphor (P) | 8.15 | 8.31 |
| Potassium (K) | 200 | 190 |

**Ec* (soil paste extract), pH** (1: 2.5 soil under suspension)**
**Ec* (soil paste extract), pH** (1: 2.5 soil under suspension)**

Also Phosphorus, potassium percent and some microelements were determined by using the procedure described by A.O.A.C. (2005)., according to Page *et al.* (1982). Potassium was determined by a flame photometer.

The preceding crop in both seasons was fallow. Recommended rate of phosphorus, 15.5% $P_2O_5$ (150 kg/fed) as calcium super phosphate and potassium rates (48%$K_2O$) as potassium sulphate were applied before sowing.

At harvest, data were calculated for ten randomly plants/plot to determine:
1- No. of pods /plant.
2- No. of seeds/pod.
3- Plant height (cm).
4- Stem diameter (cm).
5- Pod length (cm).
6- No. of branches/plant.
7- All plants of plot harvested and determine:

Pods weight kg/plot, and transformed to ton/fed. Seed yield determine by seed weight kg/ plot and transformed to seed yield ton/fed.

**Statistical analysis:**
**Statistical analysis:**

All data were statistically analyzed according to the technique of analysis of variance (ANOVA) for the strip plot design by using computer package and means compared using least significant difference (LSD) method at 5% and 1% levels of probability, as published by Gomez and Gomez (1984). Bartlett (1937) test was done to test the homogeneity of error variance. The test was not significant for all assessed traits, so, the two seasons data were combined.

## RESULTS AND DISCUTION

**1-Seed yield and No. of seeds / pod:**
**Effect of sowing dates on seed yield and No. of seeds / pod:**

Results in Table 2 and Fig 1a, 2a revealed that lima bean seed yield and No. of seeds / pod were significantly affected by sowing dates in both seasons and combined over seasons. Data in Table 2 and Fig 1a and 2a showed that the sowing date on 1st May (A1) recorded the highest values of seed yield production and No. of seeds 2.477 ton/fed seed yield and 11. 925 seeds / pod over all two seasons, while the lowest value for treatment on 15th June (A4) gave 1.810 ton/fed and 9.069 of seed yield and No. of seeds/pod, respectively. Similar results were obtained by Baudoin (2006) and Tsubo *et al.,* (2001).

**Table. 2 Effect of sowing dates and potassium fertilizer rates on seed yield (t/fed) and No. of seeds/pod of lima bean during the two seasons and their combined.**

| Treat. | Seed yield (t/ fed) | | | No. of seeds/pod | | |
|---|---|---|---|---|---|---|
| | 1st season | 2nd season | comb. | 1st season | 2nd season | comb. |
| A1 | 2.608 | 2.345 | 2.477 | 12.650 | 11.200 | 11.925 |
| A2 | 2.513 | 2.170 | 2.342 | 12.250 | 10.500 | 11.375 |
| A3 | 2.480 | 1.881 | 2.181 | 11.200 | 9.290 | 10.247 |
| A4 | 2.167 | 1.453 | 1.810 | 10.337 | 7.800 | 9.069 |
| L.S.D | 0.152 | 0.025 | 0.092 | 0.121 | 0,179 | 0.100 |
| B1 | 2.203 | 1.776 | 1.990 | 11.113 | 9.380 | 10.244 |
| B2 | 2.356 | 1.943 | 2.149 | 11.425 | 9.390 | 10.409 |
| B3 | 2.551 | 2.039 | 2.295 | 11.850 | 10.000 | 10.925 |
| B4 | 2.659 | 2.091 | 2.375 | 12.050 | 10.030 | 11.038 |
| L.S.D | 0.136 | 0.130 | 0.121 | 0.465 | 0.379 | 0.295 |
| AxB F-test | NS | NS | NS | NS | NS | NS |

**Main: Sowing dates: A1- 1st May A2- 15th May A3 -30th May A4 -15th June.**
**SUB: Fertilizer rates: B1- control (zero) B2- 50 kg B3 -75 kg B4 -100 kg $k_2o$/fed.**

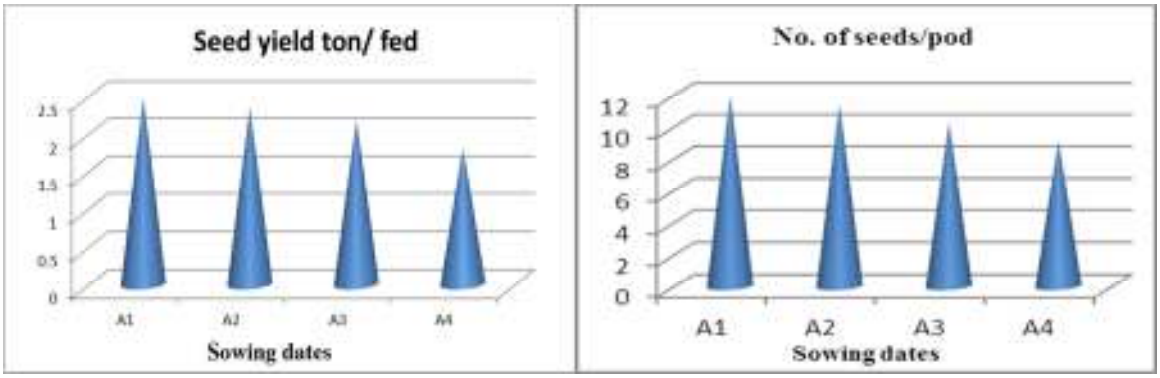


**Fig. 1a and 2a Effect of sowing dates on seed yield ton/fed and No. of seeds/pod over the two seasons in forage Lima bean.**

**Effect of potassium fertilizer rates on seed yield and No. of seeds/pod:**

The results presented in Table 2 and Fig 1b, 2b indicated that seed yield and No. of seeds/pod were significantly affected by potassium fertilizer rates in both seasons and their combined. The results indicated that B4 100 kg $k_2o$/fed recorded the highest values 2.375 t/fed and 11.038 of seed yield and No. of seeds/pod, respectively. While the lowest values was showed with B1 control (zero) potassium award 1.990 ton/fed and 10.244 seed yield and No. of seeds/pod, respectively, as combined data. These results indicated that No. of seeds/pod was positive related to seed yield, also the highest No. of seeds/pod and seed yield ton/fed were at the early sowing date on 1st May and potassium rate of 100 kg $k_2o$ /fed Oforti and Stern, 1987; Tsubo *et al.,* (2001) Similar results were obtained by Negash, *et al*., 2018 and Heuze, *et al.*, (2015).

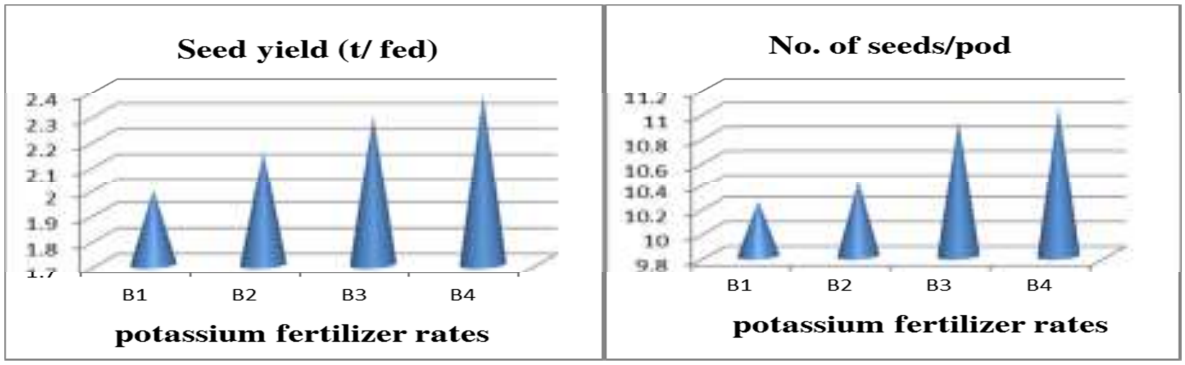


**Fig. 1b and 2b Effect of potassium fertilizer rates on seed yield (t/fed) and No. of seeds/pod as combined data.**

The same results for Lima bean can yield up to 2-8 t of fresh seeds but yield depend on cultivar type and cultivation conditions. In the tropics, in experimental conditions, climbing types grown in pure stands may yield 3-4 t/ha dry seeds whereas bushy types may yield 2-2.5 t/ha.100-seed weight was 31.81 to 39.41 g; the percentage seed coat was in the range of 12.41 to 13.81% lower than 36.9% reported for new line lima bean (Giami, 2001). This result may be due to agreement with thatof Schulte and Walsh (1993) who reported that potassium uptake is linked to increase resistance to diseases, lodging and carbohydrate production in alfalfa.

**Interaction effects:**

The results in Table 2 clearly indicated that the interaction effect of sowing dates and potassium fertilizer rates insignificantly affected in both seasons and their combined analysis on seed yield (t/fed) and No. of seeds/pod..

**2- Pods weight ton/fed and No. of pods/plant:**

**Effect of sowing dates**

The results presented in Table 3 and Fig 2a and 3a in both seasons and their combined were revealed that pods weight ton/fed and No. of pods/plant were decreased by delaying of sowing dates from 1st May to 15th June. The results revealed that sowing on 1st May (A1) was better than on 15th June (A4). This result was completely true for each of pods weight ton/fed and No. of pods/plant in both seasons and combined over seasons.

**Table. 3 Effect of sowing dates and potassium fertilizer rates on pods weight ton / fed and No. of pods/plant of lima bean during the two seasons and their combined.**

| Treat. | Pods weight ton/fed | | | No. of pods/plant | | |
|---|---|---|---|---|---|---|
| | 1st season | 2nd season | comb. | 1st season | 2nd season | comb. |
| A1 | 4.909 | 4.48 | 4.694 | 10.7 | 9.81 | 10.253 |
| A2 | 4.69 | 4.305 | 4.498 | 10.65 | 9.21 | 9.928 |
| A3 | 4.677 | 3.71 | 4.193 | 10 | 8.6 | 9.3 |
| A4 | 4.163 | 3.08 | 3.622 | 9.35 | 8 | 8.675 |
| L.S.D | 0.407 | 0.076 | 0.192 | 0.32 | 0.193 | 0.173 |
| B1 | 4.296 | 3.64 | 3.968 | 9.625 | 8.56 | 9.093 |
| B2 | 4.479 | 3.806 | 4.142 | 9.975 | 8.7 | 9.338 |
| B3 | 4.758 | 4.034 | 4.396 | 10.425 | 9.1 | 9.762 |
| B4 | 4.906 | 4.095 | 4.501 | 10.675 | 9.25 | 9.962 |
| L.S.D | 0.17 | 0.134 | 0.107 | 0.545 | 0.35 | 0.318 |
| A x B F-test | NS | NS | NS | NS | NS | NS |

**Main: Sowing dates: A1- 1st May A2- 15th May A3 -30th May A4 -15th June.**

**SUB: Fertilizer rates: B1–control(zero) B2- 50 kg B3 -75 kg B4 -100 kg $k_2o$/fed.**

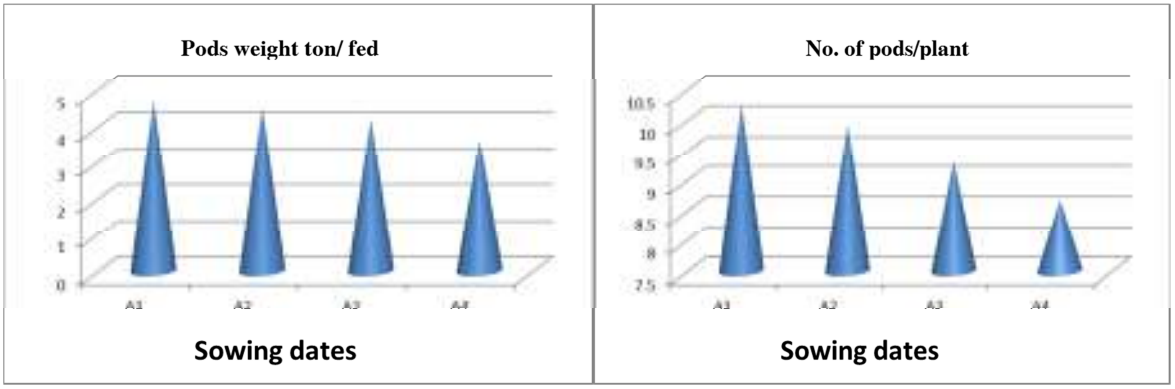


**Fig. 2a and 3a Effect of sowing dates on pods weight t/fed and No. of pods/plant as combined data.**

**Effect of potassium fertilizer rates:**

Application of potassium fertilizer rates of 100 kg $K_2o$/fed (B4) had significantly increased pods weight (t/fed) and No. of pods/plant as showed in Table 3 and (fig 2b and 3b). The highest pods weight (t/fed) and No. of pods/plant were 4.50 (t/fed) and 9.96 pods/plant, respectively, produced with fertilizer at rate of 100 kg $k_2o$/fed. Potassium fertilizer rates significantly increased pods/plant and pods weight over the control. The lowest pods/weight 3.97 t/fed and 9.09 pods/plant were recorded at the control treatment.

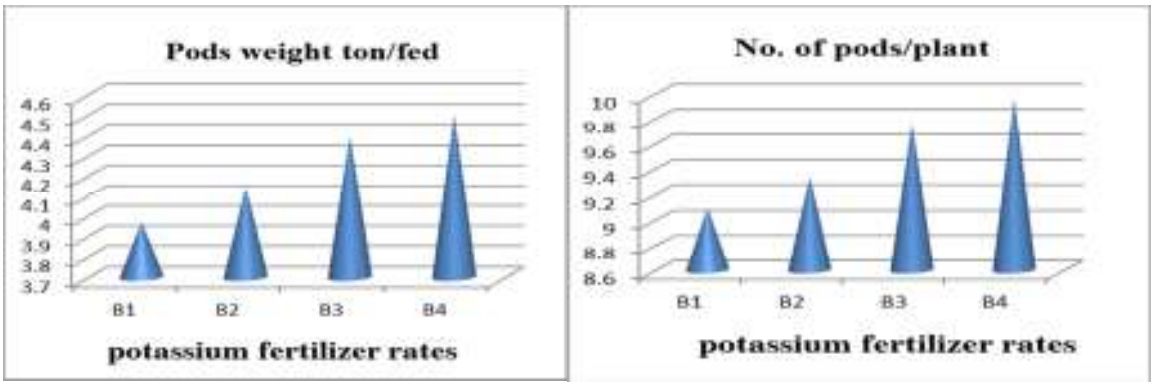


**Fig. (2b and 3b) Effect of potassium fertilizer rate on pods weight (t/fed) and No. of pods/plant as combined data.**

These result is similar to Negash, *et al.,* (2018) reported that applications of different rates of potassium fertilizer influence number of pods per plant. Similarly, Tantawy, *et al.,* (2009) observed significantly increased number of pods per plant of common bean at application rate of 100 kg $k_2o$/fed. Also, Abdel–Mowgoud, *et al.,* (2011) reported a significant increase in number of pods per plant, due to increased potassium fertilization. Thus, the increment of number of pods per plant due to application of k fertilizer confirms with k fertilizer promotes the formation of nodes and pods in legumes Turuko and Mohammed (2014).

**Interaction effects:**

The results in Table 3 indicated that the interaction effects of sowing dates and potassium fertilizer rates insignificantly affected in both seasons and combined analysis on pods weight (t/fed) and No. of pods/plant.

**Plant height and stem diameter (cm):**

**Effect of sowing dates**

The results presented in Table 4 and Fig (3a and 4a) revealed those plant height and stem diameters were significantly affected by different sowing dates in both seasons and their combined over the two seasons. The first sowing date on 1st May (A1) recorded the highest plant height and the lowest stem diameter were 104.13 cm and 1.15 cm over two seasons, respectively. The lowest values were 84.56 cm and 1.28 cm when forage lima bean sowing on 15th June for plant height and stem diameter, respectively. Over two seasons, similar results value recorded by Negash, *et al.,* (2018).

**Table. 4 Effect of sowing dates and potassium fertilizer rates on plant height (cm) and stem diameter (cm) of lima bean during the two seasons and their combined.**

| Treat. | Plant height (cm) | | | Stem diameter (cm) | | |
|---|---|---|---|---|---|---|
| | 1st season | 2nd season | comb. | 1st eason | 2nd season | comb. |
| A1 | 112.25 | 96.00 | 104.13 | 1.23 | 1.08 | 1.15 |
| A2 | 109.25 | 91.94 | 100.59 | 1.30 | 1.10 | 1.20 |
| A3 | 101.50 | 87.00 | 94.25 | 1.33 | 1.30 | 1.31 |
| A4 | 89.13 | 80.00 | 84.56 | 1.21 | 1.35 | 1.28 |
| L.S.D | 2.44 | 2.29 | 1.56 | 0.04 | 0.04 | 0.03 |
| B1 | 98.75 | 86.00 | 92.38 | 1.13 | 1.13 | 1.13 |
| B2 | 101.75 | 87.19 | 94.47 | 1.25 | 1.18 | 1.21 |
| B3 | 105.25 | 90.75 | 98.00 | 1.33 | 1.28 | 1.30 |
| B4 | 106.38 | 91.00 | 98.69 | 1.36 | 1.25 | 1.30 |
| L.S.D | 4.55 | 3.61 | 2.86 | 0.23 | 0.08 | 0.06 |
| A x B F-test | NS | NS | NS | NS | NS | NS |

**Main: Sowing dates: A1- 1st May A2- 15th May A3 -30th May A4 -15th June.**

**SUB: Fertilizer rates: B1–control (zero) B2- 50 kg B3 -75 kg B4 -100 kg $k_2o$/fed.**

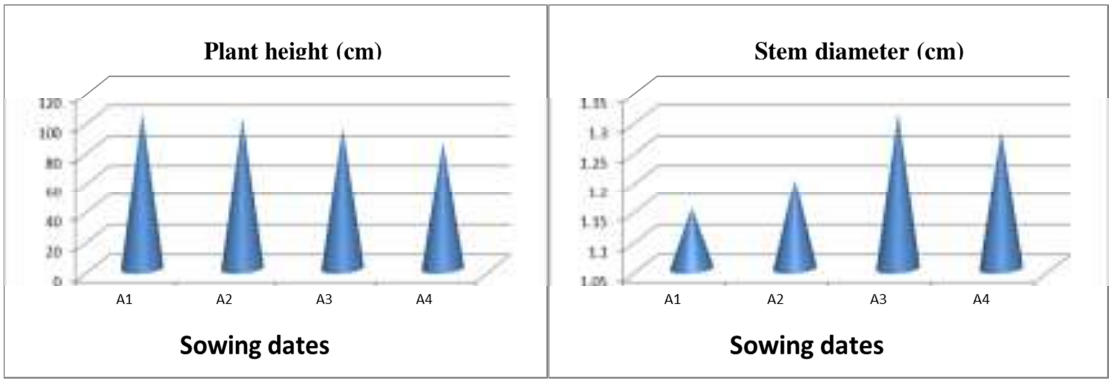


**Fig. 3a and 4a Effect of sowing dates on plant height and stem diameter (cm) as combined data.**

**Effect of potassium fertilizer rates:**

The results in Table 4 and Fig 3b and 4b revealed that plant height (cm) and stem diameter (cm) were significantly affected by potassium fertilizer rates in the first, second and over two seasons. Plant height (cm) and stem diameter (cm) increased with increment potassium fertilizer from zero to 100 kg $K_2o$/fed. These results are in agreement with El- Tohamy, *et al*., (2009).

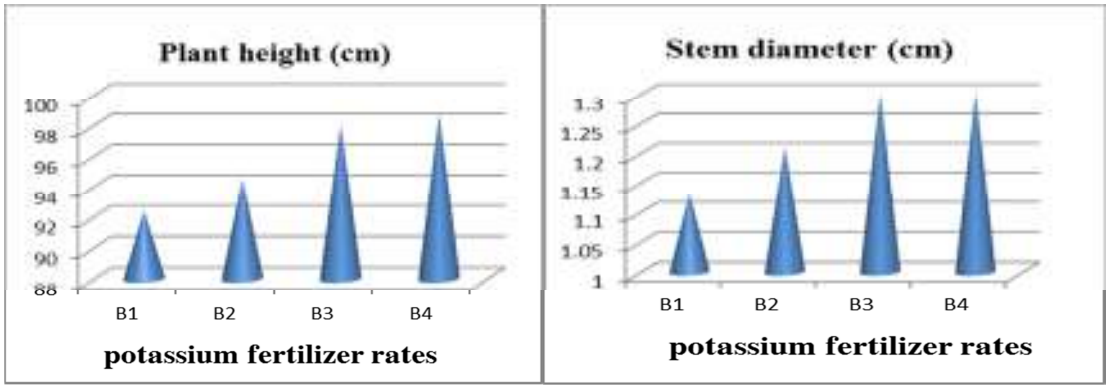


**Fig. 3b and 4b Effect of potassium fertilizer rates in plant height (cm) and stem diameter (cm) as combined data.**

**Interaction effects:**

The results in Table 4 indicted that the interaction effects of sowing date and potassium fertilizer insignificantly affected in both seasons and combined analysis on plant height (cm) and stem diameter (cm).

**4-Pod length (cm) and No. of branches/plant.**

**Effect of sowing dates:**

The results in Table 5 and (Fig 4a and 5b) showed that the highest pod length (cm) and number of branches/plant were recorded in the first sowing date on 1st May, which were 24.00 cm and 9.86 branches/plant, respectively. While the lowest values affected by sowing dates was on 15th June (A4) 21.00 cm and 8.34 pod length and number of branches/plant, respectively.

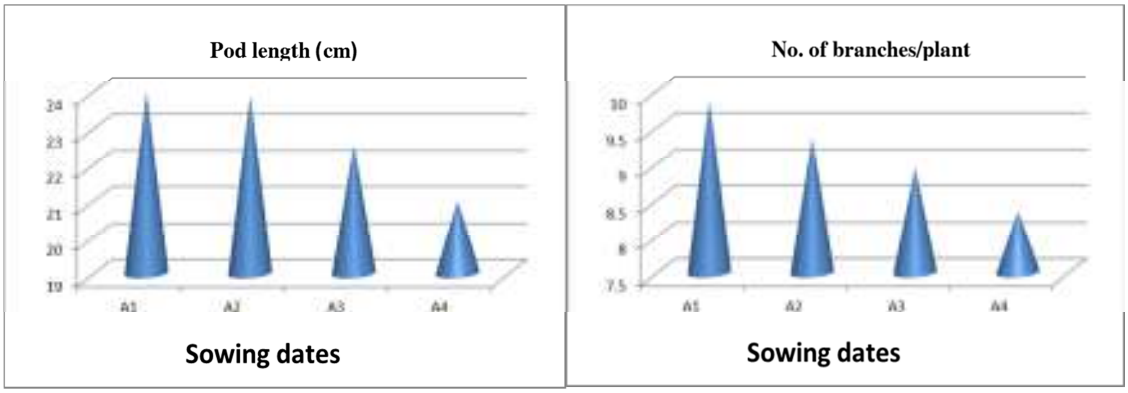


**Fig.4a and 5a Effect of sowing dates on pod length (cm) and No. of branches/plant over the two seasons as combined data.**

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**Table. 5 Effect of sowing dates and potassium fertilizer rates on pod length (cm) and No. of branches/plant of lima bean during the two seasons and their combined.**

| Treat. | Pod length (cm). | | | No. of branches/plant | | |
|---|---|---|---|---|---|---|
| | 1st season | 2nd season | comb. | 1st season | 2nd season | comb. |
| A1 | 24.50 | 23.50 | 24.00 | 10.93 | 8.80 | 9.86 |
| A2 | 24.75 | 23.00 | 23.88 | 10.40 | 8.30 | 9.35 |
| A3 | 23.00 | 22.09 | 22.54 | 9.85 | 8.00 | 8.93 |
| A4 | 21.25 | 20.76 | 21.00 | 9.18 | 7.50 | 8.34 |
| L.S.D | 1.34 | 2.54 | 0.95 | 0.27 | 0.31 | 0.19 |
| B1 | 21.50 | 21.46 | 21.48 | 9.70 | 7.85 | 8.78 |
| B2 | 22.50 | 21.88 | 22.19 | 9.95 | 8.10 | 9.03 |
| B3 | 24.50 | 23.00 | 23.75 | 10.28 | 8.30 | 9.29 |
| B4 | 25.00 | 23.00 | 24.00 | 10.43 | 8.35 | 9.39 |
| L.S.D | 2.69 | 2.24 | 1.72 | 0.48 | 0.38 | 0.30 |
| A x B F-test | NS | NS | NS | NS | NS | NS |

**Main: Sowing dates: A1- 1st May A2- 15th May A3 -30th May A4 - 15th June.**
**SUB: Fertilizer rates: B1-control(zero) B2- 50 kg B3 -75 kg B4 -100 kg $k_2o$/fed.**

**Effect of potassium fertilizer rates:**

The results in Table 5 indicated that potassium fertilizer rate at 100 kg $k_2o$/fed (B4) recorded the tallest of pod length (24.00 cm) and the highest number of branches/plant (9.39), while B1 (control) was the shortest of pod length which 21.48 cm and 8.78 branches/plant. The results illustrated that there were significant differences for potassium rates in 2015 and 2016 seasons, respectively.

Potassium application increased plant height, stem diameter and potassium content in plant. Moreover, potassium application positively affected number of racemes/plant, 1000-seed weight and seed yield. Similar results were reported by Turukom and Mohammed (2014).

**Interaction effects:**

The results in Table 5 indicted that the interaction effects of sowing date and potassium fertilizer insignificantly affected in both seasons and combined analysis on pod length (cm) and No. of branches/plant

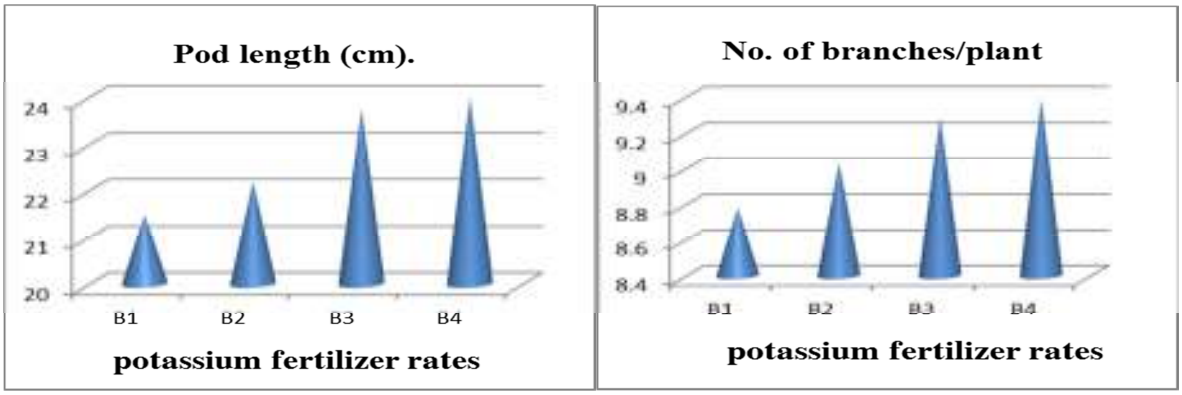


**Fig. 4b and 5b Effect of potassium fertilizer rates on pod length (cm) and No. of branches/plant as combined data.**

## CONCLUSION

We can be recommendation by using Lima bean seeds in concentrates of animal nutrient because of high seed yield 2.5 ton/fed. With about 24% protein.

Sown lima bean on 1st May and potassium fertilization at rate of 100 kg $k_2o$/fed maximized seed yield under the environmental condition of Kafr EL-Sheikh governorate.

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## تاثير مواعيد الزراعه ومعدلات التسميد البوتاسي علي محصول فاصوليا الليما

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**قسم بحوث محاصيل العلف – معهد بحوث المحاصيل الحقلية – مركز البحوث الزراعية - مصر**

تم اجراء تجربتان ميدانيتان في مزرعة محطة البحوث الزراعيه بمحافظة كفر الشيخ خلال الموسمين الصيفين ٢٠١٥, ٢٠١٦. بهدف دراسة تأثير ميعاد الزراعة ومعدلات مختلفة من السماد البوتاسى على محصول البذرة ومكوناتة. اربع معاملات من مواعيد الزراعة وهى (١مايو، ١٥ مايو، ٣٠ مايو و ١٥ يونيو) واربع معدلات من التسميد البوتاسى (بدون ،٥٠، ٧٥،١٠٠كجم بو٢ا/ فدان). و يمكن تلخيص اهم النتائج الرئيسية المتحصل عليها فيما يلي:أوضحت النتائج أن مواعيد الزراعة اثرت معنويا علي محصول البذور طن/ للفدان، عدد البذور لكل قرن، طول القرن (سم)، عدد القرون لكل نبات، وزن القرون طن/ للفدان، ارتفاع النبات (سم)، سمك الساق (سم) وعدد الفروع لكل نبات في الموسمين. اعطي ميعاد الزراعة الاول (١مايو) اعلي النتائج في جميع الصفات المدروسة بالمقارنة مع المواعيد الاخري عدا صفة سمك الساق.كان معدل إضافة سماد البوتاسيوم (١٠٠كجم بو٢ا/فدان) له تاثيرا معنويا على جميع المعاملات. واعطى أعلى محصول بذرة طن/ فدان في فاصوليا الليما بالمقارنة مع المعدلات الاخرى.اشارت النتائج أن التفاعل بين مواعيد الزراعة ومعدلات تسميد البوتاسيوم المختلفة لم يكن لة تاثير معنوى علي جميع الصفات تحت الدراسه.يمكن استخدام فاصوليا الليما فى مركزات علائق الحيوان بسبب ارتفاع الانتاجيه ٢,٥ طن بذور/فدان مع نسبة بروتين تقارب ٢٤% مما يقلل من تكاليف الانتاج الحيوانى. وتوصى الدراسه بزراعة فاصوليا الليما فى الاول من مايو والتسميد البوتاسى بمعدل ١٠٠ كجم بو٢ا/الفدان وذلك لتعظيم إنتاجية المحصول بوحدة المساحه تحت ظروف محافظة كفر الشيخ.