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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: | 2022-47 |
| Project Title:  | Exploitation of weed species extracts as an effective and environmental friendly strategy to control insects and deer in soybean |
| Organization:  | Mississippi State University |
| Project Lead Name: | Te Ming (Paul) Tseng |
| Report Period: | September 16, 2024 |
| Progress Summary (in non-proprietary lay language suitable to be shared publicly): |
| This proposal tackles major crop losses due to deer, valued at $4.5 billion. The study aims to enhance soybean crop protection by innovatively developing nanoparticle-coated repellents derived from a weed species, and evaluating their rainfastness. By optimizing adhesion and durability, this research offers a multifaceted solution that can bolster agricultural productivity, reduce economic losses, and promote sustainable crop protection practices. |
| **Detailed Progress Status**: |
| The objectives proposed were (1) Develop Nanoparticle-Coated Repellents: Create repellent formulations coated with nanoparticles to enhance adhesion to leaf surfaces, ensuring sustained protection against herbivores and minimizing wash-off and degradation; and, (2) Assess Rainfastness of Repellent: Investigate the rainfastness of the developed repellent to determine its duration of effectiveness in deterring herbivore browsing and feeding under simulated rain conditions.**Objective 1: Develop Nanoparticle-Coated Repellents: Create repellent formulations coated with nanoparticles to enhance adhesion to leaf surfaces, ensuring sustained protection against herbivores and minimizing wash-off and degradation:** We have initiated the process of preparing nanoparticle formulations, testing various types, including liposomes and PLGA-based particles, to assess their potential for enhancing adhesion to soybean leaves. In collaboration with Dr. Nicholas Fitzkee’s team, we have begun synthesizing these nanoparticles in-house. This effort will help us determine the most effective formulation for encapsulating plant extracts, ensuring that the repellent can be applied efficiently to soybean leaves and provide sustained protection against herbivores under field conditions. |