

## **AGENDA**

### **TAC Cover Crop & Nutrient Management Subcommittee – 2<sup>nd</sup> Meeting**

**October 16, 2026**

**Lower-Level Large Meeting Room, Virginia Farm Bureau**

**12580 West Creek Parkway, VA 23238 – (804) 290-1000**

**10:00 a.m.** – Welcome, introductions, declaration of a quorum, assign note taker, review agenda, and discuss the prioritization

#### **1. Review of TAC Ground Rules and General Decorum**

- ADVANCE – To officially adopt a recommendation to the TAC as it was submitted and send it to the SWCB.
- AMEND – To officially adopt language based upon, yet not identical to, a recommendation to the TAC, and send it to the SWCB.
- TABLE – To officially suspend consideration of a recommendation to the TAC. Note: Tabled items will not be brought back to the TAC for at least three years.
- DEFER – To officially postpone consideration of a recommendation to the TAC. Deferred items will be reconsidered in a future TAC year.

#### **2. Old Business**

- Matrix item 5C – review of draft specification.
- Matrix item 10C - review draft language for the CCI-SL-1.
- Matrix item 12C – review proposed supporting documentation.

#### **3. New Business**

- Review Matrix and prepare plans to address items.
- Discussion and possible action on Matrix Item 6C – presentation by Virginia Tech of recent findings.
- Discussion and possible action on Matrix Items 14C through 18C, as prioritization and time allow.

**4. Public Comment** (NOTE: Per TAC Ground Rules and Procedures, anyone attending the meeting who is NOT a member of the subcommittee or an invited guest is considered a member of the public and must reserve their comments until the public comment period)

#### **5. Review of the Day's Discussion/Outcomes/Actions**

- Finalize notes of discussion and actions for meeting minutes.
- Final check of matrix items.

**6. Adjourn: No Later Than 3:00 p.m.**

**MATRIX OF ADVANCED COVER CROP NUTRIENT MANAGEMENT RECOMMENDATIONS FOR CALENDAR YEAR 2026 (CY26) TAC**

| Item # | Ag. BMP | Suggestion to the TAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | TAC Recommendations | DCR Supports | FY2028/2029 |
|--------|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-------------|
|        |         | <b>Complete review of practices for use and effectiveness, per TAC rules (list of practices provided).</b>                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |              |             |
| 1C     |         | Offer an incentive to non-chemical kill downs such as crimping in our cover crop programs. Better for the soil, water, crops, etc. The equipment cost is another investment for the producer, and the incentive might defray that cost for more utilization of this method.                                                                                                                                                                                                                                                                   |                     |              |             |
| 2C     |         | A Summer soil building cover crop practice to include planting summer annuals in Spring or early Summer, letting them grow all Summer, and leaving all the residue on the field. This would give producers an option for rejuvenating fields over the summer. When crop prices are thin some producers will not plant certain fields or less productive farms altogether. In these circumstances the producer could take advantage of the open summer season and plant a soil building cover crop to improve the soil for the following year. |                     |              |             |
| 3C     |         | Incentivize legumes commensurate with their expense, at an inadequate minimum. I recommend that the cost-share cover more than the expense, acting as an incentive to move conventional farmers toward more productive practices. Note that we are a water quality program, yes? As discussed, healthy soil is healthy water. And a diversity of the right mix of roots = healthy soil.                                                                                                                                                       |                     |              |             |
| 4C     |         | Cost-share long-lasting soil-remediation amendments like PFAS-free biochar (see supporting documentation)                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |              |             |
| 5C     |         | Consider a practice for planting native/pollinator plants on agricultural land consistent with NRCS Practice Code and Standard 327. These plantings may be done on cropland being converted perennial native plants that would address soil, water, and wildlife habitat degradation resource concerns to meet landowner objectives.<br><i>Deferred in CY25 pending creation of a draft specification</i>                                                                                                                                     |                     |              |             |
| 6C     |         | The current Agricultural Best Management Practices (BMP) includes several important practices for the use of cover crops. The types of cover crop plants are largely based on grains, some legumes, and some brassicas. There is room for improvement. The Sustainable Agriculture Research and Education (SARE) organization also recommends the use of cover crops, but their recommended list of plants is more extensive than the current Ag BMPs. The enclosed table shows the                                                           |                     |              |             |

**MATRIX OF ADVANCED COVER CROP NUTRIENT MANAGEMENT RECOMMENDATIONS FOR CALENDAR YEAR 2026 (CY26) TAC**

| Item # | Ag. BMP | Suggestion to the TAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TAC Recommendations | DCR Supports | FY2028/2029 |
|--------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-------------|
|        |         | <p>differences. Also, under SARE's manual the use of the cover crops is more diverse. The increased plant diversity has several advantages to soil enrichment. A richer diversity of a mix of cover plants reportedly can produce better soil organic matter and deeper root structures. Expand the number of cover crop plans included in the Virginia Ag BMPs based on the SARE manual.</p> <p><i>Deferred in CY24 and 25 pending publication of data from VT.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                     |              |             |
| 7C     |         | Add NM-7 (Cover Crop for Managing Liquid and Semi-Solid Manure) as an eligible practice in WFA. It is not fair for producers to miss a core payment for these acres and it is an inefficient use of SWCD staff time to have to manage a separate application for these acres.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                     |              |             |
| 8C     |         | <p><i>Two suggestions related to cover crop seeding rates:</i></p> <ol style="list-style-type: none"> <li>For consistency, suggest edits to the Cover Crop species and rates tables related to rye species and seeding rates for all species be made consistently across all cover crop practices. There is no reason to have different seeding rates for various cover crop practices. We suggest using the same table for all practices. We suggest reviewing tables in all of the Cover Crop specifications. While not all of the Cover Crop practices offer bonus payments for Rye, it is important that the information in the tables be consistent across all related practice specifications. Currently Barley seeding rate is not consistent across all practices. There may be others that are not consistent as well.</li> <li>Reevaluate seeding rates for each planting method for all cover crop practices and ensure that the appropriate rates are being used for cover crop practices statewide. Create a required protocol to ensure existing or revised seeding rates are being used for cover crop practices.</li> </ol> |                     |              |             |
| 9C     |         | Change the date listed on page 15 of the WFA-NM specification, Policies and Specifications section #8 from April 1st to May 1st to align with other specifications that were changed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |              |             |
| 10C    |         | Consider revising the CCI-SL-1 specification to remove the requirement that the field be previously be enrolled in the SL-1 practice. There are ways to verify cropping and conversion history other than relying on SWCD practice participation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                     |              |             |

**MATRIX OF ADVANCED COVER CROP NUTRIENT MANAGEMENT RECOMMENDATIONS FOR CALENDAR YEAR 2026 (CY26) TAC**

| Item # | Ag. BMP | Suggestion to the TAC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | TAC Recommendations | DCR Supports | FY2028/2029 |
|--------|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-------------|
|        |         | records. We are potentially missing out on creditable acres by excluding acres that were not part of an SL-1 practice. Also, this concern was also brought up and discussed during the full TAC meeting in October.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     |              |             |
| 11C    |         | Recommend revising the cost share bonus payment to promote the use of Virginia grown seed. The recent data from Dr. Hunter Frame indicates there is no difference in cereal grain species in biomass and N uptake. Therefore, the incentive should be placed to increase the use of Virginia Certified/Quality Assurance (QATM), and Virginia grown seed. Virginia's small grain sector has also faced a notable decline over the past decade driven largely by a low market price. Expanding in-state seed production presents an opportunity to rebuild this market by strengthening demand and keeping more value within Virginia's agricultural economy. By incentivizing Virginia-grown seed, the program can help stabilize acreage, support local seed suppliers, and encourage a reintegration of small grains into the rotation of producers across the state. |                     |              |             |
| 12C    |         | Request that the WFANM practices be reviewed by both the Nutrient Management/Cover Crop and Programmatic Subcommittees. Our goal is to establish a clear, standardized definition of "acceptable documentation and written verification" for each practice. Currently, the specifications contain inconsistencies regarding the data required from producers. Some suggested verification examples are either irrelevant to the specific practice or lack the necessary geographic data to link the information to a specific location. Ideally, we should develop a list of relevant documentation that moves away from a reliance on invoices or bills.                                                                                                                                                                                                               |                     |              |             |
| 13C    |         | Request that the NM-1A practice be reviewed by the Nutrient Management/Cover Crop and Programmatic Subcommittees. Specifically, we suggest a review of the specification language requiring an invoice from the private certified planner. We recommend removing this requirement, as the District does not pay the invoice amount set by the plan writer. Instead, payment is based strictly on the signed-up acreage, verified by FSA maps and producer confirmation of the relevant Farm, Tract, and Fields.                                                                                                                                                                                                                                                                                                                                                         |                     |              |             |

| MATRIX OF ADVANCED COVER CROP NUTRIENT MANAGEMENT RECOMMENDATIONS FOR CALENDAR YEAR 2026 (CY26) TAC |         |                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     |              |             |
|-----------------------------------------------------------------------------------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|-------------|
| Item #                                                                                              | Ag. BMP | Suggestion to the TAC                                                                                                                                                                                                                                                                                                                                                                                                                                | TAC Recommendations | DCR Supports | FY2028/2029 |
| 14C                                                                                                 |         | Consider incentivizing mixes in cover crop practices over single species small grain planting. It seems planting species that compliment each other would provide more water quality benefit than a single cover crop species.                                                                                                                                                                                                                       |                     |              |             |
| 15C                                                                                                 |         | Consider the option of a cover crop that is harvested but is allowed to regrow and then killed down. It seems this would provide close to the same benefits associated with deep roots and high residue that a cover crop that is killed and not harvested would provide.                                                                                                                                                                            |                     |              |             |
| 16C                                                                                                 |         | Additional \$ per acre on cover crops if small grain is drilled vs broadcast (better root development)                                                                                                                                                                                                                                                                                                                                               |                     |              |             |
| 17C                                                                                                 |         | Small amount of N at CC planting - cover crops need to be treated like a cash crop and are a great tool for scavenging leftover nutrients not used by the previous crop. This will allow the plant to germinate and set roots faster, which in turn will help in nutrient scavenging and also taking of plant food that was unavailable and making it plant available. This will also build biomass which can lead to a pay for performance scenario |                     |              |             |
| 18C                                                                                                 |         | CCI-CNT interpretation regarding vertical tillage - should not be restricted from cost share because they own a piece of vertical tillage equipment, vertical tillage equipment is eligible for a conservation tillage tax credit so why are some folks being punished                                                                                                                                                                               |                     |              |             |

| MATRIX OF DEFERRED COVER CROP NUTRIENT MANAGEMENT RECOMMENDATIONS |         |                       |                      |
|-------------------------------------------------------------------|---------|-----------------------|----------------------|
| Item #                                                            | Ag. BMP | Suggestion to the TAC | Reason for Deferring |
|                                                                   |         |                       |                      |

| MATRIX OF TABLED COVER CROP NUTRIENT MANAGEMENT RECOMMENDATIONS |         |                       |                    |
|-----------------------------------------------------------------|---------|-----------------------|--------------------|
| Item #                                                          | Ag. BMP | Suggestion to the TAC | Reason for Tabling |
|                                                                 |         |                       |                    |



## Virginia Cover Crop Variety Guide

*Dr. William (Hunter) Frame, Field Crops Agronomist and Associate Professor;  
Janessa Fiorenza, Lab & Research Specialist, Tidewater Agricultural Research and Extension Center;  
Guy (Allen) Savage, Jr., Field Research Specialist, Tidewater Agricultural Research and Extension Center;  
and Brandt Tate, PhD Student, Tidewater Agricultural Research and Extension Center*



Figure 1. Cover crop mixture containing crimson clover and hairy vetch in bloom. (Suzanne Pruitt, Tidewater Agricultural Research and Extension Center)

**Acknowledgements:** Funding for this project was provided by the Virginia Ag Council and the Cotton Incorporated State Support Committee.

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# Introduction

Cover crops have many uses in agriculture and land management throughout human history. Cover crops are species planted that will not be harvested as the primary cash crop but instead serve other needs in the agroecosystem. There are many benefits to cover crops (Clark 2007):

1. Added value in soil fertility and nutrient management
2. Serve as a weed mulch to reduce herbicide costs.
3. Improving biological diversity
4. Improve soil chemical and physical properties (water infiltration, erosion, bulk density, Cation Exchange Capacity (CEC))
5. Improve ground and surface water outcomes.

Though cover crops have a tremendous positive impact on agroecosystems, when trying to maximize the return on investment (ROI), biomass development is “King.” A few examples of this are:

- 1) For weed control, a cover crop is needed with a high carbon to nitrogen ratio (C:N) that will reduce the decomposition of residues coupled with biomass accumulation that produces a complete mulch to prevent sunlight from reaching the soil surface. This is most commonly achieved by utilizing small grain cover crops such as cereal rye, wheat, barley, and oats.
- 2) For added value to soil fertility and nutrient management, specie selection and adaptation is critical to ensure maximum nutrient uptake and accumulation. Maximizing biomass is essential and in most of Virginia’s agroecosystems, nitrogen (N) is the most limited nutrient. Thus leguminous cover crop species are needed to maximize biomass and N accumulation, however leguminous cover crops must reach full bloom. Having species/varieties that bloom coincides with planting dates of cash crops will be needed to optimally utilize leguminous cover crops. This will allow for maximum N accumulation and availability to crops such as corn and cotton.

The purpose of this guide is to provide farmers, industry, crop consultants, and government personnel with information for various cover crop species and varieties within species on biomass accumulation, nutrient uptake, and flower/heading dates across Virginia. We hope that this guide allows for more educated selection of various cover crop species/varieties for Virginia row crop producers in the future.

## Evaluations

Studies were conducted at a total of seven locations from 2021 – 2026. All trials were small plot replicated studies with four replications of each entry. Measurements taken include late winter biomass (not included in this publication, full bloom/heading biomass, nutrient uptake for all macro- and secondary nutrients, and 50% bloom/heading dates for each specie/variety. Studies were evaluated weekly at the Coastal Plain locations, and bi-weekly at the Shenandoah Valley and Piedmont locations during the study. Biomass sampling was conducted by destructive sampling using a 1ft. by 1ft. square and cutting plant material at ground level. Samples were weighed wet and then dried at 60 °C to a

constant weight. Dry samples were ground to pass a 0.5 mm sieve and sent to Water's Agricultural Laboratories (Camilla, Georgia) for complete nutrient analysis.

## **Statistical Analysis**

To determine differences in biomass among varieties at each location, the authors have incorporated some basic statistics in the tables. The primary tool for determining the differences among varieties was Analysis of Variance with the Tukey's HSD (Honestly Significant Difference) (0.1) to determine biomass and nutrient uptake within each location. When the difference between varieties is larger than the HSD value, then the varieties can be considered different; however, when the difference between varieties is less than the HSD value, these varieties cannot be considered different.

## **Results**

Results are presented in the following tables and begin with the most recent years first. If there are multiple sites within a given year, there will be an "average" table that combines the data across all locations to provide average biomass and nutrient accumulation for that variety/species for Virginia. Each year will have different numbers and varieties of entries. There were a total of 100+ cover crop varieties and species tested over the four-year study. Seed companies were asked to enter varieties based on what they would like data for. The list below details the seed companies that donated seed for the project

### **Cooperating Seed Companies**

- Allied Seed
- Green Cover Seed
- King's Agriseed
- Mountain View Seeds
- Mixon Seed
- Revere Seeds
- Seedway

# Locations

## 2025 – 2026

| Region         | Location | Varieties       |
|----------------|----------|-----------------|
| Coastal Plains | Suffolk* | 39 <sup>†</sup> |

\*Tidewater Agricultural Research and Extension Center

<sup>†</sup>There are 38 individual varieties and one cover crop mixture.

## 2023 – 2024

| Region         | Location | Varieties |
|----------------|----------|-----------|
| Coastal Plains | Suffolk* | 37        |
| Piedmont       | Nelson   | 37        |
| Valley         | Augusta  | 37        |

\*Tidewater Agricultural Research and Extension Center

## 2022 – 2023

| Region         | Location | Varieties |
|----------------|----------|-----------|
| Coastal Plains | Suffolk* | 57        |
| Valley         | Augusta  | 57        |

\*Tidewater Agricultural Research and Extension Center

## 2021 – 2022

| Region         | Location | Varieties |
|----------------|----------|-----------|
| Coastal Plains | Suffolk* | 28        |

\*Tidewater Agricultural Research and Extension Center

# 2025 – 2026

## Cover Crop Results

**Table 1.** Average Biomass Production and Nutrient Uptake of Brassica Cover Crops in Coastal Plains Region of Virginia (2025 – 2026)

| Variety                  | Species  | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac)  | Phosphorous (lb/ac) | Potassium (lb/ac) | Magnesium (lb/ac) | Calcium (lb/ac)  | Sulfur (lb/ac)   | C:N              |
|--------------------------|----------|----------------|----------------------------|-------------------|---------------------|-------------------|-------------------|------------------|------------------|------------------|
| Aerifi                   | Radish   | April 17       | 3,832 <sup>ab</sup>        | 96 <sup>a</sup>   | 27 <sup>abc</sup>   | 158 <sup>ab</sup> | 13 <sup>a</sup>   | 99 <sup>a</sup>  | 32 <sup>a</sup>  | 16 <sup>b</sup>  |
| Bayou                    | Kale     | April 10       | 1,132 <sup>c</sup>         | 20 <sup>d</sup>   | 6 <sup>d</sup>      | 31 <sup>c</sup>   | 3 <sup>b</sup>    | 18 <sup>c</sup>  | 6 <sup>d</sup>   | 22 <sup>ab</sup> |
| Braco White Mustard      | Mustard  | April 2        | 3,071 <sup>b</sup>         | 53 <sup>bcd</sup> | 20 <sup>c</sup>     | 86 <sup>bc</sup>  | 10 <sup>a</sup>   | 62 <sup>ab</sup> | 20 <sup>b</sup>  | 20 <sup>ab</sup> |
| Dwarf Essex              | Rapeseed | April 2        | 4,419 <sup>ab</sup>        | 77 <sup>ab</sup>  | 27 <sup>bc</sup>    | 124 <sup>ab</sup> | 9 <sup>a</sup>    | 54 <sup>bc</sup> | 17 <sup>b</sup>  | 22 <sup>ab</sup> |
| Impact Forage            | Collards | April 2        | 931 <sup>c</sup>           | 28 <sup>cd</sup>  | 8 <sup>d</sup>      | 43 <sup>c</sup>   | 3 <sup>b</sup>    | 20 <sup>c</sup>  | 7 <sup>cd</sup>  | 19 <sup>ab</sup> |
| Jackpot                  | Turnip   | April 2        | 3,816 <sup>ab</sup>        | 60 <sup>bc</sup>  | 35 <sup>ab</sup>    | 137 <sup>ab</sup> | 12 <sup>a</sup>   | 70 <sup>ab</sup> | 17 <sup>bc</sup> | 25 <sup>ab</sup> |
| Twister*                 | Turnip   | April 2        | 4,465 <sup>ab</sup>        | 62 <sup>abc</sup> | 37 <sup>a</sup>     | 149 <sup>ab</sup> | 11 <sup>a</sup>   | 72 <sup>ab</sup> | 17 <sup>bc</sup> | 26 <sup>a</sup>  |
| Twister†                 | Turnip   | April 10       | 4,464 <sup>a</sup>         | 61 <sup>abc</sup> | 30 <sup>abc</sup>   | 168 <sup>a</sup>  | 12 <sup>a</sup>   | 81 <sup>ab</sup> | 17 <sup>bc</sup> | 25 <sup>ab</sup> |
| Average                  | --       | --             | 3,266                      | 57                | 24                  | 112               | 9                 | 60               | 17               | 22               |
| Coefficient of Variation | --       | --             | 43.95                      | 48.61             | 50.36               | 50.86             | 47.77             | 51.82            | 52.52            | 23.16            |
| P-Value                  | --       | --             | < 0.01                     | < 0.01            | < 0.01              | < 0.01            | < 0.01            | < 0.01           | < 0.01           | 0.02             |
| Tukey's HSD              | --       | --             | 1,176                      | 31.63             | 8.76                | 94.97             | 4.87              | 35.90            | 9.57             | 8.91             |

\* Seed provided by Mountain View Seeds

† Variety provided by Green Cover Seed

**Table 2.** Average Biomass Production and Nutrient Uptake of Legume Cover Crops in Coastal Plains Region of Virginia (2025 – 2026)

| Variety                  | Species        | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac) | Phosphorous (lb/ac) | Potassium (lb/ac) | Magnesium (lb/ac) | Calcium (lb/ac)  | Sulfur (lb/ac)  | C:N   |
|--------------------------|----------------|----------------|----------------------------|------------------|---------------------|-------------------|-------------------|------------------|-----------------|-------|
| AU Sunrise               | Clover         | April 17       | 1,134                      | 28 <sup>b</sup>  | 10                  | 44                | 3                 | 12 <sup>ab</sup> | 2 <sup>ab</sup> | 15    |
| BRC                      | Red Clover     | April 30       | 1,811                      | 38 <sup>b</sup>  | 5                   | 40                | 5                 | 18 <sup>ab</sup> | 2 <sup>b</sup>  | 20    |
| Cahaba White             | Vetch          | April 17       | 1,373                      | 25 <sup>b</sup>  | 8                   | 36                | 3                 | 12 <sup>b</sup>  | 4 <sup>ab</sup> | 17    |
| CCB Nitrous              | Vetch          | April 10       | 3,917                      | 116 <sup>a</sup> | 14                  | 109               | 6                 | 42 <sup>a</sup>  | 7 <sup>a</sup>  | 14    |
| GC_WW                    | Hairy Vetch    | April 10       | 2,302                      | 66 <sup>ab</sup> | 10                  | 65                | 3                 | 20 <sup>ab</sup> | 4 <sup>ab</sup> | 14    |
| Heusers Ostaat           | Clover         | April 30       | 1,363                      | 33 <sup>b</sup>  | 10                  | 49                | 3                 | 15 <sup>ab</sup> | 4 <sup>ab</sup> | 19    |
| Keystone                 | Winter Peas    | April 30       | 2,609                      | 67 <sup>ab</sup> | 11                  | 51                | 5                 | 21 <sup>ab</sup> | 6 <sup>ab</sup> | 16    |
| Patagonia                | Hairy Vetch    | April 30       | 4,028                      | 96 <sup>ab</sup> | 15                  | 104               | 6                 | 35 <sup>ab</sup> | 7 <sup>ab</sup> | 17    |
| Viper                    | Balansa Clover | April 17       | 944                        | 19 <sup>b</sup>  | 9                   | 30                | 2                 | 12 <sup>b</sup>  | 4 <sup>ab</sup> | 18    |
| Kitchen Sink*            | Mixture        | April 30       | 2,792                      | 30               | 12                  | 67                | 2                 | 8                | 3               | 37    |
| Average                  | --             | --             | 2,227                      | 54               | 10                  | 59                | 4                 | 21               | 4               | 17    |
| Coefficient of Variation | --             | --             | 68.52                      | 74.61            | 47.73               | 68.92             | 50.77             | 68.23            | 53.42           | 18.30 |
| P-Value                  | --             | --             | 0.01                       | < 0.01           | 0.10                | 0.03              | 0.03              | 0.01             | 0.01            | 0.04  |
| Tukey's HSD              | --             | --             | 2,698                      | 66.93            | 9.57                | 75.65             | 3.80              | 25.17            | 4.16            | 5.70  |

\* Cover crop mixture not included in statistical analysis. A mixture of black oats, triticale, cereal rye, forage radish, rapeseed, Austrian winter pea, crimson clover, hairy vetch, and phacelia.

**Table 3.** Average Biomass Production and Nutrient Uptake of Grain Cover Crops in Coastal Plains Region of Virginia (2025 – 2026)

| Variety                  | Species         | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac) | Phosphorous (lb/ac) | Potassium (lb/ac) | Magnesium (lb/ac) | Calcium (lb/ac)  | Sulfur (lb/ac) | C:N   |
|--------------------------|-----------------|----------------|----------------------------|------------------|---------------------|-------------------|-------------------|------------------|----------------|-------|
| AGS 2024                 | Wheat           | April 17       | 3,954 <sup>abc</sup>       | 36               | 16 <sup>ab</sup>    | 79 <sup>ab</sup>  | 3 <sup>abc</sup>  | 6 <sup>b</sup>   | 3              | 49    |
| AGS 3022                 | Wheat           | April 17       | 3,423 <sup>bc</sup>        | 28               | 13 <sup>ab</sup>    | 65 <sup>b</sup>   | 3 <sup>bc</sup>   | 5 <sup>b</sup>   | 3              | 51    |
| AGS 4043                 | Wheat           | April 17       | 3,885 <sup>abc</sup>       | 42               | 15 <sup>ab</sup>    | 78 <sup>ab</sup>  | 3 <sup>abc</sup>  | 8 <sup>ab</sup>  | 4              | 41    |
| AGS 405                  | Cereal Rye      | April 2        | 6,363 <sup>abc</sup>       | 55               | 25 <sup>a</sup>     | 148 <sup>ab</sup> | 5 <sup>abc</sup>  | 10 <sup>ab</sup> | 6              | 49    |
| AGS 433                  | Triticale       | April 17       | 2,643 <sup>bc</sup>        | 33               | 13 <sup>ab</sup>    | 62 <sup>b</sup>   | 2 <sup>bc</sup>   | 5 <sup>b</sup>   | 3              | 46    |
| AGS Monarch              | Triticale       | April 17       | 3,812 <sup>abc</sup>       | 37               | 15 <sup>ab</sup>    | 78 <sup>ab</sup>  | 3 <sup>bc</sup>   | 7 <sup>b</sup>   | 4              | 41    |
| Cosaque                  | Black Oats      | April 30       | 6,258 <sup>abc</sup>       | 47               | 18 <sup>ab</sup>    | 128 <sup>ab</sup> | 4 <sup>abc</sup>  | 10 <sup>ab</sup> | 5              | 56    |
| CPR                      | Cereal Rye      | April 30       | 3,518 <sup>bc</sup>        | 38               | 12 <sup>ab</sup>    | 83 <sup>ab</sup>  | 3 <sup>bc</sup>   | 7 <sup>b</sup>   | 4              | 38    |
| Elbon                    | Cereal Rye      | April 30       | 3,786 <sup>abc</sup>       | 40               | 19 <sup>ab</sup>    | 91 <sup>ab</sup>  | 4 <sup>abc</sup>  | 9 <sup>ab</sup>  | 4              | 41    |
| ForagePro                | Cereal Rye      | April 30       | 2,596 <sup>c</sup>         | 29               | 12 <sup>ab</sup>    | 64 <sup>ab</sup>  | 2 <sup>c</sup>    | 5 <sup>b</sup>   | 3              | 37    |
| Frostproof               | Annual Ryegrass | April 30       | 3,761 <sup>abc</sup>       | 28               | 14 <sup>ab</sup>    | 71 <sup>ab</sup>  | 4 <sup>abc</sup>  | 16 <sup>ab</sup> | 4              | 56    |
| Horizon 214              | Oat             | April 30       | 7,318 <sup>a</sup>         | 71               | 18 <sup>ab</sup>    | 160 <sup>a</sup>  | 6 <sup>ab</sup>   | 13 <sup>ab</sup> | 6              | 50    |
| Horizon 306              | Oat             | April 30       | 5,307 <sup>abc</sup>       | 31               | 17 <sup>ab</sup>    | 83 <sup>ab</sup>  | 5 <sup>abc</sup>  | 8 <sup>ab</sup>  | 5              | 55    |
| Horizon 578              | Oat             | April 30       | 3,309 <sup>bc</sup>        | 28               | 12 <sup>b</sup>     | 76 <sup>ab</sup>  | 3 <sup>bc</sup>   | 6 <sup>b</sup>   | 3              | 47    |
| Horizon 720              | Oat             | April 30       | 6,612 <sup>ab</sup>        | 45               | 23 <sup>ab</sup>    | 137 <sup>ab</sup> | 7 <sup>a</sup>    | 10 <sup>ab</sup> | 6              | 52    |
| Hyton                    | Triticale       | April 30       | 4,015 <sup>abc</sup>       | 35               | 15 <sup>ab</sup>    | 87 <sup>ab</sup>  | 4 <sup>abc</sup>  | 7 <sup>ab</sup>  | 4              | 48    |
| KF Flex                  | Annual Ryegrass | April 2        | 3,434 <sup>bc</sup>        | 33               | 11 <sup>b</sup>     | 89 <sup>ab</sup>  | 4 <sup>abc</sup>  | 16 <sup>ab</sup> | 4              | 51    |
| Lowboy                   | Annual Ryegrass | April 30       | 3,664 <sup>abc</sup>       | 28               | 15 <sup>ab</sup>    | 70 <sup>ab</sup>  | 5 <sup>abc</sup>  | 19 <sup>a</sup>  | 4              | 57    |
| PF_CHR                   | Cereal Rye      | April 30       | 3,453 <sup>bc</sup>        | 39               | 17 <sup>ab</sup>    | 78 <sup>ab</sup>  | 3 <sup>bc</sup>   | 6 <sup>b</sup>   | 4              | 38    |
| Secretariat              | Barley          | April 17       | 3,042 <sup>bc</sup>        | 33               | 16 <sup>ab</sup>    | 73 <sup>ab</sup>  | 4 <sup>abc</sup>  | 6 <sup>b</sup>   | 4              | 38    |
| Wrens Abruzzi            | Cereal Rye      | April 2        | 5,411 <sup>abc</sup>       | 49               | 22 <sup>ab</sup>    | 127 <sup>ab</sup> | 5 <sup>abc</sup>  | 9 <sup>ab</sup>  | 5              | 46    |
| Average                  | --              | --             | 4,265                      | 38               | 16                  | 92                | 4                 | 9                | 4              | 47    |
| Coefficient of Variation | --              | --             | 41.88                      | 49.21            | 33.00               | 44.55             | 41.80             | 60.84            | 39.69          | 20.69 |
| P-Value                  | --              | --             | < 0.01                     | 0.19             | < 0.01              | < 0.01            | < 0.01            | < 0.01           | 0.19           | 0.01  |
| Tukey's HSD              | --              | --             | 3,438                      | 44.41            | 11.11               | 83.71             | 3.40              | 3.96             | 11.05          | 20.88 |

## 2023 – 2024

### Average Statewide Cover Crop Results

**Table 4.** Statewide Average Biomass Production and Nutrient Uptake of Brassica Cover Crops Across Virginia (2023 – 2024)

| Variety                  | Species        | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Magnesium<br>(lb/ac) | Calcium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N   |
|--------------------------|----------------|-------------------------------|---------------------|------------------------|----------------------|----------------------|--------------------|-------------------|-------|
| Aerifi                   | Radish         | 2,899                         | 66                  | 36 <sup>a</sup>        | 89                   | 8 <sup>a</sup>       | 63 <sup>a</sup>    | 23 <sup>a</sup>   | 18    |
| Control OR               | Oilseed Radish | 2,648                         | 55                  | 20 <sup>ab</sup>       | 93                   | 6 <sup>ab</sup>      | 38 <sup>ab</sup>   | 13 <sup>b</sup>   | 19    |
| Control R                | Radish         | 2,251                         | 53                  | 21 <sup>ab</sup>       | 80                   | 7 <sup>ab</sup>      | 48 <sup>ab</sup>   | 16 <sup>ab</sup>  | 16    |
| Eco Till                 | Radish         | 2,694                         | 53                  | 27 <sup>ab</sup>       | 81                   | 6 <sup>ab</sup>      | 32 <sup>b</sup>    | 10 <sup>b</sup>   | 20    |
| Jackpot                  | Turnip         | 2,533                         | 43                  | 27 <sup>ab</sup>       | 74                   | 6 <sup>ab</sup>      | 49 <sup>ab</sup>   | 10 <sup>b</sup>   | 21    |
| Master                   | White Mustard  | 1,531                         | 40                  | 16 <sup>b</sup>        | 49                   | 4 <sup>b</sup>       | 28 <sup>b</sup>    | 7 <sup>b</sup>    | 14    |
| Vivant Hybrid            | Turnip         | 2,183                         | 35                  | 18 <sup>b</sup>        | 58                   | 5 <sup>ab</sup>      | 47 <sup>ab</sup>   | 10 <sup>b</sup>   | 19    |
| Average                  | --             | 2,391                         | 49                  | 24                     | 75                   | 6                    | 43                 | 13                | 18    |
| Coefficient of Variation | --             | 42.68                         | 41.64               | 39.74                  | 35.45                | 30.36                | 40.09              | 37.82             | 33.72 |
| P-Value                  | --             | 0.33                          | 0.20                | 0.01                   | 0.08                 | 0.04                 | 0.02               | < 0.01            | 0.54  |
| Tukey's HSD              | --             | 1,698                         | 34.23               | 15.75                  | 44.12                | 3.12                 | 8.02               | 8.02              | 10.15 |

**Table 5.** Statewide Average Biomass Production and Nutrient Uptake of Legume Cover Crops Across Virginia (2023 – 2024)

| Variety                  | Species        | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Magnesium<br>(lb/ac) | Calcium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N               |
|--------------------------|----------------|-------------------------------|---------------------|------------------------|----------------------|----------------------|--------------------|-------------------|-------------------|
| AU Early Cover           | Hairy Vetch    | 4,128                         | 136                 | 31 <sup>ab</sup>       | 164                  | 9                    | 41                 | 9 <sup>a</sup>    | 12 <sup>c</sup>   |
| AU Robin                 | Clover         | 3,070                         | 67                  | 18 <sup>abc</sup>      | 124                  | 8                    | 39                 | 5 <sup>ab</sup>   | 19 <sup>ab</sup>  |
| AU Sunrise               | Clover         | 3,138                         | 71                  | 18 <sup>abc</sup>      | 140                  | 8                    | 45                 | 5 <sup>ab</sup>   | 17 <sup>abc</sup> |
| Cahaba                   | White Vetch    | 2,615                         | 62                  | 19 <sup>abc</sup>      | 88                   | 6                    | 31                 | 6 <sup>ab</sup>   | 13 <sup>bc</sup>  |
| Dixie Crimson            | Crimson Clover | 3,023                         | 65                  | 17 <sup>abc</sup>      | 108                  | 6                    | 36                 | 4 <sup>ab</sup>   | 16 <sup>abc</sup> |
| eNhanse                  | Persian Clover | 2,213                         | 68                  | 15 <sup>bc</sup>       | 115                  | 7                    | 38                 | 4 <sup>ab</sup>   | 13 <sup>bc</sup>  |
| Frosty                   | Berseem Clover | 2,863                         | 44                  | 11 <sup>c</sup>        | 91                   | 5                    | 25                 | 3 <sup>b</sup>    | 21 <sup>a</sup>   |
| Hairy Vetch VNS          | Hairy Vetch    | 3,971                         | 115                 | 26 <sup>abc</sup>      | 140                  | 8                    | 45                 | 7 <sup>ab</sup>   | 14 <sup>bc</sup>  |
| Icicle                   | Winter Pea     | 2,681                         | 51                  | 16 <sup>abc</sup>      | 71                   | 5                    | 18                 | 5 <sup>ab</sup>   | 15 <sup>abc</sup> |
| Keystone                 | Winter Pea     | 2,470                         | 54                  | 17 <sup>abc</sup>      | 59                   | 4                    | 19                 | 5 <sup>ab</sup>   | 13 <sup>c</sup>   |
| Keystone                 | Winter Pea     | 2,903                         | 79                  | 22 <sup>abc</sup>      | 85                   | 5                    | 24                 | 6 <sup>ab</sup>   | 13 <sup>c</sup>   |
| Purple Bounty            | Hairy Vetch    | 4,034                         | 131                 | 36 <sup>a</sup>        | 171                  | 9                    | 41                 | 9 <sup>ab</sup>   | 13 <sup>c</sup>   |
| Survivor                 | Winter Pea     | 2,566                         | 62                  | 19 <sup>abc</sup>      | 64                   | 5                    | 20                 | 6 <sup>ab</sup>   | 13 <sup>c</sup>   |
| Average                  | --             | 2,975                         | 74                  | 20                     | 107                  | 6                    | 32                 | 5                 | 15                |
| Coefficient of Variation | --             | 80.93                         | 73.79               | 53.62                  | 75.19                | 74.79                | 86.7               | 64.33             | 21.09             |
| P-Value                  | --             | 0.56                          | 0.03                | < 0.01                 | 0.14                 | 0.5                  | 0.5                | 0.04              | < 0.01            |
| Tukey's HSD              | --             | 3,767                         | 93.09               | 17.68                  | 133.17               | 7.85                 | 45.95              | 5.82              | 5.03              |

**Table 6.** Statewide Average Biomass Production and Nutrient Uptake of Grass Cover Crops Across Virginia (2023 – 2024)

| Variety                  | Species         | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Magnesium<br>(lb/ac) | Calcium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N   |
|--------------------------|-----------------|-------------------------------|---------------------|------------------------|----------------------|----------------------|--------------------|-------------------|-------|
| AGS 2024                 | Wheat           | 5,871 <sup>ab</sup>           | 67                  | 39                     | 102 <sup>ab</sup>    | 4                    | 10 <sup>bcd</sup>  | 7                 | 38    |
| AGS 3022                 | Wheat           | 4,692 <sup>ab</sup>           | 59                  | 35                     | 86 <sup>ab</sup>     | 4                    | 7 <sup>cd</sup>    | 6                 | 35    |
| AGS 3026                 | Wheat           | 5,484 <sup>ab</sup>           | 81                  | 37                     | 124 <sup>ab</sup>    | 6                    | 11 <sup>a-d</sup>  | 8                 | 32    |
| AGS 4023                 | Wheat           | 4,232 <sup>ab</sup>           | 40                  | 25                     | 65 <sup>b</sup>      | 3                    | 5 <sup>d</sup>     | 4                 | 46    |
| AGS 4043                 | Wheat           | 5,871 <sup>ab</sup>           | 69                  | 34                     | 103 <sup>ab</sup>    | 5                    | 11 <sup>a-d</sup>  | 6                 | 39    |
| Coker 227                | Oat             | 5,020 <sup>ab</sup>           | 58                  | 26                     | 111 <sup>ab</sup>    | 4                    | 9 <sup>bcd</sup>   | 5                 | 37    |
| Dexter                   | Annual Ryegrass | 4,362 <sup>ab</sup>           | 52                  | 21                     | 136 <sup>a</sup>     | 6                    | 21 <sup>a</sup>    | 5                 | 37    |
| Halsey Intermediate      | Ryegrass        | 3,374 <sup>b</sup>            | 35                  | 20                     | 84 <sup>ab</sup>     | 4                    | 13 <sup>a-d</sup>  | 4                 | 43    |
| Horizon 214              | Oat             | 3,817 <sup>ab</sup>           | 51                  | 29                     | 103 <sup>ab</sup>    | 4                    | 7 <sup>cd</sup>    | 5                 | 38    |
| Horizon 306              | Oat             | 4,968 <sup>ab</sup>           | 48                  | 30                     | 117 <sup>ab</sup>    | 5                    | 9 <sup>cd</sup>    | 5                 | 48    |
| Horizon 578              | Oat             | 5,204 <sup>ab</sup>           | 65                  | 33                     | 131 <sup>a</sup>     | 5                    | 11 <sup>a-d</sup>  | 6                 | 41    |
| Horizon 720              | Oat             | 5,486 <sup>ab</sup>           | 45                  | 30                     | 128 <sup>a</sup>     | 6                    | 10 <sup>bcd</sup>  | 5                 | 51    |
| HyOctane                 | Triticale       | 5,678 <sup>ab</sup>           | 61                  | 35                     | 111 <sup>ab</sup>    | 5                    | 12 <sup>a-d</sup>  | 6                 | 40    |
| McKinley                 | Annual Ryegrass | 4,839 <sup>ab</sup>           | 50                  | 29                     | 107 <sup>ab</sup>    | 6                    | 20 <sup>ab</sup>   | 6                 | 48    |
| NC-14                    | Wheat           | 6,095 <sup>a</sup>            | 64                  | 33                     | 108 <sup>ab</sup>    | 6                    | 11 <sup>a-d</sup>  | 6                 | 45    |
| Pratex                   | Black Oat (AS)  | 4,593 <sup>ab</sup>           | 63                  | 31                     | 117 <sup>ab</sup>    | 6                    | 17 <sup>abc</sup>  | 6                 | 34    |
| Pratex                   | Black Oat (SW)  | 3,057 <sup>b</sup>            | 41                  | 24                     | 84 <sup>ab</sup>     | 3                    | 9 <sup>bcd</sup>   | 4                 | 33    |
| Average                  | --              | 4,861                         | 56                  | 30                     | 107                  | 5                    | 11                 | 6                 | 40    |
| Coefficient of Variation | --              | 30.26                         | 39.23               | 31.63                  | 27.78                | 34.65                | 34.65              | 46.88             | 39.02 |
| P-Value                  | --              | < 0.01                        | 0.02                | < 0.01                 | < 0.01               | 0.02                 | < 0.01             | 0.10              | 0.86  |
| Tukey's HSD              | --              | 2,649                         | 39.22               | 16.87                  | 53.84                | 3.12                 | 9.64               | 3.83              | 33.45 |

## Coastal Plains Cover Crop Results

**Table 7.** Average Biomass Production and Nutrient Uptake of Brassica Cover Crops in the Coastal Plains Region of Virginia (2023 -2024)

| Variety                         | Species        | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac) | Phosphorous (lb/ac) | Potassium (lb/ac) | Magnesium (lb/ac) | Calcium (lb/ac) | Sulfur (lb/ac) | C:N          |
|---------------------------------|----------------|----------------|----------------------------|------------------|---------------------|-------------------|-------------------|-----------------|----------------|--------------|
| <b>Aerifi</b>                   | Radish         | March 12       | 2,876                      | 52               | 29                  | 90                | 7                 | 71              | 25             | 21           |
| <b>Control OR</b>               | Oilseed Radish | March 21       | 2,644                      | 39               | 19                  | 83                | 6                 | 44              | 15             | 24           |
| <b>Control Radish</b>           | Radish         | March 21       | 2,847                      | 48               | 21                  | 85                | 7                 | 54              | 18             | 22           |
| <b>Eco Till</b>                 | Radish         | March 12       | 2,968                      | 66               | 26                  | 87                | 7                 | 47              | 14             | 19           |
| <b>Jackpot</b>                  | Turnip         | March 21       | 3,318                      | 43               | 24                  | 90                | 8                 | 65              | 11             | 26           |
| <b>Master</b>                   | White Mustard  | March 21       | 2,037                      | 30               | 13                  | 40                | 5                 | 36              | 9              | 19           |
| <b>Vivant Hybrid</b>            | Turnip         | March 29       | 3,067                      | 43               | 19                  | 68                | 7                 | 67              | 15             | 23           |
| <b>Average</b>                  | --             | --             | <b>2,823</b>               | <b>46</b>        | <b>22</b>           | <b>78</b>         | <b>7</b>          | <b>55</b>       | <b>15</b>      | <b>22</b>    |
| <b>Coefficient of Variation</b> | --             | --             | <b>15.11</b>               | <b>17.50</b>     | <b>44.64</b>        | <b>23.63</b>      | <b>23.91</b>      | <b>18.15</b>    | <b>19.77</b>   | <b>32.37</b> |
| <b>P-Value</b>                  | --             | --             | <b>0.31</b>                | <b>0.70</b>      | <b>0.18</b>         | <b>0.37</b>       | <b>0.63</b>       | <b>0.05</b>     | <b>0.07</b>    | <b>0.36</b>  |
| <b>Tukey's HSD</b>              | --             | --             | <b>1,117</b>               | <b>53.88</b>     | <b>13.54</b>        | <b>49.49</b>      | <b>3.14</b>       | <b>28.59</b>    | <b>12.88</b>   | <b>9.78</b>  |

**Table 8.** Average Biomass Production and Nutrient Uptake of Legume Cover Crops in the Coastal Plains Region of Virginia (2023 -2024)

| Variety                         | Species        | 50% Bloom Date    | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac)   | Phosphorous (lb/ac) | Potassium (lb/ac)  | Magnesium (lb/ac) | Calcium (lb/ac)   | Sulfur (lb/ac)    | C:N          |
|---------------------------------|----------------|-------------------|----------------------------|--------------------|---------------------|--------------------|-------------------|-------------------|-------------------|--------------|
| <b>AU Early Cover</b>           | Hairy Vetch    | April 16          | 6,313                      | 221 <sup>a</sup>   | 41 <sup>a</sup>     | 259 <sup>ab</sup>  | 13                | 67 <sup>abc</sup> | 14 <sup>a</sup>   | 12           |
| <b>AU Robin</b>                 | Clover         | April 11          | 6,058                      | 132 <sup>abc</sup> | 31 <sup>ab</sup>    | 219 <sup>abc</sup> | 13                | 79 <sup>ab</sup>  | 7 <sup>bc</sup>   | 18           |
| <b>Au Sunrise</b>               | Clover         | April 11          | 6,449                      | 147 <sup>abc</sup> | 34 <sup>ab</sup>    | 265 <sup>a</sup>   | 15                | 93 <sup>a</sup>   | 9 <sup>abc</sup>  | 18           |
| <b>Cahaba</b>                   | White Vetch    | April 26 or later | 3,872                      | 93 <sup>bc</sup>   | 25 <sup>ab</sup>    | 103 <sup>c</sup>   | 7                 | 46 <sup>bc</sup>  | 9 <sup>abc</sup>  | 15           |
| <b>Dixie Crimson</b>            | Crimson Clover | April 16          | 6,366                      | 128 <sup>abc</sup> | 30 <sup>ab</sup>    | 221 <sup>abc</sup> | 14                | 77 <sup>ab</sup>  | 8 <sup>abc</sup>  | 20           |
| <b>eNhance</b>                  | Persian Clover | -                 | 5,068                      | 145 <sup>abc</sup> | 25 <sup>ab</sup>    | 224 <sup>abc</sup> | 11                | 80 <sup>ab</sup>  | 8 <sup>abc</sup>  | 14           |
| <b>Frosty</b>                   | Berseem Clover | -                 | 5,101                      | 84 <sup>c</sup>    | 12 <sup>b</sup>     | 172 <sup>abc</sup> | 9                 | 52 <sup>abc</sup> | 5 <sup>c</sup>    | 23           |
| <b>Hairy Vetch</b>              | Hairy Vetch    | April 26          | 6,787                      | 167 <sup>abc</sup> | 30 <sup>ab</sup>    | 213 <sup>abc</sup> | 14                | 86 <sup>ab</sup>  | 11 <sup>ab</sup>  | 16           |
| <b>Icicle</b>                   | Winter Pea     | -                 | 5,055                      | 120 <sup>abc</sup> | 33 <sup>ab</sup>    | 133 <sup>abc</sup> | 8                 | 27 <sup>c</sup>   | 8 <sup>abc</sup>  | 34           |
| <b>Keystone</b>                 | Winter Pea     | -                 | 4,999                      | 128 <sup>abc</sup> | 32 <sup>ab</sup>    | 136 <sup>abc</sup> | 10                | 44 <sup>bc</sup>  | 10 <sup>abc</sup> | 14           |
| <b>Keystone Winter Pea</b>      | Winter Pea     | April 26          | 3,667                      | 115 <sup>abc</sup> | 31 <sup>ab</sup>    | 130 <sup>abc</sup> | 8                 | 32 <sup>c</sup>   | 8 <sup>abc</sup>  | 12           |
| <b>Purple Bounty</b>            | Hairy Vetch    | -                 | 7,087                      | 207 <sup>ab</sup>  | 44 <sup>a</sup>     | 254 <sup>ab</sup>  | 13                | 69 <sup>abc</sup> | 14 <sup>a</sup>   | 14           |
| <b>Survivor</b>                 | Winter Pea     | -                 | 4,442                      | 127 <sup>abc</sup> | 27 <sup>ab</sup>    | 117 <sup>bc</sup>  | 11                | 44 <sup>bc</sup>  | 9 <sup>abc</sup>  | 14           |
| <b>Average</b>                  | --             | --                | <b>5,355</b>               | <b>39</b>          | <b>24</b>           | <b>106</b>         | <b>5</b>          | <b>12</b>         | <b>5</b>          | <b>60</b>    |
| <b>Coefficient of Variation</b> | --             | --                | <b>24.91</b>               | <b>28.63</b>       | <b>28.13</b>        | <b>26.15</b>       | <b>26.03</b>      | <b>23.06</b>      | <b>22.12</b>      | <b>58.02</b> |
| <b>P-Value</b>                  | --             | --                | <b>0.07</b>                | <b>0.01</b>        | <b>0.02</b>         | <b>&lt; 0.01</b>   | <b>0.03</b>       | <b>&lt; 0.01</b>  | <b>&lt; 0.01</b>  | <b>0.38</b>  |
| <b>Tukey's HSD</b>              | --             | --                | <b>3,689</b>               | <b>107.92</b>      | <b>23.00</b>        | <b>132.94</b>      | <b>7.94</b>       | <b>38.23</b>      | <b>5.55</b>       | <b>38.23</b> |

**Table 9.** Average Biomass Production and Nutrient Uptake of Grain Cover Crops in the Coastal Plains Region of Virginia (2023 -2024)

| Variety                  | Species         | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac) | Phosphorous (lb/ac) | Potassium (lb/ac) | Magnesium (lb/ac) | Calcium (lb/ac) | Sulfur (lb/ac) | C:N   |
|--------------------------|-----------------|----------------|----------------------------|------------------|---------------------|-------------------|-------------------|-----------------|----------------|-------|
| AGS 2024                 | Wheat           | April 26       | 4,688                      | 33               | 17                  | 71                | 2                 | 2               | 2              | 61    |
| AGS 3022                 | Wheat           | April 26       | 5,770                      | 62               | 34                  | 132               | 7                 | 37              | 37             | 44    |
| AGS 3026                 | Wheat           | April 26       | 4,063                      | 28               | 16                  | 65                | 3                 | 4               | 4              | 56    |
| AGS 4023                 | Wheat           | April 26       | 4,882                      | 32               | 23                  | 73                | 4                 | 3               | 3              | 62    |
| AGS 4043                 | Wheat           | April 26       | 4,799                      | 35               | 21                  | 74                | 4                 | 5               | 5              | 55    |
| Coker 227                | Oat             | April 26       | 6,325                      | 51               | 26                  | 140               | 5                 | 6               | 6              | 54    |
| Dexter                   | Annual Ryegrass | -              | 5,689                      | 36               | 21                  | 129               | 7                 | 21              | 21             | 62    |
| Halsey Intermediate      | Ryegrass        | April 26       | 4,895                      | 29               | 19                  | 90                | 5                 | 18              | 18             | 70    |
| Horizon 214              | Oat             | April 26       | 4,113                      | 29               | 23                  | 93                | 3                 | 2               | 2              | 57    |
| Horizon 306              | Oat             | April 26       | 6,325                      | 38               | 31                  | 127               | 6                 | 7               | 7              | 69    |
| Horizon 578              | Oat             | April 26       | 4,839                      | 29               | 21                  | 100               | 3                 | 4               | 4              | 69    |
| Horizon 720              | Oat             | April 26       | 7,627                      | 43               | 32                  | 162               | 7                 | 10              | 10             | 73    |
| HyOctane                 | Triticale       | April 26       | 6,009                      | 65               | 38                  | 136               | 10                | 46              | 46             | 48    |
| McKinley                 | Annual Ryegrass | April 26       | 6,359                      | 37               | 26                  | 114               | 6                 | 22              | 22             | 75    |
| NC-14                    | Wheat           | April 26       | 6,547                      | 41               | 25                  | 105               | 5                 | 7               | 7              | 69    |
| Pratex                   | Black Oat (AS)  | March 29       | 4,535                      | 40               | 20                  | 106               | 4                 | 10              | 10             | 46    |
| Pratex                   | Black Oat (SW)  | -              | 3,572                      | 33               | 20                  | 87                | 3                 | 9               | 9              | 44    |
| Average                  | --              | --             | 5,533                      | 140              | 31                  | 192               | 11                | 62              | 9              | 17    |
| Coefficient of Variation | --              | --             | 19.88                      | 46.15            | 37.66               | 33.74             | 50.95             | 173.18          | 139.08         | 19.63 |
| P-Value                  | --              | --             | < 0.01                     | 0.43             | 0.28                | 0.12              | 0.10              | 0.96            | 0.91           | 0.02  |
| Tukey's HSD              | --              | --             | 3,020                      | 50.94            | 25.97               | 102.23            | 7.20              | 62.37           | 20.75          | 32.84 |

## Piedmont Cover Crop Results (2023 – 2024)

**Table 10.** Average Biomass Production and Nutrient Uptake of Brassica Cover Crops in the Piedmont Region of Virginia (2023 -2024)

| Variety                  | Species        | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac) | Phosphorous (lb/ac) | Potassium (lb/ac) | Magnesium (lb/ac) | Calcium (lb/ac) | Sulfur (lb/ac) | C:N   |
|--------------------------|----------------|----------------|----------------------------|------------------|---------------------|-------------------|-------------------|-----------------|----------------|-------|
| Aerifi                   | Radish         | April 25       | 3,993                      | 101              | 43                  | 103               | 12                | 105             | 31             | 16    |
| Control OR               | Oilseed Radish | -              | 3,740                      | 106              | 32                  | 137               | 16                | 69              | 23             | 14    |
| Control Radish           | Radish         | April 25       | 2,753                      | 80               | 28                  | 101               | 12                | 56              | 21             | 12    |
| Eco Till                 | Radish         | April 25       | 3,756                      | 61               | 33                  | 72                | 10                | 34              | 15             | 25    |
| Jackpot                  | Turnip         | April 12       | 4,612                      | 65               | 38                  | 112               | 7                 | 27              | 10             | 24    |
| Master                   | White Mustard  | April 25       | 922                        | 28               | 9                   | 28                | 3                 | 16              | 6              | 13    |
| Vivant Hybrid            | Turnip         | April 25       | -                          | -                | -                   | -                 | -                 | -               | -              | -     |
| Average                  | --             | --             | 3,296                      | 74               | 30                  | 92                | 10                | 51              | 18             | 17    |
| Coefficient of Variation | --             | --             | 90.09                      | 65.71            | 80.36               | 73.86             | 79.35             | 88.09           | 72.78          | 41.22 |
| P-Value                  | --             | --             | 0.83                       | 0.61             | 0.80                | 0.68              | 0.63              | 0.41            | 0.42           | 0.29  |
| Tukey's HSD              | --             | --             | 7,984                      | 130.48           | 64.87               | 188.10            | 21.26             | 118.02          | 33.89          | 18.96 |

**Table 11.** Average Biomass Production and Nutrient Uptake of Legume Cover Crops in the Piedmont Region of Virginia (2023 -2024)

| Variety                  | Species        | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac)  | Phosphorous (lb/ac) | Potassium (lb/ac) | Magnesium (lb/ac) | Calcium (lb/ac) | Sulfur (lb/ac) | C:N              |
|--------------------------|----------------|----------------|----------------------------|-------------------|---------------------|-------------------|-------------------|-----------------|----------------|------------------|
| AU Early Cover           | Hairy Vetch    | -              | 2,552                      | 89 <sup>ab</sup>  | 23                  | 93 <sup>ab</sup>  | 5                 | 23              | 6              | 12 <sup>b</sup>  |
| AU Robin                 | Clover         | April 25       | 257                        | 5 <sup>b</sup>    | 2                   | 6 <sup>b</sup>    | 0                 | 3               | 1              | 18 <sup>ab</sup> |
| Au Sunrise               | Clover         | April 25       | 671                        | 10 <sup>ab</sup>  | 6                   | 21 <sup>b</sup>   | 1                 | 8               | 3              | 16 <sup>ab</sup> |
| Cahaba                   | White Vetch    | -              | 3,070                      | 91 <sup>ab</sup>  | 28                  | 91 <sup>ab</sup>  | 6                 | 39              | 8              | 15 <sup>ab</sup> |
| Dixie Crimson            | Crimson Clover | April 25       | 260                        | 8 <sup>b</sup>    | 2                   | 9a <sup>b</sup>   | 1                 | 5               | 1              | 17 <sup>ab</sup> |
| eNhance                  | Persian Clover | -              | 559                        | 14 <sup>b</sup>   | 5                   | 21 <sup>b</sup>   | 1                 | 9               | 1              | 15 <sup>ab</sup> |
| Frosty                   | Berseem Clover | -              | 2,395                      | 33 <sup>ab</sup>  | 14                  | 47 <sup>ab</sup>  | 3                 | 10              | 3              | 27 <sup>a</sup>  |
| Hairy Vetch              | Hairy Vetch    | -              | 4,006                      | 140 <sup>a</sup>  | 33                  | 151 <sup>a</sup>  | 7                 | 37              | 8              | 12 <sup>b</sup>  |
| Icicle                   | Winter Pea     | -              | 1,556                      | 46 <sup>ab</sup>  | 14                  | 47 <sup>ab</sup>  | 3                 | 13              | 5              | 14 <sup>b</sup>  |
| Keystone                 | Winter Pea     | -              | 1,546                      | 46 <sup>ab</sup>  | 13                  | 49 <sup>ab</sup>  | 3                 | 17              | 4              | 14 <sup>b</sup>  |
| Keystone Winter Pea      | Winter Pea     | -              | 4,204                      | 115 <sup>ab</sup> | 33                  | 117 <sup>ab</sup> | 10                | 65              | 16             | 15 <sup>ab</sup> |
| Purple Bounty            | Hairy Vetch    | -              | 3,100                      | 103 <sup>ab</sup> | 29                  | 117 <sup>ab</sup> | 5                 | 28              | 7              | 13 <sup>b</sup>  |
| Survivor                 | Winter Pea     | -              | 1,145                      | 33 <sup>ab</sup>  | 9                   | 28 <sup>ab</sup>  | 2                 | 13              | 4              | 14 <sup>b</sup>  |
| Average                  | --             | --             | 1,948                      | 57                | 16                  | 61                | 4                 | 21              | 5              | 15               |
| Coefficient of Variation | --             | --             | 73.51                      | 60.92             | 68.02               | 62.50             | 79.19             | 90.09           | 96.70          | 26.54            |
| P-Value                  | --             | --             | 0.17                       | 0.01              | 0.09                | 0.02              | 0.11              | 0.014           | 0.20           | 0.02             |
| Tukey's HSD              | --             | --             | 4,479                      | 109.16            | 34.34               | 120.49            | 8.72              | 58.00           | 14.65          | 11.11            |

**Table 12.** Average Biomass Production and Nutrient Uptake of Grass Cover Crops in the Piedmont Region of Virginia (2023 -2024)

| Variety                  | Species         | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac) | Phosphorous (lb/ac) | Potassium (lb/ac) | Magnesium (lb/ac) | Calcium (lb/ac) | Sulfur (lb/ac) | C:N   |
|--------------------------|-----------------|----------------|----------------------------|------------------|---------------------|-------------------|-------------------|-----------------|----------------|-------|
| AGS 2024                 | Wheat           | April 25       | 5,966                      | 61               | 37                  | 93                | 4                 | 14              | 7              | 41    |
| AGS 3022                 | Wheat           | April 25       | -                          | -                | -                   | -                 | -                 | -               | -              | -     |
| AGS 3026                 | Wheat           | -              | 6,602                      | 96               | 38                  | 140               | 8                 | 12              | 9              | 29    |
| AGS 4023                 | Wheat           | -              | 4,092                      | 50               | 29                  | 66                | 4                 | 7               | 5              | 34    |
| AGS 4043                 | Wheat           | -              | 8,077                      | 96               | 42                  | 131               | 7                 | 16              | 8              | 35    |
| Coker 227                | Oat             | April 25       | 4,435                      | 56               | 23                  | 92                | 5                 | 11              | 5              | 33    |
| Dexter                   | Annual Ryegrass | -              | 4,272                      | 74               | 20                  | 160               | 7                 | 27              | 7              | 23    |
| Halsey Intermediate      | Ryegrass        | -              | 3,509                      | 59               | 24                  | 117               | 6                 | 20              | 8              | 28    |
| Horizon 214              | Oat             | -              | 5,713                      | 83               | 37                  | 152               | 7                 | 16              | 8              | 29    |
| Horizon 306              | Oat             | -              | 5,372                      | 80               | 34                  | 132               | 7                 | 15              | 7              | 32    |
| Horizon 578              | Oat             | -              | 5,977                      | 84               | 40                  | 146               | 8                 | 16              | 7              | 30    |
| Horizon 720              | Oat             | -              | 5,303                      | 62               | 32                  | 129               | 7                 | 17              | 7              | 36    |
| HyOctane                 | Triticale       | -              | 6,323                      | 73               | 38                  | 131               | 6                 | 14              | 8              | 37    |
| McKinley                 | Annual Ryegrass | -              | 3,073                      | 52               | 23                  | 88                | 6                 | 20              | 7              | 25    |
| NC-14                    | Wheat           | April 25       | 9,571                      | 107              | 36                  | 144               | 9                 | -               | 10             | 37    |
| Pratex                   | Black Oat (AS)  | April 25       | 4,674                      | 84               | 26                  | 114               | 10                | 33              | 13             | 23    |
| Pratex                   | Black Oat (SW)  | -              | 3,878                      | 48               | 28                  | 80                | 4                 | 17              | 6              | 33    |
| Average                  | --              | --             | 5,427                      | 73               | 32                  | 120               | 7                 | 17              | 8              | 32    |
| Coefficient of Variation | --              | --             | 37.38                      | 41.91            | 37.90               | 43.03             | 40.58             | 46.75           | 49.31          | 19.06 |
| P-Value                  | --              | --             | 0.05                       | 0.51             | 0.52                | 0.65              | 0.28              | 0.12            | 0.63           | 0.05  |
| Tukey's HSD              | --              | --             | 5,750                      | 86.66            | 33.86               | 146.64            | 7.52              | 22.83           | 10.72          | 16.98 |

## Shenandoah Valley Cover Crop Results (2023 – 2024)

**Table 13.** Average Biomass Production and Nutrient Uptake of Brassica Cover Crops in the Shenandoah Valley Region of Virginia (2023 -2024)

| Variety                         | Species        | Full Bloom<br>Biomass (lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Magnesium<br>(lb/ac) | Calcium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N          |
|---------------------------------|----------------|-------------------------------|---------------------|------------------------|----------------------|----------------------|--------------------|-------------------|--------------|
| <b>Aerifi</b>                   | Radish         | 3,236                         | 85                  | 50                     | 100                  | 8                    | 64                 | 23                | 15           |
| <b>Control OR</b>               | Oilseed Radish | 2,895                         | 82                  | 43                     | 161                  | 12                   | 53                 | 15                | 13           |
| <b>Control Radish</b>           | Radish         | 2,504                         | 67                  | 30                     | 113                  | 9                    | 51                 | 13                | 13           |
| <b>Eco Till</b>                 | Radish         | 2,036                         | 60                  | 31                     | 96                   | 9                    | 43                 | 18                | 14           |
| <b>Jackpot</b>                  | Turnip         | 1,620                         | 43                  | 32                     | 60                   | 4                    | 30                 | 7                 | 14           |
| <b>Master</b>                   | White Mustard  | 1,768                         | 50                  | 22                     | 66                   | 5                    | 33                 | 7                 | 14           |
| <b>Vivant Hybrid</b>            | Turnip         | 1,294                         | 39                  | 21                     | 71                   | 3                    | 22                 | 6                 | 13           |
| <b>Average</b>                  | --             | <b>2,193</b>                  | <b>61</b>           | <b>33</b>              | <b>95</b>            | <b>7</b>             | <b>42</b>          | <b>13</b>         | <b>14</b>    |
| <b>Coefficient of Variation</b> | --             | <b>58.71</b>                  | <b>57.21</b>        | <b>55.66</b>           | <b>63.60</b>         | <b>77.24</b>         | <b>63.52</b>       | <b>76.09</b>      | <b>24.26</b> |
| <b>P-Value</b>                  | --             | <b>0.55</b>                   | <b>0.62</b>         | <b>0.47</b>            | <b>0.52</b>          | <b>0.55</b>          | <b>0.56</b>        | <b>0.39</b>       | <b>0.97</b>  |
| <b>Tukey's HSD</b>              | --             | <b>3,242</b>                  | <b>87.90</b>        | <b>45.19</b>           | <b>153.64</b>        | <b>14.45</b>         | <b>37.86</b>       | <b>24.68</b>      | <b>8.18</b>  |

**Table 14.** Average Biomass Production and Nutrient Uptake of Legume Cover Crops in the Shenandoah Valley Region of Virginia (2023 -2024)

| Variety                         | Species        | Full Bloom<br>Biomass (lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Magnesium<br>(lb/ac) | Calcium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N          |
|---------------------------------|----------------|-------------------------------|---------------------|------------------------|----------------------|----------------------|--------------------|-------------------|--------------|
| <b>AU Early Cover</b>           | Hairy Vetch    | 3,518                         | 111 <sup>a</sup>    | 50 <sup>a</sup>        | 199                  | 13                   | 47 <sup>a</sup>    | 10 <sup>a</sup>   | 13           |
| <b>AU Robin</b>                 | Clover         | 1,020                         | 23 <sup>ab</sup>    | 11 <sup>ab</sup>       | 69                   | 4                    | 12 <sup>ab</sup>   | 3 <sup>ab</sup>   | 18           |
| <b>Au Sunrise</b>               | Clover         | 720                           | 16 <sup>b</sup>     | 7 <sup>b</sup>         | 57                   | 4                    | 10 <sup>ab</sup>   | 2 <sup>b</sup>    | 15           |
| <b>Cahaba</b>                   | White Vetch    | 1,054                         | 31 <sup>ab</sup>    | 13 <sup>ab</sup>       | 72                   | 5                    | 16 <sup>ab</sup>   | 2 <sup>ab</sup>   | 12           |
| <b>Crimson</b>                  | Crimson Clover | 601                           | 20 <sup>b</sup>     | 8 <sup>b</sup>         | 28                   | 1                    | 5 <sup>b</sup>     | 1 <sup>b</sup>    | 13           |
| <b>eNhance</b>                  | Persian Clover | 1,014                         | 26 <sup>ab</sup>    | 11 <sup>ab</sup>       | 68                   | 6                    | 14 <sup>ab</sup>   | 2 <sup>ab</sup>   | 14           |
| <b>Frosty</b>                   | Berseem Clover | 1,092                         | 24 <sup>ab</sup>    | 13 <sup>ab</sup>       | 54                   | 3                    | 8 <sup>b</sup>     | 2 <sup>b</sup>    | 17           |
| <b>Hairy Vetch</b>              | Hairy Vetch    | 1,120                         | 37 <sup>ab</sup>    | 17 <sup>ab</sup>       | 54                   | 3                    | 10 <sup>ab</sup>   | 3 <sup>ab</sup>   | 13           |
| <b>Icicle</b>                   | Winter Pea     | 1,432                         | 34 <sup>ab</sup>    | 17 <sup>ab</sup>       | 84                   | 6                    | 18 <sup>ab</sup>   | 4 <sup>ab</sup>   | 16           |
| <b>Keystone</b>                 | Winter Pea     | 866                           | 26 <sup>ab</sup>    | 14 <sup>ab</sup>       | 39                   | 3                    | 10 <sup>ab</sup>   | 3 <sup>ab</sup>   | 14           |
| <b>Keystone Winter Pea</b>      | Winter Pea     | 836                           | 27 <sup>ab</sup>    | 11 <sup>ab</sup>       | 31                   | 2                    | 9 <sup>b</sup>     | 2 <sup>b</sup>    | 12           |
| <b>Purple Bounty</b>            | Hairy Vetch    | 1,916                         | 60 <sup>ab</sup>    | 30 <sup>ab</sup>       | 114                  | 6                    | 20 <sup>ab</sup>   | 6 <sup>ab</sup>   | 14           |
| <b>Survivor</b>                 | Winter Pea     | 2,112                         | 59 <sup>ab</sup>    | 23 <sup>ab</sup>       | 77                   | 4                    | 18 <sup>ab</sup>   | 6 <sup>ab</sup>   | 12           |
| <b>Average</b>                  | --             | <b>1,331</b>                  | <b>38</b>           | <b>17</b>              | <b>73</b>            | <b>5</b>             | <b>15</b>          | <b>4</b>          | <b>14</b>    |
| <b>Coefficient of Variation</b> | --             | <b>80.27</b>                  | <b>80.63</b>        | <b>77.56</b>           | <b>90.33</b>         | <b>87.93</b>         | <b>83.07</b>       | <b>75.50</b>      | <b>23.47</b> |
| <b>P-Value</b>                  | --             | <b>0.14</b>                   | <b>0.05</b>         | <b>0.04</b>            | <b>0.24</b>          | <b>0.19</b>          | <b>0.06</b>        | <b>0.03</b>       | <b>0.29</b>  |
| <b>Tukey's HSD</b>              | --             | <b>2,886</b>                  | <b>82.77</b>        | <b>36.43</b>           | <b>177.60</b>        | <b>10.99</b>         | <b>34.12</b>       | <b>7.08</b>       | <b>8.85</b>  |

**Table 15.** Average Biomass Production and Nutrient Uptake of Grass Cover Crops in the Shenandoah Valley Region of Virginia (2023 -2024)

| Variety                  | Species         | Full Bloom<br>Biomass (lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Magnesium<br>(lb/ac) | Calcium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N   |
|--------------------------|-----------------|-------------------------------|---------------------|------------------------|----------------------|----------------------|--------------------|-------------------|-------|
| AGS 2024                 | Wheat           | 5,493                         | 75                  | 45                     | 105                  | 5                    | 10                 | 7                 | 31    |
| AGS 3022                 | Wheat           | 4,923                         | 68                  | 38                     | 87                   | 5                    | 8                  | 6                 | 31    |
| AGS 3026                 | Wheat           | 5,212                         | 89                  | 44                     | 134                  | 6                    | 12                 | 9                 | 25    |
| AGS 4023                 | Wheat           | 3,494                         | 44                  | 28                     | 63                   | 3                    | 5                  | 4                 | 34    |
| AGS 4043                 | Wheat           | 5,692                         | 93                  | 44                     | 136                  | 5                    | 14                 | 8                 | 25    |
| Coker 227                | Oat             | 6,537                         | 90                  | 51                     | 153                  | 7                    | 19                 | 8                 | 30    |
| Dexter                   | Annual Ryegrass | 3,455                         | 62                  | 36                     | 157                  | 5                    | 15                 | 6                 | 22    |
| Halsey Intermediate      | Ryegrass        | 2,079                         | 38                  | 20                     | 75                   | 3                    | 9                  | 4                 | 23    |
| Horizon 214              | Oat             | 3,623                         | 74                  | 38                     | 117                  | 5                    | 12                 | 6                 | 20    |
| Horizon 306              | Oat             | 5,803                         | 101                 | 47                     | 183                  | 7                    | 14                 | 9                 | 26    |
| Horizon 578              | Oat             | 4,798                         | 81                  | 37                     | 146                  | 5                    | 12                 | 7                 | 26    |
| Horizon 720              | Oat             | 2,924                         | 40                  | 25                     | 87                   | 3                    | 7                  | 4                 | 30    |
| HyOctane                 | Triticale       | 5,512                         | 78                  | 46                     | 138                  | 6                    | 17                 | 8                 | 32    |
| McKinley                 | Annual Ryegrass | 4,181                         | 76                  | 43                     | 128                  | 5                    | 18                 | 8                 | 22    |
| NC-14                    | Wheat           | 4,789                         | 74                  | 40                     | 102                  | 5                    | 11                 | 6                 | 28    |
| Pratex                   | Black Oat (AS)  | 5,236                         | 107                 | 56                     | 172                  | 9                    | 24                 | 10                | 21    |
| Pratex                   | Black Oat (SW)  | 3,034                         | 53                  | 32                     | 93                   | 3                    | 10                 | 5                 | 23    |
| Average                  | --              | 4,517                         | 73                  | 40                     | 122                  | 5                    | 13                 | 7                 | 26    |
| Coefficient of Variation | --              | 39.01                         | 43.74               | 38.90                  | 44.38                | 45.77                | 51.00              | 47.42             | 20.36 |
| P-Value                  | --              | 0.17                          | 0.30                | 0.39                   | 0.30                 | 0.20                 | 0.09               | 0.47              | 0.07  |
| Tukey's HSD              | --              | 4,932                         | 89.46               | 43.10                  | 151.40               | 6.42                 | 18.04              | 8.96              | 15.05 |

## 2022 – 2023

### Average Statewide Cover Crop Results

**Table 16.** Statewide Average Biomass Production and Nutrient Uptake of Brassica Cover Crops Across Virginia (2022 – 2023)

| Variety                         | Species  | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N          |
|---------------------------------|----------|-------------------------------|---------------------|------------------------|----------------------|-------------------|--------------|
| <b>African Cabbage</b>          | Cabbage  | 2,447                         | 30                  | 18                     | 71                   | 11                | 32           |
| <b>Bayou Rape Winter Kale</b>   | Kale     | 1,742                         | 17                  | 11                     | 31                   | 6                 | 38           |
| <b>Daikon</b>                   | Radish   | 2,160                         | 27                  | 18                     | 61                   | 12                | 26           |
| <b>Impact Forage Collards</b>   | Collards | 2,334                         | 24                  | 12                     | 48                   | 9                 | 31           |
| <b>Nitro</b>                    | Radish   | 2,657                         | 34                  | 25                     | 86                   | 15                | 28           |
| <b>Pruple Top</b>               | Turnip   | 1,950                         | 34                  | 17                     | 57                   | 10                | 23           |
| <b>Radish VNS</b>               | Radish   | 2,365                         | 31                  | 21                     | 79                   | 12                | 28           |
| <b>Rapeseed VNS</b>             | Rapeseed | 2,076                         | 18                  | 13                     | 42                   | 7                 | 41           |
| <b>Siberian Kale</b>            | Kale     | 1,569                         | 15                  | 9                      | 29                   | 7                 | 36           |
| <b>Smart Radish</b>             | Radish   | 2,041                         | 26                  | 19                     | 63                   | 11                | 31           |
| <b>T-Raptor Hybrid</b>          | Rapeseed | 2,481                         | 27                  | 21                     | 73                   | 8                 | 35           |
| <b>Trophy</b>                   | Rapeseed | 1,352                         | 18                  | 9                      | 36                   | 6                 | 27           |
| <b>Trophy</b>                   | Rapeseed | 2,399                         | 32                  | 17                     | 65                   | 10                | 29           |
| <b>Average</b>                  | --       | <b>2,121</b>                  | <b>26</b>           | <b>18</b>              | <b>57</b>            | <b>10</b>         | <b>31</b>    |
| <b>Coefficient of Variation</b> | --       | <b>37.49</b>                  | <b>40.55</b>        | <b>43.30</b>           | <b>41.91</b>         | <b>35.02</b>      | <b>24.39</b> |
| <b>P-Value</b>                  | --       | <b>0.71</b>                   | <b>0.36</b>         | <b>0.13</b>            | <b>0.08</b>          | <b>0.05</b>       | <b>0.25</b>  |
| <b>Tukey's HSD</b>              | --       | <b>2,141</b>                  | <b>28.11</b>        | <b>19.14</b>           | <b>65.02</b>         | <b>9.47</b>       | <b>21.14</b> |

**Table 17.** Statewide Average Biomass Production and Nutrient Uptake of Legume Cover Crops Across Virginia (2022 – 2023)

| Variety                         | Species        | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N          |
|---------------------------------|----------------|-------------------------------|---------------------|------------------------|----------------------|-------------------|--------------|
| <b>AU Merit</b>                 | Hairy Vetch    | 3,636                         | 120                 | 31                     | 120                  | 9                 | 16           |
| <b>AU Robin</b>                 | Crimson Clover | 3,362                         | 83                  | 24                     | 131                  | 5                 | 15           |
| <b>AU Sunrise</b>               | Crimson Clover | 4,325                         | 99                  | 23                     | 156                  | 7                 | 16           |
| <b>Austrian Winter Pea VNS</b>  | Winter Pea     | 2,971                         | 77                  | 16                     | 98                   | 8                 | 16           |
| <b>Austrian Winter Pea VNS</b>  | Winter Pea     | 4,523                         | 139                 | 46                     | 153                  | 13                | 15           |
| <b>Balansa Clover VNS</b>       | Balansa Clover | 4,286                         | 121                 | 29                     | 203                  | 9                 | 12           |
| <b>Cahaba</b>                   | White Vetch    | 2,881                         | 95                  | 20                     | 78                   | 5                 | 12           |
| <b>Dixie</b>                    | Crimson Clover | 5,843                         | 135                 | 30                     | 210                  | 7                 | 17           |
| <b>Fixation</b>                 | Balansa Clover | 5,945                         | 180                 | 48                     | 271                  | 15                | 13           |
| <b>Keystone Winter Pea</b>      | Winter Pea     | 3,672                         | 123                 | 37                     | 136                  | 8                 | 13           |
| <b>Medium Big Red Clover*</b>   | Red Clover     | 3,608                         | 110                 | 23                     | 130                  | 5                 | 12           |
| <b>Morton Winter Lentil</b>     | Lentil         | 2,522                         | 68                  | 19                     | 59                   | 4                 | 18           |
| <b>Patagonia</b>                | Hairy Vetch    | 4,137                         | 149                 | 37                     | 145                  | 9                 | 12           |
| <b>Patagonia</b>                | Hairy Vetch    | 5,228                         | 167                 | 45                     | 191                  | 10                | 13           |
| <b>TNT</b>                      | Hairy Vetch    | 5,460                         | 198                 | 54                     | 222                  | 9                 | 11           |
| <b>Average</b>                  | --             | <b>4,160</b>                  | <b>124</b>          | <b>32</b>              | <b>153</b>           | <b>8</b>          | <b>14</b>    |
| <b>Coefficient of Variation</b> | --             | <b>58.41</b>                  | <b>34.72</b>        | <b>71.65</b>           | <b>67.06</b>         | <b>62.47</b>      | <b>22.79</b> |
| <b>P-Value</b>                  | --             | <b>0.66</b>                   | <b>0.57</b>         | <b>0.47</b>            | <b>0.25</b>          | <b>0.09</b>       | <b>0.15</b>  |
| <b>Tukey's HSD</b>              | --             | <b>5,524</b>                  | <b>182.16</b>       | <b>52.88</b>           | <b>230.73</b>        | <b>13.60</b>      | <b>7.57</b>  |

**Table 18.** Statewide Average Biomass Production and Nutrient Uptake of Grass Cover Crops Across Virginia (2022 – 2023)

| Variety                  | Species         | Full Bloom<br>Biomass (lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N   |
|--------------------------|-----------------|-------------------------------|---------------------|------------------------|----------------------|-------------------|-------|
| AGS 2024                 | Wheat           | 2,402 <sup>ab</sup>           | 26                  | 12                     | 52                   | 3                 | 42    |
| AGS 3015                 | Wheat           | 2,719 <sup>ab</sup>           | 27                  | 17                     | 62                   | 3                 | 40    |
| AGS 3022                 | Wheat           | 3,455 <sup>ab</sup>           | 33                  | 17                     | 62                   | 4                 | 46    |
| AGS 3026                 | Wheat           | 3,200 <sup>ab</sup>           | 39                  | 16                     | 76                   | 4                 | 35    |
| AGS 4023                 | Wheat           | 3,358 <sup>ab</sup>           | 35                  | 16                     | 75                   | 4                 | 47    |
| AGS 4043                 | Wheat           | 3,219 <sup>ab</sup>           | 34                  | 17                     | 67                   | 3                 | 40    |
| Black Oats VNS           | Black Oat       | 2,923 <sup>ab</sup>           | 33                  | 17                     | 92                   | 4                 | 43    |
| Cereal Rye VNS           | Cereal Rye      | 2,120 <sup>ab</sup>           | 31                  | 16                     | 57                   | 3                 | 29    |
| Coker 227                | Oat             | 3,783 <sup>ab</sup>           | 29                  | 20                     | 85                   | 4                 | 56    |
| Cosaque                  | Black Oat       | 3,113 <sup>ab</sup>           | 24                  | 15                     | 71                   | 3                 | 49    |
| Cosaque                  | Black Oat       | 2,774 <sup>ab</sup>           | 20                  | 17                     | 67                   | 4                 | 61    |
| Elbon                    | Cereal Rye      | 4,087 <sup>ab</sup>           | 52                  | 23                     | 90                   | 5                 | 34    |
| Gainer 154               | Triticale       | 3,175 <sup>ab</sup>           | 32                  | 15                     | 76                   | 3                 | 43    |
| Gore Soft Red Beardless  | Winter Wheat    | 2,828 <sup>ab</sup>           | 38                  | 15                     | 71                   | 4                 | 31    |
| Hayden                   | Oat             | 2,955 <sup>ab</sup>           | 28                  | 21                     | 64                   | 4                 | 43    |
| Hazlet                   | Cereal Rye      | 2,765 <sup>ab</sup>           | 34                  | 19                     | 75                   | 4                 | 36    |
| Horizon 214              | Oat             | 4,441 <sup>ab</sup>           | 36                  | 21                     | 103                  | 4                 | 49    |
| Horizon 306              | Oat             | 3,987 <sup>ab</sup>           | 45                  | 16                     | 92                   | 4                 | 38    |
| Horizon 720              | Oat             | 5,366 <sup>a</sup>            | 46                  | 30                     | 107                  | 5                 | 51    |
| Hyton                    | Triticale       | 3,215 <sup>ab</sup>           | 38                  | 21                     | 89                   | 4                 | 36    |
| Kodiak                   | Annual Ryegrass | 2,824 <sup>ab</sup>           | 33                  | 14                     | 74                   | 5                 | 41    |
| KWS Serafino Hybrid      | Rye             | 2,756 <sup>ab</sup>           | 28                  | 17                     | 63                   | 4                 | 42    |
| Low Boy Dwarf            | Annual Ryegrass | 2,032 <sup>b</sup>            | 27                  | 13                     | 50                   | 4                 | 31    |
| Malabar                  | Winter Wheat    | 2,278 <sup>ab</sup>           | 28                  | 18                     | 48                   | 4                 | 33    |
| Nitrous                  | Triticale       | 3,665 <sup>ab</sup>           | 36                  | 23                     | 94                   | 5                 | 46    |
| Surge                    | Triticale       | 3,908 <sup>ab</sup>           | 48                  | 23                     | 103                  | 5                 | 33    |
| SY TF813 Winter          | Triticale       | 4,146 <sup>ab</sup>           | 44                  | 31                     | 108                  | 6                 | 39    |
| Thor Winter              | Triticale       | 2,461 <sup>ab</sup>           | 28                  | 17                     | 60                   | 4                 | 34    |
| Valor                    | Barley          | 3,055 <sup>ab</sup>           | 30                  | 16                     | 72                   | 5                 | 41    |
| Average                  | --              | 3,207                         | 34                  | 18                     | 76                   | 4                 | 41    |
| Coefficient of Variation | --              | 37.27                         | 42.48               | 37.16                  | 39.37                | 30.95             | 38.24 |
| P-Value                  | --              | 0.10                          | 0.55                | 0.10                   | 0.25                 | 0.16              | 0.60  |
| Tukey's HSD              | --              | 2,995                         | 36.10               | 16.81                  | 75.28                | 3.13              | 39.87 |

## Coastal Plains Cover Crop Results

**Table 19.** Average Biomass Production and Nutrient Uptake of Brassica Cover Crops in the Coastal Plains Region of Virginia (2022 – 2023)

| Variety                         | Species  | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac) | Phosphorous (lb/ac) | Potassium (lb/ac) | Sulfur (lb/ac) | C:N          |
|---------------------------------|----------|----------------|----------------------------|------------------|---------------------|-------------------|----------------|--------------|
| <b>African</b>                  | Cabbage  | -              | 2,447                      | 30               | 18                  | 71                | 11             | 32           |
| <b>Bayou Rape</b>               | Kale     | May 3 or later | 1,742                      | 17               | 11                  | 31                | 6              | 38           |
| <b>Daikon</b>                   | Radish   | March 24       | 2,160                      | 27               | 18                  | 61                | 12             | 26           |
| <b>Impact Forage</b>            | Collards | May 3 or later | 3,009                      | 30               | 15                  | 61                | 11             | 36           |
| <b>Nitro</b>                    | Radish   | March 24       | 2,657                      | 34               | 25                  | 86                | 15             | 28           |
| <b>Pruple Top</b>               | Turnip   | April 11       | 1,979                      | 30               | 22                  | 64                | 10             | 26           |
| <b>Radish VNS</b>               | Radish   | March 24       | 2,365                      | 31               | 21                  | 79                | 12             | 28           |
| <b>Rapeseed VNS</b>             | Rapeseed | May 3 or later | 1,569                      | 15               | 9                   | 29                | 7              | 36           |
| <b>Siberian Kale</b>            | Kale     | March 24       | 2,041                      | 26               | 19                  | 63                | 11             | 31           |
| <b>Smart Radish</b>             | Radish   | April 3        | 2,481                      | 27               | 21                  | 73                | 8              | 35           |
| <b>T-Raptor Hybrid</b>          | Rapeseed | April 11       | 1,644                      | 20               | 12                  | 44                | 7              | 31           |
| <b>Trophy</b>                   | Rapeseed | April 11       | 2,399                      | 32               | 17                  | 65                | 10             | 29           |
| <b>Trophy</b>                   | Rapeseed | May 3 or later | 2,076                      | 18               | 13                  | 42                | 7              | 41           |
| <b>Average</b>                  | --       | --             | <b>2,198</b>               | <b>26</b>        | <b>17</b>           | <b>59</b>         | <b>10</b>      | <b>32</b>    |
| <b>Coefficient of Variation</b> | --       | --             | <b>40.00</b>               | <b>39.37</b>     | <b>41.01</b>        | <b>41.38</b>      | <b>41.46</b>   | <b>23.38</b> |
| <b>P-Value</b>                  | --       | --             | <b>0.43</b>                | <b>0.21</b>      | <b>0.17</b>         | <b>0.17</b>       | <b>0.20</b>    | <b>0.29</b>  |
| <b>Tukey's HSD</b>              | --       | --             | <b>2,437</b>               | <b>27.51</b>     | <b>18.78</b>        | <b>65.90</b>      | <b>10.26</b>   | <b>20.29</b> |

**Table 20.** Average Biomass Production and Nutrient Uptake of Legume Cover Crops in the Coastal Plains Region of Virginia (2022 – 2023)

| Variety                         | Species        | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac)   | Phosphorous (lb/ac) | Potassium (lb/ac)  | Sulfur (lb/ac)    | C:N               |
|---------------------------------|----------------|----------------|----------------------------|--------------------|---------------------|--------------------|-------------------|-------------------|
| <b>AU Merit</b>                 | Hairy Vetch    | May 3 or later | 5,700 <sup>a-d</sup>       | 206 <sup>a-d</sup> | 55 <sup>ab</sup>    | 202 <sup>a-d</sup> | 14 <sup>a-e</sup> | 12 <sup>cd</sup>  |
| <b>AU Robin</b>                 | Crimson Clover | April 11       | 5,216 <sup>a-d</sup>       | 127 <sup>a-d</sup> | 38 <sup>ab</sup>    | 205 <sup>a-d</sup> | 9 <sup>cde</sup>  | 16 <sup>abc</sup> |
| <b>AU Sunrise</b>               | Crimson Clover | April 11       | 6,293 <sup>a-d</sup>       | 142 <sup>a-d</sup> | 34 <sup>ab</sup>    | 234 <sup>abc</sup> | 9 <sup>cde</sup>  | 17 <sup>ab</sup>  |
| <b>Austrian Winter Pea VNS</b>  | Winter Pea     | April 19-25    | 6,198 <sup>a-d</sup>       | 193 <sup>a-d</sup> | 47 <sup>ab</sup>    | 199 <sup>a-d</sup> | 14 <sup>a-e</sup> | 13 <sup>a-d</sup> |
| <b>Austrian Winter Pea VNS</b>  | Winter Pea     | April 19-25    | 6,755 <sup>ab</sup>        | 215 <sup>abc</sup> | 71 <sup>a</sup>     | 232 <sup>abc</sup> | 20 <sup>ab</sup>  | 13 <sup>bcd</sup> |
| <b>Balansa Clover VNS</b>       | Balansa Clover | April 19       | 6,452 <sup>a-d</sup>       | 178 <sup>a-d</sup> | 43 <sup>ab</sup>    | 282 <sup>ab</sup>  | 16 <sup>a-d</sup> | 14 <sup>a-d</sup> |
| <b>Cahaba</b>                   | White Vetch    | May 3 or later | 3,436 <sup>cd</sup>        | 116 <sup>bcd</sup> | 25 <sup>b</sup>     | 93 <sup>cd</sup>   | 8 <sup>de</sup>   | 12 <sup>d</sup>   |
| <b>Dixie</b>                    | Crimson Clover | April 19       | 6,559 <sup>abc</sup>       | 145 <sup>a-d</sup> | 35 <sup>ab</sup>    | 247 <sup>ab</sup>  | 9 <sup>cde</sup>  | 18 <sup>a</sup>   |
| <b>Fixation</b>                 | Balansa Clover | April 25       | 7,085 <sup>a</sup>         | 221 <sup>ab</sup>  | 60 <sup>ab</sup>    | 336 <sup>a</sup>   | 22 <sup>a</sup>   | 13 <sup>bcd</sup> |
| <b>Keystone</b>                 | Winter Pea     | April 25       | 4,722 <sup>a-d</sup>       | 159 <sup>a-d</sup> | 48 <sup>ab</sup>    | 177 <sup>bcd</sup> | 12 <sup>b-e</sup> | 12 <sup>cd</sup>  |
| <b>Medium Big Red Clover*</b>   | Red Clover     | -              | 3,650 <sup>bcd</sup>       | 111 <sup>cd</sup>  | 23 <sup>b</sup>     | 138 <sup>bcd</sup> | 7 <sup>e</sup>    | 12 <sup>bcd</sup> |
| <b>Morton</b>                   | Lentil         | -              | 3,304 <sup>d</sup>         | 99 <sup>d</sup>    | 26 <sup>b</sup>     | 74 <sup>d</sup>    | 6 <sup>e</sup>    | 14 <sup>a-d</sup> |
| <b>Patagonia</b>                | Hairy Vetch    | April 25       | 5,987 <sup>a-d</sup>       | 226 <sup>a</sup>   | 55 <sup>ab</sup>    | 217 <sup>a-d</sup> | 15 <sup>a-e</sup> | 11 <sup>d</sup>   |
| <b>Patagonia</b>                | Hairy Vetch    | April 25       | 6,341 <sup>a-d</sup>       | 208 <sup>abc</sup> | 58 <sup>ab</sup>    | 237 <sup>abc</sup> | 15 <sup>a-e</sup> | 12 <sup>bcd</sup> |
| <b>TNT</b>                      | Hairy Vetch    | May 3 or later | 5,460 <sup>a-d</sup>       | 198 <sup>a-d</sup> | 54 <sup>ab</sup>    | 222 <sup>abc</sup> | 16 <sup>a-d</sup> | 11 <sup>d</sup>   |
| <b>Average</b>                  | --             | --             | <b>5,544</b>               | <b>170</b>         | <b>45</b>           | <b>206</b>         | <b>13</b>         | <b>13</b>         |
| <b>Coefficient of Variation</b> | --             | --             | <b>26.92</b>               | <b>30.61</b>       | <b>38.99</b>        | <b>37.16</b>       | <b>41.11</b>      | <b>18.20</b>      |
| <b>P-Value</b>                  | --             | --             | <b>&lt; 0.01</b>           | <b>&lt; 0.01</b>   | <b>&lt; 0.01</b>    | <b>&lt; 0.01</b>   | <b>&lt; 0.01</b>  | <b>&lt; 0.01</b>  |
| <b>Tukey's HSD</b>              | --             | --             | <b>2,926</b>               | <b>99.37</b>       | <b>34.64</b>        | <b>133.20</b>      | <b>8.08</b>       | <b>4.36</b>       |

**Table 21.** Average Biomass Production and Nutrient Uptake of Grass Cover Crops in the Coastal Plains Region of Virginia (2022 – 2023)

| Variety                  | Species         | 50% Bloom Date | Full Bloom Biomass (lb/ac) | Nitrogen (lb/ac) | Phosphorous (lb/ac) | Potassium (lb/ac) | Sulfur (lb/ac) | C:N    |
|--------------------------|-----------------|----------------|----------------------------|------------------|---------------------|-------------------|----------------|--------|
| AGS 2024                 | Wheat           | April 19       | 2,362                      | 18               | 13                  | 40                | 3              | 51     |
| AGS 3015                 | Wheat           | April 19       | 3,588                      | 23               | 25                  | 73                | 4              | 61     |
| AGS 3022                 | Wheat           | April 19       | 2,901                      | 22               | 18                  | 48                | 3              | 52     |
| AGS 3026                 | Wheat           | April 19       | 4,041                      | 24               | 22                  | 63                | 4              | 63     |
| AGS 4023                 | Wheat           | April 19       | 2,687                      | 19               | 14                  | 44                | 3              | 60     |
| AGS 4043                 | Wheat           | April 19       | 2,430                      | 18               | 16                  | 40                | 3              | 49     |
| Black Oats VNS           | Black Oat       | May 3 or later | 3,617                      | 25               | 20                  | 88                | 4              | 67     |
| Cereal Rye VNS           | Cereal Rye      | April 25       | 1,531                      | 20               | 13                  | 34                | 2              | 32     |
| Coker 227                | Oat             | April 19       | 4,203                      | 27               | 23                  | 85                | 4              | 65     |
| Cosaque                  | Black Oat       | May 3 or later | 4,415                      | 25               | 20                  | 92                | 4              | 67     |
| Cosaque                  | Black Oat       | May 3 or later | 4,773                      | 37               | 27                  | 110               | 5              | 67     |
| Elbon                    | Cereal Rye      | April 19       | 2,765                      | 33               | 19                  | 63                | 4              | 35     |
| Gainer 154               | Triticale       | April 25       | 2,325                      | 19               | 14                  | 50                | 2              | 50     |
| Gore Soft Red Beardless  | Winter Wheat    | April 19       | 3,115                      | 31               | 20                  | 55                | 4              | 39     |
| Hayden                   | Oat             | May 3 or later | 3,661                      | 29               | 23                  | 81                | 4              | 50     |
| Hazlet                   | Cereal Rye      | April 25       | 2,434                      | 24               | 19                  | 62                | 3              | 41     |
| Horizon 214              | Oat             | April 19       | 4,991                      | 33               | 24                  | 103               | 4              | 58     |
| Horizon 306              | Oat             | April 19       | 3,676                      | 30               | 21                  | 58                | 4              | 47     |
| Horizon 720              | Oat             | April 19       | 5,366                      | 46               | 30                  | 107               | 5              | 51     |
| Hyton                    | Triticale       | April 25       | 3,436                      | 33               | 26                  | 81                | 5              | 43     |
| Kodiak                   | Annual Ryegrass | April 25       | 3,918                      | 31               | 19                  | 77                | 5              | 54     |
| KWS Serafino Hybrid      | Rye             | April 25       | 2,475                      | 22               | 16                  | 50                | 3              | 46     |
| Low Boy Dwarf            | Annual Ryegrass | May 3 or later | 2,117                      | 21               | 14                  | 44                | 4              | 39     |
| Malabar                  | Winter Wheat    | April 25       | 1,977                      | 23               | 18                  | 37                | 3              | 34     |
| Nitrous                  | Triticale       | April 125      | 3,504                      | 26               | 25                  | 69                | 4              | 57     |
| Surge                    | Triticale       | April 19       | 4,140                      | 40               | 31                  | 92                | 6              | 44     |
| SY TF813 Winter          | Triticale       | April 25       | 4,470                      | 39               | 33                  | 92                | 6              | 49     |
| Thor Winter              | Triticale       | April 25       | 2,301                      | 23               | 19                  | 47                | 3              | 38     |
| Valor                    | Barley          | April 19       | 4,024                      | 26               | 23                  | 84                | 6              | 57     |
| Average                  | --              | --             | 3,353                      | 27               | 21                  | 68                | 4              | 51     |
| Coefficient of Variation | --              | --             | 44.11                      | 47.06            | 37.20               | 46.50             | 39.88          | 28.11  |
| P-Value                  | --              | --             | 0.06                       | 0.58             | 0.05                | < 0.01            | 0.03           | < 0.01 |
| Tukey's HSD              | --              | --             | 4,035                      | 38.64            | 21.11               | 80.84             | 4.15           | 35.46  |

## Valley Cover Crop Results

**Table 22.** Average Biomass Production and Nutrient Uptake of Brassica Cover Crops in the Shenandoah Valley Region of Virginia (2022 – 2023).

*Note: Biomass data and nutrient analysis were not collected for Brassica varieties at the Valley location.*

| Variety         | Species  | 50% Bloom Date |
|-----------------|----------|----------------|
| African Cabbage | Cabbage  | March 24       |
| Bayou Rape      | Kale     | -              |
| Daikon          | Radish   | May 3 or later |
| Impact Forage   | Collards | March 24       |
| Nitro           | Radish   | May 3 or later |
| Purple Top      | Turnip   | March 24       |
| Radish VNS      | Radish   | April 11       |
| Rapeseed VNS    | Rapeseed | March 24       |
| Siberian Kale   | Kale     | May 3 or later |
| Smart Radish    | Radish   | March 24       |
| T-Raptor Hybrid | Rapeseed | April 3        |
| Trophy          | Rapeseed | April 11       |
| Trophy          | Rapeseed | April 11       |

**Table 23.** Average Biomass Production and Nutrient Uptake of Legume Cover Crops in the Shenandoah Valley Region of Virginia (2022 – 2023)

| Variety                         | Species        | 50% Bloom Date | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N          |
|---------------------------------|----------------|----------------|-------------------------------|---------------------|------------------------|----------------------|-------------------|--------------|
| <b>AU Merit</b>                 | Hairy Vetch    | May 3 or later | 1,573 <sup>bc</sup>           | 33 <sup>b</sup>     | 7 <sup>ab</sup>        | 38 <sup>bc</sup>     | 3                 | 20           |
| <b>AU Robin</b>                 | Crimson Clover | April 11       | 580 <sup>de</sup>             | 17 <sup>b</sup>     | 4 <sup>b</sup>         | 18 <sup>c</sup>      | 1                 | 13           |
| <b>AU Sunrise</b>               | Crimson Clover | April 11       | 1,374 <sup>cd</sup>           | 33 <sup>b</sup>     | 7 <sup>ab</sup>        | 39 <sup>bc</sup>     | 6                 | 14           |
| <b>Austrian Winter Pea VNS</b>  | Winter Pea     | April 19-25    | 1,294 <sup>cd</sup>           | 29 <sup>b</sup>     | 8 <sup>ab</sup>        | 35 <sup>bc</sup>     | 3                 | 18           |
| <b>Austrian Winter Pea VNS</b>  | Winter Pea     | April 19-25    | 1,175 <sup>cd</sup>           | 25 <sup>b</sup>     | 8 <sup>ab</sup>        | 33 <sup>bc</sup>     | 3                 | 19           |
| <b>Balansa Clover VNS</b>       | Balansa Clover | April 19       | 698 <sup>de</sup>             | 25 <sup>b</sup>     | 4 <sup>b</sup>         | 29 <sup>bc</sup>     | 2                 | 11           |
| <b>Cahaba</b>                   | White Vetch    | May 3 or later | 1,216 <sup>cde</sup>          | 32 <sup>b</sup>     | 7 <sup>ab</sup>        | 34 <sup>bc</sup>     | 3                 | 13           |
| <b>Dixie</b>                    | Crimson Clover | April 19       | 3698 <sup>a</sup>             | 107 <sup>a</sup>    | 14 <sup>a</sup>        | 98 <sup>a</sup>      | 5                 | 14           |
| <b>Fixation</b>                 | Balansa Clover | April 25       | 2,525 <sup>ab</sup>           | 57 <sup>ab</sup>    | 11 <sup>ab</sup>       | 74 <sup>ab</sup>     | 4                 | 14           |
| <b>Keystone</b>                 | Winter Pea     | April 25       | 522 <sup>de</sup>             | 13 <sup>b</sup>     | 3 <sup>b</sup>         | 12 <sup>c</sup>      | 3                 | 17           |
| <b>Medium Big Red Clover</b>    | Red Clover     | -              | 123 <sup>e</sup>              | 4 <sup>b</sup>      | 1 <sup>b</sup>         | 4 <sup>c</sup>       | 0                 | 12           |
| <b>Morton</b>                   | Lentil         | -              | 1,350 <sup>cd</sup>           | 22 <sup>b</sup>     | 8 <sup>ab</sup>        | 36 <sup>bc</sup>     | 2                 | 23           |
| <b>Patagonia</b>                | Hairy Vetch    | April 25       | 1,361 <sup>cd</sup>           | 33 <sup>b</sup>     | 9 <sup>ab</sup>        | 37 <sup>bc</sup>     | 3                 | 17           |
| <b>Patagonia</b>                | Hairy Vetch    | April 25       | 1,630 <sup>bc</sup>           | 34 <sup>b</sup>     | 9 <sup>ab</sup>        | 42 <sup>bc</sup>     | 4                 | 19           |
| <b>TNT</b>                      | Hairy Vetch    | May 3 or later | 798 <sup>cde</sup>            | 20 <sup>b</sup>     | 5 <sup>ab</sup>        | 18 <sup>bc</sup>     | 3                 | 18           |
| <b>Average</b>                  | --             | --             | <b>1,328</b>                  | <b>32</b>           | <b>7</b>               | <b>37</b>            | <b>3</b>          | <b>16</b>    |
| <b>Coefficient of Variation</b> | --             | --             | <b>15.08</b>                  | <b>28.80</b>        | <b>25.05</b>           | <b>28.08</b>         | <b>59.94</b>      | <b>20.97</b> |
| <b>P-Value</b>                  | --             | --             | <b>&lt; 0.01</b>              | <b>&lt; 0.01</b>    | <b>&lt; 0.01</b>       | <b>&lt; 0.01</b>     | <b>0.25</b>       | <b>0.19</b>  |
| <b>Tukey's HSD</b>              | --             | --             | <b>791</b>                    | <b>35.55</b>        | <b>7.16</b>            | <b>40.52</b>         | <b>4.93</b>       | <b>14.24</b> |

**Table 24.** Average Biomass Production and Nutrient Uptake of Grass Cover Crops in the Shenandoah Valley Region of Virginia (2022 – 2023)

| Variety                  | Species         | 50% Bloom Date | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N              |
|--------------------------|-----------------|----------------|-------------------------------|---------------------|------------------------|----------------------|-------------------|------------------|
| AGS 2024                 | Wheat           | April 19       | 3,344 <sup>ab</sup>           | 43                  | 15 <sup>ab</sup>       | 91                   | 4                 | 30 <sup>ab</sup> |
| AGS 3015                 | Wheat           | April 19       | 1,290 <sup>b</sup>            | 27                  | 7 <sup>ab</sup>        | 39                   | 3                 | 20 <sup>ab</sup> |
| AGS 3022                 | Wheat           | April 19       | 4,265 <sup>ab</sup>           | 51                  | 16 <sup>ab</sup>       | 108                  | 5                 | 33 <sup>ab</sup> |
| AGS 3026                 | Wheat           | April 19       | 3,025 <sup>ab</sup>           | 43                  | 13 <sup>ab</sup>       | 79                   | 4                 | 29 <sup>ab</sup> |
| AGS 4023                 | Wheat           | April 19       | 4,029 <sup>ab</sup>           | 50                  | 18 <sup>ab</sup>       | 106                  | 5                 | 33 <sup>ab</sup> |
| AGS 4043                 | Wheat           | April 19       | 3,398 <sup>ab</sup>           | 46                  | 14 <sup>ab</sup>       | 85                   | 4                 | 29 <sup>ab</sup> |
| Black Oats VNS           | Black Oats      | May 3 or later | 2,014 <sup>b</sup>            | 35                  | 10 <sup>ab</sup>       | 84                   | 4                 | 21 <sup>ab</sup> |
| Cereal Rye               | Cereal Rye      | April 25       | 2,709 <sup>ab</sup>           | 42                  | 18 <sup>ab</sup>       | 79                   | 4                 | 26 <sup>ab</sup> |
| Coker 227                | Oats            | April 19       | 2,013 <sup>b</sup>            | 35                  | 9 <sup>ab</sup>        | 67                   | 4                 | 22 <sup>ab</sup> |
| Cosaque                  | Black Oats      | May 3 or later | 1,160 <sup>b</sup>            | 21                  | 6 <sup>ab</sup>        | 38                   | 2                 | 22 <sup>ab</sup> |
| Cosaque                  | Black Oats      | May 3 or later | 1,161 <sup>b</sup>            | 25                  | 5 <sup>b</sup>         | 44                   | 2                 | 19 <sup>b</sup>  |
| Elbon                    | Cereal Rye      | April 19       | 5,534 <sup>a</sup>            | 66                  | 25 <sup>a</sup>        | 119                  | 6                 | 38 <sup>a</sup>  |
| Gainer 154               | Triticale       | April 25       | 4,024 <sup>ab</sup>           | 45                  | 16 <sup>ab</sup>       | 101                  | 4                 | 37 <sup>ab</sup> |
| Gore Soft Red Beardless  | Wheat           | April 19       | 3,159 <sup>ab</sup>           | 43                  | 14 <sup>ab</sup>       | 81                   | 4                 | 30 <sup>ab</sup> |
| Hayden                   | Oats            | May 3 or later | -                             | -                   | -                      | -                    | -                 | -                |
| Hazlet                   | Cereal Rye      | April 25       | 3,881 <sup>ab</sup>           | 53                  | 24 <sup>a</sup>        | 122                  | 5                 | 29 <sup>ab</sup> |
| Horizon 214              | Oats            | April 19       | 2,791 <sup>ab</sup>           | 47                  | 13 <sup>ab</sup>       | 103                  | 5                 | 24 <sup>ab</sup> |
| Horizon 306              | Oats            | April 19       | 3,938 <sup>ab</sup>           | 51                  | 16 <sup>ab</sup>       | 105                  | 4                 | 31 <sup>ab</sup> |
| Horizon 720              | Oats            | April 19       | -                             | -                   | -                      | -                    | -                 | -                |
| Hyton                    | Triticale       | April 25       | 2,994 <sup>ab</sup>           | 42                  | 17 <sup>ab</sup>       | 98                   | 4                 | 29 <sup>ab</sup> |
| Kodiak                   | Annual Ryegrass | April 25       | 2,207 <sup>b</sup>            | 36                  | 11 <sup>ab</sup>       | 71                   | 4                 | 26 <sup>ab</sup> |
| KWS Serafino Hybrid      | Rye             | April 25       | 3,309 <sup>ab</sup>           | 45                  | 20 <sup>ab</sup>       | 99                   | 4                 | 30 <sup>ab</sup> |
| Low Boy Dwarf            | Annual Ryegrass | May 3 or later | 1,851 <sup>b</sup>            | 34                  | 9 <sup>ab</sup>        | 56                   | 4                 | 21 <sup>ab</sup> |
| Malabar                  | Wheat           | April 25       | 3,375 <sup>ab</sup>           | 40                  | 18 <sup>ab</sup>       | 110                  | 5                 | 33 <sup>ab</sup> |
| Nitrous                  | Triticale       | April 125      | 3,942 <sup>ab</sup>           | 55                  | 19 <sup>ab</sup>       | 137                  | 6                 | 29 <sup>ab</sup> |
| Surge                    | Triticale       | April 19       | 3,504 <sup>ab</sup>           | 46                  | 20 <sup>ab</sup>       | 117                  | 5                 | 30 <sup>ab</sup> |
| SY TF813 Winter          | Triticale       | April 25       | 3,809 <sup>ab</sup>           | 49                  | 20 <sup>ab</sup>       | 115                  | 5                 | 33 <sup>ab</sup> |
| Thor Winter              | Triticale       | April 25       | 4,355 <sup>ab</sup>           | 66                  | 21 <sup>ab</sup>       | 145                  | 6                 | 26 <sup>ab</sup> |
| Valor Winter             | Barley          | April 19       | 2,885 <sup>ab</sup>           | 36                  | 15 <sup>ab</sup>       | 75                   | 5                 | 32 <sup>ab</sup> |
| Average                  | --              | --             | 3,110                         | 43                  | 15                     | 92                   | 4                 | 28               |
| Coefficient of Variation | --              | --             | 30.13                         | 30.88               | 36.58                  | 34.79                | 32.64             | 18.86            |
| P-Value                  | --              | --             | < 0.01                        | 0.19                | 0.04                   | 0.08                 | 0.14              | 0.05             |
| Tukey's HSD              | --              | --             | 3,175                         | 44.38               | 18.69                  | 105.86               | 3.88              | 17.88            |

## 2021 - 2022

### Cover Crop Results

**Table 25.** Average Biomass Production and Nutrient Uptake of Legume Cover Crops in the Coastal Plains Region of Virginia (2022 – 2023)

| Variety                         | Species        | 50% Bloom Date | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N              |
|---------------------------------|----------------|----------------|-------------------------------|---------------------|------------------------|----------------------|-------------------|------------------|
| <b>Keystone</b>                 | Winter Pea     | April 28       | 8,647 <sup>ab</sup>           | 278 <sup>a</sup>    | 45 <sup>ab</sup>       | 286 <sup>ab</sup>    | 15 <sup>ab</sup>  | 13 <sup>b</sup>  |
| <b>Viper</b>                    | Balansa Clover | -              | 4,468 <sup>cde</sup>          | 119 <sup>b</sup>    | 19 <sup>bc</sup>       | 116 <sup>bc</sup>    | 8 <sup>b</sup>    | 15 <sup>b</sup>  |
| <b>Taipan</b>                   | Balansa Clover | -              | -                             | -                   | -                      | -                    | -                 | -                |
| <b>Frosty</b>                   | Berseem Clover | -              | 2,804 <sup>c</sup>            | 82 <sup>b</sup>     | 13 <sup>c</sup>        | 70 <sup>c</sup>      | 7 <sup>b</sup>    | 13 <sup>b</sup>  |
| <b>Balody</b>                   | Berseem Clover | April 22       | 7,720 <sup>abc</sup>          | 126 <sup>b</sup>    | 25 <sup>abc</sup>      | 200 <sup>abc</sup>   | 8 <sup>b</sup>    | 25 <sup>a</sup>  |
| <b>AU Robin</b>                 | Crimson Clover | -              | 3,987 <sup>cde</sup>          | 95 <sup>b</sup>     | 18 <sup>bc</sup>       | 109 <sup>bc</sup>    | 5 <sup>b</sup>    | 17 <sup>ab</sup> |
| <b>Dixie</b>                    | Crimson Clover | May 6          | 2,826 <sup>c</sup>            | 97 <sup>b</sup>     | 18 <sup>bc</sup>       | 87 <sup>c</sup>      | 6 <sup>b</sup>    | 12 <sup>b</sup>  |
| <b>Patagonia</b>                | Hairy Vetch    | April 28       | 9,873 <sup>a</sup>            | 275 <sup>a</sup>    | 53 <sup>a</sup>        | 322 <sup>a</sup>     | 18 <sup>a</sup>   | 16 <sup>b</sup>  |
| <b>AU Merit</b>                 | Hairy Vetch    | April 14       | 4,449 <sup>cde</sup>          | 104 <sup>b</sup>    | 21 <sup>bc</sup>       | 132 <sup>abc</sup>   | 6 <sup>b</sup>    | 17 <sup>ab</sup> |
| <b>Winter King HV</b>           | Hairy Vetch    | April 14       | 3,273 <sup>de</sup>           | 81 <sup>b</sup>     | 15 <sup>bc</sup>       | 107 <sup>bc</sup>    | 7 <sup>b</sup>    | 15 <sup>b</sup>  |
| <b>Cahaba</b>                   | White Vetch    | April 14       | 4,853 <sup>b-c</sup>          | 111 <sup>b</sup>    | 19 <sup>bc</sup>       | 153 <sup>abc</sup>   | 8 <sup>b</sup>    | 18 <sup>ab</sup> |
| <b>Austrian Winter Pea VNS</b>  | Winter Pea     | May 6          | 7,090 <sup>a-d</sup>          | 206 <sup>ab</sup>   | 40 <sup>abc</sup>      | 221 <sup>abc</sup>   | 11 <sup>ab</sup>  | 15 <sup>b</sup>  |
| <b>Average</b>                  | --             | --             | <b>5,454</b>                  | <b>143</b>          | <b>26</b>              | <b>164</b>           | <b>9</b>          | <b>16</b>        |
| <b>Coefficient of Variation</b> | --             | --             | <b>26.58</b>                  | <b>25.12</b>        | <b>33.43</b>           | <b>40.65</b>         | <b>54.96</b>      | <b>17.25</b>     |
| <b>P-Value</b>                  | --             | --             | <b>&lt; 0.01</b>              | <b>&lt; 0.01</b>    | <b>&lt; 0.01</b>       | <b>&lt; 0.01</b>     | <b>&lt; 0.01</b>  | <b>&lt; 0.01</b> |
| <b>Tukey's HSD</b>              | --             | --             | <b>828</b>                    | <b>3615</b>         | <b>126.34</b>          | <b>27.98</b>         | <b>9.05</b>       | <b>7.24</b>      |

**Table 26.** Average Biomass Production and Nutrient Uptake of Grass Cover Crops in the Coastal Plains Region of Virginia (2022 – 2023)

| Variety                  | Species    | 50% Bloom Date | Full Bloom Biomass<br>(lb/ac) | Nitrogen<br>(lb/ac) | Phosphorous<br>(lb/ac) | Potassium<br>(lb/ac) | Sulfur<br>(lb/ac) | C:N   |
|--------------------------|------------|----------------|-------------------------------|---------------------|------------------------|----------------------|-------------------|-------|
| Abruzzi Rye              | Cereal Rye | April 14       | 3,122 <sup>ab</sup>           | 26                  | 14 <sup>ab</sup>       | 54 <sup>ab</sup>     | 3                 | 52    |
| AGS 2021-C Wheat         | Rye        | April 28       | 3,733 <sup>ab</sup>           | 35                  | 18 <sup>ab</sup>       | 51 <sup>ab</sup>     | 4                 | 42    |
| AGS 3000-C Wheat         | Wheat      | April 28       | 3,257 <sup>ab</sup>           | 31                  | 17 <sup>ab</sup>       | 44 <sup>b</sup>      | 3                 | 44    |
| Cereal Rye VNS           | Wheat      | April 28       | 2,718 <sup>ab</sup>           | 29                  | 15 <sup>ab</sup>       | 52 <sup>ab</sup>     | 4                 | 39    |
| Coker 227 Oat            | Oat        | April 28       | 3,717 <sup>ab</sup>           | 31                  | 17 <sup>ab</sup>       | 68 <sup>ab</sup>     | 3                 | 51    |
| Elbon-CRT Rye            | Rye        | April 14       | 3,074 <sup>ab</sup>           | 25                  | 14 <sup>ab</sup>       | 53 <sup>ab</sup>     | 3                 | 48    |
| Gore Wheat               | Wheat      | April 28       | 3,196 <sup>ab</sup>           | 38                  | 18 <sup>ab</sup>       | 50 <sup>b</sup>      | 4                 | 34    |
| Horizon 306 Oat          | Oat        | April 28       | 5,313 <sup>a</sup>            | 44                  | 23 <sup>a</sup>        | 90 <sup>a</sup>      | 4                 | 49    |
| Horizon 720 Oat          | Oat        | April 28       | 4,036 <sup>ab</sup>           | 36                  | 22 <sup>a</sup>        | 73 <sup>ab</sup>     | 4                 | 46    |
| Merlin Max Triticale     | Triticale  | April 28       | 2,840 <sup>ab</sup>           | 24                  | 13 <sup>ab</sup>       | 44 <sup>b</sup>      | 3                 | 49    |
| Nomini Barley            | Barley     | April 14       | 1,812 <sup>b</sup>            | 21                  | 11 <sup>b</sup>        | 42 <sup>b</sup>      | 3                 | 35    |
| P26R45 Wheat             | Wheat      | April 28       | 3,624 <sup>ab</sup>           | 30                  | 17 <sup>ab</sup>       | 50 <sup>b</sup>      | 3                 | 50    |
| Secretariat Barley       | Barley     | April 14       | 1,984 <sup>b</sup>            | 23                  | 10 <sup>b</sup>        | 42 <sup>b</sup>      | 2                 | 35    |
| TN 902 Wheat             | Wheat      | April 28       | 2,729 <sup>b</sup>            | 28                  | 17 <sup>ab</sup>       | 45 <sup>b</sup>      | 3                 | 40    |
| Trical 342 Triticale     | Triticale  | April 28       | 3,888 <sup>ab</sup>           | 33                  | 20 <sup>ab</sup>       | 63 <sup>ab</sup>     | 4                 | 48    |
| Viper Wheat              | Wheat      | April 28       | 2,928 <sup>ab</sup>           | 27                  | 15 <sup>ab</sup>       | 37 <sup>b</sup>      | 3                 | 45    |
| Average                  | --         | --             | 3,248                         | 30                  | 16                     | 54                   | 3                 | 44    |
| Coefficient of Variation | --         | --             | 25.86                         | 25.94               | 21.77                  | 23.95                | 26.44             | 16.23 |
| P-Value                  | --         | --             | < 0.01                        | 0.10                | < 0.01                 | < 0.01               | 0.10              | 0.04  |
| Tukey's HSD              | --         | --             | 2,370                         | 21.92               | 9.94                   | 36.22                | 2.16              | 20.21 |

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