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CHAPTER 3

Pest control in organic farming

Cristina A. Costa[1], Raquel P.F. Guiné[1], Daniela V.T.A. Costa[1], Helena E. Correia[1] and Anabela Nave[2,3]

[1]Polytechnic Institute of Viseu, CI&DETS Research Centre and Agrarian School, Viseu, Portugal
[2]National Institute of Agricultural and Veterinary Research, IP, Oeiras, Portugal
[3]Centre for the Research and Technology of Agro-Environmental and Biological Sciences, University of Trás-os-Montes and Alto Douro, Vila Real, Portugal

3.1 Introduction

Pests and diseases cause significant losses and are a major concern for farmers regardless of adopted production system. Pests and diseases are the main competitors with humans for agricultural products, particularly when it comes from crops grown under high-productivity conditions (Oerke and Dehne, 2004; Oliveira et al., 2014) or in food-deficit regions where emerging or reemerging pests and diseases are constant (Savary et al., 2019). The damages caused by these crop enemies constitute a significant factor in reducing the productivity of many crops, either in the field (preharvest) or later during storage (postharvest). An average of 35% of potential crop yield is lost due to preharvest pests worldwide, and postharvest losses (transport, preprocessing, storage, processing, packaging, marketing, and plate waste) may achieve another 35% (Oerke, 2006; Molden, 2007; Popp et al., 2012), although these estimates present large fluctuations due to several factors related to environmental conditions, the plant species being cultivated, the agricultural practices, the farmers' socioeconomic conditions, and the level of technology used (Oerke and Dehne, 2004; Oliveira et al., 2014; Tonnang et al., 2022).

Furthermore, the potential impacts of increasing growing-season temperatures and atmospheric CO_2 concentrations on pest and diseases—crop interactions increase the crop losses (estimates show that for each degree Celsius of warming, yield lost due to insects will increase by 10%—25%) and demand for new sustainable pest management strategies to mitigate damages (Oerke and Dehne, 2004; Deutsch et al., 2018; Fenu and Malloci, 2021; Tonnang et al., 2022). To reduce the negative impacts of warming on pests, diseases, and weeds and their wider dissemination, it is urgent to better understand individual species responses, but also to be

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