Chapter 4

# Crop protection in organic agriculture

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## Introduction

Organic farming systems are challenged by many of the same crop protection issues as conventional farming systems. Approaches to crop protection in organic agriculture differ widely among growers globally and regionally. At one end of the spectrum, organic growers use substitution-based approaches in large-scale operations to capture premium prices in a niche market. At the other end, resource-poor farmers producing subsistence crops use, by default, pest regulation tactics based on traditional knowledge. Organic growers at both ends of the spectrum are less motivated by environmental and public health considerations than are those growers that have formed the philosophical centre of organic agriculture movements in various parts of the world. For these growers, organic agriculture differs fundamentally from conventional agriculture, not in terms of the pest and disease challenges that face crop production or solely in the range of tactics used by growers, but in the conceptual approaches that frame crop management strategies.

Too often, descriptions of the conceptual approaches in conventional and organic agriculture are overly simplified (Trewavas 2004). Conventional pest control can no longer be characterised as the reliance on scheduled applications of broad-spectrum pesticides (biocides, insecticides, fungicides, herbicides). Best practices in conventional agriculture incorporate a wide range of tactics, including pest monitoring and judicious use and timing of selective pesticides, selection of insect and disease-resistant cultivars, and cultural controls such as crop rotation and crop residue destruction. By the same token, organic agriculture is more than conventional agriculture minus synthetic fertiliser and pesticide inputs. While some organic growers do simply substitute manure for fertiliser and botanically derived pesticides for synthetic pesticides – more often, organic practices involve a wide range of soil management and cropping practices that maintain ecosystem health and foster ecosystem services (Altieri 1986 1999, van Bruggen and Semenov 2000).

For the purpose of this chapter on pest and disease management, organic agriculture is defined as plant and animal production systems managed with an emphasis on sustainable and renewable biological processes: nutrients supplied at rates needed to maintain nutrient balances through decomposition of nitrogen (N)-fixing green manures and plant or animal-based soil amendments, and pest management relying heavily on promoting plant health, vegetation management and biological control. Curative pest treatments include application of microbials, botanicals, soaps, oils and minerals and augmentative releases of predators; synthetic fertilisers or pesticides are generally not applied, unless exemptions are granted.