



Application of Canadian Wheat Classes and Grades in Markets Around the World



Baking Technology Department
Canadian International Grains Institute



Overview

- Basic principles of bread baking
- Measuring bread quality
- Grading factors
- Breads in markets around the world



The Baker



What do they want?



Building Blocks of Flour Quality





Fundamental Ingredients

- Flour
- Water
- Yeast
- Salt





Optional Ingredients

- Shortening
- Sugar
- Milk powder
- Other cereal grains
- Yeast food
- Additives



Flour Additives

- Oxidizing agents – i.e. Ascorbic Acid
- Reducing Agents
- Bleaching Agents
- Surfactants
- Anti-spoiling agents – Acetic acid
- Enzymes



Formulations of Breads

- Lean formula
- Rich formula
- Various types of ingredients being used



Baking Process Adopted

- Short time Fermentation (NTD)
- Straight Dough
- Sponge and Dough
- Chorleywood Process
- Liquid Brew Process





Mixing

- Thorough and complete distribution of the ingredients
- Mixing the dough to its correct consistency
- Maximum gluten development





Factors Impacting Baking Quality

Gluten Proteins

Gluten



Gliadin



Glutenin





Gluten Development

- Developed when flour is mixed with water
- Tough, rubbery, elastic substance





Processing Steps/Procedures

- Bench time
- Scaling
- Intermediate proof
- Moulding





Dough Handling Characteristics

Bench Flow

Strong/Good Dough



Mellow Dough





Dough Handling Properties

Sheeting

Strong/Good Dough



Mellow Dough



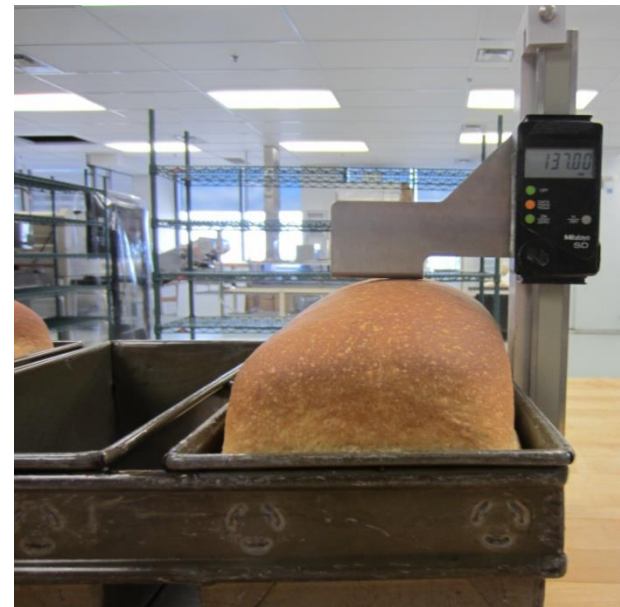


Parameters Evaluated Proof & Bake Height

Proof Height



Bake Height





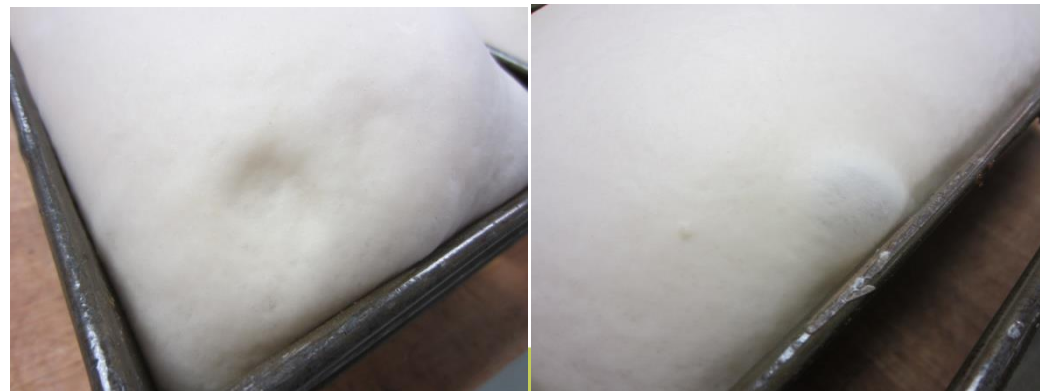
Visual Assessment of Dough Appearance after Final Proofing



Strong/Good Dough



Mellow Dough





Dough Handling Properties

Final Fermentation





“Shock” Treatment – Imitation of Mechanical Abuse





Baking





Baking Steps/Procedures

- Scaling
- Mixing
- Bulk fermentation
- Dividing & rounding
- Intermediate proofing
- Moulding (shaping)
- Final proofing
- Baking
- Cooling
- Slicing & bagging





Analysis of Bread Quality

- Evaluated dough handling properties and end product functionality
 - Dough handling properties
 - Loaf volume
 - Crumb characteristics
 - Crumb colour
 - Crumb structure





Grading Factors

- Mildew
- Sprout damage
- Frost/Heat stress
- Fusarium
- Midge
- Green (Immature)



Mildew

Associated to wet growing conditions

- Damaged kernels get grey tufts of spores at the end of the kernel
- Can affect flour brightness and crumb colour
- Baking functionality is not affected



Parameters Evaluated Flour Colour





Mildew



Control CWRS
Minolta L*: 81.3
Crumb Colour: 10

No. 2 CWRS
Minolta L*: 80.7
Crumb Colour: 9

No. 3 CWRS
Minolta L*: 80.4
Crumb Colour: 8.5



Sprout Damage

- Caused by wet growing conditions causing the kernel to sprout
- Break down of starch granules due to increased levels of α -amylase enzyme
- Baking properties affected
 - Lowers baking absorption
 - Sticky and weak dough handling properties
 - High gas production
 - Open and coarse crumb structure
 - Darker crust colour



Frost Damage

- Can affect the development and maturity of the kernel
- Cause hard kernels, low flour yield, higher starch damage and higher ash
- Baking properties affected
 - Dough handling properties
 - Loaf volume
 - Crumb structure



Fusarium Damage

- Mycotoxins (DON, vomitoxin) found on the kernel
- Destroys starch granules, storage proteins and cell walls
- Decreases test weight, causes shrunken kernels, affects milling yield
- Baking properties affected
 - Dough handling properties
 - Volume
 - Crumb structure



Fusarium Damage

No fusarium





Fusarium Damage

High fusarium



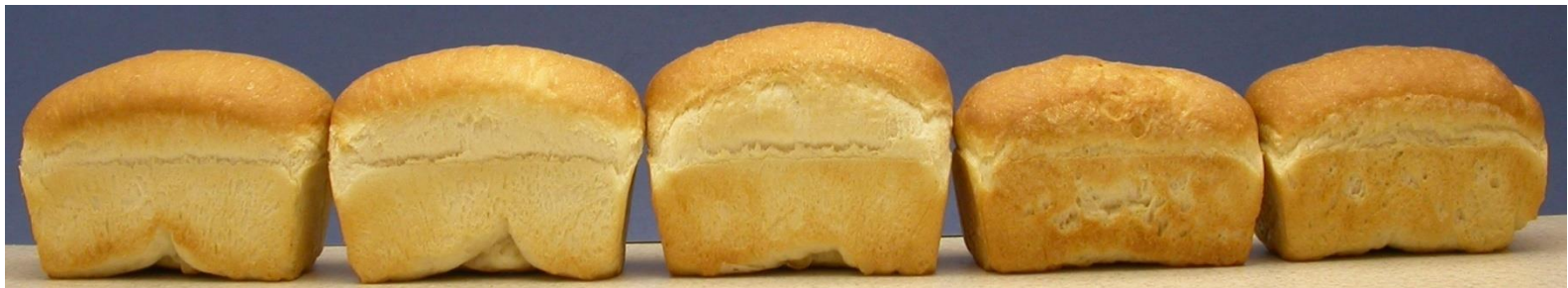


Midge Damage

- Due to insect infestation
 - Larvae feeding on the developing grain
- Causes low kernel weight, low flour yield, high protein, high ash content
- Baking properties affected
 - Weak and sticky dough handling properties
 - Crumb colour



The Grade Matters!



6.3 cc/g

6.2 cc/g

7.2 cc/g

5.8 cc/g

6.0 cc/g

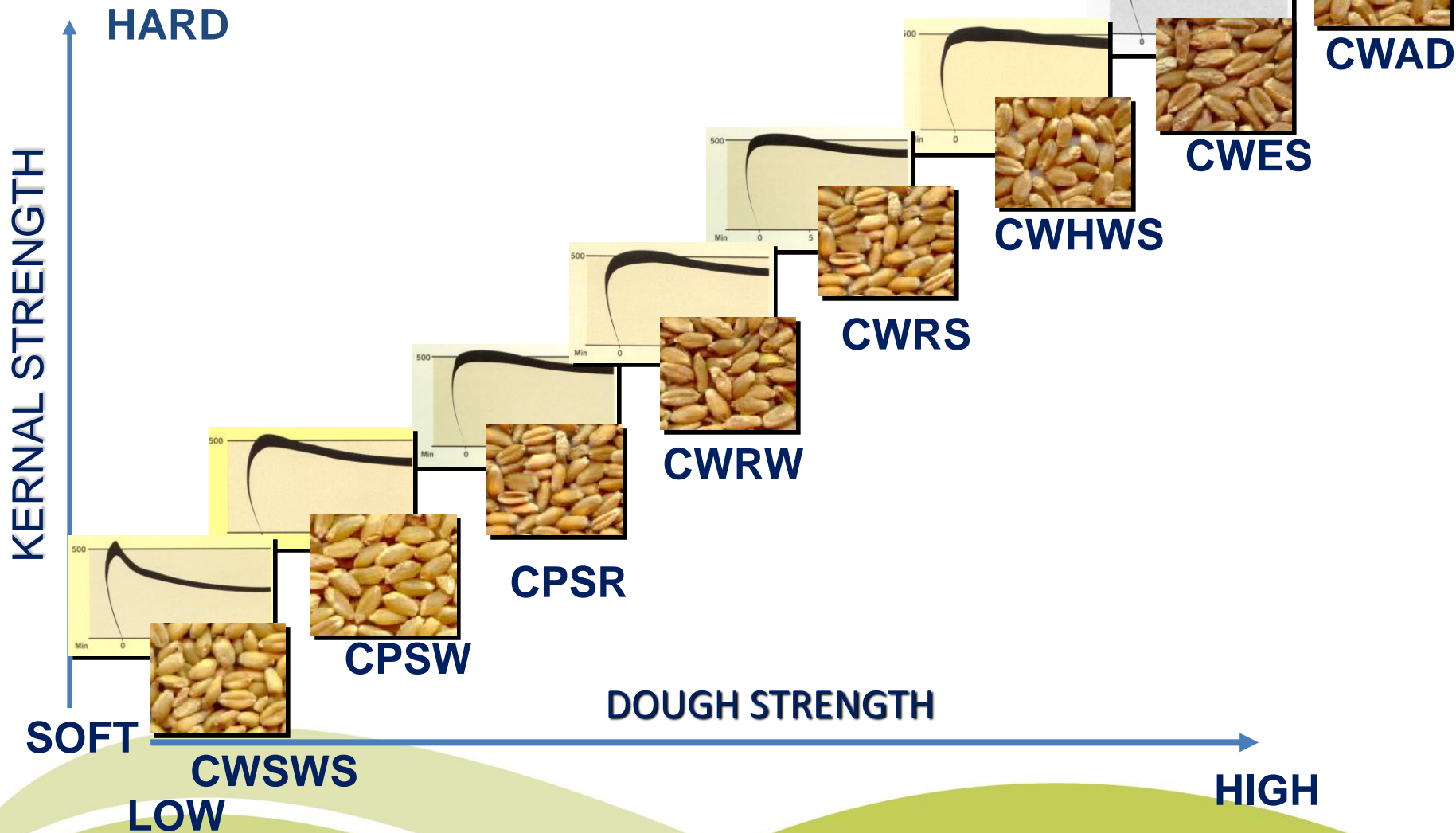


Exporting around the World



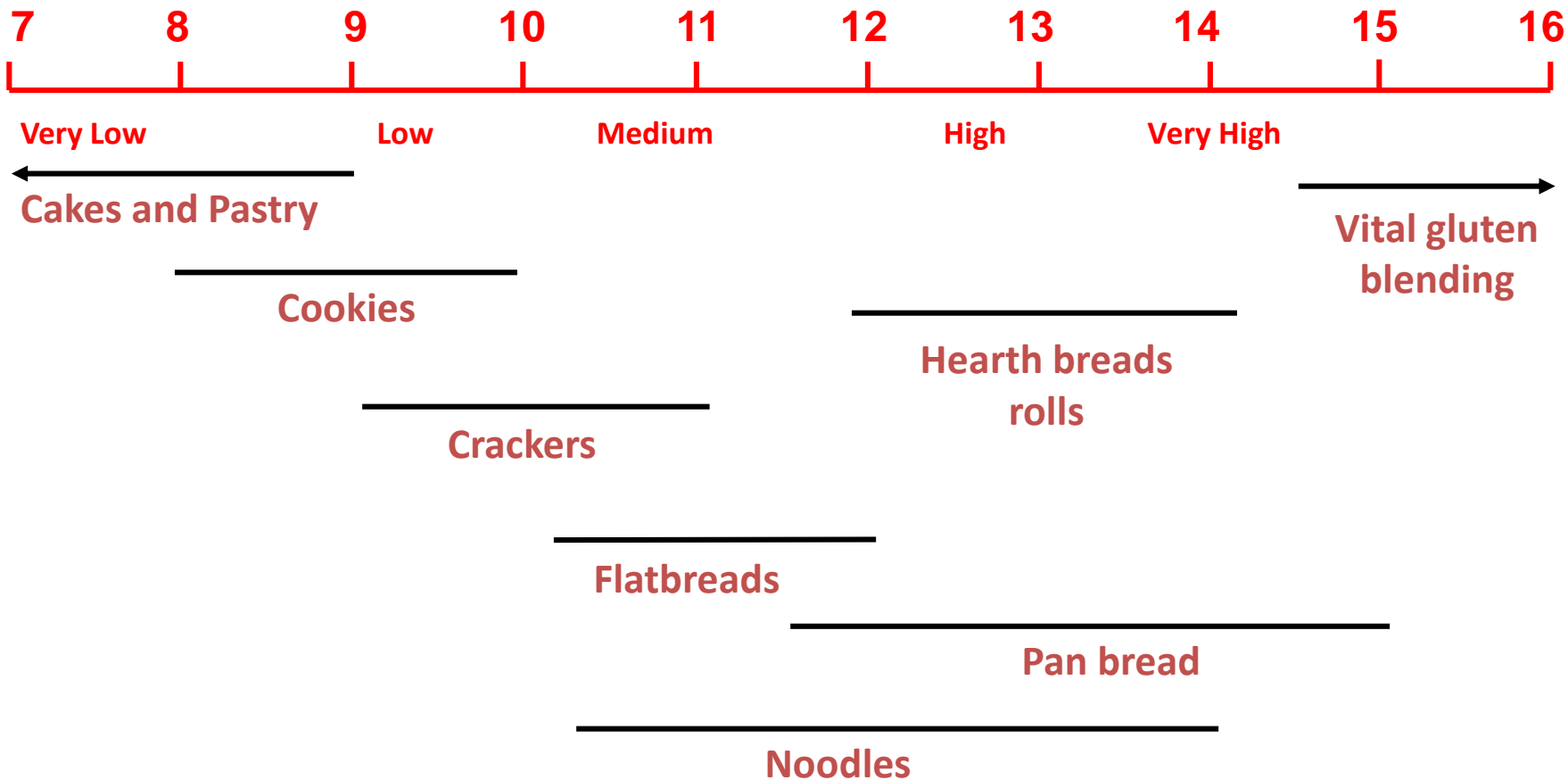


Canadian Wheat Classes





Wheat Protein Content, Functionality & Canadian Wheat Classes



Classes of Canadian Wheat

CWSWS

CPSW/CPSR

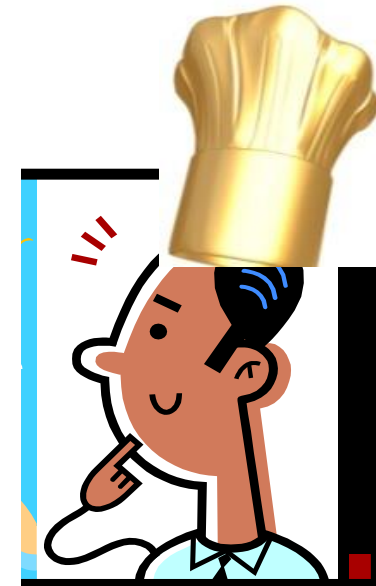
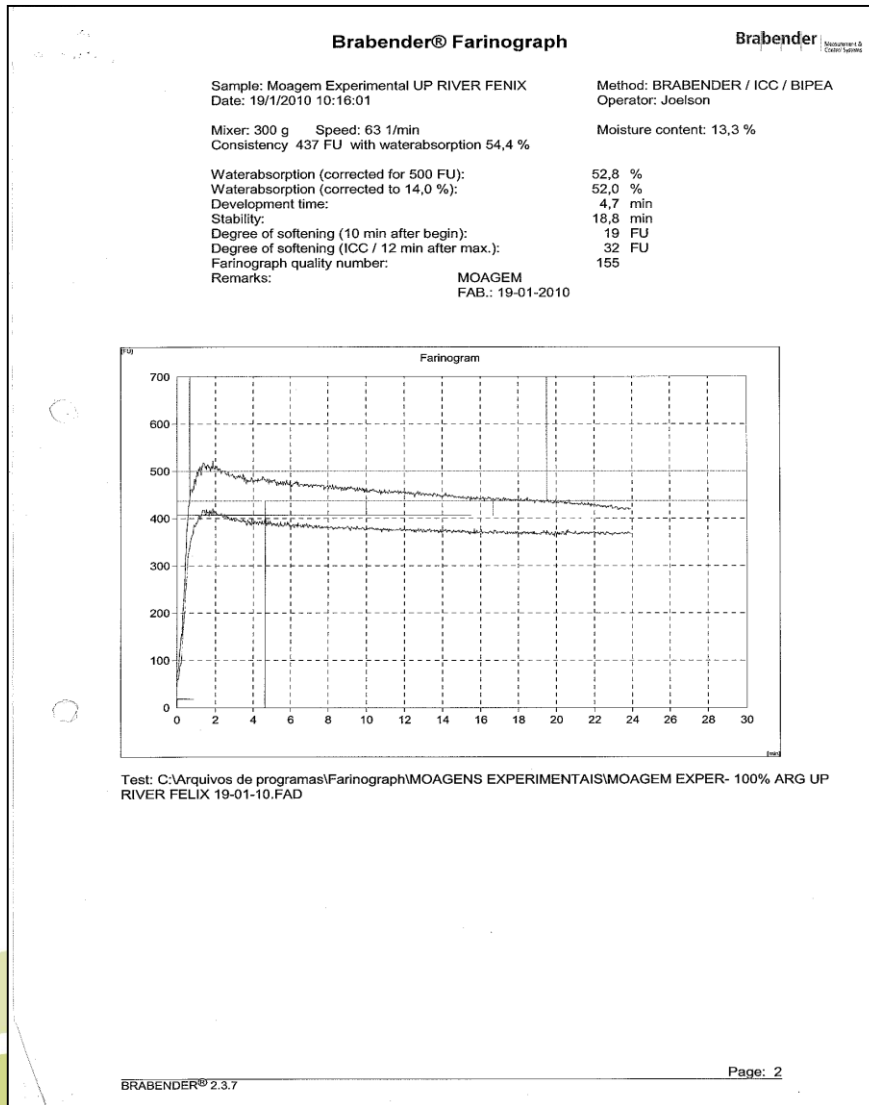
CWES CWRS CWHWS

CWRW

CWAD

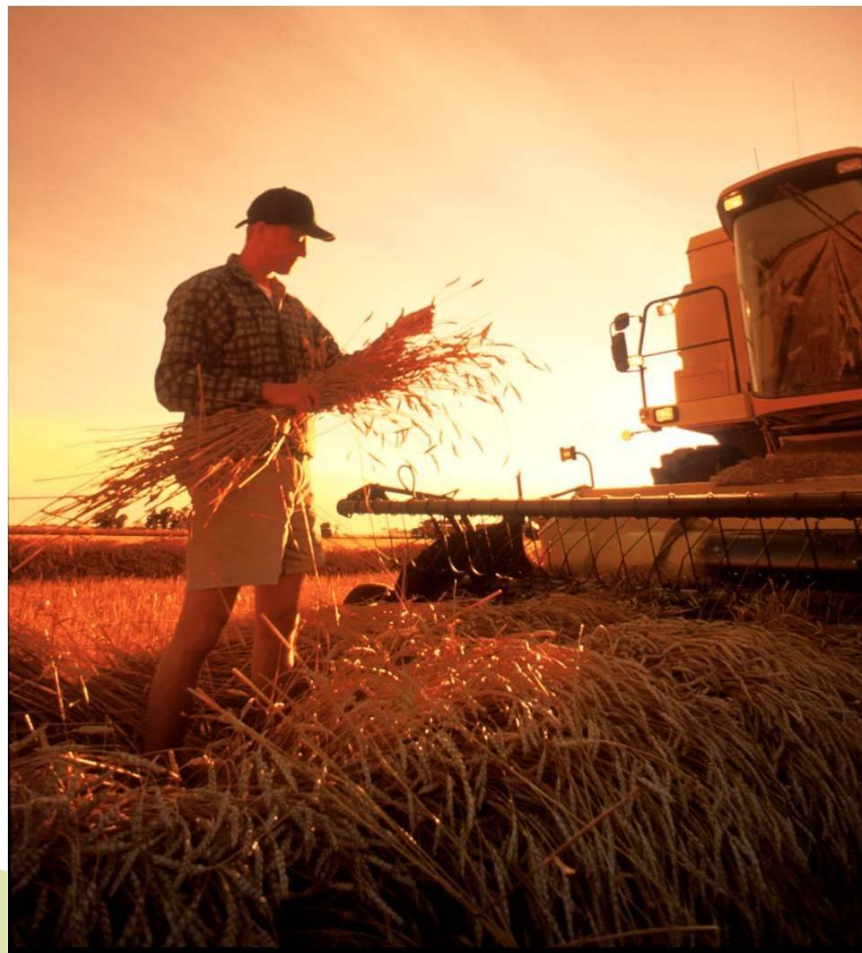


Flour Specs are Set for Bakeries





Canadian Wheat Markets





Canadian Wheat Markets

- Critical to know specific wheat/flour requirements for each market
- Critical to understand equipment/formulations/baking knowledge in all markets to support your customers



Thank you!

