



# **ESTABLISHMENT OF NUCLEAR STOCK COLLECTIONS FOR POME FRUITS IN LATVIA**

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# INTRODUCTION

- **Apples** are widely grown and economically important fruit crop in Latvia: ~ 9000 ha of which **1300 ha** are modern commercial orchards.
- The total area of **pears** is 700 ha of which commercial orchards represent only 200 ha.
- During the past two decades, many commercial apple orchards have been established using **introduced cultivars** and **clonal rootstocks**. Pears are grown mainly on seedling rootstocks.
- Due to **specific requirements of adaptation to local climatic conditions** mainly domestic cultivars and cultivars originated in **Russia, Belarus, Ukraine, Kazakhstan and Lithuania** are used.
- **New orchards** have been established using *Conformitas Agraria Communitatis* (CAC) quality material.



# INTRODUCTION

- A **legislation** at national level regulating the quality of planting material for both CAC quality material and virus-free, certified material **exists** in the country.
- But **certified nurseries do not exist**, because of lack of nuclear stock and pre-basic material for cultivars grown in Latvia as well as because of no support for such nurseries at national level.
- Currently **only CAC quality material is produced** and used in establishment of the new orchards.
- Activities to establish the certified planting material production for fruit crops in the country **started in 2005-2006** by Latvia State Institute of Fruit-Growing with financial support from Ministry of Agriculture and Ministry of Education and Science.



# INTRODUCTION

- **Insect proof greenhouses** were built and **Plant Pathology lab established** with basic equipment needed and two full time staff.
- Survey was done for **possibilities to obtain pre-basic material from other EU countries** for apples, pears, plums, cherry, raspberry, strawberry, blackcurrants, redcurrants and gooseberry.
- **Pre-basic material** for cultivars suitable for Latvia from other EU countries was available only for **apple clonal rootstocks**, strawberry and some raspberry cultivars.
- **Decision** was made to start with **establishing of nuclear stock collections** for commercially grown apple and pear cultivars as well as for several apple cultivars from local breeding program.



## Information on fruit tree viruses available at starting point:

- In previous studies in 1970-80s (Švarcbahs & Kotāns, 1977) based on visual observations and biological indexing was concluded that old domestic and introduced cultivars are more infected with latent viruses than recently breed cultivars;
- Actual data on occurrence of viral pathogens in fruit orchards in Latvia were not available;
- General opinion in the country – viruses are not wide spread and are not important.

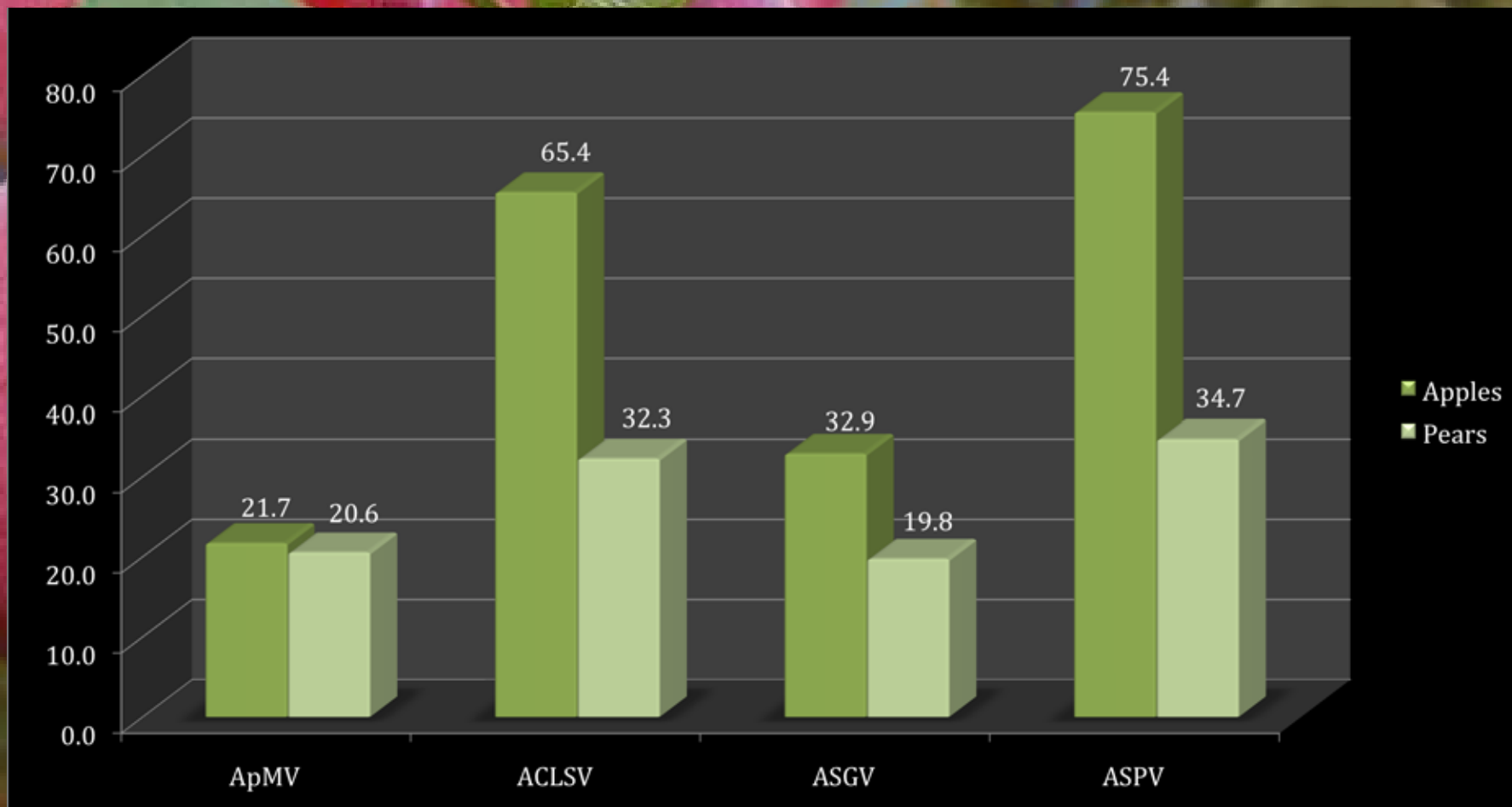
## A survey was carried out in 2007 to evaluate the occurrence of pome fruit viruses in Latvia (J Phytopathol 159:597–605 (2011):

- 50 apple and 36 pear commercial orchards and genetic resource collections were surveyed;
- 870 samples from 115 apple genotypes and 248 samples from 44 pear genotypes were collected;
- Each sample was tested for *Apple chlorotic leaf spot virus* (ACLSV), *Apple stem pitting virus* (ASPV), *Apple stem grooving virus* (ASGV) and *Apple mosaic virus* (ApMV) by One step Multiplex RT-PCR (Hassan *et al.* 2006).

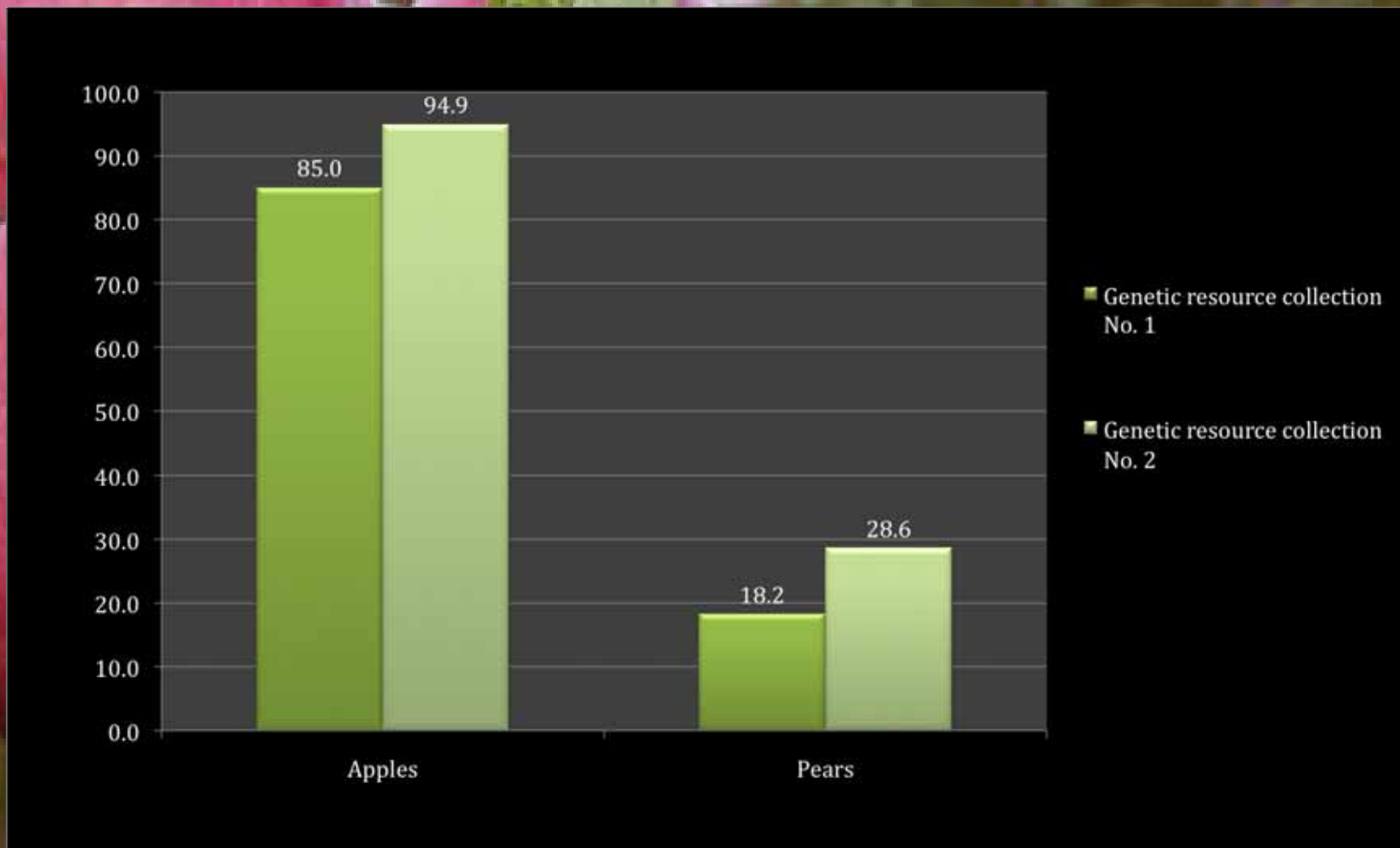


# Occurrence of ApMV, ACLSV, ASGV and ASPV in apple and pear orchards in Latvia

*About 90 % of the tested apple trees and more than 60 % of pear trees were infected with one or several pome fruit viruses.*



# Occurrence of viruses in genetic resource collections



# MATERIALS AND METHODS

Candidate material 1/2007/2009

*All procedures were done according to EPPO standard PM 4/27(1)*

1) Seedling rootstocks obtained according to EPPO standard PM 4/27(1) in 2007

2) In August 2007 first budding on seedling rootstocks: 10 of apple genotypes and 6 pears genotypes propagated from virus-tested mother trees

3) In 2008 the candidate plants tested by multiplex RT-PCR for ACLSV, ASPV, ApMV and ASGV

4) In 2009 the candidate plants subjected to 45 day-thermotherapy according to Lenz & Lankes, 2006; Svarebaks et al., 1976

5) Shoot tip (5 mm) grafting done on seedling rootstocks

6) The candidate plants tested by RT-PCR for ACLSV, ApMV, ASPV and ASGV 3x in 2010-2011

7) Tests on woody indicators started in 2012





# MATERIALS AND METHODS

Candidate material 3/2009/2011

*All procedures were done according to EPPO standard PM 4/27(1)*

1) Seedling rootstocks obtained according to EPPO standard PM 4/27(1) in 2009



2) In August 2009 budded on seedling rootstocks: 11 of apple genotypes and 10 pear genotypes from virus-tested mother trees



3) In 2011 the candidate plants tested by multiplex RT-PCR for ACLSV, ASPV, ApMV and ASGV



4) In 2011 the candidate plants subjected to 70 day-thermotherapy according to Howell *et al.*, 1998



5) Shoot tip grafting done on seedling rootstocks



6) The candidate plants tested for ACLSV, ApMV, ASPV and ASGV in April 2012



7) Tests on woody indicators started in 2012



# Testing on woody indicators 2012

## Cultivars

- Baltais Dzidrais
- Ausma
- Spartan
- Antonovka
- Liberty
- Antej
- Melba
- Lobo

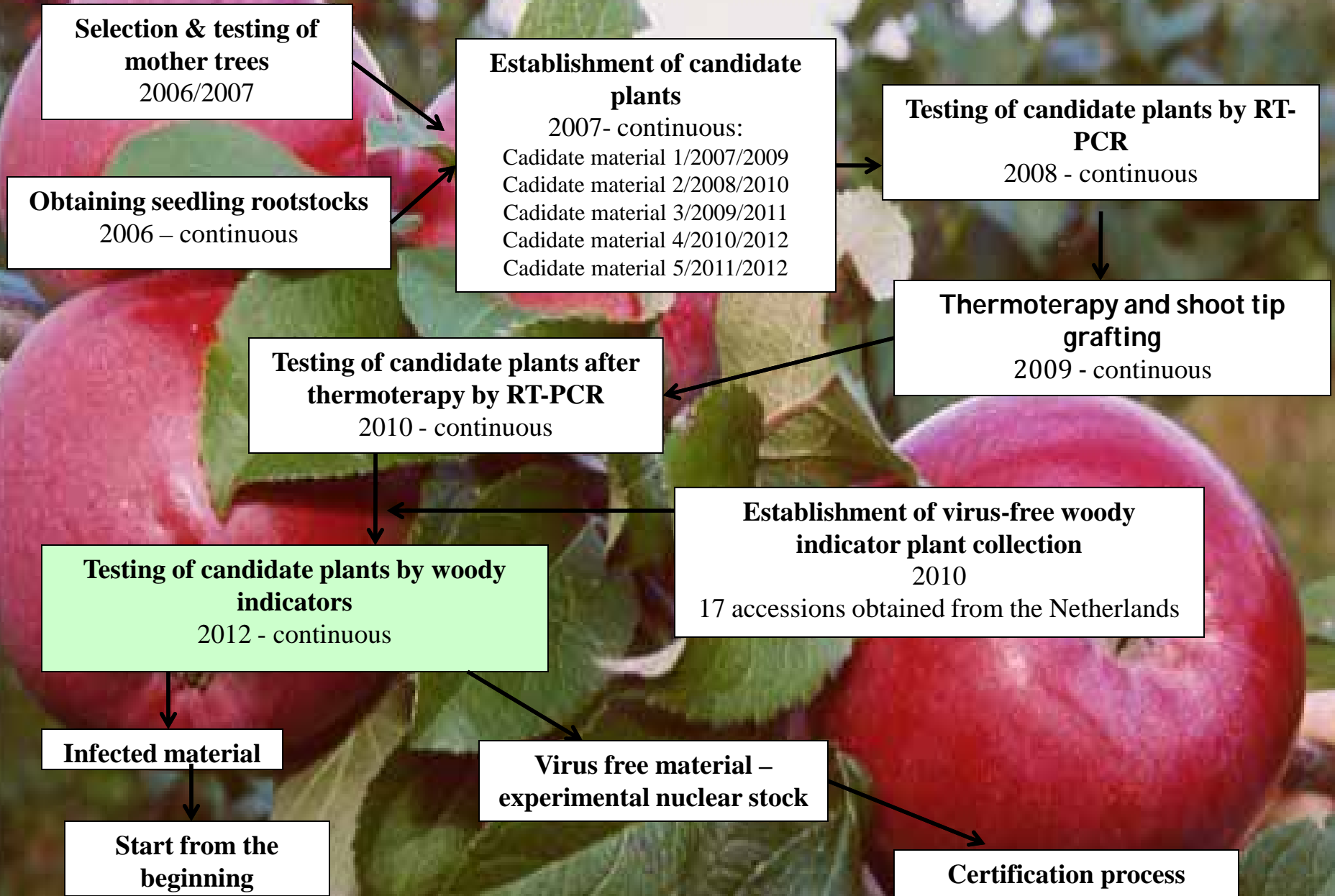


## Indicator plants

- Virginia crab (ASGV)
- Malus platycarpa (ACLSV)
- SPY 227 (ASPV)
- Lord Lambourne (ApMV)



# SUMMARY



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**Thank you for attention!**