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The changes in chlorophyll fluorescence parameters of *Medicago sativa* under drought stress and recovery after it

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Materials and methods

The aim of this study was to investigate the response of chlorophyll *a* fluorescence parameters of lucerne (*Medicago sativa*) under partly regulated environment and drought stress effect. Plants were grown in pots filled with a mixture of field soil, perlite and fine sand (volume ratio 5:3:2). Drought stress lasted one week, after that plants were left for one week recovery period. Under drought effect grown plants were watered only 50 % of norm during exposure time.

Chlorophyll *a* fluorescence parameters measurements were taken with the Plant Efficiency Analyser, PEA (Hansatech Instruments, Ltd., King's Lynn, Norfolk, England) with randomly selected youngest fully expanded leaves on the last (7th) day of the exposure of drought and after recovery.

Results

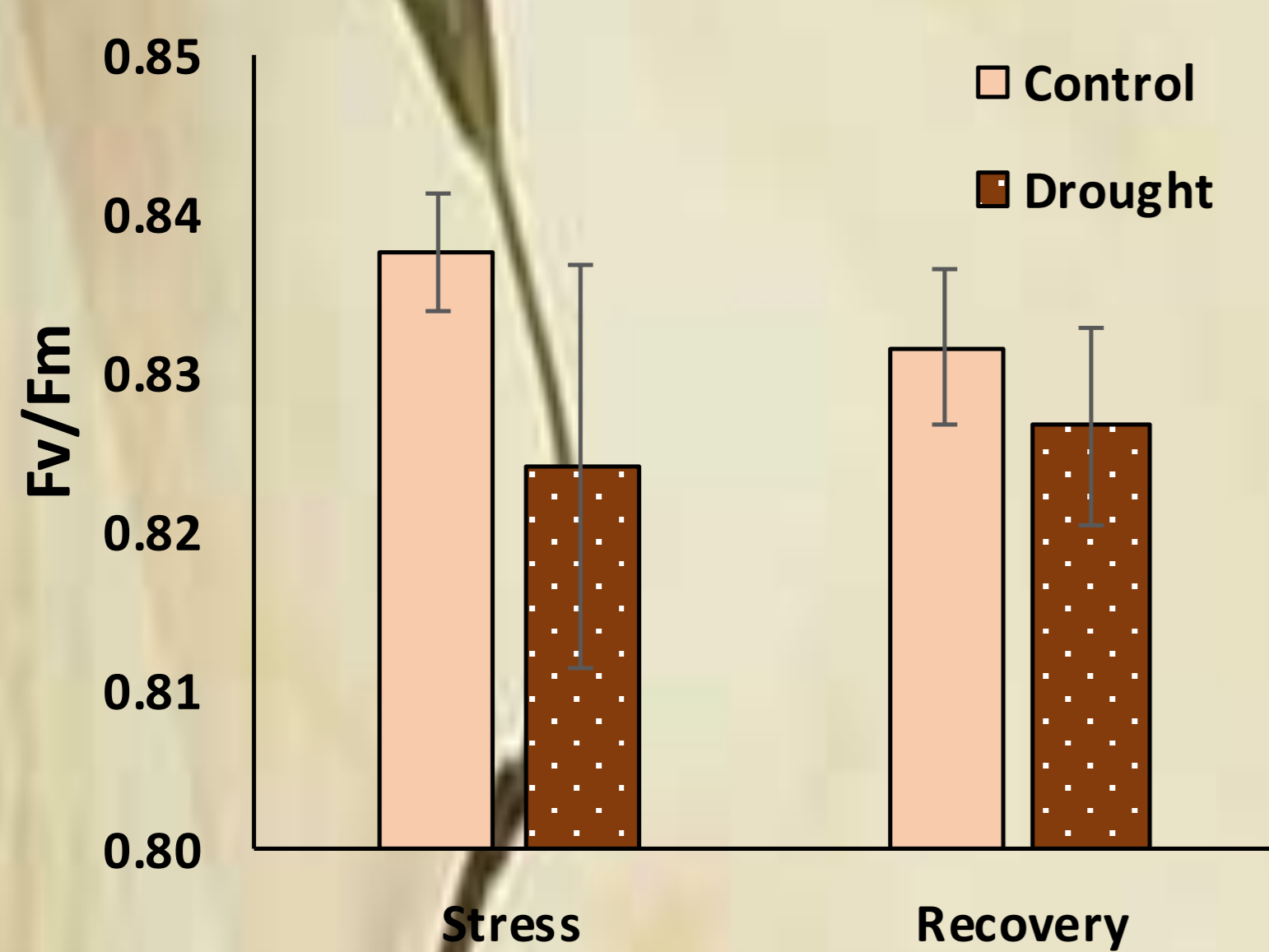


Fig. 1 Changes in Fv/Fm of *Medicago sativa* plants under drought stress and after recovery period.

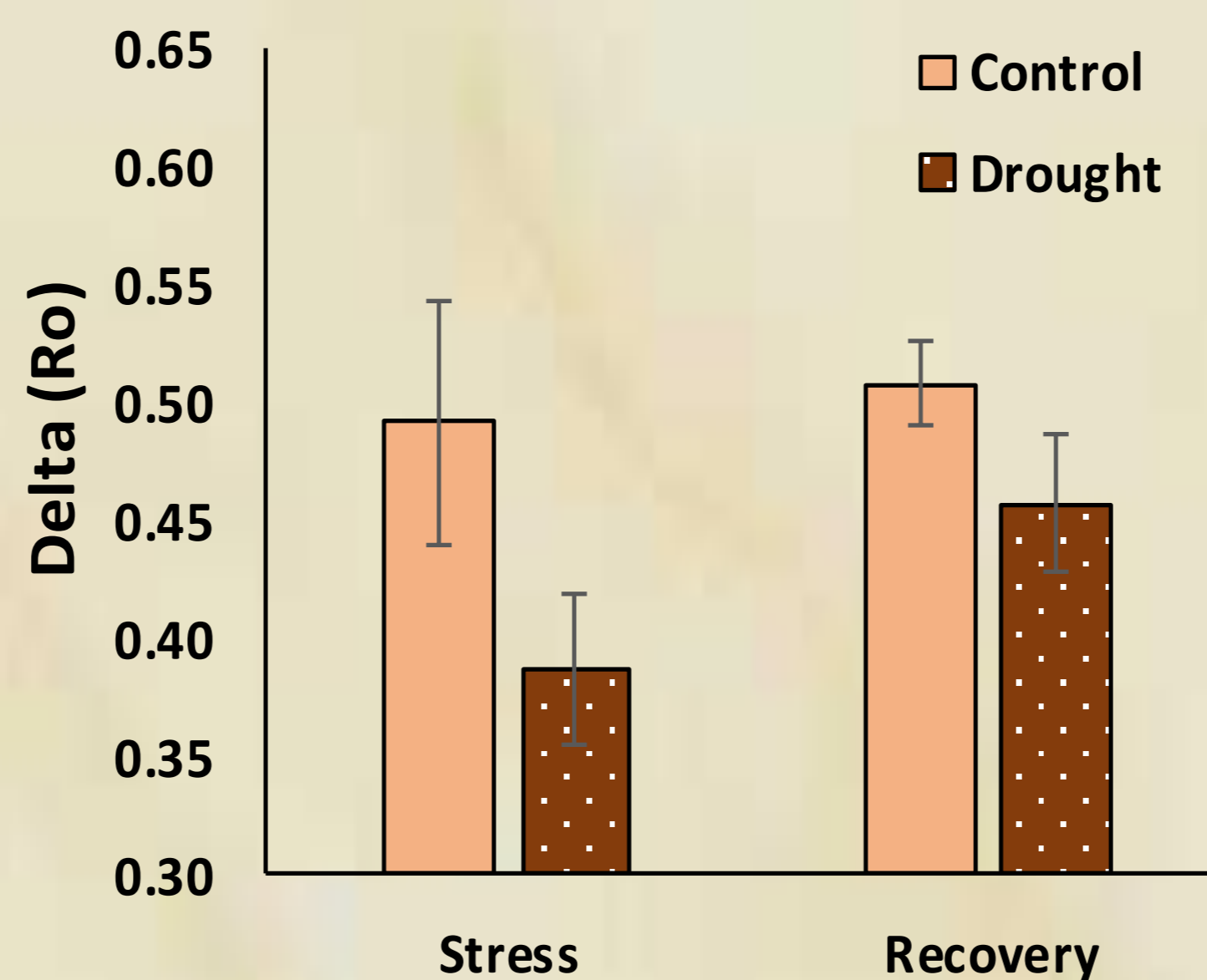


Fig. 2 Changes in Delta(Ro) in *Medicago sativa* plants under drought stress and after recovery period.

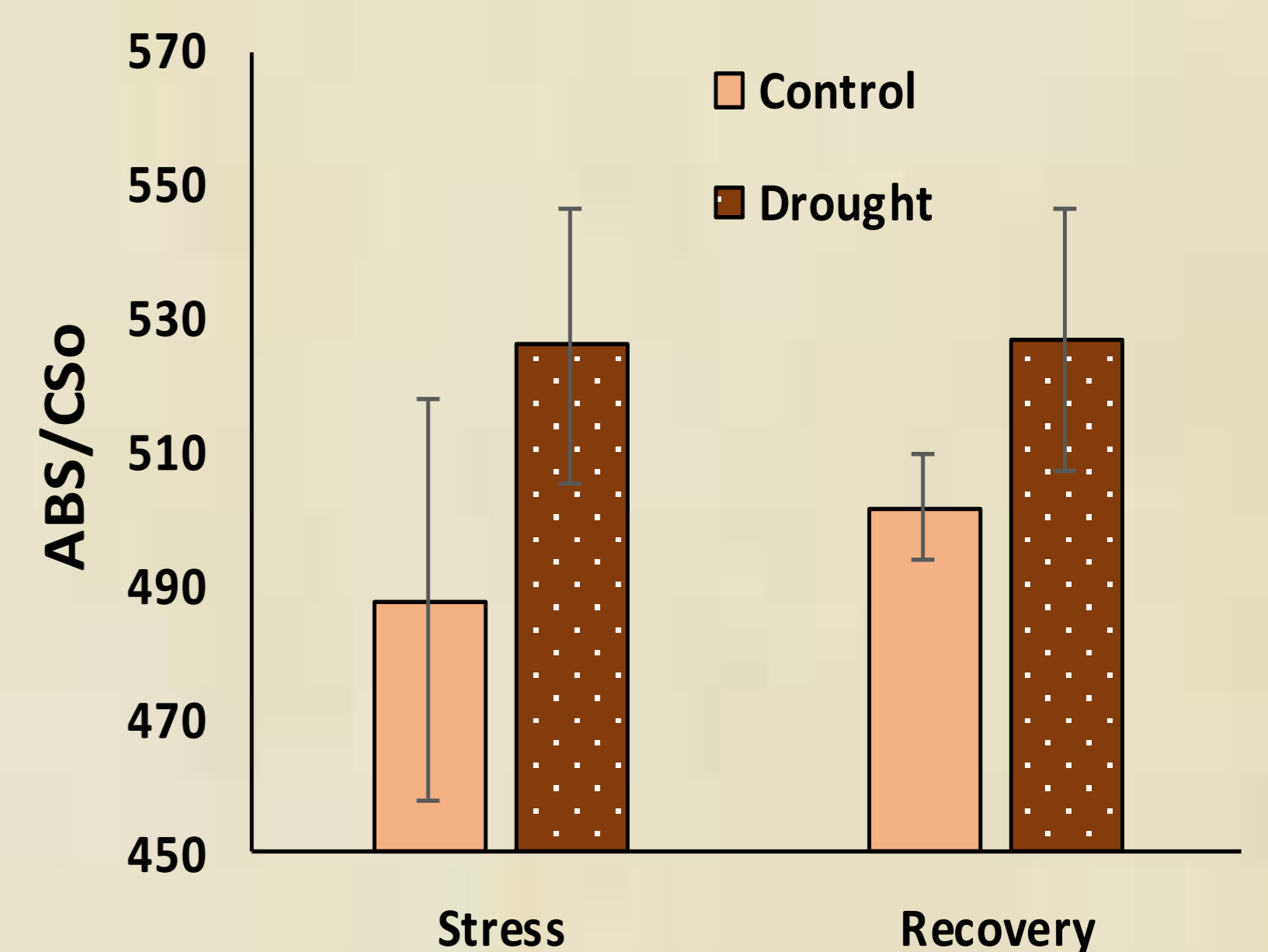


Fig. 3 Changes in ABS/CS₀ in *Medicago sativa* plants under drought stress and after recovery period.

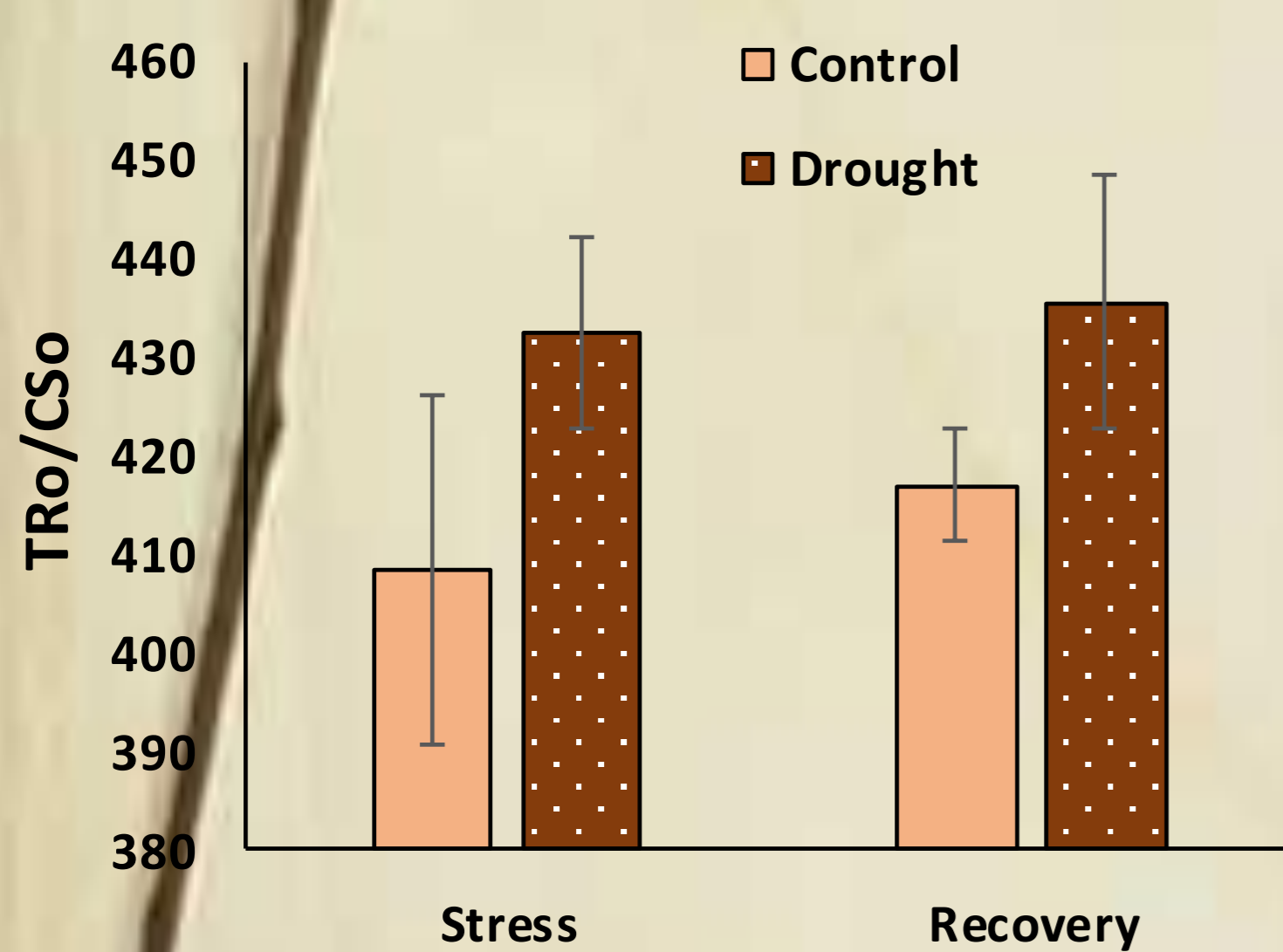


Fig. 4 Changes in TRo/CS₀ in *Medicago sativa* plants under drought stress and after recovery period.

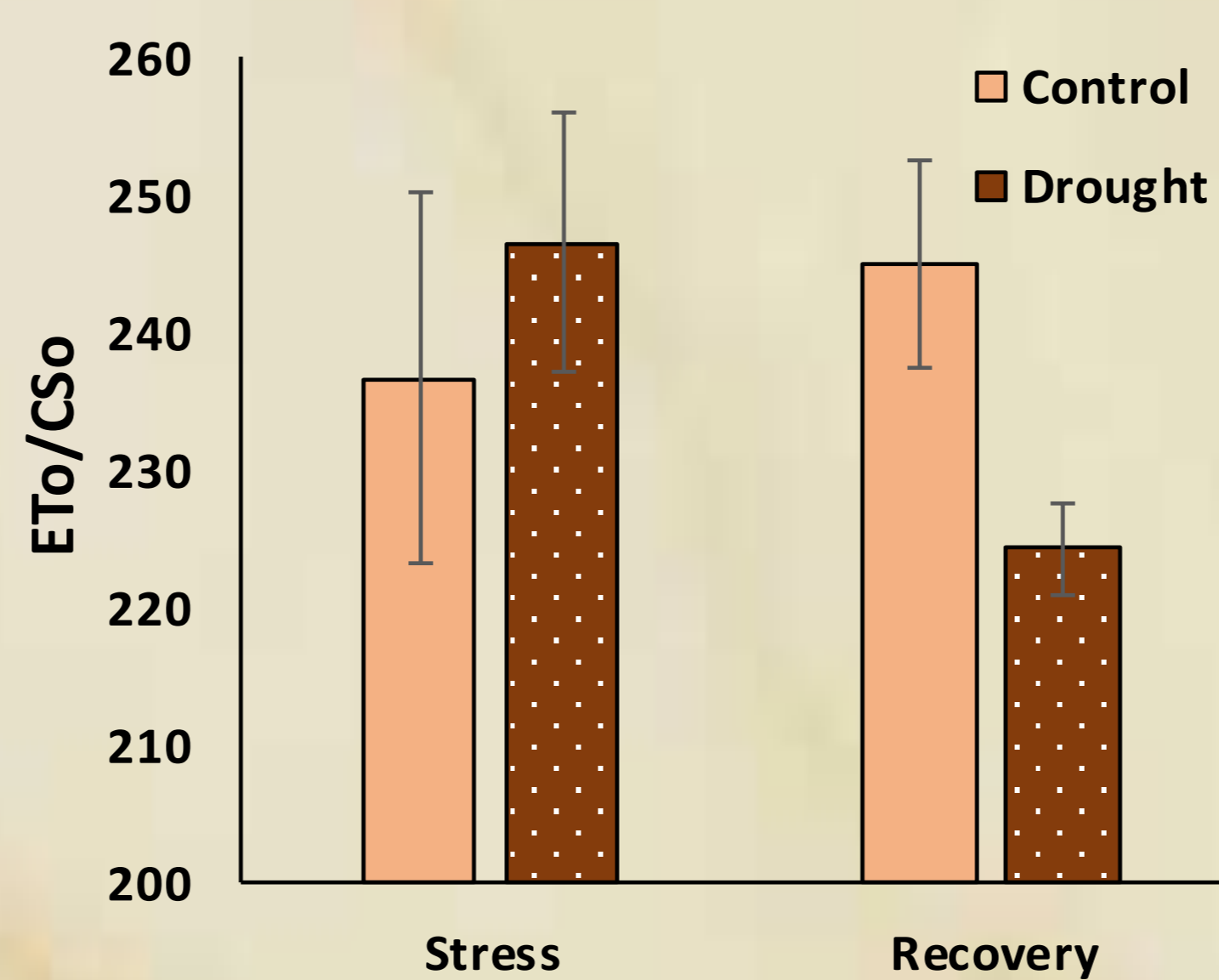


Fig. 5 Changes in ETo/CS₀ in *Medicago sativa* plants under drought stress and after recovery period.

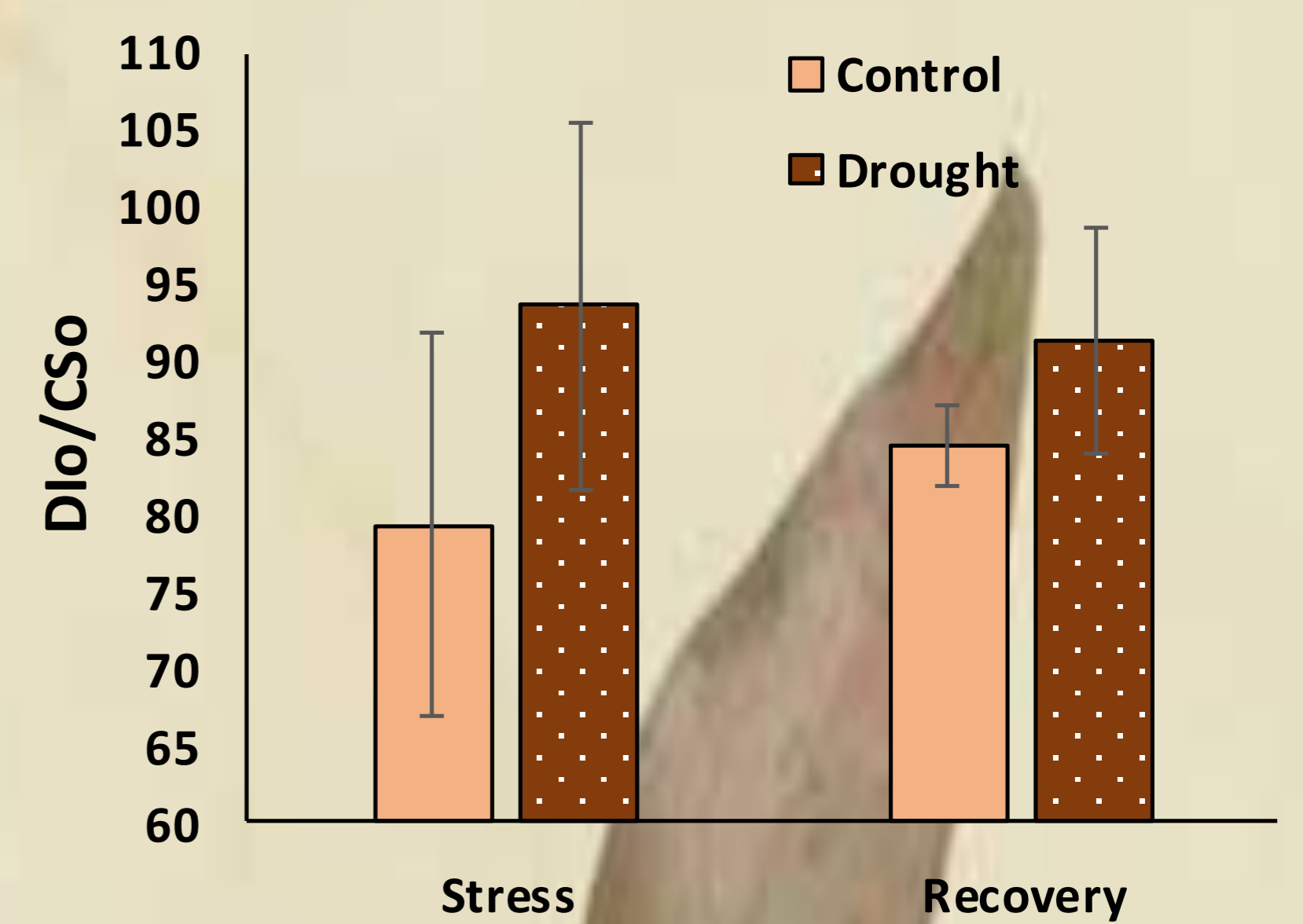


Fig. 6 Changes in DIo/CS₀ in *Medicago sativa* plants under drought stress and after recovery period.

Conclusions

1. The changes of Fv/Fm, which is an indicator of the efficiency of second photosystem (PSII), were statistically insignificant during both experiment stages.
2. The increase of specific energy flux per reaction centre (RC) for absorption ABS/CS₀ was followed by an increase of trapping energy (TRo/CS₀) under drought stress effect.
3. The efficiency with which an electron can move from the reduced intersystem electron acceptors to the PSI and electron acceptors (delta(Ro)) was lower under drought stress.
4. Higher energy usage under drought stress also indicated slightly decreased values of dissipated energy flux per cross section (DIo/CS₀).
5. After the recovery period, differences of several investigated parameters narrowed, but some still remained statistically significant. Our experiment results show that a one-week recovery period is too short for the photosynthetic system of lucerne to fully recover from the aforementioned drought stress.

Acknowledgements

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