

2010-2011 NPGA Research Committee Needs

Note: The below research needs are not listed in order of priority. The research needs are key research areas that will aid in the productivity of pulse crops in North Dakota and Montana.

Research needs for dry peas, lentils and chickpeas

1. **Weed Control Research** – According to past and current research survey results from ND and MT producers this remains the top priority. Screening trials have been conducted the past several years and need funding to continue screening various weed control options that may expand the herbicide availability list for pulse producers. Weed control problems for pulse producers are but not limited to kochia, wild buckwheat, canada thistle, prickly lettuce and russian thistle.
 - a. Continued evaluation of herbicide options and application strategies
 - b. Evaluation of Spartan, Prowl H2O, Valor and other soil applied products under different soil conditions and evaluation of fall applications.
 - c. Controlling volunteer broadleaf crops in pulse crops (Flax and Canola).
 - d. Evaluation of Harmony GT (PRE) peas.
 - e. Evaluation of split-rate combinations of herbicides.
 - f. Extreme label for Peas.
 - g. Evaluation of Sonalan for spring and fall application on lentils.
 - h. Evaluation of Linuron for weed control in pulse crops.
 - i. Evaluation of Diuron for weed control in pulse crops
 - j. Evaluation of Python as a weed control option in pulse crops
 - k. Evaluation of Balance as a weed control option in chickpeas
 - l. Evaluation of KIH 845 as a weed control option in pulse crops
 - m. Evaluate herbicide additions to current burndown products to broaden weed control spectrum and extend the fall residual weed control.
 - n. Evaluation of the Clearfield lentil and its weed control
 - o. Impact of soil residual herbicides on pulse crop rotations (Widematch carryover).
2. **Plant Disease**
 - a. Evaluate the various foliar diseases that are present in pulse crops and foliar fungicide control options.
 - i. Powdery Mildew – Dry Peas
 - ii. Sclerotinia – Pulse Crops
 - iii. Anthracnose
 - iv. Ascochyta Blight – Pulse Crops
 - v. Botrytis – Pulse Crops (Especially Chickpeas)
 - b. Evaluate the various seed and soil borne plant pathogens that are present and causing problems related to seedling diseases and stand establishment concerns. In addition evaluate seed treatment options for soil borne diseases.
 - i. Fusarium
 - ii. Mycosphaerella (Brown Spot)
 - iii. Pythium (especially organic chickpeas)

- iv. Rhizoctonia
 - v. Aphanomyces
- c. Monitoring resistance to fungicides for pulse crops.
 - d. Continue evaluation of fungicide options and application strategies
 - e. Proline
 - f. Quadris opti
 - g. Headline
 - h. Bravo
 - e. Evaluation of chickpeas seed size and the effect on plant disease pressure.
3. **Insect Control** – Lygus bug became a major factor for several dry pea and lentil producers in 2002. The lack of quality research and control measures on Lygus bug left producers with out options on scouting and controlling lygus bug. Lygus bug damage was evident on harvested crop and caused producers a major grade reduction when marketing their product.
- a. Other Insects besides Lygus Bug that require additional research in 2004:
 - i. Grasshopper – Preharvest Interval Evaluations
 - ii. Pea Aphid
 - iii. Pea Weevil
 - iv. Cutworms
 - v. Wireworms
 - a. Integrated Pest Management Survey – Scout for insects throughout the growing season that could potentially affect the pulse crops.
4. **Germplasm Evaluation** – Variety development is a high priority for North Dakota pulse producers. Evaluation of USDA/ARS varieties and private varieties is key to developing varieties that are suitable for the North Dakota and Montana environment.
- a. Core Variety Research – Evaluation of the core dry pea, lentil and chickpea varieties at various research stations throughout the state of ND and MT.
 - b. Regional Variety Screening – Working with the USDA/ARS Pulse Breeders in Pullman Washington to conduct the regional evaluation of new variety lines in this region. The regional screening would include the winter legumes developed by the USDA/ARS plant breeders.
 - c. Develop standardized screening of varieties across the United States
 - d. Establish a variety coordinator for the plains region to work with the USDA breeders on conducting the screening trials for North Dakota and Montana.
5. **Cropping Systems** – Pulse crops are an excellent rotational crop for ND and MT producers. Continued research needs to be conducted to further evaluate the effects pulse crops have on cropping systems.
- a. Mandan USDA/ARS Crop Sequence study – this is a continuing project conducted by the USDA/ARS station in Mandan ND. The project looks at peas, lentils and chickpeas and the effect they have on other crops when in rotation.

- b. NDSU and MSU crop rotation studies – Dry peas have been in cropping system or rotational studies at various research stations. These studies are looking at the value of peas in a long term rotation. The studies have not been adequately funded and need funding to continue good quality research.
- c. Evaluation of pulse crops under a no-till situation. Pulse crops have become a major part of no-till or minimal till operations in North Dakota and Montana. Further evaluation needs to be conducted on pulse crops under a no-till operation.
- d. Evaluation of pulse crops in a stacked broadleaf rotation.

6. Nutrient Management –

- a. Phosphorus and Sulfur Management – Evaluate the critical amount of phosphorus and sulfur needed for a pulse crop to meet maximum potential yields.
- b. Evaluation of nitrogen credits for pulse crops in a cropping system.
- c. Effect of Phosphorus on nitrogen fixation
- d. Evaluation of inoculant types and effect seed treatments have on inoculants.
- e. Evaluation of pulse crop nutrition as it impacts seed quality and disease susceptibility.
- f. Evaluation the factors that contribute to the protein levels in Peas.

7. Crop Management

- a. Evaluation of seed quality factors and the impact of seed quality on stand establishment.
- b. Evaluation of harvest timing impact on pulse crop seed and market quality factors.
- c. Evaluation of desiccation timings and the impact on pulse crop seed and market quality.

8. Utilization

a. Feed Utilization

- i. Net energy values - Finding a more accurate net energy value for peas would allow for more concise formulations in beef finishing rations
- ii. By pass/escape protein - There is conflicting views on the bypass protein content of peas. If the issues can be resolved through research, diets can be formulated more accurately. In addition, determining the level of bypass protein of peas may open doors in the dairy industry, as bypass protein is essential in dairy rations.
- iii. Range cow - Through grazing research it has been found that cows grazing late in the fall and early winter are deficient in energy and (or) protein. There has been a limited amount of work done evaluating peas as a supplement energy/protein source for range cows. If peas prove to be beneficial in this area, many new markets will be developed.
- iv. Metabolism and digestion - In many receiving diets as well as finishing diets intake levels increase in diets that include peas, the question is why. There has been limited amount of work done

regarding the metabolism and digestion of peas. With further research, this question can be answered.

- v. Forage peas and cereals - Currently, many producers grow peas in combination with cereal grains to be harvested and fed as forage. However, the nutrient content of this mixture is not well understood.(LP)
 - vi. Grazing peas - There is limited amount of data available on animals grazing peas. However, producers are currently using this practice with mixed results.
 - vii. Some find their animals “bloat” while other producers do not. We need to look at the differences between growing environments and varieties. (LP)
 - viii. Breeding - The pea industry would benefit from a pea variety that was bred specifically for feeding. We also need to be more consistent in yield, as well as protein and energy content
 - ix. Sensory and quality evaluation of livestock products when fed peas, lentils or chickpeas.
 - x. Dairy heifer development from a very young age
 - xi. Evaluation of forage quality
 - xii. Evaluation of grazing and feeding pulse crop residue
- b. **Food Utilization** – Developing food products and value added research with pulse crops remains a priority for pulse crop producers. Evaluation and investigation of utilizing pulse crops as a food ingredient in current food products.
- a. Evaluation of pulse crops as a food ingredient.
 - b. Screening of varieties to understand component makeup and levels. Ex: starch and protein content.
- c. **Industrial**
- i. Evaluation of pulse crops as an alternative fuel for transportation.