

## THE BEHAVIOUR OF QUINCE BERECZKI VARIETY GROWN ON WET PHREATIC CHERNOZEM COMPARED TO THE CHARACTERISTIC DISEASES AND PESTS OF THIS SPECIES

Gîtea Manuel Alexandru\*

\*University of Oradea, Faculty of Environmental Protection, 26 Gen. Magheru St., 410048 Oradea, Romania, e-mail: [giteamanuel@yahoo.com](mailto:giteamanuel@yahoo.com)

### Abstract

*Establishing a quince orchard seems from the beginning a safe and very profitable business. The life of quince trees is about 15-18 years, and the fruits may be quickly exploited, because they may be eaten fresh, preserved as compotes and they are the main components of spirits and plum brandy. It is recommended to establish an orchard with grafted seedlings, purchased from authorized nurseries, certified to provide quality guarantees and practical tips for maintaining the trees. Quince starts giving fruits in the third year after planting, and in the fifth year reaches maturity and can give productions of 30 tons per hectare. A special attention must be given to the disease and pests control process, because the trees illness can highly influence the quantity and quality of the harvest. The most productive variety that is recommended for establishing a quince orchard is the BERECZKI variety, characterized by vigorous-, auto-fertile trees, with large and very large fruits.*

**Key words:** chernozem, nursery, auto-fertile, treatments

### INTRODUCTION

Quince (*Cydonia oblonga*) belongs to the Rosaceae family, being a rustic tree, frequently encountered in family households. It is an average vigor tree, having a robust aspect, originating from south-west Asia, being cultivated since antiquity. Quince is an early fruit tree, starts giving fruits after 2 – 3 years after planting, having a large production capacity. It is a species demanding light and heat. If plantations are situated on shaded lands, the branches ungarnish and the production potential decreases. The root system is superficial, and the crown is dense. The trees' bark is very sensitive, being affected even by the superficial blows. Fruits are rich in gelling substances. For this reasons they are very sought for jam or marmalade. Also, quince contains sugars, proteins, pectin, calcium, magnesium, potassium and iron.

A special attention must be given to the control process of diseases and pests, because the tree's illness may strongly affect the quantity and quality of the harvest.

The main disease of the variety are:

Bacterial fire, produced by *Erwinia amylovora*. It is a very dangerous disease that can determine the destruction of the whole orchard.

The appearance of this disease is favored by the high atmospheric humidity, wind, precipitation and temperature between 10 and 30 degrees. The trees attacked by this disease seem to be burned by fire. The shoots wither and become brown, the fruits become black or stained. In wet weather, in the affected areas appears the bacterial exudate.

Brown stains on the leaves produced by the *Diplocarpon maculatum* fungus. This fungus parasitizes quince and pear orchards. The main form of attack occurs on leaves. The symptoms are represented by yellowish-cream circular stains and later on they become red. In the center of these stains appear black spots, representing the fungus fructifications. The stains may join together and may produce the whole tree's defoliation. The disease may attack shoots and fruits too. The shoots become brown and dry. On the fruits appear the same stains as on the leaves. These join together and the pulp cracks. On these cracks develop diseases that cause the fruit's rotting.

Quince's mummification caused by fungus *Monilia linhartiana*. It is considered the most damaging disease of trees grown in cold and rainy areas. The attacked leaves hang without falling, the flowers become brown and dry, and the branches bend like a hook. The young fruits shrivel and become brown and fall heavily. The mature fruits' pulp rots, and on their exterior appear yellowish-grey cushions. Finally, the mature fruits are mummified and remain in the tree, ensuring the disease's transmission in the following year, too. The fungus overwinters in the mummified fruits and in the bark of the attacked branches.

Powdery produces by fungus *Podosphaera clandestina*. The attack appears on the young shoots' leaves, by the appearance of white spots. These extend and cover the whole leaf. The disease progresses and the mycelium becomes grey and powdery. The attacked tissues wrinkle and dry. The fungus attacks the young fruits, too. These are covered by a white felt mycelium. The fruits crack and rot.

The main characteristic pests of the species are:

The oriental fruit moth (*Cydia molesta*). It has 3-4 generations per year, and overwinter as larvae in a silky cocoon, in the bark's holes. This moth attacks the shoots, leaves and fruits of the trees, but the greatest damage they produce is on fruits. The larvae of the first generation attack the shoots and feed with their interior, producing great damage to the newly established orchards and nurseries. The larvae of the third and fourth generation cause significant damage to fruits. These penetrate the fruit in the stalks, or "peaks", and destroy irregular galleries around the core. The fruits stop growing, get rotten and fall. The massive flight of adults is recorded in

Romania for the following periods: 20<sup>th</sup> -30<sup>th</sup> of May, 10<sup>th</sup> – 20<sup>th</sup> of June, 20<sup>th</sup> – 30<sup>th</sup> of July, and 1<sup>st</sup> – 10<sup>th</sup> of September.

The fruit's peel moth (*Adoxophyes orana*). It is a polyfagia species that attacks around 47 varieties of herbaceous and woody plants. In spring larvae eat the buds, inflorescences and leaves. Larvae penetrate the fruit, where they dig superficial galleries. The caused wounds represents open doors for fungus of *Monilinia* genus.

The San Jose louse (*Quadraspidiotus perniciosus*). It is a polyphagous species that attacks more than 200 species of plants. It presents three generations per year, and overwinter in larval stage on the bark of the affected species. Females and larvae spread to all organs of the affected plants, including the fruit, these feeding with the cellular juice of the host plants. In case of massive attack, the shields that protect the insects' body overlap and suffocate the trees. These stop growing and after 2 – 3 years dry.

The hairy caterpillar (*Hyphantria cunea*). It is a polyphagous species that attacks ornamental trees (mulberry, sycamore, etc.), as well as the species of fruit trees. It has two generations per year, and overwinter as a pupa in the soils' superficial layer. This insect produces the tree's defoliation, and thus the decrease of fruit production. Caterpillars stay underside the leaf and start to eat them. In the same time, they weave a kind of nest inside of which they feed.

Fruit weevil (*Rhynchites Bacchus*). Adults eat the buds, leaves and fruits. It is a polyphagous species that attacks a number of fruit trees. Females lay eggs in the newly formed fruits. Larvae develop in the fruit, consuming the pulp and cores. Larvae can develop only in the presence of *Monilinia* fungus.

Apple worm (*Cydia pomonella*). It is a polyphagous species that attacks many species of fruit trees. Larvae of different age attack the leaves. Females lay eggs directly on the fruit, or on the leaves net to the fruit. After hatching, larvae dig galleries in the attacked fruits, leaving excrements in their interior.

Green apple louse (*Aphis pomi*). It is a polyphagous species that attacks many species of fruit trees. Aphids colonize the underside part of leaves and the tops of growth. The attacked trees achieve small growth, does not differentiate fruit buds, the fruit remain small, the production being highly affected. In the same time, aphids transmit a series of viruses.

Bud weevil (*Sciaphobus squalidus*). It is a dangerous species that attacks especially the buds and flower buds. It develops a generation in two years, and overwinter as adult in the superficial layer of the soil. In spring,

appear the adults that climb the trees, and eat the buds and flower buds. Larvae are not dangerous for trees, these feed with the root of herbaceous spontaneous plants.

## **MATERIAL AND METHODS**

In the spring of 2014 it was planted, on the farm PFA Gîtea Daniela, the variety of Quince Bereczki, on a surface of 0,50 ha, four meters between the rows and three meters between the trees in a row (833 trees per ha).

Yearly it was administered 50 kg N, 100 kg P<sub>2</sub>O<sub>5</sub> ŞI 100 kg K<sub>2</sub>O in those three years after planting. Between the rows there was maintained dead-fallow by repeated disc and milling works, and on the row was performed handwork in these three years after planting, by mechanic and manual mowing.

During vegetation a weekly check was performed on the plantation, in order to follow the trees' health evolution.

For pest control, there were performed treatments in vegetation, based on the biological function of each pest, the existent damaging level, with one of the following substances: Decis Mega EW 50, Calypso 480 SC, Karate Zeon 50 CS, Faster 10 CE, Novadim Progress, Nurelle D. During the vegetative pause. There was performed a spraying with Confidor Oil 1,5 %.

For diseases, copper based treatments were used most of the times, because they cover and combat most of the existent quince diseases.

During the vegetative pause there were performed sprayings with copper sulfate at concentrations of 4%, 2%, 1%, in order to combat more efficiently the existent fungus and bacteria in the tree's bark, by bathing the trees.

Before flowering there was performed a treatment with Funguran OH 50 WP at a concentration of 0,3%, and during flowering there was performed a spraying with Aliette WG 80, at a concentration of 0,3%.

During vegetation there were performed sprayings, in case of alert and coverage, with one of the following fungicides, or if weather conditions required, even mixtures of contact fungicides + systemic fungicides: Dithane M 45, Champ 77 WG, Systhane Plus 24 E, Score 250 EC, Topsin, Captan 80 WDG, Thiovit Jet 80 WG, Kumulus DF.

In autumn there was performed a plowing of 20 cm deep, aiming to incorporate all the existing vegetative debris, as well as the fallen leaves, in order to minimize the possible disease outbreaks.

## RESULTS AND DISCUSSION

Regarding the bacterial fire produced by *Erwinia amylovora*, in the first three years there were not reported occurrences which could cause great damages, just in the second year of cultivation were reported two cases of isolated outbreaks on the annual branches, and in order not to endanger the whole plantation, those trees were removed and burned, and immediately after a treatment was performed with Aliette WG 80, at a concentration of 0,3% on the whole plantation.

The brown staining of leaves caused by fungus *Diplocarpon maculatum*, was not reported on any exemplar of the plantation.

The quince mummification produced by fungus *Monilia linhartiana*, has manifested in the third year after plantation, when the first fruits appeared, on 12 exemplars of the plantation (2,88%), the attacked fruits being collected and destroyed, the affected braches were cut until the healthy area, applying a treatment with Bordeleză juice, precede by another spraying with Score 250 EC + Topsin 500 SC.

Powdery produced by fungus *Podosphaera clandestine*, has not manifested in any year of investigation.

Regarding pests, there were not reported problems in any year of investigation.

## CONCLUSIONS

In conclusion, the quince culture does not have any problems regarding diseases and pests, but it will be considered their control program, so that treatments to be performed in time, and based on the warning bulletins issued by the Plant Protection Bureau, in conjunction with the existent and expected environmental conditions.

It will be considered the treatments for diseases in vegetative phase, too, which will be performed with copper based products, having a high concentration, in order to avoid problems, especially that of bacterial fire produced by *Erwinia amylovora*.

Also for this disease, it will be performed mandatory the treatment during flowering, as well as frequent treatments when the climate presents excess of humidity combined with high temperature.

There will be removed, by treatments, the appearance of all harmful insects, these being the vectors for existing disease occurrence in quince culture.

As preventive measure, there will be performed the collection and burning of fallen leaves, the cutting and burning of attacked shoots, the

cutting of affected branches up to the healthy area, the collection of mummified fruits and the mobilization of soil in the orchard (in autumn).

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