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DAMAGE TO GROWING CROPS CAUSED BY INSECTS (ШКОДА ВИРОЩУВАННЮ РОСЛИН ВІД КОМАХ)

Бабій В. О*. – здобувач вищої освіти групи Т 1/1*

Науковий керівник: Марковська А.В., доцент кафедри іноземних мов МНАУ

Дана стаття присвячена вивченню комах та їх шкідливому впливу на сільське-господарство.

Ключові слова: *комахи, збитки, сільське господарство, с/г культура, врожай.*

This article is devoted to the study of insects and their harmful effects on agriculture.

Keywords: *insects, losses, agriculture, agricultural culture, harvest.*

Farmers know they lose crops to pests and plant diseases, but scientists have found that on a global scale, pathogens and pests are reducing crop yields for five major food crops by 10 percent to 40 percent, according to a report by a UC Agriculture and Natural Resources scientist and other members of the International Society for Plant Pathology [1]. Wheat, rice, maize, soybean, and potato yields are reduced by pathogens and animal pests, including insects, scientists found in a global survey of crop health experts.

At a global scale, pathogens and pests are causing wheat losses of 10 percent to 28 percent, rice losses of 25 percent to 41 percent, maize losses of 20 percent to 41 percent, potato losses of 8 percent to 21 percent, and soybean losses of 11 percent to 32 percent, according to the study, published in the journal Nature, Ecology & Evolution [2].

Viruses and viroids, bacteria, fungi and oomycetes, nematodes, arthropods, molluscs, vertebrates, and parasitic plants are among the factors working against farmers [1].

Insects are responsible for two major kinds of damage to growing crops. First is direct injury done to the plant by the feeding insect, which eats leaves or burrows in stems, fruit, or roots. There are hundreds of pest species of this type, both in larvae and adults, among orthopterans, homopterans, heteropterans, coleopterans, lepidopterans, and dipterans. The second type is indirect damage in which the insect itself does little or no harm but transmits a bacterial, viral, or fungal infection into a crop. Examples include the viral diseases of sugar beets and potatoes, carried from plant to plant by aphids.

Although most insects grow and multiply in the crop they damage, certain grasshoppers are well-known exceptions. They can exist in a relatively harmless solitary phase for a number of years, during which time their numbers may increase. They then enter a gregarious phase, forming gigantic migratory swarms, which are transported by winds or flight for hundreds or thousands of miles. These swarms may completely destroy crops in an invaded region. The desert locust (Schistocerca gregaria) and migratory locust (Locusta migratoria) are two examples of this type of life cycle [2].

Non-Chemical Methods

Many natural controls act to keep insects in balance:

• Weather factors like temperature and rainfall can restrict the distribution of an insect species. For example, mites and leafhoppers are usually more prevalent under dry conditions.

• Geographic barriers like large bodies of water, mountains, and deserts can also limit insect distribution.

• Frogs, toads, lizards, moles, and birds are some of the many animals that feed largely on insects.

• Beneficial predator insects like ladybugs feed on aphids, while others like the braconid wasp and tachnid fly lay eggs on or in certain pests which are killed

by the developing larvae. Some predator insects like the praying mantis eat beneficial insects as well, however. Insects are also attacked by viruses, fungi, and bacteria which help keep populations down.

As agricultural activities have increased, many of these natural balances have been upset and can no longer be relied upon to keep harmful insects under control. Monoculture and the existence of vast areas under cropping have led to marked increases in a number of insect pests. Indiscriminate use of pesticides has actually resulted in buildup of harmful insects in some cases. Many of the traditional crop varieties, despite their lower productivity, have better insect resistance than some of the improved varieties.

Chemical Control

Chemical control refers to the use of commercial insecticides in the form of sprays, dusts, granules, baits, fumigants, and seed treatments. While some of these insecticides like rotenone and pyrethrin, are naturally derived, most are synthetic organic compounds that have been developed through research.

Integrated Pest Control

The disadvantages of total reliance on insecticides have given rise to integrated pest control or pest management which involves the judicious use of these chemicals based on the following guidelines and principles:

• The development and use of cultural and other nonchemical control methods to avoid or reduce insect problems.

• Determining crop tolerance to pest damage based on the principle that complete freedom from pests is seldom necessary for high yields. Nearly all plants can tolerate a surprising amount of leaf loss before yields are seriously affected.

• The appropriate timing and frequency of treatments to replace routine, preventative spraying. Treatments are not initiated before the particular insect has reached the economic damage threshold, which will vary considerably with the species. Insect scouting looking for related kinds and number of insects and their density and population counts-is an essential part of this system.

The advent of integrated pest control dates back to the early 1970's, and most of the efforts have been directed at cotton where insecticides frequently account for up to 80 percent of total production costs [3].

Some remarkable successes have been achieved with other crops as well. For the reference crops, integrated pest control is still in the very early stage, especially in developing countries.

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