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Full Length Research

Predicting the Distribution Of Dangerous Apple Tree Diseases According to the Layers Of Water Drains

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This article highlights the change of underground water level in the apple gardens of the Renet Simireko sorts under the conditions of the dry, humid climate of Khorezm region where the underground waters of Uzbekistan are located shallowly.The information was analyzed in connection with the spread of the most dangerous cytosporosis disorders. Compared with literary sources associated with the decline in plant immunity, it has been shown that under the conditions of Khorezm, where underground water is close to the ground, the reduction of plant immunity and comfortable conditions for the development of *Cytosporosis* occurred. In thedisease control system, it is recommended to rapidly monitor the groundwater level gradually.

Keywords: *Cytospora*, fungus, pathogen, smirenko, mineralization, immunity, drainage water.

INTRODUCTION

As a result of infection by a number of diseases and pests, agricultural crops are kept behind growth and development and the quantity and quality of crops are dramatically reduced. During the years of illness, the productivity can be reduced to 50% (Sheraliev A.Sh., Rahimov U.X, 2006). According to the collected data from the United Nations and Food Problems Departments- FAO, 20-25% per cent of the total crop dies annually by crop pests and diseases. It is important to anticipate the emergence of diseases and pests in the prevention of harvest loss. We conducted the research on the methods of predicting the spread of cytosporosis in Uzbekistan's Khorezm region. In predicting the distribution of pests and diseases in the condition of Khorezm region, many labor-demanding methods were used.The growing demand for agricultural products in the region, the increase in cultivated areas and the development of new crop varieties in large areas has led to improve the methods of predicting. At the present time in the region there is an increase in the distribution of *Cytosporosis* disease spreads in the Renet Simiryako apple sorts.

Erenberg (1818) pointed out that *Cytosporosis* is one of the most commonly encountered pathogens (diseases) in the forests, which is the cause of wound diseases in the branches and trunks of trees. This disease affects the broad spectrum of tree species and causes the destruction of woodland in large areas. (Adams et al., 2005, 2006).

In India, chestnut trees (Castanea sativa Mill.) in the northern part of the country was determined to be affected by the natural and anthropogenic effects. At the same time, the appearance of sores in the trees shows and burns on the leaves were observed. It is found out that this disease is very dangerous and the Valsaceae family was found to be *Cytospora* fungi. (Dar MA and Rai MK 2014)

MATERIAL AND METHODS

In Uzbekistan, the features of *cytosporosis* disease in the conditions of Tashkent were studied by

T. Ts. Panfilova (1956), Isroilov (1974), Khujaev O.T. (2010). Khorezm region differs from other regions in the way of dry climatic varieties, irrigation methods, salinity level of soils and shallow groundwater levels.

In Khorezm, totally more than 2,000 wells to measure groundwater levels and salinity levels, samples are tested every 10-15 days. Information on cytosporosis and its development in apple gardens with underground waters is very rare. We have learned that the development of cytosporosis and its spread in the Khorezm region of Uzbekistan is an important factor.

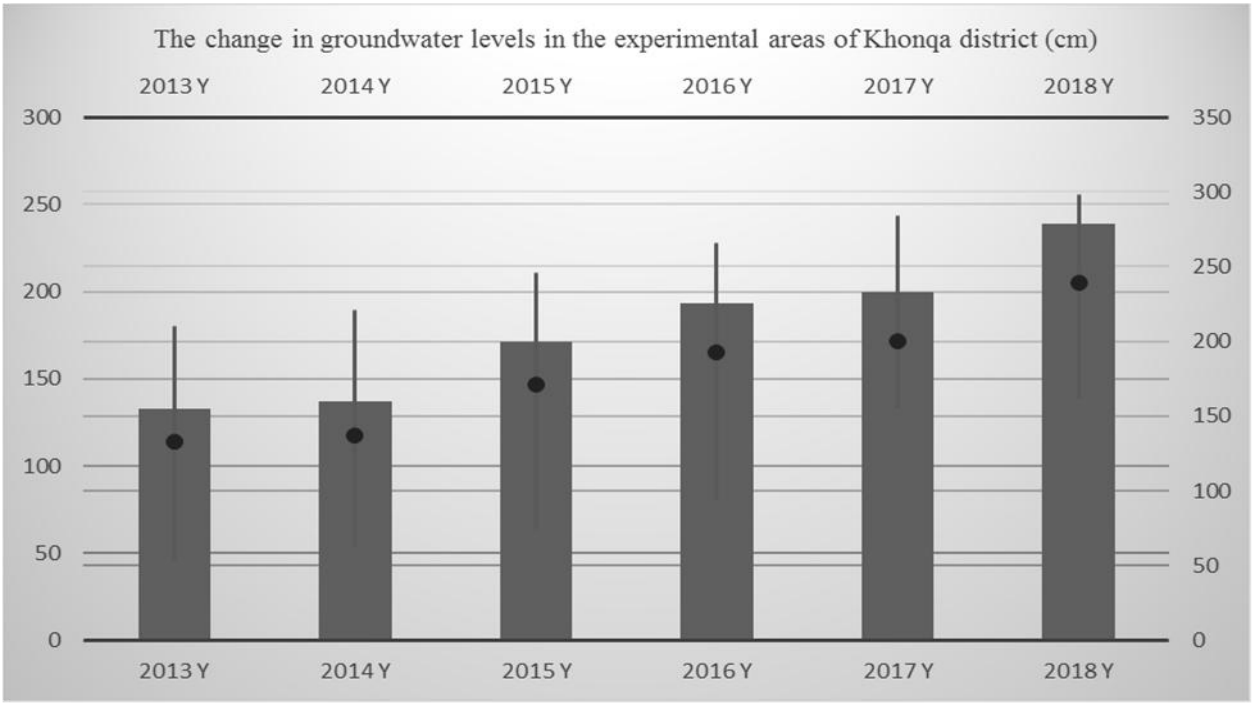
The Methods of Experimentation: The Research Methods: Three farms were selected in the Khorezm region, which are Khonqa, Khiva and Gurlan districts. The gardens were established in 2005 and they have been suffering from diseases since 2013. Information on the level of groundwater levels and salinity was taken from the wells of Khorezm Amudarya Left Coast Irrigation System Amelioration Expedition Department. Cytosporosis disease was investigated in these fields. At the same time 50 trees were examined on a diognal basis from each field.

RESULTS AND DISCUSSION

In the Khorezm region, irrigated land is equal to 100%. In the fall and spring, 5200-7000 cubic meters of water is used to clean the soil salinity. This leads to changes in groundwater levels. The indicators of drainage water's critic depth are of great practical significance for irrigated districts, because the increase of the mineralized drainage water to the level of critic depth or even higher level is one of the main causes of soil salinization. (S.M. Shmit 1985, Rakhimboev 1969, Dukhovniy, 2000) were conducted researches to investigate the less damaging depth of drainage water levels to the crops.

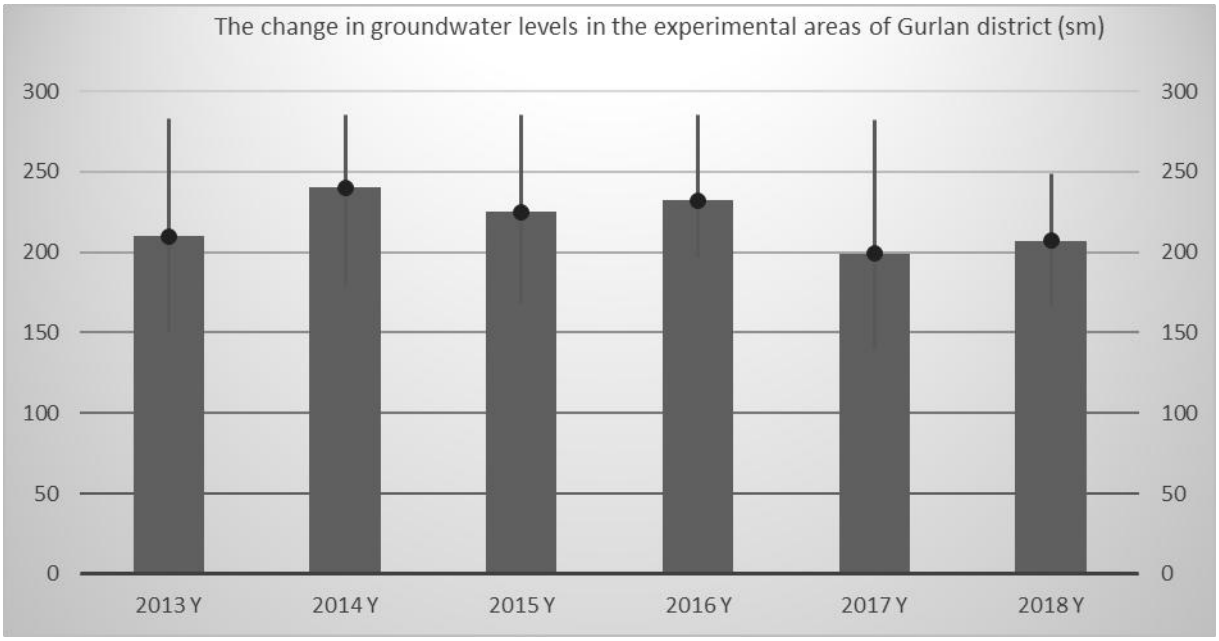
We discovered that the groundwater levels in June and July have risen to a depth of 66-94 cm by 2016 in the Khonqa district, where we are conducting the experiment. Between 2013 and 2014, the levels were rather shallow and the surface will reach the maximum level in 2017-2018. Groundwater levels in Gurlan district varied in diopazones that were relatively small compared to other areas. Minimum groundwater level is 199 cm, maximal value is 240 cm. In 2015, the level of groundwater in the Khiva district reached a minimum of 113 cm, in 2018, with a maximum of 210 cm

Figure 1: Dynamics of underground water levels of investigated apple gardens



Mukhammadiev (1982) suggested that the shallow groundwater levels are not always dangerous for plants, but sometimes can be useful in terms of salt content and soil properties. Depending on the soil properties, the critical depth scale has been developed, indicating that the water can be from 1 to 2.8 meters.

Figure 2: Dynamics of underground water levels of investigated apple gardens



The critical depth is the depth where water flows through the capillary tubes to the root part of the plant and begins to salinity. For some soils that have particular salinity, the critical depth is the depth of time at which salinity and non-salinity are equal to zero
.

Figure 3: Dynamics of underground water levels of investigated apple gardens

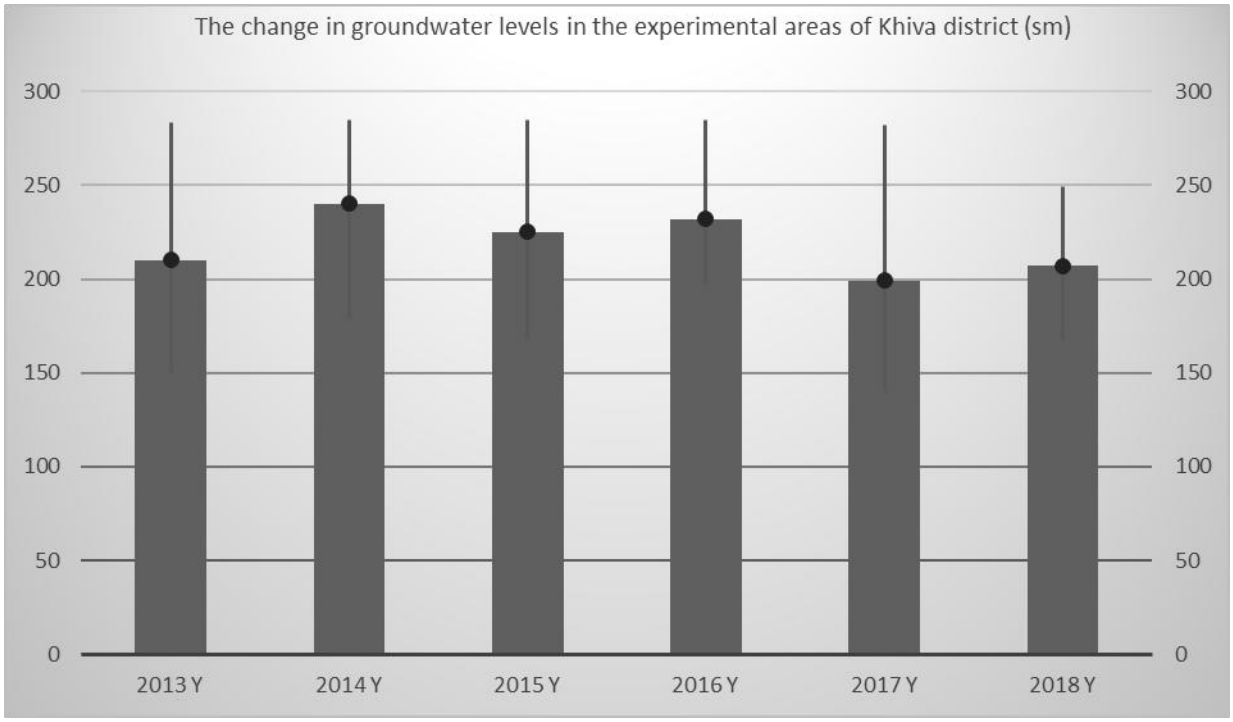


Figure 4: The damaging process of apple trees from cytosporosis disease

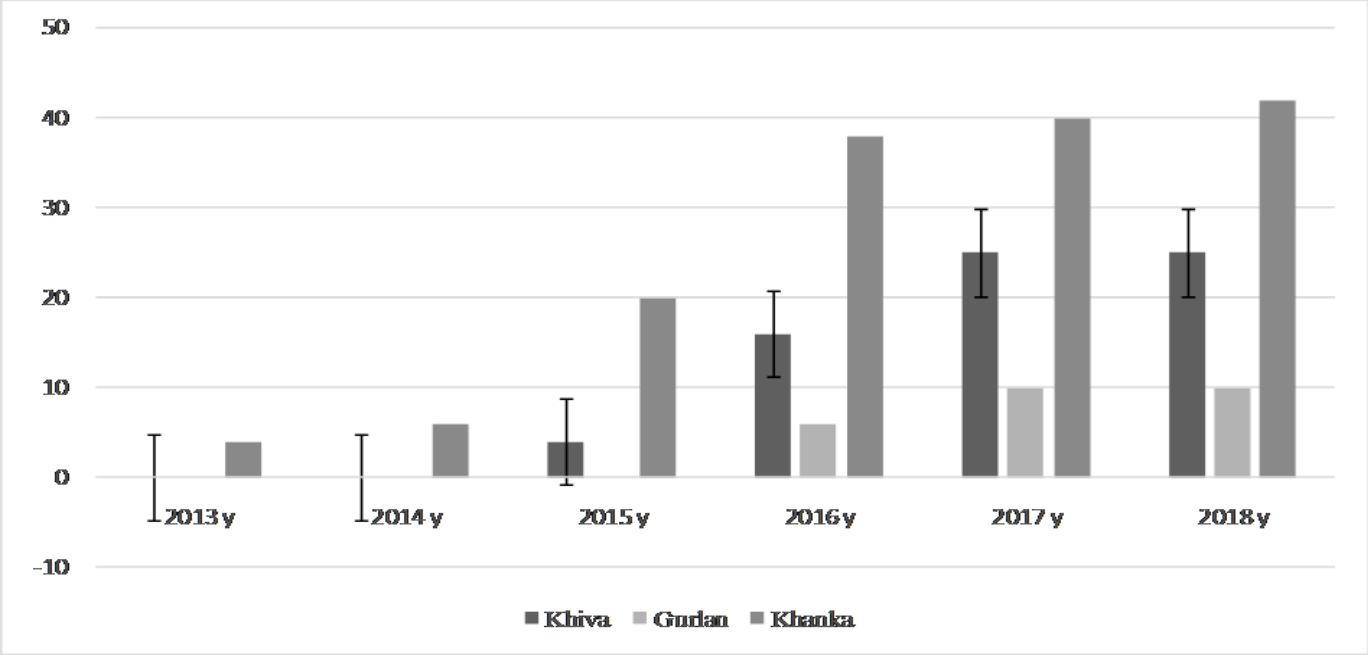


Figure 5: Dynamics of underground water levels of investigated apple gardens

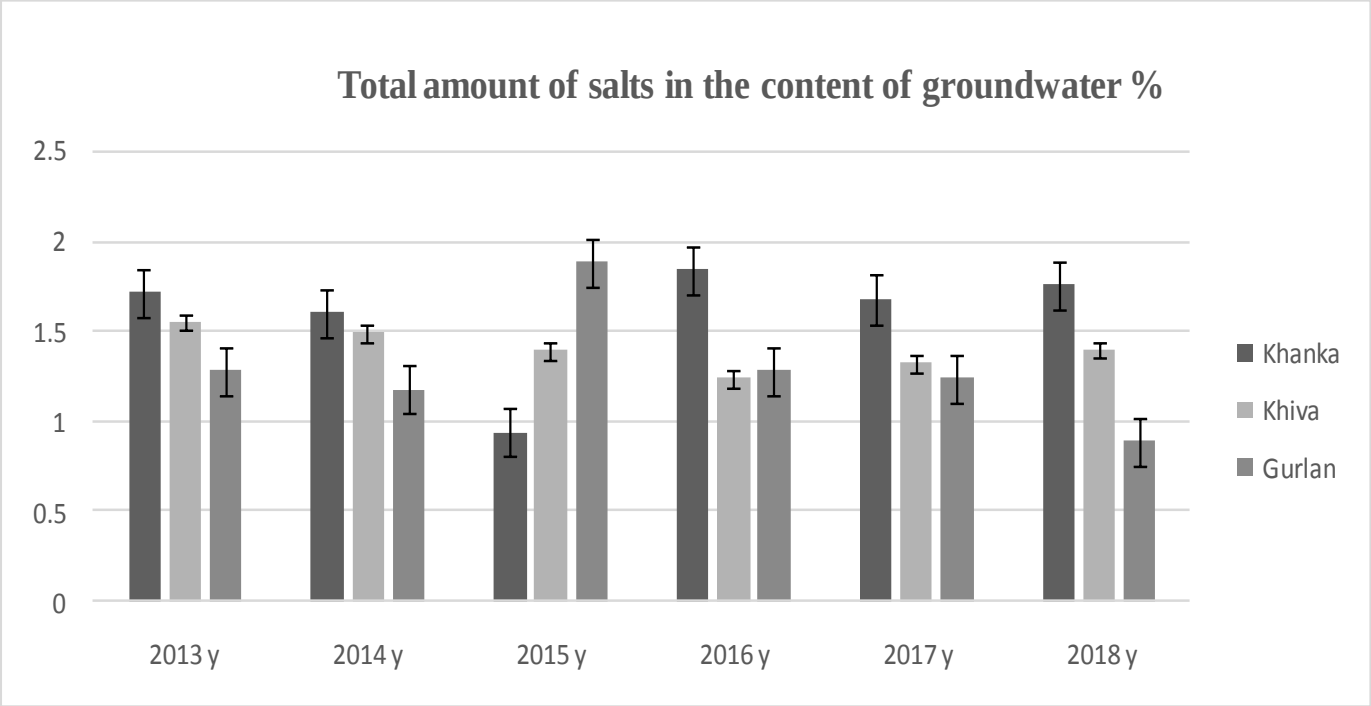
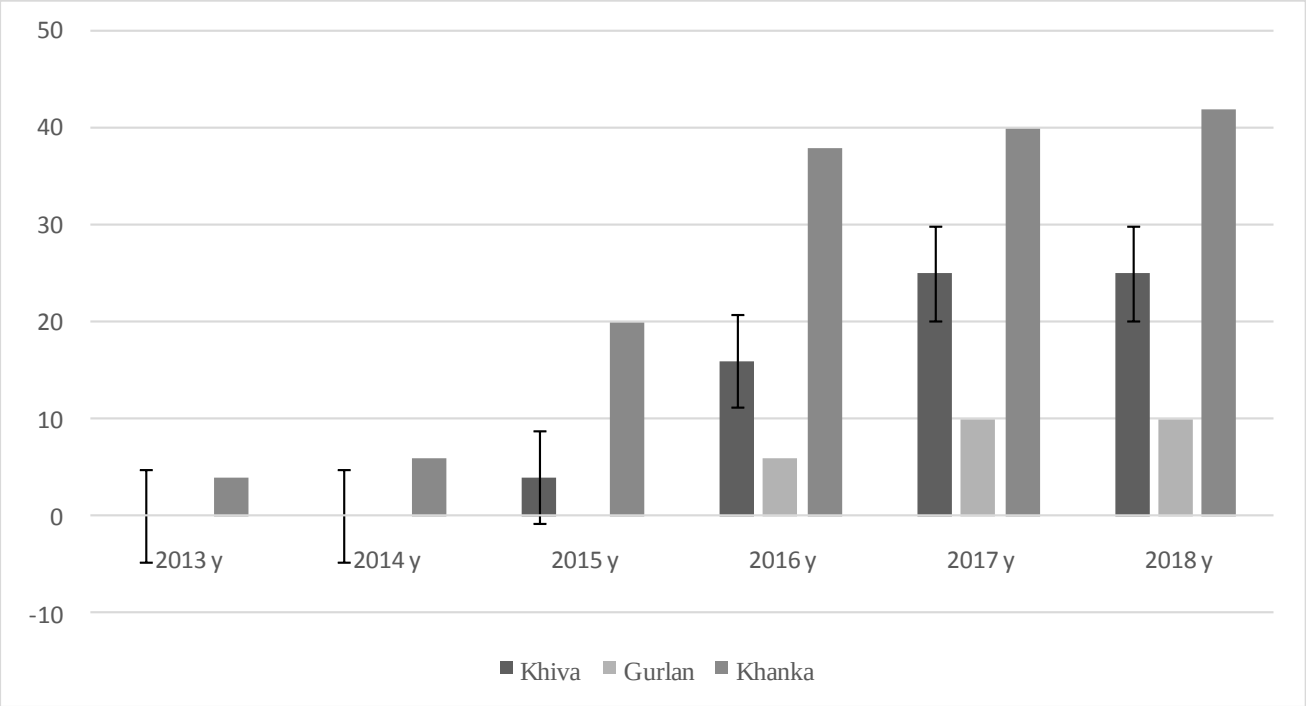


Figure 6: The damaging process of apple trees from cytosporosis disease



Therefore, when the water level is higher than the critical depth, the soil becomes saline. If this level is below a critical depth, the salt in the soil will diminish, and the soil will be less salted. (Shmit 1985)

In order to avoid soil salinization and gradually diminish salinization, we must keep the drainage water levels at least 20 to 30 cm below from the critical depth of the water surface. Otherwise, it adversely affects the development of trees and other agricultural crops. Lessening immunity of trees increases the incidence of cytosporosis.

The roots of fruit trees grow strong in spring. In the years when the yield are high, the root is slow 2.0-2.5 time, and annual growth of leaves is 4-5 times slower.

The rate of root growth and the order of soil placement depend on the varieties of fruit trees, the nature of the weld, the soil conditions, the groundwater level and the applied agrotechnics. Long-term observations of the roots of fruit trees grown on grass-covered irrigated lands of Uzbekistan are characterized by the following average indicators.

The roots of Turkmen apples are situated more shallow. Most of them are spun 90-120 cm depth. The growth of the roots depends largely on the moisture content in the soil, the amount of nutrients, the depth of drainage water in the soil, the welding, and the soil type. For example, in the soils which are salty or with shallow drainage waters, the roots that are close to the ground surface (150 cm) are not deeply rooted in the soil. In these areas, for example, the main roots of the 7-year-old Renet Simirenko varietal tree are located at a depth of 15-25 cm in the soil layers.

The roots of fruit trees grow well when the moisture content of the soil is 17-18%, ie its surface is maintained normally by the necessary nutrients and moisture. When soil moisture diminishes to 20% or less than 13-15%, the roots will not grow normally, the tree will not be adequately maintained by nutrients and moisture, and the small roots will gradually diminish. As a result, the tree loses its growth, its leaves become yellow. (Ribakov A.A. 1981)

In the Khonqa district farms, where the groundwater levels changes in great diapasons, the number of apple tree gardens suffering from *cytosporosis* is higher than other studied districts. In the farmlands of the Gurlan district, the change in groundwater levels was not observed and the symptoms of the disease began to appear in 2016. In the Khiva district farm, the level of groundwater levels in 2015 increased more than every year. In 2016 the symptoms began to appear.

According to Panfilova's information, environmental factors also play a role in parasitic development of cytosporosis fungal *Cytospora* (*Cytospora*).

Fomenko (1975) came to the conclusion that *Cytospora* fungus was secondary to parasites because

it was not likely to cause disease in favor of the development of apple trees in Voronezh in Russia.

J.M. Isina (1965) studied the development of cytosporosis in the regions with vertical elevations and observed that it reached to 74.4-82.7% at 700-800 meters above sea level. Less infected trees were found at altitudes of 1100-1400 meters above sea level. Increasingly, the level of sufferage of trees increased from 1400 meters above the balance. From the abovementioned information, it is possible to conclude that the disease of cytosporosis develops during the time when the trees fall into adverse conditions.

Cytospora spp. (Valsa spp.) is one of the fungi that damages the shrubs and branches of trees. 25 species of these fungi found in South Africa have been isolated from healthy and damaged trees. There are reports of more damage to Pinus, Populus, Prunus and Salix trees, which are non-local varieties coming from Australia, Europe, or America (Adams GC, Roux J, Wingfield MJ.2006)

CONCLUSION

This information also confirms the development of *cytosporosis* in trees that have low immune. It is possible to conclude that in determining cytosporosis in the Khorezm region, it is important to use groundwater level monitoring tools in checking the ground water levels and salinity level. This gives opportunity to predict the development of *cytosporosis* and to prevent its proliferation.

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