Conservation practices help protect crops from pests and pathogens

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Conservation agriculture is the implementation of a combination of agricultural practices that benefit the soil and its surrounding environment while ensuring sustainable yields. These practices include no-till, minimal soil disturbance, crop rotation and the use of cover crops throughout the year. Other practices include limiting the use of chemical substances and including cattle in the system to utilise cover crops and boost soil improvement. The benefit of this system is that it is more sustainable and resilient to environmental changes.

The first rule of ecology is to limit invasion of and damage to an ecosystem. Conservation agriculture is based on the same principle. Insects and plant pathogens that feed on crops can cause significant yield and economic losses. Consequently, there is conflict between the 'do no harm' principle and the success of cash crops. But, to ensure a stable yield, how can conservation agriculture be implemented, and the damage caused by insects and plant diseases limited?

Basics of conservation agriculture

The answer to this question lies in the implementation of conservation agriculture. If practices are applied correctly, pest control should not be necessary. Instead of controlling isolated symptoms in the system, it should be viewed holistically, and the entire system should be managed correctly.

There is interaction between the various components of an ecosystem, each contributing to the smooth functioning of the system. Conservation agriculture increases plant diversity in the system by including a variety of cover crops (multi-species) and the rotation of cash crops.

This diversity facilitates an increase in the biodiversity of other organisms above and below ground, which leads to an increase in functional diversity. The higher the diversity, the more ecosystem functions are performed. This contributes to the entire system's functioning. These ecosystem functions include pest control, pollination, decomposition and biocirculation.

Natural predators

Biological control is the application of practices that sustain and benefit the reproduction, survival and efficacy of predatory organisms. Natural enemies are important for regulating the population of agricultural insect pests.

The approach to the conservation of these organisms include avoiding practices that will affect them negatively and implementing ones that will benefit them. These organisms need food, water, shelter and protection from harmful circumstances to survive.

The principles on which conservation agriculture is based, create ideal conditions for natural predators by establishing an increase in plant diversity and density. When natural predators are favoured, they are better able to perform ecological functions, meaning more efficient pest control.

Other organisms that benefit from conservation agriculture, such as decomposers, can contribute to the successful circulation of nutrients in the soil. This will contribute to the general growth and health of the crop which, in turn, will be more resistant to insects and pathogens.

Follow the right principles

Achieving the goal of conservation agriculture requires knowledge of the biology of the natural organisms that contribute to ecological functions. The right principles can then be followed in creating beneficial habitats for these organisms. It is important to limit external disruptions, such as the use of chemicals, as it will have a negative impact on organisms that perform vital ecological functions. It will weaken the entire system and prevent it from functioning efficiently.

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