EFFECT OF ORGANIC, BIO AND MINERAL FERTILIZATION TREATMENTS ON YIELD, YIELD COMPONENTS AND CHEMICAL CONTENTS OF SEEDS OF FABA BEAN *"VICIA FABA* L*"*

RIZK, T.Y. [1]; A.A.ABDEL HALEEM[2]AND IMAN. KH. A. MOHAMED[2]

1 Agronomy Department, Faculty of Agriculture, Ain Shams University.
2 Central Lab. For Design and Statistical Analysis Research, A. R. C.

(Manuscript received 11 July 2005)

Abstract

Two field experiments were carried out at the Agricultural Research Station of Giza, Agricultural Research Center (A. R. C.), during the winter seasons of 2000/2001 and 2003/2004. The aim of this study was to investigate the effect of organic manure, bio and mineral fertilizers as a total or partial replacement of mineral fertilizers on yield and yield components of faba bean. Three levels of organic manure (garbage compost) *i.e* 0,20 and 40 m^3/fad and six treatments of bio and mineral fertilizer *i.e* Zero nitrogen + 15.5 P_2O_5 + 12 K_2O ,15 N + 15.5 P_2O_5 + 12 K_2O , Zero nitrogen + 7.75 P_2O_5 + 6 K_2O , 15 N + 7.75 P_2O_5 + 6 K_2O , Phosphorin (Bio fertilizer) and Phosphorin + 12 K_2O were investigated.

A strip plot design with four replications was used. Organic manure levels were assigned in the vertical strips and bio and mineral fertilizers were assigned in the horizontal strips. The results indicated that 40m^3/fad of organic manure increased all studied harvest traits. Similar results were obtained by using bio- fertilizer (phosphorin) as well as the combination of 15 N+15.5 P_2O_5+12 K_2O/fad

The promising interaction treatment which gave the highest yield and yield components was 40m^3/fad of organic manure+15 N+ 15.5 P_2O_5+12 K_2O.

Key words: Organic manure, bio-mineral fertilization, faba been, yield, chemical contents.

INTRODUCTION

Faba bean (*Vicia faba, L.*) is the most important legume crop for human nutrition in Egypt. The average national crop area in the last five years was about 283-thousand faddans with an average productivity of 8.5 ardab / faddan.

Increasing crop production is one of the major targets of agricultural policy, which could be achieved by several ways. Ensuring the maintenance of an acceptable soil fertility without requiring large additional of mineral fertilizers is one of the factors.

Man used mineral fertilizers to increase soil fertility since long time. Rerecently, he realized the risks of using mineral fertilizers, so nowadays agronomists try to stop

or reduce using them and preferring organic or bio fertilizers. Organic manure affects soil microorganisms, yield, either directly by supplying nutrients or indirectly by modifying soil physical properties that can improve the root environment and stimulate plant growth. From this point of view many researchers worked with the influence of organic manure on plant growth of many crops. (Salem and El-Massri. 1986, Yousif 1987, Saghin 1998, Attia 1999, Rizk *et al*2000 a and b, and Rizk, *et al.* 2005).

Bio fertilizers play an important role in providing the growing plants with vital nutrients which have the capability to promot growth giving an additional stimulatory effect for plant and microbial growth in treated soil. It had promising effect on the yield of faba bean (Hussein *et al*1997,Saleh *et al.* 2000 and Rizk *et al.* 2005).

Regarding the effect of mineral fertilizers (N P K) on Yield of faba bean plant. Many investigators found significant response to nitrogen fertilizer (Mlesnita *et al* 1972) and to phosphorus (Hassanein 1995) and to N P K (Ghizaw *et al*1999).

The main objectives of this investigation were to investigate and develop the most proper combinations of organic, bio and mineral fertilizers to increase the productivity of faba bean and reduce the environmental pollution, through the partial or total replacement of mineral fertilizes on faba bean.

MATERIALS AND METHODS

Two field experiments were carried out at the Agricultural Research Station of Giza, Agricultural Research Center (A.R.C.), during the winter seasons of (2000/2001 and 2003/2004) to study the effect of organic manure (Zero, 20 m^3/fad and 40m^3/fad) and selected packages of bio and mineral fertilizers (Zero nitrogen + 15.5 P_2O_5 + 12 K_2O, 15 N + 15.5 P_2O_5 + 12 K_2O, Zero nitrogen + 7.75 P_2O_5 + 6 K_2O, 15 N + 7.75 P_2O_5 + 6 K_2O), phosphorin (bio fertilizer) and phosphorin + 12 K_2O, as a total or partial replacement of mineral fertilizers on faba bean Giza 429.

Phosphorin has been obtained from the General Organization for Agricultural Balance, Ministry of Agriculture.

A strip plot design with four replications was used. Organic manure levels were assigned in vertical strips, bio and mineral fertilizers were assigned in the horizontal strips.

Faba bean seeds were sown on November 20th, in the first season and on Dec. 5th in the second one. Each plot (5.4m^2) consisted of 3 ridges, 3m in length and 60cm in width. Seeds were sown on both sides of the ridge in hills 20cm apart. Thining was done after two weeks from planting leaving two plants in the hill.

Manure fertilizer (Table1) was added before planting, bio fertilizer (phosphorin) was mixed with faba bean seeds before sowing. Mineral fertilizers N.P.K (ammonium

nitrate 33.5 % N super phosphate 15,5 %P_2O_5 and potassium sulphate 48% K_2O) were broadcasted prior to planting. Other agronomic cultural practices were carried out as usually recommended in faba bean fields.

The soil texture of the experimental site was clay loam. Chemical analysis of the soil before and after planting are presented in Tables 2, 3, meanwhile the mechanical analysis of the soil are show in table (4).

Yield and Yield components. At harvest, random samples of ten guarded plants were taken from each plot to determine the following harvest traits i.e number of pods/plant, weight of pods/plant (gm),number of seeds/plant, weight of 100 seeds (gm),seed yield (ardab/fad) and straw yield (ton/fad).

Chemical components. Representative samples of faba bean seeds were taken from each plot. The seed samples were dried at 70 °C until constant weight, and then grined to be used for crude protein, total carbohydrates and total ash . determinations .

1- Crude protein. The crude protein content was calculated by multiplying the total nitrogen % by 6.25 (Tripath *et al* 1971). The total nitrogen% was determined by using the modified micro- Kjeldahl method as described by Peach and Tracey (1956) .

2- Total carbohydrate. Total carbohydrate was determined by using the method reported by Smith *et al* (1964).

3- Total Ash. Ash percentage was estimated by method described in the A.O.A.C.(1970).

Statistical analysis. All data were subjected to the appropriate statistical analysis of variance as outlined by (Snedecor and Cochran 1980). Data of the two seasons were compared by using the least significant difference test (L. S. D) at 0.05 level of significance

Results of Barttet`s test showed that the variances between seasons were heterogeneous for most studied traits. Therefore, combined analysis of the two growing seasons was not done.

Table 1. Analysis of organic manure fertilizer used in the experiment.

Analysis	Means
Weight of cubic meter	730
Moisture %	19.12
PH (1 : 10)	8.37
EC (1 : 10) ds /m	2.41
Total N %	0.71
Total P	0.45
Total K	0.78
Organic material %	21.4
Organic carbon %	12.4
Ash	78.6
C/N ratio	1:17.52

Table 2. Chemical analysis of the soil of the experimental site at Giza before planting.

Depth		0-20	20-40	40-60
pH 1:2.5		8.50	8.44	8.42
Ca Co_3 %		4.6	4.3	4.4
Sp %		58.0	59.0	58.9
EC mS/cm		1.41	1.30	1.44
Anion meq/l	Co_3^-	0	0	0
	HCo_3	3.32	2.88	2.96
	Cl	3.2	2.84	3.06
	So_4	6.46	6.59	7.15
Cation meq /l	Ca^{++}	3.25	2.50	5.00
	Mg^{++}	2.16	1.37	2.12
	Na^+	5.55	5.58	6.00
	K^+	0.16	0.17	0.20

Table 3. Chemical analysis of the soil of the experimental site at Giza after planting.

Depth		0-20	20-40	40-60
pH 1:2.5		7.87	7.86	7.90
$CaCo_3$ %		3.03	1.82	2.27
Sp %		58.5	60.1	57.6
EC mS/cm		0.43	0.43	0.40
Anion meq/l	Co_3^-	0	0	0
	HCo_3	2.37	2.18	2.19
	Cl	0.76	0.78	0.66
	So_4	1.31	1.36	1.39
Cation meq /l	Ca^{++}	0.48	0.24	0.22
	Mg^{++}	1.58	1.62	1.45
	Na^+	2.57	2.65	2.64
	K^+	0.28	0.18	0.18

Table 4. Mechanical analysis of the soil of the experimental site at Giza

Particle size distribution %			Texture class
Sand	Silt	Clay	
29.7	27.4	43.1	Clay loam

RESULTS AND DISCUSSION

1-Effect of organic manure on some harvest traits. The effect of organic manure on the studied harvest traits of faba bean are presented in Table (5). Results show that the studied harvest traits were significantly affected by organic manure in both seasons with the exception of weight of pods/plant in the first season and straw yield /fad in both seasons.

In the first season, increasing organic manure from zero to 20 and 40 m^3/fad significantly increased number of pods/plant by 12.74 % and 29.12 %, number of seeds /plant by 6.02 % and 11.77 %, weight of 100 seeds by 10.57 % and 35.07 % and seed yield /fad by 17.17 % and 41.41% respectively. In the second season, the increases were 11.18 % and 30.08, 3.47 % and 6.85 %, 5.96 % and 11.06 % and 9.68 % and 26.25 % for the corresponding traits, respectively. Weight of pods/ plant was significantly increased by 6.19 % and 17.62 % in the second season only while the increase in this trait was not great enough to reach the significant level in the first season. Straw yield / fad was not significantly affected by organic manure in the both seasons, table (5) .

Similar findings were reported by Attia (1999) and Yousif (1987) who found increases in number of pods/ plants, number of seeds/ plant and seed yield by applying organic manure.

2-Effect of the combination of bio and mineral fertilizers on the studied traits. Data in Table (5) show the significant effect of bio and mineral fertilizers on the studied harvest traits of faba bean plant. The available results revealed clearly that all studied harvest traits, i.e number of pods and seeds/plant, weight of pods/plants, weight of 100 seeds as well as seed and straw yields/fad were significantly affected by the studied treatments of both bio and mineral fertilizers as shown in table (5). This observation hold fairly true for the two growing seasons, but the effect of fertilization treatments on weight of pods/plant as well as the straw yield were not great enough to reach the 5 % level of significance in the second season.

The two treatments of the combination of the three mineral fertilizers. i.e nitrogen, phosphorus and potassium recorded the highest values for all studied harvest traits. On the contrary, the same treatment combinations without nitrogen fertilizer gave the lowest values for the same harvest traits. This demonstrate the importance of nitrogen element on these harvest traits. Similar findings were reported by (Hussein *et al* 1991&1997) who showed that bio+mineral fertilizers increased seed yield and its components. Hussein *et al* (1991), found the combination of both N and P fertilizers significantly increased faba bean seed yield by 24% compared with the unfertilized treatment.

The effect of the two phosphorin treatments (with and without K_2O) on all studied harvest traits was not significantly different regardless of the insignificant superiority of phophorin alone compared with that of phosphorin + 12 k_2O /fad.

Table 5. Effect of organic manure and bio-mineral fertilizers on some harvest traits of faba bean during 2000/2001 and 2003/2004 seasons

Seasons	2000/2001						2003/2004					
Harvest traits / Treatments	Number of pods/plant	Weight of pods/plant (g)	Number of seeds/plant	Weight of 100 seeds (g)	Seed yield ardab/fad	Straw yield t/fad	Number of pods/plant (g)	Weight of pods/plant	Number of seeds/plant	Weight of 100 seeds (g)	Seed yield ardab/fad	Straw yield t/fad
Organic manure m^3/fad												
Zero	20.64	55.86	63.64	60.16	5.94	3.43	20.21	58.52	65.15	78.35	6.82	3.50
20 m3/fad	23.27	59.93	67.47	66.52	6.96	3.55	22.47	62.14	67.41	83.02	7.48	3.73
40 m3/fad	26.65	63.62	71.13	81.26	8.40	3.90	26.29	68.83	69.61	87.02	8.61	4.30
L.S.D. (0.05)	1.99	N.S	2.86	1.55	1.01	N.S	1.09	4.63	2.71	3.70	0.55	N.S
Bio-mineral fertilizers												
Zero N+15.5 P2O5+12 K2O	21.77	55.50	61.25	60.75	6.10	3.32	21.30	60.17	64.53	78.32	6.52	3.52
15 N+15.5 P2O5+12 K2O	27.32	64.66	75.86	88.93	8.83	4.45	28.27	73.04	76.88	92.70	9.60	4.80
Zero N+7.75 P2O5+6 K2O	20.98	53.92	57.28	54.33	5.91	3.22	20.58	58.41	63.18	70.99	6.44	3.40
15 N+7.75 P2O5+6 K2O	24.83	63.71	72.50	76.21	8.10	3.68	23.47	64.08	67.39	87.54	8.21	3.89
Phosphorin	23.71	61.02	69.42	69.31	7.08	3.62	22.51	62.15	66.62	85.33	7.69	3.80
Phosphorin + 12 K2O	22.51	60.01	68.19	66.34	6.58	3.47	21.83	61.13	65.74	81.91	7.37	3.65
L.S.D. (0.05)	1.88	2.71	2.08	3.64	0.80	0.25	2.34	N.S	3.27	5.09	0.65	N.S

3- Effect of the interaction on some traits. The effect of the interaction between organic manure and bio- mineral fertilizers combinations on faba bean yield and yield components was significant only in one out of the two seasons on the following traits i.e. number of pods/plant, weight of pods/plant, seed yield/fad, and straw yield /fad. On the other hand, its effect on the other studied traits was not significant.

In respect to the significant effects of this interaction on number and weight of pods/plant, results in Table (6) revealed that the response of this two traits to the bio-mineral fertilization combinations was not the same under the different rates of organic manure.

Regarding the response of number of pods /plant, results showed that four out of the six treatments of bio- mineral fertilizers behaved the same under the different rates of organic manure .Similar finding was noticed on the response of weight of pods/ plant due to increasing the level of organic manure from 20 to $40m^3$/fad.

Results in Table (6) reveal that the seed yield /fad of faba bean of the bio- mineral fertilization combinations did not respond similarly under the different levels of organic manure.

Increasing the rate of organic manure from 20 to $40m^3$ /fad significantly affected the seed yield in three out of the six treatments of bio- mineral fertilizers. Similar finding was recorded due to the application of $20m^3$ organic manure if compared with zero application.

In respect to the effect of this interaction on straw yield/ fad, results in Table (6) showed that the effect of the studied bio- mineral fertilization treatments on faba bean straw yield was not significantly affected by the levels of organic manure. This was true for five out of the six treatments under investigation. In other words, the response of straw yield to organic manure rates was great enough to reach the significant level with the treatment combination of 15 N+15.5 P_2O_5 +12 K_2O.

4-Effect of organic, bio and mineral fertilizers on seeds chemical contents.

Results in Table (7) show that increasing organic manure rates up to $40m^3$ / fad induced pronounced increases in seeds crude protein percentage (27.5) which exceed the control treatment by about 14 %. These results are in harmony with those obtained by Saghin (1998) who found that organic fertilizers increased faba bean seed contents of total nitrogen, crude protein, phosphorus, potassium , starch and fats.

Regarding the effect of organic manure on total carbohydrates, results showed that seeds total carbohydrates percentages were not greatly increased as the rate of applied organic manure increased. The highest value of total carbohydrates (56.73 %) was obtained at the highest rate of organic manure, while the lowest one (55.43 %) was recorded with the unfertilized ones.

Table 6. Effect of the interaction between organic manure and bio-mineral fertilizers on some harvest traits of faba bean plant during 2000/2001 and 2003/2004 growing seasons

Interaction		First season 2000/2001						Second season 2003/2004					
organic manure	Harvest traits / bio-mineral fertilizers	Number of pods/plant	Weight of pods/plant (g)	Number of seeds/ plant	Weight of 100 seeds (g)	Seed yield (ard/fad)	Straw yield t/fad	Number of pods/Plant	Weight of pods/plant (g)	Number of seeds/ plant	Weight of 100 seeds (g)	Seed yield (ard/fad)	Straw yield t/fad
Zero	Zero N+15.5 P_2O_5+12 K_2O	19.50	48.43	57.37	51.72	5.61	3.12	19.28	57.18	62.20	72.24	5.62	3.35
	15 N+15.5 P_2O_5+12 K_2O	22.57	62.60	70.80	78.82	6.50	4.00	21.58	63.85	74.10	89.43	8.25	3.79
	Zero N+7.75 P_2O_5+6 K_2O	18.93	47.57	56.20	47.44	5.48	3.06	19.03	53.35	60.98	65.30	5.56	3.24
	15 N+7.75 P_2O_5+6 K_2O	22.20	61.83	67.33	66.70	6.34	3.56	21.13	60.05	65.05	83.98	7.55	3.58
	Phosphorin	20.97	58.00	65.50	61.35	5.99	3.51	20.75	59.23	64.70	82.12	7.15	3.53
	Phosphorin + 12 K_2O	19.70	56.70	64.67	54.93	5.71	3.35	19.53	57.45	63.90	77.02	6.81	3.50
20 m^3/fad	Zero N+15.5 P_2O_5+12 K_2O	22.03	55.73	62.93	58.85	6.15	3.34	21.48	60.33	64.78	80.71	6.16	3.59
	15 N+15.5 P_2O_5+12 K_2O	26.17	64.57	74.63	82.75	8.50	4.12	24.95	66.18	77.20	91.02	9.84	4.07
	Zero N+7.75 P_2O_5+6 K_2O	20.60	53.40	57.43	50.65	6.00	3.21	20.33	59.58	62.23	72.54	6.05	3.43
	15 N+7.75 P_2O_5+6 K_2O	24.73	63.60	72.10	72.40	8.27	3.62	23.00	64.45	67.73	85.83	7.95	3.83
	Phosphorin	23.47	61.83	70.10	66.70	6.56	3.56	22.68	61.65	66.70	85.06	7.51	3.77
	Phosphorin + 12 K_2O	22.60	60.47	67.93	67.77	6.27	3.45	22.38	60.65	65.83	82.98	7.35	3.70
40 m^3/fad	Zero N+15.5 P_2O_5+12 K_2O	23.77	62.33	63.43	71.69	6.55	3.50	23.15	63.00	66.63	82.00	7.78	3.62
	15 N+15.5 P_2O_5+12 K_2O	33.23	66.80	82.13	105.22	11.47	5.24	38.28	89.10	79.33	97.64	10.72	6.54
	Zero N+7.75 P_2O_5+6 K_2O	23.40	60.80	58.20	64.91	6.26	3.39	22.38	62.30	66.35	75.13	7.72	3.53
	15 N+7.75 P_2O_5+6 K_2O	27.57	65.70	78.07	89.52	9.70	3.87	26.28	67.75	69.40	92.81	9.13	4.25
	Phosphorin	26.70	63.23	72.67	79.89	8.69	3.79	24.10	65.58	68.45	88.83	8.39	4.09
	Phosphorin + 12 K_2O	25.23	62.87	72.27	76.33	7.76	3.62	23.58	65.28	67.50	85.72	7.94	3.75
L.S.D. (0.05)		N.S	3.78	N.S	N.S	1.37	N.S	5.13	N.S	N.S	N.S	N.S	0.82

In respect to ash percentage the effect of organic manure rates on ash percentage, results indicated that raising organic manure rate up to 40m^3 /fad increased ash percentage of seeds by about 20 % of the check treatment.

Table 7. Effect of Organic manure on chemical contents of faba been seeds.

Organic manure rates	Seed chemical contents (%)		
	Protein	Total carbohydrates	Ash
Without	24.03	55.43	3.61
20 m^3/fad	26.68	56.07	3.68
40 m^3/fad	27.5	56.73	4.33

Table 8. Effect of bio-mineral fertilizers treatments on chemical contents of faba bean seeds.

Bio-mineral fertilizers treatments	Seed chemical contents (%)		
	Protein	Total carbohydrates	Ash
Zero N + 15.5 P_2O_5 + 12 K_2O	25.13	55.52	3.60
15 N + 15.5 P_2O_5 + 12 K_2O	27.50	57.58	3.80
Zero N + 7.75 P_2O_5 +6 K_2O	24.70	55.00	3.52
15 N + 7.75 P_2O_5 + 6 K_2O	27.00	56.42	3.74
Phosphorin	26.53	56.15	3.68
Phosphorin + 12 K_2O	25.57	55.87	3.66

Results in Table(8) reveal that crude protein, total carbohydrates and ash % of faba bean seeds varied according to the bio-mineral fertilizers treatments. The two treatments of the combination of the three nutrients, *i.e* N, P_2O_5 and K_2O showed superiority in seed chemical contents over the other investigated treatments.

REFERENCES

1. A.O.A. C. 1970. Official methods of analysis 11th .ed. Association of Official Agriculture Chemists, Washington, D.C., P. 832.
2. Attia, K. K. 1999. Yield and nutrient status in seeds of some faba bean varieties as affected by farmyard manure and different foliar regimes of micronutrients application. Assiut J of Agric Sci, 30, (5): 189-201.
3. Ghizaw, A; T. Mamo; Z. Yilma; A. Molla and Y. Ashagrey 1999. Nitrogen and phosphorus effects on faba bean yield and some yield components. J. Agron. and crop. Sci. 182: 3, 167-174.
4. Hassanein, M.S. 1995. Response of faba bean to phosphorus fertilizer. Ann. of Agric. Sci., Moshtohor, 33(3): 987-997.
5. Hussein, A.H.A; N.M. Abou-Zeid and M.E. Hassan 1991. Effect of N. P fertilizers, *Rhizobium* inoculation and seed fungicides on yield, yield components, nodulation and seed contents of faba bean. Egypt. J. Agric. Res., 69(3). 695-708.

6. Hussein, A.H.A.; S.A. Saleh; M.A. EL-Deeb and W. Kadry 1997. Effect of *Rhizobium* inoculation, phosphorus and potassium fertilization on growth, nodulation and yield of faba bean cultivated in the newly reclaimed soils of middle Egypt. Bull. Fac. Agric., Cairo Univ. 48 : 201-214.
7. Mlesnita, V., V. Perscea; L. Mlesnita and T. Perseca 1972. Free and protein amino acid contents in seed of *Vicia faba L.* ar. Minor under the effect of chemical fertilizer. Drpetru Grozo Agric. 28: 193-197. (c.f. Field Crop. Abst. 28: 3654, 1975.)
8. Peack, K. and Tracey, M.W. 1956. Modern methods of plant analysis. 1. Springer, Verlay Berlin.
9. Rizk, T.Y.; A.A. Abdel- Halim, and Iman Kh. A. Mohamed. 2005. Effect of organic, bio and mineral fertilization treatments on some growth traits of faba bean *" Vicia faba L "*.J. Environ. Sci. (In press).
10. Rizk, T.Y.; Zeinab M. Nassar; H.I. El- Kassas and N.H. Baumi 2000a. Growth and forage production of *Phalaris canariensis l.* as affected by nitrogen and natural fertilization resources. J. Agric. Sci., Mansoura Univ., 25(7): 3857-3873.
11. Rizk, T.Y.; M. Sh. Reiad; Zeinab M. Nassar; R.Th. Abd-Rabou and M.A. El-Shasheny 2000b. Response of alfalfa- buffel grass mixture to farm yard manure and sulfur fertilization under calcareous soil conditions. J. Agric. Sci., Mansoura Univ. , 25(8): 4845-4864.
12. Saghin, G. 1998. Effect of mineral and Organic fertilizers on symbiotic activity in horse bean . Cerectari – Agronomice –in– Moldova. 31 (1-2): 99-104.
13. Saleh, S.A.; M.A. El-Deeb and A.A. Ragab 2000. Response of faba bean (*Vicia faba l.)* to *Rhizobium* inoculation as affected by nitrogen and phosphorus fertilization. Bull .Fac. Agric., Cairo Univ., 51: 17-30.
14. Salem, S.A. and M.F. El–Massri 1986. Effect of Rhizobium inoculation and phosphorus fertilizer levels on Nodulation, seed yield and other agronomic characters of faba bean (*Vicia faba L.*). Alex. J. Agric. Res. 31 (3): 115- 125.
15. Smith, D.; G.M. Paulsen, and C.A. Roguse, 1964. Extraction of total available carbohydrates from grass and legume tissues. Plant Physiol. 39:960-962.
16. Snedecor, G. W. and G. W. Cochran 1980. Statistical methods 7th Ed. The Lowa State Univ. Press Amess, Lowa , USA.
17. Tripath, R.D.; G.P. Srivastave.; M.S. Misra, and S.C. Pandey 1971. Protein content in some variations of legumes. The Allah Abad Former. 16:291-294.
18. Yousif. H.Y. 1987. Response of faba bean to chicken manure and split nitrogen application Shambat Rescarch Station P.O. Box 30, Khartoum North, Sudan. FABIS News Letter 18, August.

تاثير معاملات التسميد العضوى والحيوى والمعدنى على المحصول ومكوناته فى الفول البلدى

توكل يونس رزق[1] - احمد على عبد الحليم[2] - ايمان خليل عباس[2]

١- قسم المحاصيل - كلية زراعة - جامعة عين شمس

٢- المعمل المركزى لبحوث التصميم والتحليل الأحصائى - مركز البحوث الزراعية

أجريت تجربة حقلية على الفول البلدي في محطة بحوث الجيزة بمركز البحوث الزراعية خلال موسمي ٢٠٠٠/٢٠٠١، ٢٠٠٣/٢٠٠٤ بهدف دراسة تأثير التسميد العضوي والتسميد الحيوى والمعدني كبديل كلي أو جزئي للسماد المعدني في الفول البلدي واستخدمت ٣ مستويات مختلفة للتسميد العضوي (سماد القمامة) (صفر، ٢٠، ٤٠م^3/فدان) ومستويين من النيتروجين (صفر، ١٥,٧٥ كجم/فدان) ومستويين من الفوسفور (٧,٥ ، ١٥,٧٥ فو$_2$ أ كجم/فدان) ومستوين من البوتاسيوم (٦ ، ١٢ بو$_2$ أ كجم/فدان) والتسميد الحيوي (فوسفورين).

اتبع فى هذه التجارب التصميم في شرائح متعامدة في ٤ مكررات وتتلخص أهم النتائج في الآتي:

١- أدت إضافة التسميد العضوي بأعلى مستوى (٤٠م^3 /فدان) الى زيادة فىعدد القرون ووزن القرون وعدد بذور النبات ووزن ال ١٠٠ بذرة .كما أثرت كذلك على حاصل الفول البلدى من القش والبذور/ الفدان وزيادة محتوى البذور من البروتين والكربوهيدرات والرماد.

٢- أعطت معاملة الجمع بين العناصر السمادية (١٥ كجم N +١٥,٥ كجم P_2O_5 +١٢ كجم K_2O) أعلى قيم في صفات الحصاد تحت الدراسةبينما اعطى الجمع بين معاملات التسميد بالفوسفورين + البوتاسيوم فى غياب النتروجين أقل قيم وهذا يعنى اهمية عنصر النيتروجين عند الجمع بين التسميد الفوسفاتى والبوتاسى.

٣- تاثرت صفات الحصاد(عدد القرون -عدد البذور/النبات ووزن القرون/النبات ووزن١٠٠ بذرة ومحصول البذور والقش/فدان) معنويا بمعاملات التسميد الحيوى والمعدنى تحت الدراسة ، بينما كان تاثير تلك المعاملات على وزن القرون /النبات وكذلك حاصل القش غير معنوي فى الموسم الثانى.

٤- لم تتأثر صفات الحصاد معنويا بالمعاملة بالفوسفورين منفردا او بالفوسفورين مع البوتاسيوم.

٥- كان تأثيرالتفاعل بين التسميد العضوي والحيوي والمعدني معنويا في موسمي النمو علىصفات (وزن القرون/النبات وعدد القرون/النبات وحاصل البذور والقش/فدان.

وتوصى هذة الدراسة بأهمية التسميد العضوى بمعدل ٤٠ م^3 / ف مع جرعة من الأزوت (١٥ كجم / ف) للحصول على أعلى حاصل فى الفول البلدى .