



Institute of Horticulture, Latvia University of Agriculture in the context of fruit industry in Latvia



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Fruit growing has longstanding traditions in Latvia. The climatic conditions and soil are favorable for it, especially in the eastern regions of Latvia. Our fruits and berries may taste less sweet than the cultivars grown in the south, yet they have more aroma and organic acids, and significantly less pesticide sprayings are needed for their growing.



Climate, relief and soil of Latvia

- The climate of the western part of Latvia is **maritime**, but **continental** climate prevails in the eastern part.
 - Precipitation (rainfall and snow) is **560 – 850 mm**
 - Monthly average temperature** is about -2.6 to -7.5 °C in January and +16.8 to +17.6 °C in July
 - The lowest temperature** recorded is -43.2 °C, **the maximum** is +36.4 °C
 - One of the biggest problems for resultative fruit growing are frequent **temperature fluctuations** during the winter period from January to March;
 - Active growth season** (t° over + 10 °C) is 135 – 140 days
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- Lowlands are prevailing in central part, in other regions they are separated by hilly uplands to 300 m above sea level..
 - Soil is very variable. The most **productive - soddy calcerous soils**, mostly loams and drained soddy clay - are found in southern Latvia.
 - The other parts of Latvia are covered by more **humid, acid soils - podzolic, podzol and gley**. Coastal areas are sandy.

Briefly about history of fruit growing in Latvia

Before the 2nd World War, when Latvia was an independent state, development in fruit growing was successful:

- State institutions understood the importance of fruit growing in national economics and the ways of its development;
- At the end of 1930-ties there were **9** paid employees at the Ministry of Agriculture and Chamber of Agriculture solving problems of horticulture, and 21 horticulture instructors in regions; **58** societies of horticulture management;
- In 1930 The Pūre Horticulture Research Station was founded, 4 horticulture schools training students;
- Already in early **1920ties export of apples started**, later also blackcurrant preserves were exported to Finland, Sweden, but mostly to Germany;
- Unluckily, lack of winterhardy cultivars in orchards resulting in loss of about 50 % areas after severe winters of 1939-1941, as well as 2nd World War ended the development of horticulture.

Briefly about history of fruit growing in Latvia

Also collectiviation and nationalization of farms under Soviet regime interrupted this process. Large extensive orchards were planted for the needs of the processing industry. The quality of production was lacking.

After the renewal of independence of Latvia in 1991, when the agricultural reform was started, many large-sized orchards were split up and returned to the previous landowners.

Only **since the middle of 1990s** and the beginning of 21st century a **new system of commercial fruit growing was introduced** (transfer to intensive western-type orchard management), Institute of Fruit Growing (now Institute of Horticulture) has been the initiator: (1) in new growing technologies, (2) in choice of cultivars, (3) in the transfer of best available knowledge and technologies in the world, and (4) testing and adaptation of knowledge and technologies to Latvian conditions.

Briefly about fruit industry in Latvia

By the statistical data of Latvia Fruit Growers Association, in 2015 there were about **6 800 ha commercial orchards**, including – **apples 2700 ha**, pears 160 ha, plums 85 ha, cherries 125 ha, Japanese quince 150 ha, cranberries 125 ha, blueberries 250 ha, **black currants 570 ha**, red currants and gooseberries 50 ha, **strawberries 400 ha**, raspberries 180 ha, **seabuckthorn 480 ha**.

Potential of fruit industry in Latvia:

- The market and consumer's demand increase for locally grown fruits, the supply still does not meet the demand for all fruit crops. The EU financed project “School Fruit” needs large amounts of fresh fruits.
- Income from one hectare is high (with appropriate growing technologies the profitability may reach 180 %), which helps the development of small farms.
- Increasing number of processing SMEs, their diverse, original products have good market potential.



Briefly about fruit industry in Latvia

The farm size is different – small farms with orchard area ab to 3 hectares dominate and about 10 % are larger farms over 15 hectares. Specialized farms dominate. The integrated growing system due to contribution of our Institute was introduced in the most of farms since 2006.

Main problems for the development of fruit industry in Latvia:

- ❑ Qualified horticulture specialists are not trained;
- ❑ Lack of training and consulting system for fruit growers;
- ❑ Slow development of fruit grower's cooperation (only four producer groups and cooperatives have been formed);
- ❑ No economic and marketing research of fruit growing, which would allow to develop a strategy for horticulture.



Briefly about fruit industry in Latvia

Main problems for the development of fruit industry in Latvia:

- ❑ Diversity of soils and climate, severe winters all demand careful **choice of suitable locations and cultivars**. This does not allow direct application of experience from other European countries.
- ❑ The crops and cultivation methods are highly diverse - so fruit growing **needs scientific expertise and long-term research**.
- ❑ **Continuous lack of support for long-term research hinders development of horticulture and is one of the main problems in horticultural science.**



Institute of Horticulture: general information

The beginnings of the Institute can be traced back to 1956, when **plant breeder Peteris Upitis started planting a experimental orchards in this place.** He left a rich heritage of fruit trees and ornamentals for further breeding.

Over the years, the experimental orchard has changed its name and owners several times.

The independent Experimental Station of Fruit-Growing was founded in 1995, when 35 ha of the orchard was separated from the 6000 ha large Soviet type collective farm.

The Latvian State Institute of Fruit-Growing was founded in 2006 by reorganizing the Experimental Station.

The Institute of Horticulture was founded on **1st of January, 2016** by reorganizing the Latvian State Institute of Fruit-Growing, incorporating scientists from Pure Horticultural research Centre. Institute is **supervised by the Latvian University of Agriculture.**

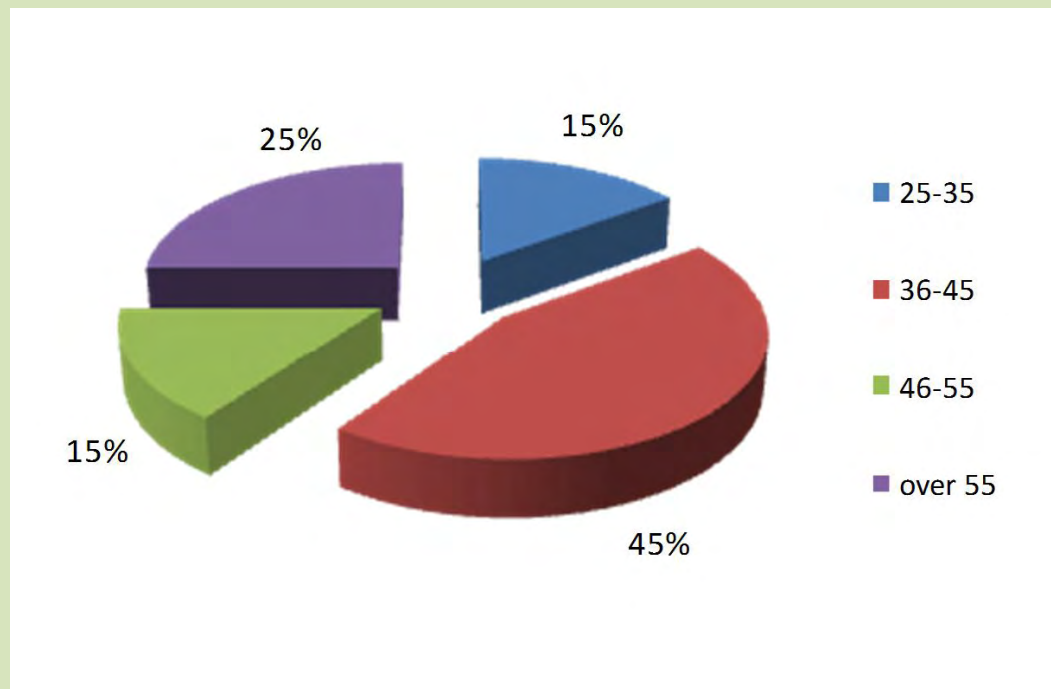


General information

At present the Institute's regular staff are 73 people, of which 50 are full-time researchers and technicians, including:

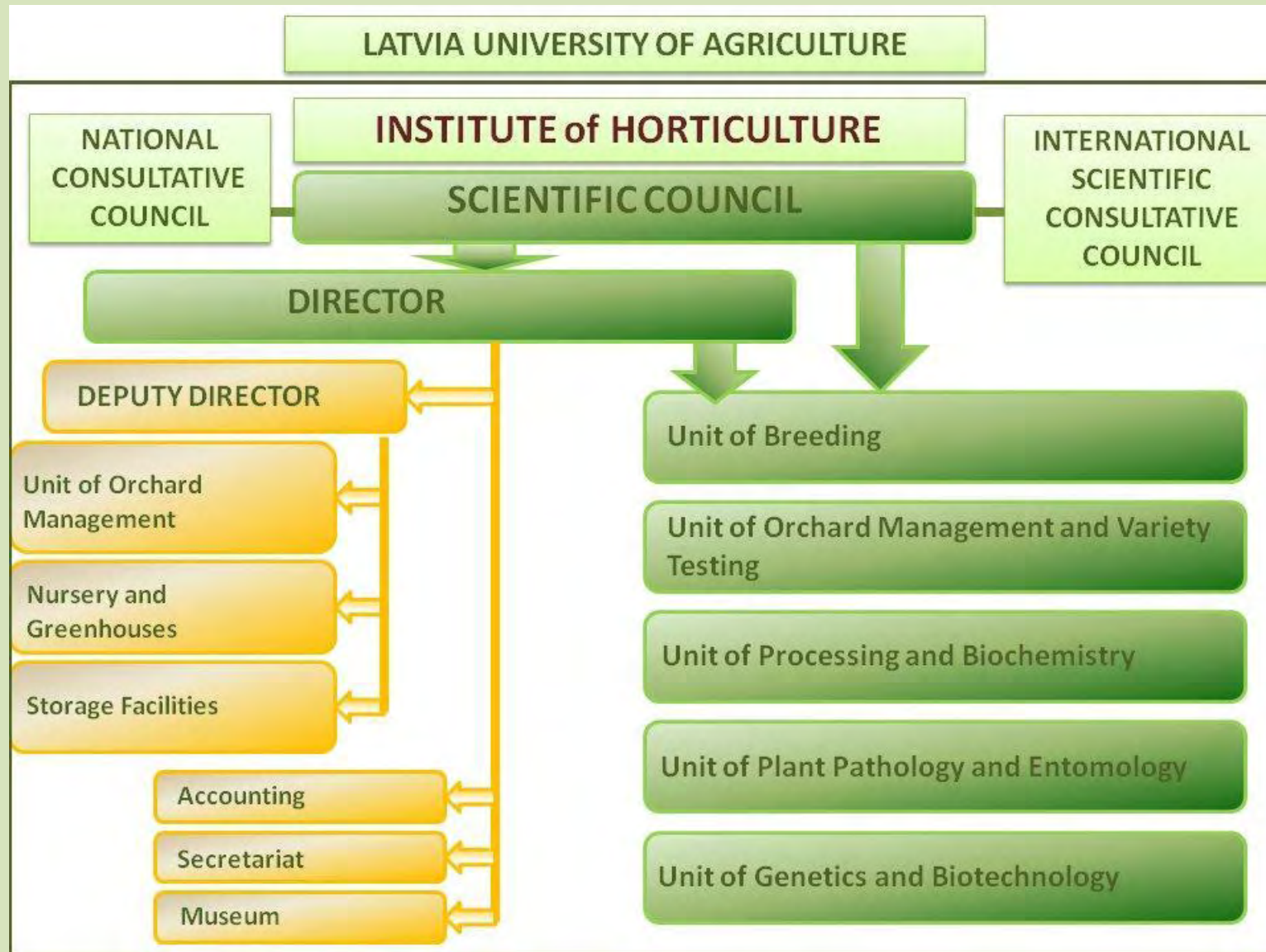
- **doctors of sciences** – 21(incl. 2 foreign scientists)
- **masters of sciences** – 13 (incl. 8 PhD students)

Distribution of researchers by age groups

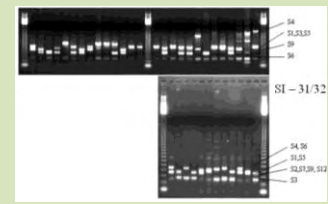


General information:

The structure of the Institute



Priority directions of the research at the Institute



- Diversification and **breeding** of horticultural crop cultivars suitable for the Baltic Sea region;
- Environmentally-friendly horticultural **production systems**;
- **Storage and processing** technologies of horticultural crops;
- **Biological basic research** for horticultural science.

After the reorganization more attention will be paid not only on fruit crops but also on vegetable research.



The results of research at Institute, aimed at the development of fruit growing

- New **local fruit crop cultivars** have been bred and local and introduced cultivars **have been recommended for commercial orchards**; testing of these cultivars, including studies on their growing technologies, are initiated in different regions of Latvia;
- **Monitoring of harmful and favorable organisms** done in plantations along with studies of their development and prognosis, improvement of control methods (together with **Latvian Plant Protection Research Centre**);
- Different origin **fruit tree rootstocks** have been tested, investigating their influence on cultivar winterhardiness, productivity and growth parameters, planting distances.
- Investigations in **fruit tree training, fertilizer application methods and tree row mulching effect** on growth and productivity of cultivars were done.
- Investigations about the possibilities of **using risk reducing technologies** for sweet cherries, raspberries and strawberries in Latvian conditions.

Research in these directions continues.



Every year we are selling 10-20 licences of our cultivars to the nurseries in Latvia and abroad.





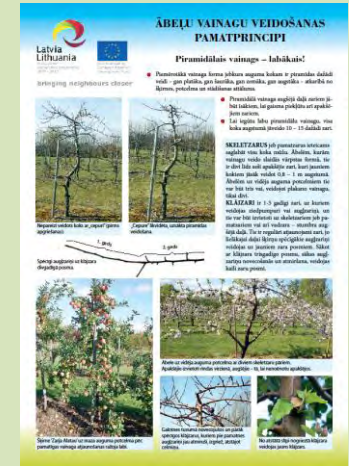
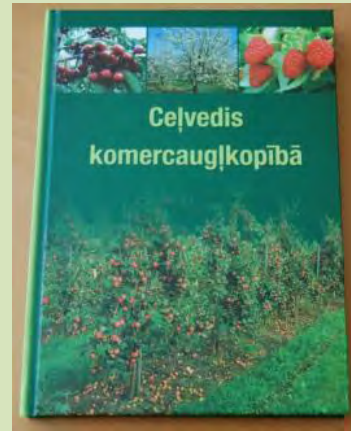
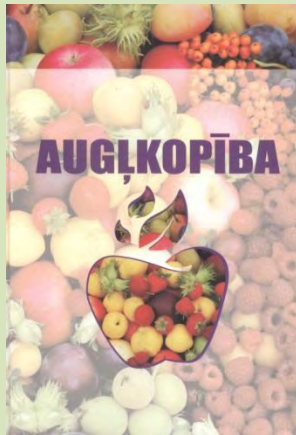
The results of research at Institute, aimed at the development of fruit growing

- ❑ Research on **different plant material** (fruits, seeds, leaves, stalks, fruits waste) as a source of bio-components for food and pharmaceutical industries:
 - ✓ The Japanese quince seed oil – new promising oil with high amounts of linoleic and oleic acid;
 - ✓ Fruit and berry press cake – rich source of fiber and bio-active components;
 - ✓ New local crab apple cultivars suitable for cider and novel product manufacturing;
 - ✓ Sea buckthorn vegetative parts – prophylactic products with high antioxidative effect and antibacterial activity, etc.
- ❑ Research on **apple storage** under various environmental conditions (incl. CA and 1-MCP) suitable for commercial production.
- ❑ **Development of innovative technologies and products** for small and medium food processing enterprises.
- ❑ In collaboration with the entrepreneurs for market diversification **five products within a year are being developed.**



Cooperation with fruit growers and food companies

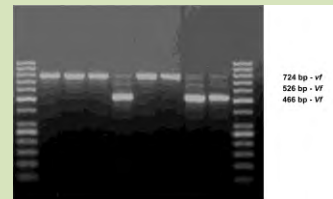
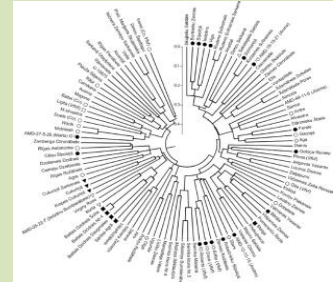
- The Institute has developed successful cooperation with **fruit and berry growers** in Latvia. Our Institute was the initiator of the **Latvian Fruit Growers' Association** founded in 1997. Our Institute is the collective member of the Association. All newest information obtained by scientific research, which can become useful for commercial growers, is passed on to the farmers with the help of the Association.
- The Institute has successful cooperation also with **processing companies** and **Latvian Food Federation**.
- Research **results transferred to growers**: practical recommendations developed and published, including 4 books and DVD, 40-50 popular science publications annually, training, consulting, seminars and farmers days for growers and processing enterprises.
- As there is no State consulting system for fruit growers in Latvia, to solve this problem at least partly, **Technology Transfer Centre for Fruit Industry (TTC)** has been developed together with Lithuanian Institute of Horticulture.



Public Homepage
www.fruittechcentre.eu is regularly renewed, providing information about TTC activities and the created informative materials, and answering questions both from growers and consumers

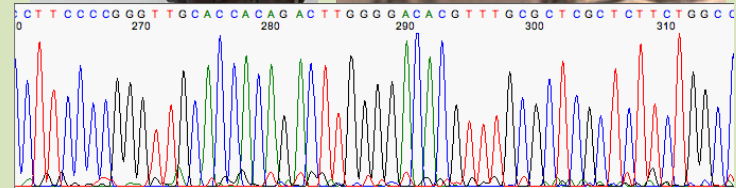
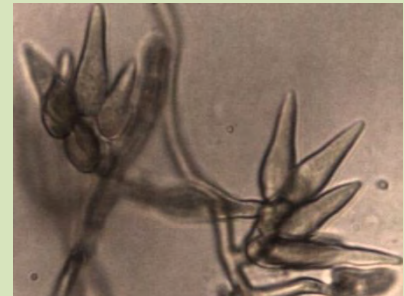
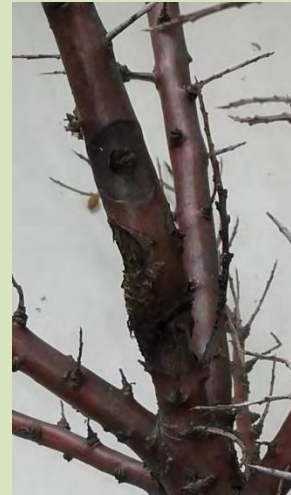
Basic research on horticultural crops, which will contribute to the development of horticulture in more distant future

- **Characterization of germplasm genetic diversity** – selection of new, valuable material for future breeding or raw material for specific purposes.
- **Research on genetic mechanisms of plant and environmental interactions** – development of methods and tools for breeding, accelerated selection (e.g. new molecular markers, selection practices).
- **Research on plant biology** – development of propagation technologies (e.g. *in vitro*) and healthy planting material, ensuring its genetic stability, implementation of new breeding methods for agronomically important traits.



Basic research on horticultural crops, *which will contribute to the development of horticulture in more distant future*

- **Identification and monitoring of diseases and pests** of horticultural crops.
- **Characterization of diversity of plant pathogens** (fungi, bacteria, viruses) and **pests** in relation to their hosts.
- Research on **host-pathogen interactions** – virulence of pathogens and host resistance, development of methods.
- **Maintenance of collection** of plant pathogenic fungi and bacteria of fruit crops.
- **Establishment of virus free nuclear ctock collections** for fruit crops, development of virus elimination methods.



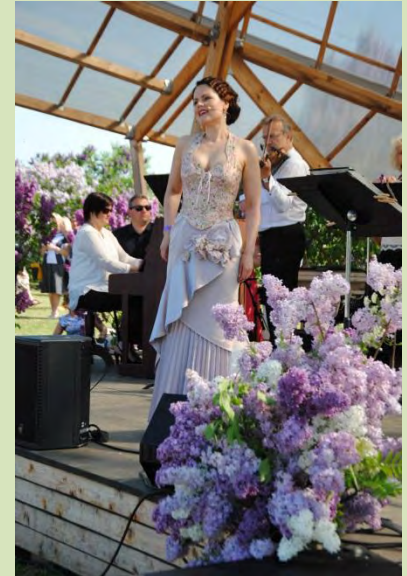
Institute activities to promote fruit and vegetable growing industry not directly related to science

Activities **strategic goal** – use the Institute's cultural potential and long-term experience of trials, **increase public awareness about development opportunities for horticulture in Latvia and promote healthy foods.**



Activities:

- The **Cherry flowering** Festival and Science Day
- **Apple Festival**, organized by the Institute in collaboration with local Dobeles municipality
- Institute organizes or participates in **fruit and berry exhibitions** in Dobeles, Riga and other towns of Latvia.
- Maintenance of **lilac** collection (more than 200 cultivars) and activities associated with the lilac flowering. Since 2002 tradition has been organized: **concerts of classical music in the garden during lilac flowering**. The famous soloists of Latvian National opera take part in these concerts.
- Activities connected with **museum** of breeder Pēteris Upītis. Every year thousands of people visit our museum and lilac garden, especially during lilac flowering.



- Institute has good results in development of fruit industry **balancing applied and basic research**
- Owing to research results of the Institute, **fruit growing in Latvia has developed, areas of commercial plantations increase**, Latvian grown fruits and berries are available on market and at schools!
- Knowledge, innovative technologies and developed products in the Institute **promotes the progress and competitiveness in a sector of fruit-growing and food in Latvia.**
- Diverse cultural, societal activities and demonstration of long-term trials **have raised awareness in fruit growing potential and in use of healthy food products.**



Many thanks to the colleagues, who helped to prepare this presentation:

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**Thank you for
your attention!!!**