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Comparative evaluation of eggplant genotypes with their wild relatives under gradually increased drought stress

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ABSTRACT: Climate change severely affects plant production and threatens life. Eggplant (*Solanum melongena* L.) is known as moderate tolerant to abiotic stresses. Drought is one of the most effective abiotic factor limits the agricultural production. In this study, 15 different eggplant genotypes, including wild relatives–*Solanum macrocarpon* L., *Solanum linnaeanum* Hepper & Jaeger, *Solanum incanum* L. group C, *Solanum insanum* (*S. melongena* L. group E), *Solanum sisymbriifolium* Lam. and *Solanum elaeagnifolium* Cav., local genotypes (TB, BB, MK, AH), and commonly grown commercial varieties (Topan 374, Kemer, Amadeo F1, Faselis F1, Bildircin F1) were used as a plant material to observe their responses under drought stress. Study was planned according to completely randomized block design with three replications. Plants were subjected to three different irrigation treatments, which were control (full irrigation) and two drought treatments, in which water deficit applied by 50 and 75% with respect to the control and their responses were observed by using physiological and phenotypical parameters. According to the findings, a 75%-water deficit allowed for faster and more efficient selection of tolerant individuals. This study additionally demonstrated that simple morphological data might be utilized to identify drought tolerance of eggplants. Thus, with these parameters, drought tolerance levels of eggplant germplasm can be evaluated without high-costed analysis at early growth stage. Moreover, genotypes MK, BB and TB together with wild relatives *S. insanum, S. incanum, S. macrocarpon, and S. linneanum* have shown remarkable tolerance to the created drought conditions.

Key words: abiotic stress, drought, eggplant, morphology, tolerance, wild relatives.

INTRODUCTION

Nowadays, one of the most important concerns in agriculture is increasing the effects of abiotic stress factors. Earth is warming steadily; at least +0.2°C annual mean enhancement of temperature per decade is predicted (Liu et al. 2019). The frequency and intensity of abiotic stresses are expected to increase under climate change pressure (Vaughan et al. 2018). Drought is one of the most serious global abiotic stresses, and it is predicted to keep on increasing. The increase of drought frequency can be easily observed in semi-arid regions along the Mediterranean coast, which are suffering from decreased precipitation and increased evaporation due to the accelerating rate of global warming (Bates et al. 2008).

Common eggplant is widely grown in temperate and tropical Asian countries, in the Middle East, around the Mediterranean basin (Daunay 2008). Many of these areas have already been suffered from the dramatic modifications of the agricultural environment triggered by the climate change (Anwar et al. 2013, Fita et al. 2015, Tani et al. 2018, Plazas et al. 2019). As a vegetable that requires high amount of water to grow, eggplant is classified as moderately tolerant to abiotic stresses, which may affect its productivity, quality, and post-harvest quality (Sekara et al. 2012). Wild relatives are known as major sources of variation for tolerance to abiotic stresses (Daunay and Hazra 2012, Rotino et al. 2014).

Major strategies combating the drought effects include screening and selection of the existing germplasm and breeding new varieties having resistant to abiotic stresses (Athar and Ashraf 2009). Domestication process causes severe reduction in genetic diversity of cultivars. Therefore, adding of heirlooms and wild relatives to the gene pools is essential to improve abiotic stress tolerant inbred lines or varieties. Observation of the morphologic responses to drought stress can be used to derive tolerant genotypes to the breeding programs (Nadeem et al. 2019). Features such as plant height, canopy width, number of leaves, leaf area, and dry biomass are known as reliable morphological data evaluating the response of plants to drought stress (Anjum et al. 2017).

It is known that plants can build effective responses at the morphological, physiological and biochemical level enabling them to enhance abiotic stress tolerance. Adaptation of eggplant to the stress conditions could be achieved with the identification of stress tolerant lines or varieties and crossing of eggplant with the wild relatives which is known as tolerant (Chapman 2020).

The aims of this study were to determine the effects of different drought treatments on different eggplant genotypes, which consist of wild relatives, local genotypes, and commercial varieties by using physiological and phenotypical parameters, and to observe their responses. Genotypes which were defined as drought tolerant will contribute to the further breeding efforts in developing drought tolerant varieties.

MATERIAL AND METHODS

An exclusive collection was constructed for the study consisting of 15 different eggplant genotypes including commercial varieties, wild relatives, and local genotypes in order to observe the responses of the plants to drought stress. Information about the plant materials is presented in Table 1. The study was conducted in semi-controlled greenhouse conditions.

Table 1. Codes, species names and providing method of the accessions.

Code/Name	Species name	Type	Provided from
MM132	*Solanum macrocarpon* L.	Wild	INRAE, France
MM195	*Solanum linnaeanum* Hepper & Jaeger	Wild	INRAE, France
MM684	*Solanum incanum* L. group C	Wild	INRAE, France
MM510	*Solanum insanum* (*S. melongena* L. group E)	Wild	INRAE, France
-	*Solanum sisymbriifolium* Lam.	Wild	INRAE, France
-	*Solanum elaeagnifolium* Cav.	Wild	NARC, Jordan
TB*	*Solanum melongena* L.	Local genotype	BATEM,Turkiye
BB*	*S. melongena* L.	Local genotype	BATEM,Turkiye
MK*	*S. melongena* L.	Local genotype	BATEM,Turkiye
AH*	*S. melongena* L.	Local genotype	BATEM,Turkiye
Topan 374	*S. melongena* L.	OP commercial variety	Asgen Seed Co.
Kemer	*S. melongena* L.	OP commercial variety	Asgen Seed Co.
Amadeo F_1	*S. melongena* L.	Commercial variety	Enza Zaden Seed Co.
Faselis F_1	*S. melongena* L.	Commercial variety	Titiz Agro Group
Bildircin F_1	*S. melongena* L.	Commercial variety	BT Seed Co.

*These local genotypes belong to BATEM eggplant gene pool were collected and inbred to F6 level.

Stress treatment

The study was planned according to completely randomized block design with three replications. Seedlings with two or three true leaves were transplanted individually to the 1-L capacity pots filled with mixture of peat moss:perlite (1:1) on April 21, 2020 and irrigated equally for ten days until achieving sufficient rooting. Each replication had six plants, which were grown under three different water treatments: control and two drought treatments, in which irrigation was reduced by 50 and 75% with respect to the control.

To determine the amount of water for both control and stressed plants, all pots in each individual groups of control were weighed daily. The plants of controls were watered up to fully recover the ETp difference (the amount of weight lost each day due to evapotranspiration), and this value was considered as 100%. Therefore, deficient water supplies were calculated as the 50 and 25% of this control value and applied to the drought stressed groups (Kiran et al. 2019, Cebeci et al. 2023). Drought treatment was started on May 3 and ended on July 3, 2020. Plants were irrigated with Hoagland solution (Hoagland and Arnon 1950), when the control plants temporarily wilted during the research. Temperature (°C) and relative humidity (%) fluctuations of the greenhouse conditions were recorded by the Hobo data logger (Apogee instruments, United States of America) and presented in Figs. 1 and 2, respectively.

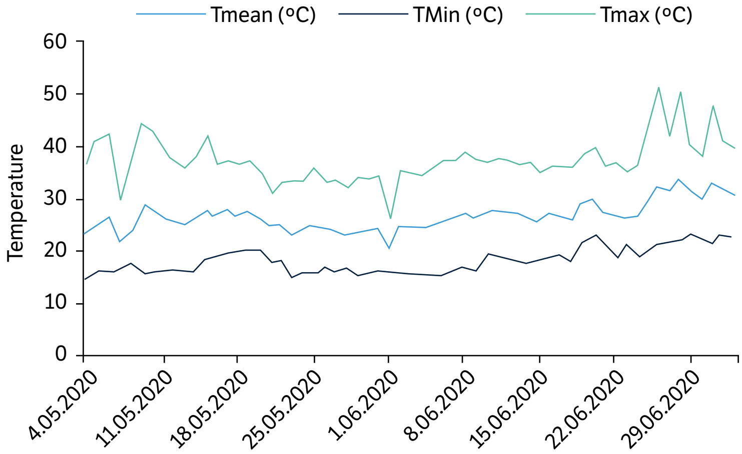

Figure 1. Daily mean, daily minimum, and daily maximum temperatures of the greenhouse during the experimental period.

Average minimum and maximum temperatures were recorded as 18.2 °C (during nights) and 37.4 °C (during days) (Fig 1). The lowest and the highest relative humidity of the greenhouse were recorded as 47.3–77.8% respectively during the study (Fig. 2).

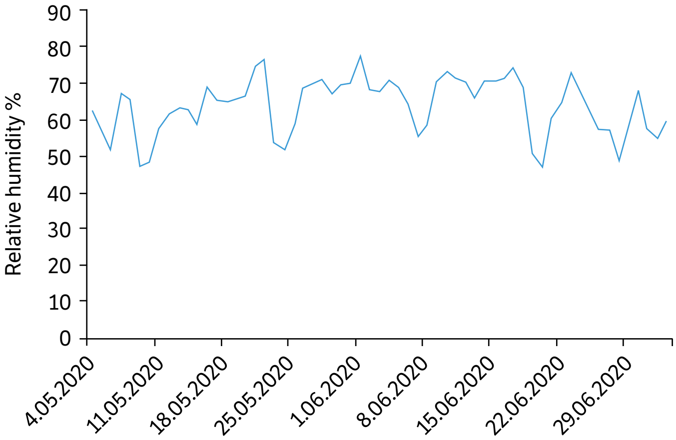

Figure 2. Relative humidity rates of the greenhouse during the experimental period.

Morphological and physiological measurements

Plant growth was measured using 10 parameters at the end of the drought treatment, and all collected data were statistically analyzed. Some measurements, such as stem diameter (SD), plant canopy width (PCW) of each eggplant, plant height (PH) (Muller et al. 2016), and total chlorophyll (TC) reading were done when the control and stressed eggplants were still alive.

TC content of the leaves was determined through SPAD-502 plus (Conica-Minolta-Japan) exactly at noon. Following the drought treatment applications, aerial parts of each plant was cut from soil level and whole roots were separated. Thus, plant fresh weight (PFW), root length (RL), root width (RW), root fresh weight (RFW), and root dry weight (RDW) were measured according to previous studies (Chapman and Pratt 1982, Kirnak et al. 2002, Ozkay et al. 2014) using six plants of each replication of every treatment. Leaves, stems and roots were separated from each other with a knife and weighed to obtain root and shoot (leaves + stem) fresh weight. Later, plant samples were dried at 65 °C for 48 h to constant weight to define the dry weight (Kirnak et al. 2002).

Data analysis

Statistical evaluation of the data for drought stress tolerance was performed by analysis of variance test utilizing the JMP 7.0 software package (SAS Institute, Cary, NC, United States of America). Differences among the mean values were calculated with LSD tests at $p < 0.001$, $p < 0.01$ and $p < 0.05$. Beside the statistical evaluation, rate of change (%) values of all measured traits under drought effect were calculated via Eq. 1:

$$(WD-C)/WD*100 \tag{1}$$

where: WD: water deficit; C: control.

It is presented as Figs. 4, 5 and 6 for the better understanding of the eggplant genotypes tolerance level.

RESULTS AND DISCUSSION

During the study, recorded climate data revealed that temperature fluctuated between 30–40°C, and air humidity was generally above 50% (Figs. 1 and 2), which suggests that optimal conditions were obtained to select drought tolerant individuals. Responses of the eggplant genotypes under increased drought conditions were investigated and revealed that there were significant differences among the genotypes for all measured traits. In some previous studies on eggplant (Mibei et al. 2017, Plazas et al. 2019, Plazas et al. 2022), drought treatment was applied by stopping the irrigation for limited time depending on the trial area's ecology.

In the study conducted by Tani et al. (2018), drought stress applied as water deficit at 25% of full water, and Rodan et al. (2020) applied water deficit as 40 and 70% level of full water. Similar to these studies, water stress was also created as water deficit in the current study at 25 and 50% level of full water, and used eggplant genotypes responded in phenotypically different depending on their tolerance capacity. Generally, decreases in PH, PCW and SD are expected under drought effect. Therefore, in the current study, all measured traits showed a gradual decrease under gradually applied drought. According to these findings, 75% water deficit application (irrigation with 25% of full water) provided to select tolerant individuals more rapid and efficient. Application of water deficit at 50% of full water prolonged the selection period of tolerant plants.

In line with previous studies, the extent of the damage under water deficiency could be different at the genotype level (Tani et al. 2018, Plazas et al., 2019). As shown in Fig. 3, the reducing effect of drought on plant height of wild relatives *S. linnaeanum*, *S. sisymbriifolium* and *S. elaeagnifolium*, with commercial varieties Kemer and Amadeo, was obvious. In comparison to the other genotypes in the study, *S. linnaeanum* and *S. sisymbriifolium* had fast growing, strong, and constructed plants, while *S. elaeagnifolium* was characterized by rapid growing bush type plants. As a result, when subjected to drought, the plant height of these genotypes' decreased more than the others. In a study by Fita et al. (2015), PH was found as one of the most distinguishing parameter among many morphological parameters assessed in 15 eggplant accessions.

Additionally, Nadeem et al. (2019) noticed the morphologic responses to drought stress could be used to derive tolerant lines, which are necessary for the breeding of drought tolerant varieties. Although our findings supported previous studies, the results of PH, PFW, RFW, RDW, and RW measurements revealed that local varieties MK, AH, BB and TB responded fairly well to the water deficiency (Fig. 3). Because of these features, they can be employed in future breeding research. MK was determined tolerant, and AH was sensitive to the salinity stress in previous studies (Yasar et al. 2006, Yasar et al. 2013), but their performances under drought conditions had not been evaluated. Decreases were reported at mean performance of morphological traits (PH, SD, PCW, etc.) under drought conditions in many studies (Fita et al. 2015, Plazas et al. 2016, Plazas et al. 2019, Kouassi et al. 2021), and normally best results were obtained from control treatments. Some researchers reported that effects of water deficit on plants could be even different at the organ level (Tambe et al. 2019, Kouassi et al. 2021).

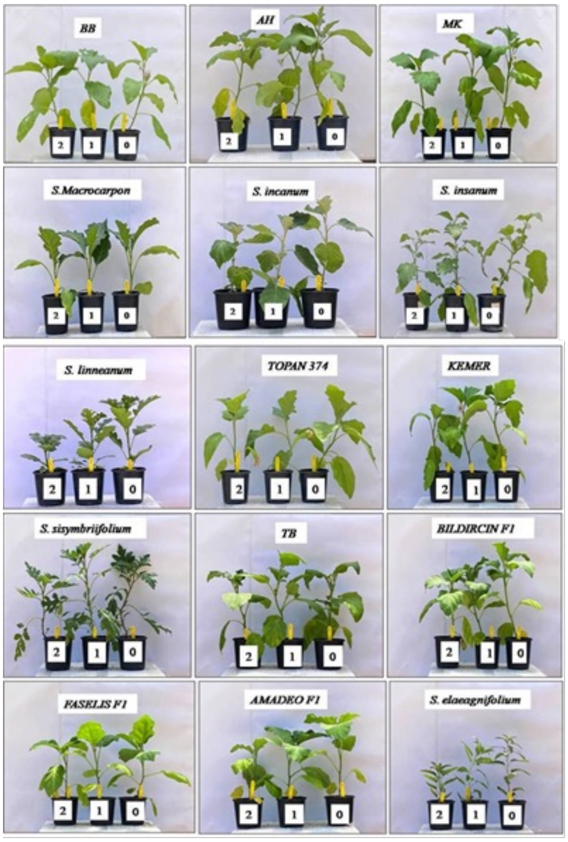

Figure 3. Plant heights of the accessions subjected to drought stress (0: control, 1: 50% water deficit, 2: 75% water deficit).

In another study, Plazas et al. (2019) concluded that deficient irrigation on eggplant strongly reduced the fresh weight of different plant leaves, and stems were affected more than roots. In this study, interaction between the used parameters was found statistically significant as shown in Table 2. Plant height and PFW measurements showed *S. sisymbriifolium* exhibited the highest results in all treatments (55.08 cm and 54.63 g at 50% WD and 48.17 cm and 43.36 g at 75% WD applications).

The lowest PFW (19.67 g at 50% WD and 10.65 g at %75 WD) were obtained from *S. elaeagnifolium* in all treatments, although it is known as a drought tolerant genotype (Christodoulakis et al. 2009, García-Fortea et al. 2019). The 15 eggplant genotypes used in the present study originated from distant environments from each other. Each of them grow well in their natural habitat. *S. elaeagnifolium* is native to desert areas and has an invasive weedy nature (Knapp et al. 2013). In our analysis, it appeared to lag behind the other genotypes considering the assessed parameters. However, further observations showed that *S. elaeagnifolium* peculiar root characteristics (Fig. 7) increased the survival capacity to these plants under severe and prolonged drought conditions. García-Fortea et al. (2019) reported that a successful hybridization between *S. elaeagnifolium* and *S. melongena* was achieved.

Table 2. Plant height, plant canopy width, stem diameter, plant fresh weight, plant dry weight, and total chlorophyll of 15 different eggplant genotypes, on the 57th day of drought stress treatment.

Genotype	Plant height (cm)			Plant canopy width (cm)			Stem diameter (mm)			Plant fresh weight (g)			Plant dry weight (g)			Total chlorophyll		
	Control	%50 WD*	%75 WD	Control	%50 WD	%75 WD	Control	%50 WD	%75 WD	Control	%50 WD	%75 WD	Control	%50 WD	%75 WD	Control	%50 WD	%75 WD
BB	42.1i-k	37.1r-u	35.0vw	51.1cd	46.7g-i	43.2lm	6.7bc	5.4i-q	5.2m-r	64.7b	47.7j-l	37.3pq	10.4ab	7.5e-j	5.5o-r	52.9g-i	51.2i-l	47.7n-q
AH	46.6ef	44.0gh	39.8l-o	51.8bc	47.9f-h	42.8m	6.3c-e	5.8f-k	5.1n-s	54.3fg	42.7mn	33.4r	8.4a-d	7.0g-l	4.9p-s	53.9g	52.3g-i	46.0q-r
MK	48.8d	46.9e	44.1gh	52.8b	48.6ef	44.8kl	6.2d-f	5.8f-j	5.2l-r	67.2b	52.9gh	41.4no	10.2a	8.1d-j	6.5l-p	53.3gh	51.6h-k	48.1m-p
MM132	37.9p-t	29.9z	29.2z	55.9a	52.6bc	48.3e-g	7.2a	6.6bcd	5.3k-r	66.2b	51.4hi	38.8o-q	9.9ab	8.3d-i	5.1o-r	56.8ef	54.2g	51.4h-k
MM684	43.4g-i	40.4k-n	39.8l-o	35.9rs	34.1t	30.0u	5.7g-l	5.0p-u	4.5u-w	42.8mn	33.4r	24.7t	8.7c-f	6.5i-m	5.5n-q	59.6bc	57.1d-f	53.8g
MM510	44.6g	42.3h-j	40.8j-m	41.6mn	38.2pq	35.5st	4.9q-u	4.6t-v	4.4v-x	58.4cd	50.7hi	32.5r	8.0c-i	6.7j-n	5.17n-r	60.6ab	57.3d-f	53.6g
MM195	44.8fg	39.7m-p	31.5yz	34.3t	31.8u	27.7v	6.8ab	6.2d-f	5.5i-p	56.5d-f	42.8mn	33.5r	9.2a-c	7.2g-l	5.10-s	61.9a	59.9a-c	58.4c-e
Topan374	41.6j-l	37.0s-u	32.9xy	46.9f-i	41.8mn	40.3op	5.5i-n	4.9r-u	4.1w-y	59.4c	50.7hi	40.6no	8.7b-e	6.9i-m	5.4o-r	53.8g	51.7h-j	48.8m-o
Kemer	49.1d	43.7g-i	38.2o-s	45.9i-k	41.9mn	37.9pq	6.0e-h	5.5i-o	5.0o-t	55.9d-f	48.9i-k	36.5q	8.2c-g	6.1k-o	3.7s-u	54.2g	51.2i-l	43.6s
Solanum sisymbrifolium	58.3a	55.1b	48.2de	46.5hj	42.7m	38.2pq	5.9e-i	5.4j-r	4.7s-v	74.5a	54.6e-g	43.3mn	10.4ab	8.2c-h	5.7m-q	56.8e-f	53.2g-h	51.1i-l
TB	35.5v-w	34.0wx	29.5z	40.8no	37.6qr	34.2t	5.2m-r	5.2m-r	5.2m-r	50.9hi	39.3op	32.2r	7,4f-k	5.1o-r	2.7uv	53.8g	49.9j-m	48.2m-p
Bıldırcın	39.3m-q	36.3t-v	32.8xy	42.8m	39.8pq	35.7st	6.1d-g	5.5i-o	5.4j-r	57.3c-e	46.3kl	37.7pq	8.0c-i	6.2l-p	4.2r-t	49.7k-m	48.1m-p	45.6r
Faselis	36.2t-v	33.9wx	30.1z	49.8de	44.9jk	42.0mn	5.5i-p	5.0p-t	4.2w-y	49.4ij	45.1lm	33.6r	7.0h-m	4.9o-s	3.1t-v	49.5l-n	46.5p-r	43.4s
Amadeo	38.8n-r	35.2vw	30.5z	46.8g-i	42.8m	40.4op	5.6h-m	5.1n-t	4.1xy	53.1gh	46.1l	29.0s	7.2f-l	4.7q-s	2.9t-u	49.0mn	46.9o-r	43.6s
Solanum elaeagnifolium	52.8c	46.5ef	37.8q-t	24.8w	22.8x	19.8y	4.3v-y	3.9y	3.2z	25.8t	19.7u	10.7v	5.1o-r	3.1t-v	2.4v	58.8b-d	56.5f	52.5g-i
CV%		2.24			2.12			4.09			3.37			8.3			1.93	
LSD		1.79			1.77			0.46			3.04			5.0			2.05	
Genotype		***			***			***			***			***			***	
Treatment		***			***			***			***			***			***	
Genotype × Treatment		***			*			**			***			*			*	

Means under a specific treatment effect are significantly different at $p < 0.05$ by LSD multiple range test; ns: non significant; *,**,***significant at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively; CV: coefficient of variation; WD: water deficit.

In the current study, the thickest SD values were provided by *S. macrocarpon* (6.57 mm at 50% WD) and *S. linnaeanum* (5.47 mm at 75% WD). Because of their strong architecture, this result is reasonable, and all decreases are expected in morphological traits under drought effect. Nevertheless, calculating changing rate (%) is highly useful for better understanding the tolerance level of the different genotypes. As shown in Fig. 4, local variety TB showed statistically non-significant change in all treatments. Beside this, another local variety MK showed the least rate of change at 50% (6.25%) and *S. insanum* (12.38%) at 75% WD treatments. However, *S. linnaeanum* (9.36% at 50% and 24.30% at 75%) and *S. macrocarpon* (10.24% at 50% and 35.20% at 75%) showed higher rate of change (decrease) than these genotypes.

In a study conducted by Kouassi et al. (2021), responses of eggplants to drought were found different depending on the genotypes. Indeed, while *S. insanum* showed the highest PCW in the previous study, it only showed intermediate values in our experiment, similiar to the genotypes *S. macrocarpon*, BB, AH, MK (Table 3; Fig. 4). Ranaweera et al. (2020) reported that drought stress (treatments were applied at 70 and 40% level of full water) on eggplant significantly ($p < 0.05$) reduced the PH, PCW, and number of leaves.

Plazas et al. (2020) identified drought tolerance in some wild relatives such as *S. anguivi, S. dasyphyllum, S. insanum, S. incanum* and *S. sisymbriifolium*, while Kouassi et al. (2021) reported that *S. sisymbriifolium* showed stable or better growth in terms of the agro-morphological parameters in drought conditions compared to the other accessions used in their study.

Kirnak et al. (2002) previously reported that drought stress reduced leaf chlorophyll contents, and Mibei et al. (2017) reported that chlorophyll contents of selected African eggplants decreased with stress. Considering the used genotypes, the wild relatives, particularly MM195, MM510 and MM684, had high chlorophyll content under drought stress, and the differences between the genotypes were clear (Table 2). Nevertheless, with regard to rate of change (Fig. 4), while the least reduced at 50% WD observed in MK and AH, *S. linnaeanum* showed the least chlorophyll reduction at 75% WD treatment.

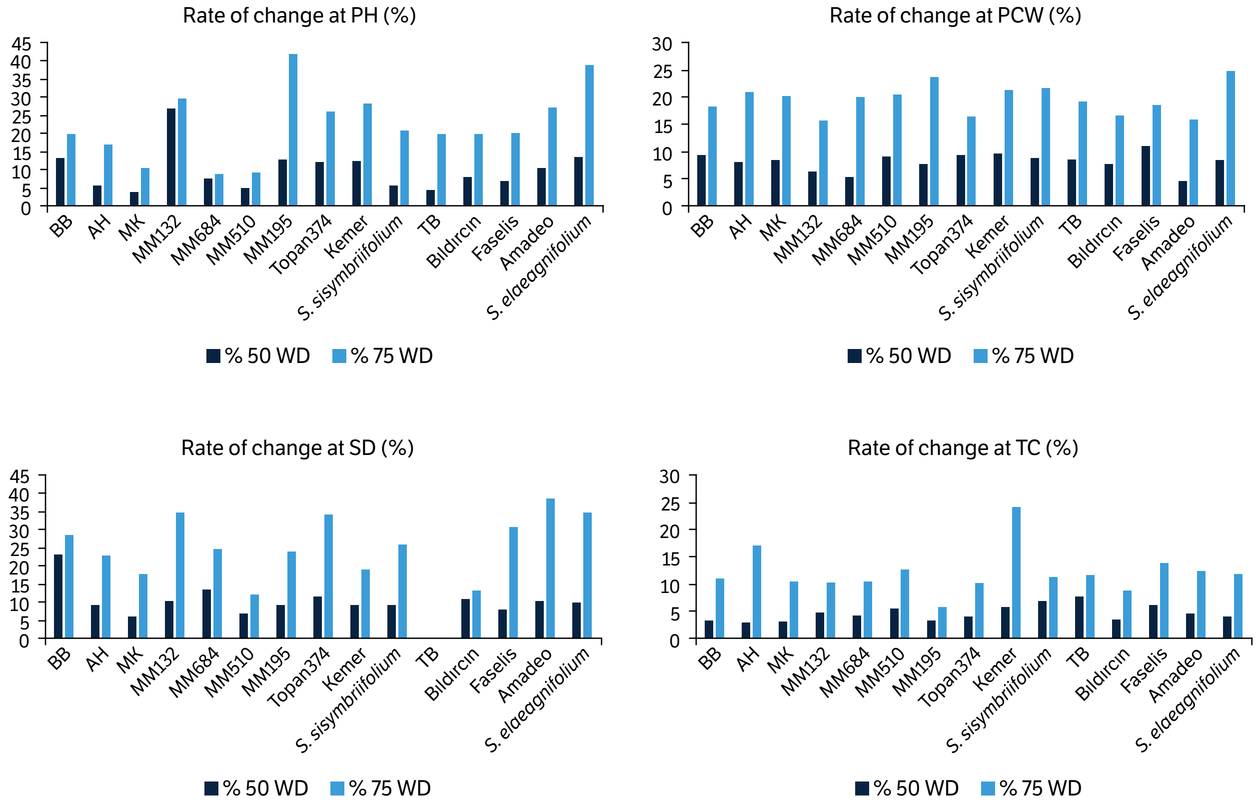

Figure 4. Relative changes in plant height (PH), plant canopy width (PCW), stem diameter (SD), and total chlorophyll (TC) of 15 eggplant genotypes under 50 and 75% drought stress as compared to control.

In terms of PFW, the highest (54.63 g at 50% WD and 43.36 g at 75% WD) and the lowest results (19.67 g at 50% WD and 10.65 g at 75% WD) (Table 2) were obtained from *S. sisymbriifolium* and *S. elaeagnifolium*, respectively. However, the lowest rate of change was determined for Faselis, Kemer, *S. insanum* and MK at 50% WD and Topan374, Faselis and TB at 75% WD application (Fig. 5). Therefore, *S. insanum*, MK and TB could be used as a plant material in interspecific hybridization studies in the future. In addition, according to results, some commercial varieties also showed tolerance to drought stress, which explains these varieties long-term market share.

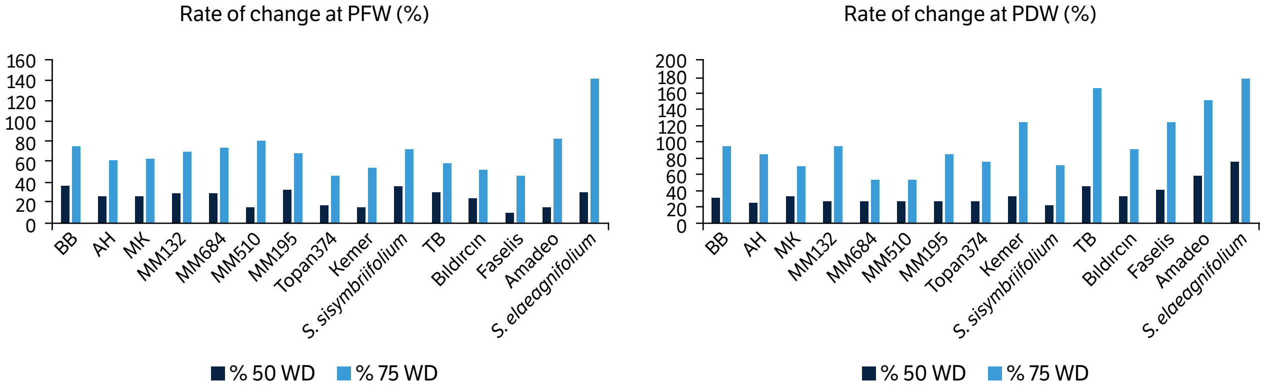

Figure 5. Relative changes in plant fresh weight (PFW) and plant dry weight (PDW) of 15 eggplant genotypes under 50 and 75% drought stress as compared to controls.

Since roots are important for drought tolerance, RFW and RDW of the accessions were recorded. Osmont et al. (2007) reported that increased RDW linked with drought adaptation and, as a response to drought, some plants could modify their root branching level. In the current study, local heirlooms root features showed remarkable results, with genotypes MK and AH showing the highest RFW and wild relative MM195 with still AH and MK showing the highest

RDW values under drought conditions. Moreover, the least RFW alteration at 50% WD was obtained for MK and at 75% WD for TB local genotype, respectively. The commercial varieties Faselis and Amadeo, which were included in this study and grown in Mediterranean countries for many years, have also found prominent in terms of RDW characteristics (Table 3; Figs. 6 and 7).

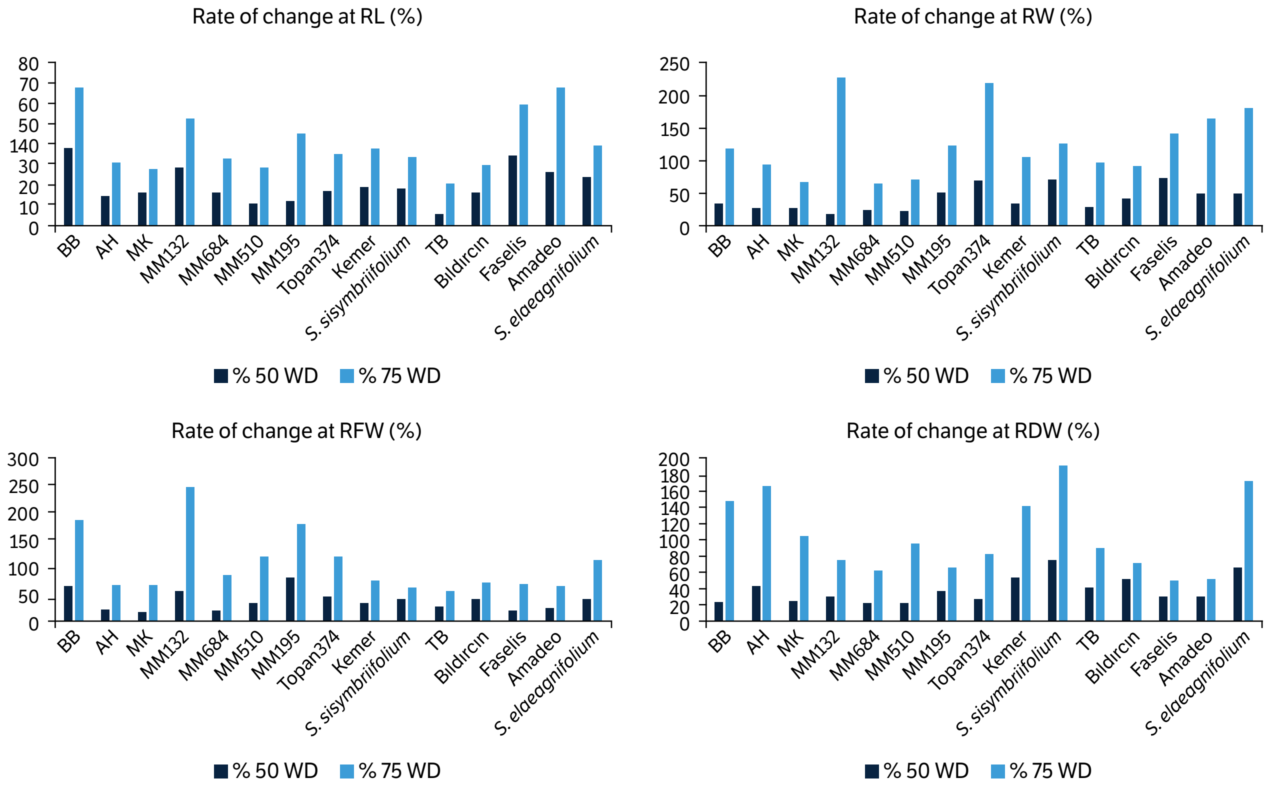

Figure 6. Relative changes in plant root length (RL), root width (RW), root fresh weight (RFW), and root dry weight (RDW) of 15 eggplant genotypes under 50 and 75% drought stress as compared to control.

In this research, RW and RL measurements were done, and differences between treatments and used genotypes were observed (Table 3). In terms of RL, *S. elaeagnifolium* showed exceptional length of root in all treatments, and BB showed the lowest RL values among the genotypes (Table 3; Figs. 6 and 7). It is known from previous studies that deeper root systems can absorb available water from deeper soil layers thus helping plants to tolerate drought stress. While the highest RW values were recorded from MK in all treatments, the lowest RWs were measured for TB, *S. elaeagnifolium* and Topan374, and the best RW value was acquired from *S. incanum* (Table 3; Figs. 6 and 7).

Under drought, root traits such as RW, RL and root areas can be developed to increase water capture capacity (Wasaya et al. 2018). Generally, plants react to drought effect through various mechanisms by reducing the growth rate and altering shoot/root ratio (Reddy et al. 2004, Bootraa et al. 2010, Tani et al. 2018). Similar results were observed in all genotypes of the current study; while the roots were getting shorter, lateral root formation was also reduced as a response to the drought effects (Figs. 6 and 7).

Eggplant wild relatives are divided into three gene pools considering their interspecific hybridization ability (Harlan and de Wet 1971, Plazas et al. 2022). *S. insanum*, which belongs to the primary gene pool (Knapp et al. 2013, Mutegi et al. 2015, Ranil et al. 2017) and is identified as tolerant to drought stress in this study, should be considered as a good candidate for improving abiotic stress tolerance of cultivar eggplant. *S. incanum* and *S. linnaeanum*, which are from secondary gene pool (Acquadro et al. 2017), also showed tolerance in the study and could be used as donor parents in tolerance breeding studies in further years. Finally, identified as drought tolerant, MK, BB and TB could be used as female parents in the breeding studies with tolerant wild relatives.

Figure 7. The effects of different water deficit stress (50 and 75%) on the root system appearance of 15 eggplant genotypes.

Table 3. Root fresh weight, root dry weight, root length, and root width of the 15 different eggplant genotypes, which were exposed to drought stress, on the 57th day of the application.

Genotype	Root fresh weight (g)			Root dry weight (g)			Root length (cm)			Root width (cm)		
	Control	%50 WD	%75 WD	Control	%50 WD	%75 WD	Control	%50 WD	%75 WD	Control	%50 WD	%75 WD
BB	7.5c-e	4.5hi	2.6k-o	2.1c	1.7e-h	0.9r-t	15.4i-m	11.1x-z	9.2z	11.8b	8.9c-f	5.4k-m
AH	10.1b	8.4c	6.0fg	2.6a	1.8de	1.0n-r	14.8k-p	12.8q-u	11.3w-z	7.2h-j	5.6k-m	3.7n-r
MK	12.1a	10.3b	7.2c-e	2.3b	1.9d-f	1.1m-p	19.8d	16.9f-i	15.3i-n	15.4a	12.2b	9.3c-f
MM132	5.1gh	3.3j-l	1.5p	1.8d-f	1.4k	1.1m-q	24.9b	19.3de	16.3g-k	11.8b	10.0c	3.6n-r
MM684	3.5i-k	2.9k-n	1.9n-p	1.7f-i	1.4kl	1.1m-q	16.3g-k	14.0m-q	12.3r-x	11.9b	9.6c-e	7.2h-j
MM510	2.9k-n	2.1m-p	1.3p	1.0n-r	0.9r-t	0.5u	15.8h-l	14.2l-q	12.2s-x	9.8cd	8.0f-h	5.7k-m
MM195	4.8h	2.7k-o	1.7op	1.9cd	1.5jk	1.2mn	17.2fh	15.3i-n	11.8u-y	8.6d-g	5.8k-m	3.8n-q
Topan374	4.3h-j	2.9k-n	1.9n-p	1.8d-g	1.5jk	1.0n-s	16.2h-k	13.8m-s	11.9u-y	7.5g-i	4.4m-o	2.3r-s
Kemer	7.9cd	5.9fg	4.6hi	2.6a	1.7dh	1.1m-p	16.6f-j	13.9m-r	12.0t-y	8.3e-h	6.2i-l	4.0n-p
Solanum sisymbriifolium	3.2j-m	2.3l-p	1.9n-p	1.6g-j	0.9p-s	0.6u	17.9e-g	15.1j-o	13.3p-v	6.6i-k	3.8n-q	2.9p-s
TB	4.5hi	3.5i-k	2.9k-n	1.5i-k	1.1m-q	0.8s-t	12.1t-y	11.4w-z	10.0z	4.9l-n	3.8n-q	2.5q-s
Bıldırcın	7.4c-e	5.3gh	4.3h-j	1.5i-k	1.0m-r	0.9q-s	13.6o-u	11.7v-z	10.4yz	6.3i-l	4.4m-o	3.3o-s
Faselis	7.9cd	6.6ef	4.7h	1.6h-k	1.2lm	1.1m-q	21.9c	16.3g-k	13.7n-t	9.4c-f	5.4k-m	3.9n-q
Amadeo	9.9b	8.1c	5.9f-g	1.5jk	1.1m-o	0.9o-s	18.1d-f	14.3l-q	10.8x-z	9.0c-f	6.1j-l	3.4o-s
Solanum elaeagnifolium	6.9d-f	4.8h	3.2j-m	1.9de	1.2m-o	0.7tu	31.0a	24.9b	22.1c	5.9j-l	3.9n-p	2.1s
CV%		12.72			6.52			5.51			11.11	
LSD		1.29			0.18			1.71			1.43	
Genotype		***			***			***			***	
Treatment		***			***			***			***	
Genotype × Treatment		**			***			***			***	

Means under a specific treatment effect are significantly different at $p < 0.05$ by LSD multiple range test; ns: non significant; *,**,***significant at $p < 0.05$, $p < 0.01$, and $p < 0.001$, respectively; CV: coefficient of variation; WD: water deficit.

CONCLUSION

The study revealed that there are significant differences among the assessed eggplant genotypes to experimentally imposed drought. Beside this, in this study, changes in response of genotypes to drought were also examined for the better understanding of the genotypes' tolerance capacity to drought. The Turkish genotypes BB, MK, TB and wild relatives MM510, MM684, MM132 and MM195 showed tolerance to the drought conditions assessed in this study. Determined genotypes can be used in interspecific hybridization studies and rootstock development in the future. Genotypes with prominent root features, such as MK, MM195, MM684, MM510 and *S. elaeagnifolium*, could be also considered inbreeding studies. Also because of its favorable root features, *S. elaeagnifolium* could be considered as a promising rootstock genotype for grafting purposes.

CONFLICT OF INTEREST

Nothing to declare.

DATA AVAILABILITY STATEMENT

All data set were generated and analyzed in the current study.

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