



## Diseases of Citrus Plants and Measures to Combat Them

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**Abstract:** *The article provides valuable information about citrus plant diseases and measures to combat them.*

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### Introduction

*Gommosis* - parasitic and non-parasitic gommosis can be found in citrus plants. Physiological processes are disturbed in the affected trees, regardless of the type of gommosis, and there is a discharge of slimy substance (glue) from the trees. The reason for the formation of glue is that semi-parasitic bacteria settle in places of mechanical damage to trees, which cause the tree cells to shrink.

Typically, gommosis appears in the lower part of the tree trunk (at the root neck), then spreads to the upper part of the trunk, skeletal branches and down to the roots. The leaves of heavily infected trees turn yellow, gradually dry and fall off. The damaged bark dries up and moves away, the woody part of the tree is exposed. Damaged roots die. The harm of gommoz is the decrease in the quality of the fruits of diseased trees and the rapid death of infected trees.

In addition, the disease is characterized by the formation of small cracks in the bark and oozing from them. These cracks become wider, the bark of the affected area gradually dies. As the bark dries, it sheds and the wood becomes bare. The leaves of heavily infected trees turn yellow and are thus different from healthy ones.

The main causes of gommosis are often mechanical damage, cold shock, heavily moistened heavy soils, deep planting.

*Countermeasures.* Strict compliance with agrotechnical rules, proper care of seedlings, not allowing the root neck to be buried with soil, ensuring that the soil moisture is not more than necessary, regularly ventilating the greenhouses, for preventive purposes, in autumn and spring, apply 1% Bordeaux liquid to trees or 25 g per 10 liters of water Entochlorok 85% spraying is recommended.

If the disease is not prevented, gommoz can kill the plants. Infected plants can be treated using the following method. The affected part of the bark of the tree is carefully cleaned with a garden knife (without touching the wood) and washed with a 3% solution of copper sulfate, after 2-3 days it contains 1 part of copper sulfate, 2 parts of quicklime or 4 parts of slaked lime and 12 parts of water paste is applied. If this method is applied several times with the detection of gommosis, the wounds will heal and the trees will recover without any serious complications. If the root and trunk of the tree are heavily damaged by gommosis, such a bush should be dug up by the root and destroyed, and the tree's place should be disinfected with a 1% formalin solution.

*Phytophthora* is caused by oomycete fungi *Phytophthora parasitica* and *P. citrophthora*. This disease is common in regions with a hot climate.

Symptoms and development of the disease. Sprouts, leaves, fruits, tips of branches, stems and roots of trees are damaged. The most serious form of phytophthorosis is the rotting of the lower and other



parts of the tree trunk and a lot of glue leaking from them.

Light-brown spots appear on the affected branch tips and stems of shoots, which grow rapidly and surround the affected parts. Often, the crusts of the affected areas die and crack. A light-yellow, then orange-red colored glue flows from the cracks. Affected branches and stems of seedlings often die. The symptoms of the disease on the trunks of large trees are the same as those of gommosis.

The causative agent enters the cambium tissues through various wounds, damages them and causes ulcers. In trees grown on resistant grafts, the infection does not go down from the graft, but in resistant varieties, it spreads downwards and rots the roots under favorable weather conditions for the pathogen. The glue produced by fungi dissolves in water, so after heavy rains, the tree is cleaned of glue.

On the upper side of the leaves, along the main vein, near the tips, round, dark-brown, isolated spots appear. They grow quickly and can cover the entire leaf. On the underside of the leaves, a oozing blister develops.

Dense, brown spots of rot appear on the fruit, which gradually grow and cover the fruit. In high humidity, a white, fluffy powder develops on the affected fruit. The fruits look like they are ripe in water and give off a bad smell.

Zoosporegia of pathogens are easily spread by rain and wind. When they grow in the presence of droplet moisture (rain, dew) they form 2-celled zoospores, in the absence of droplet moisture they grow like conidia. When they grow, a hyphae is formed, which penetrates the plant and damages it. The causative fungi ferment by means of mycelia and sporangia in infected plant residues, oospores and chlamydozoospores in the soil. The disease reduces the lifespan of trees and reduces the quality of fruit.

*Countermeasures.* It is necessary to strictly observe the rules of agrotechnics, to properly care for seedlings, to protect the root neck from being buried with soil, to keep the soil moisture in the norm, and to regularly ventilate the greenhouses.

For preventive purposes, it is recommended to spray trees with Entochlorok plus 2 g Kresoxin at the rate of 40 g per 10 l of water in autumn and spring.

Severely infected seedlings are lost.

Anthracoze - the disease is caused by the cushion coelomycete *Colletotrichum gloeosporioides*.

Symptoms and development of the disease. Leaves, branches and fruits of citrus plants are affected. On both sides of the leaves, first light-brown, then gray, round-shaped spots appear.

In wet weather, on the spots on the upper side of the leaf, in the form of concentric circles, black dots - pads consisting of conidia of the fungus - develop. The tips of the branches first turn brown, then turn pale yellow and dry. The rind of the fruits is covered with dark-brown spots, often starting from the places where there are fruit bands. Spots grow, take a slightly concave shape, the tissue under them softens, becomes wrinkled. Pads also form on stems and fruits in wet weather. Rot spreads slowly into the fruit.

In the crop, the pathogen is spread by conidia by rain and wind. Sudden changes in temperature in winter, application of fertilizers that do not maintain the balance of elements (norms) to the crop, and other factors that weaken the plant lead to an increase in the disease. The damage of anthracnose is expressed by the death of some parts of the plant, the reduction of the yield and its quality, and the reduction of the lifespan of the trees.

The disease causes the leaves to fall and the branches to dry up. Various unfavorable conditions allow its development: cold winter, excess moisture, lack of nutrients, deep planting, etc.



*Countermeasures.* The rules of agrotechnics are strictly followed, seedlings must be properly cared for. When the disease starts, chemical preparations are sprayed if necessary. Severely infected seedlings are lost. Control measures - cutting off dried and damaged branches, collecting and destroying diseased leaves, spraying plants with 1% Bordeaux liquid.

For preventive purposes, it is recommended to spray trees with Entochlorok 85% at the rate of 30 g per 10 l of water in autumn and spring.

*Powdery mildew* - the disease is aggravated by increased rainfall during the period of growth and development of lemons. Symptoms of the disease are seen with the appearance of oozing spots on the lemon leaf and body. Parasitic fungi infect the tree trunk and cause it to weaken.

*Countermeasures:* To eliminate the disease, prepare a working solution of Entochlorok plus drug in 10 liters of water at the rate of 25 g + Kresoxin 2 g.

*Rust disease* - the disease is aggravated by increased precipitation during the period of sprout growth and development. Symptoms of the disease are that the whole tree is covered with a fungus in the form of rust, leaves, branches, and fruits, giving it a reddish color.

*Countermeasures:* Against this disease, it is necessary to prepare a working solution of 20 g of the drug Acrobat in 10 liters of water and sprinkle it on time.

*Black mold disease* - this disease is aggravated by the development and spread of saprophytic fungi on the leaves and branches where the liquid (excrement) produced by aphids and aphids has fallen during the growth and development of lemons.

Symptoms of the disease are covered with black sticky dust all over the seedling. Saprophytic fungi multiply on the leaves in this coating, and in some cases, the disease leads to the death of the tree.

*Countermeasures:* In order to eliminate the disease, the whole body of the lemon tree is prevented by preparing a working solution of 20-30 g of Entochlorok 85% preparation in 10 liters of water and sprinkling it.

*Citrus nematode* - nematode begins when the lemon tree is over 4 years old. Symptoms of the disease: lemon leaves shrink and turn yellow, branches do not grow, swellings appear around the root, and nematodes develop inside it. If timely measures are not taken, the tree will die due to root rot.

*Countermeasures:* In order to prevent nematode damage, when the leaves of the tree start to turn yellow, open the trunk to the roots, depending on the age of the tree, add 70 g of the oxide preparation to 10 liters of water, and pour 5-10 liters of working solution under each lemon bush. Before pouring the working solution, soil moisture is supplied to 80 percent. Withered seedlings are dug up by the roots, transplanted and burned. The soil is removed.

*Moysimon spotting* - this disease occurs when the wrong shape is given during the growing season or when the shape is delayed. It is caused by incorrect and excessive use of various suspensions. Disease symptoms: dark green spots appear on lemon leaves and fruit. Later, these spots turn brown and cause the death of leaves and fruits.

*Countermeasures:* To prevent the disease, the greenhouse planted with lemons is well ventilated and chemical treatment is carried out by adding 65 g of Entochlorok plus drug to 10 liters of water.

*Yellowing of the tip "Yellow dragon"* - symptoms of the disease. The symptoms of the disease are different in different citrus plants and they are very similar to those of tristeza. The leaves of the affected trees become long, narrow and misshapen, turn yellow, the veins become pale, and later the veins die. Sometimes chlorosis is observed in the leaves and they fall off. The flowers are small,



irregularly shaped, the petals are short, yellowish and thickened and shed. Fruit nodes are also shed. The fruits remain small and smooth. In the last stages of disease development, the tree root rots.

*Countermeasures.* The disease has not been recorded in our country. It is forbidden to bring to Uzbekistan citrus materials intended for planting and grafting, as well as fruits for obtaining seeds from countries where citrus yellowing disease is widespread. In order to determine whether the seed and other planting material brought to Uzbekistan for the purpose of selection and scientific research is infected, examination in the laboratory and inspection of planting in the introduction-quarantine field for 3 years; if determined, burn them; removal of damaged trees; timely watering of trees, fertilizing and compliance with high agrotechnical rules increase the resistance of trees to viral diseases.

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