

## Study of vegetation in the selected area in south Jeddah province (Saudi Arabia)

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**Abstract:** In this study, the vegetation in the selected area (Waziriya dist) in south Jeddah was identified. Four locations were selected each covering (10m× 10m) 10 small quadrates inside each area (1m × 1m) were also taken then the plant species were defined. Plant density, frequency, coverage and important value were calculated. The results showed there were 9 plant species. *Aristiea adscensionis* recorded the highest value of the relative density and relative frequency, while the plant *Zygophyllum simplex* recorded the highest value of the relative coverage in the first location. And the same plant also recorded the highest values of relative density, frequency and coverage in the second and third location. While the recorded plant *Acacia ehrenbergiana* the highest coverage in the fourth location. Samples have been taken from the soil from the different depths (10-30 cm) from each location and assessed the water content and degree of pH. And soil moisture ranged between 0.6% -3.6% the pH value ranged between 7.6 - 8.4.

[Areej Ali Baeshen. **Study of vegetation in the selected area in south Jeddah province (Saudi Arabia)**. *Life Sci J* 2013;10(8s):408-412] (ISSN: 1097-8135). <http://www.lifesciencesite.com>. 68

**Key words:** *Aristiea adscensionis*, plant *Zygophyllum simplex* plant, *Acacia ehrenbergiana* plant water content, PH

### 1-Introduction

Saudi Arabia covers a vast area of the Arabian Peninsula which located in a diverse terrain, multiple climatic conditions between the low land below the surface of the sea to the mountains rising to above 3000 m above sea level, so it includes the different types of wildlife to include groupings seaweed forest Shoura, trees of coastal *Acacia*, forest of woody plants. (Shawdary and Aljewayed, 1999).

The soil of the Kingdom of Saudi Arabia is young and immature to lack of humidity and exposure to erosion, Thus, the soluble salts, and calcium fragmented and transmit wind added to the soil faster than removing and during the climatic conditions precedent and according to the inventory of soil done by the Ministry of Agriculture and Water, which published its results in the map of the soil in the Kingdom of Saudi Arabia in 1406H can be classified soils in the Kingdom according to the circumstances of its creation and composition within the ranks of land raw or modern. In addition to limited areas of soils formed under other climatic conditions precedent (Al-Nafee, 2004).

As for the climate in the Kingdom of Saudi Arabia is different from one region to other regions, but it heat wetlands in coastal areas and dry heat in the interior with the exception of high altitude above sea level and located in the center of the Hejaz mountain, therefore, Saudi Arabia has a large area of desert (Abu al-Fath, 1999).

The vegetation different from one region to another according to the different climate. and, there are five different models of plant their locations depending on the climatic conditions. Shoura example, plants are located in the east coast of the

Arabian Gulf and the West in the Red Sea coast, where high temperatures and help to grow these plants (Zahran, 1983).

### *Aim of the investigation:*

Study of vegetation in a particular area to identify how we can study the plant communities in this area.

### *The study area*

The study area located in south of Jeddah province (Waziriya dist) the picture (1.2). Located Jeddah on the Red Sea at the confluence of latitude 31 -21 ° north and longitude 4 - 39 ° east and it coastal plain is bordered by the Red Sea to the west and the Sarwat mountain from the East and it's name the region western coastal plain (Tihama).



Figure (1): vegetation in the study area



Fig(2): Side from the study area

**Table (1): Plants recorded in the study area and at locations (1 - 2 - 3 - 4) and the names of families to which they belong and the Life form for each plant species**

(+) Available, (-) Un available

| Species                          | The family     | Locations |   |   |   | Life form |
|----------------------------------|----------------|-----------|---|---|---|-----------|
|                                  |                | 1         | 2 | 3 | 4 |           |
| (1) <i>Abutilon pannosum</i>     | Malvaceae      | +         | + | + | + | Shrub     |
| (2) <i>Aristea adscensionis</i>  | Graminaeae     | +         | + | + | + | Herbal    |
| (3) <i>Zygophyllum simplex</i>   | Zygophyllaceae | +         | + | + | + | Herbal    |
| (4) <i>Tephrosia apolinea</i>    | Leguminoseae   | +         | - | - | - | Herbal    |
| (5) <i>Rumex nervosus</i>        | Polygraceae    | +         | - | + | + | Herbal    |
| (6) <i>Indigofera tritoides</i>  | Leguminoseae   | -         | + | + | - | Herbal    |
| (7) <i>Brassica tournefortia</i> | Cruciferae     | -         | + | + | - | Herbal    |
| (8) <i>Crotalaria aegyptiaca</i> | Leguminoseae   | -         | - | + | + | Herbal    |
| (9) <i>Acacia ehrenbergiana</i>  | Leguminoseae   | -         | - | - | + | Shrub     |

Relative density + relative frequency + relative coverage

**2-Materials and Methods**

The study area is in the south of Jeddah province (Waziriya dist) we choose 4 locations at random each covering 10 × 10 m<sup>2</sup> were also taken 10 small quadrates inside each location area of 1 × 1 m<sup>2</sup> and then restricted the plant species and it's classification and calculation: density, frequency, coverage and the important value with a graphic representation of results, according to the following equations:

**Absolute density =**

$$\frac{\text{Total of each type of species for all quadrates}}{\text{The total number of quadrates}} \times 100$$

The total number of quadrates × area of the quadrates

**Relative density =**

$$\frac{\text{Absolute density of the species}}{\text{Total of the absolute density of all species}} \times 100$$

Total of the absolute density of all species

**Absolute frequency =**

$$\frac{\text{Number of quadrates that were found by species}}{\text{The total number of quadrates}} \times 100$$

The total number of quadrates

**Relative frequency =**

$$\frac{\text{Absolute frequency of the species}}{\text{Total of the absolute frequency of all species}} \times 100$$

Total of the absolute frequency of all species

**Absolute coverage =**

$$\frac{\text{Total length of such intersections of species} \times 100}{\text{Number of sections} \times \text{Length of the section}}$$

**Relative coverage =**

$$\frac{\text{absolute coverage of species}}{\text{Total absolute coverage of all species}} \times 100$$

Total absolute coverage of all species

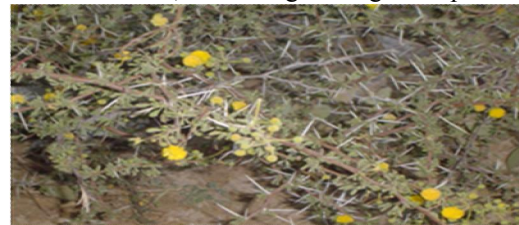
**Important value =**

The samples were taken from the soil from different depths (10 cm - 30 cm) of each quadrates and assess the water content by using the equation

**Water content of the soil (soil moisture) =**

$$\frac{\text{Wet weight} - \text{dry weight}}{\text{dry weight}} \times 100$$

As well as, measuring the degree of pH



*Acacia ehrenbergiana*



*Zygophyllum simplex*

Some plant species in the study area

**3. Results**

**3.1 - Vegetation study**

**3.1-1 Plant species**

Species recorded in the study area 9 plant species shown in Table (1) were divided in 4 locations were randomly chosen in the region.

**3.1-2 Absolute and relative density of plant species:**

Clear differences in absolute density of the plant to another. Had the highest absolute density in the plant *A. adscensionis*, reaching 550 plant / meters. And the highest relative density to the same plant at a location 1. In the locations (2,3, 4) had the highest absolute and relative density of the plant *Z. simplex* as shown in the figures (3,6, 9, 12).

**3.1-3 Absolute and relative frequency of plant species:**

We note that the highest value of the absolute frequency was in the plant *A. adscensionis* and plant *Z. simplex* value of 90% in location 1. And the highest value of the relative frequency in the same plants 32.1%. And also recorded the same plants the highest values of absolute and relative frequency.. In the

location (3.4) has recorded 100% of the absolute frequency of the plant *Z. simplex* and the same plant were also recorded the highest value of relative frequency as shown in the figures (4.7, 10, 13).

**3.1-4 Absolute and relative coverage of plant species:**

The highest values of the absolute and relative coverage of the plant *Z. simplex* in all the selected locations, recorded the highest coverage in the location 2 as shown in the figures (5, 8.11, 14).

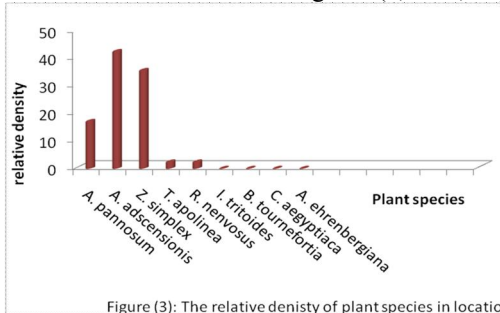


Figure (3): The relative density of plant species in location (1).

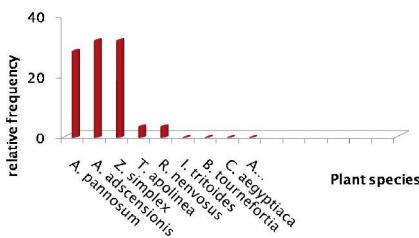


Figure (4): The relative frequency of plant species in location (1).

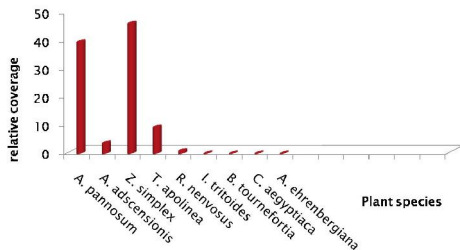


Figure (5): The relative Coverage of plant species in location (1).

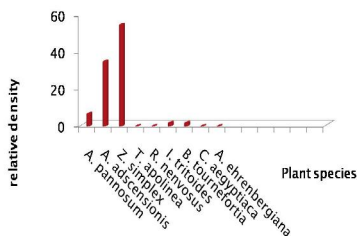


Figure (6): The relative density of plant species in location (2).

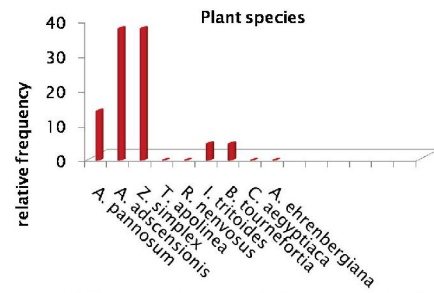


Figure (7): The relative frequency of plant species in location (2).

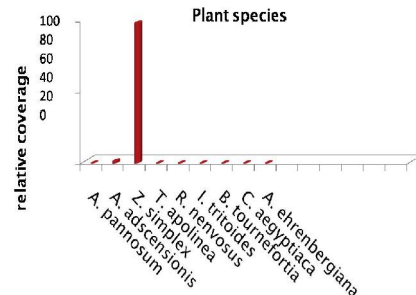


Figure (8): The relative coverage of plant species at the location (2).

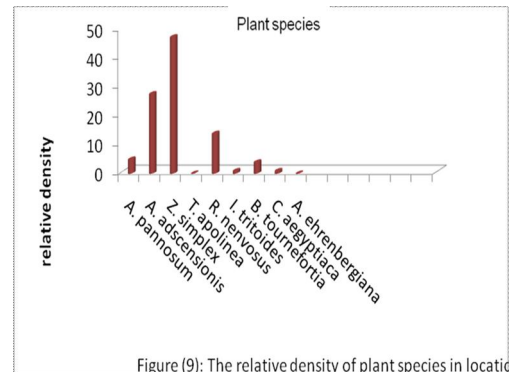


Figure (9): The relative density of plant species in location (3).

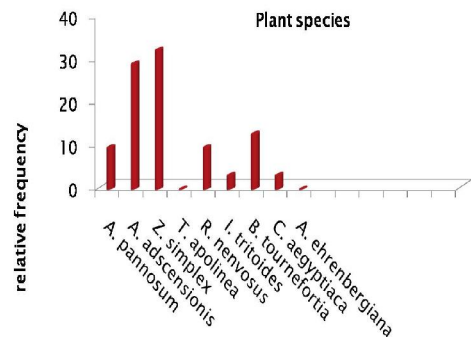


Figure (10): The relative frequency of plant species in location (3).

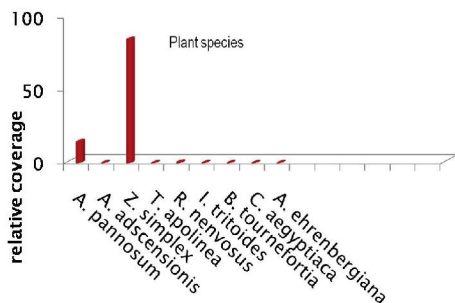


Figure (11): The relative coverage of plant species in location(3).

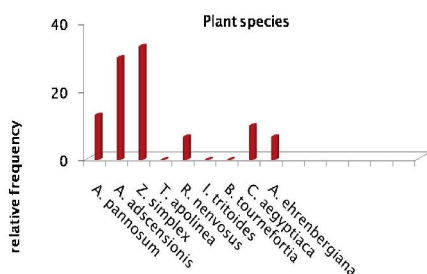


Figure (13): The relative frequency of plant species in location (4).

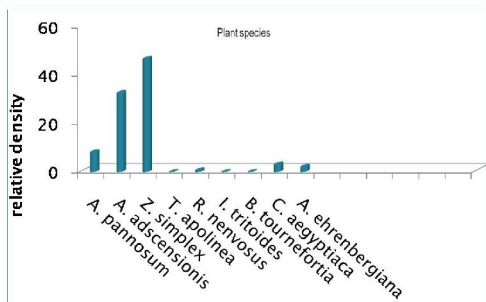


Figure (12): The relative density of plant species in location (4).

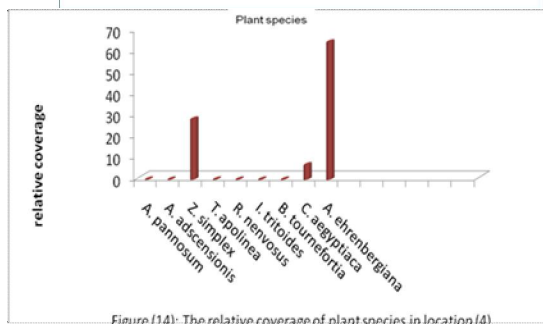


Figure (14): The relative coverage of plant species in location (4).

**3.2 Soil analysis 3.2-1 Soil moisture**

We note from Table 2 the high water content of the soil in a depth of 30 cm from a depth of 10 cm and in all locations. The highest water content at the

location (3) to a depth of 10 cm where it reached 2.4%, while the highest water content at a depth of 30 cm in location 1.

**Table (2): The average of soil moisture and pH for different depths of soil**

| pH  | average of soil moisture % | Soil depths (cm) | locations    |
|-----|----------------------------|------------------|--------------|
| 7.8 | 1.9                        | 10               | Location (1) |
| 8.3 | 3.6                        | 30               |              |
| 7.9 | 2.4                        | 10               | Location (2) |
| 8.4 | 0.6                        | 30               |              |
| 7.6 | 0.7                        | 10               | Location (3) |
| 7.8 | 2.6                        | 30               |              |
| 8.0 | 2.1                        | 10               | Location (4) |
| 8.2 | 3.4                        | 30               |              |

**3.3.- pH value**

It is clear that all locations recorded values ranging from 7.6 to 8.3.

**4.Discussion:**

This study was on a selected area in the south of Jeddah province (Waziriya dist) to identify the plant communities in this area. Characterized the study area the climate is hot and humid most days of the year, at the maximum temperature in summer 33 ° m and the lowest temperature in winter 23.1 ° m and average relative humidity between 54-69% (the General Presidency of Meteorology and Environment Protection, 2004). The highest average rainfall, 46.3 mm / month in November and the lowest average rainfall of 0.1 mm / month in the month of April, and the amount of annual rainfall in the Jeddah province 71.29 mm (Meterology and Environment, 1992).. We recorded 9 plant species at selected locations for the study, ranging between herbal and shrubs. vegetation of the coastal plain is little and sparse and limited to certain plant species with large root system which can adapt to the desert environment, except for some annuals that grow after rain (Al-Nafee, 2004). A study of vegetation in different values for the density, frequency and coverage was recorded plant *Z. simplex* higher absolute and relative density in most locations, which indicates the abundance of this species in the study area. And the same plant recorded the highest values of absolute and relative coverage and this shows the rapid spread of the plant during the suitable period for growth and abundance in the study area. As for the soil analysis were characterized by high soil water content to a depth of 30 cm and 10 cm depth in all locations and this of course after return to a deeper level of the soil for the sun's heat, which reduces the evaporation of water from it. It was also noted the pH

values ranged between 7.6 and 8.3, which means that the soil is neutral to low alkaline.

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5/24/2013