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Research Article

The Economic Evaluation for the Combined Application of Poultry Manure and Mono Ammonium Phosphate on Sesame Yield under Water Stress Conditions

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Abstract

Water stress is considered to be one of the most adverse abiotic stress factors influencing plant growth and their physiological and biochemical aspects. Field experiments were carried out to achieve the optimal use of soil application of poultry manure (0, 2, 4 and 6 ton/fed) in combination with foliar application of Mono Ammonium Phosphate (MAP) (0, 1, 2 and 3%) and its effects on productivity and quality of sesame grown under water stress condition. Soil application of 6-ton poultry manure per feddan combined with 3% MAP foliar spray gave the highest values of plant height (150.9, 123.1 cm), Capsule's number /plant (86.6, 65.6), capsules weight (67.5, 51.7 g) and 1000 seed weight (5.94, 4.40 g) under sufficient irrigation and water stress condition, respectively. Foliar application of 3% MAP foliar spray gave the highest seed yield under both irrigation treatments as compared to control treatment. Application of 6 ton/fed poultry manure gave the highest increased percentage of seed yield (20.25%) under sufficient irrigation, and (16.24%) under deficit irrigation, and control treatment gave the lowest one. Results recommended that soil application of 6 ton/fed poultry manure combined with 3% of MAP foliar spray is important to minimize the harmful effects of drought stress on sesame seed yield under water stress conditions. The maximum net returns were registered in the treatment receiving 6 ton/fed Poultry manure under deficit irrigation. This practice can help to obtain higher profit over the conventional application of recommended dose of fertilizers to the crop.

Keywords: *Water stress -Sesame- seed yield - MAP- Poultry manure- net returns.*

Introduction

Sesame (*Sesamum indicum* L.) is one of the most important oil crops with multiple purposes, whether industrial or medicinal, and its seeds are characterized by their high content of the necessary high-energy nutritional components, vitamins and major elements (Alshaima, 2021). It has economic importance to produce oil (Farhan. *et al*., 2010). Sesame ranks with peanut as two of the most important oilseed crops grown in Egypt, not only for edible oil but 4 mainly in food processing (Hamza and Abed El-Salam, 2015). Sesame seed is used for a wide array of edible products in a raw or roasted form and also for industrial uses such as soaps, lubricants, lamp oil, an ingredient in cosmetics; pharmaceutical uses, and animal feed (Bedigian, 2011). It is grown mainly in developing countries by smallholder farmers who rarely apply fertilizer. This results in both low yield and poor economic returns. Significantly higher yields have been reported to the application of organic manure and phosphorus fertilizer by many workers.

The sesame crop is one of the oldest oil crops in Egypt, where it is cultivated well in the reclaimed clay and sandy agricultural lands. According to the data of the Ministry of Agri-

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culture, the area cultivated with sesame amounted to 73.73 thousand acres in 2019, while the amount of production amounted to about 290 thousand ardebs, and the productivity of the feddan was about 5.2 ardebs.

Soils of Egypt are alkaline pH, which caused converting phosphorus content to unavailable form, mainly as tricalcium phosphate. It is well known that the use of mineral fertilizer is an important factor for vigorous growth and consequently higher yield of different plant species (El-Nagdy. *et al*., 2010). Chemical fertilizers have been used for decades to increase crop yield. However, current trends in agriculture are focused on the search for an alternative to chemical fertilizer due to, huge cost of procurement, contamination of the environment, and coupled improper application leading to the degradation of soil quality (Tilman. *et al*., 2002).

Manure application has been shown to improve solubility and uptake of P from sparingly soluble P compounds in soil and enhance the utilization of P from P-containing fertilizers (Zeidan, 2007). Mondal. *et al*., (1992) reported that the application of 10 t farmyard manure ha^{-1} significantly increased the seed yield of sesame compared to other levels of applied organic and inorganic fertilizers. Working on the effect of spacing and fertilizer application on the growth, yield, and yield components of sesame, Bonsu, (2003) reported that poultry manure application significantly increased total seed yield by 13% over the control that had no manure. Duhoon. *et al*., (2004) working on the optimization of sesame production through the bio/natural inputs reported that the application of 3.75-ton farmyard manure ha^{-1} plus other organic amendments gave a significantly higher seed yield compared with the control.

Poultry manure has long been recognized as the most desirable organic fertilizer. It improves soil fertility by adding both major and essential nutrients as well as soil organic matter which improves moisture and nutrient retention (Farhad. *et al*., 2009). The addition of N and P fertilizer enhances root development, which improves the supply of other nutrients and water to the growing parts of the plants, resulting in an increased photosynthetic area and thereby more dry matter accumulation (Ali. *et al*., 2010). Phosphorus in plants is important for a variety of processes particularly in the maintenance of energy metabolic systems, enhanced root development, and root hydraulic conductance (Jin. *et al*., 2014). Better performance of plants under soil water deficits when P is adequate is thought to be due to increased water use efficiency (Suriyagoda. *et al*., 2010).

Water shortage is considered to be one of the most adverse abiotic stress factors influencing plant growth and their physiological and biochemical aspects in addition to the adverse impacts on the social and economic life of mankind (Anjum. *et al*., 2012), as well as impairing crop production (Hamrouni. *et al*., 2001). Sesame (*Sesamum indicum* L.) Is a drought-tolerant plant, however; it is sensitive to drought at germination and seedling stages (Bahrami. *et al*., 2012). Severe droughts cause a substantial decline in crop yields through negative impacts on plant growth, physiology, and reproduction (Barnabas. *et al*., 2008).

Therefore, this study aimed to replace chemical fertilizers with organic fertilizers to reduce their harmful effect on the biological and chemical properties of these poor sandy cultivated soils and to improve the yield and economic yield result affected by poultry manure and foliar application of mono-ammonium phosphate (MAP) on sesame grown under water stress.

Materials and Methods

Experimental Procedures

Field experiments were carried out at the Research and Production Station of the National Research Centre, Nubaria region (30 30.054' N - 30 19.421' E), Behira Governorate, Egypt during 2020/2021. To achieve the optimal use of organic fertilizer (poultry manure) in combination with Chemical fertilizers (Mono Ammonium Phosphate) and its effects on productivity and quality of sesame under water stress conditions. The experimental design was split plot with four

replications. The plot area was 9-m^2. Some physical and chemical properties of a representative soil sample used of the experimental site were determined before sowing according to **Rebecca (2004)** and presented in (Table 1).

Table (1): Some physical and chemical properties of the experimental soil

pH	EC	OM	CaCO3	Particle size distribution			Texture
(1:2.5)	dSm-1	%	%	Sand %	Silt %	Clay %	Class
7.71	0.99	0.76	1.78	77.3	5.6	17.03	Sandy loam

Cations (meq/ L)				Anions (meq/ L)			
Na+	K+	Ca++	Mg++	CO3 --	HCO3-	Cl-	SO4--
3.54	1.46	3.43	1.38	0.19	2.92	2.96	3.74

Available macronutrients (mg/100 g soil)			Available micronutrients (mg/kg)			
N	P	K	Fe	Zn	Mn	Cu
14.74	4.08	15.62	10.31	0.08	4.19	0.013

The main plots were occupied by poultry manure treatments at the rates (0, 2, 4 and 6 ton fed^{-1}) and the foliar application of Mono ammonium phosphate (10 N: 55 P: 10 K) at a rate of 0, 1, 2 and 3 % were allocated randomly in the sub-plots. Foliar spray of Mono ammonium phosphate was applied in three doses during the growth stage of Sesame *(Sesam umindicum L.)* cv. Shandwell plants. The interaction of different concentrations of both compounds was also assessed in addition to untreated plants (control). Chemical analysis of poultry manure was: pH (1:2 soil water extract) 7.25, C: N ratio 16.3, N content (%) 2.51, P content (%) 1.22 and K content (%) 1.33.

Irrigation Water Regime

Drip irrigation regime was applied depending on the water requirement of Crop, to fulfill sufficient irrigation (full water requirement) and deficit irrigation (half of water requirement). Estimation of irrigation levels was carried out based on the irrigation control done by manual valves for each experimental plot.

Yield Parameters

Plant samples were collected after harvest to measure the growth parameters such as, Plant height, Capsule's number /plant, capsules weight and 1000 seed weight.

Biological Yield

The total biomass of the harvested plants (kg plot^{-1}), then it was transformed into ton per feddan.

Seed Yield (ton fed^{-1})

It was obtained as the weight of clean seeds of the plot after threshing, and then it was transformed into tone per feddan.

Economic Analysis

The prices of the inputs that were prevailing at the time of their use were considered for working out the cost of cultivation.

Net Returns

Net returns per hectare were calculated by deducting cost of Cultivation per feddan from gross income per feddan.

$$\textbf{Benefit cost ratio} = \frac{\text{Gross return (L.E fed-1)}}{\text{Total cost of cultivation (L.E fed-1)}}$$

Statistical Analysis

A combined analysis of data for the two seasons were statistically analyzed according to the technique of analysis of variance (ANOVA) for the split–plot design using MSTAT-C, (1988) computer software package. Least Significant Difference (LSD) method was used to test the differences among treatment means at 5% level of probability as described by Walworth and Sumner, (1987).

Results and Discussion

Yield Parameters of Sesame

Data in Table (2) and figures (1a, 1b) showed the effect of poultry manure and MAP

application on some plant characters of sesame under two irrigation treatments (sufficient and deficit irrigation). Data on hand revealed that the lowest yield parameters were observed at untreated (control) under water stress. Also, it is clear to mention that application of 6-ton poultry manure per feddan combined with 3% P foliar spray gave the highest values of plant height (150.9, 123.1 cm), Capsule's number /plant (86.6, 65.6), capsules weight (67.5, 51.7 g) and 1000 seed weight (5.94, 4.40 g) under sufficient irrigation and water stress condition, respectively.

Table (2): Yield characteristics of Sesame plant as affected by Poultry Manure and MAP foliar application

Poultry manure	MAP*	Plant Height (cm)		Capsule's number /plant		Capsule's weight / plant (g)		1000 Seed wt.	
		SI	*DI*	*SI*	*DI*	*SI*	*DI*	*SI*	*DI*
Zero (ton fed^{-1})	**Zero**	87.8	70.8	47.0	37.2	44.7	33.6	4.09	3.35
	1 (%)	98.8	78.8	54.1	42.4	48.0	35.2	4.64	3.48
	2 (%)	115.8	92.1	70.0	54.7	49.4	40.0	4.94	3.85
	3 (%)	127.0	103.7	73.8	62.7	59.0	42.5	5.40	4.08
(2) (ton fed^{-1})	**Zero**	98.4	74.6	52.4	40.4	48.8	35.9	4.71	3.65
	1 (%)	106.	84.1	58.4	45.8	51.2	37.8	4.72	3.70
	2 (%)	118.	93.6	71.1	57.2	51.5	41.7	5.04	3.85
	3 (%)	130.	108.	80.3	61.2	65.0	46.8	5.62	4.30
(4) (ton fed^{-1})	**Zero**	111.1	85.7	62.4	46.6	54.1	40.0	4.76	3.79
	1 (%)	114.3	89.5	69.4	52.6	57.7	41.3	4.78	3.88
	2 (%)	124.5	99.9	73.8	57.1	59.6	45.1	5.29	4.03
	3 (%)	149.3	121.4	85.5	67.5	66.5	52.5	5.84	4.40
(6) (ton fed^{-1})	**Zero**	111.8	88.0	64.1	48.5	57.1	41.1	4.77	3.82
	1 (%)	116.8	93.4	70.4	55.2	58.7	43.7	5.03	3.92
	2 (%)	124.6	100.2	73.8	57.0	59.7	45.1	5.30	4.03
	3 (%)	149.4	121.5	85.5	67.7	66.5	50.1	5.84	4.40
LSD	**PM**	2.012	1.852	2.658	0.985	0.986	1.325	0.051	0.078
	MAP	1.124	1.236	6.124	2.031	0.932	1.064	0.062	0.063
	Interaction	2.181	2.147	7.142	1.845	1.524	1.978	0.136	0.102

** **MAP:** Mono Ammonium Phosphate* ***SI;** Sufficient irrigation* ***DI;** Deficit Irrigation*

Also, one can notice that water stress has a negative effect on the studied yield parameters and the highest reduction was recorded at control treatment. Regarding to the mean value of yield parameters, data in Table (2) indicated that the poultry manure treatments effects were arranged in descending order as follows: 4=6 ton > 2 ton > control. Regarding the effect of MAP fertilizer application on the yield parameters under both sufficient irrigation and water stress treatments, resulted data clear that 3% P foliar spray followed by 2% P foliar spray gave the highest values under both irrigation treatments while control (untreated) recorded the lowest ones. This study observed that plant height, that is, growth rate increased with spacing. This is in line with studies by other researchers who reported increase in plant height in closely spaced green pepper in Kenya, E. *et al*., (2017).

According to the effect of irrigation treatments on the Capsule's number /plant and capsules weight, results indicated application of 6-ton PM/fed gave the highest increased percentage (21.27, 17.36%) and (22.18, 19.23%) and control treatment gave the lowest one under sufficient and deficit irrigation treatment, respectively.

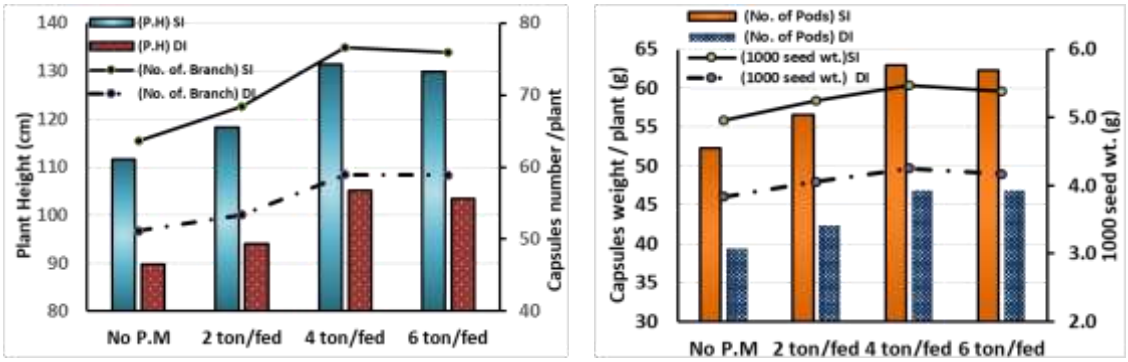

Fig (1a): Mean effect of Poultry manure on yield characteristics of sesame plant

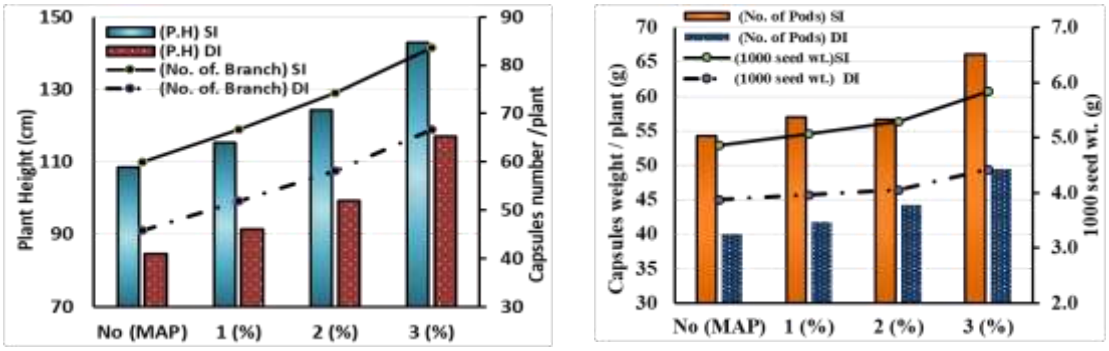

Fig (1b): Mean effect of MAP on yield characteristics of sesame plant

Also, the highest reductions induced by water stress as compare to sufficient irrigation. Results showed the same trend was recorded the highest and lowest 1000 seed weight values, respectively.

According to effect of MAP fertilizer effect on Capsule's number /plant and capsules weight, resulted data mention that application of 3% P foliar spray gave the highest increased percentage (39.65, 40.63) and (21.8 and 23.21%) values under both irrigation treatments. The maximum reduction in plant height, capsules number and weight relative to effect of water stress was obtained at control treatment. Regardless water stress treatments, data on hand (Table 36) indicated that values of the plant height and capsule weight were increased by (18.31, 18.75%) by application of 6-ton poultry manure/fed and (14.51, 17.27%) and (32.75, 38.25%) due to phosphorus application at a rate of 2 and 3% foliar spray as compare to control, respectively. It was also observed that increasing the rate of poultry manure led to increasing plant height of cayenne pepper. This observation corroborates other research findings on aromatic pepper **(Baiyeri. *et al.*, (2016)**.

Yield Production

Results in Table (3) showed the effect of poultry manure and Mono Ammonium Phosphate (MAP) application on Sesame yield under two irrigation treatments (sufficient and deficit irrigation). Data on hand revealed that the lowest Sesame seed yield was observed at untreated (control) under water stress. Also, it is clear to mention that the application of 6-ton poultry manure per feddan combined with 3% MAP foliar spray gave the highest values of seed yield (805.4, 569.5 kgfed^{-1}) and biological yield (2124, 1892 kg fed^{-1}) under sufficient and deficit irrigation water, respectively. Also, one can notice that water stress has a negative effect on harvest index and the highest reduction were recorded at control treatment.

Table (3): Yield productivity of Sesame plant as affected by poultry manure and MAP

Poultry manure	MAP*	Seed yield (kg/fed)		Biological yield (kg/fed)		Harvest index (%)	
		SI	DI	SI	DI	SI	DI
Zero (ton/fed)	Zero	510.0	393.1	1836.7	1490.1	27.8	26.4
	1 (%)	540.8	409.7	1889.6	1538.5	28.6	26.6
	2 (%)	563.9	421.1	1946.6	1592.5	29.0	26.4
	3 (%)	575.4	430.0	1997.1	1654.2	28.8	26.0
(2) (ton/fed)	Zero	529.5	411.6	1876.9	1521.0	28.2	27.1
	1 (%)	569.4	425.7	1921.6	1563.4	29.6	27.2
	2 (%)	622.8	443.0	1957.1	1643.0	31.8	27.0
	3 (%)	644.9	475.7	2019.1	1676.0	31.9	28.4
(4) (ton/fed)	Zero	565.8	425.4	1918.1	1543.3	29.5	27.6
	1 (%)	619.9	430.9	1947.0	1594.9	31.8	27.0
	2 (%)	641.1	462.1	1989.4	1643.3	32.2	28.1
	3 (%)	674.7	501.3	2036.2	1678.7	33.1	29.9
(6) (ton/fed)	Zero	593.9	440.6	1930.5	1559.5	30.8	28.3
	1 (%)	630.5	452.2	1952.0	1637.5	32.3	27.6
	2 (%)	644.2	463.6	1997.7	1674.9	32.2	27.7
	3 (%)	686.0	504.5	2035.1	1710.8	33.7	29.5
LSD 0.05	PM	10.65	8.11	13.25	12.45		
	MAP	12.14	9.72	15.22	11.35		
	Interaction	21.27	16.21	16.99	12.88		

* **MAP:** Mono Ammonium Phosphate **SI;** Sufficient irrigation **DI;** Deficit Irrigation

Regarding to the effect of MAP fertilizer application on Sesame seed and biological yield under both sufficient and deficit irrigation water treatments, data cleared that application of 3% MAP foliar spray gave the highest values under both irrigation treatments while control (untreated one) recorded the lowest ones. According to the effect of irrigation treatments on Sesame yield, results indicated application of 6-ton/fed poultry manure gave the highest increased percentage of seed yield (20.25%), biological yield (2.64%) under sufficient irrigation and seed yield (16.24%) biological yield (5.67%) under deficit irrigation, and control treatment gave the lowest one. Also, the highest reductions induced by water stress as compare to sufficient irrigation. This could be attributed to the fact that the poultry manure supplied essential nutrients for enhanced productivity (Dauda. *et al*., 2008).

According to effect of MAP fertilizer effect on Sesame yield, resulted data mention that application of 3% MAP foliar spray gave the highest increased percentage of seed yield (13.21 and 9.03%) and biological yield (3.84 and 10.11%) under both irrigation treatments. The maximum reduction in biological yield relative to effect of water stress was obtained at control treatment. Regardless water stress treatments, data on hand (Table 3) indicated that values of seed and biological yield were increased by (18.54%), (4.01%) by application of 6-ton poultry manure/fed and (11.42%), (6.64%) due to MAP application at a rate of 3% foliar spray as compare to control, respectively. Similar results were shown by Ismael, (2007) Amaranth plants with organic manure treatment had higher nutritional values in the entire plant (leaf, stem, inflorescence and root) than those with inorganic fertilizer treatment (Mofunanya. *et al*., 2015).

The Economic Analysis of Seed Yield

Table (4) shows that the average total costs of the sesame crop were estimated at 8,500 L.E,

and the total revenue was about 15,500 L.E, while the net yield per acre was estimated at 7,000 L.E, and the agricultural price was estimated at 3000 L.E per ardeb, and the profitability of the spent pound, the ton produced, and the ratio of revenue to the costs are about 1.01, 1078.7, and 2.01 L.E, respectively. By the normal cultivation method, according to the data of the Ministry of Agriculture.

Table (4): Economic parameters for the sesame crop in 2019 by the normal Method without transactions

transactions	
Production costs	L.E 8000
Total revenue	L.E15000
The net yield of the feddan	L.E 7000
The price	3000 L.E / ardeb
Cost-benefit ratio	2.01 L.E
Profitability of the spent pound	1.01 L.E
Product profit per ton	1078.77 L.E

Source: Ministry of Agriculture and Land Reclamation, annual report bulletin, various issues.

Table (5): Production costs for sesame crop/feddan without treatment

S. No	**Particulars**	**Prices (L.E)**	**Quantity**	**Costs (L.E)**
Inputs				
1. Cost of Sesame seeds		1 kg = 50.0	4Kg	200
2- Fertilizers :				
	Ammonium nitrate (33.5 %)	4.1/Kg	100Kg	410
	Potassium sulfate	4/ kg	100Kg	400
3- Plant protection chemicals				
	Stomp	200 / liter	1	200
	Laniet	140 / liter	1	140
	Malathion	100 / liter	1	100
	Knapsack sprayer	50	1	50
4- Irrigation		100	10	1000
5- Labour Charges				
1	**Men**	100 L.E /day	100	1000
Land rent		5000 L.E / Fed	1	5000
Total costs	8300			
RETURNS (L.E)	**Sesame**	25 .LE/KG	0.520 Ton	13000
net return (L.E)				4500

Source: collected and calculated from the experiment data

Table (5) Shows the total production costs, the total revenue, and the net return for cultivating one feddan of sesame crop without adding (mono ammonium phosphate - poultry manure), Where the total costs amounted to about 8,300 L.E, the total revenue amounted to about 13,000 L.E, and the net return amounted to about 4,500 L.E.

Gross Returns and Net Returns

Water stress is one of the most important abiotic stresses that may limit agriculture production worldwide. Data in Table (6) and represent the effect of Poultry manure and MAP and their interactions under sufficient and deficit irrigation treatment on the economic analysis of seed yield of sesame

plant. Data indicate the important role of Poultry manure and MAP application in alleviating drought-induced changes of sesame. In respect of the economic analysis of sesame, among Poultry manure application, the highest gross returns (LE. 15100), net returns (LE. 6500) and Benefit: cost ratio (1.756) was observed for sesame seeds received 4 ton/fed poultry manure followed by the treatment receiving 6 ton/fed poultry manure (LE.15020, LE. 6350 and 1.732) combined with foliar MAP application (3%) under sufficient irrigation as compared to other treatments and the lowest observed in the control treatment (LE. 11625, LE. 3327 and 1.401), respectively.

Table (6): Economies of Sesame plant an affected by interaction between of poultry manure with mono-ammonium phosphate

Treatment		Grain yield (Kg fed^{-1})	Total cost invested (L.E/fed)	Gross returns (L.E/fed)	Net returns (L.E/fed)	Benefit Cost ratio	T.N.I*
PM	**MAP**	**Sufficient irrigation**					
Zero (ton/fed)	**Zero**	465.1	8300	11627	3327	1.401	***
	1 (%)	493.6	8335	12341	4006	1.481	714
	2 (%)	515.5	8385	12888	4503	1.537	1261
	3 (%)	526.0	8406	13150	4744	1.564	1523
(2) (ton/fed)	**Zero**	474.9	8500	11873	3373	1.397	246
	1 (%)	508.3	8515	12707	4192	1.492	1080
	2 (%)	535.0	8520	13376	4856	1.570	1749
	3 (%)	581.4	8530	14535	6005	1.704	2908
(4) (ton/fed)	**Zero**	493.8	8549	12345	3796	1.444	718
	1 (%)	545.3	8561	13632	5071	1.592	2005
	2 (%)	577.2	8582	14431	5849	1.682	2804
	3 (%)	604.0	8600	15100	6500	1.756	3473
(6) (ton/fed)	**Zero**	501.1	8620	12526	3906	1.453	900
	1 (%)	560.5	8635	14014	5379	1.623	2387
	2 (%)	577.9	8655	14448	5793	1.669	2821
	3 (%)	600.8	8670	15020	6350	1.732	3393
Deficit irrigation							
Zero (ton/fed)	**Zero**	359.0	7800	8975	1175	1.151	
	1 (%)	374.7	7810	9367	1557	1.199	392
	2 (%)	384.9	7820	9623	1803	1.231	648
	3 (%)	393.4	7830	9834	2004	1.256	859
(2) (ton/fed)	**Zero**	364.4	7855	9109	1254	1.160	134
	1 (%)	379.4	7900	9485	1585	1.201	510
	2 (%)	398.5	7925	9962	2037	1.257	987
	3 (%)	430.3	7935	10756	2821	1.356	1781
(4) (ton/fed)	**Zero**	374.8	7946	9369	1423	1.179	394
	1 (%)	391.3	7960	9783	1823	1.229	808
	2 (%)	412.1	7974	10303	2329	1.292	1328
	3 (%)	446.3	8002	11158	3156	1.394	2183
(6) (ton/fed)	**Zero**	401.1	8020	10028	2008	1.250	1053
	1 (%)	403.4	8025	10085	2060	1.257	1110
	2 (%)	416.5	8037	10412	2375	1.295	1437
	3 (%)	456.9	8042	11421	3379	1.420	2446

T. N. I: Treatment Net Income over Control.

Whereas, under water stress treatment, application of Poultry manure fertilizer had increased gross returns, net returns and Benefit: cost ratio of sesame. The sesame plant receiving 3% foliar application of MAP registered the highest gross returns (LE. 11421), net returns (LE. 3379), Benefit: cost ratio (1.420) followed by 3% MAP foliar application (LE. 11158, LE. 3156 and 1.394) in combination with 4 ton/fed Poultry manure fertilizer as compared to other treatments (zero and 1% MAP). The mean date of the economic analysis of sesame influenced by application of Poultry manure fertilizer indicates that the maximum net returns were registered in the treatment receiving 6 ton/fed Poultry manure, and the lowest on observed at control treatment without application of Poultry manure under deficit irrigation. This practice can help to obtain higher profit over conventional application of recommended dose of fertilizers to the crop.

Conclusion

The application of poultry manure and mono ammonium phosphate (MAP) is the most effective for maximizing yield parameters and biological and seed yield under water stress conditions. It can be rec ommended to spray sesame with 3% of MAP with 4 and 6 ton of poultry manure under water stress conditions to minimize the harmful effects of drought stress on plant growth and productivity. The maximum net returns were registered in the treatment receiving 4 ton/fed Poultry manure under deficit irrigation. This practice can help to obtain higher profit over conventional application of recommended dose of fertilizers to the crop.

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