

A PROPOSAL TO
NORTH CAROLINA SMALL GRAIN GROWERS ASSOCIATION, INC.

FOR RESEARCH OR EDUCATION ENTITLED

The Effects of Using Cereal Rye (*Secale cereale*) as a Cover Crop for Control of Italian ryegrass (*Lolium multiflorum*) in Fallow Land in the Southern Piedmont of North Carolina

COVERING THE PERIOD FROM **October 1, 2023 TO September 30, 2024**

REQUESTING SUPPORT IN THE AMOUNT OF **\$1,620**

SUBMITTED BY:

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Note: This is a fundamental research or scholarly project and, as such, the University shall be free to publish or disseminate the results of this research or otherwise treat such results as in the public domain, and it will conduct the research in an open forum consistent with the University's mission of research, instruction and public service.

OBJECTIVES:

1. Explore the effectiveness of using cereal rye as a management tool for controlling Italian ryegrass.
2. Determine ideal planting dates and seeding rates for cereal rye as a weed management tool in the southern piedmont region.
3. Determine fertilization rates for production of cereal rye for forage.
4. Conduct bareground demonstration plots with pre-emergent herbicides to determine Spring biotype Italian ryegrass emergence.

Significance of Research:

1. Explore the effectiveness of using cereal rye as a management tool for controlling Italian ryegrass.

Herbicide-resistant Italian ryegrass has long infested North Carolina. In particular, the southern piedmont has widespread ALS-resistance (Osprey and PowerFlex) and spotty ACCase-(Hoelon and Axial XL) and glyphosate-resistance. And there is now confirmed paraquat-resistant ryegrass in the region. While pyroxasulfone (Zidua/Anthem Flex) provides residual control of the weed, it, and other related herbicides do not control emerged ryegrass. It is only a matter of time before our few pre-emergent modes of action are lost to resistance. Preserving these tools for small grain production is essential to maintain efficacy of the herbicidal mode of action.



May 10, 2023

Paraquat-resistant Italian ryegrass poses a serious threat to all crops in North Carolina. Although small grain production will most likely be hit the hardest the inability to control Italian ryegrass burndown poses a serious threat to timely planting of corn, cotton, and full-season soybean. Waiting for Italian ryegrass to naturally decline will push planting of these crops into June and greatly reduce yield potential.



A field of winter wheat infested with Italian ryegrass.
Photo taken February 22, 2023.

2. Determine ideal planting dates and seeding rates for cereal rye as a weed management tool in the southern piedmont region.

While there is current research on cereal rye as a forage crop, there is a need to determine the ideal planting dates and seeding rates for cereal rye in the specific application of controlling Italian ryegrass in fallow land in the southern piedmont of North Carolina.

3. Determine fertilization rates for production of cereal rye for forage.

Federal programs such as NRCS will not cover the total costs incurred when using a cover crop. Some producers may be interested in offsetting this cost by utilizing cereal rye as a forage crop. There is a need to determine the economic viability of forage production in this system by exploring different fertility rates to increase tonnage and overall forage quality.

4. Conduct bareground demonstration plots with pre-emergent herbicides to determine spring biotype Italian ryegrass emergence.

A confirmed Fall and Spring biotype has been identified and there is a shared understanding of when Fall Italian ryegrass typically emerges. However, Spring emergence dates have not been determined. Utilizing pre-emergents will minimize the contamination of the Fall and Spring biotypes and allow for the identification of only Spring emerged Italian ryegrass.

Prior and Current Research:

1. Explore the effectiveness of using cereal rye as a management tool for controlling Italian ryegrass.

Recent work from the NC State Weed Science programs have identified up to 98% reduced seed germination in field plots of drilled cereal rye at 100 lbs/A.

2. Determine ideal planting dates and seeding rates for cereal rye as a weed management tool in the southern piedmont region.

NC State Extension has publications with seeding rate and planting dates for cereal rye as a forage crop. There is no current recommendation for seeding rates for cereal rye when used to control Italian ryegrass, which may have success at a lower seeding rate, impacting a producers bottom line. Additionally, cereal rye in this application will be following various crops which will necessitate different planting dates from the ideal planting window for forage.

3. Determine fertilization rates for production of cereal rye for forage.

The current recommendation for fertilization of cereal rye as a forage crop is 50 lb of N per acre. However, since producers are looking to offset establishment costs, different rates need to be explored to establish economic viability of utilizing the cereal rye as an additional revenue source.

4. Conduct bareground demonstration plots with pre-emergent herbicides to determine spring biotype Italian ryegrass emergence.

To the researcher's knowledge, no work has been done to identify when Spring Italian ryegrass emergence in the Southern Piedmont occurs.

Plan of Work:

1. Determine ideal planting dates and seeding rates for cereal rye as a weed management tool in the southern piedmont region.

The proposed study will be conducted at four field sites in the Southern Piedmont. Treatments will include four different planting dates that range from late September to late November. Five seeding rates will be installed at each planting date using a replicated-strip trial design. Data collection will include Italian ryegrass control, density, seed production and cover crop biomass.

2. Determine fertilization rates for production of cereal rye for forage.

The proposed study will be conducted in one field site as a randomized complete block design. The study will have two seeding rates, and three nitrogen rates to discover the impact to tonnage and profitability. Data collection will include biomass, and forage quality at three harvest dates.

3. Conduct bareground demonstration plots with pre-emergent herbicides to determine Spring biotype Italian ryegrass emergence.

A separate experiment will be established to evaluate the timing of Spring biotype Italian ryegrass in an non-replicated strip trial design. Treatments for the experiment will include Group 3, 14, 14+15, and 15 herbicides (Prowl H20, Valor EZ, Anthem FLEX, Fierce EZ, and Zidua). Data collection will include control for Fall biotype, and germination timing and density of Spring biotype.

FUNDS REQUESTED:

2023-24	\$1,620
2024-25	\$4,120
2025-26	\$4,120