Double Cropping in the North: Making Money on Both Ends

Tom Kilcer, CCA Advanced Ag Systems LLC www.advancedagsys.com



Winter Forages are Cover Crops on Steroids:

all the soil/nutrient benefits plus immediate return to your checkbook

Advanced Ag Systems LLC /NYFV



- Produce <u>forage</u> for the <u>high and fresh cows.</u>
- Supports a <u>high forage diet</u>
- Have forage that keeps the cows milking in hot weather.
- Increase dry matter harvested/acre by 25 35%
- Harvest <u>6 to 10 tons/acre</u> of high quality silage before spring grasses or legumes are ready.

		Average	Low	High	
		24.28	19.93	21.5	
	Crude Protein	20.35	19.71	21.07	🔵 + Sulfur
	ADF	25.42	24.00	21.35	
	aNDF	40.28	38.54	42.58	
	aNDFom	37.91	35.88	40.12	
	Ash	7.61	7.38	7.93	Fermented
	Lignin	1.02	0.44	1.87	Winter Forage
	Sugar	6.16	4.81	7.11	
	Starch	4.60	2.6	5.48	Samples
	NDFD 30	68.21	65.57	70.21	
	NDFD 120	88.13	82.47	93.06	
	NDFD 240	98.30			
	JJF240	0.69			
	TTNDFD	66.45	64.11	69.44	TINDFd 42
	RFQ	102		206	=Avg. Corn
	RFV	160	147	169	Silage or Alfalfa
_	Ku %/nr	5.74			Silage
	Nel	0.75	0.731	0.762	18% – Cood
	Lactic	1.21	/.44	9.24	740 /0 – 0000
	Acetic	0.77	0.47	1.02	
Advanced Ag Systems	Butyric	0.44	0.4	0.5	
/NYFVI	pH	3.76	3.63	3.83	

Improves Soil Structure Benefits Next Crop

Corn grain increased yield 4 – 7% Soybeans 3yr avg. increased yield 8 – 15% Nitrate in drainage water reduced 21-38% Surface permeability in clay loam increased **7X!**

Drury et al J. Environ Qual 2012

60% less moisture in soil in spring

Break-Even Yield by N Addition and Impact on Corn Silage -- N Rate Study

Break-Even Winter Cereal Yields			
	No impact on corn silage yields	1 ton DM/acre reduction in corn yield	
	ton DM/acre		
No additional N fertilizer	0.7	1.7	
With 75 lbs N/ac MERN	1.0	2.0	

Hanchar et al. (2015). Double cropping winter cereals for forage following corn silage: costs of production and expected changes in profit for New York dairy farms. What's Cropping Up? 25(4).

Winter Forage

Cover" Crop

Optimum Planting Date

10 Days to 2 Weeks BEFORE Wheat

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Earlier Planting = Higher Yields



Double Crop with Short Season vs Max Season Corn Silage



Dr. Cox, Cornell

1680 kg/ha of silage lost for every 5 day (US) shorter season corn 1680 kg/ha of silage lost for every 5 day (US) shorter season corn 1720 kg of milk lost 20 day drop

> Winter Forage DM Yield 4479 – 8958 kg/ha

3818 – 8018 kg milk 2 – 4 x GAIN

Single vs Double Crop Silage Yield



Brachytic Dwarf BMR Forage Sorghum

Energy Crops

Summer

Grain Sorghum

2016 Miner Institute Trial

- Corn Silage lost 4 tons/acre planted into rye.
- Corn in disked rye had no yield loss.
- Vermont disked rye had 2 ton/acre GAIN

Winter Grains Have Alleopathy

Corn Plants/Plot Following Winter Grains



Brown, 2005

Cornell Cooperative Extension in

Corn Plant Vigor Following Winter Grains





Strip Till or Zone Till Negates Allelopathy on Corn as significant (>5 cm) rainfall does



Miner Institute Yield by Year of Stand



Seeding Year Yield with Winter Forage





- **Increases Seeding Year Yield**
- **Stops Erosion Loss**
- **Inhibits Weeds**

Soybean

Moves work load from April to early June

Low Rate Glyphosate High Volume Water Carrier

Establishing High Yield Winter Forage

Seed/variety selection
Seed treatment
Planting date
Fall fertilization
Planting technique



Choose the best crop

- Lodging is a potential issue with rye.
- Lodging is rare with winter triticale forage.
- New triticale varieties are almost as early as rye.
- Triticale out yields rye 35%



Yield at Optimum N Rate



Dr. Ketterings, Cornell U

2) At the species level, how do yield and forage quality change over time?

As growth stage advances:

- RFQ declines
- Milk/ha increases



Jeff Liebert Cornell U

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Don't Buy Cheap Bin-Run VNS Seed!

You would not buy bin run corn seed Don't buy bin run triticale or hybrid rye

25% Rye 75% Triticale



<u>Seed treatment below</u> with early planting yielded <u>15% more than</u> not treated seed at left.

3 Way

Treatment

Late plantings yielded up to <u>28% more</u> with seed treatments compared to none.



<u>10 Day – 2 Weeks</u> before Wheat Grain





September Planting

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October Planting

September 9 planting: harvested May 10 October 5 planting: harvested May 17

Tillers = Yield Potential

Number of Tillers/plant by Planting Date



Yield/Soil Benefits Accrue According to Fall Biomass Preduced

September 9

Biomass is Driven by Planting Date



Lbs. of Nitrogen/Acre Stored in Living Biomass



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Nitrogen Stored is Driven by Biomass X Planting Date



Total N (vegetation + Soil NH3 + NO3) soil veg



Impact of Fall Nitrogen x Planting Date on Spring Yield



N Rate Study Results Yield and Optimum N Rate



Ketterings et al



3.175 cm deep



1.27 cm Heaved





Uniformity of Stand is Critical in Corn and in Small Grains.





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Dual Season Nitrogen Management









Oct 5 Fall vs Spring N Response Preliminary

Impact of Sulfur on Protein



We Do <u>NOT</u> Suggest Topdress Manure on stands in spring

We have had some horrible results from manure contamination in high sugar forage



N Rate Study Results Nitrogen Uptake

About 23 kg of N removed for every 900 kg DM

Nitrogen Removal at Optimal N Rate				
		N Removal (lbs/acre)		
Species	Number of fields	Average	Min	Max
Rye	8	92	32	131
Triticale	33	99	42	163
Wheat	4	59	9	95

111 kg/ha typical rate

Ketterings et al

Harvesting Winter Triticale

"Stage of growth has a bigger effect on forage quality than the species of winter grain chosen"

Dr. J. Cherney, Cornell University

Winter Forage

Matures just before cool season grasses





Change in Feed Quality



Winter Triticale Harvest 2013

Date	High Temp	Low Temp
May 10	25.0	11.1
May 11	17.2	8.3
May 12	11.7	3.9
May 13	9.4	0.6
May 14	15.5	-0.6
May 15	30.0	9.4

Date	High Temp	Low Temp
May 10	77	52
May 11	63	47
May 12	53	39
May 13	49	33
May 14	60	31
May 15	86	49

Wide Swath Same Day Haylage is Critical to Capture Forage Quality

High Sugar – 20% at harvest High Yielding : 6 – 14 Tons/Acre in one cut









Tedding Speeds Drying

Harvest of Winter Triticale Forage

- Mow wide (swath >80% of cutterbar)
- Tedd after 2 hours of drying
- Chop longer 2.5 cm???
- Ensile/wrap the same day as mowed unless temp < 4 C
- Homolactic acid type bacteria
- Very high sugar allows full fermentation

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Crop Soil News

http://www.advancedagsys.com/

March 2017

"It is the crops

that feed the

cows that make the milk which creates the money."

Nitrogen for Winter Forage Production

Winter forage is one of the most rapidly expanding crop acres across the Midwest and Northeast today. The incredibly high quality forage and profitable economic returns from application of the most basic management practices has made this <u>the crop to grow</u> on both dairy/livestock farms, and farms selling forages. With the critical help from New York Farm Viability Institute, Dr. Ketterings at Cornell, and NY farmers, we have found that the nutrient management of this fall planted, spring harvested, crop is very different from normal spring planted forages and even fall planted grain crops. To that end we have been testing planting dates and fall/spring nitrogen rates to determine the optimum combination for both vield and protection of the environment.

As I have written last August, planting date is critical for this crop in the northern regions. <u>Planting</u> <u>date 10 days to 2 weeks before wheat</u> (wheat is planted September 20 in our area) sets a very high yield potential, increases storage of nutrients, protects crowns against winter injury and heaving, minimizes weed pressure, and protects against soil loss. Soil health and structure is improved rather than degraded over winter. *So how much nitrogen should we apply this spring?*



Caution: The critical first question is it winter rye or winter triticale. We have found rye tends to lodge if we put more than 75 pounds of nitrogen on in the spring. Winter triticale, a crop only 2/3 as tall but yielding 35% more than winter rye, will rarely lodge from high nitrogen rates. For winter triticale, the maximum economic response in Dr. Ketterings summary work has been 99 pounds/acre. Nearly all of these triticale stands were planted in the traditional wheat planting time around September 20. Early planting can increase yields to over 4 tons of dry matter/acre. At 17% crude protein, this could contain 220 pounds of nitrogen (and 22 pounds of sulfur – an element crucial to protein production).

Nitrogen, sulfur, and rainfall are critical to achieving high yields the following spring. In Pennsylvania and other southern areas, they often get 5 to 6 tons of dry matter/A. Here in New York we have reached 3.5 to 4.5 tons of dry matter/A with regularity if we meet the planting date above. How much should we apply? We are trying to figure that out, especially for those who applied manure last fall before planting. The work presently funded by New York Farm Viability Institute is determining how much manure we can safe-ly use before fall planted winter forage while protecting the environment, and its impact on

Questions?

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