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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. |
| Project Number:  |  |
| Project Title:  | Spray Application of Double Stranded RNA for Simultaneous Management of Multiple Soybean Fungal and Insect Diseases |
| Organization:  | Louisiana State University Agricultural Center |
| Project Lead Name: | Zhi-Yuan Chen |
| Report Date: | June 10, 2022 |
| **National Soybean Checkoff Research Database** [**https://www.soybeanresearchdata.com/**](https://www.soybeanresearchdata.com/) **(public website funded by USB). Please include a non-technical project status along with your project status. The non-technical project status will be published to the website. If a non-technical project status is not provided, the contents of this entire report will be published.** |
| Project Status: |
| The objectives of this proposed study in the first year are to: 1) produce dsRNAs in *E. coli* of 4 different genes from Cercospora species that are important for their infection, growth or toxin production; 2) develop an effective method to deliver the dsRNAs into soybean leaves; and 3) perform various greenhouse and field studies (in Louisiana first, and other states later) to determine the effectiveness of these dsRNAs in simultaneous management of cercospora leaf blight (CLB) and purple seed stains (PSS), which are caused by *C.* cf. *flagellaris* or *C. kikuchii*, and frogeye leaf spot (FLS), which is caused by *C. sojina*, through spray applications.Several progresses have been made so far: 1. DsRNA production in *E. coli* cells. We have produced dsRNAs from the Avr4 construct and CTB8 construct. The vectors for producing the other two dsRNAs (CytB and Cyp51) are being constructed and we are expecting to produce dsRNAs from those constructs in the next quarter. 2. The effect of topically applied Avr4 and CTB8 dsRNAs on reducing soybean frogeye leaf spot (FLS) disease is being evaluated in the greenhouse. 3. Commercial soybeans (Syngenta S42-B9XS) have been planted (first planting was on May 4, second on May 25, and the last planting was on June 8). Some of these plants will be treated with dsRNAs to evaluate the effectiveness of these dsRNAs in reducing CLB and FLS under natural infection conditions when the plants reach V4-5 stages. For further details, please see the attached technical report. |
| **Non-technical project status:** |
| The objectives of this study in the first year were to produce double stranded RNA (dsRNA) molecules in a bacterial expression system, use the purified dsRNAs to spray on soybean plants under greenhouse and field conditions to see whether they can reduce soybean cercospora leaf blight (CLB), purple seed stains (PPS) and frogeye leaf spot (FLS) diseases. We have produced dsRNAs targeting two of the genes from Cercospora species, and the vectors for producing dsRNAs to target two additional Cercospora genes are being constructed. Soybean plants grown in greenhouse have been recently treated with two of the dsRNAs and their effects on reducing FLS will be evaluated shortly. Additionally, soybean seeds have been recently planted in the field in three separated times, they will be used to evaluate all four dsRNAs for their ability in reducing soybean CLB, PSS and FLS under field conditions with natural infection.  |