

Comparative analysis of cover crop and perennial groundcover establishment – RHb, Cereal Rye, and Field Management Interactions

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Abstract	Methods	Classroom Applications
• I worked to understand how seeds from two cover crops – cereal rye, and RHb (Radix Hybrid bulbosa) -- germinated • I prepared the seeds by gathering suitable materials • I observed how seeds grew over time with the proper measurements and the right temperatures. • Germination tests require a high level of consistency, patience, and precision to yield reliable results. It is important to understand that not every germination test will turn out perfectly each time, as various factors can influence the outcome. • My research is important because it addresses the main objectives of the Iowa State Nutrient Reduction Strategy. I focused on developing strategies to reduce nutrient runoff, mitigate soil erosion, and build effective farm barriers, all while maintaining cash crop yields.	• Petri dishes, spray bottle (distilled water), paper towels, tape, marker and seeds • For my germination tests and experiments, I was able to gather the proper materials and properly count my portion of seeds. I systematically counted the seeds placed in the damp towel to ensure accurate data collection. Following that, I added a damp towel to maintain the appropriate moisture level for the seeds. To keep track of the experiment, I labeled each towel with the type of seeds and the date of the test. • The data collection process utilized effective tools and techniques such as note-taking, observations, and analysis. • I verified the note-taking methods by seeking confirmation about the data. • My sample size was ten seeds, and it was determined through dividing the seeds evenly into four petri dishes.	• I can apply these research methods to my classroom by having my students do a rolled towel test and using multiplication skills to calculate the germination rate. • The specific strategies that could be derived for educational purposes include leg root nodule dissection, root observation columns, and runoff/erosion. • The research focuses on enhancing STEM education through the study of plant immunity, soil ecology, and erosion control, providing a practical and innovative approach. • My research enhances students' understanding of the environment by connecting agronomy principles with environmental mandates.
Background		Future Collaborations
• Iowa State confidently champions the use of perennial groundcovers (PGC), including Radix hybrid bulbosa (Rhb) and cereal rye cover crops, alongside robust soil and field management practices. These strategies are essential for enhancing water quality and effectively controlling erosion. • Key agronomic and ecological theories encompass concepts like allelopathy and the green bridge effect, nitrogen immobilization dynamics, and the modification of microclimates, all tied to budget economics. As cereal rye decomposes over time, it releases benzoxazinoids, which can interact with the compounds found in its root systems. This creates a "green bridge" that can harbor soil-borne pathogens, contributing to an increased incidence of seedling diseases in corn crops.		• This summer taught me a lot about research in that you have to be precise, understand that timing matters, and systems need care. • To be specific, it is Philip Rockson, Cassandra Matthews, Dr. Raj Raman and Molly Lenius who are valuable for future connections. • The insights I will gain from being on a research team can be applied in a classroom setting by verifying information, analyzing data, and being resourceful. • I am committed to nurturing my professional connections by actively engaging on LinkedIn, conducting quarterly check-ins, and participating in meaningful online interactions.
Objectives	Results & Conclusion	Acknowledgements
• The primary aims of my research is to establish liver cover systems with nutrient reduction bypassing harm cash crop yields. • How do perennial groundcovers and annual cereal rye differ in resource competition with cash crops? How do drought and shade tolerance differ between single-season rye and multi-year perennial systems • My objective focuses on three main objectives: erosion reduction, compaction alleviation, and microbial stimulation. • Yes, my objectives are clear and measurable because they focus on biomass accumulation, weed suppression, and soil retention.	• The main findings of my research indicate that cereal rye develops so rapidly that it requires chemical termination, as does the perennial groundcover RHB uses for summer dormancy. • These results answer my research questions it confirms my summer-long research project by addressing cereal rye, perennial systems, and interactions with cash crops. • I found that not all germination tests with the required seeds were successful due to a lack of follow-ups and insufficient moisture in the paper towels. • I faced trial and error in my research because my original experiment couldn't take place due to time constraints and limited resources.	• For my research, Dr. Raj Raman helped me put together the research. • Iowa State University and RegenPGC were significant contributors to this poster.