

CSU Extension Internship Application



COLORADO STATE UNIVERSITY
EXTENSION

County Extension Offices

Sedgwick County
315 Cedar St
Julesburg, CO 80737
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1. Extension mentors and application contact information

Todd Ballard
Area Agronomist
Golden Plains Area Extension

2. Region

Northeast region

3. Internship Goals, Scope and Objectives

a. Goals

- Introduce the intern to field research activities
- Support research activities in weed control, cropping systems, and wheat varieties
- Promote interactions between the intern and area producers and extension personnel
- Introduce the intern to professional writing and statistical analysis

b. Scope

The intern will work with area extension agents and producers to learn about the agronomic activities in the area. Established activities include the Colorado on Farm Trials (COFT) for wheat varieties, preemergence kochia control, and wheat nitrogen rate tests. Additional work has been proposed through grants for forage sorghum, cowpeas, and canola.

Areas included will be the Golden Plains Extension Area (Sedgwick, Kit Carson, Yuma, Phillips, and Washington counties), Morgan county, Logan county, and the University of Nebraska research station at Sydney. The range will allow the intern to experience multiple field environments. The highest elevation is in Akron, CO. This site resides on USDA-ARS property. It includes both irrigated and dryland trials. The lowest elevation will be in Sedgwick county. One test site has been established at the University of Nebraska's Sydney research station for the preemergence kochia control study.

c. Objectives

- Expose the student to extension activities in both office and field settings
- Improve the student's understanding of professional activities within the farming community
- Support collaboration between CSU, USDA-ARS, and UNL
- Advance research in cropping systems and wheat production

4. PRU Activities

- a. On farm research activity will be promoted during extension field days in the summer and fall of 2021
- b. Results will be shared in appropriate publications including extension newsletters, field handbooks, and academic publications

5. Learning Outcomes

The internship will enable the student to

- a. Improve communications with agricultural producers
- b. Understand principles of field research
- c. Write extension publications

6. Identified Stakeholder Needs

Northeast Colorado row crop agriculture is heavily focused on wheat, corn, and proso millet. Expanding crop options to include broadleaf crops and sorghum will improve pest management, soil health, and water use efficiency. Established small acreage broadleaf crops in the region include dry beans and sunflowers. Cowpeas can expand those options with several market outlets. Sorghum is currently grown on a small scale primarily as grain sorghum in the region. Forage sorghum provides an opportunity to improve water use efficiency over corn silage.

Cowpeas are consumed in multiple ways. This versatility of use allows for distribution in multiple markets. Cowpeas are consumed as a fresh vegetable as peas in the pod. This market allows for the quickest return on planting investments but requires the highest harvesting labor cost. They can be consumed as mature dry edible beans. In the U.S. cowpeas that are consumed as dry edible beans are of the black-eyed pea phenotype. Cowpeas which do not meet the market requirements of these first two options can be used in cattle and swine feeds. A cowpea crop which has failed to produce adequate pulse yield for harvest still has value to the producer. Their relationship with nitrogen fixing bacteria allows for use as a green manure crop.

Cowpea experiments will focus on the interaction of two aspects of production. Choice of maturity rating is not yet well defined in Colorado. In the 2020 growing season the earliest maturities available in the CSU germplasm collection (*Maria's collection not sure what else to call it*) were mature more than thirty days prior to the first frost at the Central Great Plains Resources Management Center in Akron, CO. Akron is 4,700 in elevation and in the

northern 25% of latitudes in the state. This implies longer maturity cowpea can succeed in areas of the state with longer growing seasons. The question to be considered is the source of nitrogen. Three tiers of nitrogen availability will be tested: no addition to soil profile nitrogen, inoculation with nitrogen fixing bacteria, and supplemental nitrogen placed six inches into the soil. Deep placement of supplemental nitrogen does not discourage the development of root nodules. When the taproot reaches the supplemental nitrogen, the symbiosis with nitrogen fixing bacteria will already be established.

Forage quality of sorghum has recently received more breeding focus. Forage sorghum with relative feeds similar to corn silage provides an opportunity for reduced water use both per acre and per 100 cwt of milk. Several forage sorghum types are available. Headless sorghum-Sudangrass produces a high biomass interspecies hybrid. Dual-purpose forage sorghum offers an array of harvest maturity options. In a long growing season dual-purpose forage sorghum will reach physiological maturity. This stage is too late to achieve good forage quality results due to an increase in the concentration of starch. Finding the proper harvest timing in Colorado will be the center of a dual-purpose forage sorghum project. Photoperiod sensitive forage sorghum provides greater flexibility in harvest time than dual-purpose sorghum. The focus of work with photoperiod sensitive forage sorghum will be comparing the biomass and RFV to those of headless sorghum-Sudangrass hybrids.

The intern will have an opportunity to work on multiple projects. In addition to the cowpea and sorghum ideas mentioned above, established projects exist within Golden Plains extension. Harvest of the COFT wheat variety trials will occur during the internship. Evaluation of kochia control during chemical fallow will occur multiple times during the internship.

The internship will provide the student experience to assist in their development of understanding in farm production, extension communications, and environmental stewardship.

7. CSU Faculty Associated with the Project

Dr. Maria Muñoz-Amatriain
Assistant Professor
Plant Genetics
Department of Soil and Crop Sciences

Dr. Jerry Johnson
Professor
Crop Testing Extension Specialist
Department of Soil and Crop Sciences

Sally Jones-Diamond

Research Associate
Department of Soil and Crop Sciences

8. Mentor Experience and Approach

Mentors involved in this internship have worked in employee/student development in academic, small farm, and corporate farm settings. Our approach will focus on promoting student potential by guiding them through the steps required to complete projects. Student's educational needs will be accessed by reviewing project requirements prior to entering field activities. As skills are demonstrated the student will be given additional free rein to complete their work.

9. Travel and Housing Funds

County funds will not be used for housing during the internship. Travel between sites will be funded by extension.