Short Reports—PREC

1. Screening and development of dry bean genotypes for drought tolerance

**Investigators:** Jim Heitholt and Camby Reynolds

**Issue:** Dry bean production continues to be an important contributor to Wyoming crop production, but more research is needed to develop and evaluate novel genotypes—plants with unique genetic makeups that have not yet been documented or discovered. Without these studies, producers will lack having competitive and profitable dry bean genotypes adapted for the short growing season and drought conditions of the Bighorn and Wind River basins and southeast Wyoming.

**Goal:** Identify dry bean genotypes with superior drought tolerance and, using these genotypes, develop progeny lines that help in the discovery of specific genes associated with drought tolerance.

**Objectives:** Using field and greenhouse environments, compare the growth and yield of experimental dry bean lines under drought and well-watered conditions.

**Impact:** Results have the potential to provide breeders, plant physiologists, producers, and the commercial seed industry with quantitative data on the drought tolerance of multiple dry bean genotypes. Hybridization and genetic analyses of promising genotypes could lead to the development of novel experimental dry beans for testing in regional trials.

**Contact:** Jim Heitholt at jim.heitholt@uwyo.edu or 307-766-3104.

**Keywords:** water stress, dry bean, sustainability

**PARP:** X:3

2. Participatory breeding of winter-hardy vegetable peas for Wyoming

**Investigators:** Christopher Hilgert and Robin Groose

**Issue:** Wyoming’s environment is challenging for vegetable growers, whether home gardeners or commercial producers, and a significant limitation to local vegetable production is that virtually no vegetable varieties have been bred in Wyoming for local adaptation. This study involves development of local food pea varieties (shell, snow, and snap) to extend the growing season, increase yield, and improve success for Wyoming gardeners.

**Goal:** The goal of this U.S. Department of Agriculture Specialty Crop Block Grant Program-funded research (via the Wyoming Department of Agriculture) is to involve Wyoming Master Gardeners in an effort to develop winter-hardy food peas for home and commercial production.

**Objectives:** Evaluate and advance experimental winter-hardy food pea lines in Wyoming gardens for eventual release as “open source” varieties. (Open source varieties are available to anyone and cannot be patented.)

**Impact:** Winter food peas—seeded in autumn, overwintering in a dormant state, and waking in spring—could provide vegetable produce from the Wyoming garden earlier than almost any other plant.

**Contact:** Christopher Hilgert at chilgert@uwyo.edu or 307-766-6870.

**Keywords:** winter pea, food pea, participatory plant breeding

**PARP:** not applicable
3. Wyoming production of locally bred winter pea to integrate crop and livestock production

**Investigators:** Anowar Islam, Tim Anderson, Dave Bowman, Gregor Goertz, Jerry Nachtman, and Robin Groose

**Issue:** The two-year winter wheat–summer fallow system has made possible successful wheat establishment every other year on the central Great Plains, but has resulted in significant soil organic matter loss and utilizes only 20–30% of precipitation received during the long fallow period. Breeding winter feed pea for Wyoming adaptation has produced lines superior to existing varieties and may serve to integrate cereal and livestock production in our state.

**Goal:** Study the integration of Wyoming-bred winter feed pea into a wheat production farming system to produce forage and/or grain for livestock.

**Objectives:** Evaluate effects of ‘WyoWinter’ winter feed pea on wheat yields and overall farming system productivity.

**Impact:** We have already bred superior winter feed pea varieties for adaptation to Wyoming. This State of Wyoming-funded research, via the Agriculture Producer Research Grant Program, involves University of Wyoming researchers, in collaboration with three progressive southeast Wyoming producers, evaluating potential adoption of superior winter feed pea varieties in our state.

**Contact:** Anowar Islam at mislam@uwyo.edu or 307-766-4151.

**Keywords:** winter pea, winter wheat, livestock feed

**PARP:** I:2,3,5,6,9, II:7,9

4. Efficacy and economics of cultural and mechanical weed control practices for herbicide-resistant weed management

**Investigators:** Andrew Kniss, John Ritten, Robert Wilson, and Prashant Jha

**Issue:** Modeling is currently the most common approach for comparing the impact of weed control practices on herbicide-resistant weed evolution. Nearly all modelers recognize the importance of validating assumptions and results of predictive models through field research, yet there is a lack of field studies that quantify the impact of non-herbicide weed management practices on the evolution of herbicide-resistant weed populations.

**Goal:** Determine the impact of crop rotation diversity and tillage on enrichment of an herbicide-resistance trait within a weed population.

**Impact:** By determining the efficacy and economic impacts of non-herbicide practices on development of herbicide resistance, we hope to decrease the reliance on herbicides, thereby reducing the evolution and spread of new herbicide-resistant weed biotypes.

**Contact:** Andrew Kniss at akniss@uwyo.edu or 307-766-3949.

**Keywords:** kochia, herbicide resistance, crop rotation

**PARP:** I:3,7,9, III:1,7, VII:4,7, VIII:2, IX:1
5. Evaluate sugarbeet seed treatments under field conditions

**Investigators:** Andrea Pierson, Camby Reynolds, and Gustavo Sbatella

**Issue:** Sugarbeet establishment is critical to ensure a successful crop. Seed treatments are an integral part in allowing crop establishment by protecting seedlings from diseases.

**Goal:** Evaluate the performance of different seed treatments for sugarbeet under field conditions in the Bighorn Basin.

**Objectives:** Assess seed treatments’ efficacy by determining impact on crop stand establishment.

**Impact:** Results should provide information regarding performance of different sugarbeet seed treatments that can potentially be used in the Bighorn Basin.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** sugarbeet, seed treatment

**PARP:** IX:4

6. Evaluation of elite malting barley varieties

**Investigators:** Andrea Pierson, Camby Reynolds, and Gary Moss

**Issue:** The U.S. Department of Agriculture’s Agricultural Research Service (USDA-ARS) seeks information to grade and select varieties of elite malting barley suitable for production in the northwest region of the United States.

**Goal:** The goal is to collect data to determine and grade varieties of elite malting barley.

**Objectives:** Conduct malting barley variety performance trials in cooperation with USDA-ARS to evaluate production characteristics including lodging (when stems bend over to near ground level), days to maturity, test weight, and yield.

**Impact:** Data collected should assist in the selection process of elite malting barley varieties for Wyoming and other areas of the Northwest. Varieties will be overall ranked depending on how they cumulatively perform across the region and, in time, should provide producers with a greater selection of malting varieties.

**Contact:** Andrea Pierson at apierno1@uwyo.edu or Camby Reynolds at sreynol3@uwyo.edu or 307-754-2223.

**Keywords:** malting barley, variety trial

**PARP:** VIII:1
7. Weed control in seedling alfalfa

**Investigators:** Gustavo Sbatella

**Issue:** Weed control in seedling alfalfa is critical to ensure long-term productivity. Seedling alfalfa plants can be very sensitive to herbicide applications, but this differs with the active ingredients in herbicides that are applied.

**Goal:** Evaluate the performance of different options for weed control in seedling alfalfa for the Bighorn Basin.

**Objectives:** Assess herbicide efficacy and crop safety of herbicides applied to seedling alfalfa for weed control.

**Impact:** Results should provide information regarding performance of different herbicides for weed control in seedling alfalfa.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** alfalfa, seedling, weed control

**PARP:** III:7

---

8. Weed control in dry beans

**Investigators:** Gustavo Sbatella

**Issue:** Late-emerging weeds are difficult to control in dry beans because weed control relies mainly in herbicides that are applied to soil before planting. Although late-emerging weeds will not impact individual plant yield, they can interfere with crop harvest, result in yield losses, and affect crop quality.

**Goal:** Evaluate the performance of different options for late-season weed control in dry beans in the Bighorn Basin.

**Objectives:** Assess herbicide efficacy and crop safety of herbicides applied to dry beans for late weed control.

**Impact:** Results should provide information regarding local performance of different herbicides for late weed control in dry beans.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** dry beans, late emergence, weed control

**PARP:** III:4,7
9. Weed control in dormant alfalfa

**Investigators:** Gustavo Sbatella

**Issue:** Herbicide applications to dormant alfalfa allow the use of active ingredients that otherwise would injure the crop if applied during active vegetative growth. However, new active ingredients have to be tested for efficacy and crop safety before they can be labeled for use.

**Goal:** Evaluate the performance of new active ingredients for weed control in dormant alfalfa in the Bighorn Basin.

**Objectives:** Assess herbicide efficacy and crop safety of herbicides applied to dormant alfalfa for weed control.

**Impact:** Results should provide information regarding local performance of new herbicides that could potentially become commercially available and compare them to current labeled options for weed control in dormant alfalfa.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** alfalfa, dormant, weed control

**PARP:** III:2,7

10. Testing for suitable soybean maturity group for the Bighorn Basin

**Investigators:** Gustavo Sbatella and Camby Reynolds

**Issue:** Some growers in the Bighorn Basin are considering planting soybean as an alternative for their crop rotation; however, information is lacking concerning which maturity group is best adapted to local growing conditions.

**Goal:** Evaluate different soybean maturity groups in the Bighorn Basin.

**Objectives:** Determine which soybean maturity groups are best adapted for local growing conditions.

**Impact:** Results should provide local farmers information regarding the performance of different soybean maturity groups in the Bighorn Basin. This, in turn, could provide a feasible alternative crop for rotations.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** soybean, maturity group, alternative crops

**PARP:** I:9, II:9
11. Technical and economic evaluation for on-farm drying of confection sunflowers and grain corn in the Bighorn Basin

**Investigators:** Gustavo Sbatella and Camby Reynolds

**Issue:** Growers in the Bighorn Basin face the problem of having to harvest grains with high moisture content in the fall. The technical and economic possibility of drying crops on-farm needs to be further evaluated.

**Goal:** Provide producers with information that can assist them when deciding to implement on-farm drying of confection sunflowers and grain corn.

**Objectives:** Evaluate different methods to dry grains and if drying on-farm is an economically viable alternative for crops planted in the Bighorn Basin.

**Impact:** Results from this study should provide local growers with information on whether to implement on-farm drying for grains.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** on-farm drying, corn, confection sunflower

**PARP:** I:2, IX:2

12. Pre-plant weed control in sugarbeet

**Investigators:** Gustavo Sbatella and Andrew Kniss

**Issue:** Herbicide-resistant weeds can be particularly difficult to control in sugarbeet because this crop is sensitive to a variety of active ingredients in herbicides, which limits control options. It is important, therefore, to research if there are alternatives for weed control prior to planting time.

**Goal:** Evaluate alternatives for pre-plant weed control for sugarbeet in the Bighorn Basin.

**Objectives:** Assess herbicide efficacy and crop safety of herbicides applied pre-plant to sugarbeet for weed control.

**Impact:** Results should provide valuable information regarding local performance of different herbicides for pre-plant weed control in sugarbeet.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** sugarbeet, pre-plant weed control

**PARP:** III:1,7
13. Inter-planting forage legumes with grain corn for late-season forage production

**Investigators:** Gustavo Sbatella and Camby Reynolds

**Issue:** Growers who plant grain corn in the Bighorn Basin usually graze the planted area after harvest despite possible lack of quality and available forage elsewhere. Because of this, there is a need to evaluate ways to increase the production and nutritional value of this late-season forage.

**Goal:** Determine if it is possible to inter-plant grain corn and forage legumes to maximize grain and forage production and improve forage quality.

**Objectives:** Evaluate different corn/soybean planting ratios to provide maximum corn grain production and late-season forage quantity and quality.

**Impact:** Results should provide growers information regarding the possibility of inter-planting grain corn and forage legumes in the Bighorn Basin for grain and increase late-season forage quantity and quality.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** corn, forage legumes, inter-planting

**PARP:** I:3,6,9

14. Effects of limited irrigation on herbicide efficacy and herbicide carry-over

**Investigators:** Gustavo Sbatella and Andrew Kniss

**Issue:** A major future challenge for sustainable agriculture is to increase production with limited resources, particularly water. All farm practices will likely need to adjust to a water-limited environment, including weed control programs.

**Goal:** Study the effects that restrictions on water use for farming can have on weed control programs, particularly to soil-applied herbicides.

**Objectives:** Determine the impact of limited irrigation on efficacy, soil dissipation, and carry-over (herbicides remaining in the soil from the previous growing season) of soil-applied herbicides commonly used in corn and dry bean production.

**Impact:** Results should help farmers to develop weed control programs aimed to optimize agriculture production with less water, while maximizing the economic use of herbicides and minimizing environmental impacts.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** herbicides, carry-over, efficacy

**PARP:** III:4,7, X:1
15. Broadleaf weed control in barley

**Investigators:** Gustavo Sbatella

**Issue:** Management of herbicide-resistant weeds requires an integrated approach; therefore, the ability to control weeds in all crops included in a rotation is essential.

**Goal:** Evaluate alternatives for the Bighorn Basin to control broadleaf weeds such as kochia, common lambsquarters, and pigweeds in barley.

**Objectives:** Assess herbicide efficacy and crop safety of postemergence herbicides for broadleaf weed control in barley.

**Impact:** Results should provide information regarding local performance of potentially new commercially available herbicides when compared to current options for broadleaf weed control in barley.

**Contact:** Gustavo Sbatella at gustavo@uwyo.edu or 307-754-2223.

**Keywords:** barley, broadleaf, weed control

**PARP:** III:1,7

16. A comparison of foliar band treatments for season-long Rhizoctonia control in the Bighorn Basin sugarbeet production area

**Investigators:** William Stump, Wendy Cecil, and Matthew Wallhead

**Issue:** Growers in the Bighorn Basin have been using Quadris® foliar applications predominantly for management of sugarbeet diseases caused by Rhizoctonia. Reliance on one fungicide chemistry is not recommended because of the potential for fungicide resistance development.

**Goal:** Determine the efficacy of other labeled fungicides for season-long Rhizoctonia management compared to the grower Quadris standard.

**Objectives:** Specific objectives will be to compare the efficacy of in-furrow fungicide treatments of Proline®, Priaxor®, Vertisan™, and Quadris in combination with a Kabina seed treatment for Rhizoctonia disease incidence, severity, final yield, and sugar content.

**Impact:** Results should increase awareness for growers of alternative fungicides for Rhizoctonia management in sugarbeets and assist them in selecting the most effective fungicide treatments for season-long control.

**Contact:** William Stump at wstump@uwyo.edu or 307-766-2062.

**Keywords:** Rhizoctonia, sugarbeet, fungicide efficacy

**PARP:** not applicable