

## CHARACTERIZATION OF THE ANTHRACNOSE RESISTANCE IN THE ANDEAN BEAN CULTIVAR JALO EEP558

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### **Introduction:**

Many anthracnose resistance loci have been characterized in *Phaseolus vulgaris*. Most of the anthracnose resistance genes identified are of Middle American origin. Only one anthracnose resistance gene, *Co-1*, has been characterized from the Andean gene pool; thus, new Andean sources of resistance are constantly being sought. A multi-allelic series has been reported at the *Co-1* locus (Melotto and Kelly, 2000). The differential cultivars Michigan Dark Red Kidney (MDRK) (*Co-1*), Kaboon (*Co-1*<sup>2</sup>), and Perry Marrow (*Co-1*<sup>3</sup>), Widusa (*Co-1*<sup>5</sup>) (Vidigal et al., 2003) all carry distinct alleles at the *Co-1* locus that confer resistance to a different spectrum of races. Another allele has recently been identified in the Andean line AND277 denoted *Co-1*<sup>4</sup> (Alzate-Marin et al., 2003). In the Andean gene pool of domestication, the choice of resistance specificities is among alleles rather than genes. The best strategy for broad-based control of anthracnose is through the deployment of cultivars in which Andean and Middle American anthracnose resistance genes are pyramided. The limited number of Andean anthracnose resistance genes available limits the possible gene combinations for these resistance pyramids. Other Andean sources of resistance must be investigated to identify new resistance genes or alleles that can be exploited in breeding programs. The objective of this study was to characterize the anthracnose resistance in the Andean cultivar JaloEEP558 (Jalo). Jalo is one of the parents used to construct the bean integrated linkage map (Freyre, 1998) and therefore can be useful in mapping resistance gene loci.

### **Materials and Methods:**

To determine if Jalo carries a resistance allele at the *Co-1* locus, Jalo was crossed with MDRK for an allelism test. Two-hundred progeny from the resulting F<sub>2</sub> population were inoculated with race 73, which produces an RxR reaction in both parents.

To characterize and compare the resistance spectrum of Jalo, a small group of cultivars of Andean origin in the differential series and Jalo were screened with various races of *Colletotrichum lindemuthianum*, causal pathogen of bean anthracnose.

The presence of *Co-1* in Jalo was further validated by the STS marker linked to *Co-1* locus (Vallejo and Kelly, 2002), which mapped to linkage group B1 (Vallejo and Kelly, unpublished data).

### **Results and Discussion:**

No segregation of resistant to susceptible individuals was observed in the F<sub>2</sub> population from the cross between Jalo and MDRK when inoculated with race 73. This indicates that the gene that confers resistance to race 73 in Jalo is not independent of *Co-1* and,

therefore, could be an allele at that locus or another gene very closely linked to that locus. Since Jalo showed allelism to *Co-1*, no further allelism tests were conducted with other anthracnose resistance genes.

The inoculation study, the results of which are displayed in table 1, indicates that the anthracnose resistance gene in Jalo is indistinguishable from the reaction pattern of MDRK. These data suggest that Jalo carries the same allele of *Co-1* as does MDRK and differs from other recognized alleles at the *Co-1* locus including *Co-1*<sup>4</sup> allele in AND 277 (Alzate-Marin et al., 2003).

**Table 1.** Disease reaction of Jalo EEP558 and differential cultivars MDRK (*Co-1*), Perry Marrow (*Co-1*<sup>3</sup>), Kaboon (*Co-1*<sup>2</sup>) and Widusa (*Co-1*<sup>5</sup>) to various races of anthracnose.

Race	Jalo EEP558	MDRK	Perry Marrow	Kaboon	Widusa
2	S	S	R	R	R
7	S	S	S	R	R
38	S	S	S	S	R
47	S	S	S	S	R
73	R	R	R	R	R
80	R	R	R	R	S
88	R	R	R	R	S
128	R	R	R	R	R
357	R	R	S	S	R
1545	R	R	R	R	R

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