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Research profile

- Molecular basis of plant tolerance to abiotic stresses (low temperature, drought, and salinity) and resistance to pathogens,
- Organization and evolution of plant chromosome- and genome-specific sequences,
- Transfer of genes for environmental stress tolerance from *Festuca* species into *Lolium* species,
- Molecular and physiological mechanisms of stress response plasticity in poliploid species.

Papers

1. Perlikowski D., Skiryecz A., Marczak Ł., Lechowicz K., Augustyniak A., Michäelis A., Kosmala A. (2022). Metabolism of crown tissue is crucial for drought tolerance and recovery after stress cessation in *Lolium/Festuca* forage grasses. *Journal of Experimental Botany*. erac398. DOI: 10.1093/jxb/erac398
2. Perlikowski D., Lechowicz K., Pawłowicz I., Arasimowicz-Jelonek M., Kosmala A. (2022). Scavenging of nitric oxide up-regulates photosynthesis under drought in *Festuca arundinacea* and *F. glaucescens* but reduces their drought tolerance. *Scientific Reports* 12: 6500
3. Perlikowski D., Lechowicz K., Skiryecz A., Michaelis A., Pawłowicz I., Kosmala A. (2022). The role of triacylglycerol in the protection of cells against lipotoxicity under drought in *Lolium multiflorum/Festuca arundinacea* introgression form. *Plant and Cell Physiology* 63: 353-368
4. Stefanowicz K., Szymanska-Chargot M., Truman W., Walerowski P., Olszak M., Augustyniak A., **Kosmala A.**, Zdunek A., Malinowski R. (2021). *Plasmodiophora brassicae*-Triggered Cell Enlargement and Loss of Cellular Integrity in Root Systems Are Mediated by Pectin Demethylation. *Frontiers in Plant Science* 12: 711838
5. Blicharz S., Beemster G.T.S., Ragni L., De Diego N., Spíchal L., Hernández A.E., Marczak Ł., Olszak M., Perlikowski D., **Kosmala A.**, Malinowski R. (2021). Phloem exudate metabolic content reflects the response to water deficit stress in pea plants (*Pisum sativum L.*). *The Plant Journal* 106: 1338-1355
6. Perlikowski D., **Kosmala A.** (2020). Mechanisms of drought resistance in introgression forms of *Lolium multiflorum/Festuca arundinacea*. *Biologia Plantarum* 64: 497-503
7. Augustyniak A., Pawłowicz I., Lechowicz K., Izbiańska-Jankowska K., Arasimowicz-Jelonek M., Rapacz M., Perlikowski D., **Kosmala A.** (2020). Freezing tolerance of *Lolium multiflorum/Festuca arundinacea* introgression forms is associated with the high activity of antioxidant system and adjustment of photosynthetic activity under

- cold acclimation. *International Journal of Molecular Sciences* 21 (16): 5899. doi: 10.3390/ijms21165899
8. Lechowicz K., Pawłowicz I., Perlikowski D., Arasimowicz-Jelonek M., Blicharz S., Skiryicz A., Augustyniak A., Malinowski R., Rapacz M., **Kosmala A.** (2020). Adjustment of photosynthetic and antioxidant activities to water deficit is crucial in the drought tolerance of *Lolium multiflorum/Festuca arundinacea* introgression forms. *International Journal of Molecular Sciences* 21 (16): 5639. doi: 10.3390/ijms21165639
 9. Lechowicz K., Pawłowicz I., Perlikowski D., Arasimowicz-Jelonek M., Majka J., Augustyniak A., Rapacz M., **Kosmala A.** (2020). Two *Festuca* species - *F. arundinacea* and *F. glaucescens* - differ in the molecular response to drought, while their physiological response is similar. *International Journal of Molecular Sciences* 21(9): 3174. doi: 10.3390/ijms21093174
 10. Perlikowski D., Augustyniak A., Skiryicz A., Pawłowicz I., Masajada K., Michaelis Ä., **Kosmala A.** (2020). Efficient root metabolism improves drought resistance of *Festuca arundinacea*, *Plant and Cell Physiology* 61: 492-504
 11. Perlikowski D., Wisniewska H., Goral T., Ochodzki P., Majka M., Pawłowicz I., Belter J., **Kosmala A.** (2019). Identification of Proteomic Components Associated with Resistance to Fusarium Head Blight in Rye. *The Plant Pathology Journal* 35: 313–320
 12. Perlikowski D., Augustyniak A., Masajada K., Skiryicz A., Soja A. M., Michaelis A., Wolter G., **Kosmala A.** (2019). Structural and metabolic alterations in root systems under limited water conditions in forage grasses of *Lolium-Festuca* complex. *Plant Science* 283: 211-223
 13. Pawłowicz I., Waśkiewicz A., Perlikowski D., Rapacz M., Ratajczak D., **Kosmala A.** (2018). Remodeling of chloroplast proteome under salinity affects salt tolerance of *Festuca arundinacea*. *Photosynthesis Research* 137: 475-492
 14. Augustyniak A., Perlikowski D., Rapacz M., Kościelniak J., **Kosmala A.** (2018). Insight into cellular proteome of *Lolium multiflorum/Festuca arundinacea* introgression forms to decipher crucial mechanisms of cold acclimation in forage grasses. *Plant Science* 272: 22-31
 15. Płażek A., Pociecha 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 Physiology and Biochemistry* 123: 43-53
 16. Majka J., Zwierzykowski Z., Majka M., **Kosmala A.** (2018). Karyotype reshufflings of *Festuca pratensis* × *Lolium perenne* hybrids. *Protoplasma* 255: 451-458
 17. Majka J., Książczyk T., Kiełbowicz-Matuk A., Kopecký D., **Kosmala A.** (2017). Exploiting repetitive sequences and BAC clones in *Festuca pratensis* karyotyping. *PLoS One* 12 (6): e0179043. doi: 10.1371/journal.pone.0179043
 18. Górna K., Perlikowski D., **Kosmala A.**, Stępień Ł. (2017). Host extracts induce changes in the proteome of plant pathogen *Fusarium proliferatum*. *Fungal Biology* 121: 676-688

19. Pawłowicz I., Rapacz M., Perlikowski D., Gondek K., **Kosmala A.** (2017). Abiotic stresses influence the transcript abundance of PIP and TIP aquaporins in *Festuca* species. *Journal of Applied Genetics* 58: 421-435
20. Perlikowski D., Kierszniowska S., Sawikowska A., Krajewski P., Rapacz M., Eckhardt Ä., **Kosmala A.** (2016). Remodeling of leaf cellular glycerolipid composition under drought and re-hydration conditions in grasses from the *Lolium-Festuca* complex. *Frontiers in Plant Science* 7:1027. doi: 10.3389/fpls.2016.01027
21. 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. *Frontiers in Plant Science* 7:1063. doi: 10.3389/fpls.2016.01063
22. 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. *Frontiers in Plant Science* 7:1217. doi: 10.3389/fpls.2016.01217
23. Shemesh-Mayer E., Ben-Michael T., Rotem N., Rabinowitch H.D., Doron-Faigenboim A., Kosmala A., Perlikowski D., Sherman A., Kamenetsky R. (2015). Garlic (*Allium sativum* L.) fertility: transcriptome and proteome analyses provide insight into flower and pollen development. *Frontiers in Plant Science* 6:271. doi: 10.3389/fpls.2015.00271
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27. Jurczyk B., Krępski T., **Kosmala A.**, Rapacz M. (2013). Different mechanisms trigger an increase in freezing tolerance in *Festuca pratensis* exposed to flooding stress. *Environmental and Experimental Botany* 93: 45-54
28. Perlikowski D., **Kosmala A.**, Rapacz M., Kościelniak J., Pawłowicz I., Zwierzykowski Z. (2014). Influence of short-term drought conditions and subsequent re-watering on the physiology and proteome of *Lolium multiflorum/Festuca arundinacea* introgression forms with contrasting levels of tolerance to long-term drought. *Plant Biology* 16: 385-394
29. Wojtyła Ł., **Kosmala A.**, Garnczarska M. (2013). Lupine embryo axes under salinity stress. II. Mitochondrial proteome response. *Acta Physiologiae Plantarum* 35: 2383-2392

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32. Shemesh Mayer E., Winiarczyk K., Błaszczuk L., **Kosmala A.**, Rabinowitch H.D., Kamenetsky R. (2013). Male gametogenesis and sterility in garlic (*Allium sativum* L.): barriers on the way to fertilization and seed production. *Planta* 237: 103-120
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34. Masojć P., **Kosmala A.** (2012). Proteomic analysis of preharvest sprouting in rye using two-dimensional electrophoresis and mass spectrometry. *Molecular Breeding* 30: 1355-1361
35. Pawłowicz I., **Kosmala A.**, Rapacz M. (2012). Expression pattern of the psbO gene and its involvement in acclimation of the photosynthetic apparatus during abiotic stresses in *Festuca arundinacea* and *F. pratensis*. *Acta Physiologiae Plantarum* 34: 1915-1924
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37. Bocian A., **Kosmala A.**, Rapacz M., Jurczyk B., Marczak Ł., Zwierzykowski Z. (2011). Differences in leaf proteome response to cold acclimation between *Lolium perenne* plants with distinct levels of frost tolerance. *Journal of Plant Physiology* 168: 1271-1279
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43. Zwierzykowski Z., Zwierzykowska E., Taciak M., Jones N., **Kosmala A.**, Krajewski P. (2008). Chromosome pairing in allotetraploid hybrids of *Festuca pratensis* × *Lolium perenne* revealed by genomic in situ hybridization (GISH). *Chromosome Research* 16: 575-585
44. Rapacz M., Gąsior D., **Kosmala A.**, Zwierzykowski Z., Humphreys M.W. (2007). The role of photosynthetic apparatus in cold acclimation of *Lolium multiflorum*. Characteristics of novel genotypes low-sensitive to PSII over-reduction. *Acta Physiologiae Plantarum* 29: 309-316
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