UNIUNEA EUROPEANĂ
GUVERNUL ROMÂNIEI MINISTERUL MUNCII, FAMILIEI ŞI PROTECŢIEI SOCIALE AMPOSDRU
Fondul Social European POS DRU 2007-2013
Instrumente Structurale 2007-2013
MINISTERUL EDUCAŢIEI CERCETĂRII TINERETULUI ŞI SPORTULUI
OIPOSDRU
USAMV IAŞI

ABSTRACT

The most damagind disease for the trees from the *pomaceae* speces (these species are productive for their entire life spam – 15-20 years) is the "*focul bacterian*" from rhodoneas because this pathogen can destroy a tree shortly after the infection.

Development and intensification of agriculture has increased people's interest for knowledge, prevention and control of pathogens. This is due to several favorable factors, the most important being the existence of a broad spectrum of bacteria host plants, a large number of disseminators, the aggressiveness of the pathogen, the high speed of the spread of infection in plantations, the sporadic trait of diseases etc..

The host plants for this pathogen are limited to only a few species from the *Rosaceae* family, and the most important species from an economical poin of view are from the *Pomoideae* tribe. These plante, grouped by the morphological caracteristics of their flowers, must have a common factor that makes the succeptible to this pathogen.

This thesis **- *Researches regardin the biology, epidemiology and the control of the Erwinia amylovora (Burrill) Winslow et al pathogen in the region of Moldavia* -** is split in two parts and has 8 chapters. The first part is a sythesis of the data we found and the second part is a presentation of the environment, the clime and all the conditions from the time we made our experiments, the materials we used and the research methods and finallz our results.

The first Chapter **- *The actual state of evolution on the resear fosed on the Erwinia amylovora (Burrill) Winslow et al pathogen* -** is focused on the emergence of this pathogen, its identification and its isolation. For a long time manny researchers confronted this disease without knowing its origins(the researches note that it might have been a blight, a fungus or the effect of low

temperatures). In the 1880 sBurrill establish that this pathogen is a bug and manes it a year later: *Micrococus amylovorus (Burrill)*. We also present here the geographical distribution of this pathogen.

The second Chapter - ***The presentation of the most important blight from the trees from the pomaceae speces*** - describes the *Erwinia amylovora* (Burrill) Winslow *et al.* and *Pseudomonas syringae* pv. *syrinage* van Hall. These two pathogens are responsible for the most damagind diseases fot the trees we are talking about.

The third chapted - ***The evaluationof the situation regarding the fire blight of rhodoneas in Iasi-*** presents a complex study from the Fitosanitarian Unit of Iasi made during six years(2004-2010). This evaluation was made in:

- ✓ The fruited gardens of apple trees, quince and pear trees from 2004 to 2007;
- ✓ The mother plantation for graft branches in the 2008-2010 years;
- ✓ The seminary from 2008 until 2010.

The raport made by the Unit underlines the fact that in the last few years the ***fire blight*** of rhodoneas was not present in the mother plantation for graft branches or the seminaries but we could found it in the fruited gardens.

In the forth chapter **– The goal and the objectives of this doctoral dissertation** - we mention that the main goal of this thesis is to present the large documentation that we found concerning the research about the biology, the epidemiology, the semiology and the control of the *Erwinia amylovora (Burrill) Winslow et al.* pathogen.

Due to the fact that the two pathogens, the *Erwinia amylovora (Burrill) Winslow et al.* and the *Pseudomonas syringae* pv. *syrinage van Hall*, wew in the same time isolatete from the same samples we studied, the main goals that we proposed for this study were:

- ✓ The description of the main methods for idetifing this two pathogens;
- ✓ A comparative study of the antagonism for the pathogens;
- ✓ The stability of the szmptoms,manifestation, due to the pathogens, referring to the trees in the condition of an *in vitro* infection;
- ✓ Testing some plant extracts on the strains of *Erwinia amylovora (Burrill.) Winslow et al* that were collected and isolated from the apples and pears, *in vitro*.

✓ Testing some active molecules to establish the effectiveness of the products used for the *Erwinia amylovora (Burrill.) Winslow et al* strains isolated *in vitro*.

✓ A comparative study about the susceptibility of the pathogen samples, isolated in regard to the products that were tested *in vitro*.

The results analzsis was made in the research laboratory of Fitophatology from the Department of Plants Science and the field experiences were made at the "Vasile Adamachi" farm from the University of Agriculture Science and Veterinary Medicine. "Ion Ionescu de la Brad" from Iasi.

The fifth chapter ***-The description of the natural environment where we conducted this research –*** covers the organizational frame, the relief, the plants and the earth from the farm, the clime from the period that we are reffering to an evaluation if the tree collection(apples and pears), about 370 trees.

The sixth chapter ***- The material and the methods we used -*** detalis the rules and the procedures that were used to sample the study material and also a description of the tests used for the isolation of the *Erwinia amylvora* pathogen.

A total of 11 samples from the pears and quinces species were examinated and tested for iunofluorescence in the bacterology lab from Bacau.

In the research laboratory of fitopathology were processed four samples (two from quinces, one from pears and one from apples), these samples were tested for pathogens with green pears.

This Chapter also describes the method of inoculation for ratoons, leafs and fruits from the pears, quinces and apple trees with *Erwinia amylovora (Burrill.) Winslow et al.* and *Pseudomonas syringae* pv. *syrinage* van Hall, *in vitro* to establish the manifestation that the two pathogens are responsable for, and also the work methods for controling the pathogen that causes the ***fire blight*** using eight plant extracts and three active molecules.

The eight chapter ***- Results and discutions -*** presents our results from all our activities: the results from the imunofluorescence and pathological tests using green pears, the study regarding the way the pathogens attak the artificial organs, the behaviour of the *Erwinia amylovora* strains in the presence of active molecules and plants extracts on different environments, and also the assesment of this pathogen's attak in a natural infection.

After an *in vitro* infection the first signs we observed on the inoculated rations were doe to the *Erwinia amylovora.* In the same environmenatl conditions the *Erwinia amylovora* and *Pseudomonas syringae* pv. *syringae,* are responsible for similar symptoms on the artificial leafs of the trees we refer to, trese is a difference only in the time frame that the symptoms occur. For the leafs infected *in vitro Pseudomonas syringae* pv. *syringae* proceeds faster than *Erwinia amylovora.*

Concerning the control of *Erwinia amylovora in vitro* we observd that copper oxychloride was the mot efficient product we tested followed by the plant extracts obtained from *Pelargonium odoratissimum L´Herit, Tagetes patula L.* and *Thymus serpyllum L.* The least efficient product was the *Hedera helix L*. extract and the rest of the products we tested had a moderate effect. Our results were statisticallz prelucrated using the Anova test.

We also present here an attack situation of *Erwinia amylovora* on 40 types of pears and a group of quinces. For the assessment we used a diagram made bz the Department of Agriculture of USA and we focused our attention on the start and the progress of the attack in a natural environment.

The last chapter presents **- Conclusions and suggestions -** derived from the anterior one pathogenicity test (immature pear fruits) remains the most reliable method to confirm or exclude the presence of the *Erwinia amylovora* bacterium. After testing the three active molecules: copper oxychloride (Alcupral 50 PU), copper hydroxide (Champ 77 WG), fosetyl-aluminium (Aliette 80 WG) three isolates reacted differently. Although it is considered an effective bactericide against *Erwinia amylovora*, after testing *in vitro* the *Aliette 80 WG* pesticide, the results showed no significant antibacterial activity.

Several studies have been done about the extract obtained from *Hedera helix L.* and the results show that presents a good and very good antimicrobial activity in some cases. *In vitro* experiments points out that the strains of *Erwinia amylovora* extract does not show a good antibacterial activity, it is ranked last in the list of products tested.

Key words: fire blight, plant extracts, *in vitro* control, Aliette 80 WG;