# MISSISSIPPI COVER CROP

## VARIETY TRIALS, 2021

Information Bulletin 562 • September 2021

## MISSISSIPPI'S OFFICIAL VARIETY TRIALS

MISSISSIPPI STATE UNIVERSITY™
MS AGRICULTURAL AND
FORESTRY EXPERIMENT STATION

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This report contains data generated as part of the Mississippi Agricultural and Forestry Experiment Station research program. Joint sponsorship by the organizations listed on pages 11 is gratefully acknowledged.

Trade names of commercial products used in this report are included only for clarity and understanding. All available names (i.e., trade names, code numbers, chemical names, etc.) of varieties or products used in this research project are listed on pages 11.

# Mississippi Cover Crop Variety Trials, 2021


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Recognition is given to student worker Joey Hester for his assistance in cultivating, packing, planting, harvesting, and recording plot data.

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Find variety trial information online at ***mafes.msstate.edu/variety-trials***.

# Mississippi Cover Crop Variety Trials, 2021

## Introduction

Many seed companies and retailers that specialize in forage crops have expanded some of their products to act as cover crops. Cover crops are typically planted before a grain crop for several reasons. Cover crops can provide and stabilize N for the subsequent crop and add organic matter to the soil or increase weed suppression during the off season. Cover crops can also add root structure and ground cover to hold soil in place during rainfall, increasing the overall quality of the soil for the following crop. While legumes are valued for their ability to add nitrogen to the soil through fixation, grass crops can have an allelopathic effect towards invasive weed species.

## Protocol

Varieties of several cover-crop species were evaluated during 2020-2021 at the Mississippi Agricultural and Forestry Experiment Station's (MAFES) small-plot trials. Entries were submitted by seed companies as well as breeding programs at state universities. All entries from privately owned companies are tested on a fee basis. Selected varieties that are publicly or commercially available may have been added by MAFES Forage Variety Testing program as a reference check for comparison purposes. In addition, varieties of interest to the region may also be added when applicable. Testing during 2020-2021 was conducted at the following locations: Leveck Animal Research Center at the Mississippi State campus, Coastal Plain Branch Experiment Station at Newton, and Black Belt Branch Experiment Station at Brooksville.

The cover crop trial was planted at all locations in October 2020. Plots were 6 feet by 10 feet and planted using a precision-cone seeder on a prepared seedbed. The trial was designed as a strip plot replicated three times with harvest/termination date representing a single strip. Recommended seeding rates used are presented in Table 1. Individual strips were harvested March 15, April 1, and April 15 to best represent cover crop incorporation before typical commodity crop production (corn, cotton, soybeans) in Mississippi.

**Table 1. Recommended seeding rates for cover crops.**

| Type/Species | Rate (lb/A) |
|---|---|
| **Small Grains** | |
| Cereal Rye | 100 |
| | |
| **Legumes** | |
| Hairy Vetch | 25 |
| Berseem Clover | 20 |
| Balansa Clover | 4 |
| Ball Clover | 3 |
| Crimson Clover | 30 |
| Persian Clover | 8 |
| Winter Pea | 40 |
| Red Clover | 10 |
| | |
| **Brassica** | |
| Rape | 4 |
| Radish | 4 |
| Turnip | 4 |

All plots were harvested to a 3-inch stubble height. Plots were harvested using a Winterstieger Cibus F plot harvester equipped with a reel-type header that collected a

4.8-foot-by-10-foot swath to calculate total yield. A subsample was collected and dried at 130°F until constant weight was achieved to calculate dry matter (DM) concentration. Forage quality was estimated using NIR (Foss 2500, Foss North America, Eden Prairie, Minnesota) and the 2018 mixed hay equation of the NIRS Forage and Feed Testing Consortium (Madison, Wisconsin). Data were used to populate a "Nitrogen Availability Calculator" Model (http://aesl.ces.uga.edu/mineralization/) developed by the University of Georgia College of Agriculture and Environmental Sciences (Athens, Georgia) to report estimated N availability after 2 weeks, 4 weeks, and 12 weeks after termination. Economics data were calculated using local (Mississippi) retail cost of seed from two sources per variety with that cost added to a fixed planting cost of $13 per acre (Falconer et al., 2016). Nitrogen value was presented as a national average value, and data were analyzed using the General Linear Model (PROC GLM) of SAS. Mean separation was conducted using LSD at $\alpha$ = 0.05.

Data presented in Tables 2–16 can be used to evaluate the performance of each forage crop within its respective trial. Mean and harvest comparisons were evaluated statistically by using the least significant difference (LSD) test at the probability level of $\alpha$ = 0.05. The LSD value represents the minimum amount of yield that must be observed between any two varieties to determine if the difference was due to variety variation alone. Sources of seed are presented in Table 17.

# Starkville Results

In Starkville the greatest mean dry matter (DM) was observed when termination was delayed until April 15 (Table 2–3). March 15 proved to be too early for adequate growth to be achieved in all but the cereal rye plots. Total N availability was the greatest in berseem clover, red clover, and winter pea by April 1 with a slight decrease when termination was delayed until April 15 (Tables 4–5). Despite the increase in total N for clover entries, mean available N for all entries was similar by the 3-month time period for the April 1 and April 15 harvests.

**Table 2. Dry matter yields of cover crop varieties at three termination dates in Starkville.**

| Variety | Species | March 15 termination | April 1 termination | April 15 termination |
|---|---|---|---|---|
| | | *lb/A* | *lb/A* | *lb/A* |
| Bates RS4 | Rye | 2040 | 4841 | 3609 |
| Elbon | Rye | 656 | 3453 | 3771 |
| NF95319b | Rye | 2028 | 4601 | 2566 |
| NF97325 | Rye | 1623 | 4563 | 3178 |
| NF99362 | Rye | — | 5954 | 4510 |
| Vivant | Turnip | 13 | 1460 | 2158 |
| Jackpot | Turnip | 99 | 1699 | 1632 |
| Aerifi | Radish | — | 447 | 1297 |
| Fixation | Balansa C. | — | 774 | 2050 |
| Frosty | Berseem C. | 420 | 3178 | 4097 |
| Go-Per-12 | Persian C. | — | 853 | 2651 |
| Driller | Radish | — | 568 | 716 |
| Survivor | Winter Pea | 136 | 2744 | 2895 |
| Dynamite | Red C. | — | 2183 | 2524 |
| Q | Red C. | — | 2426 | 3425 |
| Purple Top | Turnip | 44 | 2406 | 3790 |
| Essex Rape | Rape | 183 | 1121 | 1780 |
| | | | | |
| Mean | | 453 | 2545 | 2744 |
| LSD (0.05) | | 370 | 963 | 2294 |
| CV | | 40 | 22 | 42 |

Planted: 10/8/20
Soil: Marietta Fine Sandy Loam

**Table 3. Dry matter yield for cover crop species at three termination dates in Starkville.**

| Species | March 15 termination | April 1 termination | April 15 termination |
|---|---|---|---|
| | *lb/A* | *lb/A* | *lb/A* |
| Balansa C. | — | 774 | 2050 |
| Berseem C. | 420 | 3178 | 4097 |
| Persian C. | — | 852 | 2650 |
| Radish | — | 507 | 1679 |
| Rape | 275 | 1682 | 3234 |
| Red C. | — | 2305 | 2847 |
| Rye | 1583 | 4691 | 3618 |
| Turnip | 663 | 1855 | 2843 |
| Winter Pea | — | 2744 | 2895 |
| | | | |
| Mean | 735 | 2227 | 2983 |
| LSD (0.05) | 1205 | 1031 | 2134 |
| CV | 40 | 21 | 40 |

Planted: 10/8/20
Soil: Marietta Fine Sandy Loam

**Table 4. Estimated nitrogen availability of cover crop varieties at 2 weeks, 4 weeks, and 12 weeks after three termination dates in Starkville.**

| Variety | Species | March 15 termination | | | | April 1 termination | | | | April 15 termination | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N |
| | | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* |
| Bates RS4 | Rye | 5 | 8 | 13 | 26 | 0 | 0 | 4 | 4 | -1 | -2 | -2 | -5 |
| Elbon | Rye | 3 | 5 | 7 | 15 | 2 | 5 | 10 | 18 | 2 | 3 | 7 | 11 |
| NF95319B | Rye | 5 | 8 | 13 | 25 | 2 | 4 | 10 | 16 | 7 | 10 | 15 | 32 |
| NF97325 | Rye | 6 | 10 | 16 | 31 | 1 | 2 | 6 | 8 | 8 | 12 | 17 | 38 |
| NF99362 | Rye | 6 | 11 | 16 | 33 | 1 | 2 | 7 | 9 | 2 | 4 | 6 | 13 |
| Vivant | Turnip | 7 | 12 | 17 | 35 | 8 | 12 | 16 | 36 | 7 | 12 | 15 | 35 |
| Jackpot | Turnip | 1 | 2 | 3 | 6 | 9 | 15 | 19 | 43 | 20 | 28 | 35 | 83 |
| Aerifi | Radish | — | — | — | — | 3 | 5 | 6 | 14 | 5 | 7 | 9 | 21 |
| Fixation | Balansa C. | — | — | — | — | 5 | 8 | 10 | 22 | 14 | 20 | 25 | 59 |
| Frosty | Berseem C. | 4 | 6 | 9 | 19 | 28 | 42 | 55 | 124 | 26 | 40 | 51 | 117 |
| GO-PER-12 | Persian C. | — | — | — | — | 8 | 12 | 16 | 37 | 10 | 15 | 20 | 45 |
| Driller | Radish | — | — | — | — | 4 | 6 | 7 | 17 | 7 | 11 | 15 | 32 |
| Survivor | Winter Pea | — | — | — | — | 30 | 46 | 60 | 136 | 25 | 38 | 47 | 110 |
| Dynamite | Red C. | — | — | — | — | 21 | 31 | 41 | 93 | 15 | 23 | 30 | 68 |
| Q | Red C. | — | — | — | — | 24 | 36 | 47 | 107 | 31 | 46 | 57 | 133 |
| Purple Top | Turnip | 4 | 7 | 10 | 20 | 14 | 21 | 28 | 63 | 16 | 25 | 32 | 73 |
| Essex Rape | Rape | 2 | 3 | 4 | 9 | 8 | 13 | 17 | 38 | 13 | 21 | 28 | 62 |
| | | | | | | | | | | | | | |
| Mean | | 4 | 7 | 11 | 22 | 10 | 15 | 21 | 46 | 12 | 18 | 24 | 54 |
| LSD (0.05) | | 7 | 11 | 17 | 35 | 7 | 10 | 13 | 30 | 15 | 22 | 27 | 65 |
| CV | | 42 | 42 | 35 | 36 | 37 | 37 | 36 | 37 | 42 | 36 | 35 | 38 |

Planted: 10/8/20
Soil: Marietta Fine Sandy Loam

**Table 5. Estimated nitrogen availability of cover crop species at three termination dates in Starkville.**

| Species | March 15 termination | | | | April 1 termination | | | | April 15 termination | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N |
| | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* |
| Balansa C. | — | — | — | — | 5 | 8 | 10 | 22 | 14 | 20 | 25 | 59 |
| Berseem C. | 4 | 6 | 9 | 19 | 28 | 42 | 55 | 124 | 26 | 40 | 51 | 117 |
| Persian C. | — | — | — | — | 8 | 12 | 16 | 37 | 10 | 15 | 20 | 45 |
| Radish | — | — | — | — | 4 | 5 | 7 | 16 | 6 | 9 | 12 | 27 |
| Rape | 2 | 3 | 4 | 9 | 8 | 13 | 17 | 38 | 13 | 21 | 28 | 62 |
| Red C. | — | — | — | — | 22 | 34 | 44 | 100 | 22 | 32 | 40 | 94 |
| Rye | 5 | 8 | 13 | 26 | 1 | 3 | 7 | 11 | 4 | 6 | 9 | 18 |
| Turnip | 4 | 7 | 10 | 20 | 10 | 16 | 21 | 47 | 14 | 21 | 27 | 61 |
| Winter Pea | — | — | — | — | 30 | 46 | 60 | 136 | 25 | 38 | 47 | 110 |
| | | | | | | | | | | | | |
| Mean | 4 | 6 | 9 | 19 | 14 | 21 | 28 | 64 | 15 | 23 | 29 | 67 |
| LSD (0.05) | 5 | 9 | 13 | 26 | 5 | 8 | 11 | 25 | 13 | 18 | 23 | 53 |
| CV | 42 | 42 | 35 | 36 | 37 | 37 | 36 | 37 | 42 | 36 | 35 | 38 |

Planted: 10/8/20
Soil: Marietta Fine Sandy Loam

**Table 6. Economic value of cover crop nitrogen in Starkville.**

| Variety | Species | March 15 termination | | | April 1 termination | | | April 15 termination | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total N | Cost[1] | Market value[2] | Total N | Cost | Market value | Total N | Cost | Market value |
| | | *lb/A* | *$/A* | *$* | *lb/A* | *$/A* | *$* | *lb/A* | *$/A* | *$* |
| Bates RS4 | Rye | 38.0 | 38.0 | 23.9 | 11.0 | 38.0 | 6.9 | -2.0 | 38.0 | -1.3 |
| Elbon | Rye | 38.0 | 38.0 | 23.9 | 54.0 | 38.0 | 34.0 | 10.0 | 38.0 | 6.3 |
| NF95319b | Rye | 38.0 | 38.0 | 23.9 | 27.0 | 38.0 | 17.0 | 29.0 | 38.0 | 18.3 |
| NF97325 | Rye | 38.0 | 38.0 | 23.9 | 156.0 | 38.0 | 98.3 | 30.0 | 38.0 | 18.9 |
| NF99362 | Rye | 38.0 | 38.0 | 23.9 | 54.0 | 38.0 | 34.0 | 4.0 | 38.0 | 2.5 |
| Vivant | Turnip | 21.0 | 8.0 | 13.2 | 34.0 | 8.0 | 21.4 | 91.5 | 8.0 | 57.6 |
| Jackpot | Turnip | 21.0 | 8.0 | 13.2 | 33.0 | 8.0 | 20.8 | 70.3 | 8.0 | 44.3 |
| Aerifi | Radish | 21.0 | 8.0 | 13.2 | 10.0 | 8.0 | 6.3 | 13.5 | 8.0 | 8.5 |
| Fixation | Balansa C. | 11.0 | 11.0 | 6.9 | 97.7 | 11.0 | 61.5 | 126.0 | 11.0 | 79.4 |
| Frosty | Berseem C. | 38.0 | 38.0 | 23.9 | 117.7 | 38.0 | 74.1 | 119.0 | 38.0 | 75.0 |
| Go-Per-12 | Persian C. | — | — | — | 80.0 | — | 50.4 | 149.7 | — | 94.3 |
| Driller | Radish | 21.3 | 8.0 | 13.4 | 12.0 | 8.0 | 7.6 | 11.0 | 8.0 | 6.9 |
| Survivor | Winter Pea | 35.0 | 35.0 | 22.1 | 67.0 | 35.0 | 42.2 | 117.0 | 35.0 | 73.7 |
| Dynamite | Red C. | 25.0 | 25.0 | 15.8 | 78.0 | 25.0 | 49.1 | 135.3 | 25.0 | 85.3 |
| Q | Red C. | 25.0 | 25.0 | 15.8 | 62.0 | 25.0 | 39.1 | 170.3 | 25.0 | 107.3 |
| Purple Top | Turnip | 21.0 | 7.0 | 13.2 | 72.0 | 7.0 | 45.4 | 82.5 | 7.0 | 52.0 |
| Essex Rape | Rape | 10.4 | 10.4 | 6.5 | 34.0 | 10.4 | 21.4 | 32.3 | 10.4 | 20.4 |

[1]Cost: average seed prices plus $13 per acre for planting cost.
[2]Market value assumes fertilizer cost at $0.63 per pound of N.

# Brooksville Results

In Brooksville, turnip, radish, and rape did poorly, producing little to no biomass for harvest. The greatest mean yields were observed when termination was delayed until April 15 (Tables 7–8). Rye produced the greatest DM yield at the March 15 and April 1 termination dates, while berseem clover produced the greatest by April 15. Berseem clover provided the greatest available total N for the April 1 and April 15 termination dates (Tables 9–10).

**Table 7. Dry matter yields of cover crop varieties at three termination dates in Brooksville.**

| Variety | Species | March 15 termination | April 1 termination | April 15 termination |
|---|---|---|---|---|
| | | *lb/A* | *lb/A* | *lb/A* |
| Bates RS4 | Rye | 1012 | 4167 | 4464 |
| Elbon | Rye | 576 | 3771 | 3643 |
| NF95319b | Rye | 1117 | 4013 | 4015 |
| NF97325 | Rye | 1073 | 2355 | 3649 |
| NF99362 | Rye | 1919 | 2961 | 3362 |
| Vivant | Turnip | — | 365 | 763 |
| Jackpot | Turnip | — | — | — |
| Aerifi | Radish | — | — | — |
| Fixation | Balansa C. | — | 693 | 239 |
| Frosty | Berseem C. | 613 | 2578 | 4064 |
| Go-Per-12 | Persian C. | 95 | 386 | 1394 |
| Driller | Radish | — | | — |
| Survivor | Winter Pea | 90 | 765 | 833 |
| Dynamite | Red C. | 118 | 959 | 1521 |
| Q | Red C. | — | 824 | 1190 |
| Purple Top | Turnip | — | — | — |
| Essex Rape | Rape | 77 | — | — |
| | | | | |
| Mean | | 393 | 1402 | 1714 |
| LSD (0.05) | | 218 | 974 | 1308 |
| CV | | 38 | 39 | 41 |

Planted: 10/16/20
Soil: Silty Clay

**Table 8. Dry matter yield for cover crop species at three termination dates in Brooksville.**

| Species | March 15 termination | April 1 termination | April 15 termination |
|---|---|---|---|
| | *lb/A* | *lb/A* | *lb/A* |
| Balansa C. | — | 2079 | 359 |
| Berseem C. | 613 | 2578 | 4064 |
| Persian C. | 136 | 386 | 1395 |
| Radish | — | — | — |
| Rape | — | — | — |
| Red C. | 122 | 892 | 1627 |
| Rye | 1249 | 3266 | 3827 |
| Turnip | — | 1095 | 2289 |
| Winter Pea | 270 | 765 | 1249 |
| | | | |
| Mean | 478 | 1497 | 2408 |
| LSD (0.05) | 1002 | 1665 | 1395 |
| CV | 38 | 39 | 41 |

Planted: 10/16/20
Soil: Silty Clay

**Table 9. Estimated nitrogen availability of cover crop varieties at 2 weeks, 4 weeks, and 12 weeks after three termination dates in Brooksville.**

| Variety | Species | March 15 termination | | | | April 1 termination | | | | April 15 termination | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N |
| | | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* |
| Bates RS4 | Rye | 3 | 5 | 8 | 17 | 0 | 1 | 3 | 4 | 0 | 0 | 2 | 2 |
| Elbon | Rye | 3 | 5 | 8 | 17 | 1 | 2 | 6 | 9 | -1 | -1 | 0 | -1 |
| NF95319b | Rye | 2 | 4 | 6 | 13 | 1 | 2 | 5 | 8 | -1 | -1 | 1 | -1 |
| NF97325 | Rye | 3 | 4 | 7 | 14 | 0 | 0 | 1 | 1 | 0 | 1 | 3 | 3 |
| NF99362 | Rye | 5 | 9 | 14 | 28 | 0 | 0 | 1 | 0 | 0 | 1 | 3 | 4 |
| Vivant | Turnip | — | — | — | — | 5 | 7 | 10 | 22 | 6 | 10 | 14 | 30 |
| Jackpot | Turnip | — | — | — | — | — | — | — | — | — | — | — | — |
| Aerifi | Radish | — | — | — | — | — | — | — | — | — | — | — | — |
| Fixation | Balansa C. | — | — | — | — | 21 | 32 | 41 | 94 | 3 | 4 | 5 | 11 |
| Frosty | Berseem C. | 5 | 8 | 11 | 23 | 21 | 31 | 40 | 91 | 29 | 43 | 53 | 125 |
| Go-Per-12 | Persian C. | 1 | 2 | 3 | 6 | 3 | 5 | 7 | 16 | 14 | 20 | 25 | 59 |
| Driller | Radish | — | — | — | — | — | — | — | — | — | — | — | — |
| Survivor | Winter Pea | 3 | 5 | 7 | 15 | 6 | 9 | 12 | 26 | 10 | 15 | 18 | 43 |
| Dynamite | Red C. | 2 | 3 | 4 | 9 | 10 | 15 | 20 | 45 | 12 | 18 | 22 | 53 |
| Q | Red C. | 0 | 0 | 0 | 1 | 6 | 10 | 13 | 30 | 16 | 24 | 30 | 70 |
| Purple Top | Turnip | — | — | — | — | — | — | — | — | — | — | — | — |
| Essex Rape | Rape | — | — | — | — | — | — | — | — | — | — | — | — |
| | | | | | | | | | | | | | |
| Mean | | 3 | 5 | 7 | 14 | 6 | 9 | 13 | 29 | 7 | 11 | 15 | 33 |
| LSD (0.05) | | 4 | 6 | 9 | 19 | 8 | 13 | 16 | 36 | 5 | 8 | 10 | 23 |
| CV | | 42 | 42 | 41 | 42 | 42 | 43 | 44 | 41 | 34 | 33 | 35 | 36 |

Planted: 10/16/20
Soil: Silty Clay

**Table 10. Estimated nitrogen availability of cover crop species at three termination dates in Brooksville.**

| Species | March 15 termination | | | | April 1 termination | | | | April 15 termination | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N |
| | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* |
| Balansa C. | — | — | — | — | 21 | 32 | 41 | 94 | 3 | 4 | 5 | 11 |
| Berseem C. | 5 | 8 | 11 | 23 | 21 | 31 | 40 | 91 | 29 | 43 | 53 | 125 |
| Persian C. | 1 | 2 | 3 | 6 | 3 | 5 | 7 | 16 | 14 | 20 | 25 | 59 |
| Radish | — | — | — | — | — | — | — | — | — | — | — | — |
| Rape | — | — | — | — | — | — | — | — | — | — | — | — |
| Red C. | 1 | 2 | 3 | 6 | 8 | 12 | 17 | 37 | 15 | 22 | 27 | 64 |
| Rye | 3 | 6 | 9 | 18 | 0 | 1 | 3 | 4 | 0 | 0 | 2 | 2 |
| Turnip | — | — | — | — | 5 | 7 | 10 | 22 | 6 | 10 | 14 | 30 |
| Winter Pea | 3 | 5 | 7 | 15 | 6 | 9 | 12 | 26 | 10 | 15 | 18 | 43 |
| | | | | | | | | | | | | |
| Mean | 3 | 4 | 6 | 14 | 7 | 11 | 15 | 33 | 12 | 18 | 23 | 54 |
| LSD (0.05) | 3 | 6 | 9 | 18 | 7 | 11 | 15 | 34 | 4 | 7 | 9 | 20 |
| CV | 42 | 42 | 41 | 42 | 42 | 43 | 44 | 41 | 34 | 33 | 35 | 36 |

Planted: 10/16/20
Soil: Silty Clay

**Table 11. Economic value of cover crop nitrogen at Brooksville.**

| Variety | Species | March 15 termination | | | April 1 termination | | | April 15 termination | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total N | Cost[1] | Market value[2] | Total N | Cost | Market value | Total N | Cost | Market value |
| | | *lb/A* | *$/A* | *$* | *lb/A* | *$/A* | *$* | *lb/A* | *$/A* | *$* |
| Bates RS4 | Rye | 16.7 | 38.0 | 10.5 | 4.3 | 38.0 | 2.7 | 2.3 | 38.0 | 1.5 |
| Elbon | Rye | 16.7 | 38.0 | 10.5 | 9.0 | 38.0 | 5.7 | -0.7 | 38.0 | -0.4 |
| NF95319b | Rye | 13.0 | 38.0 | 8.2 | 7.7 | 38.0 | 4.8 | -1.0 | 38.0 | -0.6 |
| NF97325 | Rye | 14.0 | 38.0 | 8.8 | 1.3 | 38.0 | 0.8 | 3.0 | 38.0 | 1.9 |
| NF99362 | Rye | 27.7 | 38.0 | 17.4 | 0.0 | 38.0 | 0.0 | 4.3 | 38.0 | 2.7 |
| Vivant | Turnip | — | 21.0 | — | 22.0 | 21.0 | 13.9 | 30.0 | 21.0 | 18.9 |
| Jackpot | Turnip | — | 21.0 | — | — | 21.0 | — | — | 21.0 | — |
| Aerifi | Radish | — | 21.0 | — | — | 21.0 | — | — | 21.0 | — |
| Fixation | Balansa C. | — | 11.0 | — | 94.0 | 11.0 | 59.2 | 11.0 | 11.0 | 6.9 |
| Frosty | Berseem C. | 23.0 | 38.0 | 14.5 | 91.0 | 38.0 | 57.3 | 124.7 | 38.0 | 78.5 |
| Go-Per-12 | Persian C. | 6.0 | — | 3.8 | 16.0 | — | 10.1 | 59.0 | — | 37.2 |
| Driller | Radish | — | 21.3 | — | — | 21.3 | — | — | 21.3 | — |
| Survivor | Winter Pea | 15.0 | 35.0 | 9.5 | 26.0 | 35.0 | 16.4 | 42.5 | 35.0 | 26.8 |
| Dynamite | Red C. | 9.0 | 25.0 | 5.7 | 44.7 | 25.0 | 28.1 | 53.0 | 25.0 | 33.4 |
| Q | Red C. | 1.0 | 25.0 | 0.6 | 29.7 | 25.0 | 18.7 | 69.5 | 25.0 | 43.8 |
| Purple Top | Turnip | — | 21.0 | — | — | 21.0 | — | — | 21.0 | — |
| Essex Rape | Rape | — | 10.4 | — | — | 10.4 | — | — | 10.4 | — |

[1]Cost: average seed prices plus $13 per acre for planting cost.
[2]Market value assumes fertilizer cost at $0.63 per pound of N.

# Newton Results

At the Newton location, DM yields were the greatest when termination was delayed until April 15. Radish varieties generally did poorly regardless of termination date, while turnip, winter pea, and berseem clover produced more than 1,000 pounds per acre by the March 15 termination date (Tables 12–13). Berseem, Persian, and red clover were among the greatest producers of DM yield by April 15. Total available N was the greatest in 'Vivant' turnip by March 15; however, by the April 15 termination date, balansa, berseem, Persian, 'Q' red clover, and winter pea produced more than 115 pounds per acre of total N (Table 14–15).

**Table 12. Dry matter yields of cover crop varieties at three termination dates in Newton.**

| Variety | Species | March 15 termination | April 1 termination | April 15 termination |
|---|---|---|---|---|
| | | *lb/A* | *lb/A* | *lb/A* |
| Vivant | Turnip | 1846 | 1478 | 2456 |
| Jackpot | Turnip | 404 | 938 | 2046 |
| Aerifi | Radish | 256 | 256 | 389 |
| Fixation | Balansa C. | 981 | 2170 | 2711 |
| Frosty | Berseem C. | 1222 | 2950 | 3736 |
| Go-Per-12 | Persian C. | 563 | 1357 | 3112 |
| Driller | Radish | 115 | 130 | 315 |
| Survivor | Winter Pea | 1084 | 1457 | 2557 |
| Dynamite | Red C. | 656 | 1696 | 3194 |
| Q | Red C. | 749 | 1573 | 3930 |
| Purple Top | Turnip | 955 | 1406 | 2886 |
| Essex Rape | Rape | 419 | 948 | 1646 |
| | | | | |
| Mean | | 771 | 1363 | 2415 |
| LSD (0.05) | | 585 | 943 | 1587 |
| CV | | 40 | 39 | 38 |

Planted: 10/7/20
Soil: Prentiss Sandy Loam
Cereal rye was not planted at Newton due to lack of seed to plant all replications.

**Table 13. Dry matter yield for cover crop species at three termination dates in Newton.**

| Species | March 15 termination | April 1 termination | April 15 termination |
|---|---|---|---|
| | *lb/A* | *lb/A* | *lb/A* |
| Balansa C. | — | 2170 | 2711 |
| Berseem C. | 1222 | 2949 | 3736 |
| Persian C. | — | 1354 | 3112 |
| Radish | 384 | 261 | 327 |
| Rape | 711 | 844 | 1646 |
| Red C. | 684 | 1647 | 2987 |
| Turnip | 3006 | 1148 | 2378 |
| Winter Pea | 1083 | 1456 | 2557 |
| | | | |
| Mean | 1339 | 1613 | 2519 |
| LSD (0.05) | 1723 | 847 | 1470 |
| CV | 40 | 37 | 38 |

Planted: 10/7/20
Soil: Prentiss Sandy Loam
Cereal rye was not planted at Newton due to lack of seed to plant all replications.

**Table 14. Estimated nitrogen availability of cover crop varieties at 2 weeks, 4 weeks, and 12 weeks after three termination dates in Newton.**

| Variety | Species | March 15 termination | | | | April 1 termination | | | | April 15 termination | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N |
| | | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* |
| Vivant | Turnip | 19 | 31 | 44 | 93 | 8 | 11 | 15 | 34 | 22 | 32 | 39 | 92 |
| Jackpot | Turnip | — | — | — | — | 8 | 11 | 15 | 33 | 16 | 24 | 30 | 70 |
| Aerifi | Radish | 3 | 5 | 7 | 14 | 2 | 3 | 5 | 10 | 3 | 5 | 6 | 14 |
| Fixation | Balansa C. | — | — | — | — | 22 | 33 | 43 | 98 | 30 | 43 | 53 | 126 |
| Frosty | Berseem C. | 11 | 17 | 25 | 53 | 26 | 39 | 52 | 118 | 28 | 41 | 50 | 119 |
| Go-Per-12 | Persian C. | — | — | — | — | 18 | 27 | 36 | 80 | 35 | 51 | 63 | 150 |
| Driller | Radish | — | — | — | — | 3 | 4 | 5 | 12 | 3 | 4 | 5 | 11 |
| Survivor | Winter Pea | 8 | 13 | 19 | 41 | 15 | 23 | 30 | 67 | 27 | 40 | 50 | 117 |
| Dynamite | Red C. | 6 | 10 | 14 | 30 | 17 | 26 | 35 | 78 | 32 | 46 | 57 | 135 |
| Q | Red C. | 6 | 9 | 13 | 27 | 14 | 21 | 28 | 62 | 40 | 58 | 73 | 170 |
| Purple Top | Turnip | — | — | — | — | 16 | 24 | 32 | 72 | 19 | 29 | 36 | 83 |
| Essex Rape | Rape | 9 | 14 | 20 | 43 | 8 | 12 | 15 | 34 | 7 | 11 | 14 | 32 |
| | | | | | | | | | | | | | |
| Mean | | 8 | 14 | 20 | 43 | 13 | 20 | 26 | 59 | 16 | 24 | 30 | 70 |
| LSD (0.05) | | 9 | 17 | 23 | 51 | 14 | 20 | 27 | 62 | 21 | 31 | 38 | 90 |
| CV | | 36 | 39 | 37 | 38 | 42 | 41 | 41 | 42 | 43 | 41 | 43 | 41 |

Planted: 10/7/20
Soil: Prentiss Sandy Loam

**Table 15. Estimated nitrogen availability of cover crop species at three termination dates in Newton.**

| Species | March 15 termination | | | | April 1 termination | | | | April 15 termination | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N | 2 Wk. | 4 Wk. | 12 Wk. | Total N |
| | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* | *lb/A* |
| Balansa C. | — | — | — | — | 22 | 33 | 43 | 98 | 30 | 43 | 53 | 126 |
| Berseem C. | 11 | 17 | 25 | 53 | 26 | 39 | 52 | 118 | 28 | 41 | 50 | 119 |
| Persian C. | — | — | — | — | 18 | 27 | 36 | 80 | 35 | 51 | 63 | 150 |
| Radish | 3 | 5 | 7 | 14 | 2 | 4 | 5 | 11 | 3 | 4 | 5 | 12 |
| Rape | 9 | 14 | 20 | 43 | 8 | 12 | 15 | 34 | 7 | 11 | 14 | 32 |
| Red C. | 6 | 9 | 13 | 29 | 16 | 24 | 32 | 72 | 30 | 44 | 54 | 128 |
| Turnip | 19 | 31 | 44 | 93 | 11 | 17 | 22 | 50 | 19 | 27 | 34 | 80 |
| Winter Pea | 8 | 13 | 19 | 41 | 15 | 23 | 30 | 67 | 27 | 40 | 50 | 117 |
| | | | | | | | | | | | | |
| Mean | 9 | 15 | 21 | 45 | 14 | 21 | 27 | 61 | 19 | 28 | 35 | 82 |
| LSD (0.05) | 9 | 16 | 23 | 48 | 12 | 18 | 23 | 53 | 13 | 19 | 23 | 54 |
| CV | 36 | 39 | 37 | 38 | 42 | 41 | 41 | 42 | 43 | 41 | 43 | 41 |

Planted: 10/7/20
Soil: Prentiss Sandy Loam

**Table 16. Economic value of cover crop nitrogen at Newton.**

| Variety | Species | March 15 termination | | | April 1 termination | | | April 15 termination | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Total N | Cost[1] | Market value[2] | Total N | Cost | Market value | Total N | Cost | Market value |
| | | *lb/A* | *$/A* | *$* | *lb/A* | *$/A* | *$* | *lb/A* | *$/A* | *$* |
| Vivant | Turnip | 93.0 | 8.0 | 58.6 | 34.0 | 8.0 | 21.4 | 91.5 | 8.0 | 57.6 |
| Jackpot | Turnip | — | 8.0 | — | 33.0 | 8.0 | 20.8 | 70.3 | 8.0 | 44.3 |
| Aerifi | Radish | 14.0 | 8.0 | 8.8 | 10.0 | 8.0 | 6.3 | 13.5 | 8.0 | 8.5 |
| Fixation | Balansa C. | | 11.0 | 0.0 | 97.7 | 11.0 | 61.5 | 126.0 | 11.0 | 79.4 |
| Frosty | Berseem C. | 53.3 | 38.0 | 33.6 | 117.7 | 38.0 | 74.1 | 119.0 | 38.0 | 75.0 |
| Go-Per-12 | Persian C. | — | — | — | 80.0 | — | 50.4 | 149.7 | — | 94.3 |
| Driller | Radish | — | 8.0 | — | 12.0 | 8.0 | 7.6 | 11.0 | 8.0 | 6.9 |
| Survivor | Winter Pea | 40.7 | 35.0 | 25.6 | 67.0 | 35.0 | 42.2 | 117.0 | 35.0 | 73.7 |
| Dynamite | Red C. | 30.0 | 25.0 | 18.9 | 78.0 | 25.0 | 49.1 | 135.3 | 25.0 | 85.3 |
| Q | Red C. | 27.0 | 25.0 | 17.0 | 62.0 | 25.0 | 39.1 | 170.3 | 25.0 | 107.3 |
| Purple Top | Turnip | — | 7.0 | — | 72.0 | 7.0 | 45.4 | 82.5 | 7.0 | 52.0 |
| Essex Rape | Rape | 43.0 | 10.4 | 27.1 | 34.0 | 10.4 | 21.4 | 32.3 | 10.4 | 20.4 |

[1]Cost: average seed prices plus $13 per acre for planting cost.
[2]Market value assumes fertilizer cost at $0.63 per pound of N.

**Table 17. Seed sources for the 2020-2021 Cover Crop Variety Testing Program.**

| Variety | Seed company/source |
|---|---|
| Bates RS4 | Noble Foundation |
| Elbon | Noble Foundation |
| NF95319B | Noble Foundation |
| NF97325 | Noble Foundation |
| NF99362 | Noble Foundation |
| Vivant | MTV |
| Jackpot | MTV |
| Aerifi | MTV |
| Fixation | Grassland Oregon |
| Frosty | Grassland Oregon |
| GO-PER-12 | Grassland Oregon |
| Driller | Grassland Oregon |
| Survivor | Grassland Oregon |
| Dynamite | Grassland Oregon |
| Q | Grassland Oregon |

# Reference

**Falconer, L., J. M. Riley, and B. Williams.** 2016. *Custom Rates for Farm and Ranch Services in Mississippi*. MSU Extension Service. Publication 2776.


MS AGRICULTURAL AND
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**Keith Coble, Interim Director** **www.mafes.msstate.edu**