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## Title

### ***Drought Tolerance Evaluation of 'Zorzal,' the Most Cultivated Common Bean in Chile, a Country Facing Desertification***

## Abstract

During the last decades, water distribution around the globe has been affected by climate change. Particularly, in Chile, the last decade has been marked by a mega-drought period, which has severely impacted agriculture. In this scenario, common bean (*Phaseolus vulgaris* L.) has been seriously affected due to its dependence on irrigation. In this work, we studied how 'Zorzal,' the most sown cultivar in Chile copes with drought stress and the mechanisms used to deal with it. A greenhouse experiment was performed during the 2019–2020 growing season. Plants were subjected to a severe drought stress suspending irrigation at the pre-flowering stage. Photosynthetic parameters, chlorophyll concentration, relative leaf water content (RWC) and lipid peroxidation were analyzed at 7 and 21 days after water suspension, yield was analyzed at the end of the growing season, and those parameters were compared to a susceptible cultivar of the same gene pool 'Arroz Tuscola.' 'Zorzal' stood out for having diverse traits associated with drought tolerance, as maintaining stable RWC during drought stress, a better reactive oxygen species scavenging system than 'Arroz Tuscola,' and stable root biomass during the drought condition. However, seed production was significantly reduced. Our results evidence that 'Zorzal,' the most widely cultivated cultivar of common bean in Chile, has good physiological and anatomical traits for plant survival under drought stress conditions. However, our study suggests that these characteristics may not be enough to maintain a stable seed production. © The Author(s), under exclusive licence to National Academy of Agricultural Sciences 2023.

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## Authors

Martínez-Barradas V.; Inostroza-Blancheteau C.; Tighe-Neira R.; Romero-Romero J.L.; Schwember A.R.; Arce-Johnson P.

## Author full names

Martínez-Barradas, Vera (57205673767); Inostroza-Blancheteau, Claudio (27667704000); Tighe-Neira, Ricardo (57193647867); Romero-Romero, Jesús Lucina (26647042900); Schwember, Andrés R. (8435390700); Arce-Johnson, Patricio (6602667391)

## Author(s) ID

57205673767; 27667704000; 57193647867; 26647042900; 8435390700; 6602667391

## Year

2024

## Source title

Agricultural Research

## Volume

13.0

---

## Issue

1

## Page start

41

## Page end

52

## Page count

11.0

## DOI

10.1007/s40003-023-00679-2

## Link

<https://www.scopus.com/inward/record.uri?eid=2-s2.0-85178889796&doi=10.1007%2fs40003-023-00679-2&partnerID=40&md5=c0bac9447d7861478afa7d943a2eeb00>

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## Affiliations

Facultad de Agronomía y Sistemas Naturales, Pontificia Universidad Católica de Chile, Santiago, Chile; Núcleo de Investigación en Producción Alimentaria, Facultad de Recursos Naturales, Universidad Católica de Temuco, Temuco, Chile; Departamento de Ciencias Agropecuarias y Acuícolas, Facultad de Recursos Naturales, Universidad Católica de Temuco, Temuco, Chile; Departamento de Biotecnología Agrícola, Instituto Politécnico Nacional, CIIDIR, Unidad Sinaloa, San Joachín, Sinaloa, Guasave, Mexico; Instituto de Ciencias Aplicadas, Facultad de Ingeniería, Universidad Autónoma de Chile, Santiago, Chile; Facultad de Ciencias Biológicas, Pontificia Universidad Católica de Chile, Santiago, Chile

## Authors with affiliations

Martínez-Barradas V., Facultad de Agronomía y Sistemas Naturales, Pontificia Universidad Católica de Chile, Santiago, Chile, Facultad de Ciencias Biológicas, Pontificia Universidad Católica de Chile, Santiago, Chile; Inostroza-Blancheteau C., Núcleo de Investigación en Producción Alimentaria, Facultad de Recursos Naturales, Universidad Católica de Temuco, Temuco, Chile, Departamento de Ciencias Agropecuarias y Acuícolas, Facultad de Recursos Naturales, Universidad Católica de Temuco, Temuco, Chile; Tighe-Neira R., Departamento de Ciencias Agropecuarias y Acuícolas, Facultad de Recursos Naturales, Universidad Católica de Temuco, Temuco, Chile; Romero-Romero J.L., Departamento de Biotecnología Agrícola, Instituto Politécnico Nacional, CIIDIR, Unidad Sinaloa, San Joachín, Sinaloa, Guasave, Mexico; Schwember A.R., Facultad de Agronomía y Sistemas Naturales, Pontificia Universidad Católica de Chile, Santiago, Chile; Arce-Johnson P., Instituto de Ciencias Aplicadas, Facultad de Ingeniería, Universidad Autónoma de Chile, Santiago, Chile

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## Author Keywords

Drought stress; Oxidative stress; Phaseolus vulgaris; Photosynthesis; Plant yield; Relative water content

## Index Keywords

Chile; Agronomy; Climate change; Cultivation; Drought; Plants (botany); Seed; Suspensions (fluids); Water supply systems; Arroz tuscola; Common beans; Drought stress; Drought tolerances; Growing season; Leaf water content; Phaseolus vulgaris; Plant yield; Relative water content; Seed production; climate change; climate effect; crop plant; crop yield; cultivar; desertification; drought resistance; drought stress; experimental study; growing season; irrigation; legume; oxidative stress; seed production; water content; Irrigation

## Funding Details

Universidad Católica de Temuco, UCT; Fondo Nacional de Desarrollo Científico y Tecnológico, FONDECYT, (1201749, ANID-2023, ATE23007); Consejo Nacional de Ciencia y Tecnología, CONACYT, (739582); Agencia Nacional de Investigación y Desarrollo, ANID, (FEQUIP2018-CI-04)

## Funding Texts

Funding text 1: VMB was supported by Consejo Nacional de Ciencia y Tecnología (Mexico) 739582, and Agencia Nacional de Investigación y Desarrollo (Chile) 21200394 PhD scholarships. The authors thank Financing Fund for Equipment (FEQUIP). FEQUIP2018-CI-04, UC Temuco, Fondo Nacional de Desarrollo Científico y

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Tecnológico 1201749 and, Anillos Investigación ANID-2023 (ATE23007). ; Funding text 2: VMB was supported by Consejo Nacional de Ciencia y Tecnología (Mexico) 739582, and Agencia Nacional de Investigación y Desarrollo (Chile) 21200394 PhD scholarships. The authors thank Financing Fund for Equipment (FEQUIP), FEQUIP2018-CI-04, UC Temuco, Fondo Nacional de Desarrollo Científico y Tecnológico 1201749 and, Anillos Investigación ANID-2023 (ATE23007).

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## **Correspondence Address**

P. Arce-Johnson; Instituto de Ciencias Aplicadas, Facultad de Ingeniería, Universidad Autónoma de Chile, Santiago, Chile; email: patricio.arce@uautonoma.cl

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## **Publisher**

Springer

## **ISSN**

2249720X

## **Language of Original Document**

English

## **Abbreviated Source Title**

Agric. Res.

## **Document Type**

Article

## **Publication Stage**

Final

## **Source**

Scopus

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## EID

2-s2.0-85178889796