

# A Modified Petzoldt and Dickson Scale for White Mold Rating of Common Bean

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## ABSTRACT

A modified scale for the greenhouse straw-test of Petzoldt and Dickson using the cut-stem and cut-branch methods is suggested for scoring the reaction of dry and green bean (*Phaseolus vulgaris* L.) genotypes to white mold [caused by *Sclerotinia sclerotiorum* (Lib.) de Bary]. The modified scale facilitates a better separation between resistant and intermediate and susceptible classes, and will provide a useful tool for dry and green bean germplasm improvement.

## INTRODUCTION

Direct (Petzoldt and Dickson, 1996) or indirect (Kolkman and Kelly, 2000; Miklas et al., 1992) greenhouse tests for detection of physiological resistance to white mold have been developed. Actually one of the most used is the straw test proposed by Petzoldt and Dickson (1996). Moreover, they suggested a rating scale to discard susceptible and allow developing the resistant genotypes. Sometimes this scale can be confusing for discriminating between intermediate, susceptible and resistant genotypes. We propose a modified Petzoldt and Dickson scale that facilitates a better separation between resistant and intermediate and intermediate and susceptible classes (Table 1).

## MATERIALS AND METHODS

More than 2000 bean plants were evaluated in the greenhouse at Kimberly, Idaho between October 2004 and May 2005. The inoculum was grown on PDA plates for 48 hours before the inoculation and only the newest part of the mycelial culture was used. Plastic tips carrying the inoculant with a volume between 50-1000 µL were utilized. The cut-stem and cut-branch methods were used.

Table 1. Mean white mold score for selected common bean using the Petzoldt & Dickson and modified scales in the greenhouse at Kimberly, Idaho in 2005.

Genotype	Petzoldt and Dickson Scale	Modified Scale
A 195	4.8	2.8
B 7354	6.7	6.0
G 122	7.5	5.7
ICA Busni	7.8	6.8
I 9365-25	8.7	5.7
MO 162	6.7	3.8
NY 6020-4	6.2	3.7
WM 32	6.6	4.4
WM 35	6.7	4.0
92 BG7	6.7	3.3
Othello (susceptible)	8.6	7.6
LSD ( $P \leq 0.05$ )	1.2	1.8

## REFERENCES

- Kolkman, J.M., and J.D. Kelly. 2000. An indirect test using oxalate to determine physiological resistance to white mold in common bean. *Crop Sci.* 40:281-285.
- Miklas, P.N., K.F. Grafton, and B.D. Nelson. 1992. Screening for partial physiological resistance to white mold in dry beans using excised stems. *J. Am. Hortic. Sci.* 117:321-327.
- Petzoldt, R., and M.H. Dickson. 1996. Straw test for resistance to white mold in beans. *Annu. Rpt. Bean Improv. Coop.* 39:142-143.

## THE MODIFIED SCALE

The modified scale for the greenhouse straw-test is the following:



1 No sign of stem/branch infection adjacent to agar inoculant when straw/pipette tube is removed for inspection.

## RESISTANT



2 Stem/branch infected but invasion of the first internode <1 inch.



3 Stem/branch invasion of the first internode >1 inch but not reached the first node.

## INTERMEDIATE



4 Stem/branch invasion reached the first node, but no further.



5 Stem/branch invasion passed the second internode <1 inch.



6 Stem/branch invasion of the second internode >1 inch but not reached the second node.

## SUSCEPTIBLE



7 Stem/branch invasion reached the second node, but no further.



8 Stem/branch invasion passed the second node, but invasion of the third internode <1 inch.



9 Stem/branch invasion of the third internode >1 inch leading to plant death.