**Effects of reducing the ambient UV-B radiation on Salix arctica and Vaccinium uliginosum**

Effects of reducing the ambient UV-B radiation on gas exchange and chlorophyll fluorescence of two dwarf shrub species, Salix arctica and Vaccinium uliginosum, was studied in a high arctic heath in North East Greenland during two growing seasons. Films (Mylar, transmitting $\lambda > 320$ nm, and Lexan, transmitting $\lambda > 400$ nm) were used to reduce UV-B radiation and UV-B+A respectively. A UV transparent film (Teflon, transmitting $\lambda > 280$ nm) and no film were used as controls. Field measurements showed that the plants under Teflon, Mylar and Lexan received app. 91%, 39% and 17% of the ambient UV-B irradiance, respectively. UV radiation decreased the maximal photochemical efficiency ($F_v/F_m$) and other fast fluorescence transient derived parameters in both species, despite an increased level of leaf flavonoid content. The responses varied in significance according to species and site. The relation of these effects to a significantly decreased stomatal conductance ($g_s$) and intercellular CO2 concentration ($C_i$) pointed to respiration as an im-portant factor in the interpretation of the observed unaffected net CO2 assimilation ($P_n$) in UV-reduced treatments. It is concluded that the studied species have not fully acclimatized to the level of ambient UV-B radiation, and that ambient UV-B level is an important stress factor for the investi-gated plants in High Arctic.

**The use of bioindication plants for the assessment of air pollutants in the city of Cochabamba, Bolivia**

Fluoride, chloride and sulphur content of leaves of Chinaberry (*Melia azederach* L.) and Peruvian peppertree (*Schinus molle* L.) were investigated at the end of the dry season in 2000 and 2001 in the city of Cochabamba, Bolivia, to document the air pollution situation in this area. The leaf content of these pollutants where always slightly higher in *M. azederach* as compared to *S. molle*. Differences between sampling years and between sites could be detected and especially for chloride a point source for emission could be identified. It was possible to detect sulphur and chloride as an essential component of dust particles. Among gaseous pollutants dust has also be taken into consideration as a source of fluoride, chloride and sulphur. The presented study has proved the suitability of *M. azederach* and *S. molle* as bioaccumulators and further investigations should lead to the development of appropriate threshold levels for this region.
In situ autumn ozone fumigation of mature Norway spruce - Effects on net photosynthesis

Twelve cuvettes were installed on current year's twigs in the top of the canopy of a 35 years old Norway spruce stand in Denmark. From 10 to 16 hours, six of the cuvettes received 5-60 nl l(-1) ozone in addition to ambient air and six cuvettes received ambient air with a 40% reduced ozone concentration. The experiment was conducted during 70 days during the autumn. Our system could not detect any ozone effects on dark respiration, but eventually effects on dark respiration could be masked in signal noise. An inhibition of daily net photosynthesis in ozone treated shoots was apparent, and it was found that a mean increase in ozone concentration of 10 nl l(-1) reduced net photosynthesis with 7.4 %. This effect should be related to a pre-exposure during the season of AOT40 12.5 mul l(-1) h.

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Nitrous oxide and N-leaching losses from agricultural soil: Influence of crop residue particle size, quality and placement

Incorporation of crop residues provides a source of readily available C and N, and previous works indicate that farming strategies where crop residues are used for soil fertility purposes may lead to increased emissions of N2O. Information on the importance of different residue management on the potential for N2O emissions, however, is missing. The objectives of this work were to determine the short-term effects of crop residue particle size and spatial distribution on soil-atmosphere fluxes of N2O. Implications for leaching losses of inorganic N were also assessed. The work included an experiment with lysimeters incubated in the field and an experiment with soil incubated under controlled conditions. The results show that finely ground pea material (<3 mm) evolved 50 % more N2O (33.8 mg N m(-2)) than coarse particles (25 mm) of pea material (22.7 mg N m(-2)) and twice as much N2O as residue-free soil (16.5 mg N m(-2)). Barley material, on the other hand, did not influence N2O emissions regardless of particle size (10-17 mg N m(-2)). The lack of N2O evolution with barley residue was likely due to N-limitations whereas with N-rich pea material the particle size obviously controlled N-availability. Carbon dioxide evolution increased about three-fold both with barley and pea residue, but apart from a transient initial depression in CO2 evolution with <3 mm particles there was no overall effect of particle size on CO2 evolution. Very likely the grinding to <3 mm was inadequate to achieve soil physical protection of the crop residue material against microbial attack. Leaching of N tended to be reduced about 40 % with barley and 20 % with pea, but the numbers were not significantly different from residue-free soil, which leached 4.7-4.9 g N m(-2). When wheat and alfalfa residues were mixed into the soil N2O emissions increased 6.5 and 1.6 times, respectively, compared with residue placed in a layer. Wheat residue in a layer evolved 3.4-times less N2O than alfalfa in a layer, whereas when mixed the two residue types evolved similar amounts of N2O. This difference was probably due to N-limitations in localised zones around the layered wheat. The results from this study should be extrapolated to the Field situation only after very careful consideration. Nevertheless, the study emphasizes the potential for residue management to restrain N2O emissions from agricultural soils. From a N2O mitigation point of view, incorporating of residues with low N-contents is advantageous over a homogeneous mixing of N-rich materials into the soil.

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