

# SOFT RED WINTER WHEAT

2022 Quality Survey



U.S. WHEAT  
ASSOCIATES



# SOFT RED WINTER

## COMPETITIVE ADVANTAGE

Soft red winter (SRW) wheat is the third largest class of wheat grown in the United States with an annual average production over the last five years of 8.3 million metric tons (MMT), or just over 306 million bushels. Although SRW is the third largest class measured by production, it is the fourth largest as measured by export sales. U.S. SRW wheat is predominantly grown east of the Mississippi River and the South as far west as northeast Texas and southeast Kansas.

Importers of SRW are served from ports on the Lakes, East Coast, Gulf and Western Gulf. Mexico imports a substantial portion of its SRW purchases via direct rail shipment. Importers and the domestic milling and baking industries use SRW for specialty products such as cookies (biscuits), crackers, snack foods, and cake flour. SRW is a versatile wheat for blending with hard red spring (HRS) and hard red winter (HRW) wheat to lower grist cost and improve bread crumb texture, or to improve the quality and appearance of a wide variety of products.

### ***Milling Advantages:***

SRW can be challenging to mill. Some advantages to milling SRW are reduced energy requirements and fewer roller mills for mill flows designed specifically for soft wheat. The truth is, few mills are designed for only SRW as it is generally a specialty wheat used for specialty products. The real advantage for milling companies is in the cost reduction of the mill grist and increased diversity of products when SRW is included in a long term, strategic wheat procurement plan. SRW performs best on the mill at lower moisture content (14.5%) compared to hard wheat (16%) and requires increased sifter area per metric ton.

### ***Baking Advantages:***

As previously mentioned, the target market for SRW is confectionary products, but SRW performs well as a blending flour in a wider variety of products such as crackers and cookies. The lower moisture content of the flour creates an advantage for the baker by increasing the amount of water added while optimizing water absorption and product quality to the consumer. The finer particle size will generally increase the rate of water absorption, decreasing mix time and improving production efficiencies. As is the message with most of the U.S. wheat classes, blending SRW flour with other flour types creates opportunities to create the optimal flour type for any number of end-use products. Some markets have found success

blending SRW wheat flour with HRS and HRW wheat flour to improve crumb texture and even the loaf volume of pan bread by improving the dough development and mixing properties.

### ***Sourcing Opportunities:***

Soft red winter wheat is lower in protein as compared to hard wheat classes and is generally lower cost. It is most often available out of the Mississippi River for export, but at times can be shipped via rail to the center Gulf or Mexico. Another important factor to consider when purchasing SRW is to include a maximum value for deoxynivalenol (DON), particularly in years when SRW matured during wet, humid conditions.

Optimal purchases of SRW are in combination with HRW or HRS, to minimize storage constraints at the destination mill. There is a high demand for SRW in the domestic U.S. market. In years where acreage and production are lower than average, the price can be inverted in comparison to higher protein classes.



# SOFT RED WINTER

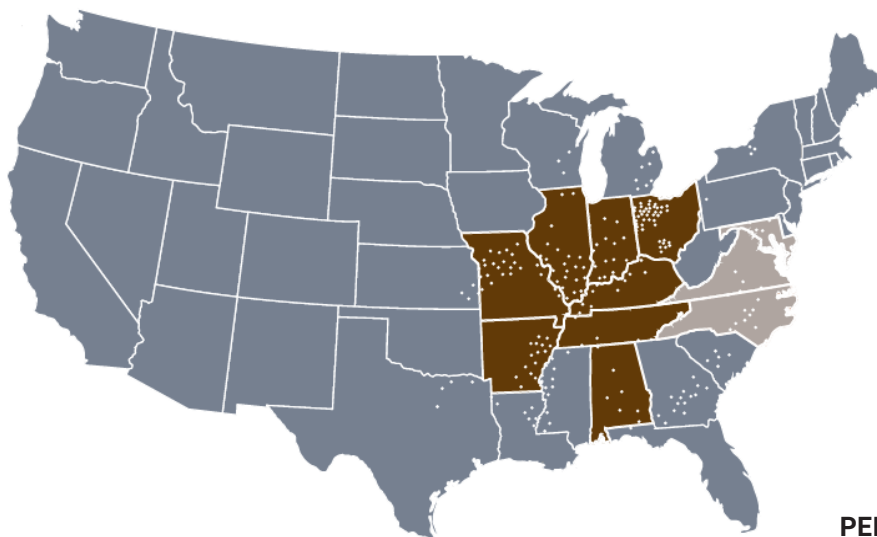
## 2022 PRODUCTION

For the major producing states (million metric tons)

|                               | 2022        | 2021       | 2020       | 2019       | 2018       |
|-------------------------------|-------------|------------|------------|------------|------------|
| <i>Alabama</i>                | 0.2         | 0.2        | 0.1        | 0.2        | 0.2        |
| <i>Arkansas</i>               | 0.3         | 0.2        | 0.1        | 0.1        | 0.1        |
| <i>Georgia</i>                | 0.1         | 0.2        | 0.1        | 0.1        | 0.1        |
| <i>Illinois</i>               | 1.5         | 1.3        | 1.0        | 1.0        | 1.0        |
| <i>Indiana</i>                | 0.6         | 0.6        | 0.5        | 0.4        | 0.5        |
| <i>Kentucky</i>               | 0.9         | 0.8        | 0.6        | 0.7        | 0.5        |
| <i>Maryland</i>               | 0.3         | 0.3        | 0.3        | 0.3        | 0.3        |
| <i>Michigan</i>               | 0.7         | 0.8        | 0.6        | 0.6        | 0.6        |
| <i>Missouri</i>               | 1.0         | 0.9        | 0.6        | 0.7        | 0.8        |
| <i>New York</i>               | 0.2         | 0.2        | 0.2        | 0.1        | 0.2        |
| <i>North Carolina</i>         | 0.5         | 0.5        | 0.6        | 0.3        | 0.6        |
| <i>Ohio</i>                   | 0.9         | 1.2        | 0.9        | 0.6        | 0.9        |
| <i>Pennsylvania</i>           | 0.3         | 0.4        | 0.4        | 0.3        | 0.3        |
| <i>Tennessee</i>              | 0.6         | 0.6        | 0.4        | 0.4        | 0.5        |
| <i>Virginia</i>               | 0.2         | 0.2        | 0.2        | 0.2        | 0.3        |
| <i>Wisconsin</i>              | 0.5         | 0.5        | 0.2        | 0.3        | 0.4        |
| <b>Surveyed-States Total*</b> | <b>7.0</b>  | <b>7.0</b> | <b>5.3</b> | <b>4.8</b> | <b>5.8</b> |
| East Coast-Tributary          | 1.1         | 1.1        | 1.1        | 0.8        | 1.2        |
| Gulf-Tributary                | 5.9         | 5.9        | 4.2        | 4.0        | 4.6        |
| <b>Sixteen-State Total</b>    | <b>8.8</b>  | <b>9.1</b> | <b>6.8</b> | <b>6.1</b> | <b>7.3</b> |
| <b>Total SRW Production</b>   | <b>10.4</b> | <b>9.8</b> | <b>7.2</b> | <b>6.5</b> | <b>7.8</b> |

Based on August 2022 estimates from USDA's National Agricultural Statistics Service.

\*Eleven states denoted by italics were surveyed accounting for 68% of 2022 SRW production.

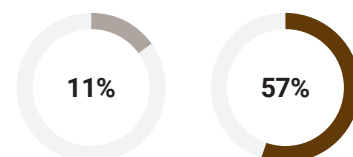


# 11

STATES SURVEYED

# 68%

OF TOTAL SRW PRODUCTION REPRESENTED



EAST COAST GULF PORT

PERCENTAGE OF TOTAL SAMPLED U.S. SRW PRODUCTION BY EXPORT TRIBUTARY

# SOFT RED WINTER

## 2022 CROP OVERVIEW

The U.S. soft red wheat (SRW) production region experienced generally good growing conditions in the 2022 crop year. The crop is very sound with high test weight and falling number values, lower moisture, good milling characteristics, and is relatively free of DON. Processors will find a versatile crop with good qualities for cookies, cakes and crackers. With higher protein and good extensibility, the crop should also be valuable in blending for baking applications. Overall, buyers should be extremely happy with the quality of the entire 2022 SRW crop. Buyers are encouraged to review their quality specifications to ensure that purchases meet their expectations.

### Weather and Harvest:

SRW is grown over a wide area of the eastern United States. The area seeded to SRW in fall 2021 for the 2022 harvest is estimated by USDA at 6.86 million acres (2.78 million hectares), up from both the 6.59 million acres (2.67 million hectares) seeded for the 2021 harvest and the 5-year average.

### PLANTING

This was the highest number of planted acres since 2015. Planting started at a normal pace mid-September 2021 and progressed at the 5-year average pace.

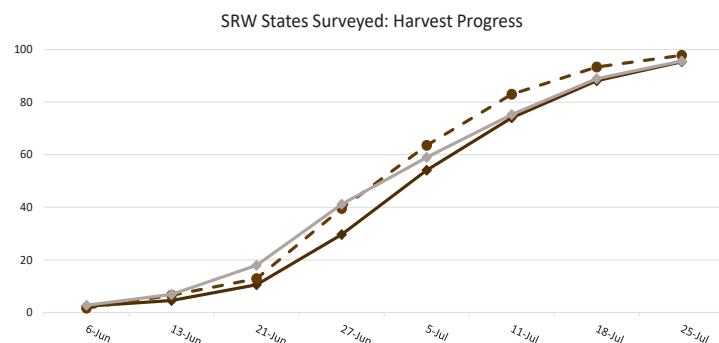
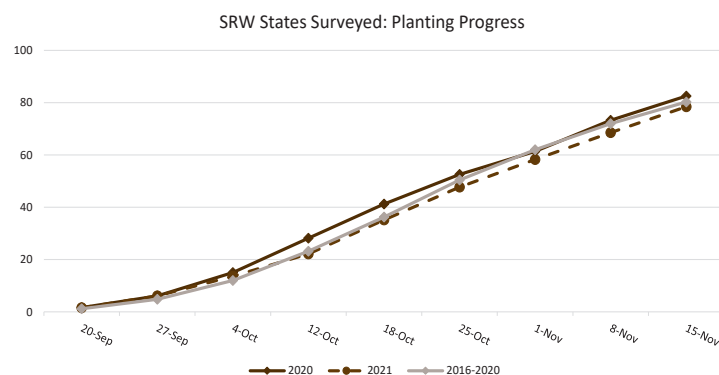
### GROWING SEASON

By late November in the six SRW survey states where USDA estimates wheat crop conditions 88% of the winter wheat crop had emerged and was rated 68% good to excellent and 93% fair to excellent. As the crop went into dormancy, only southern Arkansas and eastern North Carolina were abnormally dry.

During a generally warm winter from the Mississippi Valley eastward, most of the SRW growing area received plentiful moisture through the winter and spring with only Maryland seeing a decrease in soil moisture. By early May, winter wheat conditions in the major SRW growing states were predominately rated fair to excellent, with less than 10% rated as poor or very poor.

### HARVEST

The 2022 SRW harvest began mid-May in Alabama but not until the week of June 10 for other Gulf-tributary states. The East Coast harvest began in mid-June. Across the entire SRW growing region the second half of June was hot and dry, allowing for excellent harvest progress; only Ohio, Virginia and Maryland saw above average rainfall in June. By July, much of



the SRW growing region experienced heat, humidity and above average rainfall conditions with pockets of favorable harvest weather.

The 2022 SRW production, estimated at 381 million bushels (10.4 million metric tons (MMT)), is up from 360 million bushels (9.8 MMT) in 2021 and above the 5-year average of 307 million bushels (8.3 MMT).

# SOFT RED WINTER

## 2022 CROP HIGHLIGHTS

### Crop Survey Methods:

#### SAMPLE COLLECTION AND ANALYSIS

Great Plains Analytical Laboratory, Kansas City, Missouri, collected, tested and analyzed 229 samples from elevators in 18 reporting areas across 11 states.

#### SAMPLE TESTING

Test weight, moisture, protein, 1000 kernel weight, wheat ash, wheat falling number and DON were determined on individual samples; the remaining tests were determined on 18 composite samples.

The results were weighted by the estimated production for each reporting area and combined into "Composite Average," "East Coast" and "Gulf Ports" values. Gulf states include Alabama, Arkansas, Illinois, Indiana, Kentucky, Missouri, Ohio, and Tennessee, and account for 85% of the 2021 SRW production in the states surveyed. East Coast states include Maryland, North Carolina and Virginia and represent the remaining 15% of production in the states surveyed.

The states surveyed account for an estimated 68% of total 2022 U.S. SRW production.



### Grade Data:

- **GRADE** - the overall sample average collected for the 2022 SRW harvest survey is U.S. No. 1 SRW; the Gulf average is U.S. No. 1 SRW, and the East Coast average is U.S. No. 2 SRW.
- **TEST WEIGHT** averages trended higher this year, indicative of sound wheat and a uniform crop. The Composite average is 60.1 lb/bu (79.1 kg/hl), Gulf average is 60.3 lb/bu (79.3 kg/hl) and East Coast is 59.7 lb/bu (78.5 kg/hl).
- **TOTAL DEFECTS** for the crop are 0.9%, same as last year and lower than the 5-year average. For the East Coast, total defects (1.1%) are moderately higher than last year (0.9%) whereas the Gulf saw lower total defects

this year (0.8%) compared to last year (0.9%).

### Wheat Data:

- **WHEAT PROTEIN** content demonstrates a consistent crop. The Composite average of 9.6% (12% mb) and East Coast average of 10.1% are higher than 2021 and 5-year averages. The Gulf average of 9.4% is slightly higher than 2021 but below the 5-year average.
- **WHEAT MOISTURE** for this year's crop is lower than 2021 and the 5-year averages, due to optimal harvest conditions compared to last year: Composite 12.4%, East Coast 12.7%, Gulf 12.3%.
- **WHEAT FALLING NUMBER** trended well above average indicating this is a sound crop with very

little sprout damage: Composite (327 sec), East Coast (336 sec) and Gulf (325 sec) are all above 2021 and 5-year averages.

- **SINGLE KERNEL** values also reflect a consistent crop. For the East Coast, kernels are softer, heavier and larger than last year but harder and smaller than the 5-year average. For the Gulf, kernels are slightly softer, lighter and smaller than last year, but harder than the 5-year average.
- **VOMITOXIN (DON)** averages are well below the USDA threshold of 2.0 ppm and indicate that the sampled crop is relatively free of DON: Composite (0.7 ppm), Gulf (0.8 ppm) and East Coast (0.4 ppm).



# SOFT RED WINTER

## 2022 CROP HIGHLIGHTS

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### Flour Data:

- **LABORATORY MILL FLOUR EXTRACTION** for Composite (66.4%), East Coast (66.6%) and Gulf (66.4%) are all higher than 2021 but below the 5-year averages. The extraction rate from a laboratory mill is not optimized and will always be significantly lower than the rate obtained from a commercial mill.
- **AMYLOGRAPH VISCOSITY** indicates enhanced starch characteristics that are well suited for batter-based products. The 2022 averages for Composite (666 BU), East Coast (574 BU) and Gulf (687 BU) reinforce the high falling numbers and indicate very low levels of amylase activity.
- **SOLVENT RETENTION CAPACITY (SRC)** values for this crop indicate excellent quality for cookies and crackers.
  - **GPI** Gulf value is 0.63, the same as last year's. The East Coast value of 0.67 is higher than last year's 0.64.
  - **Sucrose** values for this year indicate cookies and crackers will benefit from reduced bake time and water-holding issues: Composite (90%), East Coast (86%) and Gulf (91%), all lower than last year and the 5-year average.
  - **Lactic Acid** values for Composite and Gulf are 102% and similar to last year's values. The East Coast is 104%, much lower than last year's 112%.

- **Sodium Carbonate ( $\text{Na}_2\text{CO}_3$ )**  
East Coast value of 68% is significantly lower than last year's 76%. The Composite and Gulf values are similar or equal to last year's at 71% and 72% respectively.

### Dough Properties:

- **DOUGH PROPERTIES** suggest that this crop is weaker than the 5-year average and is typical for SRW.
- **ALVEOGRAPH** data indicate a crop that is more extensible, less resistant than last year and is suitable for blending bread-type products. P values: Composite (36 mm), East Coast (41 mm) and Gulf (35 mm); L values: Composite (82 mm), East Coast (91 mm) and Gulf (80 mm).

### End-Products:

- **COOKIE SPREAD FACTOR** for Composite (10.7), East Coast (10.6) and Gulf Ports (10.7) are all similar to last year and higher than the 5-year averages, indicating good spreadability.
- **LOAF VOLUME** averages are higher than last year and indicate this crop is excellent for blending: Composite (624 cc), East Coast (610 cc) and Gulf (627 cc).



# SRW QUALITY DATA – BY TRIBUTARY

|                                                   | Composite Average |           |           | East Coast* |           |           | Gulf*      |           |           |
|---------------------------------------------------|-------------------|-----------|-----------|-------------|-----------|-----------|------------|-----------|-----------|
|                                                   | 2022              | 2021      | 5-Year    | 2022        | 2021      | 5-Year    | 2022       | 2021      | 5-Year    |
| <b>Wheat Grade Data</b>                           |                   |           |           |             |           |           |            |           |           |
| Test Weight (lb/bu)                               | 60.1              | 59.8      | 58.9      | 59.7        | 58.8      | 58.0      | 60.3       | 60.0      | 59.1      |
| (kg/hl)                                           | 79.1              | 78.6      | 77.5      | 78.5        | 77.4      | 76.4      | 79.3       | 78.9      | 77.8      |
| Damaged Kernels (%)                               | 0.2               | 0.3       | 0.5       | 0.5         | 0.3       | 1.1       | 0.1        | 0.3       | 0.4       |
| Foreign Material (%)                              | 0.1               | 0.1       | 0.1       | 0.2         | 0.1       | 0.1       | 0.1        | 0.1       | 0.1       |
| Shrunken & Broken (%)                             | 0.6               | 0.5       | 0.6       | 0.5         | 0.6       | 0.8       | 0.6        | 0.5       | 0.5       |
| Total Defects (%)                                 | 0.9               | 0.9       | 1.2       | 1.1         | 0.9       | 1.8       | 0.8        | 0.9       | 1.0       |
| Grade                                             | 1                 | 2         | 2         | 2           | 2         | 2         | 1          | 2         | 2         |
| <b>Wheat Non-Grade Data</b>                       |                   |           |           |             |           |           |            |           |           |
| Dockage (%)                                       | 0.4               | 0.3       | 0.3       | 0.3         | 0.2       | 0.3       | 0.4        | 0.3       | 0.3       |
| Moisture (%)                                      | 12.4              | 13.6      | 13.3      | 12.7        | 14.2      | 13.5      | 12.3       | 13.4      | 13.2      |
| Protein (%) 12%/0% mb                             | 9.6/10.9          | 9.3/10.6  | 9.5/10.8  | 10.1/11.5   | 9.6/10.9  | 9.6/10.9  | 9.4/10.7   | 9.3/10.6  | 9.5/10.8  |
| Ash (%) 14%/0% mb                                 | 1.46/1.70         | 1.60/1.86 | 1.62/1.89 | 1.38/1.61   | 1.53/1.78 | 1.59/1.84 | 1.48/1.72  | 1.61/1.87 | 1.63/1.90 |
| 1000 Kernel Weight (g)                            | 32.9              | 34.2      | 32.7      | 34.6        | 35.7      | 33.8      | 32.6       | 33.9      | 32.5      |
| Falling Number (sec)                              | 327               | 299       | 309       | 336         | 260       | 286       | 325        | 307       | 315       |
| Kernel Size (%) lg/med/sm                         | 85/14/01          | 88/11/01  | 85/14/01  | 87/13/00    | 87/12/01  | 85/14/02  | 85/14/01   | 88/11/01  | 85/14/01  |
| Single Kernel: Hardness                           | 23.4              | 24.5      | 21.8      | 24.1        | 27.1      | 21.3      | 23.3       | 24.0      | 22.0      |
| Weight (mg)                                       | 32.5              | 34.3      | 34.2      | 34.4        | 33.9      | 35.1      | 32.1       | 34.3      | 34.0      |
| Diameter (mm)                                     | 2.60              | 2.65      | 2.63      | 2.64        | 2.61      | 2.64      | 2.59       | 2.65      | 2.63      |
| Sedimentation (cc)                                | 11.1              | 10.0      | 11.0      | 12.1        | 12.3      | 11.4      | 10.9       | 9.5       | 11.0      |
| DON (ppm)                                         | 0.7               | 0.8       | 0.7       | 0.4         | 0.2       | 0.6       | 0.8        | 0.9       | 0.8       |
| <b>Flour Data</b>                                 |                   |           |           |             |           |           |            |           |           |
| Lab Mill Extraction (%)                           | 66.4              | 66.0      | 67.4      | 66.6        | 65.4      | 67.2      | 66.4       | 66.1      | 67.5      |
| Color: L*                                         | 91.1              | 91.2      | 91.4      | 90.5        | 91.1      | 91.3      | 91.3       | 91.2      | 91.4      |
| a*                                                | -2.4              | -2.3      | -2.3      | -2.3        | -2.3      | -2.3      | -2.4       | -2.3      | -2.3      |
| b*                                                | 9.3               | 9.1       | 8.9       | 9.3         | 8.6       | 8.8       | 9.3        | 9.1       | 8.9       |
| Protein (%) 14%/0% mb                             | 7.6/8.9           | 7.4/8.6   | 7.7/9.0   | 8.0/9.3     | 7.6/8.8   | 7.9/9.2   | 7.6/8.8    | 7.4/8.6   | 7.7/8.9   |
| Ash (%) 14%/0% mb                                 | 0.41/0.48         | 0.41/0.48 | 0.43/0.50 | 0.41/0.48   | 0.44/0.51 | 0.44/0.51 | 0.41/0.47  | 0.40/0.47 | 0.43/0.50 |
| Wet Gluten (%)                                    | 20.7              | 20.2      | 21.2      | 22.8        | 19.4      | 21.7      | 20.3       | 20.3      | 21.1      |
| Gluten Index                                      | 82                | 84        | 83        | 80          | 91        | 85        | 83         | 83        | 83        |
| Falling Number (sec)                              | 326               | 283       | 306       | 313         | 260       | 288       | 329        | 288       | 310       |
| Amylograph Viscosity: 65g (BU)                    | 666               | 459       | 527       | 574         | 302       | 377       | 687        | 489       | 563       |
| Damaged Starch (%)                                | 3.4               | 5.0       | 4.5       | 4.4         | 4.2       | 4.5       | 3.2        | 5.1       | 4.5       |
| SRC: GPI                                          | 0.64              | 0.63      | 0.63      | 0.67        | 0.64      | 0.62      | 0.63       | 0.63      | 0.63      |
| Water/50% Sucrose                                 | 51/90             | 54/95     | 56/101    | 50/86       | 54/100    | 58/103    | 52/91      | 54/94     | 56/101    |
| 5% Lactic Acid/5% Na <sub>2</sub> CO <sub>3</sub> | 102/71            | 106/73    | 112/77    | 104/68      | 112/76    | 113/81    | 102/72     | 105/72    | 111/77    |
| <b>Dough Properties</b>                           |                   |           |           |             |           |           |            |           |           |
| Farinograph: Peak Time (min)                      | 1.2               | 1.2       | 1.2       | 1.4         | 1.4       | 1.3       | 1.1        | 1.1       | 1.2       |
| Stability (min)                                   | 1.6               | 1.6       | 1.8       | 2.0         | 2.0       | 1.8       | 1.5        | 1.6       | 1.8       |
| Absorption (%)                                    | 51.2              | 52.2      | 52.4      | 52.2        | 52.3      | 52.9      | 51.0       | 52.2      | 52.3      |
| Alveograph: P (mm)                                | 36                | 44        | 39        | 41          | 43        | 40        | 35         | 44        | 39        |
| L (mm)                                            | 82                | 56        | 80        | 91          | 57        | 78        | 80         | 56        | 81        |
| W (10 <sup>-4</sup> J)                            | 85                | 79        | 83        | 103         | 78        | 83        | 81         | 79        | 83        |
| P/L Ratio                                         | 0.44              | 0.78      | 0.49      | 0.45        | 0.74      | 0.52      | 0.44       | 0.79      | 0.48      |
| Extensograph: Resistance (BU)                     | 200               | 177       | 175       | 194         | 185       | 165       | 202        | 175       | 177       |
| (45 min) Extensibility (cm)                       | 15.3              | 15.9      | 15.9      | 16.6        | 16.4      | 16.4      | 15.0       | 15.8      | 15.8      |
| Area (cm <sup>2</sup> )                           | 53                | 50        | 48        | 58          | 54        | 47        | 52         | 49        | 49        |
| <b>Baking Evaluation</b>                          |                   |           |           |             |           |           |            |           |           |
| Bake Grain and Texture (1-10)                     | 4.4               | 4.4       | 4.9       | 5.0         | 4.5       | 5.1       | 4.3        | 4.4       | 4.9       |
| Bake Absorption (%)                               | 54.0              | 53.5      | 54.1      | 54.6        | 53.2      | 54.5      | 53.8       | 53.6      | 54.0      |
| Loaf Volume (cc)                                  | 624               | 607       | 675       | 610         | 602       | 676       | 627        | 608       | 675       |
| Cookie Diameter (cm)                              | 8.9               | 8.9       | 8.9       | 8.8         | 8.9       | 8.8       | 8.9        | 8.9       | 8.9       |
| Spread Factor (d/h)                               | 10.7              | 10.6      | 9.8       | 10.6        | 10.9      | 9.3       | 10.7       | 10.5      | 9.9       |
| <b>% Sampled Area Production</b>                  | <b>100%</b>       |           |           | <b>16%</b>  |           |           | <b>84%</b> |           |           |

\*East Coast: Maryland, Virginia, North Carolina; Gulf: Alabama, Arkansas, Illinois, Indiana, Kentucky, Missouri, Ohio, Tennessee

# SRW QUALITY DATA – BY STATE

|                                                           | Alabama   | Arkansas  | Illinois  | Indiana   | Kentucky  | Missouri  | Ohio      | Tennessee | Maryland  | North Carolina | Virginia  |
|-----------------------------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------------|-----------|
| <b>Wheat Grade Data - from Area Composite Samples</b>     |           |           |           |           |           |           |           |           |           |                |           |
| Test Weight (lb/bu)                                       | 58.0      | 57.1      | 61.3      | 59.7      | 61.1      | 60.3      | 59.8      | 59.4      | 60.6      | 58.9           | 60.1      |
| (kg/hl)                                                   | 76.4      | 75.2      | 80.6      | 78.6      | 80.4      | 79.3      | 78.7      | 78.2      | 79.7      | 77.5           | 79.1      |
| Damaged Kernels (%)                                       | 0.0       | 0.0       | 0.0       | 0.5       | 0.0       | 0.0       | 0.6       | 0.0       | 0.0       | 0.7            | 0.5       |
| Foreign Material (%)                                      | 0.0       | 0.0       | 0.0       | 0.2       | 0.0       | 0.0       | 0.3       | 0.0       | 0.2       | 0.1            | 0.2       |
| Shrunken & Broken (%)                                     | 0.2       | 0.6       | 0.5       | 0.7       | 0.5       | 0.4       | 0.9       | 0.6       | 0.5       | 0.5            | 0.4       |
| Total Defects (%)                                         | 0.2       | 0.6       | 0.5       | 1.3       | 0.5       | 0.4       | 1.8       | 0.6       | 0.7       | 1.4            | 1.1       |
| Grade                                                     | 2         | 3         | 1         | 2         | 1         | 1         | 2         | 2         | 1         | 2              | 1         |
| <b>Wheat Non-Grade Data - from Individual Samples</b>     |           |           |           |           |           |           |           |           |           |                |           |
| Moisture (%)                                              | 12.4      | 11.7      | 12.1      | 12.9      | 11.9      | 12.3      | 13.2      | 11.7      | 13.3      | 12.4           | 13.5      |
| Protein (12% mb)                                          | 9.0/10.2  | 10.1/11.5 | 9.6/10.9  | 9.5/10.8  | 8.9/10.2  | 9.9/11.2  | 9.0/10.3  | 9.1/10.4  | 9.7/11.0  | 10.5/11.9      | 10.0/11.3 |
| Ash (%) 0% mb                                             | 1.38/1.57 | 1.59/1.80 | 1.52/1.73 | 1.43/1.62 | 1.42/1.61 | 1.55/1.76 | 1.43/1.62 | 1.42/1.62 | 1.34/1.52 | 1.38/1.57      | 1.43/1.62 |
| 1000 Kernel Weight (g)                                    | 33.3      | 30.7      | 32.8      | 32.9      | 32.7      | 31.7      | 33.3      | 32.1      | 35.4      | 33.8           | 35.5      |
| Falling Number (sec)                                      | 306       | 284       | 329       | 329       | 328       | 324       | 331       | 321       | 324       | 349            | 322       |
| DON (ppm)                                                 | 0.4       | 1.0       | 0.5       | 0.4       | 0.7       | 0.6       | 0.6       | 0.9       | 0.8       | 0.1            | 0.5       |
| <b>Wheat Non-Grade Data - from Area Composite Samples</b> |           |           |           |           |           |           |           |           |           |                |           |
| Dockage (%)                                               | 0.2       | 0.5       | 0.5       | 0.5       | 0.4       | 0.3       | 0.3       | 0.4       | 0.4       | 0.3            | 0.4       |
| Moisture - %                                              | 12.5      | 11.6      | 11.9      | 13.0      | 12.0      | 12.2      | 13.3      | 11.5      | 13.4      | 12.2           | 13.3      |
| Protein (%) 12% mb                                        | 8.8       | 10.1      | 9.4       | 9.1       | 8.9       | 9.8       | 9.4       | 9.3       | 9.3       | 10.5           | 9.8       |
| Kernel Size (%) lg/med/sm                                 | 88/12/00  | 85/14/01  | 84/15/01  | 84/15/01  | 82/17/01  | 84/15/01  | 85/14/01  | 84/15/01  | 91/09/00  | 84/15/01       | 87/13/00  |
| Single Kernel: Hardness                                   | 10.5      | 13.2      | 24.6      | 19.9      | 19.2      | 24.9      | 33.1      | 14.9      | 23.2      | 22.4           | 29.0      |
| Weight (mg)                                               | 34.3      | 31.0      | 31.8      | 33.6      | 31.9      | 31.7      | 31.8      | 32.3      | 35.0      | 34.2           | 34.2      |
| Diameter (mm)                                             | 2.64      | 2.60      | 2.59      | 2.63      | 2.55      | 2.62      | 2.57      | 2.60      | 2.69      | 2.60           | 2.65      |
| Sedimentation (cc)                                        | 8.0       | 9.0       | 10.7      | 12.7      | 9.0       | 12.2      | 11.7      | 10.0      | 11.2      | 12.0           | 13.3      |
| DON (ppm)                                                 | 0.3       | 0.8       | 0.7       | 0.7       | 0.9       | 0.9       | 1.0       | 0.8       | 1.0       | 0.1            | 0.5       |
| <b>Flour Data</b>                                         |           |           |           |           |           |           |           |           |           |                |           |
| Lab Mill Extraction (%)                                   | 65.3      | 65.2      | 66.1      | 66.4      | 67.5      | 67.4      | 65.7      | 65.0      | 66.2      | 66.9           | 66.4      |
| Color: L*                                                 | 91.6      | 90.6      | 91.4      | 91.7      | 91.0      | 90.9      | 91.5      | 91.4      | 91.0      | 90.0           | 91.0      |
| a*                                                        | -2.4      | -2.2      | -2.4      | -2.5      | -2.3      | -2.3      | -2.5      | -2.2      | -2.3      | -2.3           | -2.4      |
| b*                                                        | 9.0       | 8.8       | 9.2       | 9.4       | 9.2       | 9.2       | 9.6       | 8.7       | 9.1       | 9.4            | 9.5       |
| Protein (%) 14%/0% mb                                     | 6.7/7.8   | 8.0/9.3   | 7.8/9.0   | 7.2/8.4   | 7.5/8.7   | 7.9/9.2   | 7.4/8.6   | 7.2/8.4   | 7.4/8.6   | 8.3/9.6        | 8.0/9.3   |
| Ash (%) 14%/0% mb                                         | 0.38/0.44 | 0.45/0.53 | 0.41/0.47 | 0.36/0.42 | 0.39/0.45 | 0.43/0.50 | 0.42/0.48 | 0.42/0.49 | 0.38/0.44 | 0.43/0.50      | 0.42/0.49 |
| Wet Gluten (%)                                            | 14.6      | 22.6      | 20.5      | 19.3      | 20.4      | 20.9      | 20.5      | 19.3      | 18.9      | 25.4           | 21.6      |
| Gluten Index                                              | 98        | 84        | 94        | 90        | 70        | 80        | 71        | 94        | 94        | 71             | 83        |
| Falling Number (sec)                                      | 300       | 270       | 319       | 342       | 318       | 352       | 349       | 308       | 316       | 311            | 313       |
| Amylograph Viscosity: 65g (BU)                            | 620       | 316       | 780       | 707       | 717       | 645       | 676       | 673       | 661       | 517            | 607       |
| Damaged Starch (%)                                        | 3.0       | 1.6       | 3.2       | 3.2       | 3.8       | 3.4       | 2.7       | 3.4       | 2.8       | 5.5            | 3.8       |
| SRC: GPI                                                  | 0.71      | 0.62      | 0.63      | 0.66      | 0.62      | 0.64      | 0.57      | 0.65      | 0.66      | 0.69           | 0.65      |
| Water                                                     | 49        | 54        | 54        | 51        | 54        | 47        | 52        | 51        | 49        | 50             | 53        |
| 50% Sucrose                                               | 94        | 99        | 95        | 90        | 96        | 79        | 94        | 88        | 84        | 84             | 94        |
| 5% Lactic Acid                                            | 113       | 107       | 104       | 105       | 104       | 93        | 102       | 101       | 100       | 105            | 107       |
| 5% Na <sub>2</sub> CO <sub>3</sub>                        | 66        | 72        | 71        | 68        | 71        | 65        | 86        | 68        | 67        | 68             | 71        |
| <b>Dough Properties</b>                                   |           |           |           |           |           |           |           |           |           |                |           |
| Farinograph: Peak Time (min)                              | 1.2       | 1.2       | 1.3       | 1.0       | 1.1       | 1.0       | 1.0       | 1.1       | 1.2       | 1.5            | 1.4       |
| Stability (min)                                           | 1.1       | 1.7       | 1.9       | 1.3       | 1.3       | 1.6       | 1.5       | 1.2       | 1.5       | 2.3            | 1.9       |
| Absorption (%)                                            | 49.8      | 51.1      | 50.6      | 50.8      | 51.0      | 52.6      | 50.2      | 50.8      | 51.7      | 52.1           | 53.0      |
| Alveograph: P (mm)                                        | 35        | 28        | 35        | 37        | 35        | 38        | 32        | 31        | 37        | 40             | 49        |
| L (mm)                                                    | 62        | 98        | 85        | 70        | 83        | 85        | 66        | 80        | 89        | 101            | 70        |
| W (10 <sup>-4</sup> J)                                    | 74        | 66        | 85        | 84        | 83        | 89        | 69        | 70        | 94        | 108            | 101       |
| P/L Ratio                                                 | 0.56      | 0.29      | 0.41      | 0.53      | 0.42      | 0.44      | 0.49      | 0.39      | 0.42      | 0.40           | 0.69      |
| Extensograph: Resistance (BU)                             | 216       | 170       | 204       | 243       | 205       | 177       | 215       | 175       | 177       | 213            | 170       |
| (45 min) Extensibility (cm)                               | 14.9      | 16.3      | 14.6      | 14.1      | 14.2      | 15.6      | 15.4      | 15.7      | 16.3      | 16.6           | 16.9      |
| Area (cm <sup>2</sup> )                                   | 58        | 47        | 52        | 58        | 50        | 48        | 57        | 47        | 51        | 63             | 53        |
| <b>Baking Evaluation</b>                                  |           |           |           |           |           |           |           |           |           |                |           |
| Bake Grain and Texture (1-10)                             | 3.5       | 4.0       | 4.8       | 3.5       | 4.5       | 5.0       | 3.6       | 3.5       | 4.8       | 5.5            | 4.3       |
| Bake Absorption (%)                                       | 53.0      | 53.0      | 53.6      | 53.3      | 54.0      | 55.0      | 53.2      | 54.0      | 54.0      | 54.6           | 55.4      |
| Loaf Volume (cc)                                          | 668       | 635       | 620       | 642       | 646       | 617       | 608       | 634       | 620       | 601            | 619       |
| Cookie Diameter (cm)                                      | 8.9       | 9.0       | 8.8       | 9.1       | 8.8       | 9.0       | 8.9       | 8.9       | 9.0       | 8.6            | 8.9       |
| Spread Factor (d/h)                                       | 11.2      | 11.3      | 10.5      | 10.9      | 10.4      | 10.7      | 10.9      | 11.2      | 11.4      | 10.0           | 11.0      |



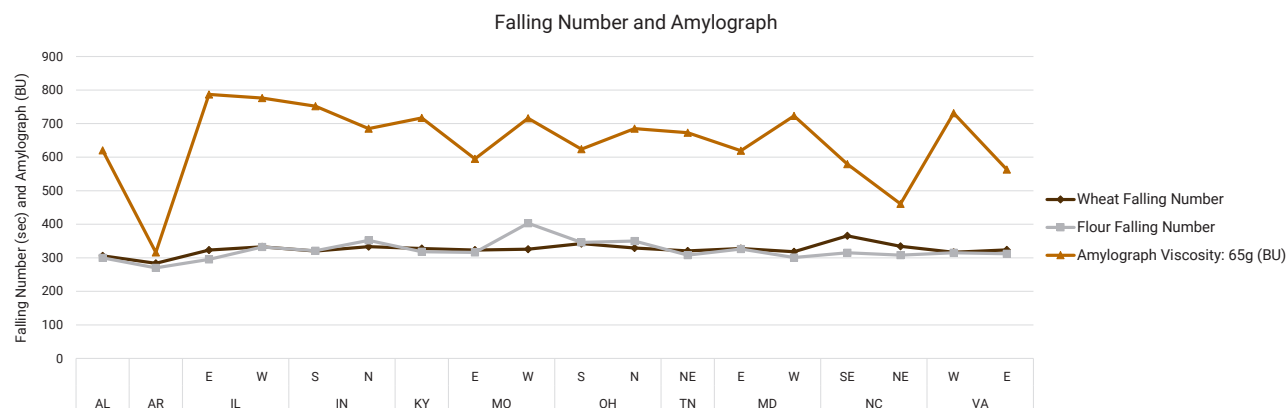
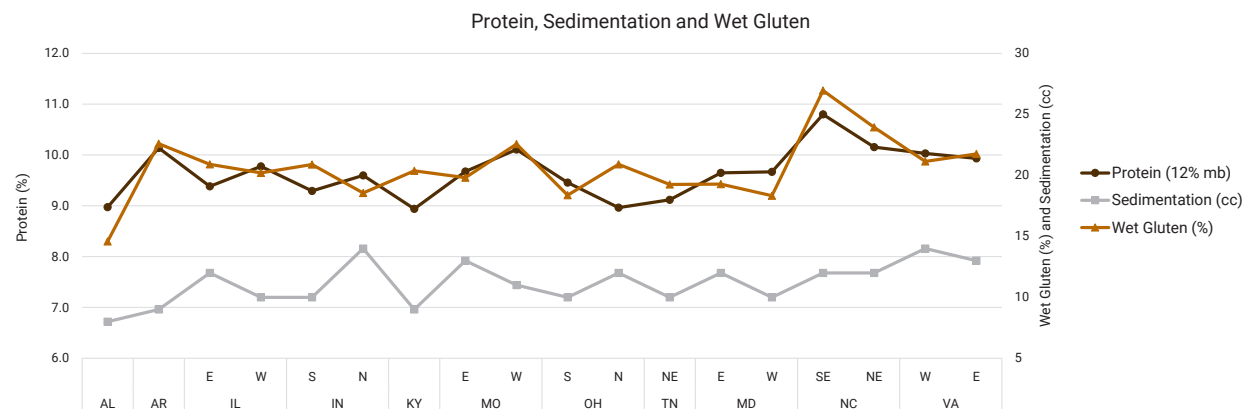
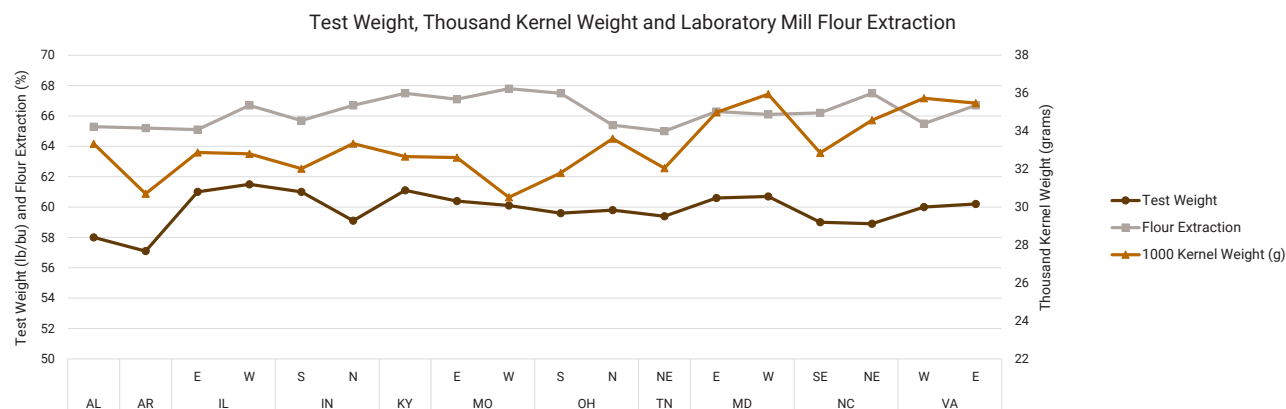
# SRW QUALITY DATA – BY AREA

|                                                    | Alabama | Arkansas | Illinois |      | Indiana |      | Kentucky | Missouri |      | Ohio |      | Tennessee | Maryland |      | North Carolina |      | Virginia |      |
|----------------------------------------------------|---------|----------|----------|------|---------|------|----------|----------|------|------|------|-----------|----------|------|----------------|------|----------|------|
|                                                    | E       | W        | S        | N    | E       | W    | S        | N        | NE   | E    | W    | SE        | NE       | W    | E              |      |          |      |
| Wheat Grade Data - from Area Composite Samples     |         |          |          |      |         |      |          |          |      |      |      |           |          |      |                |      |          |      |
| Test Weight (lb/bu)                                | 58.0    | 57.1     | 61.0     | 61.5 | 61.0    | 59.1 | 61.1     | 60.4     | 60.1 | 59.6 | 59.8 | 59.4      | 60.6     | 60.7 | 59.0           | 58.9 | 60.0     | 60.2 |
| (kg/hl)                                            | 76.4    | 75.2     | 80.2     | 80.9 | 80.2    | 77.8 | 80.4     | 79.5     | 79.1 | 78.4 | 78.7 | 78.2      | 79.7     | 79.8 | 77.6           | 77.5 | 78.9     | 79.2 |
| Damaged Kernels (%)                                | 0.0     | 0.0      | 0.0      | 0.0  | 0.0     | 0.7  | 0.0      | 0.0      | 0.0  | 0.0  | 0.7  | 0.0       | 0.0      | 0.0  | 0.7            | 0.7  | 0.0      | 0.7  |
| Foreign Material (%)                               | 0.0     | 0.0      | 0.0      | 0.0  | 0.0     | 0.3  | 0.0      | 0.0      | 0.0  | 0.3  | 0.3  | 0.0       | 0.3      | 0.0  | 0.3            | 0.0  | 0.0      | 0.3  |
| Shrunken & Broken (%)                              | 0.2     | 0.6      | 0.4      | 0.6  | 0.4     | 0.8  | 0.5      | 0.2      | 0.8  | 0.7  | 0.9  | 0.6       | 0.4      | 0.6  | 0.6            | 0.5  | 0.4      | 0.4  |
| Total Defects (%)                                  | 0.2     | 0.6      | 0.4      | 0.6  | 0.4     | 1.8  | 0.5      | 0.2      | 0.8  | 1.0  | 1.9  | 0.6       | 0.7      | 0.6  | 1.6            | 1.2  | 0.4      | 1.4  |
| Grade                                              | 2       | 3        | 1        | 1    | 1       | 2    | 1        | 1        | 1    | 2    | 2    | 2         | 1        | 1    | 2              | 2    | 1        | 1    |
| Wheat Non-Grade Data - from Individual Samples     |         |          |          |      |         |      |          |          |      |      |      |           |          |      |                |      |          |      |
| Moisture (%)                                       | 12.4    | 11.7     | 12.4     | 12.0 | 12.0    | 13.3 | 11.9     | 12.2     | 12.3 | 12.7 | 13.3 | 11.7      | 13.2     | 13.4 | 11.8           | 13.0 | 13.4     | 13.6 |
| Protein (12% mb)                                   | 9.0     | 10.1     | 9.4      | 9.8  | 9.3     | 9.6  | 8.9      | 9.7      | 10.1 | 9.5  | 9.0  | 9.1       | 9.6      | 9.7  | 10.8           | 10.2 | 10.0     | 9.9  |
| Ash (%) 0% mb                                      | 1.38    | 1.59     | 1.48     | 1.55 | 1.46    | 1.41 | 1.42     | 1.55     | 1.54 | 1.35 | 1.44 | 1.42      | 1.36     | 1.31 | 1.37           | 1.39 | 1.47     | 1.42 |
| 1000 Kernel Weight (g)                             | 33.3    | 30.7     | 32.9     | 32.8 | 32.0    | 33.3 | 32.7     | 32.6     | 30.5 | 31.8 | 33.6 | 32.1      | 35.0     | 35.9 | 32.9           | 34.6 | 35.7     | 35.5 |
| Falling Number (sec)                               | 306     | 284      | 323      | 333  | 320     | 333  | 328      | 323      | 326  | 342  | 329  | 321       | 328      | 318  | 365            | 334  | 317      | 323  |
| DON (ppm)                                          | 0.4     | 1.0      | 0.3      | 0.6  | 0.7     | 0.3  | 0.7      | 0.6      | 0.7  | 0.9  | 0.6  | 0.9       | 0.8      | 0.9  | 0.1            | 0.2  | 0.1      | 0.6  |
| Wheat Non-Grade Data - from Area Composite Samples |         |          |          |      |         |      |          |          |      |      |      |           |          |      |                |      |          |      |
| Dockage (%)                                        | 0.2     | 0.5      | 0.5      | 0.5  | 0.4     | 0.5  | 0.4      | 0.3      | 0.4  | 0.5  | 0.3  | 0.4       | 0.4      | 0.3  | 0.3            | 0.3  | 0.4      | 0.4  |
| Moisture (%)                                       | 12.5    | 11.6     | 12.0     | 11.9 | 12.4    | 13.3 | 12.0     | 12.1     | 12.3 | 13.0 | 13.4 | 11.5      | 12.9     | 14.1 | 11.7           | 12.6 | 13.5     | 13.2 |
| Protein (%) 12% mb                                 | 8.8     | 10.1     | 9.2      | 9.5  | 9.1     | 9.1  | 8.9      | 9.8      | 9.9  | 9.4  | 9.4  | 9.3       | 9.3      | 9.3  | 10.8           | 10.3 | 9.8      | 9.9  |
| Kernel Size: Large (%)                             | 87      | 86       | 84       | 84   | 82      | 86   | 86       | 87       | 82   | 83   | 85   | 84        | 90       | 91   | 83             | 86   | 83       | 88   |
| Medium (%)                                         | 12      | 14       | 15       | 15   | 17      | 14   | 13       | 13       | 18   | 15   | 14   | 15        | 10       | 9    | 16             | 13   | 17       | 11   |
| Small (%)                                          | 0       | 1        | 1        | 1    | 1       | 1    | 1        | 0        | 1    | 2    | 0    | 1         | 0        | 0    | 1              | 0    | 1        | 0    |
| Single Kernel: Hardness                            | 10.5    | 13.2     | 22.3     | 26.0 | 21.7    | 19.1 | 19.2     | 23.8     | 26.5 | 24.4 | 34.6 | 14.9      | 25.0     | 20.6 | 19.6           | 24.9 | 26.3     | 29.9 |
| Weight (mg)                                        | 34.3    | 31.0     | 32.9     | 31.2 | 33.5    | 33.7 | 31.9     | 32.2     | 31.0 | 31.6 | 31.8 | 32.3      | 35.1     | 34.9 | 32.9           | 35.4 | 33.4     | 34.5 |
| Diameter (mm)                                      | 2.64    | 2.60     | 2.60     | 2.59 | 2.64    | 2.63 | 2.55     | 2.65     | 2.58 | 2.61 | 2.56 | 2.60      | 2.69     | 2.69 | 2.56           | 2.64 | 2.59     | 2.67 |
| Sedimentation (cc)                                 | 8.0     | 9.0      | 12.0     | 10.0 | 10.0    | 14.0 | 9.0      | 13.0     | 11.0 | 10.0 | 12.0 | 10.0      | 12.0     | 10.0 | 12.0           | 12.0 | 14.0     | 13.0 |
| DON (ppm)                                          | 0.3     | 0.8      | 0.3      | 1.0  | 0.8     | 0.7  | 0.9      | 0.8      | 1.0  | 1.2  | 0.9  | 0.8       | 1.0      | 0.9  | 0.1            | 0.0  | 0.4      | 0.5  |
| Flour Data                                         |         |          |          |      |         |      |          |          |      |      |      |           |          |      |                |      |          |      |
| Lab Mill Extraction (%)                            | 65.3    | 65.2     | 65.1     | 66.7 | 65.7    | 66.7 | 67.5     | 67.1     | 67.8 | 67.5 | 65.4 | 65.0      | 66.3     | 66.1 | 66.2           | 67.5 | 65.5     | 66.7 |
| Color: L*                                          | 91.6    | 90.6     | 91.4     | 91.4 | 91.6    | 91.7 | 91.0     | 91.1     | 90.7 | 90.7 | 91.6 | 91.4      | 91.0     | 90.9 | 90.2           | 89.9 | 91.2     | 91.0 |
| a*                                                 | -2.4    | -2.2     | -2.5     | -2.4 | -2.5    | -2.5 | -2.3     | -2.3     | -2.4 | -2.4 | -2.5 | -2.2      | -2.4     | -2.3 | -2.2           | -2.3 | -2.4     | -2.4 |
| b*                                                 | 9.0     | 8.8      | 9.5      | 9.1  | 9.5     | 9.3  | 9.2      | 9.0      | 9.6  | 9.9  | 9.6  | 8.7       | 9.1      | 9.0  | 9.2            | 9.5  | 9.2      | 9.5  |
| Protein (%) 14% mb                                 | 6.7     | 8.0      | 7.5      | 7.9  | 7.1     | 7.3  | 7.5      | 7.9      | 8.0  | 7.8  | 7.3  | 7.2       | 7.6      | 7.0  | 8.8            | 7.8  | 8.2      | 7.9  |
| Ash (%) 14% mb                                     | 0.38    | 0.45     | 0.41     | 0.40 | 0.35    | 0.37 | 0.39     | 0.42     | 0.45 | 0.47 | 0.41 | 0.42      | 0.41     | 0.35 | 0.44           | 0.42 | 0.40     | 0.43 |
| Wet Gluten (%)                                     | 14.6    | 22.6     | 20.9     | 20.2 | 20.9    | 18.6 | 20.4     | 19.8     | 22.6 | 18.4 | 20.9 | 19.3      | 19.3     | 18.3 | 27.0           | 23.9 | 21.1     | 21.8 |
| Gluten Index                                       | 98      | 84       | 91       | 96   | 82      | 95   | 70       | 91       | 64   | 96   | 67   | 94        | 94       | 94   | 68             | 74   | 90       | 80   |
| Falling Number (sec)                               | 300     | 270      | 295      | 332  | 321     | 352  | 318      | 316      | 403  | 346  | 350  | 308       | 326      | 301  | 315            | 308  | 315      | 312  |
| Amylograph Viscosity: 65g (BU)                     | 620     | 316      | 787      | 776  | 752     | 685  | 717      | 595      | 716  | 624  | 685  | 673       | 619      | 723  | 579            | 461  | 731      | 563  |
| Damaged Starch (%)                                 | 3.0     | 1.6      | 3.0      | 3.4  | 3.0     | 3.4  | 3.8      | 3.8      | 3.0  | 3.8  | 2.5  | 3.4       | 3.4      | 2.1  | 6.6            | 4.6  | 3.8      | 3.8  |
| SRC: GPI                                           | 0.71    | 0.62     | 0.65     | 0.61 | 0.64    | 0.67 | 0.62     | 0.63     | 0.67 | 0.59 | 0.56 | 0.65      | 0.66     | 0.67 | 0.70           | 0.69 | 0.74     | 0.62 |
| Water                                              | 49      | 54       | 52       | 54   | 51      | 52   | 54       | 47       | 47   | 57   | 52   | 51        | 46       | 52   | 46             | 53   | 54       | 52   |
| 50% Sucrose                                        | 94      | 99       | 95       | 95   | 92      | 89   | 96       | 80       | 78   | 98   | 93   | 88        | 79       | 92   | 82             | 85   | 88       | 96   |
| 5% Lactic Acid                                     | 113     | 107      | 107      | 102  | 102     | 106  | 104      | 91       | 95   | 101  | 102  | 101       | 94       | 109  | 100            | 109  | 108      | 106  |
| 5% Na <sub>2</sub> CO <sub>3</sub>                 | 66      | 72       | 70       | 71   | 66      | 69   | 71       | 65       | 65   | 73   | 89   | 68        | 65       | 69   | 62             | 73   | 59       | 75   |
| Dough Properties                                   |         |          |          |      |         |      |          |          |      |      |      |           |          |      |                |      |          |      |
| Farinograph: Peak Time (min)                       | 1.2     | 1.2      | 1.2      | 1.3  | 0.9     | 1.1  | 1.1      | 1.0      | 1.2  | 1.2  | 1.0  | 1.1       | 1.1      | 1.3  | 1.5            | 1.5  | 1.6      | 1.3  |
| Stability (min)                                    | 1.1     | 1.7      | 1.7      | 1.9  | 1.8     | 1.1  | 1.3      | 1.3      | 2.0  | 1.4  | 1.5  | 1.2       | 1.3      | 1.7  | 2.2            | 2.4  | 2.0      | 1.9  |
| Absorption (%)                                     | 49.8    | 51.1     | 50.8     | 50.5 | 50.7    | 50.9 | 51.0     | 52.8     | 52.3 | 51.0 | 50.0 | 50.8      | 51.9     | 51.5 | 52.6           | 51.6 | 52.6     | 53.2 |
| Alveograph: P (mm)                                 | 35      | 28       | 36       | 34   | 37      | 37   | 35       | 38       | 38   | 33   | 32   | 31        | 34       | 42   | 43             | 38   | 50       | 48   |
| L (mm)                                             | 62      | 98       | 82       | 86   | 75      | 67   | 83       | 76       | 99   | 73   | 65   | 80        | 102      | 71   | 113            | 90   | 65       | 72   |
| W (10 <sup>-4</sup> J)                             | 74      | 66       | 89       | 82   | 87      | 82   | 83       | 82       | 99   | 66   | 70   | 70        | 90       | 99   | 126            | 92   | 97       | 103  |
| P/L Ratio                                          | 0.56    | 0.29     | 0.44     | 0.40 | 0.49    | 0.55 | 0.42     | 0.50     | 0.38 | 0.45 | 0.49 | 0.39      | 0.33     | 0.59 | 0.38           | 0.42 | 0.77     | 0.67 |
| Extensograph: Resistance (BU)                      | 216     | 170      | 156      | 231  | 210     | 259  | 205      | 180      | 172  | 171  | 223  | 175       | 166      | 192  | 205            | 220  | 180      | 167  |
| (45 min) Extensibility (cm)                        | 14.9    | 16.3     | 15.8     | 13.9 | 14.4    | 13.9 | 14.2     | 15.4     | 16.0 | 14.8 | 15.5 | 15.7      | 17.0     | 15.2 | 16.8           | 16.4 | 17.2     | 16.8 |
| Area (cm <sup>2</sup> )                            | 58      | 47       | 45       | 56   | 53      | 61   | 50       | 48       | 49   | 42   | 60   | 47        | 50       | 52   | 62             | 64   | 59       | 51   |
| Baking Evaluation                                  |         |          |          |      |         |      |          |          |      |      |      |           |          |      |                |      |          |      |
| Bake Grain and Texture (1-10)                      | 3.5     | 4.0      | 4.5      | 5.0  | 3.5     | 3.5  | 4.5      | 5.0      | 5.0  | 4.0  | 3.5  | 3.5       | 5.0      | 4.5  | 6.0            | 5.0  | 5.0      | 4.0  |
| Bake Absorption (%)                                | 53.0    | 53.0     | 53.0     | 54.0 | 53.0    | 53.5 | 54.0     | 55.0     | 55.0 | 54.0 | 53.0 | 54.0      | 54.0     | 54.0 | 54.5           | 54.6 | 55.0     | 55.5 |
| Loaf Volume (cc)                                   | 668     | 635      | 640      | 609  | 622     | 652  | 646      | 642      | 581  | 593  | 611  | 634       | 587      | 668  | 554            | 642  | 543      | 646  |
| Cookie Diameter (cm)                               | 8.9     | 9.0      | 9.1      | 8.7  | 9.1     | 9.1  | 8.8      | 8.9      | 9.2  | 8.9  | 8.9  | 8.9       | 9.0      | 9.1  | 8.5            | 8.8  | 8.9      | 8.9  |
| Spread Factor (d/h)                                | 11.2    | 11.3     | 11.0     | 10.3 | 10.7    | 11.0 | 10.4     | 10.6     | 10.8 | 11.2 | 10.8 | 11.2      | 11.3     | 11.4 | 9.7            | 10.3 | 10.5     | 11.2 |

N-North, S-South, E-East, W-West, NE-Northeast; Lg-Large, Med-Medium, Sm-Small; mb-moisture basis; NA-Not Available

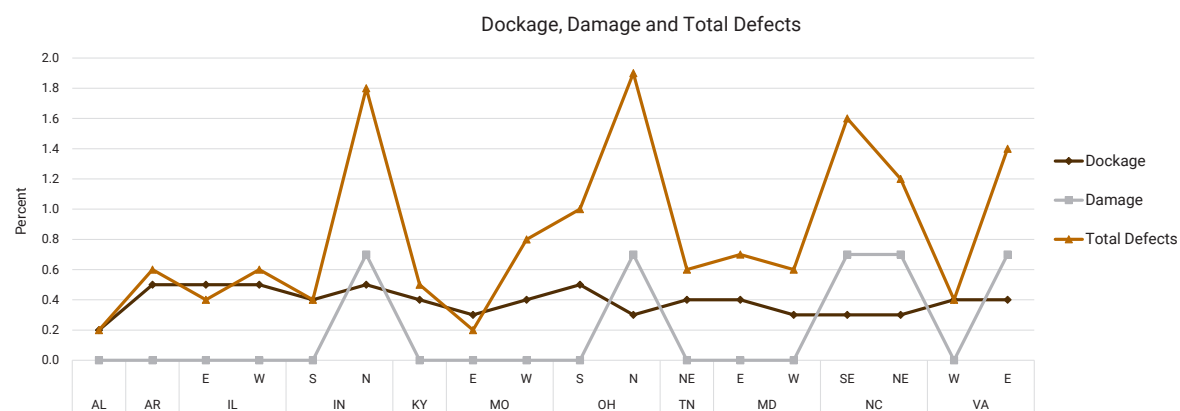
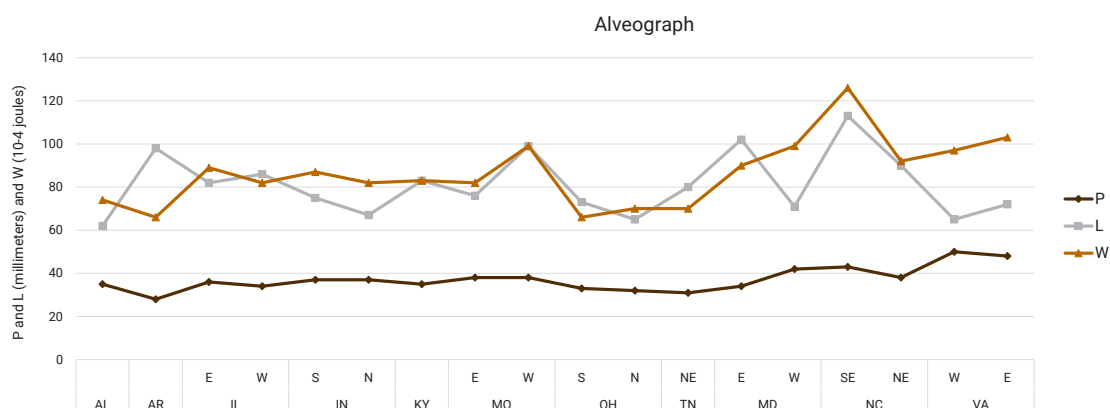
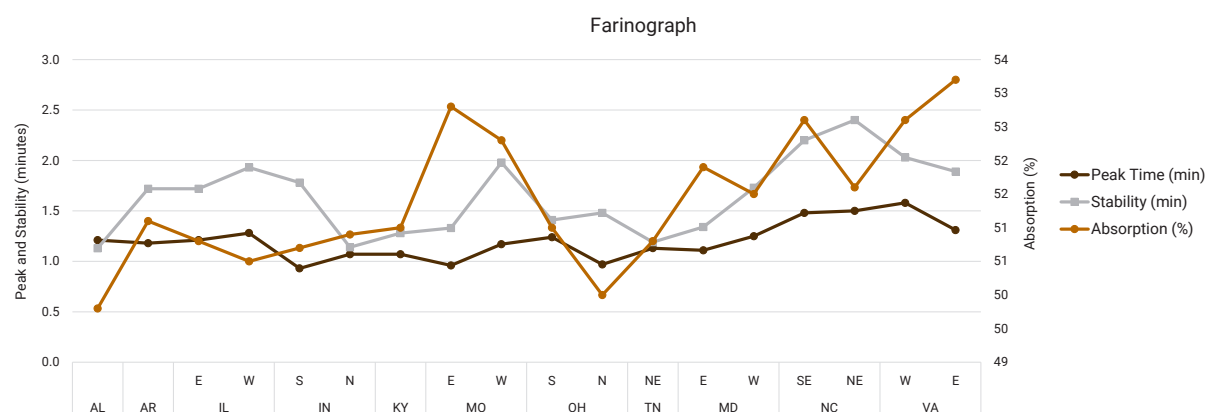
# COMPARISONS OF 2022 RESULTS

■ For Selected Quality Factors



# COMPARISONS OF 2022 RESULTS

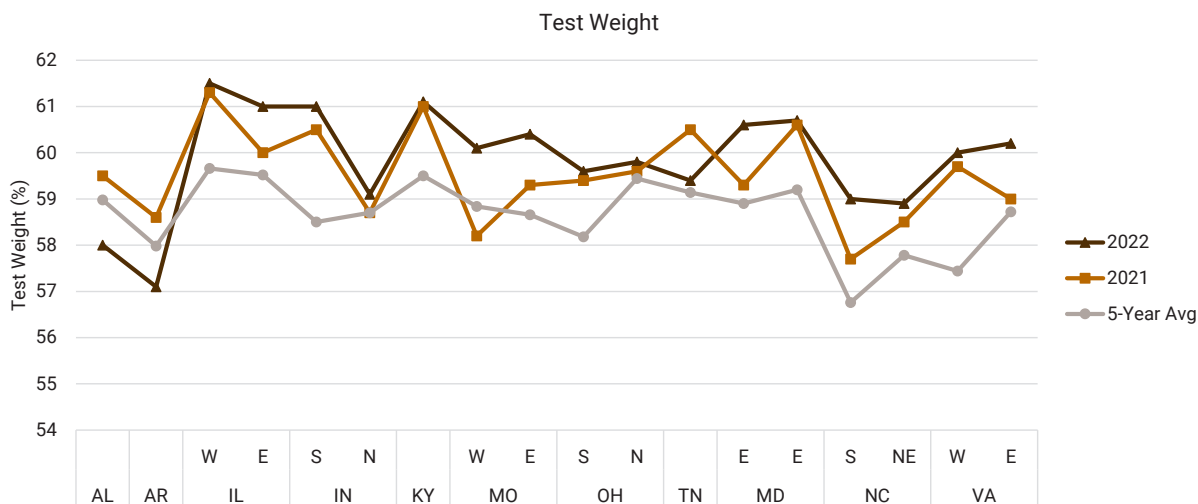
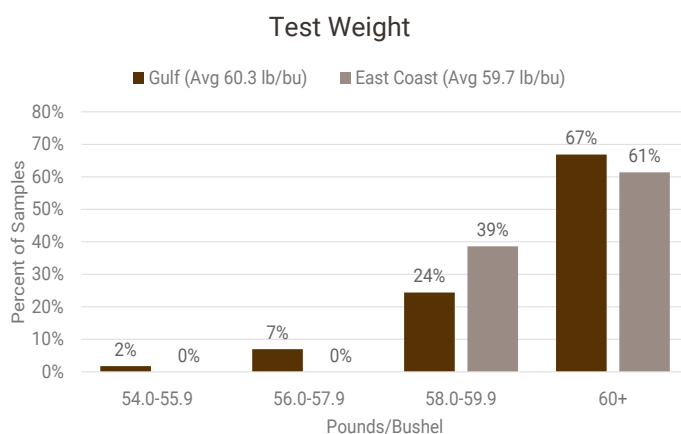
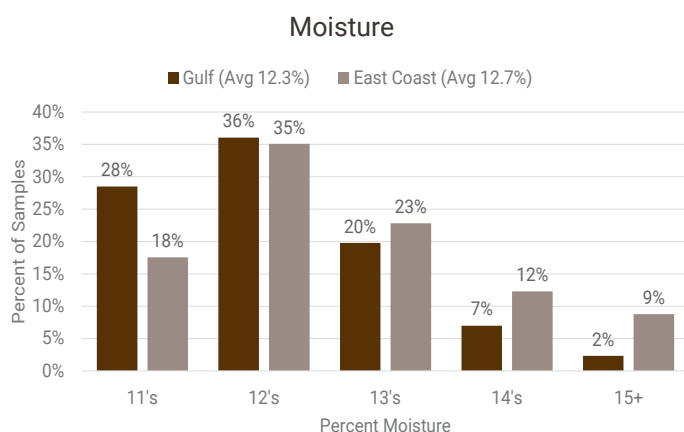
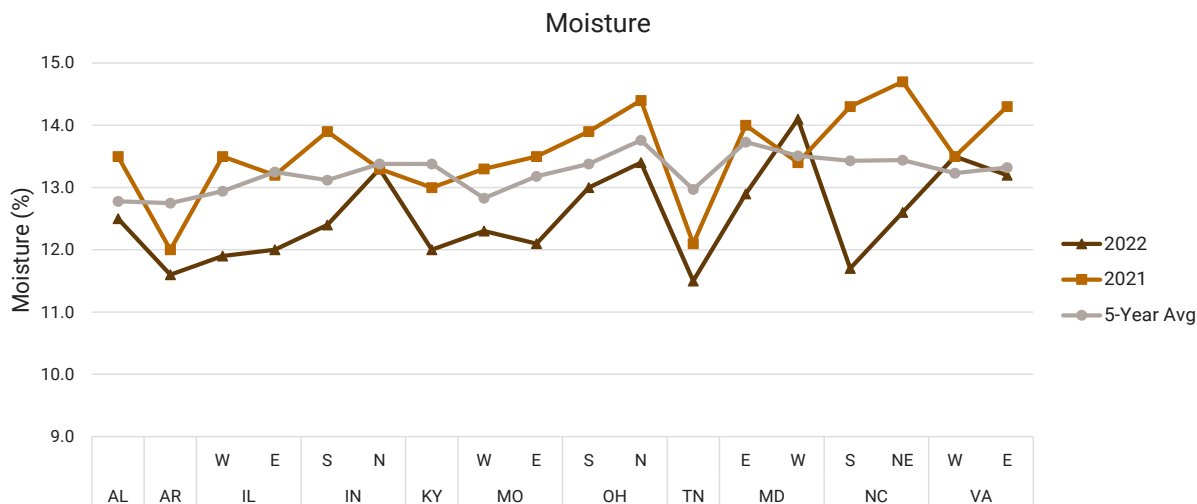
## For Selected Quality Factors





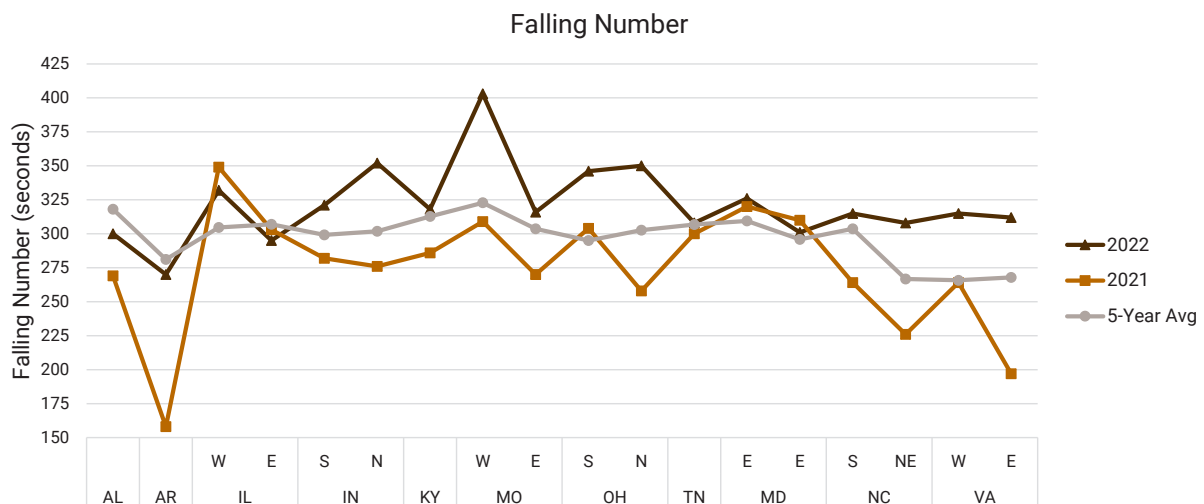
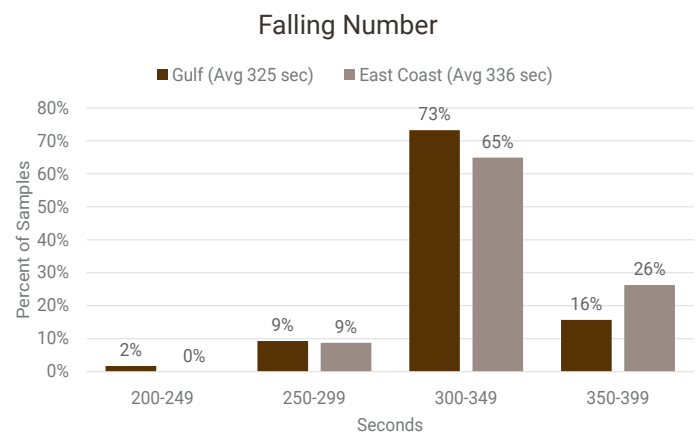
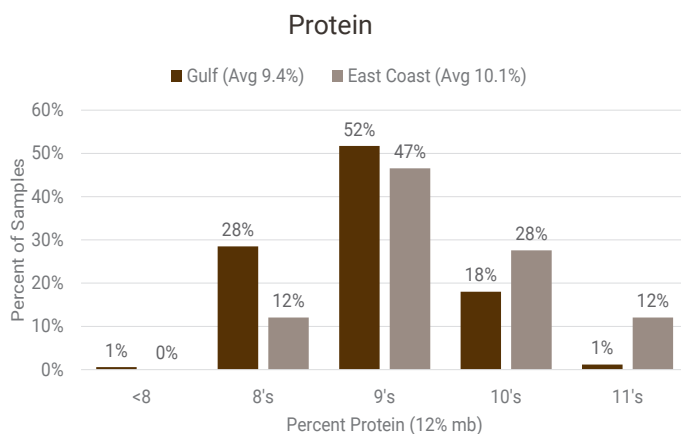
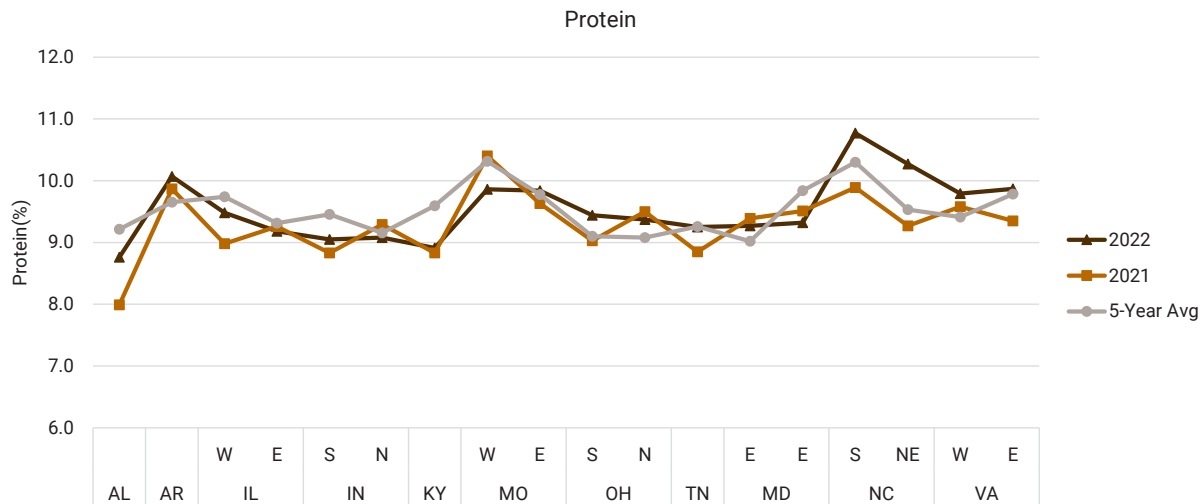
# DISTRIBUTION OF 2022 RESULTS AND COMPARISONS WITH PREVIOUS YEARS

## Moisture and Test Weight



# DISTRIBUTION OF 2022 RESULTS AND COMPARISONS WITH PREVIOUS YEARS

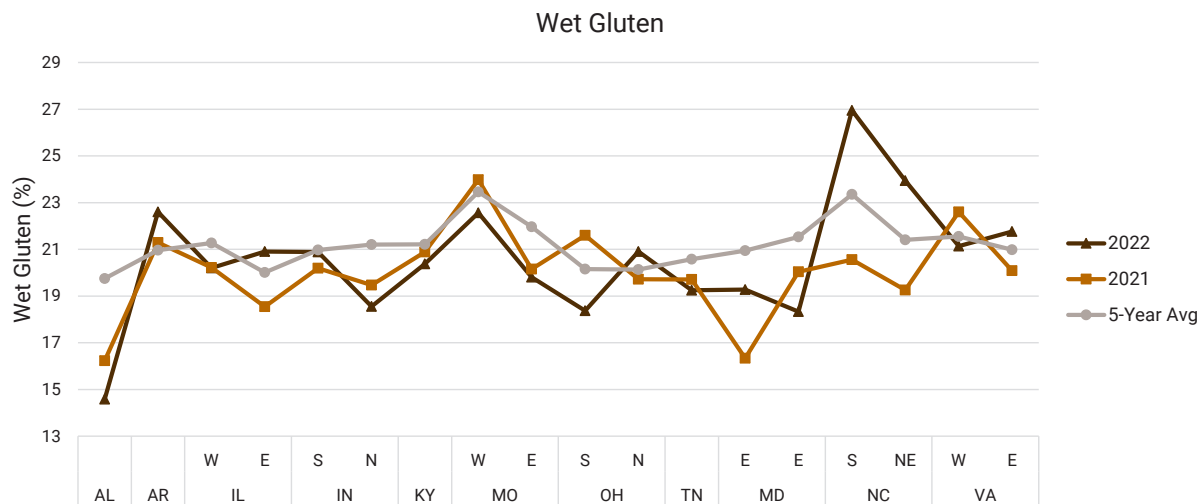
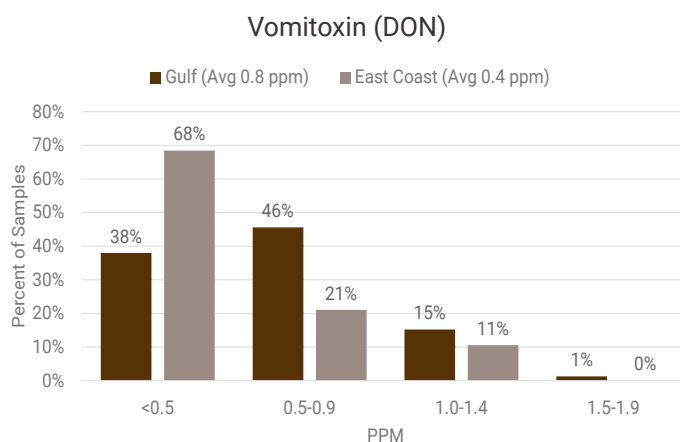
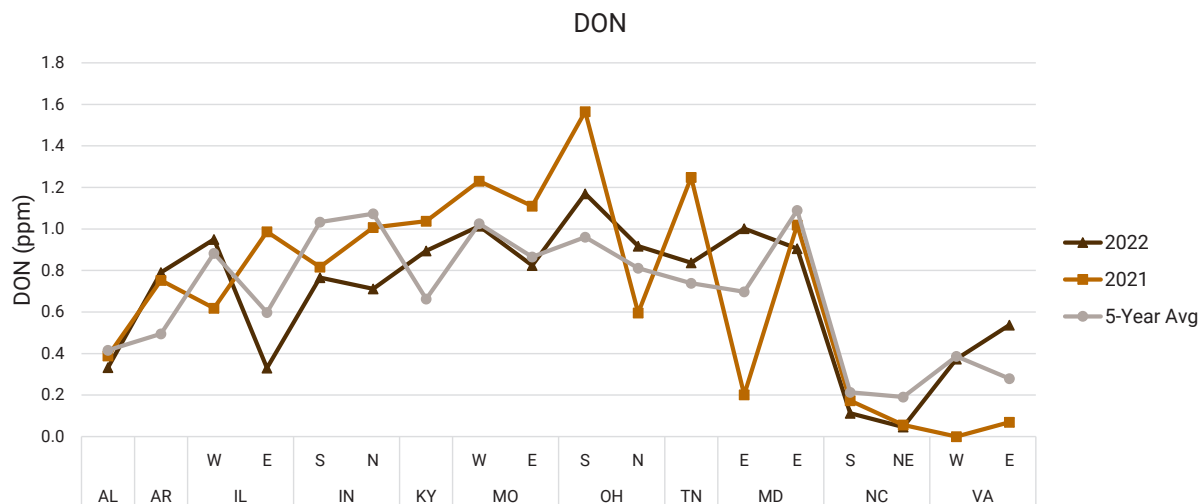
## Protein and Falling Number



AL-Alabama, AK-Arkansas, IL-Illinois, IN-Indiana, KY-Kentucky, MD-Maryland, MO-Missouri, NC-North Carolina, OH-Ohio, TN-Tennessee, VA-Virginia; N-North, S-South, E-East, W-West, NE-Northeast

# DISTRIBUTION OF 2022 RESULTS AND COMPARISONS WITH PREVIOUS YEARS

## Vomitoxin (DON) and Wet Gluten

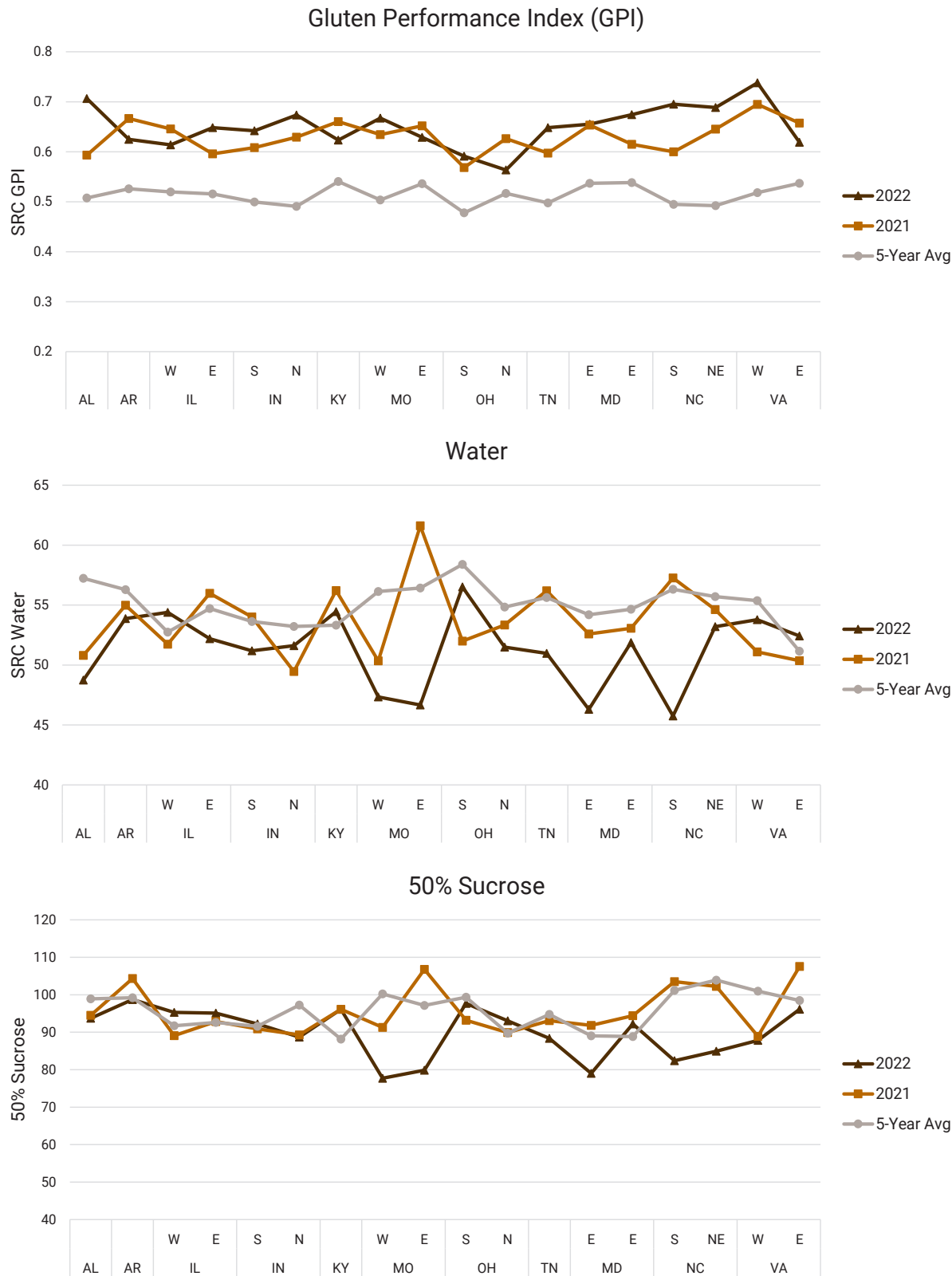






# DISTRIBUTION OF 2022 RESULTS AND COMPARISONS WITH PREVIOUS YEARS

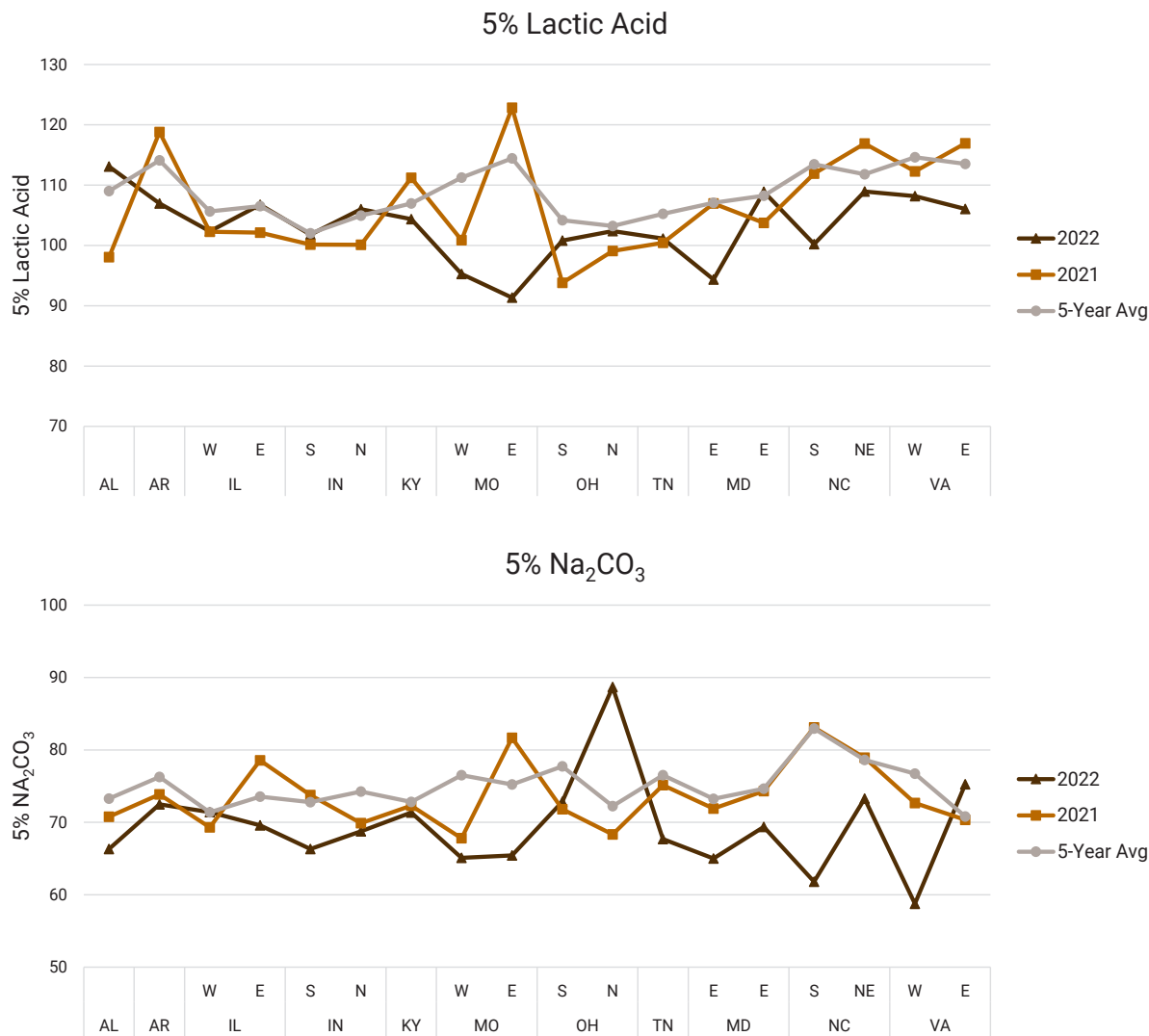
## ■ Solvent Retention Capacity (SRC)





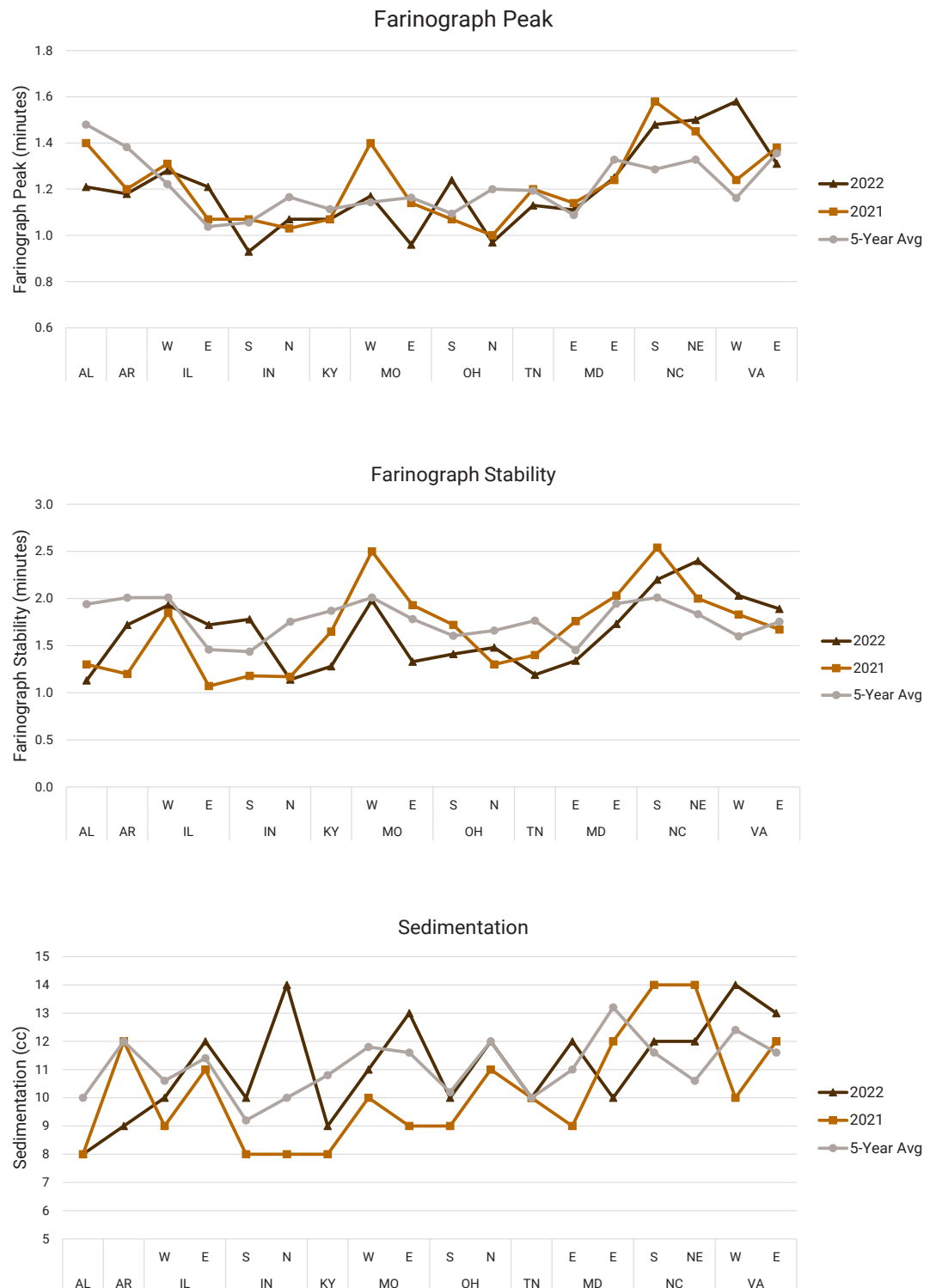
# DISTRIBUTION OF 2022 RESULTS AND COMPARISONS WITH PREVIOUS YEARS

## ■ Solvent Retention Capacity (SRC)



# DISTRIBUTION OF 2022 RESULTS AND COMPARISONS WITH PREVIOUS YEARS

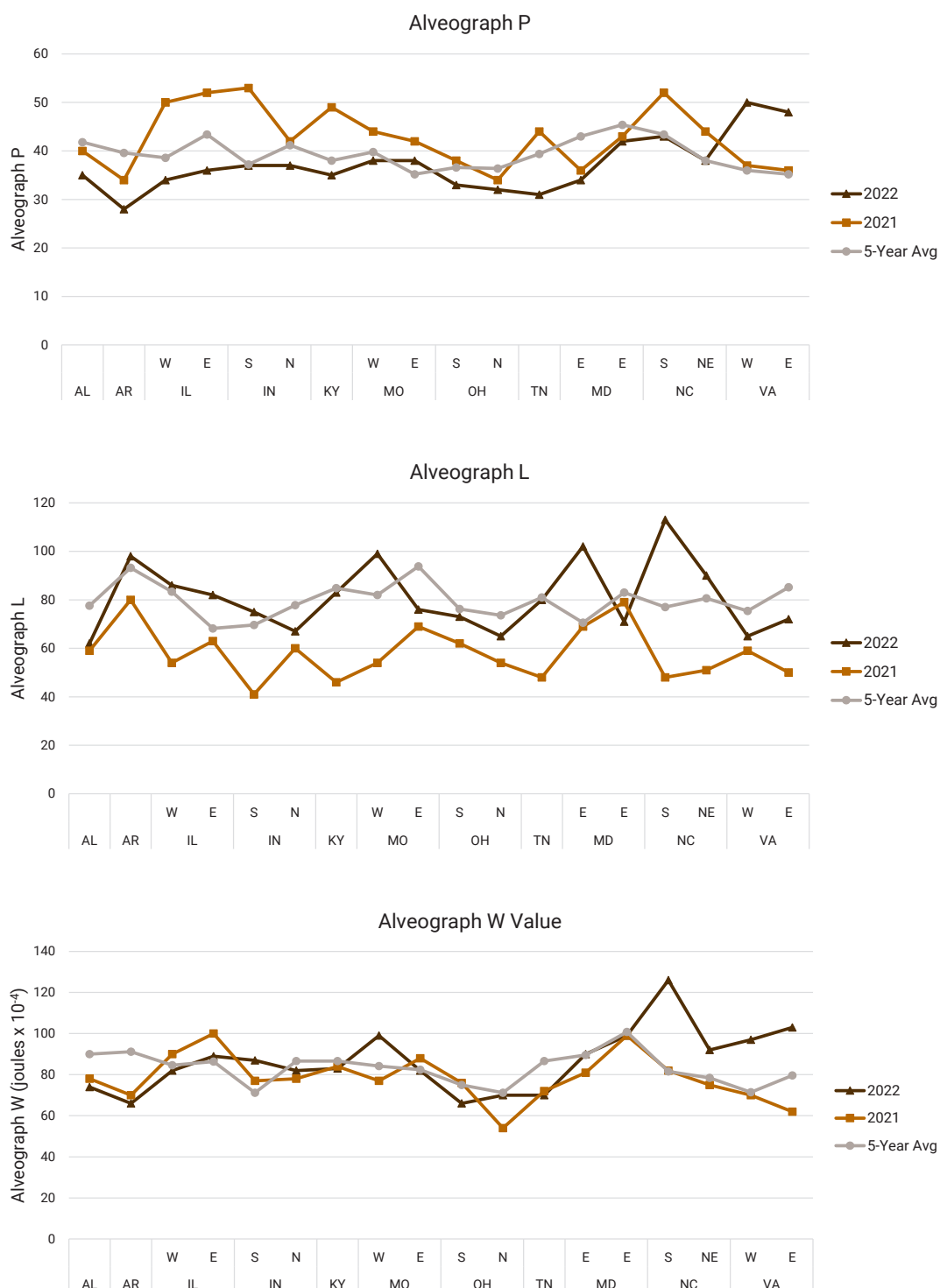
## Farinograph & Sedimentation





# DISTRIBUTION OF 2022 RESULTS AND COMPARISONS WITH PREVIOUS YEARS

## Alveograph



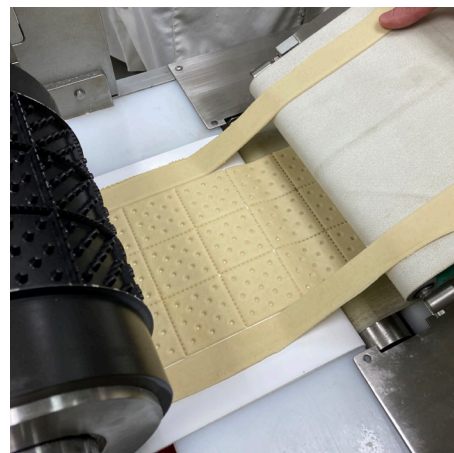


# ANALYSIS METHODS

## SOFT RED WINTER LABORATORY TESTING

All quality data contained in this report is the result of testing and analysis conducted by Great Plains Analytical Lab in Kansas City, Missouri.

| TEST:                                        | METHODOLOGY:                                                                                                                                                  |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WHEAT GRADE FACTORS</b>                   |                                                                                                                                                               |
| Grade                                        | Official U.S. Standards for Grain.                                                                                                                            |
| Test Weight                                  | AACCI 55-10.01.                                                                                                                                               |
| Damaged Kernels                              | Official U.S. Standards for Grain.                                                                                                                            |
| Foreign Material                             | Official U.S. Standards for Grain.                                                                                                                            |
| Shrunken and Broken                          | Official U.S. Standards for Grain.                                                                                                                            |
| Total Defects                                | Official U.S. Standards for Grain.                                                                                                                            |
| <b>WHEAT NON-GRADE FACTORS</b>               |                                                                                                                                                               |
| Dockage                                      | Official USDA procedures.                                                                                                                                     |
| Moisture                                     | AACCI 44-15.02. <ul style="list-style-type: none"> <li>Wheat: DICKEY-john GAC® 2500-UGMA Grain Analysis Computer.</li> <li>Flour: air oven method.</li> </ul> |
| Protein (12% mb)                             | AACCI 46-30.01 (Dumas combustion nitrogen analysis or CNA method).                                                                                            |
| Ash (14% mb)                                 | AACCI 08-01.01 expressed on a 14% mb.                                                                                                                         |
| 1000 Kernel Weight                           | Based on a 10 g clean wheat sample counted by an electronic counter, results converted to express weight by 1000 kernels                                      |
| Kernel Size                                  | Wheat is sifted with a RoTap sifter using Tyler No. 7 (2.82 mm) and No. 9 (2.00 mm) screens.                                                                  |
| Single Kernel Characterization System (SKCS) | AACCI 54-31.01 using Perten SKCS 4100.                                                                                                                        |
| Sedimentation                                | AACCI 56-61.02.                                                                                                                                               |
| Falling Number                               | AACCI 56-81.04; 2019 FGIS barometric pressure correction procedure; average value is a simple mean of sample results.                                         |
| DON                                          | Neogen ELISA.                                                                                                                                                 |

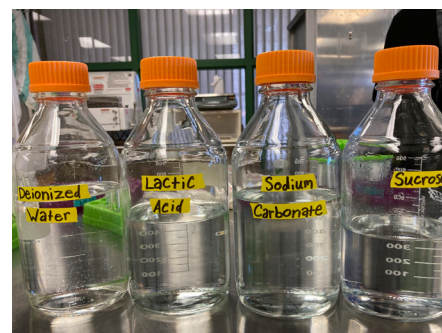


For the full methodology, scan the QR code or visit the USW website at [www.uswheat.org/working-with-buyers/wheat-glossary](http://www.uswheat.org/working-with-buyers/wheat-glossary).

# ANALYSIS METHODS

## SOFT RED WINTER LABORATORY TESTING

| TEST:                             | METHODOLOGY:                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FLOUR FACTORS</b>              |                                                                                                                                                                                                                                                                                                                                    |
| Laboratory Milling Extraction     | AACCI 26-10.02, AACCI 26-21.02. Samples are milled on a Buhler Laboratory mill (MLU 202) using a 183-micron ( $\mu$ ) sieve.                                                                                                                                                                                                       |
| Color                             | CIE 1976 L*a*b* color system. Minolta Chroma Meter with Granular-Materials attachment CR-A50 and CR-410 colorimeter.                                                                                                                                                                                                               |
| Protein (14% mb)                  | AACCI 46-30.01 (Dumas CNA method).                                                                                                                                                                                                                                                                                                 |
| Ash (14% mb)                      | AACCI 08-01.01 expressed on a 14% mb.                                                                                                                                                                                                                                                                                              |
| Wet Gluten                        | AACCI 38-12.02.                                                                                                                                                                                                                                                                                                                    |
| Gluten Index                      | AACCI 38-12.02.                                                                                                                                                                                                                                                                                                                    |
| Falling Number                    | AACCI 56-81.04; 2019 FGIS barometric pressure correction procedure; average value is a simple mean of sample results.                                                                                                                                                                                                              |
| Amylograph Viscosity              | AACCI 22-10.01 modified to use 65 g flour (14% mb) and 450 ml distilled water with pins.                                                                                                                                                                                                                                           |
| Damaged Starch                    | AACCI 76-30.02 (Enzymatic hydrolysis).                                                                                                                                                                                                                                                                                             |
| Solvent Retention Capacity        | AACCI 56-11.02.                                                                                                                                                                                                                                                                                                                    |
| <b>DOUGH PROPERTY FACTORS</b>     |                                                                                                                                                                                                                                                                                                                                    |
| Farinograph                       | AACCI 54-21.02 (constant flour weight method) with 50 g bowl.                                                                                                                                                                                                                                                                      |
| Alveograph                        | AACCI 54-30.02, Chopin-Alveolab.                                                                                                                                                                                                                                                                                                   |
| Extensograph                      | AACCI 54-10.01; 45 min rest.                                                                                                                                                                                                                                                                                                       |
| <b>EVALUATION OF END-PRODUCTS</b> |                                                                                                                                                                                                                                                                                                                                    |
| Bread                             | AACCI 10-10.03 ("pup loaf" method); producing two loaves per batch using dry yeast and ascorbic acid. After mixing, the dough is divided into two equal portions, fermented for 160 min, molded and panned in pup loaf pans before proofing and baking. Loaf volume is measured immediately after baking by rapeseed displacement. |
| Sugar-Snap Cookies (Biscuits)     | AACCI 10-50.05, macro-method.                                                                                                                                                                                                                                                                                                      |



For the full methodology, scan the QR code or visit the USW website at [www.uswheat.org/working-with-buyers/wheat-glossary](http://www.uswheat.org/working-with-buyers/wheat-glossary).





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