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| Please use this form to clearly and concisely report on project progress. The information included should reflect quantifiable results that can be used to evaluate and measure project success. Comments should be limited to the designated boxes. Technical reports, no longer than 4 pages, may be attached to this summary report. |
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| Project Title:  | Spray Application of Double Stranded RNA for Simultaneous Management of Multiple Soybean Fungal and Insect Diseases |
| Organization:  | Louisiana State University Agricultural Center |
| Principal Investigator Name: | Zhi-Yuan Chen |
| Report Period: | March 16, 2025 to June 15, 2025 |
| Project Status: Continue (or roll over) |
| The objectives of this proposed study in the third year are to: 1) Continue the effort to fine-tune the conditions to increase the efficacy of dsRNA in disease suppression; 2) Examine the potential of mixing different dsRNA to enhance their effectiveness in reducing disease symptoms under greenhouse conditions; and 3) Perform small scale field studies to determine the effectiveness of these dsRNAs in simultaneous management of Cercospora leaf blight, frogeye leaf spot and purple seed stains through foliar applications.Previously, we reported our findings on the effectiveness of applying mixed dsRNAs on reducing soybean fungal diseases and on our small scale field studies with different dsRNAs and adjuvants in reducing soybean frogeye leaf spot disease. For this quarter, we have conducted several studies to increase the dsRNA efficacy. One of the studies was to understand how dsRNA suppresses fungal disease development on soybean by examining the dsRNA treatment on fungal spore germination and hyphal growth under *in vitro* conditions. Most of the dsRNAs we examined significantly reduced fungal growth and one of the dsRNA also has an additional effect on suppressing fungal spore germination. The other study we conducted was to assess the effect of different nanoparticles in protecting the dsRNA. We examined the effect of three different dsRNAs with or without being coated with one of the three different nanoparticles in protecting soybean plants from fungal diseases in the greenhouse conditions. Based on our real time PCR quantification of fungal growth in inoculated soybean leaves, all three dsRNAs provided significant protection against fungal infection in comparison to the untreated control or soybean plants treated with dsRNA against green fluorescent protein (GFP) (another control). Currently, this study is being repeated under field conditions. For performing small scale field study to determine the effectiveness of dsRNA in managing soybean cercospora diseases, the first batch of soybean (Syngenta NK43-Y9XFS) was planted on May 19, 2025 and second batch was planted on June 2, 2025. The third batch will be planted next week. These soybean plants will be treated with dsRNA with different adjuvants before and after Cercospora diseases start to show up in the field.  |