

# 2016 Oat Field Crop Trials Results



## Minnesota Agricultural Experiment Station and the College of Food, Agricultural and Natural Resource Sciences

Proper selection of oat varieties requires consideration of the anticipated growing conditions, the pests that might be encountered in a specific production situation, the purpose for growing the crop and its eventual usage. Specific growing situations will dictate the priority and emphasis given to each trait included in the tables.

The results of the variety performance evaluations are summarized in Tables 1 through 4. The oat performance trials were grown in 10 locations in Min-

nesota including Waseca, Le Center, St. Paul, Lamberton, Kimball, Morris, Fergus Falls, Crookston, Stephen and Roseau in 2016. The greatest challenge in both the oat performance evaluations and commercial production this past growing season was lodging. As a result, the trials in St. Paul, Fergus Falls, Morris and Roseau are not included in the final results. The performance evaluations were treated with a fungicide when the flag leaf was fully extended (Feekes 9). The average yield across the testing



**Table 1. Origin and agronomic characteristics of oat varieties in single-year (2016) and multiple-year comparisons (2014-2016).**

| Entry             | Origin         | Year of Release | PVP Status | Seed Color | Maturity <sup>1</sup> |          |          | Plant Height <sup>2</sup> |          |          | Lodging <sup>3</sup> |          |          |
|-------------------|----------------|-----------------|------------|------------|-----------------------|----------|----------|---------------------------|----------|----------|----------------------|----------|----------|
|                   |                |                 |            |            | 2016                  | 2-Year   | 3-Year   | 2016                      | 2-Year   | 3-Year   | 2016                 | 2-Year   | 3-Year   |
| Badger            | U of Wisconsin | 2010            | PVP(94)    | Yellow     | 1                     | 1        | 1        | 2                         | 2        | 1        | 5                    | 6        | 5        |
| BetaGene          | U of Wisconsin | 2015            | Pending    | Yellow     | 4                     | 5        | 5        | 3                         | 3        | 3        | 5                    | 6        | 5        |
| Colt              | SDSU           | 2010            | PVP(94)    | White      | 1                     | 1        | 1        | 3                         | 3        | 2        | 4                    | 5        | 5        |
| CS Camden         | Meridian Seeds | 2013            | Pending    | White      | 8                     | —        | —        | 4                         | —        | —        | 3                    | —        | —        |
| Deon              | U of Minnesota | 2014            | PVP(94)    | Yellow     | 8                     | 9        | 9        | 6                         | 5        | 5        | 4                    | 4        | 4        |
| Esker             | U of Wisconsin | 2006            | PVP(94)    | Yellow     | 2                     | 3        | 2        | 4                         | 4        | 2        | 4                    | 5        | 4        |
| Goliath           | SDSU           | 2013            | Pending    | White      | 8                     | 9        | 9        | 9                         | 9        | 9        | 6                    | 7        | 6        |
| Hayden            | SDSU           | 2015            | Pending    | White      | 6                     | 7        | 6        | 5                         | 5        | 5        | 5                    | 5        | 5        |
| Horsepower        | SDSU           | 2012            | PVP(94)    | White      | 3                     | 3        | 3        | 2                         | 2        | 1        | 5                    | 6        | 5        |
| Jury              | NDSU           | 2012            | Pending    | White      | 6                     | 6        | 7        | 7                         | 7        | 7        | 6                    | 7        | 7        |
| Natty             | SDSU           | 2015            | Pending    | White      | 2                     | 2        | 3        | 6                         | 6        | 6        | 4                    | 5        | 5        |
| Newburg           | NDSU           | 2011            | PVP(94)    | White      | 6                     | 7        | 7        | 7                         | 7        | 7        | 6                    | 7        | 6        |
| Reins             | U of Illinois  | 2016            | Pending    | Tan        | 2                     | 2        | —        | 1                         | 1        | —        | 3                    | 3        | —        |
| Rockford          | NDSU           | 2008            | PVP(94)    | White      | 7                     | 9        | 9        | 6                         | 6        | 6        | 4                    | 5        | 5        |
| Ron               | U of Wisconsin | 2014            | PVP(94)    | White      | 6                     | 6        | 6        | 5                         | 5        | 4        | 5                    | 6        | 5        |
| Saber             | U of Illinois  | 2010            | PVP(94)    | White      | 1                     | 2        | 1        | 2                         | 2        | 1        | 4                    | 5        | 4        |
| Shelby 427        | SDSU           | 2011            | PVP(94)    | White      | 1                     | 1        | 2        | 4                         | 5        | 4        | 5                    | 6        | 5        |
| Souris            | NDSU           | 2008            | PVP(94)    | Tan        | 6                     | 7        | 7        | 4                         | 4        | 3        | 4                    | 5        | 5        |
| Streaker          | SDSU           | 2016            | PVP(94)    | Hulless    | 2                     | —        | —        | 5                         | —        | —        | 6                    | —        | —        |
| <b>LSD (0.10)</b> |                |                 |            |            | <b>1</b>              | <b>1</b> | <b>1</b> | <b>1</b>                  | <b>1</b> | <b>1</b> | <b>1</b>             | <b>1</b> | <b>1</b> |

<sup>1</sup> 1 = earliest and 9 = latest.

<sup>2</sup> 1 = shortest and 9 = tallest.

<sup>3</sup> 1 = least prone and 9 = most prone.

locations was 132 bushels per acre in 2016. This compares to an average of 151 bushels per acre in 2015 and a three-year average of 144 bushels per acre. While Hayden, the 2015 release from SDSU, surpassed Deon for yield in 2016, Deon remained the top yielding variety across the state in the multi-year comparisons (Table 4).

Relative maturity, as measured by the number of days to heading, plant height and resistance to lodging have been converted to a 1-9 scale to allow for easier interpretation of the data (Table 1). Differences for all three characteristics are generally much less in the southern half of the state or when seeding is delayed. In the northern half of the state the gap in characteristics widens as is also the case when seeding early. Presenting averages of the actual data therefore can be misleading. Earlier varieties tend to perform relatively better in the southern parts of the state, while later maturing varieties usually have a yield advantage in the north. Varieties with lodging scores greater than 4 should be chosen with caution as lodging problems can take away yield, quality and reduce harvestability. This is especially important if your soils are highly fertile. The extensive lodging encountered across the state will put more emphasis on straw strength in the variety selection process for next year. Deon provides some of the best straw strength available in oats, but as this past year proofed, when conditions are favorable even Deon will encounter substantial lodging.

Quality traits are also presented on a 1-9 scale (Table 2). Test weight and Groat percentage are important considerations for grain production, perhaps equal to grain yield, whether the crop is intended for food or feed. The latter is defined as the percentage of germ, bran and endosperm in proportion to the whole seed on a weight basis.

The disease ratings are based on in-

**Table 2. Quality characteristics of oat varieties in single-year (2016) and multiple-year comparisons (2014-2016).**

| Entry                 | Test Weight <sup>1</sup> |          |          | Groat Percentage <sup>1</sup> |
|-----------------------|--------------------------|----------|----------|-------------------------------|
|                       | 2016                     | 2-Year   | 3-Year   | 2016                          |
|                       | ----- (1-9) -----        |          |          | ----- (1-9) -----             |
| Badger                | 4                        | 2        | 2        | 6                             |
| BetaGene              | 3                        | 1        | 1        | 3                             |
| Colt                  | 7                        | 8        | 8        | 4                             |
| CS Camden             | 2                        | —        | —        | 7                             |
| Deon                  | 6                        | 5        | 5        | 6                             |
| Esker                 | 3                        | 1        | 1        | 4                             |
| Goliath               | 6                        | 4        | 6        | 6                             |
| Hayden                | 8                        | 8        | 9        | 6                             |
| Horsepower            | 5                        | 3        | 5        | 4                             |
| Jury                  | 5                        | 5        | 6        | 5                             |
| Natty                 | 6                        | 7        | 7        | 1                             |
| Newburg               | 2                        | 1        | 2        | 9                             |
| Reins                 | 9                        | 9        | —        | 6                             |
| Rockford              | 6                        | 6        | 6        | 7                             |
| Ron                   | 4                        | 3        | 3        | 5                             |
| Saber                 | 6                        | 6        | 6        | 1                             |
| Shelby 427            | 7                        | 9        | 9        | 4                             |
| Souris                | 4                        | 2        | 3        | 7                             |
| Streaker <sup>2</sup> | —                        | —        | —        | —                             |
| <b>LSD (0.10)</b>     | <b>1</b>                 | <b>1</b> | <b>1</b> | <b>3</b>                      |

<sup>1</sup>1 = highest and 9 = lowest.

<sup>2</sup>Streaker is a hulless variety and excluded from the ratings.

**Table 3. Disease characteristics of oat varieties in single-year (2016) comparisons.**

| Entry      | Crown Rust <sup>1</sup> | Smut <sup>1</sup> | Barley Yellow Dwarf <sup>1</sup> |
|------------|-------------------------|-------------------|----------------------------------|
|            |                         | ----- (1-9) ----- |                                  |
| Badger     | 5                       | 1                 | 5                                |
| BetaGene   | 3                       | 1                 | 6                                |
| Colt       | 5                       | 1                 | 7                                |
| CS Camden  | 3                       | 3                 | 7                                |
| Deon       | 3                       | 1                 | 5                                |
| Esker      | 3                       | 1                 | 6                                |
| Goliath    | 4                       | 1                 | 1                                |
| Hayden     | 4                       | 1                 | 3                                |
| Horsepower | 5                       | 3                 | 5                                |
| Jury       | 4                       | 3                 | 2                                |
| Natty      | 4                       | 1                 | 5                                |
| Newburg    | 4                       | 3                 | 4                                |
| Reins      | 5                       | 1                 | 4                                |
| Rockford   | 5                       | 3                 | 4                                |
| Ron        | 3                       | 1                 | 7                                |
| Saber      | 5                       | 9                 | 3                                |
| Shelby 427 | 5                       | 4                 | 5                                |
| Souris     | 4                       | 1                 | 5                                |
| Streaker   | 4                       | 1                 | —                                |

<sup>1</sup>1 = most resistant and 9 = most susceptible.

oculated screening nurseries for crown rust and smut on the University of Minnesota’s St. Paul campus and for Barley yellow dwarf virus (or red leaf of oats) on the University of Illinois’ Champaign Urbana campus (Table 3). Consider most oat varieties are moderately to very susceptible to crown rust. The use of a fungicide at Feekes 9 is warranted if crown rust is present in the lower canopy at that time and the variety has crown rust rating of 4 and higher. Expect some yield losses due to crown rust with the most susceptible cultivars even when a fungicide application is made at Feekes 9 if conditions for crown rust remain favorable during the grain fill period. Therefore, selecting moderately susceptible cultivars like Deon and Ron is still prudent. Treated seed should be used for smut-susceptible varieties. Varieties susceptible to Barley yellow dwarf (a rating of 6 or higher) should be chosen carefully, especially in the southern half of the state or when planting is delayed as viruliferous aphids are more likely to arrive early enough in the crops development to

cause economic damages.

Descriptions of oat varieties covered by the U.S. Plant Variety Protection Act include a PVP designation. When PVP is followed by the notation (94), seed of that variety may not be sold by a grower, not even to a relative or neighbor, without the express permission of the variety’s developer/owner. If the PVP application is pending, consider the variety as having PVP (94) protection. Using oats for cover crop does not exempt the buyer from the legal obligation to purchase only certified or registered classes of seed.

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| <b>Oat</b>                       |              |
|----------------------------------|--------------|
| <b>Planting Rate and Date</b>    |              |
| Bushel Weight, Pounds.....       | 32           |
| Seeds/Pound.....                 | 16,200       |
| Planting Rate, Pounds/Acre.....  | 80           |
| Planting Rate, Seeds/Sq. Ft..... | 28           |
| Planting Date.....               | Early Spring |

**Table 4. Relative grain yield of oat varieties in Minnesota in single-year (2016) and multiple-year comparisons (2014-2016).**

| Entry                 | Lamberton               |            |            | Waseca                  | Le Center  | Kimball    | Crookston               |            |            | Stephen                 |            |            | State                   |            |            |
|-----------------------|-------------------------|------------|------------|-------------------------|------------|------------|-------------------------|------------|------------|-------------------------|------------|------------|-------------------------|------------|------------|
|                       | 2016                    | 2-Year     | 3-Year     | 2016                    | 2016       | 2016       | 2016                    | 2-Year     | 3-Year     | 2016                    | 2-Year     | 3-Year     | 2016                    | 2-Year     | 3-Year     |
|                       | ----- (% of Mean) ----- |            |            | ----- (% of Mean) ----- |            |            | ----- (% of Mean) ----- |            |            | ----- (% of Mean) ----- |            |            | ----- (% of Mean) ----- |            |            |
| Badger                | 92                      | 79         | 92         | 97                      | 105        | 104        | 97                      | 92         | 94         | 96                      | 94         | 82         | 97                      | 91         | 91         |
| BetaGene              | 102                     | 114        | 113        | 108                     | 98         | 85         | 99                      | 104        | 107        | 102                     | 99         | 99         | 98                      | 102        | 103        |
| Colt                  | 71                      | 72         | 78         | 87                      | 96         | 110        | 77                      | 84         | 77         | 75                      | 74         | 74         | 86                      | 82         | 79         |
| CS Camden             | 104                     | —          | —          | 85                      | 100        | 95         | 105                     | —          | —          | 91                      | —          | —          | 103                     | —          | —          |
| Deon                  | 110                     | 122        | 121        | 105                     | 103        | 97         | 98                      | 96         | 101        | 117                     | 116        | 117        | 106                     | 108        | 111        |
| Esker                 | 95                      | 101        | 106        | 114                     | 109        | 114        | 99                      | 97         | 96         | 99                      | 97         | 100        | 103                     | 100        | 101        |
| Goliath               | 98                      | 90         | 95         | 99                      | 96         | 109        | 102                     | 98         | 100        | 109                     | 109        | 110        | 99                      | 97         | 99         |
| Hayden                | 104                     | 97         | 101        | 94                      | 112        | 116        | 113                     | 115        | 113        | 99                      | 96         | 102        | 109                     | 106        | 108        |
| Horsepower            | 79                      | 74         | 74         | 85                      | 109        | 108        | 98                      | 99         | 101        | 106                     | 102        | 106        | 95                      | 94         | 97         |
| Jury                  | 99                      | 96         | 98         | 100                     | 100        | 87         | 102                     | 105        | 107        | 101                     | 98         | 103        | 98                      | 98         | 101        |
| Natty                 | 107                     | 102        | 103        | 112                     | 101        | 92         | 102                     | 101        | 101        | 107                     | 106        | 106        | 104                     | 103        | 102        |
| Newburg               | 102                     | 93         | 96         | 89                      | 105        | 91         | 102                     | 104        | 108        | 105                     | 103        | 105        | 100                     | 98         | 102        |
| Reins                 | 97                      | 101        | —          | 110                     | 105        | 112        | 102                     | 95         | —          | 95                      | 94         | —          | 100                     | 96         | —          |
| Rockford              | 83                      | 76         | 77         | 66                      | 103        | 94         | 102                     | 96         | 97         | 90                      | 87         | 89         | 92                      | 88         | 91         |
| Ron                   | 115                     | 114        | 116        | 106                     | 107        | 97         | 97                      | 99         | 100        | 99                      | 98         | 98         | 102                     | 101        | 102        |
| Saber                 | 112                     | 96         | 97         | 120                     | 108        | 103        | 113                     | 104        | 101        | 98                      | 96         | 96         | 107                     | 102        | 101        |
| Shelby 427            | 92                      | 84         | 87         | 101                     | 102        | 107        | 91                      | 95         | 94         | 91                      | 96         | 93         | 95                      | 94         | 94         |
| Souris                | 87                      | 71         | 75         | 71                      | 100        | 93         | 101                     | 102        | 99         | 99                      | 97         | 101        | 94                      | 92         | 93         |
| Streaker              | 76                      | —          | —          | 70                      | 63         | 56         | 90                      | —          | —          | 72                      | —          | —          | 69                      | —          | —          |
| <b>Mean (Bu/Acre)</b> | <b>133</b>              | <b>150</b> | <b>149</b> | <b>115</b>              | <b>164</b> | <b>118</b> | <b>184</b>              | <b>190</b> | <b>185</b> | <b>130</b>              | <b>133</b> | <b>119</b> | <b>132</b>              | <b>141</b> | <b>144</b> |
| <b>LSD (0.10)</b>     | <b>19</b>               | <b>39</b>  | <b>27</b>  | <b>18</b>               | <b>13</b>  | <b>26</b>  | <b>18</b>               | <b>21</b>  | <b>16</b>  | <b>18</b>               | <b>27</b>  | <b>22</b>  | <b>13</b>               | <b>14</b>  | <b>12</b>  |