Cover crop biomass: how much to expect in Nebraska



Biomass production is critical for providing ecosystem services such as improving soil health, suppressing weeds, reducing soil erosion, and offering forage for livestock. This fact sheet summarized key insights from the webinar on factors influencing cover crop biomass production in Nebraska.



Why does biomass matter?

Cover crop biomass refers to the total amount of plant material produced (aboveground and belowground) over a given period.

Cover crops contribute 30-75% of their fixed carbon to the soil through roots, promoting faster soil organic matter buildup than aboveground biomass [1].

Key Factors Influencing Biomass Production

Species Selection

- *Grasses* typically produce higher biomass than other species and have a higher carbon-to-nitrogen ratio, supporting soil carbon inputs.
- *Legumes* perform well in nitrogen-deficient soils but are more sensitive to climatic stress.
- **Brassicas** aerate the soil with deep roots but are also sensitive to environmental stress.
- *Mixtures* enhance resource-use efficiency and productivity by combining complementary traits.

Climate and Weather

- Warm and wet growing seasons yield higher biomass than cool, dry conditions [2, 3].
- Yearly variations in precipitation and temperature significantly affect biomass yields, even with consistent planting dates [3, 4].

Management Practices

- Planting beyond October 5 reduces available heat units and limits growth [3].
- Delayed termination in spring significantly increases biomass (e.g., every day's delay from April 1 to 30 results in an additional 31 lbs acre⁻¹) [3].

Effect of Planting and Termination Dates

Mid-September planting yields up to 10x more biomass than late October planting [3].

Delaying termination from early to late April can quadruple biomass for early October-planted crops [3].

Field Study Results

Irrigation increased biomass production by up to 68% compared to dryland in western Nebraska [4].

A 2014-2018 study in eastern Nebraska showed pre-harvest broadcasting increased biomass by 90% in wet years, while post-harvest drilling increased biomass in drier conditions [5].

Biomass Ranges by Species

- Rye: 170 5,630 lbs acre⁻¹
- Triticale: 669 6,388 lbs acre⁻¹
- Wheat: 98 5,987 lbs acre-1
- Canola: 89 1,963 lbs acre⁻¹.

Biomass Loss in Short vs. Long Growing Season [6]

Region	Wheat	Rye	Triticale (%)	Canola
Panhandle	40	50	43	37
North Central	21	27	23	22
Northeast	27	34	32	20
Central	40	49	45	30
East Central	36	44	41	25
Southwest	53	67	58	43
South Central	50	59	55	36
Southeast	43	51	48	28

Management Recomendation

- **Species Selection:** Choose species or mixtures adapted to specific regional and environmental conditions.
- **Growing Window**: Focus on longer growing seasons (mid-Sept to early May) could double biomass or more compared to shorter seasons (early Oct to mid-April).
- **Regional Considerations:** Adjust management practices based on precipitation zones and climatic conditions.
- **Be flexible:** Biomass production in Nebraska is highly variable due to regional and annual differences in climate and soil properties.

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