Insects and Insect Pest Management System

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Abstract

Insects are the basis material for the work of an insect pest management system, and accordingly, understanding and knowing the basic material for the work of this system is an important and essential issue for its success and development, just as this understanding should establish a realistic and practical view of this group of organisms. Insects are the main competitor of man on earth because they preceded it by appearing millions of years ago, The success of insects in continuing and millions of years ago to live on Earth demonstrates the importance of the role that this group of creatures play in the continuation of life on Earth, The number of known insect species today exceeds 1.25 million species, and this constitutes more than 80% of the known species in the animal kingdom and The human struggle against insect pests began long ago and before the emergence of civilization.

Keywords: pest, insects.

1. Introduction

The outlook of the insect pest management system can be summarized In the following points:

First: Insects are the main competitor of man on earth because they preceded it by appearing millions of years ago, and thus they have become one of the most capable animals to adapt to changing food, climate and competition with other animals. From the land free of insects, it lives in forests, deserts, cultivated lands, residential areas, and fresh and salt water pools, even for some types of it found in the pole snows, hot springs and oil wells. And if we add to its adaptive capabilities this high efficiency for reproduction and its ability to consume different types and quantities of food with high capabilities to protect itself and its various phases and quickly escape from its enemies, we find ourselves in front of fearful creatures that deserve study and attention.

Second: The success of insects in continuing and millions of years ago to live on Earth demonstrates the importance of the role that this group of creatures play in the continuation of life on Earth, but this role may appear when it comes to human property, health, and animal health, a negative role in what is a positive role when These insects produce food, silk, and dyes, and attack their enemies from other insects and pests. Therefore, the pest management system views insects as beings that should not forget us, the harmful side of it.

Third: The number of known insect species today exceeds 1.25 million species, and this constitutes more than 80% of the known species in the animal kingdom, and the harmful insect species are limited to 10-30,000 species, and a good proportion of harmful insect species do not rise to the level of the species That causes tangible economic losses, that this reality pushed the pest management system to:

1- Calling for the issuance of legislations and instructions that call for insect protection in particular, and 2- 0.3% of which are harmful types, because of the rest of the species’ role in protecting the environment and the continuing role of life in it.

2- Abandoning the principle of extermination of harmful insect species, and calls for persuading consumers to accept the affected agricultural materials or products and leave members of the pest in the field to preserve the vital enemies present in the field.

Fourth: The human struggle against insect pests began long ago and before the emergence of civilization, and that conflict still exists to this day and will undoubtedly continue in the future because both objects steadfastly demand the same things that the other wants, and despite the development taking place in control techniques, we are still powerless. By eradicating one of its types, or to provide ourselves with adequate protection against its inconvenience.
2. Aims of insect pest management system

The pest management system seeks to achieve the following:

First: Reduce the insect pest population below the economic threshold

Prevention of insect pest numbers reaching the level of economic damage can be achieved through the following:

1- Pest status analysis: It is necessary to understand the relationship between the levels of insect pest infestation and the loss in the crop so that a program for control can be established. Since the general view of society considers that any loss in the crop is a real loss, but the costs of achieving full productivity of the crop may exceed the value. The expected profit from this, and therefore it is necessary to determine the maximum number of pests that can be tolerated at a particular time and in a specific place without causing this economic loss of the crop. The agricultural product considers that the partial reduction in the quantity or quality of the resulting crop is an economic loss, and its estimate, whether calculated or intuitive, depends on many factors, including the costs of crop protection, the costs of avoiding potential loss, the prevailing marketing conditions, and the final benefit of the crop, and in order to make an accurate judgment, it is necessary to understand the inter-economic factors, on the one hand, and the damage that can be caused by other types of pests, on the other.

2- Devising methods that reduce the balance conditions in dangerous pests: The main pest varies in the severity of its infection from year to year, and its average density (general equilibrium mode) is characterized by always exceeding the critical economic limit. The pest management system aims to alter the environment in a way that works to reduce the general level of pest balance to a level below the critical economic limit. This can be achieved through the following:

A- Introduce, adapt, and spread vital enemies in the free areas.

B- Using the plant varieties.

C- Altering or modifying the pest environment to increase the effectiveness of the control means by using appropriate agricultural cycles, eliminating crop residues or mechanical removal of bushes and using irrigation mills and others. Pest control methods may also inadvertently increase its intensity, such as repeated insecticide treatment on the crop, which will eliminate vital enemies and thus increase the level of general equilibrium.

3- The use of control means in a way that causes the least environmental damage: the use of vital enemies, resistant varieties, and environmental modification in an integrated way leads to the lack of need to take other steps towards the subject of control except in some exceptional circumstances, and it can be said in general that the permanent control of the main pest on some agricultural crops is achieved by integrating agricultural operations and maintaining vital enemies, and when severe epidemic waves emerge from the primary or secondary insect pests, it is necessary to interfere with the use of pesticides. With the necessity of choosing the specialized pesticide, the appropriate dose and the appropriate timing for treatment, as attention to these criteria leads to reducing the imbalance in the natural balance.

4- Prediction and Warning: The process of forecasting, warning or alerting is considered one of the most important features of an insect pest management system where the number of pests is characterized by severe and continuous change, so the number of pests in a certain area may double in one day or less and the same number of pests may decrease between one day and another at a clear rate. Given the constant change in weather conditions, crop growth, vital enemies and other factors affecting the growth of the pest population. Accordingly, it is not possible to determine the appropriate time to implement the available control methods. Therefore, the pest management system depends on the development of prediction and warning methods that depend on how to control the ecosystem and the type of pest targeted for control and on the environmental conditions and economic resources, Therefore, the pest management system is based on the development of the use of optical and pheromone traps and various attraction traps as well as the use of systems for analyzing the weather conditions and the use of prediction equations based on accurate studies of the relationship between the family and the pest and various environmental factors as well as the use of computer and remote sensing techniques in order to reach the best ways to warn farmers of possible injuries to their fields, as well as to guide them to appropriate measures that must be adhered to to avoid anticipated damage [1].

Second: Decrease the cost of pest control

The pest management system reduces the costs of the control process through several means, including:
1- Planning the agricultural environment: Scientific planning for the agricultural process is very necessary in the field of pest management, as determining the method of cultivation, irrigation, fertilization and the type of crop has a major role in anticipating the pest and preventing it from appearing epidemiologically.

2- The plant's ability to withstand pest infection: Cultivation of varieties that are tolerant or resistant to infestation with pests is an important tool in the pest management system.

3- Determine the critical economic threshold for pest and the importance of this in deciding the vital control, the timing of spraying and the number of spray times, all of which play an important role in determining the costs of control.

4- Reducing the number of spraying times and reducing the concentrations used in the control, as well as considering chemical control the last paper that should be used in the pest management system.

Third: Preserving the environment and public health

The pest management system works to reduce the number of insect pests in ways that are consistent with the environment and public health, usually through the following:

1- A good understanding of the agricultural environment: The agricultural environment differs from the natural environment in that it is less different in the number of plant species and their associated organisms, as the human effort in the agricultural environment and the agricultural processes associated with agricultural production and land investment operations are clear, while the natural environment is considered it is left to enter the human effort in it, this difference was the reason for the emergence of pests in an epidemic manner in the agricultural environment due to the appropriate environmental conditions to them and that understanding this reality is of great importance in the field of pest management, which depends in many of its ways on agricultural operations to reduced pests.

2- Activating the role of natural pest control agents because of the role these factors play in controlling pests.

3- Using pesticides in a rational way to preserve the harmful environmental impacts resulting from the wrong use.

4- Using attractive, repellent and nutritional compounds as alternatives to chemical pesticides [2].

3. Pest management ,philosophy principles and tools

The insect pest management system is based on a philosophy based on abandoning the principle of annihilation and disposal of pest, so we find that it gives up the word Control, which means control and control and replacing it with the word management. This philosophy calls for accepting the right of other organisms, including insects, to have a share in our food and crops. And that this share should not rise to the level of human economic loss. Accordingly, this philosophy calls for leaving individuals from the pest in the field to ensure the preservation of its vital enemies and the natural balance in the environment. The administration of the philosophy calls for advanced agricultural production while protecting the environment and ensuring the protection of human health and pets.

Achieving this philosophy through the pest management system requires knowledge of the following principles:

1- Environmental aspects of insect pest
2- Life aspects of insect pest
3- The natural organization of the insect pest
4- The quantitative bases for measurement and sampling
5- Economics of insect pest control

As for pest management tools, they include all available means and techniques that can be used to reduce the number of insect pests, including:

1- Genetic engineering techniques
2- Mechanical and physical control
3- Legislative methods
4- Agricultural control methods, Agricultural methods
5- Biological control
6- Chemical control
4. Insect pest status and Definition

The word "Pest" is all generic with a broad scope, and the proof is that the Oxford Concise Dictionary defined the pest as a form of harassment, a harmful person, an animal, or anything else, and that the word Pest came from the Latin word Pestis, meaning plague. Moreover, there are many definitions that were mentioned in the references that directly indicate the general and broad concept of this word, including:

1- Pest is any living organism that is found in an inappropriate place, as the rose bush is considered to be pest when it is in a field cultivated with palms.

2- Pest is all kinds of harmful and annoying creatures whose control becomes necessary for economic and social reasons.

3- Federal or American law defines pest as any insect, rodent, nematode, fungus, or bush, or any other earthly form, water plants, animals, virus, or bacteria that cause harm to humans.

4- Pest is every living organism whose numbers increase in nature in a way that leads to damage or damage to the environment in which a person lives.

5- As for [2], he pointed out that pests are all organisms that compete with humans in all agricultural systems and include insects, dreams, other spiders, ticks, and other external parasites on animals, nematodes, and other parasitic worms that are harmful to plants, animals, fungi, bacteria, viruses, bushes, and plants.

6- [3], has defined pest as all biological factors that reduce yields such as insects, bushes, diseases, nematodes, and other living creatures.

7- Dempster [4] asserted, in a definition of pest, that any animal causes economic damage to crops and domestic animals or is harmful to human health and that its numbers become large at least at a certain time in order to cause economic harm, where some pests can cause significant damage even if their numbers As few as disease-carrying insects.

From the above it turns out that pests are those types that become an enemy of human well-being because of their activity and effectiveness. All of the above definitions agree on the principle of harm and economic loss as an attribute inherent to the organism in order to become a pest and that economic loss or damage may not always be associated with increasing numbers of pests.

Likewise, the previous definitions also agree not to specify the quality of the pest as it includes all living organisms, so the pest can be defined as any disturbing insect or transmitting the pathogens of humans, animals and agricultural crops as well as causing it to cause economic losses to crops, food products, stock materials, farm animals and property Man is general.

The association of the term pest with the economic loss caused by the insect pest led the agricultural workers to divide the insect pest into four levels:

1- Key insects pests

This group of insect pests has the advantage that the value of the critical economic limit to it is below its normal equilibrium level and is called the key pest because it forms the main basis or goal that is established on the basis of the pest management system. Examples of this group of insect pests are:

A- Apple worm Laspeyresia pomonella (L.) on apples.
B- Heliothis zea (Boddie) on corn.
C- asparagus Crioceris asparagi (L.) on asparagus.

These major insect pests may be secondary pests when attacking other crops. For example, we find that the Haze (Bod) attack of the jet crop never needs to be controlled because its preparation never reaches the level of economic damage.

2- Perennial insects

This group of insect pests has the advantage that its critical economic limit is slightly above the natural equilibrium level (Figure 2), which makes the intervention process to reduce its numbers necessary continuously whenever there is an increase in its numbers, and therefore it is called permanent or continuous pests due to its presence with its family at levels that are constantly harmful. Among the insects represented by this group:

A- Portheria dispar (L.) on forest trees.
B- Anthonomus grandis Both. On cotton.
C- Colorado potato beetle Leptinotarsa desmlandeta (say) on potatoes.
D- Mexican bean beetle Epilachna varievestis Mul. On the beans.

3- Occasional Insects pests

This group has the advantage of having a high critical economic limit for it far from the natural equilibrium level (Figure 3) and that its preparation does not reach the critical economic limit level except when its setting is affected by appropriate
environmental conditions for its multiplication or increase in its number or the result of using pesticides incorrectly leading to the exclusion of its vital enemies, and when its preparation reaches to the level of the critical economic limit, appropriate measures must be taken to reduce its numbers and prevent it from reaching the level of economic damage. These include:

A- Hyphantria cunea (Dru) on forest trees where it appears abundantly every 5-10 years.
B- Plathypena scabra (F) on the jet and soybeans.

4- Rare Insects pests

It includes many insect species that notice feeding on different crops, but their numbers never reach the critical economic limit level or their numbers may be large until the amount of damage they cause does not rise to the level of economic loss (Figure 4). Insects representing this group include:

A- From cowpea Aphis craccivora (F) on the jet.
B- Diaacrisia virginica yellow woolen bear on corn.
C- Vanessa cardui (F.) for the soybean or colored lady.

Figure 1. Critical economic limit below the Normal equilibrium level of the apple worm and thus becomes a major lesion [5].

Figure 2. Critical economic limit of the Colorado potato beetle just above the normal equilibrium Level, thereby becoming a permanent lesion [5].

Figure 3. The critical economic limit is much higher than the normal equilibrium level of the green jetworm, and thus it is a pest at times [5].

Figure 4. The critical economic limit is very high and rarely reaches the level of economic damage as in the yellow woolen insect [5].
5. Why Insect Become pest

There is no doubt that any insect can become a pest as a result of the influence of various factors, and that understanding these factors leads to the development of programs and means that can reduce the number of this pest and reduce its risks, especially since insects are part of the natural ecosystem and that changes, events, and human activities that It affects the natural ecosystem, it must affect the insects, being one of the components of this system.

6. Agricultural practices and management operations in insect pest management

Agricultural management and service operations in the pest management system aim to attempt to alter the agricultural or farm environment so that it becomes somewhat inappropriate to the pest and thus can limit the severity of the damage by affecting the level of the pest population in the field, either by killing the insect pest or by affecting its fertility or alternatively provides a suitable environment for the natural enemies of the pest, and all of these conditions require full knowledge of the life and habits of insect pests and their plant families. Cultivation and crop service operations are one of the routine operations carried out by farmers in order to achieve good productivity and that some modifications to these operations in order to achieve a good pest control may not need to increase investment in tools and equipment used to conduct pest control, and that there is no reason not to. They are used in developing countries where labor is available and thus help us establish modern environmental systems for managing insect pests.

One of the benefits of alternating agriculture and mixed crop cultivation is that the farmer avoids the major losses caused by agricultural pests, including insects. Therefore, minor improvements in agricultural operations may lead to increased pressure on insect pests, in order to achieve better protection of agricultural crops.

7. Good planning for field Ecosystem

Good planning based on the correct scientific foundations for establishing a farm plays an important role in combating agricultural pests, including insects, and in reducing the costs of different agricultural operations. Among the most important things to be done in this field are the following:

1- Soil Examination: It is necessary to conduct a complete examination of the farm soil and determine its physical and chemical specifications, the proportions of the minerals contained therein, the type of crops and plants in which it can be grown.[6]

2- Settlement the farmland well to eliminate heterogeneity in the topography of the land, which may result in heterogeneity in humidity and fertility, leading to heterogeneity in plant growth.

3- Examination of water: It is necessary to determine the source of the water that will be used in irrigation, and whether it is well water or streams or rivers, with the need to analyze this water and determine the levels of mineral elements present in it, especially sulfur.

4- Determining the quality of crops and crops prevailing in the region, with the necessity of knowing the most important pests attacking them and the measures taken to control them.

5- Defining and planning the construction sites that will be erected on the farm, and defining the methods to ensure the easy movement of the agricultural mechanisms.

6- Knowing the prevailing weather conditions in the area, the movement of wind direction, and the necessity of establishing windbreaks.

7- Determine the type of irrigation system that will be adopted on the farm after determining the type or types of crops to be grown on the farm.

The identification of the aforementioned points undoubtedly helps in establishing a model farm based on correct scientific foundations and the adoption of these foundations can directly or indirectly help reduce the number of insect pests and others.

8. Role of Agriculture operations in insect control

Various agricultural operations have an important role in altering the pest environment, directly or indirectly, in a manner that leads to its influence and preservation of its numbers. Among these operations are the following:
First: plowing

It is one of the first agricultural operations in which the land begins to be prepared for cultivation, and it is a process that aims to dismantle and flip the land and stir it up. This process leads to:

1- Killing insects with their different phases as a result of hitting the plow.
2- Burial of insects with their various phases deep in the soil and their failure to leave the soil.
3- Exposing insects to their vital enemies and inappropriate external factors.
4- To get rid of the bushes that have insects before planting the main host for them. As is the case with thrips insects that attack cotton seedlings after moving from the developing bushes in the cotton fields.

9. What determines the success of the tillage process is the following:

1- Depth of tillage: The depth of tillage is related to the type of pest to be controlled, for example, when combating insects of the earth and the carp, it takes a deep tillage to reach the colonies of the land and destroy them.
2- Date of tillage: The tillage should be done at the time when the insect or one of its phases is in the soil.

A successful example of the use of tillage in the fight is the use of it to combat the flaky insect on the wheat Exaeretopus triticia Will in Nineveh Governorate, where it was found that conducting the spring tillage of the growing bush in the abandoned lands, including different phases of this pest, especially for the period from early March to before the first half From April, the number of insects decreased significantly. [7], stated that good tillage leads to the growth of strong wheat seedlings that reduce the damage of the Eurygaster integriceps put...

Second: Planting system

It is known that there are two common systems in agriculture:

A- Monoculture system

This topic has been the focus of attention of many researchers in the field of studying the impact of single cultivation on the agricultural ecosystem, because they believe that cultivating one type of crops in very large areas created favorable conditions for the reproduction of certain insect species, which led to their increase and made them known pests, because single cultivation performs To simplify or reduce insect and plant diversity, thereby creating suitable habitats for a few species that specialize in a particular plant or crop. However, we find that other researchers and specialists say that large losses due to insect pests may not be due to the crops that were planted individually, but rather that large areas of cultivation The individual can be specifications or encouraging beneficent only through the simple effect on colonies of insect lesion.

B- Multiculture system

This system is based on the cultivation of different crops on the farm and is a common system in developing countries and this system has benefits including: It gives the farmer the opportunity to avoid losses due to the deterioration of the prices of a particular crop or the result of his severe injury to one of the pests. It provides an opportunity for vital enemies and environmental diversity that helps reduce the number of pests. In the areas of cotton cultivation in Sudan, it was found that one of the main factors that affect the infection of cotton with the American cotton nut worm is the area of areas cultivated with alternative families, where it was observed that large areas cultivated with white corn and peanuts include large groups of cotton nut worm before the cotton and then transferred to cotton While cultivation of ivy (Dolychos lablab L.), which is characterized by its attractive smell to the American cotton nut worm to the extent that it prevents it from attacking the cotton [8], it was also found that the growth of the bush near the cotton may also affect some of the cotton pests, because these bushes contain many Vital enemies that come Grandfather coconut cotton the American worm.

The examples of the issue of mixed agriculture and environmental diversity are very numerous and we are not in the process of reviewing them. What is important to say here is that the success of mixed farming depends on the correct choice of crops to be grown together, as well as the type of insect pest attacking these crops and their vital enemies.
Third: Adjustment of planting dates

Successful control of many insect pests can be achieved through good scientific control of planting dates early or late, so as to ensure that the plant escapes from the insect pest that targets it, or so that the sensitive phases of the plant grow at a time when the pest is less abundant or dense as well, so cultivation at the appropriate time for planting It may also increase the productivity of the crop.

Examples in this field include the following:
A- The effect of early cultivation on controlling insect pests
1- In Africa, the peanut crop Arachis hypogea L. suffers from significant losses caused by the import virus transmitted by Aphis craccivora Koch and found that early cultivation of this crop in the rainy season led to the production of large plants and was less attractive to the insect of the man and the virus infection was much less than the crop Who planted late [5].
2- In Ghana, it was found that planting yellow corn early in the beginning of the rainy season led to a failure to avoid being infected with the corn stem borer and that this was sufficient without the need to use other control measures.
3- In Iraq, Al-Mallah [9], found that early cotton cultivation avoids catching Earias insulana (Boisd.).
4- Early tobacco cultivation avoids infection with a tobacco insect, Myzus persicae (Sulz.).

Early planting may not always be in the protection of the plant, but rather the opposite can happen, so in this case it is necessary to delay the date of planting to protect the crop from infestation by insect pests.

B- The effect of delaying the date of cultivation in combating insect pests
1- That the delay in wheat cultivation in the fall in the United States avoids catching a Heisanella destructor (say)
2- The late cultivation of winter barley avoids severe infection with aphids in the fall season.
3- In Egypt, it was found that delaying the cultivation of cotton to take advantage of the exit of nut worms from the virgins before the appearance of the rich parts on the cotton plant, thus avoiding the infection with nut worms.

From the foregoing it becomes clear that the goal of organizing the dates of cultivation is to grow the crop so that the presence of the sensitive phase at the time when the insect pest is not present or the numbers are low so that it does not affect the family significantly, also it should be noted that the dates of cultivation and the dates of the appearance of insect pests vary according to the location Geographical, environmental conditions, and the type of crops grown in the region, which requires fixing and studying these dates for each region to obtain good results in the field of controlling insect pests. Therefore, it can be said that the organization of cultivation dates seeks to achieve a kind of false resistance to escape and it is really a case of resistance by strictly regulating the dates of cultivation.

Fourth: Planting method

The method of cultivation and the accuracy of its operations can affect, to varying degrees, the control of insect pests, through the following:
1- Seed used in agriculture

The acquisition of good and strong plants that tolerate certain levels of insect infestation is achieved through the cultivation of healthy seeds and treatment with pesticides, as well as in the selection of healthy seedlings taken from nurseries not infected with pests, and in this area it is preferred to obtain seeds and seedlings certified by companies and the competent authorities in this field. Several studies have shown that the source of the insect infection is the seeds used in cultivation, as cultivation of potato tubers infected with the potato worm causes the production of plants infected with this insect.

2- The distances of cultivation or plant density

Several studies have shown that the intensity of cultivation affected the increase or decrease in the percentage of infestation with insect pests. In northern Nigeria, it was found that peas grown with close distances were more affected by the pea beetle
compared to pea plants cultivated with far distances [10]. As for fruit trees, it is also necessary to consider the cultivation distances between trees in a manner that ensures the good growth of trees and facilitates the movement and passage of agricultural machinery and control machines, as well as the arrival of sunlight to the different tree sides, as well as the way to raise trees is also a role that can facilitate the process of control and access to insect pest in order to achieve a successful fight.

3- Depth of cultivation

It was found that planting seeds and seeds at appropriate depths greatly helps in germination speed and the emergence of seedlings and their good stability in the soil while deep cultivation may lead to a large percentage of seedlings failing to appear on the surface of the soil as well as it was found that covering the tubers well avoids catching the potato worm.

4- Agriculture on Marouz

The abandonment of cultivation in a prose method and the adoption of the cultivation system in Merouz greatly help in the process of removing bushes and controlling insect pests.

Fifth: Good husbandry

Good crop service can be accomplished through the following:

1- Irrigation: The irrigation process includes determining the timing and levels of irrigation for each crop because of the important role that irrigation plays in the life of the plant and the organisms associated with it, including insect pests. Also, wet or dry pests may make insect life difficult or impossible, especially for insects that live in the soil or One of its phases. In general, it was found that providing water in suitable quantities is one of the essential things to provide balanced vegetative and reproductive growth. When water is available in excess of quantities, the plants may go to vegetative growth and thus be more attractive to insects, especially the scaly wings that feed on leaves, Lygus bugs and other insects.

Either in dry areas or where irrigation is used to supplement rain water, farmers must regulate the number of irrigation times and the amount of water used. When plants receive only the necessary amount of moisture that achieves balanced vegetable and fruit growth, they tend to be more productive and retain a greater proportion of the fruits produced early in Season These plants are less attractive to many types of insects and can produce fruits in a shorter period of time than plants that have suffered from water shortages or excessive irrigation.

2- Fertilization:

Providing the needs of the plant with basic or major and minor nutrients helps the plant grow well and gives it the ability to withstand insect infestation. Therefore, all fertilizing elements must be used with caution and a correct balance by adding nitrogen in greater quantities than those needed by a specific type of plant that leads to vegetative growth that attracts some Types of insect pests, as the vegetative growth increases to the point of delaying the fruit contract or reducing them, as is the case with other fertilizing elements or compounds, so it should be used in balance in order for plants to grow and bear good fruit.

From the above, it is evident that there is a strong relationship between moisture and fertilization, and that studying this relationship and determining the nutritional needs of each crop or plant can lead to determining the extent to which irrigation and fertilization can be used to reduce the number of insects that attack the crop.

3- Hoeing and Weeding:

Hoeing and weeding operations aim to remove the bushes between the cultivated and the main crop cultivation lines, as removing the bush reduces its competition for the main crop on water, nutrients and sunlight. Several studies have shown that the weak control of the bush leads to a significant reduction in crop yield as a result of competition as it prepares Bushmen are an alternative family to many insect and pathological pests. Therefore, getting rid of the bush reduces the damage of the bush to different crops.

4- Pruning: The pruning process is one of the important processes that take place in the orchards of fruit trees and ornamental shrubs because of the role this process plays in removing the affected branches and growth as well as it is a method or tool for pruning the tree in a way that allows sunlight to enter it and facilitates the process of the arrival of pesticides. While spraying to
Different parts of the tree, it is possible to straighten the pruning process to remove and cut off infected branches with insects, especially pits and beetles, burning and disposal.

5- Khuff and earring: It means the process of removing a number of flowers and fruits from some plants and trees that exceed the capacity of the plant and that fall naturally after a while, but the farmer doing this process helps him to remove the flowers and buds and the infected fruits, which helps reduce infection by insects. For the earring process, we mean removing the apical growths that make up the flowers, to prevent the flowers from forming and to increase the branching of the plant.

Sixth: Botanical traps

The work of plant traps is based on the premise that insect pests usually prefer a specific crop over another crop, and therefore the preferred crop can be used as a vegetable catch by planting it in lines around the main crop and then extracting the plant used as a plant trap and burying or burning it to get rid of the insect pest. The method is successful with the corn stalk borer, which attacks the cane, as the corn has been cultivated in the sugar cane fields as a catch. The corn stalk borer is attracted to it and then extracted and burned in order to protect the sugar cane from injury to the corn stalk borer.

Seventh: organizing the dates of harvesting and pisking

Harvesting and early harvesting of the crop often leads to the escape of the crop from infestation by insect pests, especially insects that attack the fruits, such as tomato worms, cotton nuts, cornstarchs, and grain ears, etc. This can be achieved through the following:

1- Cultivating short-season varieties

2- Early termination of the crop: This can be achieved by using some chemical compounds to drop the leaves. It has already been found that the early termination of the crop has led to a reduction in the number of complete insects that enter the beds at the end of the season.

3- The plant density

Eighth: Sanitation hygiene

It means the cleanliness of the field and all that relates to agricultural operations, including seeds, fertilizers and equipment, as follows

1- Seed: It is necessary to use seeds of high purity and free from impurities and insects, as cultivating infected and impure seeds leads to the production of weak plants.

2- Fertilizers: Municipal organic fertilizers are often a source of transport for many insects, and it is preferable to use heat treated organic fertilizers.

3- Agricultural equipment: It is necessary to wash the agricultural equipment and clean it well after its use is completed, as many insects or one of their phases are hidden in this equipment and when they are transferred to work in other areas or fields where the insect injury may be transmitted.

4- Getting rid of the previous sources of infection: The leaves and remnants of many of the infected crops remaining in the field, as well as the branches and fruits, are a source of renewed injury in the following season. Therefore, getting rid of them and removing them reduces the possibility of infection in the following season and this can be achieved through the following:

A- Burning

B- Collecting the leaves, fruits and infected vegetable parts and burying them. Collecting the remaining plant, whether it is healthy or infected, and trying to bury it or remove it from the field is a good procedure to prevent insects from using these parts as shelters and families for them, as well as killing the insects in these parts in the event that they are infected with insects.

C- Cleaning the edges of the field: The farmers’ interest in cleaning their fields makes them often neglect the cleaning of the edges and the areas surrounding their fields, which are grown by many bush plants that are a refuge for insects that infect their economic crops, where they feed, grow and multiply on these bushes and cause them to hide and hide, as well as they are
considered Stores for many pathogens and insects that transmit them as well, as these bushes contain many useful and important vital enemies in the field of biological control.

Ninth: the agricultural cycle Crop rotation

Much has been written about the importance of the agricultural cycle in preventing insects from appearing in a serious pest, by adopting a good agricultural cycle in which 2-3 crops are exchanged alternately and each of them belongs to a botanical family that differs from the rest and is not a common family of one of the insect pests present in the region. Agricultural may not be successful with multiple food-insect pests, but it may be more successful with insects with few food families.

A good agricultural cycle works to reduce the incidence of insect pests as well as its role in preserving the fertility of the soil and preventing the insect pest from building its numbers and appearing epidemiologically as a result of repeated cultivation of its preferred family. Also, some crops used in the agricultural cycle may be of little economic importance.

Tenth: Tabour and the removal of alternative host Fallowing

The process of telling the agricultural land, i.e. leaving it without cultivation, excluding the alternative families of the insect pest, aims to break the growth cycle and increase the number of insect pests in the field, and accordingly, the process of telling and removing the alternative families aims to starve the insect pest and die in the end. As for removing the alternative families, this method aims to remove these families when there is no main crop in the right, in order to control the number of insects that spend the winter or summer sleep period on these families.

The fight or removal of alternative families represents a double-edged sword, which, despite its effectiveness in reducing the number of insect pests, at the same time working to reduce the numbers of important vital enemies that resort to these plant families, that many insect pests can use the bushes as alternative families [11]. Examples include the following:

1- Johnson's lawn is considered an excellent host for the white corn fly, so removing these weeds from around the field is an important issue for combating this fly.

2- Beet leaf glove grows and multiplies on many broad-leaved winter bush plants, and therefore removing these bushes helps reduce the numbers of beet gloves.

3- White fly uses many broad-leaved bushes as alternative families, and removing these bushes prevents the white fly from increasing its numbers.

4- In the state of Florida, it was found that more than 80% of leaf grunters attacking vegetable crops come from the bushes in and around the field.

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