

**EFFECT OF DIFFERENT LEVELS OF SALINITY
AND ANTI-TRANSPIRATION ON THE
GROWTH AND FODDER VALUE
OF PANICUM PLANTS**

By

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A Thesis Submitted in Partial Fulfillment

Of

The Requirement for the Degree of

DOCTOR OF PHILOSOPHY

in

Agricultural Sciences

(Salt and Dry Farming Technology)

Department of Salt and Dry Farming Technology

Arid land Agricultural Graduate Studies and Research Institute

Ain Shams University

2022

ABSTRACT

Adel Said Hassan Ali EL Wardany: Effect of Different Levels of Salinity and Anti-transpiration on the Growth and Fodder Value of *Panicum* Plants. Unpublished Ph.D. Arid land Agriculture Graduate Studies and Research Institute (ALARI). Ain Shams Univ., 2022.

This study was carried out at the private farm in Ismailia and the regional center for Food and Feed (RCFF), Agricultural Research Center (ARC), ministry of Agriculture, Egypt. The aim of this study the effect of different levels of salinity and anti-transpiration on growth characters, chemical composition, and Value of Fodder for *Panicum maximum* plants during spring, summer, autumn and winter seasons through 72 treatments to experiment with the *Panicum maximum* plants [3 anti-transpiration x 4 salinity x 6 replicates].

Two types of anti-transpiration molasses (sugarcane) (5 ml / l), kaolin (50 g / l) and control. Using four levels of salinity (Rasheed salt) [well water in Ismailia (control) - 2000 - 4000 - 6000 ppm].

The results showed the highest plant height (123.77 cm) with the salinity of the well water (Control) with Kaolin anti-transpiration during the summer season. However, the results showed the largest number of branches and number of leaves (863.43, 325.10, respectively) with the salinity of the well water (control) with the anti-transpiration of molasses during the spring season. While the results showed the highest fresh and dry weight (298.20 and 1323.02) g/m² respectively, and the largest leaf area (7542.77) cm²/m² with the salinity of well water (control) with anti-transpiration kaolin during the summer season. and The results showed the highest percentage of protein (23.49%) with the salinity of 4000 ppm with anti-transpiration molasses during the winter season, while the lowest percentage of protein (15.15%) with the salinity of well water (control) with anti-transpiration kaolin during the summer season. The lowest percentage of fiber derivatives (hemicellulose cellulose, lignin, NDF, ADF, and ADL) at the beginning of growth during the spring and summer season at the level of salinity of the well water (control) and 2000

ppm. The results showed (DMD) comparison for *Panicum maximum* with alfalfa. A close percentage (DMD) was recorded in the kaolin (% 96.62) compared to other anti-transpiration levels with a salinity of 6000ppm compared to other salinity levels. The results showed (ME (Mj/KG DM), (ME (Kcal /KG DM), and OMD) comparison for *Panicum maximum* with alfalfa. *Panicum* recorded a higher percentage of alfalfa with control salinity with kaolin, with salinity 2000ppm with molasses, and with salinity 4000ppm with control and kaolin during the spring season.

In conclusion, the idea of producing *Panicum maximum* is acceptable from a technical point of view. Due to the absence of forages green during the summer in Egypt.

Keywords:

Panicum maximum, anti-transpiration, salinity, summer, spring, autumn, winter, season, crops

CONTENTS

	Page
LIST OF TABLES	III
LIST OF FIGURES	VIII
LIST OF ABBREVIATION	IX
1. INTRODUCTION	1
2. REVIEW OF LITERATURE	4
2.1. Feeds.....	4
2.2. Chemical composition to Panicum plants.....	5
2.3. Panicum plants for feed animals and the efficiency.....	7
2.3.1. History of Panicum plants.....	8
2.3.2. Panicum plants for livestock fodder.....	9
2.3.3. Changes in digestibility due to Panicum plants.....	10
2.3.4. Livestock performance from Panicum plants.....	10
2.3.5. Effect on growth performance and weight gain.....	12
2.3.6. Effect on nutrient digestibility.....	13
2.4. Effect of saline water.....	13
2.4.1. Effect of saline water on Panicum plants.....	15
2.4.2. Effect of Panicum plants using saline water on the Chemical composition of the plants.....	16
2.5. Effect of Anti-Transpiration on plants.....	16
3. MATERIAL AND METHODS	21
3.1. Materials.....	21
3.2. The study was divided into three main parts:.....	21
3.3. Part one.....	21
3.3.1. Cultivation.....	22
3.3.2. Irrigation rate and amount of water used.....	22
3.3.3. Fertilization.....	23
3.3.4. Data Recorded for experiments.....	23
3.3.5. Vegetative growth.....	24
3.4. Part two.....	25
3.4.1. Chemical composition investigation.....	25

II

	Page
3.4.2. Sample preparation.	25
3.4.3. Proximate analysis.....	26
3.4.4. Fiber fraction analysis.....	26
3.4.5. Determination of cellulose and hemicellulose and lignin..	26
3.5. Part three.....	26
3.5.1. In-vitro digestibility	26
3.5.2. In vitro calculation	26
3.5.3. Relative gas production parameters calculation	27
3.6. Statistical analysis.....	27
4. RESULTS AND DISCUSSION	28
4.1. Growth characteristics	28
4.2. Chemical composition.....	40
4.3. Fiber fraction.....	51
4.4. Effect of <i>Panicum maximum</i> plants In-vitro dry matter digestibility.....	60
4.5. Water Consumption.....	91
5. SUMMARY	94
6. REFERENCES	98
ARABIC SUMMARY	

III

LIST OF TABLES

No.		Page
1	Salinity and pH of irrigation water during the experiment period	24
2	Average temperatures in Ismailia Governorate during the experiment period	24
3	Soil salinity before and after planting	25
4	Effect of salinity, anti-transpiration, and seasons and its interaction on plant height (cm) of <i>Panicum maximum</i> plants	28
5	Effect of salinity, anti-transpiration, and seasons and its interaction on a number of branches of <i>Panicum maximum</i> plants per (m ²).....	30
6	Effect of salinity, anti-transpiration, and seasons and their interaction on the number of leaves of <i>Panicum maximum</i> plants per (m ²).....	32
7	Effect of salinity, anti-transpiration, and seasons and its interaction on a fresh weight of <i>Panicum maximum</i> plants (gm) per (m ²).....	33
8	Effect of salinity, anti-transpiration, and seasons and their interaction on the dry weight of <i>Panicum maximum</i> plants (gm) per (m ²).....	35
9	Effect of salinity, anti-transpiration, and seasons and their interaction on a leaf area of <i>Panicum maximum</i> plants (cm ²) per (m ²)	36
10	Effect of salinity, anti-transpiration, and seasons and their interaction on the specific density of leaf of <i>Panicum maximum</i> plants per (m ²)	37
11	Effect of salinity, anti-transpiration, and seasons and their interaction on a leaf area index of <i>Panicum maximum</i> plants per (m ²).....	38

IV

No.		Page
12	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage of Protein in <i>Panicum maximum</i> plants	40
13	Effect of salinity, anti-transpiration, and seasons on the percentage of the moisture of <i>Panicum maximum</i> plants	42
14	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage ash of <i>Panicum maximum</i> plants	44
15	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage crude fiber of <i>Panicum maximum</i> plants.....	45
16	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage (EE) ether extract of <i>Panicum maximum</i> plants.....	47
17	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage total carbohydrate of <i>Panicum maximum</i> plants	48
18	Effect of salinity, anti-transpiration, and seasons and their interaction on the energy (kcal/g) of <i>Panicum maximum</i> plants.....	49
19	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage Cellulose of <i>Panicum maximum</i> plants.....	51
20	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage hemicellulose of <i>Panicum maximum</i> plants.	53
21	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage lignin of <i>Panicum maximum</i> plants	55
22	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage NDF of <i>Panicum maximum</i> plants.	56

No.		Page
23	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage ADF of <i>Panicum maximum</i> plants	58
24	Effect of salinity, anti-transpiration, and seasons and their interaction on the percentage ADL of <i>Panicum maximum</i> plants	59
25	Effect of salinity, anti-transpiration, and seasons and their interaction on dry matter degradability (DMD) of <i>Panicum maximum</i> plants	60
26	Dry matter degradation (DMD) comparison for <i>Panicum maximum</i> with alfalfa	61
27	Effect of salinity, anti-transpiration, and seasons and their interaction on Neutral Detergent Fiber degradability (NDFD) of <i>Panicum maximum</i> plants	62
28	Neutral Detergent Fiber degradability (NDFD) comparison for <i>Panicum maximum</i> with alfalfa	63
29	Effect of salinity, anti-transpiration, and seasons and their interaction on Acid Detergent Fiber degradability (ADFD) of <i>Panicum maximum</i> plants	64
30	Acid Detergent Fiber degradability (ADFD) comparison for <i>Panicum maximum</i> with alfalfa	65
31	Effect of salinity, anti-transpiration, and seasons and their interaction on Metabolizable Energy (ME (Mj/Kg DM)) of <i>Panicum maximum</i> plants	66
32	. Metabolizable Energy (ME (Mj/Kg DM)) comparison for <i>Panicum maximum</i> with alfalfa.....	68
33	Effect of salinity, anti-transpiration, and seasons and their interaction on Metabolizable Energy (ME (Kcal/KG DM)) of <i>Panicum maximum</i> plants	69

VI

No.		Page
34	Metabolizable Energy (ME (Kcal/KG DM)) comparison for <i>Panicum maximum</i> with alfalfa.....	70
35	Effect of salinity, anti-transpiration, and seasons and their interaction on Organic Matter degradability (OMD) of <i>Panicum maximum</i> plants	71
36	Organic Matter degradability (OMD) comparison for <i>Panicum maximum</i> with alfalfa	72
37	Effect of salinity, anti-transpiration, and seasons and their interaction on Short Chain Fatty Acid (SCFA (MMOL/200MG DM)) of <i>Panicum maximum</i> plants	74
38	Short Chain Fatty Acid (SCFA (MMOL/200MG DM)) comparison for <i>Panicum maximum</i> with alfalfa	75
39	Effect of salinity, anti-transpiration, and seasons and their interaction on Gas Production per g DM (GPDM) of <i>Panicum maximum</i> plants	76
40	Gas Production per g DM (GPDM) comparison for <i>Panicum maximum</i> with alfalfa	77
41	Effect of salinity, anti-transpiration, and seasons and their interaction on Gas Production per g OM (GPOM) of <i>Panicum maximum</i> plants	78
42	Gas Production per g OM (GPOM) comparison for <i>Panicum maximum</i> with alfalfa	79
43	Effect of salinity, anti-transpiration, and seasons and their interaction on Gas Production per g NDF (GPNDF) of <i>Panicum maximum</i> plants	80
44	Gas Production per g NDF (GPNDF) comparison for <i>Panicum maximum</i> with alfalfa	81
45	Effect of salinity, anti-transpiration, and seasons and their interaction on Gas Production per g ADF (GPADF) of <i>Panicum maximum</i> plants	83

VII

No.		Page
46	Gas Production per g ADF (GPADF) comparison for <i>Panicum maximum</i> with alfalfa	84
47	Effect of salinity, anti-transpiration, and seasons and their interaction on Gas Production per g degraded DM (GPdDM) of <i>Panicum maximum</i> plants	85
48	Gas Production per g degraded DM (GPdDM) comparison for <i>Panicum maximum</i> with alfalfa	86
49	Effect of salinity, anti-transpiration, and seasons and their interaction on Gas Production per g degraded NDF (GPdNDF) of <i>Panicum maximum</i> plants	87
50	Gas Production per g degraded NDF (GPdNDF) comparison for <i>Panicum maximum</i> with alfalfa	88
51	Effect of salinity, anti-transpiration, and seasons and its interaction on Gas Production per g degraded ADF (GPdADF) of <i>Panicum maximum</i> plants	89
52	Gas Production per g degraded ADF (GPdADF) comparison for <i>Panicum maximum</i> with alfalfa.....	90
53	Effect of salinity, anti-transpiration, and seasons and their interaction on Water Consumption of <i>Panicum maximum</i> plants (L/Kg DM).....	91
54	Water Consumption comparison for <i>Panicum maximum</i> with alfalfa..	93

VIII

LIST OF FIGURES

No.		Page
1	Preparing for farming.....	21
2	Panicum maximum cultivation.....	22
3	Six months after the first mowing.....	23

IX

LIST OF ABBREVIATIONS

ADF	: Acid Detergent Fiber
NDFD	: Neutral Detergent Fiber degradability
°C	: Celsius degree
ADFD	: Acid Detergent Fiber degradability
ADL	: Acid Detergent Lignin
ARC	: Agricultural Research Center
CHO	: carbohydrate
CP	: crude protein
DDM	: digestible dry matter
DE	: digestible energy
DM	: dry matter
DMD	: Dry matter degradability
DMI	: dry matter intake
EE	: fats
GE	: growth energy
GPADF	: Gas Production per g ADF
GPdADF	: Gas Production per g degraded ADF
GPdDM	: Gas Production per g degraded DM
GPDM	: Gas Production per g DM
GPdNDF	: Gas Production per g degraded NDF
GPNDF	: Gas Production per g NDF
GPOM	: Gas Production per g OM
IN-VDMD	: In- Vitro dry matter digestibility
L.S.D	: least significant difference test
ME (Mj/KG DM)	: Metabolizable Energy
NDF	: Neutral Detergent Fiber
OMD	: Organic Matter degradability
RCFF	: Regional Center for Food and Feed
S1	: well water in Ismailia (control)
S2	: 2000 ppm (sea salt)
S3	: 4000ppm (sea salt)

X

S4 : 6000ppm (sea salt)
SCFA(MMOL/200MG DM) : Short Chain Fatty Acid
TDN : Total digestible nutrients

SUMMARY

Guinea grass (*Panicum maximum*) spreads in semi-tropical and tropical regions of the world (Whyte et al.,1959), where it is used in fattening ruminants. Guinea grass (*Panicum maximum*.) plants are characterized by rapid growth after harvest, dense growth, and an increase in the number of leaves due to the increase in the number of basal buds of plants, and also tend animals to Guinea grass (*Panicum maximum*.) (Bianchini et al.,1999).

This study was conducted at the farm in New Salhia in Ismailia Governorate and the Regional Center for Food and Feed (R.C.F.F.) Laboratories Agricultural Research Center (ARC) during the period from 2019 to 2020. To study the effect of different levels of salinity and anti-transpiration on the growth and fodder value of *Panicum maximum* plants.

Anti-transpiration and salinity of irrigation were used through 72 treatments to experiment with the *Panicum maximum* plants [3 anti-transpiration x 4 salinity x 6 replicates].

Two types of anti-transpiration molasses (sugarcane) (5 ml / l), kaolin (50 g / l) and control. Using four levels of salinity (Rasheed salt) [S1= well water in Ismailia (control) –S2= 2000 ppm- S3= 4000 ppm – S4= 6000 ppm].

The seedling of Guinea grass (*Panicum maximum*) used in this study was obtained from a private farm. Seedling price for plants *Panicum maximum* was [0.35 LE/seedling].

Irrigation is carried out at a rate of 16 liters / m² / week

NPK 20/20/20 fertilizer was used at 50 g/2 L/m²/month. NPK was added monthly after ten days of each cutting.

Mowing is done every 30 days for a year The average of the three months (April, May, and June) is taken for the spring season, the average of the three months (July, August, and September) for the summer season, the average of the three months (October, November, and December) for

SUMMARY AND CONCLUSION

the Autumn season, and the average of the three months (January and February, and March) for the winter season to measure the expected fresh and dry weight of the forage.

Dry samples were used for chemical analysis. The average fresh and dry fodder yield per unit m² was calculated. Samples of *Panicum maximum* plants were collected from each try and separated for measuring plants height, No. of leaves, No. of Branches, Density, Leave area Index Leave area, fresh weight, and dry weight (each per square meter and per cm of height).

The results of the trials concluded that:

1. The highest plant height (123.77 cm) were achieved with the salinity of the well water (Control) with Kaolin anti-transpiration during the summer season.
2. The largest number of branches and number of leaves (863.43, 325.10, respectively) were recorded with the salinity of the well water (control) with the anti-transpiration of molasses during the spring season.
3. The highest fresh weight and dry weight (298.20 and 1323.02) g/m² respectively, and the largest leaf area (7542.77) cm²/m² were recorded with the salinity of well water (control) with anti-transpiration kaolin during the summer season.
4. The results showed the highest percentage of protein (23.49%) with the salinity of 4000 ppm with anti-transpiration molasses during the winter season, while the lowest percentage of protein (15.15%) with the salinity of well water (control) with anti-transpiration kaolin during the summer season.
5. The percentage of fiber decreased (22.09%), and the percentage of carbohydrates and energy also increased (284.07%, 45.68%) respectively with salinity 4000 ppm with anti-transpiration molasses during the spring season, while the percentage of fat increased (3.87%) with salinity 4000 ppm with anti-transpiration molasses during the summer season

SUMMARY AND CONCLUSION

6. The lowest percentage of fiber derivatives is hemicellulose cellulose, lignin, NDF, ADF, and ADL, at the beginning of growth during the spring and summer season at the level of salinity of the well water (control) and 2000 ppm.
7. The results showed (DMD) comparison for *Panicum maximum* with alfalfa. A close percentage (DMD) was recorded in the kaolin (% 96.62) compared to other anti-transpiration levels with a salinity of 6000ppm compared to other salinity levels.
8. The results showed (NDFD) and (ADFD) comparison for *Panicum maximum* with alfalfa. *Panicum* recorded a higher percentage of alfalfa (% 104.13 and % 118.30) respectively with control salinity with molasses during the spring season, while it was higher in most of the transactions during the summer, autumn, and winter seasons.
9. The results showed (ME (Mj/KG DM), (ME (Kcal /KG DM), and OMD) comparison for *Panicum maximum* with alfalfa. *Panicum* recorded a higher percentage of alfalfa with control salinity with kaolin, with salinity 2000ppm with molasses, and with salinity 4000ppm with control and kaolin during the spring season.
10. The results showed an (SCFA (MMOL/200MG DM)) comparison for *Panicum maximum* with alfalfa. *Panicum* recorded a higher percentage of alfalfa (% 105.56) with control salinity with kaolin during the spring and summer seasons respectively.
11. The results showed (GPDm), (GPOM), and (GPNDf) comparison for *Panicum maximum* with alfalfa. *Panicum* recorded a less percentage of alfalfa.
12. The results showed (GPADF) a comparison for *Panicum maximum* with alfalfa. *Panicum* recorded a higher percentage of alfalfa during the spring season in most of the treatments.
13. The results showed (GPdDM) comparison for *Panicum maximum* with alfalfa. *Panicum* recorded a higher percentage of alfalfa during the spring and summer seasons in most of the treatments.

SUMMARY AND CONCLUSION

14. The results showed (GPdNDF) and (GPdADF) comparison for *Panicum maximum* with alfalfa. *Panicum* recorded a higher percentage of alfalfa during the spring season in most of the treatments.

Finally, The study concluded that *panicum* fodder was produced during the year, especially during the spring and summer season, with a high digestive value compared to alfalfa, while it bears high salinity up to 4000 parts per million, whether soil salinity or salinity of irrigation water. In conclusion, the idea of producing *panicum* fodder is accepted as an alternative for alfalfa in areas of high salinity.