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PROGRAM AND ABSTRACTS

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Soil bioindicators: how soil properties influence their responses and how to select them in function of the site issues?

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Context - Despite no directive exists for soil protection, this key component of ecosystem needs to be protected. To fill the lack of tools to monitor the soil threats and to assess the impact of soil management, biological indicators have been developed in the French program Bioindicators 2 (ADEME). On the 47 plots of 13 sites (agricultural, industrial and forest), the influence of soil characteristics and soil use on the response of 80 biological parameters (fauna, flora and microorganisms) have been assessed by using linear multivariate regressions.

Results - The soil texture and the organic carbon rate has been identified as the main soil characteristic influencing the biological responses, even if each bioindicator is influenced by its own pool of soil parameters. It underlines the necessity to use battery of bioindicators for an integrative assessment of soil quality. An influence of soil contaminants (organic or metallic) have been highlighted for 86% of the bioindicators showing the necessity to consider their bioavailability for suitable soil management. To disseminate the use of bioindicators, a web interface has been implemented (<http://ecobiosoil.univ-rennes1.fr/ADEME-Bioindicateur/>). It presents all the biological methods developed in the program and allows consultation of the variation range of each bioindicator considering site contexts and soil physico-chemical characteristics of soils thus leading to provide a first benchmark. It also provides tools to the end-users to select the bioindicator(s) which best fit(s) with their own site problematic (agricultural practices, bioavailability of contaminants, soil monitoring...) and to communicate (technical sheets...).

Conclusion – For the first time, the soil properties influence on the response of 80 bioindicators was characterized under similar environmental conditions. As each bioindicator is influenced by a specific pool of soil parameter, chemical measures cannot be used as a surrogate of biological measures. This program has provided usable tools for a biologically-based site management.

Keywords: bioindicators, soil quality, soil properties, web interface