Warming and water deficit alter the sporoderm and starch content in the *Stylosanthes capitata* pollen grain

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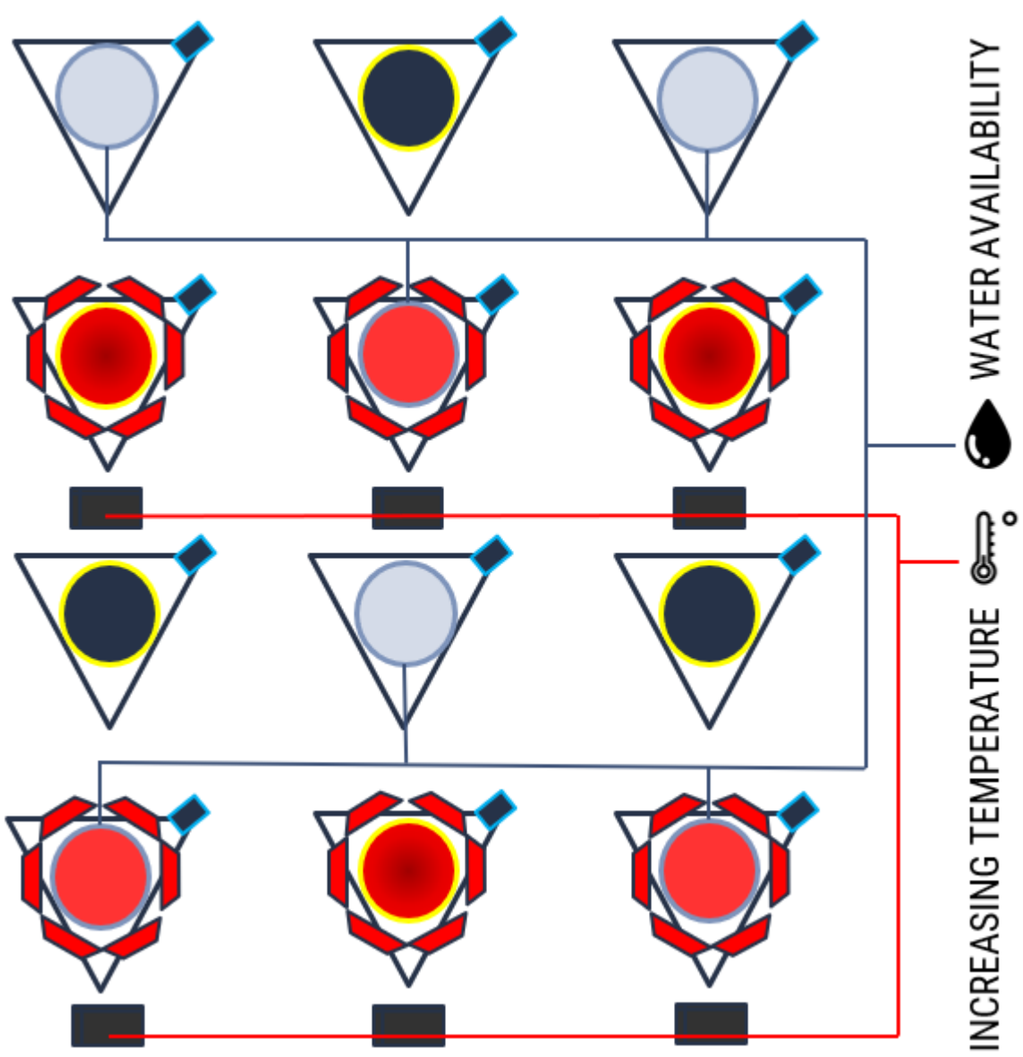
Climate Change driven by rising greenhouse gas emissions, alters hydrological cycles and compromises terrestrial ecosystems. In tropical regions, elevated temperature (*eT*) and water stress (*wS*) are key factors affecting plant development and reproduction. Under field conditions, we simulated canopy warming (+2 °C) combined with drip irrigation to assess the isolated and combined effects of *eT* and *wS* on pollen grains of *Stylosanthes capitata*, a legume native to Brazil with notable economic and ecological relevance.

Simulation on the T-FACE facility

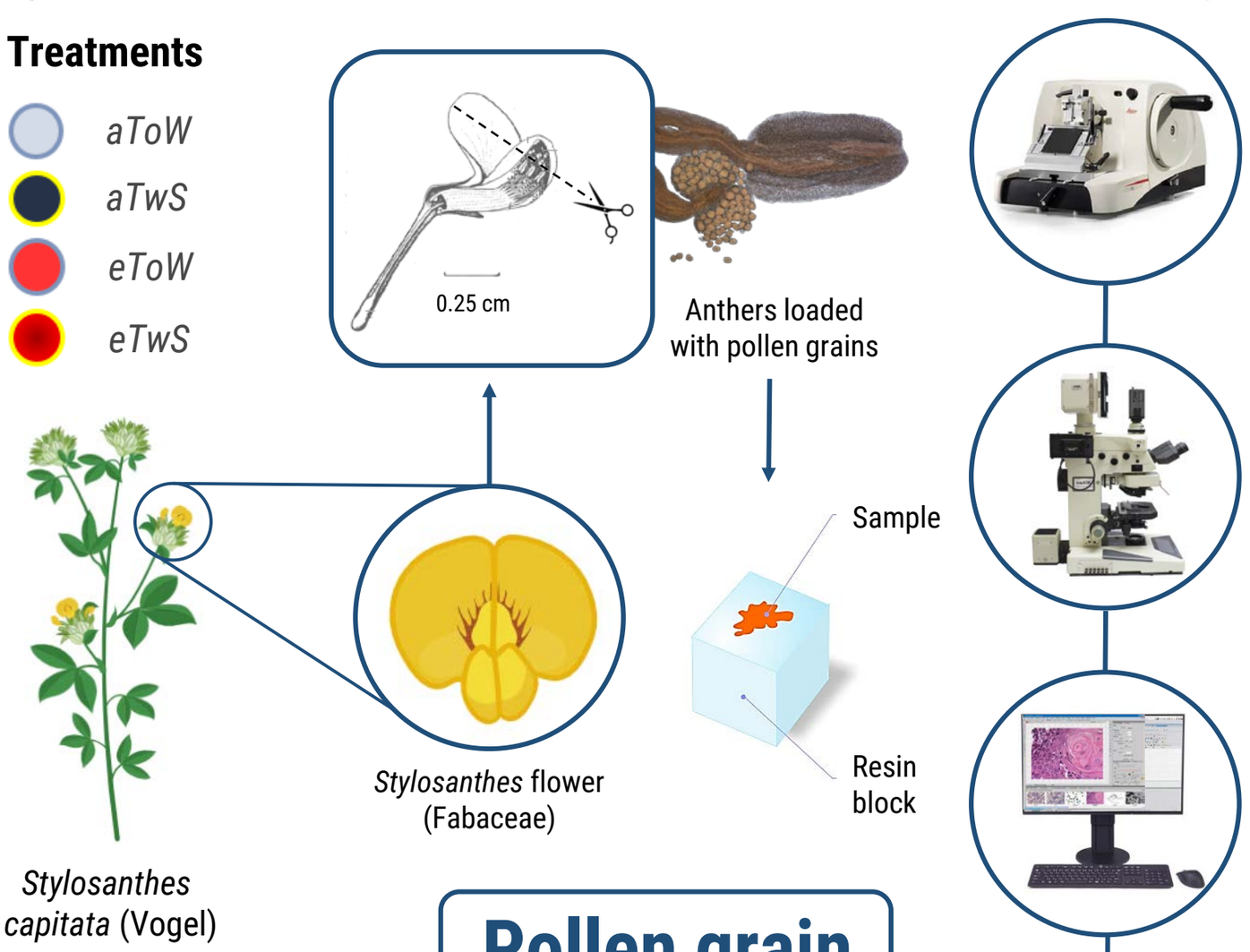


aT – ambient temperature; *eT* – elevated temperature
oW – optimal water condition; *wS* – water stress

Histochemical and Microscopy

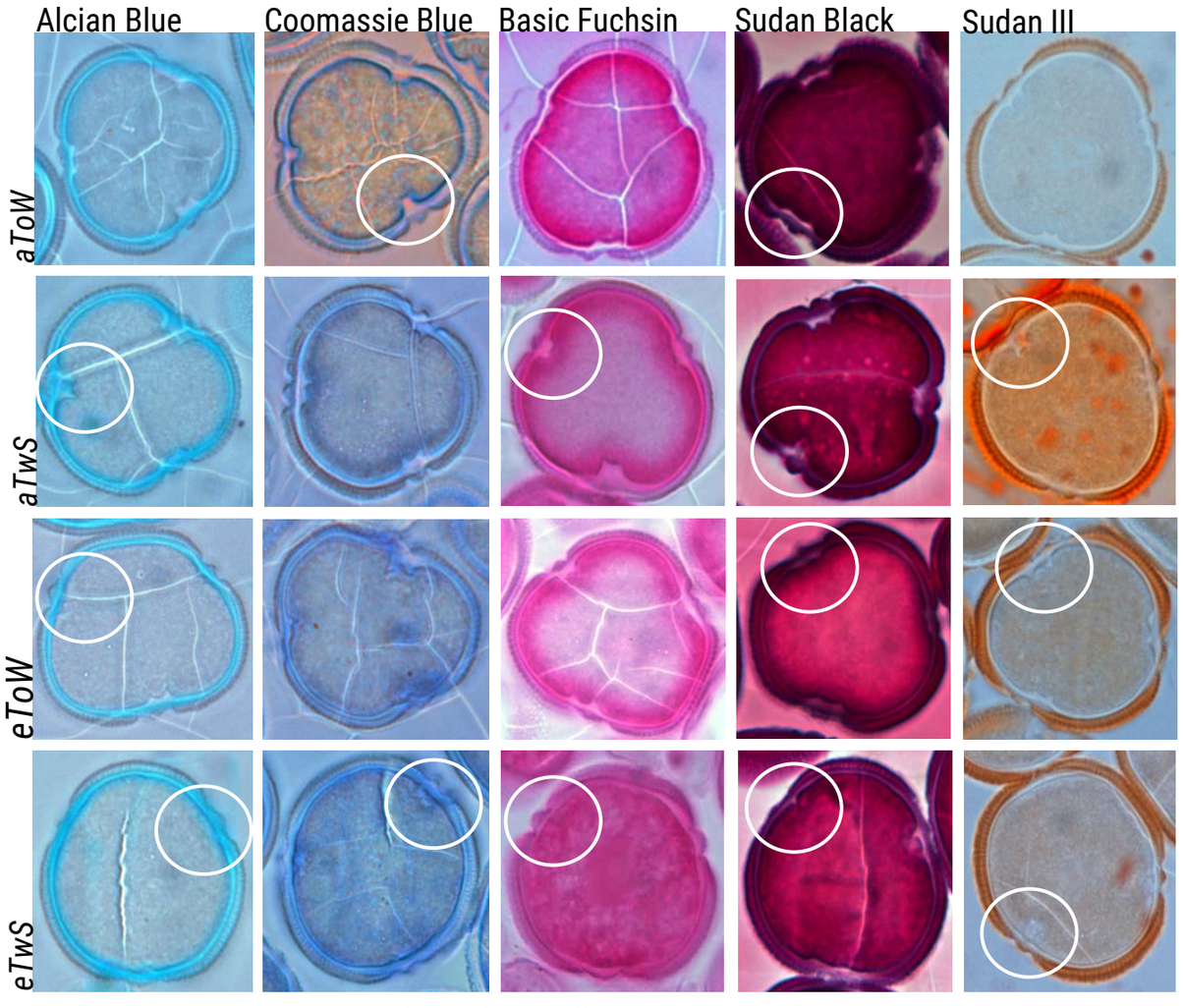
Treatments

- *aToW*
- *aTwS*
- *eToW*
- *eTwS*



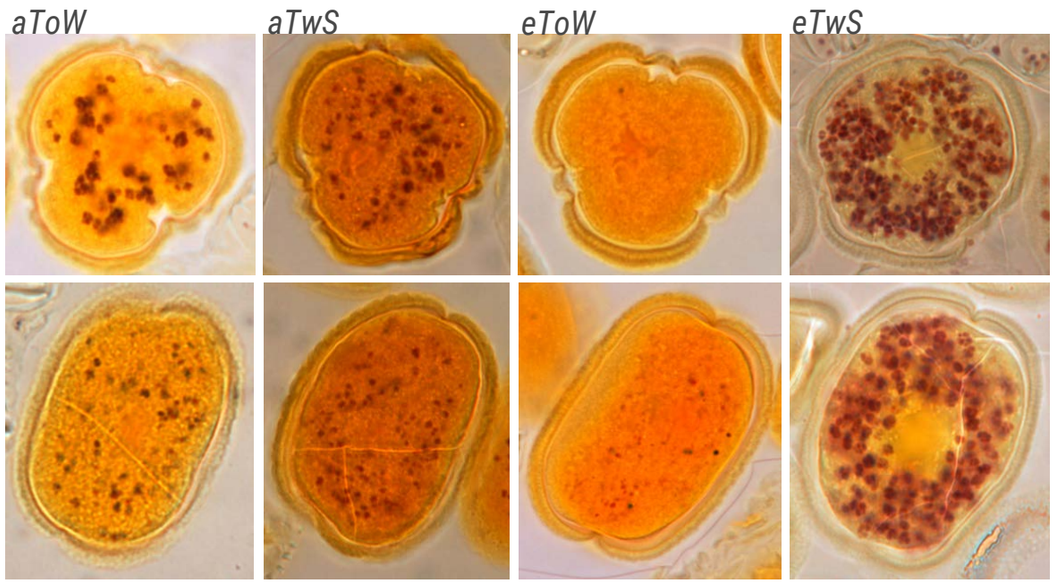
Pollen grain

Sporoderm

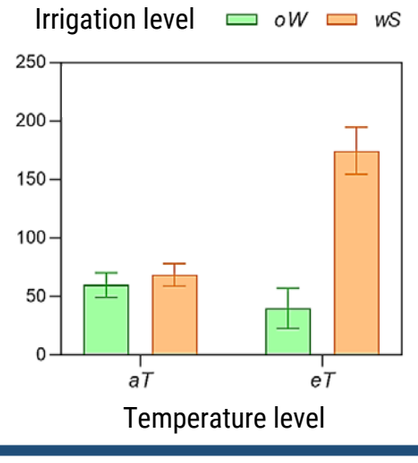


Transverse sections of *Stylosanthes* pollen grains. Rows represent treatments and columns represent histochemical analyses. White circles indicate alterations in the intine at the pollen aperture region. Scale: 20 µm

Starch content



Representative *Stylosanthes* pollen grains from each T-FACE treatment in transverse (above) and longitudinal (below) sections stained with Lugol's solution. Scale: 20 µm



Starch density (N_{area})
T **
W ****
*T*x*W* ****
(*T*) Temperature
(*W*) Water availability

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Finding Water deficit combined with elevated temperatures (+2 °C) alters pollen grains and can significantly reduce the reproductive success of *Stylosanthes capitata*.