



RustWatch will:

- Enable more efficient detection of rust resistance in wheat, and the deployment of rust resistant varieties in Europe.
- Enable testing of elite European wheat varieties and breeding lines in field trials in Europe and the Himalayan region of Pakistan (the global centre of diversity of yellow rust).
- Develop a web-based European early warning system for wheat rusts.
- Provide state-of-the art research with new diagnostic tools enabling rapid and precise identification of new invasive races of rust.
- Investigate the impact of virulence, aggressiveness and adaptation to global warming on pathogen spread and establishment.
- Provide new tools in the testing of host resistance by going beyond the visual observation of disease to categorising resistance at the cellular level.



Three rust species infect wheat and are distributed globally, i.e.,
 Yellow (stripe) rust caused by *Puccinia striiformis* f.sp. *tritici*,
 Leaf (brown) rust caused by *Puccinia triticina* and
 Stem (black) rust caused by *Puccinia graminis* f.sp. *tritici*

These pathogens have a worldwide prevalence and potential for long distance spread. Invasions into new areas pose a serious threat to food security regionally and globally.

- In 2011 a new population of yellow rust (the Warrior races) became established across Europe - probably originating in the Himalayan region.
- By 2016 the pre-existing European population of wheat yellow rust had been replaced by these invasive races.
- In 2016 Europe experienced the most severe epidemics of wheat stem rust for more than 50 years.
- In 2017 unusual and severe epidemics of yellow rust were observed on several continents. In many cases, these epidemics were caused by genetically identical yellow rust races.

When and where the next high-impact wheat rust race incursions are not known. In order to mitigate their impact, we need effective, coordinated surveillance at all levels across cereals and alternate hosts around the world.