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Department of Environmental Stress Biology

Plant Molecular Physiology and Cytogenetics Team

Specialisation: molecular biology of plants, abiotic and biotic stresses, *Lolium-Festuca* complex

Research profile

- Physiological and molecular background of abiotic stress tolerance including low temperature stress,
- Transfer of genes for stress tolerance from *Festuca* species into *Lolium* species,
- plant material: forage grasses of *Lolium-Festuca* complex.

Methods

- Gene expression profiling at transcriptome (*real-time* RT-PCR) and proteome (2-D electrophoresis, mass spectrometry, Western blot) levels,
- Physiological analyses (WC, RWC, electrolyte leakage, gas exchange parameters, chlorophyll fluorescence),
- Analysis of plant root system reaction to water deficit,
- Lipidome analysis under low temperature conditions,
- Tests for plant tolerance to drought and low temperature in the simulated conditions.

National and international grants

- NCN *Sonata* project (no. 2011/01/D/NZ3/02068): "Jasmonic acid biosynthesis regulation by mitogen-activated protein kinases in *Arabidopsis thaliana*", **2012-2013**, co-investigator
- Program Innovative Economy 2007-2013, priority I "Research and development of modern technologies", action 1.3 "Support for R&D projects for entrepreneurs carried out by scientific entities", sub-action 1.3.1 "Development projects" (no. UDA.POIG.01.03.01-00-101/08-00): "Biotechnological tools for breeding cereals with increased resistance to drought", POLAPGEN, **2014-2015**, co-investigator
- Project of Ministry of Agriculture and Rural Development: „Identification of genes associated with the expression of winter-hardiness and drought tolerance in *Lolium multiflorum/Festuca arundinacea* introgression forms”, 2014-2020
- Project of National Science Centre (PRELUDIUM7): „Analysis of the selected components of root system architecture and root metabolism with reference to water deficit tolerance in grasses of the *Lolium-Festuca* complex”, 2015-2016
- Project of National Science Centre (PRELUDIUM13): “Analysis of molecular mechanisms of frost tolerance in *Lolium multiflorum/Festuca arundinacea* introgression forms.” 2018-2020, project coordinator

National cooperation

- University of Agriculture in Cracow, Department of Plant Physiology (prof. Marcin Rapacz). Topic: Abiotic stress tolerance in *Lolium-Festuca* complex
- Adam Mickiewicz University Poznan, Department of Plant Ecophysiology (D.Sc. Magdalena Arasimowicz-Jelonek). Topic: accumulation of reactive oxygen species and activity of antioxidant enzymes in *Lolium-Festuca* complex

Publications

- Perlikowski D, Czyżniejewski M, Marczak Ł, **Augustyniak A**, Kosmala A. 2016. Water Deficit Affects Primary Metabolism Differently in Two *Lolium multiflorum*/*Festuca arundinacea* Introgression Forms with a Distinct Capacity for Photosynthesis and Membrane Regeneration. *Front Plant Sci.* 25;7:1063. doi:10.3389/fpls.2016.01063
- Perlikowski D, Wiśniewska H, Kaczmarek J, Góral T, Ochodzki P, Kwiatek M, Majka M, **Augustyniak A**, Kosmala A. 2016. Alterations in Kernel Proteome after Infection with *Fusarium culmorum* in Two Triticale Cultivars with Contrasting Resistance to Fusarium Head Blight. *Front Plant Sci.* 17;7:1217. doi:10.3389/fpls.2016.01217
- Płażek A, Pocięcha E, **Augustyniak A**, Masajada K, Dziurka M, Majka J, Perlikowski D, Pawłowicz I, Kosmala A. 2018. Dissection of resistance to *Microdochium nivale* in *Lolium multiflorum*/*Festuca arundinacea* introgression forms. *Plant Physiol Biochem.* 123:43-53. doi: 10.1016/j.plaphy.2017.11.022
- **Augustyniak A**, Perlikowski D, Rapacz M, Kościelniak J, Kosmala. 2018. Insight into cellular proteome of *Lolium multiflorum*/*Festuca arundinacea* introgression forms to decipher crucial mechanisms of cold acclimation in forage grasses. *Plant Sci.* 272:22-31. doi: 10.1016/j.plantsci.2018.04.002

Hobby

sport - martial arts, bodybuilding