

Country report, Lithuania



Institute of Horticulture, LAMMC

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Plant Gene Bank



National legislation

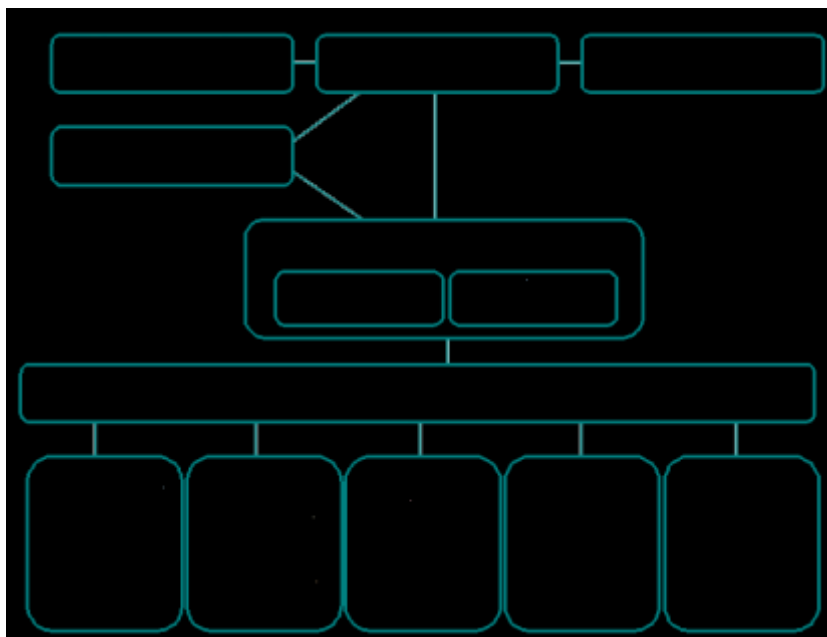
Regulation of the Council of the European Union



Plant Gene Bank



www.agb.lt



The PGB will be reorganized and will be jointed to the State Forest Service in 2020.

National plant genetic resources



Plant Gene Bank



- Orchard plants
- Vegetable plants,
- Cereal crops
- Technical agricultural crops
- Ornamental plants
- Medical aromatic plants
- Forest genetic reserves
- Forest seed stands
- Forest plus trees



National genetic resources of orchard plants



Plant Gene Bank



Table 1. List of genetic resources of orchard plants

Plant species	Storage location	Number of clones, varieties
<i>Malus domestica</i> Borkh.	SDI	25
<i>Malus sylvestris</i> Mill.	SDI	50
<i>Pyrus communis</i> L.	SDI	10
<i>Pyrus pyrastrer</i> Burgsd.	SDI	127
<i>Cydonia oblonga</i> Mill.	SDI	3
<i>Prunus domestica</i> L.	SDI	12
<i>Prunus cerasus</i> L.	SDI	4
<i>Prunus avium</i> L.	SDI	18
<i>Fragaria ananassa</i> Duch.	SDI	5
<i>Ribes nigrum</i> L.	SDI, VU BS	23
<i>Ribes sylvestre</i> Lam.	VU BS	1
<i>Ribes uva-crispa</i> L.	VU BS	6
<i>Vitis vinifera</i> L.	VU BS	6
<i>Actinidia kolomikta</i> (Maxim.) Maxim.)	VDU KBS	5
<i>Oxycoccus palustris</i> Pers.	VDU KBS	54

Total: 349 units

SDI – Institute of Horticulture, LAMMC; VU BS – Botanical Garden of Vilnius University; VDU KBS – Kaunas Botanical Garden of Vytautas Magnus University



National genetic resources of vegetable plants



Plant Gene Bank



Table 2. List of genetic resources of vegetable species

Plant species	Storage location	Number of clones, varieties
<i>Allium cepa</i> L.	SDI, AGB	2
<i>Allium schoenoprasum</i> L.	SDI, AGB	1
<i>Allium sativum</i> L.	SDI, AGB	2
<i>Beta vulgaris</i> L. var. <i>conditiva</i> Alef.	SDI, AGB	10
<i>Brassica oleracea</i> L. convar. <i>capitata</i> (L.) Alef. var. <i>alba</i> DC.	SDI, AGB	2
<i>Capsicum annuum</i> L.	SDI, AGB	2
<i>Coriandrum sativum</i> L.	SDI, AGB	1
<i>Cucumis sativus</i> L.	SDI, AGB	18
<i>Daucus sativus</i> Röhl.	SDI, AGB	17
<i>Lycopersicon esculentum</i> Mill.	SDI, AGB	21
<i>Phaseolus vulgaris</i> L.	SDI, AGB	2
<i>Raphanus sativus</i> L.	SDI, AGB	4
<i>Vicia faba</i> L. (partim)	SDI, AGB	1

Total: 83 units



Seed storage facility at PGB

Plant species	Seeds sample, accessions
<i>Allium angulosum</i>	5
<i>Allium cepa</i>	2
<i>Allium schoenoprasum</i>	3
<i>Allium senescens</i>	1
<i>Brassica oleracea</i>	2
<i>Cydonia oblonga</i>	4
<i>Capsicum annuum</i>	3
<i>Cucumis sativus</i>	20
<i>Daucus sativus</i>	20
<i>Lycopersicon esculentum</i>	25
<i>Malus domestica</i>	1
<i>Phaseolus vulgaris</i>	2
<i>Raphanus sativus</i>	4





Plant collections at Institute of Horticulture, LAMMC

- Trees in field/*in vitro* (apple, pear, sour cherry, sweet cherry, plum, abricot) - 1710 accessions (11 ha),
- Berries field/*in vitro*/cryo (currant, gooseberry, strawberry, wild strawberry, blackberry, raspberry) – 475 accessions (1.2 ha),
- Uncommon and ornamental plants in field/*in vitro* (mountain ash, hazelnut, grap, actinidia, flower) – 130 accessions (1 ha),
- Vegetables in field/greenhouse – 200 accessions (0.8 ha),
- Spice plants in field/greenhouse – 100 accessions (0.1 ha).

Genetic resources database

The screenshot shows the website 'Augalų genų bankas' (Plant Gene Bank) with the title 'Sodo augalų nacionaliniai genetiniai išteklių' (National genetic resources of garden plants). The page displays a list of genetic resources with the following columns: ID, Genus, Species, Origin, and Cultivar Name.

ID	Genus	Species	Origin	Cultivar Name
AG000240	Malva	domestica	naminė obelis	Arsenija
AG000241	Malva	domestica	naminė obelis	Beržinskų ananasas
AG000242	Malva	domestica	naminė obelis	Lietuvos pekinas
AG000243	Malva	domestica	naminė obelis	Roja
AG000244	Malva	domestica	naminė obelis	Baltasis alyvas
AG000245	Malva	domestica	naminė obelis	Rudens drybulė
AG000246	Malva	domestica	naminė obelis	Svarna
AG000247	Malva	domestica	naminė obelis	Žemaičių gėdovė
AG000248	Pyrus	communis	Pagrastis kriaušė	Pilapis šlyvinis
AG000250	Pyrus	communis	Pagrastis kriaušė	Alka
AG000251	Pyrus	communis	Pagrastis kriaušė	Arkatyvojė dielė
AG000252	Pyrus	communis	Pagrastis kriaušė	Jūratė
AG000253	Pyrus	communis	Pagrastis kriaušė	Lynų beilė
AG000254	Pyrus	communis	Pagrastis kriaušė	Vardėnė
AG000419	Actinida	scabrida	Margalapa aktinoida	Vasarinė kavetė
AG000420	Actinida	scabrida	Margalapa aktinoida	'Arykštė'
AG000421	Actinida	scabrida	Margalapa aktinoida	'Laba'
AG000422	Actinida	scabrida	Margalapa aktinoida	'Lada'
AG000423	Actinida	scabrida	Margalapa aktinoida	'Sakara'



Institute of Horticulture



STRUCTURE OF IH, LAMMC

Departments

Laboratory of Plant Physiology
Laboratory of Biochemistry and Technology
Laboratory of Plant Protection
Department of Orchard Plant Genetic and Biotechnology
Department of Horticulture Technologies
Department of Vegetable Breeding and Growing Technologies

Joint Research Centre (“Nemunas” valley)

Laboratory of Plant Biological Markers
Laboratory of Plant Photophysiology
Laboratory of Cryobiology
Laboratory of Plant Metabolomics



The Main Directions

● **Breeding of horticultural plants:**

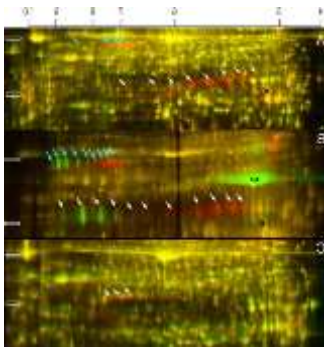
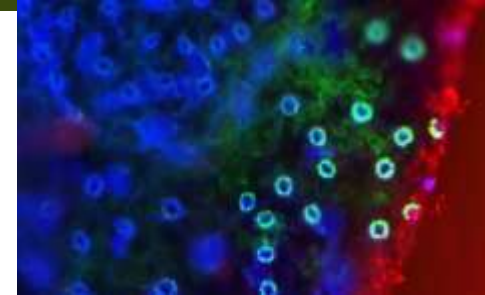
- creation of new varieties
- accumulation and preservation of genetic resources

● **Biological regularities of horticultural plants:**

- modelling of agrobiological systems for quality and productivity

● **Processing and storage:**

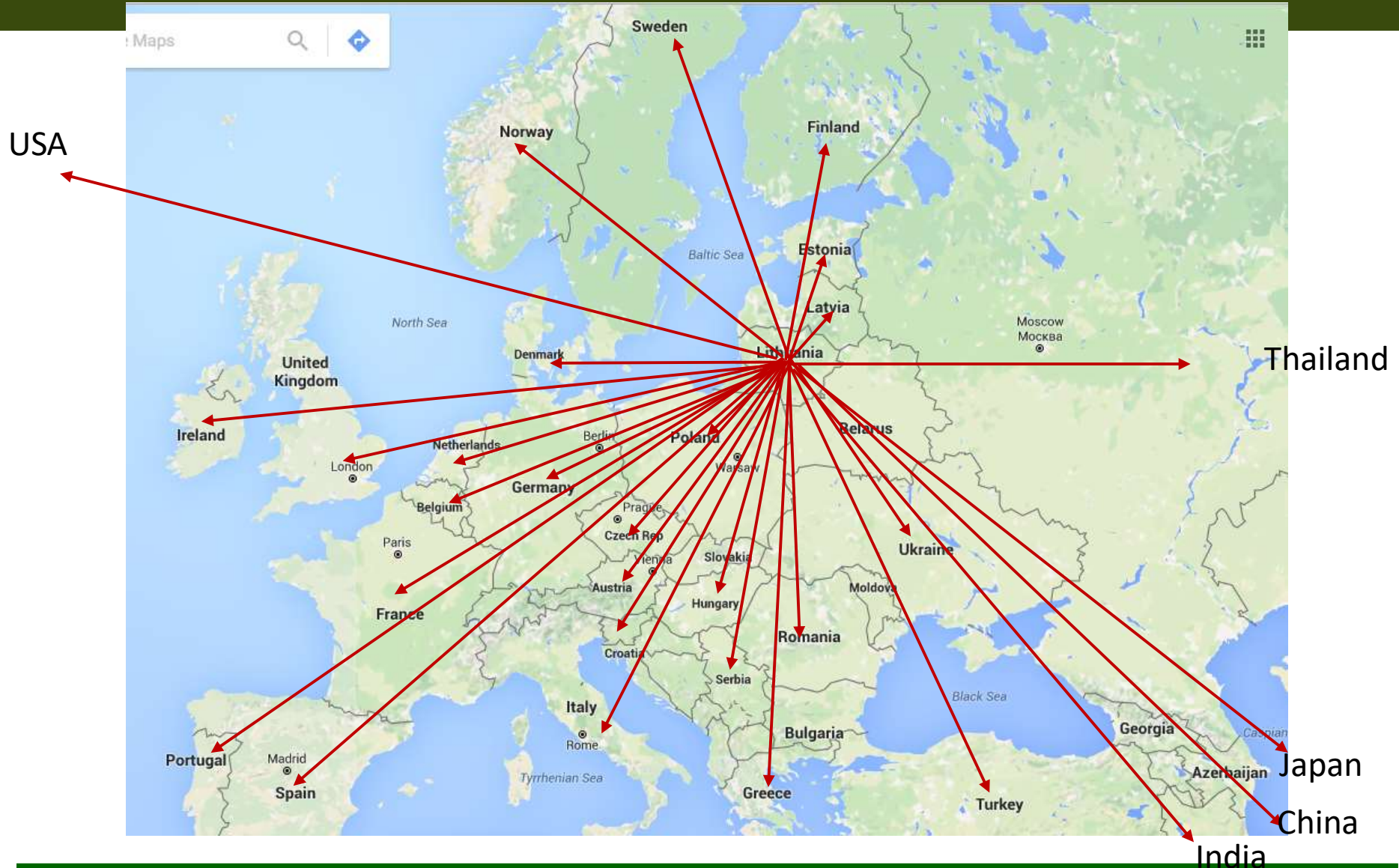
- modelling and optimization of processes
- analysis of biologically active compounds in fresh and processed production



The Key Research Objectives and Directions

Biotechnological approach	for improvement of resistance to biotic and abiotic factors in horticultural plants, identification of specific genes, development of molecular markers
Climate and environment changes	complex effect on agricultural ecosystems
Metabolic changes	modulation of differential and complex impact of changing climate and anthropogenic factors
Morphogenetic and photophysiological effects	optimization of crop or plantation physiological parameters by technological means, the formation of biopotential and realization in ontogenesis
Monitoring system	of phytopathogens and pests
Plant growing technologies	novel, safe to environment, organic and competitive
Innovative products and technologies	changes in biologically valuable compounds, contaminants and quality of processed fruits, vegetables and berries, optimization of storage and processing technology

International collaboration (disciplinarity)



International collaboration (disciplinarity)

USA - Cornell University, Montana State University, Purdue University

Japan - Centre for Sustainable Resource Science

China – Fudan University

Poland - University of Warmia and Mazury, Institute of Horticulture, Krakow University

Finland - University of Helsinki/LUKE

Spain - Universidad Pública de Navarra Campus de Arrosadía, IRTA

Denmark - University of Copenhagen

France – INRA, Ctifl

Switzerland – Agroscope

Germany - Julius Kühn-Institute, Jork research station

Latvia – Institute of Horticulture

Estonia - Estonian University of Life Science

Great Britain – EMR

Belgium – PC Fruit

Italy - FEM, Laimburg research station, Bologna University

Austria – Haidegg

Norway – NIBIO

The Netherlands - Wageningen University

Member of International Organizations



European Fruit Research Institutes Network

European Fruit Research Institute Network (EUFRIN)



European Vegetable Research Institute Network



International Union of Food Science and Technology (IUFOST)



National Food Cluster

The Main International Projects (1)

- **Horizon 2020** „European Fruit Network“, 2016–2019
- **INTERREG LAT-LIT** project LLI-181; “Revival of old traditional fruit, vegetable and ornament plants and their products: Heritage Gardens Tour”, 2017-2019
- **INTERREG R004**; “Advancement of nontechnological innovation performance and innovation capacity in fruit growing and processing sector in selected Baltic Sea Region countries”, 2016-2019
- **INTERREG**; “Market driven authentic Non-Timber Forest Products from the Baltic region - focus on wild and semi cultivated species with business potential”, 2019-2021.
- **TWIN** project UA/12 ENPI HE 01 16 (Lithuania-Ukraine) („Approximation of Ukrainian legislation with the EU in the field of plant protection products and plant health and strengthening associated inspection and laboratory services“, 2016-2019
- **EURALLIVEG** ECPGR „Allium plants: crop diversity in North Europe/Baltic region“, 2017- 2019

The Main International Projects (2)

- **ISEKI** “Innovative Developments and Sustainability of ISEKI Food”, “Internationalisation and Sustainability of ISEKI Food Network”
- **The Baltic Sea Soya network** – research and promotion of vegetable protein production
- **ERA-NET** “Strawberry Pathogens Assessment and Testing” 2013-2015
- **COST Action FA1306** “Sustainable production of high quality cherries for the European market” 2014-2018
- **COST Action 1104** „Sustainable production of high-quality cherries for the European market“ 2012-2016
- **European Commission under Council Regulation (EC) No 870/2004** “Core collection of Northern European genepool of Ribes – RIBESCO, 2007-2011.
- **European Commission under Council Regulation (EC) No 870/2004** “European Small Berries Genetic Resources, GENBERRY, 2007-2010.

TOP National Projects

◎ High level R&D projects (SMART)

- UV-A lighting strategies for controlled environment horticulture: upgrade to sustainable, high-value production (2017-2021)
- Closed plant cultivation system for production of raw materials for peptide nanoengineering applications (2017-2021)

◎ Global grant programme of the Lithuanian Research Council

- Identification of genes involved in regulation of pathogen induced hypersensitive response in *Malus* sp. plants (2011-2015)

- JSC „RŪTA“
- JSC „Mėlynė“
- IC „Morkūnas“
- JSC „Kėdainių konservų fabrikas“
- JSC „Visos sultys“
- JSC „Kvalitetas“
- JSC „EKOSULA“
- JSC „Dehidra“
- JSC „Eco Extractum“
- JSC „Biohumusas“
- Farmers T. Skaizgirys, P. Tiknevičius, et. all.



- Agreements with associations „Medsėdžių bendruomenė“, „Vaisiai ir uogos“ and „Pramoninių uogynų augintojų asociacija“ Total: 560000 €

Future Goals

High-level research

International collaboration

Expansion of PhD studies

R&D collaboration

Socio-economic impact

More than 50% publications in Q1

Horizon 2020; Horizon Europe

Foreign students, PhD thesis in English

Innovative projects for industry

Establishment of Education Centre of Agrobiography

