ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 7, Issue, 02, pp.12680-12684, February, 2015

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

MAJOR DISEASES OF CITRUS IN ADJARA REGION

***, [1]Gabaidze, M., [2]Memarne G. and [3]Beradze, L.**

[1]Department of Agrarian Science, Shota Rustaveli State University, Institute of Phytopathology and Biodiversity, Kobuleti, Georgia
[2]Department of Agriculture, Shota Rustaveli State University, Institute ofPhytopathology and Biodiversity, Kobuleti, Georgia
[3]Department of Biology, Institute of Tea, Subtropical Crips and Tea Industry, Ozurgeti, Georgia

ARTICLE INFO

Article History:
Received 10th November, 2014
Received in revised form
27th December, 2014
Accepted 07th January, 2015
Published online 28th February, 2015

Key words:

Citrus, Pathogen, Rot, Mold, Monitoring.

ABSTRACT

In 2012-2014 in citrus farmers private plots of Adjara region, as a resultof monitoring, the following diseases were fixed according to their severity and negative marketing impact: Scab, Phytophthora root rot, Melanose, Anthracnose, Sooty Mould, Gray Mold, Green Mold, Black Aspergillus, Alternaria Brown spot, Citrus Blast and other.

INTRODUCTION

Many countries all over the world are interested in citrus fruit production. Citrus plantations are grown in more than 75 countries and give a fruitful crop in case of good agro-technical conditions. In Georgia, 65-70% of citrus crop are harvested in Adjara region. Citrus crop is 30-40% lessen by different microorganisms. The damage caused by them is huge in terms of its quantity as well as its quality (**Beradze *et al.*, 2008, Beradze and Kechakmadze, 1984**). Mild and wet climatic conditions of Georgia is favorable for damaging citrus trees leaves, shoots, flowers, ovaries, fruits and root system in whole. Pathogen microorganisms, when penetrating into a plant, damage the process of metabolism, decrease citrus crop and product marketing value, moreover, kill the plant during epiphytotic. Socio-economical and political situation that existed in Georgia in the end of the 20th century, also had a negative impact on citrus production; also because of economical crisis the most part of citrus plantation does not follow the technologies that lead, in its turn, to permanent disease sources existence. The best citrus production conditions in Georgia exist in Adjara region (**Vitkovskii *et al.*, 1998**). Consequently, a wide spectrum of citrus diseases is found here and it is necessary to conduct phytosanitary monitoring systematically; and on the base of its results it will be possible to study different factors that influence the development of citrus diseases; prognoses expected crop loss caused by it; makes it necessary to conduct some research works in this very field, as we are facing very dangerous ecological and economical damage.

Corresponding author: Gabaidze, M.
[1]Department of Agrarian Science, Shota Rustaveli State University, Institute of Phytopathology and Biodiversity, Kobuleti, Georgia.

MATERIALS AND METHODS

Survey was carried out in private plots of farmers from Kobuleti and Khelvachauri municipalities. In total were visited 492 citrus-growing plots. Surveys were carried out in spring (February, March, April), summer (July, August), autumn (October, November) and in winter (December, January), for post-harvest diseases. Potato dextrose agar media was used for detecting citrus fungal pathogens. In 2012-2014 on the base of private citrus farmer's plots monitoring, the following diseases were fixed:Scab, Phytophthora root rot, Melanose, Anthracnose, Sooty Mould,Gray Mold, GreenMold, Black Aspergillus, Alternaria Brown spot, Citrus Blast and other. Citrus Scab (causal agent-Elsinoefawsetii). The disease has been spread in all citrus production regions. Favorable conditions: wind, rain, insects that spread fungi spores (**Dewdney and Timmer, 2014, Chung, 2010. Kunta *et al.*, 2013**). Citrus Scab infects citrus leaves, shoots, and fruits. Disease renovation begins with the organs that have been diseased in previous years. On diseased young leaves yellowish blotches appear, that turn later on into a brown color and are

covered with velvet flake. Diseased leaves experience deformation. The surface of the diseased fruit is covered with pink-brown blotches. When the disease is too severe, fruits change the shape, fall down off the tree. In case the disease is weak, fruits lose their marketing value.

Figure 1. Citrus Scab on the fruit and twigs

Citrus Phytophthora root rot (causal agent-Phythoptoracitrophthora). In fall it causes serious damage (September, October), wet and rain conditions make the disease more damaging. Phytophthora root rot infects citrus young trees, fruitful plants, leaves and fruits. When diseased the grafting place is covered with brown spots. The spots become bigger around the stem and along it; the plant wilts above the damaged part. In case of young shoots infection, the disease symptoms appear on leaves, the shoots become of dark color, later- brown. When separate leaves are diseased, big spots appear that cover sometimes a big part of the leaf. Leaves often fall down. Fruits become brown and fall down off the tree. Mature plants disease is seen on stems and also near root, out of which sap is flowing out. If a fruitful tree is diseased very much, the plant dies.

Figure 2. Citrus tree with Phytophthora root rot

Citrus Anthracnose (causal agent-Collect otrichum glocosporioides (Penz), infects citrus mature leaves, flowers, ovaries, green and ripe fruits. The spot on leaves is of light green color in the beginning, later, it becomes grey. Under wet conditions, red blotches appear on the spot, which are fungus spores. If the disease is severe, the leaves are totally ruined. Every year flowers disease is 20-30%. Green fruits are infected on petioles. Fruits become brown and red blotches appear on the surface. On ripe fruits, dark brown spots appear.

Citrus Sooty mould (causal agent-Capnodium citri), surface fungus, that is not connected with plant tissue physiologically and is not a parasite. It is developed on plant insects and excrements of scales. The disease is mainly found in dark places, plant leaves, buds, and fruits are first covered with a dark grey then, black flake. The black flake covers the plant tissue out of light, makes aeration difficult and prevent assimilation.

Figure 3. Citrus Anthracnose on the leaves

Citrus Alternaria Brown spot (causal agent- Alternaria citri Piez). The disease is spread in all citrus production regions; causes great crop loss. Infection begins in field conditions and becomes stronger while storage. Green fruits are diseased as well as ripe ones. Near the fruit petioles, brown or dark brown spot appears (**Dewdney and Timmer, 2014**). The spot spreads alongside the fruit's length towards the centre, then, the mild part of the fruit rots, and the color of rotten fruit changes. It spreads onto other fruits when being in contact with them.

In 2014 in 80% of Adjara region citrus plantations, the fungus Mycosphaerella Citriwas spread. The disease, caused by it (Greasyspot) was unknown for citrus farmers. First, the disease symptoms (**Dewdney and Timmer. 2014**) were seen on the lower and then upper parts of leaves, as a brown flake, later it became of dark brown color and went onto branches, fruits and made the marketing value low.

Figure 4. Citrus Sooty mould on the leaves and fruits

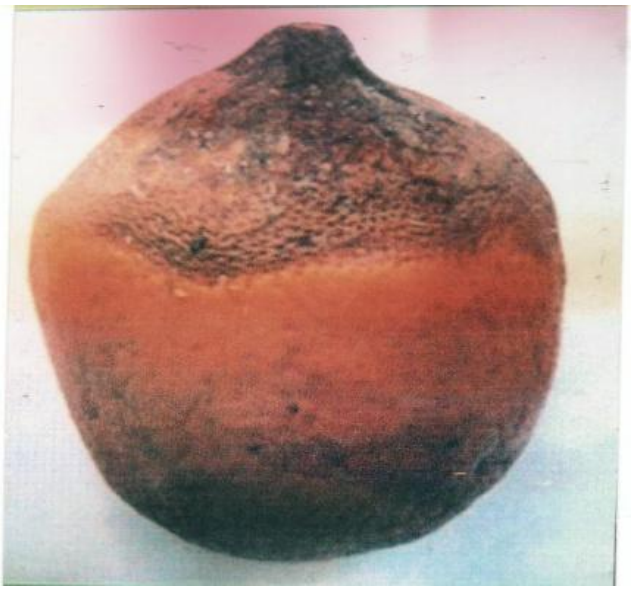

Figure 5. Citrus Alternaria Brown spot on the fruit

Figure 6. Citrus leaveswithsymptoms of GreasySpot

Citrus Melanose (causal agent - Diaporte citri F.A. Wolf, phomopsis citri H. Fawc), causes citrus black spots, melanose. Young leaves, buds, fruits are diseased in vegetation period. Dark green, thin spots appear on infected leaves; later on they become bigger and of a dark color. When the disease is severe, the leaves change their shape and falls down off the tree. On diseased leaves the fungus develop picnidiums (**Nelson, 2008**). On green buds, the disease appears as convex dots which unite and form a big dry spot. Then, long thin cracks appear on the stem. The fruit disease begins from the petioles. Different size of black dots appear on green fruits. As the fruit becomes bigger, the spots crack and white dents appear between them. Sometimes, the whole fruit becomes black. In case if the disease is not severe, fruits finish their development, ripe but they rot while storage.

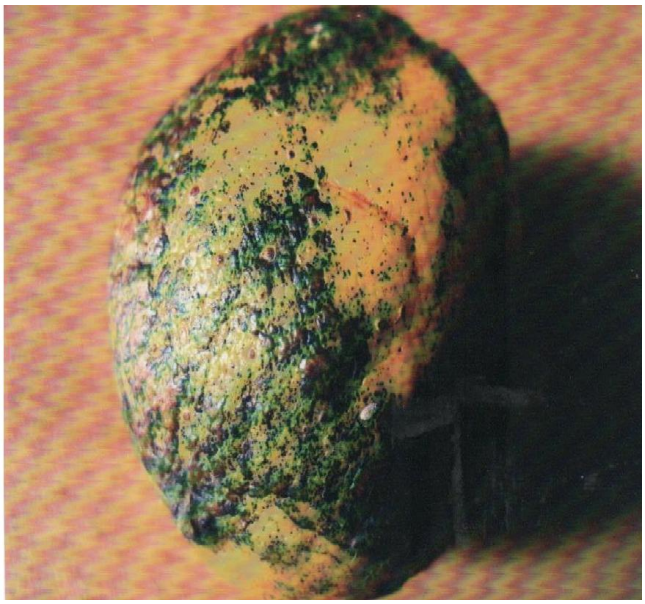

Figure 7. Melanose on the fruit

Citrus Gray Mold (causal agent - BotrytiscinereaPers), is a wide-spread fungus. It infects citrus leaves, branches, flowers and ovaries. The disease becomes stronger in spring on the organs that are damaged because of low temperature during winter (**Beradze and Dzhaceli, 2011**). Brownish spots are developed on leaves and fruits that are soon covered with grey flake. When the flowers are infected, it makes them rot and they fall down. Light brown spots appear on fruits and as a result of it, sometimes, 15-20% of fruits rot.

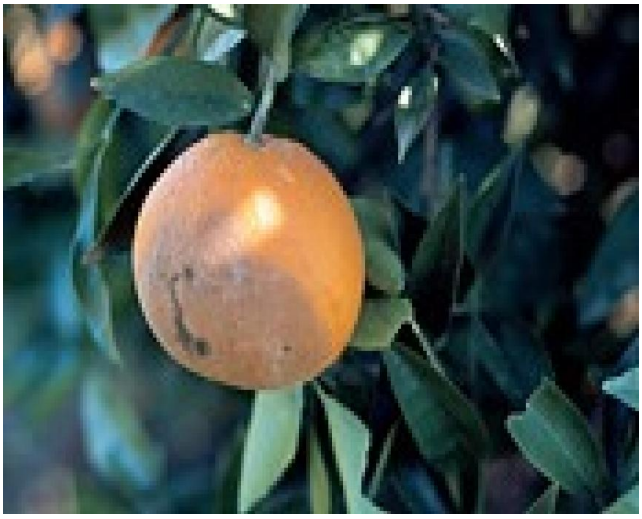

Figure 8. Citrus Gray Mold on the fruitFigure. 9 Citrus Green Mold on the fruits

Citrus Green Mold (causal agent -PenizilliumitalicumWehm), infects citrus fruits while storage. Sometimes 15-30% of fruits are killed because of this disease. The infected place becomes watery soft, the spot becomes bigger and after a couple of days a white mycelium is developed on the fruit on which a flake appears. It becomes bigger and covers the surface of the fruit. The infection develops very quickly and spreads on the other fruits. Mechanical damage, humidity, high temperature is a favorable condition for this disease.

Black Aspergillus (causal agent- Aspergillus niger V. Thiegem). causes a real black rot. The disease begins with the mechanically damaged place. First, the peel rots, becomes watery. Then, well-developed black flake appears in the center of the spot that is caused by the fungus.

Figure 10. Black Aspergilluson the fruit

Citrus Blast (causal agent-Pseudomonascitriputeale). It is one of the most dangerous citrus bacterial disease in the whole world. The monitoring that was conducted in Adjara region citrus plantations, showed that Citrus Blast develops in the second half of February, in some places-in the beginning of March.

Figure 11. Symptoms of Citrus Blast

It should be mentioned here that in the beginning the disease is fixed on separate leaves and one year old branches (**Snowden, 1990**). Necrosis begins from petioles as a small watery, green spot that grows in several days and becomes of a black color that is caused by the tissue death. Humidity, temperature change, wind, hail makes this disease severe. Also, insects help this disease develop.

Acknowledgements

The authors are grateful toleaders of the project USAID / EPI, Citrus Production Training Program" to provide financial assistance in the survey of citrus plantations.

Conclusion

Survey was carried out in private plots of farmers in Kobuleti and Khelvachauri municipalities. During survey were visited 492 citrus-growing plots and a wide spectrum of citrus diseases was found. As a result our monitoring, the following diseases were fixed according to their severity and negative marketing impact: Scab, Phytophthora root rot, Melanose, Anthracnose, Sooty Mould, Gray Mold, Green Mold, Black Aspergillus, Alternaria Brown spot, Citrus Blast.

REFERENCES

Beradze L. A. and Dzhaceli E.sh. 2011. Seasonal incidence of main citrus diseases. International scientific and practical conference, Integrated Plant Protection: strategy and tactics" Belorussia. P- 67-71

Beradze, L. A. and Kechakmadze L. A. 1984. Major diseases of citrus fruits and fightagainst it. *Subtropical Crops,* N3, P-131-138

Beradze, L. A., Djakeli, E. Sh., Motskobili, N. A. and Memarne G. R. 2008. Pathogenic fungi on citrus fruit in western Georgia. Abstracts book of first international Transcaucasus conference on plant pathology. P – 79

Chung, K. R. 2010. Elsinoefawcettii and Elsinoeaustralis: the fungal pathogens causing citrus scab. *Molecular Plant Pathology,* PP- 13

Dewdney, M. M. and Timmer, L.W. 2014. Greasy Spot. Florida Citrus Pest Management Guide, P-144

Dewdney, M. M. and Timmer, L. W. 2014. Florida Citrus Pest Management Guide: Citrus Scab. P – 146. http:edis.ifes.ufl.edu

Dewdney, M. M. and Timmer, L. W. 2014. Florida Citrus Pest Management Guide: Alternaria Brown Spot. P – 147. http:edis.ifes.ufl.edu

Kunta, M., Palm, M., Rascoe, J., deSa, P. B., Timme, L. W., daGraca, J. V., Mangan, R. L., Malik, N. S. A., Salas, B., Satpute, A., Setamou, M. and Skaria, M. 2013. Sweet Orange Scab with a new scab disease, syndrome" of citrus in the U.S.A. associated with Elsinoeaustralis, *Tropical Plant Pathology*, Vol.38. PP-203-212

Nelson, S. 2008. Citrus Melanose. *Plant Disease,* PH-59

Snowden, A. L. 1990. A Color Atlas of Post-Harvest Diseases and Disorders of Fruit and Vegetables. Volume 1. General Introduction and Fruits, Wolfe Scientific.

Vitkovskii, V. L., Samoladas, T. H., Korovina, O. N. and Karaja, R. K. 1998. Flora of Cultivated Plants. *Citrus Crops,* Vol. 24. PP-370-376

****