Influence of Multiple Stress Sources on Cork Oak (*Quercus suber* L.) Seedling Susceptibility to *Phytophthora cinnamomi*

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Some evergreen species within the genus *Quercus* (namely *Q. ilex* and *Q. suber*) are of paramount socio-economic and ecological importance in Spain and Portugal. Two main threats to their long-term survival are currently recognized. Firstly, invasive soil-borne pathogens, particularly *Phytophthora cinnamomi,* which kill myriads of trees every year. Secondly, the potential long-term response of these key species to extended drought stress derived from climate change. A rise in mean temperatures and a significant loss of annual rainfall drop, together with an increase of extreme rainfall events, is forecast for this area by the end of the XXIth century **(1)**. These environmental changes could enhance the incidence of the pathogen, favored by alternating mild/extreme rainfall events and drought periods (4).

Previous studies showed that abiotic stress may affect both plant and pathogen performance **(2, 3),** which make very difficult (or even impossible) to separate direct effects of abiotic stress on trees from indirect pathogen-mediated effects.

When the combined effects of abiotic stress and pathogens on plants are considered, a critical question is whether increased abiotic stress is able to induce a weakening of trees and facilitate root infections ('host weakening hypothesis'). Alternatively, it can be hypothesized that, as long as the conditions will be favorable for a highly virulent pathogen, the previous stress-history of a susceptible host is not especially relevant for disease spreading ('primary pathogen hypothesis')

We tested these two alternative hypotheses in a greenhouse experiment where *Q. suber* seedlings were submitted to two water regimes (current and a dryer scenario of 1/3 reduced water inputs) and three levels of soluble salts (a source of physiological drought). After 150 days, plant performance was evaluated and transferred to new pots infested with resting spores of *P. cinnamomi.* Pots were subjected to periodical soil flooding and assessed weekly for crown symptoms. After 6 weeks plants were assessed for root necrosis.

We found that both water and salt stresses significantly affected plant performance, but no significant differences in *Phytophthora* symptom severity were found among plants subjected to different intensity of both stresses after they were infected.
We concluded that:

1. Extended exposure of cork oak seedlings to different abiotic stress scenarios did not increase their susceptibility to *Phytophthora cinnamomi.*

2. Our experimental results held the ‘primary pathogen hypothesis’ against the ‘host weakening hypothesis’.

3. Notwithstanding, the direct effect of these harsh environmental scenarios on the pathogen itself may determine different outcomes that need to be experimentally tested.

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