

# Assessing the effect of complex ground types on ground-dwelling arthropod movements with video monitoring: dealing with concealed movements under a layer of plant residues

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## Abstract

1 Understanding the effect of ground types on foraging movements of ground-dwelling arthropods is a key step to managing their spatial distribution as required for successful conservation biological control. Indeed, fine movements at the centimetre scale can strongly influence the foraging ability of pest predators. However, because RFID or harmonic tracking techniques are not yet suitable for small species and video tracking focuses on uniform and light backgrounds, foraging movements have rarely been studied in relation to ground types. 2 We present a method to track a ground-dwelling arthropod (the earwig *Euborellia carai-bea*) at night, walking on two contrasted ground types : bare soil and soil partly covered with a stratum of banana plant residues allowing individuals to hide periodically. 3 The tracking of individuals within these ground types was achieved by infrared light, tagging individuals, video treatments and semi-automatic cleaning of trajectories. We tested different procedures to obtain segments with identical durations to quantify speeds and sinuosities. These procedures were characterised by the junction time gap between trajectory fragments, the rediscritisation time of trajectories, and whether or not to use interpolation to fill in missing points in the trajectories. 4 Earwigs exhibited significantly slower and more sinuous movements on soil with banana plant residues than on bare soil. Long time gaps for trajectory junction, extended rediscritisation times and interpolation were complementary means to integrate concealed movements in the trajectories. The highest slowdown in plant residues was detected when the procedure could account for longer periods under the residues. 5 These results suggest that earwigs spent a significant amount of time concealed by the residues. Additionally, the residues strongly decreased the earwigs' movement. Since the technical solutions presented in this study are inexpensive, easy to set up and replicate, they represent valuable contributions to the emerging field of video monitoring.

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