

A herd of black cows is grazing in a lush green field. The cows are scattered across the middle ground, some facing left and some right, all with their heads down eating grass. The field is a vibrant green, and the background is a soft-focus expanse of more grass.

Rapid Review: Winter Crop Discussions

June 16, 2022

Recognize Dairy Systems

Fall harvest

“Winter Crop”

→ fall manure

→ winter crop

- (spring grazing or harvest as feed)
→ On-farm N cycling

Bottom Line



Winter cover protects from soil and nutrient losses.



Manure application on bare ground is detrimental to water quality.

“Winter Crop” Request

“Systems where dairy farmers are taking off corn silage end of August 1 to September coming back with fall manure applications and then following up that with winter forage crops. These are neither commodity or traditional cover crops, they're truly forage crops, where they're doing multi species- particularly for the reason of spring grazing or harvest as feed. They are removing these crops to cycle the nitrogen within their farming operations. Perhaps it's even better defined as what we now have as a legume or legume grass mix hay land use.”

Phase 6 Cover Crop BMP

Proposed Winter Crop

Baseline:

Fallow Ground

+ soil residual N + **manure N**

Proposed BMP:

Winter Crop

+ soil residual N + **manure N**

Traditional Cover Crop (no harvest*)

- Baseline: **Fallow Ground** + soil residual N + zero applied N
- BMP Option 1: winter cereal/legume mix + soil residual N + **zero applied N**
- BMP Option 2: winter cereal/legume mix + soil residual N + **50 lbs N/ac fall manure (70% of Option 1 Efficiency)**

Commodity Cover Crop (harvest)

- Baseline: **Commodity small grain** + soil residual N + **30 lbs N/ac**
- BMP: Commodity small grain + soil residual N + **zero fall-applied N**

***Can we include dairy forage/feed systems?**

(Staver) Cover Crops

Dec 2020 AgWG Presentation

Many studies but many gaps. Consistent findings:

- Winter cereals respond to higher soil N, producing more biomass and moving more soil nitrate-N into above-ground biomass as soil N availability increases.
- The reference cover crop used in past panel reports (cereal rye planted at 2 bu/acre) when planted in early or standard planting periods is capable of taking more N out of the soil than is generally available postharvest in summer annual row crop settings.
- Reducing cover crop uptake potential by reducing planting rates, or delaying planting, increases the likelihood that nitrate will be leached out of reach of cover crop roots before uptake can occur.
- Increasing the fall soil nitrate pool by applying manure or inorganic N will increase winter cereal N uptake but also increase the potential for nitrate leaching.

(White) Nitrogen Scavaging in Forage Systems

Jan 2021 AgWG Presentation

Concluding Thoughts

- Winter cover crop growth is N limited
- When manure is applied in the fall, cover crop growth responds to scavenge the manure N
- Fall manure applications did not increase subsoil NO₃ until spring, when leaching rates slow down and summer-planted crops can recover the N in the profile
- Availability of N at soil surface from fall manure applications may have a small effect on reducing cover crop scavenging ability in the subsoil during low N demand periods of cover crop growth (late winter)
- Spring cover crop growth has a high N demand and cleans up the soil profile N equally in manured and non-manured treatments
- Not sure how to handle this in the Bay Model, but please consider whether there is a “double penalty” for the fall manure + cover crop practice

Comments: AgWG Ad Hoc July 2021

Corn silage rotation is high loading (manure applied)

Whether CC is harvested or not- doesn't change anything (tracking N fate)

Winter cover is beneficial

- Harvest potential negates N reduction credit in CAST
- Data collection challenges for winter cover BMPs

Want to encourage winter cover

- N reduction credit will provide incentive

Lingering Questions: AgWG Ad Hoc July 2021

Use BMP we already have in CAST?

- CAST is annualized loads- is this another version of double cropping?

Create a new land use in Phase 7?

Better understanding of dominant dairy rotations?

Process question- modifying Expert Panel definition

- What was the intention of the Cover Crop EP?
- Is this an Expert Panel question or something else? (e.g., land use)

What Next?

- Ag Modeling Team Item?
- Workplan for next version of CAST?



Resources:

[CAST Issue Tracker \(AgWG\)](#)

[Cover Crop Expert Panel \(2016\)](#)

Chesapeake Assessment Scenario Tool (CAST)

[Source Data](#)

AgWG CAST-21 Workplan Ad-Hoc Group

[July 2021 Materials](#) (Winter Crop Discussion)

AgWG Charlie White Presentation Jan 2021

[Nitrogen Retention by Cover Crops with Fall Manure Applied](#)

AgWG Ken Staver Presentation Dec 2020

[Review of 2017 Cover Crops Expert Panel](#)

Relevant Cover Crop Land Uses from CAST

Sector	LoadSource	LoadSourceMinor	LoadSourceDescription
Agriculture	Full Season Soybeans	Row Crops	Soybeans that are not double-cropped
Agriculture	Double Cropped Land	Row Crops	Double-cropped land represents areas that have two crops grown on the same acre between January and December. Crops eligible for double-cropping vary by state and may include alfalfa, barley, rye, small grain hay, sorghum for silage, soybeans, triticale, wheat, corn for silage or greenchop, and other haylage, grass silage, and greenchop. No other land use includes double cropping.
Agriculture	Silage with Manure	Row Crops	Includes the crops corn and sorghum for silage or greenchop that is not double-cropped and receives fertilizer and manure where available
Agriculture	Small Grains and Grains	Row Crops	Includes canola, oats, rye, wheat, barley, buckwheat, emmer and spelt, and triticale that is not double-cropped
Agriculture	Grain without Manure	Row Crops	Includes the crops corn and sorghum for grain that is not double-cropped and receives only inorganic fertilizer
Agriculture	Silage without Manure	Row Crops	Includes the crops corn and sorghum for silage or greenchop that is not double-cropped and receives only inorganic fertilizer
Agriculture	Specialty Crop Low	Row Crops	Includes aquatic plants, orchards, Christmas trees, asparagus, nursery stock, short-rotation woody crops, sunflower seed, berries, peas, lima and snap beans
Agriculture	Other Agronomic Crops	Row Crops	Includes summer fallow, idle cropland, sod, tobacco, cotton, sweet corn, peanuts and dry edible beans
Agriculture	Grain with Manure	Row Crops	Includes the crops corn and sorghum for grain that is not double-cropped and receives inorganic fertilizer and manure where available
Agriculture	Specialty Crop High	Row Crops	Includes bedding/garden plants, cut florist greens, potted plants, mushrooms, other nursery and greenhouse crops, greenhouse vegetables, fruits and vegetables grown outside that are not included in Specialty Crop Low