



INSTITUTE OF  
AGRICULTURE  
Lithuanian Research Centre  
for Agriculture and Forestry



# RESEARCH AND SERVICES

2018

# DEPARTMENT OF PLANT NUTRITION AND AGROECOLOGY

Head Dr. Sigitas Lazauskas

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Research staff: 8 research workers and 4 PhD students

## Research topics

- Crop nutrition diagnosis and crop yield modelling
- Effects of long-term fertilizer application on the productivity of agricultural crops, migration of chemical elements, nutrient balance
- Biodiversity formation and variation in grassland and field swards in agrolandscapes differing in genesis and sustainability
- Yield formation of grain legumes, cereals and grasses, sustainable use of soils in organic agriculture
- Potential of energy plants and search for new plant species for biofuel production
- Chemical and biophysical quality of soil in different agroecosystems

## Services

- Recommendations for the use of various organic and mineral macro- and micro fertilizers for field crops. Recommendations on fertilizer rates for specific soil conditions and target yield, fertilizer choice and application methods
- Recommendations on grassland management and agroecology
- Recommendations on energy crops cultivation and use for the development of innovative products





Photosynthetic measurements



Assessment of plant foliage



Experiments on agroecological systems



Agrobiological evaluation of plants



Dissemination of research results



Spectrometric measurements

# DEPARTMENT OF PLANT PATHOLOGY AND PROTECTION

Head Dr. Roma Semaškiene  
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E-mail: roma.semaskiene@lammc.lt

Research staff: 9 research workers and 3 PhD students

## Research topics

- Epidemiology and biology of arable crops' diseases and pests, the distribution of pathogen and insect pest populations, evaluation of the crop loss
- Factors favouring emergence of new diseases and insect pests, prevention and control methods
- Development of human-and environment-safe, efficient and profitable disease and insect pest management strategies
- Mould fungi and mycotoxin contamination in agricultural products
- Resistance of plant pathogens and insect pests to pesticides

## Services

- GEP trials on efficacy and selectivity evaluation of plant protection products in arable crops
- Recommendations on disease and insect pest control in arable crops
- A seed dressing agent for legumes – rhizogen, and wine yeast production
- Seed and grain health and quality testing





Investigation of pest resistance to insecticides



Analysis of seed and grain infection



Recommendations on pest control



Identification of pathogens



Identification of diseases and pests and their damage, training



GEP trials

# DEPARTMENT OF SOIL AND CROP MANAGEMENT

Head Dr. Virginijus Feiza

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Research staff: 8 research workers and 2 PhD students

## Research topics

- Selection of crop and soil management systems, crop rotations and their sequences
- Effects of soil tillage on the variation of soil physical properties under changing climate conditions
- Development of reduced soil tillage system and identification of the feasibility to reduce soil tillage for individual zones of the country
- Weed and crop competition; optimization of weed control in a crop stand
- Changes in weed flora and seed bank in the soils of different acidity and productivity
- Investigation of soil development in agro-ecosystems

## Services

- Determination of quality indicators of plants
- Recommendations on the choice of pre-crops, soil tillage systems and methods, application of crop cultivation technologies
- Consultations on the choice of crop rotations, soil tillage systems, cultivation technologies of grain legumes and cereals, oilseed rape, sugar beet, maize, chemical and mechanical weed control
- Research on weed resistance to herbicides
- Biological efficacy testing of new chemical agents
- Investigation of soil physical parameters and soil mapping
- Determination of soil compaction and ploughing and stubble breaking pan
- Soil profile diagnostics and morphology
- Determination of soil water retention (field capacity, available water content, wilting point), soil pore size distribution, water permeability





Determination of depth and thickness of soil plough pan



Investigation of weed resistance to herbicides



Investigation of soil morphological and soil formation processes



Investigation on chemical weed control in cereals



Investigation of sugar beet soil and crop management practices and reduction of weed infestation



Investigation of soil water retention – plant supply with water under changing climate conditions

# DEPARTMENT OF CEREAL BREEDING

Head Dr. Algė Leistrumaitė

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Research staff: 6 research workers

## Research topics

- Development of new lines and populations of winter cereals, research into their adaptive qualities, yield structural elements and agronomic value, breeding of novel promising varieties
- Development of genotypes of spring cereals, research into their adaptive and agronomic characteristics, identification of promising germplasm for breeding of novel varieties
- Development of genotypes of legumes, investigation of their adaptive and agronomically valuable characteristics, breeding of new homogeneous varieties of different earliness
- Investigation of genetic recourses of cereals and grain legumes, their evaluation and selection according to adaptability to biotic and abiotic factors
- Selection of cereal varieties and breeding lines best suited for organic farming
- Maintenance breeding and seed production of cereals and grain legumes

## Services

- Consultations on the issues relating to cultivation of Lithuanian varieties of cereals, seed production and inspection of seed production crops
- Variety testing trials of cereals in the field and laboratory conditions





Hybridization of spring barley varieties



Plant measurements in the trials



Winter wheat variety  
'Kena DS'



Maturity assessment of  
winter wheat



Spring barley variety  
'Ema DS'



Investigation of winterhardiness  
of cereals

# DEPARTMENT OF GRASS BREEDING

Head Eglė Norkevičienė

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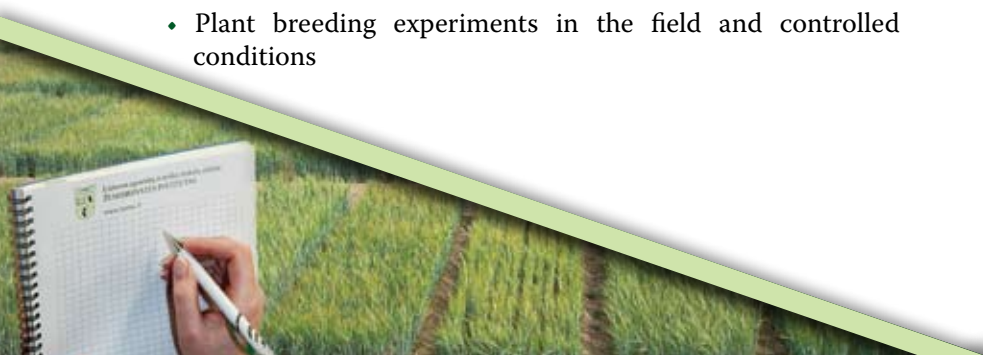
Research staff: 5 research workers and 1 PhD student

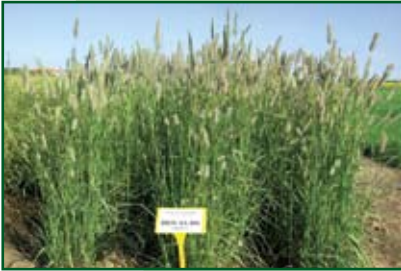
## Research topics

- Performance of major forage and turf grass breeding programmes; forage grasses: *Trifolium pratense* L., *T. repens* L., *Medicago sativa* L., *Phleum pratense* L., *Lolium perenne* L., *Festulolium*, *Festuca pratensis* Huds., *Dactylis glomerata* L., *Poa pratensis* L; turf grasses: *Poa pratensis* L., *Festuca rubra* L., *F. ovina* L., *Agrostis capillaris* L., *Lolium perenne* L.
- Maintenance breeding and seed production
- Genetic resources of forage and turf grasses
- Search for promising species of perennial grasses and legumes and non-traditional plants, investigation and breeding of *Panicum virgatum* L., *Dactylis polygama* Horv., *Arrhenatherum elatius* P. Blauv, *Melilotus* spp., *Poa nemoralis* L., *Koeleria gracilis* Pers., *Festuca trachyphylla* (Hack.) Krajina, *Festuca psammophila* Fritsch, *F. sabulosa* H. Lindb. and other species

## Services

- Consultations on the issues of cultivation of Lithuanian varieties of forage and lawn grasses, seed production and seed purchase
- Plant breeding experiments in the field and controlled conditions





Multiplication of common timothy



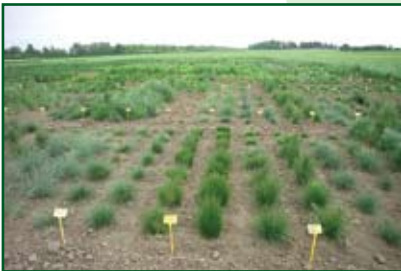
Application of selection and hybridization methods using isolators



Variety testing of legumes



Training on identification of grass species



Genetic collection of varieties of grasses



Seed cleaning operations

# CHEMICAL RESEARCH LABORATORY

Head Dr. Alvyra Šlepetienė

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Research staff: 6 research workers and 3 PhD students

## Research topics

- Quality of grasses and legumes, rapeseed, maize and grass silage, chemical composition of traditional and alternative crops and their by-products as influenced by genotypic diversity, agrotechnological peculiarities and climate change
- Physical, chemical and technological analysis of grain, flour, dough and bread, qualitative and quantitative characteristics of starch, assessment of variation causality, suitability for industrial processing
- The regularities of variation of soil chemical properties (nitrogen, phosphorus, potassium, sulfur, organic matter content and its composition) in different agro-ecosystems
- Changes in carbon and its compounds in the soil, the effect of various factors on carbon sequestration
- Determination of quality indicators of plant-derived materials by NIR spectroscopy
- Quality and safety of food, forage, renewable energy sources as influenced by plant genetic origin, climate peculiarities, and plant nutrient supply
- Feasibility of multifunctional use of agricultural traditional and alternative herbaceous plants for the development of technologies for the production of plant-derived materials and bioproducts and their environmental impacts

## Services

- Analyses of herbaceous forages, plant biomass and silage
- Analyses of various forages (pulp, cake, granulated and combined forages)
  - Analyses of cereal grain, flour and starch quality
  - Analyses of industrial crops (oilseed rape, potatoes, sugar beet, Jerusalem artichoke)



- Analyses of rape seed and cake quality
- Chemical analyses of soil and peat
- Determination of water-soluble carbonates and water-soluble carbon by an ion chromatography method
- Analyses of chemical composition of energy crops and various biofuels
- Analyses of biogas formation and by-products
- Analyses of farmyard manure, slurry and other substrates
- Analyses of quality composition of soil humus, humic fertilizers and agents
- Particle size measurement and division into groups (A, B starch, soil texture) by a laser diffraction method



Humus division into fractions



Plant and soil analyses –  
determination of C, N, S  
by the Dumas method  
(Vario EL III, Elementar)



Determination of elements –  
K, Ca, Mg, Na, Fe, Zn, Al,  
by the atomic absorptiometry  
(AAnalyst 200, Perkin Elmer)



Determination of grain quality –  
gluten content and gluten index  
(GLUTOMATIC system, Perten)

# LABORATORY OF GENETICS AND PHYSIOLOGY

Head Dr. Kristina Jonavičienė

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Research staff: 5 research workers and 2 PhD students

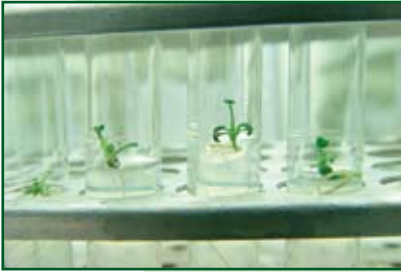
## Research topics

- Development of valuable breeding material using genetic and biotechnological methods
- Research on plant drought and freezing tolerance
- Development and application of advanced plant phenotyping technologies
- Wheat doubled haploid production via wheat × maize crossing
- Study of plant polyploidy
- Molecular identification and genetic diversity analysis of pathogenic fungi

## Services

- Evaluation of plant freezing and drought tolerance under controlled conditions
- Induction of wheat doubled haploids
- Production of polyploids of forage grasses





Development of gerplasm –  
clover polyploids



Production of wheat  
doubled haploids



Studying freezing tolerance  
of plants



Plant genomic studies



Selection of valuable genotypes of  
perennial ryegrass in a phytotron



Leaf elongation rate analysis of  
grasses under drought stress

# LABORATORY OF AGROBIOLOGY

Head Dr. Vita Tilvikiene

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Research staff: 3 research workers and 2 PhD students

## Research topics

- Soil agrochemical properties and pollution
- Application of plant nutrition diagnostics – assessment of shortage of macro- and micro-elements and optimization of their contents
- Quality of plants and food
- Development and use of novel mineral and organic fertilizers, liming materials
- Quality of soil improving materials, potential pollution, use
- Application of environmental pollution prevention measures

## Services

- Quantification of low-concentration and extreme precision-requiring organic and inorganic chemical substances in the environment and various products
- Analyses of plant fibre
- Analyses of soil, water, air, sewage sludge, sapropel, forages, food, fertilizers, liming materials, peat, composts, waste materials, fuel, ash, plant protection products, packaging
- Quantitative and qualitative analyses of volatile compounds in food, plant raw materials, composts by gas chromatography-mass spectrometry
- Cultivation of plants in the controlled climate conditions





Cultivation of plants in the controlled climate conditions



Analysis of the composition of short fibres of plants



Determination of compounds in non-destructive biological samples



Analysis of polycyclic aromatic hydrocarbons and chlorobiphenyls, humic and fulvic acids in the soil and composts



Determination of metal concentrations in plants and food products



Determination of pesticide residues in plants and soil

# LABORATORY OF MICROBIOLOGY

Head Dr. Skaidrė Supronienė

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Research staff: 2 research workers and 2 PhD students

## Research topics

- Identification and control of plant pathogens
- Population structure of mycotoxin producers
- Isolation and identification of endophytic microorganisms, determination of their effects on plant growth
- Microbiological contamination of plant produce and control
- Maintenance, investigation and cultivation of the collection of symbiotic bacteria of legume plants
- Investigation of the population structure of soil microorganisms in different cropping systems

## Services

- Monitoring of plant pathogens, mycotoxin producers and other microorganisms associated with soil, plant raw material, food and forage contamination; their isolation and identification according to morphological, biochemical and genetic characteristics
- Microbiological assays, analyses of micro-objects using microscopes
- Assessment of fungicidal activity of microorganisms
- Investigation of genetic, phenotypic and species diversity of plant pathogens, mycotoxin producers and nitrogen fixing plant endophytic microorganisms
- Community-level physiological profiling of soil microorganisms using *Biolog Eco* plates
- Analyses of fungal and bacterial pathogenicity to plants
- Assessment of the effects of changing environmental conditions and farming practices on the population diversity, spread and establishment of the newly emerging plant pathogens in the agroecosystems
- Multiplication of symbiotic bacteria of legumes

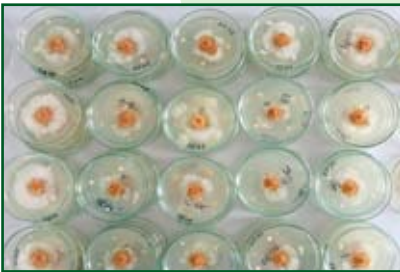




Community-level physiological profiling of soil microorganisms using a Biolog system



Pathogenicity tests



Assessment of fungicidal activity of microorganisms



Identification of causal agents of fungal diseases according to morphological characteristics



Determination of colony forming units of yeast, mould fungi and bacteria



Multiplication of symbiotic bacteria of legumes



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