|  |  |
| --- | --- |
| 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 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 Period: | June 16, 2022 to Sep 15, 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 in the second quarter 2: 1. We completed the cloning and production of dsRNA for two additional genes from *Cercosopora* cf. *flagellaris* with 4 dsRNAs available for this study. 2. We have preliminarily evaluated the effects of topically applied CYP5, CTB1, CTB8 and AVR4 dsRNAs on reducing soybean frogeye leaf spot (FLS) disease. There is a clear disease suppression in the leaves treated with dsRNAs comparing to control leaves treated with DEPC water or empty vector (EV), indicating the effectiveness of the dsRNAs in reducing disease symptoms. We are in the process of repeating this study. 3. Commercial soybeans (Syngenta S42-B9XS) have been planted three times. The soybean plants from the 2nd and 3rd plantings have been used for small scale dsRNA study starting in mid-August. However, due to frequent rains in the field, no clear difference between treated and control soybean plants has been observed so far. We plan to repeat this field study in year 2. 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 cloned and produced dsRNAs targeting four the genes from Cercospora species. Soybean plants grown in greenhouse have been recently treated with all four of the dsRNAs and showed clear effect in reducing FLS. Additionally, field grown soybean plants have been used in a small scale study to evaluate the effect of dsRNA in reducing soybean CLB, PSS and FLS under field conditions with natural infection. | |