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## Unexpected movements of earthworms between tree rows and crop alleys in a Mediterranean agroforestry site

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In alley cropping sites, parallel tree rows covered with herbaceous vegetation are added into cropped fields. These tree rows provide an additional habitat for many soil organisms in plots that are usually low in biodiversity. Previous studies showed that tree rows present a higher diversity and higher densities of soil fauna compared to the crop alleys. However, it is not sure that the crop alleys really benefit from the presence of additional fauna in the tree rows. A possible benefit could come from a dispersal of soil fauna hosted in the tree rows towards the crop alleys during favorable periods of time, but such movements have never been investigated. Our experiment investigated the movement of earthworms in tree rows vicinity in a Mediterranean alley cropping field planted with walnut trees, in which crop alleys were ploughed and cultivated with pea. Traps, consisting of three joined plastic walls sunk vertically into the soil and delimiting a cubic 25\*25 cm wide soil block of 15 cm depth were placed at 30 cm from the tree row border in March 2019. These traps were opened on one side, allowing soil fauna entrance either from the tree row or from the crop alley, and defaunated at trap implementation (5 replications). Traps were removed 2 months after the beginning of the experiment and earthworm density determined by manual sorting. In addition, the plot was sampled at different distances from the tree row (0 m, 0.3 m, 1 m and 6 m i.e. in the middle of the crop alley) for earthworm density determination in 25\*25\*30 cm soil blocks at trap implementation and removal. Results showed that the distribution of epigeic earthworms (living at the soil surface) vary with the distance from the tree row, with more individuals found in the tree row and in its immediate vicinity than in the middle of the crop alley, while endogeic earthworms (living in the soil) presented no significant variation in their distribution with the distance from the tree row. Traps were mostly recolonized by endogeic earthworms, and significantly more earthworms were found in traps opened towards the crop alley than in traps opened towards the tree row. These results suggest that Spring was not a favorable season for earthworm dispersal from the tree row in this site, and that earthworms more probably used the tree row and its vicinity as a refuge against adverse conditions in the crop alley. This type of experiment should be repeated at other seasons, and with varying management practices of the crop alley, as different conditions could induce different movements.