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Short Communication

Evaluation of Wheat Germplasm Against Yellow Rust and Powdery Mildew of Wheat at Keylong

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The eroding genetic base of the cultivated wheats has been of much concern in recent years. Wheat being a staple food for 35 per cent of the world population, the International Board for Plant Genetic Resources (IBPGR) has set high priority for the collection, evaluation, documentation and utilization of wheat genetic resources (Crostan and Williams, 1981). Although a reasonably good level of rust resistance in our present day wheat cultivars has been obtained, resistance to powdery mildew is very rare. Sources of resistance to yellow rust (*Puccinia striiformis* West.) and powdery mildew (*Erysiphe graminis* f. sp. *tritici*) of wheat, which are known to reduce wheat yields, have to be identified and utilized to avoid losses.

Keylong (Lahaul-Spiti valley) in Himachal Pradesh is a 'hot spot' for both these diseases and thus is an ideal place for screening wheat germplasm. This paper reports our findings on evaluation of a comprehensive collection of 2211 accessions of wheat germplasm (Table 1) under natural field conditions at Keylong.

Each accession was planted in one metre row at the Punjab Agricultural University, Research Farm, Gumrang (Keylong) in May 1987, where the incidence of yellow rust and powdery mildew was very high and this facilitated screening of the germplasm. The data on the incidence of yellow rust and powdery mildew were recorded at the time of maximum disease development in September 1987 according to the modified Cobb scale and a scoring scale of 0-9 given by Saari and Prescott (1975), respectively. Accessions having 0-ts of rust severity were rated as resistant whereas for powdery mildew accessions which were completely free from the disease were marked as resistant.

A majority of the accessions of *Triticum aestivum*, *T. durum*, triticale, rye and *T. carthlicum* evaluated gave resistant reaction to yellow rust (Table 1). In comparison, the susceptible accessions had a very high rust severity. Resistance to powdery mildew was identified only in a very few accessions of *T. aestivum* and *T. durum* thus showing that these were the most susceptible species. However, triticale, rye and *T. carthlicum* were the most resistant species, Resistance was also found in several other species with only one or two accessions in our collection. Overall, a very high proportion (86.5%) of the accessions evaluated were resistant to yellow rust, whereas only 18.6 percent accessions were resistant to powdery mildew.

TABLE 1. EVALUATION OF WHEAT GERMPLASM FOR RESISTANCE TO YELLOW RUST AND POWDERY MILDEW OF WHEAT AT KEYLONG

Species	No. of accessions evaluated	No. (%) resistant accessions	
		Yellow rust	Powdery mildew
T. aestivum	1366	1132 (82.8)	84 (6.1)
T. durum	495	450 (90.9)	3 (0.66)
Triticale	331	325 (98.1)	321 (98.7)
Secale cereale	4	3 (75.0)	3 (75.0)
Barley	8	3 (37.5)	3 (37.5)
T. monococcum	1	1 (100)	0 (0)
T. carthlicum	3	2 (66.6)	2 (66.6)
T. compactum	1	1 (100)	0 (0)
T. dicoccum	2	2 (100)	0 (0)
Total accessions	2211	1919 (86.5)	416 (18.6)

This study shows that excellent sources of resistance to yellow rust and powdery mildew are present in wheat germplasm which are worth exploiting. According to Kumar (1988), out of 23 samples of yellow rust collected from Lahaul-Spiti district (H. P.) and analysed, 18 sample were found to be of race K (47S 102), 2 of race A (70S4), 2 of race G (4S0) and 1 of race 24 (0S0-1). It is, therefore, presumed that the material evaluated at Keylong possesses resistance to race K which is the most virulent and widely prevalent race in the northern zone. As resistance to race K is very rare in our cultivated wheats, these resistant sources are highly desirable and worth utilizing. The utilization of cultivated cereals, such as rye and barley to improve wheat may be self-defeating because it potentially enhances the overall genetic vulnerability of the three cereal crops (Gill *et al.*, 1983). However, of the 35 genes for resistance to brown rust identified in wheat, two genes i.e. Ir 25 and Ir 26 were transferred from rye (Sharma and Gill, 1983). The most promising new CIMMYT wheat lines "Veery" and "Bob white" also owe their resistance to yellow rust to chromosome 1 of rye involved in 1B/1R translocation. Resistance to both yellow rust and powdery mildew in one host is highly desirable. The best accessions of *T. aestivum*, *T. durum*, triticale, rye and *T. carthlicum* free from both the diseases can be utilized for improving disease resistance in bread wheat. Tomerlin *et al.* (1984) have also shown *T. carthlicum* and *T. monococcum* to be resistant to powdery mildew. However, confirmation of the sources of resistance and cataloguing of genes for resistance should precede any attempt to transfer the resistance into cultivated wheats.

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