

Getting Started in Small Grains

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Today's Outline

- Benefits of Small Grains in Cropping
- Wheat
- Barley
- OATS



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Benefits of Small Grains on Farm

- Crop Rotation is beneficial to entire crop system – Many studies
- Spreads out workload and weather risks
- Reduces crop input costs
- Reduces soil erosion – both root and residue benefits
- Aids in weed control issues
- May increase soil organic matter content
- Breaks diseases and insect cycles
- Cover crop opportunities



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What Small Grain Works Best on Your Farm?

- Research and document market and end-use needs and opportunities
- Identify current crop/land/soil issues
- Develop a work plan
- Identify seed and equipment needs and sources

Best Management Practices for Wheat



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WHEAT – Winter Wheat and Spring Wheat

- What Market Class of wheat should you plant?
- What markets are available?
- Hard wheat and soft wheats are different commodities with different end uses and cannot be mixed in the marketplace
- Most soft wheat produced in Eastern US
- Most spring wheats are hard wheats
- Winter wheat is generally grown in warmer wintertime environments
- Seed source?



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Wheat Variety Selection Criteria

- Fusarium resistance (scab)
- Test weight – the higher the better
- Yield per acre – what is the target yield needed for profitability
- Winter hardiness (winter classes)
- Maturity
- Resistance to other diseases and insects (BYDV, Hessian fly, etc.)
- Lodging resistance



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Best Practices for Winter Wheat

- Select more than one variety
- Plant treated seed (if not organic)
- Drill in 7" rows if possible
- Plant wheat 1" – 1.5" deep – deeper crown establishment is important for winter wheat survival
- Plant 1.3 to 1.5 millions seeds/acre ~30-35 seeds/sqft. (~21 seeds/ft in 7" rows)
- Apply 30-40 lbs N and some P preplant (18-46-0)
- If later planting (Sept 15 or later) or into heavy residue, increase planting rate by 10-20%
- Prefer planting into soybeans with some stubble left rather than corn.
- Topdress with 40-60#N at spring green up. Later application may boost yield potential and protein, but time constraints of other crop planting, etc.



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Spring Wheat

- Use a scab resistant variety if possible
- Plant as early as possible in spring – Mid/late March to Mid April
- Apply all fertilizer before planting.
- Same recommendations on planting rates, etc.
- Fungicide use (non-organic) at beginning of flowering
- Recommend Prosaro or Caramba (U of Illinois recommendation), not a strobilurin
- Ground application of fungicide is recommended



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Scab Symptoms





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Other Wheat Diseases

Stripe Rust

Leaf Rust



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Wheat Harvest

- University of Illinois recommends harvesting wheat at 15% to 18% moisture and DRYING with low or no added heat. Reason – waiting for wheat to dry down in the field results in lower TW and increases the risk of rain damage to both yield (lodging) and grain quality.





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Barley



- Barley is widely adapted to many climates
- Generally has excellent cold tolerances
- Many varieties will ripen earlier than other small grains
- Barley has high tolerance to alkaline soils, but poor tolerance to acidic soils
- Barley generally has very good drought tolerance
- Barley has good heat tolerance, but only to DRY heat, not high humidity due to diseases
- Best adapted to cooler, drier areas with loamy soils with medium fertility and relatively dry conditions after heading.
- Wisconsin was a leading barley production state from late 1800's till 1940's



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Barley Use



- Can be an excellent livestock feed – only about 2% lower in TDN than corn
- High moisture barley is popular in dairy rations where high quality corn has been difficult to produce
- Good source of beta glucans (food uses)
- Malt barley production is tricky (protein and plant diseases) but recent increase in micro-brewing has created increased demand for locally grown barley



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Barley Management



- Select a variety with the best combination of desired end-use characteristics and agronomic traits. Feed? Forage? Malt market?
- Manage your nitrogen rates. Malt barley requires LOW protein (max 13.5%). Also – Barley is more susceptible to lodging than many other small grains. High N availability and/or application contributes to lodging
- Barley grows best in lighter soils or higher ground
- Seedling emergence can be a challenge with any soil crusting
- Careful and timely harvest is critical to grain quality.

OATS!!!

THESE ARE NOT YOUR FATHER'S OATS!



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Factors Affecting Oats Production Have CHANGED!



- Larger, heavier tillage equipment
- Larger planting equipment – equipment width, seed placement, crop row width
- New Varieties – Targeted Usage
- New cropping patterns and fertility needs: i.e. – rotations, canola, corn, soy, fallow/no fallow, etc.
- Plant disease pressures have changed - increased
- New harvesting and storage capabilities
- Quality specs have changed
- Climate change?

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Profitable Oats Production in the Future Requires a Strategy

Strategy Includes:

- Crop Rotation Strategy
- Field Selection
- Variety Selection
- Weed Control Strategy
- Harvesting and Storage Strategy
- Marketing Strategy

Field Selection



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- Choose fields relatively free of wild oats contamination and minimal herbicide residue carryover.
- Oats are a desirable rotational crop with canola, soybeans, and/or legumes
- Rotate with corn, beans, canola, hay fields – best to NOT rotate with other cereals back to back.
- Oats can tolerate cooler, wetter soils better than many other cereal crops.
- Good, clean viable seed oats will germinate well at 45 degrees F.

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Seeding Oats



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- Clean Seed – We always recommend Certified Seed
- Treated (if not organic)
 - Fungicide for smut
 - Oats respond well to some bacterial based inoculants
- Dates – EARLY!
 - Mid March to early May
 - Better returns from early dates – yield and TW's
- Rate
 - 2.5 to 3.5 bu per acre
 - Goal of 18-23 plants per sq foot final stand



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Seeding Rate



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- Optimum plant populations range from 18 to 23 plants per square foot. Use 1,000 kernel weight of the seed and the following formula to determine seeding rate:

$$\text{Seeding rate} = \frac{\text{desired plants/sq. ft.} \times \text{TKW (g)} \times 10}{\% \text{ expected seed survival}}$$

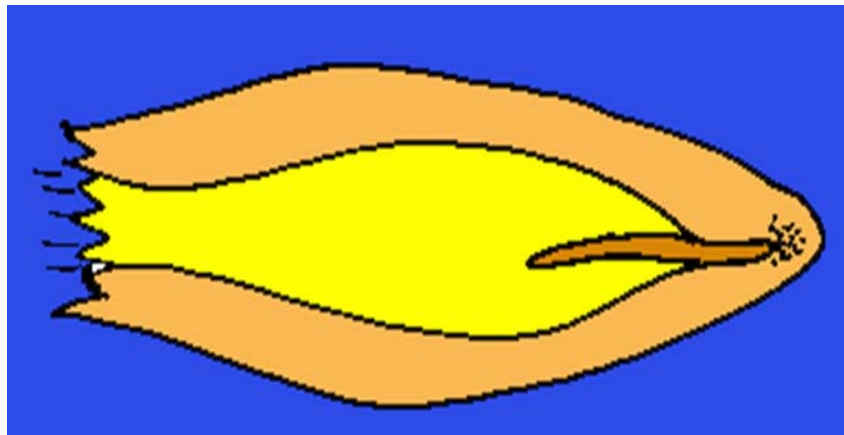
- Expected seedling survival is used in its decimal form (90 per cent = 0.9).
- Seeding Rate is expressed in pounds per acre of seed.

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Whole Oat Kernel



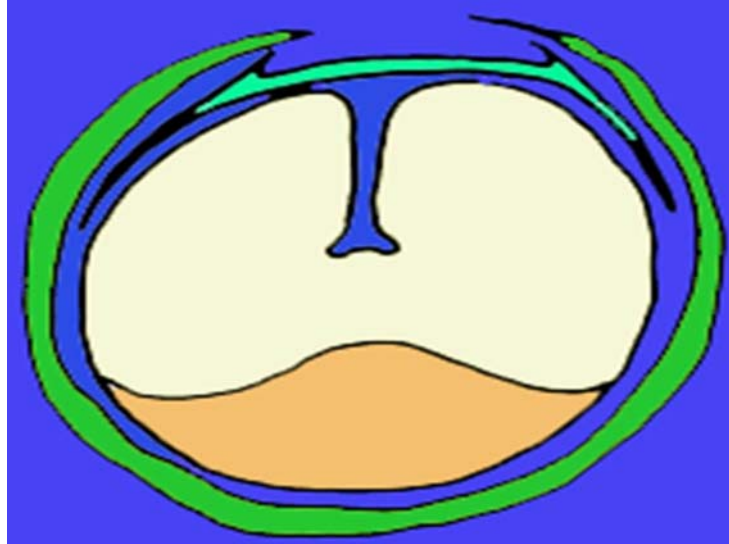
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Cross Section Of Oat Kernel



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VARIETY SELECTION

Iowa, Minnesota, Wisconsin, South Dakota, North Dakota



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Grain Millers Preferred Milling Varieties:

Reins
Shelby 427
BetaGene
Deon
Hayden
Rockford
Newburg



Variety	Breeding Origin	Maturity	Crown Rust	Stem Rust	BYDV	Hull Color
Reins	U of Illinois	Early	MR	MS	R	Tan
Beta-Gene	U of Wisconsin	Medium	MS	MR	R	Yellow
Shelby 427	SDSU	Medium	S	MR	R	White
Deon	U of MN	Late	MR	MS	MR	Yellow
Hayden	SDSU	Late	MS	MS	MR	White
Leggett	AAFC	Late	MS	MS	S	White
Newburg	NDSU	Late	S	R	MS	White
Rockford	NDSU	Late	S	MR	R	White



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Other Milling Oats Varieties

Variety	Breeding Origin	Maturity	Crown Rust	Stem Rust	BYDV	Hull Color
Badger	U of Wisconsin	Early	S	S	MR	Yellow
Colt	SDSU	Early	MS	S	MS	White
Sabers	U of Illinois	Early	MR	S	R	Yellow
Spurs	U of Illinois	Early	MR	S	R	Tan
Tack	U of Illinois	Early	R	S	R	Tan
Excel	Ag Alumni Seed	Early	S	S	R	Yellow
Shelby 427	SDSU	Medium	S	MR	R	White
Souris	NDSU	Medium	S	MS	MS	White
Horsepower	SDSU	Medium	S	S	MR	White
Deon	U of MN	Late	MS	MS	MR	Yellow
HIFI	NDSU	Late	S	MR	R	White
Rockford	NDSU	Late	S	MR	R	White
Newburg	NDSU	Late	S	R	MS	White

Fertilizer Requirements for Oats



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For specific recommendations, **have your soil tested**. If soil analyses are not available, a general recommendation is as follows:

- **Nitrogen (N):** Apply 0-30 lb/acre N following fallow or legume breaking, 30-55 lb/acre following grass and grass-legume breaking and 55-90 lb/acre N following stubble. The primary nitrogen deficiency symptom is leaf yellowing starting with the older leaves.
- **Phosphate (P₂O₅):** Apply phosphate at 30-40 lb/acre. The primary phosphorus deficiency symptom is leaf purpling/browning starting at the tips of older leaves on the seedling.
- **Potassium (K₂O):** On sandy-textured or organic soils apply potassium at 15-30 lb/acre potash (K₂O) in a sideband or 30-60 lb/ac broadcast. Where required, potassium should be placed with the seed. Deficiency symptoms are difficult to detect but include short internodes and weak stems.
- **Sulphur (S):** Apply sulphate sulphur at 15 lb/acre on well-drained soils. Sulphur deficiency may occur in many soils and in any area of the province. A soil test is recommended to establish the available sulphur status of fields, especially if in rotations with canola.

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Selected Crop Nutrient Needs



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(Minimum plant needs lbs/A)

Crop	Yield (A)	N	P ₂ O ₅	K ₂ O	Mg	S
Alfalfa	8 ton	408	96	392	43	43
Barley	120 bu.	166	67	182	17	23
Canola	60 bu.	180	90	150	37	30
Corn	150 bu.	135	57	41	14	12
Oats	100 bu.	73	27	18	4	7
Wheat	80-bu. Grain	120	48	27	12	8

WEED CONTROL



- Best early weed control – Early planting with thick stands.
- Oats can tolerate early preplant glyphosate application for clean field conditions at planting.
- Some successes seen with early mechanical tillage for weed control
- Oats are very tolerant of all registered amine formulations of herbicides for broadleaf weed control. Avoid ester formulations
- Dicambas, 2,4-Ds, MCPA formulations all good – depends on weeds being controlled.
- Control broadleaf weeds at or before **4th leaf stage (preboot)** for best effective control, yield potential, and lower risk of crop injury.
- Most all milling companies have no restrictions on herbicide use as long as manufacturers application rates and timing are obeyed. There are registered tolerances, but limited testing at present time. **NO GLYPHOSATE!!!!**

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Plant Disease Controls



- **Primary Oat Diseases –**
 - Crown Rust (leaf rust)
 - Stem Rust
 - Barley Yellow Dwarf Virus (BYDV or “Red Leaf”)
 - Septoria
 - Fusarium

Fungicides work well on oats to control diseases, and have been shown to boost yields when applied timely. However – be aware that fungicide application can delay maturity up to 7 days.

- Stratego
- Tilt
- Headline
- Others



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Harvesting and Storage

- **Swathing**
 - Target average kernel moisture of 25 percent or below
 - Greenest kernels just changed to cream colored
 - Green hulls not desired
- **Dessication**
 - Legal and tolerances in US and Canada
 - Caution needed – timing critical
 - Quality implications
 - NO DESSICANTS on grain sold to Grain Millers
- **Combine**
 - Avoid dehulled kernels
 - Slow cylinder speed and widen concave clearances if dry conditions
- **Drying**
 - Target of 12-13 percent moisture
 - Recommend bin aeration if at all possible
 - Dryer temps less than ~65C (150F)
 - Max Grain temps between ~45 to 50C (110 to 120 F)
- **Storage**
 - See drying section above!
 - CLEAN, dry storage with air is best



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Like Beauty –

QUALITY is in the “Eye of the Beholder”

- Farmers raise a “**CROP**” and market a “**GRAIN**”
- Grain Millers buys a “**GRAIN**” and markets an “**INGREDIENT**”



- When you truly understand your crop’s role as a food ingredient and the process to convert that grain into food, you begin to fully appreciate the **SPECIFICATIONS** and the steps necessary to make **QUALITY**.

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Grain Millers Purchasing Specification



- **38# Test Weight** (Winchester bushel) Minimum 36# with discounts
- **13.5% Spec., 13.0% Moisture Target**, Maximum 14% with discounts over 13.5%
- 1.0% Wheat Allowed, Maximum 2%
- 1.0% Wild Oats Spec. Discounts to 2.5%
- 1.0% Barley Allowed, Discounts to 2.0%
- .5% Max Canola Spec., 1% Maximum with discounts
- 8% dehulled oats allowed, maximum of 12%
- 12% Small Oats (Thins) Allowed, (thru a 5/64 X3/4 inch slotted sieve) Discounts to 20%
- 0.1% Heat Damage Allowed
- 2.0% FM Allowed, Max. 3.0%
- .02% Ergot maximum
- All other Grain Millers analysis and discounts to apply.
- All oats must meet all applicable USDA, EPA, FDA, and/or CFIA (Canada) guidelines.
- No LIVE insects
- Oats must not contain any detectable levels of pesticide, chemicals, or odors. NO GLYPHOSATE!!

Keys to Becoming a Strategic Grain Supplier



- *Understand who truly is the customer and what drives their decisions to buy your grain.*
- *Understand the customer's definition of **QUALITY**.*
- *Understand the differences between "a crop" and "an ingredient", and those factors that drive value for the end user.*
- *Fully understand and document your market, your product, and your capabilities better than your competitors.*
- *Food purchasing is the most year-round process affecting consumers. Grain marketing should also be a year round process.*



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Thanks for listening!

Questions?

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