# Comparison between the growth and development of some cultured plants among different regions of Kish Island

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## Abstract

Kish Island is located in the Persian Gulf on the mainland Iran. Salinity and the use of low quality water affect the ornamental aspects of species. Plants in Kish Island irrigated by low quality water face with salt and drought stress. The purpose of this study was to analyze the performance of *Tecoma stans* (L.) Juss. ex Kunth, *Euonymus* sp., *Conocarpus erectus* Jack, *Ficus benjamina* L., *Ficus bengalensis* L., *Melia azadirachta* L. and *Delonix regia* (Boj. ex Hook.) Raf in four different regions (Sanaie, Sadaf, Pavion and Saffain) of Kish Island regarding the growth, development and ornamental characteristics. During the assay, March-September, the plant height, leaf area, leaf number, chlorophyll and proline content, stem diameter and height, and dry and fresh weight of leaf were measured twice. *C. erectus* and *F. bengalensis* were recommended for the considered regions in Kish Island. Furthermore, *D. regia* was ideal for Sadaf and Pavion regions. This study may be useful in selecting suitable species for the same situation as these different regions in Kish Island.

**Keywords**: arid, drought, ornamental plants, salt stress

## Introduction

Kish area has a surface area of 90 sq. km with an outer boundary of 40 km. and a nearly elliptical shape. It is located in the Persian Gulf 19 km. off the Lengeh port on the mainland Iran. Kish is located on a narrow strip of tropical vegetation on the Northern Hemisphere with a narrow longitude between the Persian plateau in the north and the Arabian Peninsula in the south. Kish's climate is considered to be a very dry semi equatorial. Its humidity is approximately 60 % most of the year and the annual temperature is 26.6 °C. The island's special geographic and climatic conditions in the warm and shallow sea water near the straits of Hormoz have kept the vegetation in the island in poor growth. The lack of topographical complications, a thin top soil over the island's hard and extended coral reef base, aridity and heat are the main variables affecting the pattern of poor vegetation in the island (Ghahraman, 2007).

Water used for irrigation in some regions of Kish Island has low quality. Salinity and consumption of low quality water affect the ornamental aspects of cultivated and wild species, although, in general, wild species have a greater degree of salt tolerance than their cultivated relatives (Morales, et al., 2001).

Due to these, the use of salt and drought tolerant species in landscaping projects, parks, xeriscape and public areas requires consideration (Morales et al., 1998).

The purpose of this study is to analyze the performance of *Tecoma stans* (L.) Juss. ex Kunth*, Euonymus* sp.*, Conocarpus erectus* Jack*, Ficus benjamina* L.*, Ficus bengalensis* L. *, Melia azadirachta* L. and *Delonix regia* (Boj. ex Hook.) Raf in four different regions of the Kish Island in terms of growth, development and ornamental characteristics. This study may be useful in selecting appropriate species for the same situation as these different regions in Kish Island.

## Materials and Methods

### Plant materials

*Seven ornamental plant species: Tecoma stans (L.) Juss. ex Kunth, Euonymus sp., Conocarpus erectus Jack, Ficus benjamina L., Ficus bengalensis L., Melia azadirachta L. and Delonix regia (Boj. ex Hook.) Raf were used. All of them are known as tropical and sub-tropical plants.*

*T. stans* is native to wide ranges from southern Texas, New Mexico and Arizona and northern Argentina and from Florida and the Bahamas to Trinidad in the Caribbean. It belongs to Bignoniaceae family. *T. stans* can't tolerate heavy frost. It produces tubular and fragrant flowers and pollinated by bees and other insects and humming birds. It is a medium-sized shrub with many branches and basal stems (Tipton, 1994).

*F. benjamina* is species of fig tree, Moraceae, native to south and Southeast Asia and Australia. It is a tree reaching 30 m (100 ft) high in natural conditions, with gracefully drooping branches and glossy leaves 6-13 cm long, oval with an acuminate tip. In tropical latitudes, the weeping fig makes a very large and stately tree for parks and other urban situations, such as wide roads (Firth and Wolf, 1976).

*F. bengalensis* is native to India where it grows from low altitudes to 610 m, especially in dry regions (Neal, 1965). The genus is made up of about 1000 species from pan tropical and subtropical origins (Wagner et al. 1999). Plants in the genus are all woody, ranging from trees and shrubs to climbers (Neal, 1965). Its family is Moraceae.

*M. azadirachta* is a tree in the mahogany family Meliaceae. It is native to Bangladesh, India, Myanmar and Pakistan growing in the tropical and semi-tropical regions. It is a fast-growing tree that can reach a height of 15-20 m. The alternate, pinnate leaves are 20-40 cm long, with 20-31 medium to dark green leaflets about 3-8 cm long. The terminal leaflet is often missing. The petioles are short. Very young leaves are reddish to purplish in color (Ganguli, 2002).

*C. erectus* is native to North America. It is able to reach an altitude of 12 m with a 6 m spread. It belongs to Combretaceae family. This low-branching, trunked, shrubby and evergreen tree has glaucous medium-green leaves (Gilman and Watson, 1993).

*Euonymus* sp. belongs to Celastraceae family. It is a loose, spreading shrub that can grow to 4.5 m in height, but is most commonly seen about 2 to 2.5 m high (Gillman, 1999).

*D. regia* is a shrub growing to 12 m tall, native to Madagascar. The leaves are bipinnate. It belongs to the Fabaceae family (Allen, 2006).

### Site condition

The plants were cultivated in four different regions (Saffain, Sadaf, Sanaie and Pavion) in Kish Island when they were two months old. Saffain is located on the North West, Sadaf approximately on the center, Sanaie on the North East and Pavion on the South East of the Island. The experiment was conducted over March to September in 2007 under the natural condition of Kish Island.

The maximum/minimum average temperature is 30/3 $^{o}$C (Mokhtarpoor, 1996). The relative humidity ranges between 76 and 82 %. Kish Island has long sunny hours which are roughly 3100 hours a year (Ghahraman, 2007).

Electrical conductivity (EC) and pH of soil and water of four regions which were under research were measured.

**Measurements of growth and ornamental characters**

During the assay, the plant height, leaf area, leaf number, chlorophyll content, diameter of stem, stem height, and fresh and dry weight of leaf were measured every 3 months during 6 months (March-September). Leaf area was measured by Delta-T leaf Area Meter (Device Ltd., Cambridge, UK). Chlorophyll content was measured by Minolta SPAD-502 chlorophyll meter in all plants of per treatment. Then, the real amount was approximated by Saini method (Saini, et al., 2001). Dry weight of the leaves is got after being dried at 70 $^{o}$C in the oven for 48 hours. Furthermore, the content of proline was measured after 6 months by Bates method (Bates, et al., 1973). The experiment was done as one factor in the form of complete block design. It was conducted in four regions with 6 repetitions. The effects of the regions, species and interaction of them on measured characters were studied.

**Statistical analysis**

The data of the trial was analyzed by MSTAT-C software. Treatment means were separated with Tukey's test ($P$ = 0.05).

## Results

Electrical conductivity (EC) and pH of soil and water of four regions which were under research are shown in Table 1.

Table 1. Measured EC and pH of soil and water in different regions that were studied.

| | Water | | Soil | |
|---|---|---|---|---|
| Region | EC | pH | EC | pH |
| Sanaie | 1.7 | 6.3 | 2.16 | 8.06 |
| Sadaf | 1.2 | 7.3 | 1.3 | 8.02 |
| Pavion | 0.9 | 7.7 | 2.4 | 7.91 |
| Saffain | 1.8 | 6.7 | 5.06 | 7.82 |

**Effects of regions on plants**

There was no significant difference between any measured characters regarding the effect of regions on plants.

**Effects of species**

*Ficus bengalensis* was the most in the leaf area and indicates significant difference with the other species. *Euonymus* sp. was the least and had no significant difference with other species except *Ficus bengalensis* (Table 2). There was no significant difference between other species regarding the other characters.

**Interaction of species and regions on ornamental characters Leaf area**

Leaf area of *F. benghalensis* was the maximum in all the regions, showing significant difference with other species. The other species had no significant difference with each other (Table 2).

Table 2. The effects of region, species and the interaction between them on leaf area ($cm^2$).

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 6222a[z] | 8637a | 6408a | 7617a | 7221A |
| *D. regia* | 1550bc | 1821bc | 639.6c | 707c | 1171B |
| *T. stans* | 1522bc | 2872bc | 2387bc | 3556b | 2584B |
| *M. azadirakhta* | 692c | 2638bc | 2018bc | 1896bc | 1811B |
| *C. erectus* | 818c | 1138bc | 1179bc | 1060c | 1049B |
| *F. benjamina* | 1311bc | 2042bc | 1304bc | 1711bc | 1592B |
| *Eunymus* sp. | 911c | 1285bc | 875c | 1121bc | 1048B |
| Mean | 1861A | 2919A | 2114A | 2524A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

**Thickness of stem**

In Sanaie region *F. bengalensis* had the thickest stems, indicating no significant difference with other species except *F. benjamina* and *Euonymus* sp.

In Sadaf region *F. bengalensis* stem was the thickest, again, indicating no significant difference with *D. regia*, *T. stans* and *M. azadirachta*. *F. benjamina* had the minimum thickness of stem. It indicated significant difference with *F. bengalensis* and *D. regia. F. bengalensis* had the thickest stem in Pavion region. *Euonymus* sp. had the least thickness of stem, indicating significant difference only with *F. bengalensis*.

In Saffain region the stem of *F. bengalensis* was the thickest, indicating significant difference with the other species. The stem of *C. erectus* had the least thickness, indicating significance difference only with *F. bengalensis* (Table 3).

Table 3. The effects of region, species and the interaction between them on the thickness of stems (cm).

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 0.63ab[z] | 0.8a | 0.56a-d | 0.6a-c | 0.65A |
| *D. regia* | 0.32 c-g | 0.46 b-f | 0.51b-e | 0.57a-d | 0.47A |
| *T. stans* | 0.32c-g | 0.27e-g | 0.3d-g | 0.4b-g | 0.32A |
| *M. azadirakhta* | 0.3d-g | 0.35b-g | 0.4b-g | 0.33c-g | 0.35A |
| *C. erectus* | 0.3d-g | 0.24e-g | 0.26e-g | 0.4b-g | 0.3A |
| *F. benjamina* | 0.24e-g | 0.26e-g | 0.17g | 0.27e-g | 0.24A |
| *Eunymus* sp. | 0.29d-g | 0.21fg | 0.26e-g | 0.27e-g | 0.26A |
| Mean | 0.33A | 0.3A | 0.35A | 0.41A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test

**Length of stems**

There was no significant difference between species in the considered regions (Table 4).

Table 4. The effects of region, species and the interaction between them on the length of stems (cm).

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 4.15d[z] | 12.22a-d | 14.75a-d | 23.25 a-d | 14A |
| *D. regia* | 15.7a-d | 28.75a-d | 23.6a-d | 17.67a-d | 21.42A |
| *T. stans* | 6.04cd | 5.62cd | 12.67a-d | 27.83a-c | 13.04A |
| *M. azadirakhta* | 2.3d | 19.5a-d | 31.95a-c | 22a-d | 18.93A |
| *C. erectus* | 4.2d | 18.42a-d | 22.08a-d | 37.67a | 20.6A |
| *F. benjamina* | 20.1a-d | 33.25ab | 19.2a-d | 25a-d | 24.38A |
| *Eunymus* sp. | 11.9a-d | 25.17a-d | 12.42a-d | 8b-d | 14.37A |
| Mean | 9.19A | 20.42A | 19.52A | 23.06A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

**Number of node**

*Melia azadirachta*, *Conocarpus erectus* and *F. bengalensis* had the highest number of the nodes in Sanaie. *E. japonica* was the least in this region, indicating significant difference only with both *M. azadirachta* and *C. erectus*. There was no significant difference between the other species in other regions (Table 5).

Table 5. The effects of region, species and the interaction between them on number of nodes.

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 18.75a-d[z] | 14b-d | 22.7a-d | 20.8a-d | 19.06A |
| *D. regia* | 12.3cd | 22a-d | 20.8a-d | 15.2b-d | 17.58A |
| *T. stans* | 13.75b-d | 19.5a-d | 11.8cd | 14.6b-d | 14.92A |
| *M. azadirakhta* | 12.8b-d | 25.5a-d | 17.25a-d | 33.6a | 22.29A |
| *C. erectus* | 22.75a-d | 28.75a-c | 25a-d | 30.6ab | 26.81A |
| *F. benjamina* | 11.75cd | 15.2b-d | 11.7cd | 12.8b-d | 12.85A |
| *Eunymus* sp. | 8.4d | 11.4cd | 9.2d | 11.3cd | 10.08A |
| Mean | 14.37A | 19.48A | 16.92A | 19.87A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

**Number of leaves**

In Sanaie *C. erectus* had the highest number of leaves, showing no significant difference with *F. benjamina* and *M. azadirachta*. *F. bengalensis* was the least. It had significant difference only with both *C. erectus* and *F. benjamina*.

There was no significant difference between plants of Sadaf. *D. regia* had the highest number of leaves in Pavion and it had significant difference only with *F. bengalensis*. It was the least.

In Saffain there was no significant difference between plants (Table 6).

Table 6. The effects of region, species and the interaction between them on number of leaves.

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| *F. bengalensis* | 2e[z] | 4.9c-e | 4.2de | 2.25e | 3.3A |
| *D. regia* | 14a-e | 23.7ab | 12.25b-e | 8.6b-e | 14.6A |
| *T. stans* | 8.9b-e | 9.2b-e | 9.3b-e | 9.25b-e | 9.2A |
| *M. azadirakhta* | 11b-e | 15.3a-e | 14.1a-e | 15.9a-e | 14.1A |
| *C. erectus* | 17.7a-e | 21.2a-c | 17.8a-e | 29.9a | 21.65A |
| *F. benjamina* | 8b-e | 21.4a-c | 11.75b-e | 21.a-d | 15.5A |
| *Eunymus* sp. | 8.9b-e | 9.4b-e | 9.3b-e | 3.8de | 7.9A |
| Mean | 10.1A | 15A | 11.25A | 13A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

**Height of plants**

*C. erectus* was the tallest plant in Sanaie, however; it had no significant difference with *M. azadirachta* and *D. regia*. *F. benjamina* was the least and it had significant difference only with *C. erectus* (Table 7).

In Sadaf *D. regia* was the highest of all plant. It indicated no significant difference with *C. erectus* and *M. azadirachta*. The lowest was that of *F. bengalensis* and it had significant difference only with both *M. azadirachta* and *D. regia* (Table 7).

*D. regia* was the highest in Pavion. There was no significant difference between *D. regia*, *T. stans, M. azadirachta* and *F. benjamina*. *F. bengalensis* was the least and it had significant difference with the other species except *T. stans*, *C. erectus* and *Euonymus* sp. (Table 7). There was no significant difference between the species in Saffain (Table 7).

Table 7. The effects of region, species and the interaction between them on height of plants (cm).

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 41.5gh[z] | 42.9gh | 43gh | 45gh | 43.1A |
| *D. regia* | 70.8b-h | 98.7a-c | 101.3ab | 78.9a-g | 87.4A |
| *T. stans* | 53.4e-h | 64.4b-h | 51.3e-h | 60.4c-h | 57.4A |
| *M. azadirakhta* | 59.3d-h | 87a-e | 85.5a-f | 91.75a-d | 80.9A |
| *C. erectus* | 35.9h | 48.1f-h | 67.5b-h | 115a | 66.6A |
| *F. benjamina* | 52.3e-h | 91.6a-d | 41.3gh | 64.3b-h | 62.4A |
| *Eunymus* sp. | 52e-h | 59.25d-h | 43.1gh | 33.25h | 46.9A |

| | | | | |
|---|---|---|---|---|
| Mean | 52.2A | 70.3A | 61.85A | 69.8A |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

**Fresh and dry weight of the leaf**

*F. bengalensis* had the highest fresh and dry weight of shoots in the whole area. Its fresh weight had significant difference with other species. Fresh and dry leaf weight of *D. regia* was the least in Sanaie. It had significant difference only with *F. bengalensis* (Tables 8 and 9). *F. benjamina* and *Euonymus* sp. had the least fresh weight and they had significant difference only with *F. bengalensis*. *Euonymus* sp. and *T. stans* had the least fresh weight in Pavion and Saffain, respectively. They had significant difference only with *F. bengalensis* (Table 8).

Table 8. The effects of region, species and the interaction between them on the fresh weight of leaves (g).

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 1.1bc[z] | 2.8a | 1.2b | 2.9a | 2A |
| *D. regia* | 0.3d | 0.25d | 0.2d | 0.1d | 0.2A |
| *T. stans* | 0.3d | 0.6d | 0.5d | 0.6cd | 0.5A |
| *M. azadirakhta* | 0.3d | 0.6d | 0.35d | 0.25d | 0.4A |
| *C. erectus* | 0.3d | 0.3d | 0.2d | 0.2d | 0.25A |
| *F. benjamina* | 0.3d | 0.4d | 0.1d | 0.3 d | 0.3A |
| *Eunymus* sp. | 0.4d | 0.2d | 0.1d | 0.4d | 0.3A |
| Mean | 0.4A | 0.7A | 0.4A | 0.7A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

*D. regia* was the least regarding the dry weight in Sadaf and Pavion. *F. benjamina* had the least leaf dry weight in Saffain. They had significant difference only with *F. bengalensis* (Table 9).

Table 9. The effects of region, species and the interaction between them on the dry weight of leaves (g).

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 0.46b[z] | 0.9a | 0.28bc | 0.9a | 0.6A |
| *D. regia* | 0.09c-e | 0.07d-e | 0.03de | 0.02e | 0.05A |
| *T. stans* | 0.12c-e | 0.12c-e | 0.14c-e | 0.2c-e | 0.14A |
| *M. azadirakhta* | 0.08de | 0.23cd | 0.13c-e | 0.08c-e | 0.13A |
| *C. erectus* | 0.09c-e | 0.09c-e | 0.08d-e | 0.12c-e | 0.09A |
| *F. benjamina* | 0.07de | 0.12c-e | 0.06d-e | 0.08d-e | 0.08A |
| *Eunymus* sp. | 0.1c-e | 0.08d-e | 0.06d-e | 0.08d-e | 0.08A |
| Mean | 0.15A | 0.2A | 0.11A | 0.2A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

**Chlorophyll**

There was no significant difference between leaf chlorophyll content of the used species all over the area (Table 10).

Table 10. The effects of region, species and the interaction between them on leaf chlorophyll content (mg*g F.W.$^{-1}$).

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 4.2a[z] | 4.5a | 3.9a | 7.3a | 5A |
| *D. regia* | 3.1a | 4.2a | 4.3a | 4.2a | 4A |
| *T. stans* | 4.6a | 2.7a | 3.25a | 5a | 3.9A |
| *M. azadirakhta* | 5.3a | 3.1a | 4.7a | 4.8a | 4.5A |
| *C. erectus* | 4.3a | 4.5a | 8.3a | 10.1a | 6.8A |
| *F. benjamina* | 6.3a | 4.8a | 2.9a | 5.1a | 4.8A |
| *Eunymus* sp. | 6.7a | 3.95a | 135.4a | 5.3a | 37.9A |
| Mean | 4.9A | 4A | 23.3A | 6A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

**Proline**

*T. stans* had the most content of proline in Sanaie. However, it showed no significant difference with *Ficus benjamina* L. and *M. azadirachta*. *D. regia* was the least, indicating no significant difference with *C. erectus*, *F. benjamina* and *Euonymus* sp. (Table 11).

Table 11. The effects of region, species and the interaction between them on leaf proline content (µM*g F.W.$^{-1}$).

| Species/ Region | Saffain | Pavion | Sadaf | Sanaie | Mean |
|---|---|---|---|---|---|
| *F. bengalensis* | 2.57d-h[z] | 0.72gh | 3.73b-h | 5.93g | 3.24A |
| *D. regia* | 1.5e-h | 6.34a-f | 0.07h | 0.16h | 2.02A |
| *T. stans* | 5.18a-h | 4.53a-h | 8.37a-c | 7.92a-d | 6.5A |
| *M. azadirakhta* | 9.6a | 8.61ab | 1.92e-h | 6.64a-e | 6.7A |
| *C. erectus* | 6.6a-e | 5.2a-h | 2.34e-h | 1.5e-h | 3.91A |
| *F. benjamina* | 2.9c-h | 5.28a-h | 1.3e-h | 3c-h | 3.12A |
| *Eunymus* sp. | 1.91e-h | 1.1f-h | 0.32h | 0.37h | 0.92A |
| Mean | 4.32A | 4.54A | 2.58A | 3.64A | |

z- Means with the same letters (small letters belongs to interactions and capital letters relates to means) have no significant difference at 5 % level of Tukey's test.

Proline of *T. stans* was the highest in Sadaf. It showed no significant difference only with *F. bengalensis*. *D. regia* had the least of proline. It had significant difference only with *T. stans* (Table 11).

In Pavion, *M. azadirachta* had the highest amount of proline. It had significant difference only with both *F. benghalensis* and *Euonymus* sp. The minimum belonged to *F. bengalensis*. It showed significant difference with both *D. regia* and *M. azadirachta* (Table 11).

*M. azadirachta* had the highest amount of proline in Saffain. It had no significant difference with both *T. stans* and *C. erectus*. The other species had no significant difference with each other (Table 11).

## Discussion

Salinity can affect all of the growth parameters and cause a huge reduction in plant biomass. The root and shoot length, fresh and dry mass will decrease by NaCl treatments. These changes are associated with an increase in $Na^+$ and $Cl^-$ contents in the seedlings and increased activities of superoxide desmutase, catalase, peroxidase, and polyphenol oxidase. The increased enzyme activity will coincide with decreased ascorbate content and enhanced $H_2O_2$ and proline content (Agarwal and Pandey, 2004). Plant height was significantly inhibited by salinity (Navarro, et al., 2008). Our results proved plants of Saffain (saline region) showed shorter plants that

had shorter stems in comparison with the other regions. It might be because of the low quality of the water and drought. As the drought period gets longer, most of the plants reduce their shoot growth, while the elongation of roots is usually stimulated, which permits deeper soil penetration in search for water (Yin, et al., 2005). The results are similar to Agarwal and Pandey (2004) in *Cassia angustifolia* M. Vahl and Ghoulam and Fares (2001) in sugar beet (*Beta vulgaris* L.). Also, Abdul-Halim et al. (1988) stated that an increase in irrigation water salinity reduced wheat (*Triticum aestivum* L.) plant height, which agrees with our results.

The plants of Saffain had less leaves in comparison with the other regions. The reduction of the number of leaves might be due of the high EC of the soil. Fornes et al. (2007) also stated that the number of leaves in *Petunia* reduced in the saline treatment.

In general, the first symptom of salt stress in ornamental plants is a reduction in leaf area (Rodríguez, et al., 2005). The leaves of Saffain region plants also showed this symptom.

*C*. *erectus* had the best quality in every region. Therefore, it is recommended to plant in similar region that the experiment was done. *C*. *erectus* is ideal for seaside plantings as it is highly tolerant of full sun, sandy soils, and salty conditions. It also tolerates brackish areas and alkaline soil (Gilman and Watson, 1993).

*Euonymus* sp. did not show good growth in our experiment. Drought and salt tolerances of *Euonymus* sp. are moderate and poor, respectively (Gilman, 1999). Therefore, it is not suggested to plant in condition like Kish Island. In addition to *T. stans* does not recommended for the same condition. It will grow in most well-drained soils in areas receiving 700-1800 mm of rainfall (Tipton, 1994). However, Kish Island receives only 190mm of rainfall (Ghahraman, 2007). The ornamental characters were affected by salinity, with symptoms of salt injury, such as leaf margin burning (Navarro, et al. 2008). The symptom was seen in leaf margins of Saffain region's plants.

As the results of proline contents showed *T. stans* and *M. azadirachta* accumulated more proline. Therefore, they are more tolerant to saline soil, and high EC and pH of the soil and water. Salt stress causes to make more proline in plants (Chauhan, et al., 1980). However, this event occurred in tolerant plants to salt stress more than sensitive plants (Chauhan, et al., 1980; Chu, et al., 1976). Proline amino acid is reported as a produced metabolite in salt and drought stress conditions (Dunn, et al., 1998; Yelenosky, 1979). There are some reports about the function of proline in plants under stress (Syvertsen, 1984) and it is considered as an osmotic regulator (Syvertsen and Yelenoski, 1988).

In sanaie *F. bengalensis* and *C. erectus* had the best growth in the most measured factors and they are suggested to be cultivating in this region. *F. bengalensis* and *D. regia* were recommended as suitable plant for Sadaf and Pavion regions. In addition to showing the best growth, they had good shoot quality in both regions. *F. bengalensis* is also suggested for Saffain region. These plants can be used for the regions which have the same conditions like the considered regions.

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