GENETIC CONTROL OF LEAF RUST IN BARLEY

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By
Oswaldo Chicaiza

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Twelve genes (Rph1 to Rph12) have been reported to control the resistance to *Puccinia hordei* Otth in barley (*Hordeum vulgare* L.). This study was conducted to (1) develop ‘Bowman’ backcross-derived lines differing in the Rph genes, (2) identify new Rph genes, and (3) map the new Rph genes in barley chromosomes using morphological markers.

Twelve differential cultivars (possessing Rph1 to Rph12), Tunisia 17 (Tu17), and seven *H. vulgare* subsp. *spontaneum* accessions (PI 354937, PI 355447, PI 391024, PI 391059, PI 391089, PI 466245, and PI 466324) were crossed and backcrossed to the susceptible cultivar Bowman. Isolates ND8702 and AUS220 of *P. hordei* were used to evaluate the parents, F1, and F2 progenies during the development of the derived lines. Isolate ND8702 is avirulent to all Rph genes except Rph1, Rph4, Rph10, and Rph11 which were selected for using isolate AUS220. The infection phenotypes to 12 isolates of *P. hordei* were similar for the original source of the Rph genes and the backcross-derived lines.

Two genes were identified in lines from cross to Tu17 based on the reaction to isolates ND8702 and AUS220. The lines homozygous for different Rph genes were designated as Tu17a and Tu17b. Allelism tests indicated that one of the lines carries an Rph gene which is a new allele at the Rph7
locus. The Rph genes in Tu17a and in the derived line from PI 466324 are different from each other and from those isolated from the other six H. vulgare subsp. spontaneum accessions. The Rph gene from PI 355447 was different and not allelic to the 14 previously reported resistance genes. The symbol Rph15 is suggested for the resistance gene from PI 355447. The Rph genes from PI 354937, PI 391024, PI 391069, PI 391089, and PI 466245 are alleles at the Rph15 locus. The Rph15 gene is linked to the vl (p=32.3±2.7%) and rb (p=38.8±2.9%) genes in the long arm of chromosome 2. The gene from PI 466324 was shown to be a new allele at the Rph3 locus.