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THEMATIC RESEARCH FOCUS ↓

Research Area: Field of plant molecular biology and biotechnology – elaboration of procedures for gene transfer into plant genome by use of *Agrobacterium tumefaciens* with the aim to improve valuable traits of economically important crops. Field of system biology, genomics and proteomics – characterization of novel genotypes obtained by application of biotechnological approaches (biotech plants), as well as plant genetic resources using advanced genomic and proteomic techniques. Study of plant reaction on biotic and abiotic stress factors, as well as plant adaptation mechanisms on adverse conditions.

Excellence

- *Agrobacterium tumefaciens* - mediated genetic transformation
- Preparation of vector constructs, study of gene expression
- Proteomics – protein quantification by use of two-dimensional gel electrophoresis and mass spectrometry

Mission: Targeted gene transfer into plant genome together with mutation techniques can markedly contribute to effectivity of breeding process and to improvement of valuable traits of economically important crops. The result will be creation of novel valuable genotypes, their effective propagation in vitro and their introduction into agricultural production system, what will contribute to sustainable agriculture, maintenance of biological diversity and food safety.

TECHNOLOGIES ↓

Content of Research

- Preparation of vector constructs and *Agrobacterium tumefaciens* – mediated plant genetic transformation
- Gene detection and isolation
- Protein analysis by two-dimensional electrophoresis and mass spectrometry
- Study of plants with special life cycle (parasitic plants)
- Mutation breeding of amaranth

Main Capabilities: techniques of genetic engineering, plant molecular biology and proteomics, radiation mutagenesis, techniques of tissue cultures

Fields of Research Results Application

- Agricultural praxis – production of novel valuable genotypes, their biochemical and molecular characterization; knowledge of plant defense mechanisms against harmful biotic and abiotic environment influences enables us to manipulate and regulate positively breeding process in

order to improve plant production and defense mechanisms by use of genetic engineering or mutation breeding; methods of protein quantification by mass spectrometry are useful for detection and quantification of allergen proteins in agricultural crops; the research of plants with special life cycle (parasitic plants) enables to minimize their negative impact on agricultural production.

KEY RESEARCH EQUIPMENT ↓

- Equipment needed for DNA isolation, analyses, sequencing
- Equipment needed for protein isolation and analyses
- Microscopic techniques
- Equipment for tissue culture work, culture rooms

REALIZED PROJECTS

- 2013 – 2017:** Pathogen-informed strategies for sustainable broad-spectrum crop resistance (COST)
- 2013 – 2017:** Strigolactones: biological roles and applications (COST)
- 2013 – 2015:** Exploitation of modern biotechnologies in amaranth breeding programme (VEGA)
- 2011 – 2013:** Participating of the antioxidant plants systems in a physiological-biochemical response on a cadmium and nickel stress influence (Bilateral project SK-Ukraine)
- 2011 – 2013:** The elucidation of plant adaptation in contaminated Chernobyl area (VEGA)

COLLABORATION ↓

Academic/Research Partners

- Slovak University of Agriculture in Nitra (Slovakia)
- Constantine The Philosopher University in Nitra (Slovakia)
- University of Presov in Presov (Slovakia)
- Institute of Cell Biology and Genetic Engineering, The National Academy of Sciences of Ukraine, Kiev, Ukraine

Companies

- NPPC Research Institute of Plant Production, Piešťany (Slovakia)

EXPECTATIONS

Requirements

We are looking for partners with concrete research and/or commercial ideas and goals that could be achievable using our equipment and know-how.

Offers

We offer the use of equipment and know-how of the research group.