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Plant Pathology Research Report **PPRR-10**

First Report of *Hirsutella thompsonii* as an Entomopathogenic Fungus of Hemp Russet Mite (*Aculops cannabicola*) in Kentucky

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Introduction

Hemp russet mite (HRM, *Aculops cannabicola*) is one of the most damaging pests of indoor/greenhouse grown hemp (*Cannabis sativa*). More information about hemp russet mite can be found in *Hemp Russet Mite, a Key Pest of Hemp in Kentucky* (EntFact-162). Limited tools for management of this pest are available. HRM is characterized as a yellow to pale white, 0.1 to 0.2 mm, worm-like organism.

In 2021, HRM was identified in University of Kentucky hemp field trials at three research farms across the state. Beginning in September, large numbers of darkened, dead HRM were observed on plant samples (Figure 1) from all locations. Samples of dead HRM were processed at the laboratory, and after 5 days, gray fungal masses developed around each HRM, with additional fungal structures developing over the next 2 weeks (Figure 2). Fungal characteristics were found to be similar to the fungus *Hirsutella thompsonii*. DNA sequencing was used to identify the fungus as *Hirsutella thomposnii*, with a 100% match to previously known genetic sequences of this species.

Research Study & Observations

To confirm whether *H. thompsonii* was able to infect healthy HRM and cause the same symptoms observed initially at the field, we performed laboratory tests on detached leaves from plants infested with healthy HRM. Treatments included were (i) leaves with Hirsutella thompsonii; (ii) unaltered leaves, and (iii) leaves with without the fungus. After eight days, only HRM from the *H. thompsonii* inoculated treatments developed fungal growth, whereas HRM from the non-treated controls evaluated did not. Evaluation of the resulting fungal growth was identical to the *H. thompsonii* characteristics previously identified.

Figure 1. Yellow (blue arrows) and black/brown (red arrows) colored hemp russet mite (HRM) observed on a hemp leaf under 50X magnification.

Figure 2. *Hirsutella thompsonii* fungal growth characterized by gray mycelia (fungal body) and cream/pink reproductive structure.

After 14 days, 50 HRM per leaf were evaluated for variations in color. Black/brown colored HRM represented 28% of the total sample for fungal inoculated treatment. These observations were consistent with initial field findings and other studies that reported changes in color when mites were infected with *H. thompsonii*.

Conclusions

This study confirmed the pathogenicity of *H. thompsonii* on HRM. Considering the limited options to control HRM on hemp and it damage in greenhouse production systems, further research is warranted to improve the understanding of the potential use and efficacy of *H. thompsonii* as a sustainable management tool.

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Complete research study can be found at

Ricciardi, M. M., Smith, H., Viloria, Z., Dixon, E., Szarka, D., Pearce, R., Gauthier, N., Villanueva, R. T. 2024. First report of Hirsutella thompsonii as an entomopathogenic fungus of hemp russet mite (Aculops cannabicola) in Kentucky. Plant Health Progress https://apsjournals.apsnet.org/doi/abs/10.1094/PHP-04-23-0035-BR.