

Developing Nitrogen and Potassium Fertilizer Rate Recommendations for Cigar Wrapper Tobacco in North Carolina

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Background

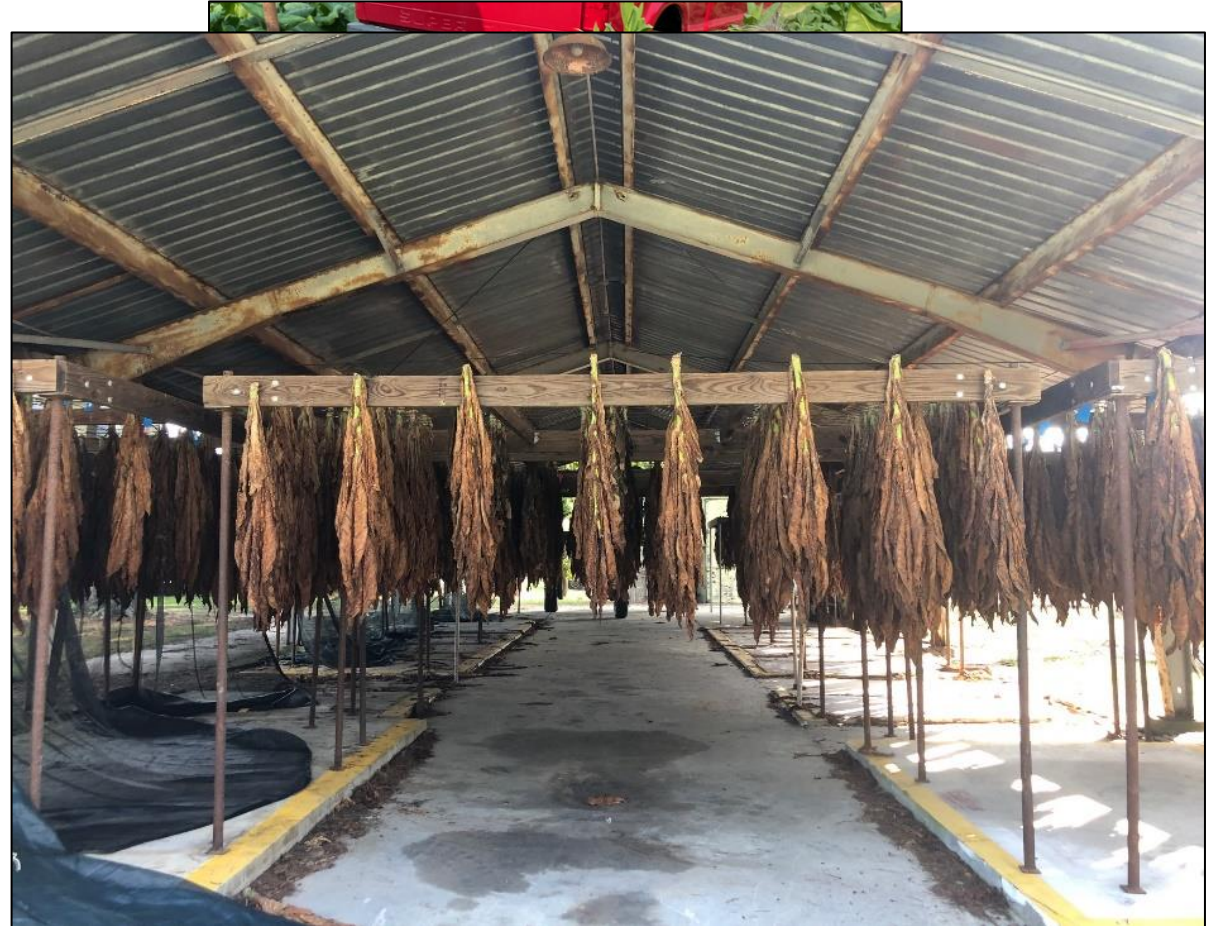
- Used to make cigars – needs to be perfect
- New crop to NC
- No researched



North Carolina

Management Overview

- Very careful handling throughout the season
- Intensive pesticide application program
- Stalk cut, air-cured



Objective



Background Production Knowledge

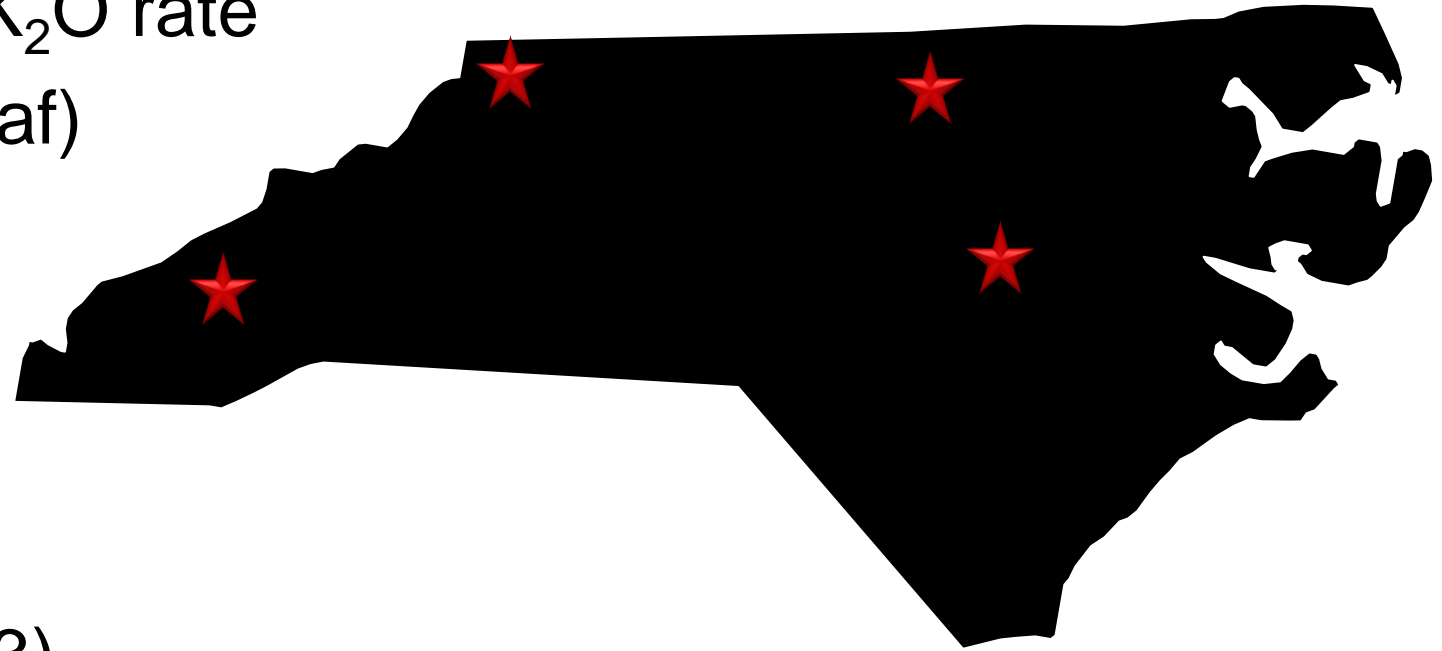
- Guidelines from industry:
 - 120 - 160 lbs N/a
 - P based on soil test
 - 150 - 200 lbs K₂O/a

ALP and Production..., 2023
- Preliminary research in Kentucky:
 - 150 - 175 lbs N/a

Bailey & Pearce, 2020

Materials & Methods

- 2 separate trials: N rate & K₂O rate
- Variety: PAB (Lancaster Leaf)
- Locations:
 - Clayton (2021 - 2023)*
 - Oxford (2021 - 2023)
 - Laurel Springs (2021)
 - Waynesville (2021 - 2023)
- Data analyzed in R version 4.3.2 with nlme package



N Rate Trial

- 0, 80, 160, 240, 320, & 400 lbs N/a (n=6)
- RCBD with 4 blocks
- Split-applied as 28% UAN @ transplanting & 3 WAT
- All other nutrients consistent

K₂O Rate Trial

- 0, 50, 100, 150, 200, 250, & 300 lbs K₂O/a (n=7)
- RCBD with 4 blocks
- Sidedressed as potassium sulfate @ transplanting
- All other nutrients consistent

Initial Soil Samples in Potassium Trials

Environment	pH	K (mg/dm ³)
CC22	5.8	52.3
CC21	5.6	54.5
OX23	6.1	70.3
CC23	6.3	88.8
LS21	5.8	92.5
OX21	5.6	95.2
OX22	5.9	111.3
W22	6.3	134.3
W21	5.6	141.8
W23	6.1	149.8

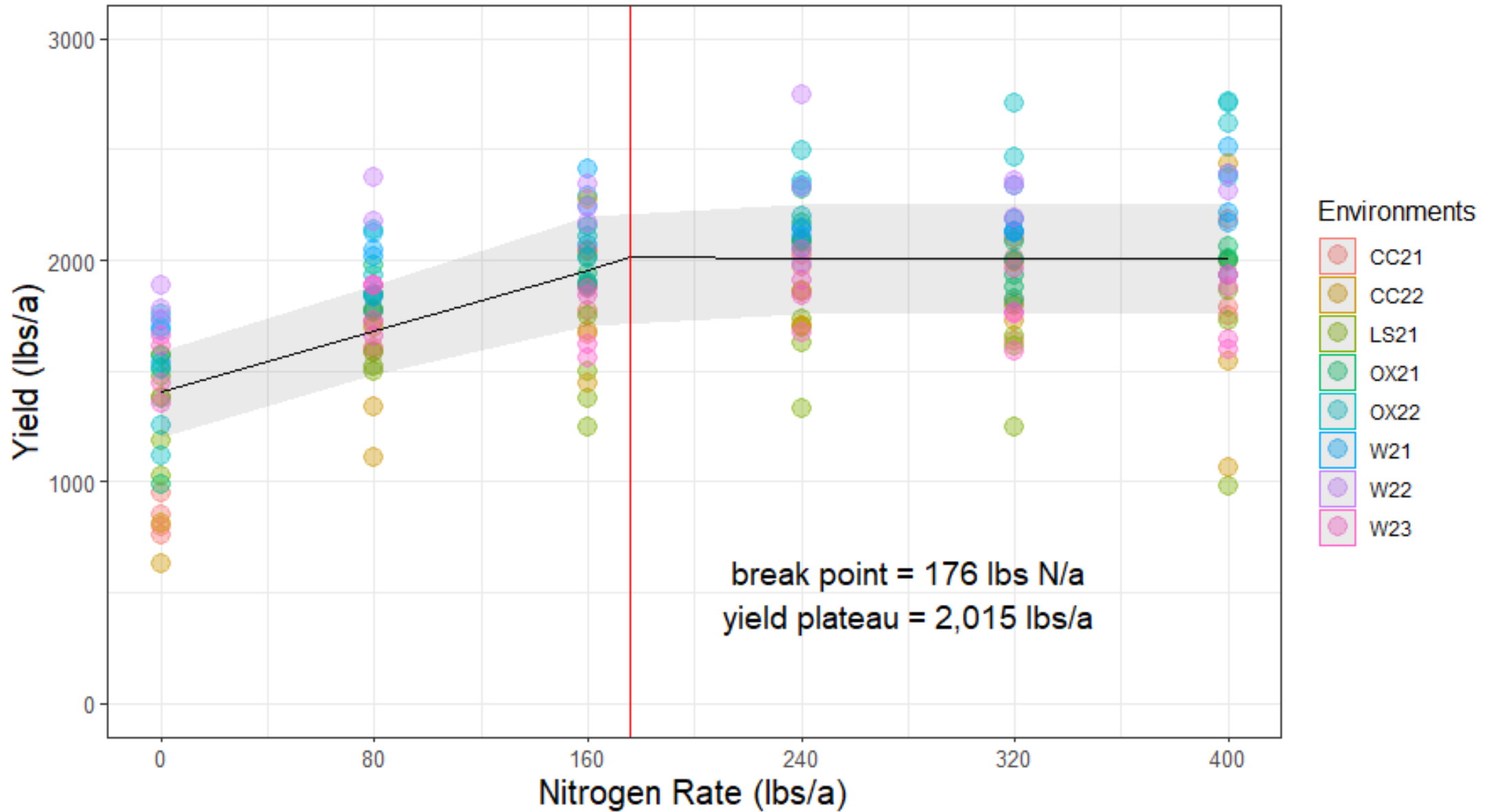
Data Collection

- Yield
- Visual Quality
- Cured leaf alkaloids



Yield

Nitrogen Rate Effect on Cigar Wrapper Yield





0 lbs N/a



80 lbs N/a

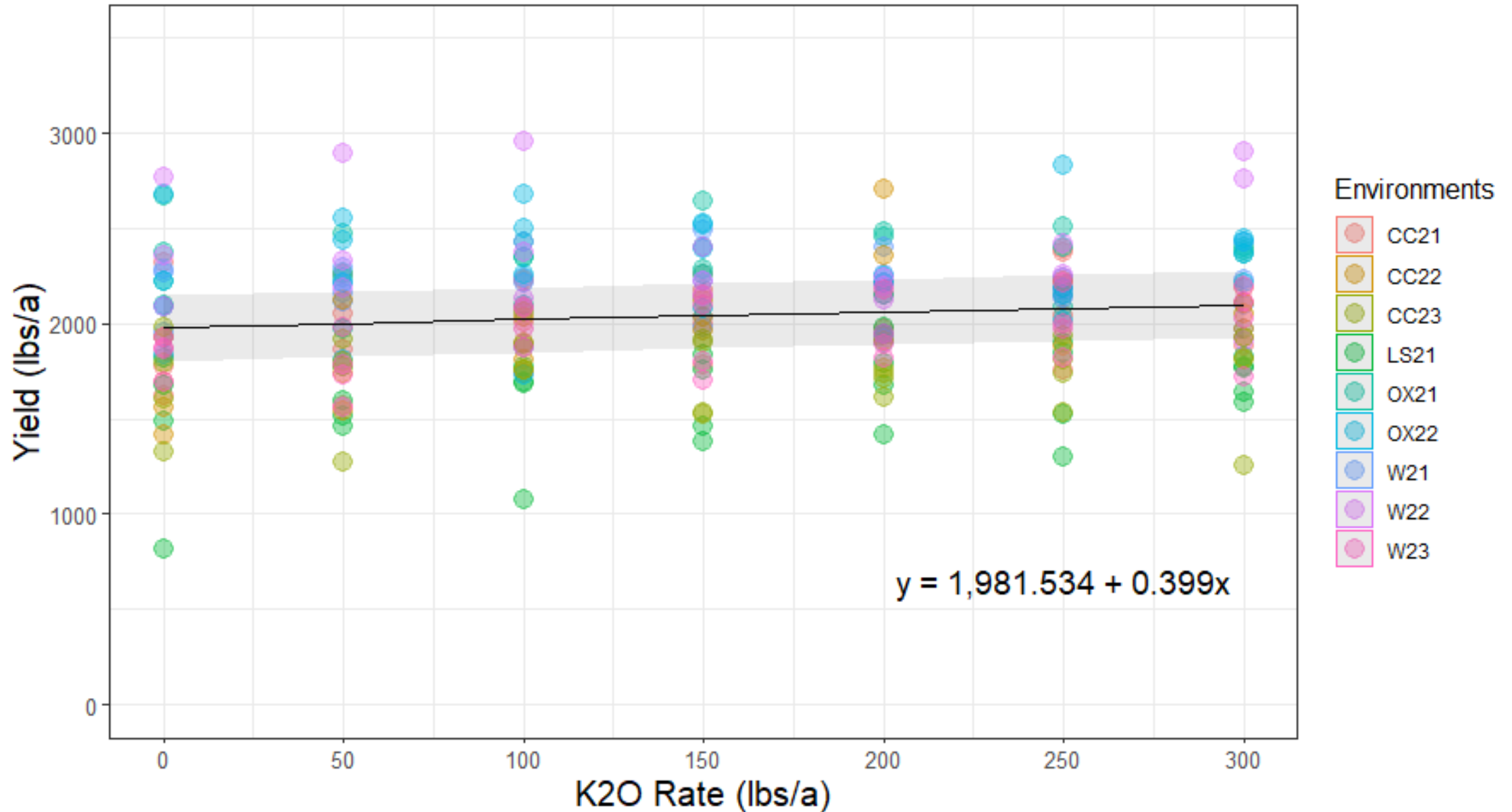


160 lbs N/a



240 lbs N/a

Potassium Rate Effect on Cured Leaf Yield



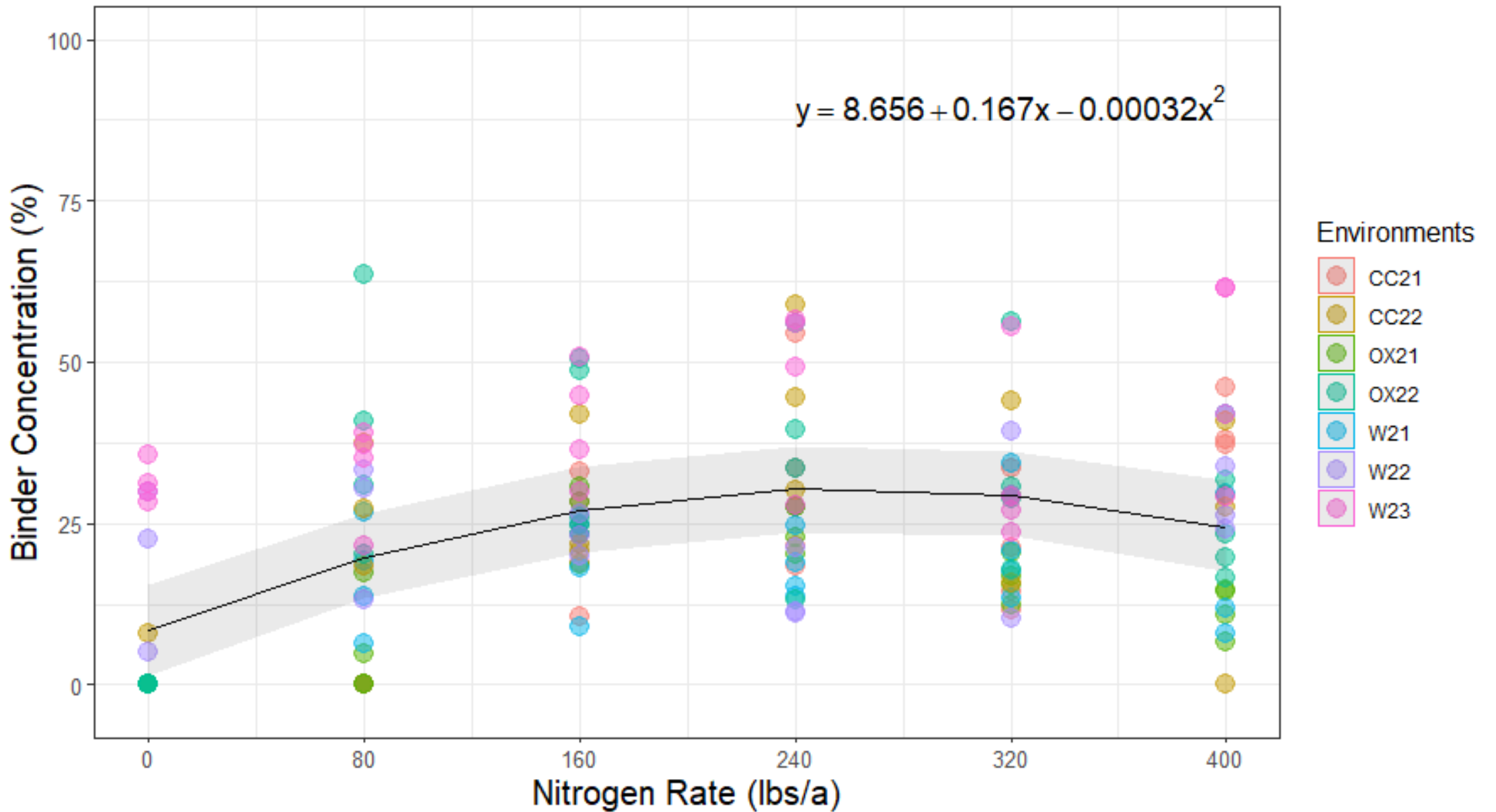
Visual Quality

Cigar Wrapper Quality Grades

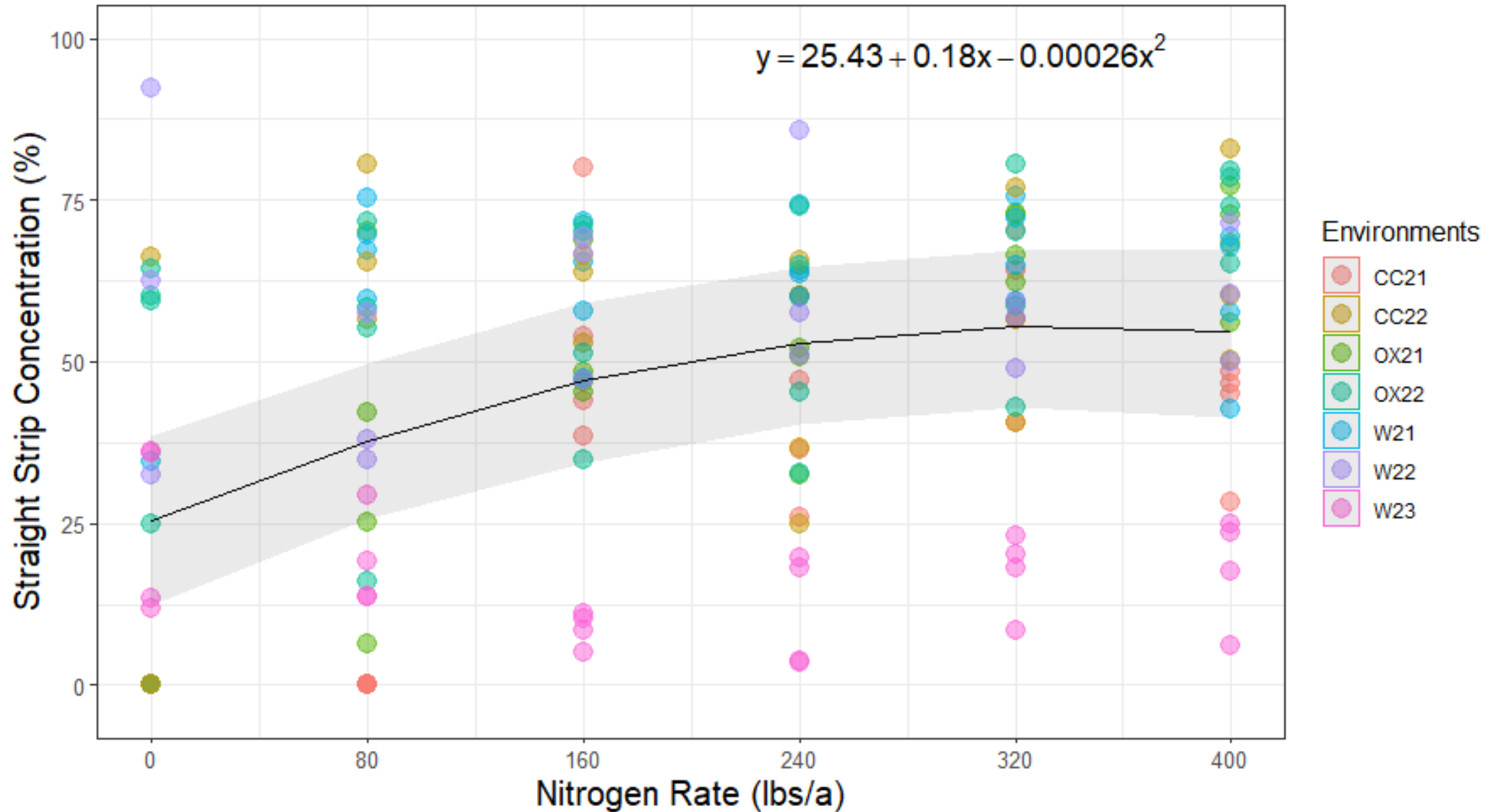
- Wrapper
- Binder
- Straight Strip
- Filler



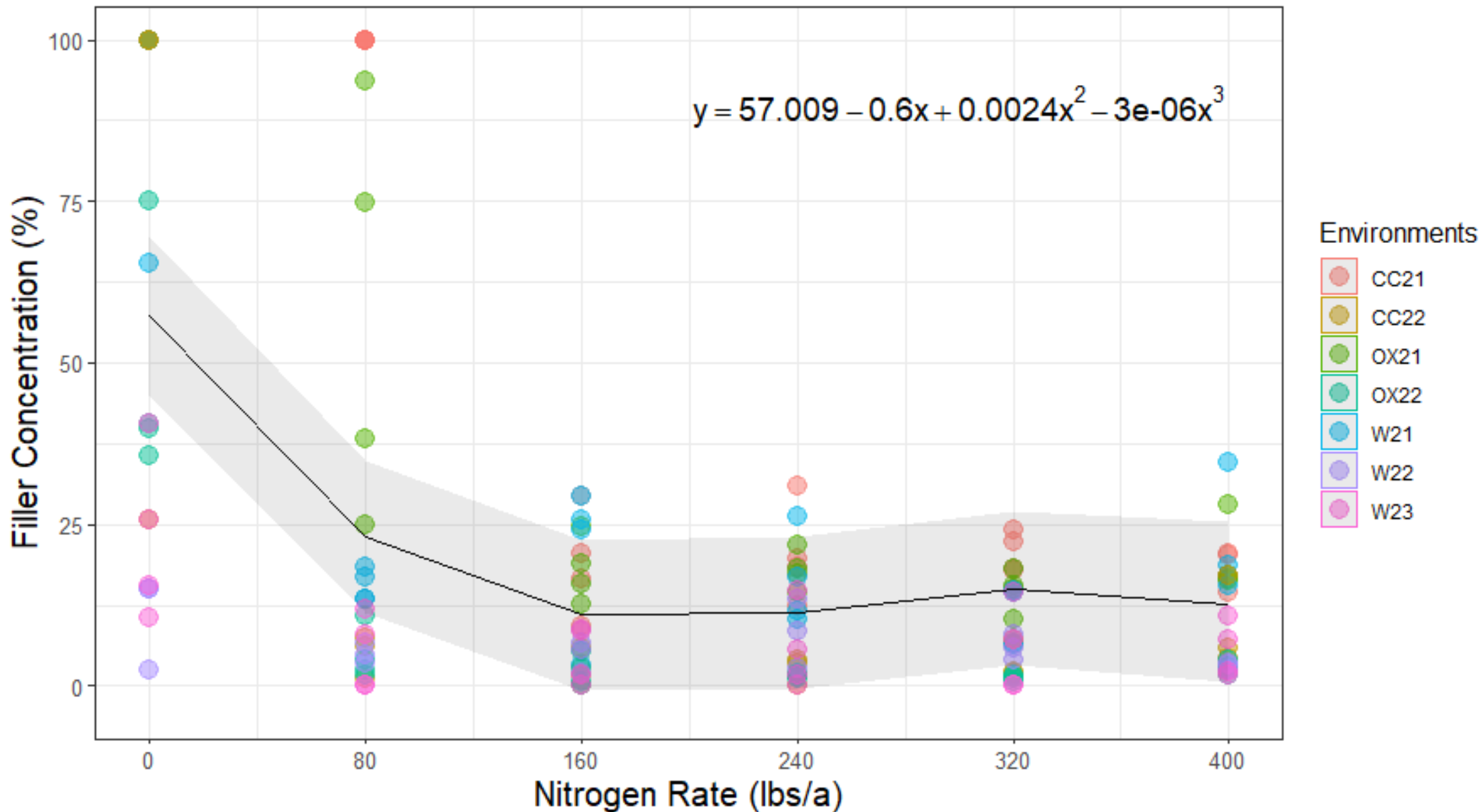
Nitrogen Rate Effect on Binder Concentration



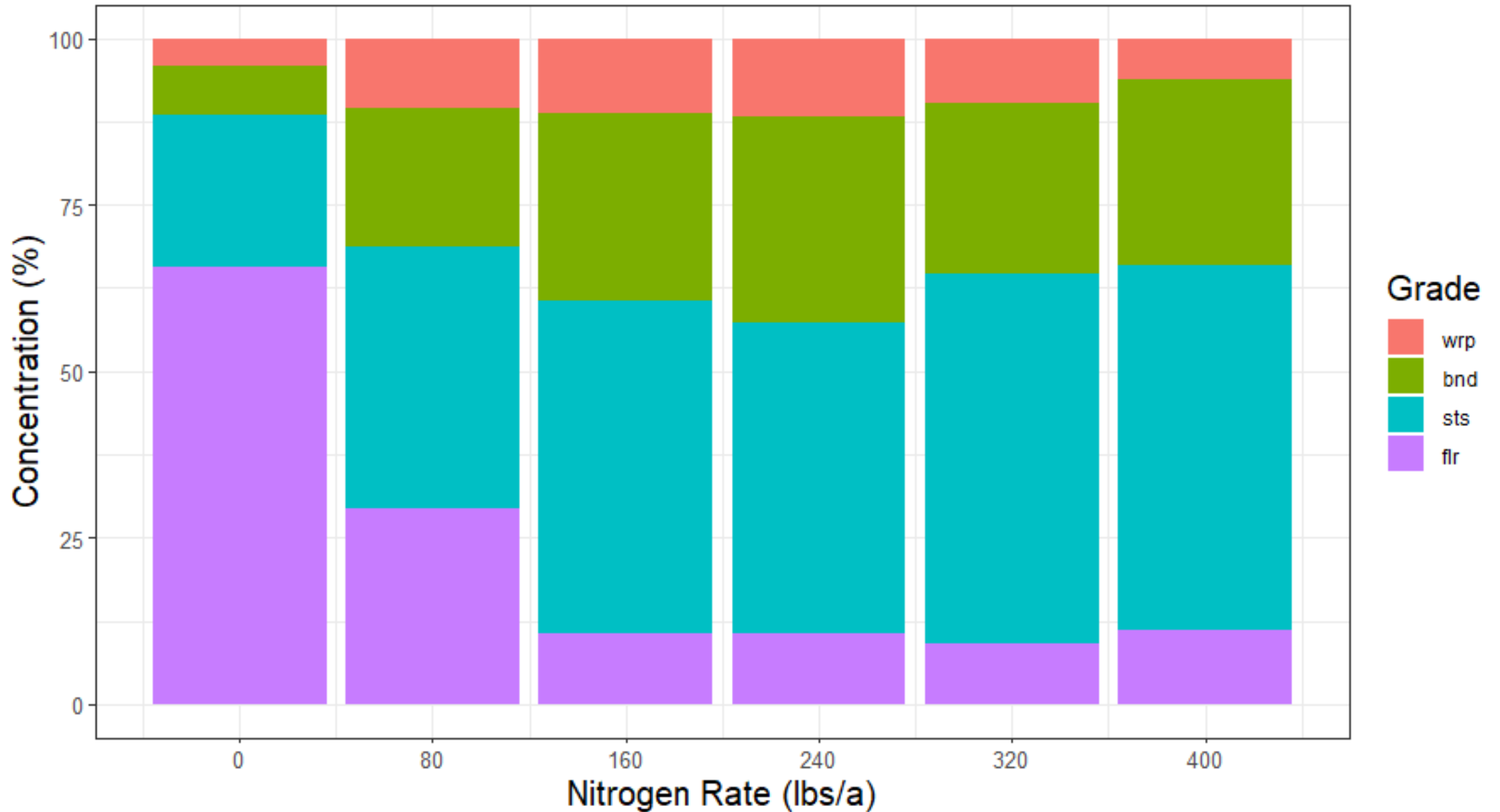
Nitrogen Rate Effect on Straight Strip Concentration



Nitrogen Rate Effect on Filler Concentration



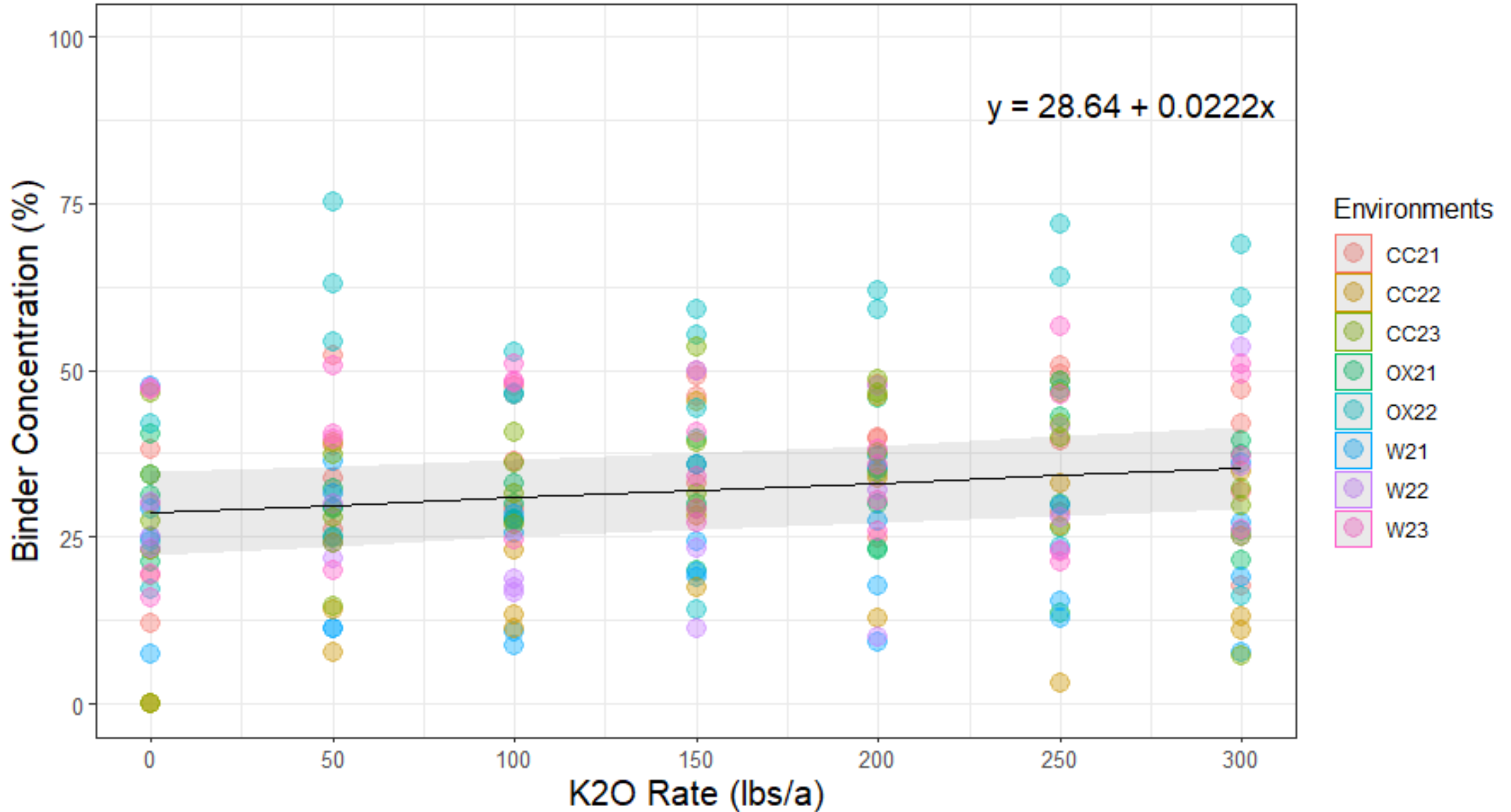
Nitrogen Rate Effect on Cigar Wrapper Grade



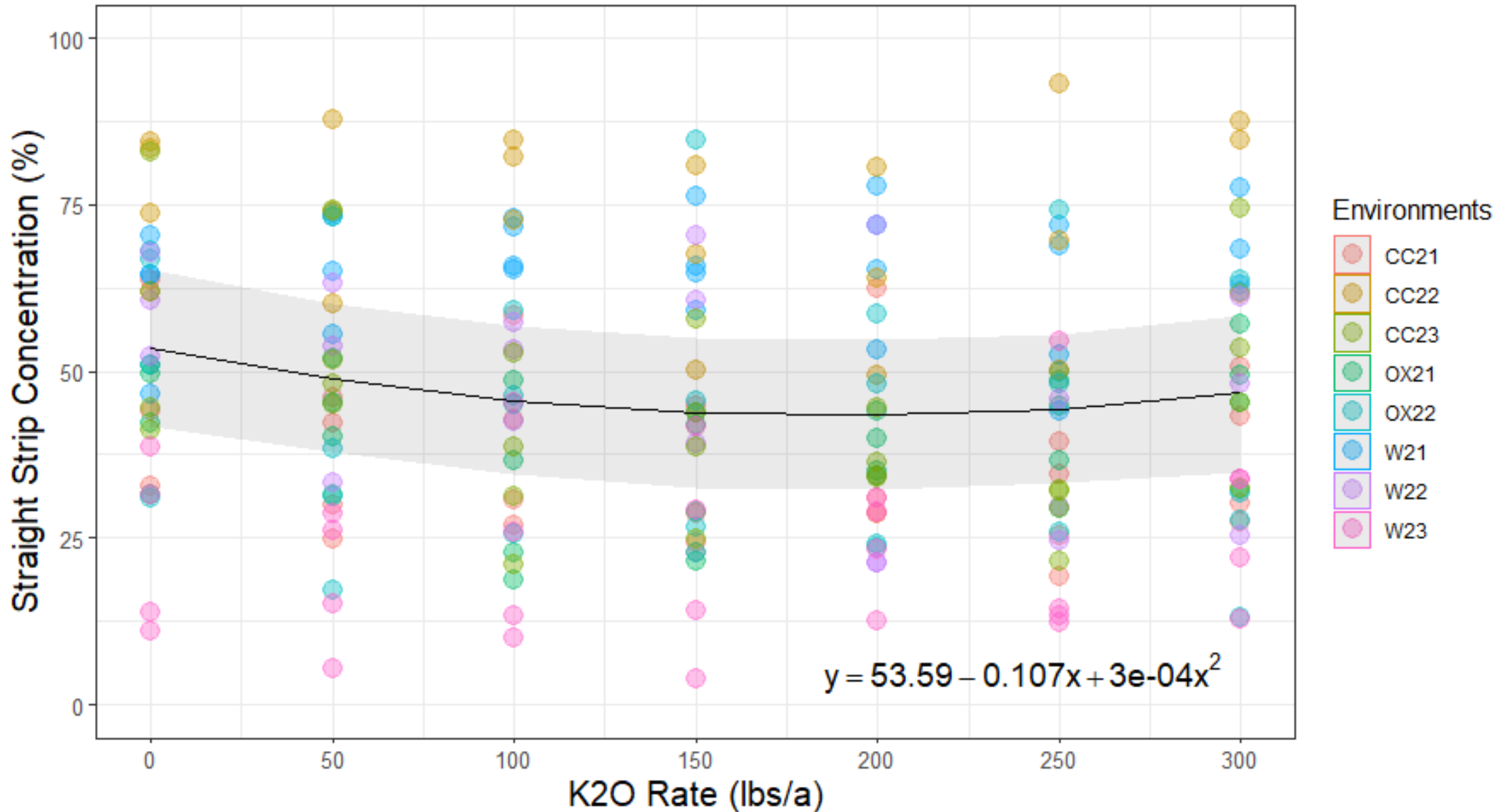
Visual Nitrogen Deficiency



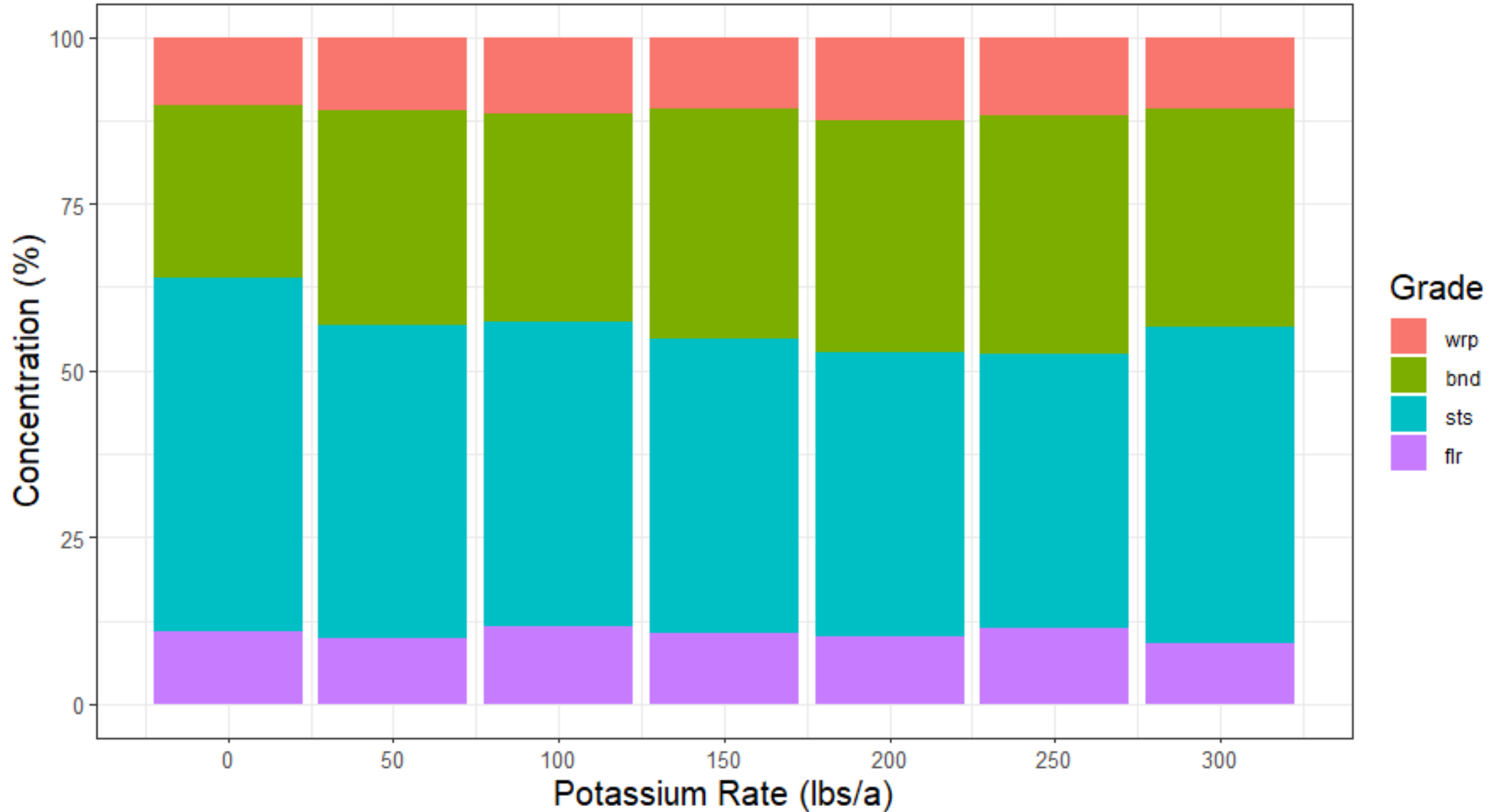
Potassium Rate Effect on Binder Concentration



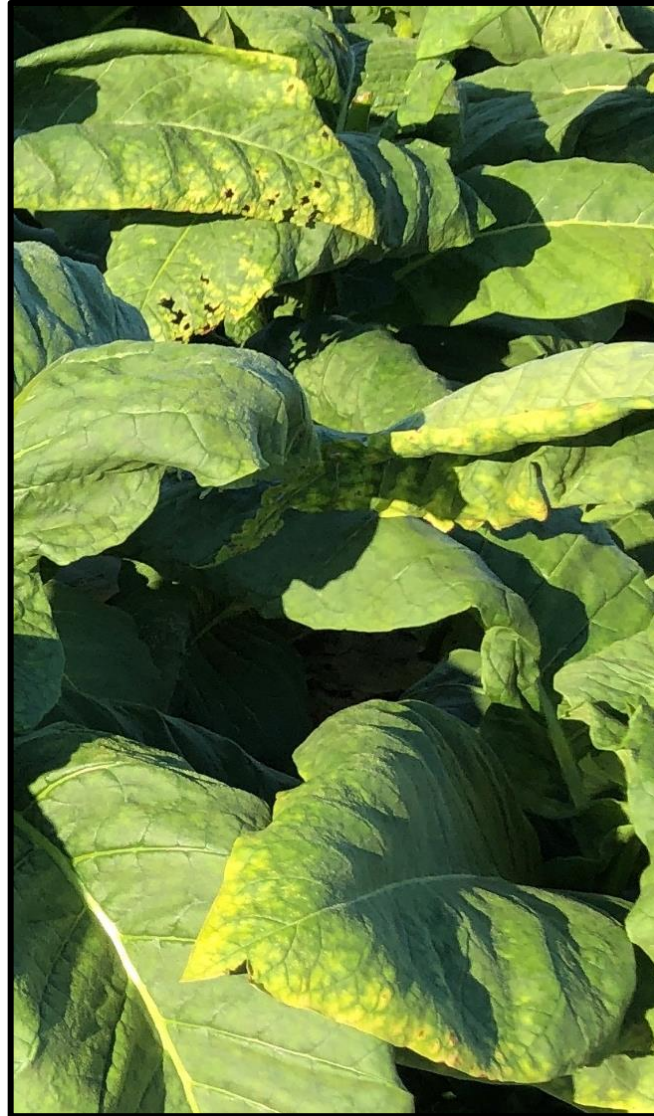
Potassium Rate Effect on Straight Strip Concentration



Potassium Rate Effect on Cigar Wrapper Grade

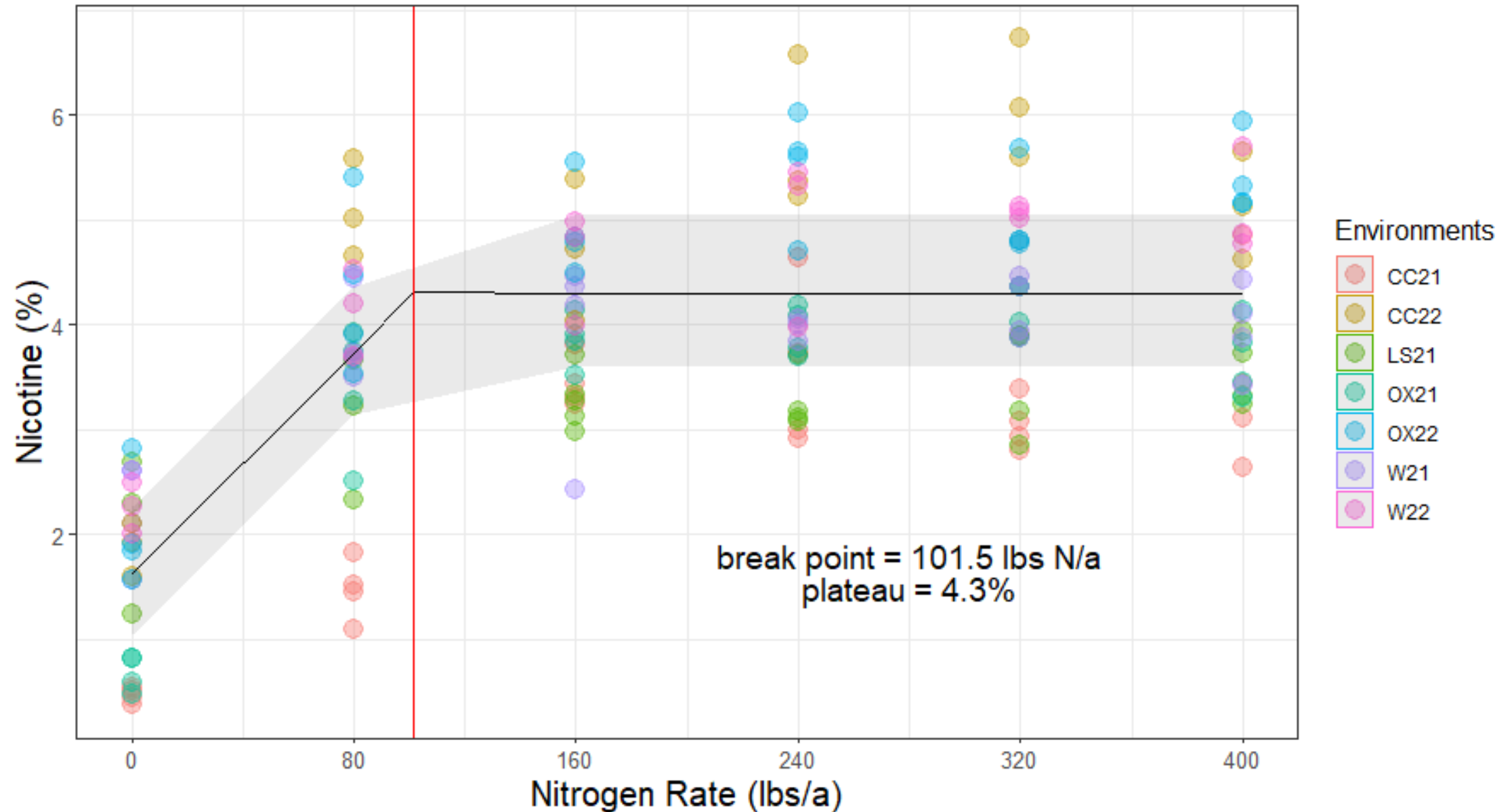


Visual Potassium Deficiency

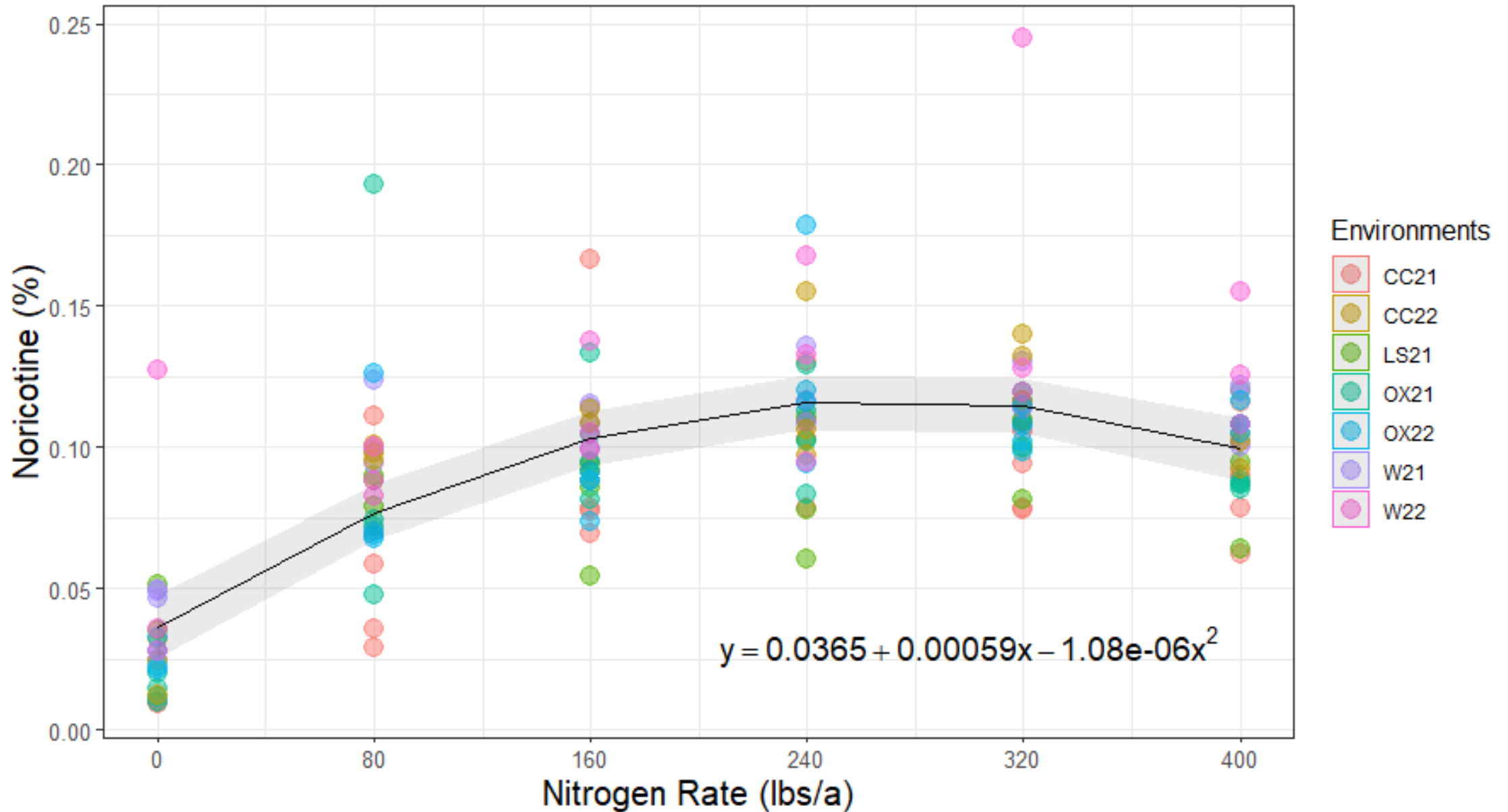


Cured Leaf Alkaloids

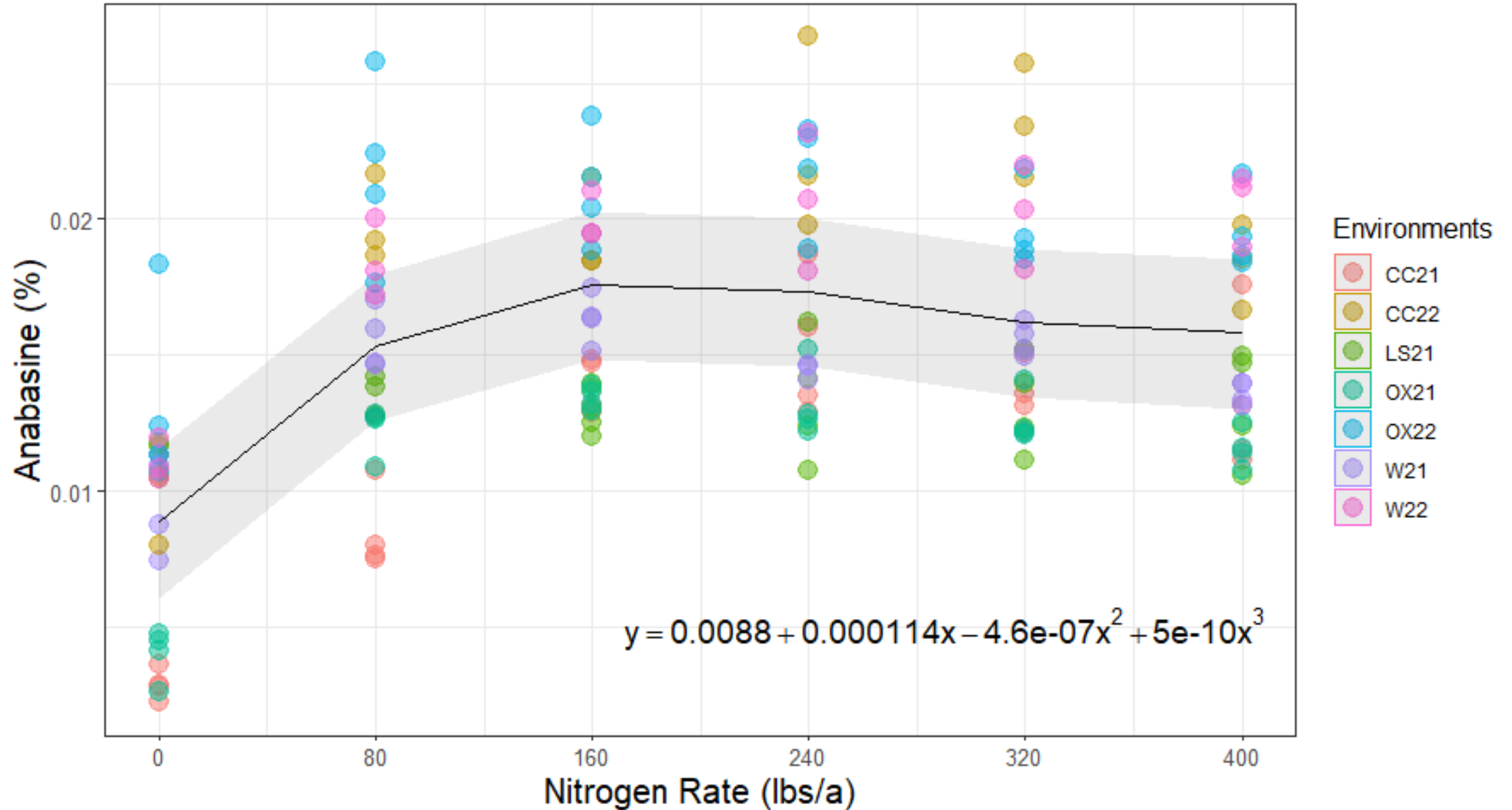
Nitrogen Rate Effect on Nicotine Concentration



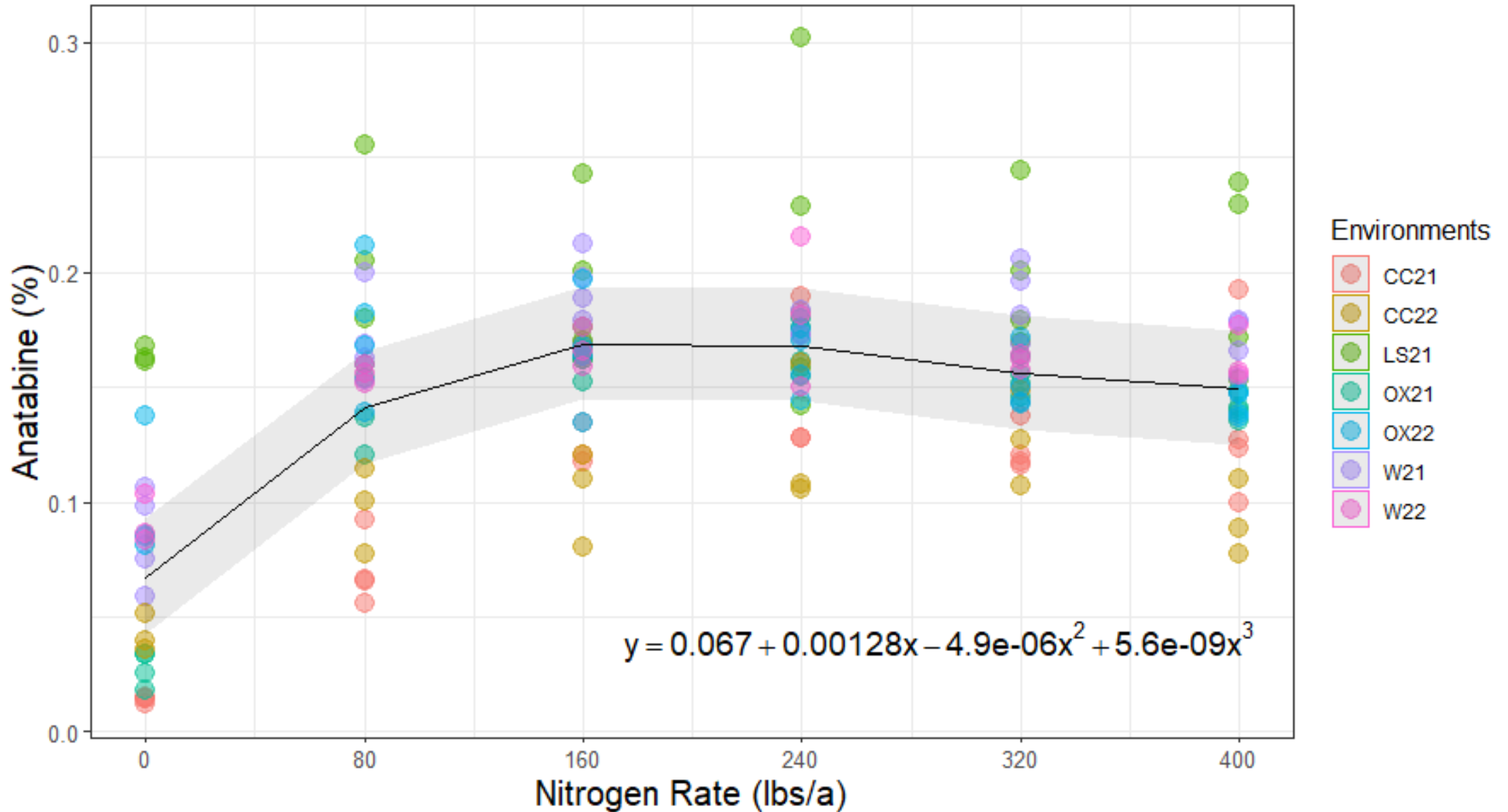
Nitrogen Rate Effect on Nornicotine Concentration



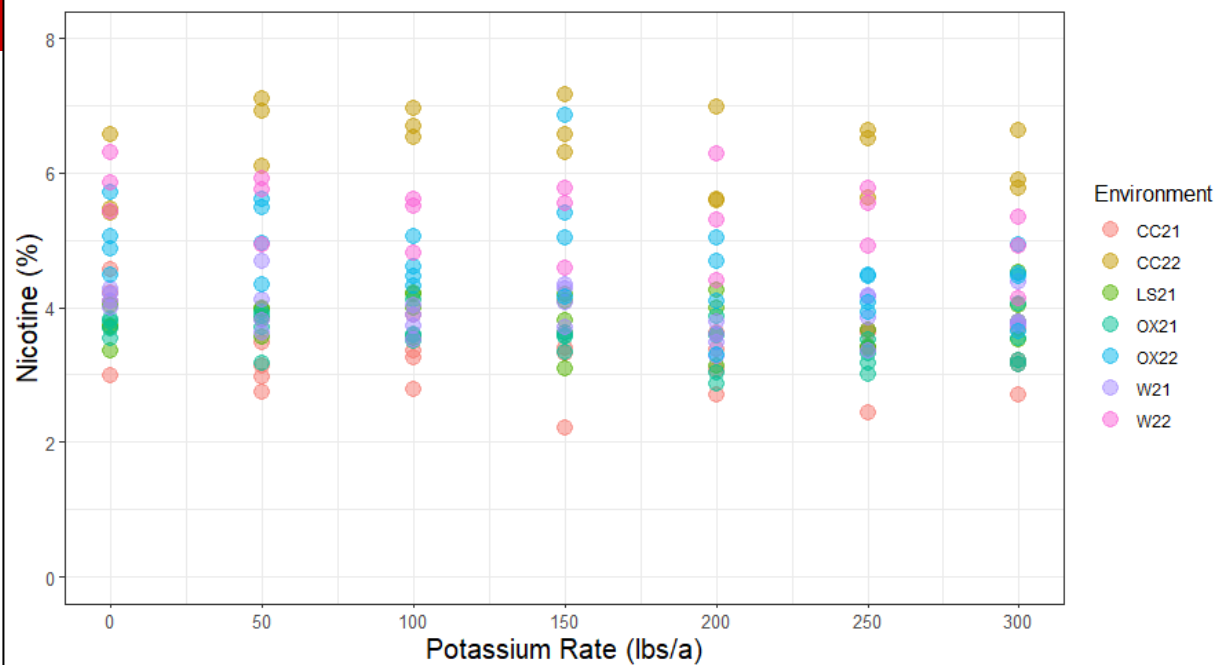
Nitrogen Rate Effect on Anabesine Concentration



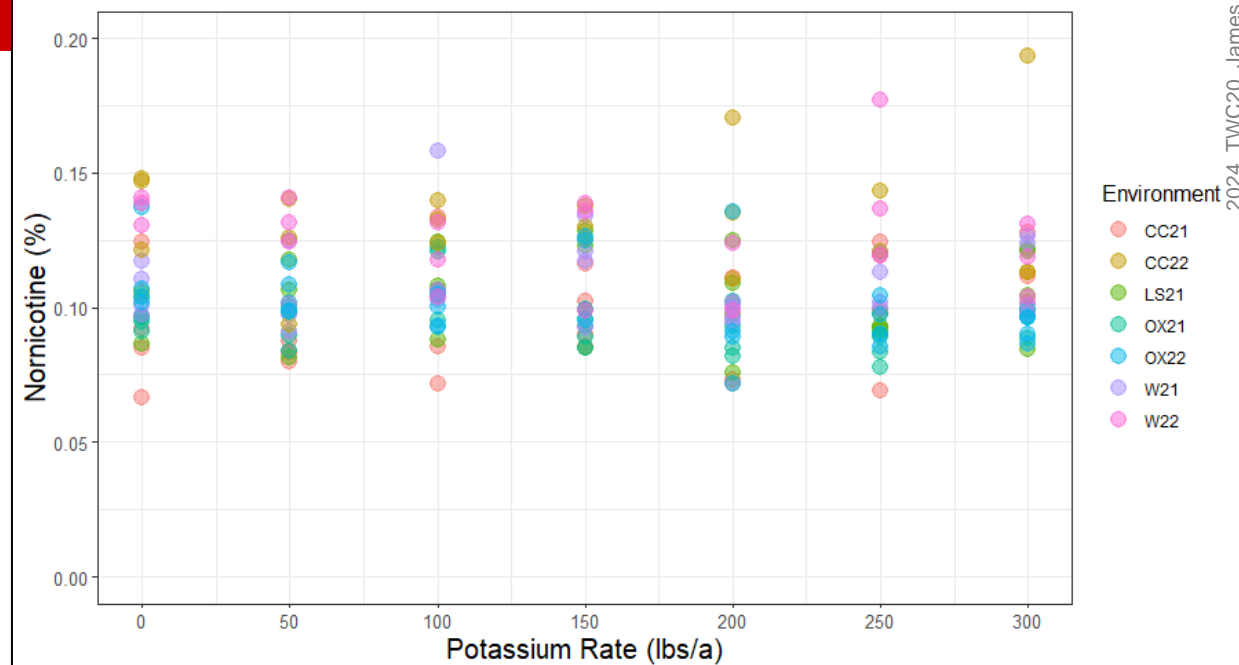
Nitrogen Rate Effect on Anatabine Concentration



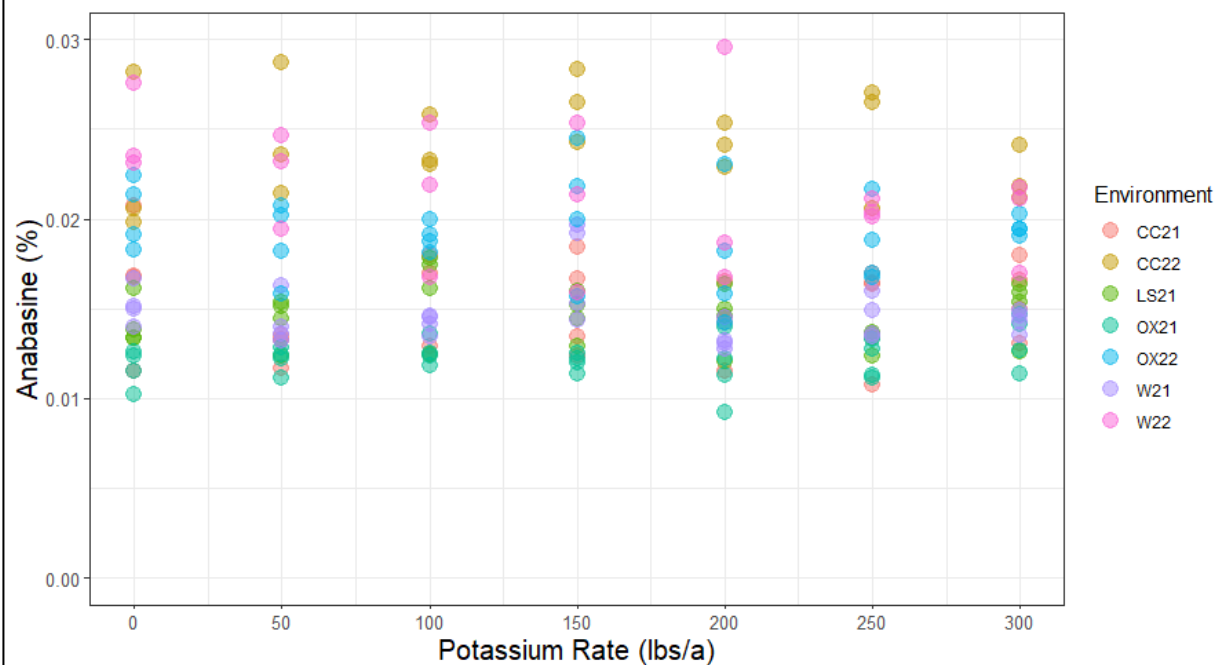
Potassium Rate Effect on Nicotine Concentration



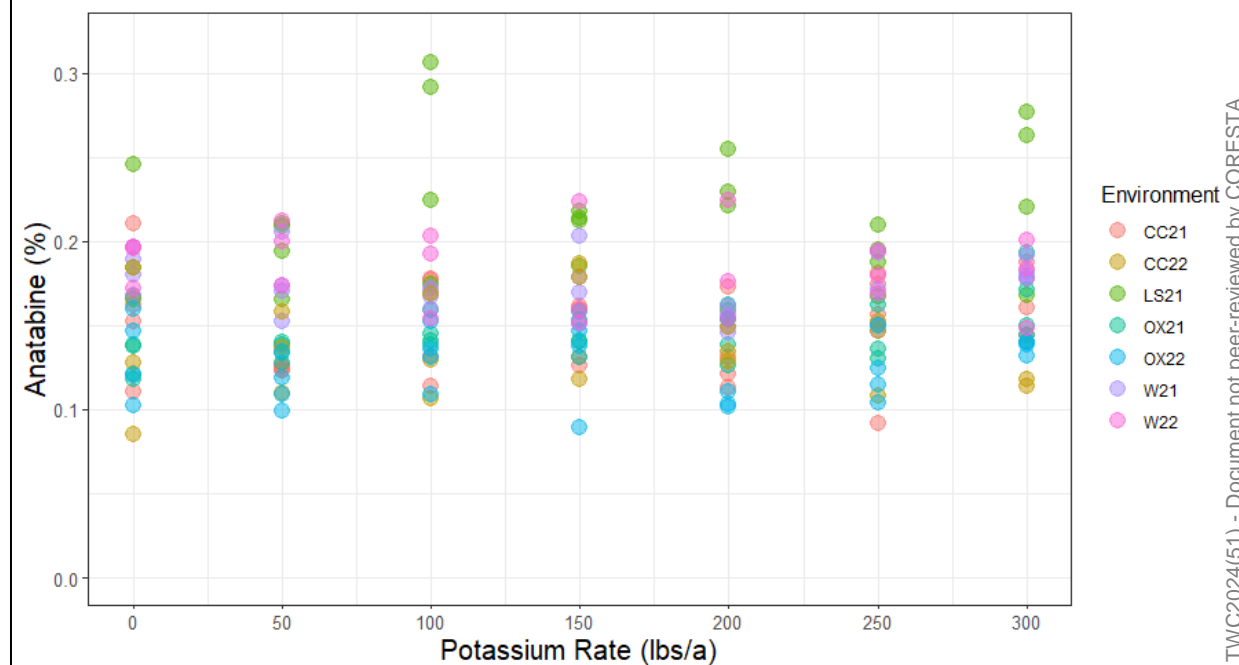
Potassium Rate Effect on Nornicotine Concentration



Potassium Rate Effect on Anabasine Concentration



Potassium Rate Effect on Anatabine Concentration

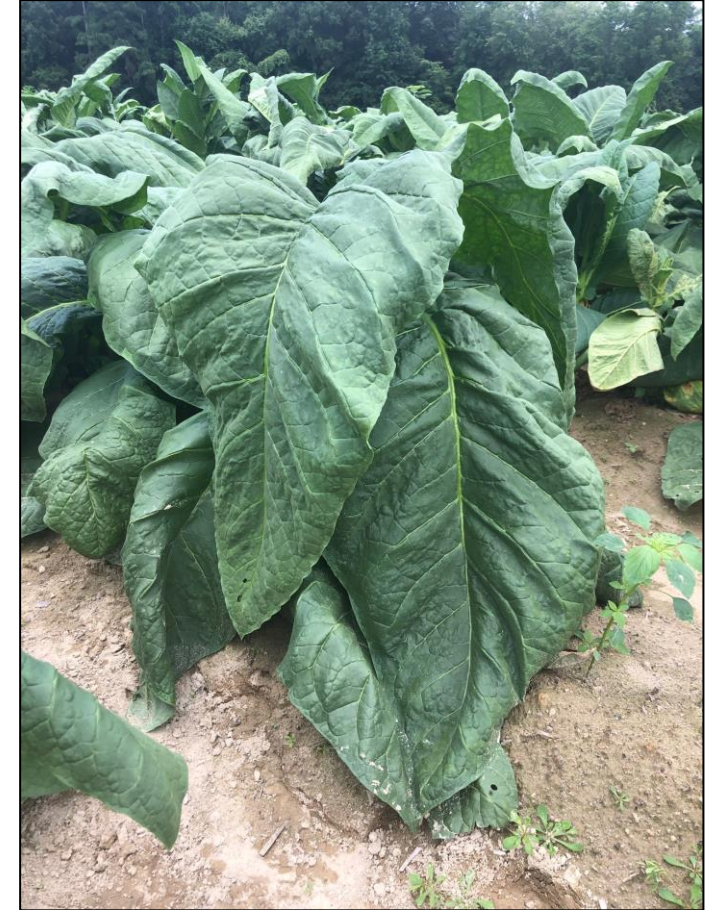


Preliminary Conclusions

- *Nitrogen*
 - 175 lbs N/acre to maximize yield without overapplying
 - Appropriate rate for visual quality & alkaloids
 - N rate affects quality, but need improvement in other management aspects: insect control & handling
 - No and low N treatments did not cure well.
- *Potassium*
 - Anticipate a maintenance application rate of K: 150 lbs/acre
 - Potassium deficiency observed in fields with low initial K
- *Nitrogen appears to be more impactful to yield and quality than K.*

Acknowledgements

- NCDA – New & Emerging Crops Program
- NCSU Tobacco Agronomy & Soil Fertility
- Central Crops Research Station, Oxford
Tobacco Research Station, Upper Mountain
Research Station, & Mountain Research Station
- Lancaster Leaf – Lancaster, PA



References

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https://darktobacco.ca.uky.edu/files/connecticut_broadleaf_cigar_wrapper_tobacco_fact_sheet_2020.pdf

ALP and Production Guidelines: For all LLTC Contracted Tobacco Types 2023. 2023. Universal, Lancaster Leaf Tobacco Company of Pennsylvania, Inc., Lancaster, PA. p.21.

Questions?

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