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SALINITY STRESS EFFECTS ON TEN WHEAT VARIETIES MORPHOLOGICAL FEATURES

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CONTEXT

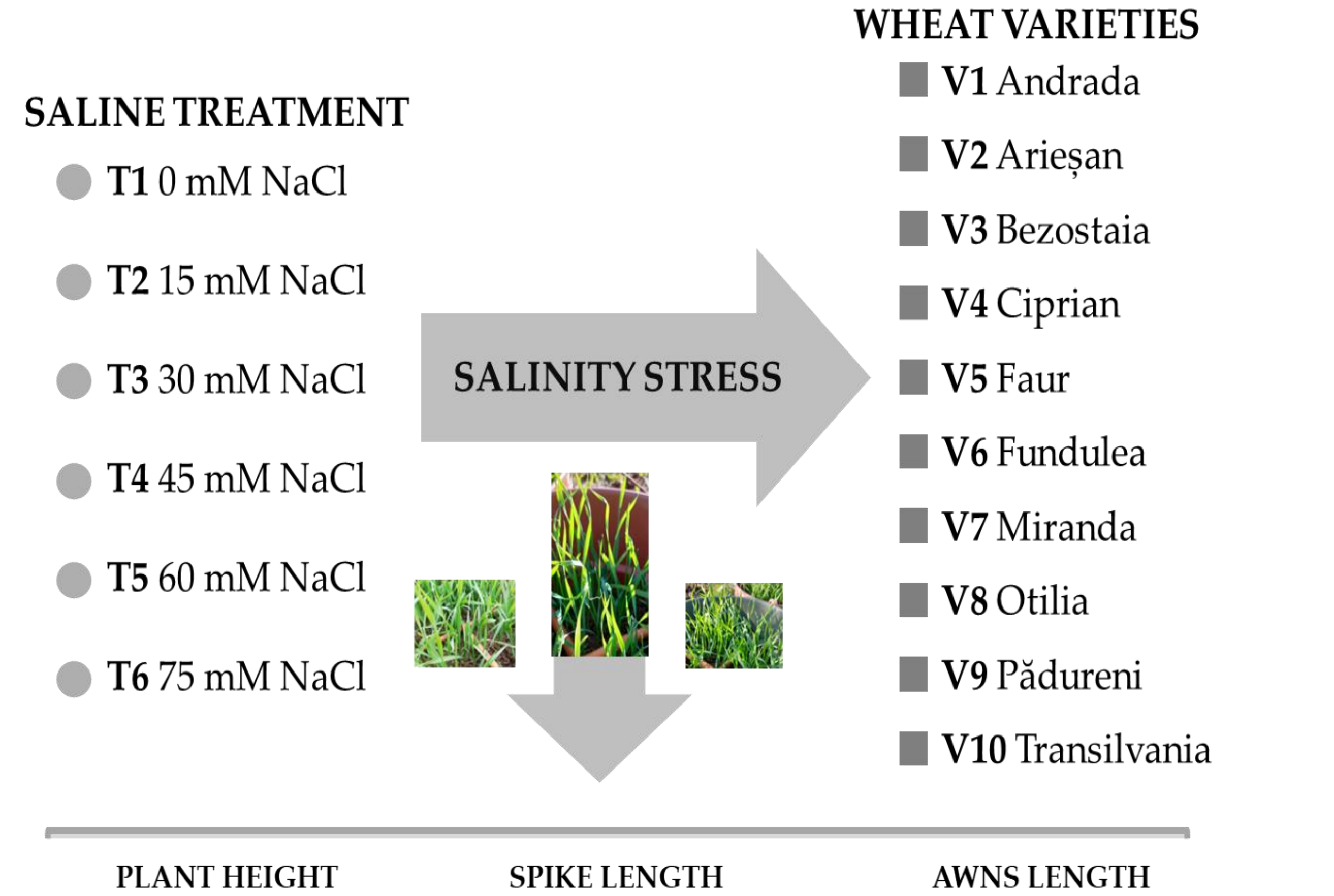
Over 200 million hectares of agricultural land were covered by wheat crops in 2022 (Pequeno et al., 2024). Salinity stress affects plant growth and development through the changes it induces in physiological and biochemical processes (Shahid et al., 2020).

Considering the massive impact of salinity on wheat crop which plays a vital role in assuring global food security, the researchers aimed to create and adapt different varieties and cultivars that are not affected by this abiotic stress (Mondal et al., 2021).

OBJECTIVE

In this context, the study aim was to test the salinity stress tolerance of ten wheat varieties morphological features with high agronomic importance.

MATERIALS AND METHODS



RESULTS AND DISCUSSIONS

Table 1. Plant height for each wheat variety in relation to salinity gradient

	T1	T2	T3	T4	T5	T6
V1	53.33±0.73 c	42.50±2.30 i-t	40.07±1.07 m-u	42.67±1.93 i-s	40.53±0.29 l-u	44.07±1.52 g-p
V2	52.30±1.74 cd	48.33±1.33 d-h	48.33±1.30 d-h	43.97±0.38 g-p	46.80±0.68 f-j	43.90±1.10 g-q
V3	50±1.73 c-f	45.47±1.23 f-k	44.67±2.17 g-n	42.70±0.90 1i-r	44.33±1.45 g-o	43.40±2.17 i-r
V4	34.73±1.70 v-y	37.33±1.20 u-x	40.53±0.18 l-u	31.63±1.52 yz	28.77±3.73 z	37.77±1.47 s-w
V5	39.2±3.19 p-w	43.47±1.29 h-r	40.43±0.81 l-u	32.73±0.63 x-z	37.73±2.73 t-w	37.23±0.47 u-x
V6	44.90±0.10 g-m	45.83±2.94 f-k	47±2.61 f-i	42.03±4.59 j-u	39.83±1.48 n-u	31.53±1.64 yz
V7	43.6±2.11 g-r	46.23±1.52 f-k	45.23±1.23 f-l	43.40±1.24 i-r	41.77±1.30 k-u	42.87±0.74 i-r
V8	30.73±0.73 yz	32.10±0.78 yz	41.37±1.02 k-u	39.57±1.52 o-v	39.03±2.16 q-w	34.33±0.38 w-y
V9	47.07±2.02 e-i	51.93±0.93 c-e	52.10±1.10 cd	63.23±1.24 ab	66.23±4.92 a	58.43±0.38 w-y
V10	31.63±1.40 yz	40.10±0.72 m-u	48.40±1.18 d-g	48.33±0.24 d-h	45.57±0.26 f-k	38.90±1.17 r-w

Note: Means±SE followed by different letters indicate significant differences at p<0.05.
ANOVA: F(variety)=73.03, p(variety)<0.001; F(treatment)=4.25, p(treatment)<0.001; F(variety
× treatment)=7.61, p(variety × treatment)<0.001.

Table 2. Spike length for each wheat variety in relation to salinity gradient

	T1	T2	T3	T4	T5	T6
V1	8.50±0.21 ^{d-g}	8.87±0.38 ^{b-e}	7.07±0.30 ^{j-n}	8.03±0.17 ^{e-i}	8.13±0.55 ^{e-l}	8.53±0.73 ^{d-g}
V2	9.60±0.49 ^{a-c}	8.50±0.29 ^{d-g}	9.33±0.33 ^{a-d}	8.90±0.12 ^{b-e}	8.80±0.21 ^{b-e}	7.73±0.18 ^{f-j}
V3	4.77±0.15 ^o	4.53±0.26 ^o	4.83±0.17 ^o	3.97±0.12 ^o	4.00±0.00 ^o	4.77±0.18 ^o
V4	6.13±0.70 ⁿ	6.43±0.72 ^{mn}	7.20±0.35 ^{i-m}	7.30±0.15 ^{h-m}	7.20±0.21 ^{i-m}	6.77±0.33 ^{k-n}
V5	7.33±0.18 ^{h-m}	7.33±0.23 ^{h-m}	6.97±0.22 ^{j-n}	7.00±0.20 ^{j-n}	7.63±0.48 ^{g-k}	7.20±0.12 ^{i-m}
V6	6.43±0.38 ^{mn}	7.47±0.32 ^{h-l}	6.97±0.38 ^{j-n}	7.33±0.07 ^{h-m}	6.97±0.23 ^{j-n}	6.20±0.92 ⁿ
V7	7.47±0.41 ^{h-l}	8.63±0.41 ^{d-f}	7.80±0.21 ^{f-j}	7.27±0.09 ^{i-m}	7.80±0.17 ^{f-j}	8.23±0.17 ^{e-h}
V8	6.53±0.23 ⁱ⁻ⁿ	6.40±0.15 ^{mn}	7.23±0.09 ⁱ⁻ⁿ	7.20±0.15 ^{i-m}	7.40±0.2 ^{h-l}	7.00±0.12 ^{j-n}
V9	7.33±0.33 ^{h-m}	8.10±0.06 ^{e-l}	8.13±0.18 ^{e-l}	8.63±0.35 ^{d-f}	9.7±0.23 ^{ab}	8.67±0.18 ^{e-f}
V10	8.47±0.45 ^{d-g}	10.27±0.37 ^a	9.33±0.48 ^{a-d}	10.13±0.59 ^a	10.13±0.07 ^a	8.67±0.09 ^{e-f}

Note: Means±SE followed by different letters indicate significant differences at p<0.05.
ANOVA: F(variety)=103.81, p(variety)<0.001; F(treatment)=3.17, p(treatment)<0.050;
F(variety × treatment)=2.80, p(variety × treatment)<0.001.

Table 3. Awns length for each wheat variety in relation to salinity gradient

	T1	T2	T3	T4	T5	T6
V1	3,70±0.10 ^{l-o}	4.60±0.06 ^{e-l}	4.03±0.33 ⁱ⁻ⁿ	4.53±0.22 ^{e-l}	4.33±0.09 ^{f-m}	4.50±0.35 ^{e-l}
V2	4.23±0.43 ^{f-n}	4.00±0.29 ⁱ⁻ⁿ	4.73±0.12 ^{e-j}	4.83±0.12 ^{d-l}	4.67±0.03 ^{e-k}	4.23±0.32 ^{f-n}
V3	0.17±0.17 ^r	0.47±0.03 ^{q-r}	1.37±0.41 ^{q-r}	0.70±0.06 ^{p-r}	0.67±0.03 ^{p-r}	1.53±0.35 ^p
V4	2.97±0.30 ^o	3.40±0.26 ^{no}	4.27±0.29 ^{f-n}	3.80±0.15 ^{k-o}	4.07±0.09 ⁱ⁻ⁿ	3.47±0.13 ^{m-o}
V5	3.43±0.13 ^{m-o}	4.17±0.43 ^{g-n}	4.10±0.12 ^{h-n}	4.47±0.12 ^{e-l}	4.77±0.64 ^{e-j}	4.40±0.15 ^{e-l}
V6	3.97±0.03 ⁱ⁻ⁿ	4.03±0.35 ⁱ⁻ⁿ	3.80±0.30 ^{k-o}	4.07±0.23 ⁱ⁻ⁿ	3.90±0.40 ^{j-n}	4.23±0.69 ^{f-n}
V7	4.00±0.40 ⁱ⁻ⁿ	6.20±1.40 ^a	4.70±0.21 ^{e-k}	4.47±0.24 ^{e-l}	4.70±0.20 ^{e-k}	4.73±0.19 ^{e-j}
V8	4.30±0.40 ^{f-n}	4.03±0.48 ⁱ⁻ⁿ	4.23±0.09 ^{f-n}	5.00±0.12 ^{c-h}	4.43±0.09 ^{e-l}	4.87±0.19 ^{d-l}
V9	5.27±0.26 ^{b-e}	5.00±0.15 ^{c-h}	5.10±0.12 ^{b-f}	5.73±0.03 ^{a-d}	5.97±0.32 ^{ab}	5.80±0.25 ^{a-c}
V10	4.63±0.27 ^{e-k}	5.10±0.17 ^{b-f}	4.70±0.32 ^{e-k}	5.13±0.37 ^{b-f}	5.07±0.15 ^{b-g}	5.07±0.20 ^{b-g}

Note: Means±SE followed by different letters indicate significant differences at p<0.05.
ANOVA: F(variety)=91.29, p(variety)<0.001; F(treatment)=5.22, p(treatment)<0.001;
F(variety × treatment)=1.40, p(variety × treatment)<0.001.

CONCLUSIONS

- Both salinity stress treatments and time exposure had effects on the assessed parameters.
- The most vigorous and tolerant wheat plants were Pădureni according to the highest mean values recorded for plant height and awns length.
- With a high tolerance to the applied doses, Transilvania wheat obtained the highest mean value of spike length.
- Bezostaia showed sensitivity to saline treatment spike and awns length by the low average values observed.
- It is vital to understand plant responses to salt stress in order to maintain food security, for this reason, therefore it is recommended to test larger sets of varieties and plants over a wider range of applied salt doses.

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