CULTIVATING HEALTHY COMMUNITIES

2013 Small Grain Research Trial Results



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COMMUNITY 4-H & YOUTH ENVIRONMENT AGRICULTURE FOOD





| Sample | Bakery | Variety | Туре | Source | Amount | Harvest moisture | Test weight | Protein @ 12% moisture | Protein @ 14% moisture | falling number | DON | SDS | Baking Test Score | Bakers Comments | |
|--------|-----------|-----------|---------|---------|--------|---------------------|----------------------|------------------------------|------------------------------|-------------------|-----|---------|----------------------|---|--|
| | | | | | | | | | | | | | | | |
| # | State | | | | lbs | % | lbs bu ⁻¹ | % | % | seconds | ppm | mls | | | |
| | | | | | 25 | 10.0 | ~ ~ | | 12.0 | 150 | 0.5 | | | | |
| 1 | VT | Yorkton | HRSW | ME | 25 | 13.2 | 61.5 | 14.1 | 13.8 | 479 | 0.5 | | 74.1 | Slightly lower volume, good flavor | |
| 2 | ME | AC Barrie | HRSW | ME | 25 | 13.4 | 60.8 | 14.0 | 13.7 | 491 | 0.4 | | | | |
| 3 | MF | Superb | HRSW | VT | 16.8 | 12.1 | 61.1 | 13.4 | 13.1 | 433 | 0.7 | 84 | | | |
| | | Bupero | into ti | ,,, | 10.0 | 12.1 | 01.1 | 15.1 | 15.1 | 155 | 0.7 | | | | |
| 4 | ME | AC Walton | HRSW | VT & NY | 18 | 15.0 | 56.6 | 13.0 | 12.7 | 433 | 0.2 | 97 | | | |
| 5 | VT | Barlow | HRSW | ME | 25 | 15.0 | 63.6 | 13.0 | 12.7 | 398 | 1.0 | | 77.1 | Great bread | |
| | | Durion | 11100 | | | 1010 | 0010 | 1010 | 12.1 | 070 | 110 | | ,,,,, | | |
| 6 | ME | Brick | HRSW | ME | 25 | 14.3 | 62.8 | 13.2 | 12.9 | 423 | 0.6 | | | | |
| 7 | ME | Faller | HRSW | VT | 18.2 | 11.4 | 60.8 | 12.9 | 12.6 | 432 | 0.1 | 88.5 | 75.3 | Strong, excellent volume, great flavor | |
| | | | | | | | | | | | | | | | |
| 8 | ME and VT | Glenn | HRSW | ME | 75 | 13.8 | 63.5 | 14.8 | 14.4 | 422 | 0.7 | | 67.4 | Excellent volume, great crumb | |
| 9 | VT | Kaffe | SRSW | VT | 17.6 | 11.2 | 59.9 | 12.0 | 11.7 | 374 | 0.3 | 52.5 | | | |
| | | | | | | | | | | | | | | | |
| 10 | VT | Magog | HRSW | VT | 14 | 12.1 | 60.6 | 13.1 | 12.8 | 464 | 0.2 | 80.5/82 | | Excellent crumb and volume, good flavor | |
| 11 | VT | McKenzie | HRSW | VT | 8.2 | 11.4 | 61.0 | 13.1 | 12.8 | 421 | 0.4 | | | Good flavor, no great crumb | |
| | | | | | | | | | | | | | | | |
| 12 | VT | RB07 | HRSW | ME | 25 | 13.8 | 60.9 | 13.4 | 13.1 | 394 | 0.7 | | 75.6 | Great bread | |
| 13 | ME | Red Fife | HRSW | VT | 12.4 | 11.7 | 60.9 | 13.6 | 13.3 | 377 | 0.3 | 62 | 70.1 | Slightly lower volume, less than perfect texture | |
| | | | | | | 10 - | | 4.5.5 | | | 0- | | | | |
| 14 | VT | Roblin | HRSW | ME | 25 | 12.7 | 60.1 | 15.3 | 14.9 | 467 | 0.5 | | 73.5 | Great bread | |
| 15 | VT | Sv Soren | HRSW | VT | 13.2 | 11.2 | 61.5 | 14.1 | 13.8 | 432 | 0.4 | 86/86 | | Crumb and flavor closer to traditional spring samples | |
| | | 2, 2010m | | | | | | | | | | 22,00 | | | |
| 16 | ME | Tom | HRSW | ME | 25 | 14.2 | 62.4 | 13.8 | 13.4 | 445 | 0.7 | | 64.6 | low volume, overly extensible | |

2013 Deoxynivalenol (DON) Levels:

- Most damaging disease this year was *Fusarium* head blight (FHB)
- Combination of heavy rain and cool temperatures during flowering created the ideal environment for FHB
- A high incidence of premature bleached grain heads, the telltale sign of FHB
- Infection resulted = highest levels of the mycotoxin deoxynivalenol (DON) seen to date!







2013 Commercial Samples

- 172 samples analyze
- 152 DON analysis
- DON level range: 0.0 16.7ppm
- 71 greater then 1ppm
- PA, NY and VT = highest levels
- Grains with highest DON levels; spring wheat, barley, winter wheat, and rye.
- No Oats tested over 1ppm

VARIETY TRIALS

Small Grain Foliar Diseases:

Excessive rain + cool temperatures = fungal diseases!

- Ascochyta Leaf Spot (Didymella exitialis)
- Wheat Leaf Rust (Puccinia triticina)
- Stem Rust (Puccinia graminis f.sp. tritici)
- Stripe Rust (Puccinia striiformis)
- **Powdery Mildew** (*Erysiphe graminis f. sp. tritici*)
- Septoria Leaf Blotch-Leaf and glume blotch: Septoria nodorum (*Leptosphaeria nodorum*), and leaf blotch: S. tritici (*Mycosphaerella graminicola*)
- **Tan Spot or Yellow Leaf Spot** (*Helminthosporium tritici-repentis* (*Drechslera tritici-repentis, Pyrenophora tritici-repentis*)







• **Spot Blotch** (Cochliobolus sativus)





Winter Wheat Foliar Disease



Leaf disease severity and the percent plant infection of the 25 winter wheat varieties in Alburgh, VT

*Varieties with the same letter did not differ significantly leaf disease severity or plant infection.

Winter Wheat Yield and Protein Content:



Yield and protein concentration of 25 winter wheat varieties, Alburgh, VT.

*Varieties with the same letter did not differ significantly in yield or protein.

Winter Wheat Quality:



Spring Wheat Yields and Protein:



Yield and protein concentrations of 22 spring wheat varieties, Alburgh, VT. Varieties with the same letter did not differ significantly.

Spring Wheat Quality:



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Heirloom Winter Wheat:





Heirloom Spring Wheat:



Heirloom Spring Wheat Varieties

On-Farm Spring Wheat Breeding Trials

Cultivars used as parents in spring wheat breeding project.

| Abbreviation | Cultivar | Year | Place of Origin | Pedigree |
|--------------|-----------|------|-----------------|------------------------------|
| ACB | AC Barrie | 1997 | Saskatchewan | Neepawa/Columbus//BWOO |
| Ch | Champlain | 1870 | Vermont | Black Sea/Gold Drop |
| D | Defiance | 1878 | Vermont | Golden Drop/White Hamburg |
| Н | Hope | 1927 | South Dakota | Yaroslav emmer/Marquis |
| RB | Red Bobs | 1926 | Saskatchewan | selection from field of Bobs |
| RF | Red Fife | 1918 | Ontario, Canada | information not found |
| S | Surprise | 1909 | Vermont | Chile Club/Michigan Club |







Yield and protein of F5 spring wheat crosses grown in Alburgh, VT, 2013.

800 14.4 14.2 700 14.0 600 13.8 ein (%) acre-1) 200 13.6 **se** 400 Prot 13.4 Yield 300 Crude 13.2 13.0 200 12.8 100 12.6 0 12.4 H/Ch ACB/RF Ch/ACB D/ACB S/RB Spring Wheat Cross ----Crude Protein Yield

Yield and protein of F6 spring wheat crosses grown in Westfield, VT, 2013.





Crosses made with Champlain

Winter Barley:



Spring Barley:



Oats:

| Variety | Yield | Harvest moisture | Test weight | Crude protein @12% moisture |
|------------|----------------------|---------------------|----------------------|-----------------------------------|
| | lbs ac ⁻¹ | % | lbs bu ⁻¹ | % |
| Badger | 1911* | 9.80 | 31.3 | 11.5 |
| Dieter | 1794* | 9.53 | 32.3 | 12.1 |
| Excel | 1739 | 9.73 | 35.3* | 11.5 |
| Jim | 1868* | 10.3 | 33.1 | 11.4 |
| Rigadon | 1449 | 10.8 | 31.6 | 11.4 |
| Rockford | 1724 | 12.4* | 35.9* | 12.0 |
| Saber | 2144* | 9.20 | 33.5 | 11.4 |
| Souris | 1802* | 9.43 | 33.4 | 11.4 |
| Streaker | 738 | 12.2* | 37.0* | 12.6 |
| Tack | 2503* | 9.90 | 36.3* | 11.5 |
| LSD (0.10) | 709 | 1.9 | 2.4 | NS |
| Trial mean | 1767 | 10.3 | 34.0 | 11.7 |





The Effects of Topdressing Organic N Amendments on Hard Red Winter Wheat

Application rates and timings of organic N amendments and total amount of N applied, Alburgh, VT.



DANISH BARLEY



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UNIV

Yield impact of topdressing organic N sources at critical wheat developmental stages, Alburgh, VT.



Yield impact of topdressing organic N sources at critical wheat developmental stages, Alburgh, VT. Varieties with the same letter did not differ significantly in yield.

The impact of topdressing organic N sources at critical wheat developmental stages on crude protein concentrations, Alburgh, VT.



The impact of topdressing organic N sources at critical wheat developmental stages on crude protein concentrations, Alburgh, VT. Varieties with the same letter did not differ significantly in protein concentration.







Figure 1. HGM seeded in main plots in Aug 2012, shown here on 28 Sep 2012

High Glucosinolate



High Glucosinolate

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High Glucosinolate

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Winter Wheat Planting Date:







Spring Wheat Planting Date Trial:



Spring Wheat Seeding Rate

| Seeding rate | Yield | Moisture | Test | Crude | Falling | DON |
|----------------------|----------------------|----------|----------------------|----------|---------|------|
| | @ | | weight | protein | number | |
| | 13.5% | | | @ 12% | | |
| | moisture | | | moisture | | |
| lbs ac ⁻¹ | lbs ac ⁻¹ | % | lbs bu ⁻¹ | % | seconds | ppm |
| 50 | 1244 | 16.3 | 55.5 | 14.5 | 347 | 5.0 |
| 75 | 1614 | 17.7 | 54.8 | 15.4 | 308 | 4.2* |
| 100 | 1371 | 16.2 | 53.3 | 14.8 | 340 | 4.2* |
| 125 | 1542 | 15.9 | 57.3 | 15.0 | 325 | 4.8 |
| 150 | 1777 | 17.4 | 57.5 | 15.4 | 327 | 3.6* |
| 175 | 1341 | 17.6 | 56.5 | 15.8 | 293 | 3.6* |
| 200 | 1564 | 15.5 | 56.9 | 14.9 | 319 | 4.7 |
| LSD (0.10) | NS | NS | NS | NS | NS | 0.74 |
| Trial mean | 1493 | 16.6 | 55.9 | 15.1 | 323 | 4.3 |

2013 Flax Trials



- > grown for fiber, oil, meal
- > human consumption & animal feed
- > heart-healthy omega-3 fatty acids
- > spring annual
- > competes poorly with weeds
- → 12" 36" tall
- > tiny leaves



Flax Weed Control

| Treatment | Row spacing | Cultivation |
|--------------------------|----------------|---------------|
| 1. Narrow row | 4.5 | none |
| 2. Wide row, cultivation | 9 | Schmotzer hoe |
| 3. Tine-weed | 6 | Tine-weeder |
| 4. Interseed, clover | 6 | none |
| 5. Control | 6 | none |

| Cultivation | Percent of Weeds Removed | | | | |
|---------------|-----------------------------|--|--|--|--|
| Tine weeder | 23.4% | | | | |
| Schmotzer hoe | 80.5% | | | | |







Narrow row



Wide row with Schmotzer hoe

Flax Weed Control



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Harvest Challenges





QUESTIONS???

The 10th Annual Grain Growers Conference "Grow it Here"

Many thanks to our sponsors and exhibitors for their generous support and contributions!







United States Department of Agriculture Risk Management Agency



Castanea Foundation, Inc.

