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CHEMICAL DIVERSITY OF SOIL LIPIDS REFLECTS SURROUNDING BIODIVERSITY IN A FRENCH PEATBOG

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Introduction
The spatial heterogeneity of molecular biomarkers preserved in soils and sediments, and their representativeness of the spatial distribution of the surrounding vegetation, is seldom taken into account in environmental or paleoenvironmental studies. Here we examine the distribution of lipids in peat soils in relation to their potential plant sources in the surroundings.

Sampling Site
La Guette peatland is located in Neuvy-sur-Barangeon (Sologne, Cher) in the French Centre Region (154 m a.s.l.; N 47°19’; E 2°16’). This site covers 25 ha and is a transitional fen (pH about 4.4-5).

Specificity of biomarkers
We first explored lipid compounds that could be specific for distinct vegetation by comparing molecular imprints in soils with those of the surrounding plants.

Lipid Analyses
About 5 g of soil or plant sample were sonicated with CH2Cl2 (3 x 10 min x 15 ml). Total extract was fractionated into neutral and acidic compounds using anion-exchange bonded silica. Neutral fraction was separated into five fractions using a sequence of solvents of increasing polarity. Alcohol fractions were aminopropyl-bonded silica. Neutral fraction was separated into five fractions.

Conclusions
- Pentacyclic triterpenyl acetates detected by Erica tetralix and Calluna vulgaris were found in high concentrations in open stations.
- Tricyclic diterpenes and methoxy-serratanes detected in Pinus sylvestris were found in high concentrations in semi-close and close stations dominated by Betula pendula.
- Non-specific compounds showed rather homogeneous distribution along the stations. Reversely, compounds supposedly specific, although less abundant, are more efficient. For example, outliers in methoxy-serratanes and tricyclic diterpenes are those exhibiting the highest dP/B.

Variability of molecular imprints in stations
We then compared the distribution of these lipid classes among soil samples in stations under varying vegetation cover.

Tree cover x Tree specific biomarkers
Once demonstrated the efficiency for some lipid classes to be reflective of the surrounding vegetation, we test to what extent they spatially represent the surrounding vegetation. This test is realized on tree species and achieved by comparing the correlation between biomarker concentration and tree density with the considered area.