

Chapter 8

Guardian Crops

Cultivating Resilience

Against Pests


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ABSTRACT

Guardian crops are a relatively new method of reducing the need for pesticides by controlling pests through inherited competence. The production of crops and food may be negatively impacted by the growing populations of pests. The main handicap of consuming these synthetic products in a field is that it pollutes the environment and degrades the field's quality, which also hurts human health. To cope with the hazardous chemical, there are various nations approaches to crop improvement have

DOI: 10.4018/979-8-3693-3061-6.ch008

adopted globally. New emerging technological approaches like CRISPR or genetic modification have more potential to minimize the use of pesticides and their negative impact on community health. The world's nutritional needs and the preservation of ecological systems for future generations can be synchronized through precision agriculture, agro-ecological practices, and environmentally friendly technologies.

INTRODUCTION

The crops known as “guardian crops” shield their food. At its core, the idea of a guardian crop represents a fundamental shift in the ways that pests can be managed. The ability to fend off pests will be inherited by the cultivated crops. It is a relatively new method of reducing the need for pesticides by controlling pests through inherited competence. Integrated pest management is also an emerging field to control the pest. Integrated pest management ensures the control of pests by natural mechanisms and reduces the use of pesticides (Sylvain et al., 2023). The expanded use of chemical treatments is leading to obstacles for society. The organisms that are injurious to both organism and their surroundings are called pests. Insects are regarded as pests that endanger agriculture, agronomy, and public health. The ultimate result is a reduction in the quantity of plants, growth potential, and yield of ingredients (George et al., 2021).

For farmers, determining the degree of pest risk and the causative agent is a concerning matter (Sylvain et al., 2023). There are several techniques that have been adopted to control the pest in pre-harvesting or post-harvesting respectively. The cause of pest population outbreaks is the shifting climate and weather. The production of crops and food may be negatively impacted by the growing populations of pests (Bijay et al., 2023). A crop's intrinsic capabilities refer to its innate ability to repel pests. Pathogens face a variety of challenges when it comes to plants. First line of defense against foreign invaders is a physical barrier, which is made up of things like stiff cell walls and waxy cuticles. Plant tissue can be destroyed at any point during the crop-growing process by mechanical damage, animal herbivory, bacterial and fungal pathogen contamination, and other factors (George et al., 2021). A vast array of biotic and abiotic stresses can affect plants including drought, salinity, cold and pathogens throughout life. This has prompted the advancement in the immune system that assists to face the stresses. One mechanism that senses an external signal and transmits it to an internal system for the initiation of a cascade pathway is receptor-like kinases (Tan et al., 2019). Many terrestrial plants have trichomes on their foliage, branches, and petal organs (Fei et al., 2020). Trichomes are an appending structure that arises from the epidermal surface and is derived from the epidermis. It is an ideal system to study the regulation of morphogenesis because it is simple to study (Sambade

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