Al - Duqm Primary School

Effect of plant charcoal as fertilizer on the growth of plants in sandy soil in the state of Duqm

Preparation of the students:
1 - Taghreed Matar Aljunibi
2 - Zahra Mohammed al-Issawi
3 - Rawan Salah Juma

School: Duqm for basic education
Sultanate of Oman - Central
Supervised by: Nashwa Mohammed Saleh Khader
March 2018

Table of contents

Abstract Abstract

What are the reasons for the slow growth of the plant in the province of Duqm in the central province ?, and ways to improve the sandy soil
This research aims at identifying the causes of the slow growth of plants in sandy soils
Plant growth slowed after a period of time in agriculture.
To answer these questions:
1. Soil protocols (soil properties - soil temperature - acidity)
2. Air-air protocol (air temperature-humidity)
3 - The water protocol was used (water temperature irrigation - and conductivity - salinity)
4. Ground cover protocol (plant height measurement)
The study concluded that the soil salinity is high because PH = 8.9
5-- It has been observed that the high temperature of the air, plants exposed to sunlight vary in growth from plants
The least exposed to sunlight, the growth of plants was compared to the neighboring area and through knowledge of soil properties
Salinity and acidity a close proportion of the results was found
Studies have reached a high level of groundwater, which led to the yellowing of plants and the death of roots
Because the soil is flooded with too much water, we use spray irrigation.

In the interview of the director of the municipality of agriculture, a number of recommendations were reached: the manufacture of plant charcoal
, Mixing with animal dung to increase the density of sandy soil, coal absorbs nitrogen from manure
Of the most important elements necessary for plant growth.

The study mixed the charcoal with animal manure for three weeks, then put the fertilizer, and the mixture in
Sandy soil where charcoal helps sandy soil retain nutrients.

Organic matter represents soil element: Maintains humidity at a constant soil level, making it lax

Suitable for root growth, when decomposed nutrients move to the soil.

The benefit of charcoal: Increasing the ability to exchange cationic ions permanently.

Means (the ability of the soil to press the nutrients).

Research Question

1 - What are the reasons for the slow growth of the plant in the province of Duqm in the central province?

2 - How to improve the sandy soil permanently

Hypothesis
Add the charcoal to the sandy soil and verify the growth of the plant naturally and permanently

6. Introduction

This research aims to slow the growth of the plant well in the state of Duqm in the central province Note
The plant growth slowed down in the school garden
The sandy soil in the school consists of large granules, which are of poor soils and do not retain water in a garden
Nutrients.
The presence of the garden in the school is necessary, because it has environmental benefits, health and applied, it is purifying
The air, helps to temper temperatures especially at the beginning of the summer, as it increases the beauty
School and make it more attractive ,.
And allow students and teachers to practice and apply in scientific classes

The importance of plants to the
community provides job opportunities for the unemployed and relieve high temperatures
Humidity in the air
Is a financial source for many projects to reduce soil erosion. Relieve wind. Upload input
Industrial activity. Contributes to the achievement of national food security and attention to forestry reduces the proportion of dust
High in the state of Duqm

search methods

First: Research Plan:
Materials Bean plant seeds - Sand soil samples - Charcoal - Animal manure - Sawdust

The search question will also be answered as follows
Use soil, water, air,
PH - salinity - humidity - temperature
Theoretical examination of the soil in the school garden
Schedule a search plan implementation
Distribute the roles of the work to the research team and the cooperating team
Collection of information from scientific references

Interview with the director of the municipality to check
Interview with the Director of the Ministry of Agriculture
Interview with the Director of Water Desalination in Wilayat of Duqm
Visit neighboring schools and compare plant growth in conductivity, salinity and acidity
Planting seedlings in January
Add charcoal with animal manure as fertilizer for sandy soil
Application of the plant cover protocol to measure plant length theoretically and follow up its growth

Second Study Location:

(Al-Wusta Governorate), Duqm State, Al-Duqm Primary School, Bahr Al-Arab Primary School, January and April, Air, Water, Soil and Plant Cover

Data collection and analysis:
Collect, organize and analyze all data obtained from soil characteristics, salinity, acidity
Percentage of carbonates, roots, rocks, analysis of conductivity data, salinity, acidity of irrigation water

8. Results:: Discussion of Measurement Limitation

The results obtained from the study sites (soil characteristics) between the school and the school Duqm
Arabian Sea by comparing soil type

Arab Sea School	Soil characteristics Al Duqm School	
7.5YR: 6/4	7.5YR: 6/2	The color
Rough	Rough	Consistency
muddy	muddy	Fabric
a lot	a lot	Rocks
Very few	Very few	the roots
Medium	Medium	Carbonates
0.288	0.470	Salinity
9.7	8.65	Hydrogen number

Table (1) Soil characteristics data by comparing salinity and alkalinity between Duqm and Bahr Al Arab schools

The following data were obtained by comparing salinity between the soil of the school of Duqm and the school of the Arabian Sea

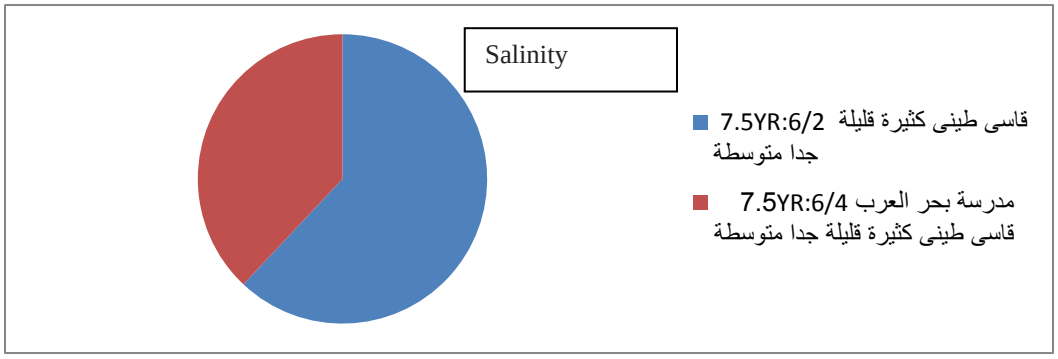

Diagram 1: Comparison of soil salinity of Duqm and Bahr Al Arab schools in Al Wusta Governorate

The following table shows a comparison of water quality in the study areas

Average pH	Average salinity of water	Average electrical conductivity	Average temperature	Type of water	Time	Comparative analysis
For water	PPT	536	23.1	Fresh	Date	Irrigation Water
23.9	371.0	597	23.2	Fresh	13/2/2018	Irrigation Water

Table (2) Comparison of the quality of water for irrigation of crops in the school Duqm school adjacent to the Arabian Sea

Diagram 2: Comparison of Irrigation Water between Al Duqm School and Bahr Al Arab School

Salinity	conductivity	Hydrogen number	Transparency	Humidity	Temperature (water)	DAYS
0.597	585	8.65	120	39	25	17/12/2017
0.282	583	9.40	120	67	24.8	28/12/2017
0.363	511	9.46	120	66	22 .6	2/1/2018
0.322	458	9.59	120	40	21.4	9/1/2018
0.223	459	9.78	120	45	23 .2	24/1/2018
0.320	535	9.24	120	48	21.1	13/2/2018

The results obtained from the study site (irrigation water)

Table (3) Data of irrigation water in the garden of the school Duqm

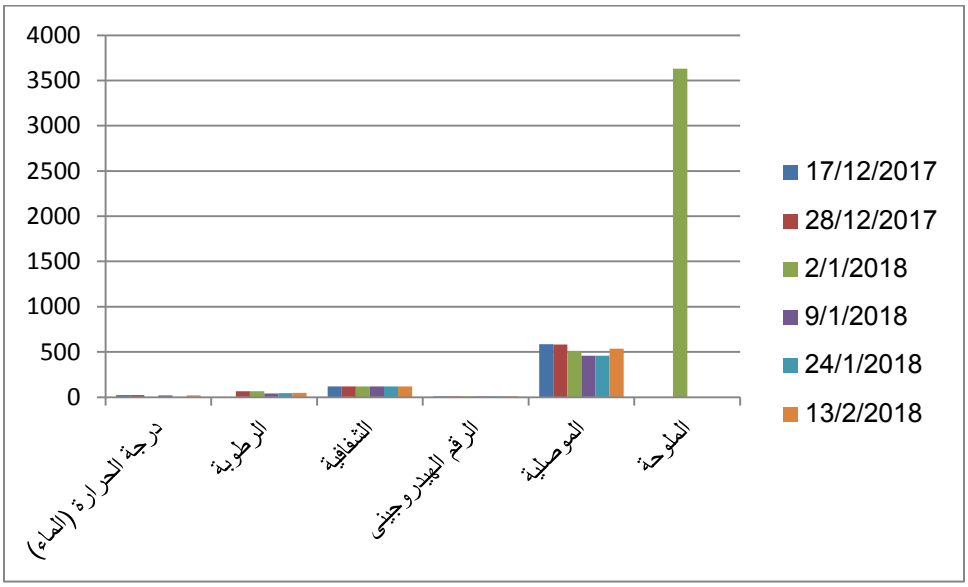

Diagram 3 Water data within six days

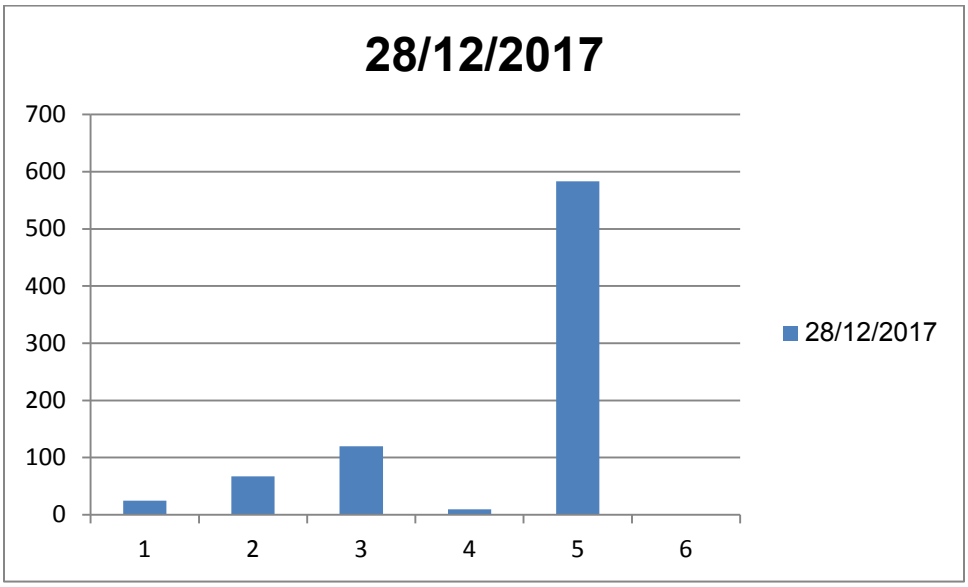

Diagram 4 for one-day data on irrigation water characteristics

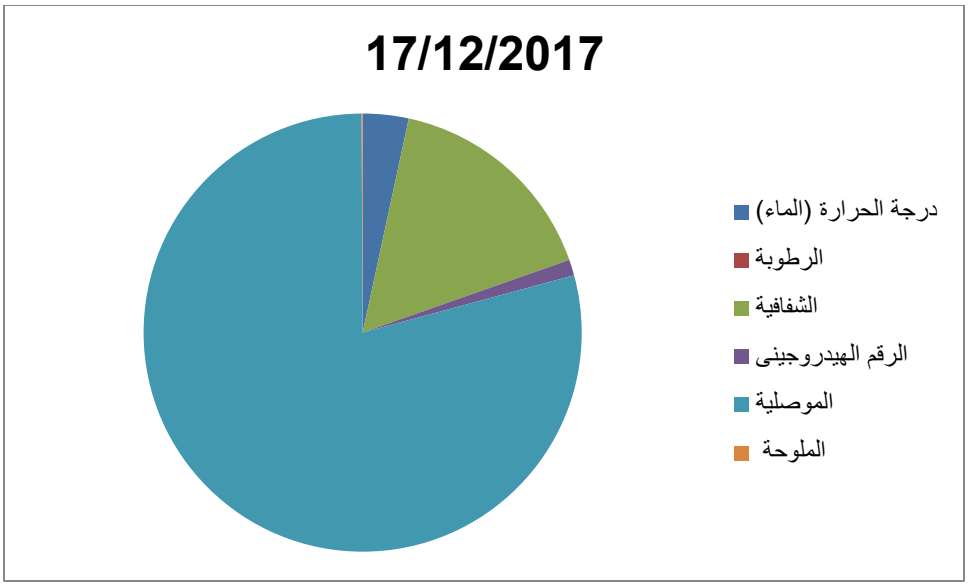

Diagram 4 for one-day data on irrigation water characteristics

Discussion of the results:
1 - through the table and chart No. (1) shows the high proportion of salts and alkalinity of cultivated soil as well

The salinity of the soil is higher than the neighboring school

To avoid salinity, use more water and discharge excess water from the plant

2 - Through the table and drawing number (2) shows the higher salinity more in the school Duqm

The higher conductivity of irrigation water in the nearby Arabian Sea School and higher alkalinity

Table 3 and Figure 3 show salinity, alkalinity and conductivity

For irrigation water within six days

Comparison of plant growth between the neighboring school

And through the data show the same problem in the neighboring school

The growth of the plant and the proximity of the soil properties of salinity and high acidity will slow down

Transfer the trace of research to the neighboring school to improve plant growth

1 - high percentage of soil salinity water absorption of plant toxicity

2- The pH of the soil reached 8.8 and the natural from 5.5 to 6.5

4 - sandy soil does not retain the nutrients so the addition of charcoal as organic fertilizer increases the density

Soil improves the sandy soil well

Conclusion - 9

By displaying the data collected in the tables and graphs, the salinity of the water was reached

Irrigation using soil protocol and soil temperature rise

The arrival of PH to 8.9 for the soil indicates the salinity of the soil and the high salinity of the water

Of the plant and the application of the soil cover protocol periodically to observe the length of the plant

And what should be the work of fertilizer for sandy soil (charcoal + animal manure + sawdust)

Take advantage of the stems of plants and straw to clean the environment in the work of charcoal

Recommendations
1 - increase the green areas to overcome the wind and dust season in the state of Duqm

2 - Interest in planting and the use of spray irrigation for crops in sandy soils

3 - daily irrigation of sandy soil and non-irrigation at high temperature because the roots are hot

Causing plant death
4. We appeal to the Ministry of Agriculture to guide farmers to the importance of organic manure (charcoal) for sandy soils

5 - the work of a robot to protect plants from being fed and damaged by birds

6 - Inspect the wells water periodically to ensure the absence of leakage of industrial fertilizers
7. Use unsaturated seeds

11- Thanks and appreciation: 11
I would like to extend my sincere thanks and appreciation to the Director of the desalination plant in the Wilayat of Duqm

On all the information he gave us, and the data we obtained to compare the results we collected

And the Director of the Water Authority on information and data

I would also like to thank the Director of the Ministry of Agriculture and Fisheries in the Wilayat of Duqm: Mr. Ahmed Mohammed Al Mayahi

On information support

I would like to thank the Director of the School: Ms. Fatima Al-Junaibi / for her support
And support in accomplishing any work related to research

I would also like to thank Professor Ghada Abdel-Galil, Vice-President of Al-Duqm School, for facilitating the work of the research

Done by God's goodness

References -15

BOOKS BOOKS
Mustafa, Salma (2016). The book of agriculture

Fahmy, Salah (2016). Reclamation of new desert lands

Jaber, Alaa. (2016,5january) Soil types and characteristics. The largest Arab site in the world

Taha, Mohi (2015, Oct. 1) Determination of soil fertility.
https://agronomie.info/%D9%83%D8%AA%D8%A7%D8%A8-%D8%AA%

the article
(August 2014-26). How sand soil permanently improves the article of the perennial agriculture community
https://permacultureabia.org/2015/12/02/sandy-soil-improve/

Scientific Research Guide