

# Field Manual of Techniques in Invertebrate Pathology: Application and Evaluation of Pathogens for Control of Insects and Other Invertebrate Pests

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## Abiotic Factors

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### 5.1 Introduction

Pathogens of invertebrates, along with their hosts, inhabit all niches throughout the world, in ecosystems ranging from sub-arctic to arid, temperate, and tropical. The abiotic factors that affect pathogen survival, reproduction, distribution and pathogenic effects on hosts consist of environmental elements such as temperature, moisture, and ultraviolet (UV) radiation, habitat characteristics including soil texture, soil type, and pH, as well as chemical inputs such as fertilizers, pesticides, and pollutants. In the present chapter, we will provide an updated overview of what has been learned regarding abiotic effects on different entomopathogen groups during the past 30 years. We focus our discussion on entomopathogens that have demonstrated potential roles in microbial control. The abiotic factors discussed complement other influences (biological and genetic, which are described in other chapters) that dictate the prevalence and activity of pathogenic organisms.

### 5.2 The Surviving Unit

We define the surviving units as the life stages or propagules of the organism that persist in the environment and are transmitted to the next host. While another way to think of these stages would be as stages for persistence and transmission, we are emphasizing the fact that they are the stages exposed to abiotic conditions and that they must survive in order to encounter a new host.

#### 5.2.1 Nematodes

Among several families within the order Rhabditida, environmental stress (lack of food, high population density, heat, etc.) induces the development of a unique juvenile stage, the "dauer juvenile" (Riddle, 1988). This stage is adapted morphologically and physiologically to remain in the environment without feeding while it searches

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