Name and surname:	**Kamila Nowosad**
Academic Degree:	dr hab. inż. (DSc.)
Institute/Department:	Department of Genetics, Plant Breeding and Seed Production
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UPWr Base of Knowledge - link:	https://bazawiedzy.upwr.edu.pl/info/author/UPWr60ed5ccd95364870838b47fdd2605c01?affil=&r=author&tab=&title=Profil%2Bosoby%2B%25E2%2580%2593%2BKamila%2BNowosad%2B%25E2%2580%2593%2BUniwersytet%2BPrzyrodniczy%2Bwe%2BWroc%25C5%2582awiu&lang=pl&qp=
Researchgate:	
Personal website / Working group website:	
Participation in projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	1.Implementation of genetic tools into creative crop breeding in order to introduce modern varieties adapted to climate change, market conditions and the principles of the European Green Deal – NCBIR FENG.01.01-IP.01-001/23, 2024-2026 - RT 2.Identification of the molecular mechanism of winter rye resistance to brown rust. MRiRW 2020-2026 – PI 3.Development of new biotechnological tools enabling effective assessment of sugar beet's resistance to bolting and selection of parental forms for breeding heterosis of this species. MRiRW 2020-2026 - RT
Do you plan to engage support of second supervisor or auxiliary supervisor?	YES
	Auxiliary supervisor
Name and surname:	Bartosz Kozak
Academic Degree:	dr inż. (Dr. Eng.)
Faculty, Institute/Department:	Department of Genetics, Plant Breeding and Seed Production
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UPWr Base of Knowledge - link or most important publications from last 3 year (JCR) / patents from last 3 years (maximum 5):	https://bazawiedzy.upwr.edu.pl/info.seam?id=UPWr2d626d1caad44522af72cc6e6bba8ff4&affil=&lang=pl
Researchgate:	
Personal website / Working group website:	
Projects in last 5 years (chronological; with distinction into PI (kierownik) and RF (wykonawca)):	Research on gametic embryogenesis in Lupinus angustifolius L. - induction of haploids and analysis of the genetic basis of this process. MRiRW 2018 - 2020 RF Increasing market competitiveness through the implementation of product, process, technological, and marketing innovations associated with the hatching of 'Niemodlin chicks' in the hatchery in Magnuszowice. MRiRW 2019 RF Variable electromagnetic field as a factor regulating gene expression in plants, exemplified by flax. NCN 2019 - 2022 RF Genotyping of the ExL mapping population of narrow-leaf lupin using SNP markers. NCN - miniatura 4 2020 - 2021 PI Refining the genetic map of narrow-leaf lupin and searching for markers linked to utility traits, with particular emphasis on protein and alkaloid content. MRiRW 2020 - 2025 RF Identification of the molecular mechanism of winter rye resistance to brown rust. MRiRW 2020 - 2025 RF
PhD topic:	Identification of genes associated with obtaining a more extensive root system by plants of the Secale genus
Research discipline in Doctoral School:	Agriculture and Horticulture
Short description of the research problem to be solved in the PhD (minimum 1000 characters):	The focus of this research project is on analyzing drought stress and identifying drought-tolerant or resistant genotypes in Rye, including studies on wild, perennial Rye species. This initiative is geared towards addressing the urgent need for sustainable agricultural practices that minimize environmental impacts, including the consumption of energy and water. It's recognized that a significant portion of the world's food, either directly or through animal feed, comes from three primary plant groups: cereals, legumes, and oilseeds. These groups occupy over 80% of agricultural land due to their ease of transport, storage, and rich nutritional content. However, the cultivation of these predominantly annual plants requires extensive soil preparation each year, leading to significant consumption of fuel, water, and energy, as well as environmental pollution from fertilizers and pesticides. In response, there has been growing interest in recent years in developing new plant varieties that mimic natural perennial ecosystems. Perennial crops show considerably less soil erosion compared to annuals, improve soil fertility, reduce water loss and nitrate leaching, and have a deeper root system and longer vegetative periods beneficial for carbon sequestration. To investigate drought resistance and tolerance in Rye, the project will undertake a series of research tasks focused on analyzing the genetic and physiological responses of Rye to drought conditions. The project will gather a diverse range of Rye genotypes, including both wild and cultivated varieties, from national and international gene banks. The selection process will prioritize genotypes with potential traits for drought resistance or tolerance. The selected genotypes will be subjected to controlled drought conditions in both greenhouse and field experiments. This will involve gradually reducing water availability and monitoring the plants for key indicators of drought stress, such as leaf wilting, chlorophyll fluorescence, and water-use efficiency.The project will conduct detailed phenotypic assessments under drought conditions. This includes measuring physiological traits such as root length and density, stomatal conductance, transpiration rates, and photosynthetic efficiency. These phenotypic data will provide insights into the mechanisms of drought tolerance in Rye. Using techniques like quantitative trait locus (QTL) mapping and genome-wide association studies (GWAS), the project will identify genetic markers linked to drought resistance. The data obtained from genotyping will be correlated with the phenotypic traits observed during drought stress to pinpoint specific genes or gene clusters responsible for drought tolerance. Advanced molecular techniques, including RNAseq and micro RNAseq, will be used to study gene expression patterns under drought stress. This will help in understanding the regulatory mechanisms and pathways activated in Rye in response to water scarcity. Potential drought-resistant genotypes identified from wild species will be used in crossbreeding experiments with cultivated Rye varieties. The aim is to introduce drought-resistant traits into commercially viable Rye cultivars. Offspring from the crossbreeding experiments will be evaluated for their drought resistance. This step is crucial to confirm the inheritance of desired traits and their effectiveness under real-world conditions. Selected genotypes, showing promising drought-resistant traits, will undergo extensive field trials to assess their agronomic performance, including yield and quality under drought conditions. By accomplishing these tasks, the project aims to deepen the understanding of drought resistance in Rye and contribute to the development of more resilient crop varieties suitable for cultivation in environments prone to water scarcity.
Professional skills for PhD candidate (e.g. master program, specializations, softwares, language, analytical techniques, minimum 500 characters):	A suitable PhD candidate profile qualifications and skills: 1.Educational Background: A Master's degree in a relevant field such as Plant Sciences, Genetics, Agronomy, Environmental Sciences, or a closely related field. The candidate should have a strong foundation in plant biology, genetics, and molecular biology. 2.Technical Skills: Proficiency in molecular biology techniques, such as DNA/RNA extraction, PCR. Familiarity with advanced molecular techniques like RNAseq and micro RNAseq is advantageous. 3.Analytical Skills: Strong quantitative skills, including experience in data analysis using statistical software. 4.Field and Laboratory Experience: Experience in conducting both greenhouse and field experiments. Skills in phenotypic assessment of plants, understanding of soil and water management in an agricultural context, and ability to work with diverse plant genotypes. 5.Problem-Solving and Critical Thinking: Ability to approach complex problems analytically and creatively. The project requires innovative thinking to understand and solve issues related to drought stress in plants. 6.Communication Skills: Strong written and oral communication skills are essential for disseminating research findings through scientific publications and presentations. 7.Collaborative Skills: As the project involves collaboration with national and international gene banks, as well as potential interdisciplinary collaboration, good interpersonal skills and the ability to work in a team are important. 8.Motivation and Passion: A strong interest in sustainable agriculture, crop improvement, and addressing global challenges such as climate change and food security. 9.Adaptability and Resilience: The ability to adapt to changing conditions and persist in the face of research challenges is vital, especially in field-based research. 10.Ethical and Safety Awareness: Understanding of ethical considerations in genetic research and adherence to safety protocols in both the laboratory and field.
a) Project title:	none
b) Agreement number:	0
c) Number of months in the project to support PhD student (in months; starting from 1st of October 2024):	0
Project website:	