THE JOURNEY OF WHEAT IN CANADA

ENSURING QUALITY AND QUANTITY OF YOUR AGRICULTURAL PRODUCTS

WHEN YOU NEED TO BE SURE
BEGINNING OF LIFE

- **Wheat breeding**
  - Improve on agronomy, disease resistance and flour quality
  - Improve bake performance and demand
  - Industry expectations are strict and therefore takes time.

- **Committee of industry experts evaluate new lines**
  - Meet or exceed current standards for the wheat class?
  - Consistent performance over multiple years and growing regions?
  - Experts from supply chain vote to recommend or object.

- **Quality focuses are:**
  - Physical wheat characteristics
  - Milling performance
  - Dough/Gluten Strength
  - End-use quality

- If variety is recommended to be registered, Canadian Grain Commission confirms quality meets the assigned class.
# Wheat Classes in Canada

<table>
<thead>
<tr>
<th>Wheat Class</th>
<th>% of wheat grown</th>
<th>Best for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>CWRS CANADIAN WESTERN RED SPRING</td>
<td>68</td>
<td>Breads</td>
</tr>
<tr>
<td>CWAD CANADIAN WESTERN AMBER DURUM</td>
<td>22</td>
<td>Pasta, couscous</td>
</tr>
<tr>
<td>CPS CANADIAN PRAIRIE SPRING</td>
<td>4</td>
<td>Blending, flour yield</td>
</tr>
<tr>
<td>CNHR CANADIAN NORTHERN HARD RED</td>
<td>2</td>
<td>Blending, cost?</td>
</tr>
<tr>
<td>CWSWS CANADIAN WESTERN SOFT WHITE SPRING</td>
<td>2</td>
<td>Cakes, pastries</td>
</tr>
<tr>
<td>CWRW CANADA WESTERN RED WINTER</td>
<td>1</td>
<td>Bread, steam buns</td>
</tr>
<tr>
<td>CWSP CANADIAN WESTERN SPECIAL PURPOSE</td>
<td>1</td>
<td>High yielding</td>
</tr>
<tr>
<td>CWHWS CANADIAN WESTERN HARD WHITE SPRING</td>
<td>-</td>
<td>&quot;White&quot; noodles, bread</td>
</tr>
<tr>
<td>CWES CANADA WESTERN EXTRA STRONG</td>
<td>-</td>
<td>Blending</td>
</tr>
</tbody>
</table>
CROP QUALITY ASSESSMENTS

- Grain companies do new crop quality survey
  - What is quality change from last year?
  - What are differences regionally?
  - What can we assure for our customers?

- Wheat catchment area around each terminal assessed
  - Grade, quantity per grade, average protein content, disease, falling number, vomitoxin (DON)…

- Regional composites by grade and catchment formed for further quality assessment
  - Milling, flour physical properties, dough rheology, bake
Licensed Grain Elevators – 335

Manitoba – 82 (1,496,110)
Saskatchewan – 173 (3,661,408)
Alberta – 77 (1,834,160)
CROP QUALITY ASSESSMENTS

WHY DO THEY INVEST THIS TIME AND EFFORT?

- To understand what is available for their market
- How to efficiently fill orders to meet quality specifications
- Plan how to manage any challenges caused by wheat quality (ie. segregation, drying)

TO LET CUSTOMERS KNOW WHAT THEY CAN PROVIDE CLIENTS AND MAINTAIN UNIFORMITY UNTIL NEXT CROP
WHAT DO MILLERS EXPECT OF CANADIAN WHEAT?

- #3 Quality
- #2 Price
- #1 Uniformity/Consistency

New crop quality survey is one way grain companies try to achieve quality expectation and uniformity

What else?
  - SGS ASSISTS THE GRAIN COMPANIES
WHERE WE ARE POSITIONED TO SERVE

- All cereals and oilseeds
- Submitted and sampled by SGS
- Inland and Ports
- Certified to Canadian and International Standards
Assess quality and assign a grade to harvest samples

Grade at different logistical points
  - Loading inland
  - Unloading at port
  - Loading vessels

Grade and test incrementally (every 2000 MT min.) and report Real Time to shipper.

Upon completion of vessel, recheck all increments to ensure accuracy; form composite and examine to satisfy client expectation

“Certify” cargo shipment as 3rd party; neutral party
## WHEAT SHIPMENTS TO ASIA

<table>
<thead>
<tr>
<th></th>
<th>2018 - 2019 Crop Year to Date (MMT)</th>
<th>2017 - 2018 Crop Year to Date (MMT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indonesia</td>
<td>2,427.6</td>
<td>1,694.9</td>
</tr>
<tr>
<td>China P.R.</td>
<td>1,892.7</td>
<td>1,065.5</td>
</tr>
<tr>
<td>Japan</td>
<td>1,585.0</td>
<td>1,537.7</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1,174.1</td>
<td>1,164.0</td>
</tr>
<tr>
<td>South Korea</td>
<td>399.0</td>
<td>140.6</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>384.3</td>
<td>442.4</td>
</tr>
<tr>
<td>Thailand</td>
<td>314.8</td>
<td>112.7</td>
</tr>
<tr>
<td>U.A.E.</td>
<td>291.9</td>
<td>285.4</td>
</tr>
<tr>
<td>Iraq</td>
<td>207.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Philippines</td>
<td>156.7</td>
<td>335.1</td>
</tr>
<tr>
<td>Other</td>
<td>314.5</td>
<td>413.2</td>
</tr>
<tr>
<td>SEA total</td>
<td>3,916.5</td>
<td>3,306.7</td>
</tr>
<tr>
<td>ASIA Total</td>
<td>9,147.9</td>
<td>7,291.5</td>
</tr>
</tbody>
</table>

**Total Wheat Exports**: 18,253.00

Wheat Exports to Asia: 50.1%

Wheat Export to S.E.A: 21.5%
The GATL is a result of a joint venture between SGS and the Grain Farmers of Ontario.

Current services offered:

- **Grain and flour analysis:**
  - Protein, falling number, gluten, starch damage...

- **Dough testing:**
  - Farinograph, Alveograph, Extensograph, ...

- **Product Evaluation**
  - Baking – bread, cookies
  - Noodles

- Use industry approved testing methods

- Ability to mill wheat samples into flour on a small scale but representative of large commercial mills.
INDUSTRY REACH

- Wheat breeders:
  - Early generation varieties

- Farmers:
  - “How much is my crop worth?”

- Grain elevators:
  - New crop quality survey
  - Vessel composite analysis – milling and baking

- Flour mills:
  - New crop quality survey
  - Vessel composite analysis – milling and baking

- Bakeries:
  - Supplier verification of test results.
DIFFERENCES AMONG WHEAT CLASSES

Different classes of wheat for different purposes:

- Hard Wheat Flour – best for breads, croissants
- Durum semolina – primarily for pasta

Each class has unique traits; some better for certain products than others.
  - Differences between varieties in each class
TESTS PER WHEAT CLASS

Hard Wheat:
- Farinograph
- Extensograph
- Alveograph
- Starch Damage
- Wet Gluten and Gluten Index
- Bread baking

Soft Wheat:
- Amylograph – viscosity
- Alveograph
- Solvent Retention Capacity
- Cookie bake test

Durum:
- Alveograph
- Wet Gluten and Gluten Index
- Colour – brightness, yellowness, redness

• Industry puts more weight on certain tests depending on which class it is from – correlate better to end use quality; better to distinguish differences between samples
WHY TEST VESSEL SHIPMENTS

- Awareness of quality variations between shipments
  - Demand from millers for gluten quality measurements of wheat is increasing worldwide
- Quality can vary between holds of a ship
- Prepare to adapt to variations
  - Segregate quality variations at receiving
  - Modify flour ingredients to adjust strength (i.e. ascorbic acid)
  - Inform clients of necessary baking adjustments
- For shipments originating from Canada, results can be available well before ship arrives to destination port.
- Composites obtained for grading would be divided down for milling and baking analysis.
NEW CROP UPDATE

- Harvest progress slow but still continuing – cool, wet weather
- 50% completed as of October 4, 2019
  - 27% # 1 CWRS
  - 46% # 2 CWRS
  - 15% # 3 CWRS
  - 12% CW FEED
- Main downgrading factors are sprouting and mildew
- Higher yield than forecasted; higher than 2018 crop
- Higher protein – approximately 13.5% average.
- The weather as harvest slowed was cool which tends to slow deterioration
### CWRS Quality

<table>
<thead>
<tr>
<th>Grade:</th>
<th>No. 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year:</td>
<td>2019</td>
</tr>
<tr>
<td>Wheat:</td>
<td></td>
</tr>
<tr>
<td>Protein, %</td>
<td>14.4</td>
</tr>
<tr>
<td>Falling Number, sec.</td>
<td>381</td>
</tr>
<tr>
<td>Milling (Buhler Lab Mill):</td>
<td></td>
</tr>
<tr>
<td>Yield – total products basis, %</td>
<td>76.9</td>
</tr>
<tr>
<td>Flour:</td>
<td></td>
</tr>
<tr>
<td>Protein (14% M.B.), %</td>
<td>13.7</td>
</tr>
<tr>
<td>Wet Gluten, %</td>
<td>38.1</td>
</tr>
<tr>
<td>Gluten Index</td>
<td>86.2</td>
</tr>
<tr>
<td>Ash (14% M.B.), %</td>
<td>0.53</td>
</tr>
</tbody>
</table>
## DOUGH RHEOLOGY AND BAKE TEST

<table>
<thead>
<tr>
<th>CWRS QUALITY</th>
<th>No. 1 and 2</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farinograph:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Absorption, %</td>
<td></td>
<td>68</td>
<td>68.9</td>
</tr>
<tr>
<td>Dough Development Time, min.</td>
<td></td>
<td>7.3</td>
<td>7.8</td>
</tr>
<tr>
<td>Stability, min.</td>
<td></td>
<td>9.7</td>
<td>13.1</td>
</tr>
<tr>
<td>MTI, BU</td>
<td></td>
<td>31</td>
<td>22</td>
</tr>
<tr>
<td>Alveograph:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P (height), mm</td>
<td></td>
<td>102</td>
<td>124</td>
</tr>
<tr>
<td>L (length), mm</td>
<td></td>
<td>120</td>
<td>109</td>
</tr>
<tr>
<td>P/L</td>
<td></td>
<td>0.86</td>
<td>1.1</td>
</tr>
<tr>
<td>W, 10^-4 J,</td>
<td></td>
<td>401</td>
<td>451</td>
</tr>
<tr>
<td>Extensograph, 45 min.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum resistance (Rmax), BU</td>
<td></td>
<td>354</td>
<td>425</td>
</tr>
<tr>
<td>Extensibility (Length), mm</td>
<td></td>
<td>202</td>
<td>200</td>
</tr>
<tr>
<td>Area (cm²)</td>
<td></td>
<td>96</td>
<td>110</td>
</tr>
<tr>
<td>Bake - Pup loaf:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bake Loaf Volume, cm³</td>
<td></td>
<td>1038</td>
<td>1090</td>
</tr>
<tr>
<td>Bake Loaf Height, mm</td>
<td></td>
<td>107.4</td>
<td>118.4</td>
</tr>
<tr>
<td>Specific Volume, cm³/g</td>
<td></td>
<td>6.6</td>
<td>7.3</td>
</tr>
</tbody>
</table>
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