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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 | |
| Mailing Address | | Dept of Plant Pathology and Crop Physiology, 302 Life Sciences Building, LSU | | | | | |
| City/State/Zip | | Baton Rouge, LA 70803 | | | | | |
| Phone number | | 225-578-7850 (office) | | | | | |
| Additional PIs  For 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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