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EFFECT OF SOME DIFFERENT METHODS AND NATURAL ENEMIES ON THE CONTROL OF THE APHID OF SOME HERBOGY GRASS FIELD CROPS IN NEPAL

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ABSTRACT: The study dealt with methods of controlling aphids on some grassy field crops in Nepal. The aphids are considered a dangerous sucking piercing insect because they feed on plant sap and attack all parts of the plant and cause damage to it also transmit different viruses. The insects' spreads in both Egypt and Nepal, where the climatic conditions are similar in both countries, which prompted farmers to use multiple methods to control this insect because of the special importance of the grass field crops and where a large percentage of the population depends on them. There are many ways to control aphids, biologically, chemically, and others. One of the most important methods of combating this insect is integrated pest management (IPM). This controlling strategy depends on the rational use of both physical and mechanical control, chemical and biological control, and organizational and legislative control in a way that achieves the goal of its use and maintains the ecological balance. To accomplish this, it is necessary to persuade farmers to use alternative methods to combat natural enemies, particularly aphids, in addition to planting new pest- and disease-resistant plant varieties, exploiting the available natural resources and exploiting environmental factors to eliminate pests, as well as raising their awareness of the effective time and appropriate time to spray pesticides in the proper way, as well as the precautions to be taken into account when spraying and information related to chemical control, as well as their skill in using other control methods and evaluating these uses in control, especially aphids.

Key words: Aphids, Integrated Pest Management, Natural Enemies, Nepal.

INTRODUCTION

Field crops are defined as crops that are grown in large areas and for the purposes of growing these crops either to meet the human need for food resources, either directly such as wheat, rice, beans, lentils and peanuts, or indirectly such as alfalfa and other fodder crops where animals feed on them and then humans feed on the products of these animals such as meat, milk and eggs.Some of these crops are grown to supply industries with raw materials such as cotton, on which the textile industry and oil extraction depend, as well as sugar cane and sugar beet, on which the sugar industry depends. Depending on the growing season, they are divided into winter, summer, Nile crops and divided by life cycle into biennial and perennial crops. Field crops are also divided according to plant families into the grassy family and the leguminous family, and there are other crops belonging to different plant families and the grass family is in the process of studying them (**El-Deeb, 2003**).

Aphids have soft pear-shaped bodies with long legs and antennae and may be green, yellow, brown, red, or black depending on the species and the plants they feed on. A few species appear waxy or woolly due to the secretion of a waxy white or gray substance over

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their body surface. Most species have a pair of tube-like structures called cornicles projecting backward out of the hind end of their body. The presence of cornicles distinguishes aphids from all other insects. Generally adult aphids are wingless, but most species also occur in winged forms, especially when populations are high or during spring and fall. The ability to produce winged individuals provides the pest with a way to disperse to other plants when the quality of the food source deteriorates. Although they may be found singly, aphids often feed in dense groups on leaves or stems. Unlike leafhoppers, plant bugs, and certain other insects that might be confused with them, most aphids don't move rapidly when disturbed **(Boray, 2018)**.

Low to moderate numbers of leaf-feeding aphids aren't usually damaging in crop or on vegetables. However, large populations can turn leaves yellow and stunt shoots; aphids can also produce large quantities of a sticky exudate known as honeydew, which often turns black with the growth of a sooty mold fungus. Some aphid species inject a toxin into plants, which causes leaves to curl and further distorts growth. A few species cause gall formations. Aphids may transmit viruses from plant to plant on certain vegetable and ornamental plants. Squash, cucumber, pumpkin, melon, bean, potato, lettuce, beet, and chard are crops that often have aphid-transmitted viruses associated with them. The virus's mottle, yellow, or curl leaves and stunt plant growth. Although losses can be great, they are difficult to prevent by controlling aphids, because infection occurs even when aphid numbers are very low; it takes only a few minutes for the aphid to transmit the virus, while it takes a much longer time to kill the aphid with an insecticide **(Boray, 2018)**.

A few aphid species attack parts of plants other than leaves and shoots. The lettuce root aphid is a soil dweller that attacks lettuce roots in spring and summer, causing lettuce plants to wilt and occasionally die. In fall, this species often moves to poplar trees, where it overwinters in the egg stage and produces leaf galls in spring. The woolly apple aphid infests woody parts of apple roots and limbs, often near pruning wounds, and can cause overall tree decline if roots are infested for several years. Heavy infestations of crown and root aphids on carrots may weaken tops, causing them to tear off when carrots are harvested **(Boray, 2018)**.

This insect is considered one of the most important and dangerous insects piercing sucking in the world and the danger of this insect lies in absorbing plant sap and transmitting some viral diseases, although it is a very delicate and weak insect, but within it is a system and speed of defense and the ability to survive and physiological efficiency **(Boray, 2018)**. In addition, this insect infects all parts of the plant such as leaves and roots and this insect is described by specialists as easy abstaining and simple difficult, hence the thinking of linking control operations in Nepal and Egypt to this insect (**El-Deeb, 2003**).

The importance of this study lies in solving the problem of insect infestation and increasing the production of crops (wheat and corn) because it plays an important and vital role in securing the lives of peoples, hence the thinking about reducing the insect infestation that affects these crops, including aphids.

Methodology Used in the Study

The study generally uses research methods in sucking piercing insects, especially about the mixed approach, which combines the inductive and deductive approach and is accompanied by analysis, activation, and conclusion of the research topic.

Research Problem

1. The scarcity of scientific material related to the subject of the research, as the letters are few (up to the point of scarcity) and even direct contact with the Embassy of Nepal
2. The complete separation between the researcher and the study area, which did not enable field work.

The Importance of the Study

The importance of the crops under study lies in the economic importance of these crops in food security in Nepal. Hence the thought of finding some ways to increase production and maintain the level of per capita income of these

crops and reduce environmental pollution and pesticide residues in these plants. The trend here is to study and know the different control methods and alternatives to pesticides used in Nepal to preserve vital enemies, reduce waste of public money, prevent chronic diseases, and preserve beneficial economic insects.

Objectives of the Study

1. Identify the most important insect pests in Nepal, especially aphids.
2. Studying and inventorying the methods of pest control under study in Nepal.
3. Determine the most appropriate methods to combat aphids and study the effects of control methods.
4. The extent to which the insect has acquired the characteristic of resistance to chemical control methods in Nepal.
5. Develop a framework or plan with proposals to solve any problem that may appear in a safe, safe, and fast manner to avoid damage, especially about integrated control.

Identify the Most Important Insect Pests in Nepal, Especially Aphids

Family: Aphididae

Small insects are often wingless, although the wings are somewhat transparent, few veins and the front pair is larger than the back and wrist are mental. Horn sensor of 3-6 cuttings and there may be a pair of appendages called (cornicles) above the abdomen from the back and vary in length according to the species and be very small in some species. At the end of the abdomen there is usually a posterior extension called the tail (Cauda) under which the anus is located. Black, yellow, green, and brown aphids predominate in colors and some species secrete from special glands a fine waxy substance or in the form of white threads. The types of aphids are many and it may be difficult to distinguish some of them just by looking at them, but it is difficult to distinguish the closely related species Microscopic. This is due to the many differences in size, color, and other characteristics in the members of the same species, but rather the same generation **(Boray, 2018)**.

Life circle of aphids

Aphids multiply surprisingly quickly, for the large number of offspring of one individual, and the speed of puberty and breeding aphids in the cold regions in Europe, America, and others sexually and not sexually alternately. It appears in the fall males and females fertilize and lay eggs fertilized eggs for the duration of the winter and hatch in the spring females breed asexually and give birth to young breed in turn asexually and continue this type of reproduction throughout the summer When the temperature rises, the weather dries up, or the host plant dries, some individuals develop wings that help move to other plants. It was found that the insect is grown in the summer and after four days during which it molts four molts. At the end of summer, a generation of females and males is reproduced. Fertilized females then lay their fertilized eggs that remain until the next spring and thus the life cycle is restored **(Boray, 2018)**.

In the hot and warm regions for the duration of winter, such as Egypt, the breeding of most species continues asexually throughout the year, where males do not appear and eggs are not laid as cotton and there are a few in Egypt as green plums and pomegranates in which the mating cycle takes place where males appear Females lay eggs in the cold months only on the shoots of deadly plants and after hatching eggs in the spring continues reproduction does not mate as mentioned above (**Al-Manshawi *et al.*, 2001**).

Importance and damage

Aphid prefers juicy parts such as the tips of branches, leafy and floral buds and some species infect the roots, and it has been observed that aphids are attracted to plants with white and colored powders as well as covered with dust where there is near agricultural roads (**Al-Manshawi *et al.*, 2001** and **Boray, 2018**).

The damages of aphids are summarized in the following:

a) Absorption of sap and weakening of the plant.

b) Curling and yellowing of leaves, especially the leaves of the growing tops.

c) Some species cause tumors on the market such as fluffy aphids.

Fig. 1. Showing Light green and dark green forms of the cotton aphid, *Aphis gossypii*

d) Some species secrete fine substances and cover the surface of plants as a mealy plum

e) Aphid feces (honey dew) rich in sugars and found in abundance in the places of infection and therefore known as infection in farmers honeydew and this article attracts ants and grows on them black mold fungus.

f) Lock leaf stomata and the color of the plant in to black in the honeydew and the biological construction of the plant stops.

g) Stunted the plant to absorb amino acids and reduce the potassium content of the plant so that it stops growing.

h) Transmission of viral diseases (**Youssef, 2000**).

Ways of Transmission or Infection

Aphids are transmitted either directly by contact of the infected plant with another plant or by the movement of winged individuals to long or close distances, and aphids may be transmitted by means such as being attached to humans, animals, or any other means (**Youssef, 2000).**

Hosts

A plant host may have one or more of the hosts and may move from one host to another during his lifetime, that is, he has cyclic migration. During autumn, there may be a host called the first host (primary host) and remain on it or lay eggs on it, which hatch in the spring and the offspring remain until the beginning of summer. Then the insects move to another host, or several hosts called secondary hosts (Secondary host) and some grassy weed and remain on it until the end of summer and then return to the first host and so on. Insects may only move from leaves to roots, such as from plum in Egypt (Mealy Plum Aphis) (**Zaidan and Abdel-Majid, 2000**).

Symptoms of aphid infestation

(A) - Yellowing of leaves to damage plastids.

(B) - Absorption of sap, leaf curling and curling.

(c) - The presence of honeysuckle and black mold drop (**Zaidan, 2000)**.

Main aphids affecting grass field crops in Nepal

***Rhopalosiphum maidis (*Fitch)**

This insect is considered a pest of corn, barley, wheat, and sugar corn as it is found on grassroots and does not infect reed fields unless adjacent to infected barley fields. And transferred from grass weed after the maturity of these two crops (wheat and barley) and then appear on sugar corn and migrate from them to summer corn or grass weed that prefer them *P. Stogninum* and the incidence peaks in corn Nile and the infection of this manna another peak on

barley and wheat in early spring and the infection is more severe in barley than wheat as well as in the following types of corn tusk camel and American Badri and sugar and Giza Baladi and seventy (**Atris, 2015).**

Symptoms of infection

The shape of the corn leaves is slightly deformed, as the upper parts of the internal surfaces prefer to sheathe the leaves, but when the infection intensifies, the leaves are yellowed and drooping, and when the male inflorescence appears, it moves to it and prefers the lower part of it, as it also infects the cob and absorbs its juice, and honey secretions cause adhesion of pursey threads, as well as the adhesion of pollen, and this leads to a lack of yield. This insect transmits the mosaic and reed virus, and the resistance of this insect leads to an increase in yield 7.2% on average **(Atris, 2015)**.

Toxoptera graminum Rondeni

Its color is light green and, on the back, a rather dark green line and abounds in February and March and affects wheat and barley and is found on the blade of the leaves and the infection is usually few and may abound in the summer and affects rice and corn Awija. Highly infected plants are treated if they are not equivalent, and the areas are small. Additionally, the most important types of aphids that infect wheat are following:

a- Aphids oats *Rhopalosiphum padi*

b- Aphidsgreen wheat hug; *Schizophis gromunum*

c- Aphids maize *Rhopalosphum maidis*

d- Aphids Russian grain aphid wheat (**Atris, 2015**).

Aphids Barley

Of the insects that infect barley, barley insect, necrotic worms and cutworms all cause problems and damage to the crop, but aphids are considered one of the most dangerous because it transmits viral diseases to it from the bush spread in its fields.

Barley plants are infected with aphids, which cause significant losses in the crop, as the insect attacks the leaves and branches of the barley plant, where it absorbs plant sap from the upper plant tissues, causing yellowing and wilting of the plant. Honeysuckle also causes severe infection where the grain is not full and therefore the yield is reduced. There are many other types of aphids that infect barley, such as maize, green wheat and English crops, in addition to many other types of aphids (**Atris, 2015**).

Biological Control of Aphids

Predators

Many insect predators are used in the fight against aphids and the most important groups of insect predators that are used to combat aphids such as: -

Coccinellae sp

Such as Coccinellae 11 points and Coccinellae al-Samni, black, scummens and Rhodalia, where we prey on larvae and whole insects of aphids as well as whiteflies, scale insects and mealy bugs.

The insect is reveling *Staphy linidae*

Where we prey on aphids, small insects, eggs, and modern hatching of many Lepidoptera (cotton leaf warm).

Predatory flies *Syrphidae* (Order Diptera)

Such as Syrphidae flies, where its larvae prey on aphids, some scale insects, and mealy bugs, while the whole insect feeds on flower nectar

Chrysopoidae

Its larvae prey on aphids, sedimentation, and whiteflies, while full-fledged insects in most species live freely, non-predatory.

Predatory bugs (belonging to the order Hemiptera)

Such as the flower bug (auris) where it is considered a predator of aphids, men, red spider, and whiteflies (**Ghaith, 2017**).

Parasites used in the fight against aphids

Colmani parasites

In an extensive study on the parasite in the fight against aphids *Aphis gossypii* found that the parasite eliminates the aphid immediately if placed in large numbers (about 100 females) every 15 days where the parasitism was complete from the first day and helped the reproduction of the parasite to continue the

process of parasitism before adding the parasite again after 15 days and that treatment with the parasite was better than adding it by half the number every week or a quarter of the number twice a week, but this parasite was not a high degree In the fight against aphids in hot weather suitable for the rapid reproduction of aphids (**Ghaith, 2017**).

Pathogens used in the fight against aphids

A- Biofly fungal cause 3 × 10 7 / ml at a rate of 200 ml/100 liters of water.

B- The use of the fungus *Verticillium lecanii* is useful in the biological control of aphids (**Ghaith, 2017**).

Integrated Management of Aphids

Plants should be monitored and observed regularly at least twice a week for aphids to detect the infestation early, and so that it is easier to resist it easier when it begins to appear as many species as possible of aphids cause the greatest damage in late spring when temperatures are warm and not hot (35 degrees – 80 degrees Fahrenheit).

Aphids that cause damage to the leaves are often large numbers and if they begin to deform the leaves, it is difficult to control them because the leaves help to spread and shelter aphids from insects and natural enemies.

Aphids tend to be more widespread in the direction of the opposite of the wind so a special effort is made to examine these areas.

Many species of aphids prefer the lower side of the leaves so that it must be examined well when checking the spread of aphids and not only the upper side and must also check for the presence of natural enemies of aphids such as female beetles and insects Lepidoptera (Lace wings) and larvae of served flies (**Taher and Al Zahar, 2016; Dreistadt *et al.*, 2004).**

Agricultural control of aphids

Before starting the planting process, you must verify that the surrounding areas are free of sources of aphids and remove these sources, as some aphids are built on weeds and then move to crop seedlings after their emergence and these weeds that are spread by aphids can also provide a source for the presence of natural enemies of aphids. Aphid-containing weeds should always be checked and removed before planting. Another way to reduce the spread of aphids is to spray the plants with a strong spray of water, which pushes to escape and wash the secretions secreted on the plant and water spray should be used early in the day so that the plants dry quickly in the sun and are less susceptible to fungal diseases and often a strong spray of soapy water provides sufficient resistance to aphids (**Taher and Al-Zahar, 2016**).

The most important agricultural methods and guidelines used to confront aphids:

A- The use of certified varieties free of fungal and viral diseases and planted in areas suitable for their growth so that they are resistant and tolerant to infection.

B- Using appropriate agricultural distances because dense and intertwined agriculture increases insect infestations.

C- Implementation of agricultural operations in the elimination of weeds and residues of previous crops and balanced organic fertilization is the most factors to reduce the infestation in the crop.

D- Use of plant traps through the theory of food preference of hosts.

E- Following a triple agricultural cycle that works on soil fertility and low pest infestation.

F- Deep plowing of the soil works to break it down, kill the incomplete phases of insects and get rid of weeds that are a source of attraction for insects (**Taher and Al-Zahar, 2016**).

Mechanical control of aphids

Aphid trap

- The first method: paint a group of plates in yellow (brings aphids) with glue or any adhesive and then distributed in the area between the infected crops to catch the aphid.
- The second method: yellow containers are placed with water inside as the water quickly attracts to the water bowl and knocks, and to prevent mosquito breeding, we can put a little oil on top of the water (**Taher and Al-Zahar, 2016**).

Spray cold water

Spraying cold water with a strong flow (from a water hose) on the affected parts directly removes the aphids, preferably doing this process early in the morning to enable the plants to dry quickly and thus prevent the provision of appropriate conditions for fungal diseases (**Taher and Al-Zahar, 2016**).

Biological control of aphids as one of the integrated control programs

We defined biological control as the set of methods that require the use of living organisms to reduce the number of pests by predators, parasitoids, or pathogenic microorganisms to a level below critical economic limits, and this leads to reducing the percentage of damage caused by pests that harm humans, livestock, or crops.

In practice, the balance between living groups is altered in favor of species that are desirable within a natural or modified ecosystem due to agricultural practices.

The need for biological control has emerged after the emergence of health and environmental risks and damages due to the widespread use of chemical control, in addition to the emergence of resistant strains of pests to the pesticides used, and this calls for the search for new pesticides at a great material cost. (**Taher and Zahar, 2016; Bugg *et al.*, 2008)**

Methods and means of biological control of agricultural pests

Biological control of agricultural pests is carried out in several ways and means, which we summarize as follows:

Control of the life cycle of the pest (parasite)

Knowing the life cycle of the parasite, its life cycle can be controlled to reduce its numbers and parasites may be insects, spiders, fungi, bacteria or viruses, for example, if the parasite is an insect, insects multiply with eggs at specific times and in some species the development is complete, so larvae (similar to worms) come out of the eggs that feed on agricultural crops or parasitize on animals and humans Then turn into capable (hibernation) to develop into a full insect, each Marah has a specific timing If we control the life cycle of the insect to disrupt the cycle we have fought the insect without the use of a chemical, adjusting the dates of planting may disrupt the life cycle of some harmful insects, because the insect completes its life cycle in a certain time If we plant early varieties appear insect and reap the crop before it completes its life cycle and dies and decreases in number in the next year (**Taher and Al-Zahar, 2016; Bugg *et al.*, 2008; Lawson and Dreistadt-June, 2005)**.

Shedding beneficial insects on harmful targets

Of the beneficial insects' predators feed on parasites that harm the plant any pests and may feed on all phases from eggs to larvae to full insects and may damage their eggs when taken incubators for their eggs (any incubators for predator eggs)

An example of this is Abu Eid insects, most of which are predators, and their species are approximately (3000) species, where they feed on aphids, scale insects, mealy bugs and all their phases. Aphids that feed on aphids and several parasitic insect genera of the family Aphelinidac have also been successfully used to combat aphids (**Taher and Al-Zahar, 2016**).

Shedding the dream (mites) on harmful targets

There are more than 30 species of insect predatory or parasitic mites, and the predatory dream uses *Phyrosoeulusprsimilis* against aphids (**Taher and Al-Zahar, 2016**).

Release of beetles

Where the release of commercially available female beetles may be given some temporary control when handled properly but the aphids will be eliminated within a few days.

Female beetles should be kept refrigerated before being released into planting and this should be done at dusk because doing so in broad daylight will make female beetles fly away immediately. Water spray should be sprayed on the surface of infected plants before releasing female beetles and spray water spray on female beetles. Water spray on female beetles as well and female beetles should be placed on the base of the infected plants or in

the lug area of the lower branches where female beetles begin to crawl higher in search of aphids (**Taher and Al-Zahar, 2016**).

Insect pathogenic fungi

Aphids are susceptible to fungal diseases when the weather is humid and these spores can kill entire colonies of aphids when the appropriate environmental conditions are available and one of the most famous fungal diseases spread among the masses of insects is the insect disease caused by the fungus (*Beauveria bassiana*) due to death among insect larvae by 35% - 100% (**Taher and Al-Zahar, 2016**).

Control by ants

The presence of ants often leads to infection with aphids and often indicates the presence of aphids If there are large numbers of ants climbing the trunks of the plant, the upper parts of the plant must be examined to verify the presence of aphids and ants are resistant to aphids, which is an essential element in the fight against aphids, where there is a type of ant by taking aphid eggs and keeping it in an underground fight in the dark until these eggs hatch and remain for a long time in the dark, so you get blind and lose Her sight and then the ant takes this out insects to the outside where he takes care of them and her face how he wants to walk these herds of manna to feed and then return them to his home where he brings them by counting on the back of special blows with antennae to motivate them to generate a sugary liquid is one of the best foods when ants (**Taher and Al-Zahar, 2016**).

Regulatory and legislative control

It is intended to work on pest control and reduce their damage through the enactment of government laws, and these laws are:

A- Laws of external agricultural quarantine, where this is represented in taking care to prevent new pests and diseases that do not exist in a country to enter by examining the letters in the places of arrival and examining exports because they are free of pests and completely preventing the import of prophetic materials from abroad except under special conditions and accompanied by certificates indicating their examination and ensuring that they are free of infection.

B- Internal agricultural quarantine laws to prevent the spread of a pest from one region to another within the same country and to prevent the transfer of materials and products infected with this pest.

C- Agricultural laws, which are the laws enacted by the state to eliminate pests.

D- Pesticide laws are for dealing with pesticides used in pest control (**Taher and Al-Zahar, 2016**).

Chemical control of aphids as one of the integrated control programs

It is the control that is carried out using chemical compounds to eliminate large numbers of harmful insects and spiders or eliminate fungi and weeds and the advantages of this method is its extreme effectiveness and direct and rapid impact in the extermination of pests and ease of spread, where pesticides can be sprayed by plane over very large areas and this type of control has been known since ancient times such as the use of types of toxins to get rid of rodents and scorpions and expel mosquitoes smoking and the like, but their use was on a limited scale The chemical control in the second half of the twentieth century has relied on highly effective chemical compounds and rapid methods and mechanisms and proved effective at the beginning and over time problems began to appear and it became clear that this method carries great risks threatening ecosystems and human health and drains large funds to search for new pesticides after the emergence of resistant strains (**Taher and Al-Zahar, 2016; APC, 2017**).

Chemical control of aphids using pesticides, extracts, and pesticide substitutes

Chemical control of aphids

We have all previously said that chemical control is the control that is carried out using chemical compounds and these compounds are known as pesticides and the pesticide is defined as every substance or mixture of materials that

works to kill the pest wherever it is found to reduce its damage.

Some factors must be available in this material, such as its ability to kill the pest in an appropriate concentration that does not affect plants, animals, or humans, and it also has a degree of stability to meet the purpose of control with its cheap production costs and ease of use (**Zaidan and Abdel-Majid, 2000**).

History of Chemical Control

Man has known the use of toxic chemicals since a long time ago, where the old use of sulfur as an insecticide, powders and ointments to control animal and plant pests and in 1850 when the owners of orchards felt the danger of insects and the difficulty of combating them, they resorted to insects to study their problems and try to find a way to save their crops and therefore aranigan compounds were used for control and then tobacco compounds were used .Perthum toxins and sulfur powder are unlike other inorganic compounds such as anthimon, mercury, selenium, zinc and fluorine, especially against insects with biting mouthparts.

Chemical factories began in conjunction with research bodies to manufacture pesticides and these efforts succeeded in discovering a modern group that played an important role in the field of pest control and began manufacturing pesticides in the period from 1920 to 1925, where synthetic organic compounds appeared represented in the production of the pesticide DDT in 1942 to combat flies, ants, mosquitoes, fleas, and ticks.

After that, many organochlorine compounds appeared after World War II, and in 1946 organophosphorus compounds appeared to control pests that were not affected by organic compounds, and in 1950 a group of systemic compounds appeared, which are phosphorous compounds characterized by their ability to penetrate and spread in plant sap.

Although modern compounds have achieved great success in pest control, they have upset the natural balance between pests and their natural enemies, which led to the emergence of other pests that were secondary and have no significant harm, in addition to the emergence of strains resistant to many compounds in addition to toxicity problems and environmental pollution (**Fathy and Abdel Aziz, 2018**).

Steps to be considered when using chemical pesticides

A- Identifying and controlling the foci of infection early to limit their spread with available pesticides, especially the edges of the field.

B- Using appropriate spraying machines to find the pesticide to the insect where it is located under the sheaths and under the plant leaf.

C- Moderate irrigation and not to waste watering water and create wet and low places where moisture accumulates, and therefore the plants are weak and scattered and become hotbeds of infection.

D- Stop spraying when the vital enemies of aphids appear and when the plant reaches a late stage because of the futility of control and giving an opportunity to vital enemies to attack aphids.

E- Stop spraying when the temperature reaches 30°C 5 to stop the growth and reproduction of aphids at this temperature ((**Fathy and Abdel Aziz, 2018**).

Reasons for pest resistance to the action of pesticides

Since the problem of pest resistance to the action of the pesticide and those interested in pest control are looking for the causes of this phenomenon and how to fluctuate on it or delay the emergence of resistance against the materials used in control (**Zaidan, 2000)**.

In order to understand the nature of insect resistance to the pesticide, we must understand how the pesticide kills the insect and what factors are present in resistant insects and are not present in sensitive insects that are attributed to resistance and it may be difficult to determine whether the increasing rate of destruction of the pesticide inside the body of the resistant insect is the cause of resistance and whether there are other reasons for resistance or not (**Zaidan, 2000)**.

As for how the insecticide kills the insect, it is through its effect on one of the vital and sensitive systems of the insect, and this effect results in the death of the insect. If the insect can avoid the effect of the pesticide, this means that such an insect has means of defense such as:

A- Protective system that prevents the pesticide from reaching the sensitive biological system.

B- The replacement of some sensitive biological systems with non-sensitive ones that are not affected by the pesticide and the protective systems that prevent the pesticide from reaching the sensitive biological system can be.

C- Low speed of penetration of the pesticide and its penetration into the body of the insect.

D- Excretion of the pesticide or its breakdown products outside the body

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دراسة تأثير بعض طرق المكافحة المختلفة والأعداء الطبيعية في مكافحة حشرة المن لبعض المحاصيل الحقلية النجيلية في دولة نيبال

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تناولت الدراسة طرق مكافحة حشرات المن على بعض المحاصيل الحقلية المعشبة في نيبال. تعتبر حشرة المن حشرة ثاقبة ماصة خطيرة لأنها تتغذى على عصارة النبات وتهاجم جميع أجزاء النبات وتسبب أضرارًا لها كما تنقل أمراضًا فيروسية مختلفة. تنتشر الحشرة في كل من مصر ونيبال حيث تتشابه الظروف المناخية في كلتا الدولتين مما جعل الزراعيين يتجهون لاستخدام أساليب متعددة لمجابهة هذه الحشرة لما للمحاصيل الحقلية النجيلية من أهمية خاصة وحيث يعتمد عليها نسبة كبيرة من السكان. وتعددت طرق مكافحة حشرة المن من حيوية وكيميائية وغيرها، ومن أهم أساليب مجابهة هذه الحشرة هو إدارة المكافحة المتكاملة للآفات (IPM). تعتمد استراتيجية التحكم هذه على الاستخدام الرشيد لكل من المكافحة الفيزيقية والميكانيكية والمكافحة الكيميائية والبيولوجية والمكافحة التنظيمية والتشريعية بشكل يحقق الهدف من استعمالها ويحافظ على التوازن البيئي. ولتحقيق ذلك، من الضروري إقناع المزارعين باستخدام طرق بديلة للمكافحة بالأعداء الطبيعية وخصوصاً حشرة المن بالإضافة إلى زراعة أصناف نباتية جديدة مقاومة للآفات والأمراض، واستغلال الموارد الطبيعية المتاحة واستغلال عوامل البيئة للقضاء على الآفات وكذلك توعيتهم بالوقت الفعال والميعاد المناسب لرش المبيدات بالطريقة السليمة وكذلك الاحتياطات الواجب مراعاتها عند الرش والمعلومات المتعلقة عن المكافحة الكيميائية وكذلك مهارتهم على استخدام طرق المكافحة الأخرى وتقييم هذه الاستخدامات فى المكافحة وخاصة حشرة المن.

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