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Research Article

CLASSIFICATION OF FOCUSES AND MECHANICAL TRANSMISSION OF PLANT VIRUSES

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ABSTRACT

Currently, as a result of the development of many lands, the primary virus foci have decreased. As a result, new relationships between cultivated and wild plants, pathogens and vectors have emerged. To some extent, these relations are characterized by the concept of natural foci. Because some viruses specialize in a narrow range of plants, they do not spread at all in natural foci. Therefore, studying both theoretical and practical aspects of work in this direction with the help of new, modern methods and technologies is one of the urgent tasks before us in the near future. To date, there is information on several characteristics of all studied tomato, tobacco, turnip, rapeseed, radish, potato, alfalfa, cotton, corn, and bell pepper viruses in Uzbekistan. But there is no information about their natural foci and groups, and how they slowly infect cultivated plants and the emergence of new virus foci, and they have not been studied until now. Taking this into account, we can identify the natural foci of some viruses studied in Uzbekistan and see the ways of their transmission, especially mechanical transmission.

KEYWORDS

Phytovirology, pathobiocenosis, pathogen, chlorosis, mycoplasma, transmissive, reservoir, infection, prognosis, epiphytotia, specific

INTRODUCTION

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One of the main conditions for ensuring the normal growth, development and efficiency of vegetable crops in agriculture is the use of healthy organic materials. The health quality of planting material depends on many factors, first of all, whether it is free from virus infection. Infection of plants with viruses has a negative effect on the food, nutritional value and suitability of the products obtained from them. In order to see what kind of symptoms the plant viruses show in the plants, we first try to infect the plants that can clearly show the viruses. The use of mechanical method to infect the viruses is considered effective. In the case of mechanical infection, it is possible to see with a clear eye through the signs in the leaves of the plant used for control in 2-3 days. In nature, about 800 viruses develop and infect plants. There are ways of natural or artificial transmission of these viruses to plants, and several types of these ways have been studied and are currently used for virus transmission.

Academician Ye.N. According to Pavlovsky's theory, the natural foci of transmissible diseases has theoretical and practical importance, it allows to know the law of development of virus epiphytotia and provides a scientific basis for their disappearance. In addition, this theory foresees the migration of virus foci from one place to another, hidden foci infections, and the emergence of "daughter" foci. According to Pavlovsky, the natural foci of transmissible diseases is a phenomenon in which the "causing agent" of the disease is a special carrier and the evolution of the animal - the causative agent, and until now, independent of man, has passed several generations for a long time. they live in their natural habitats even during the period of change. An example of such a disease with a natural focus is Far Eastern encephalitis, the causative agent (virus) of which is spread by ticks in the transovarial way. Ticks infect wild animals, and the virus is transmitted through blood to previously uninfected ticks. Even if a person is susceptible to the disease in this case, it will not be of any importance in the spread and preservation of the virus in nature. Therefore, the basis for the existence of a natural focus is the presence of wild animals, an organism prone to infection, a carrier that ensures the continuous circulation of the causative agent. For example, Common Cucumber Mosaic Virus, Solanum Stolbur, Shingle Mosaic Virus, Legume and Pea Yellowing, Alfalfa Mosaic and many other diseases can be shown. Yu.I. Vlasov studied the biology of some pathogens - the causative agents of diseases with natural outbreaks, and some theoretical aspects of these results were obtained in the development of measures to fight against viral diseases and in forecasting the epiphytotypy of viral diseases. Phytovirology The concept of "natural source" first of all means that the causative agent of the disease is a virus, the carrier is an insect and other elements, and an organism prone to infection is a plant or animal organism. Having this feature, reservoirs of viruses can be wild plants. The primary natural hearth can function and live independently of the cultivated plant. In order to infect cultivated plants, they must be grown in the zone of the source of infection and there must be conditions for the transfer of the carrier from the natural source to agricultural crops there will be times. They appear in zones where viruses spread in cultivated plants multiply and infect wild plants. Over time, representatives of the wild flora become permanent natural hosts of this or that pathogen. Any natural source of infection is a pathobiocenosis, because it includes the causative agent of the disease. pathogen (virus, mycoplasma). Currently, as a result of the development of many lands, the primary virus foci have decreased. As a result, new connections between cultivated and wild plants, pathogens and vectors have emerged. To some extent, these relations are characterized by the concept of natural foci. Because

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some viruses specialize in a narrow range of plants, they do not spread at all in natural foci. Summarizing the literature data and his own results, Vlasov divides the degree of correlation of viral diseases with natural outbreaks into four groups:

1) typical natural focal diseases;

2) having permanent circulation of the causative agent of the disease among cultivated plants;

3) diseases with a partial connection with natural foci;

4) diseases related to natural foci (unconfirmed).

The rules about natural foci of the disease (uchenie) are aimed at fulfilling the following practical tasks:

1) identification (separation) of natural sources of infection for cultivated plants (crops);

2) researching the specific characteristics of pathogen circulation in natural foci, the conditions of transmission of infection to cultivated plants;

3) Development of ways to prevent the sudden appearance of disease (vspyshka) in agricultural crops.

Natural foci and types of plant virus diseases

Typical naturally-occurring diseases include wild plants - carriers - diseases in which wild plants circulate according to the scheme. Although viruses belonging to this group sometimes cause epiphytotia in cultivated plants, cultivated plants are not considered an obligatory link in the circulation of these viruses. There are the following groups of these viruses or viral diseases:

1. Typical natural focal diseases;

2. Diseases with natural foci whose causative agent circulates among cultivated plants;

3. Diseases whose causative agents are partially in contact with natural foci;

4. Diseases that have not been confirmed to be related to natural outbreaks

TYPICAL NATURAL FOCAL DISEASES

The virus overwinters in perennial weeds. In the spring and early summer, Aphis fabae migrates from its primary host (viburnum, jasmine) to weeds, infects, and from there transfers to planted legumes. Some of the aphids go to the weeds and form a new hearth. So, the virus always circulates in natural foci in the weed - aphid - weed. Its stable preservation in nature does not depend on the presence of legumes. Studying the biology of the virus draws attention to the following factors. First, a natural outbreak can be hidden latent, because often the symptoms of the disease are not obvious in weeds. Second, not one, but several weeds can be "virus-carriers". All this confirms that leguminous yellows and related viruses can circulate in natural foci.

Alfalfa wound tumor, Common cucumber mosaic, Cotton leaf curl, Rustless coaster mosaic, Rice powdery mildew viruses also belong to the group of "Typical natural foci diseases". They also have their own specific disease-causing plants, vector insects, and their own circulation. Studying these laws and features and following them will prevent virus epiphytotia.

Determining factors of typical natural focal diseases

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Diseases (viruses)	Symptoms	Dispersive insects	Spread by seed	Reservoirs	Circulation	Literature
Yellowing of peas and legumes	Chlorosis, twisting and crushing of upper leaves, retardation in growth and development	Legume black aphid-Aphis fabae Scop. also bean, vetch, alfalfa aphids	Seed transmission has not been proven	Cirsium arvense (L.) Scop., Chenopodium album L. secondary focus alfalfa	The virus overwinters in perennial weeds.	Vlasov, 1964; 1966

One of the main conditions for ensuring the normal growth, development and efficiency of vegetable crops in agriculture is the use of healthy organic materials. The health quality of planting material depends on many factors, first of all, whether it is free from virus infection. Infection of plants with viruses has a negative effect on the food, nutritional value and suitability of the products obtained from them. In order to see what kind of symptoms the plant viruses show in the plants, we first try to infect the plants that can clearly show the viruses. The use of mechanical method to infect the viruses is considered effective. In the case of mechanical infection, it is possible to see with a clear eye through the signs in the leaves of the plant used for control in 2-3 days. In nature, about 800 viruses develop and infect plants. There are ways of natural or artificial transmission of these viruses to plants, and several types of these ways have been studied and are currently used for virus transmission.

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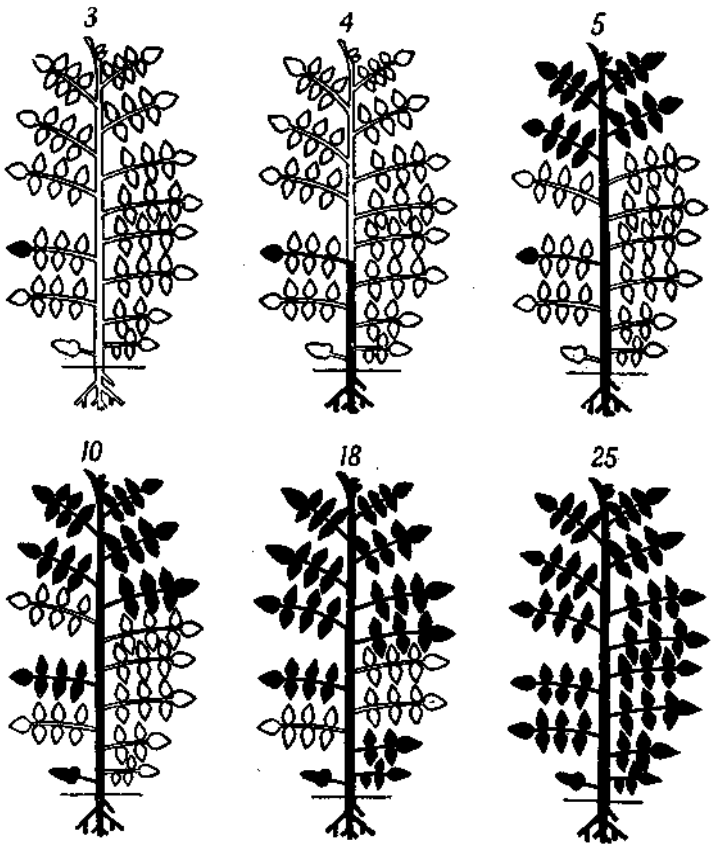

Picture 1

The virus can be released from the infected body to the environment in different ways. A virus in the external environment can infect a plant in various ways. The virus can be transmitted mechanically to the leaf by natural or artificial friction, by grafting, by using insects, by using a weevil. The transmission of the virus to the carrier insect is carried out by the insect feeding on the diseased plant.

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Picture 2

In the case of viruses that spread through the soil, the virus can be released from the exudates separated from the roots of the diseased plant, from the remains of the diseased plant, and the virus can be released from the diseased plant through the wounds that appear when they are processed. In this case, hands and processing equipment are infected with infectious sap. In the special experiments of M.I. Goldin, viruses transmitted through soil were shown to be released from the patient's body. A certain amount of virus released from the root of a plant infected with TMV passes into the solution. Several other factors influence the spread of viruses in nature.

The first group includes Cucumber mosaic virus, Shingle mosaic virus, Pea mosaic virus, Physalis virus, etc.

The second group includes potato U virus, cauliflower mosaic virus, tomato yellowing virus.

The third group includes TMV, potato X viruses and shows that they are found in cultivated plants (tobacco, tomato, pepper, potato) and in wild plants (gulyavnik, physalis, chicory). The transmission of TMV through seeds and the transmission of potato virus X through tubers show that they are adapted to the permanent circulation in agricultural plants.

The fourth group includes the cucumber mosaic virus belonging to the tobamovirus family, and soy mosaic viruses from potyviruses. Focuses on their infecting a narrow range of plants and their spread through seed and planting material by contact or vector vectors. It shows that some viral diseases can be transmitted only by grafting. Yu.I. Vlasov studied the biology of some pathogens - the causative agents of diseases with natural outbreaks, developed some theoretical aspects of these results and developed measures to combat viral diseases. Certain results were obtained in the emergence and forecasting of epiphytotypic viral diseases. Wild plants can be reservoirs of viruses and mycoplasmas with this feature. The primary natural hearth can function and live independently of the cultivated plant. In order to infect cultivated plants, they must be grown in the zone of the source of infection and there should be conditions for the

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transfer of the carrier from the natural source to agricultural crops. Along with primary natural sources, there are secondary natural sources. will be available. They appear in zones where viruses spread in cultivated plants multiply and infect wild plants. Over time, representatives of the wild flora become permanent natural hosts of this or that pathogen. Any natural source of infection is a pathobiocenosis, as it includes the causative agent. In this case, pathobiocenosis is understood as a plant-host, carrier and pathogen (virus, mycoplasma) formed as a result of evolution in the environment under known external conditions. Currently, as a result of the development of many lands, the primary virus foci have decreased. . As a result, new connections between cultivated and wild plants, pathogens and vectors have emerged. To some extent, these relations are characterized by the concept of natural foci. Because some viruses specialize in a narrow range of plants, they do not spread at all in natural foci. Therefore, studying both theoretical and practical aspects of work in this direction with the help of new, modern methods and technologies is one of the urgent tasks before us in the near future. To date, there is information on several characteristics of all studied tomato, tobacco, turnip, rapeseed, radish, potato, alfalfa, cotton, corn, and bell pepper viruses in Uzbekistan. But there is no information about their natural foci and groups, and how they slowly infect cultivated plants and the emergence of new virus foci, and they have not been studied until now. Taking this into account, we can identify the natural foci of some viruses studied in Uzbekistan and see the ways of their transmission, especially mechanical transmission.

Mechanical virus transmission.

In nature, about 800 viruses develop and infect plants. There are ways of natural or artificial transmission of these viruses to plants, and several types of these ways have been studied and are currently used for virus transmission. Some of these ways are listed below:

- mechanical transmission of viruses;

- transmission of viruses by grafting;

- loading of viruses with the help of a particle;

- transmission of viruses by insects;

The mechanical method is based on the introduction of viruses from a wound on a plant leaf. For this, microwounds are created by sprinkling diatom algae (celite) or corborundum (silicon carbide) or corundum (aluminum oxide) in the cuticle of the plant leaf that needs to be infected.

The diseased plant organ is taken and a buffer (glycine or phosphate) is added in a porcelain mortar and diluted thoroughly. One of the agents is dusted on the surface of the plant leaf that needs to be infected. will settle down. Corud and corborund are sprayed on the surface of the prepared leaf. 1-2 drops of the virus suspension are dropped and gently applied using a sterilized glass stick, a cotton or gauze swab, or well-washed and dried fingers. The strength of rubbing depends on the type of plant, its age, the quality of the leaves, and the image. If you rub it harder, the cuticle layer on the surface of the plant leaf will be damaged and the leaf may dry up. After using the image, it is advisable to keep the plant in a moist place for several hours.

Gibbs and Harrison (1978) suggest that several factors are important to increase virus infectivity.

a) the presence of ions in the inoculum, the infectivity of the inoculum depends on the amount of ions in it. For example, the concentration of phosphate buffer

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0.02-0.1 M and pH 7.0-8.5 increases the infectivity of the virus. Again, infectivity and virus depend on the host-plant and their combination. Many viruses lose their activity at low levels of RNA.

b) Inhibitors of infectivity - sometimes it is very difficult to mechanically transfer viruses to a sensitive plant. This phenomenon depends on some proteins and polysaccharides that serve as "inhibitors of infectivity" in many plant cells. These do not eliminate the infectivity of the virus, but somehow affect the transmission of the virus. Such inhibitors are present in sap isolated from sugar beet, Chenopodiumspp, Phytolaccaspp and Dianthussp. In order to eliminate the inhibitory effect, if the concentration of the virus is greater, when the sap of the infected plant is diluted, the inhibitor is also diluted and the effect is lost.

c) virus-inactivating substances - virus infectivity is also affected by substances in the plant that destroy its activity. The juices of the leaves of woody plants contain tannin, which binds to viruses under certain conditions and precipitates the viruses, resulting in the loss of virus infectivity. But in order to prevent such situations, in the process of homogenization of plant leaves, a buffer equal to pH 8-9 is used and crushed in solutions such as nicotine or caffeine. In an alkaline environment, the binding of tannins to the virus weakens. There are other methods in which a single protein is added to the medium in which the virus is homogenized (for example, powdered skin). This protein competes with the virus to bind tannin.

Virus infection by grafting.

Grafting has long been used in horticulture to improve the quality of plants that are propagated from seed, not propagated by cuttings and grafting, and are of low importance for agriculture. At the same time, grafting is also very important in conducting scientific work. Grafting is the connection of one plant to another plant cutting or bud. A grafted plant is called a scion, and a grafted plant is called a scion. Viruses can be transmitted from one plant to another by grafting. In this case, if a graft infected with a virus is grafted onto a graft, or if a healthy graft is grafted onto a graft infected with a virus, the virus will pass to the second pair and show symptoms of the disease. For the first time, grafting was used by Dutch gardeners in the 17th century. They transferred the satin-like properties of the tulip bulb to a healthy bulb by grafting it. Grafting is mainly used for tree plants (apples, apricots, cherries). In order for the welding to have a good result, first of all, it is necessary to be close to the system to be welded (apple to quince, pear, apricot to cherry, plum.), in addition, when welding, the graft and the cambium part of the graft, the wood parts should touch each other well and it is necessary to tie tightly. Sometimes a virus in one of them affects the growth of the plant as a whole after grafting. A more economically important citrus cultivar loses its virus resistance after grafting. Transmission of the virus can also occur during vaccination.

There are many ways to transmit viruses by grafting. Below are some of these methods:

A. When grafting herbaceous plants, the grafting method is used. In this case, the lower part of the joint is sharpened to a point.

V. It is possible to infect the branches of raspberry-like plants by placing them in a container of water (bottle method), by grafting them to potatoes, potatoes and other plants.

G. By bud grafting of woody plants (eye graft).

V. In grafting, the roots of two plants are preserved, for example, in a vine.

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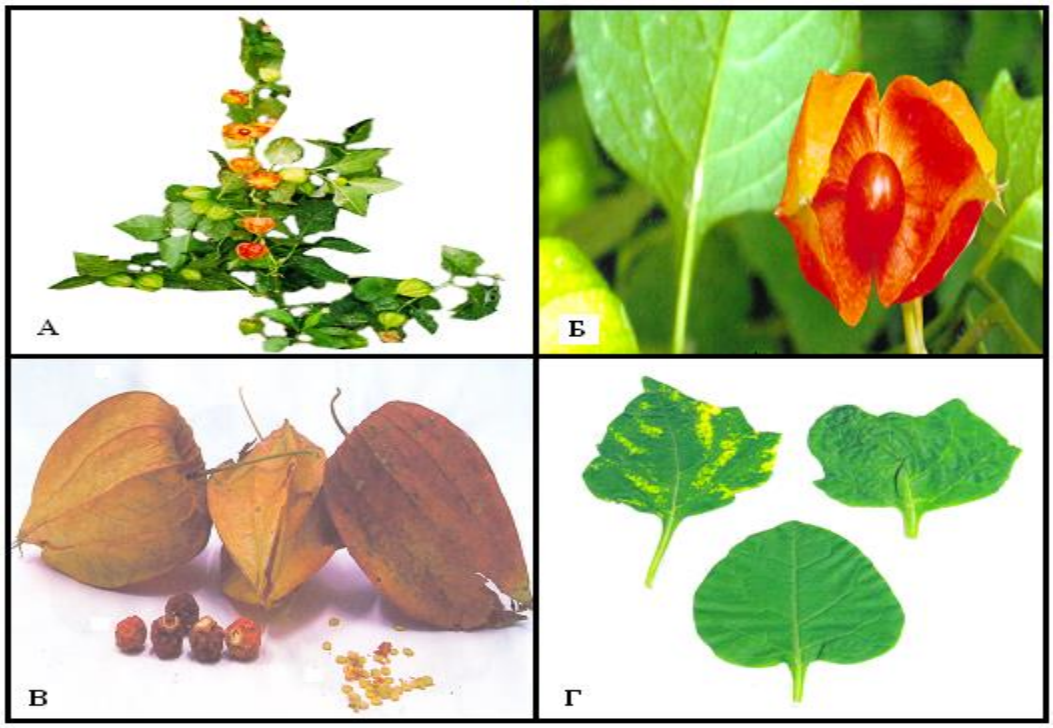
Regardless of the method of welding, the tissue of the graft and the graft must be in contact with each other. It is left until the plant grows. Only then will it be good for the virus to spread. Welded parts are tightly clamped with various tapes, and it is very important that the upper part is always wet.



Picture 3

If the concentration of the virus in the body is high and it is not spread evenly throughout the body, the virus will transfer from the grafted site to the second plant after two days. If the concentration of the virus in the plant body is low and evenly distributed throughout the body, then the virus can spread to the second plant within a week, and in some trees, it can last for a month.

Summary. On the basis of the information collected on the basis of the literature, it was concluded about the spread of plant viruses in the case that they were determined about their centers. The most effective and widely used method for infecting viruses is the mechanical method. is. and in this method it is possible to make an accurate diagnosis in the case of analysis based on specific symptomatic signs.

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