



## Sclerotinia stem rot in Brazil: management by biocontrol, fungicides and evaluation for resistance of soybean genotypes



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### INTRODUCTION

Sclerotinia stem rot caused by *Sclerotinia sclerotiorum* is the second most important disease on soybean in Brazil after soybean rust. The use of infected seeds, crop irrigation by center pivots, and no-till production have caused increases in Sclerotinia stem rot. Cattle are grazed on soybean residues and deposit manure in soybean fields. This kind of debris contains viable sclerotia (50 %), and this practice has disseminated the pathogen in Minas Gerais and Goiás States. The lack of crop rotation and mechanical dissemination during soil preparation, sowing and harvest complete this scenario. In Brazil disease management includes: biocontrol with *Trichoderma* species applied to seeds and in furrow, direct sowing with *Braquiaria* species, winter desiccation before sowing, and spraying fungicides before and after flowering starts. The use of cultivars with immunity, partial resistance and tolerance may be possible.

### OBJECTIVES

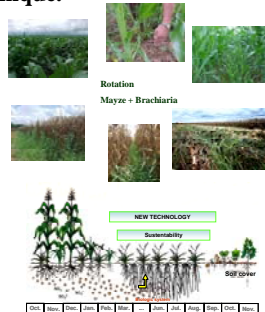
This study evaluated the best phenological stage of soybean cultivars for inoculation of *S. sclerotiorum*, as well as inoculation methods to evaluate partial resistance of soybean to this pathogen.

### MATERIAL AND METHODS

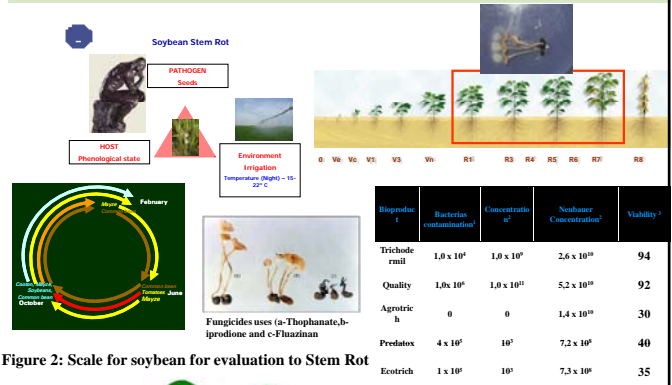
The phenological stages analyzed were V<sub>1</sub>, V<sub>2</sub>, V<sub>3</sub>, V<sub>4</sub> and R<sub>1</sub> of the MG/BR-46 (Conquista) and M-SOY 8200. The inoculation methods consisted of a PDA mycelial disk, which were labeled as “permanent disk”, “24-hour disk” and “touch disk”. The reaction of soybean cultivars to *S. sclerotiorum* was evaluated on 90 cultivars in detached leaf tests using the “permanent disk” technique.

**Table 1: Diseases Progress in Brazil on soybeans**  
Until 1988 Late diseases  
1988-9 Stem Canker  
1991-2 Cist Nematode

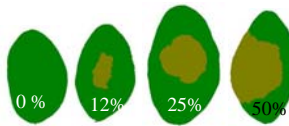
1995 Powdery mildew  
2000 Rhizoctonia Blight  
2001 Fusarium syndrome - SDS  
2002 Rust Resurgence  
2003 Rust epidemics and anthracnose  
2004 Rust epidemics, target spot and Macrophomina  
2005-6, 2007/8 and 2008/9 Rust epidemics, macrophomina and sclerotinia stem rot



**Figure 1: Sclerotinia stem rot management on soybeans in Brazil**



**Figure 2: Scale for soybean for evaluation to Stem Rot**



### RESULTS AND DISCUSSION

The results demonstrated that smaller disease severity was directly proportional to plant age, and the ideal inoculation stage as V<sub>2</sub> (leaves and stems) and V<sub>3</sub> (leaves). The permanent disk gave the best results for the inoculation of *S. sclerotiorum* on soybean cultivars, for both detached organs and whole plants. Nineteen genotypes performed as resistant and moderately resistant in the detached leaf test; however, only two of them were moderately resistant when whole plants were inoculated.

**Table 2: Cultivars reaction to S. sclerotiorum**

Cultivar	Flower color	Severity (%)	<i>S. Sclerotiorum</i> reaction
Emopara 316	purple	20,0 a	MIR
BRS Milena	purple	25,0 a	MIR
Emopara 314	purple	27,0 a	MS
FMT Pradia	purple	32,7 b	MS
FMT Tufurama	white	35,0 b	MS
M-SOY 8360	purple	36,7 b	MS
BR 16	white	37,7 b	MS
BRSMG 790A	purple	41,7 c	MS
P9BR11	purple	45,0 c	MS
M-SOY 8382	purple	48,3 c	MS
M-SOY 2002	purple	55,0 d	S
BRSMG 68 (Vencodory)	purple	60,0 d	S
BRSGO Princess	purple	80,0 e	S
CD 211	white	80,7 e	S
CD 209	white	87,0 e	S
BRSGO Calopônia	purple	87,7 e	S
M-SOY 8008	white	88,3 e	S
BRS 185	purple	90,0 e	S
Emopara 315	white	94,3 e	S
BRS Bahia RR	white	95,0 e	S

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