The Effect of Animal Manure on the Yield of Wheat (Mazar99)

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Abstract: *Field experiment has been carried out at Baghlan province 2016-2017. 4 rates of animal manure fertilizer at 4 replication in a randomize complete block design (RCBD), the length of rows 4 m, wide of plots 1:20cm, plot size 4:80 m^2 ,planting area76.8m^2 ,distance between rows 20cm , Number of rows 6 , distance between varieties 60cm, Seed rate 12gr/ m2, depth of sowing 2.5cm, date of planting 12-11-2016, date of harvesting 15-6-2017, number of irrigation 4 , number of weed control 4, number of fertilizer 4 rates of animal manure (T1- Fertilizer 0 , T2- Fertilizer 3 ton/h , T3- Fertilizer 6 ton/ha, T4- Fertilizer 9 ton/ha). We used from some available agricultural tools such as 3pall, 9 pall, roller and some other equipment necessary from cultivation up to harvesting time. The result indicated that the optimum amount of animal manure 6 ton/ ha is the best rate of animal manure fertilizer, Hence the appropriate dose of animal manure is needed to reach the maximum grain yield with high quality depend on the soil fertility and environmental factors. Therefore based on soil condition and climatic factors the best amount of Animal manure fertilizer is 6-8 ton/ha.*

Keywords: animal manure fertilizers, soil fertility, plant nutrients and soil physical properties and wheat yield

1. Introduction

Animal manure is very important for soil fertility and soil condition which enhance the productions. Furthermore, it improves the soil physical properties; increase soil infiltration rate and water holding capacity. animal manure is environmentally friendly it's not harmful to the soil organisms and crops. (https://www.ijsr.net/archive.pdf) The cultivation of wheat (Triticum spp.) reaches far back into history, Wheat was one of the first domesticated food crops and for 8 000 years has been the basic staple food of the major civilizations of Europe, West Asia and North Africa. (1:2,3) Today, wheat is grown on more land area than any other commercial crops and continues to be the most important food grain source for humans. As it is well-known the production of high quality wheat is very important for the production in a country. (6: 7)

After 1960, due to replacement of recycling of organic wastes and application of inorganic fertilizers with the introduction of new crop varieties, the physical conditions of the soils have become deteriorated particularly in rain fed areas of NWFP. This ultimately has accelerated soil erosion and there have been heavy losses of soil and plant nutrients. (4: 2, 3) This has resulted in poor soil fertility of eroded marginal lands. There is a need to develop management strategies to use both organic and inorganic sources of plant nutrients for sustained crop production. In addition to restricted use of organic manures, inorganic fertilizers are applied at very low rates and imbalanced proportions. (3: 150-158) Balanced application of plant nutrients and integrated plant nutrient management has proved to enhance crop yields. (7) As it is well-known the production of high quality wheat is very important for the production in a region or country. Consequently, the goal of this research is to investigate the possibility of yield improvement and baking quality of wheat due to appropriate use of fertilizer.

(Animal manure) The investigations would focus on practical methods in field experiments. Animal manure plays a vital role in all living tissues of the plant (2: 443-448). Farmyard manure plays a vital role in increasing the yield of the crop. Application of proper amount of animal manure is considered key to obtain bumper crop of wheat (5). Animal manure support the synthesis of total dry matter of plants and their elements are constituents of many fundamental cell components such as nucleic acids, amino acids, enzymes, and photosynthetic pigments.(8)

Objective

To investigate and identified the effects of 4 rate animal manure application on the different stages of wheat growing, including Seed germination, number of plant/m^2 , number of teller/plant, number of spike/m^2 , length of spike/cm , weight of 1000 seed/gr and yield of wheat (Mazar99) in the field experiment.

2. Materials and Methods

Field experiment located at Baghlan province 2016-2017. 4 rates of animal manure fertilizer at 4 replication in a randomize complete block design (RCBD), the length of rows 4 m, wide of plots 1:20cm, plot size 4:80 m^2 ,planting area76.8m^2 , distance between rows 20cm , Number of rows 6 , distance between varieties 60cm, Seed rate 12gr/ m2 =57.6 gr/Plot, depth of sowing 2.5cm, date of planting 12-11-2016, date of harvesting 15-6-2017, number of irrigation 4 , number of weed control 4, number of fertilizer 4 rates of animal manure fertilizer (T1- Fertilizer 0 , T2- Fertilizer 3 ton/h , T3- Fertilizer 6 ton/ha, T4- Fertilizer 9 ton/ha).
I used from some available agricultural tools such as 3pall, 9 pall, roller and some other equipment necessary from cultivation up to harvesting time.

Table 1: Show the location and altitude, longitude, annual precipitation .etc. of trial.

Temperature/c^o		Soil property	annual precipitation (mm)	Longitude	Latitude	Altitude	Location
-2.4	33.1	Clay loam	271	68-45- E	Dec-36	510	Baghlan province

Table 2: Shows design of 4 Treatment of animal manure Fertilizer at 4 Replication

R-4	Canal of Irrigation	Level				Level
		P16 (T2)	P15 (T4)	P14 (T3)	P13 (T1)	
		Canal of Irrigation				
R-3		P9 (T3)	P10 (T2)	P11(T1)	P12(T4)	
R-2		P8 (T2)	P7 (T1)	P6 (T4)	P5 (T2)	
		Canal of Irrigation				
R-1		P1 (T1)	P2 (T2)	P3 (T3)	P4 (T4)	
		Level				

P= Plot, T= Treatment, F= fertilizer

Data recording

It has been calculated and recorded the number of plants/m^2, number tellers/plant, number spike/ m^2, length of spike/plant also we record the length of stem/plant, weight of 1000 seed/plant. The method of data recording, 3 sampled has been taken from each plots and based on the calculation the mean of the sample result is recorded and after harvesting wheat the products of all plots has been weighed and recorded in the record book.

For the Statistical analysis - ANOVA using IBM SPSS Statistics 20 software. Mean separations was done by using the Duncan test. $p < 0.05$ were considered as significant.

Figure 1: Show the Soil preparation, cultivation and data recording of different step of wheat growing

3. Result of research

Number of plants /m^2

From this four treatments of animal manure, the number of plants /m^2 of treatment 3 (6ton/ha) is 863.75 In first step and the number of plant /m^2 of treatment 4 (9 ton/ha) is 688.75 in the second step and the number of plant /m^2 of treatment 2 (3 ton/ha) is 579.25 in the third step and the number of plant /m^2 of treatment 1 (0 ton/ha) is 385.5 in the fourth step of plant/m^2. The animal manure has positive effect on the number of plant/m^2 and number plant/ m^2 have positive effect on the yield of wheat.
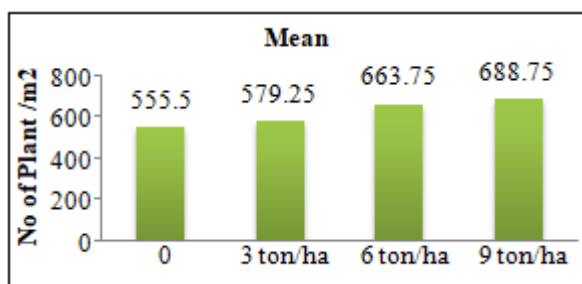
Number of tellers /plant

The number of tellers /plant of treatment 3 (6 ton/ha) is 5.6 In the first level and the number tellers /plant of treatment 4 (9 ton/ha) is 5.2 in the second level and the number of tellers /plant of treatment 2 (3 ton/ha) is 4.3 in the third level and the number of tellers /plant of treatment 1 (0 ton/ha) is 3.8 in the fourth level of tellers /plant.

The animal manure has positive effect on the number of tellers/plant and the number tellers /plant have positive effect on the yield of wheat.
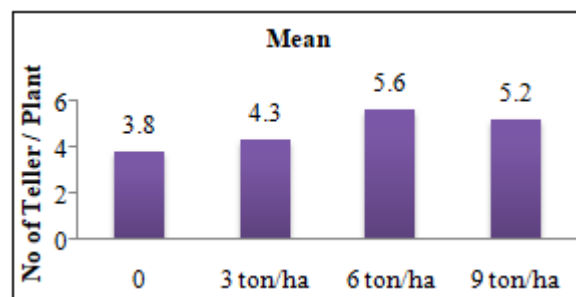

Figure 2: Effect of Animal Manure on the Number of plant/M2

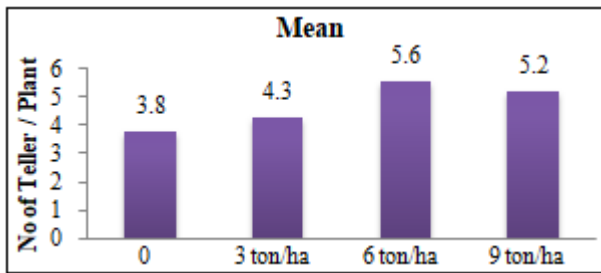**Figure3:** Effect of Animal Manure on the Number of Teller/M2

Figure3: Effect of Animal Manure on the Number of Teller/M2

Number of Spike /m²

The number Spike /m² of treatment 3 (6 ton/ha) is 650.5 in the first level and the number Spike /m² of treatment 4 (9 ton/ha) is 578 in the second level and the number of Spike /m² of treatment 2 (3 ton/ha) is 416 in the third level and the number of Spike /m² of treatment 1 (0 ton/ha) is 365 in the fourth level of Spike /m²

The animal manure has positive effect on the Number of Spike /m² and the Number of Spike /m² have positive effect on the yield of wheat.
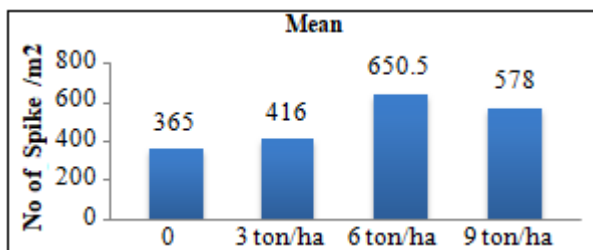

Figure 4: Effect of Animal Manure on the Number of Spike/M2

Length of Spikes/cm

The Length of spike of treatment 3 (6 ton/ha) is 11cm in the first level and the length of Spike of treatment 4 (9 ton/ha) is 10.5 in the second level and length of Spike of treatment 2 (3 ton/ha) is 9.75 in the third level and the Length of Spike of treatment 1 (0 ton/ha) is 9.3 in the fourth level of length of Spike.

The Length of Spike shows the effect of animal manure in the growth of plant in the field. The Length of Spike has positive effect on the yield of wheat. The animal manure has positive effect on the Length of Spike/cm and the number of Spike /m²

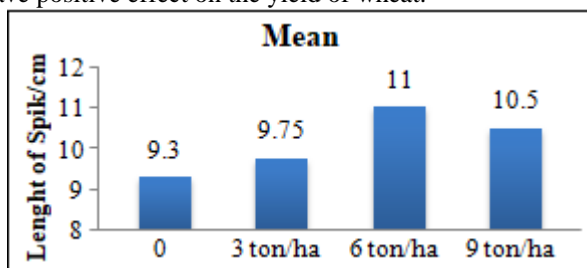Have positive effect on the yield of wheat.

Figure 5: Effect of Animal Manure on the Lenght of Spik/cm

Height of plants/cm

The plant height of treatment 3 (6 ton/ha) is 86 cm in the first level and the height of plant [of] treatment 4 (9 ton/ha) is 85.5 in the second plant and the height of plant of treatment 2 (3 ton/ha) is 83.4 in the third plant and the height of plant of treatment 1 (0 ton/ha) is 82.5 in the fourth position of height of plant.

The animal manure has positive effect on the height of plant/cm and the height of plant/cm

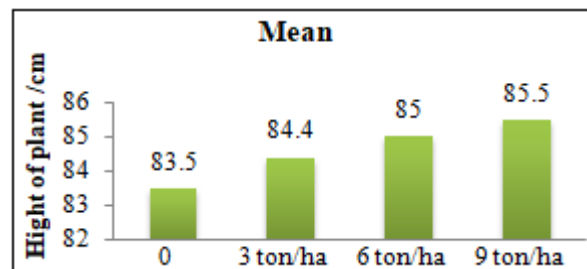Don't have positive effect on the yield of wheat.

Figure 6: Effect of Animal Manure on the Height of plant/cm

Weight of 1000 seed/gr

The weight of 1000 seeds of treatment 3 (6 ton/ha) is 56.5 gr in the first level and the weight of 1000 seed of treatment 4 (9 ton/ha) is 52.75 gr in the second level and the weight of 1000 seed of treatment 2 (3 ton/ha) is 50.4 gr in the third level and the weight of 1000 seed of treatment 1 (0 ton/ha) is 48 gr in the fourth level of height of plant. The different weight of 1000 seeds/gr show the animal manure has positive effects of the number of seed/plant of wheat.
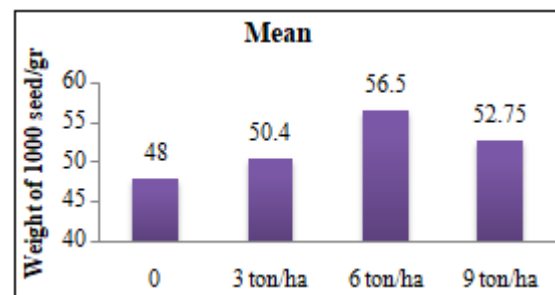

Figure 7: Effect of Animal Manure on the Weight of 1000 Seed/gr

Yield of wheat

The yield of wheat of treatment 3 (6 ton/ha) is 5.06 ton/ha in the first level and the yield of wheat of treatment 4 (9 ton/ha) is 4.42 ton/ha in the second level and the yield of wheat of treatment 2 (3 ton/ha) is 4.23 ton/ha in the third level and the yield of wheat of treatment 1 (0 ton/ha) is 3.57 ton/ha in the fourth level of yield.

This result show that animal manure has positive effects on the yield of wheat, but the 6 ton /ha of animal manure is the optimum animal manure in Baghlan province of Afghanistan. In addition it is indicated that 6 and 9 ton/ha of

animal manure is the optimum animal manure fertilizer in

Baghlan province of Afghanistan.

Table 3: Shows the , total , average , yield kg/jerib, yield tone /ha

	Treatments	R-1	R-2	R-3	R-4	Total	Average	Yield kg/jerib	yield ton/ha
V-Mazar 99	F1-0	1.91	2.375	1.85	1.3	7.435	1.85875	714.904	3.57
	F2- 3	2.3	1.99	2.5	2	8.79	2.1975	845.192	4.23
	F3 - 6	2.375	2.275	2.89	2.98	10.52	2.63	1011.538	5.06
	F4- 9	2.7	2.6	2	1.89	9.19	2.2975	883.654	4.42
	Total	9.285	9.24	9.24	8.17	35.935	8.98375	3455.288	17.276

This result show the high yield from Treatment 3(6 ton/ha) of animal manure 5.06 ton/ha.

Figure 8: Effect of Animal Manure on the Yield of wheat
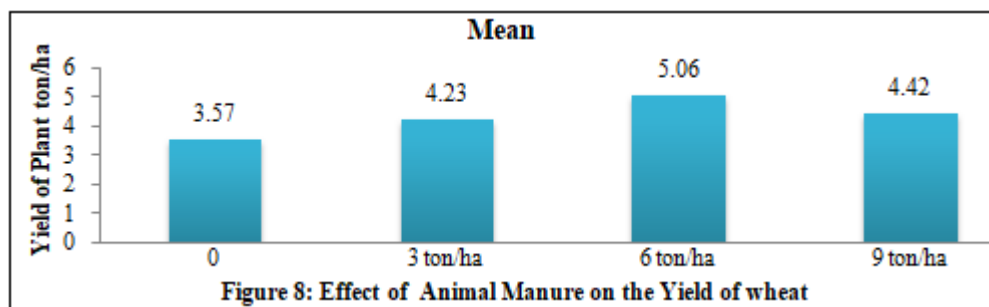
This result show the high yield from Treatment 3(6 ton/ha) of animal manure 5.06 ton/ha.

The analytical methods of the wheat yield measurement
ANOVA TABLE

Table 4: Show the Statistic analyze result of experiment

Source of Variation	Degree of freedom	sum of Sgaures	Mean Sguares	Computed F	Tabular F 5%	Tabular F 1 %	Probability	Leas Significant different		T-Tabular 5 %	T-Tabular 1 %
S.V	DF	SS	MS	FC	FT5%	FT 1%	PRB	LSD 5%	LSD 1%	T 5 %	T 1 %
TRT	3	1.21	0	3	3	4	0.122633	0.52	0.67	3.69	4.781
REP	3	0	0	0	3	4	0.715322				
ERROR	9	1.43	0	Significant							
TOTAL	15	3									

C.V= 4.44

This result shows the significant result in treatment and non significant result in replication.

4. Conclusions and Recommendation

The aim of the experiment is to identify the effect of animal manure fertilizer on the yield of wheat (Mazar99) in Baghlan province. Based on the research outcome the yield of T3- F 6 ton/ha is (5.06 ton /h) in the first level of yield and `the `yield of T4 - F 9 ton/ha is (4.42 ton/ha) in the second level and the yield of T 2 – F 3 ton/ha is (4.23 ton/ha yield) in the third level and the yield of T1– F 0 is (3.57 ton/ha) in the fourth level of yield.

The result indicated that treatment of T3- F 6 ton/ha or between 6 and 9 ton/ha is optimum fertilizer of animal manure in Baghlan Province. Based on the result if the farmer of Baghlan province applied 6 -9 ton/ha of animal manure, this is the best rate to increase the yield of wheat.

The result support that the optimum animal manure of Pozae-shan baghlan is 6 ton/ ha and it's estimated that between 6- 9 ton/ha of animal manure is needed to reach the maximum grain yield with high quality depend on the soil fertility.

Also the animal manure have positive effects on the number of tellers/plant, number of spikes/m^2 ,length of spikes/cm, weight of 1000 seed and yield of plant. But animal manure

fertilizer did not have effects on the number of plants/m^2 and height of plant.

I recommend to the farmers of Baghlan Province to apply the appropriate amount of animal manure on his field, but the different rates of animal manure depend on the location and soil fertility.The optimum rate of animal manure fertilizer in most areas of Baghlan province is 6 ton/ha or 6 - 9 ton/ha.

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