

Small Grain Variety Trial Results & Inoculant Research

CARC Research Roundup, December 7, 2017

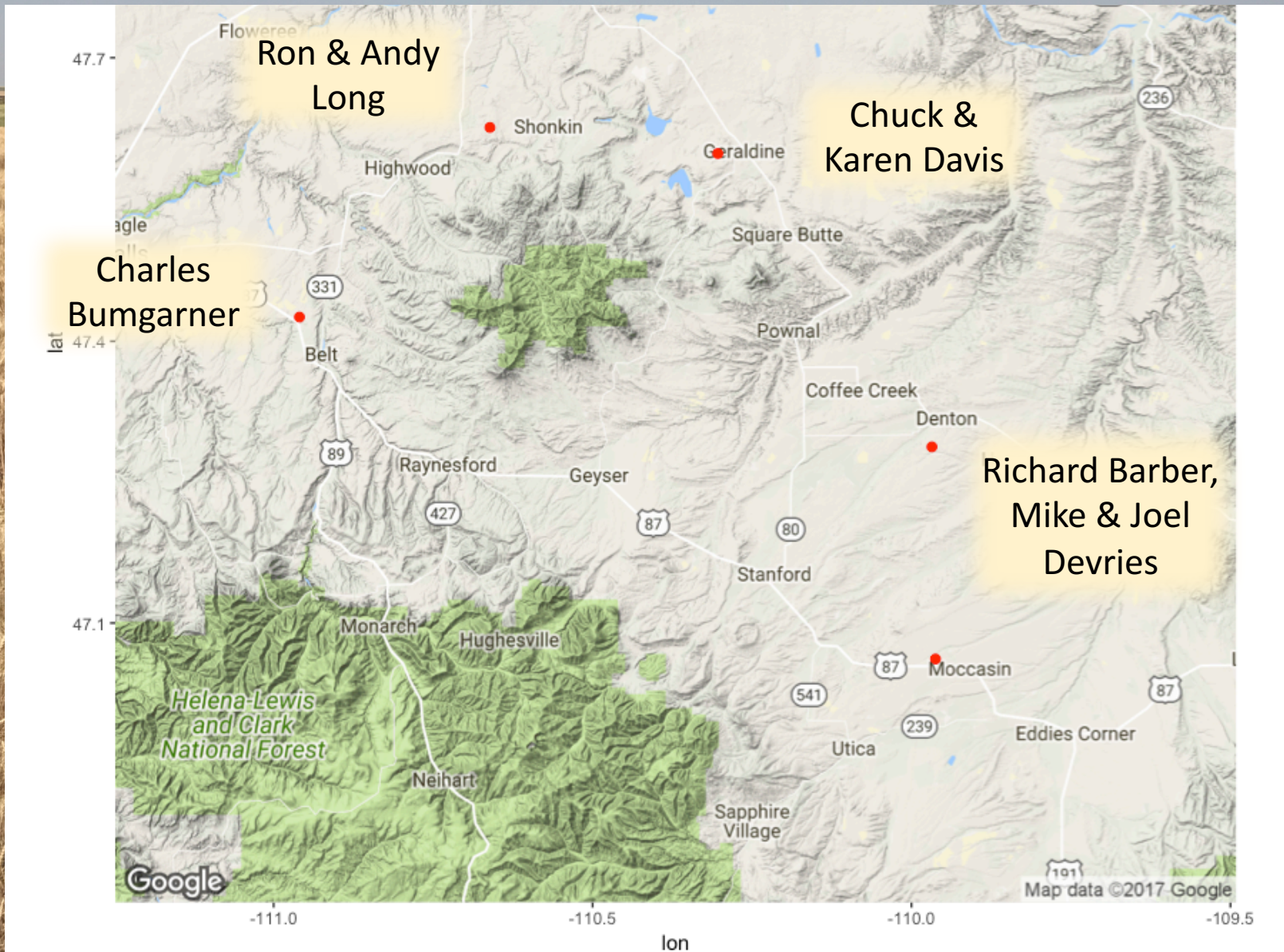
Dr. Jed Eberly

Assistant Professor, Agronomy and Soil Microbiology

Montana State University

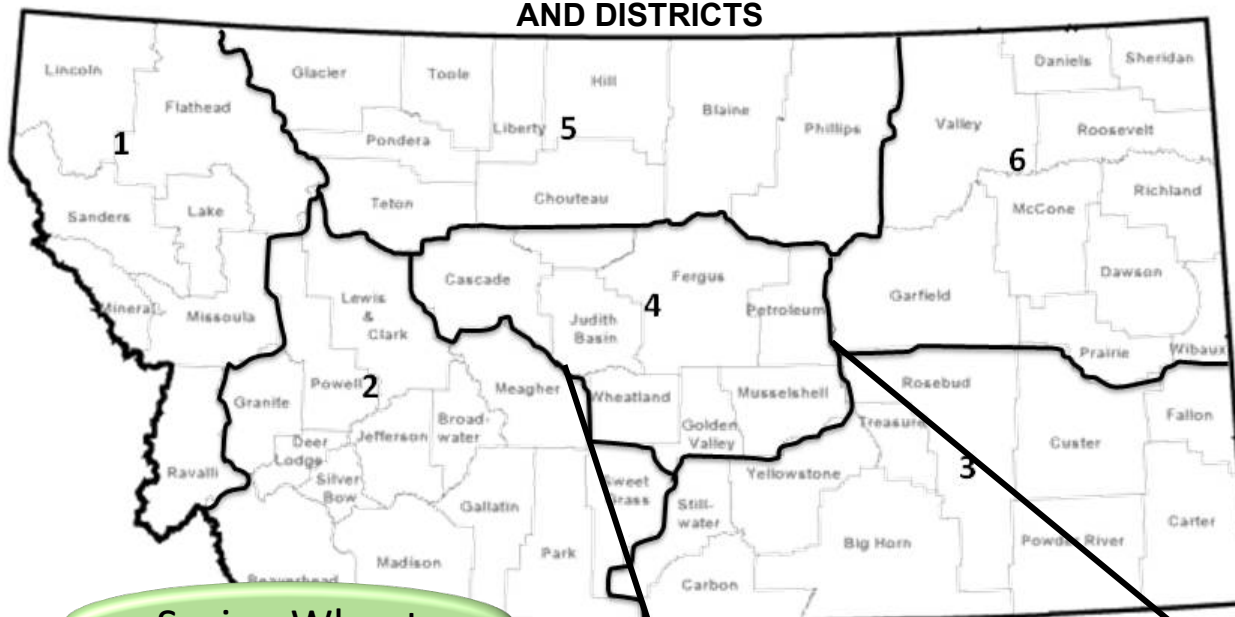
Central Agriculture Research Center

Regional Cooperators



2017 District 4 Recommended Varieties

MONTANA COUNTIES AND DISTRICTS



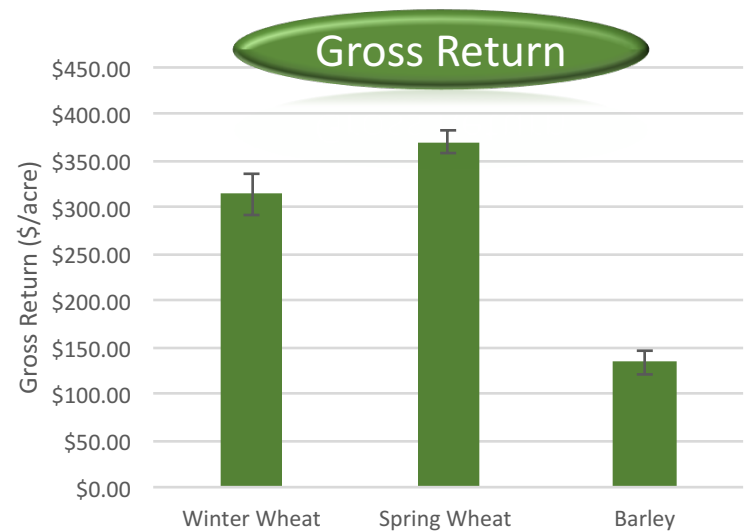
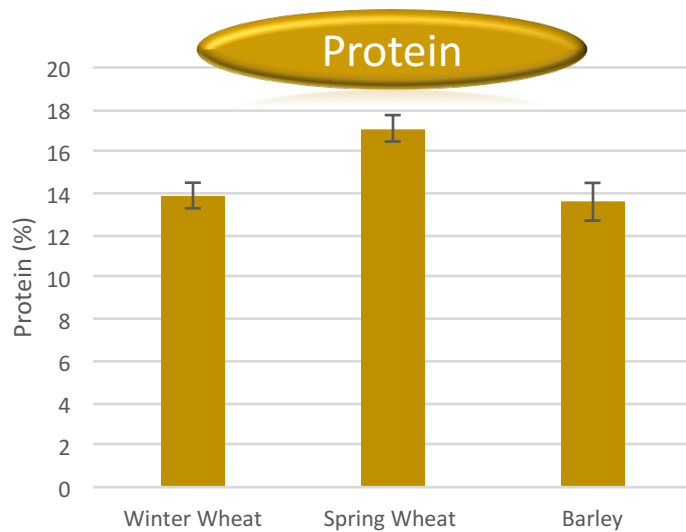
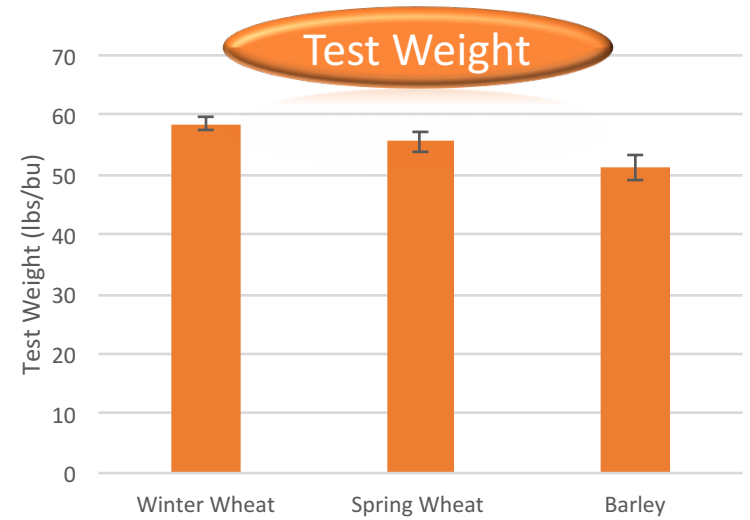
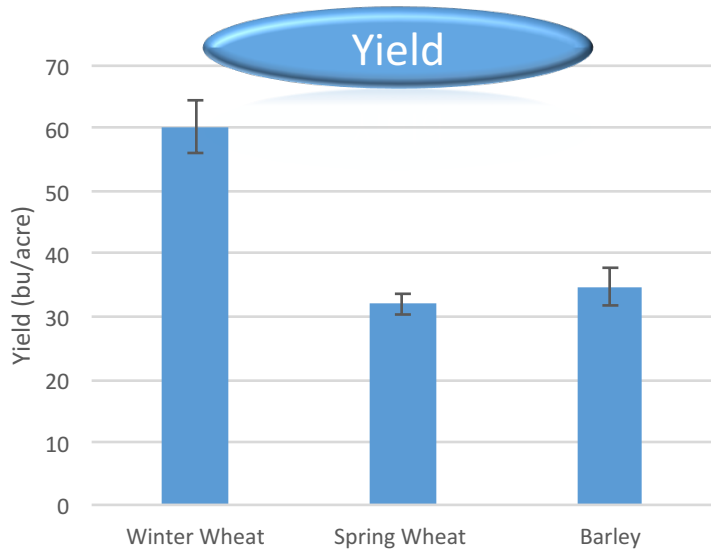
Spring Wheat

- | | |
|---------|--------------|
| Choteau | SY Soren |
| Corbin | SY Tyra |
| Duclair | Westbred 926 |
| Hank | Vida |
| Jedd | WB Gunnison |
| Kelby | QB9879CLP |
| McNeal | *SY Ingmar |
| O'Neal | *LCS Pro |

Winter Wheat

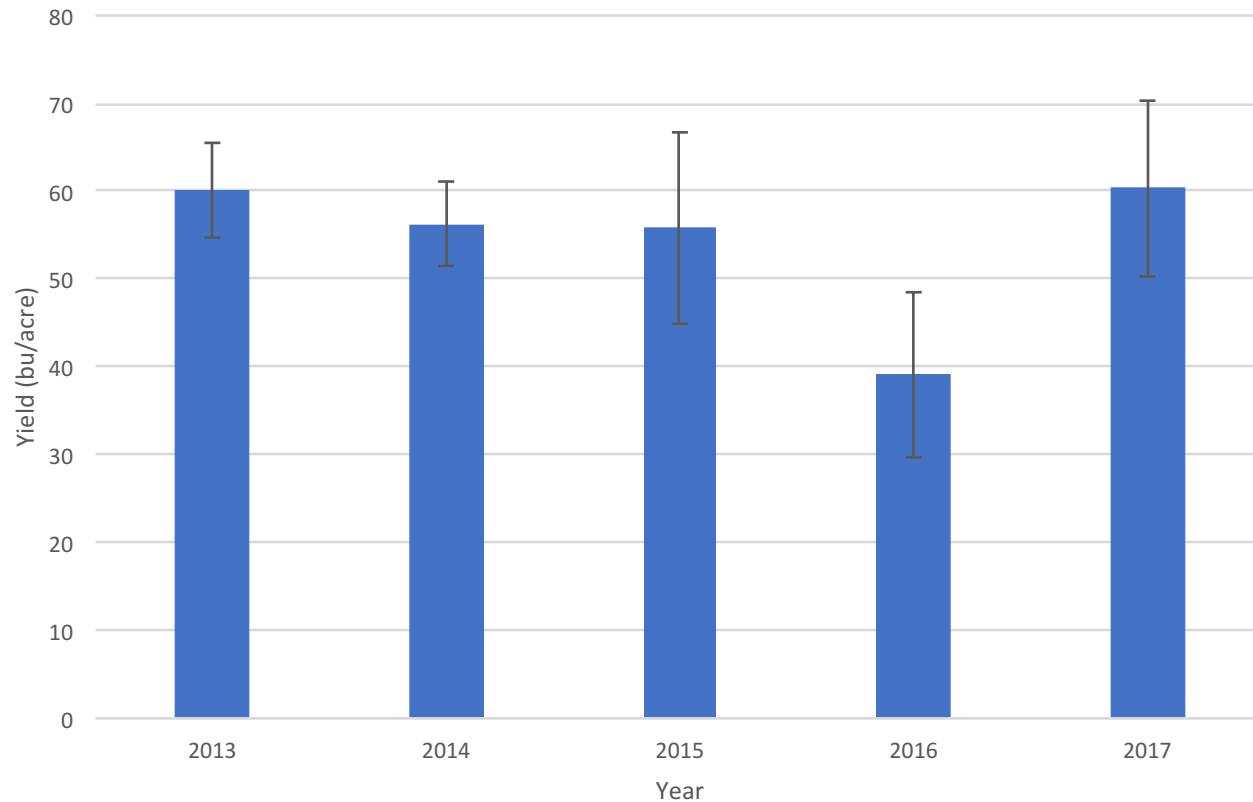
- | | |
|---------|-------------|
| Bearpaw | Northern |
| Coulter | SY Wolf |
| Decade | Warhorse |
| Judee | WB-Quake |
| Keldin | Yellowstone |
| Loma | |

Cereal VT Overview, Moccasin, MT

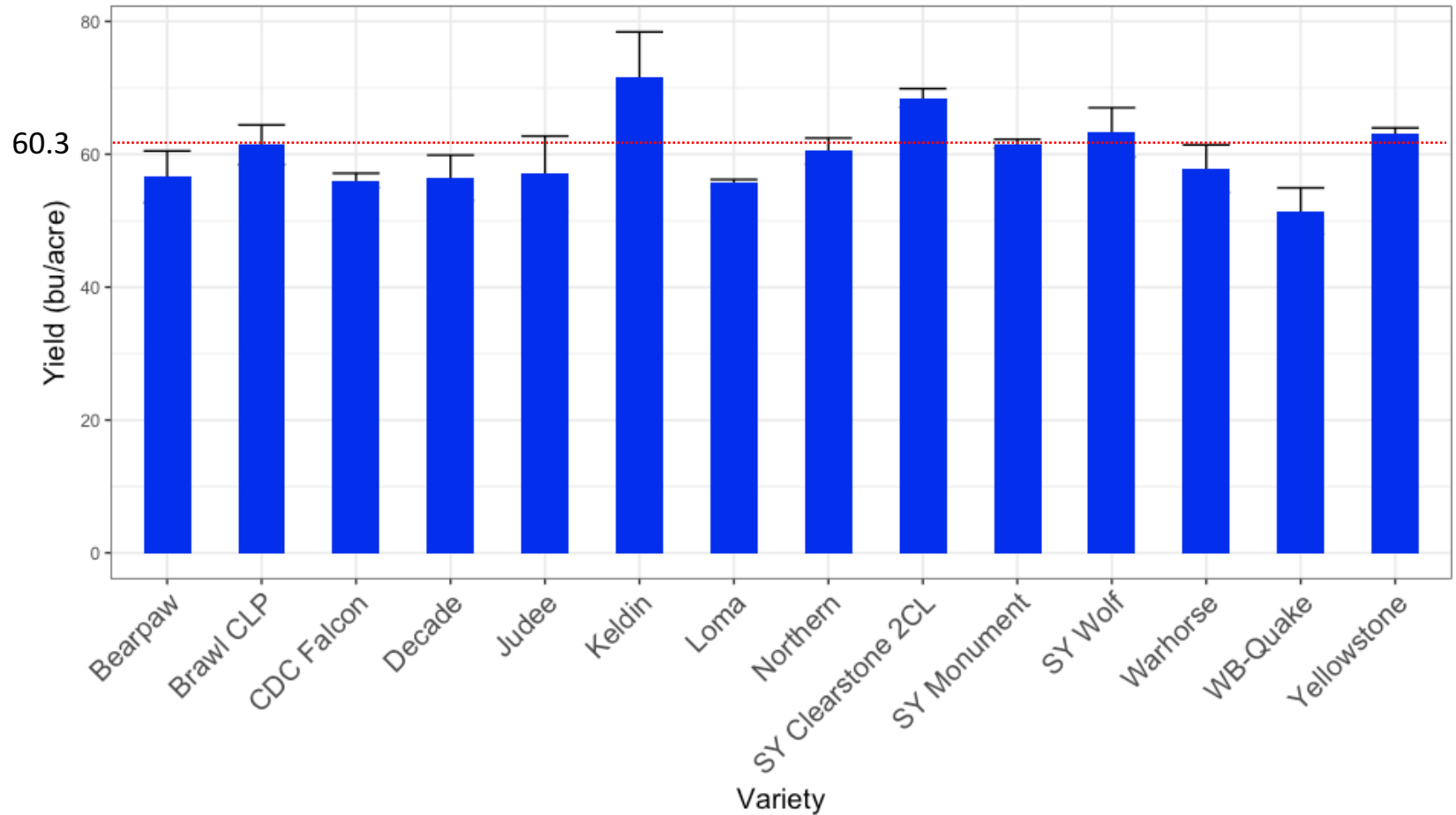


Moccasin Winter Wheat Results

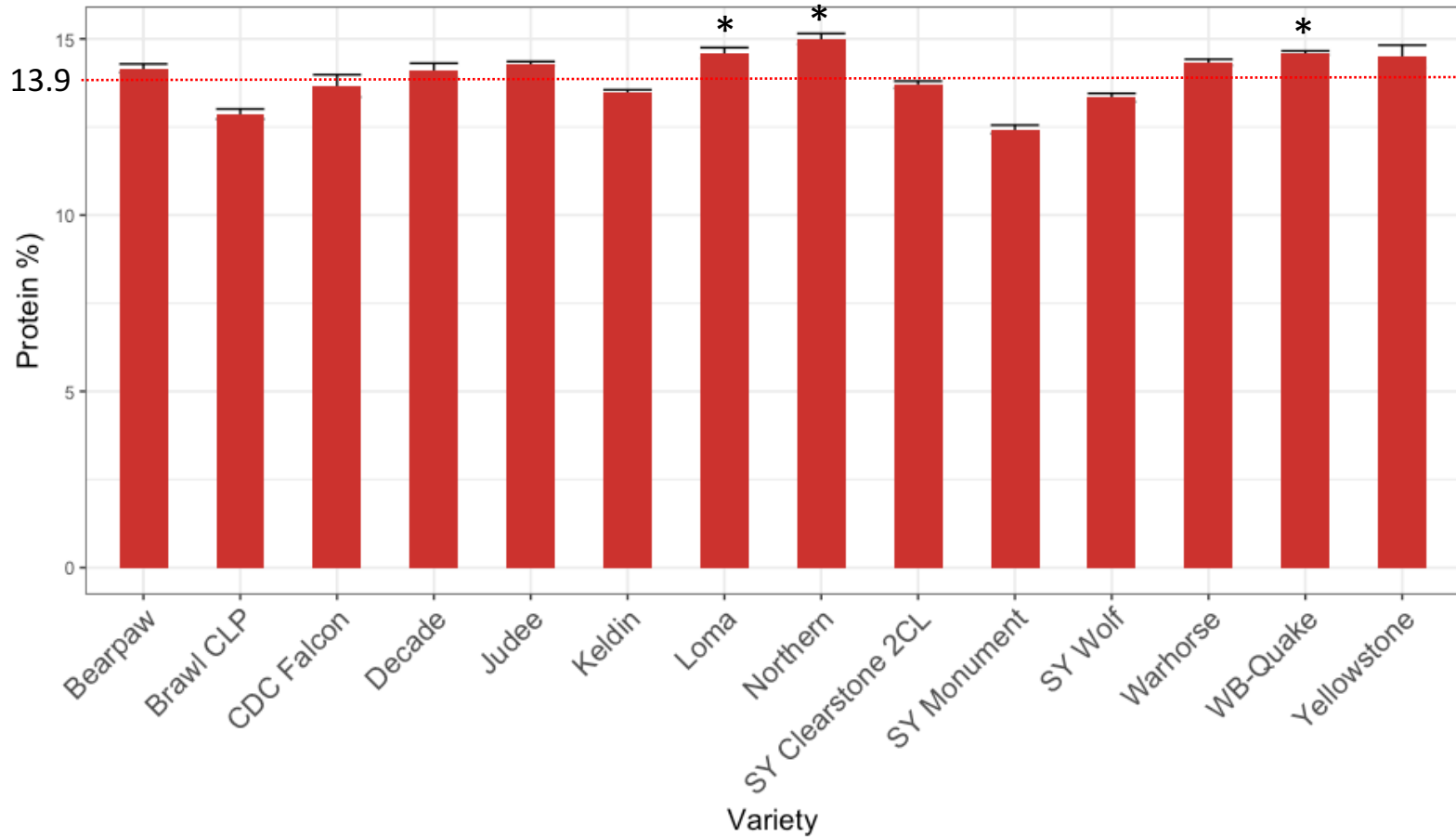
Moccasin average yield past 5 years



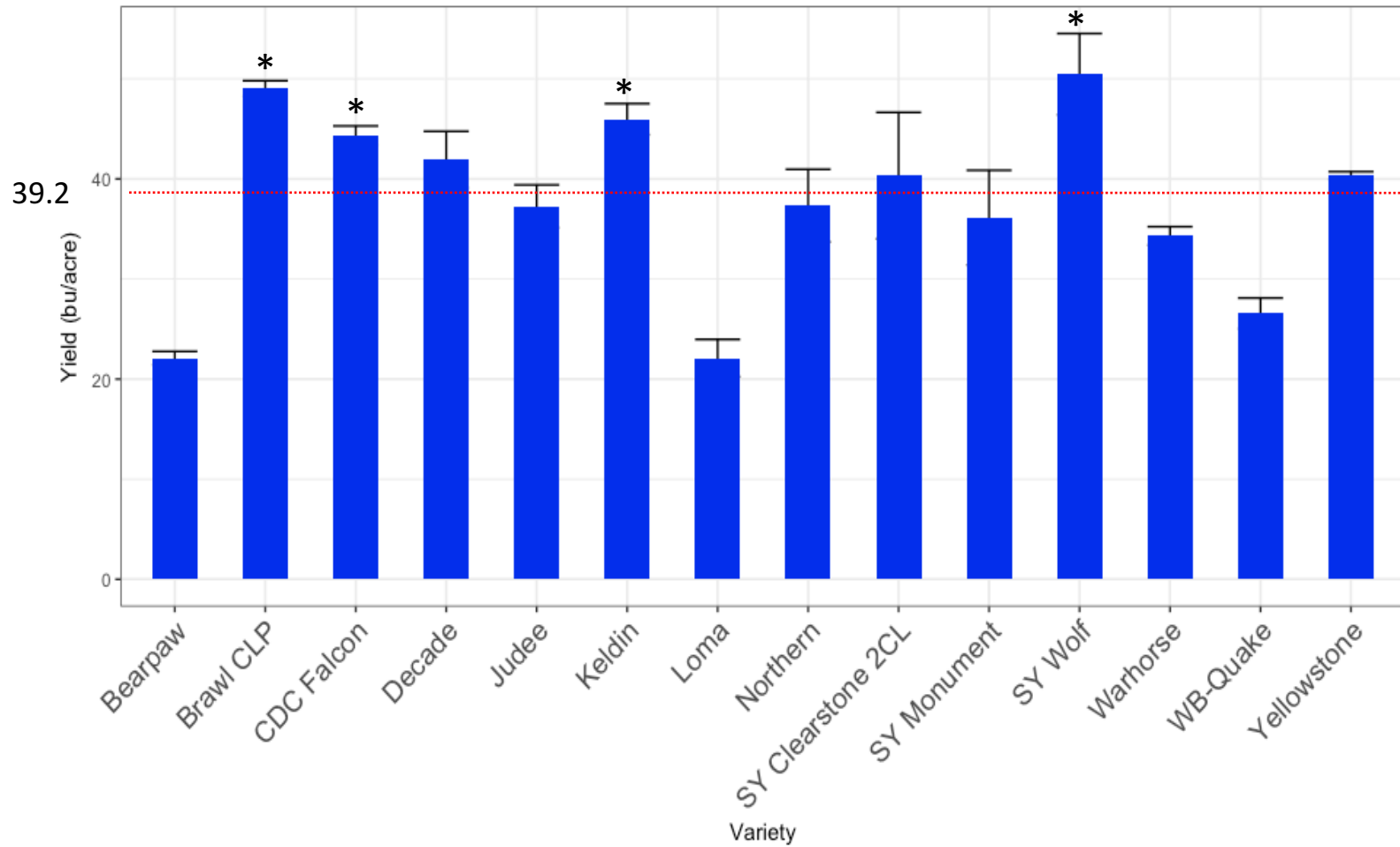
Moccasin Winter Wheat Results



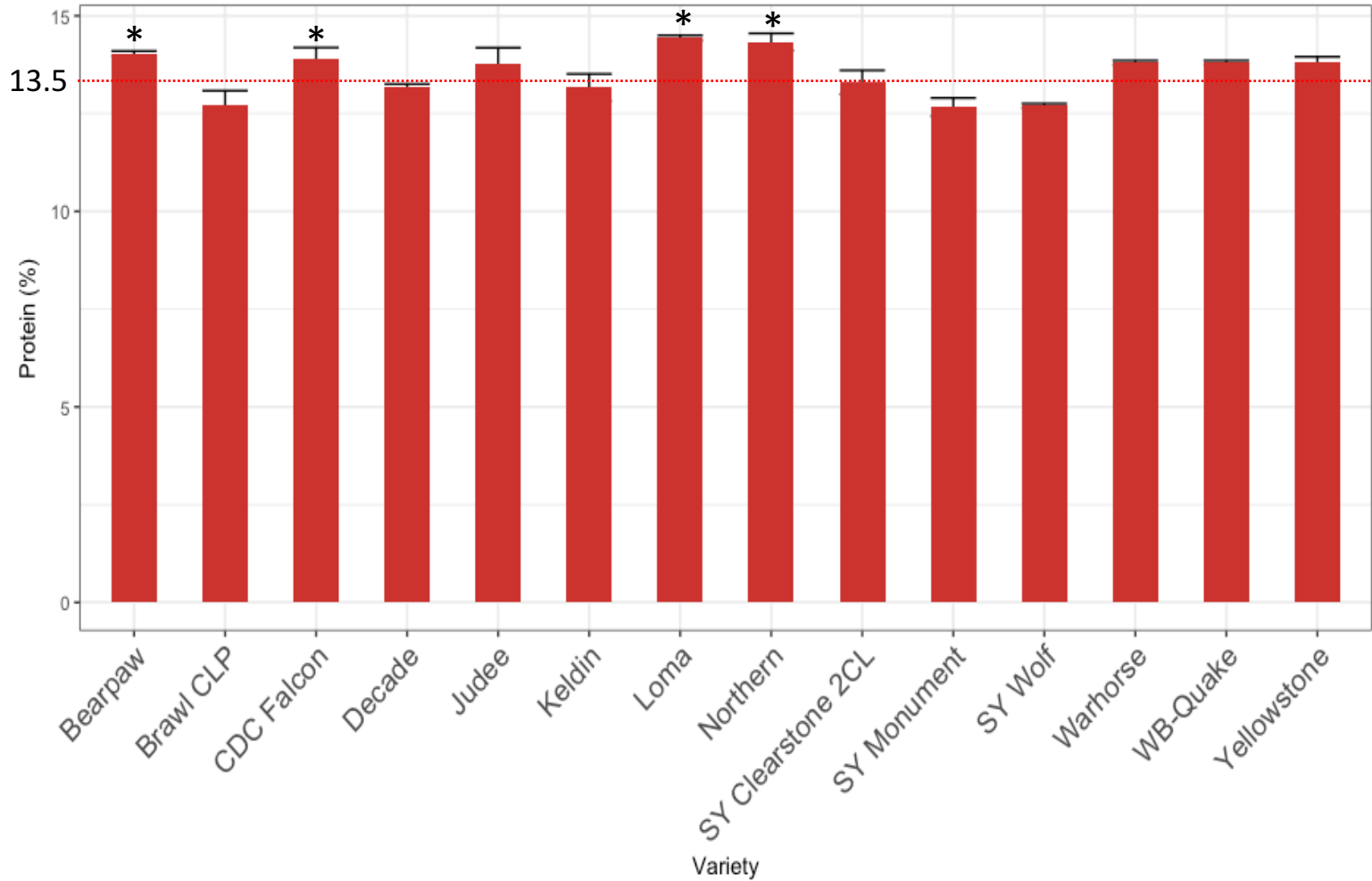
Moccasin Winter Wheat Results



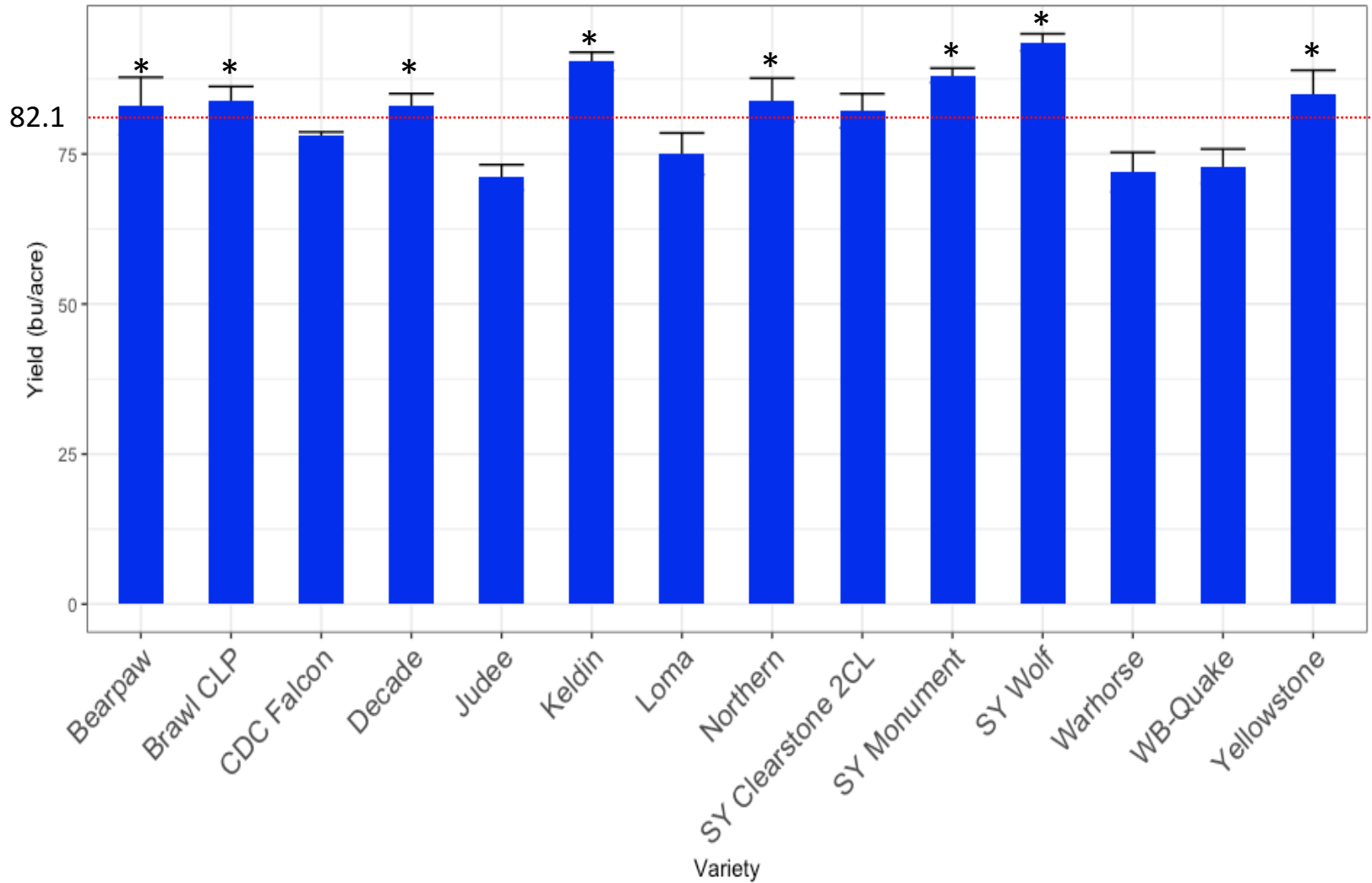
Denton Winter Wheat Results



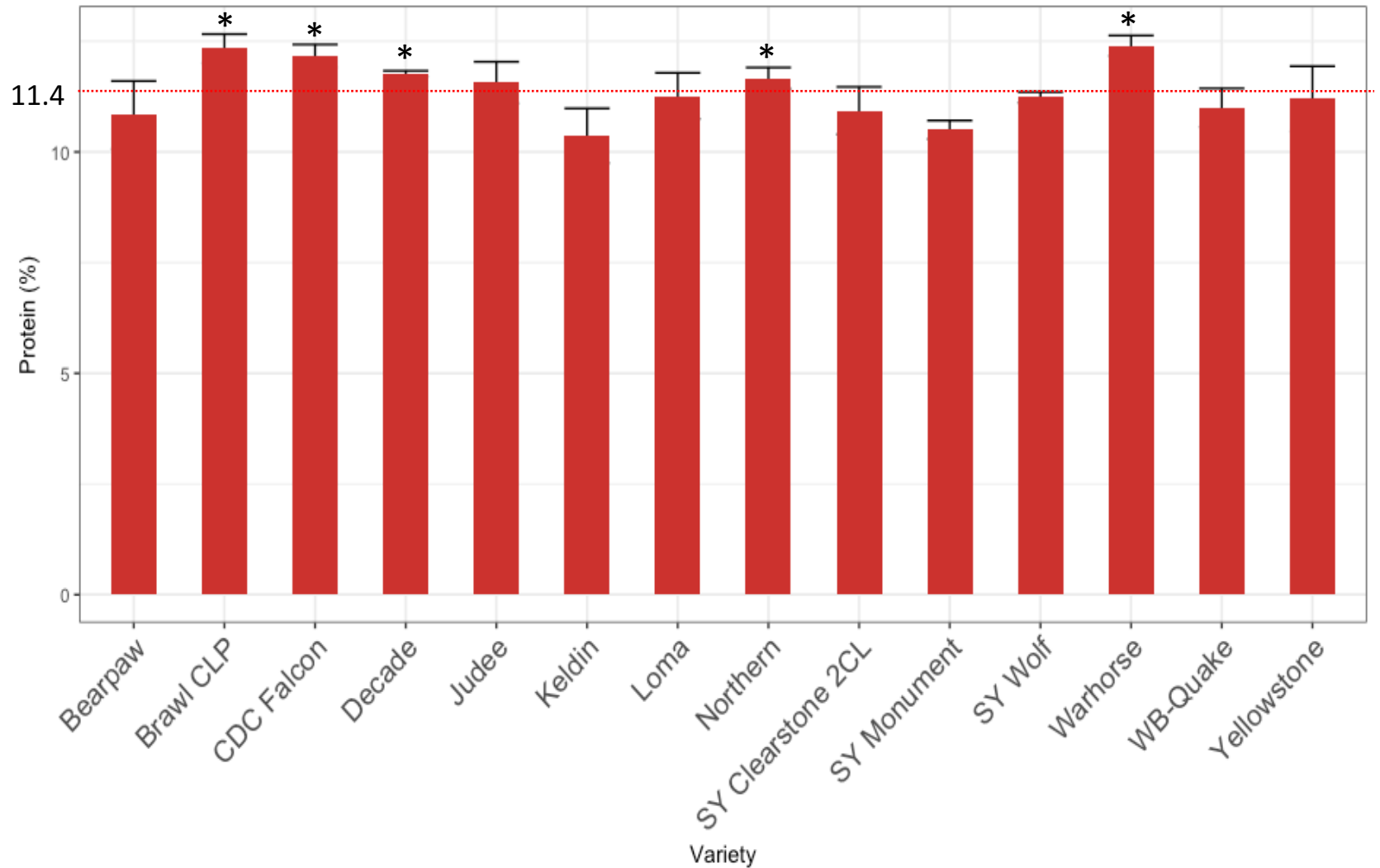
Denton Winter Wheat Results



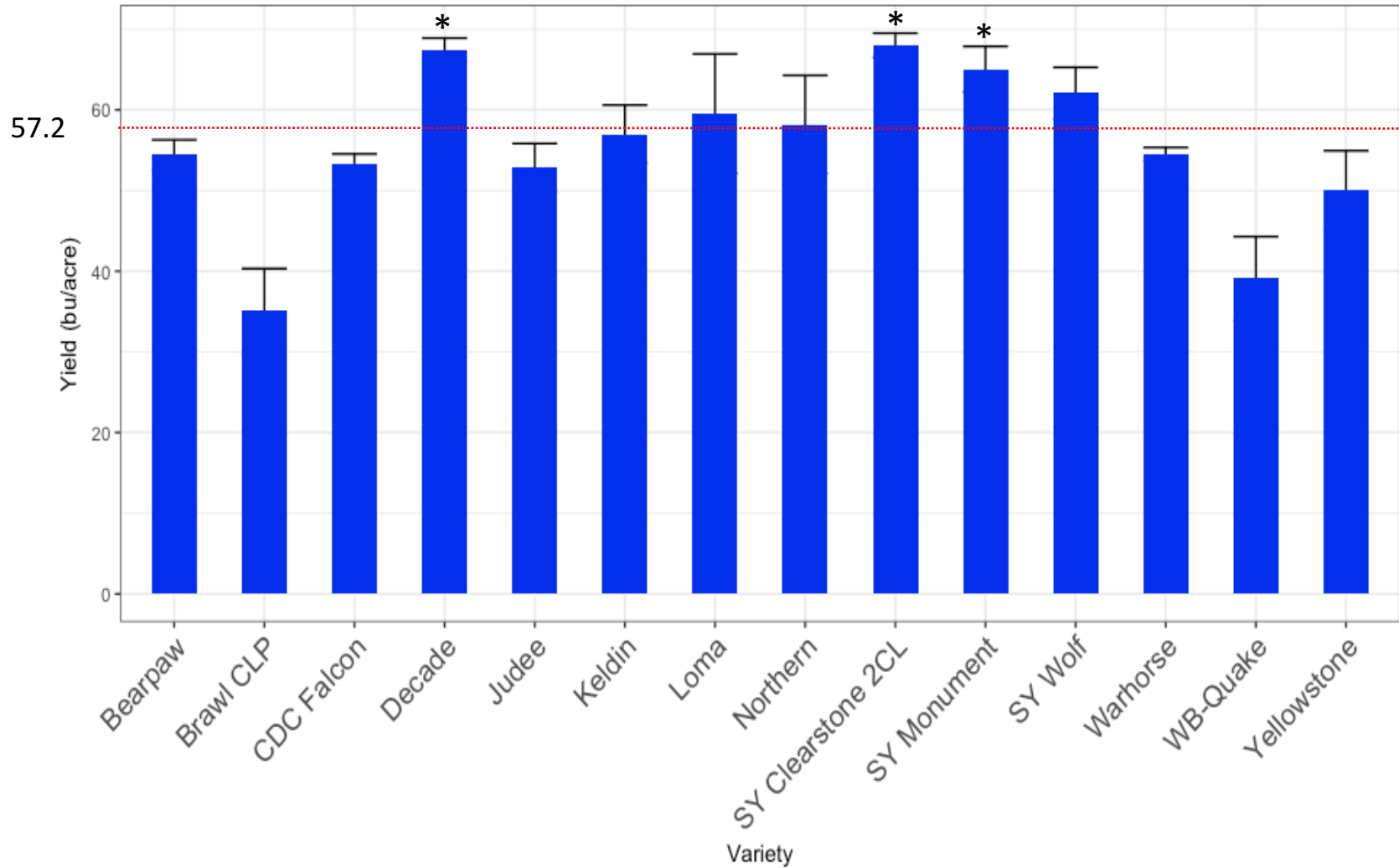
Geraldine Winter Wheat Results



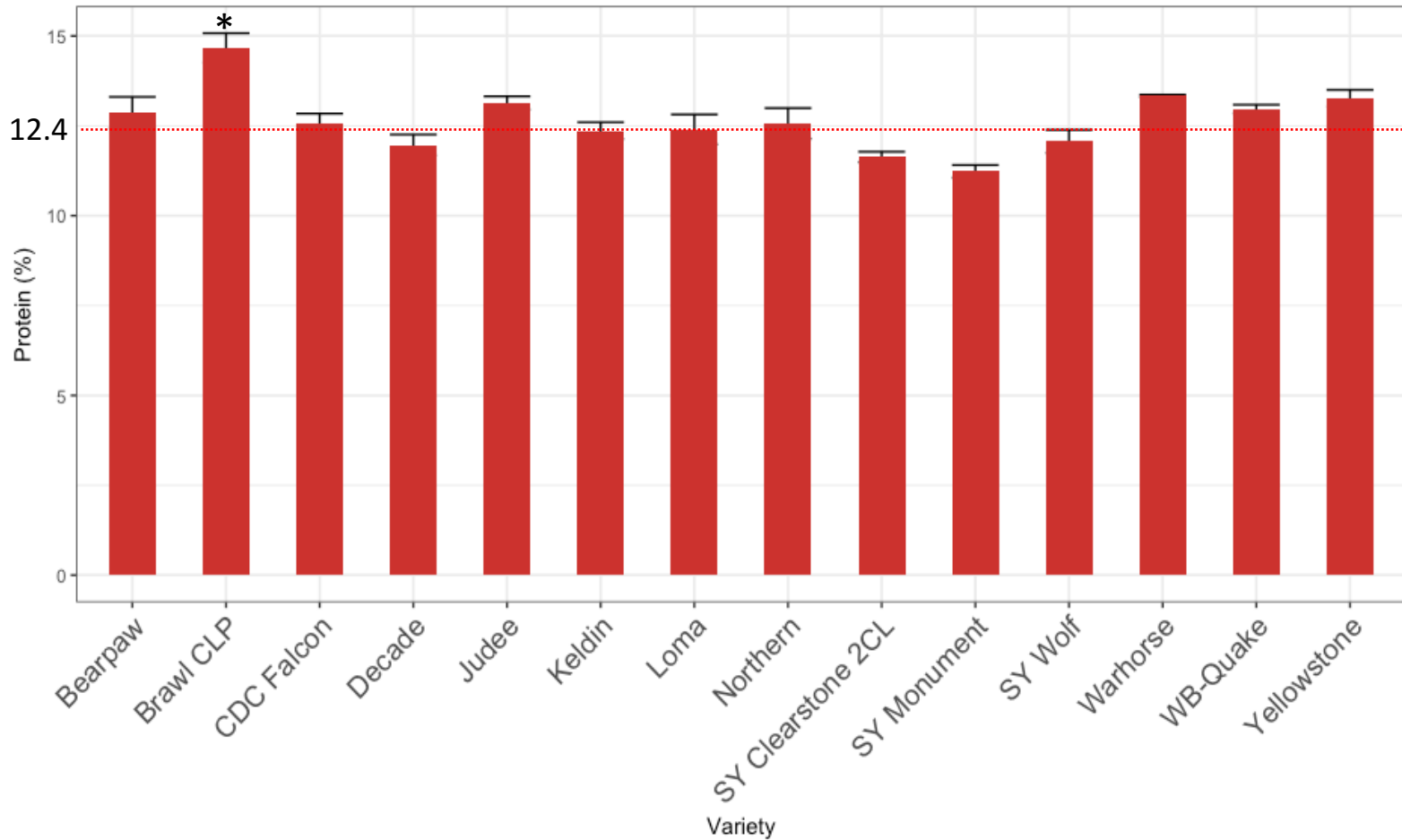
Geraldine Winter Wheat Results



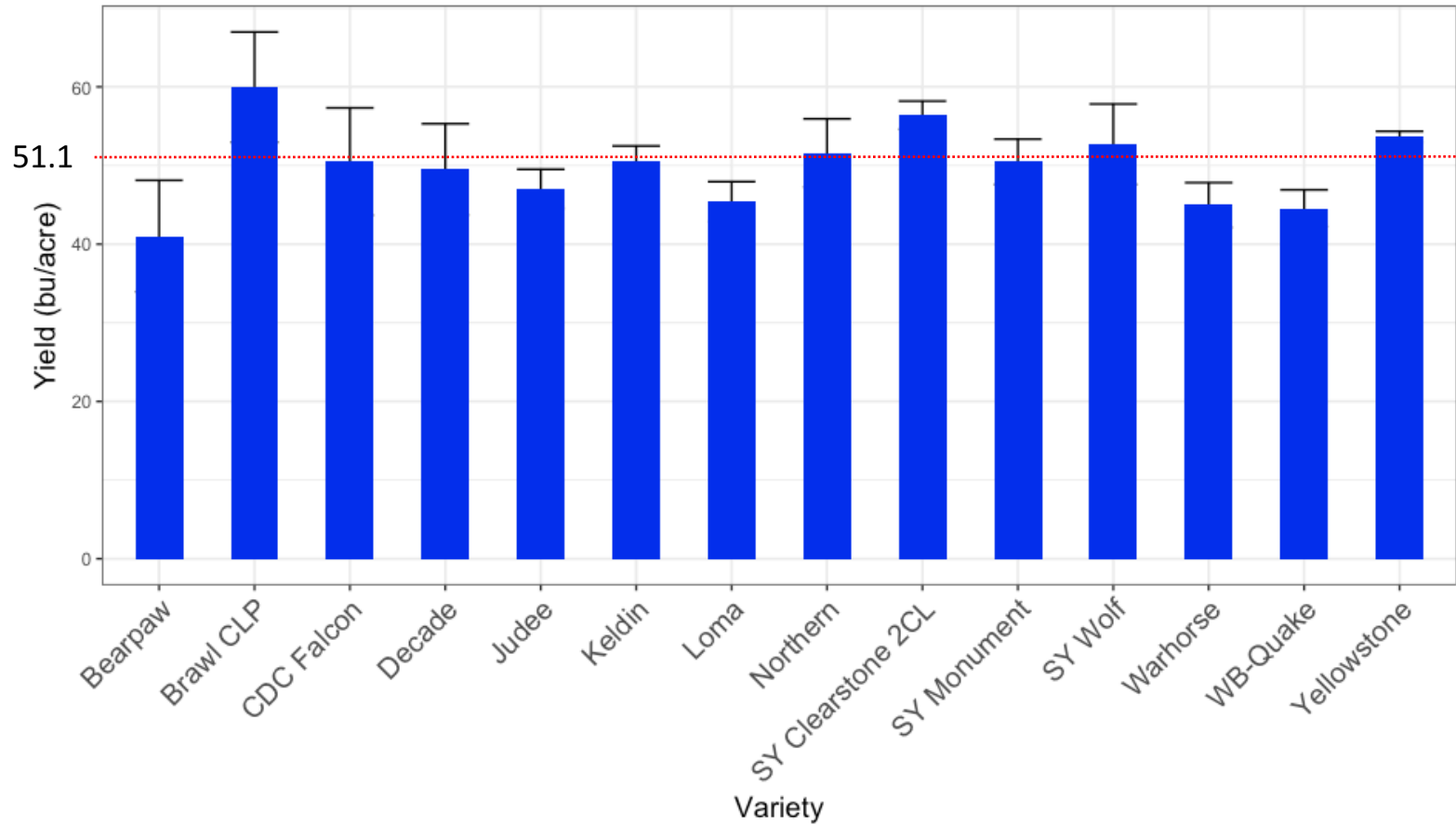
Highwood Winter Wheat Results



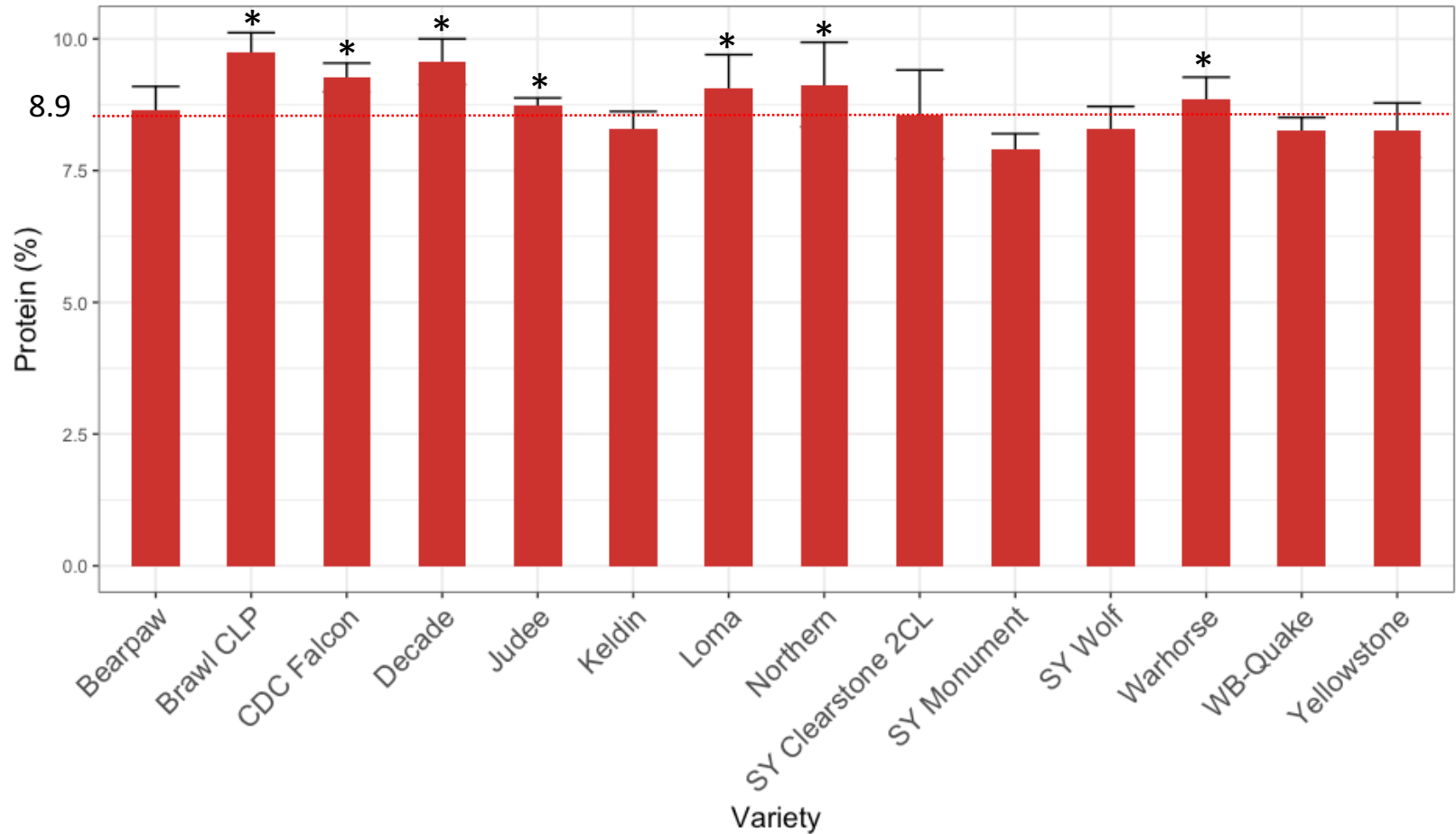
Highwood Winter Wheat Results



Belt Winter Wheat Results

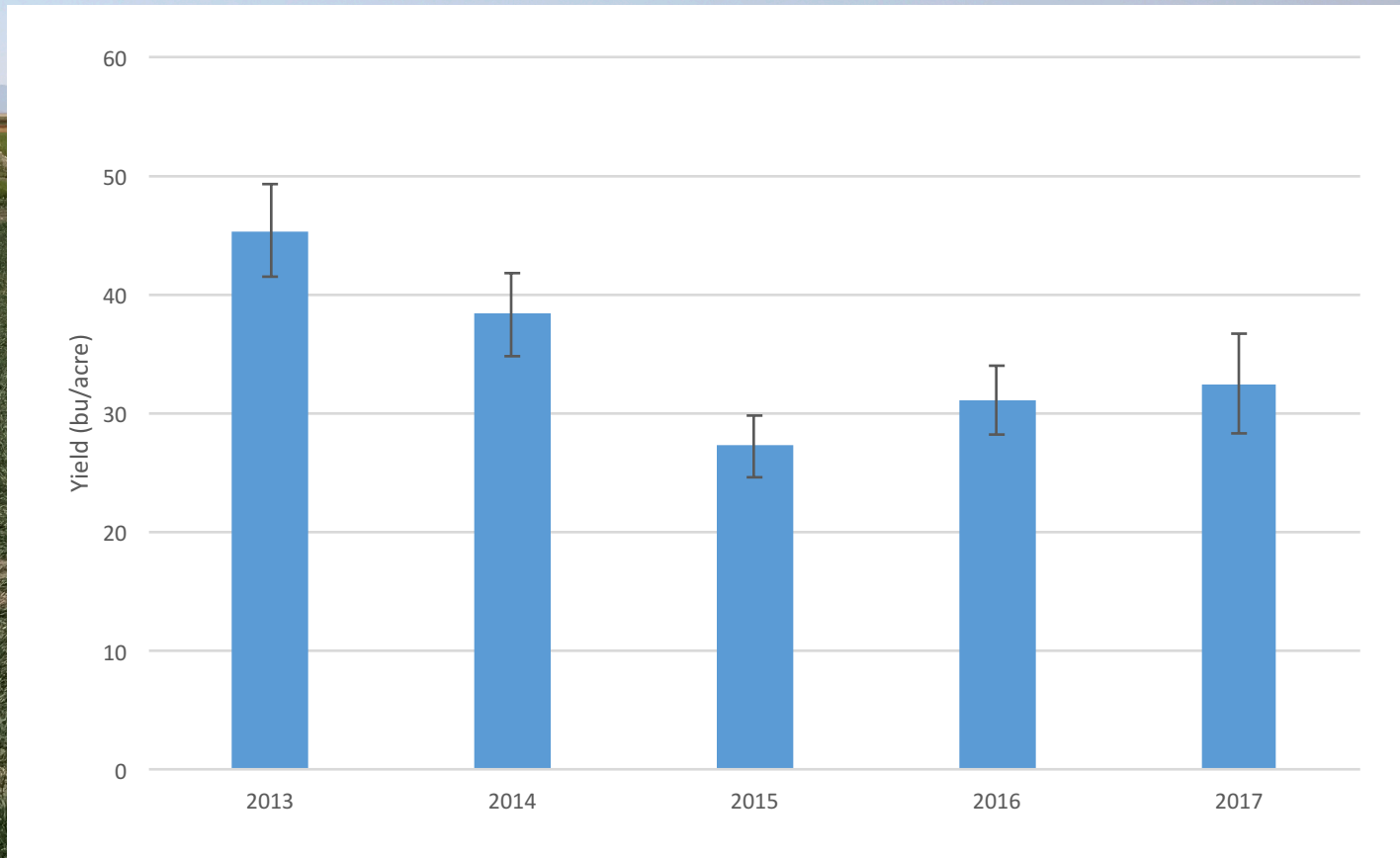


Belt Winter Wheat Results

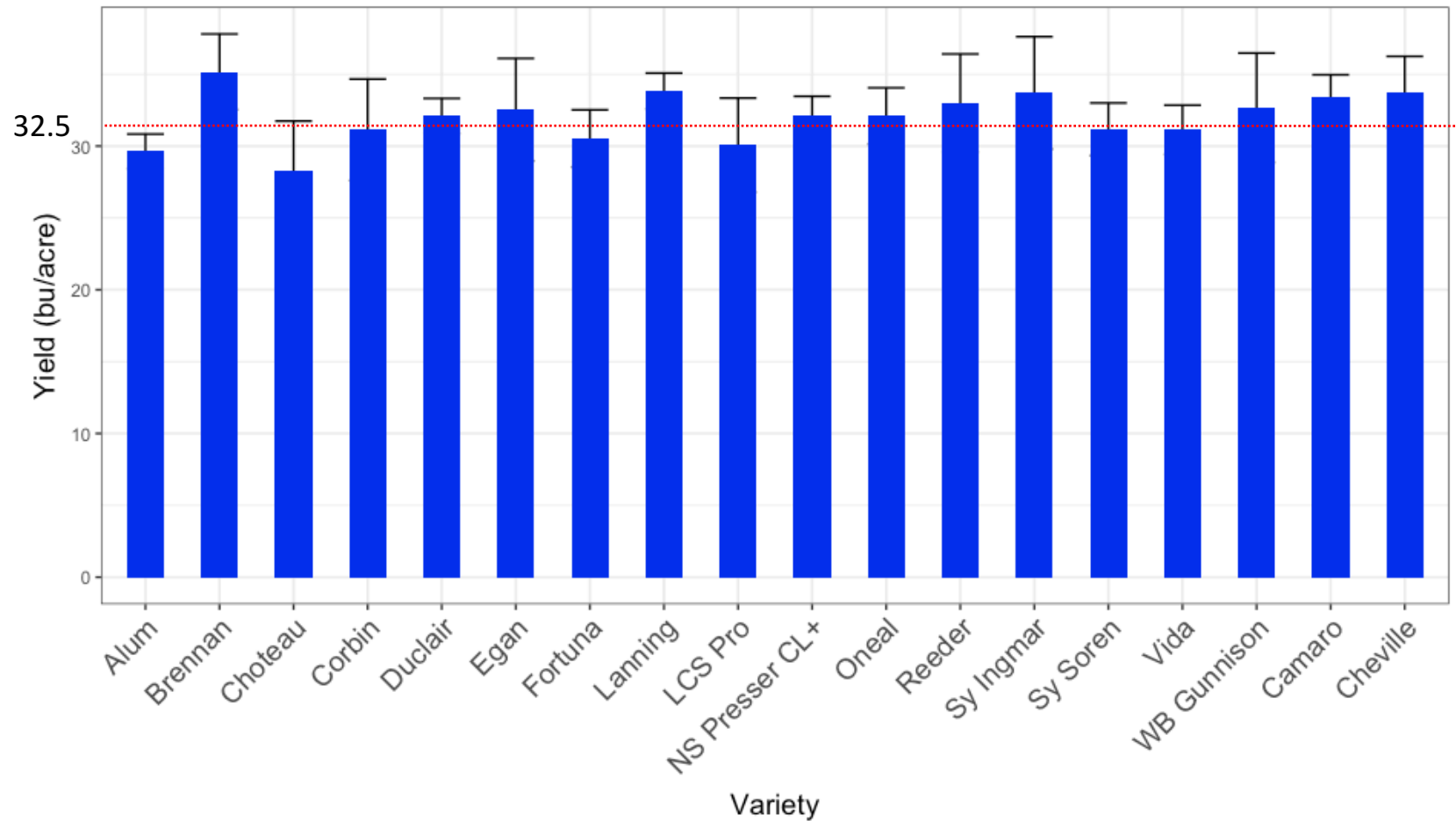


Moccasin Spring Wheat Results

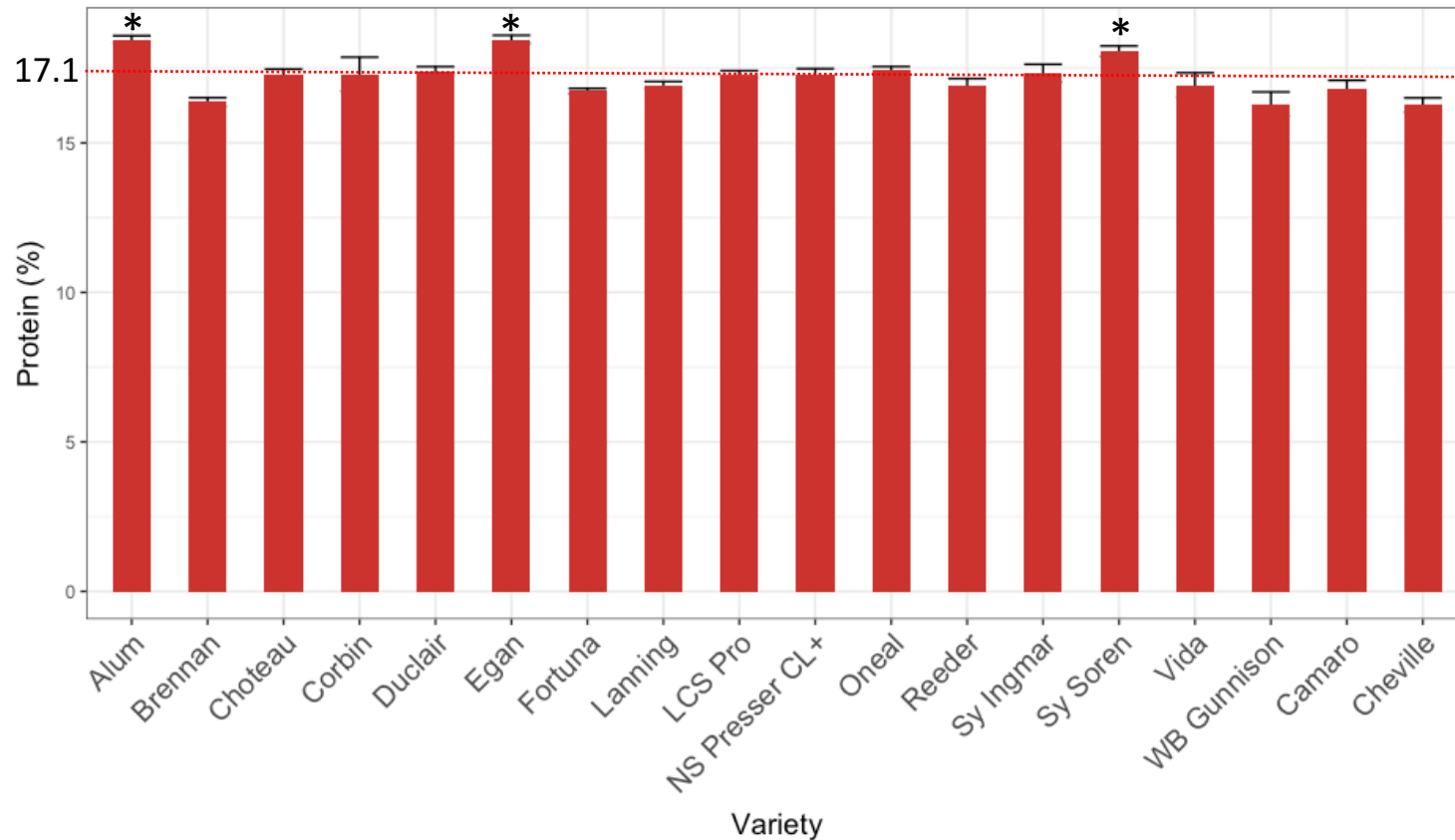
Moccasin average yield past 5 years



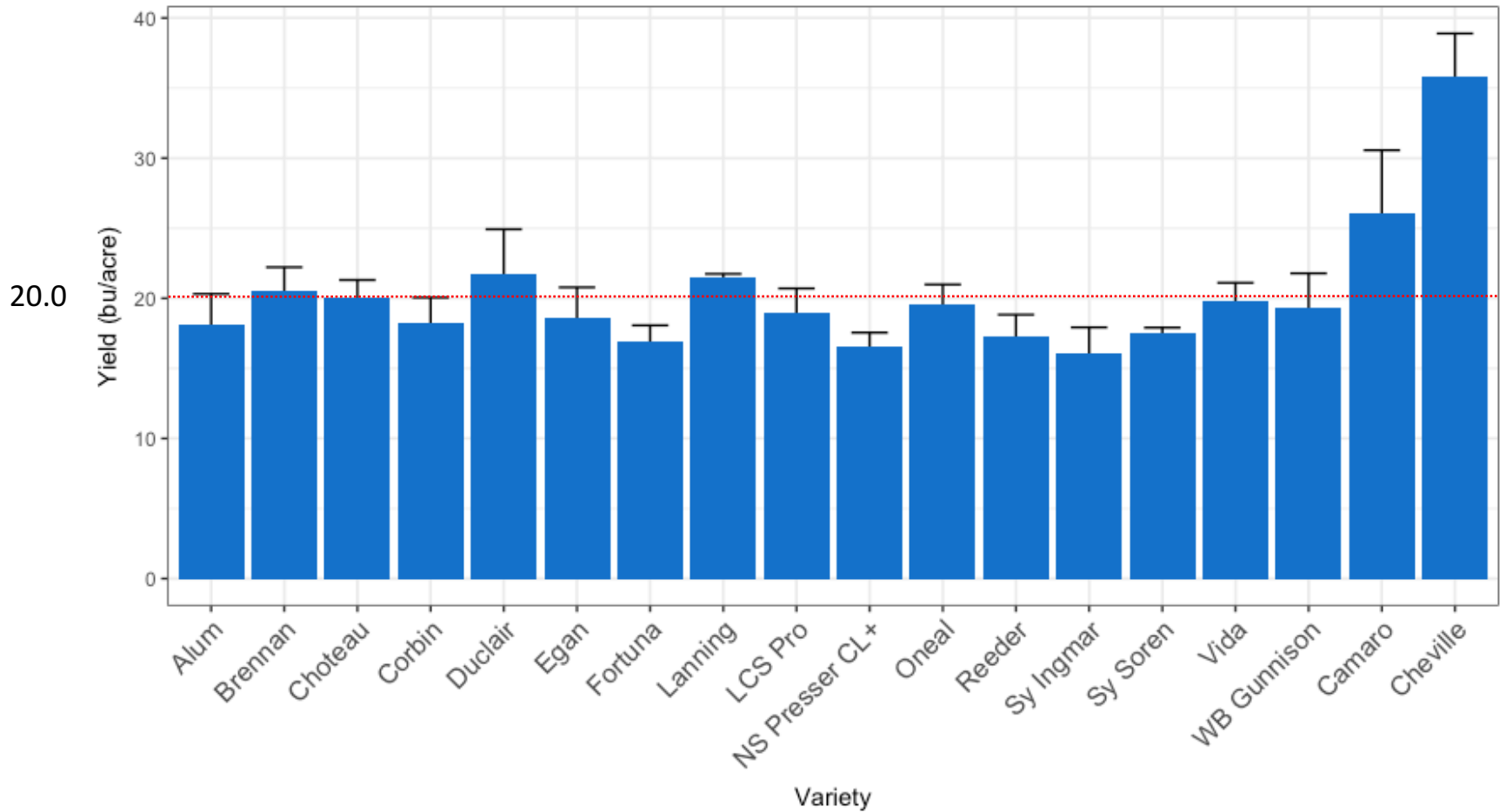
Moccasin Spring Wheat Results



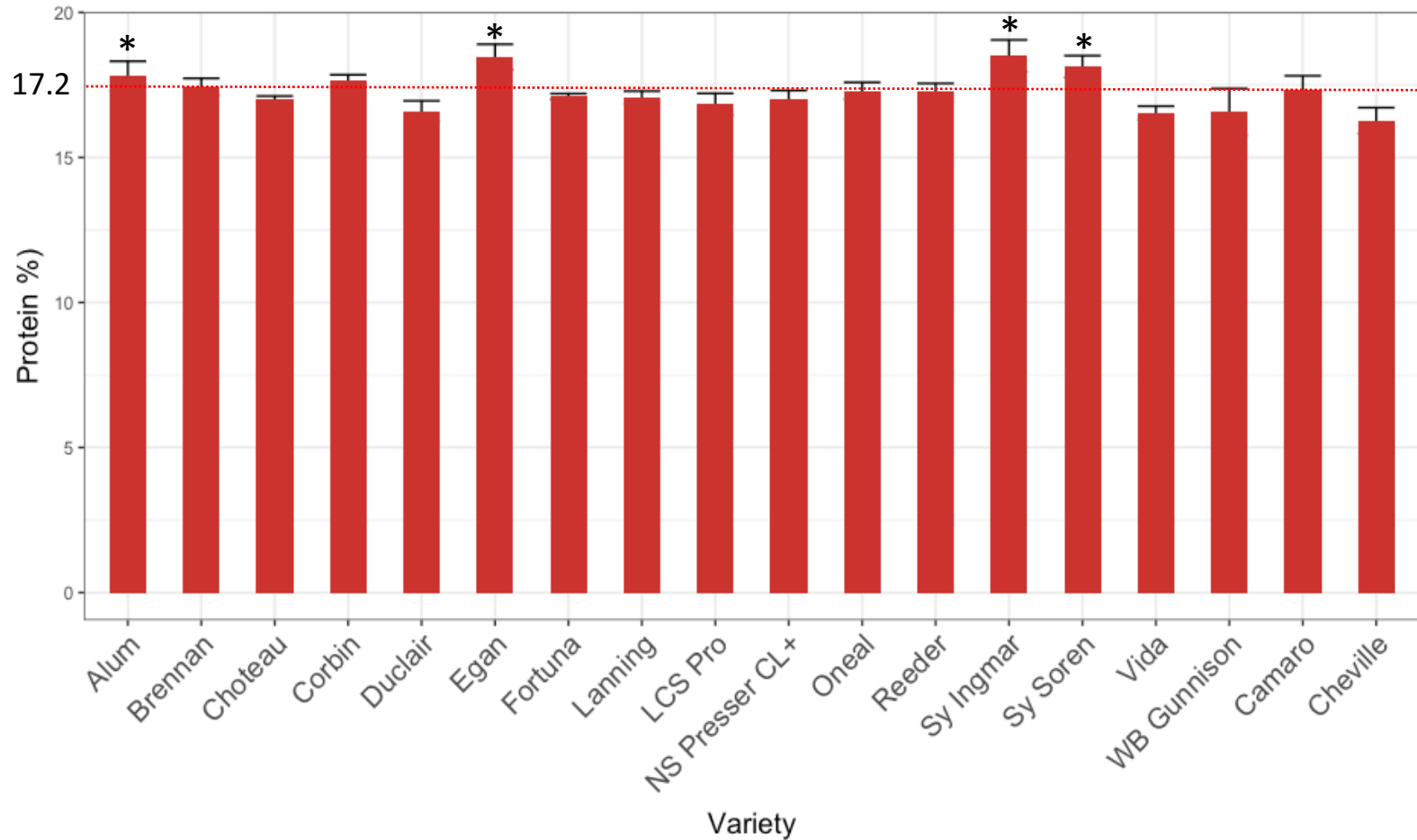
Moccasin Spring Wheat Results



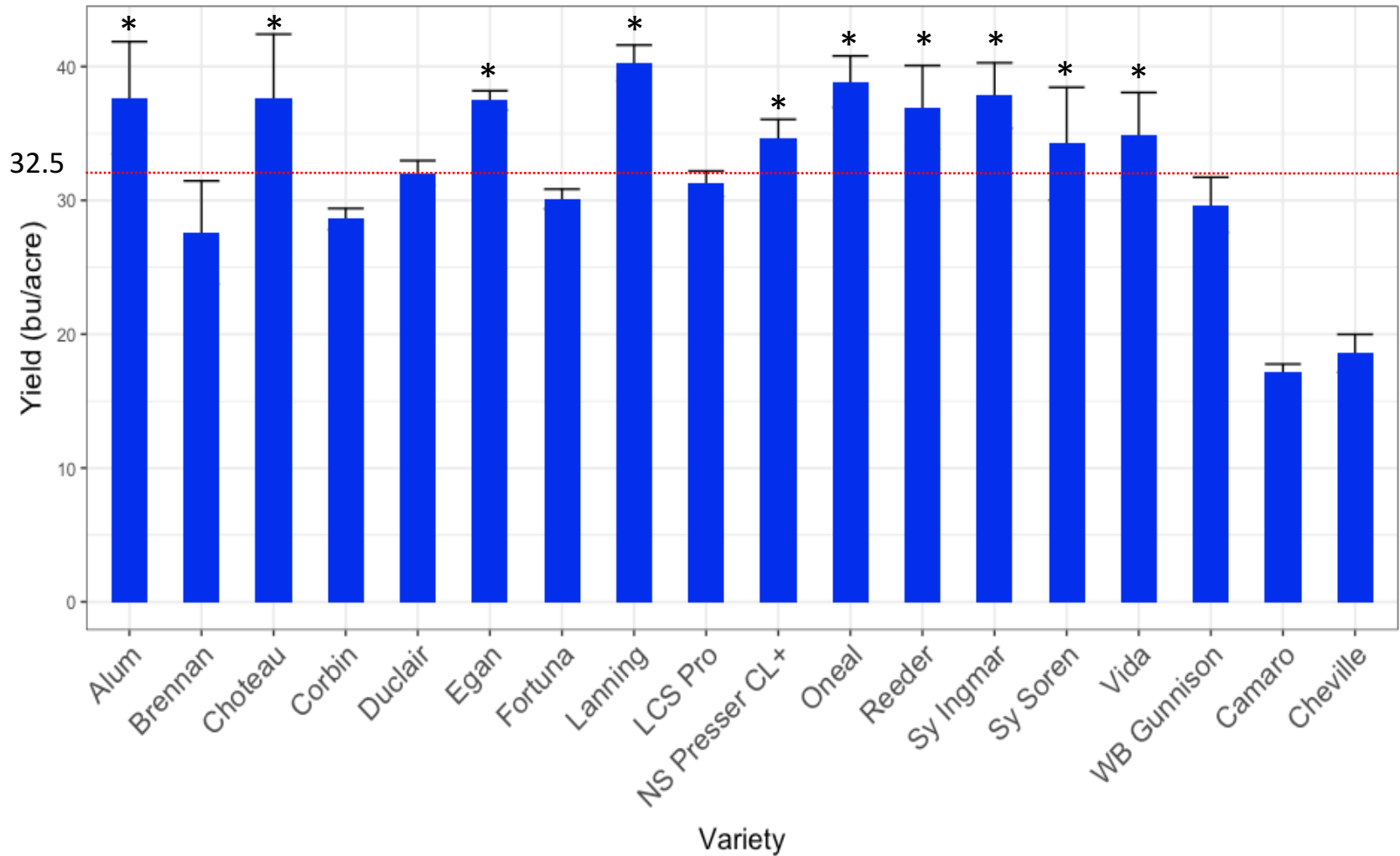
Denton Spring Wheat Results



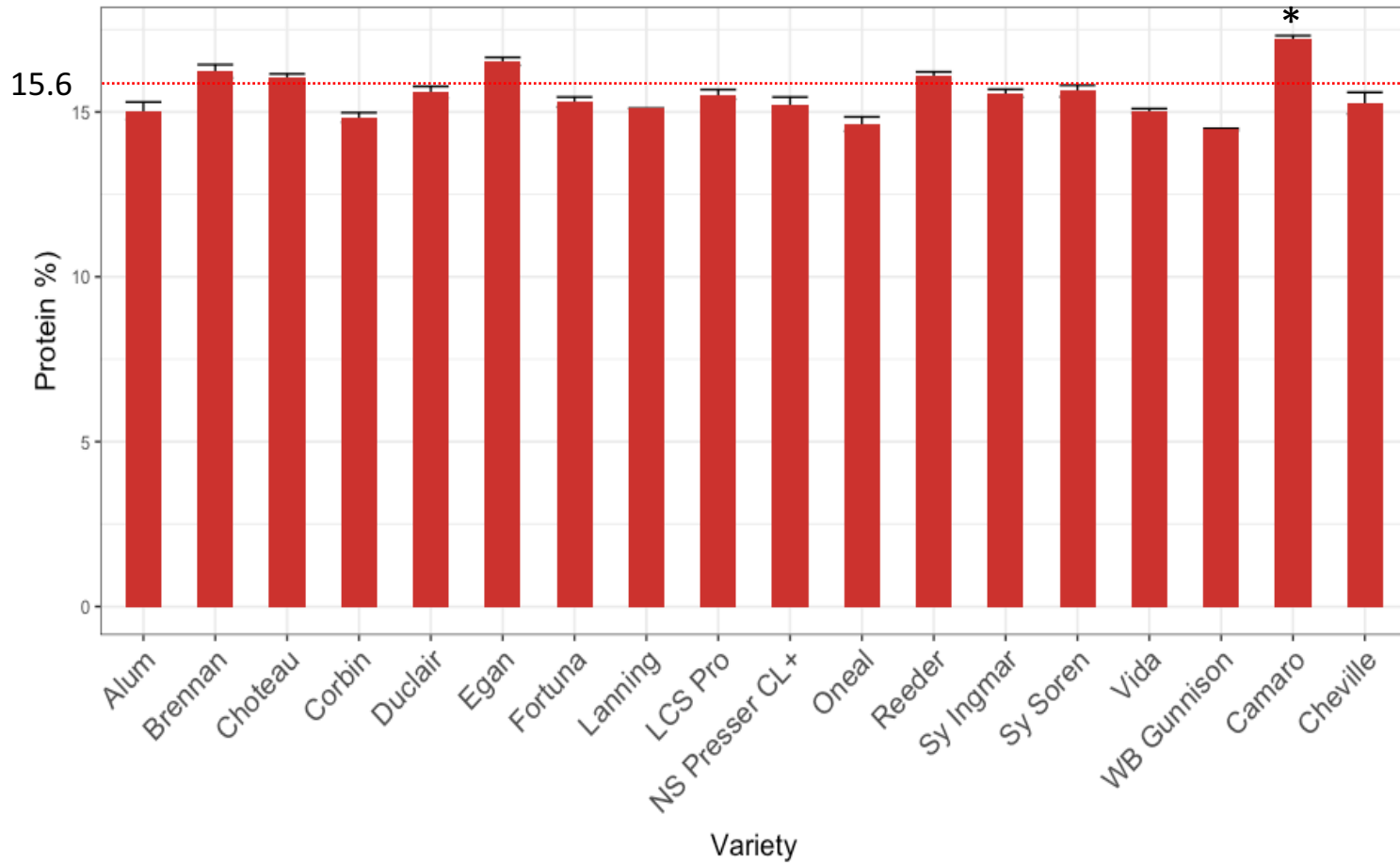
Denton Spring Wheat Results



Highwood Spring Wheat Results

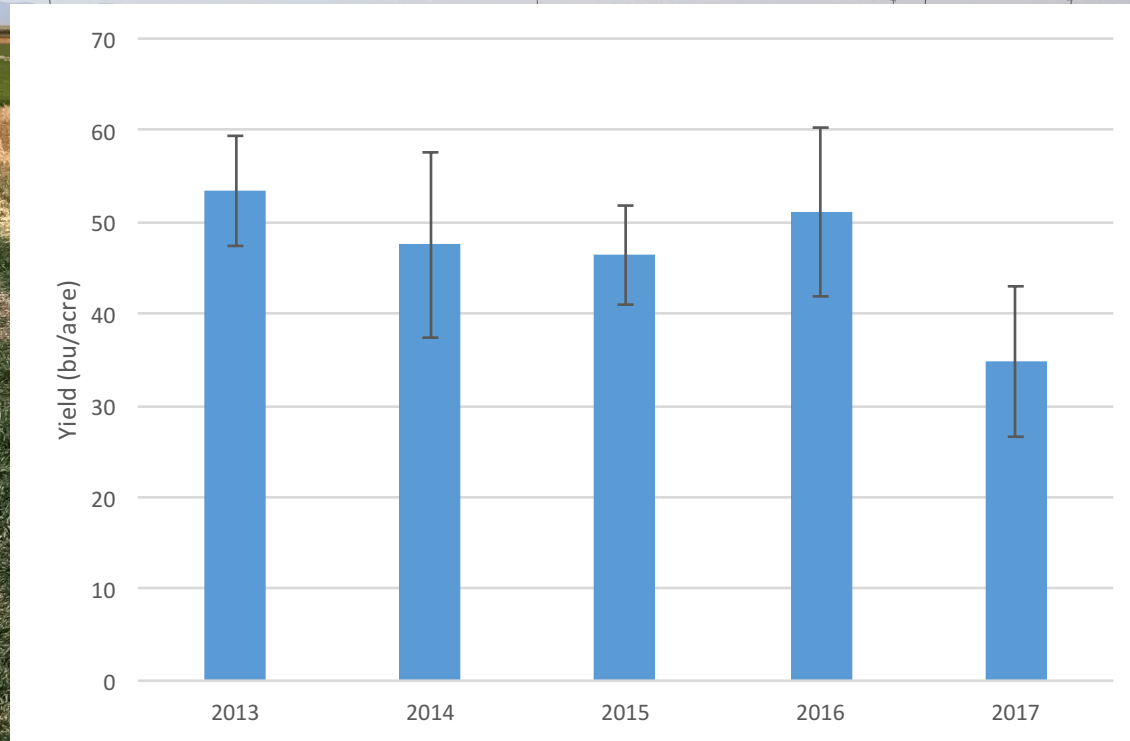


Highwood Spring Wheat Results

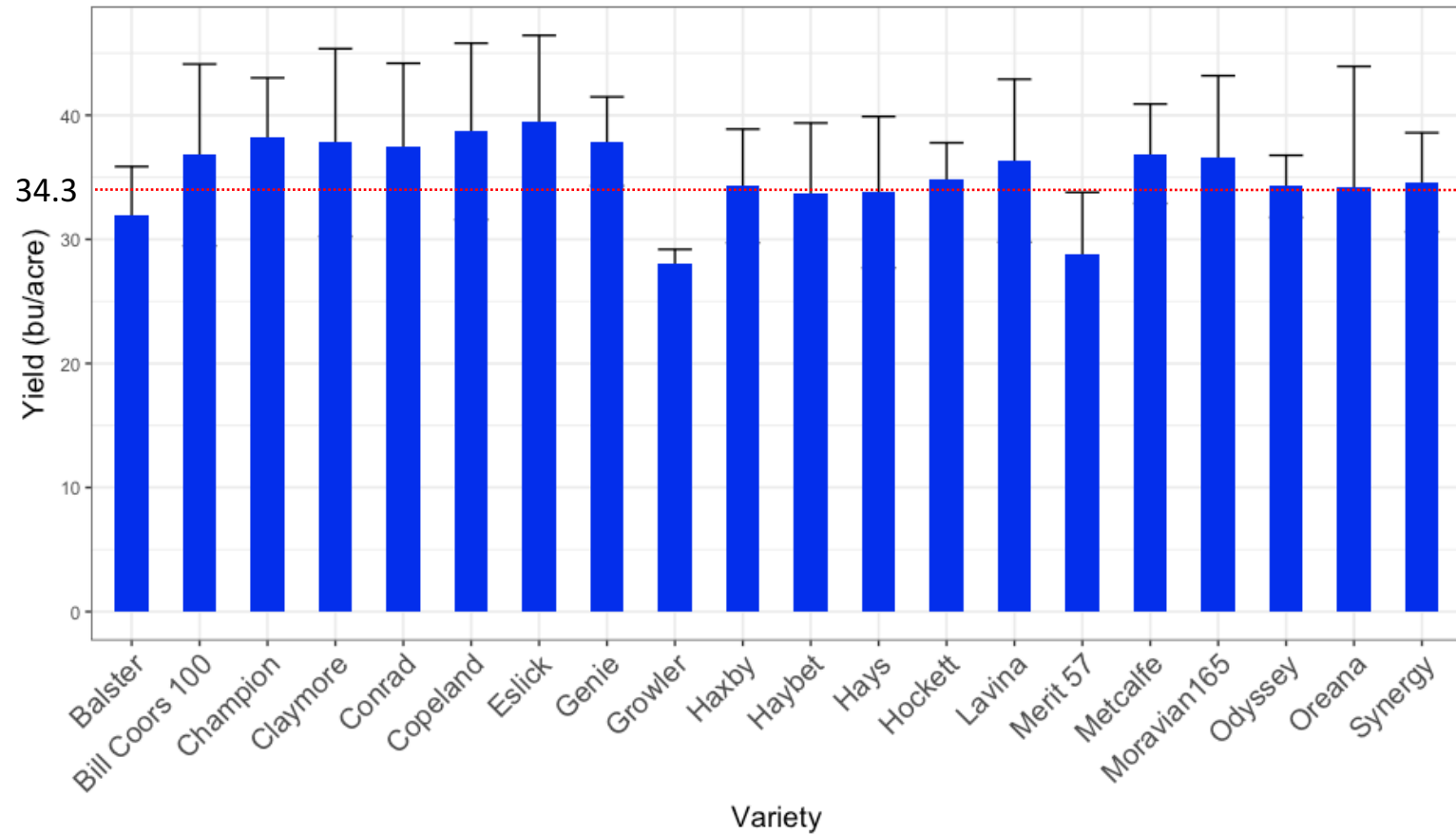


Moccasin Barley Results

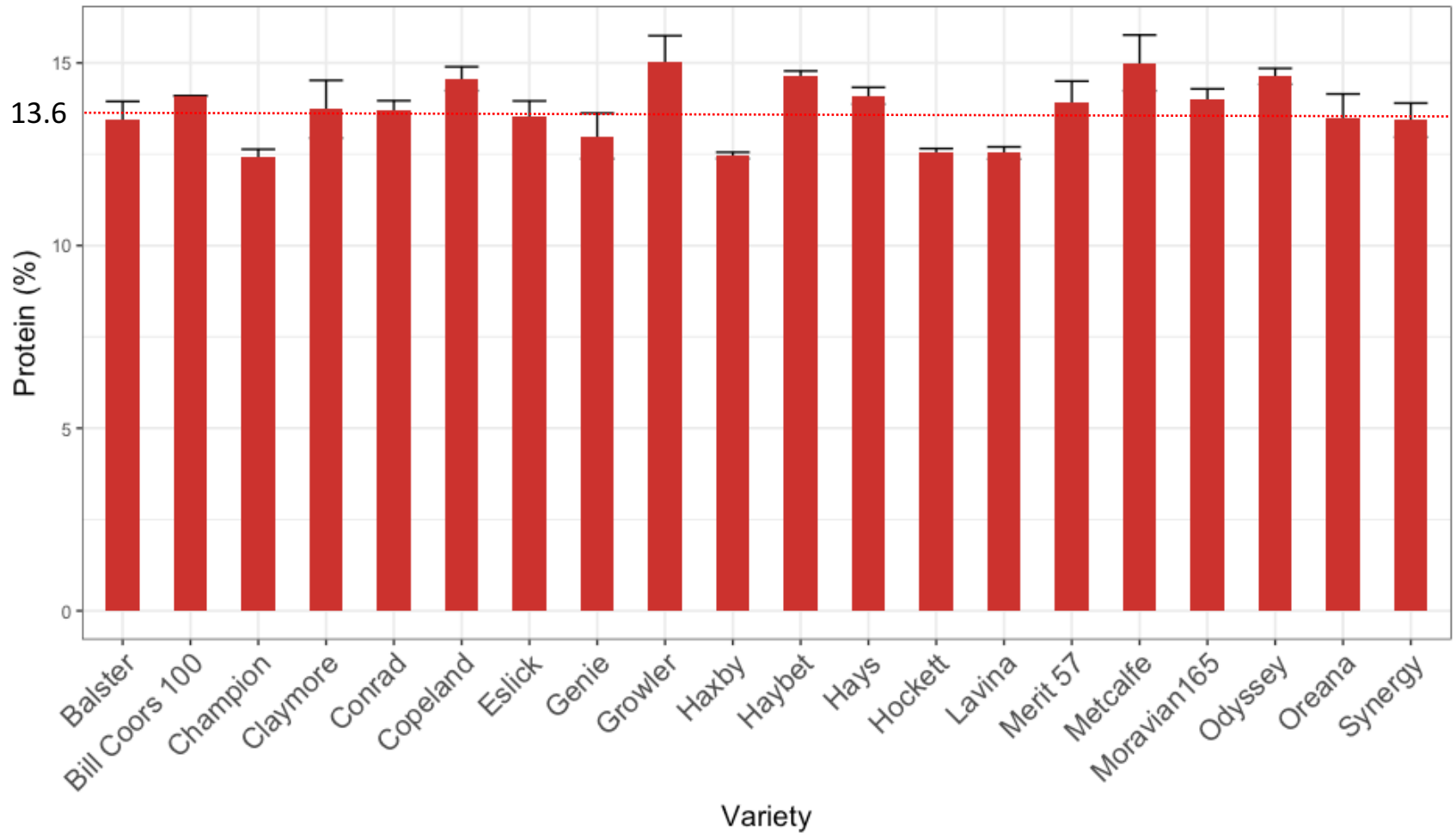
Moccasin average yield past 5 years



Moccasin Barley Results



Moccasin Barley Results



Off Station Barley Results

Yield

- Denton: 27.8 bu/ac
- Highwood: 28.4 bu/ac

Protein

- Denton: 18.4%
- Highwood: 16.7%

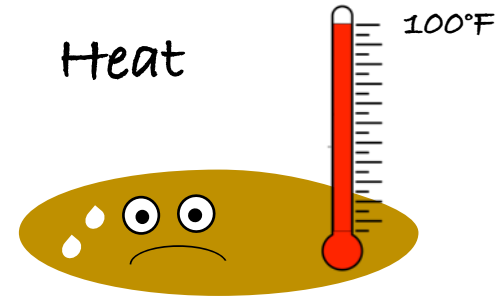
Soil Microbiology



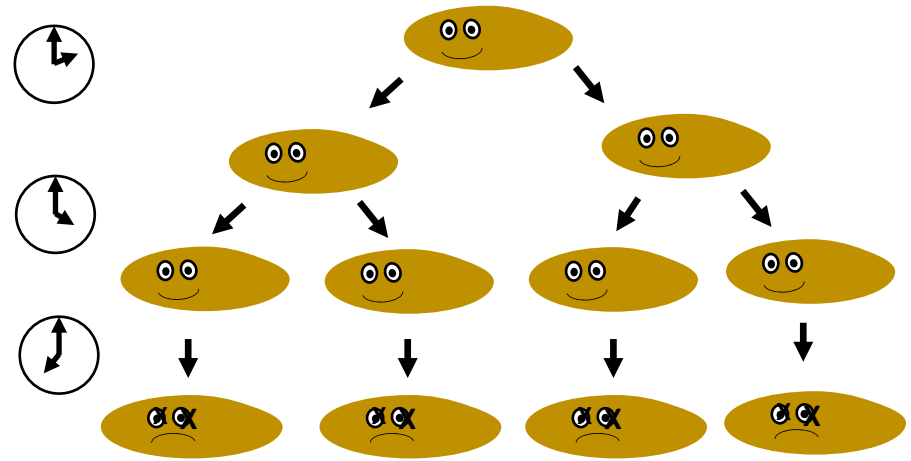
Inoculant Viability

Factors contributing to inoculant failure

- Storage conditions
 - Heat
 - Moisture



Moisture

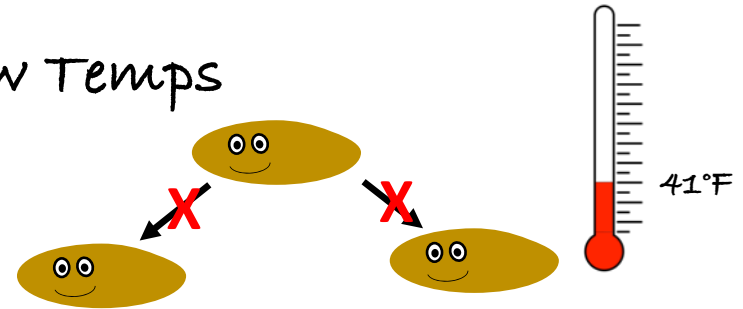


Inoculant Viability

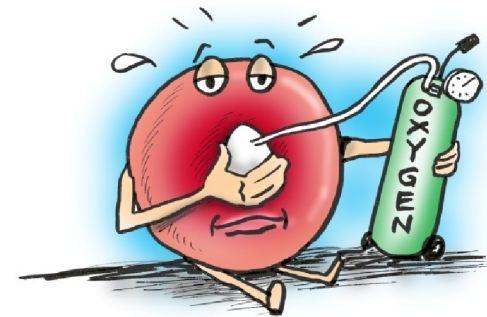
Factors contributing to inoculant failure

- Storage conditions
 - Heat
 - Moisture
- Field conditions
 - Low temperatures
 - Excess moisture (anaerobic conditions)

Low Temps

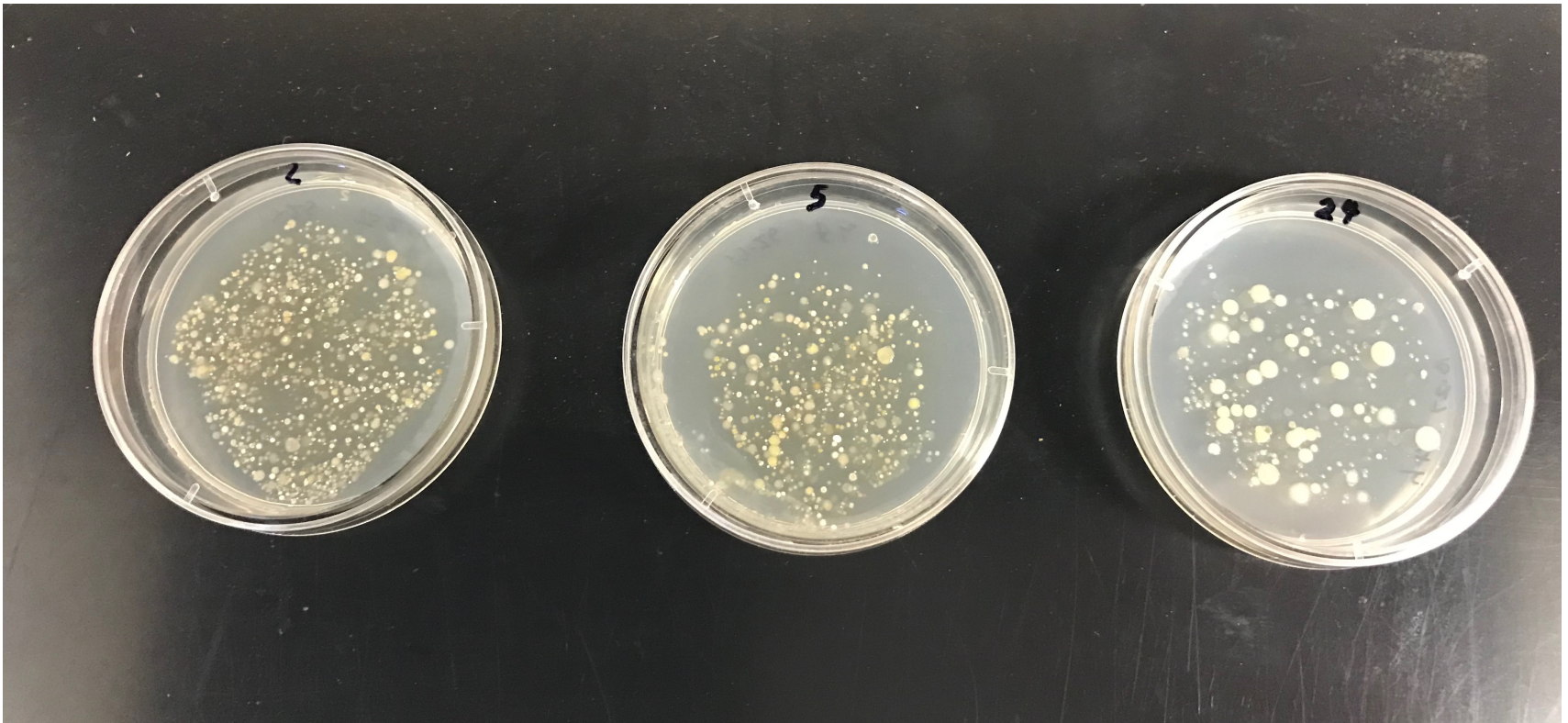


Saturated soils – low/no oxygen



Inoculant Viability

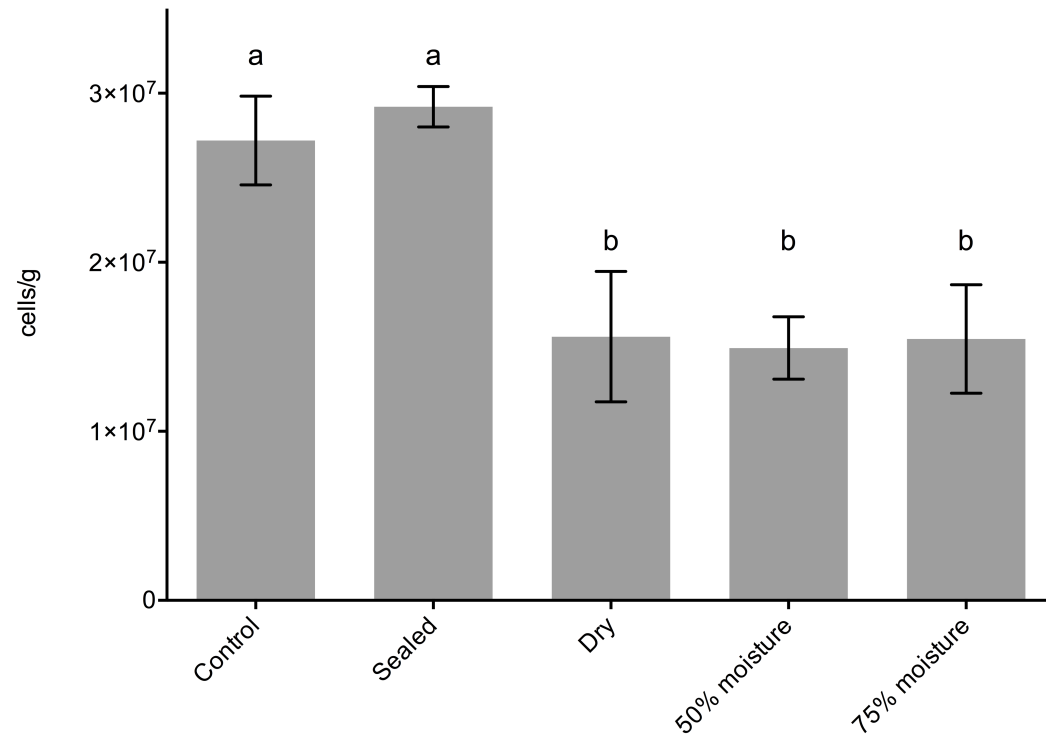
- Viable cell count assay
- Ambient temperature and humidity
- 2, 5, and 24 hours following inoculation



Inoculant viability

Conditions

- Control (sealed bag, room temp storage)
- Treatments (all at 100°F)
 - Sealed – sealed container
 - Dry – open container
 - 50% - sealed container at 50% moisture
 - 75% - sealed container at 75% moisture
- 24 hr incubation



Samples with the same letter are not significant at $p < 0.001$

Future Direction

- Identify other factors contributing to inoculant failure
- Field kit for rapid determination of inoculant viability
- Isolate new rhizobia strains for Central Montana

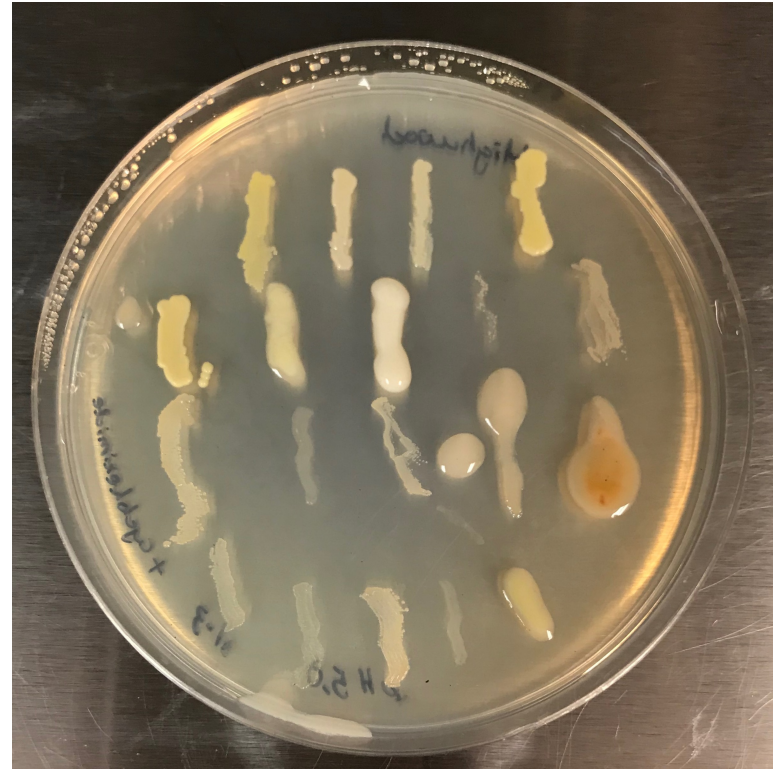
Isolation of novel strains

Highwood acidic soil isolates

- Rhizobia isolation medium
- Low (<4.5) pH tolerant
- 40+ isolates to date

Future work

- Identify isolates
- Characterize potential N-fixing and other beneficial microorganisms



Acknowledgements

- CARC Faculty and Staff
- Phil Bruckner – winter wheat breeder
- Luther Talbert – spring wheat breeder
- Jamie Sherman – barley breeder



Regional Cooperators

- Richard Barber, Mike & Joel Devries
- Chuck and Karen Davis
- Ron and Andy Long
- Charles Bumgarner

Questions?

