SUMMARY

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Two field experiments were carried out during summer season of 1999, 2000 and winter season of 2000, 2001 at Barrag Horticulture Research Station of the agricultural Research center (ARC). The aim of the present research is to study the response of three varieties of common bean and three varieties of pea to N and P fertilizers and some biofertilizers i.e. Phosphorine, Rhizobacterien and Nitrobien on the growth parameters, yield and its components and the chemical composition of the dry seeds compared with two levels of mineral fertilizers 100% and 50% of the recommended NP fertilizers.

The obtained results in this study could be summarized as follows:

5- 1- Plant growth paraments:

Plant Length:

The bean two cultivars S1 and Nebraska were tallest than Diacol cv. While pea cvs. Little Marvel and Wever Top significantly increased their plant length compared to Lincolin cv.

Concerning the influence of biofertilizers treatments Phosphorine, Nitrobien significantly increased plant length in second season only and on pea Nitrobien treatment gave a significant in first season.

The best results were the Nebraska cv. with Nitrobien treatments on bean experiment and on pea it was the Wever Top cv. with Phosphorine and Rhizobacterien treatments.

Number of branches per plant:

The number of branches per plant of bean cultivars were insignificantly effected in both seasons. The pea plants were significantly increased is their number of branches in Lincolin cv. and Wever Top cv.

The tested treatments had no significant differences on bean, but on pea plants there were significant in first season only with phosphorine and half recommended treatments on bean plants there were insignificant interaction during the two growing seasons, while on pea the first season showed significant on number of branches per plant in most cases.

Dry matter percentage per plant:

The high dry matter percentage per plant given by S1 cv. in the second season. But there were no significant increase in the dry matter percentage of pea plants.

The best treatment were the Phosphorine and the half recommended on bean plant dry matter in the first season, also the Phosphorine and Nitrobien caused the same results in the second season. Moreover the Rhizobacterien was best treatment with pea in both seasons.

The high dry matter percentage recorded by Phosphorine treatment with bean cvs. Diacol and Nebraska in first season and with S1 cv. in the second season. All the studied treatments had significant effect with pea cvs. and the best values were Rhizobacterien, half recommended with Wever Top cv. and Phosphorine, Nitrobien with Little Marvel cv. in the first and second seasons respectively.

5- 2- Yield and its components:

Number of pods per plant:

The S1 cv. and Nebraska bean cv. showed significantly differences compared with Diacol cv. Also, the Little Marvel. and Wever Top pea cv. showed a significant increase on number of pod per plant.

The biofertilizers treatments showed a significant increase in the number of pods of bean plants during the two seasons. The pea plants cvs. treatments gave the same significant effect on both seasons except the Nitrobien treatments.

All the interaction effects among the studied treatments and cvs. was significant in first season on bean and in both seasons on pea.

Number of seeds per pod:

The bean cvs. S1, Nebraska and pea cvs. Little Marvel, Wever Top gave the highest number of seeds per pod.

The biofertilizers treatments significantly increased number of seeds per pod of bean and pea plants.

The interaction showed that bean cvs. with all treatments were significant except Diacol cv. in first season while the pea cvs. were significant with all studied just in first season.

Seeds weight per pod:

The heaviest seeds weight per pod was given by cvs. Diacol, Nebraska and pea cvs. Little Marvel, and Lincolin.

The biofertilizers treatments significantly increased seeds weight per pod of bean, while on pea phosphorine gave the same result.

The interaction effect showed that a significant increase of seeds weight per pod of bean Diacol cv. and Nebraska cv. with all treatments. The pea Little Marvel cv. with the biofertilizers treatments showed a significant influence.

Seed index (100-seed weight):

The cultivars Diacol, Nebraska of bean and Lincolin of pea revealed significantly differed seed index in both seasons.

The Rhizobacterien, Nitrobien, Phosphorine and half recommended treatments had a significant increase 100- seed weight with pea plants only.

Bean cv. Diacol gave the highest 100-seed weight with the tested treatments and the pea Lincolin cv. with all biofertilizers recorded the best results.

Seed yield:

The bean cv. such as Diacol and Nebraska produced the heaviest dry seed yield and on pea the best cvs. was the Lincolin cv.

All tested treatments gave a significant increase of bean seed yield but the pea Rhizobacterien treatment gave significant increase of seed yield in the two seasons.

There was a significant increase of bean seed yield as a result of interaction between the bean cvs. and all the studied treatments. The pea heaviest seed yield was Lincolin cv. with Nitrobien and half recommended treatments and by Little Marvel cv. with Rhizobacterien treatment.

5-3- Seeds chemical composition:

Protien content:

The S1 bean cv. seeds contains high protein than the other cvs. However, the pea Little Marvel cv. and Lincolin cv. significantly increased in their protein content.

The biofertilizers treatments gave significant in seed protien just in second season on bean experiment.

The high protien content was recorded by all treatments of bean cvs. S1 and Nebraska while on pea cvs. it was Lincolin cv. with Nitrobien treatment.

Total sugars content:

The phosphorine, Rhizobacterien and Nitrobien treatments gave a significant effect on bean total sugar content, while all tested treatments were significant in first season only with pea cvs.

The best results of bean cvs. were recorded by Diacol cv. and Nebraska cv. with phosphorine treatment.

The pea experiment showed that the best treatment was the phosphorine with the studied pea cultivars.

Oils content:

The phosphorine and the half recommended treatments showed significant increase in their oil content of bean seeds.

The phosphorine and the Nitrobien treatments had a significant effect on the dry seeds oil content of pea cvs.

The bean cv. S1 with phosphorine treatment recorded the best results of oil content. Also the highest values of pea oil seed content in both seasons was the Wever Top cv. with phosphorine treatments.

Ash content:

The three cultivars of bean differed significantly in their ash content in first and second seasons. Also pea cultivars recorded the same results.

All the tested treatments of bean cvs. significantly increase in their ash content compared with the control. The pea cvs.

showed that the phosphorine and the Rhizobacterien treatments were significant in both seasons.

The highest ash content of bean cvs. resulted by S1 cv. with Rhizobacterien and half recommended treatments.

The pea three cultivars had a significant increase in their ash content only in the second season with all studied treatments except the half recommended treatment with Wever Top cv.

N, P and K content:

Data indcated that the best bean cvs. on seeds N, P and K contents was the S1 cv. in both seasons.

The pea Little Marvel cv. and Wever Top cv. significantly increased in their N and P contents in both seasons and increased K content in second season.

The biofertilizers treatments significantly increased their N, P and K percentage of bean seeds. However, the pea cvs. N content significantly increased with Rhizobacterien in second season but P and K percentage were significantly increased with phosphorine, Rhizobacterien, Nitrobien and half recommended treatments.

The best results recorded on bean N and P percentage by S1 cv. With Rhizobacterien and phosphorine and Diacol cv. With Nitrobien on K percentage showed by Lincolin cv. with Rhizobacterien treatment, Little Marvel cv. with phosphorine

treatment and Wever Top cv. With Nitrobien treatment respectively.

Total free Amino acids and Total phenolic content:

a) Total free Amino acids content:

The S1 cv. and Nebraska cv. total free amino acids contents were more responsive to the biofertilizers in both seasons. However, the pea Little Marvel and Lincolin cvs. were a significantly effected in the two seasons.

The phosphorine was significant in first season, the Rhizobacterien, Nitrobien and half recommended treatment significantly increased the total free amino acids in both seasons of bean while on pea phosphorine, Nitrobien and half recommended treatments gave significant differences in the two growing seasons.

The best treatments were bean Nebraska cv. with Rhizobacterien treatment and S1 cv. with Nitrobien treatment and the pea Little Marvel cv. with half recommended treatment and Lincolin cv. with Nitrobien treatment.

b)- Total phenolic content:

The significant effect among cultivars was pea cultivars only. The Wever Top cv. gave a significant increase in phenolic content with slightly differences than Lincolin and Little Marvel cvs. in the first season.

The tested biofertilizers treatments did not differ significantly compared with control on bean and pea.

The interaction effect was significant just on pea experiment. The Lincolin and Wever Top cvs. gave a significant increased on total phenolic content with all studied treatments but the Little Marvel cv. was significant with phosphorine, these results were true in the first season.

The determination of protein subunits molecular weight by SDS- PAGE:

Polyacrylamide gel electrophoresis in the presence of detergent sodium dodecyl sulphate (SDS- PAGE) was used for determining the subunit molecular weight of protien. SDS-PAGE of commen bean protien dissociate into 12 subunits with MW ranging from (79- 14 KD). In addition all subunit with MW 27 KD was detected in seed of the phospho, Rhizo, Nitro inoculated but the inoculated in Rhizo and Nitro showed more strong intensity band than other treatment but SDS- PAGE of pea protien dissociate into 11 subunits molecular weight ranging from (82- 15 KD). In addition subunit with MW 25 KD was detected in seed of the Rhizo and Nitro inoculated, also both treatments showed more strong intensity band than other treatments.

Effect of seeds inoculation on Trypsin inhibitor activity and protein digestibilty index:

TIA in common bean range from 7.10 mg /g in Diacol cv. and 10.64 mg /g in S1 cv but TIA in pea cvs. ranging between (2.23- 2.96 mg /g).

The protein digestibility index in common bean ranging between (75.12- 77.30 %) but in pea ranging between (74.00- 75.90 %).

The results indicated that the inoculation of seeds with Rhizo and Nitro increased the trypsin inhibitor activity than other treatments consequently decreased the protein digestibility index.

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