PLANT VOLATILE ORGANIC COMPOUNDS ASSOCIATED WITH FUNGAL ENDOPHYTE SEED TREATMENT OF COTTON

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Abstract

Fungal endophytes are asymptomatic endosymbionts of plants that can confer benefits to the host plant such as drought tolerance and herbivore resistance. We isolated naturally occurring fungal endophytes from field-grown cotton, cultured them in lab, and used their prepared biomass in seed treatments. The reproductive structures (squares and bolls) of control cotton plants were significantly more preferable to sucking-pests compared to endophyte-treated cotton in a previous experiment. Specifically, the sucking-pests exhibited a significantly longer latency to first contact with endophyte-treated plant structures compared to controls in no-choice tests, and preferred control plant structures in choice tests. These data indicate that volatile compounds are likely a factor influencing sucking-pest feeding behavior on squares or bolls of fungal endophyte-treated cotton. Our goal with this work is to describe the differences in volatile profiles for endophyte-treated plants compared to controls. We performed a qualitative analysis of volatiles emitted from field-grown control and endophyte-treated cotton squares using solid-phase micro-extraction (SPME) fibers to sample static headspace. Qualitatively, the volatiles released by endophyte-treated plants were comparable to those emitted by control plants. Based on these results, the differences in feeding behavior previously observed are likely quantitative involving the relative abundances of the volatiles being released. We have begun to collect quantitative data on foliar tissues for both the constitutive and herbivore induced volatile profiles but analyses are not yet complete. Our preliminary analyses indicate that we will be able to detect short-term quantitative differences relevant to caterpillar herbivory using SPME and relatively long-term differences relevant to sucking-pest herbivory using dynamic headspace sampling techniques.