
Landscape composition and farming practices affect the abundance of the codling moth and its predation and parasitism in apple orchards

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Abstract

There is increasing recognition that landscape management could contribute to sustainable pest control. However, while many studies indicate that the proportion of semi-natural habitat over the landscape correlates positively with the abundance and diversity of natural enemies in fields, results are more equivocal concerning the reduction of pest abundance. This last result is possibly due to the diversity of land-use intensity in the landscapes. In the present studies, we assessed whether amount of semi-natural habitat and pesticide use at both local and landscape scales affected the abundance of codling moth (*Cydia pomonella*, lepidoptera), its parasitism and predation of sentinel eggs in commercial apple orchards of south-eastern France. Apple orchards are managed very intensively with an average of approximately 35 treatments yearly, among which most insecticides target the codling moth. To estimate codling moth abundance and parasitism, we trapped diapausing larvae in approximately 45 orchards in autumn. Sentinel codling moth eggs were exposed in 13 orchards representing a range of local pesticide use. Data analyses were based on model selection to assess significant variables at both local and landscape scales. Our results indicate a strong effect of the pesticide use intensity at both scales on the abundance of codling moth, its parasitism and eggs predation. Codling moth abundance within sampled orchards also marginally depended on the amount of windbreak hedgerows in the landscape.

Keywords: Landscape, parasitism, predation, pesticides, orchards, Lepidoptera.

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