



Graduation Project



Effect of Treated Municipal Wastewater on Growth and Yield of Local Wheat Cultivars

Students: Khalid Yaseen, Waed Abdelraheem and Yahya Hannoun.

Supervisor : Dr. Munqes Shtaya

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Introduction

- **Water shortage in Palestine, is very serious**
- **The agriculture sector is a major consumer of groundwater.**
- **Wastewater reuse was identified to solve the water shortage problem in Palestine.**
- **Wheat is one of the most ancient cultivated cereals.**
- **The total cultivated area in the world is 218543071 ha producing 35312 hg/ha**
- **The total cultivated area in Palestine is 15489 ha producing 22301 hg/ha**



Objective

To compare the growth and the yield of different wheat cultivars irrigated with fresh and treated wastewater.

Materials and Methods

Plant material

- Four local wheat cultivars Dubbie, Anber, Nab Aljamal and Kahatat were used in this study.

Experimental design: factorial design with three replicates.





Materials and Methods



Treatments:

- Treated wastewater from Nablus station was used, and fresh water was used as control.
- No fertilizers were added to the treated water.
- 3 g/l of Urea was added to the fresh water.
- Plants were irrigated twice a week.



Materials and Methods

Data Collection

During the growing season the following data will be collected:

1. Days to heading.
2. Days to maturity.
3. Tiller number.
4. Spike number per plant
5. Flag leaf Chlorophyll content.
6. Flag leaf area (using leaf area meter)
7. Plant height.

After harvest the following data will be collected:

1. Total grain yield.
2. Vegetative biomass.
3. Spike length.
4. Thousand seed weight.



Results:

Table 1: The effect of treated wastewater on days to heading and days to maturity

Treatment	Days to heading	Days to maturity
Control	80.08 ^a	91.25 ^a
Treated wastewater	79.50 ^a	91.30 ^a

Accessions	Days to heading	Days to maturity
Nab Aljamal	91.00 ^a	97.50 ^a
Kahatat	85.67 ^b	97.50 ^a
Anbar	74.00 ^c	84.83 ^a
Dubbe	68.50 ^d	84.67 ^a

Means that do not share a letter are significantly different.



Table 2: The effect of treated wastewater on plant height (cm) and flag leaf area (mm) at maturity

Treatment	Plant height (cm)	Flag leaf area (mm)
Control	64.46 ^a	3358.04 ^a
Treated wastewater	56.46 ^a	3877.29 ^a
Accessions		
Nab Aljamal	75.92 ^a	3548.17 ^a
Kahatat	66.67 ^{ab}	3456.83 ^a
Anbar	54.00 ^{bc}	3683.58 ^a
Dubbie	45.25 ^c	3782.08 ^a

Means that do not share a letter are significantly different.



Table 3: The effect of treated wastewater on chlorophyll content (SPDA)

Treatment	SPDA (heading stage)	SPDA (filling stage)
Control	51.73 ^a	49.92 ^a
Treated wastewater	53.72 ^a	47.67 ^a
Accessions		
Nab Aljamal	53.75 ^a	48.37 ^b
Kahatat	54.52 ^a	41.45 ^c
Anbar	48.35 ^b	51.13 ^{ab}
Dubbie	54.27 ^a	54.22 ^a

Means that do not share a letter are significantly different.



Table 4: The effect of treated wastewater on average tiller number and spike number

Treatment	Tiller number	Spike number
Control	4.74 ^a	2.81 ^a
Treated wastewater	4.32 ^a	2.11 ^b
Accessions		
Nab Aljamal	3.98 ^a	0.73 ^c
Kahatat	4.82 ^a	2.18 ^b
Anbar	4.86 ^a	3.59 ^a
Dubbie	4.44 ^a	3.32 ^a

Means that do not share a letter are significantly different.



Conclusions

- 1. Treated wastewater had no effect on all the measured parameters except on spike number (reduced).**
- 2. Dubbie is an early flowering and maturity cultivar.**
- 3. Nab Aljamal is a late flowering and maturity cultivar.**



Recommendations

- 1. Treated wastewater can be used to irrigate wheat!!!**
- 2. Farmers may grow either Anbar or Dubbie for seed production.**
- 3. Farmers may to grow Nab Aljamal for hay production.**



Acknowledgment

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