**Leaf rust and powdery mildew in polish winter wheat**

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Leaf rust, caused by *Puccinia recondita* f. sp. *triticina*, and powdery mildew, caused by *Blumeria graminis* f. sp. *tritici*, are the two most important diseases of wheat worldwide. Every year, these two diseases cause significant agricultural production losses, the extent depending on the weather conditions. Unfortunately, the varieties of wheat that are grown in Poland are still sensitive to the natural populations of *P. recondita* and *B. graminis*.

Pyramiding resistance genes for leaf rust and powdery mildew combined with the MAS is very effective process to obtain a new cultivars resistant to this diseases. Moreover, in breeding programs there are several examples of the successfully introduction resistance genes into a single cultivar and molecular markers are commonly used in this process.

The strategy of accumulation a new effective resistance genes originating from new sources of resistance into one genotype is the best way to obtain a new cultivar with durable and effective resistance resulting in more stable yields. In the plant breeding are many examples for such process but an introduction Lr41, Lr47, Lr55, Pm21, Pm36, Pm37 resistance genes in wheat is reported first time in presented study.

The second objective is of our study is to clarify the location Lr55 gene in wheat genome and mapping closely linked molecular markers suitable for markers assisted selection (MAS).

The third goal of this research is to determine the effectiveness of resistance genes for powdery mildew and leaf rust in relation of the populations *B. graminis* and *P. triticina* currently occurring in Poland.