

# Playing Second Fiddle: Making Wheat Malt User Friendly

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# Program

- Challenge
- Approach
- Experimental & Commercial Trial Results
- Conclusions
- Going Forward

# Challenge

- Wheat is breeding...
- Inferior wheat malt...
- We sought to...
- Paying attention to...

# Malting Approach

- Process Development
- Processing Aids
- Varietal Exploration

# Methods-Micro-malting Iterations



Steeping and Germination Compartments



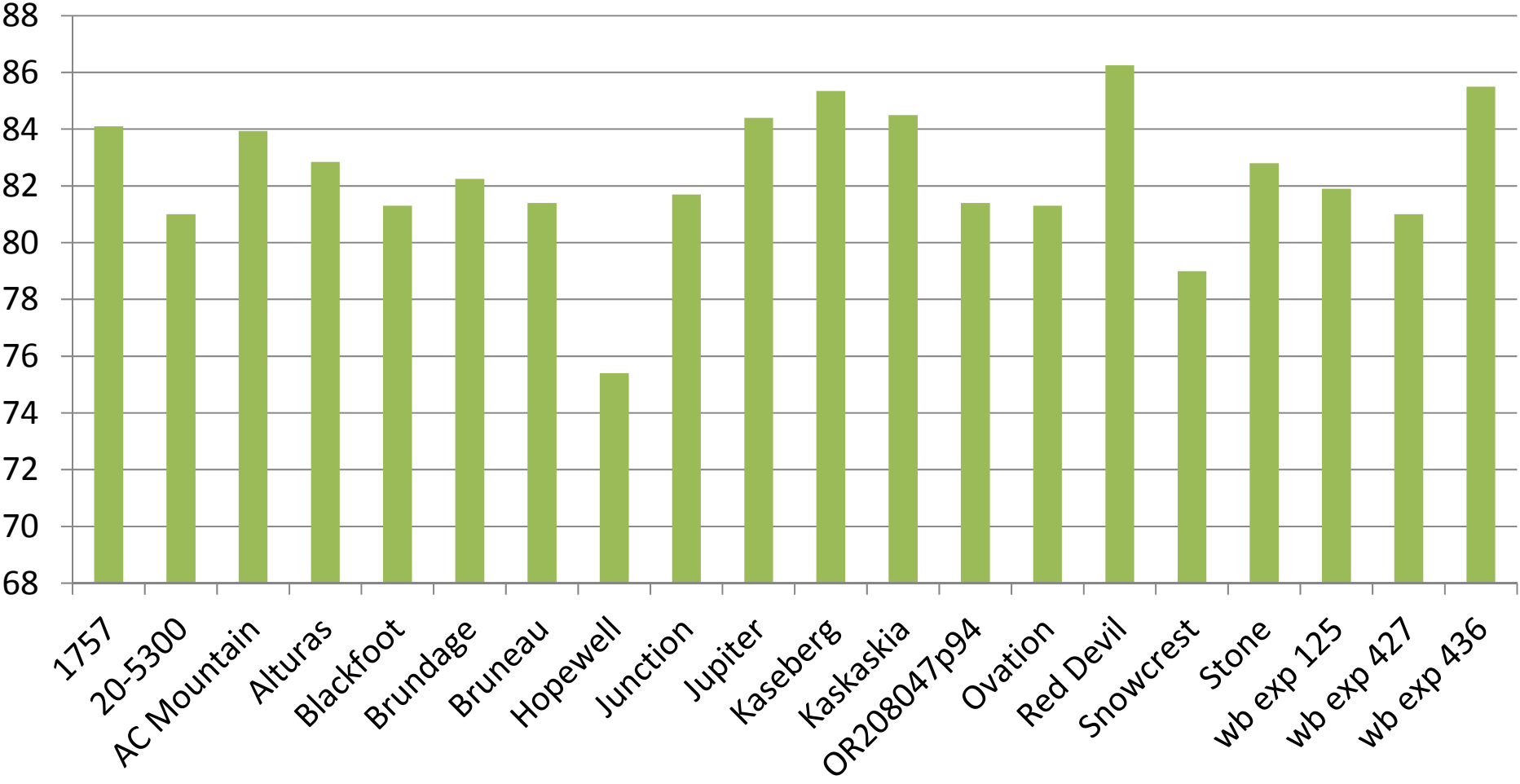
Steeping and Germination cans with malt

Kilns (cans are placed inside with malt)



# Comparison of Extract by Variety

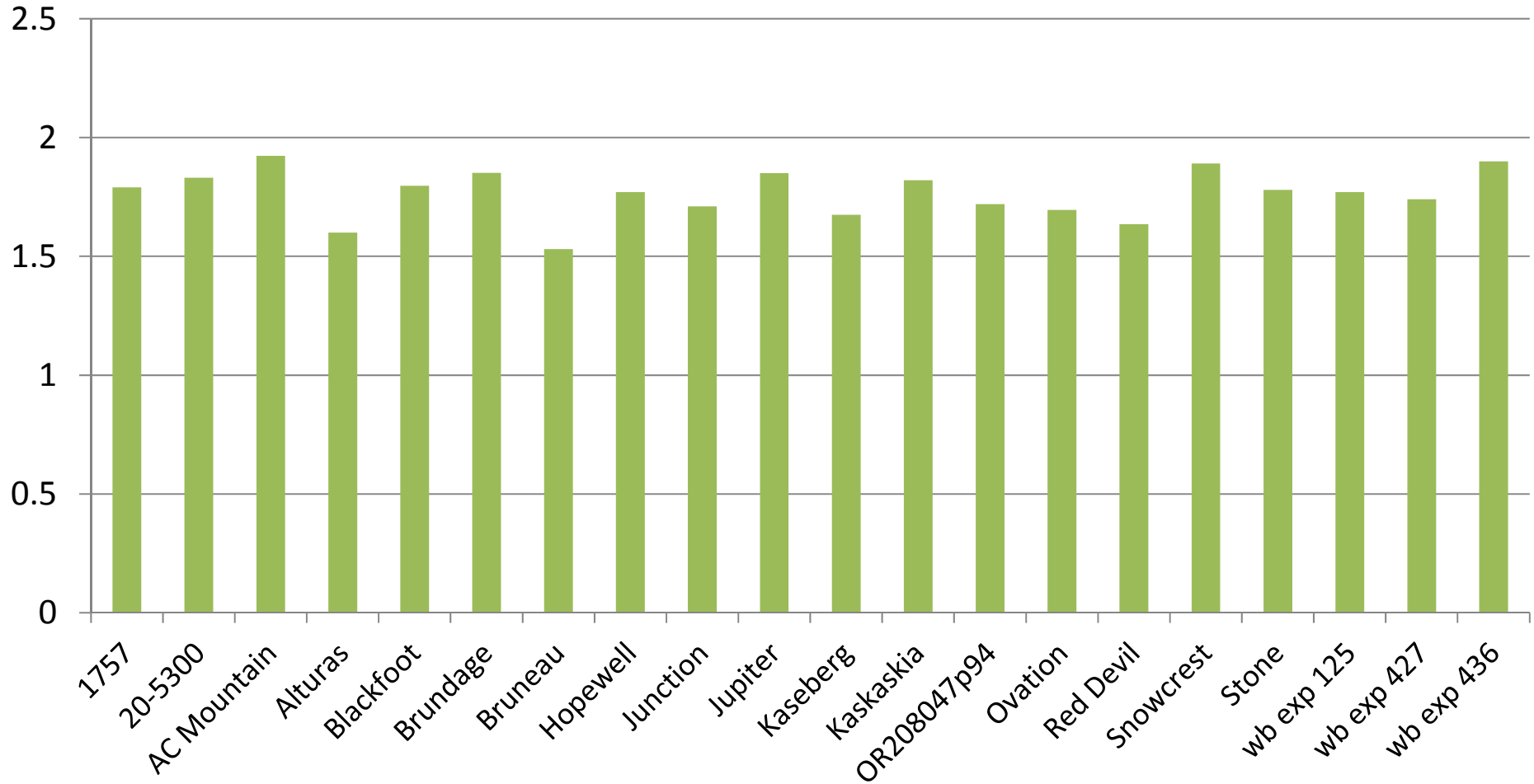
Red Devil (Soft Red) and Kaseberg (Soft White) top performers



Variety

# Comparison of Viscosity by Variety

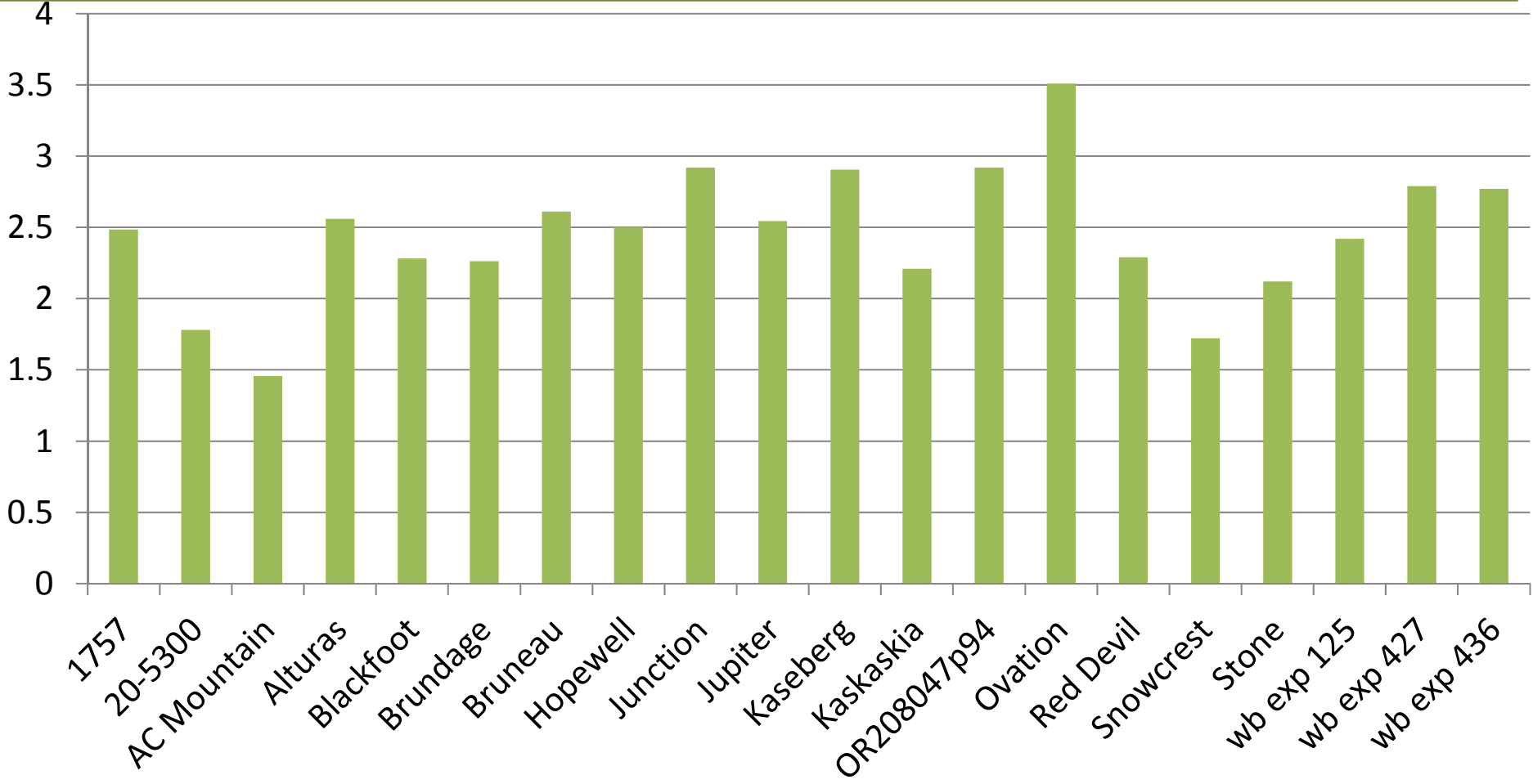
Bruneau and Alturas (Soft Whites) top performers



Variety

# Comparison of Color by Variety

Ovation and AC Mountain (Soft Whites) Boundary Varieties

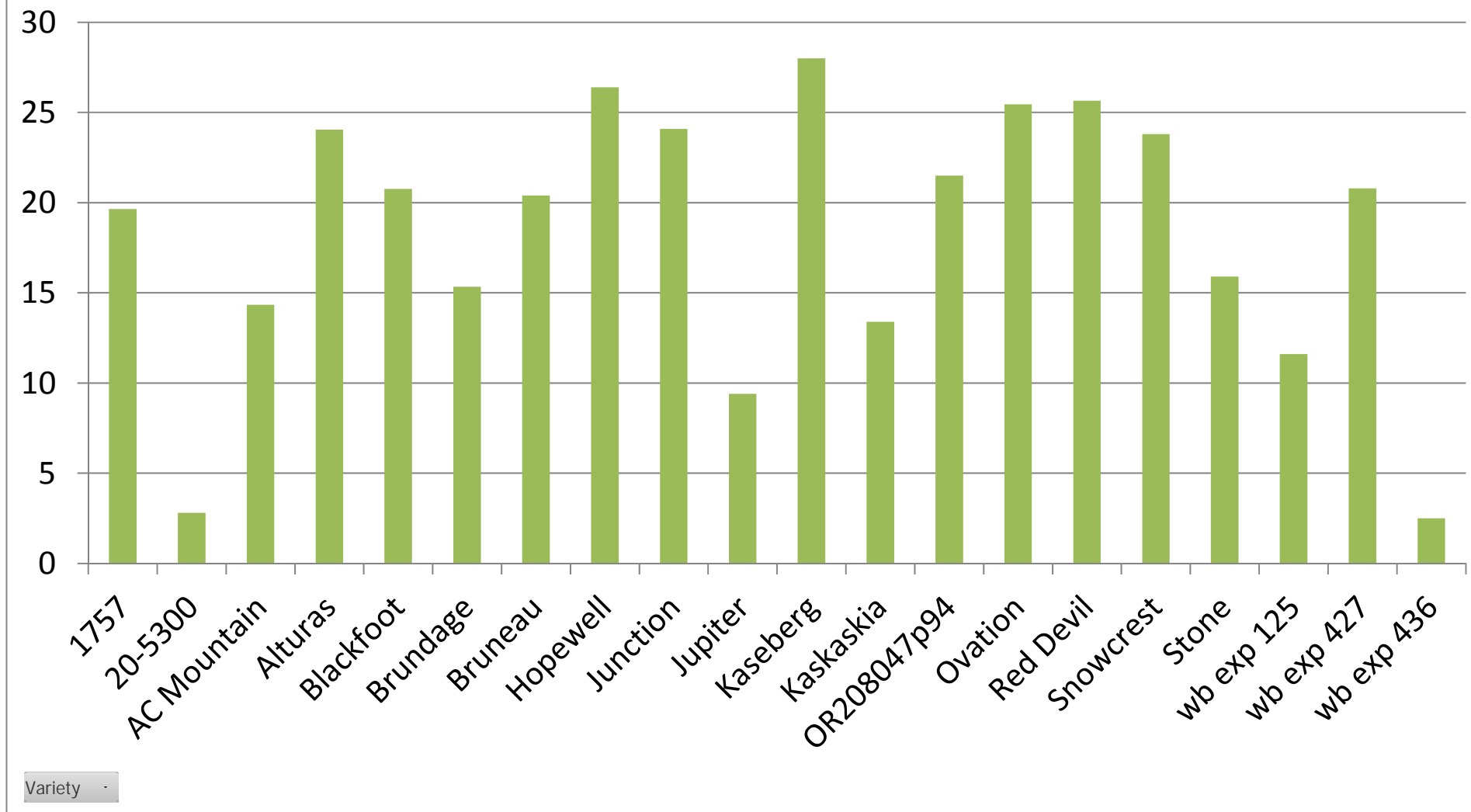


Variety



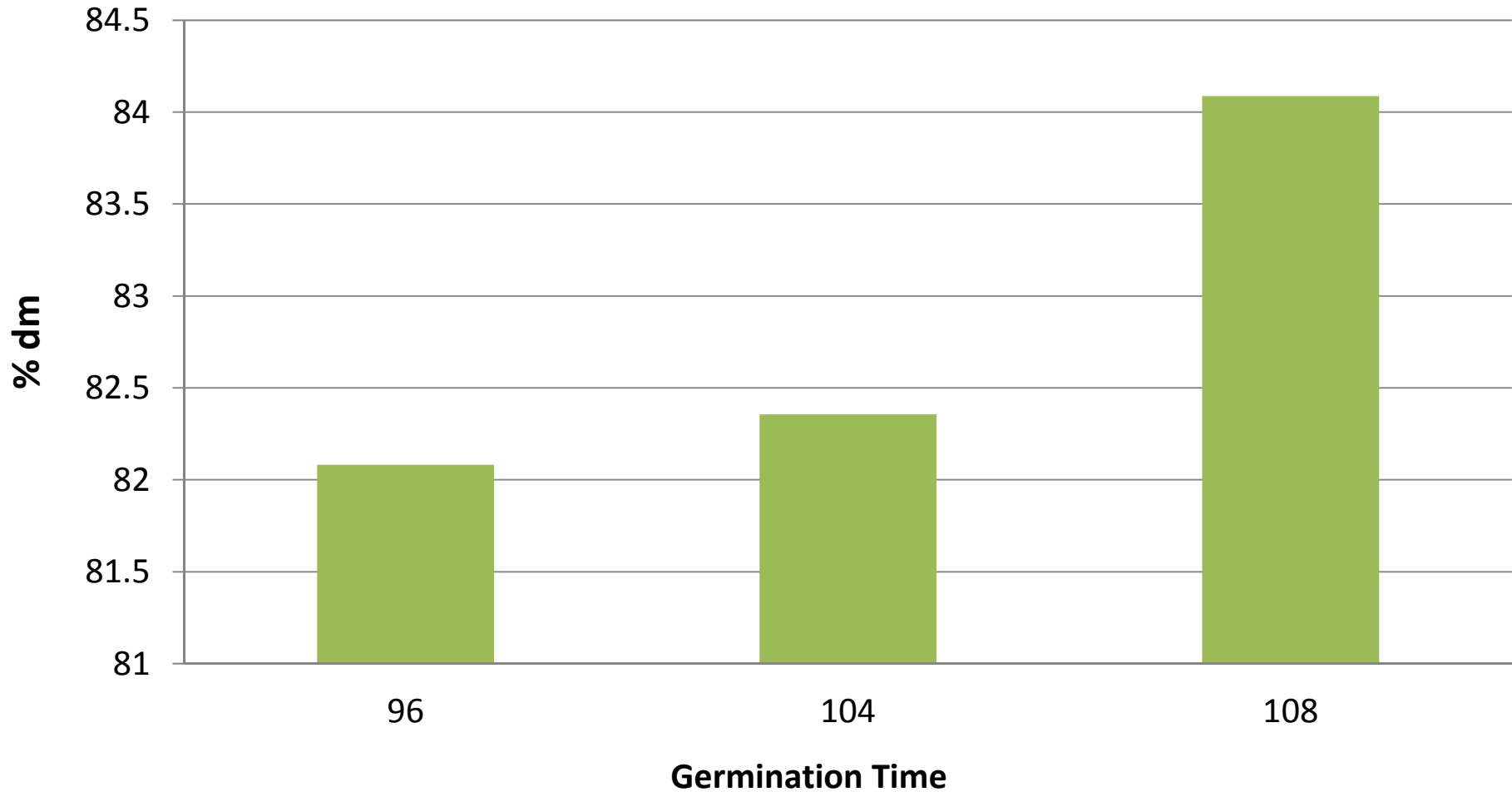
# Alpha Amylase Comparison by Variety

Kaseberg(Soft White) and Hopewell (Soft Red) Top Performers



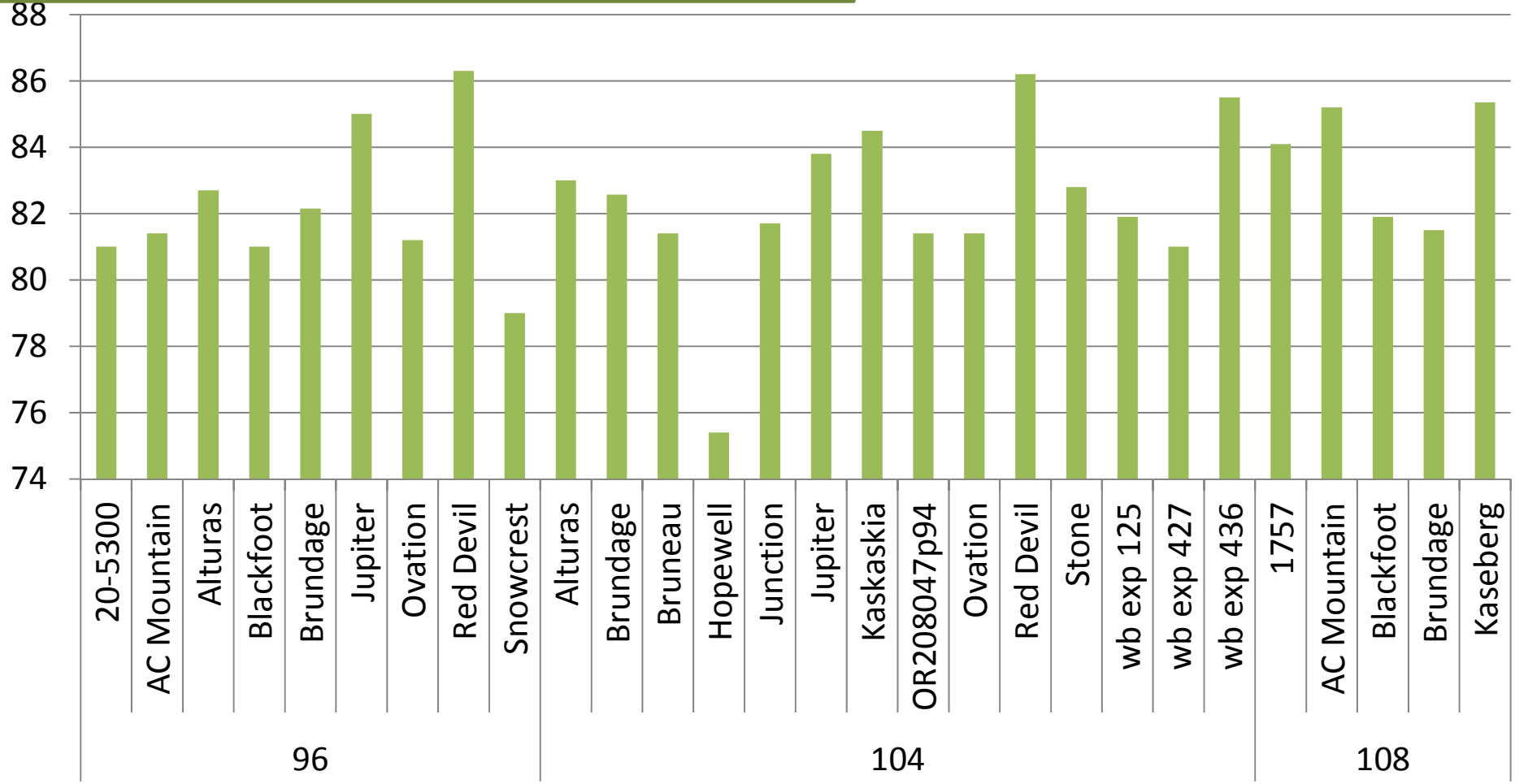
# Process Modification Results-Extract

Extending germination increases extract



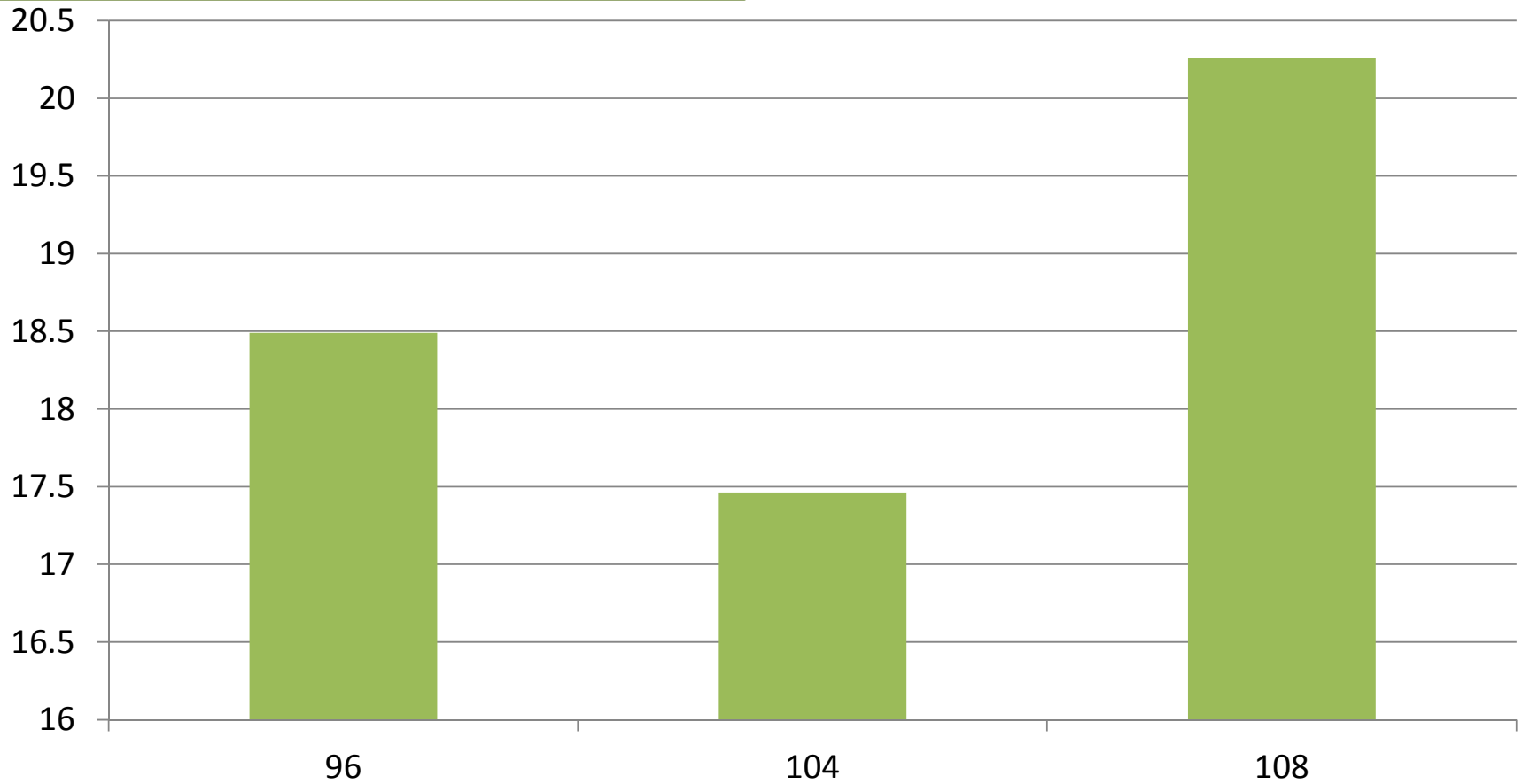
# Breakdown by Variety

Extending germination increases extract in particular, AC Mountain and Blackfoot



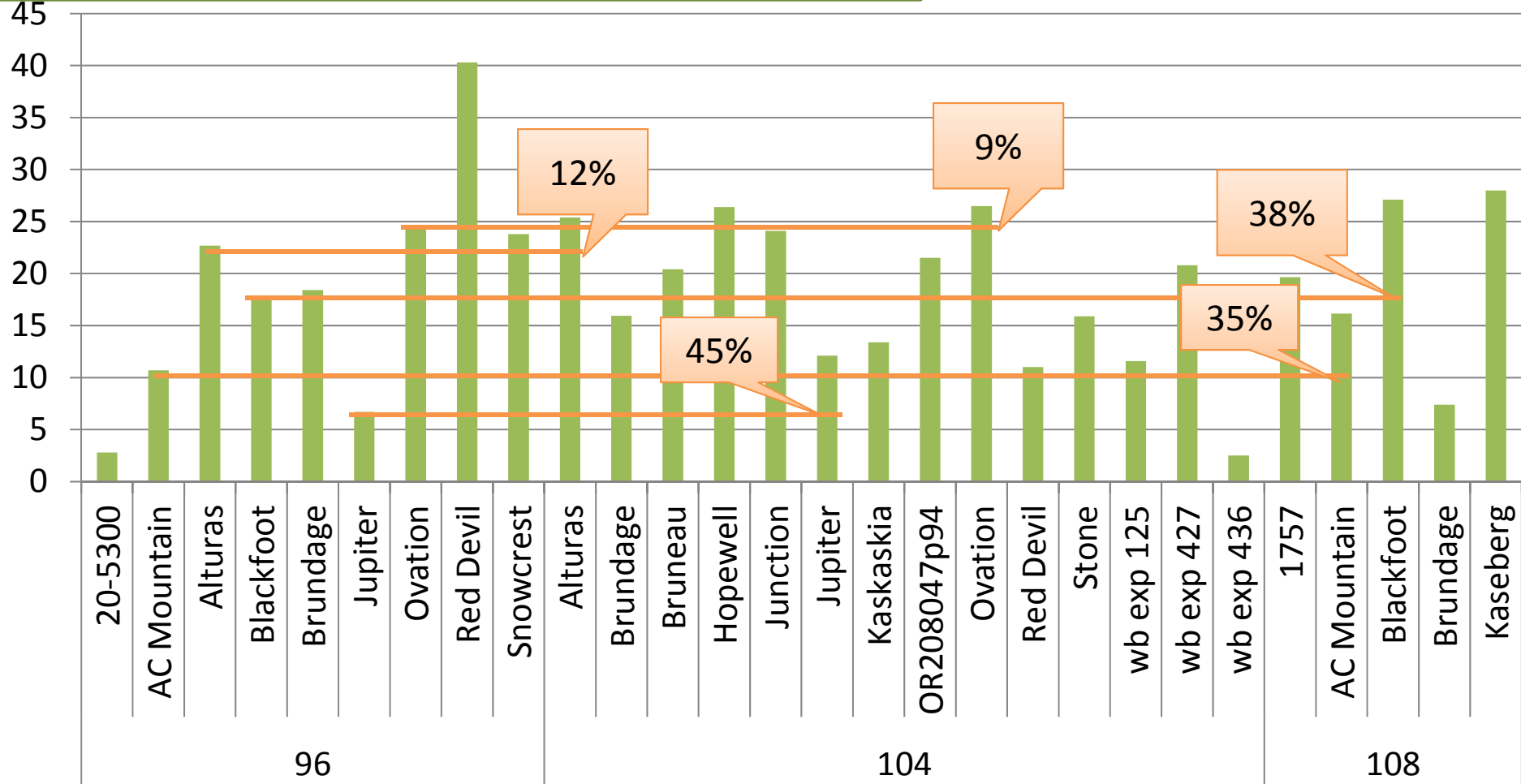
# Process Modification Results-Alpha Amylase

Extending germination increases Alpha



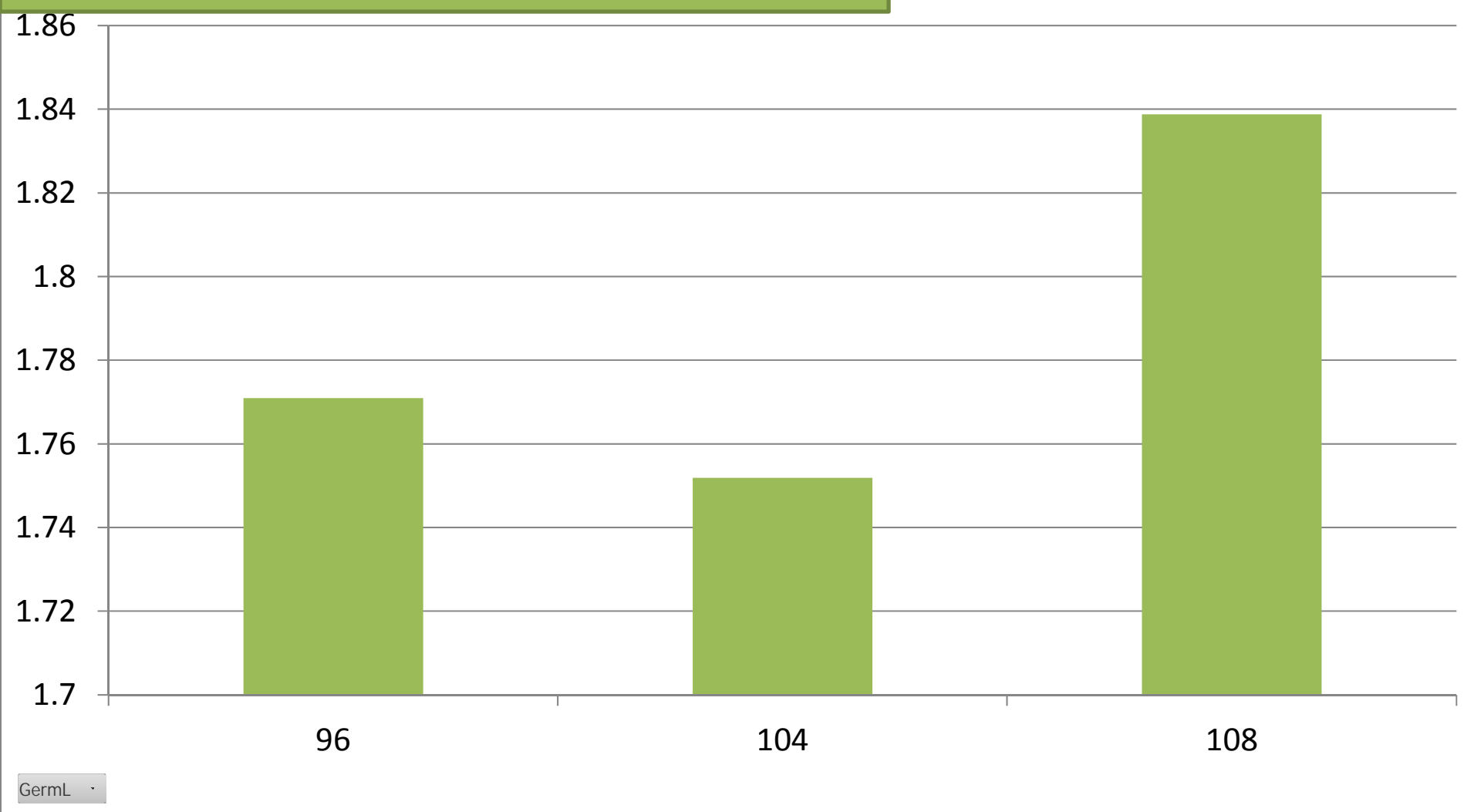
# Alpha Amylase: Breakdown by Variety

Extending germination increases Alpha



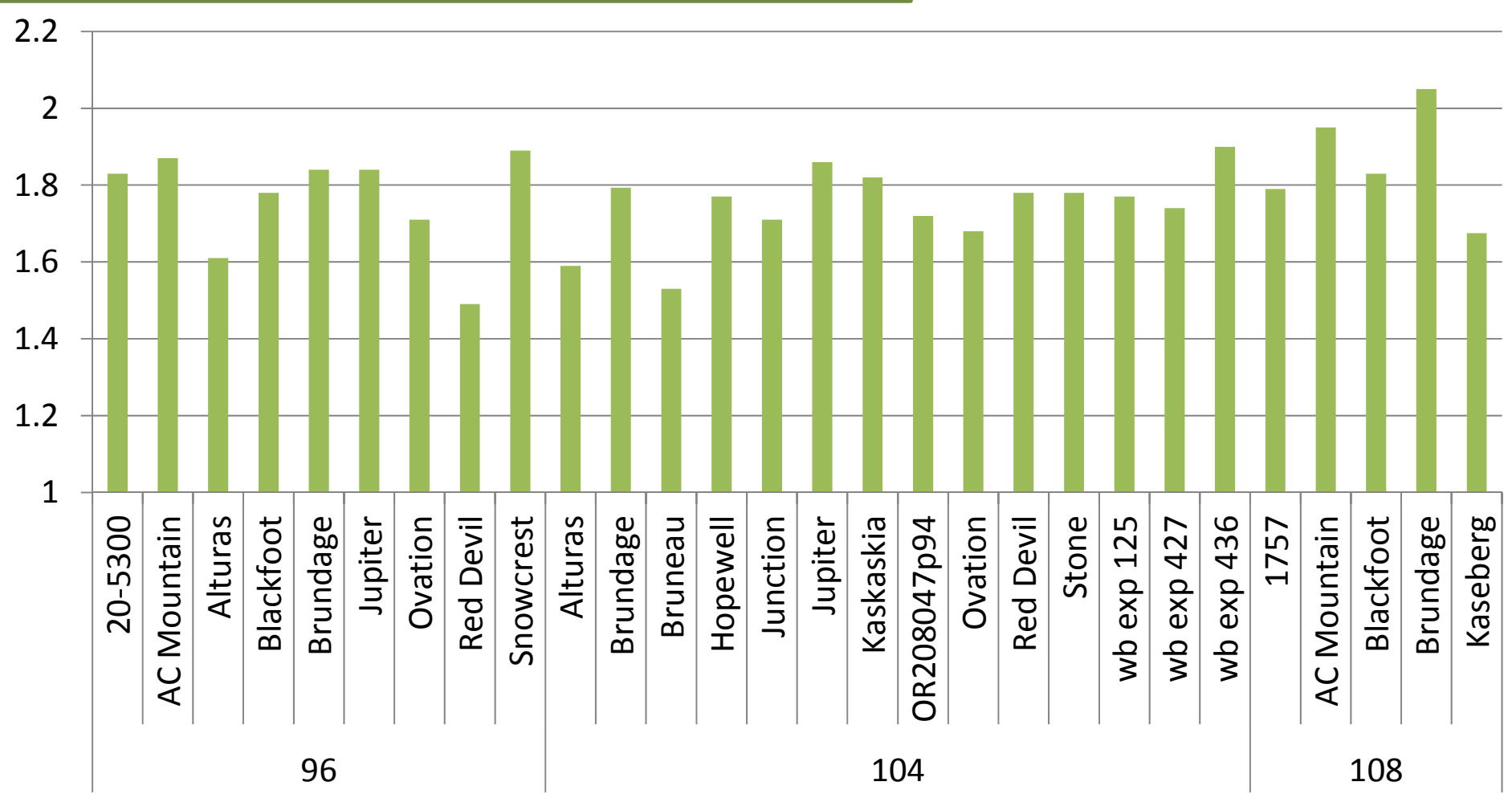
# Viscosity

Skewed by variety outliers



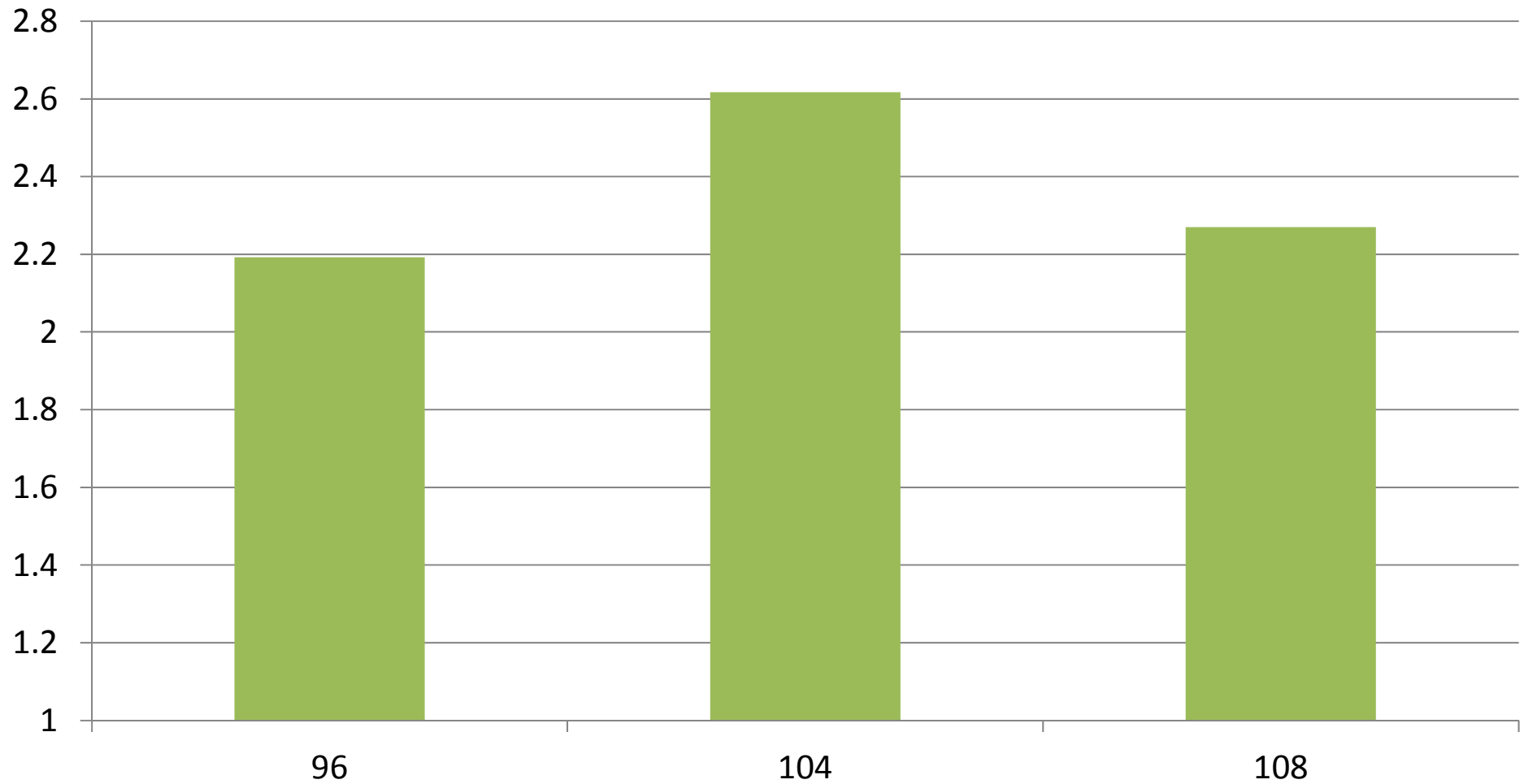
# Viscosity Breakdown by Variety

Some varieties have more AX



# Color

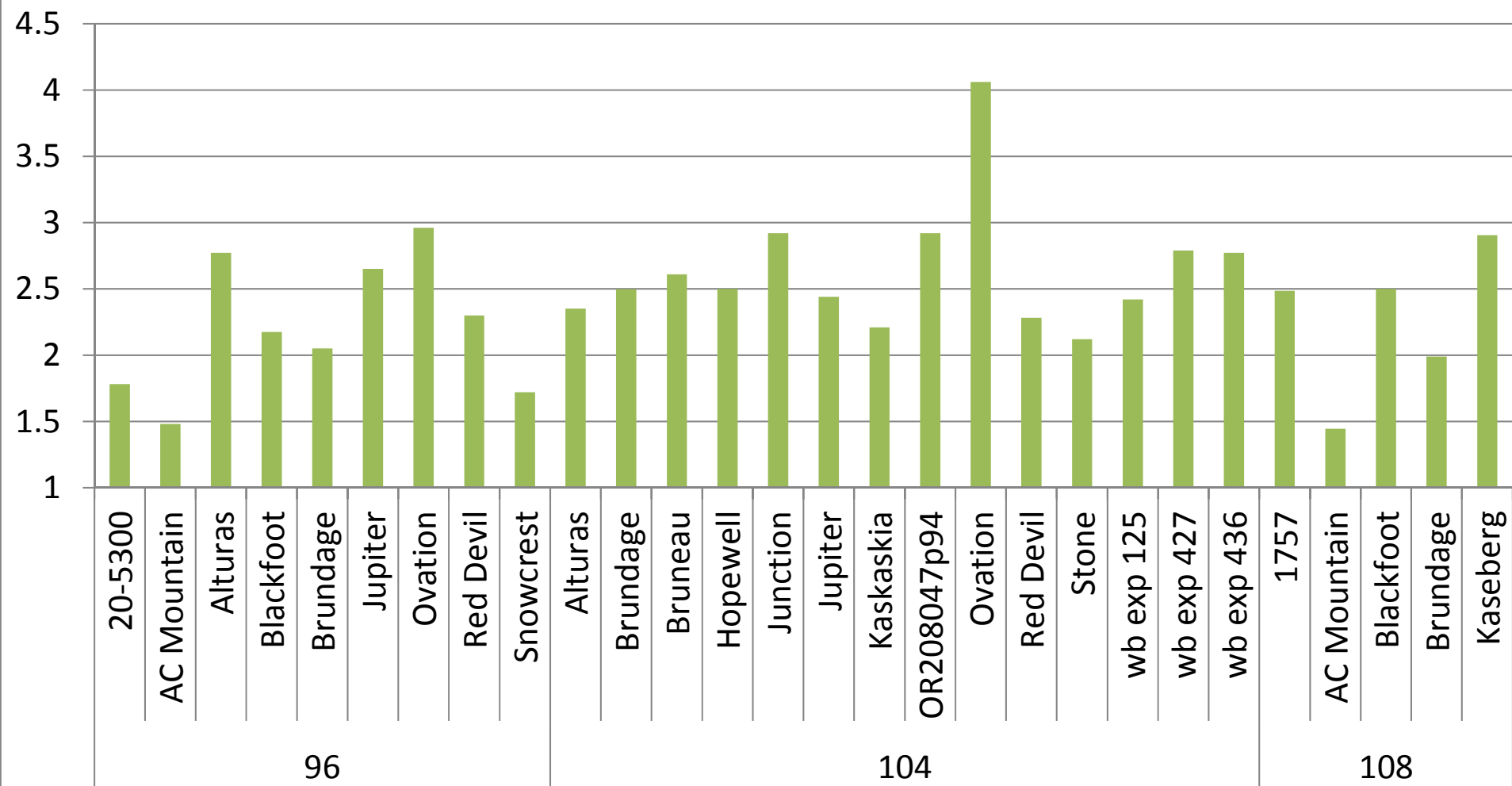
Does not have to increase over time





# Color Breakdown by Variety

Increasing germination Does not have to lead to increase in color

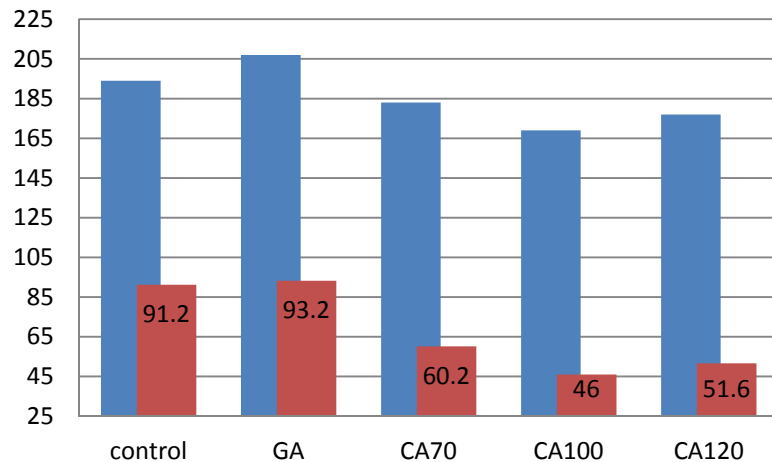


# Micro Malting with Processing Aids

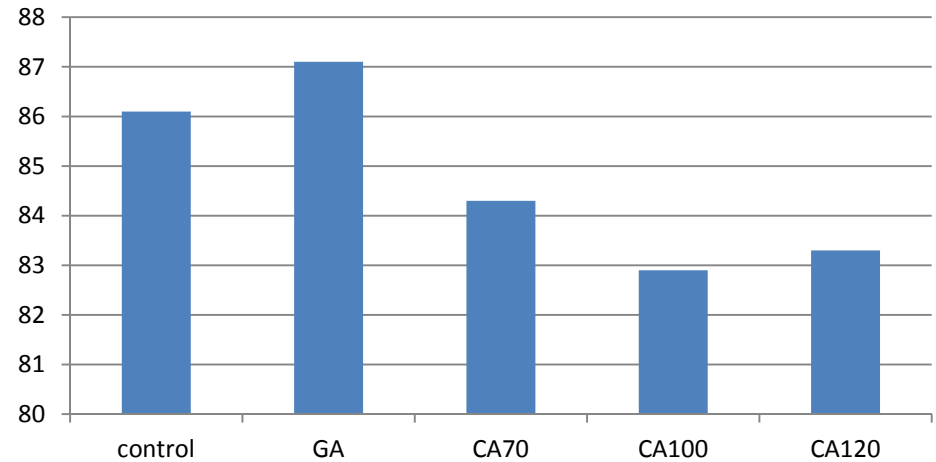
## Brundage

- Calcium Chloride
- Gibberillic Acid

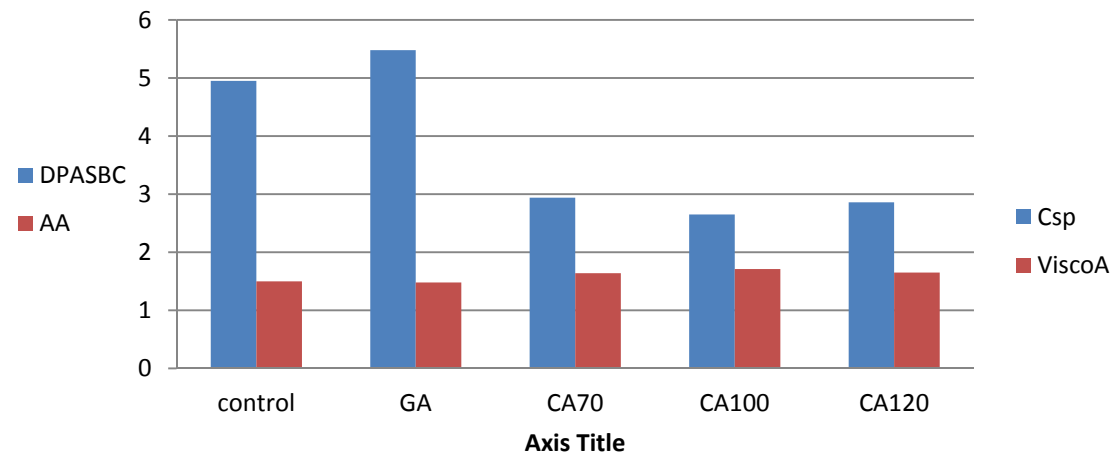
### AA and DP vs Processing Aid



### Efdm, %DM

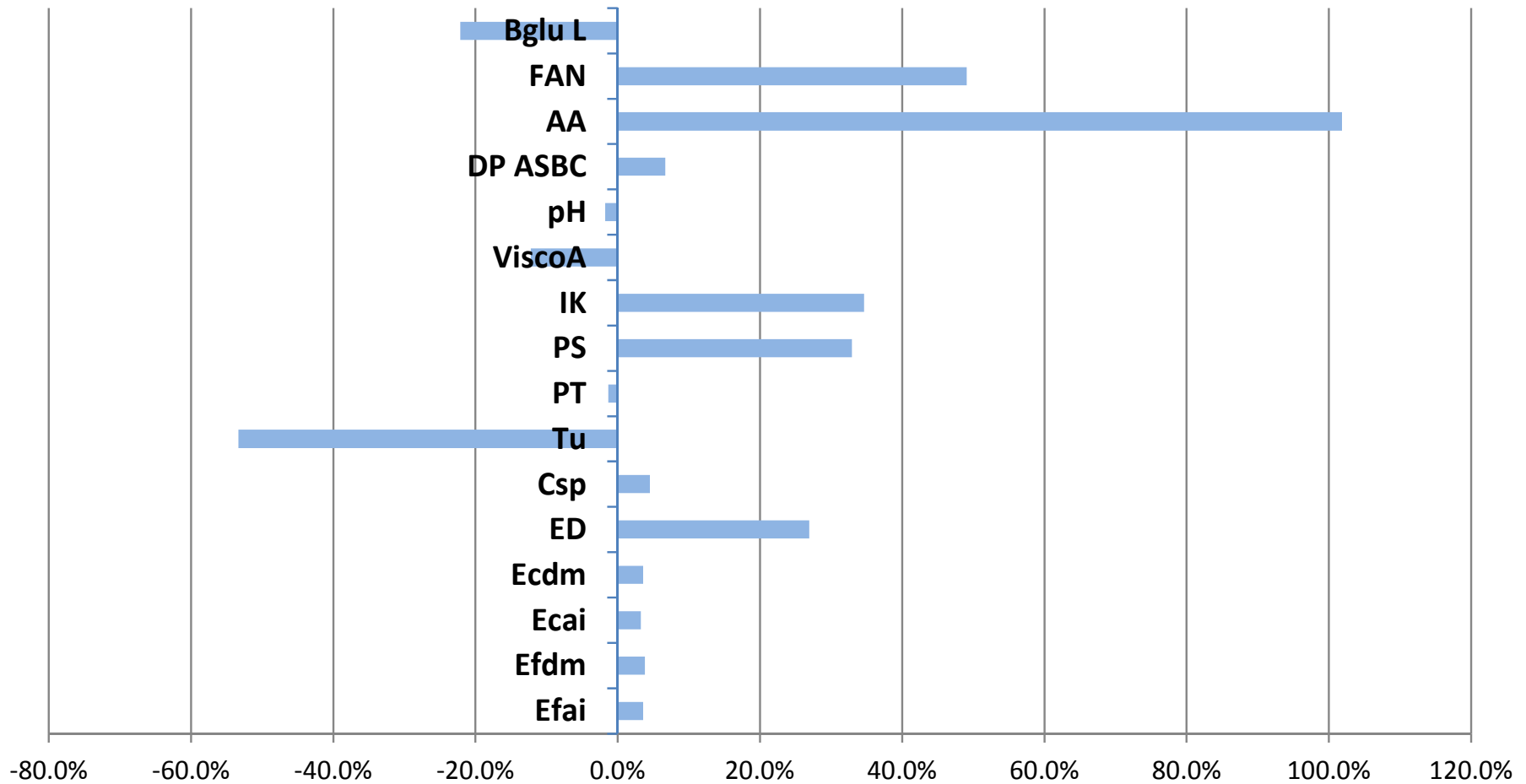


### Color and Viscosity vs Processing Aid



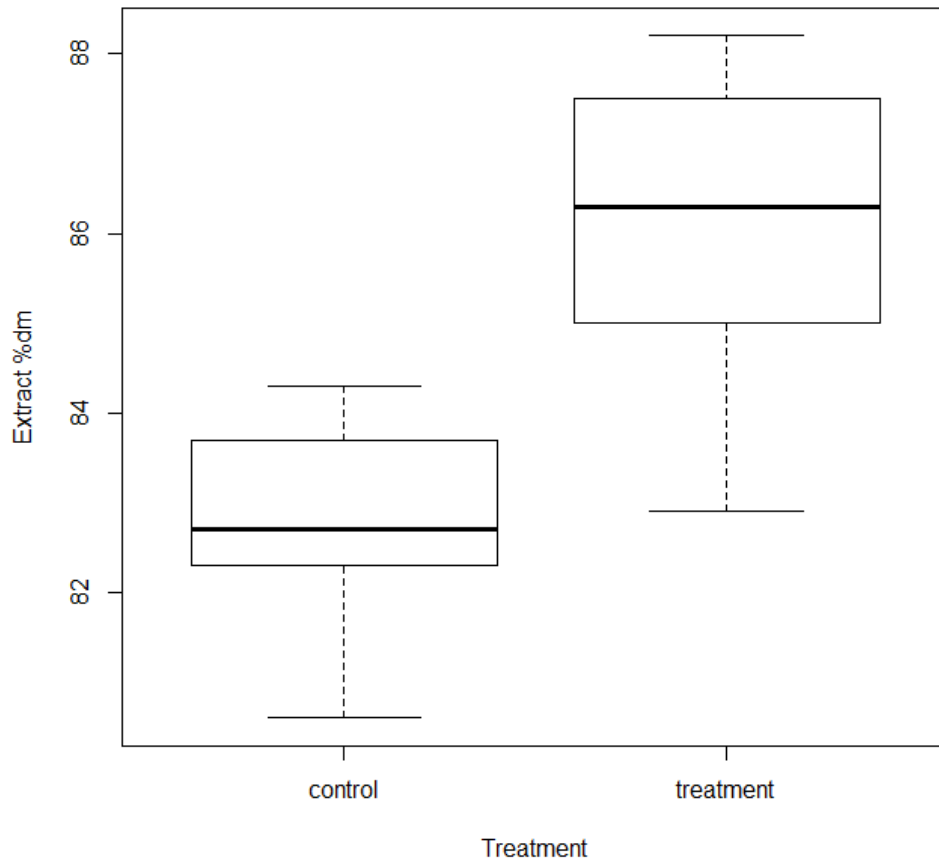
# Commercial Trial Results

**% Change Between Brundage without Gibb and with Gibb**

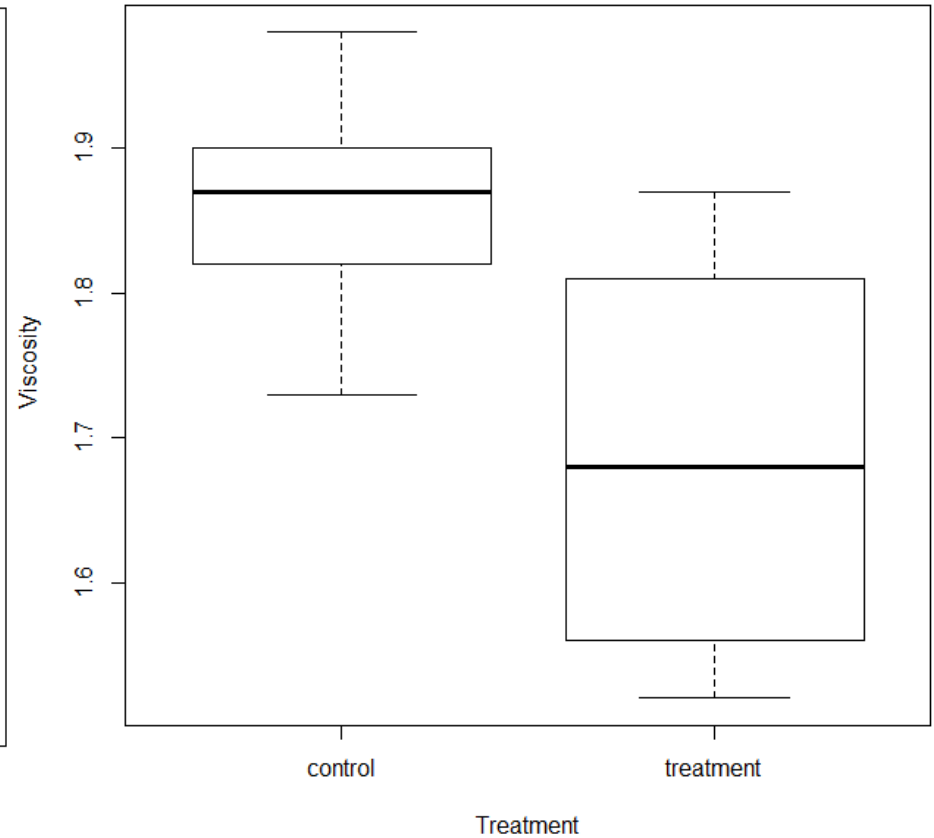


# Commercial Trial Results

No Gibb vs Gibb Application Impact on Extract



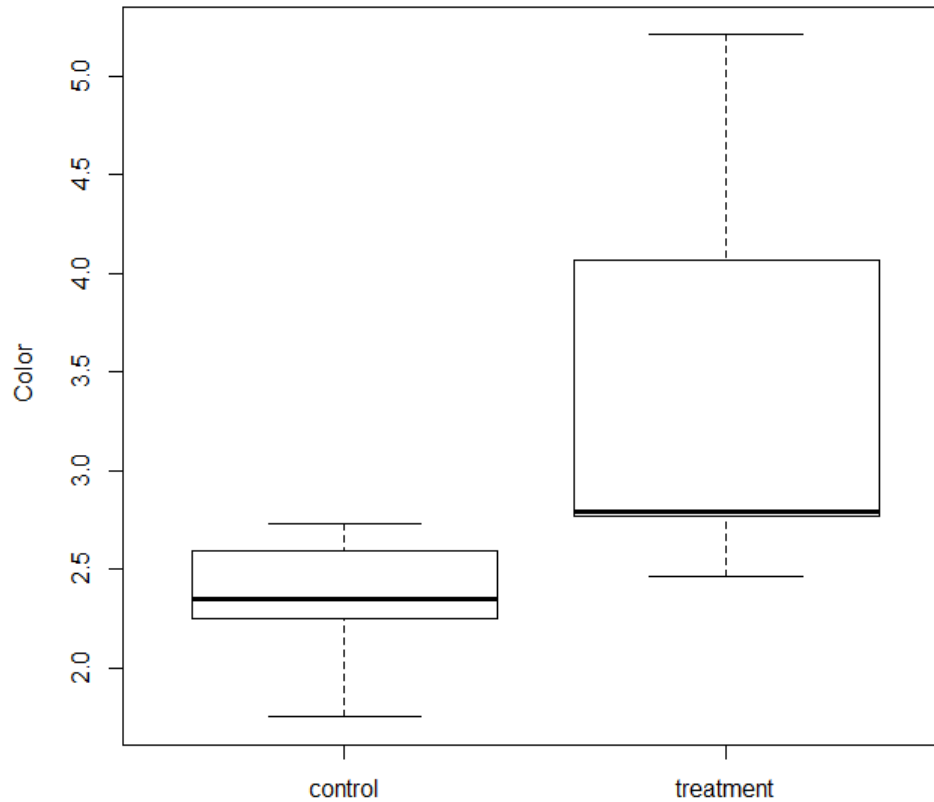
No Gibb vs Gibb Application on Viscosity



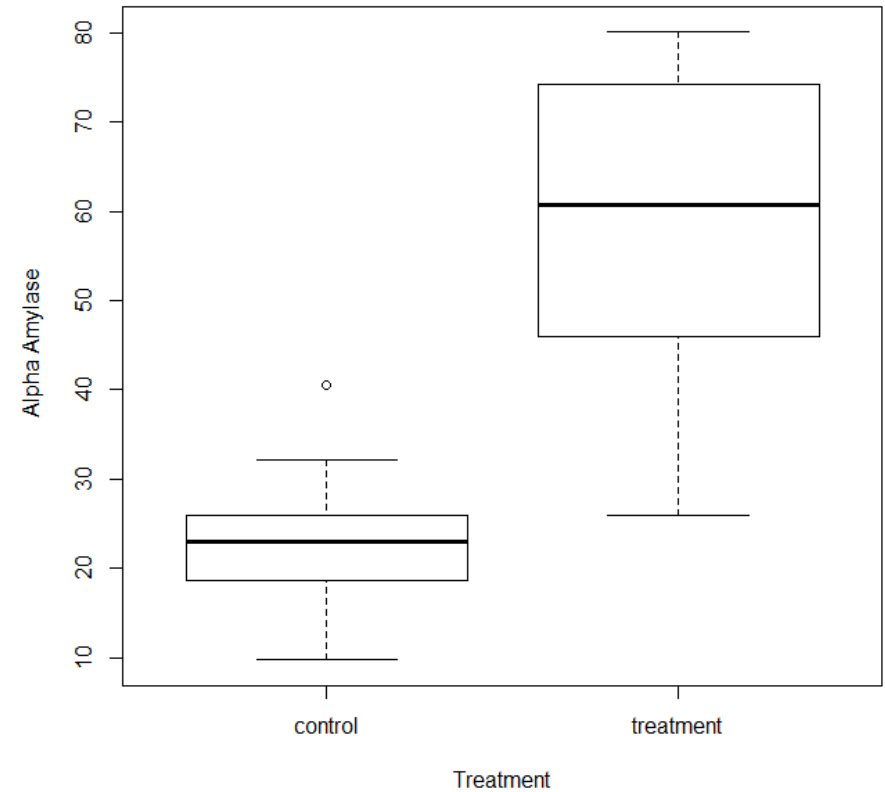
Impact much greater in Commercial conditions than Micromalting

# Commercial Trial Results

No Gibb vs Gibb Application Impact on Color



No Gibb vs Gibb Application Impact on  $\alpha$ -Amylase



Malting with Gibbed Wheat requires a softer kilning regime

# Conclusions

- Variety selection impacts
  - Alpha
  - Extract
  - Viscosity
- Processing Changes can improve quality
- Gibberellic Acid is effective at
  - Increasing
    - Enzyme
    - Extract
  - Decreasing
    - Viscosity
    - Turbidity

# Going Forward

- Nano-Brews
  - Brundage Gibb vs No Gibb
    - Flavor
    - Foam Stability
    - Haze
  - New Varieties
    - Jupiter
    - Red Devil
    - **Bruneau**

# Acknowledge

- Cargill Malt
- North American Malt Quality Lab
- John Zietz, Barley Supply Chain



Questions?