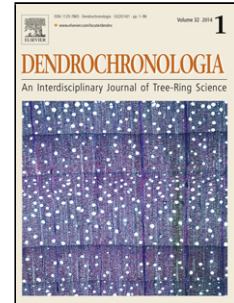


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## *Aridity variations in the semiarid Argentinean Pampas: How they affect *Prosopis caldenia* growth at the edge of the world distribution area.*

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### **Abstract**

The semiarid Pampas in central Argentina, occupied by *caldén*'s (*Prosopis caldenia* Burkart) woodlands (*caldenales*), had been affected by several wet and dry periods in the last century. Nowadays, the *caldenales* cover about 17 million hectares of central Argentina and their current state is critical due to massive deforestation rates. *Caldén* has an important dendrochronological potential since it produces sensitive tree rings linked to climate oscillations, fire events, competence, insect breakout, among others. The standard dendrochronological analysis can be improved with new advances in serial modeling and multivariate ordination techniques for handling problems related to the comparison of dendrochronological samples. We applied a statistical algorithm, BIODry, which integrates conventional procedures for modeling patterns between annual diameter increments and drought. *P. caldenia* dendrochronological data were used accounting for multiple sources of variation from the sample design, and comparing patterns from contrasting climatic portions of the study site. The relation between diameter growth dynamics of *caldén* with temperature and precipitation fluctuations along the second half of the last century was analyzed. Populations at the Northern limit of its natural distribution area were selected. Monthly temperature and precipitation were evaluated in order to identify relative water surplus and deficit periods and an annual aridity index (AAI) was calculated. The objectives of the present work were: to analyze, describe and model response patterns between the *P. caldenia* diameter growth increment and the AAIs. A common growth response pattern and differences in tree and population levels were also analysed. The algorithm BIODry showed a good behavior, according to the considered statistical parameters (all the fixed effects were statistically significant). Several and common problems associated with the

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