Geophysical Research Abstracts, Vol. 8, 04769, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04769

Monoterpene formation in evergreen leaves of Holm oak (Quercus ilex L.) is not affected by mechanical wounding

D. Andrés-Montaner, I. Zimmer, D. Steigner, R. J. Fischbach, **J.-P. Schnitzler**

Karlsruhe Research Center, Institute of Meteorology and Climate Research (IMK-IFU), Kreuzeckbahnstr. 19, 82467 Garmisch-Partenkirchen, Germany
(joerg-peter.schnitzler@imk.fzk.de)

Plants emit reactive volatile organic compounds (VOC) such as monoterpenes, which can have significant influence on atmospheric chemistry. The evergreen Holm oak (Quercus ilex) belongs to the dominant monoterpene-emitting tree species in Mediterranean forests. Its emission is light dependent and closely related to photosynthesis. In Holm oak no storage tissue for monoterpenes is present in leaves contrary to coniferous needles which contain large endogeneous terpene reservoirs. For the latter it is already known, that monoterpene formation and accumulation can be induced by mechanical wounding or jasmonate treatment, which simulates a destructive pest or other stresses without damaging the plant.

Jasmonates are naturally occurring plant growth regulators being involved in the induction of plant defence mechanisms in response to biotic and abiotic stresses. Application of Jasmonic acid (JA) or its methyl ester (MeJa) has been shown to increase the biosynthesis of isoprene, mono- and sequiterpenes in different plant species..

To investigate, whether monoterpene formation of Holm oak leaves is affected by damage we analysed expression of monoterpene synthase genes, the corresponding enzyme activities and leaf internal amounts of monoterpenes. For this purpose Holm oak trees have been wounded mechanically or have been treated with methyl jasmonate to mimic wounding.

Mechanical wounding as well as a treatment with 100 μM or 10 mM MeJa had no effect on light-dependent monoterpene biosynthesis in Holm oak leaves, neither on

molecular and enzymatic level nor on leaf-internal monoterpene concentrations over an observation period of 5 days. On the other hand conifer needles (Picea abies) resonded to the 10 mM MeJa treatment with an induction of d-3-carene-synthase activity within 48 h after spraying.