Summary of ADF Projects, 2012
Crops Research Funding

34 crop-related research projects: $8,274,019

Breakdown by Commodity

Oilseeds	$4,127,799
Cereals	$2,328,926
Pulses	$1,251,508
Fruits and Vegetables	$527,786
Other/General	$38,000

Breakdown by Organization

University of Saskatchewan	$5,672,563
National Research Council	$709,915
Agriculture and Agri-Food Canada	$593,500
Agrisoma Biosciences Inc.	$490,000
Linnaeus Plant Sciences Inc.	$435,000
Quantum Biosciences Inc.	$200,041
University of Regina	$173,000

Oilseeds

Assessment of arbuscular mycorrhizal inoculants for flax production
Objectives:

- Assess the growth promotion characteristics, impact and growth rate of commercially available arbuscular mycorrhizal inoculants in flax production.

Funding: $201,669
Contact: Frances Walley, Soil Science, (306) 966-6854
University of Saskatchewan

Characterization of flax germplasm for resistance to Fusarium wilt
Objectives:

- Characterize flax germplasm for resistance to Fusarium wilt disease caused by Fusarium Oxysporum

Funding: $287,700
Contact: Helen Booker, Crop Development Centre, (306) 966-5878
University of Saskatchewan

New sources of variation for the development of early maturing (or northern adapted) and yellow linseed varieties.
Objectives:

- Core collection as a source of variation for northern adapted flax.

Funding: $515,930
Contact: Helen Booker, Crop Development Centre, (306) 966-5878
University of Saskatchewan

Safety and efficacy data to support the listing of camelina meal and oil as feedstuffs with the Canadian Food Inspection Agency (CFIA)
Objectives:

- Generate Canadian safety and efficacy data to support the listing of camelina meal and oil as feedstuffs with CFIA.

Funding: $438,085
Contact: Andrew Van Kessel, Animal and Poultry Science, (306) 966-4136
University of Saskatchewan

Improving seed size for high yield of elite flax cultivars
Objectives:

- Determine the inheritance of large seed size in selected flax accessions and map the genetic loci that make the most significant contribution to seed size.

Funding: $386,764
Contact: Gopalan Selvaraj, (306) 975-5577
National Research Council – Plant Biotechnology Institute

Clubroot resistance genes and associated markers

Objectives:

- Locate clubroot resistance genes and isolate them with the express goal of developing genic and nearby non-genic markers for use in marker-assisted breeding of canola.

Funding: $143,151

Contact: Gopalan Selvaraj, (306) 975-5577
National Research Council – Plant Biotechnology Institute

Development of a germplasm resource for canola crop improvement

Objectives:

- Develop a foundational resource for canola crop improvement and a nested association mapping population that will target adaptation to prairie conditions.

Funding: $340,500

Contact: Isobel Parkin, Saskatoon Research Centre, (306) 956-7283
Agriculture and Agri-Food Canada

Identifying virulence factors in the cause of blackleg disease of canola

Objectives:

- Identify virulence factors encoded by the Leptosphaeria Maculans (LM) genome.
- Identify conserved effector proteins in LM.
- Develop novel and robust sources of LM resistance by targeting conserved effectors.
- Develop molecular markers to monitor the pathogen population in the field and to identify new emerging isolates.

Funding: $157,000

Contact: Hossein Borhan, (306) 956-2827
Agriculture and Agri-Food Canada

Value-added processing of camelina oil for industrial applications

Objectives:

- Purify the C20:1 produced in camelina and the production of various products from this oil including ozonolysis products.

Funding: $435,000

Contact: Jack Grushcow, (604) 224-5700
Linnaeus Plant Sciences Inc

Commercialization of industrial oilseeds for feedstock
Objectives:

- Use technology to stack six new traits into carinata in order to produce a new "industrial" oilseed that has the following features:
  - Optimized oil composition with optimized oil chemistry for biofuel;
  - Enhanced overall yield of optimized oils through improvements in seed yield and overall oil content within the seeds; and
  - Ability to grow with high performance on semi-arid marginal land with reduced input requirements.

Funding: $490,000
Contact: Steven Fabijanski, (613) 834-5265
Agrisoma Biosciences Inc

Processing of high glucosinolate cruciferous plants
Objectives:

- Develop processes for producing biopesticide concentrates from Cruciferous species

Funding: **$**732,000
Contact: Martin Reaney, Plant Sciences, (306) 966-5027
University of Saskatchewan

Cereals

Enhancing disease resistance, pigment characterization and isolation of spring wheat
Objectives:

- Focus on identifying near-homozygous lines with improved Fusarium head blight, leaf rust and stem resistance reactions.
- Identify as many of the anthocyanins as possible in purple pericarp lines.
- Enhance and scale-up a process to isolate anthocyanins from blue or purple wheat.

Funding: $158,400
Contact: Pierre Hucl, Crop Development Centre, (306) 966-8667
University of Saskatchewan

Removing Fusarium contaminated seeds from wheat and barley
Objectives:

- Determine the capacity of the BoMill TriQ individual seed sorter for sorting samples of wheat, durum and barley with various levels of Fusarium-damaged kernels.

Funding: $160,000
Contact: Tom Scott, Animal and Poultry Science, (306) 966-4279
University of Saskatchewan

Saskatchewan spring emmer, einkorn and spelt wheat breeding initiative
Objectives:

- Develop a spring spelt variety with stem rust resistance similar to current common spring wheat classes grown in Saskatchewan.
- Develop a high lutein einkorn variety with competitive agronomic performance equal to the long-term agronomic einkorn check.
- Develop a food-type emmer wheat variety which is shorter-strawed but equal in yield to the feed quality variety 'Vernal'.

Funding: $250,000
Contact: Pierre Hucl, Crop Development Centre, (306) 966-8667
University of Saskatchewan

Healthier oat through improved oil stability and fatty acid profile
Objectives:

- Improve oat oil stability and nutrition by identifying oat germplasm that contains a higher proportion of oleic acid and less linoleic acid.
- Identify oat germplasm with lower levels of oxygenated fatty acid.

Funding: $270,000
Contact: Xiao Qiu, Food and Bioproduct Sciences, (306) 966-2181
University of Saskatchewan

Stripe rust resistance in wheat
Objectives:

- Conduct a preliminary analysis of the population structure of the stripe rust pathogen in Saskatchewan and compare this to isolates from Alberta and Manitoba, and isolates known to have adapted to cool conditions.

Funding: $154,545
Contact: Randy Kutcher, Crop Development Centre, (306) 966-4951
University of Saskatchewan

Sprouting tolerance improvement in durum and Canada Western Red Spring Wheat
Objectives:

- Complete the introgression of sprouting tolerance from hexaploid wheat into high yielding, low cadmium accumulating durum wheat germplasm.

Funding: $318,000
Contact: Pierre Hucl, Crop Development Centre, (306) 966-8667
University of Saskatchewan

A genetic approach to improved profitability for Saskatchewan wheat farmers
Objectives:

- Utilize available genetic information to develop high yielding durum and wheat cultivars that have built in resistance to rusts (leaf, stem, stripe), Fusarium head blight, wheat stem sawfly, wheat blossom midge, and have high protein concentration.

Funding: $592,940
Contact: Curtis Pozniak, Crop Development Centre, (306) 966-2361
University of Saskatchewan

Barley cultivars resistant to true loose smut
Objectives:

- Improve the CDC's barley breeding program and the ability to screen and release two-row barley varieties to producers with true loose smut resistance.

Funding: $225,000
Contact: Aaron Beattie, Crop Development Centre, (306) 966-2102
University of Saskatchewan

Unveiling the genetic root of orange wheat blossom midge (OWBM) tolerance in wheat and a novel diagnostic test for its existence
Objectives:

- Develop a novel DNA marker that can accurately predict the presence of orange wheat blossom midge in Canada Western Red Spring Wheat and durum, regardless of genetic background.
- Utilize the novel DNA marker to develop a low cost, rapid, and high throughput test method for detecting and quantifying the amount of wheat midge susceptible variety (refuge) in any given varietal blend, wheat seed sample, regardless of genetic background.

Funding: $200,041
Contact: Leigh Marquess, (306) 956-2070
Quantum Biosciences Inc

Pulses

Fertilization of lentils with zinc to increase yield
Objectives:

- Determine the grain yield and zinc concentration response in selected genotypes of three different market classes of lentils (large green-seeded, small green-seeded, and red).
- Assess the effect of the zinc sulfate application to lentils on the yield and zinc concentration in hard red spring wheat that is grown the following year.

Funding: $70,890
Contact: Jeff Schoenau, Soil Science, (306) 966-6844
University of Saskatchewan

Determine the potential for enhancing pea yield
Objectives:

- Evaluate whether Ascochyta pisi and Mycosphaerella pinodes have different temperature and moisture optima.
- Assess the role of seed infection with Ascochyta pisi on disease development in field pea.
- Assess yield loss due to Ascochyta pisi in a selection of European and Canadian field pea cultivars under field conditions.

Funding: $110,584
Contact: Sabine Banniza, Crop Development Centre, (306) 966-4959
University of Saskatchewan

Greenhouse and field evaluation of early nodulating rhizobia for lentils
Objectives:

- Identify superior rhizobia strains that nodulate lentils earlier.

Funding: $83,375
Contact: Rosalind Bueckert, Plant Sciences, (306) 966-8826
University of Saskatchewan

Characterizing protein composition and quality from different pea cultivars
Objectives:

- Evaluate the amino acid profiles and structures of proteins extracted from a diverse set of pea cultivar.

Funding: $80,000
Contact: Michael Nickerson, Food and Bioproduct Sciences, (306) 966-5030
University of Saskatchewan

Cropping sequence effects of pea, lentil and chickpea using stable isotopes
Objectives:

- Quantify nitrogen fixation credit of pea, lentil, and chickpea grown in sequence with oilseeds, pulses, and cereals by determining nitrogen fixation and pulse residue inputs (roots, rhizodeposits and above ground).
- Determine carbon and nitrogen inputs of pea, lentil, and chickpea as they are affected by cropping sequence.
- Examine the influence of previous crop (oilseed, cereal, or pulse) on soil inputs of pea, lentil, and chickpea.
- Investigate differences in microbial community structure between the pea, lentil and chickpea and as affected by cropping sequence.
- Quantify biological nitrogen fixation in different pulses in rotations of different diversity in the field.

Funding: $160,927
Contact: Diane Knight, Soil Science, (306) 966-2703
University of Saskatchewan

Integrating genetic and genomic resources for lentil improvement
Objectives:

- Build a set of interspecific populations, use gene-based markers to generate lentil linkage maps and integrate these resources to provide better evaluations of breeding populations and thus facilitating a rapid deployment of improved lentil cultivars in different market classes.

Funding: $515,745
Contact: Kirstin Bett, Plant Sciences, (306) 966-4947
University of Saskatchewan

Determination of the endogenous auxin 4-chloro-indoleacetic acid content in lentil and other legume species
Objectives:

- Accelerate pulse variety development by improving interspecific hybridization and doubled haploid techniques.

Funding: $49,987
Contact: Albert Vandenberg, Crop Development Centre, (306) 966-8786
University of Saskatchewan

Prevention of drought/heat stress-induced yield losses in pulse crops
Objectives:

- Investigate methods to prevent/reduce seed loss in pulse crops after heat/drought stress conditions with chemical treatments and plants with altered gene expression in hormone pathways.

Funding: $180,000
Contact: Sue Abrams, (306) 975-5569
National Research Council – Plant Biotechnology Institute

Fruits and Vegetables

Breeding and selecting haskap for nutraceutical and agronomic suitability
Objectives:

- Evaluate haskap seedlings for agronomic traits and identify the best ones for commercial production.
- Observe effects of mechanical harvesting of haskap bushes and investigate genetic and cultural solutions for any problems identified.
- Measure nutraceutical differences between Lonicera caerulea subspecies and if hybrids between them are superior.
- Document the high levels of healthy compounds in our recent haskap varieties and those advanced selections being considered for release.

Funding: $135,000
Contact: Bob Bors, Plant Sciences, (306) 966-8583
University of Saskatchewan

Comparing saskatoon and blue berries – the effects on plasma antioxidant capacity

Objectives:

- Conduct a systematic study on the absorption, metabolism and excretion of anthocyanins following a single dose or following multiple administrations of saskatoon berries and blueberries in healthy adult volunteers.

Funding: $86,786
Contact: Jim Fang, College of Pharmacy and Nutrition, (306) 966-6372
University of Saskatchewan

New products and strategies for wireworm management
Objectives:

- Assess the potential to control wireworm damage to cereal and potato crops and reduce overall wireworm populations by applying new pesticides and pesticide combinations as seed treatments to cereal crops.

Funding: $75,000
Contact: Doug Waterer, Plant Sciences, (306) 966-5860
University of Saskatchewan

Northern vigor and virus prevention through epigenetic pre-treatment of potato seed

Objectives:

- Understand and exploit the potato epigenome to enhance virus prevention through several generations in seed potato production.

Funding: $96,000

Contact: Larry Kawchuk, (403) 317-2271
Agriculture and Agri-Food Canada

Protecting Saskatchewan fresh produce from microbial threats

Objectives:

- Evaluate best practices for on-farm monitoring of irrigation water and identify effective treatment options for inactivation of pathogens from irrigation water.
- Investigate the survival of bacterial pathogens on fresh produce during pre- and post-harvest conditions and develop practical best management practices to reduce food contamination.
- Develop an outreach program to help producers perform risk assessments of their irrigation water and use the information to implement management practices for maintaining irrigation water quality.

Funding: $135,000

Contact: Chris Yost, Biology, (306) 585-5223
University of Regina

Other/General

Weather risk management and the use of weather derivatives by Saskatchewan grain farmers.

Objectives:

- Estimate the level of usage of weather derivatives by Saskatchewan grain farmers.
- Identify hurdles that prevent farmers from using weather derivatives and approaches to overcome these hurdles.
- Identify the role of private sector financial institutions, like banks and credit unions, in providing weather derivative products that appeal to Saskatchewan farmers.

Funding: $38,000

Contact: Saqib Khan, Faculty of Business, (306) 337-3218
University of Regina