ITEMS FROM PAKISTAN

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Diversity and distribution of rust diseases of wheat (Puccinia spp.) in southern Pakistan.

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Pakistan is an agricultural country. A large portion of the population is directly or indirectly dependent on agriculture. Presently, a burgeoning population is demanding more food, which only can be accomplished when the production of cereal crops in the country is increased. To achieve this, sustainable control of biotic and abiotic constraints is needed. Among the biotic constraints, rust diseases (stem, leaf, and stripe) caused by *Puccinia spp*. are important fungal diseases of the wheat crop attributed to substantial grain losses (Chen 2005; Bux et al. 2012).

Leaf, stem, and yellow rust prevail in all the wheat-growing areas of southern Sindh, spanning from Thatta to Sanghar and the Nawabshah area. Leaf rust is common in all the areas and occurs regularly. Yellow rust is sporadic and prevails when the climatic conditions are favorable for the pathogen. Stem rust is a regularly occurring and most dangerous rust occurring in the southern wheat-growing areas of Sindh. These diseases effect the wheat crop by damaging the respiratory system, killing foliage, stunting growth, and most importantly reducing grain yield by shriveling grain, reducing weight, and effecting quality (Chen 2005). Grain losses of 10–70% caused by these devastating pathogens have been reported. In severe disease epidemics, the grain damage may be up to 100% (Chen 2005).

These destructive fungal pathogens are controlled by fungicides and host-genetic resistance through developing resistant wheat cultivars. The pathogens are dynamic, changing their genetic make-up over time to become more aggressive and devastating. Therefore, for sustainable control, studies on the diversity of the pathogen and identifying genetic resources through molecular technology are needed. To achieve this, developing efficient molecular markers for the genes conferring resistance are indispensible (Bux et al. 2011).

We carried out a survey of wheat rust diseases across Sindh province, southern Pakistan. Occurrence of leaf, stem, and yellow rust is limited to particular areas or overlap each other. In 2012, leaf rust was common and observed across the wheat tract in the Sindh province. We observed a high incidence of the disease in Kunri, Umar kot, Petaro, Jamshoro, Tandom Adam, Mirpur Matrhelo, Kandiaro, and other areas. Stem rust was limited to a few areas. During our survey, we observed a few pustules of stem rust on wheat growing around Matiari and Sanhgar. Yellow rust was completely absent in the southern parts of Sindh province. However, a few diseased leaves were observed in Ghotki wheat-growing regions lying on the border of Sindh–Punjab provinces.

All three rust diseases are damaging the rural economy in Sindh. To control these diseases sustainably, monitoring the pathogen's prevalence is necessary before applying the appropriate control measures. However, sustainable control can be accomplished by increasing the genetic diversity of existing wheat cultivars. Furthermore, agricultural extension services will assist in combating the pathogen by creating awareness among the farmers. Research on modern lines, in parallel with those in developed countries, will help resolve the problem and devise new avenues for sustainable control.

References.

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