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# Assessment of salinity tolerance in chilli (*Capsicum annuum* L.) genotypes

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**Abstract**
Salinity is a major constraint in crop cultivation. However, when tolerant genotypes are cultivated they improve their physiological mechanisms to cope up with salinity stress. An investigation was carried out to assess the impact of salt stress on growth and yield characters of chilli genotypes. A pot culture experiment was conducted during 2016 at TNAU, Coimbatore to evaluate the performance of 20 chilli genotypes at three salinity levels viz., 25mM NaCl, 50mM NaCl and 100mM NaCl and compared with control (0mM NaCl). The plant growth characters like plant height, number of branches, days to first flowering, leaf area were significantly reduced by increasing levels of salinity in irrigation water. Such declining trend was also observed in fruit characters like fruit length, fruit girth, fruit weight (green and dry) and number of fruits per plant. Among the 20 genotypes CO1, K1, Jayanthi and IC119546 were found highly tolerant to salinity, while the genotypes IC 119589 and LCA 334 were highly sensitive to saline conditions.

**Keywords:** Chilli, genotypes, different salinity levels, screening salt tolerance, yield

## Introduction

Globally, chilli (*Capsicum annuum* L.), is the second most important solanaceous vegetable, accounting for a production of 170.03 MT from 19,83,000 ha with productivity of 1900 kg per hectare in India (Horticultural Statistics at a Glance 2015) [8]. In Tamil Nadu, it is cultivated in an area of 289 ha with a production and productivity of 8.67 MT and 506 kg/ha respectively (NHB 2014) [14]. Besides imparting pungency and red colour to dishes, it is also a rich source of vitamin A, C and E and assists in good digestion.

Most of the regions where cultivation of chilli is predominent are characterized by the presence of moderate to high levels of salts. Plants are subjected to various kinds of biotic and abiotic stresses including drought, heat, salinity and chilling, which hamper the seedling establishment, allometry and economic yield (Munns and Tester 2008) [13]. Salinity, a huge and worldwide problem has affected about 930 million ha of land, which accounts about 20% of world’s land area (Qadir 2016) [18]. There is about 7 million ha of salt affected soil (saline and sodic) in India. Critically, this problem is due to the reduction in availability of fresh water as well as precipitation, which forces the growers to use underground water containing salts, particularly NaCl. This has resulted in gradual buildup of Na+ and Cl- in the root zone. Salinity is one of the key environmental factors that adversely influence crop productivity in several regions of the world.

Salt damage to plants is attributed to the reduction in water availability, toxicity or specific ions and nutritional imbalance caused by such ions (Ifediora *et al.* 2014) [9]. However, the magnitude of the effect of salinity varied with the plant species, type and level of salinity. The development of salinity-tolerant cultivars is an economical and effective approach to cope with salinity (Niu *et al*. 2010) [15]. High salt concentrations cause various events that negatively impact agricultural production, such as delays in plant growth and development, inhibition of enzymatic activities and a reduction in the photosynthetic rate. Dieriga *et al.* (2003) [5] and Foolad (2004) [6] suggested that the salinity reduces growth in different ways. Reduced cell membrane stability, reduced photosynthesis and activity of the photosynthetic enzymes, reduced cells inflammation and thus reduced leaf development, disorder in ion absorption especially the accumulation of sodium and chlorine ions in the leaves and ultimately reduced growth and economic performance are the effects of salinity on the crops [Munns and Tester (2008) [13] and Shahid *et al*. (2011) [20]].

Increasing salt tolerance of crops through plant breeding could increase the sustainability of irrigation with low quality water by reducing the need for leaching and allowing the use of poor quality water. Corrective measures of salinity problems are expensive and only temporary Therefore, selection and breeding for salt tolerance would be more permanent and complementary solutions to minimize salinity effects (Ashraf and McNeilly 2004 [1]). Genetic variability within a species is a valuable tool for screening and breeding for salt tolerance. Therefore, the present study was undertaken to evaluate the effect of salinity on growth and yield of chilli genotypes.

**Materials and Methods**

Pot culture experiment was carried out in the Department of Vegetable Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore. A total number of thirty six genetically diversed chilli genotypes were collected from various national institutions and research stations *viz*., NBPGR New Delhi, IIVR Varanasi, IIHR Bangalore, KAU Kerala, PAU Ludhiana, HRS Guntur and local types of Tamil Nadu were used for this studies. The genotypes were evaluated under Factorial Completely Randomized Design with two replication. Forty-five days old healthy seedlings were transplanted in the pot. Saline conditions were simulated by employing aqueous NaCl solutions of 25, 50 and 100 mM prepared by dissolving analytical grade NaCl in water.

The treatment control was maintained for each chilli genotype where only normal water was applied. To avoid osmotic shock, NaCl concentrations were adjusted gradually (increasing 25 mM every two days) until desired concentration was reached. Each plant was irrigated at the rate of 1½ litre saline water per irrigation and the treatment was imposed at an interval of five days starting from the day of transplantation as per method suggested by Kameswari and Manohar Prasad (2005) [10]. Observation on characters were recorded and the mean values were derived. The recorded data were analysed with two-way analysis of variance (ANOVA) given by Gomez and Gomez (1984) [7].

**Results and Discussion**

**Growth Attributes**

The study result revealed that salt stress adversely affected the performance of twenty chilli genotypes as compared to the control. Significant ($p \leq 0.05$) differences regarding different morphological attributes by various salinity levels are presented in Table 1. Among the genotypes, the mean plant height ranged from 26.00 cm to 34.80 cm in 100mM NaCl treatment and 44.20 cm to 68.50 cm in control. Under 100mM saline water treatment the highest plant height was observed by the var.CO 1 (34.80 cm) followed by the var.K1 (34.50 cm) and the var. Jayanthi (34.00 cm).

Mean number of branches per plant was ranged between 8.50 (control) and 1.00 (100mM NaCl). As expected, control condition and the highest NaCl level (100mM NaCl) produced the highest and the lowest branches per plant respectively. It was observed that the branch number was decreased as salt stress increased. In the control treatment, it varied from 4.00 (IC119589) to 8.50 (var. Jayanthi). At the highest saline stress level (100mM of NaCl) var. Jayanthi and K1 recorded the highest branch number of 3.50. These saline tolerant chilli genotypes under saline condition might have manifested by restricted translocation /exclusion of $Na^+$ and $K^{(-)}$ ions from root to leaves and increased the assimilation of photosynthates and adjusted osmotically to the growing conditions as a result of which they were successful in maintaining required cell enlargement so they showed maximum plant height and number of branches (Shahid *et al.*, 2011)[20], Samira *et al*. (2012) [19] and Zhani *et al.* (2012) [23] obtained a similar result in chilli.

Significant differences were observed for days to first flowering in all the treatments which in an important criteria to assess the earliness for flowering. Earliness for flowering was registered between 72.50 days in control and 97.50 days under 100mM NaCl. Under control treatment, it varied from 72.50 days (var. K1) to 87.00 days (var. Punjab Lal). Among the genotypes, the var. K1 and IC119546 were early to flowering (72.50 days), which was onpar with var. CO 4 and Jayanthi (73.50 days). At the highest saline stress level (100mM of NaCl), the var. K1 and var. Jayanthi took 88.00 days for flowering which was on par with var. CO1 (88.50 days). The var. Jayanthi, IC119546 and K1 were produced flowers and showed tolerance to salinity upto the highest concentration of 100mM of NaCl. Generally chilli genotypes have genetical ability to produce more auxin, gibberellin and growth substances at early phase of growth and that would have caused early induction of flowering. The varieties Jayanthi, CO 1 and K1 showed the high salt tolerant potential regarding the early flowering which indicates that these cultivars might have accumulated less ratios of salt toxic ions (Na and Cl) in their tissue, thus absorbed the maximum beneficial ions. The balanced nutrient uptake and moisture content would have facilitated the enzymatic and protein activities necessary for growth and flower development (Tahir Abbas *et al.* 2014) [21]. These results are comparable as per the report of Kameswari and Manohar Prasad (2005) [10] in chilli and Turhan *et al*. (2009) [22] in tomato.

**Table 1:** Variation in morphological parameters of chilli genotypes to increasing salinity levels

| Genotypes (G) | Plant Height (cm) | | | | No of branches/plant | | | | Days to first flowering | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $T_1$ | $T_2$ | $T_3$ | $T_4$ | $T_1$ | $T_2$ | $T_3$ | $T_4$ | $T_1$ | $T_2$ | $T_3$ | $T_4$ |
| CA7 | 60.00 | 43.90 | 40.20 | 21.50 | 5.50 | 4.00 | 2.50 | 1.50 | 75.00 | 80.00 | 85.50 | 92.00 |
| CO1 | 68.50 | 53.20 | 42.85 | 23.50 | 7.50 | 5.50 | 3.50 | 3.00 | 74.00 | 75.50 | 82.50 | 88.50 |
| CO4 | 64.00 | 50.50 | 40.50 | 21.25 | 6.50 | 5.00 | 3.50 | 2.50 | 73.50 | 74.00 | 84.50 | 90.00 |
| PKM1 | 60.50 | 47.25 | 42.95 | 20.00 | 7.00 | 4.50 | 3.50 | 2.50 | 74.50 | 73.50 | 85.50 | 90.50 |
| K1 | 68.20 | 55.80 | 42.35 | 22.00 | 8.00 | 5.00 | 4.00 | 3.50 | 72.50 | 78.00 | 84.50 | 88.00 |
| Guntur local | 61.56 | 50.90 | 39.75 | 21.50 | 7.00 | 4.50 | 3.50 | 2.50 | 73.50 | 78.00 | 86.00 | 92.50 |
| LCA 639 | 65.60 | 52.35 | 41.85 | 22.00 | 7.00 | 5.50 | 3.50 | 1.50 | 75.50 | 78.00 | 85.00 | 87.00 |
| LCA 334 | 49.10 | 44.10 | 41.78 | 15.00 | 6.50 | 5.50 | 3.50 | 2.50 | 75.00 | 81.50 | 83.50 | 90.00 |
| Peraiyur Local | 62.20 | 49.90 | 46.95 | 20.50 | 7.50 | 5.50 | 3.50 | 2.50 | 79.50 | 85.50 | 88.00 | 91.00 |
| Anugraha | 60.50 | 44.86 | 41.80 | 16.50 | 6.50 | 4.50 | 3.50 | 2.50 | 78.00 | 79.50 | 82.50 | 84.50 |
| Ujwala | 56.50 | 42.66 | 40.38 | 15.00 | 6.00 | 4.50 | 3.50 | 2.00 | 73.50 | 76.50 | 80.50 | 94.50 |
| EC 399549 | 54.00 | 45.70 | 42.36 | 14.00 | 6.50 | 4.50 | 3.50 | 2.50 | 82.00 | 83.50 | 89.00 | 93.00 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EC 554803 | 52.00 | 45.70 | 41.75 | 16.50 | 6.50 | 4.50 | 3.50 | 1.50 | 84.00 | 87.00 | 92.00 | 97.50 |
| IC 119546 | 58.00 | 43.80 | 39.10 | 20.33 | 7.00 | 5.50 | 4.00 | 3.00 | 72.50 | 79.00 | 85.00 | 90.50 |
| IC 119589 | 44.20 | 40.20 | 38.40 | 15.33 | 4.00 | 2.50 | 2.00 | 1.00 | 84.50 | 86.50 | 90.50 | 93.50 |
| Punjab Lal | 48.10 | 46.15 | 37.80 | 14.50 | 4.00 | 3.00 | 2.00 | 1.00 | 87.00 | 89.50 | 93.50 | 97.00 |
| Jayanthi | 65.55 | 57.35 | 42.20 | 23.00 | 8.50 | 7.50 | 5.50 | 3.50 | 73.50 | 76.00 | 79.50 | 88.00 |
| EC 497636 | 56.20 | 48.45 | 45.40 | 19.30 | 7.50 | 6.50 | 5.00 | 3.00 | 74.50 | 77.00 | 81.50 | 85.50 |
| Arka Suphal | 56.50 | 45.60 | 39.00 | 22.33 | 7.00 | 5.50 | 4.50 | 3.00 | 75.00 | 77.50 | 82.50 | 89.50 |
| Arka Abhir | 60.35 | 46.75 | 43.44 | 21.35 | 7.00 | 5.00 | 3.50 | 1.50 | 78.00 | 81.00 | 85.60 | 93.50 |
| Mean | 58.60 | 46.97 | 41.94 | 19.26 | 6.75 | 4.90 | 3.45 | 2.20 | 77.15 | 80.25 | 85.60 | 91.75 |
| Factor | **Plant height (cm)** | | | | **No. of branches** | | | | **Days to first flowering** | | | |
| | G | | T | G x T | G | T | | G x T | G | | T | G x T |
| SEd | 0.76 | | 0.34 | 1.53 | 0.06 | 0.03 | | 0.13 | 1.02 | | 0.45 | 2.05 |
| CD (0.05) | 1.52 | | 0.68 | 3.04 | 0.13 | 0.06 | | 0.27 | 2.04 | | 0.91 | 4.08 |

**Leaf area/plant**

The study results revealed that the salt stress affected the leaf area drastically in all the chilli genotypes under all the three saline treatments. In control the leaf area ranged from 1413.2 cm² per plant (accession EC554803) to 1697.0 cm² (cv.CO 1). The highest leaf area per plant of 1191.30 cm² was recorded in the highest salt level by the var. K1. Generally, evidence shows that salinity increases the leaf lamina thickness, due to an increase in mesophyll cell size or number of layers. Such salt-induced succulence could lower the resistance to $CO_2$ uptake and thus increase photosynthetic rates by increasing the amount of internal leaf surface area across which gaseous exchange can occur per unit of leaf area (Longstreth and Nobel, 1979) [11]. The salt-tolerant genotypes may reflect an increase in mesophyll thickness and the internal surface area for $CO_2$ absorption, which probably compensates for any stomatal assimilation limitation (Kozlowski, 1997) [12]. In the highest stress level (100mM NaCl), leaf area got reduced and the range was measured from 1191.30 cm² (var.K1) to 907.80 cm² (var. Ujwala). Bandeoglu *et al*. (2000) [3] and Nizam *et al.* (2017) [16] indicated that the retarded plant growth and leaf development is due to inhibition of cell elongation due to higher concentration of Na ion which cause membrane disorganization, inhibition of cell division and expansion (Deivanai *et al*. (2011) [4].

**Yield contributing characters**

Yield determined by average fruit weight, fruit length, fruit girth, number of fruits and total yield per plant was significantly affected and decresed with increasing salinity levels (Table 2 and 3). The highest fruit length of 10.50 cm was recorded in the control by the var. Arka Suphal. This was followed by Arka Abhir (9.60 cm), Jayanthi (8.50 cm) and K1 (7.80 cm). At the highest stress level (100mM NaCl) var. Jayanthi and K 1recorded highest fruit length (4.55 cm) followed by cv. CO1 and Arka Abhir (4.00 cm).

The mean fruit girth in the control treatment ranged from 2.30 cm (Anugraha) to 3.60 cm (cv. Jayanthi and K 1). At the highest salt stress level (100mM of NaCl) var. Jayanthi recorded the highest fruit girth with 2.80 cm followed by Guntur local type (2.70 cm) with var. K 1 and CO 1 (2.60 cm).

With regard to fruit weight, significant differences were observed for fresh weight and dry weight of pods in all the treatments (Table 3). The highest fruit weight of both green and dry fruit was observed in the control treatment by the var. Jayanthi which recorded 3.74 g and 1.52 g respectively while in the 100mM of NaCl treatment the var.CO 1 had the highest fruit weight of both green and dry fruit (3.04 g and 0.94 g respectively). The lowest fruit weight of green and dry fruit was observed in the 100mM NaCl treatment by the accession IC119589 followed by Punjab Lal and LCA 334.

The mean number of fruits per plant ranged between 28.50 (control) to 2.00 (100mM NaCl). The highest number of fruits per plant was observed in the control by the varieties K1, LCA 639 and the accession IC119546 (28.50). At the highest salt stress level (100mM NaCl) var. K1, Jayanthi and LCA639 recorded the highest number of fruits (5.50) followed by the var. Arka Suphal and CO 1 (4.00). Better performance of Jayanthi, K1 and IC119546 genotypes for these attributes might be because of decrease in water potential at lower level resulting in less loss of turgor, the balanced nutrient uptake and moisture content would have facilitated the enzymatic and protein activities necessary for fruit development under salinity. The maintenance of turgor even under salinity might have facilitated efficient cell divison and elongation in these genotypes and consequently they had increased yield.

The lowest number of fruits per plant was observed in the control by the varieties Ujwala and the accession EC554803 (13.00). At the highest salt stress level (100mM NaCl) var. LCA 334 and EC554803 recorded the lowest number of fruits (1.50).

The current results showed that high salinity level resulted in significant reduction of plant height, number of branches and enhanced the days to flowering in the remaining chilli genotypes. This reduction in plant height, flowering and leaf area under salinity conditions was often accompanied with the decrease in rates of photosynthesis, which in turn would have been due to decreased stomatal conductance, reduced assimilation of photosynthates and consequently restricting the availability of $CO_2$ for carboxylation. Besides these, ionic imbalance caused by the osmotic effect of soil solution it also adversely affected the nutrient and water uptake by plants there by resulting in reduction of leaf area, reduced plant growth flowering and fruiting (Pessarkali 1991) [17].

Such a declining trend in fruit characters were due to reduced accumulation of assimilates and also high osmotic pressure at higher levels of salinity which might have hindered the water and nutrient uptake and disturbed salt avoidance mechanism which leading to reduced fruit weight, fruit length as well as number of fruits (Aslam *et al.* 2011) [2]. This is in accordance with Kameswari and Manohar Prasad (2005) [10] and Samira *et al*. (2012) [19] in chilli.

**Table 2:** Variation in physiological and yield characters of chilli genotypes to increasing salinity levels

| Genotypes (G) | Leaf area/plant ($cm^2$) | | | | Fruit length (cm) | | | | Fruit girth (cm) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $T_1$ | $T_2$ | $T_3$ | $T_4$ | $T_1$ | $T_2$ | $T_3$ | $T_4$ | $T_1$ | $T_2$ | $T_3$ | $T_4$ |
| CA7 | 1662.0 | 1539.5 | 1429.3 | 1097.8 | 6.50 | 5.25 | 2.80 | 2.85 | 3.10 | 2.90 | 2.40 | 1.75 |
| CO1 | 1697.0 | 1622.0 | 1544.0 | 1153.8 | 7.80 | 7.15 | 4.00 | 4.00 | 3.50 | 3.40 | 3.10 | 2.60 |
| CO4 | 1645.5 | 1537.0 | 1438.3 | 1094.3 | 5.80 | 5.20 | 4.20 | 3.00 | 3.35 | 3.00 | 2.80 | 2.50 |
| PKM1 | 1651.2 | 1518.2 | 1420.5 | 1096.5 | 6.20 | 5.30 | 4.33 | 3.00 | 3.40 | 3.20 | 2.90 | 2.30 |
| K1 | 1624.5 | 1513.0 | 1408.4 | 1191.3 | 7.80 | 7.00 | 5.30 | 4.55 | 3.60 | 2.80 | 2.60 | 2.60 |
| Guntur local | 1603.4 | 1507.2 | 1415.6 | 1090.4 | 6.30 | 5.20 | 4.20 | 3.00 | 3.50 | 3.10 | 2.90 | 2.70 |
| LCA 639 | 1643.5 | 1511.5 | 1430.3 | 1099.8 | 7.00 | 6.20 | 4.50 | 3.80 | 3.50 | 3.20 | 3.00 | 2.60 |
| LCA 334 | 1607.3 | 1517.1 | 1104.3 | 981.4 | 5.25 | 4.50 | 3.60 | 1.80 | 2.60 | 2.25 | 2.00 | 1.50 |
| Peraiyur local | 1653.3 | 1567.4 | 1458.0 | 1102.4 | 6.50 | 6.00 | 4.20 | 3.00 | 3.40 | 3.20 | 2.90 | 2.50 |
| Anugraha | 1632.3 | 1547.8 | 1422.8 | 1100.4 | 6.25 | 5.30 | 4.00 | 3.00 | 2.30 | 2.00 | 1.70 | 1.50 |
| Ujwala | 1628.4 | 1532.4 | 1231.0 | 907.8 | 4.20 | 3.70 | 3.00 | 2.30 | 3.00 | 2.65 | 2.20 | 1.90 |
| EC 399549 | 1601.2 | 1422.3 | 1234.5 | 1053.4 | 5.50 | 4.60 | 3.50 | 2.30 | 3.15 | 2.80 | 2.60 | 2.25 |
| EC 554803 | 1413.2 | 1324.5 | 1104.5 | 954.3 | 5.00 | 4.40 | 3.00 | 2.00 | 2.95 | 2.80 | 2.50 | 1.90 |
| IC 119546 | 1645.5 | 1587.3 | 1345.7 | 1086.0 | 6.50 | 6.20 | 4.60 | 3.60 | 3.40 | 3.20 | 2.90 | 2.50 |
| IC 119589 | 1453.0 | 1276.8 | 1042.0 | 945.5 | 4.60 | 4.20 | 3.30 | 2.30 | 2.65 | 2.30 | 2.00 | 1.40 |
| Punjab Lal | 1574.5 | 1362.3 | 1103.4 | 1056.5 | 5.60 | 5.00 | 3.45 | 3.00 | 2.90 | 2.65 | 2.30 | 2.00 |
| Jayanthi | 1695.5 | 1540.3 | 1353.5 | 1189.3 | 8.50 | 7.83 | 5.66 | 4.55 | 3.70 | 3.30 | 3.00 | 2.80 |
| EC 497636 | 1587.5 | 1443.5 | 1255.0 | 1095.5 | 5.20 | 4.60 | 3.60 | 2.70 | 3.30 | 3.10 | 2.90 | 2.50 |
| Arka Suphal | 1542.5 | 1323.0 | 1123.5 | 1099.5 | 10.50 | 9.33 | 6.25 | 3.50 | 3.30 | 3.15 | 2.85 | 2.60 |
| Arka Abhir | 1523.3 | 1324.5 | 1128.0 | 1054.5 | 9.60 | 8.30 | 6.00 | 4.00 | 3.40 | 3.20 | 2.95 | 2.50 |
| **Mean** | 1602.9 | 1480.0 | 1298.7 | 1028.2 | 6.53 | 5.76 | 4.15 | 3.03 | 3.10 | 2.85 | 2.55 | 2.15 |

| Factor | Leaf area ($cm^2$) | | | Fruit length (cm) | | | Fruit girth (cm) | | |
|---|---|---|---|---|---|---|---|---|---|
| | G | T | G x T | G | T | G x T | G | T | G x T |
| SEd | 16.83 | 7.52 | 33.67 | 0.05 | 0.02 | 0.11 | 0.25 | 0.51 | 0.51 |
| CD (0.05) | 33.50 | 14.98 | 67.01 | 0.11 | 0.05 | 0.23 | 0.11 | 0.22 | 1.02 |

$T_1$- Control with distilled water (0 mM) $T_2$ - 25 mM NaCl, $T_3$ - 50 mM NaCl and $T_4$ - 100 mM NaCl

**Table 3: Variation in yield parametres of chilli genotypes to increasing salinity levels**

| Genotypes (G) | Fruit weight (g) Green | | | | Fruit weight (g) Dry | | | | No of fruits/plant | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $T_1$ | $T_2$ | $T_3$ | $T_4$ | $T_1$ | $T_2$ | $T_3$ | $T_4$ | $T_1$ | $T_2$ | $T_3$ | $T_4$ |
| CA7 | 2.85 | 2.65 | 2.15 | 1.50 | 1.48 | 1.41 | 1.35 | 0.60 | 22.00 | 18.50 | 11.50 | 3.00 |
| CO1 | 3.48 | 3.35 | 3.20 | 3.04 | 1.43 | 1.20 | 1.04 | 0.94 | 23.50 | 16.50 | 13.00 | 4.00 |
| CO4 | 3.33 | 3.18 | 3.04 | 2.88 | 1.30 | 1.23 | 1.12 | 0.84 | 26.50 | 19.00 | 14.50 | 4.50 |
| PKM1 | 3.26 | 3.15 | 3.01 | 2.85 | 1.23 | 1.10 | 1.00 | 0.87 | 25.50 | 22.50 | 16.50 | 4.00 |
| K1 | 3.65 | 3.10 | 3.01 | 2.87 | 1.39 | 1.24 | 1.10 | 0.90 | 28.50 | 16.00 | 13.00 | 5.50 |
| Guntur local | 3.65 | 3.23 | 3.08 | 3.00 | 1.43 | 1.20 | 1.00 | 0.87 | 27.50 | 19.50 | 12.00 | 3.00 |
| LCA 639 | 3.52 | 3.00 | 2.53 | 2.25 | 1.64 | 1.20 | 1.05 | 0.85 | 28.50 | 23.00 | 15.00 | 5.50 |
| LCA 334 | 2.59 | 2.30 | 2.02 | 1.85 | 0.84 | 0.75 | 0.62 | 0.54 | 18.50 | 16.00 | 8.00 | 1.50 |
| Peraiyur local | 3.43 | 3.33 | 3.10 | 2.56 | 1.24 | 1.18 | 1.05 | 0.85 | 20.00 | 18.00 | 16.00 | 3.00 |
| Anugraha | 2.83 | 2.54 | 2.20 | 1.85 | 0.93 | 0.82 | 0.65 | 0.49 | 24.00 | 20.00 | 10.00 | 4.00 |
| Ujwala | 3.14 | 3.00 | 2.85 | 2.60 | 1.00 | 0.92 | 0.74 | 0.54 | 13.00 | 10.00 | 8.00 | 2.00 |
| EC 399549 | 3.05 | 2.82 | 2.67 | 2.00 | 1.16 | 1.05 | 0.87 | 0.64 | 17.00 | 13.00 | 10.00 | 3.00 |
| EC 554803 | 3.10 | 2.73 | 2.00 | 1.54 | 1.21 | 1.12 | 1.00 | 0.85 | 13.00 | 10.00 | 7.00 | 1.50 |
| IC 119546 | 3.35 | 3.10 | 2.80 | 1.90 | 1.38 | 1.25 | 1.09 | 0.95 | 28.50 | 22.00 | 12.00 | 4.00 |
| IC 119589 | 2.75 | 2.60 | 2.12 | 1.33 | 1.00 | 0.92 | 0.75 | 0.40 | 15.00 | 10.00 | 6.50 | 2.50 |
| Punjab Lal | 3.15 | 3.00 | 2.64 | 1.50 | 1.20 | 1.00 | 0.80 | 0.50 | 15.50 | 11.00 | 10.00 | 3.00 |
| Jayanthi | 3.74 | 3.30 | 3.10 | 3.00 | 1.52 | 1.35 | 1.14 | 0.94 | 24.00 | 18.00 | 14.00 | 5.50 |
| EC 497636 | 3.34 | 3.20 | 3.06 | 2.58 | 1.30 | 1.22 | 1.10 | 0.92 | 22.50 | 16.50 | 11.00 | 3.00 |
| Arka Suphal | 3.12 | 3.00 | 2.80 | 2.55 | 1.23 | 1.14 | 1.00 | 0.86 | 27.50 | 22.00 | 15.00 | 4.00 |
| Arka Abhir | 3.25 | 3.18 | 3.00 | 2.78 | 1.28 | 1.20 | 1.06 | 0.95 | 24.50 | 21.00 | 12.50 | 3.00 |
| **Mean** | 3.02 | 2.85 | 2.58 | 2.18 | 1.18 | 1.05 | 0.91 | 0.73 | 20.00 | 16.50 | 11.50 | 3.10 |

| Factor | Fruit weight (g) Green | | | Fruit weight (g) Dry | | | No of fruits/plant | | |
|---|---|---|---|---|---|---|---|---|---|
| | G | T | G x T | G | T | G x T | G | T | G x T |
| SEd | 0.02 | 0.01 | 0.05 | 0.01 | 0.005 | 0.02 | 0.21 | 0.09 | 0.42 |
| CD (0.05) | 0.05 | 0.02 | 0.11 | 0.02 | 0.01 | 0.04 | 0.42 | 0.18 | 0.84 |

$T_1$- Control with distilled water (0 mM) $T_2$ - 25 mM NaCl, $T_3$ - 50 mM NaCl and $T_4$ - 100 mM NaCl

**Conclusion**

The results of the present study demonstrated that NaCl present in the soil affects the physiological processes of growth and yield of chilli. The increase in salinity level, decreased the growth, flowering, fruiting and yield and also yield contributing characters like fruit length, fruit girth, number of fruits and fruit weight. In the present study, the varieties Jayanthi, CO1, K1 and IC119546 were found to be saline tolerant among the evaluated genotypes based on the growth and yield characters. These identified genotypes can also be used in breeding programs for developing superior and saline tolerant hybrids for commercial cultivation under salinity prone soils where chilli crop cannot be grown for economic return.

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