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## MONITORING FOREST SPECIES DIVERSITY: FEEDBACKS FROM A 15-YR EXPERIENCE

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### ABSTRACT

Trends in species diversity represent an important challenge to be addressed by forest monitoring in response to environmental changes, of which climate is critical. However assessing such changes faces methodological issues. Useful lessons can be drawn from practical experience. In France, forest ecosystems have been intensively monitored since 1992 on 102 permanent plots (RENECOFOR network), in the framework of the ICP-Forests Pan-European monitoring program. Among ecosystem parameters, plant composition has been recorded every five years since 1995, inside and outside the fenced central area of each plot. Fungi species (basidiomycota) were inventoried on 51 plots. Special attention has been paid to assessment quality: inventories by expert taxonomists, assessments on permanently delimited areas, use of harmonized taxonomy, observer effects quantified with intercalibration exercises and control assessments. For both plant and fungi surveys, detecting and identifying species are affected by important observer effects. In average per census, 19% of plant species are undetected by each observer team compared to consensus inventory. Also the species richness continuously increases with the number of inventories over time. Therefore species richness hardly appears as a relevant indicator to be monitored. After 15 years, temporal changes in plant composition and indicator values were of weak magnitude, not unidirectional and inconsistent with significant changes measured in soil chemistry (pH, C/N). The most significant temporal change observed was the diverging trajectories of plant communities between fenced and unfenced areas, indicating the prominent role of large wild mammals. Fungi inventories revealed significant spatial patterns of communities, responding to environmental factors. Results were used to evaluate the sampling effort needed for detecting further significant response to each factor. What trends can be actually detected in biodiversity? This should be carefully considered by stakeholders, regarding time scales, magnitude of changes and relevant response indicators.



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