

The objective of the project is to characterize the genetic basis of resistance to clubroot infection in the developed DH lines by integration of traditional genetic approaches with new, high-throughput next-generation (NG) technologies. This will allow a more effective identification of the genes connected with resistance, including new genes involved in plant pathogen-defense mechanisms. Genetic diversity among the possible clubroot resistant lines will be analyzed using new technologies including modern bioinformatics tools. Candidate resistance genes identified by the integration of the data are expected to give rise to future studies on the host plant physiology and biochemistry under pathogen-infection stress for understanding of essential resistance mechanisms.

The research to be carried out is based on the concept of combining the highly complementary expertise in classical breeding and phytopathology and resistance screening procedures (Prof. I. Bartkowiak-Broda, IHAR-PIB, Oddział Poznań, Prof. M. Korbas, IOR-PIB, Poznań) with expertise in advanced next generation genomic approaches and bioinformatics analysis for high-throughput data (Prof. W. M. Karłowski group at the UAM-Poznań and foreign partners Prof. R. Snowdon, Dr. C. Obermeiers group at Justus Liebig University, Giessen, Germany, JLU-Giessen).

Present reasons for choosing the research topic is the development of the research in the field of the important oil crop - rapeseed resistance to biotic stress. The project will contribute to the progress and development in knowledge on genetic determination of clubroot resistance mechanisms specific for the newly developed rapeseed genotypes. What is equally important, the research project will provide the basis for subsequent research on physiology and biochemistry of resistant host genotypes. In the long term, the expected results will enable further development of effective selection methods in the development of new resistant rapeseed cultivars. The project results will also have an economic and societal impact by effective protection of the economically important oil crop *Brassica napus* against a difficult to control soil-borne pathogen and enable to secure against long-term economic losses and environmentally friendly and sustainable control of the disease. The research project will be crucial for maintaining and further increasing the economic value of winter rapeseed, including Polish cultivars on the oil crops market in the world