



Combining the power of image and textural grain analysis

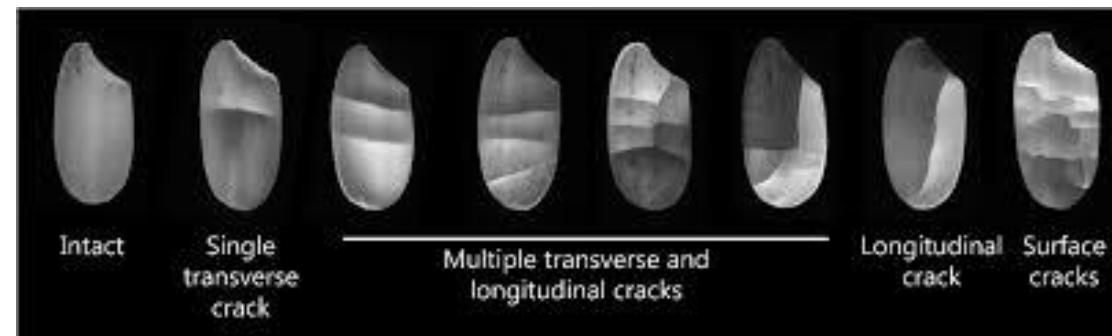
Perten
a PerkinElmer Company

Raul Ovelar
Perten


PerkinElmer
For the Better

Image Analysis

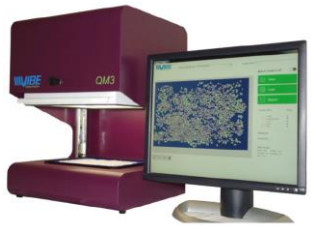
- Appearance (colour, integrity)
- Varietal identification
- Adulteration
- Contaminants / foreign material
- Defects (insect damage, mechanical/heat damage, sprouted, stains, broken/cracked, immature, disease: fungi, mould, others)
- Dimension



Rice cracks and fissures ([Oli et al., 2021](#))

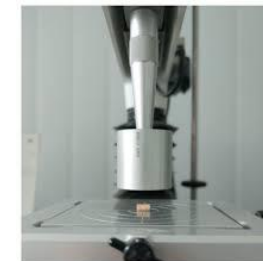
Image Analysis

- Visual assessment using a magnification lamp and/or light box
- Colorimeter
- Instruments that sort/present the sample, capture the image and the software does the analysis



Texture Analysis

- Hardness
- Hardness homogeneity
- Defects (insect damage, broken/cracked, not mature)
- Dimension (thickness)



Combining image and textural grain analysis

Texture Analysis

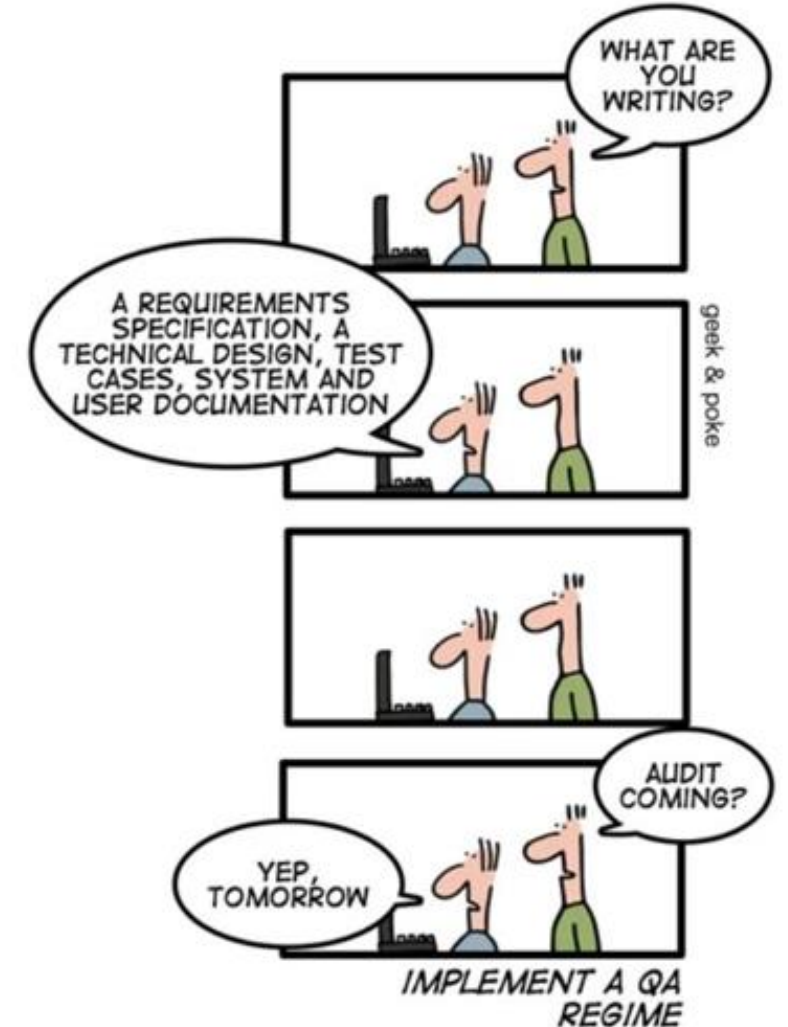


Image Analysis



The PaddyCheck

HOW TO ENSURE QUALITY



Instrument – Measurement Points

A

Reflected image

Grain size



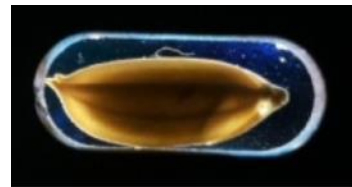
Visual Image:

- Length
- Width
- Color
- Damage/spots
- More!

B

Polarized image

Translucency



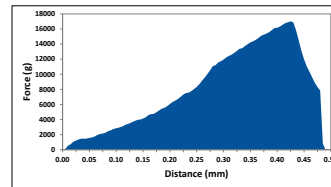
Translucent Image:

- Cracks/fissures
- Infestation
- Chalkiness
- More!

C

Force

Strength
3-point bend



Texture Test:

- Force over time/distance
- Thickness
- Cracks
- Hardness
- More!

I TOOK A PICTURE OF WHEAT



Singulation



AACC Method 61-10.01

Determining Crack Resistance and Translucency

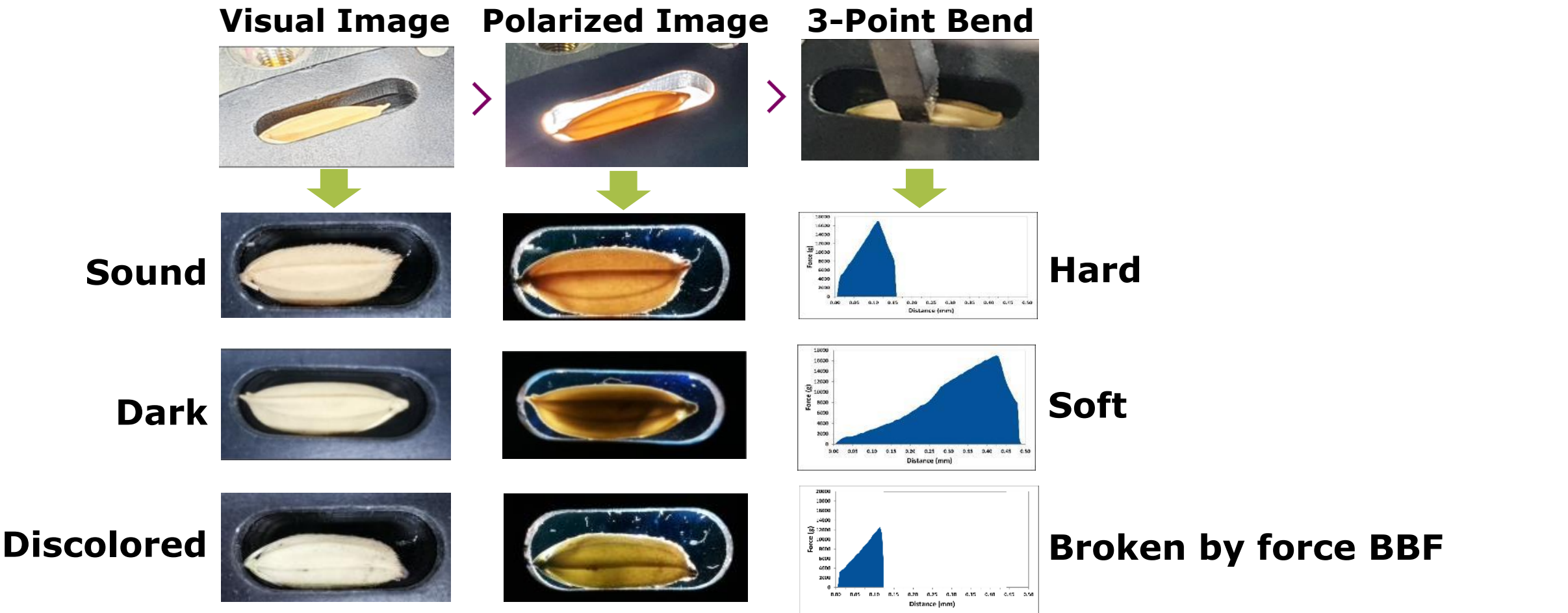
Analysis Result

Product: Paddy General

Sample ID: 2018-06-11 14:59:15

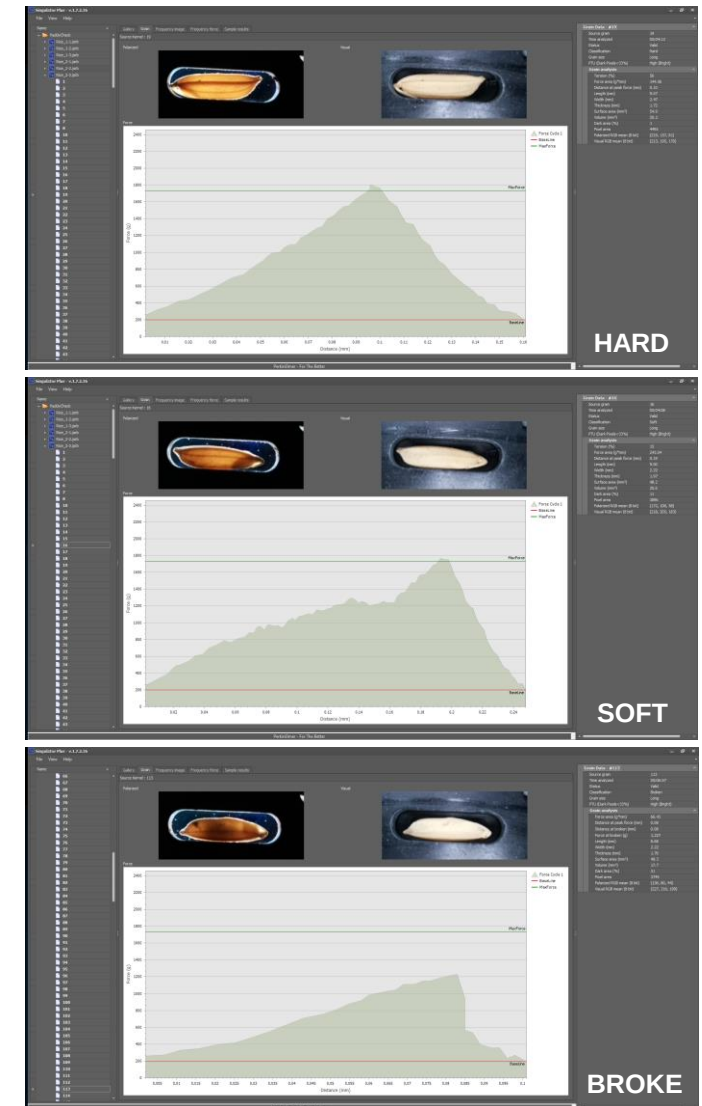
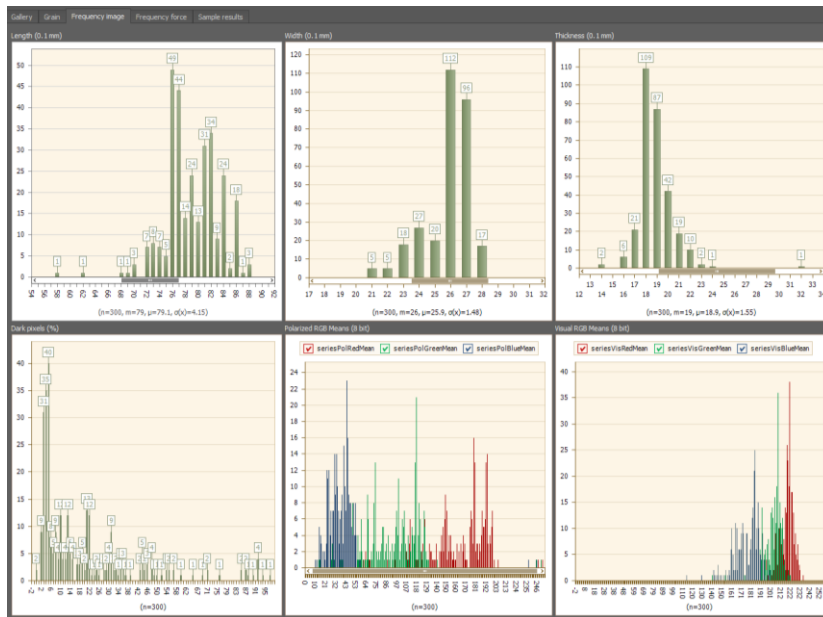
Hard: 83.7% Soft: 2.7% BBF: 13.7%

Hard High PTU: 51.4%



Software – Singulator Plus

- Combination of imaging and texture analysis
- Detailed image information – size and color distribution
- Detailed texture information – distribution of peak distance & tension

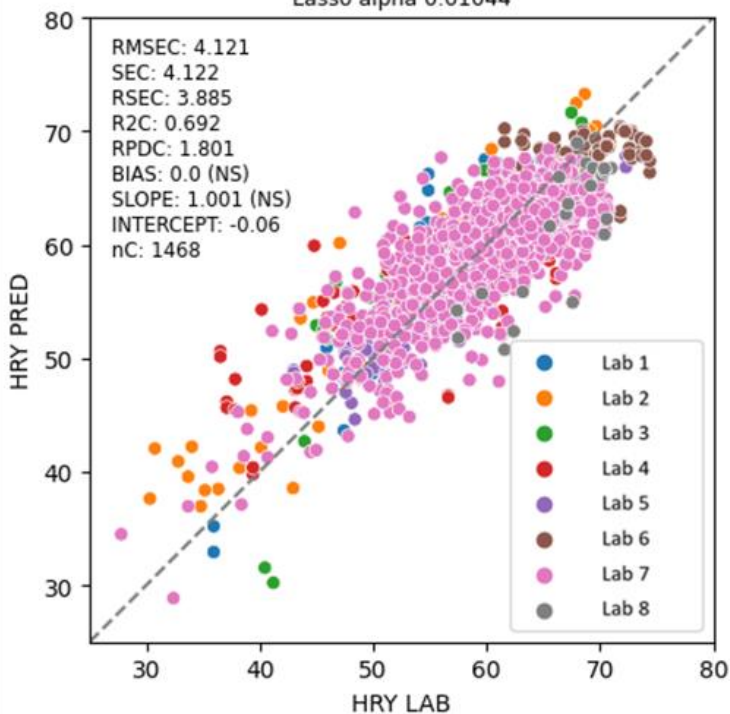


Predicting HRY

- Head Rice Yield

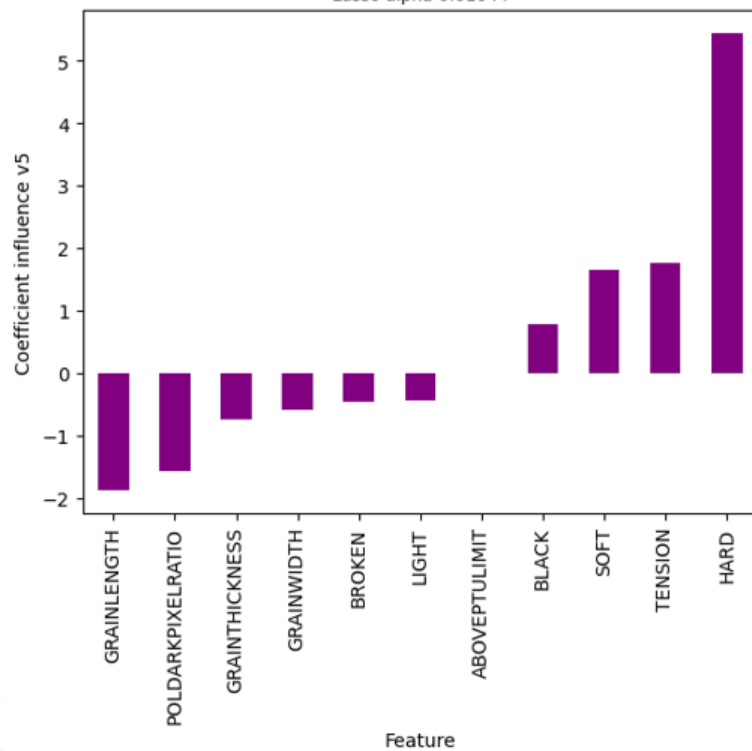
HRY Calibration v5

Lasso alpha 0.01044



Coefficients

Lasso alpha 0.01044



Observations

- Successful automation measurements of fundamental, physical rice attributes
- Models can be developed for prediction of milling attributes such as HRY (head rice yield)
- Identify possible blends of varieties
- FUTURE WORK:
 - Varietal identification
 - Varietal purity / adulteration
 - Input to the malting process
 - Other cereals and pulses



