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# The Influence of laurophyllous Species on organic Matter and Geochemistry in Soils of Southern Switzerland and Northern Italy as a Response to Climate Change

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In recent decades (especially since 1950) numerous non-indigenous plant species of the evergreen broad-leaved (laurophyllous) type have started to colonise forests of southern Switzerland and northern Italy. The colonisation of laurophyllous species is an obvious indication of fast and accelerating climate change that is due to increased winter temperatures and lower frost frequencies. With respect to these changes in the vegetation cover, the question arises if or to which extent they influence soil organic matter and geochemistry and therefore soil quality.

In southern Switzerland, the common forest vegetation at sites $<$ c. 1000 m a.s.l. predominantly consists of chestnut species. *Castanea sativa* represents the present vegetation type at sites $<$ c. 1000 m a.s.l. An older *Quercetum-Betuletum* forest can be occasionally found in the area Locarno/Ascona/Cannobio. We studied the short-time influence of laurophylloid vegetation compared to chestnut and oak/birch forests.

Measurements of total organic carbon and nitrogen, pH, CEC and chemical fractionations of soil organic matter into humic and fulvic acids have been performed. Additionally, the oxalate and Na-pyrophosphate extractable content was determined for Fe, Al and Si.

The short-term effects of the laurophylloid vegetation on soil chemistry were quite pronounced. This was expressed by lower C/N ratios, lower fulvic and humic acid

percentages, higher values of the oxalate and Na-pyrophosphate extractable Fe and by a change in the quality and quantity of fulvic and humic acids and consequently of the humification degree.

Changes in the vegetation have already led in the short-term to significant disturbances of the soil system. The bio-degradation of the litter source seemed to be enhanced compared to chestnut or *Quercetum-Betuletum* forest. The chemistry of SOM between *Quercetum-Betuletum* and chestnut vegetation sites did not differ greatly because the quality of the litter source seemed to be similar. Within about 50-100 years humus chemistry at laurophyllous stands has changed and led consequently to a different Fe speciation (expressed by a higher percentage of oxalate and pyrophosphate extractable Fe). In contrast to Al, also the Si-chemistry was partially affected.