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Monoterpene emission and tolerance to photostress of *Quercus ilex* and *Quercus suber* provenances

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We investigated *Quercus ilex* (L.) and *Q. suber* (L.) saplings from eastern and western French provenances for inter and intraspecific differences in isoprenoid emissions and in their ability to tolerate photostress at low and high temperature conditions. Stress tolerance was assessed by monitoring fluorescence parameters and by determining the foliar concentrations of malondialdehyde (MDA), a metabolite formed during peroxidation of membrane lipids. Experiments made on intact leaves under saturating light (2000 μmol photons $m^{-2}s^{-1}$) showed that photostress is tolerated better at high temperatures (47 ˚C) than at low temperatures (10 ˚C). During low temperature exposure, the decrease in photosystem II efficiency (Fv/Fm) was positively correlated with foliar MDA concentrations. During high temperature exposure, the decrease in Fv/Fm was negatively correlated with MDA concentrations and was positively correlated with the increase in leaf emission rates. There was no significant difference among species and provenances, although *Q. suber* leaves tended to maintain higher PSII efficiency under photostress than *Q. ilex* leaves at both high and low temperature conditions. However, when heat tolerance was evaluated under darkness on excised desiccating leaves, *Q. ilex* was significantly more resistant than *Q. suber*, which may be attributed to specific differences in leaf structure. Leaves of all studied oak categories emitted principally the same monoterpenes in similar amounts. Intra and interspecific differences were found in the proportions of single compounds: *Q. suber* emissions contained higher proportions of sabinene and lower proportions of myrcene than *Q. ilex* emissions, and in both species, trees emitting limonene in high proportions were more frequent in western than in eastern provenances.