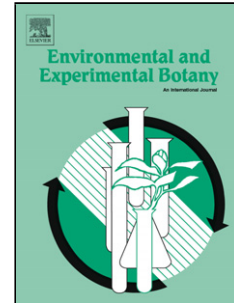


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Leaf Age and Light Quality influence the Basal Resistance against *Botrytis cinerea* in Strawberry Leaves

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Highlights

- Younger leaves are more susceptible to *Botrytis* infection
- Leaf age should be taken into account when assessing disease resistance
- Red light improves leaf resistance irrespective of leaf age
- Low hydrogen peroxide levels are correlated with basal leaf resistance in strawberry

Abstract

In this study, the effects of both leaf age and light quality on leaf resistance against *Botrytis cinerea* were investigated. Strawberry plants were grown in a growth chamber equipped with white, blue, red or red+blue light-emitting diodes (LEDs) at a photosynthetic photon flux (PPF) of 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$. The effect of leaf age and light quality on leaf morphology, resistance to *B. cinerea*, hydrogen peroxide levels, metabolites and pigments was studied. Leaf number increased under red light, while leaf petiole length was reduced by red+blue light. Leaf resistance to *B. cinerea* dramatically increased with leaf age from 1- to 4-week-old leaves but decreased again in 5-week-old leaves. Red light significantly improved leaf resistance, while white and blue-light treated leaves were the most susceptible to *B. cinerea* at all leaf ages. Hydrogen peroxide levels positively correlated with disease severity and were influenced by both leaf age and light quality. They were lowest in 4-week-old leaves and in red light-grown leaves, irrespective of leaf age. Chlorophyll and carotenoids levels negatively correlated with disease severity and increased with leaf age but were lowest in blue light-grown leaves. Total phenolics and flavonoid levels were very high in the very susceptible 1-week-old leaves and considerably lower in the older leaves. Red light stimulated total phenolics in 1- to 4-week-old leaves. Proline levels were strongly stimulated by blue light, especially in 1 and 5-week-old leaves. Overall, low hydrogen peroxide levels and high chlorophyll and carotenoids levels appear to be the best indicators for leaf resistance to *B. cinerea* in strawberry leaves. Moreover, leaf age should be taken into account when assessing the effect of light quality on disease resistance.

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