THE EFFECT OF BIO, ORGANIC AND MINERAL FERTILIZATION ON PRODUCTIVITY OF SUNFLOWER SEED AND OIL YIELDS

BY

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ABSTRACT

Two field experiments were conducted out at the Experimental Farm of Sakha Agriculutral Research Station , Kafr El-Sheikh, The experiments were conducted to study the effect of bio, organic and mineral fertilizers on seed and oil yeilds of sunflower through inoculation with biological nitrogen fixation (BNF) as a bacteria in form of (Rhizobacterine or Microbine inoculation), farm yard manure (FYM) as organic source at rate of 20 and 30 m^3/fed.and mineral nitrogen fertilizer. A randomized complete block design with four replication was used. The obtained results could be summarized as follows :

The bio, organic, mineral fertilizers and their combinations significantly affected growth analysis and som growth attributes such (dry matter accumulation /plant and leaf area index), some agronomic characters such (stem diameter, head diameter and plant height) as well as yeild and its components such (100 seed weight, seed yeild /fed., oil percentage and oil yeild) in 2007 and 2008 seasons.

Application of organic manure at the rate of 30 m^3 /fed. FYM with 30 kgN/fed. as mineral fertilizers recorded the hieghest values of dry matter accumulation /plant, leaf area index, stem diameter, head diameter, plant height, 100 seed weight, seed oil content as well as seed and oil yeilds /fed.

Sunflower plants, which received 20 or 30 m^3 FYM with biofertilizers as mixture of Microbin and Rizobacterine were among those having great dry matter accumulation /plant, leaf area index, stem diameter, head diameter, plant height, 100 seed weight, seed oil content as well as seed and oil yeilds /fed. compared with those received 30 Kg N/fed. In both seasons.

Application of FYM alone at the rate of 20 or 30 m^3 was less effect on growth analysis and growth attributes, agronomic characters as well as yeild and its components than applying mineral nitrogen alone or combined with them.

It could be concluded that under the conditions of this investigation, application of organic manure at the rate of 30 m^3 FYM /fed. with 30 kg N/fed.as mineral nitrogen or application of organic manure at the rate of 20 or 30 m^3 FYM under the inoculation with biofertilizers as mixture of Microbin and Rizobacterine could be recommended for increasing seed and oil yields of sunflower.

INTRODUCTION

Sunflower (*Helianthus annuus, L.*) is considered one of the major source of edible vegetable oil in the world and in A.R. of Egypt also due to high unsaturated fatty acids content *(Leland, 1996)*. So, there is need to increase the oil yield to enhance food security. The nutrition specially with nitrogen is one of the important factors to increase sunflower seed yield .

The nitrogen deficiency in Egyptian soils is one of the most limiting factors for sunflower production. To address issues of crop environment and crop productivity the over all management system of crop culture needs to be improved especially the nutrients management of crops. The application of organic and bio fertilizers sustain the fertility of the soil for along time . On the other hand, the farmers add rarely sufficient amount of organic manure to the soil against the removal. Under this condition there is need to explore the possibilities of using the expanding nativc sources of plant nutrition, such as organic and bio fertilizers. Several investigators showed the effect of mineral and organic fertilizers application on sunflower as; *Abou khadrah et al., (2002), Mohamed (2003) and Awad, (2004)*they reported that the application of nitrogen rate up to 45 kg N/fed. significantly increased dry matter acumulation, plant height, head diameter, LAI, stem diameter, 100 seed weight and seed yeilds as well as oil yields/fed. They reported also that increasing N- level tended to decrease seed oil content and increasing mineral nitrogen rat with bio and FYM significantly increased dry matter acumulation , LAI,stem diamter, head diamter , 100-seed weight, seed yeild and oil yeild.

The bio fertilizers are one of the sources as a part from supplying nutrients for the crops, conserve the environment from pollution as a result of excessive use of N fertilizer. The beneficial effect of bio fertilizers, viz. *Azospirillum* and *Azotobacter* inoculation on sunflower has been reported by several investigatours; *Saleh et al., (2004)* studied the response of some sunflower cultivars to Rhizobacterien as bio-fertilizers in comparing with mineral nitrogen

They reported that all studied characters were significantly increased by increasing nitrogen levels up to 30 kg N /fed.or inoculation of sunflower seed with Rhizobacterien plus application of 20 kg N/fed

Mohamed (2003) *and Abou khadrah et al., (2002)* reported that data revealed that the inoculation of sunflower seed with (N_2-fixing) bacteria (Cerealin) or with phosphate dissolving bacteria (Phosphorine) or with combined of the two biofertilizers significantly enhanced all the studied traits over the control (dry matter acumulation/ plant in some growth stages, head diameter, number of seeds/head, seed oil content, seed yield/plant as well as seed and oil yields/fed). *Nawar, (1994) and Radwan (1996)* reported that inoculation of sunflower seed with phosphate dissolving bacteria (phosphorine) significantly increased number and weight of seeds/head and head diameter in addition to growth attr3ibutes. The results obtained by *Keshta and El-Kholy (1999)* indicated that the application of inorganic nitrogen and bio- fertilizers as a source of N_2 fixing bacteria for sunflower increased plant height, head diameter, 100- seed weight, seed yield/fed. and seed oil content.

The importance of organic manures in the soil has been recognized for centuries as the key to soil fertility and productivity. Organic manures, favorable by product of farming and allied industries contribute to plant growth through their favourable effect on physical, chemical and biological properties of soil. Though, information is available on the conjunctive use of organic manures and inorganic fertilizers for improving soil fertility and crop yields (Meena et al., (2007) .

Gorttappeh et al. (2000). In iran they showed that increases in application rates of nitrogen fertilizers and manure increased seed and biological yeilds, 100- seed weight, plant height, as well as oil percentage and yield. The highest seed and oil yeilds were obtained with 200 kg N/ha. and with organic fertilizer of 30 t/ha. *Keshta and El-Kholy (1999)* indicated that organic manure application increased the effeciency of both mineral nitrogen and biofertilizers of nitrogen as well as organic matter percent.

There for the present investigation aimed to study the response of the sunflower cultivar Sakha 53 to inorganic fertilizers (mineral nitrogen), organic fertlizers (F.Y.M) and boi fertilizer i.e(Rizobacterin (mixture of bacteria and Microbin), as well as their combinations.

MATERIALS AND METHODS

The present study was conducted at the Experimental Farm of Sakha Agricultural Research Station, at Kafr El-Sheikh Governorate, Agricultural Research Center, (ARC), Egypt during the two successive sunflower growing seasons, 2007 and 2008. Soil samples were randomly taken from the experimental sites at depth from 0 to 30 cm from soil surface and were prepared for both mechanical and chemical analysis. The soil of the experimental fields was clay in texture with pH of 8.2, organic matter, 1.69 % and containing 17.94, 13.77 and 284 ppm available N, P and K, respectively (average of tow seasons). The preceding crop was wheat in the two seasons. Randomized complete block design with four replications was used in both seasons of experimentation Each experiment included eleven treatments as showen in the following table :

1	30kg N/fed.	7	20 m^3 FYM + Rizobacterin
2	20m^3 F.Y.M	8	30 m^3 FYM + Microbin
3	30m^3 F.Y.M	9	30 m^3 FYM + Rizobacterin
4	20m^3 FYM +30 kg N/fed.	10	20m^3FYM+BNF as Microbin &Rizobacterin
5	30m^3 FYM +30 kg N/fed	11	30m^3FYM+BNF as Microbin &Rizobacterin
6	20m^3 FYM + Microbin		

Each plot contained five ridges, 4 m im lomg and .60 cm wide with hills 20 cm apart. The size of each plot was 12m^2. Seed of sunflower cultivar Sakha 53 were sown on May 22th and 26th in the first and second seasons, respectively.

Phosphorous fetilizer in the form of calcium super phosphate (15.5% P_2O_5) was applied at the rate of 200 kg fed. during land preparation. Nitrogen was added in the form of Urea (46.6 % N) to the soil in three equal doses. The first dose was added befor sowing irrigation, while the second and the third ones were added befor the first and the second irrigations, respectively. The biofertilizers utilized were Rhizobacterien and Microbin inoculation which are a commercial biofertilizer sources containing active bio-nitrogen fixing bacteria, produced by Generl Organization for Agriculture

Equalization, Ministry of Agriculture and Land Reclamation, Egypt, Abou El Naga, (1993) The inoculation was performed by coating the wetted sunflower seeds with Rhizobacterien and Microbein using a sticking substance (arabic gum, 5%) just before sowing. The farm yard manure (F.Y.M) as organic source, containing 11.9% OM, 0.38%N, 0.44%P_2O_5 and 1.18%K_2O was applied at the rate of 20 or 30 m^3 befor sowing planting through land preparation Soil was directly irrigated after planting to provide suitable moisture for the inoculant. .

Thining practices were conducted after 21 days from planting to secure one plant per hill. Other practices for growing sunflower were conducted as recommended.

Growth analysis was determined on five guarded plants taken randomly from each experimental plot. Three samples in both seasons were taken at 35, 45 and 55 days after sowing (DAS) (five plants were taken in every sample). The sum of dried plant fractions were used to calculate the total dry matter accumulation (g/plant) of growth attributes, leaf area index (LAI) was calculated according to the following formula mentioned by Watson (1952).LAI = unit leaf area per plant/ plant ground area.

Ten guarded plants at harvest were randomly taken from each experimental plot and the following characters were determined: plant height (cm), head diameter (cm) and 100-seed weight (g), seed yield (kg/fed.) was calculated from each plot, Seed oil content was determined according to A.O.A.C. (1980) using soxhlet apparatus and diethyl ether as a solvent. Heads of the two inner ridges of each plot were harvested and left two weeks until fully air dried by sunshine and seed yield was calculated as t/fed. Oil yield (kg/fed.) was determined by multiplying seed yield (kg/fed. On bases seed yeild of ten plants) by seed oil content.

All date collected were subjected to statistical analysis of variance as described by Snedecor and Cochran (1980). The mean values were compared according to Duncan's multiple range test (Duncan, 1955). All statistical analysis was performed using analysis of variance technique by means of "IRRISTAT" computer software package.

RESULTS AND DISCUSSION

A. Growth analysis and Growth attributes :

Data cited in Tables 1 & 2 show a significant effect due to bio, organic, mineral fertilizers and their combinations on dry matter accumulation /plant and leaf area index at all sampling dates in both 2007 and 2008 seasons. The increase in dry matter accumulation /plant and leaf area index may be due to the increase in size of successive leaves, which improved translocation of assimilates. The great values of dry matter accumulation /plant and leaf area index produced from the plants received the mineral nitrogen at the recommended rate 30 kg N/fed. alone or in combination with 20 and 30 m^3 farm yard manure treatments .

Sunflower plants which fertilized with the rate of 20 and 30 m^3 farm yard manure along with biofertilizers as mixture of Microbin and Rizobacterine were among those having great dry matter accumulation (g/plant) and leaf area index compared with those received 30 kg N/ fed. at the most sampling dates in both seasons. Significantly increase in dry matter accumulation and leaf area index due to biofertilizers along with organic manure has a synergistic effect on subsequent plant growth and increase bacterial development, as Microbin and Rizobacterine inoculum cause biological N_2 fixation, which improves plant growth. Application of organic manure at the rate of 30 m^3 /fed.along plus 30 kgN/fed. recorded the hieghest values of dry matter accumulation (g/plant) and LAI at all growth stages. This increase in growth attributes might be due to the role of nitrogen fertilizer on structure of protein molecule, which is necessary for biological activity and improvement of plant metabolism as well as growth of stems and leaves. *Abou khadrah et al., (2002), Mohamed (2003) and Awad, (2004).*

Table(1): Dry matter accumulation (g/plant) of sunflower cv. Sakha 53 as affected by bio, organic and mineral fertilizers at 35,45 and 55 days after sowing in 2007 and 2008 seasons.

Treatment.	Days after sowing					
	2007			2008		
	35	45	55	35	45	55
F test	**	**	**	**	**	**
30 kg N	27.85c	79.10b	127.9d	27.55b	78.60b	127.6d
20m^3 FYM	21.60f	67.60e	116.9g	20.60f	68.10e	116.9g
30 m^3 FYM	23.63e	70.30d	120.2f	22.60e	70.22de	119.4f
20 m^3 FYM + 30 kg N	31.14b	83.92a	136.0b	30.78a	83.10a	135.2b
30 m^3 FYM + 30 kg N	32.78a	86.10a	139.0a	31.60a	85.47a	138.3a
20 m^3 FYM+Microb.	24.20e	71.92cd	122.5e	24.58d	71.13cd	122.2e
20 m^3 FYM + Rizob.	25.63d	72.45cd	122.9e	25.42cd	71.70cd	122.5e
30 m^{3}FYM+ Microb.	25.63d	73.82c	126.3d	26.48bc	73.05cd	125.5d
30 m^3 FYM + Rizob.	26.50d	74.20c	126.7d	26.10bc	73.87c	126.2d
20 m^{3}FYM+BNF mix.	26.58d	74.17c	127.4d	25.53cd	73.67c	126.8d
30 m^{3}FYM + BNF mix.	26.63d	76.83b	131.9c	26.90bc	76.62b	131.7c

***, ** and NS indicate p<0.05, p<0.01 and not significant, respectively. Means of each column designated by the same latter are not significantly different at 5% level using Duncan s multiple range test.**

Table (2): Leaf Area Index of sunflower cv. Sakha 53 as affected by bio, organic and mineral fertilizers at 35,45 and 55 days after sowing in 2007 and 2008 seasons.

Treatment/fed.	Days after sowing					
	2007			2008		
	35	45	55	35	45	55
F test	**	**	**	**	**	**
30 kg N	1.62b	3.92b	4.97b	1.605ab	3.94b	5.03b
20m^3 FYM	1.22g	2.84g	3.81h	1.160f	2.82g	3.71h
30 m^3 FYM	1.30 fg	3.00f	3.99g	1.313e	2.97f	3.91g
20 m^3 FYM + 30	1.57bc	3.95ab	5.18a	1.493cd	3.92b	5.06b
30 m^3 FYM + 30 kg	1.71 a	4.08a	5.27a	1.663a	4.10a	5.21a
20 m^3 FYM+	1.36ef	3.25e	4.18f	1.345e	3.15e	4.12f
20 m^3 FYM +	1.42de	3.26e	4.29ef	1.395de	3.20e	4.23f
30 m^{3}FYM+	1.49cd	3.44d	4.36de	1.465cd	3.43d	4.37e
30 m^3 FYM +	1.52c	3.66c	4.48d	1.470cd	3.58c	4.53d
20 m^{3}FYM+ BNF	1.52c	3.75c	4.72c	1.500bcd	3.70c	4.72c
30 m^{3}FYM + BNF	1.56bc	3.91b	4.97b	1.57abc	3.86b	4.96b

***, ** and NS indicate p<0.05, p<0.01 and not significant, respectively. Means of each column designated by the same latter are not significantly different at 5% level using Duncan s multiple range test.**

B. Agronomic characters :

Data presented in Tables (3) show a significant effect due to bio, organic, mineral fertilizers and their combinations on stem diameter, head diameter and plant height in both 2007 and 2008 seasons. The increase in stem diameter, head diameter and plant height might be due to the improve in translocation of assimilates.The great values of stem diameter, head diameter and plant height produced from sunflower plants fertilized with the mineral nitrogen at the recommended rate (30 kg N/fed.) alone, or the same rate incomination with 20 and 30 m^3 farm yard manure similar results observed by *Abou khadrah et al., (2002), Mohamed (2003) and Awad, (2004)*.

Plants fertilized with the rate of 20 and 30 m^3 farm yard manure along with biofertilizers as mixture of Microbin with Rizobacterine were among those having great stem diameter, Head diameter and

plant height compared with those, which received 30 kg N/fed. such increase in these characters due to biofertilizer along with organic manure had a Synergestic effect on subsequent plant growth and cause bacterial development as Microbin and Rizobacterine inoculum to give biological N_2 fixation, which improve plant growth.

Application of organic manure at rate 30 m^3 /fed. along with 30 kgN/fed. As mineral nitrogen recorded achieved the hieghest values of stem diameter, head diameter and plant height in the two seasons of study .

Application of farm yard manure alone the at the rate of 20 and 30 m^3 was less effective on stem diameter, head diameter and plant height than applying mineral nitrogen alone or combined with them. Such increase in stem diameter, head diameter and plant height from applying mineral nitrogen might be due to the fact that nitrogen compose protoplasmic protein, which required for increasing growth and leaf area.

The previous results are in good accordance with those reported by *Radwan (1996); Keshta and El- Kholy (1999); Sharief et al. (2000) and Abou-Ghazala et al. (2001), Abou Khadrah et al. (2002) and Awad (2004)*

C. Yeild and its components :

The data in Table (4) show that 100 seed weight and seed yield /fed. were significantly influenced by the bio, organic, mineral fertilizers and some their combinations . These significant increases in 100 seed weight and seed yeild /fed. May be due to improvent in translocation of assimilates. The great values of 100 seed weight and seed yeild were produced from sunflower plants received the mineral nitrogen at the recommended rate (30 kg N/fed.) alone or the same rate with 20 and 30 m^3 farm yard manure.

Table (3) : Stem diameter(cm), head diameter(cm) and plant height(cm) of sunflower cv. Sakha 53 as affected by bio, organic and mineral fertilizers in 2007 and 2008 seasons.

Treatment/fed.	Stem diameter (cm)		Head diameter (cm)		Plant height(cm)	
	2007	2008	2007	2008	2007	2008
F test	**	**	**	**	**	**
30 kg N	2.293ab	2.265ab	16.16d	16.16b	170.9ab	170.6abc
20m^3 FYM	1.850c	1.850d	17.25cd	11.88d	150.0f	152.0f
30 m^3 FYM	2.233b	2.050bcd	17.62c	13.25c	154.8e	155.5f
20 m^3 FYM + 30 kg N	2.418ab	2.125bc	18.53bc	16.75b	165.8cd	166.8cde
30 m^3 FYM + 30 kg N	2.423ab	2.450a	20.35a	17.88a	171.8ab	172.8ab
20 m^3 FYM+ Microb.	2.310ab	1.900cd	19.48ab	11.50d	162.3d	164.0e
20 m^3 FYM + Rizob.	2.428ab	1.825d	18.18bc	11.13d	166.3cd	167.8cde
30 m^3FYM+ Microb.	2.398ab	1.950cd	17.34cd	14.25c	168.0bc	169.3bcd
30 m^3 FYM + Rizob.	2.352ab	2.125bc	17.84c	14.13c	163.8d	165.0de
20 m^3FYM+ BNF mix.	2.472ab	1.825d	18.38bc	11.63d	173.0a	174.0a
30 m^3FYM + BNF mix.	2.515a	1.875d	18.61bc	14.00c	173.0a	173.5ab

***, ** and NS indicate p<0.05, p<0.01 and not significant, respectively. Means of each column designated by the same latter are not significantly different at 5% level using Duncan s multiple range test.**

Sunflower plants received the rate of 20 and 30 m^3 farm yard manure along with biofertilizers as mixture of Microbin and Rizobacterine were among those having great 100 seed weight and seed yeild compared with those fertilized by 30kg N/fed. As mineral nitroge in both seasons. The significant increase in 100 seed weight

and seed yeild due to biofertilizers along with organic manure has a synergistic effect on subsequent plant growth and useful for bacterial development as Microbin with Rizobacterine inoculum to occur biological N_2- fixation which improve plant growth and so improving seed yeild. Application of organic manure at rate 30 m^3 /fed.along with 30 kgN/fed. As mineral nitrogen gave treatment achieved the hieghest values of 100 seed weight and seed yeild.

Table (4) : 100 seed weight(g) and seed yeild (t/fed) of sunflower cv. Sakha 53 as affected by bio, organic and mineral fertilizers in 2007and 2008 seasons.

Treatment/fed.	100 seed weight (g)		Seed yeild /feddan(t /fed)	
	2007	2008	2007	2008
F test	**	**	**	**
30 kg N	5.32d	5.26bc	1.28c	1.28b
20m^3 FYM	5.50cd	5.60ab	0.97f	0.92e
30 m^3 FYM	5.75bc	4.90c	1.01ef	0.99de
20 m^3 FYM + 30 kg N	6.10ab	5.80a	1.60b	1.55a
30 m^3 FYM + 30 kg N	6.37a	6.08a	1.78a	1.65a
20 m^3 FYM+ Microb.	5.53cd	5.08c	1.13de	1.08cde
20 m^3 FYM + Rizob.	4.87e	5.25bc	1.22cd	1.18bc
30 m^3FYM+ Microb.	6.11ab	5.73ab	1.22cd	1.17bc
30 m^3 FYM + Rizob.	5.61cd	5.73ab	1.25cd	1.18bc
20 m^3FYM+BNF mix.	5.83bc	5.25bc	1.18cd	1.18bcd
30 m^3FYM + BNF mix.	6.31a	5.60ab	1.18cd	1.15bcd

***, ** and NS indicate p<0.05, p<0.01 and not significant, respectively. Means of each column designated by the same latter are not significantly different at 5% level using Duncan s multiple range test.**

Application of farm yard manure alone at the rate of 20 and 30 m^3 was less effective on 100 seed weight and seed yeild than applying mineral nitrogen alone or in combined with them. Such increase in 100 seed weight and seed yeild due to applying mineral nitrogen might be due to the fact that nitrogen composes protoplasmic protein,which required for increasing the growth and nextly increasing

the 100 seed weight and seed yeild. Similar results were reported by *Mohamed (1997), Keshta and El- Kholy (1999); Gorttappeh et al. (2000), Sharief et al. (2000), Abou-Ghazala et al. (2001), Abou Khadrah, et al., (2002), Saleh et al., (2004) and Awad (2004.)*

Data in Table 5 show seed oil content and oil yeild of sunflower cv. Sakha 53 were significantly affected by bio, organic, mineral fertilizers and their combinations in 2007and 2008 seasons. This significant increase in oil yeild may be due to the increase in seed yeild and oil percentage and so the improvement in translocation of assimilates. The highest values of seed oil content and oil yeild were produced from sunflower plants received the mineral nitrogen at the recommended rate (30 kg N/fed.) alone or in combination with 20 and 30 m^3 farm yard manure.

Table (5) : Seed oil percentage (%) and Oil yeild (kg/fed.) of sunflower cv. Sakha 53 as affected by bio, organic and mineral fertilizers in 2007 and 2008 seasons.

Treatment/fed.	Oil percentage (%)		Oil yeild (kg/fed.)	
	2007	2008	2007	2008
F test	**	**	**	**
30 kg N	38.47bcd	38.34abc	497.4b	495.7b
20m^3 FYM	37.97d	37.83c	367.2d	359.3e
30 m^3 FYM	38.25cd	38.10bc	381.9cd	368.4de
20 m^3 FYM + 30 kg N	38.08d	37.97bc	583.9a	589.2a
30 m^3 FYM + 30 kg N	39.08a	38.72a	637.0a	615.5a
20 m^3 FYM+ Microb.	38.85ab	38.45ab	437.0bc	415.3cde
20 m^3 FYM + Rizob.	38.80abc	38.70a	460.0b	447.7bc
30 m^3FYM+ Microb.	38.42bcd	38.17abc	459.2b	448.2bc
30 m^3 FYM + Rizob.	37.9d	38.35abc	467.3b	452.1bc
20 m^3FYM+BNF mix.	38.88ab	38.70a	446.1bc	432.5bcd
30 m^3FYM + BNF mix.	38.85ab	38.75a	457.5b	444.8bc

***, ** and NS indicate p<0.05, p<0.01 and not significant, respectively. Means of each column designated by the same latter are not significantly different at 5% level using Duncan s multiple range test.**

Sunflower plants, which received the rate of 20 and 30 m^3 farm yard manure along with biofertilizers as mixture of Microbin and Rizobacterine were among those having great seed oil content and oil yeild compared with those fertilized by 30 kg N/fed. in both seasons. Such significant increase in oil yeild and oil seed content may be due to the useful effect of biofertilizers and organic manure on subsequent plant growth and for bacterial development and so improve plant yeild. Application of organic manure at rate 30 m^3 /fed.along with 30 kgN/fed.as mineral nitrogen recorde the hieghest values of seed oil content and oil yeild in the two seasons of study.

Application of farm yard manure alone at rate 20 and 30 m^3 was less effective on seed oil content and oil yeild than applying mineral nitrogen alone or with them. Such increase in seed oil content and oil yeild from applying mineral nitrogen might be due to the fact that nitrogen composes protoplasmic protein, which required for increasing the growth and then increasing the seed oil content and oil yeild. Similar results were reported by *Mohamed. (1997), Keshta and El- Kholy (1999), Gorttappeh et al. (2000), Sharief et al. (2000), Abou-Ghazala et al. (2001), Abou Khadrah et al. (2002), Saleh et al., (2004), and Awad. (2004).*

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الملخص العربى

دراسة تأثير التسميد العضوى والحيوى والمعدنى على إنتاجية بذرة وزيت دوارالشمس

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أجريت تجربتان حقليتان بالمزرعة البحثية لمحطة البحوث الزراعية بسخا – كفر الشيخ مصر خلال موسمى ٢٠٠٧، ٢٠٠٨ بهدف دراسة تأثير التسميد العضوى والحيوى والمعدنى على إنتاجية بذرة وزيت دوار الشمس صنف سخا ٥٣ من خلال التلقيح بالبكتريا الحيوية المثبته للنيتروجين (الميكروبين و الريزوبكتيرين) ومستويات من السماد البلدى كمصدر عضوى (٢٠، ٣٠، م^{٣} سماد بلدى/فدان) ومستوى التسميد المعدنى ٣٠ كجم أزوت/فدان وقد استخدم تصميم القطاعات كاملة العشوائية فى أربع مكررات فى تنفيذ التجارب. ويمكن تلخيص أهم النتائج المتحصل عليها فيما يلى :

- اثرت الاسمدة العضوية والحيوية والمعدنية والتواليف المختلفة بينها معنويا على وزن المادة الجافة /نبات و دليل مساحة الاوراق ، قطر الساق ، قطر القرص ، طول النبات ،المحصول ومكوناته فى موسمى ٢٠٠٧ و٢٠٠٨.
- حقق اضافة السماد العضوى بمعدل ٣٠ م^{٣} / فدان + ٣٠ كجم ن معدنى / فدان أعلى القيم فى كل من المادة الجافة / نبات ، دليل مساحة الاوراق ، قطر الساق ، قطر القرص ، طول النبات ، وزن ١٠٠ بذرة ، محصول البذرة /فدان ، وكذلك محصول الزيت ، محتوى البذور من الزيت .
- كانت معاملة السماد العضوى بمعدل ٢٠ او ٣٠ م٣ فى تواليف مع مخلوط من السماد الحيوى(ميكروبين + ريزوباكتيرين) من ضمن المعاملات التى حققت اعلى القيم من كل من المادة الجافة / نبات ، دليل مساحة الاوراق ، قطر الساق ، قطر القرص ، طول النبات ، وزن ١٠٠ بذرة ، محصول البذرة /فدان ، ، نسبة الزيت وكذلك محصول الزيت) مقارنة بمعاملة السماد المعدنى (٣٠ كجم ازوت/فدان) فى كلا الموسمين .
- كانت معاملة السماد العضوى بمعدل ٢٠ او ٣٠ م٣ اقل تاثيرا على صفات النمو والصفات المحصولية وكذلك صفات المحصول ومكوناته مقارنة باضافة النيتروجين المعدنى فقط او فى تواليف مع الاسمدة العضوية بمعدل ٢٠ او ٣٠ م٣.

ويمكن ان نخلص من الدراسة بانه تحت ظروف هذه الدراسة ان اضافة السماد العضوى بمعدل ٣٠ م^{٣}/ فدان مع ٣٠ كجم ن /فدان كسماد معدنى او اضافة السماد العضوى بمعدل ٢٠ م^{٣} مع مخلوط من اللقاح الحيوى (الميكروبين و الريزوبكتيرين) يمكن أن ينصح به لزيادة محصول بذور دوار الشمس .