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| Project Title | SPRAY APPLICATION OF DOUBLE STRANDED RNA FOR SIMULTANEOUS MANAGEMENT OF MULTIPLE SOYBEAN FUNGAL AND INSECT DISEASES |
| PI’s Name | Zhi-Yuan Chen | E-mail | zchen@agcenter.lsu.edu |
| PI’s Title | Professor | Institution: | Louisiana State University AgCenter |
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| Additional PIsFor this project | None |
| Research Locations (and states involved) | Baton Rouge, Louisiana |
| **Timeline:** **Current Year - FY23** | **Multi-Year Project Information** (if applicable) |
| Year 1 | Year 2 | Year 3 |
| Start Date | 04/01/2023 |  |  |  |
| End Date | 03/30/2024 |  |  |  |
| Funds Requested | $48,483 | $20,000 | $48,483 | $ 45,500 |
| **Program Area (e.g., breeding, mngt.): disease management** |
| Objectives | 1) Fine-tune the conditions to effectively deliver dsRNA into soybean plants; 2) Examine the potential of nano-particles in enhancing dsRNA stability on leaf surface; and 3) Determine the effectiveness of these dsRNAs in simultaneous management of CLB, FLS, and PSS through spray applications in greenhouse/field conditions. |
| Justification | Double stranded RNAs (dsRNA) have been shown to travel between host and pathogen/pests and can suppress the expression of its target genes by binding and initiating a sequence specific degradation, and thus achieve the disease control. |
| Exp Setup | 1) Determine the effectiveness of different methods for delivering dsRNA to plants; 2) Examine the potential of lignin nano-particles in enhancing dsRNA stability on leaf surface. 3) Identify the most potent dsRNAs in reducing soybean fungal diseases. |
| Summary  | This is a very novel research with great potential that has not been attempted by any other lab in US to manage soybean fungal and possibly insect and nematode diseases. |
| Key Metrics | Demonstration of successful delivery of dsRNA using PDS gene, reduced CLB/FLS/PSS disease development, extended protection by dsRNA using nanoparticles. |
| Expected Deliverables | 1) Optimized method for delivering dsRNA; 2) Identification of key fungal genes to suppress to manage CLB/FLS/PSS; 3) New funding support from USB/USDA/NSF. |
| Benefit to midsouth farmers | Reduced yield losses due to fungal pathogens/pests, reduced use of fungicides/pesticides, operation cost, environmental pollution, and enhanced sustainability. |
| Progress Made | We have produced the Avr4, CTB8, Cyp51, and CytB dsRNAs in small scale and are performing initial testing with PDS gene in growth chamber conditions. |
| Signature of Principle Investigator | Date: |
|  | 08/03/2022 |

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