Collembolan communities as bioindicators of land use intensification

International audience, Springtail communities (Hexapoda: Collembola) were sampled in the Morvan Nature Regional Park (Burgundy, France) in six land use units (LUUs) 1 km(2) each, which had been selected in order to cover a range of increasing intensity of land use. Human influence increased from LUU 1 (old deciduous forest) to LUU 6 (agricultural land mainly devoted to cereal crops), passing by planted coniferous forests (LUU 2) and variegated landscapes made of cereal crops, pastures, hay meadows, conifer plantations and small relict deciduous groves in varying proportion (LUUs 3-5). Sixteen core samples were taken inside each LUU, at intersections of a regular grid. Species composition, species richness and total abundance of collembolan communities varied according to land use and landscape properties. Land use types affected these communities through changes in the degree of opening of woody landscape (woodland opposed to grassland) and changes in humus forms (measured by the Humus Index). A decrease in species richness and total abundance was observed from old deciduous forests to cereal crops. Although the regional species richness was not affected by the intensification gradient (40-50 species were recorded in every LUU), a marked decrease in local biodiversity was observed when the variety of land use types increased. In variegated landscapes the observed collapse in local species richness was not due to a different distribution of land use types, since it affected mainly woodland areas. Results indicated the detrimental influence of the rapid afforestation of previous agricultural land, which did not afford time for the development of better adapted soil animal communities.

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