IAOM 2009

20th Annual Technical Conference

Antalya

FRANCE EXPORT CÉRÉALES

French cereals : for the markets of the world

Keeping the Mill in Balance

Christian H. Heiniger

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Miller's Targets

- ✓ **Complete separation between bran and endosperm**

- ✓ **Producing clean bran**

  (no flour sticking to the bran)

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Miller's Ideal Grinding

- ✓ **Production of pure**
  - ✓ Semolina
  - ✓ Middlings
  - ✓ Flour
- ✓ **Clean and coarse flaked bran**

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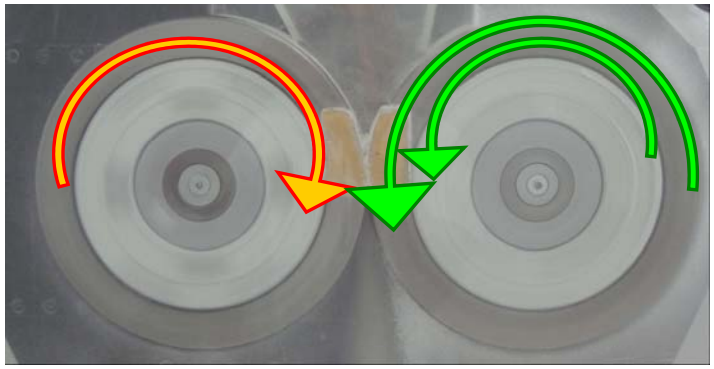
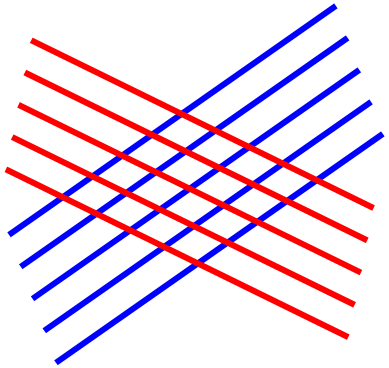
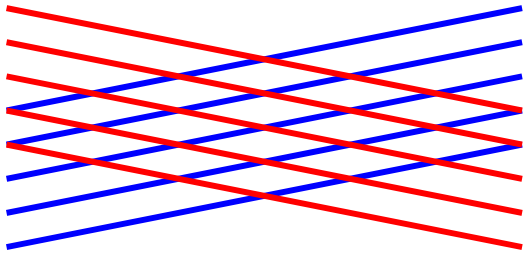
Miller's Reality

- **Differential Roll speed**



- **Pressing and shear forces**





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Understanding Grinding
Consider Grain Structure

- ✓ **Aleuron layer, Endosperm or bran ?**
- ✓ **Aleuron Cells, Dark colour, High Ash**

  High protein content, Low Backing abilities
- ✓ **Soft wheat, looser Endosperm structure**
- ✓ **Hard wheat, compact Endosperm structure**

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Miller's actions

- ✓ **Tempering management**
- ✓ **Reduce pressing and sharing forces**

  Roll maintenance is required
- ✓ **Use bran finishers**

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Mill Stock management

- ✓ **Quality of intermediate products**
  - ✓ Semolina
  - ✓ Middlings
  - ✓ Flour
- ✓ **Do not overload your purifiers**
  - ✓ Max. 4% of total bran can be removed
- ✓ **Max. 5% bran expected from reduction**

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Break system values

- Bran — approx. 15%
- Flour — 10 - 18 %
- Semolina - Middling — 67 - 75 %

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Balance disturbance

- ✓ **Wheat conditioning**
- ✓ **Sieves condtions (sifter)**
- ✓ **Air and sieves management (purifiers)**
- ✓ **Rolls condition:**
  - ✓ **Worn out flutes**
  - ✓ **Porosity of reduction rolls**

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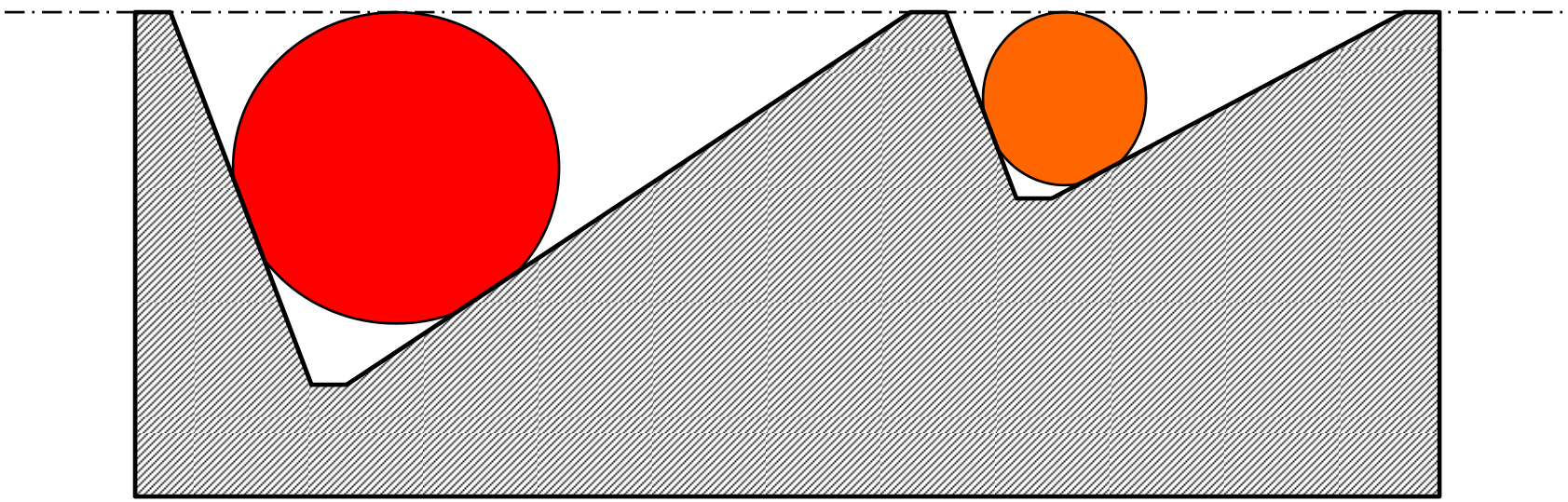
Flute configuration



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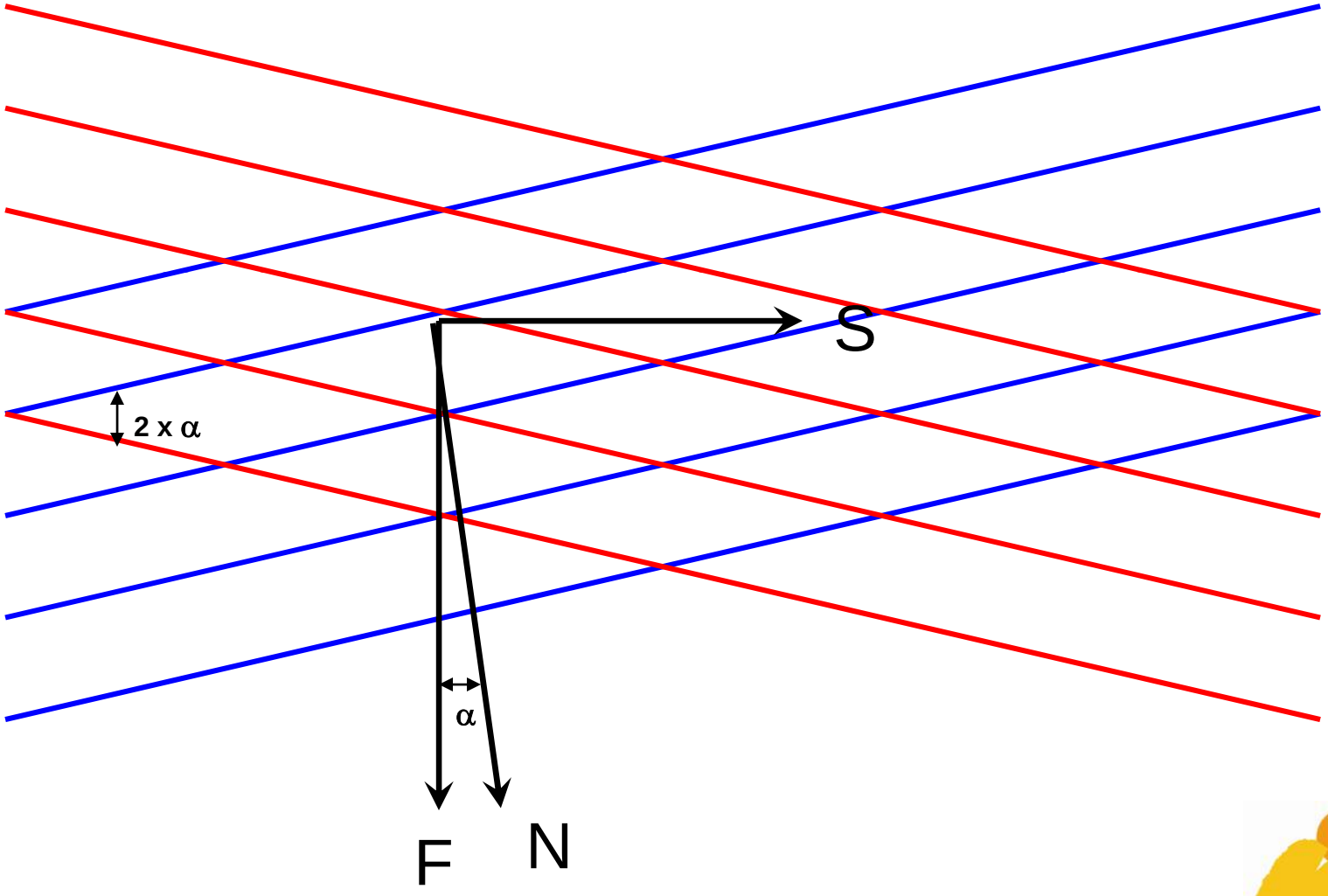
Roll Spiral (twist)



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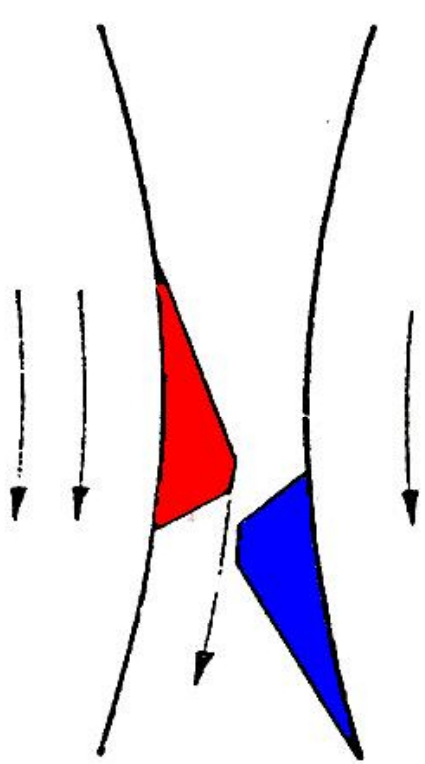
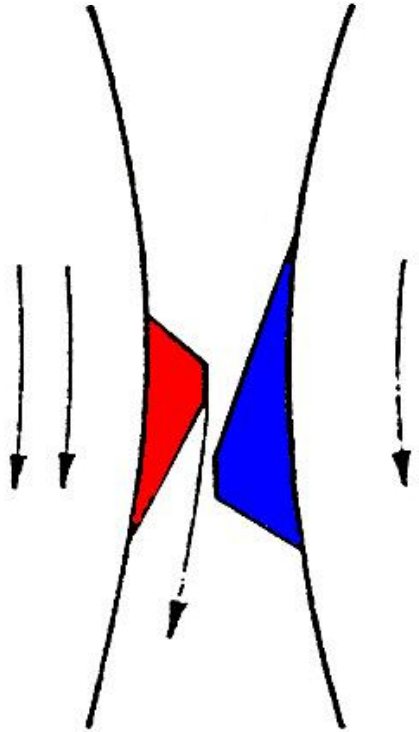
Flute positions





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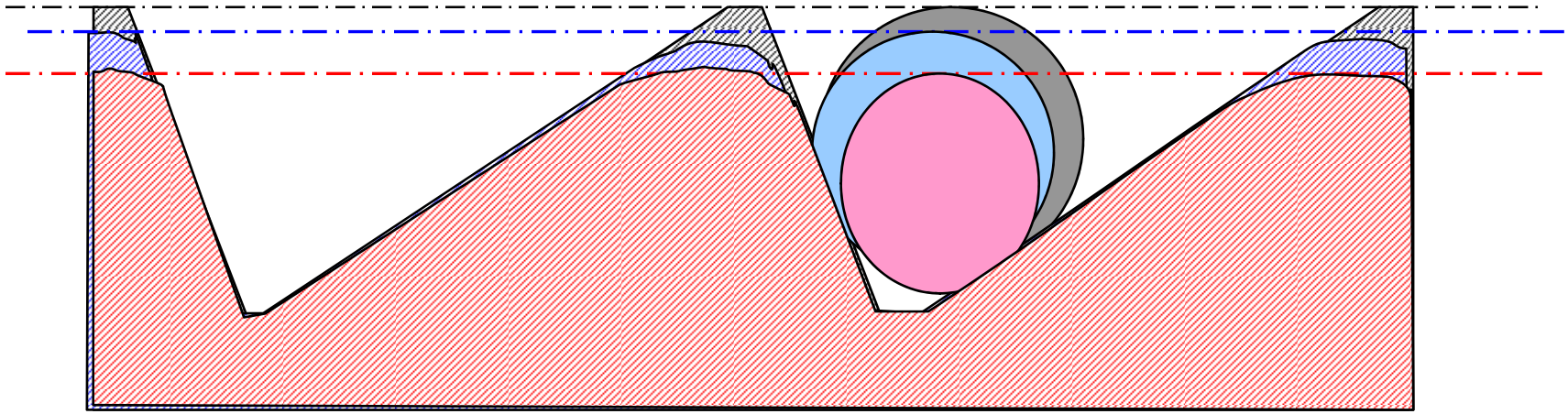
Flute wear



Grinding trials
By
France Export Céréales

Equipment:

- **MIAG “vario” model C**
- **Sifters BÜHLER MPAR and MLU Lab sifter**

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Wheat and method

- ✓ **Soft wheat** **Hardness: 20**
- ✓ **Medium wheat (French)** **Hardness: 62**
- ✓ **Hard wheat** **Hardness: 90**

*** Hardness is measured according to Nir Hardness Score AACC 3970 A**

- ✓ **Optimised conditioning for each wheat**

  Moisture and tempering time

- ✓ **Individual rolls setting**

  Each wheat and each stream

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Diagram

- **5 break system**

  B1, B2, B3, B4, B5 (no coarse or fine)

- **Division in 5 granulations**

Coarse semolina,	> 500 µ
Medium semolina,	500 - 300 µ
Fine semolina,	300 - 180 µ
Coarse middling,	180 - 132 µ
Fine middling,	132 - 118 µ

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Rolls configuration

- **B1,** doll / doll, Flutes 250, angle 30 / 65, Spiral 6 %
- **B2,** doll / doll, Flutes 350, angle 30 / 65, Spiral 8 %
- **B3,** doll / doll, Flutes 500, angle 50 / 65, Spiral 10 %
- **B4,** sharp / sharp, Flutes 725, angle 50 / 65, Spiral 12 %
- **B5,** sharp / sharp, Flutes 725, angle 50 / 65, Spiral 12 %

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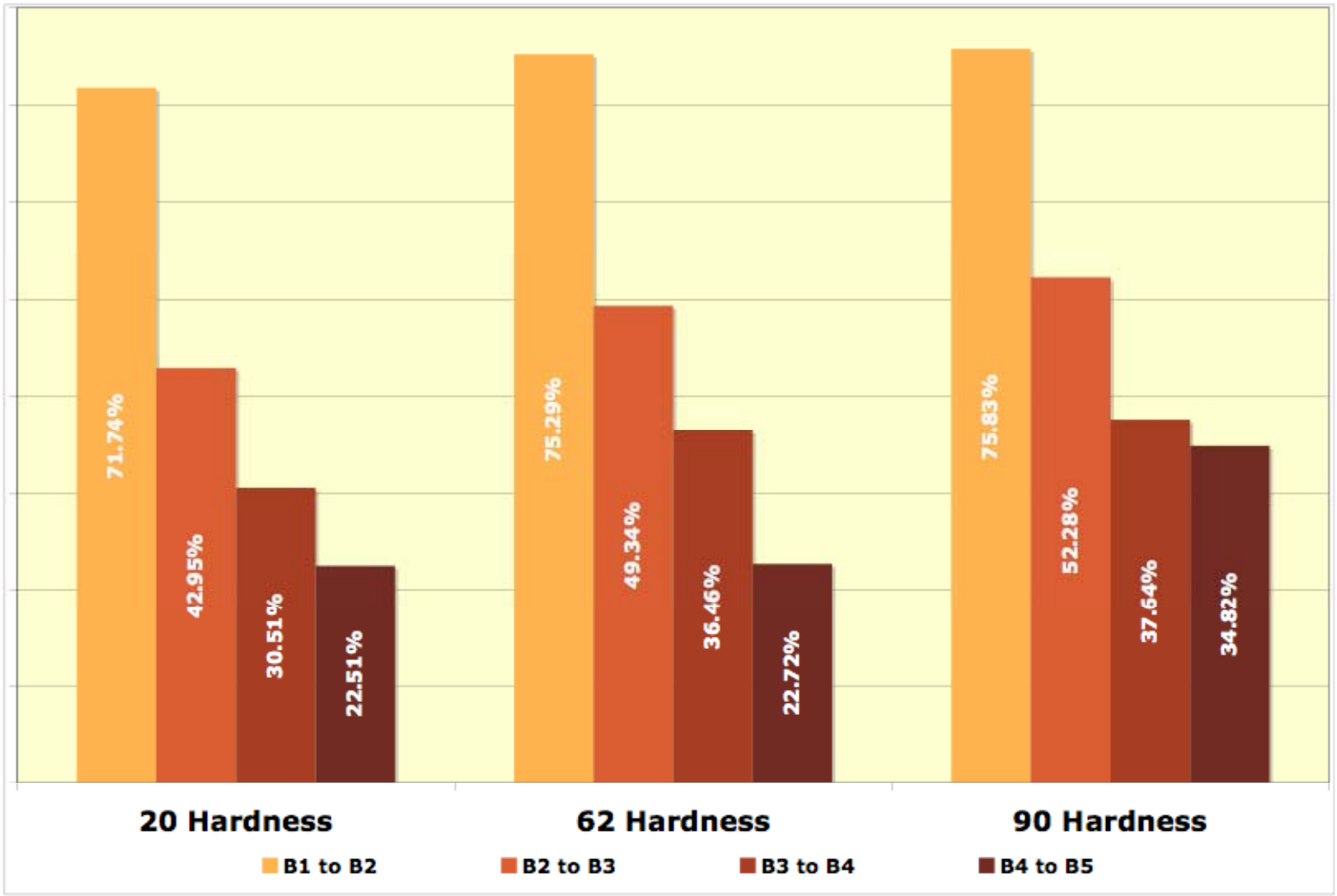
Milling results overtails



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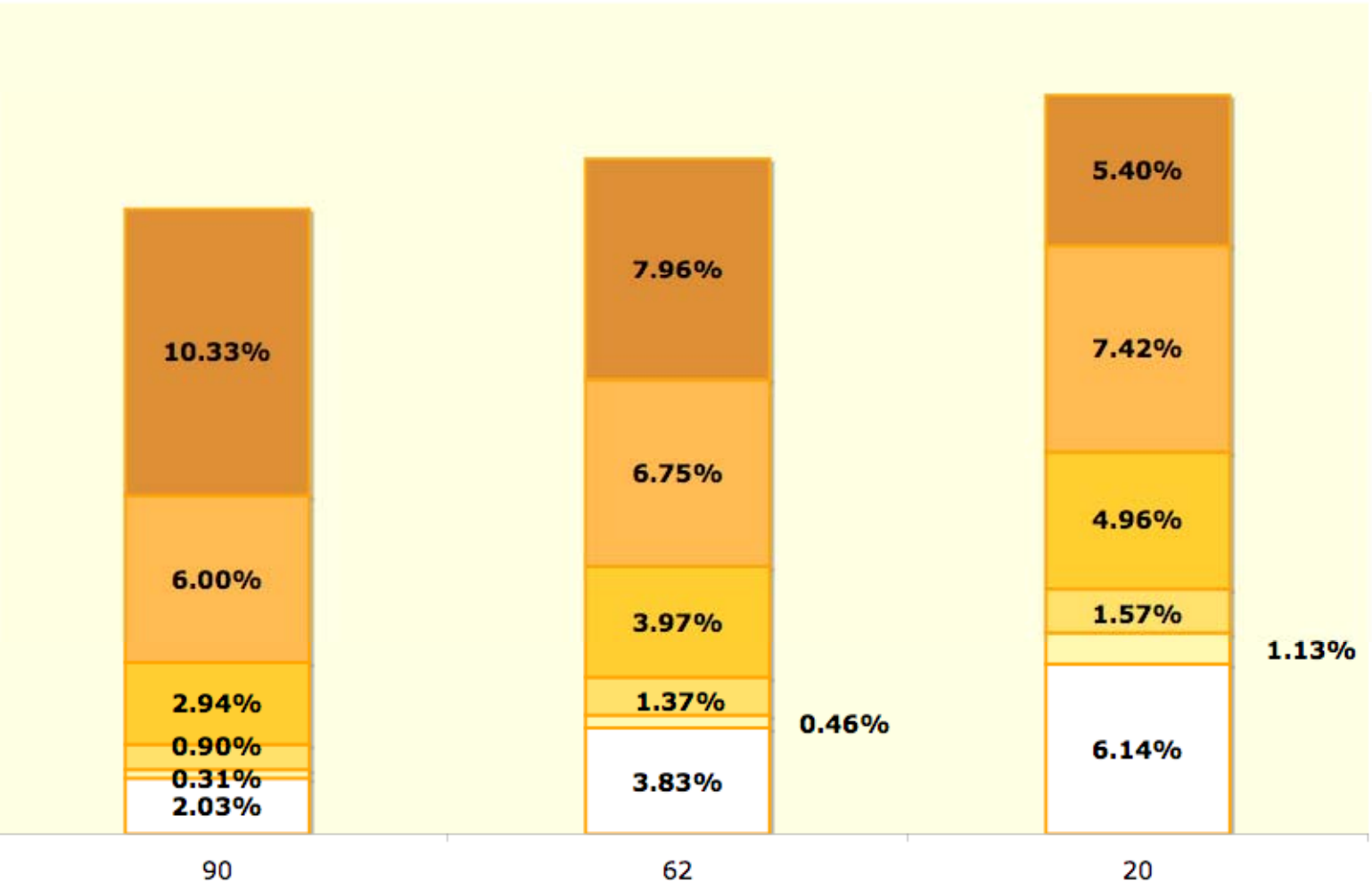
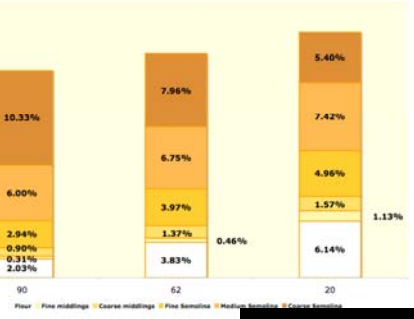
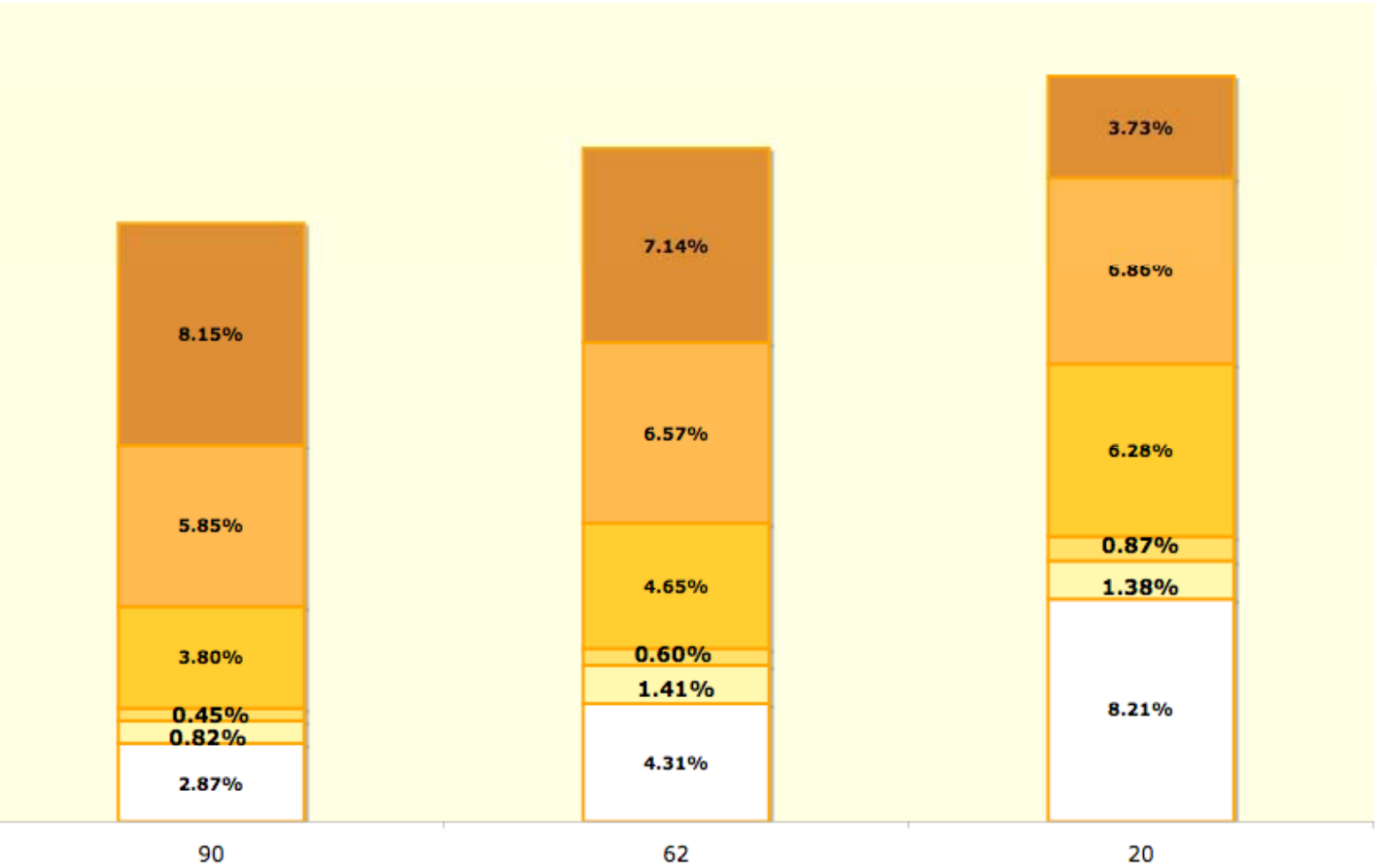
Milling results B1

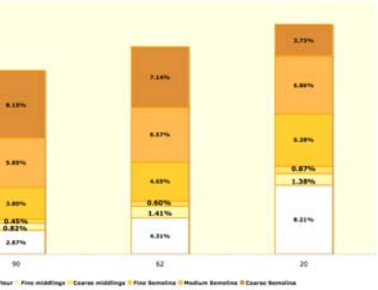




Milling results B1

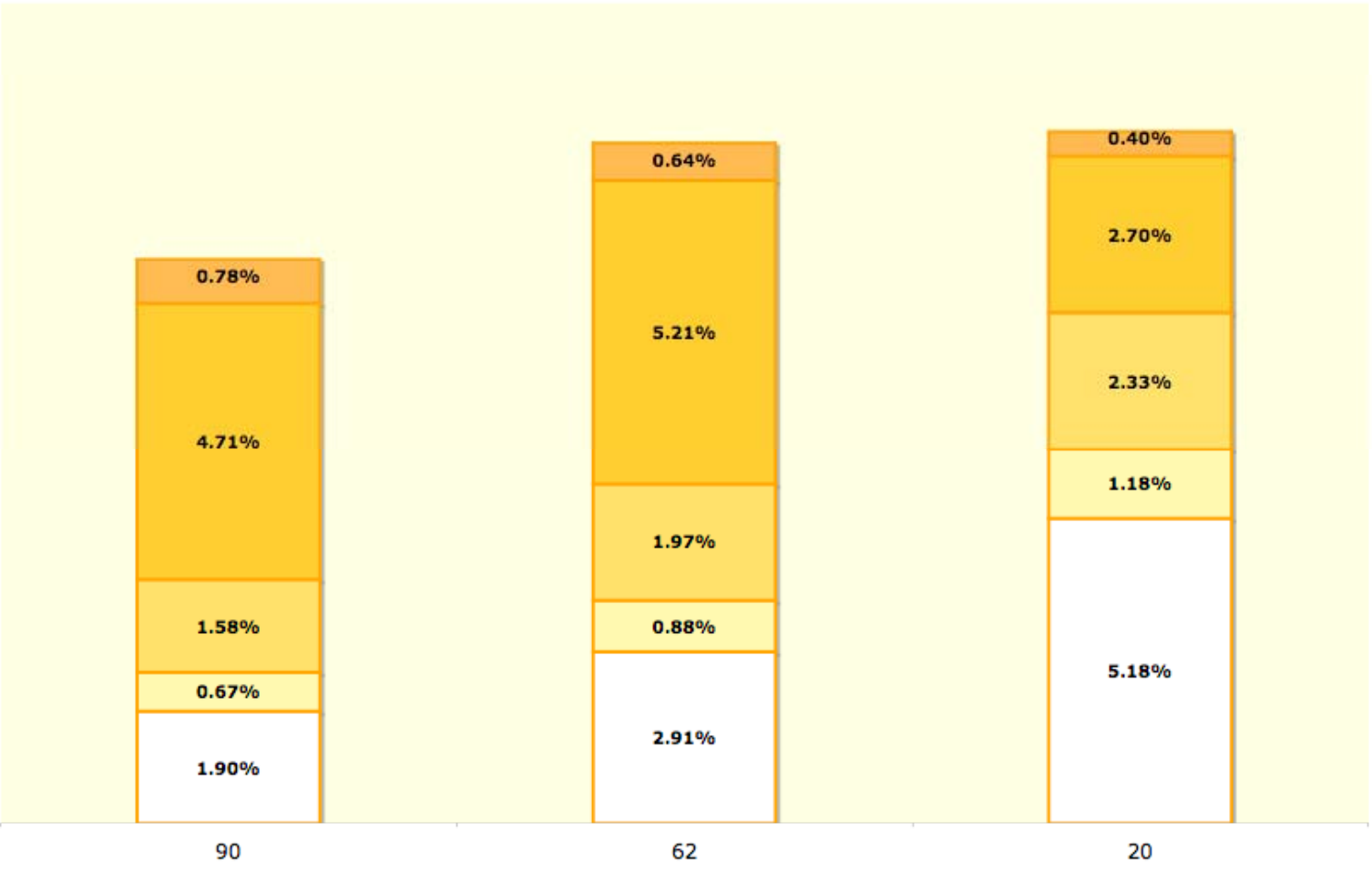
Milling results B2

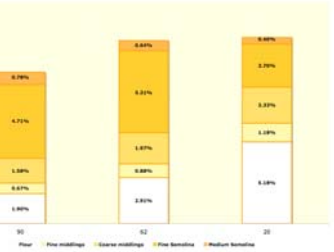




Milling results B2

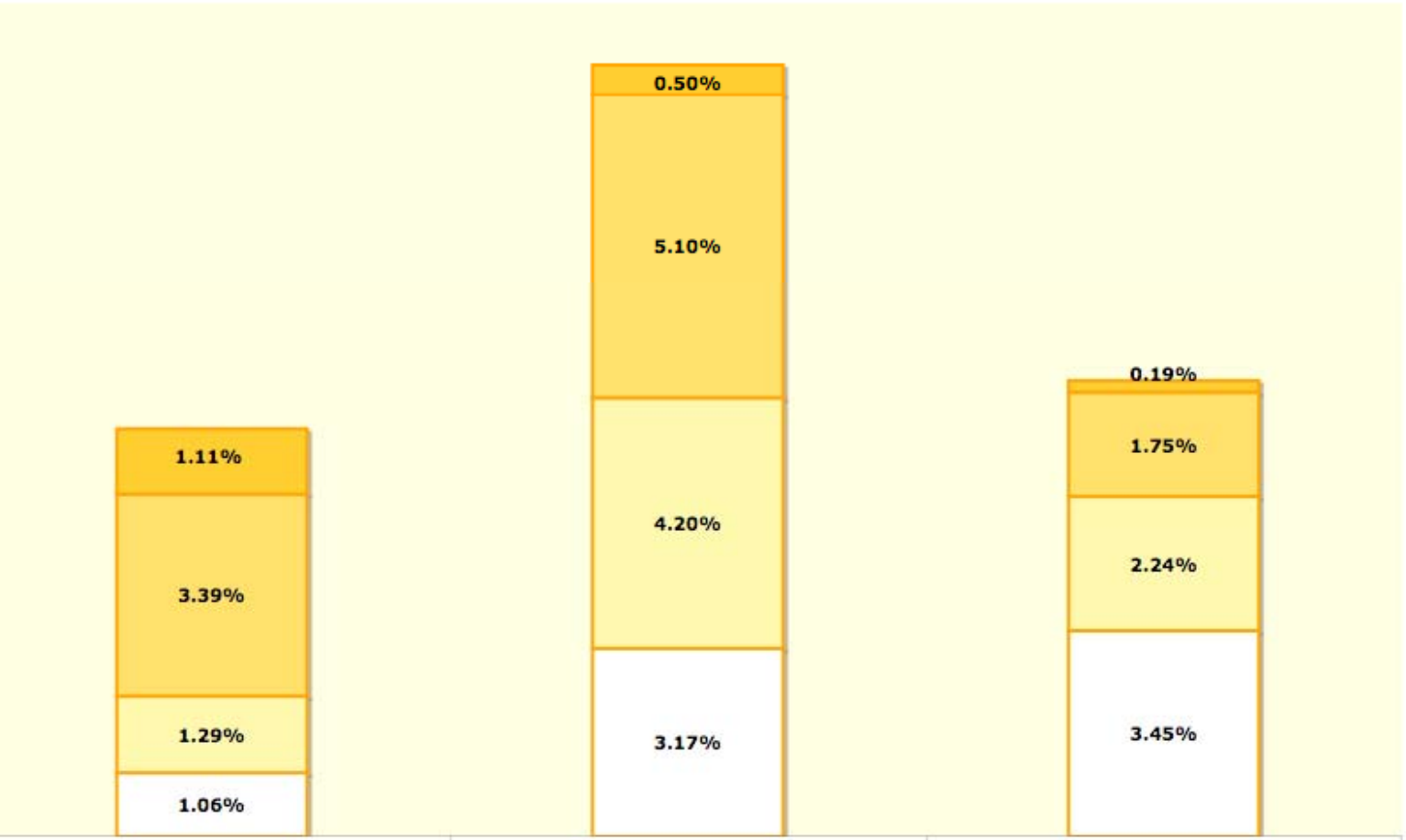
Milling results B3

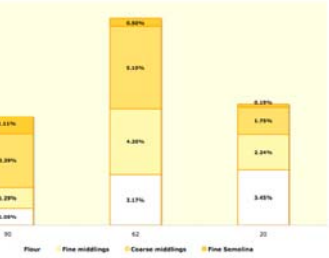




Milling results B3

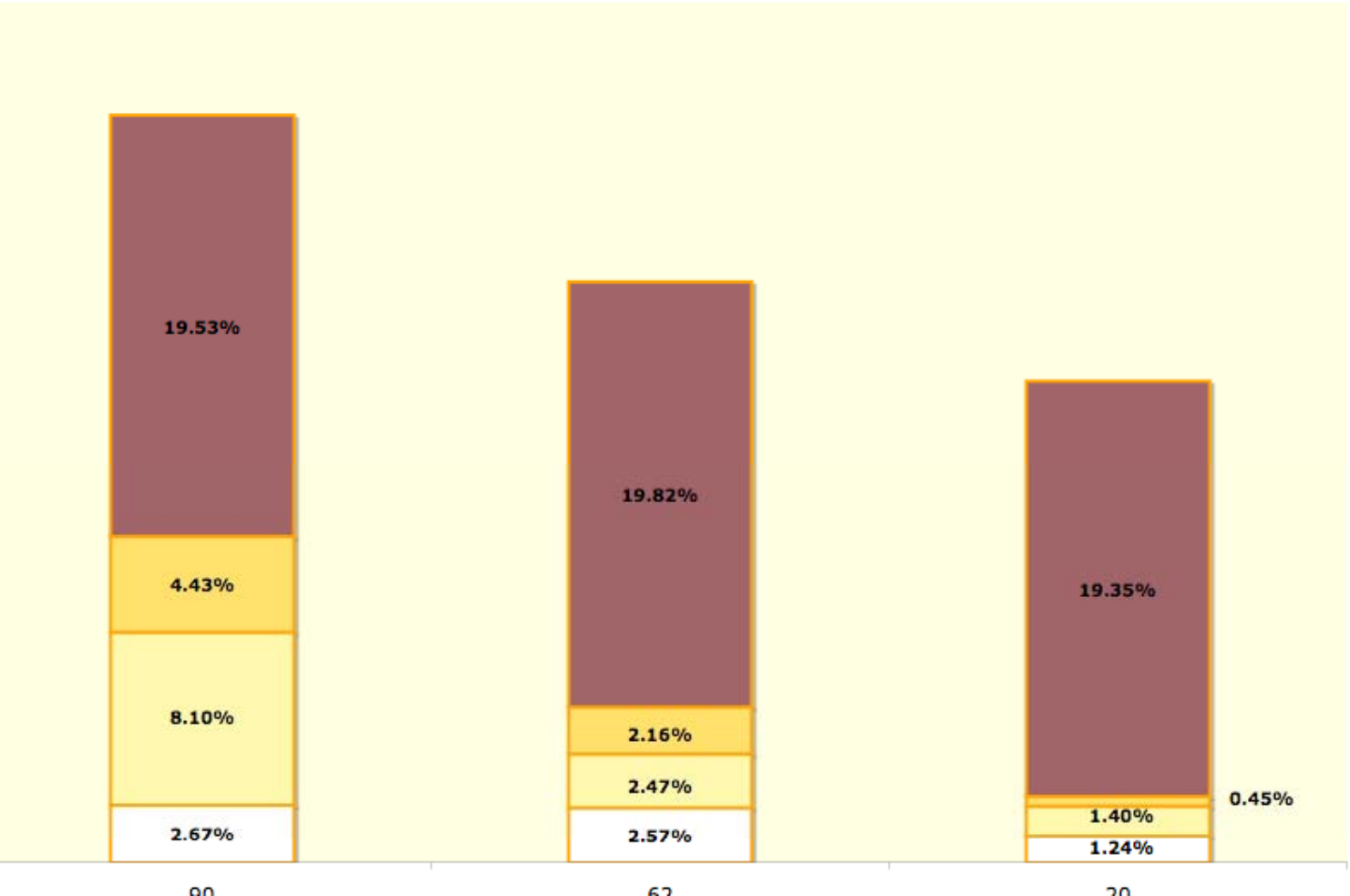
Milling results B4

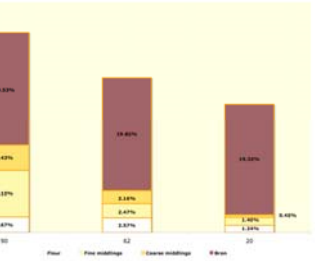




Milling results B4

Milling results B5





Milling results B5

Thank you for your kind attention

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CÉRÉALIERS DE FRANCE