Nutrient Management Spear Program

Double cropping with winter cereals and forage sorghum in New York

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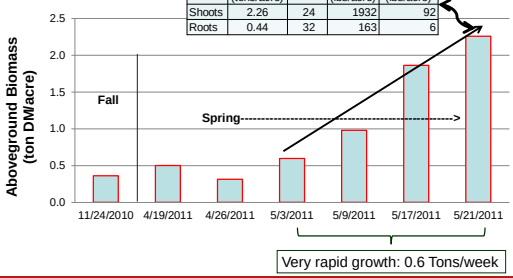
Sarah Lyons, Karl Czymmek, Greg Godwin, Debbie Cherney, Jerry Cherney, Tom Kilcer, and Jack Meisinger, and many others!

Dairy Forage Production

- Dairy farms aim to grow most if not all of the forages fed to cows on the farm itself
- Typically one main crop per growing season
  - Corn silage (3-4 years) and alfalfa/grass hay (3-4 years)
- Cover cropping became of interest because of its many benefits for erosion control, soil health and nutrient cycling
- Demand for forage made dairy farms wonder about harvesting the cover crop as forage

	Biomass	C:N	Total C	Total N
	(tons/acre)		(lbs/acre)	(lbs/acre)
Shoots	2.26	24	1932	92
Roots	0.44	32	163	6



General Agronomic

- Planting:
  - Firm, well-prepared seedbed; 1 ¼ - 1 ½ inch depth, 100-125 lbs seed/acre
  - No-till seeding into crop residue is possible with proper seeding depth and good soil to seed contact
  - Earlier the better; shallow or late planting can result in small root systems that can spring-heave and winterkill

General Agronomic

- Pest management:
  - Crop is harvested before most pests can do any damage
  - Geese and deer could be an issue
  - None of the farmers who replied to our survey used any form of pest control….unless it involved collection of dinner at the same time

General Agronomic

- Harvest management:
  - For dairy cow forage, harvest at stage 9 (flag leaf; no heads visible)
  - Across the farm, cut triticale or rye first, then follow with cool season grasses, alfalfa/grass mixtures, and clear alfalfa

Feekes 9 (Flag leaf stage)
Milk cow quality

Feekes 10 (Boot stage)
Heifer & dry cow quality

General Agronomic

- Harvest management:
  - Mow at full-width; conditioning not needed but tedd to expose lower layers
  - Dry to 30% DM and ensile the same day as mowing
  - Allowing a narrow swath to sit 2-3 days will result in poorly fermented, high butyric, lows-sugar, mediocre silage
  - Wetter silage: chop at ≥ ¾ inch total length of cut; inoculate with a homolactic bacteria

General Agronomic

- Land preparation next crop:
  - Use a strip-tiller or zone builder or no-till
  - Full-width tillage will require 2-3 passes to break-up root masses (especially triticale) and will likely not be economical

General Agronomic

Fertility management:

- A 2 ton DM/acre crop:
  - 90 lbs N/acre (14% CP)
  - 30 lbs P_2O_5/acre
  - 155 lbs K_2O/acre
- Apply P and K according to soil test
- For nitrogen…research was needed

Phosphorus guidelines for winter cereals for forage:

Morgan soil test P (STP) lbs/acre	P needed lbs P_2O_5/acre
50 or greater	0
40 or more but less than 50	10
30 or more but less than 40	20
20 or more but less than 30	30
10 or more but less than 20	40
Less than 10	85 – (5*STP)

Potassium guidelines for winter cereals for forage:

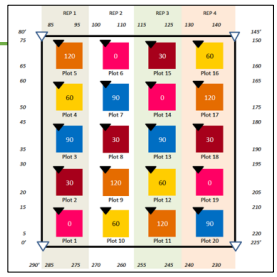
To determine the K recommendations use the Cornell Morgan soil test K (lbs K/acre) and the following equation:

K (lbs K_2O/acre) = (110-STK)*0.70

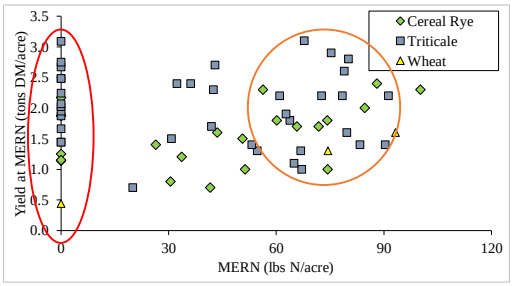
So, if the soil test is 53 lbs/acre Morgan K, the recommended amount of K_2O for triticale is (110-53)*0.70 = 40 lbs K_2O per acre.

Nitrogen Management

- 62 on-farm N-rate trials with 5 rates of N in 4 reps
  - 0, 30, 60, 90, 120 lbs N/acre
- Determined the most economic rate of nitrogen (MERN) for each location
- Categorized trials based on yield response to N and developed a recommendation system



Thanks to all our participants who coordinated local trials throughout NY!!



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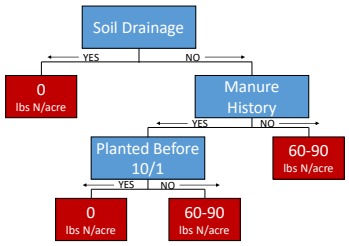
Spring MERN Decision Tree



Correctly predicted 78% of trials included in analysis

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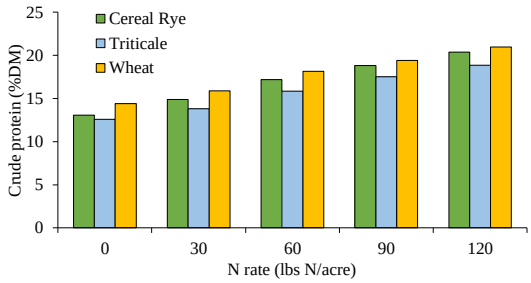

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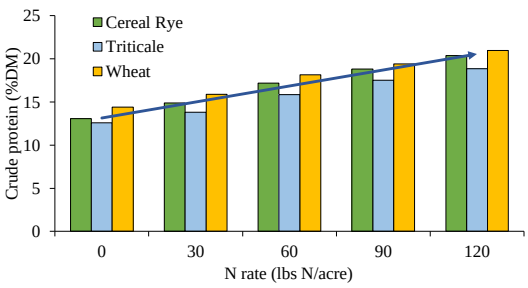

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Conclusions Winter Cereals

- Plant by late-September for fall growth, fall N uptake, and spring growth.
- For well-drained soils, or fields with recent manure histories with early planting additional N at green-up may not be needed.
- Fields with poor drainage, no recent manure history: forage winter-cereals may not yield well and will likely require additional N inputs
- Nitrogen management at green-up did not greatly affect forage quality except for CP, which increased with N addition even if the additional N did not increase spring yield.

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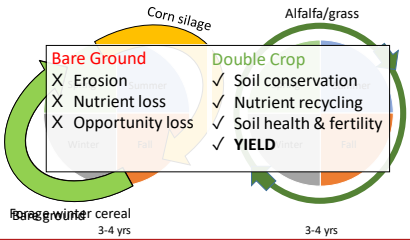
Typical New York Forage Rotation



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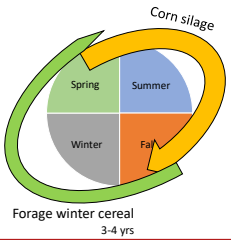
Double Cropping in the Northeast



Double Cropping Challenges

- Weather (wet/dry springs)
- Timing (overlap with corn silage growing season)

Is there a suitable alternative to corn as summer crop?

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Forage Sorghum

- Brown midrib (BMR) brachytic dwarf sorghum is a high-quality short season (85-89 d), single-cut forage crop
- Tolerates drought and resists lodging
- Requires soil temperatures of at least 60°F for planting, which normally occurs in early June in New York.
- Yield assessments show that this forage sorghum variety has the potential to compete in yield with corn silage.


Agronomy Fact Sheet Series — Fact Sheet 92

Guidance for Growing BMR Brachytic Dwarf Forage Sorghum

Introduction

Sowing Rate, Row Spacing and Depth

Fertilization

Planting Date

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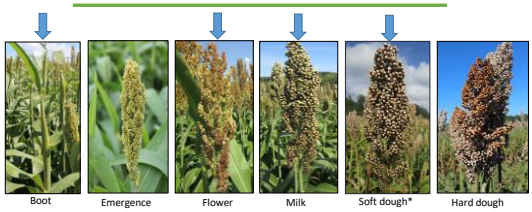
Forage Sorghum Timing of Harvest



*Initially recommended harvest time

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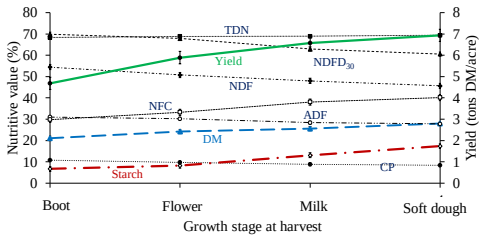
Forage Sorghum Timing of Harvest



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Forage Sorghum Summary

- BMR forage sorghum can be harvested at the late-flower to early-milk stage without losing much yield.
  - Additional energy supplementation may be needed in the diet to account for a lower starch content.

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Double Cropping Forage Sorghum and Triticale

- Trial at Musgrave Research Farm
- 5 spring N rates for triticale
  - 0, 30, 60, 90, 120 lbs N/acre
- 2 summer N rates for forage sorghum
  - 0N and +N (200 lbs N/acre)
- 4 timings of sorghum harvest/triticale planting
  - Every ~2 weeks starting early Sept.

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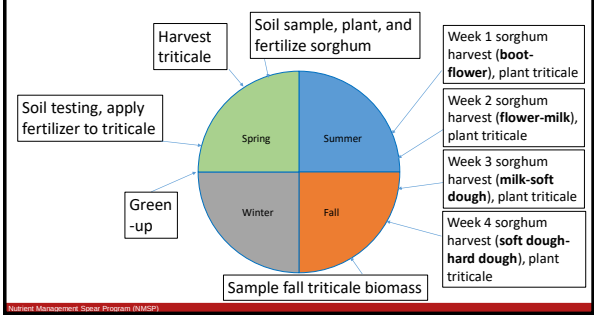

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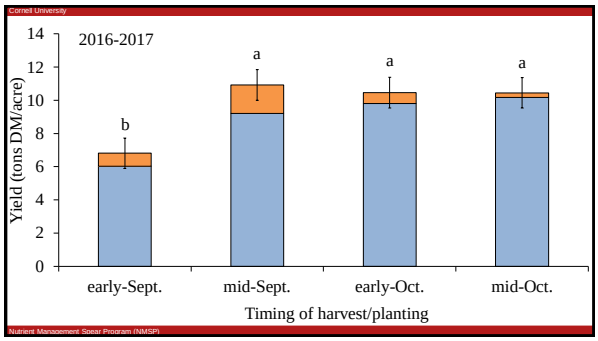
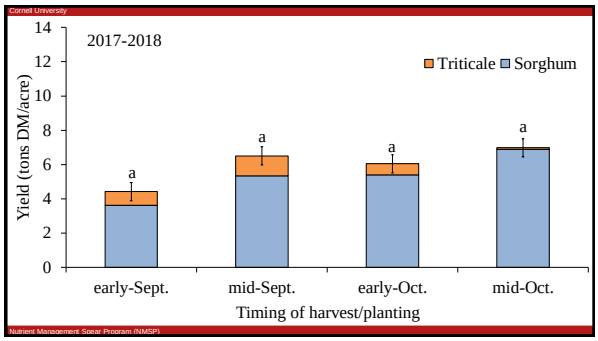
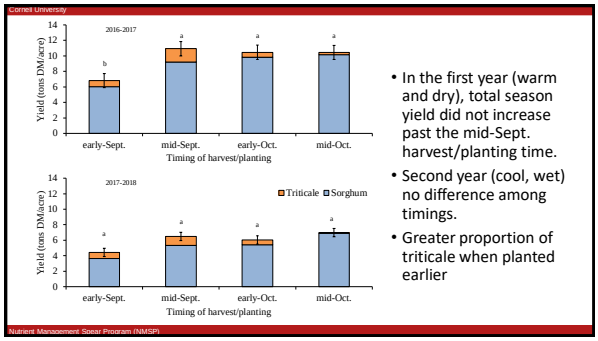
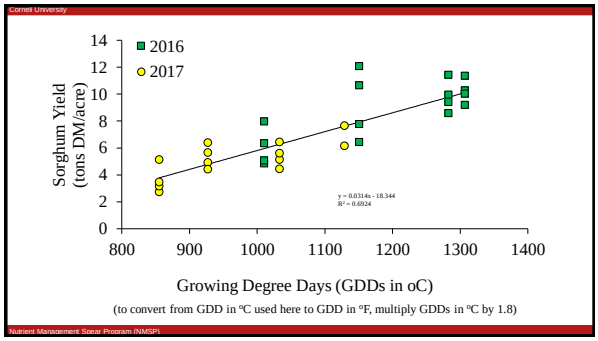
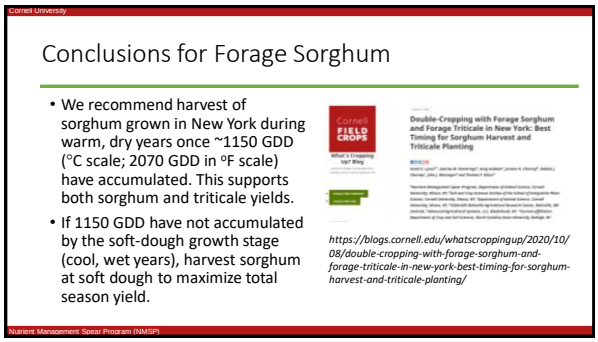


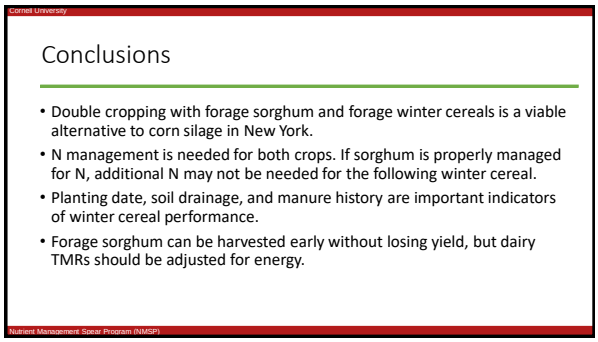




- In the first year (warm and dry), total season yield did not increase past the mid-Sept. harvest/planting time.
- Second year (cool, wet) no difference among timings.
- Greater proportion of triticale when planted earlier







Extension Articles

- Lyons, S.E., Q.M. Ketterings, G. Godwin, D.J. Cherney, J.H. Cherney, M.E. Van Amburgh, J.J. Meisinger, and T.F. Kilcer. 2019a. Best timing of harvest for brown midrib forage sorghum yield, nutritive value, and ration performance. What's Cropping Up? 29(3): 42-43.
- Lyons, S.E., Q.M. Ketterings, G. Godwin, D.J. Cherney, J.H. Cherney, J.J. Meisinger, and T.F. Kilcer. 2019b. Nitrogen management of brown midrib forage sorghum in New York. What's Cropping Up? 29(1):1-3.
- Lyons, S.E., Q.M. Ketterings, S. Ort, G.S. Godwin, S.N. Swink, K.J. Czymmek, D.J. Cherney, J.H. Cherney, J.J. Meisinger, and T. Kilcer. 2019c. Nitrogen management for forage winter cereals in New York. What's Cropping Up? 29 (3): 44-45.
- Lyons, S.E., Q.M. Ketterings, G. Godwin, J.H. Cherney, K.J. Czymmek, and T. Kilcer. 2018. Spring N management is important for triticale forage performance regardless of fall management. What's Cropping Up?
- Lyons, S.E., Q.M. Ketterings, G. Godwin, K.J. Czymmek, S.N. Swink, and T. Kilcer. 2018. Soil nitrate at harvest of forage winter cereals is related to yield and nitrogen application at green-up. What's Cropping Up?
- Lyons, S.E., Q.M. Ketterings, G.S. Godwin, J.H. Cherney, K.J. Czymmek, and T.F. Kilcer. 2017. Planting date and N availability impact fall N uptake of triticale. What's Cropping Up? 27(2):20-22.

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