www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(8): 1763-1780

www.thepharmajournal.com
Received: 12-06-2023
Accepted: 17-07-2023

N Kowsalya
Department of Floriculture and Landscape Architecture, College of Horticulture, Dr. YSRHU, Anantharajupeta, Kadapa district, Andhra Pradesh, India

K Swarajya Lakshmi
Department of Floriculture and Landscape Architecture, College of Horticulture, Dr. YSRHU, Anantharajupeta, Kadapa district, Andhra Pradesh, India

M Raja Naik
Department of Floriculture and Landscape Architecture, College of Horticulture, Dr. YSRHU, Anantharajupeta, Kadapa district, Andhra Pradesh, India

VV Padmaja
Department of Plant Physiology, College of Horticulture, Dr. YSRHU, Anantharajupeta, Kadapa district, Andhra Pradesh, India

KV Naga Madhuri
Department of Soil Science and Agricultural Chemistry, Regional Agricultural Research Station, ANGRAU, Tirupati, Andhra Pradesh, India

Corresponding Author:
N Kowsalya
Department of Floriculture and Landscape Architecture, College of Horticulture, Dr. YSRHU, Anantharajupeta, Kadapa district, Andhra Pradesh, India

Response of ornamental plants irrigated with different levels of saline water to biochar and gypsum

N Kowsalya, K Swarajya Lakshmi, M Raja Naik, VV Padmaja and KV Naga Madhuri

Abstract
The present investigation was carried out to evaluate the efficacy of biochar and gypsum in amelioration of ten ornamental plant species irrigated with saline water. Six months old ornamental plants were applied with salinity levels of 0, 6 and 9 dS m^{-1}. 100 g of biochar (2% of the total pot mass) was applied to one group of plants, while 20 g of gypsum was applied to the other. According to the results, elevating salt content in irrigation water lowered the plant spread, stem girth, number of leaves $plant^{-1}$, leaf area, root length, and root to shoot ratio. Because of its great capacity for adsorbing salt, using biochar at 2% of the total pot mass promoted the growth of ornamental plants. Gypsum application had a significant impact on reducing the negative effects of salt stress on ornamental plants that were irrigated with saline water, as it removed the most Na^+ from the soil.

Keywords: Ornamental plants, soil amendments, salt tolerance, root to shoot ratio, biochar

Introduction
In particular in arid and semi-arid areas, salinity is one of the most severe environmental issues that produce osmotic stress and impede the growth of most ornamentals (Hussain *et al*., 2009) [13]. In addition to reducing plant growth, biomass, photosynthesis, and water usage efficiency, high salt concentrations in soil and water also cause physiological drought and ion toxicity. Ion toxicity consequently causes Na^+ accumulation, chlorosis, and necrosis in plants, which interfere with numerous physiological processes (Munns, 2002) [21]. As a result of ionic imbalances, the osmotic effect and nutritional deficiencies brought on by salinity stress, plants experience oxidative stress (Rehman *et al*., 2019) [26]. Under aberrant climatic conditions, reactive oxygen species (ROS) rise in plant cells (Vwioko *et al*., 2019) [32]. The plasma membrane of the plant cell and metabolic components including proteins, lipids, and nucleic acids can nevertheless suffer oxidative damage from significant ROS creation (Irakoze *et al*., 2021) [15].

To counteract the harmful consequences of the high salinity of water and soil, numerous mitigation and amelioration approaches have been used. Application of soil amendments is one such method that has been tried to increase plant tolerance to salinity. Plant growth is improved by biochar through direct or indirect mechanisms of action. The indirect method comprises altering the physical, chemical, and biological features of the soil, while the direct growth promotion under biochar amendment related to supply mineral nutrients, i.e. Ca, Mg, P, K and S etc., to the plant (Cheng *et al*., 2012) [9]. Gypsum is the most often utilized ameliorant in saline-sodic soils for maintaining soil electrolyte levels and enhancing soil physical and hydraulic qualities (Keren, 1996) [17].

By 2050, the country's current 6.73 million ha of salt-affected soils are expected to nearly triple to 20 million ha (Sharma, 2014) [29]. The issue of low-quality waters will also become more of a problem in the near future due to the predicted growth of the irrigated area and the excessive usage of natural resources to meet the demands of a rising population for food and other means of survival (Sharma, 2011) [28]. As a result, water of questionable quality will become crucial in these locations and may be utilized to water ornamental plants (Carter *et al*., 2005) [6]. Because of this water scarcity, it is important to consider the usage of salt tolerant plants in landscaping projects, xeriscape and public spaces (Navarro *et al*., 2008) [22]. Therefore, the objective of the current study was to screen the ornamental plant species for salt tolerance. The experiment included ten ornamental plants known to have aesthetic value.

Materials and Methods

The experiment was conducted at the College of Horticulture, Anantharajupeta, Dr. Y. S. R. Horticultural University during 2021 and 2022. Treatment details are mentioned here under.

Factor 1: Ornamental plants-10 (OP_1 to OP_{10}) (List given in the table below)

Factor 2: Salt concentrations-3 (C_0, C_1 and C_2)

Factor 3: Soil amendments-3 (A_0, A_1 and A_2)

Number of treatments: 90

Number of replications: 2

Number of plants per replication: 5

Statistical design: Factorial Completely Randomized Design (FCRD)

Period of study: January to August 2021

January to August 2022

S. No.	Factor	Levels in factor
1	Factor 1- Ornamental Plants	OP_1 - *Ixora cocccinea*
		OP_2 - *Tabernaemontana coronaria*
		OP_3 - *Bougainvillea spectabilis*
		OP_4 - *Acalypha wilkesiana*
		OP_5 - *Duranta erecta*
		OP_6 - *Caesalpinia pulcherrima*
		OP_7 - *Rhoeo discolor*
		OP_8 - *Sansevieria trifacsciata*
		OP_9 - *Pandanus veitchii*
		OP_{10} - *Canna indica*
2	Factor 2- Salt concentrations	C_0- Control (0.8 dS m^{-1})
		C_1- 6 dS m^{-1}
		C_2- 9 dS m^{-1}
3	Factor 3- Soil amendments	A_0- Control
		A_1- Biochar (2% of total pot mass i.e., 100 g $plant^{-1}$)
		A_2- Gypsum (20 g $plant^{-1}$)

Six months old plants of ten ornamental species were planted in poly bags (9" × 11") each holding 5 kg growing media, containing soil, sand and FYM (2:1:1). A set (300) of plants were applied with 100 g of Biochar (2% of total pot mass) per each polybag and another set (300) of plants were applied with 20 g of gypsum per bag as per treatment schedule before planting itself. All the plants were irrigated regularly with tap water (0.3 dS m^{-1}) up to 15 days of planting. Then the stress treatments were imposed by irrigating plants with the NaCl dissolved water. Plants were watered at alternate days (500 ml $plant^{-1}$) with NaCl dissolved water to provide respective concentration of EC (6 and 9 dS m^{-1}). The control plants were irrigated with normal tap water (EC= 0.3 dS $m^{-1}$and 6.8 pH) without any added NaCl.

Collection of experimental data

Data for various morphological attributes were recorded starting from 45 days after saline water application, followed by every 45 days interval. Similar procedure was repeated in the second year and the 2 years pooled data is presented here in tables. Plant spread was measured in North-South and East-West directions with the help of meter scale and the average values of two sides were expressed in square centimetres (cm^2). Stem girth was measured at just above the collar portion of the plant using digital verniercalipers and expressed in mm. The number of fully opened leaves were counted and recorded as number of leaves per plant. Leaf area was measured by using LI-COR model LI-300 leaf area meter with transparent conveyor belt (Model I-3050 A) utilizing an electronic digital display and expressed in square centimetres. Root length was measured from stem end to root tip using meter scale and expressed in centimetres. The Root to Shoot ratio of randomly selected and labeled plants in each treatment was calculated by using the following formula proposed by Cirillo *et al*., (2016) [10].

$$\text{Root: Shoot ratio} = \frac{\text{Dry weight of root (g)}}{\text{Dry weight of shoot (g)}}$$

Results and Discussion

Plant spread (cm^2)

Morphological assessment on the growth pattern of ten ornamental plants showed that, the plant spread significantly differed with various salinity levels, soil amendments and their interactions (Table 1a). The analyses on ornamental plants at 45 DAT (Days after Treatment), disclosed that *Caesalpinia pulcherrima* (OP_6) recorded the maximum plant spread (259.13 cm^2) followed by *Bougainvillea spectabilis* (OP_3) which was observed with 230.77 cm^2, while among salinity levels, the significantly maximum plant spread (184.49 cm^2) was noted in salinity control (C_0). The maximum plant spread in *Caesalpinia pulcherrima* was due to the innate nature of having wide spreading canopy compared to other ornamentals. Highest salinity stress level (9 dS m^{-1}) resulted in reduced plant spread, where this is due to the reason that, higher salinity causes salt stress injury on the canopy and limits plant spread. These results are in consonance with the findings of Lakshmaiah *et al.* (2018) [19].
Among soil amendments, plants applied with biochar (A_1) had the maximum plant spread (176.55 cm^2) followed by gypsum (A_2) which had 167.85 cm^2 plant spread. According to Thomas *et al*. (2013) [30], biochar stimulates the growth of plants under salt stress and enhances their resistance to environmental stress factors, leading to an increase in plant spread when applied to the soil. These results are in conformity with the findings of Akhtar *et al*. (2015) [2] and Mehdizadeh *et al*. (2020) [20]. Increasing vegetative growth and plant spread in salt stressed plants as a result of gypsum application are concordant with those obtained by Habba *et al*. (2013) [12] and Abdel Fattah *et al*. (2014) [1].
The combined effect of ornamental plants, salinity levels and soil amendments showed that, the plant spread was found to be highest in OP_6 C_0 A_1 (299.11 cm^2), while the lowest plant spread was recorded in OP_5 C_2 A_0 (72.05 cm^2). However at 6 dS m^{-1}, the maximum plant spread was observed in OP_6 C_1 A_1 (259.62 cm^2) followed by OP_6 C_1 A_2 (251.71 cm^2) and OP_3 C_1 A_1 (234.65 cm^2), while at 9 dS m^{-1}, OP_6 C_2 A_1 had the maximum spread of 256.89 cm^2, followed by OP_6 C_2 A_2 (247.99 cm^2) and OP_3 C_2 A_1 (229.95 cm^2). The data regarding plant spread at 90, 135 and 180 DAT (Table 1a and b) also showed similar significant results as above discussed data.

Stem girth (mm)

An inquisition of data regarding stem girth (Table 2a), showed that the individual means and combined effects of ornamentals, salinity levels and soil amendments were observed to be significant. At 45 DAT among the ornamental plants studied, stem girth varied significantly and *Pandanus veitchii* (OP_9) showed the highest stem girth of 21.35 mm followed by *Sansevieria trifacsciata* (OP_8) which recorded 19.47 mm, whereas *Duranta erecta* (OP_5) showed the least stem girth of 8.10 mm. Even though *Pandanus veitchii* was noted as salt sensitive plant, the maximum stem girth was result of the plant's habit.

It was found that plants treated with normal water (C_0) resulted in maximum stem girth of 14.37 mm, while minimum stem girth (12.09 mm) was recorded under high salinity (C_2). Because it takes more energy to get water from the root zone and produce the metabolic changes required surviving under stress, excessive soil salt inhibits plant growth and stem girth. In order to enhance plant development and yield, this energy is transferred from other activities (Rhoades *et al*., 1992) [27]. As a result, the stem girth decreased due to lower cell division, cell elongation, and lateral meristemic activity. The obtained results of reduced stem girth due to unfavourable effects of salinity stress are concordant with those obtained by Unlukara *et al.* (2008) [31] and Ifediora *et al.* (2014) [14].

Among amendments biochar (A_1) was noticed with maximum stem girth of 14.43 mm followed by gypsum (A_2) which recorded 13.20 mm, while A_0 was observed with minimum stem girth of 12.06 mm. The data indicated that, treatments with either biochar or gypsum caused a progressive increase in stem girth, than applying only salt water. Akhtar *et al*. (2015) [2] reported that, the application of biochar increases the growth of plants under salinity stress. These findings regarding biochar are in accordance with Mehdizadeh *et al*. (2020) [20]. The similar increases in growth parameters as a result of gypsum treatments have been reported by Ashour and Mahmoud (2017) [4], Reddy *et al*. (2014) [25] and Kumar *et al*. (2014) [18].

The interaction response of ornamental plants, salinity levels and soil amendments revealed that, the maximum stem girth was observed in OP_9 C_0 A_1 (24.02 mm), whereas OP_5 C_2 A_0 was noticed with the minimum stem girth of 6.30 mm. At 6 dS m^{-1}, the highest stem girth was found in OP_9 C_1 A_1 (22.97 mm) followed by OP_9 C_1 A_2 (21.30 mm) and OP_8 C_1 A_1 (20.86 mm), while at 9 dS m^{-1}, the maximum stem girth was observed in OP_9 C_2 A_1 (21.36 mm) followed by OP_9 C_2 A_2 with 19.82 mm. The stem girth of ornamental plants recorded at 135 and 180 DAT (Table 2a and b) were also significantly influenced by different salinity levels and soil amendments. However the interactions of OPXCXA during 90 DAT were observed to be non-significant.

Number of leaves plant^{-1}

An analysis of the data pertaining to number of leaves plant^{-1} (Table 3a) revealed that, the number of leaves in ornamental plants significantly differed with salt treatments and soil amendments. The study on ornamentals at 45 DAT showed that, *Duranta erecta* (OP_5) recorded the highest number of leaves (78.25), which was on par with *Bougainvillea spectabilis* (OP_3) which had 77.67 no's, while the lowest was recorded in OP_{10} (9.03). The number of leaves plant^{-1} was reduced in *Duranta erecta* (OP_5) during later stages of plant growth indicating that, high salt concentrations caused senescence and leaf fall making the plant more sensitive to salt stress. However, *Bougainvillea spectabilis* (OP_3) was observed to record highest number of leaves plant^{-1} later during investigation, which could be due to the salinity tolerance of the species and/or its genetic makeup to have more number of leaves.

Among the salt concentrations studied, the highest number of leaves plant^{-1} was observed in C_0 with 57.28 no's, whereas the lowest number of leaves were recorded in C_2 (38.38). Salinity has been demonstrated to be one of the environmental elements that affect the senescence process and the ensuing leaf loss. The accumulation of harmful ions caused leaf fall, which led to a decrease in the number of leaves at high salt concentrations. The accumulation of harmful ions caused leaf fall, which led to a decrease in the number of leaves at high salt concentrations. Salinity has been demonstrated to be one of the environmental elements that affect the senescence process and the ensuing leaf loss. In order to protect the young, growing leaves from salt levels that are toxic as well as to rid the plants of excess salt, the number of leaves only decreased at the maximum salt concentration, whereas the number of dead leaves grew with salinity (Wahome, 2001) [33]. The maximum number of leaves plant^{-1} were recorded with the use of soil amendment A_1 (53.02) followed by A_2 (47.51), while the minimum leaf count was noticed in A_0 with 42.08 no's. The adverse effects of salinity stress on ornamental plants were inconsequential, when plants are applied with biochar or gypsum. These results regarding the effect of gypsum were confirmed by Ashour and Mahmoud (2017) [4] and Habba *et al*. (2013) [12] and similar results regarding effect of biochar was obtained by Mehdizadeh *et al*. (2020) [20].

Regarding the interactions of ornamentals, salt concentrations and amendments studied during 45 DAT, the number of leaves plant^{-1} was found to be non-significant. Although there is a significant difference observed in interaction response of OPXCXA during later stages, where OP_5 C_0 A_1 was observed with maximum leaf count of 118.13 no's, while minimum was recorded in OP_{10} C_2 A_0 (7.30) at 90 DAT. However at 6 dS^{-1}, OP_3 C_1 A_1 (96.13) had the maximum leaf count plant^{-1} followed by OP_3 C_1 A_2 (88.10), whereas at 9 dS^{-1}, the highest number of leaves was spotted in OP_3 C_2 A_1 (87.15) followed by OP_3 C_2 A_2 with 79.10 no's. Similar significant differences were observed in number of leaves plant^{-1} with the influence of salinity levels, amendments and their interactions at 135 and 180 DAT (Table 3b).

Leaf area (cm^2)

Data pertaining to individual means and combined effect of different ornamentals, salinity stress levels and soil amendments on leaf area recorded at 45 and 90 DAT was presented in Table 4a. At 45 DAT, the maximum leaf area was recorded in *Canna indica* (OP_{10}) with 328.31 cm^2 followed by *Sansevieria trifacsciata* (301.77 cm^2), while minimum was encountered in *Duranta erecta* (OP_5) with 32.02 cm^2. In the present investigation, *Canna indica* (OP_{10}) recorded the maximum leaf area, which might be due to the plant's innate nature to have largest leaf area.

It was observed that, the plants from the salinity control treatment C_0 recorded the largest leaf area of 162.22 cm^2, while least was encountered in C_2 (145.99 cm^2). However, the significant decline was observed in leaf area of various ornamentals with regard to increasing salinity stress level. Lower photosynthetic rates caused less assimilate concentration to be available for leaf growth, which in turn led to reduced leaf expansion (Gomez-Bellote *et al*., 2013) [11]. Similar results have been obtained by other studies (Cirillo *et al*., 2016 [10] and Alvarez and Sanchez-Blanco, 2014) which reported that, plants subjected to salinity stress show a general reduction in leaf size and dry matter production.

The plants applied with biochar treatment (A_1) were observed with the maximum leaf area of 157.42 cm^2 followed by gypsum (A_2) which showed the leaf area of 153.40 cm^2, whereas minimum leaf area was noticed in amendment control (149.61 cm^2). Regarding the effect of biochar and gypsum application in ornamentals gave the increment in leaf area, which agrees with the findings of Mehdizadeh *et al*. (2020) [20] and Ashour and Mahmoud (2017) [4].

Among the interaction effects of OPXCXA, OP_{10} C_0 A_1 (341.28 cm^2) was resulted in largest leaf area, while smallest leaf area was noted in OP_5 C_2 A_0 with 20.33 cm^2. At 6 dS m^{-1}, the maximum leaf area was found in OP_{10} C_1 A_1 (329.88 cm^2) followed by OP_{10} C_1 A_2 (327.55 cm^2) and OP_8 C_1 A_1 (304.63 cm^2), while at 9 dS m^{-1}, OP_{10} C_2 A_1 (325.18 cm^2) had the largest leaf area followed by OP_{10} C_2 A_2 (322.43 cm^2). Data recorded at 90, 135 and 180 DAT (Table 4a and b) regarding leaf area was also noted to be similar with the above discussed results. However the interaction effects of OPXCXA during 180 DAT was recorded as non-significant with respect to leaf area.

Root length (cm)

The data corresponding to root length responded significantly among ornamental plants, salt concentrations and soil amendments (Table 5a). Among ornamental plants at 45 DAT, *Caesalpinia pulcherrima* (OP_6) had the maximum root length of 33.24 cm followed by *Bougainvillea spectabilis* (27.89 cm), while the minimum root length was observed in *Canna indica* (8.85 cm). Salt treatment C_0 resulted in highest root length of 23.65 cm, while the least root length was noticed in C_2 with 15.62 cm. According to the findings of the current study, lower photosynthetic area caused by a high salt concentration tends to slow down or even cease root elongation (Patel and Pandey, 2008) [24]. The reduced root length induced by salt stress in this experiment is regarded as a favourable trait, limiting the capacity of the plants to accumulate toxic ions in the shoot (Munns, 2002) [21]. Similar results were reported by Patel *et al*. (2010) [23] and Alvarez and Sanchez-Blanco (2014) [3].

Among amendments the maximum root length was seen in biochar (A_1) which recorded 20.86 cm followed by gypsum 19.16 cm, whereas the minimum was recorded in A_0 (17.14 cm). Biochar amended soils reduced the root sensitivity to osmotic stress by improving soil properties, enhanced soil moisture and Na^+ binding in biochar (Akhtar *et al*., 2015) [2]. Increasing main root length of plants in this study indicated a higher availability of water and nutrients in a specific zone of the soil with the use of biochar. The similar findings were disclosed by Mehdizadeh *et al*. (2020) [20]. Gypsum increases soil physical and chemical qualities by boosting water infiltration, enhancing root growth, and reclaiming sodic soils in addition to supplying readily available Ca and S ions for plant nutrition (Chen and Dick, 2011) [8]. These results are in accordance with the findings of Ashour and Mahmoud (2017) [4]. Among the interaction response of ornamentals, salt concentrations and soil amendments notably maximum root length was observed in OP_6 C_0 A_1 with 41.73 cm, while the lowest was found in OP_{10} C_2 A_0 (5.38 cm). However at 6 dS m^{-1}, OP_6 C_1 A_1 (33.25 cm) had the maximum root length, followed by OP_6 C_1 A_2 (32.13 cm) and OP_3 C_1 A_1 (28.18 cm), whereas at 9 dS m^{-1} the highest root length was observed in OP_6 C_2 A_1 (30.56 cm) followed by OP_6 C_2 A_2 with 29.34 cm root length. Similar results have also been recorded at 90, 135 and 180 DAT (Table 5a and b).

Root to shoot ratio

The perusal of the data mentioned in Table 6a indicated that the root to shoot ratio was influenced by different salt concentrations and soil amendments in ornamental plants, which divulged that at 45 DAT, *Acalypha wilkesiana* (OP_4) recorded the highest root to shoot ratio of 1.24 followed by OP_2 (1.12), while the lowest was recorded in *Sansevieria trifacsciata* (OP_8) with root to shoot ratio of 0.28. In the current investigation, it was found that, *Acalypha wilkesiana* (OP_4) had the highest root to shoot ratio, which could be due to the plant's instinctive nature of having high root growth than the shoot. These results of high root to shoot ratio in *Acalypha wilkesiana* (OP_4) made the plant survive under salinity, whereas gradual decreasing pattern of root to shoot ratio with respect to increasing crop duration resulted in toxic ion accumulation and cessation of plant growth.

In the salt concentrations studied, C_0 (0.88) showed the maximum root to shoot ratio, which stood at par with C_2 (0.87), while minimum was recorded in C_1 with a root to shoot ratio of 0.80. However, increasing salinity stress level significantly reduced the root to shoot ratio, because the reductions in shoot growth were matched by an equivalent loss of root biomass. Nevertheless the root to shoot ratio was observed to increase with regard to increasing salinity only in *Tabernaemontana coronaria* (OP_2), *Acalypha wilkesiana* (OP_4), *Duranta erecta* (OP_5) and *Pandanus veitchii* (OP_9), where these species have shown a higher dry root mass than shoot dry mass.

These results concord with Cramer, 2002 who delineate that, high salt concentrations in the irrigation water result in reduced plant growth, limited leaf expansion and changing the relationship between the aerial and root parts. Under salt stress, a higher root fraction may favour the retention of toxic ions in this organ, preventing their translocation to the aerial portions. According to Cassaniti *et al*. (2012) [7], this reaction may represent a typical strategy for plant survival in saline environments. According to Banon *et al*. (2012) [5] high shoot to root ratio indicates that the plant is more prone to experience water stress. The findings are strongly consistent with earlier researches by Cirillo *et al*. (2016) [10] and Kamaluldeen *et al.* (2014) [16].

When soil amendments effect was analysed, it was observed that, the maximum root to shoot ratio was observed with A_1 (0.88) followed by A_2 (0.85), whereas minimum was noticed in A_0 with 0.82 root to shoot ratio. The use of biochar soil application significantly increased the root to shoot ratio in all the ornamental plants, where the similar findings were reported by Mehdizadeh *et al*. (2020) [20].

At 45 DAT among the interactions of OPXCXA, the highest root to shoot ratio was recorded in OP_4 C_2 A_0 (1.40), which stood statistically on par with OP_4 C_2 A_2 (1.38), while OP_8 C_2 A_0 (0.23) recorded the least root to shoot ratio. Almost identical data have been recorded at 90, 135 and 180 DAT and presented in Table 6a and b.

Table 1a: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to plant spread (cm^2) (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A) Intervals 45 DAT A_0	A_1	A_2	Mean	90 DAT A_0	A_1	A_2	Mean
OP_1	C_0	190.46	232.99	212.05	211.83	231.39	280.36	258.96	256.90
	C_1	181.60	196.07	188.05	188.57	192.95	210.96	200.65	201.52
	C_2	170.20	188.18	178.91	179.10	183.74	154.64	193.98	177.45
	Mean	180.75	205.74	193.00	193.17	202.69	215.32	217.86	211.96
OP_2	C_0	210.84	241.25	230.66	227.58	258.44	294.90	276.91	276.75
	C_1	198.68	213.67	205.40	205.91	211.08	223.82	219.47	218.12
	C_2	187.98	164.13	195.86	182.66	202.71	219.34	210.05	210.70
	Mean	199.16	206.35	210.64	205.38	224.08	246.02	235.47	235.19
OP_3	C_0	225.86	261.07	246.84	244.59	287.75	332.63	314.62	311.67
	C_1	215.40	234.65	228.17	226.07	233.57	256.66	247.40	245.88
	C_2	211.20	229.95	223.83	221.66	226.05	249.07	235.56	236.89
	Mean	217.48	241.89	232.94	230.77	249.12	279.45	265.86	264.81
OP_4	C_0	154.68	188.43	171.26	171.46	187.35	241.17	215.61	214.71
	C_1	143.40	152.70	147.49	147.86	152.36	164.08	159.31	158.58
	C_2	130.92	141.30	136.85	136.36	140.31	155.47	147.79	147.86
	Mean	143.00	160.81	151.87	151.89	160.00	186.90	174.24	173.71
OP_5	C_0	96.71	120.51	106.70	107.97	113.95	145.91	131.96	130.60
	C_1	82.73	92.25	87.40	87.46	91.50	100.59	96.38	96.15
	C_2	72.05	80.23	76.86	76.38	80.79	94.16	86.35	87.10
	Mean	83.83	97.66	90.32	90.60	95.41	113.55	104.90	104.62
OP_6	C_0	258.32	299.11	274.20	277.21	327.30	365.22	351.50	348.01
	C_1	246.88	259.62	251.71	252.73	259.78	283.48	273.80	272.35
	C_2	237.45	256.89	247.99	247.44	251.75	276.27	260.71	262.91
	Mean	247.55	271.87	257.96	259.13	279.61	308.32	295.34	294.42
OP_7	C_0	139.37	167.95	153.32	153.55	168.43	195.94	184.61	182.99
	C_1	125.88	138.33	132.56	132.26	137.68	154.09	145.72	145.83
	C_2	116.54	131.87	122.74	123.71	128.04	146.06	135.94	136.68
	Mean	127.26	146.05	136.20	136.50	144.71	165.36	155.42	155.17
OP_8	C_0	124.17	150.78	137.82	137.59	142.80	179.00	164.69	162.16
	C_1	114.87	135.94	127.62	126.14	130.40	153.52	146.06	143.32
	C_2	108.14	131.63	118.93	119.57	121.23	149.27	133.81	134.77
	Mean	115.73	139.45	128.12	127.76	131.47	160.59	148.18	146.75
OP_9	C_0	172.88	201.64	191.78	188.76	202.73	257.16	227.05	228.98
	C_1	151.23	164.04	157.58	T157.61	164.37	174.80	167.82	168.99
	C_2	141.60	155.59	146.08	147.76	152.88	163.45	158.20	158.17
	Mean	155.23	173.76	165.14	164.71	173.32	198.47	184.35	185.38
OP_{10}	C_0	112.33	137.06	123.60	124.33	131.67	165.51	148.42	148.53
	C_1	102.36	115.86	110.22	109.48	115.21	134.67	125.05	124.98
	C_2	93.95	112.92	103.08	103.32	107.61	127.79	117.72	117.71
	Mean	102.88	121.95	112.30	112.37	118.16	142.65	130.40	130.40
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	168.56	200.08	184.82	184.49	205.18	245.78	227.43	226.13
	C_1	156.30	170.31	163.62	163.41	168.89	185.67	178.17	177.57
	C_2	147.00	159.27	155.11	153.79	159.51	173.55	168.01	167.02
	Mean	157.29	176.55	167.85	167.23	177.86	201.66	191.20	190.24

Factor	$SE_m(\pm)$	CD @ 5%	$SE_m(\pm)$	CD @ 5%
ornamental plants (OP)	0.674	1.895	0.617	1.734
salt concentrations (C)	0.369	1.038	0.338	0.950
opxc	1.168	3.282	1.069	3.003
Amendments (A)	0.369	.1.038	0.338	0.950
OPXA	1.168	3.282	1.069	3.003
CXA	0.640	1.798	0.585	1.645
OPXCXA	2.023	5.685	1.851	5.202

Table 1b: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to plant spread (cm^2) (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		135 DAT				180 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	241.38	295.61	280.36	272.45	247.16	302.88	290.55	280.20
	C_1	203.77	224.94	213.93	214.21	213.08	230.31	222.50	221.96
	C_2	195.28	213.68	204.44	204.47	202.02	220.40	212.08	211.50
	Mean	213.47	244.74	232.91	230.37	220.75	251.20	241.71	237.88
OP_2	C_0	272.33	318.08	296.36	295.59	280.38	329.58	306.47	305.48
	C_1	220.28	242.47	230.94	231.23	227.87	241.91	237.26	235.68
	C_2	209.46	225.10	218.10	217.55	219.17	226.67	219.95	221.93
	Mean	234.02	261.88	248.47	248.12	242.47	266.05	254.56	254.36
OP_3	C_0	298.27	347.04	325.61	323.64	306.91	360.58	340.17	335.89
	C_1	251.32	289.15	271.42	270.63	262.91	286.04	269.18	272.71
	C_2	238.66	259.55	250.52	249.57	249.47	268.88	260.34	259.56
	Mean	262.75	298.58	282.52	281.28	273.10	305.16	289.89	289.38
OP_4	C_0	194.28	249.78	228.75	224.27	201.85	266.74	239.13	235.91
	C_1	159.04	173.78	166.50	166.44	166.44	184.67	176.69	175.93
	C_2	148.20	161.78	156.03	155.33	154.13	169.67	161.46	161.75
	Mean	167.17	195.11	183.76	182.01	174.14	207.02	192.43	191.20
OP_5	C_0	121.94	161.57	147.61	143.70	130.74	175.18	162.17	156.03
	C_1	96.20	106.22	99.23	100.55	91.93	103.50	97.99	97.81
	C_2	85.90	97.44	91.62	91.65	90.86	101.61	95.41	95.96
	Mean	101.34	121.74	112.82	111.97	104.51	126.76	118.52	116.60
OP_6	C_0	336.39	380.37	363.86	360.21	344.07	394.02	372.66	370.25
	C_1	270.27	307.48	288.71	288.82	281.42	300.82	292.18	291.47
	C_2	263.74	283.65	272.27	273.22	274.33	294.86	285.38	284.86
	Mean	290.13	323.83	308.28	307.41	299.94	329.90	316.74	315.52
OP_7	C_0	174.97	206.61	207.65	196.41	183.17	219.62	219.86	207.55
	C_1	145.77	165.80	151.94	154.50	154.31	171.16	162.14	162.54
	C_2	135.07	149.53	142.50	142.37	143.40	155.09	149.51	149.33
	Mean	151.94	173.98	167.36	164.42	160.29	181.96	177.17	173.14
OP_8	C_0	154.92	195.26	191.87	180.68	161.27	208.85	202.83	190.98
	C_1	148.97	179.41	160.39	162.92	159.44	187.27	174.17	173.62
	C_2	135.08	161.45	149.14	148.55	145.82	172.28	158.10	158.73
	Mean	146.32	178.70	167.13	164.05	155.51	189.47	178.36	174.45
OP_9	C_0	213.97	268.49	253.87	245.44	222.48	283.19	267.83	257.83
	C_1	169.52	180.00	175.41	174.98	176.29	188.08	183.90	182.75
	C_2	158.46	170.43	165.71	164.87	164.23	175.82	168.16	169.40
	Mean	180.65	206.31	198.33	195.09	187.66	215.69	206.63	203.33
OP_{10}	C_0	142.68	178.65	173.80	165.04	148.47	188.81	190.96	176.08
	C_1	127.91	150.71	138.41	139.01	136.45	157.10	146.16	146.57
	C_2	118.00	137.84	127.79	127.88	126.93	148.65	136.60	137.39
	Mean	129.53	155.73	146.66	143.97	137.28	164.85	157.90	153.34
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	215.11	260.14	246.97	240.74	222.65	272.94	259.26	251.62
	C_1	179.30	201.99	189.69	190.33	187.01	205.08	196.21	196.10
	C_2	168.78	186.04	177.81	177.54	177.03	193.39	184.70	185.04
	Mean	187.73	216.06	204.82	202.87	195.56	223.81	213.39	210.92
Factor		$SE_m(\pm)$		CD @ 5%		$SE_m(\pm)$		CD @ 5%	
ornamental plants (OP)		0.769		2.161		0.801		2.250	
salt concentrations (C)		0.421		1.183		0.439		1.232	
opxc		1.332		3.742		1.387		3.897	
Amendments (A)		0.421		1.183		0.439		1.232	
OPXA		1.332		3.742		1.387		3.897	
CXA		0.729		2.050		0.760		2.135	
OPXCXA		2.307		6.482		2.402		6.751	

Table 2a: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to stem girth (mm) (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		45 DAT				90 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	8.80	11.30	10.00	10.03	13.04	14.81	14.15	14.00
	C_1	8.14	10.14	8.84	9.04	11.96	14.06	13.11	13.04
	C_2	6.93	8.84	8.12	7.96	10.13	12.43	11.42	11.33
	Mean	7.96	10.09	8.98	9.01	11.71	13.77	12.89	12.79
OP_2	C_0	10.68	12.77	11.52	11.66	14.33	16.41	15.56	15.43
	C_1	9.74	11.64	10.59	10.65	13.14	15.27	14.14	14.18
	C_2	8.73	10.84	9.75	9.77	11.61	13.87	12.76	12.75
	Mean	9.72	11.75	10.62	10.69	13.03	15.18	14.15	14.12
OP_3	C_0	12.44	14.75	13.62	13.60	16.01	18.03	16.99	17.01
	C_1	11.43	13.44	12.36	12.41	14.56	16.47	15.41	15.48
	C_2	10.43	12.84	11.74	11.67	12.91	15.36	14.14	14.13
	Mean	11.43	13.67	12.57	12.56	14.49	16.62	15.51	15.54
OP_4	C_0	10.35	12.52	11.31	11.39	12.16	14.59	13.44	13.40
	C_1	9.24	11.52	10.44	10.40	11.33	13.58	12.34	12.42
	C_2	8.34	10.52	9.51	9.45	10.27	12.39	11.31	11.32
	Mean	9.31	11.52	10.42	10.41	11.25	13.52	12.36	12.38
OP_5	C_0	7.83	9.74	8.75	8.77	11.10	12.91	12.17	12.06
	C_1	7.21	9.15	8.24	8.20	10.04	12.02	10.97	11.01
	C_2	6.30	8.43	7.26	7.33	8.95	11.12	9.98	10.02
	Mean	7.11	9.10	8.08	8.10	10.03	12.02	11.04	11.03
OP_6	C_0	13.14	15.53	14.26	14.31	16.39	18.35	17.37	17.37
	C_1	12.12	14.07	12.88	13.02	15.31	17.37	16.18	16.29
	C_2	11.07	13.06	12.07	12.07	14.11	16.28	15.14	15.18
	Mean	12.11	14.22	13.07	13.13	15.27	17.33	16.23	16.28
OP_7	C_0	11.76	15.57	13.74	13.69	15.17	17.13	16.15	16.15
	C_1	10.83	13.14	12.00	11.99	14.06	16.07	15.01	15.04
	C_2	9.63	11.99	10.68	10.77	12.53	14.79	13.61	13.64
	Mean	10.74	13.57	12.14	12.15	13.92	15.99	14.92	14.94
OP_8	C_0	19.33	22.20	20.62	20.71	22.39	24.33	23.32	23.35
	C_1	18.03	20.86	19.36	19.41	20.83	22.95	21.82	21.86
	C_2	16.96	19.71	18.19	18.28	19.51	21.63	20.62	20.59
	Mean	18.11	20.92	19.39	19.47	20.91	22.97	21.92	21.93
OP_9	C_0	21.20	24.02	22.68	22.63	24.31	26.19	25.16	25.22
	C_1	20.37	22.97	21.30	21.55	23.07	25.11	24.03	24.07
	C_2	18.45	21.36	19.82	19.88	21.52	23.71	22.63	22.62
	Mean	20.00	22.78	21.27	21.35	22.97	25.00	23.94	23.97
OP_{10}	C_0	15.37	18.28	17.12	16.92	18.57	20.53	19.62	19.57
	C_1	14.35	16.90	15.54	15.60	17.56	19.72	18.64	18.64
	C_2	12.73	14.74	13.83	13.77	16.08	18.40	17.19	17.22
	Mean	14.15	16.64	15.50	15.43	17.40	19.55	18.48	18.48
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	13.09	15.67	14.36	14.37	16.35	18.33	17.39	17.35
	C_1	12.14	14.38	13.15	13.23	15.18	17.26	16.16	16.20
	C_2	10.96	13.23	12.09	12.09	13.76	16.00	14.88	14.88
	Mean	12.06	14.43	13.20	13.23	15.10	17.19	16.14	16.14

Factor	$SE_m(\pm)$	CD @ 5%	$SE_m(\pm)$	CD @ 5%
ornamental plants (OP)	0.033	0.093	0.029	0.080
salt concentrations (C)	0.018	0.051	0.016	0.044
opxc	0.058	0.162	0.049	0.139
Amendments (A)	0.018	0.051	0.016	0.044
OPXA	0.058	0.162	0.049	NS
CXA	0.032	0.089	0.027	0.076
OPXCXA	0.100	0.280	0.086	NS

Table 2b: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to stem girth (mm) (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		135 DAT				180 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	16.28	18.68	17.70	17.55	20.37	23.00	21.64	21.67
	C_1	14.70	16.78	15.85	15.78	18.00	20.31	19.19	19.16
	C_2	13.00	15.40	14.30	14.23	15.85	18.11	16.90	16.95
	Mean	14.66	16.95	15.95	15.85	18.07	20.47	19.24	19.26
OP_2	C_0	18.45	20.55	19.48	19.49	21.79	24.27	23.06	23.04
	C_1	16.68	18.80	17.75	17.74	20.00	22.19	21.19	21.12
	C_2	15.15	17.53	16.43	16.37	18.32	20.64	19.45	19.47
	Mean	16.76	18.96	17.88	17.87	20.04	22.36	21.23	21.21
OP_3	C_0	19.73	22.20	21.05	20.99	23.29	25.90	24.64	24.61
	C_1	18.10	20.70	19.48	19.43	21.54	23.79	22.64	22.65
	C_2	16.68	18.75	17.83	17.75	19.95	22.40	21.21	21.19
	Mean	18.17	20.55	19.45	19.39	21.59	24.03	22.83	22.82
OP_4	C_0	15.40	17.60	16.48	16.49	18.29	20.82	19.40	19.50
	C_1	13.68	16.05	14.88	14.87	16.54	19.11	17.85	17.83
	C_2	12.15	14.58	13.28	13.33	15.06	17.59	16.31	16.32
	Mean	13.74	16.08	14.88	14.90	16.63	19.17	17.85	17.88
OP_5	C_0	13.48	16.60	15.05	15.04	16.87	19.29	18.00	18.05
	C_1	11.85	14.28	12.95	13.03	14.74	17.31	15.85	15.96
	C_2	10.40	12.98	11.63	11.67	13.04	15.45	14.14	14.21
	Mean	11.91	14.62	13.21	13.24	14.88	17.35	15.99	16.07
OP_6	C_0	20.85	23.03	22.00	21.96	24.70	27.50	26.11	26.10
	C_1	19.35	22.08	20.70	20.71	23.00	25.50	24.19	24.23
	C_2	17.80	20.23	19.05	19.03	21.11	23.53	22.32	22.32
	Mean	19.33	21.78	20.58	20.56	22.93	25.51	24.20	24.22
OP_7	C_0	18.83	21.15	19.95	19.98	22.24	24.92	23.61	23.59
	C_1	17.30	19.60	18.55	18.48	20.55	22.95	21.74	21.75
	C_2	16.00	18.58	17.35	17.31	19.37	21.79	20.53	20.56
	Mean	17.38	19.78	18.62	18.59	20.72	23.22	21.96	21.97
OP_8	C_0	25.25	27.63	26.38	26.42	29.10	31.71	30.40	30.40
	C_1	23.65	25.93	24.75	24.78	27.56	30.00	28.87	28.81
	C_2	22.43	24.93	23.63	23.66	25.54	28.06	26.74	26.78
	Mean	23.78	26.16	24.92	24.95	27.40	29.92	28.67	28.66
OP_9	C_0	26.95	28.95	27.95	27.95	30.90	33.30	32.11	32.10
	C_1	25.58	27.70	26.58	26.62	29.10	31.29	30.29	30.23
	C_2	23.80	26.48	25.08	25.12	27.50	30.09	28.82	28.80
	Mean	25.44	27.71	26.53	26.56	29.17	31.56	30.40	30.38
OP_{10}	C_0	22.18	24.55	23.15	23.29	26.40	28.87	27.61	27.62
	C_1	20.65	23.05	22.00	21.90	24.59	27.00	25.69	25.76
	C_2	19.60	21.95	20.78	20.78	23.21	25.69	24.41	24.43
	Mean	20.81	23.18	21.98	21.99	24.73	27.19	25.90	25.94
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	19.74	22.09	20.92	20.92	23.39	25.96	24.65	24.67
	C_1	18.15	20.50	19.35	19.33	21.56	23.94	22.75	22.75
	C_2	16.70	19.14	17.93	17.92	19.89	22.33	21.08	21.10
	Mean	18.20	20.58	19.40	19.39	21.62	24.08	22.83	22.84

Factor	$SE_m(\pm)$	CD @ 5%	$SE_m(\pm)$	CD @ 5%
ornamental plants (OP)	0.031	0.087	0.016	0.046
salt concentrations (C)	0.017	0.048	0.009	0.025
opxc	0.054	0.151	0.028	0.080
Amendments (A)	0.017	0.048	0.009	0.025
OPXA	0.054	0.151	0.028	0.080
CXA	0.029	NS	0.016	0.044
OPXCXA	0.093	0.261	0.049	0.138

Table 3a: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to number of leaves plant^{-1} (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		45 DAT				90 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	64.00	74.00	70.00	69.33	71.85	81.15	77.35	76.78
	C_1	53.75	66.50	60.50	60.25	60.30	73.83	68.45	67.53
	C_2	43.00	55.75	48.75	49.17	50.65	64.88	57.85	57.79
	Mean	53.58	65.42	59.75	59.58	60.93	73.28	67.88	67.37
OP_2	C_0	49.75	61.50	54.75	55.33	59.30	69.20	62.08	63.53
	C_1	39.50	50.75	45.75	45.33	46.08	60.63	53.60	53.43
	C_2	29.00	41.00	35.00	35.00	35.95	48.90	42.40	42.42
	Mean	39.42	51.08	45.17	45.22	47.11	59.58	52.69	53.13
OP_3	C_0	78.00	92.75	85.75	85.50	87.58	98.63	93.88	93.36
	C_1	70.50	86.25	79.50	78.75	78.90	96.13	88.10	87.71
	C_2	60.75	77.00	68.50	68.75	69.35	87.15	79.10	78.53
	Mean	69.75	85.33	77.92	77.67	78.61	93.97	87.03	86.53
OP_4	C_0	69.50	84.75	76.50	76.92	78.43	92.95	84.85	85.41
	C_1	58.75	70.00	64.50	64.42	61.95	73.40	67.55	67.63
	C_2	47.75	57.75	51.75	52.42	51.80	62.83	57.95	57.53
	Mean	58.67	70.83	64.25	64.58	64.06	76.39	70.12	70.19
OP_5	C_0	90.75	108.00	99.50	99.42	98.78	118.13	111.30	109.40
	C_1	70.50	78.00	74.00	74.17	72.18	80.95	76.90	76.68
	C_2	57.25	65.50	60.75	61.17	59.40	65.63	62.73	62.58
	Mean	72.83	83.83	78.08	78.25	76.78	88.23	83.64	82.89
OP_6	C_0	56.25	70.00	63.00	63.08	67.38	77.58	69.78	71.58
	C_1	49.25	63.00	56.75	56.33	56.98	73.68	66.13	65.59
	C_2	39.50	54.25	46.75	46.83	49.23	66.35	57.43	57.67
	Mean	48.33	62.42	55.50	55.42	57.86	72.53	64.44	64.94
OP_7	C_0	40.25	53.75	47.75	47.25	48.08	61.85	55.08	55.00
	C_1	34.00	45.25	39.00	39.42	39.13	51.15	44.83	45.03
	C_2	26.00	36.00	30.50	30.83	31.85	43.33	37.88	37.68
	Mean	33.42	45.00	39.08	39.17	39.68	52.11	45.93	45.91
OP_8	C_0	20.00	35.50	28.50	28.00	31.85	43.58	36.10	37.18
	C_1	14.25	21.50	17.25	17.67	22.80	41.73	33.35	32.63
	C_2	11.75	19.50	15.75	15.67	18.33	35.90	26.98	27.07
	Mean	15.33	25.50	20.50	20.44	24.33	40.40	32.14	32.29
OP_9	C_0	31.50	43.75	37.00	37.42	42.13	51.88	45.15	46.38
	C_1	20.25	28.50	24.00	24.25	23.08	33.30	27.90	28.09
	C_2	13.25	19.25	16.25	16.25	17.03	24.83	21.93	21.26
	Mean	21.67	30.50	25.75	25.97	27.41	36.67	31.66	31.91
OP_{10}	C_0	8.75	12.25	10.75	10.58	10.30	13.40	12.38	12.03
	C_1	7.75	9.75	8.75	8.75	8.53	10.33	9.35	9.40
	C_2	6.75	8.75	7.75	7.75	7.30	9.30	8.38	8.33
	Mean	7.75	10.25	9.08	9.03	8.71	11.01	10.03	9.92
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	50.88	63.63	57.35	57.28	59.57	70.83	64.79	65.06
	C_1	41.85	51.95	47.00	46.93	46.99	59.51	53.62	53.37
	C_2	33.50	43.48	38.18	38.38	39.09	50.91	45.26	45.09
	Mean	42.08	53.02	47.51	47.53	48.55	60.42	54.56	54.51

Factor	$SE_m(\pm)$	CD @ 5%	$SE_m(\pm)$	CD @ 5%
ornamental plants (OP)	0.416	1.168	0.189	0.531
salt concentrations (C)	0.228	0.640	0.104	0.291
opxc	0.720	2.023	0.327	0.920
Amendments (A)	0.228	0.640	0.104	0.291
OPXA	0.720	2.023	0.327	0.920
CXA	0.394	1.108	0.179	0.504
OPXCXA	1.247	NS	0.567	1.593

Table 3b: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to number of leaves plant^{-1} (Pooled means of two seasons)

Ornamental Plants (OP)	**Salt Concentrations (C)**	**Amendments (A)**							
		Intervals							
		135 DAT				**180 DAT**			
		A_0	**A_1**	**A_2**	**Mean**	**A_0**	**A_1**	**A_2**	**Mean**
OP_1	C_0	79.60	91.48	85.48	85.52	86.33	99.25	91.80	92.46
	C_1	68.98	84.98	76.53	76.83	77.85	89.75	85.20	84.27
	C_2	60.63	74.55	68.13	67.77	71.73	81.63	77.80	77.05
	Mean	69.73	83.67	76.71	76.70	78.63	90.21	84.93	84.59
OP_2	C_0	67.48	78.08	71.93	72.49	74.15	92.30	81.78	82.74
	C_1	53.00	66.48	59.45	59.64	60.70	73.80	67.63	67.38
	C_2	44.03	55.48	50.05	49.85	50.70	62.70	56.30	56.57
	Mean	54.83	66.68	60.48	60.66	61.85	76.27	68.57	68.89
OP_3	C_0	95.03	110.95	103.35	103.11	102.70	123.15	112.70	112.85
	C_1	89.90	107.90	99.38	99.06	100.20	112.75	106.68	106.54
	C_2	80.50	96.40	88.98	88.63	91.78	104.68	97.15	97.87
	Mean	88.48	105.08	97.23	96.93	98.23	113.53	105.51	105.75
OP_4	C_0	86.00	102.95	94.90	94.62	94.68	115.20	104.83	104.90
	C_1	70.03	80.48	74.93	75.14	74.75	84.28	79.68	79.57
	C_2	59.43	70.48	65.00	64.97	64.75	73.28	68.10	68.71
	Mean	71.82	84.63	78.28	78.24	78.06	90.92	84.20	84.39
OP_5	C_0	105.90	126.48	119.00	117.13	114.20	131.40	121.73	122.44
	C_1	77.43	84.08	80.40	80.63	80.70	87.30	83.78	83.93
	C_2	64.98	70.48	67.90	67.78	68.20	73.25	70.30	70.58
	Mean	82.77	93.68	89.10	88.51	87.70	97.32	91.93	92.32
OP_6	C_0	75.50	90.60	82.43	82.84	84.20	104.80	94.78	94.59
	C_1	67.18	84.93	75.95	76.02	77.60	91.98	85.75	85.11
	C_2	59.33	73.05	67.10	66.49	69.75	81.38	75.23	75.45
	Mean	67.33	82.86	75.16	75.12	77.18	92.72	85.25	85.05
OP_7	C_0	56.95	72.95	63.48	64.46	65.65	84.85	75.43	75.31
	C_1	46.55	57.93	52.00	52.16	52.80	62.65	58.20	57.88
	C_2	38.55	49.05	43.88	43.83	44.15	54.15	49.15	49.15
	Mean	47.35	59.98	53.12	53.48	54.20	67.22	60.93	60.78
OP_8	C_0	40.43	55.05	47.00	47.49	49.23	64.68	56.33	56.74
	C_1	34.00	54.05	43.95	44.00	46.88	55.80	51.88	51.52
	C_2	28.48	42.55	38.13	36.38	39.85	49.78	44.73	44.78
	Mean	34.30	50.55	43.03	42.63	45.32	56.75	50.98	51.01
OP_9	C_0	49.93	59.03	52.95	53.97	58.20	72.23	65.20	65.21
	C_1	28.93	36.88	32.48	32.76	33.30	41.23	36.78	37.10
	C_2	22.90	28.95	25.98	25.94	27.80	32.80	30.13	30.24
	Mean	33.92	41.62	37.13	37.56	39.77	48.75	44.03	44.18
OP_{10}	C_0	11.90	14.50	13.45	13.28	13.18	15.73	14.68	14.53
	C_1	9.40	11.48	10.40	10.43	10.13	12.73	11.25	11.37
	C_2	8.43	10.48	9.43	9.44	9.18	11.15	10.33	10.22
	Mean	9.91	12.15	11.09	11.05	10.83	13.20	12.08	12.04
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	66.87	80.21	73.40	73.49	74.25	90.36	81.92	82.18
	C_1	54.54	66.92	60.55	60.67	61.49	71.23	66.68	66.47
	C_2	46.72	57.15	52.46	52.11	53.79	62.48	57.92	58.06
	Mean	56.04	68.09	62.13	62.09	63.18	74.69	68.84	68.90
Factor		$SE_m(\pm)$		CD @ 5%		$SE_m(\pm)$		CD @ 5%	
ornamental plants (OP)		0.160		0.451		0.084		0.235	
salt concentrations (C)		0.088		0.247		0.046		0.129	
opxc		0.278		0.781		0.145		0.407	
Amendments (A)		0.088		0.247		0.046		0.129	
OPXA		0.278		0.781		0.145		0.407	
CXA		0.152		0.428		0.079		0.223	
OPXCXA		0.481		1.353		0.251		0.704	

Table 4a: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to leaf area (cm^2) (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		45 DAT				90 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	96.65	108.28	102.33	102.42	96.81	110.28	103.82	103.63
	C_1	91.49	96.55	94.00	94.01	85.53	91.89	88.69	88.70
	C_2	85.43	91.20	87.98	88.20	79.17	84.33	82.13	81.87
	Mean	91.19	98.67	94.77	94.87	87.17	95.50	91.54	91.40
OP_2	C_0	105.44	119.33	112.48	112.41	106.08	121.60	113.88	113.85
	C_1	100.19	105.19	101.99	102.45	94.00	99.16	96.55	96.57
	C_2	93.90	99.23	96.55	96.56	87.53	92.59	89.79	89.97
	Mean	99.84	107.91	103.67	103.81	95.87	104.45	100.07	100.13
OP_3	C_0	64.28	78.53	70.73	71.18	64.90	80.48	72.71	72.69
	C_1	61.44	67.24	64.09	64.25	57.74	64.45	61.09	61.09
	C_2	57.36	62.94	60.28	60.19	53.58	59.24	56.49	56.44
	Mean	61.02	69.57	65.03	65.21	58.74	68.05	63.43	63.41
OP_4	C_0	86.99	99.93	93.58	93.50	87.84	101.91	95.25	95.00
	C_1	79.13	83.43	81.18	81.24	72.01	75.62	73.66	73.76
	C_2	71.20	75.13	73.04	73.12	62.59	66.75	64.64	64.66
	Mean	79.10	86.16	82.60	82.62	74.14	81.42	77.85	77.81
OP_5	C_0	38.07	48.48	42.48	43.01	38.30	49.97	44.11	44.12
	C_1	29.30	33.18	31.14	31.20	22.61	26.12	24.37	24.37
	C_2	20.33	23.41	21.84	21.86	15.40	18.61	17.15	17.05
	Mean	29.23	35.02	31.82	32.02	25.43	31.56	28.54	28.51
OP_6	C_0	186.38	204.53	195.83	195.58	187.26	206.51	198.09	197.28
	C_1	182.99	188.34	185.78	185.70	177.95	185.21	181.45	181.53
	C_2	178.59	184.33	181.23	181.38	173.79	179.04	176.29	176.37
	Mean	182.65	192.40	187.61	187.55	179.66	190.25	185.28	185.06
OP_7	C_0	75.47	89.83	81.88	82.39	76.07	91.50	84.13	83.90
	C_1	68.10	73.33	70.69	70.70	62.59	66.95	64.50	64.68
	C_2	61.34	66.13	63.68	63.71	55.38	59.49	57.73	57.53
	Mean	68.30	76.43	72.08	72.27	64.68	72.64	68.79	68.70
OP_8	C_0	300.54	313.18	305.78	306.50	301.73	315.44	307.88	308.35
	C_1	297.99	304.63	300.94	301.18	295.76	302.77	298.42	298.98
	C_2	295.11	300.09	297.68	297.62	292.86	298.26	295.31	295.48
	Mean	297.88	305.96	301.46	301.77	296.78	305.49	300.54	300.94
OP_9	C_0	272.25	287.48	280.28	280.00	273.48	290.11	282.69	282.09
	C_1	262.28	265.88	264.18	264.11	255.19	258.50	256.74	256.81
	C_2	253.39	256.63	254.80	254.94	246.23	249.58	247.88	247.89
	Mean	262.64	269.99	266.42	266.35	258.30	266.06	262.44	262.26
OP_{10}	C_0	328.80	341.28	335.63	335.23	331.02	343.85	338.24	337.70
	C_1	324.75	329.88	327.55	327.39	320.40	327.37	323.91	323.89
	C_2	319.36	325.18	322.43	322.32	314.09	319.45	317.05	316.86
	Mean	324.30	332.11	328.53	328.31	321.84	330.22	326.40	326.15
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	155.48	169.08	162.10	162.22	156.35	171.16	164.08	163.86
	C_1	149.76	154.76	152.15	152.22	144.38	149.80	146.94	147.04
	C_2	143.60	148.42	145.95	145.99	138.06	142.73	140.44	140.41
	Mean	149.61	157.42	153.40	153.48	146.26	154.56	150.49	150.44

Factor	$SE_m(\pm)$	CD @ 5%	$SE_m(\pm)$	CD @ 5%
ornamental plants (OP)	0.159	0.446	0.177	0.498
salt concentrations (C)	0.087	0.244	0.097	0.273
opxc	0.275	0.772	0.307	0.862
Amendments (A)	0.087	0.244	0.097	0.273
OPXA	0.275	0.772	0.307	0.862
CXA	0.151	0.423	0.168	0.472
OPXCXA	0.476	1.338	0.531	1.493

Table 4b: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to leaf area (cm^2) (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		135 DAT				180 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	97.27	111.84	105.08	104.73	98.43	113.98	107.08	106.49
	C_1	78.55	84.20	81.20	81.31	72.33	78.58	75.18	75.36
	C_2	72.34	77.49	75.29	75.04	66.48	71.53	68.98	68.99
	Mean	82.72	91.18	87.19	87.03	79.08	88.03	83.74	83.61
OP_2	C_0	106.38	123.25	115.94	115.19	107.58	125.18	118.13	116.96
	C_1	86.20	91.26	88.66	88.71	79.63	84.48	81.88	81.99
	C_2	80.50	85.25	82.75	82.83	74.03	78.43	75.83	76.09
	Mean	91.03	99.92	95.78	95.58	87.08	96.03	91.94	91.68
OP_3	C_0	66.28	82.55	74.39	74.40	67.33	84.48	76.48	76.09
	C_1	53.81	60.97	57.02	57.27	49.93	58.23	53.73	53.96
	C_2	48.56	54.87	51.76	51.73	45.48	51.68	48.63	48.59
	Mean	56.21	66.13	61.05	61.13	54.24	64.79	59.61	59.55
OP_4	C_0	89.06	103.48	97.32	96.62	90.43	105.53	99.53	98.49
	C_1	63.78	66.93	65.28	65.33	55.63	59.08	57.38	57.36
	C_2	53.66	56.72	55.17	55.18	45.43	48.58	47.03	47.01
	Mean	68.83	75.71	72.59	72.37	63.83	71.06	67.98	67.62
OP_5	C_0	39.10	52.11	45.41	45.54	40.43	54.03	47.63	47.36
	C_1	19.73	22.08	20.73	20.84	17.58	20.18	18.88	18.88
	C_2	14.37	16.73	15.57	15.56	13.53	16.08	14.78	14.79
	Mean	24.40	30.31	27.23	27.31	23.84	30.09	27.09	27.01
OP_6	C_0	188.48	208.55	199.64	198.89	189.78	210.73	201.78	200.76
	C_1	172.31	179.27	175.47	175.68	166.78	174.93	170.63	170.78
	C_2	167.51	173.36	170.41	170.42	163.38	169.93	166.43	166.58
	Mean	176.10	187.06	181.84	181.66	173.31	185.19	179.61	179.37
OP_7	C_0	77.39	93.86	86.00	85.75	78.78	95.93	88.43	87.71
	C_1	55.17	59.02	56.92	57.03	47.13	51.18	49.08	49.13
	C_2	47.75	51.41	49.36	49.50	39.43	42.93	41.08	41.14
	Mean	60.10	68.10	64.09	64.10	55.11	63.34	59.53	59.33
OP_8	C_0	302.57	317.09	310.28	309.98	303.58	319.03	311.98	311.53
	C_1	292.46	300.57	296.31	296.44	286.43	299.58	294.98	293.66
	C_2	289.70	295.01	292.55	292.42	287.23	293.78	290.23	290.41
	Mean	294.91	304.22	299.71	299.61	292.41	304.13	299.06	298.53
OP_9	C_0	274.38	292.10	284.44	283.64	277.48	293.88	286.08	285.81
	C_1	245.19	248.05	246.44	246.56	234.83	238.33	236.28	236.48
	C_2	235.38	238.38	237.03	236.93	216.03	218.83	217.43	217.43
	Mean	251.65	259.51	255.97	255.71	242.78	250.34	246.59	246.57
OP_{10}	C_0	332.40	345.87	340.06	339.44	333.43	347.68	341.83	340.98
	C_1	313.03	319.29	315.88	316.06	307.08	314.13	309.98	310.39
	C_2	308.37	312.78	310.37	310.51	302.23	307.33	304.93	304.83
	Mean	317.93	325.98	322.10	322.00	314.24	323.04	318.91	318.73
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	157.33	173.07	165.85	165.42	158.72	175.04	167.89	167.22
	C_1	138.02	143.16	140.39	140.52	131.73	137.87	134.80	134.80
	C_2	131.81	136.20	134.03	134.01	125.32	129.91	127.53	127.59
	Mean	142.39	150.81	146.76	146.65	138.59	147.60	143.41	143.20

Factor	$SE_m(\pm)$	CD @ 5%	$SE_m(\pm)$	CD @ 5%
ornamental plants (OP)	0.180	0.506	0.275	0.773
salt concentrations (C)	0.099	0.277	0.151	0.423
opxc	0.312	0.876	0.476	1.339
Amendments (A)	0.099	0.277	0.151	0.423
OPXA	0.312	0.876	0.476	1.339
CXA	0.171	0.480	0.261	0.733
OPXCXA	0.540	1.517	0.825	NS

Table 5a: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to root length (cm) (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		45 DAT				90 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	22.13	27.13	24.46	24.57	29.03	38.96	32.44	33.47
	C_1	18.24	20.60	19.56	19.47	19.79	22.15	20.98	20.97
	C_2	16.21	18.61	17.45	17.42	17.65	20.33	18.75	18.91
	Mean	18.86	22.11	20.49	20.49	22.15	27.14	24.05	24.45
OP_2	C_0	22.19	28.86	26.43	25.82	26.65	40.77	34.78	34.07
	C_1	17.79	19.86	18.89	18.84	19.26	21.28	20.23	20.25
	C_2	15.24	17.01	15.94	16.06	16.70	18.78	17.75	17.74
	Mean	18.40	21.91	20.42	20.24	20.87	26.94	24.25	24.02
OP_3	C_0	28.56	36.32	32.96	32.61	33.30	47.40	41.09	40.60
	C_1	25.61	28.18	26.98	26.92	27.53	30.13	28.65	28.77
	C_2	22.79	25.51	24.13	24.14	24.55	27.25	25.90	25.90
	Mean	25.65	30.00	28.02	27.89	28.46	34.93	31.88	31.75
OP_4	C_0	26.18	32.82	29.39	29.46	31.33	43.79	37.16	37.42
	C_1	22.51	24.30	23.46	23.42	23.82	25.60	24.70	24.71
	C_2	19.51	21.26	20.36	20.38	20.73	22.40	21.60	21.58
	Mean	22.73	26.13	24.40	24.42	25.29	30.60	27.82	27.90
OP_5	C_0	16.24	23.33	21.16	20.24	20.98	35.16	29.91	28.68
	C_1	12.66	14.22	13.41	13.43	13.71	14.95	14.25	14.30
	C_2	10.05	11.41	10.66	10.71	11.00	12.25	11.60	11.62
	Mean	12.98	16.32	15.08	14.79	15.23	20.79	18.59	18.20
OP_6	C_0	34.48	41.73	38.90	38.37	38.85	50.53	46.41	45.26
	C_1	30.82	33.25	32.13	32.06	32.66	34.70	33.55	33.64
	C_2	27.99	30.56	29.34	29.29	29.73	32.18	30.98	30.96
	Mean	31.09	35.18	33.46	33.24	33.75	39.13	36.98	36.62
OP_7	C_0	13.81	20.87	17.83	17.50	18.00	31.64	26.22	25.29
	C_1	10.29	12.34	11.47	11.37	11.61	13.70	12.70	12.67
	C_2	8.43	10.41	9.47	9.44	9.80	11.70	10.73	10.74
	Mean	10.84	14.54	12.92	12.77	13.14	19.01	16.55	16.23
OP_8	C_0	17.81	24.66	21.59	21.35	23.05	36.38	30.74	30.06
	C_1	15.03	17.58	16.28	16.30	17.31	19.70	18.25	18.42
	C_2	12.93	15.91	14.46	14.43	14.80	17.70	16.25	16.25
	Mean	15.26	19.38	17.44	17.36	18.39	24.59	21.75	21.58
OP_9	C_0	10.65	18.38	14.77	14.60	15.40	28.74	23.31	22.48
	C_1	8.31	10.00	9.26	9.19	9.42	10.94	10.05	10.14
	C_2	6.91	8.46	7.73	7.70	7.95	9.45	8.65	8.68
	Mean	8.62	12.28	10.59	10.49	10.92	16.37	14.00	13.77
OP_{10}	C_0	8.81	15.24	11.76	11.94	13.30	24.26	18.94	18.83
	C_1	6.70	9.11	8.03	7.94	8.37	10.80	9.45	9.54
	C_2	5.38	7.92	6.68	6.66	6.90	8.85	8.20	7.98
	Mean	6.96	10.76	8.82	8.85	9.52	14.64	12.20	12.12
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	20.09	26.93	23.92	23.65	24.99	37.76	32.10	31.62
	C_1	16.80	18.94	17.94	17.89	18.35	20.39	19.28	19.34
	C_2	14.54	16.70	15.62	15.62	15.98	18.09	17.04	17.04
	Mean	17.14	20.86	19.16	19.05	19.77	25.41	22.81	22.66

Factor	$SE_m(\pm)$	CD @ 5%	$SE_m(\pm)$	CD @ 5%
ornamental plants (OP)	0.052	0.146	0.163	0.457
salt concentrations (C)	0.028	0.080	0.089	0.250
opxc	0.090	0.253	0.282	0.791
Amendments (A)	0.028	0.080	0.089	0.250
OPXA	0.090	0.253	0.282	NS
CXA	0.049	0.139	0.154	0.433
OPXCXA	0.156	0.438	0.488	1.370

Table 5b: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to root length (cm) (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		135 DAT				180 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	32.38	43.38	37.68	37.81	36.38	48.03	40.48	41.63
	C_1	21.18	23.45	22.25	22.29	22.13	24.28	23.18	23.19
	C_2	18.85	21.40	20.15	20.13	19.88	21.83	20.83	20.84
	Mean	24.13	29.41	26.69	26.74	26.13	31.38	28.16	28.55
OP_2	C_0	30.18	45.65	39.53	38.45	32.98	49.63	44.23	42.28
	C_1	20.48	22.35	21.25	21.36	21.13	23.08	22.03	22.08
	C_2	17.75	19.98	18.88	18.87	18.68	20.43	19.53	19.54
	Mean	22.80	29.33	26.55	26.23	24.26	31.04	28.59	27.96
OP_3	C_0	37.60	52.58	46.75	45.64	41.13	56.53	51.23	49.63
	C_1	28.95	33.10	31.20	31.08	30.38	36.43	33.43	33.41
	C_2	25.60	29.58	27.70	27.63	26.83	31.63	29.33	29.26
	Mean	30.72	38.42	35.22	34.78	32.78	41.53	37.99	37.43
OP_4	C_0	35.65	48.83	42.63	42.37	38.48	52.08	47.38	45.98
	C_1	24.75	26.10	25.35	25.40	25.23	27.03	25.83	26.03
	C_2	21.05	22.45	21.70	21.73	21.63	23.13	22.33	22.36
	Mean	27.15	32.46	29.89	29.83	28.44	34.08	31.84	31.45
OP_5	C_0	25.25	39.88	34.55	33.23	29.03	43.78	38.78	37.19
	C_1	14.20	15.25	14.70	14.72	14.58	15.63	14.98	15.06
	C_2	11.50	12.70	12.05	12.08	11.93	13.03	12.43	12.46
	Mean	16.98	22.61	20.43	20.01	18.51	24.14	22.06	21.57
OP_6	C_0	41.88	55.25	51.93	49.68	45.08	60.18	56.18	53.81
	C_1	34.00	36.15	34.90	35.02	35.28	40.48	37.73	37.83
	C_2	31.18	34.00	32.63	32.60	32.08	35.93	33.93	33.98
	Mean	35.68	41.80	39.82	39.10	37.48	45.53	42.61	41.87
OP_7	C_0	22.05	37.00	31.58	30.21	25.58	41.53	35.68	34.26
	C_1	12.70	14.20	13.35	13.42	13.33	14.78	13.98	14.03
	C_2	10.73	12.65	11.60	11.66	11.43	12.93	12.13	12.16
	Mean	15.16	21.28	18.84	18.43	16.78	23.08	20.59	20.15
OP_8	C_0	25.00	42.23	34.00	33.74	28.13	45.08	38.13	37.11
	C_1	19.25	22.75	20.68	20.89	21.08	24.88	22.93	22.96
	C_2	16.50	20.70	18.65	18.62	17.78	22.18	19.23	19.73
	Mean	20.25	28.56	24.44	24.42	22.33	30.71	26.76	26.60
OP_9	C_0	18.93	33.28	27.68	26.63	22.08	37.33	30.93	30.11
	C_1	10.03	11.25	10.58	10.62	10.48	11.53	10.98	10.99
	C_2	8.55	9.75	9.15	9.15	9.08	10.28	9.63	9.66
	Mean	12.50	18.09	15.80	15.46	13.88	19.71	17.18	16.92
OP_{10}	C_0	16.55	28.88	24.75	23.39	19.78	32.23	27.03	26.34
	C_1	9.65	12.45	10.73	10.94	10.68	13.13	11.93	11.91
	C_2	8.30	11.13	9.75	9.73	9.48	11.88	10.68	10.68
	Mean	11.50	17.48	15.08	14.69	13.31	19.08	16.54	16.31
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	28.55	42.69	37.11	36.11	31.86	46.64	41.00	39.83
	C_1	19.52	21.71	20.50	20.57	20.43	23.12	21.70	21.75
	C_2	17.00	19.43	18.23	18.22	17.88	20.32	19.00	19.07
	Mean	21.69	27.94	25.28	24.97	23.39	30.03	27.23	26.88
Factor		$SE_m(\pm)$		CD @ 5%		$SE_m(\pm)$		CD @ 5%	
ornamental plants (OP)		0.167		0.470		0.075		0.211	
salt concentrations (C)		0.092		0.258		0.041		0.115	
opxc		0.290		0.815		0.130		0.365	
Amendments (A)		0.092		0.258		0.041		0.225	
OPXA		0.290		0.815		0.130		0.365	
CXA		0.159		0.446		0.071		0.200	
OPXCXA		0.502		1.411		0.225		0.632	

Table 6a: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to root to shoot ratio (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		45 DAT				90 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	0.68	0.81	0.73	0.74	0.69	0.82	0.75	0.75
	C_1	0.68	0.70	0.70	0.69	0.68	0.69	0.69	0.69
	C_2	0.67	0.69	0.69	0.68	0.69	0.69	0.69	0.69
	Mean	0.68	0.73	0.70	0.71	0.69	0.74	0.71	0.71
OP_2	C_0	1.08	1.16	1.13	1.12	1.11	1.15	1.12	1.12
	C_1	1.11	1.11	1.11	1.11	1.10	1.09	1.10	1.09
	C_2	1.14	1.11	1.11	1.12	1.15	1.14	1.14	1.14
	Mean	1.11	1.13	1.12	1.12	1.12	1.12	1.12	1.12
OP_3	C_0	0.80	0.90	0.87	0.86	0.81	0.91	0.88	0.87
	C_1	0.80	0.80	0.81	0.80	0.79	0.81	0.79	0.80
	C_2	0.83	0.85	0.84	0.84	0.84	0.85	0.84	0.84
	Mean	0.81	0.85	0.84	0.83	0.81	0.85	0.84	0.84
OP_4	C_0	1.09	1.16	1.12	1.12	1.08	1.12	1.10	1.10
	C_1	1.21	1.20	1.21	1.20	1.20	1.17	1.18	1.18
	C_2	1.40	1.37	1.38	1.38	1.38	1.37	1.38	1.38
	Mean	1.23	1.24	1.24	1.24	1.22	1.22	1.22	1.22
OP_5	C_0	0.91	1.15	1.01	1.02	0.92	1.09	1.03	1.01
	C_1	0.93	0.92	0.93	0.93	0.94	0.93	0.93	0.93
	C_2	1.04	1.05	1.05	1.05	1.06	1.00	1.04	1.03
	Mean	0.96	1.04	1.00	1.00	0.97	1.01	1.00	0.99
OP_6	C_0	0.85	0.92	0.88	0.88	0.86	0.91	0.90	0.89
	C_1	0.86	0.86	0.86	0.86	0.85	0.86	0.85	0.85
	C_2	0.88	0.89	0.88	0.88	0.88	0.88	0.88	0.88
	Mean	0.86	0.89	0.87	0.88	0.87	0.89	0.88	0.88
OP_7	C_0	0.66	0.91	0.81	0.79	0.71	0.93	0.84	0.83
	C_1	0.57	0.60	0.59	0.59	0.54	0.60	0.58	0.58
	C_2	0.60	0.67	0.64	0.64	0.64	0.71	0.67	0.67
	Mean	0.61	0.73	0.68	0.67	0.63	0.75	0.70	0.69
OP_8	C_0	0.28	0.39	0.34	0.34	0.31	0.42	0.38	0.37
	C_1	0.24	0.26	0.25	0.25	0.25	0.29	0.27	0.27
	C_2	0.23	0.27	0.25	0.25	0.25	0.28	0.27	0.27
	Mean	0.25	0.31	0.28	0.28	0.27	0.33	0.30	0.30
OP_9	C_0	0.91	1.25	1.09	1.08	0.89	1.19	1.12	1.07
	C_1	0.94	0.96	0.96	0.96	0.88	0.93	0.88	0.90
	C_2	1.15	1.09	1.14	1.13	1.09	1.04	1.09	1.07
	Mean	1.00	1.10	1.06	1.06	0.95	1.05	1.03	1.01
OP_{10}	C_0	0.74	0.91	0.83	0.82	0.75	0.90	0.87	0.84
	C_1	0.63	0.66	0.64	0.64	0.61	0.65	0.63	0.63
	C_2	0.72	0.76	0.75	0.74	0.75	0.76	0.74	0.75
	Mean	0.70	0.77	0.74	0.74	0.71	0.77	0.75	0.74
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	0.80	0.96	0.88	0.88	0.81	0.95	0.90	0.88
	C_1	0.80	0.81	0.81	0.80	0.79	0.80	0.79	0.79
	C_2	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
	Mean	0.82	0.88	0.85	0.85	0.82	0.87	0.85	0.85
Factor		$SE_m(\pm)$		CD @ 5%		$SE_m(\pm)$		CD @ 5%	
ornamental plants (OP)		0.002		0.005		0.002		0.006	
salt concentrations (C)		0.001		0.003		0.001		0.003	
opxc		0.003		0.008		0.004		0.010	
Amendments (A)		0.001		0.003		0.001		0.003	
OPXA		0.003		0.008		0.004		0.010	
CXA		0.002		0.005		0.002		0.006	
OPXCXA		0.005		0.015		0.006		0.018	

Table 6b: Response of ornamental plants (OP) to salt concentrations (C), soil amendments (A) and their interactions with respect to root to shoot ratio (Pooled means of two seasons)

Ornamental Plants (OP)	Salt Concentrations (C)	Amendments (A)							
		Intervals							
		135 DAT				180 DAT			
		A_0	A_1	A_2	Mean	A_0	A_1	A_2	Mean
OP_1	C_0	0.69	0.81	0.77	0.76	0.71	0.83	0.79	0.77
	C_1	0.70	0.71	0.71	0.70	0.71	0.72	0.72	0.72
	C_2	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
	Mean	0.69	0.74	0.72	0.72	0.70	0.75	0.73	0.73
OP_2	C_0	1.10	1.13	1.11	1.11	1.10	1.15	1.12	1.12
	C_1	1.10	1.10	1.10	1.10	1.11	1.10	1.11	1.10
	C_2	1.14	1.13	1.13	1.13	1.14	1.13	1.13	1.13
	Mean	1.11	1.12	1.11	1.12	1.11	1.12	1.12	1.12
OP_3	C_0	0.82	0.91	0.90	0.87	0.83	0.92	0.92	0.89
	C_1	0.80	0.81	0.81	0.81	0.81	0.82	0.82	0.82
	C_2	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	Mean	0.82	0.85	0.85	0.84	0.83	0.86	0.86	0.85
OP_4	C_0	1.06	1.08	1.09	1.08	1.07	1.09	1.07	1.08
	C_1	1.20	1.19	1.19	1.19	1.20	1.20	1.20	1.20
	C_2	1.36	1.35	1.36	1.36	1.35	1.31	1.33	1.33
	Mean	1.21	1.21	1.21	1.21	1.21	1.20	1.20	1.20
OP_5	C_0	0.90	1.06	1.03	1.00	0.91	1.11	1.05	1.02
	C_1	0.95	0.96	0.96	0.96	0.99	1.00	1.00	1.00
	C_2	1.01	1.03	1.02	1.02	1.01	0.99	0.99	1.00
	Mean	0.96	1.01	1.00	0.99	0.97	1.03	1.01	1.00
OP_6	C_0	0.86	0.91	0.90	0.89	0.86	0.93	0.91	0.90
	C_1	0.86	0.86	0.86	0.86	0.87	0.87	0.87	0.87
	C_2	0.88	0.89	0.88	0.88	0.88	0.88	0.88	0.88
	Mean	0.86	0.89	0.88	0.88	0.87	0.89	0.89	0.88
OP_7	C_0	0.73	0.93	0.90	0.85	0.77	0.99	0.93	0.90
	C_1	0.58	0.63	0.58	0.60	0.59	0.63	0.60	0.61
	C_2	0.65	0.73	0.69	0.69	0.67	0.65	0.66	0.66
	Mean	0.65	0.76	0.72	0.71	0.68	0.76	0.73	0.72
OP_8	C_0	0.33	0.44	0.41	0.39	0.34	0.47	0.43	0.41
	C_1	0.28	0.30	0.29	0.29	0.30	0.32	0.31	0.31
	C_2	0.26	0.30	0.28	0.28	0.28	0.30	0.29	0.29
	Mean	0.29	0.34	0.32	0.32	0.30	0.36	0.34	0.34
OP_9	C_0	0.85	1.15	1.06	1.02	0.85	1.16	1.08	1.03
	C_1	0.89	0.90	0.89	0.89	0.92	0.95	0.95	0.94
	C_2	1.02	1.10	1.08	1.07	1.04	0.97	1.01	1.01
	Mean	0.92	1.05	1.01	0.99	0.94	1.03	1.01	0.99
OP_{10}	C_0	0.76	0.90	0.90	0.85	0.78	0.93	0.92	0.88
	C_1	0.65	0.68	0.67	0.67	0.69	0.72	0.70	0.70
	C_2	0.76	0.79	0.77	0.77	0.77	0.76	0.76	0.76
	Mean	0.72	0.79	0.78	0.76	0.74	0.80	0.80	0.78
For comparing salt concentrations (C) and amendments (A) levels									
	C_0	0.81	0.93	0.91	0.88	0.82	0.96	0.92	0.90
	C_1	0.80	0.81	0.80	0.81	0.82	0.83	0.83	0.83
	C_2	0.86	0.88	0.87	0.87	0.87	0.85	0.86	0.86
	Mean	0.82	0.88	0.86	0.85	0.84	0.88	0.87	0.86

Factor	$SE_m(\pm)$	CD @ 5%	$SE_m(\pm)$	CD @ 5%
ornamental plants (OP)	0.002	0.005	0.003	0.009
salt concentrations (C)	0.001	0.003	0.002	0.005
opxc	0.003	0.008	0.005	0.015
Amendments (A)	0.001	0.003	0.002	0.005
OPXA	0.003	0.008	0.005	0.015
CXA	0.002	0.005	0.003	0.008
OPXCXA	0.005	0.014	0.009	0.026

Conclusion

According to the aforementioned findings, *Sansevieria trifacsciata*, *Bougainvillea spectabilis*, and *Caesalpinia pulcherrima* exhibited the highest performance with regard to many of the morphological attributes, enabling them to tolerate high soil salinity and maintain their aesthetic value even up to 9 dS m^{-1}. However *Tabernaemontana coronaria*, *Ixora cocccinea*, *Canna indica* and *Rhoeo discolor* could tolerate up to 9 dS m^{-1} soil salinity only when biochar and gypsum were used, as these plants had moderate performance under saline conditions. *Pandanus veitchii*, *Acalypha wilkesiana* and *Duranta erecta* could survive up to 6 dS m^{-1}

only when biochar and gypsum were used, but could not survive under high salinity (9 dS m^{-1}), as because these plants had very least performance with respect to all morphological parameters and plant growth, thus leading to salt sensitivity. Soil addition of gypsum at 20 g $plant^{-1}$ was the best effective and economic treatment recommended for mitigating the harmful effect of salinity stress on ornamental plants. Our study revealed that the growth and soil fertility was higher when biochar (2% of total pot mass) was added. Therefore, biochar could be one effective method to remediate salt-affected soil as a consequence of its potential to increase soil characteristics.

References

1. Abdel Fattah GH, El-Fouly AS, Abdel Monem A. Effect of using monopotassium phosphate and gypsum in alleviating the deleterious effect of saline water irrigation on *Polianthes tuberosa*, L. plant. Middle East Journal of Agriculture Research. 2014;3(4):890-899.
2. Akhtar SS, Andersen MN, Liu F. Biochar mitigates salinity stress in potato Journal of agronomy and crop science. 2015;201:368-378.
3. Alvarez S, Sanchez-Blanco MJ. Long-term effect of salinity on plant quality, water relations, photosynthetic parameters and ion distribution in *Callistemon citrinus.* Plant Biology. 2014;16(4):757-764.
4. Ashour HA, Mahmoud AWM. Response of *Jatropha integerrima* plants irrigated with different levels of saline water to nano silicon and gypsum. Journal of Agricultural Studies. 2017;5(4):136-160.
5. Banon S, Miralle J, Ochoa J, Sanchez-Blanco MJ. The effect of salinity and high boron on growth, photosynthetic activity and mineral contents of two ornamental shrubs. Horticultural Science. 2012;39(4):188-194.
6. Carter CT, Grieve CM, Poss JA, Suarez DL. Production and ion uptake of Celosia argentea irrigated with saline wastewaters. Sci. Hort. 2005;106:381-394.
7. Cassaniti C, Romano D, Flowers TJ. The Response of Ornamental Plants to Saline Irrigation Water. Irrigation-water management, pollution and alternative strategies; c2012. p. 131-158.
8. Chen L, Dick WA. Gypsum as an Agricultural amendment. General use guidelines. Ohio State University Extension. Columbus, Ohio; c2011. p.1-35.
9. Cheng Y, Cai Z, Chang S, Wang J, Zhang J. Wheat straw and its biochar have contrasting effects on inorganic N retention and N2O production in a cultivated Black Chernozem. Biol. Fertil. Soil. 2012;48:941–946.
10. Cirillo C, Rouphael Y, Caputo R, Raimondi G, Sifola MI, De Pascale S. Effects of high salinity and the exogenous application of an osmolyte on growth, photosynthesis and mineral composition in two ornamental shrubs. The Journal of Horticultural Science and Biotechnology. 2016;91(1):14-22.
11. Gomez-Bellot MJ, Alvarez S, Banon S, Ortuno MF, Sanchez-Blanco MJ. Physiological mechanisms involved in the recovery of Euonymus and Laurustinus subjected to saline waters. Agricultural Water Management. 2013;128:131-139.
12. Habba EI, Abd El-Aziz NG, Metwally SA, Mazhar AAM. Response of growth and chemical constituents in *Khaya sengalensis* to salinity and gypsum under calcareous soil conditions. World Applied Sciences Journal. 2013;22(4):447- 452.
13. Hussain K, Majeed A, Nawaz K, Khizar HB, Nisar MF. Effect of different levels of salinity on growth and ion contents of black seeds (*Nigella sativa* L.). Curr. Res. J Biol. Sci. 2009;1:135–138.
14. Ifediora NH, Edeoga HO, Omosun G. Effects of Salinity on the Growth and Viscosity of Fruits of Okra (*Abelmoschus esculentus* L.). International Journal of Current Agricultural Research. 2014;3(7):81-84.
15. Irakoze W, Prodjinoto H, Nijimbere S, Bizimana JB, Bigirimana J, Rufyikiri G, *et al*. NaCl-and Na2SO4-Induced Salinity Differentially Affect Clay Soil Chemical Properties and Yield Components of Two Rice Cultivars (*Oryza sativa* L.) in Burundi. Agronomy. 2021;11:571.
16. Kamaluldeen J, Yunusa IAM, Zerihun A, Bruhl JJ, Kristiasen. Uptake and distribution of ions reveal contrasting tolerance mechanisms for soil and water salinity in okra (*Abelmoschus esculentus*) and tomato (*Solanum esculentum*). Agricultural Water Management. 2014;146:95-104.
17. Keren R. Reclamation of sodic-affected soils. In: Agassi, M. (Ed.), Soil Erosion, Conservation and Rehabilitation. New York, Marcel Dekker; c1996. p. 353–374.
18. Kumar AS, Reddy KV, Ashok M. Identification of variations in plant morphology through different methods of gypsum application in tulsi (*Ocimum basilicum*). International Journal of Scientific& Technology Research. 2014;3(11):190-195.
19. Lakshmaiah K, Aruna P, Ganga M. Morphological Studies on the Suitability of *Clerodendrum inermi*, *Leucophyllum frutescens* and *Acalypha hispida* Shrubs for use in Landscaping under Salinity Conditions. International Journal of Current Microbiology and Applied Sciences. 2018;7(12):2464-2469.
20. Mehdizadeh L, Moghaddam M, Lakzian A. Amelioration of soil properties, growth and leaf mineral elements of summer savory under salt stress and biochar application in alkaline soil. Scientia Horticulturae. 2020;267:1-11.
21. Munns R. Comparative physiology of salt and water stress. Plant, Cell & Environment. 2002;25(2):239-250.
22. Navarro A, Banon S, Conejero W, Sanchez-Blanco MJ. Ornamental characters, ion accumulation and water status in Arbutus unedo seedlings irrigated with saline water and subsequent relief and transplanting. Environ. Exp. Bot. 2008;62:364-370.
23. Patel AD, Jadeja H, Pandey AN. Effect of salinization of soil on growth, water status and nutrient accumulation in seedlings of *acacia auriculiformis* (Fabaceae). Journal of Plant Nutrition. 2010;33(6):914-932.
24. Patel AD, Pandey AN. Growth, water status and nutrient accumulation of seedlings of *Holoptelea integrifolia* (Roxb.) plant in response to soil salinity. Plant Soil and Environment. 2008;54:367-373.
25. Reddy AR, Kumar VR, Priyanka M, Sastry KP. Influence of different doses of gypsum on growth of herb (*Cymbopogon flexuosus*) lemongrass var. Krishna. Research Journal of Pharmaceutical, Biological and Chemical Sciences. 2014;5(2):433-447.
26. Rehman S, Abbas G, Shahid M, Saqib M, Farooq ABU, Hussain M. Effect of salinity on cadmium tolerance, ionic homeostasis and oxidative stress responses in conocarpus exposed to cadmium stress: Implications for

phytoremediation. Ecotoxicol. Environ. Saf. 2019;171:146–153.
27. Rhoades JD, Kandiah A, Mashali AM. The use of saline waters for crop production. FAO Irrigation and Drainage; c1992. p. 48.
28. Sharma DK. CSSRI Vision 2030. Central Soil Salinity Research Institute, Karnal; c2011.
29. Sharma DK. CSSRI Vision 2050. Central Soil Salinity Research Institute, Karnal; c2014.
30. Thomas SC, Fry S, Gale N, Garmon M, Launchbury R, Machado N, *et al*. Biochar mitigates negative effects of salt additions on two herbaceous plant species. Journal of Environmental Management. 2013;129:62-68.
31. Unlukara A, Kurunc A, Kesmez GD, Yurtseven E. Growth and evapotranspiration of okra (*Abelmoschus esculentus* L.) as influenced by salinity of irrigation water. Journal of Irrigation and Drainage Engineering. 2008;134(2):160-166.
32. Vwioko ED, El-Esawi MA, Imoni ME, Al-Ghamdi AA, Ali HM, El-Sheekh MM, *et al*. Sodium Azide Priming Enhances Waterlogging Stress Tolerance in Okra (*Abelmoschus esculentus* L.). Agronomy. 2019;9:679.
33. Wahome PK, Jeschb HH, Grittnerb I. Mechanisms of salt stress tolerance in two rose rootstocks: *Rosa chinensis* `Major' and *R. rubiginosa*. Scientia Horticulturae. 2001;87:207-216.