



CITRUS PHYTOPHTOROSE IN HUMID SUBTROPICAL ZONE OF WEST GEORGIA

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Abstract. Materials about harmfulness of phytophthora, which is one of the significant disease of citrus, its spread, time of emergency and effective means of its control are given in the article.

Key words: citrus, *Phytophthora citrophthora*, phytophthora

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Citrus phytophthora is spread in all citrus-growing regions of Georgia. Percentage of spreading the disease is high enough in those years when air relative humidity is high and it is frequent rainy conditions. The disease is very significant with its harmfulness and negative economical meaning. It was first noticed in Kobuleti region in 1939 on the plants introduced from Florida by L. Kanchaveli and N. Sakvarelidze. Then the disease was discovered in Ureki citrus farm that caused drying of 35000 lemon seedling in 1935 (KANCHAVELI 1987). We carried out researches in greenhouses and citrus plantations of Guria, Adjara and Samegrelo zones in order to establish the spread of disease. In 2010-2013 disease of seedlings was spread by 10-12% in Guria, it was up to 8-10% in Adjara and in Samegrelo zone it was determined by 7-8%. Disease of lemon fruit got to 10% in frequent rainy conditions in 2011-2013.

According to our investigation disease of root collar and trunk caused by phytophthora was marked mainly in old plants and it reached 12-15% in abovementioned three regions.

The fungus *Phytophthora citrophthora* Leonia causes citrus phytophthora. Fungi diseases citrus seedlings, leaves and fruit of fruit-bearing plants, root collar and stem. It often causes drying of young plants, damages greatly the old plants by rotting the fruit in the phase

of maturing. Fruit are diseased during storage period too.

Disease is mainly emerged on the nodes and grafting places of citrus seedlings in form of brown spots. Spots get bigger as round a stem so along it and passes gradually to the healthy part, at last it coil the stem and the plant dies above the damaged part. Flowing of glue on the spots often takes place.

The plant totally dries in case of infection at the grafting places, but when the young shoots become diseased marks of disease is emerged by darkening leaves and shoots which become brown during certain time (MKERVALI 1985). In case of disease individual leaves big brown spots appear on different places of leaf blade which often occupy a large part of a leaf. The spot is surrounded by yellowish chlorotic ending. If a spot appears on the base of a leaf then falling of leaves take place (DOBROZRKOVA *et al.* 1965). Fruit disease occurs with the identical symptoms as in field so in storage conditions. Part of a fruit, sometimes the whole fruit becomes brown as if it were scalded (Fig. 1).

In those places where the diseased part passes into the healthy one the fungus conidia carriers are noticed on the tops of which there are some individual conidiums of lemon shape. White airy mycelium develops (BERADZE & KECHAKMADZE 1984; BERADZE *et al.* 2008) on diseased fallen leaves in high moisture



Fig. 1. Lemon fruit diseased with phytophthora.

conditions. Disease of aged plants is emerged mainly in the second half of summer as on stem so at the root collar from where glue flowing-gummosis happens (BERADZE 1988, 2003). Heavy diseased fruit-bearing trees wither.

Fungus develops on artificial nutrient area in form of white weak airy mycelium. Zoosporangiums are usually formed on the end of filaments. It is of ellipsis or lemon form in size $65-90 \times 25-35 \mu\text{m}$. There are porus attached on the tops from where zoospore comes out. There are 30-35 zoospores in each zoosporangium, it is elongated or oval in shape with grain stuffing $10-17 \mu\text{m}$ in size. Zoospore has two narrow eyelashes on the side by means of which it moves in the drop of water. After certain time zoospore stops moving and develops front growths by which it enter into plant tissues and causes infection. Fungus develops chlamdospore in its own in pure culture. It is like elongated or roundish ellipsis with fat drops of different size.

Comparatively high temperature is necessary for growth development of fungus ($25-27 \text{ }^\circ\text{C}$). In Georgia it develops well in $20-30 \text{ }^\circ\text{C}$ conditions. Moisture has a great meaning for fungus development especially in form of water drop. Water drop is essential for formation zoospores. Soils with surplus humidity and excess doze of organic-fertilizers favor the disease development, thickness of young plants in greenhouses is an important factor as well.

Carrying out prophylactic measures is of great importance for controlling citrus phytophthora, namely: it is necessary to keep

sanitary-hygienic conditions by gathering the diseased organs systematically and their annihilation, balanced applying of mineral and organic fertilizers. Clearing area the trunk and branches of fruit-bearing plants from diseased parts. Cutting out the diseased branches, disinfection of cleared wound with 1% copperas (green vitriol) or blue oil paint. Whitening trunk and branches of fruit-bearing plants for winter with mixture of lime, 10 parts of clay and 2 parts of green vitriol or blue vitriol. Thrice treatment should be carried out against the disease with 1% copper mixture (Bordeaux mixture), first spraying-before beginning vegetation, second spraying – after fruit nodding, third spray – in the end of June – beginning of July.

Conclusions

Citrus phytophthora is spread in all citrus-growing regions in Georgia. The fungus *Phytophthora citrophthora* causes the disease which diseases citrus seedlings, leaves and fruits of fruit-bearing plants, root collar and stem, it often causes drying of plant.

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