

Circular economy for biodiversity

Unlocking the green potential



*Skills for sustainable,
resilient, and socially
fair communities*



Institute of Plant Genetics
Polish Academy of Sciences

Lidia Błaszczyk

3-11 June 2023

#EUGreenWeek
PARTNER EVENT

Institute of Plant Genetics of the Polish Academy of Sciences

- an important research center functioning for almost 70 years within the area of biological and agricultural sciences, with special regard to the field of genetics and genomics of crop and model plants;
- the mission of IPG PAS is to conduct and promote research meeting all highest standards;
- the Institute's staff participates actively in interdisciplinary national and international cooperation with leading institutions/groups, integrating its research with national environment and the ERA;
- the scientists undertake new challenges of basic research, develop innovative methods to solve emerging problems (including those due to climate changes), disseminate obtained results, to support sustainable agriculture;
- the Institute promotes education of young researchers, running doctoral studies (in 1994 the Stefan Barbacki National Award for young scientists was established, granted annually);
- in January 2014, the Institute was awarded the "HR Excellence in Research" logo by the European Commission;
- discipline: **agriculture and horticulture**;
- fields of activity:
 - genetics, cytogenetics, genomics
 - phenotyping, phenomics
 - plant resistance
 - metabolomics
 - biotechnology
 - biometry and bioinformatics
 - integrative plant biology



HR EXCELLENCE IN RESEARCH



The **BIO-TALENT (The Creation of the Department of Integrative Plant Biology)** project was submitted under FP7-ERACHairs-Pilot Call-2013. It is **the first ERA Chair in Poland** funded by the European Commission to upgrade, stimulate, unlock, develop and extend the research potential of the Institute of Plant Genetics, Polish Academy of Sciences through the creation of an excellent, international and interdisciplinary research Department on molecular genetics, genomics, resistance to stresses and bioinformatics.



Project title: **Intelligent Collections of Food Legumes Genetic Resources for European Agrofood Systems** (Akronim: **INCREASE**). Program: H2020-EU.3.2.1.1. - Increasing production efficiency and coping with climate change, while ensuring sustainability and resilience. GA: 862862. Duration: 1 May 2020 – 30 April 2025. Co-ordinator: Roberto Papa, Università Politecnica Delle Marche, Italy. IPG PAS co-ordinator: Karolina Susek



Project title: **The Creation of the Department of Plant Nanotechnology to Maximise the Impact of the ERA Chair Culture on the IPG PAS** (Acronym: **NANOPLANT**). Project type: Coordination and Support Action (EU H2020-ERACHairs). GA: 856961. Duration: 1 September 2019 – 31 August 2024. Co-ordinator: Franklin Gregory

Project title: **European Plant Phenotyping Network 2020** (Acronym: **EPPN2020**). Project type: H2020-INFRAIA-2016-1. GA: 731013. Duration: 1 May 2017 – 30 April 2021. Co-ordinator: Francis Tardieu, INRA, France. IPG PAS co-ordinator: Paweł Krajewski. Consortium: 22 members

Project title: **EPI-CATCH - EPIgenetic mechanisms of Crop Adaptation To Climate cHange**. Project type: The European Cooperation in Science and Technology (EU COST Action). GA: EU CA19125. Duration: 17 September 2020 - 16 September 2024. Co-ordinator: Martinelli Federico, University of Florence, Italy. IPG PAS co-ordinator: Susek Karolina

Department of Plant Microbiomics

Head: Assoc. Prof. Lidia Błaszczyk

The research focuses on understanding the microbiome of selected cereal species and determining the ecological role of microorganisms related to the rhizosphere, phyllosphere and endosphere of these plants.

The main research goals:

- a) assessment of the diversity of microorganisms inhabiting underground and above-ground parts and internal tissues of plants; determining the mode of transmission of endogenous microorganisms and estimating the influence of the host genotype, individual plant organs and plant growth conditions on the composition and distribution of rhizosphere, phyllosphere and endosphere microorganisms;
- b) to determine the morphological, anatomical, physiological and molecular responses of plants to changes in their microbiome;
- c) determination of the role of epigenetic mechanisms (DNA methylation, lncRNA, microRNA and post-transcriptional modifications of histones) in multidirectional interactions of wheat plants with pathogenic and symbiotic fungi, including the assessment of the impact of DNA methylation on long-term and intergenerational epigenetic memory of wheat on stress caused by fungal colonization;
- d) selection of endogenous microorganisms for use as biostimulators of plant growth and biological agents for limiting fungal diseases and for bioaugmentation of metallophytes.

Research projects:

1. “The common wheat (*Triticum aestivum* L.) endosphere mycobiome dynamics and its impact on the growth and fitness of plant”, 2019-2021, funding: National Science Centre (NCN), no 2017/27/B/NZ9/01591
2. “The molecular basis of wheat (*Triticum aestivum* L.) responses to *Trichoderma* spp. root colonization”, 2016-2020, funding: National Science Centre (NCN), no 2015/19/B/NZ9/03083
3. “Analysis of changes occurring in the roots of common wheat (*Triticum aestivum* L.) as a result of their interaction with *Trichoderma* fungi”, 2016-2018, funding: National Science Centre (NCN), no 2016/19/N/NZ9/01625

Recent publications:

1. Salmon et al. Constellation of the endophytic mycobiome in spring and winter wheat cultivars grown under various conditions. *Sci Rep.* 2023 13;13(1):6089;
2. Błaszczyk L. et al. Containment of *Fusarium culmorum* and Its Mycotoxins in Various Biological Systems by Antagonistic *Trichoderma* and *Clonostachys* Strains (2023). *Journal Fungi.* 9 (3): 289;

General topics:

- restoration of the cereal microbiomes structure;
- targeted myco-supplements for cereals
- endophyte-based fungicides for large-area crops
- protection by silencing: the use of dsRNA in the fight against toxigenic pathogens of cereals



- **HORIZON-CL6-2023-BIODIV-01-14: Biodiversity friendly practices in agriculture – breeding for Integrated Pest Management (IPM)**
- **HORIZON-CL6-2023-ZEROPOLLUTION-02-2-two-stage: Safe-and-sustainable-by- design bio-based platform chemicals, additives, materials or products as alternatives**

New project with registration number 2022/47/B/NZ9/01282 submitted under the OPUS 24 call and awarded funding by the decision No. DEC -2022/47/B/NZ9/01282 of the Director of the NATIONAL SCIENCE CENTER, entitled "RNA ACTION: microRNA and siRNA - mediators in communication between common wheat and pathogenic and symbiotic fungi", Institute of Plant Genetics PAS, PI: Lidia Błaszczyk

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Żniwiarka, Stanisław Koszeliński (1876-1968)



Upalny Dzień, Włodzimierz Tetmajer (1862 - 1923)



Koszenie, Adam Setkiewicz (1875 - 1945)