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Colletotrichum Sublineola Can Spread Infection to Johnson Grass Rhizome Tissue

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ABSTRACT

Nine Johnson grass accessions' excised leaf blades and rhizomes, as well as the leaf blades of two sorghum accessions, BTx623 and SC748-5, were injected with four strains of Colletotrichum sublineola. Seven Johnson grass accession-CS sublineola isolate combinations showed successful acervuli forms. This is the first study to prove Johnson grass rhizomes can be colonized by C. sublineola, notwithstanding the rarity of infection leading to pathogen proliferation.

Keywords: Johnson grass, Plant, Rhizomes and Leaves

INTRODUCTION

Sorghum halepense, a wild relative of sorghum, is regarded as a particularly dangerous underground weed. Johnson grass grows a thick underground rhizome network that can make up as much as 70% of its dry weight. Due to clonal and self-pollinating reproduction mechanisms, faster growth, and the development of climate change, the Johnson grass habitat is continuously expanding. Johnson grass can readily cause severe economic losses since it spreads by both rhizomes and seeds. For instance, estimates of annual losses from Johnson grass in Arkansas, Louisiana, and Mississippi from the early 1990s were in the tens of millions of dollars. When compared to the corn yield with no weeds present, the corn silage yield with Johnson grass from rhizomes or from seed all season long interference was 83 and 62% lower, respectively. Johnson grass rhizomes were shown to survive the winter in a research at depths of at least 20 cm and to only die at temperatures as low as about 9 °C. Johnson grass is thought to act as a reservoir for important crop diseases like those that affect corn and sorghum, in addition to its exponential growth and dissemination.

A significant disease of farmed sorghum is *Colletotrichum sublineola* Henn. Ex Sacc & Trotter 1913, and S. halepense isolates of *C. sublineola* have been demonstrated to infect sorghum accessions. Furthermore, inoculation of *S. halepense* at late growth stages in a recent study under perfect circumstances in a greenhouse resulted in infection by *C. sublineola* strains derived from grain sorghum. All aerial plant components can suffer harm from *sublineola*, however it is unknown if S. bicolor isolates of *C. sublineola* can infect *S. halepense* rhizomes. The ability of S. bicolor isolates of *C. sublineola* to infect S. halepense rhizome tissue is predicted. Four isolates of *C. sublineola* were used in an excised leaf assay to inoculate leaf blades and rhizomes in order to evaluate the hypothesis.

MATERIALS AND METHODS

In total, two sorghum accessions, Btx623 and Sc748-5 and nine Johnson grass accessions were tested. Although none of these sorghum cultivars is part of the host differential set, BTx623 and SC748-5 have both been used as checks in earlier research as susceptible and resistant, respectively. Jacob Barney provided the Johnson grass accessions in the form of rhizomes.

RESULTS AND DISCUSSION

The majority of the four *C. sublineola* isolates were resistant to the inoculated Johnson grass leaves. Nearly all analyzed samples at infected areas exhibited a robust hypersensitive response in the form of rhizome fragments, and fungal germ tube forms were visible.

CONFLICT OF INTEREST

The authors affirm that they have no known financial or interpersonal conflicts that would have appeared to have an impact on the research presented in this study.