Effects induced by punctual solar trackers on soil biodiversity in an agricultural field context

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Résumé

The development of renewable energy technologies is growing rapidly, with solar energy being the most promising source. Agrivoltaics in particular offers the advantage to combine crop and energy production on the same land. While many studies have looked at the impact of ground-mounted solar power panels, very few have focused on agrivoltaic structures, and none on dual axis trackers with bi-dimensional turning mount-holding panels and limited ground anchorage. Our study focused on the relative impact of trackers (via anchorage constraint to farming practices and mobile shading) and farming practices on the physical, chemical and biological soil features in both wheat croplands and meadows. Using a PLS-PM analysis, we show that trackers have a slightly negative or positive effect, depending upon the crop and organisms considered, while agricultural practices had a negative effect in all cases. Shading positively affects earthworms in wheat fields and meadows. Regarding arthropods and microorganisms' activity, the effect is positive in wheat fields, but negative in meadows. Due to cropping constraints, the trackers foot area shows altered chemical soil properties but hosts more plant species. Our results show that such solar equipment does affect soil biodiversity in various ways. To mitigate these potential impacts, it is crucial to implement sustainable soil management practices in agrivoltaic projects. Our results point the way for future studies on wheat crops and grasslands and foster the study of biodiversity across various crops.

Mots-Clés: biodiversity, agrivoltaic, solar trackers, photovoltaic, soil

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