

PRODUCTION OF PULSE CROPS IN WESTERN COLORADO MESA COUNTY

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PROJECT INTRODUCTION

Contributed to two pulse crop research projects, cowpea (*Vigna unguiculata*) and winter pea (*Pisum sativum*), including data collection, plot maintenance, and preliminary analysis.

Cowpeas: This study examines how different cowpea cultivars and phosphorus treatments affect agronomic performance and consumer preference in the “Southern Sweet Pea” stage of development. The research includes measurement of season long evapotranspiration. The goal is to identify cultivar × management combinations that perform well in both field and in marketability.

Winter Peas: This study investigates how winter pea biomass and grain yield respond to three factors: variety (5 levels), phosphorus fertilization (yes/no), and irrigation cut-off date (October 31, May 1, or June 1). The aim is to guide farmers toward optimal management for yield and profitability in western Colorado. Due to the constraints of furrow irrigation infrastructure, cut-off date treatments were applied in geographic sections rather than fully randomized plots.

INTERNSHIP GOALS

Apply classroom knowledge in real-world farming systems to better understand sustainable and regenerative agriculture.

Build connections with researchers, farmers, and the community to support future work in decolonial and justice-centered food systems. Learn how factors like variety, phosphorus application, and irrigation timing affect crop growth, yield, and quality.

Develop skills in weed identification, growth stage assessment, and field trial management.

HOW DOES THIS APPLY TO YOUR EDUCATION

This internship ties directly to my studies in Soil and Crop Sciences with a focus on sustainable soil management. Due to climate change’s impact on water availability in the Colorado River basin, it is important to explore alternative food sources that can adapt to changing conditions. Working with cowpeas and winter peas is a great example, they grow well in low-irrigation, nutrient-poor, and disturbed soils. This experience will let me apply what I have learned about soil health and crop growth while gaining practical skills in field research and sustainable agriculture.

WHAT YOU DID

Cowpea Project: We grew three cowpea cultivars: CA Type 5, CA Type 46, and Purple Hulled Pink Eye, under three phosphorus treatments. At the start of the season, we counted weeds to track early-season competition. We also tracked growth stages, pod length, and seed count. For Type 5, we ran a consumer evaluation on pod size, using three maturity categories: immature pods (stage 1 and 2), mid-way mature pods (stage 3), and fully formed peas mature pods (stage 4).

Winter Peas Project: During the growing season, I participated in both field and laboratory phases of the trial:

- Measured plant population density before and after freeze.
- Collected 1 m² forage samples from each plot at peak biomass.
- Dried samples for 48 hours to determine dry biomass yield.
- Ground forage samples using a Wiley mill for forage quality analysis.
- Assisted with grain harvest using a combine to collect peas from each plot.
- Recorded total dry pea weight and percent moisture at harvest.
- Ground grain samples for protein analysis.

Figure 1. (image) & Figure 2. (image)



Figure 1. Winter pea harvest using a Wintersteiger combine.

Figure 2. From left to right, Todd Ballard and Laura Lenhart standing in front of cowpea plots during WCRC-GV field day.

WHAT YOU LEARNED

Cowpea Project:

- Gained experience in weed identification at the beginning of the season.
- Practiced growth stage identification throughout the season.
- Observed that Type 5 again performed strongly and consumers preferred certain pod sizes.

Winter Pea Project:

- Field data collection and sample processing require careful timing to ensure accuracy and consistency. The layout means irrigation cut-off date lines up with location in the field. Biomass and grain yield are the primary influences on producer revenue. Protein is a secondary revenue influence. Plant density is a contributing factor to yield. Mixed statistical models enable data analysis of the results and their interactions. Understanding the experimental design is essential to completion of data analysis.

Other Projects and Adventures

- Sainfoin production with Dr. Perry Cabot
- Discovery Farms with Dr. Alexandra Firth
- Evaluation of evapotranspiration rates with drone data with Dr. Jose’ Chavez and Dr. Perry Cabot
- Heritage Orchard with Emily Lockard
- Paonia Soil Company Tour with Bart Eller
- Tour other WCRC and TRA locations

NEXT STEPS

Cowpea Project: Compare consumer preferences with yield and quality data. See how phosphorus rates interact with irrigation timing for different cultivars. Use the results to fine-tune recommendations for local growers.

Winter Peas Project:

Finish the forage quality and protein tests.

Run a mixed-model analysis with variety, phosphorus, and irrigation cut-off date as fixed effects, and block and block × irrigation cut-off date as random effects.

Complete annual report

Share what we find with local growers and extension folks.