Summer Annual Grains as Forage: Why, How?

UW-Madison Division of Extension

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Advantages

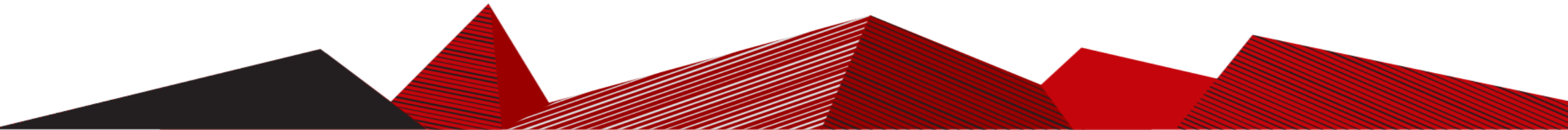
- Flexibility (manure, tiling, situation change)
- Low Cost
- Relatively Dependable
- Relatively easy to establish
- Harvest method flexibility
- Grain/straw option as backup w. spring pltg.

Disadvantages

- Harvest window relatively short for high quality forages
- Herbicide carryover potential (make certain read labels)
- Crop Insurance ramifications for spring planted crops
- Nitrates and potassium content

Selection

- Oats are not the only option.
- Spring barley, spring triticale, spring wheat can all come into play.
- Barley and oats relatively similar yield and quality.
- Wheat tends to have slightly lower yields, with similar quality to barley and oats.
- Triticale similar yields to barley and oats, but with slightly higher protein content.



Oat and Barley Performance Trials

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Oat Forage Data 2019 Trials – Madison

Table 6. Forage dry matter yield and quality of **spring oat varieties harvested at Madison**, Wisconsin in 2019 and an average for three years (2017, 2018, and 2019).

	Booting date[a]		Heading date		Dry biomass (ton/A)		Relative forage quality		Crude protein (%)		Milk (ton/A)	
Variety	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**
ForagePlus	20-Jun*	22-Jun*	3-Jul*	3-Jul*	0.96*	0.94*	159.5	141.8*	8.5	10.3*	1.43*	1.30*
Goliath	14-Jun	16-Jun	29-Jun	27-Jun	0.78	0.72	169.7*	153.5*	9.2*	11.2*	1.18	1.02*
Laker	16-Jun	18-Jun	2-Jul	30-Jun	0.96	0.87*	157.6	144.1*	8.8*	11.3*	1.53*	1.23*
Vista	13-Jun	15-Jun	26-Jun	24-Jun	1.01*	0.86*	154.2	149.9*	8.8*	11.3*	1.50*	1.25*
Trial Mean[b]	16-Jun	19-Jun	29-Jun	30-Jun	0.85	0.99	162.0	134.3	8.9	10.2	1.31	1.31
Trial Standard Error	0.10	0.09	1.12	0.08	0.01	0.01	0.77	0.94	0.04	0.08	0.02	0.04
LSD	1.24	1.91	1.53	1.72	0.17	0.24	9.5	21.1	0.51	1.73	0.19	0.54

[a] Varieties that are not significantly different ($P<0.05$) from the highest performing variety in the trial are marked with a star (*). These analyses refer to a Fisher's Least Significant Difference (LSD) test. [b] The trial mean average that includes the varieties in the table and some additional elite experimental lines is provided. It is not just the average of these varieties. -- Information not available

Oat Forage Data 2019 - Arlington

- Shows one of the key decision points – quality or yield? Half ton more DM, but 30 pts less RFQ

Table 7. Forage dry matter yield and quality of **spring oat varieties harvested at Arlington**, Wisconsin in 2019 and an average for three years (2017, 2018, and 2019).

	Booting date[a]		Heading date		Dry biomass (ton/A)		Relative forage quality		Crude protein (%)		Milk (ton/A)	
Variety	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**
ForagePlus	6-Jul*	2-Jul*	11-Jul*	10-Jul*	1.41	1.59*	102.7*	116.8*	9.0	10.8*	1.66*	2.04*
Goliath	2-Jul	27-Jun	7-jul	4-Jul	1.46	1.42*	102.8*	123.8*	9.6*	11.5*	1.66*	1.82*
Laker	2-Jul	29-Jun	10-Jul	6-Jul	1.39	1.48*	104.1*	113.8*	10.0*	11.1*	1.62*	1.78
Vista	30-Jun	26-Jun	6-J	3-Jul	1.69*	1.51*	106.1*	114.1*	9.7*	11.5*	1.93*	1.73
Trial Mean[b]	2-Jul	19-Jun	9-Jul	6-Jul	1.35	1.47	112.2	118.3	10.0	11.4	1.63	1.81
Trial Standard Error	0.05	0.05	0.05	0.06	0.01	0.01	0.48	0.49	0.04	0.03	0.03	0.01
LSD	0.91	1.33	0.84	1.70	0.20	0.22	8.7	13.0	0.6	0.9	0.78	0.21

[a] Varieties that are not significantly different ($P<0.05$) from the highest performing variety in the trial are marked with a star (*). These analyses refer to a Fisher's Least Significant Difference (LSD) test. [b] The trial mean average that includes the varieties in the table and some additional elite experimental lines is provided. It is not just the average of these varieties. -- Information not available

Barley Forage Data – 2019 Madison

Table 8. Forage dry matter yield and quality of **spring barley varieties harvested at Madison**, Wisconsin in 2019 and an average for three years (2017, 2018, and 2019).

	Booting date[a]		Heading date		Dry biomass (ton/A)		Relative forage quality		Crude protein (%)		Milk (ton/A)	
Variety	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**
Hays	7-Jun	11-Jun	24-Jun*	23-Jun*	0.59*	0.61*	174.3*	155.9*	9.7	10.9*	0.93*	0.85
Kewaunee	5-Jun	7-Jun	15-Jun	15-Jun	0.51*	0.46	172.3*	162.1*	10.6*	12.3*	0.77	0.66*
Westford	12-Jun*	15-Jun*	24-Jun*	22-Jun*	0.66*	0.74*	168.5*	149.9*	9.5	10.5	1.02*	1.04*
Trial Mean[b]	15-Jun	19-Jun	29-Jun	30-Jun	0.85	0.99	162.0	134.3	8.9	10.2	1.31	1.31
Trial Standard Error	0.10	0.09	1.12	0.08	0.01	0.01	0.77	0.94	0.04	0.08	0.02	0.04
LSD	1.24	1.91	1.53	1.72	0.17	0.24	9.46	21.09	0.51	1.73	0.19	0.54

[a] Varieties that are not significantly different ($P<0.05$) from the highest performing variety in the trial are marked with a star (*). These analyses refer to a Fisher's Least Significant Difference (LSD) test. [b] The trial mean average that includes the varieties in the table and some additional elite experimental lines is provided. It is not just the average of these varieties. -- Information not available

Barley Forage data 2019 - Arlington

- Again, shows importance of matching needs to harvest date, and harvest window importance.

Table 9. Forage dry matter yield and quality of **spring barley varieties harvested at Arlington**, Wisconsin in 2019 and an average for three years (2017, 2018, and 2019).

	Booting date[a]		Heading date		Dry biomass (ton/A)		Relative forage quality		Crude protein (%)		Milk (ton/A)	
Variety	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**	**2019**	**3-year**
Hays	27-Jun	25-Jun	1-Jul	1-Jul*	1.13*	1.19*	140.8*	131.5*	10.42*	11.86*	1.62*	1.64*
Kewaunee	25-Jun	22-Jun	27-Jun	26-Jun	0.926	1.00*	128.3	138.3*	10.66*	12.49*	1.26*	1.37
Westford	9-Jun*	27-Jun*	2-Jul*	1-Jul*	1.01*	1.14*	134.3*	135.7*	10.35*	11.64*	1.40*	1.59*
Trial Mean[b]	2-Jul	29-Jun	9-Jul	6-Jul	1.35	1.47	112.2	118.3	9.96	11.39	1.63	1.81
Trial Standard Error	0.05	0.05	0.05	0.06	0.01	0.01	0.48	0.49	0.04	0.03	0.03	0.01
LSD	0.91	1.33	0.84	1.70	0.20	0.22	8.65	13.0	0.62	0.89	0.78	0.21

[a] Varieties that are not significantly different ($P<0.05$) from the highest performing variety in the trial are marked with a star (*). These analyses refer to a Fisher's Least Significant Difference (LSD) test. [b] The trial mean average that includes the varieties in the table and some additional elite experimental lines is provided. It is not just the average of these varieties. -- Information not available

Seed/Variety Selection Realities

- There probably is a best choice for what you're doing.
- Particularly true for late summer planting. If planting in mid-August, mid maturity cultivars probably optimal. If planting later, earlier maturity may serve you better.
- Bin-run seed is an option. Cheaper, possibly lower germination and lower yield potential, but don't need to be concerned about same disease issues that make grain production from bin run seed more challenging.

Adding peas into the equation

- Pea/Small grain mixtures are available and a valid option. What do the peas really add?
- Basically, protein. Very seldom will they add yield.
- Thus, becomes a choice based on your farm’s forage quality needs and other forage availability.

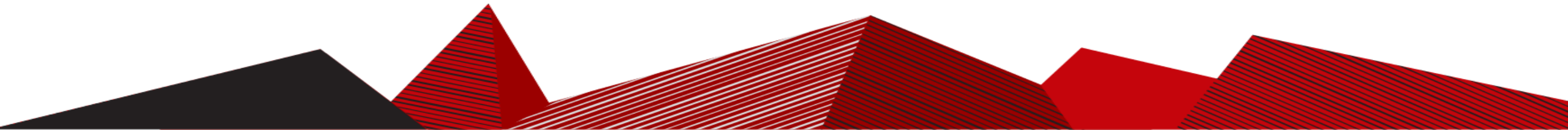
Oats/Peas vs. Oats Data
Michigan U.P. Research Station Data 2018

Harvested at boot stage of oats in plot

Varieties	Yield (DM Tons/Ac)	Crude Protein %	RFV
Laker oats	2.56	10.0	100
Laker & Fergie peas	2.37	12.3	102
Laker & Arvika peas	2.33	15.3	114
Ogle oats	2.34	10.7	114
Ogle & 4010 peas	2.12	16.5	132
Goliath oats	2.26	10.1	119
Goliath & 4010 peas	1.97	13.7	130
Forage Plus oats	2.51	10.2	108
Forage Plus & 4010 peas	2.34	20	134

Agronomic Considerations

- Small grains can be established using no-till, minimum till, aerial seeding, or conventional till methods.
- Earlier planting dates provide better yield and flexibility.
- BUT, one of the advantages of small grains is that they can grow in cool condition and take advantage of fall growth opportunity.
- Seeding rates do matter. Optimum seeding rates equal higher yields and good forage quality.



Planting Options

Specie	Plant date	Seed size seeds/lb	Seed rate million seeds/a	Bu weight lbs
Spring barley (winter barley NOT recommended)	Early spring	10,000-15,000	1.5	48
Oats	Early spring	11,000-15,000	1.5	32
Rye	Late September-early October	11,000-20,000	1.5	56
Triticale Cross of wheat (female) x rye (male)	Late September-early October	11,000-18,000	1.5	50
Winter wheat	Late September-early October	10,000-15,000	1.5	60

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Nutrient Management Considerations

- 40 – 60 lbs. of available nitrogen
- Normal P, K, micronutrient usage for a forage
- Can utilize manure based nutrients, scavenge nutrients from previous crop applications (but may take a yield and/or quality hit), or apply fertilizers at planting.
- Take into account potential for nitrate issues and try not to overapply nitrogen.
- Also remember potassium content. Small grains are luxury consumers of K. If wanting to feed to pre-fresh groups, need to test K content.

Pest Management

- Probably not going to need to actively manage weeds, diseases, or insects. Primarily due to seasonality and harvest timing.
- BUT, really need to pay attention to herbicide restrictions from past crops. If plant within the plant back restriction time frame, cannot be used as feed.

Harvesting

- Spring or early summer planted grains require attention to harvest timing.
- Boot stage is optimum balance of yield and quality, but manage according to farm needs.
- Maturity stages progress quickly in June & July.
- Longer harvest windows for late planted grains, but then need to balance dry down situations, snow risk?, and available time.

Boot stage – up to Feekes 10.0
Heading starts at Feekes 10.1

Mechanical harvest

- Spring planted yields flexibility. Silage, Hay, baleage, Grazed, or change plans and combine for grain/straw.
- Late plantings decrease flexibility, but can still be harvested for silage, baleage, grazed, or about a 5% chance of being able to make dry hay.

Grazing: A Great option

- Late planted grains really suited to grazing
  - Be cautious, but not worried, about nitrates, especially after a true killing frost (20 or so degrees)
  - Graze according to your schedule and the growth for your conditions. Don’t worry about the book statements.
  - Can graze after snow if the forage is not completely covered
  - Marshfield grazed lodged oats after snow with little change in intakes

Fall grazing Notes

- Demonstration/study I conducted in Marinette County grazing small grains and others in later fall.
- Yield: Barley>Oats>Wheat
- Palatability: Wheat>>>>Oats>Barley

- Consider changing planted options based on what animals will be grazing the acres.

Cereal Grain Forage Overview

- Flexibility in when you plant them and how you use them is their greatest strength.
- Spring plant/Early summer harvest
  - Good yield potential, shorter optimum harvest window
- Early August planting/Fall Harvest
  - Good yield potential, but highly variable according to planting date, growing season.
  - Very good quality
  - Need to think through harvesting options and plan accordingly.

Resources Utilized

- Ashley Olson, Vernon County Agriculture Educator
- Shawn Conley, Soy/Small Grains Specialist
- MSU Extension Forage Trials, via Jim Isleib, Crops Educator for the U.P.


Focus on Forage
Optimizing forage production in Wisconsin
February 10, 2021 - 12:30 pm to 1:30 pm - Webinar
Alternative Forage Strategies When Alfalfa Fails
Tom Kilcer, Advanced Ag Systems
Midwest Forage Association - Membership Update
Chelsea Russell, Local Council Director
Webinar is FREE
Preregistration required:
https://go.wisc.edu/334pqz
CCA CEUs offered
Webinar is sponsored by the Calumet, Central WI, Chippewa, Fond du Lac, Outagamie, Shawano, and Sheboygan Forage councils.
Webinar series is brought to you by the University of Wisconsin-Madison, Division of Extension and UW_-Nutrient and Pest Management Program.

	NM	SW	PM	CM	PD
CEU Tracking Number: WI 56638 **Approved CEUs:**	0.0	0.0	0.0	1.0	0.0

Meeting Title: Focus on Forage Webinar
Location: Online, WI
Meeting Date: 02/03/2021, 01:00 PM to 01:30 PM

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Focus on Forage

Optimizing forage production in Wisconsin

Wednesdays – January 13 through March 3 – 12:30 to 1:30 pm
Register at https://go.wisc.edu/334pqz

February 10	Alternative Forage Strategies When Alfalfa Fails (Tom Kilcer, Advanced Ag Systems)
February 17	No webinar
February 24	Alfalfa-Grass Mixtures for Dairy Forage: Using Meadow and Tall Fescues (Dr. Jerry Cherney, Cornell U)
March 3	To be determined

Resources and Recordings Posted at:
https://fyi.extension.wisc.edu/grain/

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Questions?
Email Ashley Blackburn aablackburn@wisc.edu