SUMMARY

Two field experiments were carried out at Sidi Salem District, Kafr El-Sheikh Governorate during the two seasons 2003/04 and 2004/05 to study the effect of 3 planting dates (29th Oct, 13th Nov. and 28th Nov.) and 9 mineral and biophosphorus fertilization treatments on the growth and seed yield and its components as well as on insect infestation of faba bean seeds (c.v. Sakha 1) during storage. The 9 phosphorus fertilization treatments included: check treatment "control", 15 ad 30 kg P_2O_5/fed. mineral fertilizer (calcium superphosphate), 300 and 600 gm/fed. phosphorin (biofertilizer), and the combinations of the two minerals x two biofertilizers. Phosphorin is active strain of *Bacillus megatherium* var. *phosphaticum*. The soil of the experiments was clay loam.

A split plot design was used with 4 replicates. The main plots were assigned to the 3 planting date and the sub plots were randomly assigned to the P fertilization treatments. Biofertilizer was mixed with seeds, just before planting mineral fertilization was added before planting. After harvest the susceptibility of faba bean seeds to be attacked by *C. maculatus* was followed in the laboratory of Plant Protection Institute, Sakha.

The results could be summarized as follows:

I. Effects of planting dates:

1- Seed germination % was higher at late planting date (Nov. 28) than at earlier planting in both seasons.

2- The tallest faba bean plants at 100 days were produced at early planting (Oct. 29) in the first season, and with medium planting date (Nov., 13) in the second one with significant differences.

3- Early planting (Oct. 29) significantly increased number of branches/plant after 100 days in both seasons compared with latest planting (Nov. 28).
4- Early planting significantly produced greater fresh weight/plant in the first season whereas medium planting date (Nov. 13) significantly produced the greatest fresh weight/plant in the second seasons.
5- Early planting (Oct. 29) positively affected number of branches/plant at harvest in both seasons. Branches number was reduced with delaying planting date.
6- Number of pods/plant was increased in early planting and reduced towards delaying planting date. Significant differences were recorded in the first season.
7- Planting date significantly affected pods weight/plant in the second season. Medium date of planting (Nov. 13) produced the highest weight followed by late planting (Nov. 28).
8- Seed yield/plant was significantly affected by planting date in the second season. Medium date (Nov. 13) produced maximum yield followed by late planting (Nov. 28) and inferior seed yield/plant was produced with early planting (Oct. 29).
9- Seed index was significantly affected by planting date in both seasons. Early planting (Oct. 29) with the first season, and medium date (Nov. 13) in the second season were superior in affecting seed index.
10- Seed yield/fed. significantly increased with medium date of planting in both seasons, being 2158 and 2222 kg/fed., in the first and second seasons, respectively.
11- Straw yield/fed. was significantly affected by planting date in both seasons. The greatest straw yield was produced with early planting (Oct. 29) in both seasons, being 3033 and 2365 kg/fed. in the first and second seasons, respectively.

12- Biological yield of faba bean (kg/fed.) was greatest with early planting in the first season being 5238 kg/fed., but with medium date (Nov. 13) in the second season, recording 4539 kg/fed. Differences in biological yield were almost significant.

13- Harvest index was increased gradually as planting date was delayed. The greatest harvest index was 51.4% and 50.48% in the first and second season, respectively which were recorded with (Nov. 28) planting.

14- Seed coat % was significantly affected by planting date in both seasons. The highest value was recorded with late planting (Nov. 28) being 13.98% in the first season, whereas early planting (Oct. 29) recorded the greatest value of seed coat %, being 16.11% in the second season.

15- Cotyledons % was significantly affected by planting date in both seasons. Medium date of planting (Nov. 13) recorded the highest cotyledons %, being 86.55 and 84.82% in the first and second seasons, respectively.

16- P% in seeds was significantly affected by planting date. Medium date of planting produced the highest P% in seeds, being 0.255 and 0.222% in the first and second season, respectively.

17- The increase in seed coat% increased progeny emergence and laid eggs. The seed coat and P content decreased in the late planting date (Nov. 28) in comparison with early planting (Oct. 29).

18. Planting date affected preference and the medium planting date (Nov. 13) recorded the lowest adult emergence, laid eggs and damage %.

II. Effect of phosphorus fertilization:

1. P application significantly affected seed germination % in both season. All P treatment induced a higher germination % and the greatest % was recorded by mixing min. I + Bio II in the first season (96.33%) and by mixing min. II + Bio II in the second season (98.67%).
2. Plant height of faba bean plants at 100 days was significantly increased due to P application in the first season. The tallest plants were produced by applying min. II + Bio I combination, recording a plant height of 110.89 cm which surpassed the check treatment by 7.42% in 2003/04 season.
3. Number of branches/plant at 100 days significantly increased due to applying mineral or bio-phosphorus treatments, either singly or in combination and in both seasons. The greatest number of branches was recorded by combining Min. I + Bio II treatment in both seasons.
4. P application either in single or in combined application of mineral or bio-phosphorus form significantly increased fresh weight/plant at 100 days compared with the check treatment. The best results were obtained by Bio I treatment in the first season and min. II treatment in the second season.
5. Number of branches/plant at harvest was positively affected by P application. The greatest number of branches/plant was recorded by min. I treatment in the first season and min. II + Bio II treatment in the second one.
6. P application either as mineral or biofertilization as well as in single or combined application significantly increased number of pods/plant in the first season. The highest number was 13.58 pods, produced by min II. treatment.

7. Pods weight/plant was significantly increased by mineral or biofertilization of phosphorus in both seasons. The best result was obtained by min. II treatment in both seasons, recording 29.16 and 27.98 gm in the first and second season, respectively.
8. P application either as mineral or biofertilization significantly increased seed yield/plant in both seasons. The greatest weight was 23.19 gm in the first season, being 22.142 gm in the second one, which were recorded by Min. II and Bio II+ Min II, respectively.
9. Seed index of faba bean was not significantly affected by P application in both seasons.
10. Seed yield/fed. was significantly increased by P application either as mineral or biophosphorus in both season. The highest seed yield in the first season was 2194.60 kg/fed. was obtained by min. II treatment, whereas Min. I + Bio I recorded the greatest seed yield/fed. in the second season, being 2098.8 kg/fed.
11. Application of P significantly increased straw yield/fed. in both seasons. The highest yield was 2582.5 kg/fed. in the first season, obtained by applying min. I treatment, whereas min. II produced the maximum straw yield/fed. being 2279.2 kg.
12. Biological yield significantly and positively responded to P application in both seasons. The maximum biological yield was produced by applying min. II treatment in both seasons which was 4737.9 and 4372.5 kg/fed. in the first and second seasons, respectively.
13. Harvest index was not sigfiantly affected by P application in both seasons.

14. Seed coat % was affected by P application in both seasons. The greatest value was obtained by Bio. II treatment (14.22%) in the first season, being (16.14%) in the second season which was obtained by min. I + min. II treatment.
15. Cotyledon % of faba bean seed was significantly affected by P fertilization in both seasons. The maximum value was 86.48% in the first season, being 85.04% in the second one, which were recorded by Min. II and Bio. I treatments in the first and second seasons, respectively.
16. P% in faba bean was markedly affected by mineral and biophosphorus application in both seasons. The application of Min. I + Bio. II treatment recorded the highest P % (0.239%) in the first season, whereas Min. II treatment recorded the greatest P % in the second season, being 0.23%.
17. There were marked differences in total adult emergence, laid eggs, seed damage % and field infestation %. On the average of the two seasons, all P applications markedly increased total adult emergence, laid eggs and damage % of seeds compared with the control. Also, infestation % increased due to P application compared with the control.

III. Interaction between planting dates and P-fertilization treatments:

1. Seed germination % was significantly affected by planting dates x P fertilization in both seasons. The highest germination % was recorded by combining late planting (Nov. 28) + Min. II + Bio. II treatment in the first season, and by late planting + Min. II in the second season. Germination percentages were 98.0 and 99.0%, respectively.

2. Number of braches/plant at 100 days was significantly affected by planting dates x P fertilization in the second season. The highest number of branches was 2.78 which was recorded with medium date (Nov. 13) + either Min. I + Bio I, Min. I + Bio., II or Min. II and Bio II.
3. Fresh weight/plant at 100 days was significantly affected by the interaction in the second season. The best combination was that between medium date (Nov. 13) + Bio II treatment.
4. Number of branches/plant at harvest was significantly affected by the interaction in the second season. Combing early planting (Oct. 29) + Bio. II P treatment produces the maximum number of branches, being 2.96.
5. The effect of the interaction on: number of pods/plant, pods weight/plant, seed yield/plant, seed index, seed yield/fed., straw yield/fed, biological yield/fed. and harvest index was not significant in both seasons.
6. Seed coat % was significantly affected by the interaction in both seasons. The greatest values were recorded by combining late planting with min. II + Bio. I treatment in the first season, whereas late planting combined with Min. I + Bio II recorded the highest seed coat % in the second season.
7. The interaction between planting date and P fertilization treatments was significant on cotyledons % in seed in both seasons. The highest values were obtained by combining medium date of planting with Min. I P application in the first season, recording 87.42%, whereas the combination of late planting with Min. I produced the maximum cotyledons %, in the second season, being 85.98%.

8. The interaction significantly affected P % in faba bean seeds in both seasons. The greatest value was produced by combining medium date (Nov. 13) combined with Min. II + Bio II treatment in both seasons, being 0.282 and 0.240% in the first and second season, respectively.
9. Total adult emergence of *Callosobruchus maculatus* (F.) (by non-choice) was significantly affected by the interaction in both seasons. The lowest values were recorded with no P application at early planting date in both seasons. The highest values were recorded by late planting and higher P fertilization.
10. Laid eggs (non-choice) number was significantly affected by the interaction in both seasons. The lowest values were recorded at medium planting date combined with the check treatment. The highest values were observed with early planting combined with intensive P application.