Considerations of hop quality for both the grower and brewer

Thomas H. Shellhammer
Department of Food Science and Technology

Exciting times for brewing research and teaching

Questions to be addressed today

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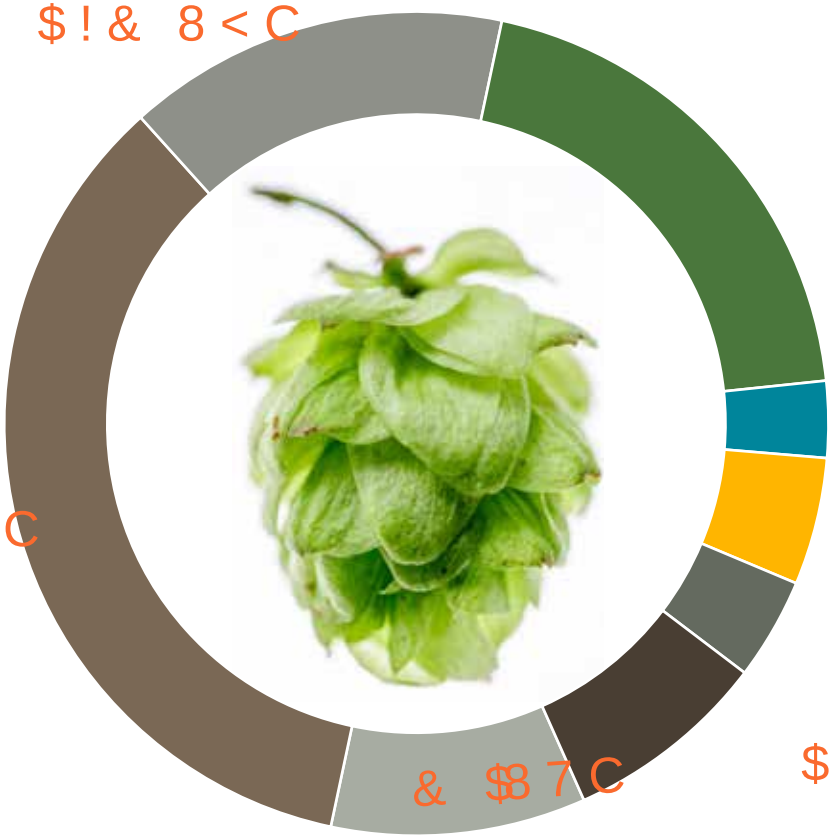
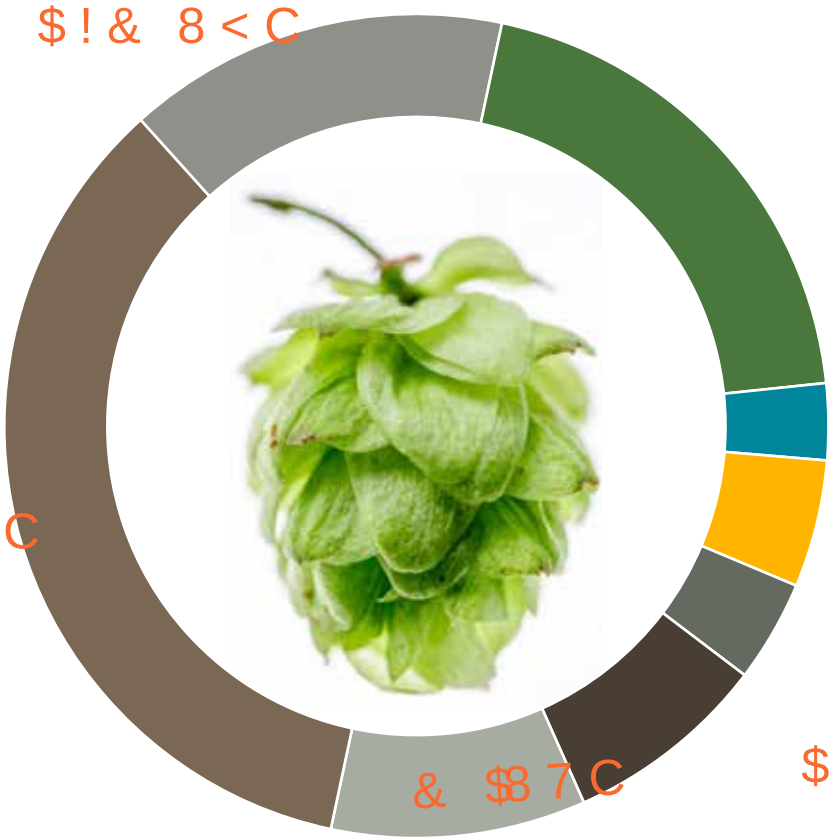
What’s in hops?



Hop composition – hop aroma



Hop Essential Oil

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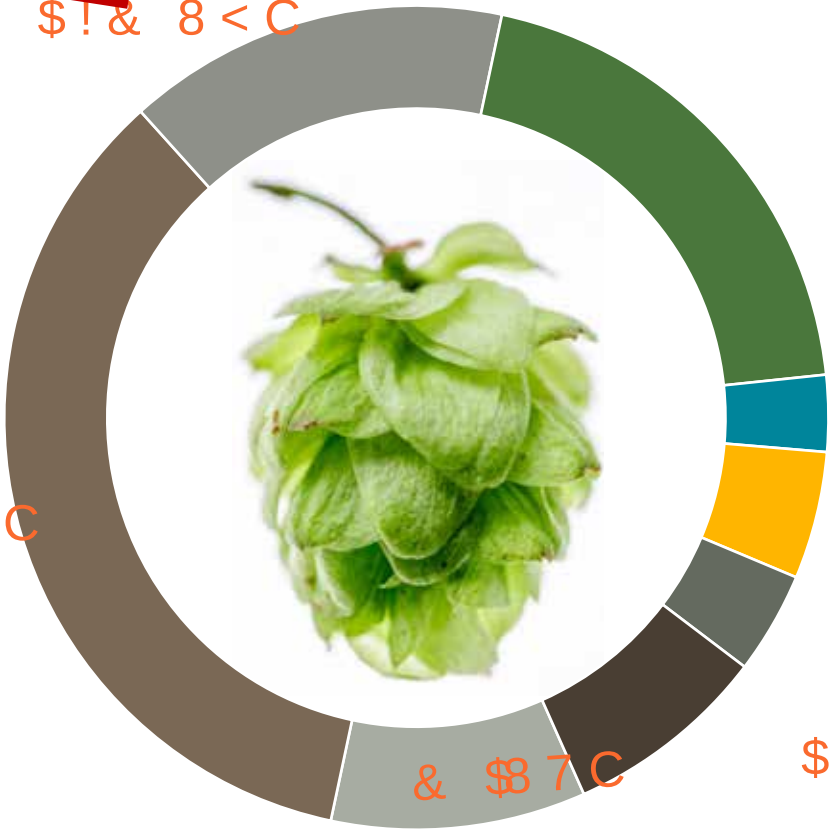
Hop composition – water extractables



GAUGING HOP AROMA INTENSITY IN HOPS

Things to consider when dry -hopping on small scale..

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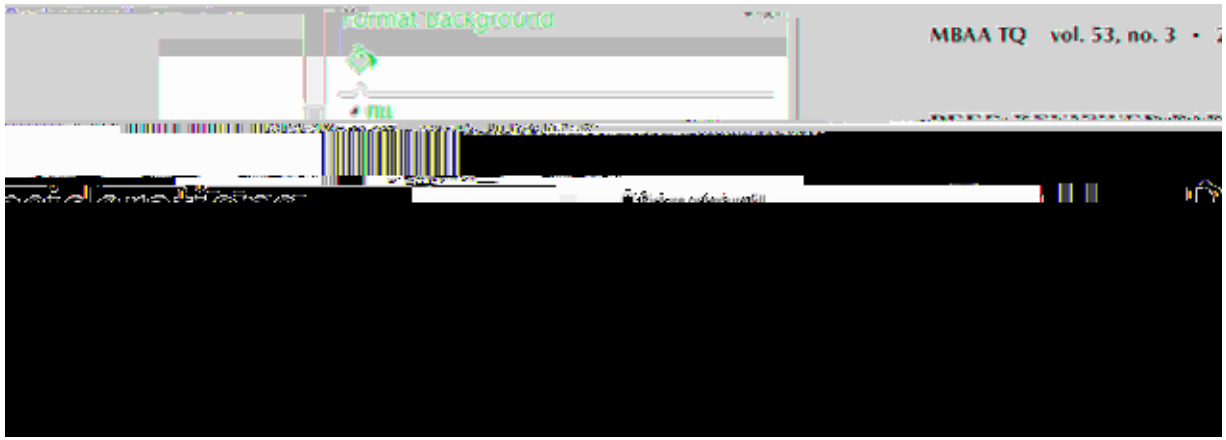

Hop Preparation and Dry -Hopping Parameters

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Brewing “unhopped ” beer

Beer Specifications:

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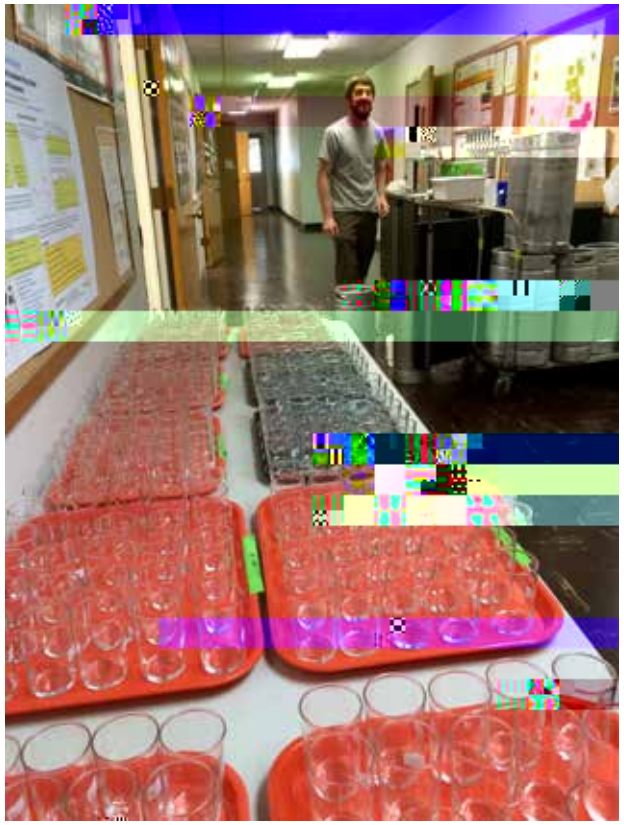
- Original Gravity:
- Real Extract:
- BU
- ABV

Evaluations using draft beer

Sensory evaluation - descriptive analysis



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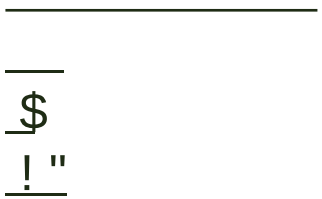
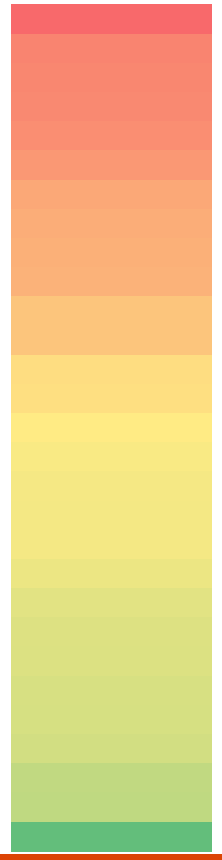
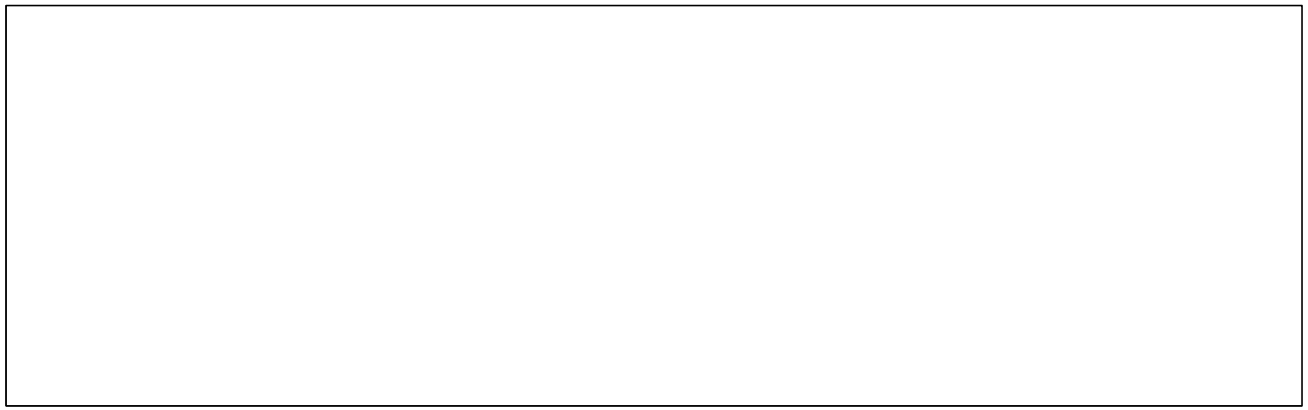
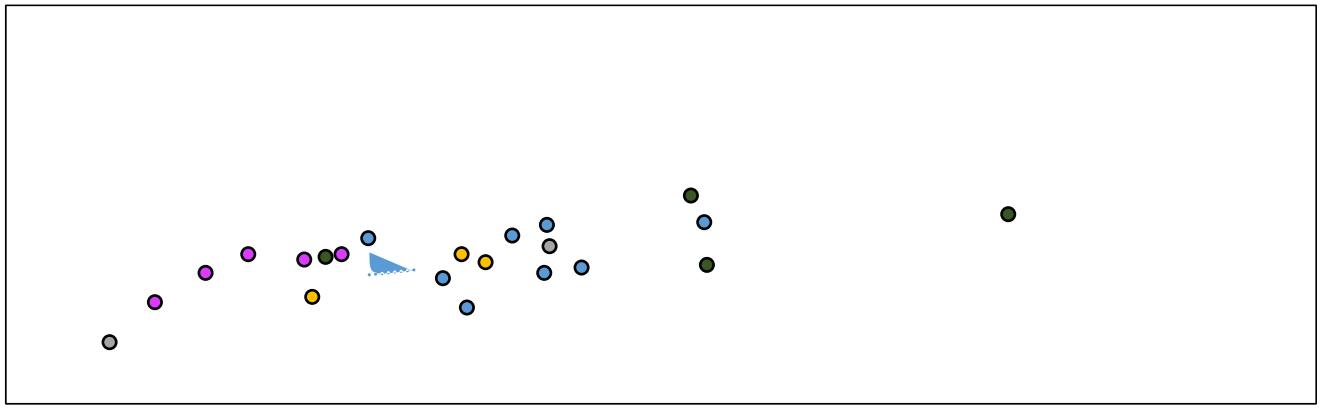




Cascade Samples: Citrus quality vs total oil content





Other interesting findings…..

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Cascade 2014 Harvest

Cascade 2015 Harvede 29 22 (ad)3 (0.0000F138 -1..6 <002B>]TJ 6.68

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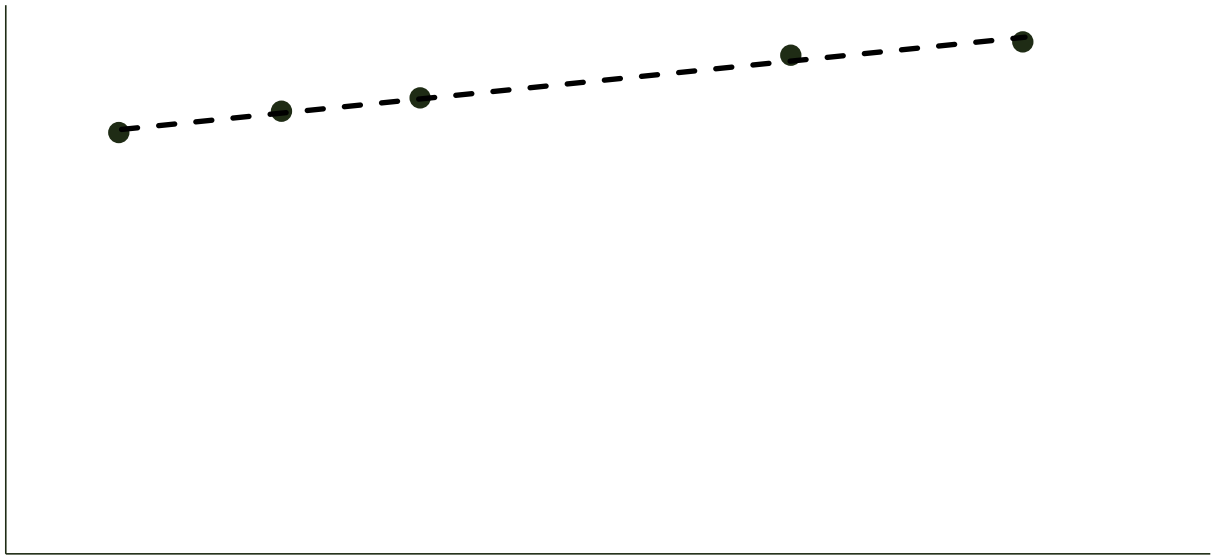
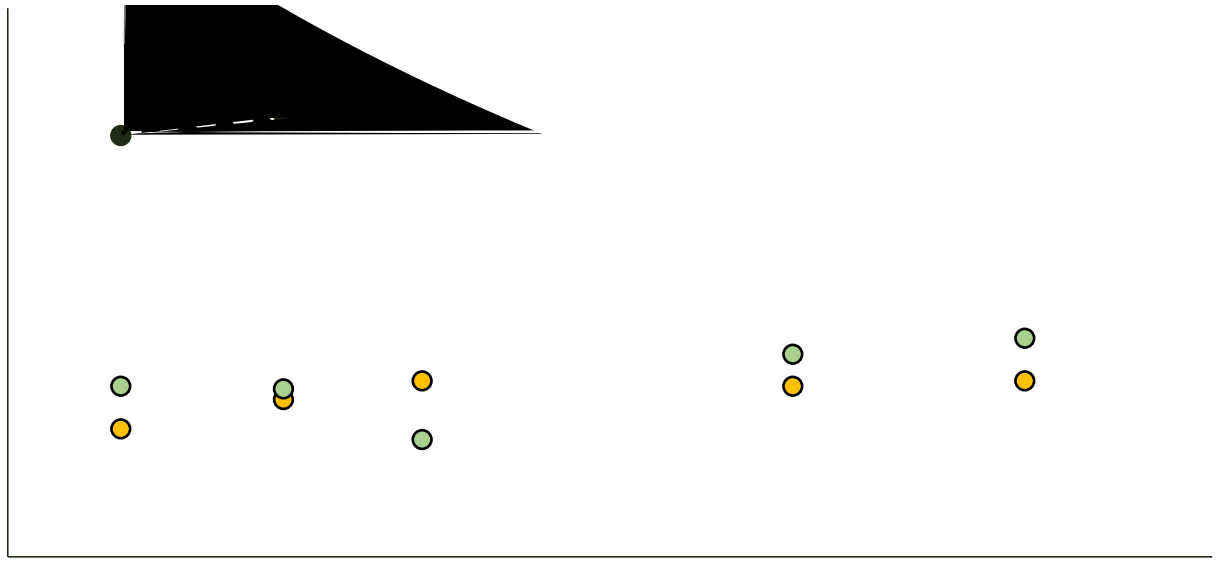
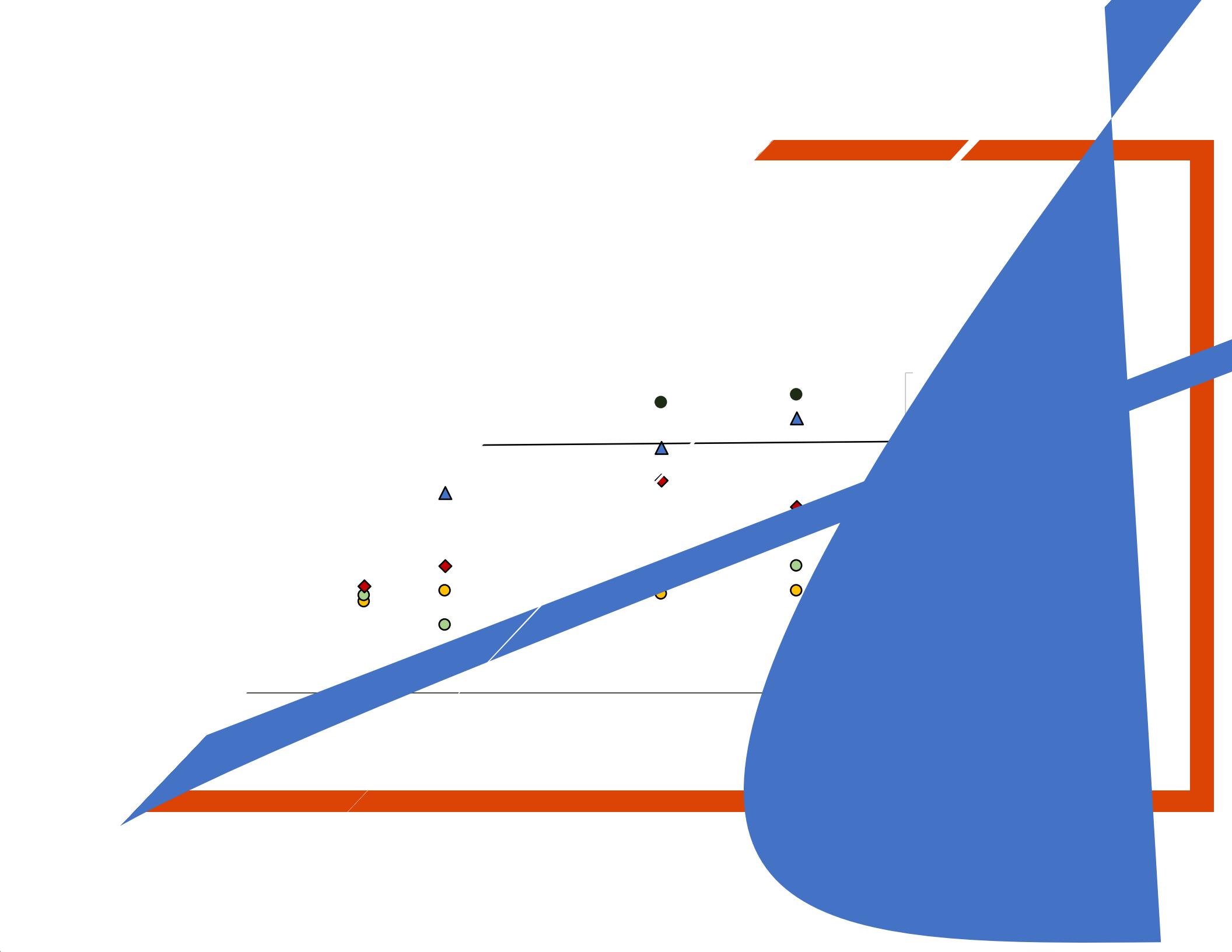
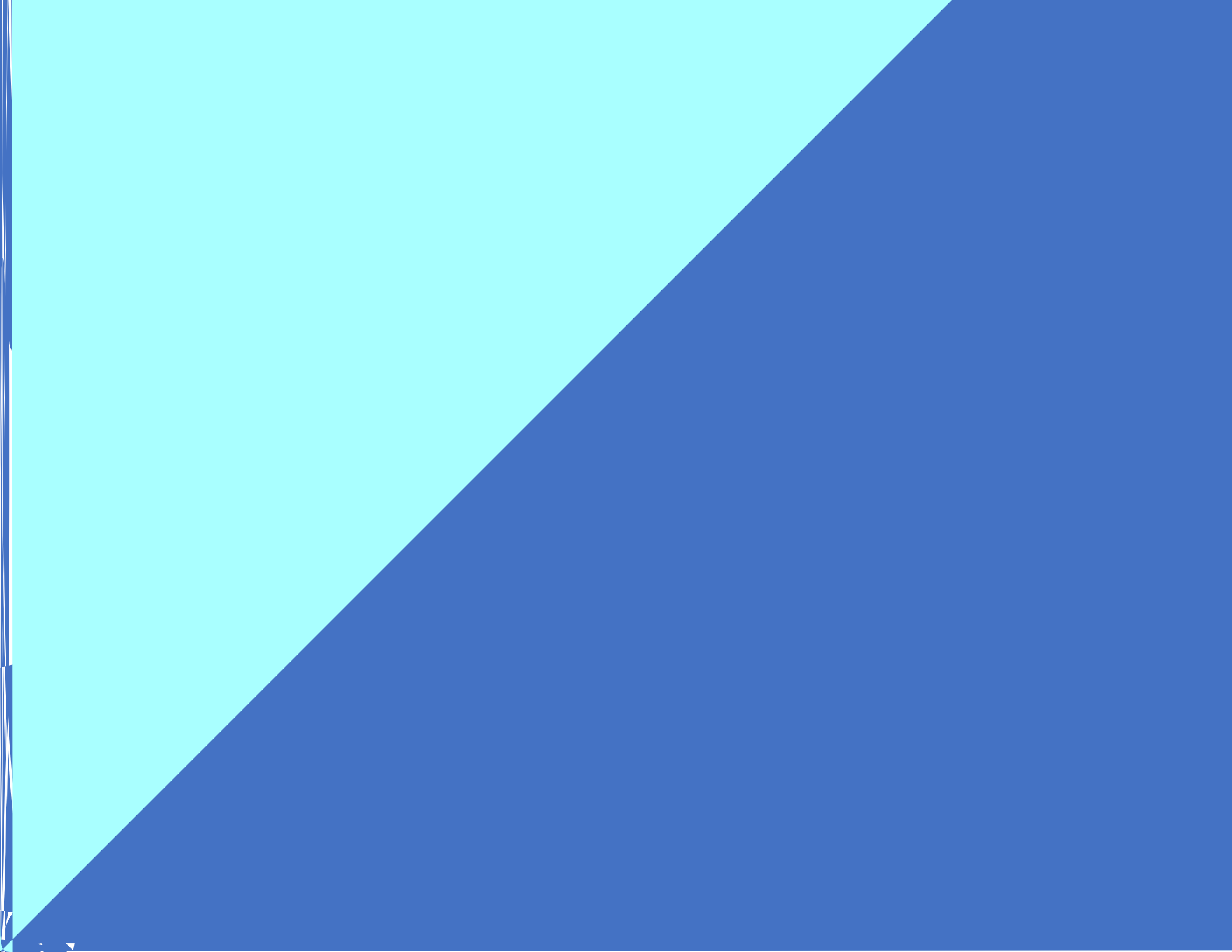
Impact of harvest maturity on dry -hop aroma quality - Farm 2

2014Harvest









Conclusions

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Lindsey Rubottom
Masters student (willdefend May 2020)
Oregon State University

IMPACT OF HOP KILNING TEMPERATURE ON HOP QUALITY

Hop Kilning Temperature Research Plan

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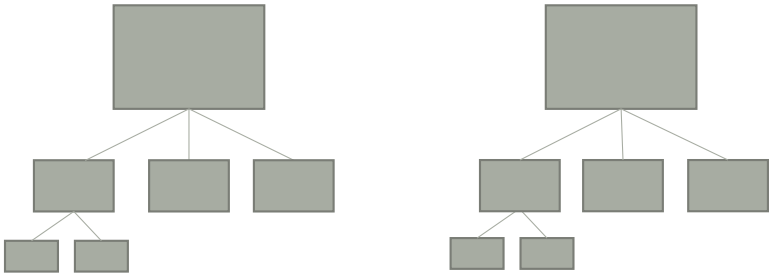

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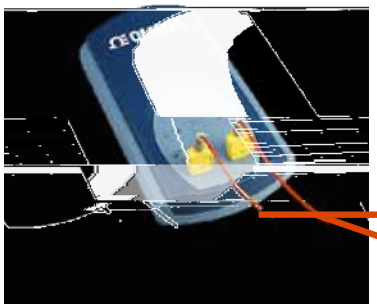
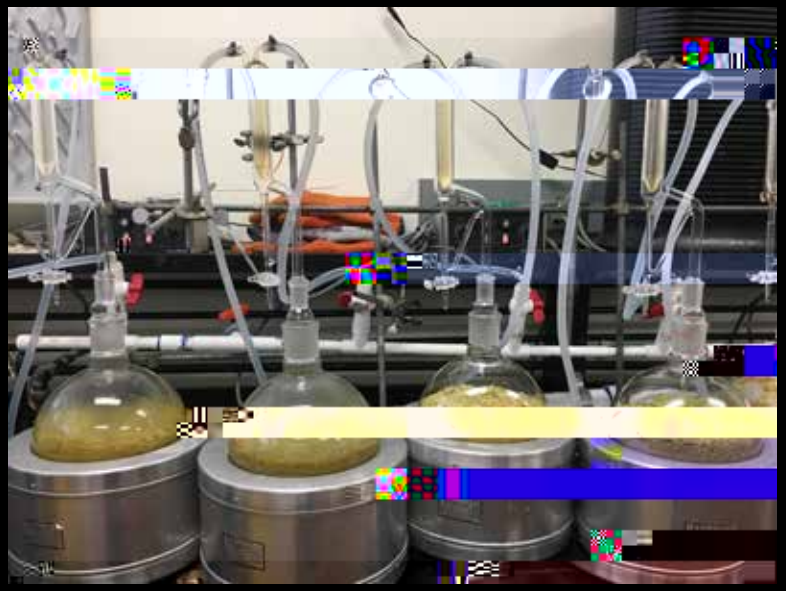


Air On in the plenum and drying time



CHEMISTRY

Oregon State University

OSU Chemistry Analysis

- ASBC Hops 6 – Spectrophotometry
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- ASBC Hops 14 – High performance liquid chromatography (HPLC)
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- ASBC Hops 13 – Steam Distillation
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- ASBC Hops 17 – Hop Oil Compositional Analysis
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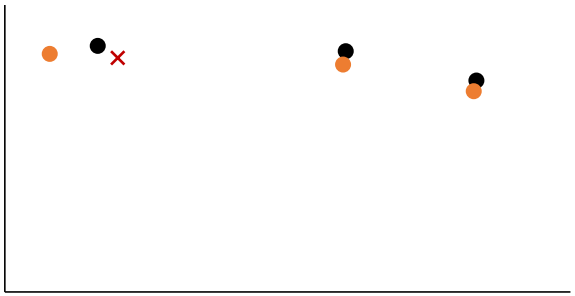
- Enzymatic dextrin reducing power of hops

2019 Total oil



2019 %Alpha Acid

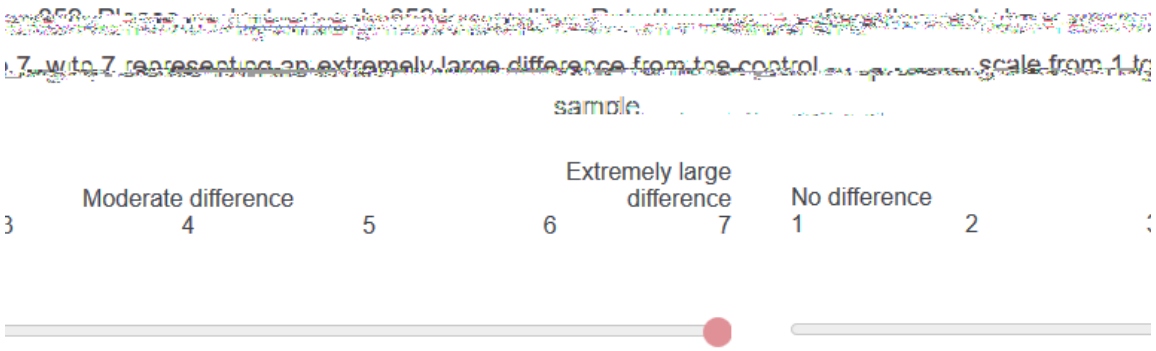
2019 Hop Storage Index

SENSORY

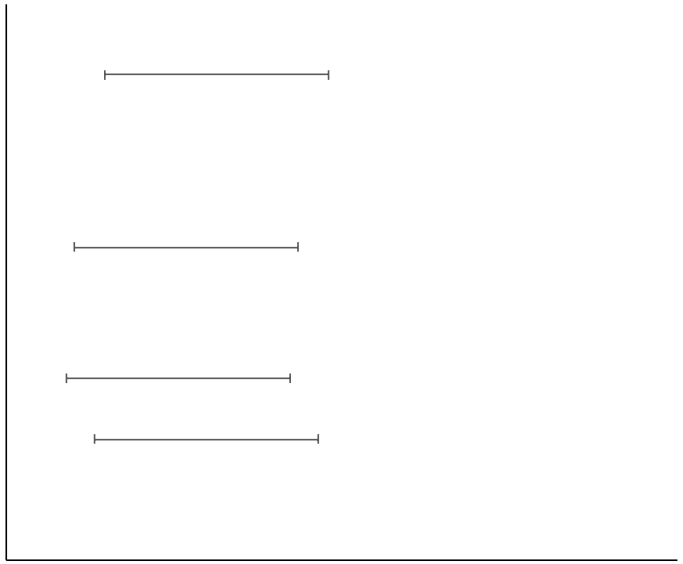
DIFFERENCE FROM CONTROL (DFC)

Oregon State University

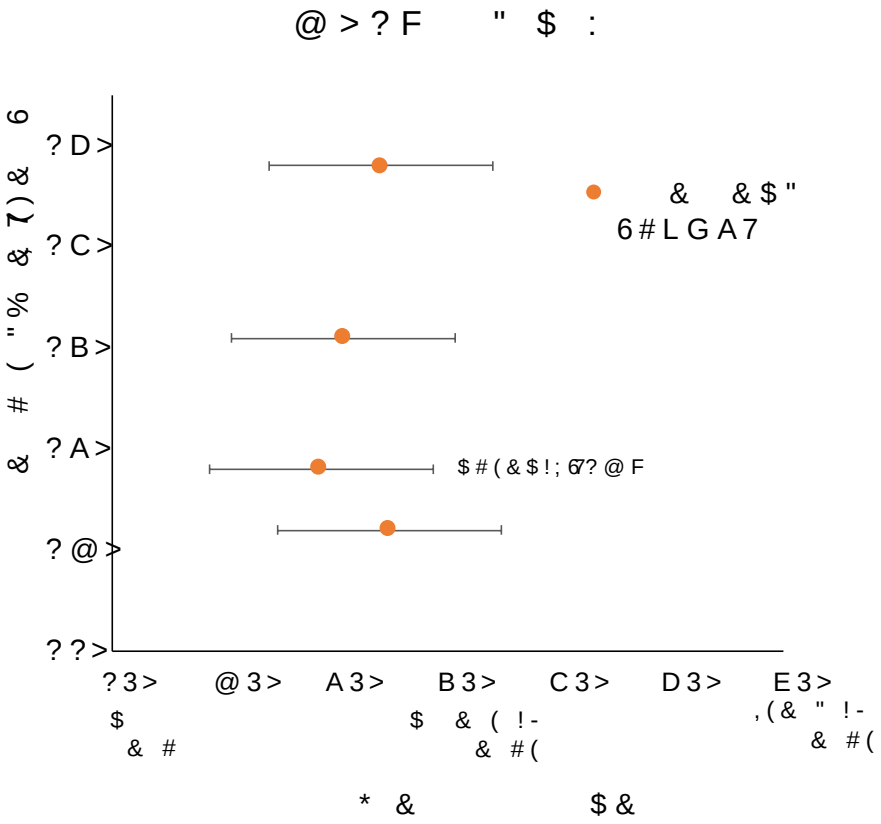
Sensory Descrimination Testing Difference from Control (DFC)

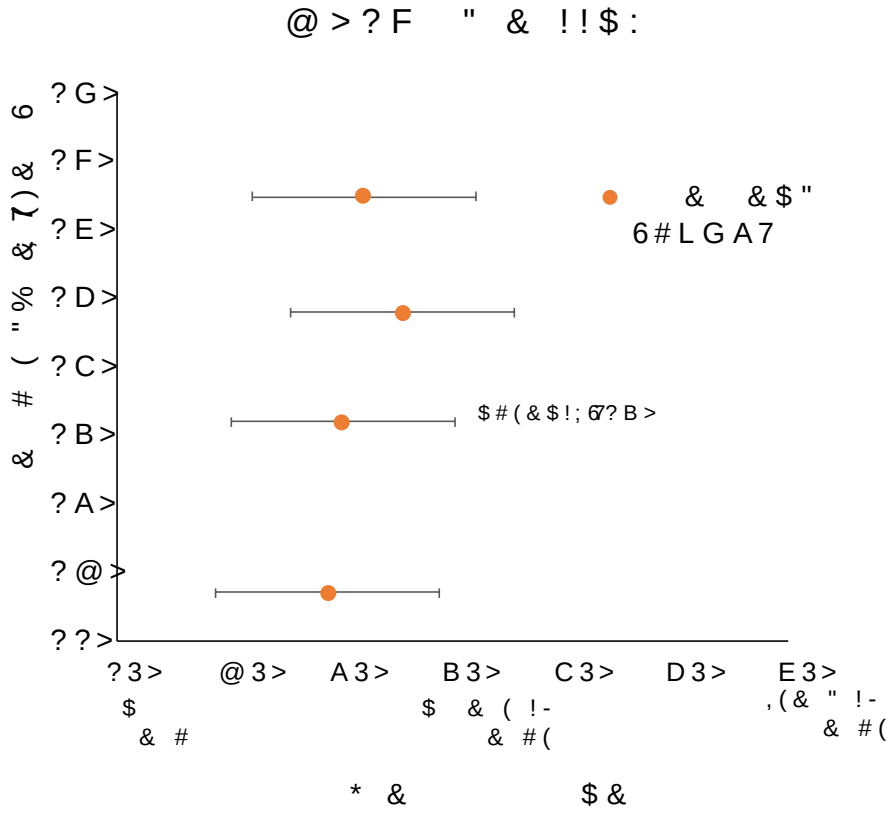


HY 2018 DFC results- Hop Grinds



HY 2018 DFC results- Beer Aroma





Overall Conclusions to date regarding hop kilning temperature

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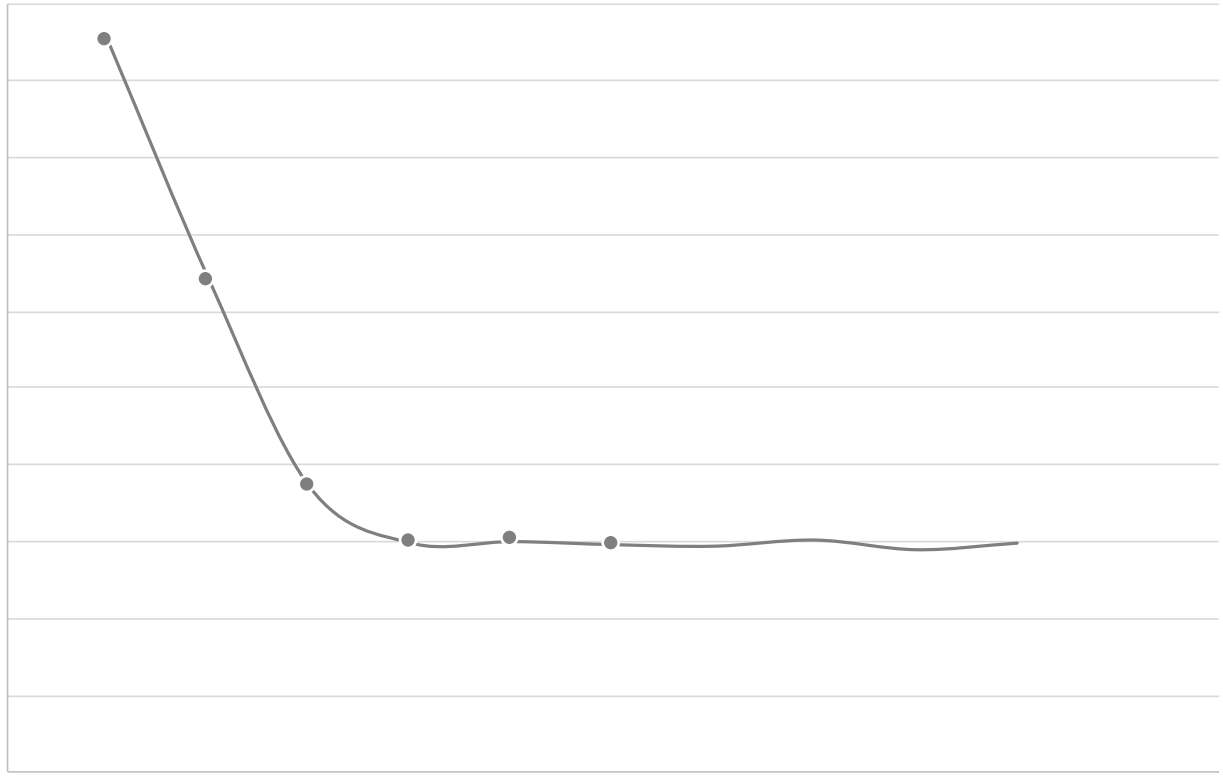
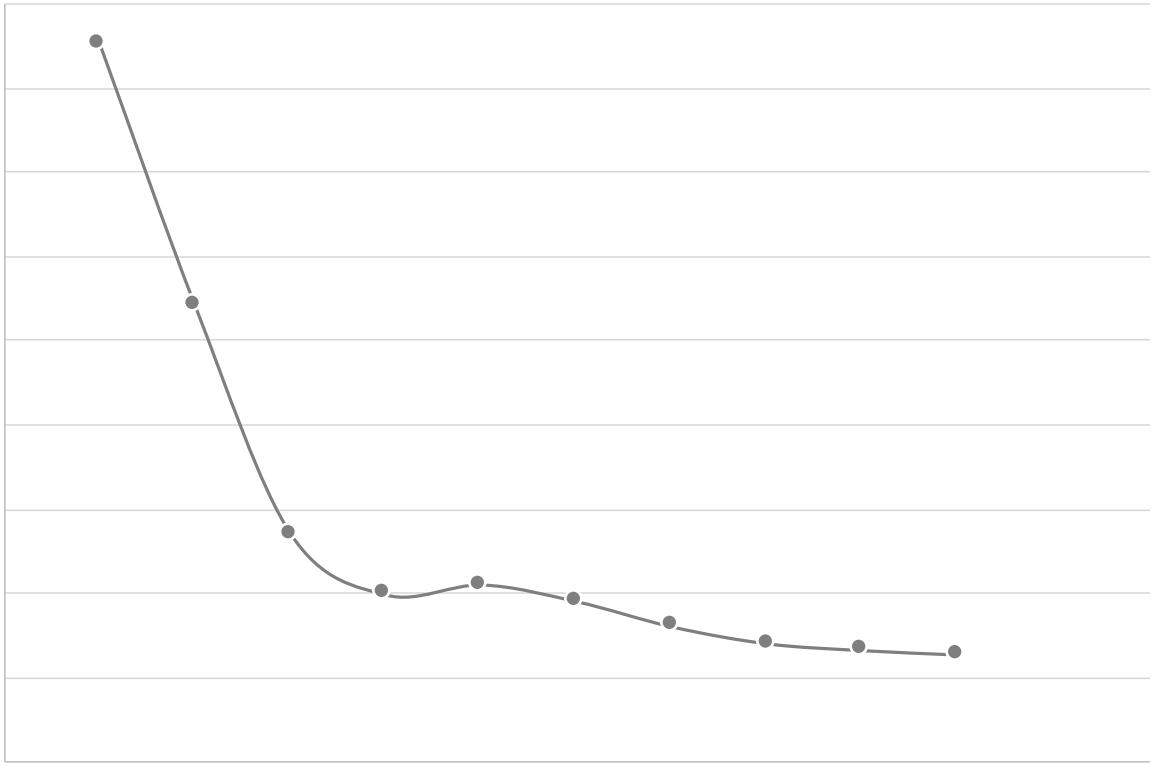
HOP CREEP



Dry-hopping can create “Hop Creep”



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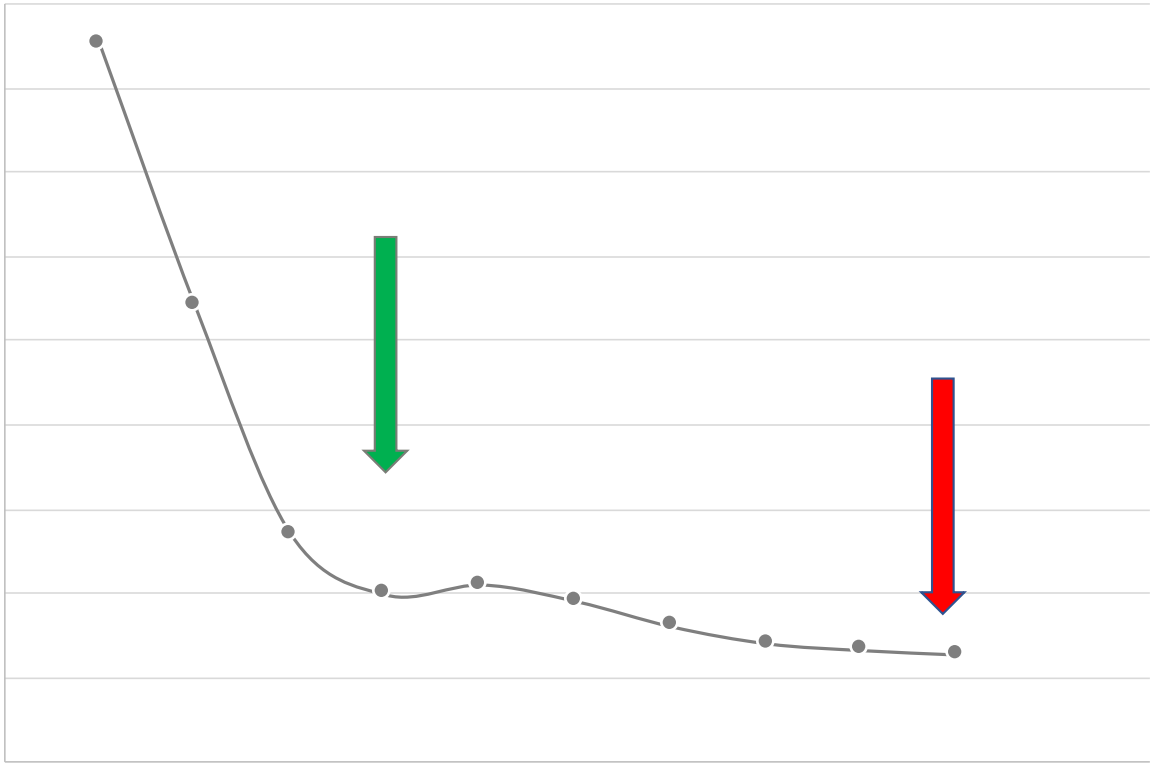

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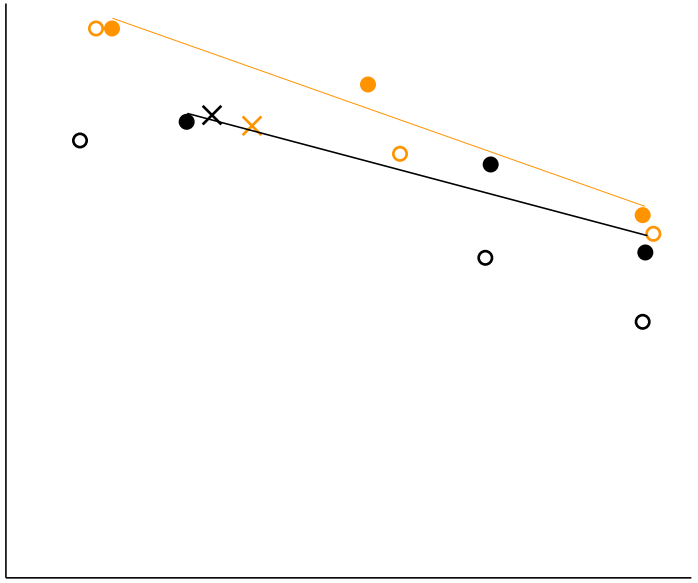
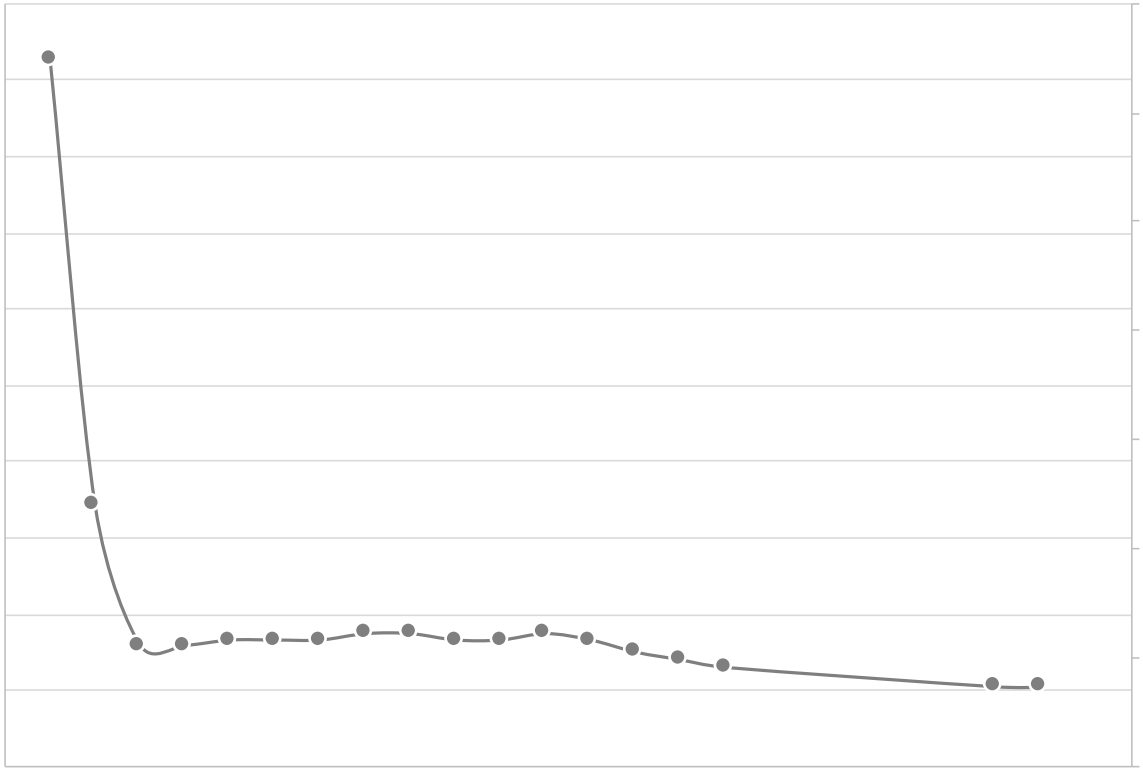
FIELD-TO-FIELD VARIATION & IMPACT OF HOP KILNING TEMPERATURE

2019 HY kilning trials & Hop Enzyme activity





Conclusion

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Acknowledgements

Oregon State University

Funding agencies

Hops

Thank you

Oregon State
Univers