Winter Wheat Variety Performance Summary in Montana


Introduction

The agronomic characteristics of winter wheat varieties recently developed or evaluated by the Montana Agricultural Experiment Station are compared in this publication with other varieties grown in the state. Varieties recommended for production in the respective districts of Montana are designated by an R. A brief description of each variety is given which may include a variety’s particular advantages or disadvantages. The information was extracted from the IntraState Winter Wheat Nursery. This data is prepared by research personnel of the Montana Agricultural Experiment Station. Where available, up to four years of yield data are shown for the varieties. In some years data are not available because of hail, winterkill, or other unavoidable causes.

Variety Testing Procedures

Fig. 1. Test Locations for Montana winter wheat performance tests in 2016.

Montana State University researchers have over the last five years been exploring innovative organic ways to control weeds, increase yields, improve rotations, and integrate livestock into cropping systems at the Fort Ellis Research Station outside of Bozeman. They are ready to share some of their intermediate findings at a field day that is being called “Organic Principles Review” (OPR), to be held June 13, 2017 at the research station and on campus in Lintfield Hall. The event is a collaboration of the Organic Advisory and Research Council (OAEC), Montana State University Extension, Montana Farmers Union, and the Montana Organic Association.

Presentations by MSU faculty and staff will cover an overview of: Five-year rotation using contrasting systems; crop yield and quality; weed management, including bindweed research; beneficial insects; soil quality and greenhouse gas emissions; assessing climate change impacts; and integrating livestock into cropping systems. In addition presenters will share an economic overview of the systems and discuss ongoing and future organic research initiatives including what the future may hold for Montana producers who are constantly looking for ways to minimize inputs and maximize yields, improve rotations, and innovate organic ways to control weeds, increase yields, improve rotations, and integrate livestock into cropping systems. In addition presenters will share an economic overview of the systems and discuss ongoing and future organic research initiatives including what the future may hold for Montana farmers. The lessons they are learning will be instructive to both organic and conventional producers who are constantly looking for ways to minimize inputs and maximize harvests in efficient and effective ways. The Organic Advisory and Education Council is pleased to be a host of this exciting event,” said Ole Norgaard, OAEC board chair.

“We are grateful to see this level of comprehensive organic research being done by Montana State University, focused on developing and refining organic cropping systems and weed control for Montana farmers. The lessons they are learning will be instructive to both organic and conventional producers who are constantly looking for ways to minimize inputs and maximize harvests in efficient and effective ways.” OPR will take place at the Fort Ellis Research Station in the morning, and then further discussions and analysis will be held from on the MSU Campus.

Fort Ellis Research Farm 9:00 am - 12:00 pm - 33336 East Frontage Road, Bozeman, MT 59715. From Interstate 90 and Main St. (Exit 309), Research Farm is located 2 miles east on Frontage Road.

Lintfield Hall 1:00 pm - 4:30 pm - MSU Campus, corner of S. 11th Ave. and W. Cleveland St. From Interstate 90 and N. 19th Ave. (Exit 305), travel south on N. 19th Ave. for 3 miles. Turn east on W. College St. for ½ mile to S. 11th Ave. Lintfield Hall is located on south side of campus. Campus parking passes can be bought at Fort Ellis. Tour is free and open to the public.
Winter Wheat Variety Performance
Summary in Montana
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Locations
Hard winter wheats were planted at 8 Montana and 1 North Dakota location (Fig. 1) including Carter/Ft. Benton, Conrad and Havre in the North Central district, Moccasin in the Central district, Huntley in the Southern district, Sidney and Williston, ND representing the Northeast district, Kalispell in the Northwest and Bozeman in the Southwest districts of the state.

Entries
Names of commercially available varieties and experimental lines evaluated in 2016 are listed with their origins, experimental designation, release year, and pedigrees in Table 2 for the hard winter wheats. Forty-nine hard wheats are included in this summary comprising 30 varieties (15 public and 15 private) and 19 experimental lines (18 public and 1 private). Numbered entries preceded by a state designation [e.g. MT1348 (Montana) or private company, PSB13NEDH-14-71, (Limagrain)] are experimental lines provided by the breeder.

Experimental Design and Seeding Methods
The Intrasate Winter Wheat Test consists of a 49 entry test with 3 replicates. These tests are planted as 7x7 lattices or a randomized complete block design at each location. Plot size varied by location, from 35 ft2 at Conrad to 60 ft2 at Havre. Row number varies: Bozeman and Havre are 3-row, Conrad, Huntley, Carter, and Sidney are 4-row, Moccasin (5-row), Kalispell (7-row), and Williston (8-row) Row spacing at all locations was on 1 ft. centers, except at Williston and Kalispell (6” centers). All plots were seeded at 0.6 grams seeds/ft2, which is roughly equivalent to 1 bushel per acre, except at Williston where the seeding rate was about 77 pounds per acre. Information on previous crop, planting date, fertilizer use and harvest date is available in Table 1.

For each nursery was treated with Cruiser Maxx Cereals seed treatment at recommended rates before planting.

Description of Data Collected
Yield
All rows of each plot were trimmed and measured and harvested using an experimental plot combine.

Grain yields are reported in bushels per acre based on a 60 pound standard bushel weight. In addition to yields obtained in 2016, data is provided for two (2015-2016), three (2014-2016) and four (2013-2016) year averages for hard wheat entries tested during previous cropping seasons.

Test Weight
Test weights (pounds per bushel) were obtained for each plot by using Dickey-John Grain Analysis Computer (GAC) at all locations. Other locations use a Seedburo test weight apparatus. In this case, a sample is dropped through a funnel at a given height into a quart brass bucket, excess grain is removed by a flat stick then weighed on a gram scale, and grams per quart are converted into pounds per bushels.

Heading Date
Heading date is taken when 50% of the heads in a plot are extended above the flag leaf collar. Heading dates are recorded both in ordinal date (number of days from January 1) and the actual calendar date.

Plant Height
Plant height was measured, in inches, from the soil surface to the top of the head, excluding the awns.

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2017 Recommended VXTLs: Hard Winter Wheat for Montana by District

<table>
<thead>
<tr>
<th>Variety</th>
<th>Districts (see map on cover)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Northwest</td>
</tr>
<tr>
<td>Hard Red Winter Wheat</td>
<td>D</td>
</tr>
<tr>
<td>Bearpaw +</td>
<td>D</td>
</tr>
<tr>
<td>Broadview (P)</td>
<td>D</td>
</tr>
<tr>
<td>Colter +</td>
<td>D</td>
</tr>
<tr>
<td>Decade +</td>
<td>D</td>
</tr>
<tr>
<td>Jerry</td>
<td>D</td>
</tr>
<tr>
<td>Jude +</td>
<td>D</td>
</tr>
<tr>
<td>Keldin (P) +</td>
<td>D</td>
</tr>
<tr>
<td>Loma +</td>
<td>D</td>
</tr>
<tr>
<td>Northern +</td>
<td>D</td>
</tr>
<tr>
<td>SY Wolf (P)</td>
<td>D</td>
</tr>
<tr>
<td>Warhorse +</td>
<td>D</td>
</tr>
<tr>
<td>WB-Quake (P)</td>
<td>D</td>
</tr>
<tr>
<td>Yellowstone +</td>
<td>D</td>
</tr>
</tbody>
</table>

- D = Dryland
- I = Irrigated
- (P) = a Private Variety
- + = a “Protected” variety under the Plant Variety Protection Act
- ++ = PVP Title V pending
- # = sawfly areas only
- 2 = pending approval at Variety Release Meeting, February 21, 2017

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(605) 639-1904, Spearfish, SD
(406) 799-8323, Victor, MT
(406) 799-8323, Victor, MT
Winter Wheat Variety Performance Summary in Montana

Table 1. Summary of agronomic practices used on hard winter wheat performance trials in Montana in 2016. Fall nitrogen (N), phosphorus (P2O5) and potassium (K2O) were preplant applied and incorporated.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Planting Date</th>
<th>N</th>
<th>P2O5</th>
<th>K2O</th>
<th>2016 Harvest Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kalispell</td>
<td>Oct 9</td>
<td>9</td>
<td>40</td>
<td>40</td>
<td>Aug 16</td>
</tr>
<tr>
<td>Bozeman</td>
<td>Sep 26</td>
<td>126</td>
<td>10</td>
<td>10</td>
<td>Aug 4</td>
</tr>
<tr>
<td>Huntley</td>
<td>Oct 11</td>
<td>126</td>
<td>10</td>
<td>10</td>
<td>Jul 24</td>
</tr>
<tr>
<td>Bozeman</td>
<td>Sep 23</td>
<td>10</td>
<td>60</td>
<td>16</td>
<td>Aug 1</td>
</tr>
<tr>
<td>Conrad</td>
<td>Sep 29</td>
<td>110</td>
<td>150</td>
<td>22</td>
<td>Jul 24</td>
</tr>
<tr>
<td>Havre</td>
<td>Oct 12</td>
<td>120</td>
<td>10</td>
<td>10</td>
<td>Jul 26</td>
</tr>
<tr>
<td>Carter</td>
<td>Oct 7</td>
<td>16</td>
<td>28</td>
<td>20</td>
<td>Jul 26</td>
</tr>
<tr>
<td>Sidney</td>
<td>Sep 16</td>
<td>10</td>
<td>15</td>
<td>0</td>
<td>Jul 26</td>
</tr>
<tr>
<td>Williston, ND</td>
<td>Sep 16</td>
<td>5</td>
<td>30.6</td>
<td>0</td>
<td>Jul 26</td>
</tr>
</tbody>
</table>

Grain Protein

Grain protein is sampled from a composite of all 3 replicated plots at each location. It is determined as a % by NIR (near infrared analyzer) on the Infratech whole grain analyzer. Samples are adjusted to a 12% moisture basis.

Winter Survival

Percent winter survival is estimated for each plot after initial spring-green up at locations where significant winter injury occurred. There was no difference in winter-killed at either Sidney or Williston in 2016. Table 12 contains information on % winter survival and associated yield in winter-killed environments from 2007 to 2015. The data summarizes 8 tests in which significant winter-killed occurred (test average for winter survival was less than 90%). All sites with winter-killed were in District 6 (Sidney and Williston) which is the most severe location for winter wheat survival of our testing locations.

Wheat Stem Sawfly

Wheat stem sawfly (WSS) is a persistent and economic problem for wheat growers in Montana. Currently, Montana wheat acreage infested by WSS is primarily in the north central (District 5), central (District 4) and south central (District 3) cropping districts. Host plant resistance in the form of stem solidity has been effective in reducing sawfly losses in both spring and winter wheat. Solid-stemmed winter wheats, ‘Vanguard’, ‘Rampart’, and ‘Genou’ were leading varieties in the past but are now placed on only minor acreage. Current solid-stemmed varieties include: Judee, (released in 2011, the second leading variety at 18% of planted acreage), Warhorse (2013, the third leading variety at 10%) Bearpaw (2011, 4%), and WB-Quake (2010, 1%).

Table 13 contains information on yield and % sawfly cutting at 10 testing locations where sawfly pressure was present during the years 2011-2016. The data is from Havre, Billings (15 miles northeast of Pt. Benton), Turner (60 miles east-northeast of Havre), Carter (13 miles west of Pt. Benton), and Willow Creek (35 miles west-northwest of Bozeman). Solidness scores (rated on a 5-25 scale) are shown for solid and semi-solid varieties in Table 15.

Cereal Quality

Milling and baking characteristics for varieties are presented in Table 14. They are rated for each variety on a 1-5 scale (5 = superior). A quantitative polyphenol oxidase (PPO) has been determined for varieties since the 2006 mill and bake evaluation. These varieties are reported in Table 15 as low to high. A lower value is associated with better Asian noodle quality.

Disease Reactions

Disease reactions for hard red wheat varieties are listed in Table 15. There is information on dwarf smut, stripe rust, stem rust and brown rust.

Statistical Analyses and Interpretation

The data collected at each winter wheat location was analyzed as a three-replication lattice or randomized complete block design. Least significant difference at the 0.05 probability level (LSD, p < 0.05) and coefficients of variation (CV) were calculated from analysers of variance at each location. The LSD is used to compare the performance of two specific varieties at a time. If the difference between two varieties exceeds the LSD this is interpreted as a true difference, because a difference between two varieties this large will only occur 5% of the time due to chance.

Tables 3 through 11 show 2016 data for hard winter wheat collected at all harvested experimental locations. Data from previous years has been in the test for two, three or four years, combined analyses of the yield data over years are presented.

Variety selection should be based on yield stability across locations and on a variety of growing conditions of years. Selection should also consider test weight, winter-hardiness, heading date, plant height, protein and disease resistance.

2016 Test Conditions

Statewide winter wheat yields were projected by the Montana Agricultural Statistics Service at 49 bushels per acre (bu/a), for 2016, tying the record set in 2010. This is an increase over the 41 bu/a for the 2015 harvest year. The harvested acreage in 2016 was 2.15 million acres (total production = 105.4 million bu) compared 2.22 million acres in 2015 (total production = 91.2 million bu). Rainfall for the 2015-2016 crop year was generally above average at all locations tested (Table 14), except Bozeman, Kalispell, and Huntley. Rainfall across Montana was -2.91 inches (Kalispell to +6.76 at Havre). Average yearly temperatures were above long term at all locations, ranging from Conrad (+1.2°F) to +4.2°F at Williston.

Other Agronomic Characters

Table 15 contains information on grain maturity, chalk color, relative winter survival and straw strength for the hard wheat varieties listed in this publication.

Continued on Page A14
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Thank you. We always appreciate your business.
Winter Wheat Variety Performance

Summary in Montana

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Test weight averaged 60.1 lb/bu across all locations. KalisPELL (53.7 lb/bu), rain delayed harvest and stem rust, Williston (57.4), and Havre (59.9) were below 60 lb/bu, while the other 6 locations were above.

Heading dates were earlier in 2016 than long term averages at 7 harvested locations where comparisons are available. Havre and Williston both at -12 days had the greatest differences, while the least change occurred at Huntley (-4 days).

Stem rust at both Bozeman (average = 25%, range 2 - 87%) and KalisPELL (average = 70%, range 22 - 99%) were a factor in yield reduction for highly susceptible varieties (Avery, Bearpaw, Broadview, Byrd, Cowboy, Decade, Jerry, and WB-4059CLP).

There was sawfly cutting recorded at the Northern Seeds Carter/Ft. Benton site averaging 27% ranging from 1 (Warhorse) to over 60% (Broadview, Byrd, and T158) of stems cut, across all entries.

Protein content averaged 11.1% across all locations (location range = 7.8 - 13.4%) tested. The range of named varieties across all locations was from a low of 10.0% (Avery) to a high of 11.8% (Brawl CL Plus). Increased rainfall and higher than average yields contributed to lower proteins at some locations.

Leading winter wheat varieties planted for 2016 were Yellowstone (18.8%), Judee (18.1%), Warhorse (10.0%), Brawl Plus (7.3%), Decade (5.0%), and Bearpaw (4.5%).

Dwarf Smut (TCK)

Dwarf smut (TCK) can be controlled with ‘Dividend’ seed treatment (see page 5). Dwarf smut or dwarf bunt (Tilletia controversa Kuhn) is a fungal disease that occurs in areas where winter wheat is subjected to prolonged snow cover or unfrozen ground. The planting of dwarf smut resistant varieties (Promontory and SY Clearstone 2CL are resistant) is a practical means of control.

The amount of wheat lost each year because of dwarf smut is small in relation to the state’s total crop, but individual operators may experience severe losses in heavily infested, localized areas.

What Recommendation by MAES Means

Classification of winter wheat varieties is determined each year by the Montana Agricultural Experiment Station (MAES) Wheat Variety Release Committee. This 16 member committee is composed of one wheat breeder, one cereal or forage quality scientist, one plant pathologist, one entomologist, one weed scientist, one cropping systems specialist, six Research Center agronomists, one manager from both the Montana Foundation Seed program and the Montana Seed Growers Association, one Montana Wheat and Barley Commit-tee member and one representative of the Montana Agricultural Experiment Station Advisory Board.

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Table 2. List of public, private, and experimental hard winter wheat varieties.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Experimental Description</th>
<th>Origin</th>
<th>Release Year</th>
<th>Pedigree</th>
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</thead>
<tbody>
<tr>
<td>MT1443</td>
<td>selection from a composite of 2 entries: SK184, Yellowstone</td>
<td>1986</td>
<td>SK184, Yellowstone</td>
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<td>MT1460</td>
<td>selection from a composite of 2 entries: SK618, Yellowstone</td>
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<td>MT1456</td>
<td>selection from a composite of 3 entries: SK184, Yellowstone, SY Clearstone 2CL</td>
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<tr>
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Private Elite Lines

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<thead>
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<th>Variety</th>
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<th>Release Year</th>
<th>Pedigree</th>
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<td>PSS113NEMH</td>
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<td>N.D.</td>
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<td>selection from a composite of 2 entries: MT1488, MT1489</td>
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<td>MT1488, MT1489</td>
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</table>

Winter Wheat Variety

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Winter Wheat Variety Performance Summary in Montana

A variety is eligible for recommendation when a minimum of 16 location-years of performance data is obtained from the Montana State University statewide winter wheat performance trials and test results indicate that the variety is equal to or superior in overall merit to specified check cultivars and has end-use quality equal to or exceeding currently recommended varieties. For varieties originating from private companies, recommendation is considered only at the request of the company when adequate data is available.

Recommendations of varieties are considered on a case by case basis. Yield performance of a variety is an important criteria, but also considered is test weight, grain protein content, winter survival, pest resistance and end-use quality data. In general, yield needs to be at least equal to currently recommended varieties in a particular district, unless the variety is being recommended for a specific purpose, e.g. winter hardiness, sawfly resistance. For example, Rampart, which is not competitive in the absence of wheat stem sawfly, is recommended in Districts 3, 4 and 5 for sawfly areas only. Only six varieties are recommended for the Northeast district due to severe winter conditions and a higher probability of stem rust in this region. Thus varieties recommended for District 6 must have higher winter survival and stem rust resistance.

If a serious defect in the variety is identified during performance testing, the variety will not be recommended. Examples of defects resulting in non-recommendation include: high probability of winter-kill, low grain protein, low baking quality, etc.

Lack of variety recommendation by MAES may occur due to a decision by the originating company not to test the variety in statewide performance trials. In this case the lack of recommendation is due to inadequate data rather than a specific varietal defect.

Montana produces primarily hard red and hard red winter wheats. Continuous improvement of the milling and/or baking quality of Montana grown winter wheat is one of many objectives of the Montana Agricultural Experiment Station breeding and cultivar development program. All varieties recommended by the Montana Agricultural Experiment Station have been evaluated and found to be acceptable for milling and baking performance by the Cereal Quality Laboratory at Montana State University.

The list of Montana recommended varieties, if grown and marketed within their respective classes, is acceptable by domestic users. Montana’s future as a hard red and hard white winter wheat producing state for both the domestic and export markets rests on the quality of the product.

Producing Winter Wheat

Plant CERTIFIED CLASS SEED of varieties RECOMMENDED by the Montana Agricultural Experiment Station.

Seed Treatment

Treat all winter wheat seed with a recommended fungicide to reduce losses caused by cereal smut or other seed-borne diseases. Several non-mercurial compounds are registered for seed treatment.

Table 3. HARD WINTER: District 1 – Kaposel – Dryland (Hard Rainfall)
For sale: 1981 International 4300 Conventional

2000 Chevrolet 3500 HD 4x4, SRW, Regular Cab, gas with used DewEze 475. (2) Used Hydra-Bed 1 on ground, 1 on old Chev.

2000 Dodge Ram 3500 4x4, SRW, Regular Cab, gas with used DewEze 475. (2) Used Hydra-Bed 1 on ground, 1 on old Chev.

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Continued from page A28

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Winter Wheat Variety Performance Summary in Montana

Continued from page A28

2000 Chevrolet 3500 HD 4x4, SRW, Regular Cab, gas with used DewEze 475. (2) Used Hydra-Bed 1 on ground, 1 on old Chev.

Winter Wheat Variety Performance Summary in Montana

Continued from page A28

2000 Chevrolet 3500 HD 4x4, SRW, Regular Cab, gas with used DewEze 475. (2) Used Hydra-Bed 1 on ground, 1 on old Chev.

Winter Wheat Variety Performance Summary in Montana

Continued from page A28

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Winter Wheat Variety Performance Summary in Montana

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Winter Wheat Variety Performance Summary in Montana

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Winter Wheat Variety Performance Summary in Montana

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2000 Chevrolet 3500 HD 4x4, SRW, Regular Cab, gas with used DewEze 475. (2) Used Hydra-Bed 1 on ground, 1 on old Chev.
Winter Wheat Variety Performance Summary in Montana

CONTINUED FROM PAGE A30

Seeding Depth
Set the drill to place the seed 1 to 2 inches below the soil surface. Deeper seeding reduces tillering and limits the yield potential of winter wheat. With the furrow drills, wind-driven soil particles settle in the furrows covering the seed deeper than desired.

Yield in Winter Wheat as Influenced by Percent Stand
During periods of winter injury farmers are frequently faced with a decision as to whether or not a field should be torn up and re-seeded. A 40 to 50 percent winter wheat stand, if general over field, may produce as much as a re-seeded spring wheat crop. Thinner stands will likely demand more attention for weed control.

The guidelines for evaluating winter wheat stands are to determine the average number of healthy plants per square yard. We suggest making a square frame out of 3/8 inch rod. Walk the field in a zigzag pattern counting at ten random locations. Fields that have 80 or more plants per square yard will probably produce more than if replanted to spring wheat (information taken from 1995 Master’s Thesis, “Critical Overwintering Plant Population for Successful Winter Wheat Production in Montana” by Doug Holen).

Additional Descriptive Information for Winter Wheat Varieties
New for the 2017 Bulletin:

Avery—hard red winter wheat developed by Colorado and released in 2015. Avery is an early to medium heading, medium statured, white chaffed variety. Avery has average yield and below average test weight and protein. Avery is susceptible to stripe rust. Mill and bake characteristics, under Montana conditions, have not been determined. PVP, Title V is pending. (Certificate #201600244). Avery will not be in the Montana Intrasate Winter Wheat Test for 2017.

WB4483—hard red winter wheat developed by WestBred/Monsanto in 2016. WB4483 is a short to medium statured wheat, with white chaff. WB4483 has slightly below average yield and average test weight and protein. WB4483 is moderately susceptible to stripe rust. Mill and bake characteristics, under Montana conditions, have not been determined. PVP, Title V is pending (Certificate #201600380).

WB4575—hard red winter wheat developed by WestBred/Monsanto in 2016. WB4575 is a short to medium statured wheat, with white chaff. WB4575 has average yield and above average test weight and protein. Avery is susceptible to stripe rust. Mill and bake characteristics, under Montana conditions, have not been determined. PVP, Title V is pending.

CONTINUED ON PAGE A42
Winter Wheat Variety Performance Summary in Montana

CONTINUED FROM PAGE A40

Table 6: HARD WINTER — District 4: Moccasin — Dryland

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<thead>
<tr>
<th>Cultivar/Line</th>
<th>Grain Yield (bushels/acre)</th>
<th>Test weight</th>
<th>Heading Date</th>
<th>Plant Date</th>
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**Note:** Table values include varieties within a column with the variety within a column based on Paterson's protected LSD (p = 0.05).

**R:** Recommended Variety; **P:** Primacy Variety; **+:** Protected Variety; **++:** PVP Pending

Varieties previously in bulletin:

Bearpaw — hard red winter wheat developed by the Montana Agricultural Experiment Station in 2011. Bearpaw is a white-glumed, solid-stem, semi-dwarf (Rht1) wheat with medium hardiness. Bearpaw has average yield, test weight, and protein, and below average winter hardness. Bearpaw is resistant to prevalent races of stem rust but susceptible to stripe and leaf rust. Strain Rht_1 of Bearpaw is similar to Rampart. Bearpaw has a high PPO variety with above average milling and average baking properties. PVP, Title V option has been issued (Certificate #201200407).

Brawl CL Plus — hard red winter wheat developed by Colorado and released in 2011. Brawl CL Plus is an early maturing, medium short statured wheat, with white chaff. Brawl CL Plus has average yield and above average test weight and protein. Brawl CL Plus is susceptible to stripe rust. Brawl CL Plus is a high PPO variety with average mill and bake characteristics. PVP, Title V has been issued (Certificate #201200434). Additionally, the CLEARFIELD genes are patented.

Broadview — hard red winter wheat developed by the Lethbridge, Alberta winter wheat breeding program in 2009 and licensed to Meridian Seeds LLC. Broadview is a medium maturing, medium statured wheat, with white chaff. Broadview has above average yield, average test weight and protein, and excellent winter hardiness. Broadview is susceptible to stripe rust and resistant to stem and leaf rust. It is a high PPO variety with average milling and baking properties, similar to CDC Falcon. Broadview will not be in the Montana Intrastate Winter Wheat Test for 2017.

Byrd — hard red winter wheat developed by Colorado and released in 2011. Byrd is an early maturing, medium short statured wheat, with white chaff. Byrd has average yield and test weight and below average protein. Byrd is susceptible to stripe rust. Byrd is a high PPO variety with average mill and bake characteristics. PVP, Title V has been issued (Certificate #201200404). Byrd will not be in the Montana Intrastate Winter Wheat Test for 2017.

CDC Falcon — hard red winter wheat developed by the Crop Development Center, Saskatoon, Saskatchewan and released in 1998. Licensed to WestBred LLC. Superior hard red winter wheat developed by the Crop Development Center, Saskatoon, Saskatchewan and released in 1998. Licensed to WestBred LLC. Superior hard red winter wheat.

CDC Falcon is protected under the Plant Variety Protection Act, but not the Title V option (Certificate #200800322). CDC Falcon will not be in the Montana Intrastate Winter Wheat Test for 2017.

Word a plenty

The president of a prestigious corporation was invited to deliver the keynote speech at an industry convention. Wanting to impress his peers, he asked his public relations manager to write him a smart, punchy, memorable speech about twenty minutes long.

After the convention, the president returned to his office and demanded to this his public relations officer pronto. When the man entered, the president bellowed: “What’s the big idea of giving me an hour-long speech? Most of the audience walked out before I was halfway finished!”

The staffer was puzzled. “I wrote a twenty-minute speech,” the man said, “and I gave you the two extra copies you asked for.”

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Winter Wheat Variety Performance Summary in Montana

CONTINUED FROM PAGE A42

Colter – an awned, white glumed, high yielding hard red winter wheat to be released in 2013 by the Montana Agricultural Experiment Station. Colter is similar to Yellowstone for grain yield and most agronomic traits with the exception that Colter is about 0.5 lb/bu higher for test weight and has superior stem rust resistance relative to Yellowstone. Colter is moderately resistant to stripe rust, but susceptible to leaf rust. Colter has excellent milling and baking bread quality, similar to Yellowstone. PVP, Title V is issued (Certificate #201100096). Colter will not be in the Montana Intrastate Winter Wheat Test for 2017.

Cowboy – an awned, white glumed, high yielding hollow-stemmed public variety developed in in Colorado and jointly released in 2012 by Colorado and Wyoming. In limited testing in Montana, Cowboy has average test weight and below average protein and winter hardiness (= 2 (0-5 scale, 5 = best). Cowboy is a medium to early heading variety with shorter than average plant height. Cowboy is susceptible to stripe rust, but resistant to stem rust. Milling and baking quality are below average in Montana tests. PVP, Title V has been issued (Certificate #201300476). Cowboy will not be in the Montana Intrastate Winter Wheat Test for 2017.

Decade – hard red winter wheat developed by the Montana Agricultural Experiment Station and released jointly with North Dakota (pending at publication) in 2010. Decade is an early to medium maturing reduced height wheat with white chaff. Decade is resistant to prevalent races of stem rust but very susceptible to stripe rust. Decade has excellent milling and baking quality. PVP, Title V has been issued (Certificate #201100096).

Freeman – hard red winter wheat developed by Nebraska and released in 2013. Freeman is an early maturing, medium short stunted wheat, with white chaff. Freeman has average yield, below average test weight and average protein. Freeman is resistant to stripe rust. Freeman is a high PPO variety with below average mill and bake characteristics. PVP, Title V is pending (Certificate #201140108). Freeman will not be in the Montana Intrastate Winter Wheat Test for 2017.

Jerry – hard red winter wheat released by North Dakota State University in 2001. It is white-chaffed, awned, and short statured wheat, with white chaff. Jerry has good winter hardiness and is a top yielder in areas where winterkill can occur. Jerry has average test weight and protein under Montana conditions. It has good resistance to prevalent races of stem and leaf rust, but is susceptible to stripe rust. Mixing properties and baking performance are equal to Roughrider. Jerry will not be in the Montana Intrastate Winter Wheat Test for 2017.

Table 7. HARD WINTER W. – District S. Coordinated Dryland

<table>
<thead>
<tr>
<th>CutfllLine</th>
<th>District</th>
<th>2016 Yield</th>
<th>2015 Yield</th>
<th>Test Weight</th>
<th>Heading Date</th>
<th>Protein</th>
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<td>Jersey</td>
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<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
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<tr>
<td>R Bearpaw</td>
<td>District S.</td>
<td>85.4 lb/bu</td>
<td>85.4 lb/bu</td>
<td>62.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
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<td>Brawil CL Plus</td>
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<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
</tr>
<tr>
<td>R Broadf (P)</td>
<td>District S.</td>
<td>85.4 lb/bu</td>
<td>85.4 lb/bu</td>
<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
</tr>
<tr>
<td>Bynd</td>
<td>District S.</td>
<td>56.4 lb/bu</td>
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<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
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<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
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CONTINUED ON PAGE A60

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2014 John Deere 5670, 975 separator hours .... $195,000
2014 John Deere 5680, 875 separator hours .... $185,000
2008 John Deere 9770, 1050 separator hours .... $130,000
2012 John Deere 8245R, 6300 hours, 2 years extended warranty .......... $90,000
2009 John Deere 9530, 2700 hours .................. $135,000
2012 John Deere 9560R, 2100 hours, PTO, big pump. ... $215,000
2012 John Deere 9460R, 4250 hours, big pump, 3-pt., warranty .......... $155,000
1998 John Deere 9200, 8700 hours, PowerShift, 3-pt., PTO ............... $38,000
John Deere 7920, 3800 hours, 746 loader .......... $85,000
2013 John Deere 6170R, H380 loader, 488 hours, IVT suspensions .......... $135,000
2013 John Deere 6150R, H360 loader, 2800 hours .......... $90,000
2014 Degelman Pro Till, 40-ft., new blades .......... $85,000
Several John Deere 635 flex heads ......... $15,000 - $20,000
John Deere 640D draper head with pea auger .......... $30,000

PRNP, Title V has been issued (Certificate #201140108).

Freeze – hard red winter wheat released by Nebraska and released in 2013. Freeman is an early maturing, medium short stunted wheat, with white chaff. Freeman has average yield, below average test weight and average protein. Freeman is resistant to stripe rust. Freeman is a high PPO variety with below average mill and bake characteristics. PVP, Title V is pending (Certificate #201140108). Freeman will not be in the Montana Intrastate Winter Wheat Test for 2017.

Jerry – hard red winter wheat released by North Dakota State University in 2001. It is white-chaffed, awned, and similar in maturity to Roughrider. Jerry has good winter hardiness and is a top yielder in areas where winterkill can occur. Jerry has average test weight and protein under Montana conditions. It has good resistance to prevalent races of stem and leaf rust, but is susceptible to stripe rust. Mixing properties and baking performance are equal to Roughrider. Jerry will not be in the Montana Intrastate Winter Wheat Test for 2017.

Continued on Page A60

Table 7. HARD WINTER W. – District S. Coordinated Dryland

<table>
<thead>
<tr>
<th>CutfileLine</th>
<th>District</th>
<th>2016 Yield</th>
<th>2015 Yield</th>
<th>Test Weight</th>
<th>Heading Date</th>
<th>Protein</th>
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<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
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<td>R Bearpaw</td>
<td>District S.</td>
<td>85.4 lb/bu</td>
<td>85.4 lb/bu</td>
<td>62.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
</tr>
<tr>
<td>Brawil CL Plus</td>
<td>District S.</td>
<td>85.4 lb/bu</td>
<td>85.4 lb/bu</td>
<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
</tr>
<tr>
<td>R Broadf (P)</td>
<td>District S.</td>
<td>85.4 lb/bu</td>
<td>85.4 lb/bu</td>
<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
</tr>
<tr>
<td>Bynd</td>
<td>District S.</td>
<td>56.4 lb/bu</td>
<td>56.4 lb/bu</td>
<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
</tr>
<tr>
<td>BzN/Ds375 (N2453)</td>
<td>District S.</td>
<td>56.4 lb/bu</td>
<td>56.4 lb/bu</td>
<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
</tr>
<tr>
<td>DCD Falcon (P)</td>
<td>District S.</td>
<td>56.4 lb/bu</td>
<td>56.4 lb/bu</td>
<td>52.5 lb/bu</td>
<td>7-9 Jan</td>
<td>5.4 lb/bu</td>
</tr>
</tbody>
</table>
NEW HOMES WOW!!

- Beautiful 2200 sq. ft. modular with all the bells & whistles.
- LOCK IN SALE PRICE, TAKE DELIVERY LATER!

- Mounted, new 480/80R38 tires, replaces old 18.4-R38,
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- Cover Crops
- Soybeans
- Grass

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Winter Wheat Variety Performance
Summary in Montana

CONTINUED FROM PAGE A50

Judee – hard red winter wheat developed by the Montana Agricultural Experimental Station in 2011. Judee is a white-glumed, semi-dwarf hard red winter wheat with medium maturity. Judee has average yield, test weight, and protein, and below average winter hardness. Judee is susceptible to prevalent races of stem and leaf rust but resistant to stripe rust. Strain-soldness of Judee is most similar to Genou. Judee is a high PPO variety with average mill and above average bake properties. PVP, Title V has been issued (Certificate #201200161).

Keldin – hard red winter wheat developed by Peter Franck (Germany) and released by WestBred in 2011. Keldin is a medium maturing, medium short stalked wheat, with white chaff. Keldin has above average yield and test weight and average protein. Keldin is resistant to stripe rust. Keldin is a high PPO variety with average mill and bake characteristics. PVP, Title V has been issued (Certificate #201300462).

Loma – hard red winter wheat developed by the Montana Agricultural Experimental Station and available to growers in fall 2016. Loma is a semi-solid stemmed (similar to Genou), medium-late maturing, medium short stalked wheat, with white chaff. Loma has above average yield and above average test weight and protein. Loma is resistant to both stripe and stem rust. Loma is a low PPO variety with average milling and average baking properties. PVP, Title V has been issued (Certificate #201600992). Rampart – Released by the Montana Agricultural Experimental Station in 1996. It is an awned, red chaffed, solid-stemmed hard red winter wheat variety. The kernel is long with a sloping back and a heavy brush.

####

You should always fill up your gas tank before you drive for a quarter of a tank. Always have a little bit of fuel will ensure your car’s fuel injection system stays healthy.

####

Did you know... The average person falls asleep in seven minutes?

###

Did you wait for longer than 30 seconds in your car? Turn off the engine. You use more fuel idling after 30 seconds than you use to restart your car.

Did you know... Coffee is the second largest item of international commerce in the world. The largest is petrol?
The checks are rounded to angular with an open crease. Rampart is resistant to the wheat stem sawfly. It is moderately resistant to prevalent races of stem rust. Rampart is resistant to stripe rust. It is susceptible to leaf rust, dwarf smut and the Russian wheat aphid. Rampart has excellent milling and baking properties and is a sister line to Vanguard. Rampart will not be in the Montana Intrasate Winter Wheat testing for 2017.

SY Clearstone 2CL – a 2-gene CLEARFIELD hard red winter wheat developed by Montana Agricultural Experiment Station in 2012 and licensed exclusively to Syngenta Seeds. SY Clearstone wheat 2CL is very similar to Yellowstone. It is a medium maturing, medium tall, white chaffed wheat with average winter hardiness. It is a high yielding wheat with average test weight and protein. SY Clearstone 2CL is resistant to stripe rust and has moderate resistance to stem rust, the latter an improvement over Yellowstone. SY Clearstone 2CL is resistant to common bunt. SY Clearstone 2CL is a medium PPO variety with average mill and above average bake properties. PVP, Title V has been issued (Certificate #201300357).

SY Monument – hard red winter wheat developed by Syngenta and released in 2015. SY Monument is a medium maturing, short statured wheat, with white chaff. SY Monument has average yield, above average test weight, and average protein. SY Sunrise is resistant to stripe rust. SY Monument is a high PPO variety with average mill and below average bake characteristics under Montana conditions. PVP, Title V has been issued (Certificate #201400332).

SY Sunrise – hard red winter wheat developed by Syngenta and released in 2015. SY Sunrise is an early maturing, short statured wheat, with white chaff. SY Sunrise has average yield, above average test weight, and average protein. SY Sunrise is resistant to stripe rust. SY Monument is a high PPO variety with average mill and below average bake characteristics under Montana conditions. PVP, Title V has been issued (Certificate #201400370).

CONTINUED ON PAGE C34
Winter Wheat Variety Performance Summary in Montana

SY-Wolf – hard red winter wheat developed by Syngenta (AgriPro) Seeds in 2010. SY-Wolf is a medium maturing, short statured wheat with white glumes. SY-Wolf has above average yield and test weight and average protein. Winter-hardiness was average in 2011 at Sidney. SY-Wolf is moderately susceptible to moderately resistant (MS/MSR) to stripe rust, but resistant to stem rust. Boomer has average miling and below average baking properties. PVP, Title V has been issued (Certificate #201100390).

T158 – hard red winter wheat developed by Trio Research (now part of Limagrain) and released in 2009. T158 is an early maturing, short statured wheat, with white chaff. T158 has average yield, above average test weight, and below average protein. T158 is resistant to stripe rust. T158 is a high PPO variety with average mild and and below average bake characteristics. T158 will not be in the Montana Intrastate Winter Wheat Test for 2017.

Warhorse - is an awned, white glumed, solid-stemmed hard red winter wheat released in 2013 by the Montana Agricultural Experiment Station. Warhorse has medium maturity and has medium semi-, short-, and high-plant height. Warhorse’s harvest index, 4 on a 0-5 scale, is an improvement over other solid stem varieties. Stem solidness is similar to that of Bearpaw and Rampart, while sawfly cutting of stems is very low (similar to Rampart). Warhorse yields are similar to Ju-dee, while test weight and protein are above average. Warhorse is resistant to both stem and stripe rust. Warhorse has acceptable mill and bake qualities. PVP, Title V has been issued (Certificate #201400131).

<table>
<thead>
<tr>
<th>Cultivar/Line</th>
<th>2014 = severe winter kill, no harvest</th>
<th>2015 = no harvest</th>
<th>Test weight (bu/acre)</th>
<th>Protein (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SY-Wolf</strong></td>
<td>6.4</td>
<td>9.1</td>
<td>56.9</td>
<td>13.1</td>
</tr>
<tr>
<td><strong>T158</strong></td>
<td>5.9</td>
<td>8.9</td>
<td>55.2</td>
<td>12.5</td>
</tr>
<tr>
<td><strong>Warhorse</strong></td>
<td>6.0</td>
<td>9.5</td>
<td>58.2</td>
<td>14.0</td>
</tr>
</tbody>
</table>

Coca-cola® and aluminum foil will clean rust off your car bumper.

Clean splattered bugs off with baking soda and a nylon net.
WB3768 – a white-chaffed hard white winter wheat developed by the Montana Agricultural Experiment Station and licensed exclusively to WestBred in 2013. WB3768 is a high yielding variety similar to Yellowstone. WB3768 is similar to Yellowstone for most agronomic traits with the exception of higher test weight and later maturity. WB3768 is 1.8 inches taller than Yellowstone. Like Yellowstone, WB3768 is resistant to prevalent races of stem rust, but susceptible to stem and leaf rust. WB3768 is moderately resistant to common bunt. WB3768 has acceptable milling and baking quality. WB3768 is a low PPO cultivar with favorable Asian noodle color stability and noodle score. PVP, Title V has been issued (Certificate #201500028). WB3768 will not be in the Montana Intrasate Winter Wheat Test for 2017.

WB4059CLP – hard red winter wheat developed by WestBred and released in 2013. WB4059CLP is an awnless, early maturing, short stalked wheat, with white chaff. WB4059CLP has below average yield and test weight and above average protein. WB4059CLC is very susceptible to stripe rust. WB4059CLP is a high PPO variety with average mill and bake characteristics. PVP, Title V has been issued (Certificate #201300488). Additionally, the CLEARFIELD genes are patented. WB4059CLP will not be in the Montana Intrasate Winter Wheat Test for 2017.

WB4614 – hard red winter wheat developed by WestBred and released in 2013. WB4614 is a medium maturing, medium short stalked, wheat with white chaff. WB4614 has average yield and protein and above average test weight. WB4614 is resistant to stripe rust. WB4614 is a high PPO variety with average mill and bake characteristics. PVP, Title V has been issued (Certificate #201500188).

WB4623CLP – hard red winter wheat developed by WestBred and released in 2015. WB4623CLP is a medium late maturing, short stalked wheat, with white chaff. WB4623CLP has average yield and test weight and protein. WB4623CLP is resistant to stripe rust. WB4623CLP is a medium low PPO variety with average mill and above average bake characteristics. PVP, Title V has been issued (Certificate #201500189). Additionally, the CLEARFIELD genes are patented.

WB-Quake – hard red winter wheat developed by WestBred (Monsanto) in 2011. WB-Quake is a medium to late maturing, medium short stalked, hard red winter wheat, with white chaff. WB-Quake has above average yield, average test weight and protein with average winter hardness. WB-Quake is resistant to stripe rust and moderately resistant to stem rust. WB-Quake is a high PPO variety with above average milling, baking properties. PVP, Title V is issued (Certificate #201100471).
Winter Wheat Variety Performance
Summary in Montana
CONTINUED FROM PAGE C34

WB3768 – a white-chaffed hard winter wheat developed by the Montana Agricultural Experiment Station and licensed exclusively to WestBred/Monsanto in 2013. WB3768 is a high yielding variety similar to YellowStone. WB3768 is similar to YellowStone for most agronomic traits with the exception of higher test weight and later heading date and maturity. WB3768 is 1.8 inches taller than YellowStone. Like YellowStone, WB3768 is resistant to prevalent races of stem rust, but susceptible to stem and leaf rust. WB3768 is moderately resistant to common bunt. WB3768 has acceptable milling and baking quality. WB3768 is a low PPO cultivar with favorable Asian noodle color stability and noodle score. PVP, Title V has been issued (Certificate #201500028). WB3768 will not be in the Montana Intrastate Winter Wheat Test for 2017.

WB4059CLP – hard red winter wheat developed by WestBred and released in 2013. WB4059CLP is an awnless, early maturing, short-statured wheat with white chaff. WB4059CLP has below average yield and test weight and above average protein. WB4059CLP is very susceptible to stripe rust. WB4059CLP is a high PPO variety with average mill and bake characteristics. PVP, Title V has been issued (Certificate #2013004481). Additionally, the CLEARFIELD genes are patented. WB4059CLP will not be in the Montana Intrastate Winter Wheat Test for 2017.

WB4614 – hard red winter wheat developed by WestBred and released in 2013. WB4614 is a medium maturing, medium short-statured, wheat with white chaff. WB4614 has average yield and protein and above average test weight. WB4614 is resistant to stripe rust. WB4614 is a high PPO variety with average mill and bake characteristics. PVP, Title V has been issued (Certificate #201500188).

WB4623CLP – hard red winter wheat developed by WestBred and released in 2015. WB4623CLP is a medium late maturing, short-statured wheat, with white chaff. WB4623CLP has below average yield and protein. WB4623CLP is resistant to stripe rust. WB4623CLP is a medium low PPO variety with average mill and above average bake characteristics. PVP, Title V has been issued (Certificate #201500189). Additionally, the CLEARFIELD genes are patented.

WB-Quake – hard red winter wheat developed by WestBred (Monsanto) in 2011. WB-Quake is a medium to late maturing, medium short-statured hard red winter wheat with white chaff. WB-Quake has above average yield, average test weight and protein with average winter hardness. WB-Quake is resistant to stripe rust and moderately resistant to stem rust. WB-Quake is a high PPO variety with above average milling and baking properties. PVP, Title V is issued (Certificate #201100471).

Table 11. HARD WINTER: District 6 – Williston, North Dakota – Dryland

<table>
<thead>
<tr>
<th>Cultivar/Line</th>
<th>2016 DAS</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>Yield</th>
<th>Weight</th>
<th>Plant</th>
<th>Height</th>
<th>Date</th>
<th>Quality</th>
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<tbody>
<tr>
<td>Adjusted</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
<td>19.5</td>
</tr>
</tbody>
</table>

CONTINUED ON PAGE C48
Winter Wheat Variety Performance
Summary in Montana

Yellowstone – hard red winter wheat developed by the Montana Agricultural Experiment Station and released to seed growers in 2005. Yellowstone is a very high yielding winter hardy variety with medium test weight, maturity, height, and grain protein. Yellowstone has excellent baking and good Asian noodle quality. It is moderately resistant to TCK smut and resistant to stripe rust, but susceptible to stem rust. Yellowstone has been the leading winter wheat variety planted in Montana since 2012. PVP Title V has been issued (Certificate #200600284).

Plant Variety Protection

The Plant Variety Act, signed into law in 1970, offers legal protection to developers of new varieties of plants which reproduce sexually – that is, through seeds. The law provides for a Plant Variety Protection Office in the U.S. Department of Agriculture. The office receives and processes applications and when “novelty” is established, issues a certificate granting protection rights specified by the applicant.

The owner (or developer) holding a “certificate of protection” has complete control over the variety for 20 years. The law provides two types of protection:

1. Without Seed Certification

The owner of the protected variety may exclude others from reproducing the variety, selling it, offering it for sale, importing or using it in the commercial production of a hybrid or a different variety without permission. In this sense, the owner of a protected variety may bring civil damage action against anyone who infringes upon his rights.

2. Certified Seed Option

The owner of the protected variety may exclude others from reproducing the variety, selling it, offering it for sale, importing or using it in the commercial production of a hybrid or a different variety without permission. In this sense, the owner of a protected variety may bring civil damage action against anyone who infringes upon his rights.

The owner may specify that the seed of his variety “shall be sold or advertised only as a class of Certified Seed”. Production and sale of such seed by variety name, when not certified, constitute a violation of the Federal Seed Act. This means of protection may be used extensively for public as well as private benefit.

Amendments to the Plant Variety Protection Act (PVP9A) have passed both houses of Congress and been signed into law by the President. These amendments went into effect in 1995. The farmers exemption has been changed for new varieties. Seed for varieties issued a certificate after April 4, 1995, may only be purchased from the owner or his agent. A farmer can only save seed of these varieties for use on his own farm and cannot sell the protected seed to his neighbor.

A variety protected under the certification option does not permit a farmer producing seed to sell or offer for sale or advertise by variety name unless it is certified. Sale of such seed by variety name as uncertified seed will constitute a violation of the Federal Seed Act. Interstate movement of seed is subject to inspection by Federal Seed Control officials. Seed within the state is subject to inspection by State Department of Agriculture inspectors.

Owners of protected varieties will give public notice that their variety is protected by affixing to the label or container the words: “Unauthorized Propagation Prohibited” or the words, “Unauthorized Seed Multiplication Prohibited”. Producers must check the label (tag) or the container for the above wording.
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YOUR COST $31,500

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"New" 2015 Buhler Farm King 4490 26.5-ft wide disc, Stoneflex hangers, 410 WSS HD bearings, 24" blades, 9" spacing, notched front, plain rear, 0 acres

**$5200** Annual Payment/O.A.C

Winter Wheat Variety Performance Summary in Montana

CONTINUED FROM PAGE C48

Table 13. HARD WINTER WHEAT - Yield Performance under Safely Pressure and % Safely Cutoff (2011/2016)

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Powell</td>
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<td>78.9</td>
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<td>Teton</td>
<td>80.5</td>
<td>78.2</td>
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<td>78.3</td>
<td>78.9</td>
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<tr>
<td></td>
<td>Mean</td>
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<td>78.2</td>
<td>78.4</td>
<td>77.1</td>
<td>78.3</td>
<td>78.9</td>
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</table>

Table 14. Precipitation (in. per month) and Average Monthly Temperature (°F) for Crop Year 2011-2016

<table>
<thead>
<tr>
<th>Agricultural Research Center</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
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</thead>
<tbody>
<tr>
<td>Bozeman</td>
<td>2.2</td>
<td>2.1</td>
<td>1.8</td>
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<td>2.8</td>
<td>3.2</td>
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<td>2.9</td>
<td>3.9</td>
<td>4.1</td>
<td>3.8</td>
<td>3.4</td>
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<tr>
<td>Missoula</td>
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<td>1.0</td>
<td>1.0</td>
<td>0.5</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
<td>0.3</td>
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Table 15. Selected agronomic characters, cereal quality evaluations and disease reactions of hard winter wheat varieties.

<table>
<thead>
<tr>
<th>Variety</th>
<th>Agronomic Characters</th>
<th>Cereal Quality</th>
<th>Disease Reactions</th>
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<tbody>
<tr>
<td></td>
<td>Morphology</td>
<td>Growth habit</td>
<td>At maturity</td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Avon</td>
<td>M-E White</td>
<td>S</td>
<td>N</td>
</tr>
<tr>
<td>Beersw</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Swift CL Plus</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Broadview</td>
<td>M-E White</td>
<td>S</td>
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<tr>
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<td>M</td>
</tr>
<tr>
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<td>S</td>
<td>M</td>
</tr>
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<td>Coller</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Cowley</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Decade</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Eden</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Jerry</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
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<td>M</td>
</tr>
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<td>Kansas</td>
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<tr>
<td>Loma-2</td>
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<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Northern</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Ramfart</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
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<tr>
<td>ST-Crescent</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>ST Monument</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>ST Swerve</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>ST Wolf</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>T156</td>
<td>M-E White</td>
<td>S</td>
<td>M</td>
</tr>
<tr>
<td>Warhorse</td>
<td>M-E White</td>
<td>S</td>
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</tr>
<tr>
<td>WB7370 (KHW)</td>
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<td>WB91696WC</td>
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<td>S</td>
<td>M</td>
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<tr>
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<td>M-E White</td>
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<td>WB4576</td>
<td>M-E White</td>
<td>S</td>
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<tr>
<td>WB4823CL</td>
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<td>S</td>
<td>M</td>
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<tr>
<td>Yellowstone</td>
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