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# Identification of Plant Species in Rawdhatumalkhfas, Riyadh Saudi Arabia by Germinable Soil Seed Bank

Wafa'a. A. Al-Taisan

Dept. of Biology, Girls College of Science, Dammam University, P.O. Box 1982. Kingdome of Saudi Arabia

**Abstract:** The present study was conducted to identify plant species in RawdhatUmAlkhfas, Riyadh, Saudi Arabia using Germinable soil seed bank. The experiments were conducted (designed) in four sites and most of these seeds were germinated during the first four weeks. The average number of seedlings developed from 52 to 260/m2. This study, also, demonstrated the different amount and the installation of stocks of soil among the seeds in the four study sites. Site 1 showed the most density and diversity in vegetation and seeds stock in the soil because it has less agricultural development, while site 2 has less vegetation because it is exposed to overgrazing, urban development and frequent visitors. Site 3 contained the lowest number of seeds due to the presence on both sides of a valley stream and this is expected of the valley sweep to the seeds and growing plants in this site. Site 4 exists in more flat environment and less vulnerable to development activities, as noted increase in the number of yearbooks compare to perennials, and increasing in the average number of seeds germinated during the autumn season compare with the spring season. Comparing the plant species that have appeared in the germination experiment at the four sites with what has been confined to the natural vegetation in same locations, it shows the absence of plant species that been observed in the plant inventory record of these areas. It was also observed from this study seeds absence of some plant species, especially perennial plants, in soil samples, with the presence of these species in the plants inventory record. The results showed the lack of density and diversity of vegetation in the study locations because of the climate effect (high temperature and lack of rainfall for consecutive years), the destruction of vegetation (as a result of development activities, agricultural, pastoral and run over by cars) which affected the seed numbers in the soil inventory. The low number of seeds in the soil inventory is indicative of the threat facing the vegetation in RawdhatUmAlkhfas. Therefore, this study recommends further studies about the reasons for the non-appearance of some plant species in the germination experiments, although its presence in Flora record of study area and disappearance from the soil seed bank. Also more studies are need for the rehabilitation of some degraded sites and to raise the productivity through the implementation of some of the appropriate programs.

**Key words:** germinable soil seed bank, Saudi Arabia, Seed density, Annuals, vegetation.

## INTRODUCTION

Soil seed banks are a key to understanding the dynamics of plant populations, species and ecosystems (Silvertown, 1982; Kalisz, 1991; Kalisz and McPeek, 1992; Gu¨nter, 1997; Bekker *et al*., 1998; Cabin *et al*., 1998). Soil is a natural store for the seeds of plants that can be dormant for long periods and that can germinate and grow upon the availability of appropriate environmental conditions. Seed environment and seed stock mechanism in the soil contribute to useful information for plant protection operations, management and proper planning to enhance natural ecosystems (Al-Yemeni, 2002; Shaukat and Siddiqui, 2004). A soil seed bank is defined as the total number or density of viable seeds stored in the soil in a given period .It represents record of the recent vegetation and new potential seedling emergence pattern of an area in the future (Wang *et al* 2005). Soil seed banks represent a successional memory that transfers information on earlier vegetation dynamical events (Willems 1995; Bakker *et al.* 1996; Bekker *et al.* 1997). In arid ecosystems, soil seed banks are characterized by high spatial and temporal variability (Thompson, 1987;Rundel and Gibson, 1996), and are particularly affected by spatial patterns of vegetation (Guo *et al*., 1998). For several local floras, the use of seedling emergence data to determine soil seed bank persistence has revealed that persistent seeds tend to be smaller, more compact, dependent on light for germination, while transient seeds are larger, often elongated or bear appendage (Thompson and Grime, 1979; Thompson *et al*., 1993; Bekker *et al*., 1998; Moles *et al*., 2000; Cerabolini *et al*., 2003; Peco *et al.*, 2003; Funes *et al*., 2007).

All the seed of plant species that been recorded in soil samples were similar to the plant species in soil surface (Kellmann, 1994; Schneider and Sharitz, 1986; Roberts, 1981) While not observed the appearance of some plant species in soil samples with the presence of these species in the Flora record some of the sites and

**Corresponding Author:** Wafa'a. A. Al-Taisan, Dept. of Biology, Girls College of Science, Dammam University, P.O. Box 1982. Kingdome of Saudi Arabia.

the reason for this is due to dormant seeds, some of these plants or low productivity and lack of vitality of seeds, or because of consumption by rodents in those areas.

The temporal variations, in the soil of what it contains of the seeds, are more important than spatial variations. (Coffin and Lauenroth, 1989) More studies on soil seed bank have agreed that it may be affected because of successive years of drought and environmental destruction (human activities and agricultural development) (Al-Yemeni and Al-Farraj, 1995; Al- Yemeni *et al*., 2000). Although a seed bank represents an important component of desert habitats as it allows species, mainly annuals, to survive, its role in arid and semi-arid habitats in plant population dynamics and distribution patterns, and its relations to the above-ground vegetation are poorly understood. Little is known about seed bank dynamics among contrasting disturbances or whether there are common surface properties that explain seed bank abundance and species composition of disturbed surfaces in general (DeFalco *et al*., 2009). There are studies and valuable information about the relationship between the quality of the existing vegetation cover and its contents in the soil from the seeds of several plant communities and environments (Thompson, 1978; Egley, 1986; Baker, 1989; Kemp, 1989; Batanouny *et al*., 1991 and 2000; Bertiller, 1998) but still very few studies about what is the content of soils deserts and Pastures of Saudi Arabia from seeds live potential. The aims of this study are to identify some different of plants species and its quantities in RawdhatUmAlkhfas using seed germination of stock seed bank.

## MATERIAL AND METHODS

***Study Area:***

The study was performed in RawdhatUmAlkhfas, which is located in Butine Al-Barh; to the south of Al-Barh Village, about 16 km to the northwest of the city of Dharma, and approximately 39.5 km north-west of Riyadh, 120 km at latitude (24□ 48/N, 45□ 50/E) and Longitude 45 48 55: (Fig.1). In general, RawdhatUmAlkhfas is solid flat land and contain mud and alluvial deposits. The average monthly temperatures ranging from 6.9°C (in January) to 43.7°C (in July& August), usually the main rainfall is in late autumn, winter and early spring. It is different between the showers powerful and reverse for a limited period during autumn, also concentrated rainfall in the cold and wet months of the year from November to April and the average amount of the rainfall is between 47.3 mm in spring and 31.9 mm in winter.

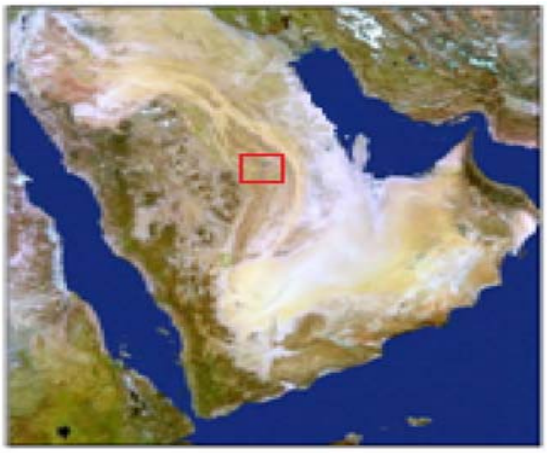

**Fig. 1:** Satellite map of Saudi Arabia shows the study area.

***Seed Bank Sampling:***

A comprehensive survey has been done for all growing plants (annuals and perennial) in RawdhatUmAlkhfas. Four sites were selected in the study area (Figure 1). It has been taken into account during selection of these sites to be represented - as much as possible - the diversity of habitat and plant communities that common in the study area. Soil samples were collected and irrigation agriculture methods were used to observe what seeds of different plants species the samples contain. The following steps were applied

Soil samples were collected during two periods of the year -

a) End of the autumn season (dry) in the month of November 2008, when most of the shrubs produce seeds

b) After the spring season (wet) during the month of May 2009 when most of the plants, especially annuals, produce their seeds. Both results had been kept separately.

- Samples soil were dried aerobically less than 25 C ° degrees.

.- Samples soils were mixed and samples were taken from each axis separately- nine soil samples (each with 25 × 20 cm area and 5 cm depth). The soil samples were placed through a 4 mm sieve to exclude coarse stones and plant fragments.

- The excluded material was examined manually for large seeds and fruits. Known volume of sieved soil samples were spread in 1 cm deep layer overlying sterilized coarse sand in 25 ×20 × 8 cm germination trays, 3 replicates were taken from each axis (9 samples per site).

-The germination trays were placed in the growth room at of 30 C ° / 20 C ° temperature for the day and night, respectively, 12 hours on the night and 12 hours day. Watering was done with tap water one or two times daily to keep the soil moist.

- Emerging seedlings were counted and replanted for identification, and to distinguish them. This process took three months.

- Using (Subjective Measure) DAFOR (Kent and Coker, 1992) measurement was used to give an overview of the abundance of plant species that have been monitored in RawdhatUmAlkhfas record. in this method, five symbols were used to describe the abundance of plant species, including: Dominant, abundant, frequent, occasional and rare (Kent and Coker, 1992).

- Plants samples were collected and dried using herbarium methodology according to the reference of plant communities (Flora) Saudi Arabia (Collentte,1999) and (Mandaville, 1990; Migahid, 1996) and (Chaudhary, 2000, 2001a&b).

***Statistical Testing:***

The One-Way ANOVA, regression and correlation analyses were conducted using SPSS15 for Windows. The least square means were presented and the level of significance was set at $P < 0.05$.

***Results:***

The average number of plant seeds growing in RawdhatUmAlkhfas were recorded and identified and the most seeds germinated during the first four weeks with average numbers from 52 to 260/m2 (table 1). Soil samples that been collected in the end of autumn and spring showed a number of perennial plants in the four studied locations, such as: *Helianthemumlippii, Gypsophila capillaries, Fagoniaschweinfurthii, Salvia aegyptiaca, Tribuluspentandrus, Acacia gerrardii, Lasiurusscindicus, Ziziphusnummularia, Cyperus conglomerates, Pennisetumdivisum, Allium sindjarense, Heliotropiumdigynum, Achilleafragrantissina, Convolvulus oxyphyllus, Farsetiaaegyptia, Cenchrusciliaris, Cyndondactylon, Ochradenusbaccatus and annuals plant species such as: Herniaria hirsute, Calendula arvensis, Matricariaaurea, Reichardiatingitana, Schismusbarbatus, Polypogonmonspeliensis, Eremobiumaegyptiacum, Spergulariadiandra, Euphorbia granulate, Suaedaaegyptiaca, Centaureapseudosinaica, Erucariahispanica, Mathiolalongipetala, Anethumgraveolens, Rumexvesicarius, Savignyaparviflora.*

Table (1) showed there was an increase in the number of germinated seeds (seed / m ²) during the autumn season compared with the spring season. In the autumn season Site 1 showed the highest average in the number of seedlings (260), site 4 (200), site 2 (155) and site 3 (95). Undefined It means the plants that grew, did not complete their growth so could not be identified (what does mean, may be no need). In spring season, Site 1 had the highest average in the number of seedlings (121), followed by site 4 (106) and site 3 (73) and site 2 (52). In table (2) there was no significant difference in the content of the soil seed of the four sites under different growth images (trees, shrubs, forbs, grasses) for each site during the autumn and spring seasons.

In comparison between the seeds germination (trees, shrubs, forbs, grasses) with each other in each site, separately, during the summer and winter seasons in the four sites, there were no significant difference (table 3). Table 4 showed there were no significant differences in the soil content from germinating seeds, depending on the nature of life (perennials and annuals) for each season separately in the four sites, also when comparing perennials with yearbooks for each site during the autumn and spring, there were no significant differences morale (table 5). However Site (1) in the autumn season had significant differences. The density of germinal soil seed bank was significantly higher in the autumn season than those in the spring season. It was noted that a number of annuals perennials are increased.

By comparing the plant species that have appeared in germination experiments (table 6) with what has been confined to the natural vegetation cover of the four sites (table 7), illustrated the absence of plant species observed in the plants inventory record of these areas with no appearance in seeds stock soil. Also study showed that there are no seeds of some plant species, especially perennial plants, in soil samples but these species are present plants inventory record. There are about 85 of wild plant species belonging to 76 species belonging to 30 family in RawdhatUmAlkhfas.

**Table 1:** Average number of seeds germinated (seed / m ²) in the four sites studied for two seasons (autumn and spring).

| Season Site | Site 1 | Site 2 | Site 3 | Site 4 |
|---|---|---|---|---|
| Autumn | 260 | 155 | 95 | 200 |
| Spring | 121 | 52 | 73 | 106 |

**Table 2:** Average number of seeds plant / m ² according to the nature of the growth of the two seasons (autumn and spring).

| Seasons | Site | Trees | Shrubs | Forbs | Grasses | Undefined | Total |
|---|---|---|---|---|---|---|---|
| Autumn | 1 | - | 8.33±0.33 | 44±7.00 | 11±2.65 | 5.33±1.33 | 11.31±68.66 |
| | 2 | - | 12±5.77 | 29.66±11.05 | 4.66±1.20 | 5.33±2.66 | 20.68±51.65 |
| | 3 | 1±0.57 | 6.66±3.48 | 16±4.35 | 5.33±0.88 | 2.66±0.88 | 10.16±31.65 |
| | 4 | 1.0±1.0 | 15±4.16 | 40.66±17.18 | 3.33±2.02 | 6.66±4.25 | 28.61±66.65 |
| | L.S.D | 0.441099 | 0.487527 | 0.309072 | 0.529323 | 0.529323 | 2.296344 |
| Spring | 1 | - | 1.66±1.20 | 28±12.77 | 8.66±0.33 | 2.0±1.0 | 15.3±40.32 |
| | 2 | - | 3.33±0.33 | 11.33±3.84 | 2±1.15 | 0.66±0.66 | 5.98±17.32 |
| | 3 | - | 1.33±0.88 | 20.33±10.33 | 2.66±1.20 | 0±0.0 | 12.41±24.33 |
| | 4 | - | 1.66±0.88 | 22±7.0 | 9±5.03 | 2.33±1.20 | 14.11±34.99 |
| | L.S.D | - | 0.42286 | 0.650449 | 0.191311 | 0.24775 | 1.51237 |

**Table 3:** Average number of seeds of plants / m ² for the four sites according to the nature of the growth of the two seasons (autumn and spring).

| Seasons | Life form | Site1 | Site2 | Site3 | Site4 |
|---|---|---|---|---|---|
| Autumn | Trees | 0.00±0.00 | 0.00±0.00 | 1±0.57 | 1±1 |
| | Shrubs | 8.33±0.33 | 12±5.77 | 6.66±3.48 | 15±4.16 |
| | Forbs | 44±7.00 | 29.66±11.05 | 16±4.35 | 40.66±17.18 |
| | Grasses | 11±2.65 | 4.66±1.20 | 5.33±0.88 | 3.33±2.02 |
| | Undefined | 5.33±1.33 | 5.33±2.66 | 2.66±0.88 | 6.66±4.25 |
| | L.S.D | * 1.4806 | 0.02369 | 0.016094 | 0.03698 |
| Spring | Trees | 0.00±0.00 | 0.00±0.00 | 0.00±0.00 | 0.00±0.00 |
| | Shrubs | 1.66±1.20 | 3.33±0.33 | 1.33±0.88 | 1.66±0.88 |
| | Forbs | 28±12.77 | 11.33±3.84 | 20.33±10.33 | 22±7 |
| | Grasses | 8.66±1.33 | 2±2.66 | 2.66±0.88 | 9±4.25 |
| | Undefined | 2.00±1.00 | 0.66±0.66 | 0.00±0.00 | 2.33±1.20 |
| | L.S.D | 0.032436 | 0.008505 | 0.049733 | 0.014361 |

significant *

**Table 4:** number of seeds / m ² for plants and annuals and perennial totaling in the two seasons (the nature of life) for the four sites.

| Seasons | Site | perennials | annuals | Undefined | Total |
|---|---|---|---|---|---|
| Autumn | 1 | 10±1.52 | 53.33±7.05 | 5.33±1.33 | 9.9±68.66 |
| | 2 | 14.66±6.38 | 31.66±11.78 | 5.33±2.60 | 20.76±51.56 |
| | 3 | 12.33±4.25 | 16.66±3.84 | 2.66±0.88 | 8.97±31.65 |
| | 4 | 18.66±3.71 | 41.33±16.89 | 6.66±4.25 | 24.85±66.65 |
| | L.S.D | 0.563249 | 0.19754 | 0.750126 | 1.510915 |
| Spring | 1 | 6.33±4.37 | 32±10.01 | 2±1 | 15.38±40.33 |
| | 2 | 5.66±1.66 | 11±3.51 | 0.66±0.66 | 5.83±17.32 |
| | 3 | 4.33±1.33 | 20±8.50 | 0.0±0.0 | 9.83±24.33 |
| | 4 | 4.66±1.76 | 28±10.40 | 2.33±1.20 | 13.36±34.99 |
| | L.S.D | 0.942137 | 0.377774 | 0.24775 | 1.567661 |

**Table 5:** number of seeds / m ² of plants in four sites by the nature of life in the two seasons (autumn and spring) seasons and compared with each other.

| Seasons | Site | Site1 | Site2 | Site3 | Site4 |
|---|---|---|---|---|---|
| Autumn | perennials | 10±1.52 | 14.66±6.38 | 12.33±4.25 | 18.66±3.71 |
| | annuals | 53.33±7.05 | 31.66±11.78 | 16.66±3.84 | 41.33±16.89 |
| | Undefined | 5.33±1.33 | 5.33±2.60 | 2.66±0.88 | 6.66±4.25 |
| | L.S.D | 0.000364 | 0.13349 | 0.062055 | 0.129481 |
| Spring | perennials | 6.33±4.37 | 5.66±1.66 | 4.33±1.33 | 4.66±1.76 |
| | annuals | 32±10.01 | 11±3.51 | 20±8.50 | 28±10.40 |
| | Undefined | 2.0±1.0 | 0.66±0.66 | 0.0±0.0 | 2.33±1.20 |
| | L.S.D | 0.03101 | 0.049876 | 0.064482 | 0.046321 |

***Discussion:***

This study reported the characteristics of climate in the RawdhatUmAlkhfasarea. It became clear that the region's climate consist of a hot summer, cold winter and relatively infrequent and fluctuating rainfall from one season to another and from year to year, due to the distance of the area from bodies of water and the lack of any sources of surface water. March is the rainiest month in the area. Observed from the study, several plant species were found in all of the soil samples, which were collected from the four sites in fall and spring seasons; annual plants were slightly higher than perennials, this is consistent with what (Dore and McNeill, 1980). The large number of annual seeds in soil samples ( hundreds or even up to thousands of seeds) per square meter are due

to the present of these seeds in the soil since a year or more (Avila *et al*., 2000) . Due to grazing, the soil seed bank could allow for the germination of annuals, in dominant communities, along with a small proportion of perennials. (Yan *et al*., 2012).

It was observed during the study that certain plant species were absent and were not found in the seed bank of the soil, although they had been observed previously in the records of plants in of these regions and this is consistent with what is mentioned in many studies in non-comparable between what is visible above the ground for and what in the subsoil of the seeds in the same locations (Al Qaraawi*et al*., 2009; Assaeed and Al Doss2002; Perez *et a1*.,1998 ; Rice, 1989; Louda, 1989). The absence of seeds of some plant species, especially perennial plants, in soil samples with the presence of these species in the record inventory of plant species may be the reason for this lack of seed production of these plants or the fact that the seeds resulting from low vitality, lack of suitable environment germination, consumption by insects, moving by the wind or buried in the soil during animal grazing (Dore and McNeill, 1980; Thompson and Grime, 1979). Site 1 is a less vulnerable location of the activities of development of agricultural and urban, while site 2 is exposed lid vegetation to overgrazing and the development activities of urban and frequent visitors and site 3 resides on both sides of the stream dredging with seeds and growing plants site 4 is located in flatter and less vulnerable environmental to development activities. This explains the superiority of Site 1 compare to other sites in terms of density, diversity of vegetation, the amount and the installation of stock seeds soil, which prove there is relationship between soil seeds and vegetation (Willems, 1983).

Comparing the germination among the four sites, using the images of different growth stage (trees, shrubs, forbs, grasses), the average number of seeds density showed no significant differences in both autumn and spring seasons. However, herbs were more prevalent compared to the trees, shrubs and grasses. By Comparison the effect of season on the seed-bank shows no significant differences between perennials and annuals. There was an increase in the average number of seeds germinated for the autumn season compared to spring season. Furthermore, it was also observed in this study that the seeds of some plant species, especially perennial plants were not found in the soil samples, even though these species are available in plant species records of RawdhatUmAlkhfas. Marked Site 1 that a less vulnerable location of the activities of development of agricultural and urban, while site 2 is exposed lid vegetation to overgrazing and the development activities of urban and frequent visitors and site 3 resides on both sides of the waterway dredging with seeds and growing plants Site 4, located in more flatter and less exposed environment to development activities.

Also recorded an increase in the average seeds germinated in the autumn season compared the spring season, this may be, the presence of seeds in the soil since its launch in the spring season and though not by a large moral correspond with what he found both, and survival to autumn, but the seeds of spring did not settle in the soil as a result of exposure to predation by rodents, insects or moved by the wind to other areas( ALQaraawi *et al*., 2009; and Mayor *et al*., 2002).

In addition to the destruction of vegetation as a result of development activities, the lack vegetation (density and diversity) in RawdhatUmAlkhfas is due to the scarcity of rainfall for consecutive years , especially during the time from 1978 – 2008 ( Al-Yemeni *et al*., 2000 ; Al-Yemeni and AlFarraj, 1995) and the low number of seeds in soil stock indicative of the threat facing the vegetation in RawdhatUmAlkhfas.

This study demonstrated that the different amount and composition of soil seed stocks in different locations to RawdhatUmAlkhfas is compatible with studies that emphasize the soil seed bank varied from one location to another, even closer distances (Reichman, 1984).

**Table 6:** plant species and the average number of seeds germinating m / ² for Sites in the four seasons of autumn and spring of RawdhatUmAlkhfas.

| Species | Family | Growth form | Life form | Average number of seeds germinating In the autumn season | Average number of seeds germinating In the spring season |
|---|---|---|---|---|---|
| *Allium sindjarense* Boiss.et Hasskn.Ex Regel | Alliaceae | F | P | ____ | 2 |
| *Rhazyastricta*Decne. | Apocynaceae | S | P | 1 | 2 |
| *Calotropisprocera*(Ait.)Ait | Asclelpiadaceae | T | P | 3 | ____ |
| *Arnebiahispidissima*(Lehm.)DC. | Boraginaceae | F | A | 7 | 4 |
| *Echiumrauwolfii* Del. | Boraginaceae | F | A | 4 | ____ |
| *Heliotropiumarbainense* Fresen. | Boraginaceae | S | P | 6 | 1 |
| *Capparisspinosa* L. | Capparaceae | S | P | 14 | ____ |
| *Gypsophila capillaries* (Forssk.)C.Christ. | Caryophylaceae | S | P | 4 | ____ |
| *Herniaria hirsute* L. | Caryophylaceae | F | A | ____ | 4 |
| *Silenearabica*Boiss. | Caryophylaceae | F | A | 9 | 15 |
| *Bassiaeriophora* (Schrad.) Asch. | Chenopodiaceae | F | A | 14 | 6 |
| *Chenopodium album* L. | Chenopodiaceae | F | A | 11 | ____ |
| *Chenopodiummurale* L. | Chenopodiaceae | F | A | 10 | 23 |
| *Haloxylonsalicorricum* (Moq.) Bunge | Chenopodiaceae | S | P | 4 | ____ |

| | | | | | |
|---|---|---|---|---|---|
| *Spergulariadiandra*(Guss.)Heldr.&Sart. | Chenopodiaceae | F | A | ____ | 6 |
| *Suaedaaegyptiaca*(Hasselq.) zoh. | Chenopodiaceae | F | A | 15 | 2 |
| *Helianthemumlippii*(L.)Doum.Cours. | Cistaceae | S | P | 9 | 3 |
| *Achilleafragrantissina* (Frossk) sch.-Big | Compositae | S | P | 18 | 3 |
| *Anthemisarvensis* L. | Compositae | F | A | 21 | 3 |
| *Artemisia sieberi*Besser. | Compositae | S | P | 1 | ____ |
| *Calendula arvensis* L. | Compositae | F | A | 3 | ____ |
| *Centaureapseudosinaica*Czerep. | Compositae | F | A | 11 | ____ |
| *Launaeacapitata* (Spreng.) | Compositae | F | A | 40 | 15 |
| *Launaeamucronata*(Forssk.)Muschl. | Compositae | F | A | 8 | 1 |
| *Matricariaaurea* (Loefl.)Sch.-Bip. | Compositae | F | A | 15 | 5 |
| *Picrisbabylonica*Hand-Mazz. | Compositae | F | A | 19 | 9 |
| *Pulicariacrispa* (Forssk.)Oliva | Compositae | S | P | 5 | ____ |
| *Rhanteriumepapposum*Oliva | Compositae | S | P | 5 | 3 |
| *Reichardiatingitana* (L.) | Compositae | F | A | 13 | ____ |
| *Senecioglaucus* L. | Compositae | F | A | 42 | 12 |
| *Convolvulus glomeratus*Choisy | Convolvulaceae | F | P | 2 | 10 |
| *Convolvulus oxyphyllus* Boiss.subsp.OxycladusRech.f. | Convolvulaceae | S | P | 4 | ____ |
| *Eremobiumaegyptiacum*(Sprengel) Boiss. | Cruciferae | F | A | 18 | 1 |
| *Erucariahispanica* (L.)Druce | Cruciferae | F | A | 8 | ____ |
| *Farsetiaaegyptia*Turrill | Cruciferae | S | P | 7 | 2 |
| *Horwoodiadicksoniae*Turrill | Cruciferae | F | A | 9 | 16 |
| *Mathiolalongipetala*(Vent.)DC. | Cruciferae | F | A | 11 | 2 |
| *Savignyaparviflora* (Del.)Webb | Cruciferae | F | A | 22 | ____ |
| *Citrullusclocynthis*(L.)Schrad. | Cucurbitaceae | F | P | 1 | 2 |
| *Cyperus conglomerates* Rottb. | Cyperaceae | F | P | 5 | ____ |
| *Euphorbia granulata*Forssk. | Euphorbiaceae | F | A | 6 | ____ |
| *Cenchrusciliaris*L. | Gramineae | G | P | 6 | 6 |
| *Cyndondactylon* (L.)Pers. | Gramineae | G | P | 2 | 5 |
| *Lasiurusscindicus*Henrard | Gramineae | G | P | 10 | 3 |
| *Loliumrigidum*Gaudin | Gramineae | G | A | 2 | ____ |
| *Pennisetumdivisum*(J.Gmel.)Henrard | Gramineae | G | P | 9 | 1 |
| *Phalaris minor* Retz. | Gramineae | G | A | 21 | 7 |
| *Polypogonmonspeliensis*(L.) Desf. | Gramineae | G | A | 10 | 7 |
| *Schismusbarbatus* (L.) Thell.. | Gramineae | G | A | 14 | 17 |
| *Stipacapensis*Thunb. | Gramineae | G | A | 11 | 7 |
| *Salvia aegyptiaca* L. | Labiatae | S | P | 2 | 1 |
| *Malvaaegyptica* L. | Malvaceae | F | A | 12 | 4 |
| *Malvaparvitflora*L. | Malvaceae | F | A | 22 | 7 |
| *Spergulariadiandra*(Guss.)Heldr.&Sart. | Chenopodiaceae | F | A | ____ | 6 |
| *Acacia gerrardii*Benth. | Mimosaceae | T | P | 3 | ____ |
| *Neuradaprocumbens* L. | Neuradaceae | F | A | 11 | 7 |
| *Astragaluscaprinus* L. | Papilionaceae | S | P | 14 | 1 |
| *Melilotusindicus*(L.)All. | Papilionaceae | F | A | 5 | 7 |
| *Trigonellastellata*Forssk. | Papilionaceae | F | A | 4 | 7 |
| *Plantagoamplexicaulis* Cav. | Plantaginaceae | F | A | 7 | 4 |
| *Plantagoboissieri*Hausskn.&Bornm | Plantaginaceae | F | A | 20 | 4 |
| *Plantagoovata*Forssk.. | Plantaginaceae | F | A | 19 | 10 |
| *Emexspoinosa*(L.) campd. | Polygonaceae | F | A | 6 | 9 |
| *Rumexvesicarius*L. | Polygonaceae | F | A | 6 | 9 |
| *Ochradenusbaccatus* Del. | Polygonaceae | S | P | 6 | 2 |
| *Reseda arabica*Boiss | Resedaceae | F | A | 4 | 4 |
| *Ziziphusnummularia*(Burm.F.)Wight et Arn. | Rhamnaceae | S | P | 2 | 3 |
| *Lyciumshawii*Roem .&Schult. | Solanaceae | S | P | 6 | ____ |
| *Anisosciadiumlanatum*Boiss. | Umbelliferae | F | A | 6 | 21 |
| *Anethumgraveolens*L. | Umbelliferae | F | A | 6 | 2 |
| *Fagoniaschweinfurthii*(Hadidi)Hadidi | Zygophyllaceae | S | P | 8 | 2 |
| *Tribulusterrestris* L. | Zygophyllaceae | F | A | ____ | 10 |
| *Zygophyllumcoccineum* L. | Zygophyllaceae | S | P | ____ | 1 |

A=annual ,P=perennial, & F=forb,G=grass,S= shrub ,T= Tree.

**Table 7:** plant species and the average number of seeds germinating m / ² for the four sites for the spring season of 2008 RawdhatUmAlkhfas.

| Species | Family | Growth form | Life form | Abundance |
|---|---|---|---|---|
| *Allium sindjarense* Boiss.et Hasskn.Ex Regel | Alliaceae | F | P | O |
| *Rhazyastricta*Decne. | Apocynaceae | S | P | D |
| *Calotropisprocera*(Ait.)Ait | Asclelpiadaceae | T | P | R |
| *Asphodelustenuifolius* Cav. | Asphodelaceae | F | A | F |
| *Arnebiahispidissima*(Lehm.)DC. | Boraginaceae | F | A | O |
| *Echiumrauwolfii* Del. | Boraginaceae | F | A | O |
| Heliotropiumarbainense Fresen. | Boraginaceae | S | P | O |
| *Heliotropiumdigynum* (Forssk)Asche.exC.Christ. | Boraginaceae | S | P | R |
| *Capparisspinosa* L. | Capparaceae | S | P | F |
| *Gypsophila capillaries* (Forssk.)C.Christ. | Caryophylaceae | S | P | F |
| *Herniaria hirsute* L. | Caryophylaceae | F | A | F |
| *Silenearabica*Boiss. | Caryophylaceae | F | A | A |
| *Spergulariadiandra*(Guss.)Heldr.&Sart | Caryophylaceae | F | A | R |
| *Bassiaeriophora* (Schrad.) Asch. | Chenopodiaceae | F | A | F |
| *Chenopodium album* L. | Chenopodiaceae | F | A | F |
| *Chenopodiummurale* L. | Chenopodiaceae | F | A | F |
| *Haloxylonsalicorricum*(Moq.) Bunge | Chenopodiaceae | S | P | D |
| *Suaedaaegyptiaca*(Hasselq.) zoh. | Chenopodiaceae | F | A | O |
| *Helianthemumlippii*(L.)Doum.Cours. | Cistaceae | S | P | F |
| *Achilleafragrantissina* (Frossk) sch.-Big | Compositae | S | P | F |
| *Anthemisarvensis* L. | Compositae | F | A | F |
| *Anvillea radiate* Coss.&Dur. | Compositae | S | P | R |
| *Artemisia sieberi*Besser. | Compositae | S | P | R |
| *Calendula arvensis* L. | Compositae | F | A | F |
| *Centaureapseudosinaica*Czerep. | Compositae | F | A | R |
| *Flaveriatrinervia*(Spreng.)Mohr. | Compositae | F | A | A |
| *Launaeacapitata* (Spreng.) | Compositae | F | A | A |
| *Launaeamucronata*(Forssk.)Muschl. | Compositae | F | A | O |
| Matricariaaurea (Loefl.)Sch.-Bip. | Compositae | F | A | A |
| *Picrisbabylonica* Hand-Mazz. | Compositae | F | A | O |
| *Pulicariacrispa* (Forssk.)Oliva | Compositae | S | P | F |
| *Rhanteriumepapposum*Oliva | Compositae | S | P | D |
| *Reichardiatingitana* (L.) | Compositae | F | A | O |
| *Senecioglaucus*L. | Compositae | F | A | A |
| *Convolvulus glomeratus*Choisy | Convolvulaceae | F | P | R |
| *Convolvulus oxyphyllus* Boiss.subsp.OxycladusRech.f. | Convolvulaceae | S | P | R |
| *Anastaticahierochuntica*L | Cruciferae | F | A | F |
| *Eremobiumaegyptiacum*(Sprengel) Boiss. | Cruciferae | F | A | A |
| *Erucariahispanica* (L.)Druce | Cruciferae | F | A | F |
| *Farsetiaaegyptia*Turrill | Cruciferae | S | P | O |
| *Horwoodiadicksoniae*Turrill | Cruciferae | F | A | D |
| *Mathiolalongipetala*(Vent.)DC. | Cruciferae | F | A | A |
| *Savignyaparviflora*(Del.)Webb | Cruciferae | F | A | O |
| *Zillaspinosa*Prantl | Cruciferae | S | P | D |
| *Citrulluscolocynthis*(L.)Schrad. | Cucurbitaceae | F | P | D |
| *Cyperus conglomerates* Rottb. | Cyperaceae | F | P | occasional |
| *Euphorbia granulata*Forssk. | Euphorbiaceae | F | A | O |
| *Cenchrusciliaris* L. | Gramineae | G | P | R |
| *Cyndondactylon* (L.)Pers. | Gramineae | G | P | F |
| *Lasiurusscindicus*Henrard | Gramineae | G | P | F |
| *Loliumrigidum*Gaudin | Gramineae | G | A | R |
| *Panicumturgidum*Forssk | Gramineae | G | P | A |
| *Pennisetumdivisum*(J.Gmel.)Henrard | Gramineae | G | P | A |
| *Phalaris minor* Retz. | Gramineae | G | A | O |
| *Poaannua* L. | Gramineae | G | A | A |
| *Polypogonmonspeliensis*(L.) Desf. | Gramineae | G | A | A |
| *Schismusbarbatus* (L.) Thell.. | Gramineae | G | A | F |
| *Stipacapensis*Thunb. | Gramineae | G | A | F |
| *Salvia aegyptiaca* L. | Labiatae | S | P | O |
| *Teucriumpolium* L. | Labiatae | S | P | R |
| *Malvaaegyptica* L. | Malvaceae | F | A | F |
| *Malvaparvitflora* L. | Malvaceae | F | A | F |
| *Acacia gerrardii*Benth. | Mimosaceae | T | P | F |
| *Acacia tortilis*(Forssk). | Mimosaceae | S | P | O |
| *Neuradaprocumbens*L. | Neuradaceae | F | A | F |

| | | | | |
|---|---|---|---|---|
| *Cistanchephelypaea*(L.)Cout. | Orobanchaceae | F | P | F |
| *Astragaluscaprinus* L. | Papilionaceae | S | P | F |
| *Melilotusindicus*(L.)All. | Papilionaceae | F | A | F |
| *Trigonellastellata*Forssk. | Papilionaceae | F | A | O |
| *Plantagoamplexicaulis* Cav. | Plantaginaceae | F | A | A |
| *Plantagoboissieri*Hausskn.&Bornm | Plantaginaceae | F | A | F |
| *Plantago ovate* Forssk.. | Plantaginaceae | F | A | F |
| *Emexspoinosa* (L.) campd. | Polygonaceae | F | A | A |
| *Rumexvesicarius* L. | Polygonaceae | F | A | F |
| *Ochradenusbaccatus* Del. | Polygonaceae | S | P | R |
| *Reseda arabica*Boiss | Resedaceae | F | A | R |
| *Ziziphusnummularia*(Burm.F.)Wight et Arn. | Rhamnaceae | S | P | A |
| *Lyciumshawii*Roem .&Schult. | Solanaceae | S | P | D |
| *Tamarixnilotica*(Ehrenb.)Bunge. | Tamaricaceae | S | P | F |
| *Anisosciadiumlanatum*Boiss. | Umbelliferae | F | A | F |
| *Anethumgraveolens* L. | Umbelliferae | F | A | O |
| *Fagoniaschweinfurthii*(Hadidi)Hadidi | Zygophyllaceae | S | P | O |
| *Tribuluspentandru* | Zygophyllaceae | F | P | F |
| *Tribulusterrestris* L . | Zygophyllaceae | F | A | O |
| *Zygophyllumcoccineum* L. | Zygophyllaceae | S | P | O |

A=annual ,P=perennial, & F=forb,G=grass,S= shrub ,T= Tree.
O=Occasional ,F= Frequent, D= Dominant ,A= Abundant ,R= Rare.

***Conclusion:***

Observed from the study is the different density of stock seed in the soil from one location to another with the heterogeneity of species within the site 1 due to drought and lack of rain in the growth seasons of these plants as well as logging and overgrazing. As a result of the small number of seeds germination in some of the sites studied, indicates that the danger signs facing the cover natural vegetation in the study area. Therefore, the study recommends doing more studies on the reasons for the non-appearance of some plant species in the experiments germination, although their presence is in record of Flora in the studied area, disappearance from the Bank of the soil seed and planning for the proper management of re-cultivation of the kinds of unwanted and regulation of grazing, prevent logging and the establishment of reserves.

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