SUMMARY

The objective of this study was to investigate the effect of some weed control treatments and combinations between chemical , bio-organic fertilization on growth, yield and its components of wheat Sakha-93 sown by two methods in ridges or in rows, also, fresh and dry weights of associated weeds either broad leaved or grassy weeds.

Two field experiments were carried out during winter season of 2004/2005 and 2005/2006 in the Experimental Station of the National Research Centre, Shalakan District, Kalubia Governorate, Egypt, where the soil was clay loam in texture, moderate in $CaCO_3$ %,pH 8.1 and organic matter 2.1 % .

The experiments included 30 treatments, which were the combinations of two sowing methods, three weed control treatments and five bio-organic and chemical fertilization treatments.

The treatments of the experiment were as follows:

A. Sowing methods:

1. In ridges.
2. In rows.

B. Weed control treatments:

1. Unweeded (control).
2. Hand weeding - twice (after 30 and 60 days from sowing).

3. Chemical weeded (Panther 55 % SC (isoproturon) 500 g/L. (urea group) + Deflophenikcan pyridine carboxamide group50 g/L.) at the rate of 600 cm^3/feddan. The herbicidal treatment was applied at 2-3 leaf stage of wheat using knapsake sprayer (200 liters of water/fed.) + 0.1 % teepol as wetting agent.

C. Fertilization treatments

1- 100 % recommended dose of organic fertilizer- 10 m^3 / fed. In form of chicken manure and bio-fertilizer (cerealine)

2- 75 % recommended organic fertilizer + 25 % recommended of NPK chemical fertilizers.

3- 50 % rec. org. fert. + 50 % rec. NPK fert.

4- 25 % rec. org. fert. + 75 % rec. NPK fert..

5- 100 % rec. NPK fert. (75N –31.0 P2O5 –48.0 K2O) kg/fed.

Cerealine contain *(Azospirillum spp.*)- commerical product of biofertilizer produced by General Organization of Agriculture Equalization Fund (GOAEF) - Ministry of Agriculture, Egypt used with each treatment contain organic fertilizer.

The treatments were arranged in split-split plot design with four replications. The main plots were assigned for sowing methods, sub plots were devoted randomly to weed control and fertilization treatments were allocated randomly in sub-sub plots.

Plant samples were taken at 75 and 105 days after sowing DAS to study the following characters

1. Weeds:

Samples of weeds for each plot were taken at 75 and 105 DAS to determine:

1- Fresh weight of broad leaved (g/m^2).

2- Dry weight of broad leaved (g/m^2).

3- Fresh weight of grassy weeds (g/m^2).

4- Dry weight of grassy weeds (g/m^2).

5- Fresh weight of total weeds (g/m^2).

6- Dry weight of total weeds (g/m^2).

2. Wheat growth characters:

Samples of wheat plants were taken at 75 and 105 DAS for each plot to tedermine:

1- Plant height (cm).

2- Number of tillers/m^2.

3- Fresh weight of tillers (g/m^2).

4- Dry weight of tillers (g/m^2).

5- Number of leaves /m^2.

6- Fresh weight of leaves (g/m^2).

7- Dry weight of leaves (g/m^2).

8- No. of spikes/m^2 at 105 (DAS).

9- Fresh weight of spikes (g/m^2) at 105 (DAS).

10- Dry weight of spikes (g/m^2) at 105 (DAS).

11- Leaf area LA (cm^2)

12- Leaf area index LAI.

3- Yield and yield components:

At harvest two central ridges or rows from each plot were harvested to estimate the yield components. Harvest index % calculated by dividing grain yield on biological yield/fed x 100.

1- Plant height (cm).

2- Number of tillers/m^2.

3- Number of spikes/m^2.

4- Spike length (cm).

5- Spike weight (g).

6- Grain weight of spike (g).

7- 1000-grain weight (g).

All plants for each plot were harvested to determine the following characters:

8- Grain yield (kg/fed)

9- Straw yield (kg/fed)

10- Biological yield (kg/fed)

11- Harvest index %

4- Chemical composition of wheat grains:

Chemical composition of wheat grains was determined for protein, phosphorus and potassium

1- protein yield (kg/fed.).

3- Potassium yield (kg/fed.).

2- phosphorus yield (kg/fed.).

The obtained results could be summarized as follows:

A- Effect of sowing methods treatments:

- Sowing method in ridges decreased fresh and dry weight of both broad leaved and grasses also, total weeds / m^2 at 75 and 105 DAS, the differences were significant in all characters except broad leaved dry weight at 75 DAS.
- Sowing in ridges clearly recorded the best values for all studied characters at 75 and 105 DAS except for tillers fresh weight / m^2 at 75 DAS and LA at 75 - 105 DAS.
- Data cleared that sowing in ridges significantly surpassed sowing in rows in no. of tillers/m2 no. of spikes/m2; spikes length; weight of grains / spike; spike weight whereas sowing in rows surpassed sowing in ridges in plant height and 1000-grains weight by insignificant differences
- Sowing in ridges recorded the highest yield kg /fed. , straw yield kg /fed., biological yield kg /fed.and harvest index % .
- Sowing in ridges significantly surpassed sowing in rows in wheat grains content of protein, phosphorus and potassium as kg/fed.

B- Effect of weed control treatments:

- Chemical weeded significantly decreased broad leaved , grassy weeds and total weeds either fresh or dry / m2 at both samples 75 and 105 DAS.

- Chemical weeded produces the tallest plants; highest no., fresh and dry weight of tillers and leaves/m^2 at 75 and 105 DAS also, no., fresh and dry weight of spikes/m^2 at 105 DAS; LA and LAI at 75 DAS. Hand- weeding gave the highest value of LA, LAI at 105 DAS.
- Chemical weeded had superiority compared to handweeding and unweeded in no of tillers/plant; no. of spikes/m^2; spikes length; spikes weight; weight of grains/spike; 1000-grains weight; whereas control gave the tallest plants
- Hand weeding gave the highest grain yield kg/fed. , harvest index%.
- With significant differences, and highest straw and biological yields/fed.
- The treatment of chemical weeded gave the heaviest content of protein, phosphorus and potassium in wheat grains as kg /fed.

C- Effect of bio-organic fertilization treatments:

- Treatment of 25 % rec. org. fert. + 75 % rec. chem. fert gave the lowest weight of broad ,grasses and total weeds /m2 at 75 and 105 DAS .
- Regarding fertilization 100 % rec. chem. fert. significantly surpassed others in all studies characters except leaves no., fresh and dry weights of leaves/m2 at 75 DAS and LA; LAI at 105 DAS and no. of spikes/m2 at 105 DAS.

rec. org. fert. + 75 % rec. chem. fert.) produced tallest plants and heaviest 1000-grains.

- Interaction of sowing method in ridges x 100 % rec. NPK gave the highest grain yield kg /fed. ,straw yield kg /fed.and biological yield kg /fed.
- Interaction of sowing method in ridges x 100 % rec. NPK gave the highest value of wheat grains protein and phosphorus content as kg/fed. but the interaction between sowing method in ridges x (25% rec. bio-organic fert. + 75 % rec. NPK) gave the best value of potassium as kg/fed.

F- Effect of interaction between weed control and bio–organic fertilization treatments:

- Interaction between chemical weeded x (25% rec. org. fert. + 75 % rec. chem.. fert.) gave the lowest weight of weeds .
- Regarding interaction of weed control and fertilization treatments, interactions of chemical weeds with (25 % rec. org. fert. + 75 % rec. chem.. fert.) or 100 % rec. chem.. fert. recorded highest value in most characters .
- Interaction between hand weeding x (25 % rec. bio-organic fert. + 75 % rec. NPK) gave the highest grain yield kg /fed. while Interaction between chemical weeded x 100% rec.of chem. fert. gave the highest straw yield kg /fed.and biological yield kg /fed.
- The highest content of protein, phosphorus and potassium recorded by interaction between hand weeding x (25 % rec. bio-organic fert. + 75 % rec. NPK.).

G- Effect of interaction between sowing methods,weed control and bio-organic fertilization treatments:

- Interaction of sowing in ridges × chemical weeded ×(25 % rec. org. fert. + 75 % rec. chem.. fert.) or 100% rec. NPK gave the lowest broad leaved , grasses and total weeds/m2 at 75 and105 DAS .

- Interaction of sowing in ridges × chemical weeded x100%rec. of NPK gave the highest no. of tillers/m2;spikes/m2,the tallest spike, the heaviest weight of spike , grain weight /spike and 1000grain weight .

- Interaction of the three factors revealed that the best interaction was sowing in ridges x chemical weeded x (25 % rec. org. fert. +75 % rec. chem. fert.)

- The highest grain yield kg/fed. produced by sowing in ridges x hand weeding x 25 % rec. org. fert. + 75 % rec. chem. fert. with significant differences and the greatest straw yield and biological yield kg /fed. gave by interaction between sowing in ridges x chemical weeded x 100% dose rec. of NPK .

- Interaction between sowing method in ridges x hand weeding weeds x (25 % rec. bio-organic fertilization + 75 % chemical fertilizer NPK) gave the highest content of protein, phosphorus and potassium in wheat grains as kg/fed., while the lowest content gave by interaction between sowing method in rows x unweeded x 100 % rec. bio-organic fertilization.

Generally it can be concluded that adding bio-organic fertilizers instead of part of the chemical fertilizers under the conditions of sowing methods in ridges and hand weeding weeded control to increase significantly the grain yield, straw yield, biological and protein yield for wheat/fed. This will be improve soil physical, biological and chemical properties, rationalize the consumption of such chemical fertilizers to protect the environment from chemical pollution and its harmful effect on the human and animal health and nutrition.