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Common apple diseases

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Abstract: This article describes the biology, distribution, damage, species composition and morphology of the fungi that cause moliniosis and calmaraz disease, which are common in apple trees.

Key words: Mycelium, conidia, apple, stem, leaf, damage.

Apples cover 44% of all orchards in Uzbekistan. Of the 261,800 hectares of land, 120,500 hectares are occupied by pod trees, 95% of which are apples. In January-May 2023, Uzbekistan exported 4,400 tons of apples worth 1.8 million US dollars to 7 countries. According to the Statistics Agency, apple exports decreased by 702 tons compared to the corresponding period of 2022. There are reports of the spread of calamari and molinosis diseases in apple orchards.

Disease damage. Moniliosis is the most harmful disease of bees in many countries. Damaged shoots, nodes, joints of leaves and twigs die, branches become bare and trees become weak. In general, the decrease in yield is proportional to the death of combs and nodes due to disease. The disease reduced the yield of quince in Armenia from 135 centners to 3.9 centners per hectare (by 91.1%), in some years the crop was not harvested at all. In Georgia, 50% to 99.7% of the quince harvest was lost. In the Krasnodar region, Crimea and Moldova, moniliosis is the main obstacle to quince harvest and expansion of quince orchards.

Symptoms of the trigger. The disease is caused by the ascomycete (discomycete) fungus Monilinia cydoniae, synonyms are Monilinia linhartiana, Scerotinia cydoniae and Peziza linhartiana; anamorph Monilia cydoniae, synonym Monilia linhartiana. The causative agent is narrowly specialized and affects only the quince.

Apothecia of the fungus are rare in nature, and they are not recorded in all countries where moniliosis is widespread. But according to the report, the conidia of all Monilinia species belonging to the disjunctive group form an ascomycete stage in the development cycle, and if the observations are made carefully, it will be possible to find its apothecia. Apothecium grows in the spring from sclerotium that wintered in the soil around the quince tree, in the remains of the plant.

Apotatiums are flat cup or saucer-shaped, diametric 3-5mm, brown, the lower part of the leg is black, 5-7mm long. Cylindrical, colorless, 150-160x6-9 µm, with 8 ascospores. Ascospores are obliquely located in a row in the bag, ellipsoidal, the ends are slightly thinned, colorless, 9-11.5-15x6-9µm. Paraphyses are 135x1.5µm, filamentous, 1-celled, dichotomously branched, 3-4-celled.

The conidiophores of the anamorph are dichotomously divided. Conidia are round or lemon-shaped, with small tubercles at both ends, colorless or slightly yellowish, 9-17.5x7.5-15µm, forming simple or branched chains. Young conidia do not have disjunctors, in mature conidia their length is 1-5 µm.

Sclerotia develop in nodes, less often in leaves. They are similar to grain seeds with a slightly closed center or irregularly shaped, brown in color, small, 2-4 mm in diameter at the widest part.

In the medium of potato-glucose agar, the fungus forms grayish, sometimes yellowish, oozing colonies. There is a mycelial sheet, drops of exudate. The hyphae are colorless, and microconidia with a width of 1-4 µm develop in round, light-green, short growths.

According to information, quince is affected by moniliosis again in the stage of ascomycete (diuscomycete) - Monilinia linhartiana, anamorph - Monilia linhartiana; this disease is one of the 2 most dangerous diseases of bees in Europe. Apothecium diametric 3-7mm, leg 2-20x1mm, sacs 200-260x17-19µm.

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Conidia are colorless, 10-20x8-15µm, in chains, with disjunctors. Given the closeness of the characters of the ascomycete and anamorph stages, it is possible that this species is a synonym of Monilinia cydoniae.

In some countries, Bahi fruits can be damaged by Monilia fructicola and Monilia laxa, which are fungi that cause disease in pears. Fungi enter the fruit through insect damage and mechanical injuries. Small spots appear on the fruits during the growth period of the trees, which develop during the period of fruit collection, transportation and storage in the warehouse (when the temperature is above 10 C) and turn into round, becomes brown spots.

The disease is widespread, but it causes severe damage in areas with high humidity. Leaves, branches and fruits are infected. Round brown spots appear on the leaves, which are covered with green-olive velvety dust (Fig. 104). The size of the spots varies from 2 to 13 mm, which depends on the age of the leaf, the resistance of the variety and weather conditions. The largest spots are observed on young leaves of resistant varieties and in wet weather. In apples, powdery mildew usually occurs on the upper side of the leaves, and in pears, on the lower side. Infected leaves dry up prematurely and fall off.

On the fruits, parsha appears in the form of spots covered with a dark olive velvety dust, sharply demarcated by a thin border. In these places, the upper cell layer becomes scaly, which prevents the pathogen from penetrating deeper into the tissue. However, the blistering of the affected area prevents the uniform growth of the fruit and cracks appear in the affected areas. When harvested in warm weather with frequent fogs, late blight appears on the fruits in the form of very small brown-black spots. The disease occurs especially in storage.

Damage to the branches is characterized by the appearance of small swellings on the bark, which then burst, and the bark is covered with small oozing cracks. Branches stop growing and often die.

Powdery mildew often develops on flowers, fruits, and leaves, causing premature shedding of leaves and buds. Sometimes in apples, parsha is also found in the bud shells.

The causative agent is bag fungi belonging to the Dothideales order: in apple - Venturia inaequalis Wint., in pear - Ventu-ria pirina Aderh. From the morphological point of view, these fungi are almost indistinguishable from each other, but from the point of view of their biological characteristics, they are narrowly specialized, i.e. adapted to the food plant. Therefore, the apple peel does not damage the pear, and the pear peel does not damage the apple.

The cyst stage of the parsha pathogen occurs in the spring on infected leaves that have overwintered. Around the affected area of the mesophyll of the leaf, pseudothecia covered with a large number of sharp hairs are formed in autumn. Usually, several pseudotheciums appear in each patch of atrophy. Each of them produces 120-200 nodule-cylindrical sacs in the spring, and each sac produces 8 two-celled yellow-green sacspores.

In V. inaequalis, the diameter of the pseudothecium is 90-120 µm, and the size of the sacs and chaltaspores is 40-70x10-12 and 13-17x6-7 µm, respectively; In V. pirina, the diameter of the pseudothecium is 120-160 µm, and the size of the sac and sacspores is 50-70x10-12 and 14-20x5-8 µm, respectively (Fig. 38). Dispersion and dispersion of haltaspores occurs in intermittent humidity and temperature range from 7 to 230C (optimum range is 18-200C). Thus, haltaspores are considered the primary source of infection that damages plants in the spring.

Dispersal of haltaspores occurs in early spring in warm climates, and in late spring in cool climates. The release of holtaspores from the bag can take up to 60 days, depending on weather conditions. Scattering of haltaspores is considered the most dangerous for the damage of plants during the period of writing of buds, coloration of buds, flowering and general shedding of petals. Spores are spread by air currents and water droplets.

Haltaspores grow in abundant moisture and temperatures from 2 to 300C. At a favorable temperature (18-200C) their growth begins after 4 hours, and at lower and higher temperatures (ideally 6 and 270C) after 6 hours. Haltaspora forms a tumor, which penetrates the plant tissue and initiates the development of mycelium. The fungus infects young leaves, it does not enter leaves older than 25 days.

The incubation period of the disease lasts 8-21 days. When the temperature is 17-210C, it is 10 days (1-2 days less in pears). The first signs of parsha are observed during the gross shedding of leaves. Parsha appears in the growing parts of the plant during the conidial period. In the mycelium under the epidermis of the leaf, olive-colored, unobstructed cone-diabands are formed. Single, inverted pear-shaped and egg-shaped, green-

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yellow conidia are formed in them. When they do, the epidermis cracks and the conidia are easily dispersed by wind currents and raindrops, damaging healthy plants. During the growing season, parsha pathogens can produce 4-6 to 9-10 generations of conidia.

When infected with conidia, plants undergo the same incubation period as when infected with chaltaspores.

The causative agent of apple scab is Fusicladium dendriticum Fuck in the conidial period, and Fusicladium pirinum Fuck in pear. it is called. In F. dendriticum, the size of conidiabands is 15-40x4-6 µm, and conidia are 13-30x6-12 µm (Fig. 38), in F. pirinum it is 16.5-60x4.5-8 and 13-30x5-9 µm. . There are also reports of mycelium overwintering and new conidial spore formation in spring. So, the causative agent of parsha overwinters in fallen leaves and sometimes (most often in pears) in infected branches with mycelium.

As we noted above, parsha develops in conditions of sufficient humidity, so the disease does not cause much damage in our republic.

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