Studies of LASER effects for screening of resistant plant type against brown rust in wheat

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Abstract

Wheat (*Triticum aestivum)* is a staple food in Pakistan and is an important crop at global scale as well. It is an important source of basic nutrition for masses of dependents in the country. It is highly nutritious food and a good source of carbohydrates, proteins and dietary fibers. In 2021 nearly 27 million tons of wheat was predicted to produce in Pakistan. In 2020-2021, global wheat production was 622.2 million tons. Since, wheat crop is cultivated on a very large area of the country to fulfill the needs of the people. But still a number of diseases and pests, negatively impact the yield of the crop. Fungal diseases are considered as the main problem in this crop, for instance brown rust alone is responsible for more than 50% yield losses. The brown or leaf rust, results in low production and inferior quality grain. Leaf Rust is a fungal disease caused by *Puccinia triticina* and this pathogen is well adapted. Due to diverse nature of this pathogen and lack of complete resistance in wheat, often directs to think out of the box for creation of variability in the existing germplasm. In the current study, two wheat varieties Arooj and Subhani were treated with LASER treatment. The LASER treatment was further divided into different time intervals. Three different time points, 1.5, 2.5 and 3.5 minutes were used to treat seeds of these two wheat varieties. The treated seeds were sown in 3 kg earthen pots. The other agronomic applications were made as per recommendations. The treated and control plants were subjected to leaf rust scoring as per Cob's scale. The data for other plant parameters like chlorophyll contents, germination rate, disease severity, leaf characters, spike characters and agronomic characters were calculated and subjected to statistical software for analysis and drawing valid inferences. Our findings show remarkable resistance in the treated seed after evaluation.

Keywords: Wheat Production, LASER Technology Effect, Brown Rust, Morpho-physiological traits, Data Analysis