

Introduction

- Plants are susceptible to conditions such as drought and high salt levels, which they are more likely to face due to climate change. This contributes to a decline in agricultural productivity.
- Arabidopsis thaliana* is commonly used model in researching the effects of adverse environmental conditions.
- Abscisic acid (ABA) is a key defense mechanism against stress in plants (Ndathe et al., 2022).
- Previous research reports a plant's response to stress is significantly influenced by the timing of exogenous ABA treatment (Torun et al., 2020).
- This study aims to evaluate the timing of ABA treatment and how it can promote resistance to salt and drought in *Arabidopsis thaliana* grown on agar medium.
- Plants with an early ABA treatment are expected to handle stress better and grow more than those treated later on.



Methods

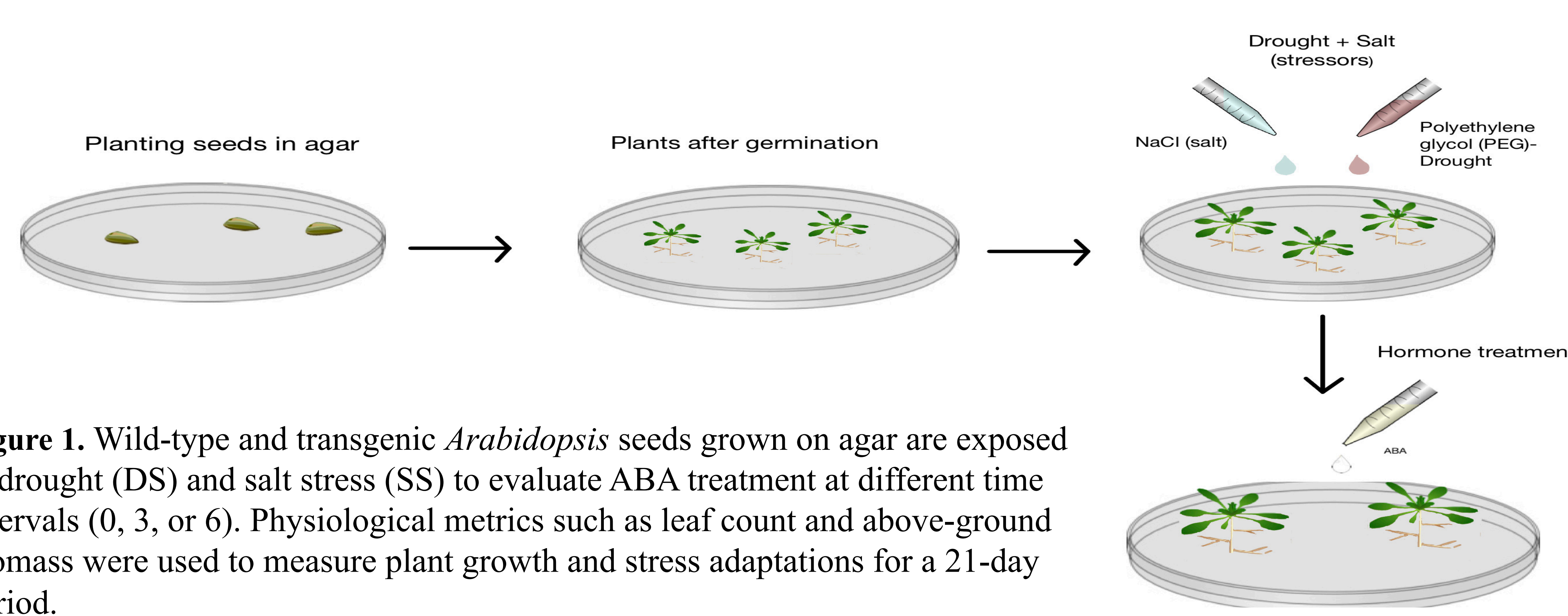


Figure 1. Wild-type and transgenic *Arabidopsis* seeds grown on agar are exposed to drought (DS) and salt stress (SS) to evaluate ABA treatment at different time intervals (0, 3, or 6). Physiological metrics such as leaf count and above-ground biomass were used to measure plant growth and stress adaptations for a 21-day period.

Results

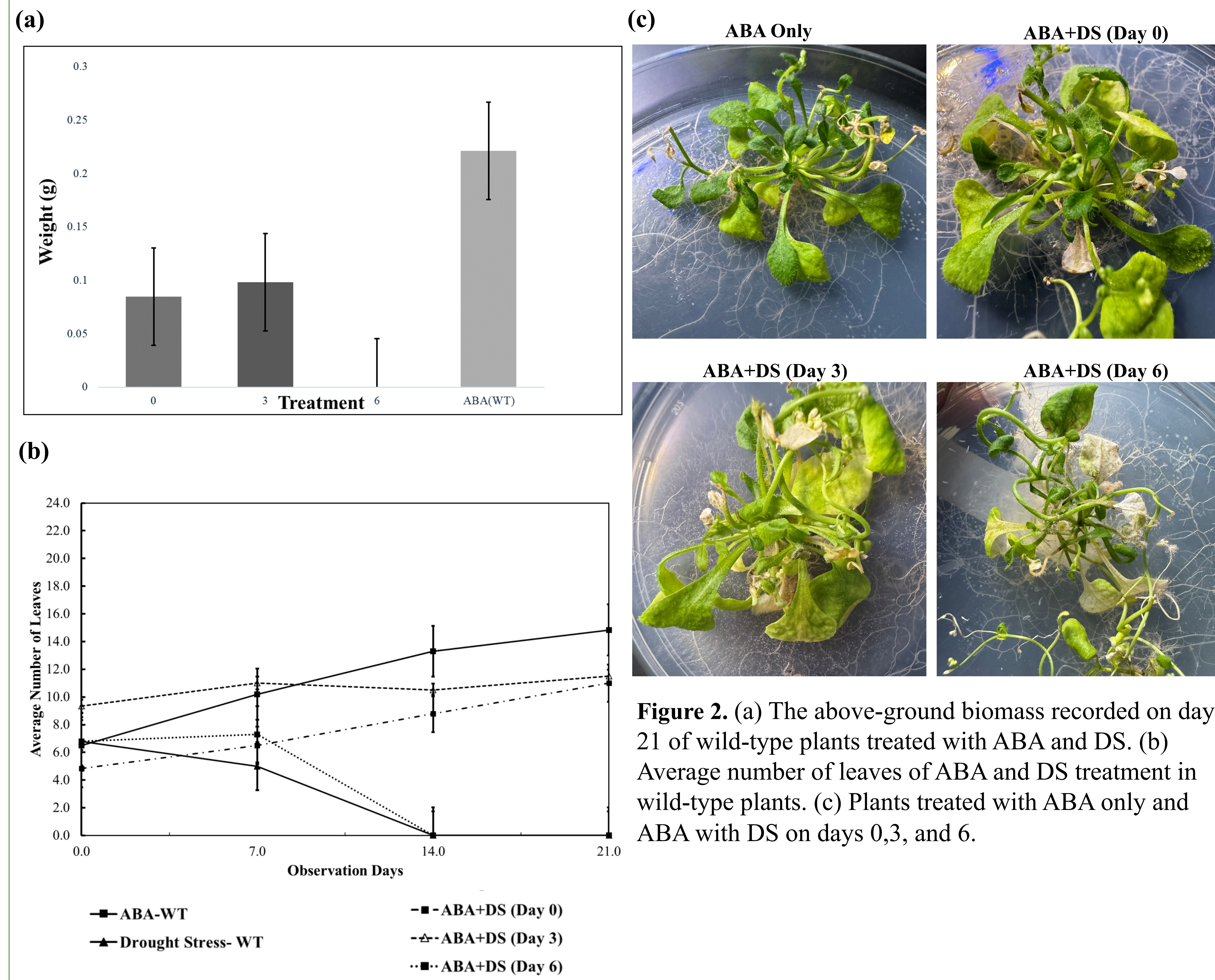


Figure 2. (a) The above-ground biomass recorded on day 21 of wild-type plants treated with ABA and DS. (b) Average number of leaves of ABA and DS treatment in wild-type plants. (c) Plants treated with ABA only and ABA with DS on days 0, 3, and 6.

Discussion

- Early ABA treatment (day 0) of plants subjected to drought stress had an increased tolerance than those treated on days 3 and 6 in both wild-type and transgenic plants.
- Results suggest ABA helped plants regulate adaptations to both drought and salt stress, with the effect becoming more pronounced with time.
- These procedures aim to help farmers grow crops that can survive difficult environmental conditions.
- This study offers valuable insights into the effects of ABA. However, future research is required with genetic approaches to understand the mechanisms of ABA-mediated responses in *Arabidopsis* plants, which may have significant implications for maintaining sustainable agriculture in unfavorable climatic conditions.

Future Work

- Future studies are required using genetic approaches such as PCRs to analyze gene expression in leaf samples.
- Furthermore, the RNA-binding proteins involved in plant growth will be analyzed to determine the molecular mechanisms of ABA in response to stress.
- Further studies will also look at the timing of ABA application in presence of both drought and salt stress combined.

References

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