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Annual variation in the activity of hydrolytic enzymes of the P and S cycles in soils under different types of forest vegetation

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The annual variation in the activity of hydrolytic enzymes in soil is usually attributed to variations in temperature, edaphic moisture content and substrate availability, factors which in turn depend on climate and the vegetation that the soil supports. However, in some cases it has been observed that the relationship is not so clear, as the variations in enzyme activity do not follow clear seasonal patterns. The aim of the present study was to investigate the seasonal variations in the level of activity of various P cycle (phosphodiesterase and phosphomonoesterase) and S cycle (arylsulphatase) enzymes in soils from Galicia (NW Spain), in relation to the type of forest vegetation. For this, the activities of these enzymes were measured once at month over a period of 13 months in soils developed under *Quercus robur* L., *Eucalyptus globulus* L. and *Pinus radiata* D. Don, at two study sites (Sobrado and Casanova).

During the entire period of the study the activities of the P cycle enzymes in the Sobrado soil were higher in the soils under *Pinus* than in the soils under *Quercus* and *Eucalyptus* (considering both absolute values of activity and activity per unit organic C, that is, specific activity). In contrast, in the Casanova soils, the values of activities of both enzymes were higher in the soils under *Eucalyptus*. At both sites, the arylsulphatase activity was always higher in the soils under *Quercus* than in the soil under *Pinus* and *Eucalyptus*.

At both sites, the activities of all three enzymes varied greatly throughout the year,

in terms of absolute activity and specific activity. At both sites and for the soils under different types of vegetation, the variation in arylsulphatase activity was directly related to the variations in temperature and precipitation. In contrast, the annual variation in the activities of enzymes involved in the P cycle was not clearly related to the climatic conditions, and the correlations between climatic parameters and enzyme activity were barely significant.