

Ecophysiological evaluation and simulation models to enhance climate resilience of wheat

ARGENTINA, URUGUAY, UNITED STATES, SPAIN



Webstory



Technological solution

Facing yield losses caused by climate variability, this combination of empirical and modeling tools allows the prediction of the agronomic impact of droughts and thermal stress. The physiological characterization of commercial genotypes, alongside the analysis of specific alleles (such as the photoperiod gene Ppd-D1), facilitates the selection of tolerant cultivars and the design of adapted management practices, reducing productive vulnerability in the Southern Cone.



Technological description

The technology integrates advanced physiological phenotyping with dynamic crop simulation models (WOFOST and GECROS). Experimentally, mobile rain-out shelters with automated sensors are implemented to induce controlled water stress. Simultaneously, portable polyethylene tents are deployed over the crop canopy to artificially elevate daytime temperatures during critical stages, simulating heatwaves. These tools allow the measurement of parameters such as stomatal conductance and yield components, feeding predictive algorithms to evaluate varietal performance.



Impacts and results

The project validated the use of portable tents, successfully increasing the canopy temperature by over 5 °C. An agronomic database of 14 commercial varieties tested across 16 different locations was processed, and four contrasting cultivars were evaluated under induced water stress. The dissemination of these technological advances reached 1,100 attendees in virtual technical workshops. As projected targets, the initiative expects to finalize the calibration of prediction algorithms and publish management guidelines to transfer resilient genotypes to farmers.



+ 1100

Beneficiaries reached in technical workshops



14

Commercial wheat varieties evaluated in the field



+ 16

Experimental sites monitored in network



3

Technical dissemination products validated



3

Graduate and undergraduate students in training



2500

Target beneficiary producers and technical advisors

PARTICIPATING ORGANIZATIONS



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