

Summary of ADF Approved Projects 2007

(approved November 29, 2006)

Total ADF funding awarded for 35 projects in 2007 \$4,395,447.50

University of Saskatchewan\$2,990,066

College of Agriculture..... \$2,761,840

Plant Science and CDC 1,665,076

Soil Science..... 455,830

Animal and Poultry Science..... 508,934

Applied Microbiology and Food Science.... 132,000

College of Engineering \$154,556

Agricultural and Bioresource

Engineering \$154,556

Western College of Veterinary Medicine \$73,670

Large Animal Clinical Sciences \$73,670

University of Regina\$195,000

Faculty of Engineering.....\$195,000

Other research organizations..... \$1,210,381.50

Linnaeus Plant Sciences Inc.\$281,448

Prairie Swine Centre \$225,975

Biolin Research Inc. \$24,300

Prairie Agricultural Machinery Institute (PAMI).....\$381,740.50

Alberta Invasive Plant Council.....\$75,000

EcoTech.....\$27,918

Canada-Saskatchewan Irrigation Diversification Centre\$80,000

Agriculture and Agri-Food Canada – Indian Head\$30,000

Agriculture and Agri-Food Canada – Lethbridge\$84,000

Summary of ADF Approved Projects 2007

(approved November 29, 2006)

University of Saskatchewan

College of Agriculture

Department of Plant Sciences

51 Campus Drive, Saskatoon, SK S7N 5A8

Project number 2006-0100

Approved: 288,825.00

CHARACTERIZATION AND DEPLOYMENT OF NOVEL OAT CROWN RUST RESISTANCE FOR SASKATCHEWAN AND WESTERN CANADA

Objectives:

- Study the inheritance of new seedling crown rust resistance sources in oats.
- Develop and validate PCR-based markers for adult plant crown rust resistance.
- Combine effective crown rust resistance genes in elite CDC oat germplasm.

Contact: Curt McCartney (306) 966-4951

Project number 2006-0104

Approved: 170,500.00

COMBINING EFFECTIVE RESISTANCE GENES TO THE SASKATCHEWAN LEAF SPOTTING COMPLEX IN SPRING AND DURUM WHEAT

Objectives:

- Assess the *Stagonospora nodorum* and *Septoria tritici* pathogen populations for variation in virulence.
- Combine multiple resistance genes to tan spot, *stagonospora nodorum* blotch, and *septoria tritici* blotch in adapted CDC spring and durum wheat lines.
- Tag the *stagonospora nodorum* blotch resistance genes *Snb1* (spring wheat), *Snb2* (spring wheat), and *SnbTM* (durum wheat) with microsatellite markers.
- Transfer *stagonospora nodorum* blotch and *septoria tritici* blotch resistance genes from spelt wheat lines into spring wheat using a backcrossing approach.

Contact: Curt McCartney (306) 966-4951

Project number 2006-0123

Approved: 80,000.00

DEVELOPMENT OF FORAGE OAT AND BARLEY CULTIVARS WITH IMPROVED NUTRITIVE VALUE

Objectives:

- Improve the nutritive value (lower ADF, higher TDN) of forage oats by: a) incorporating the low lignin hull trait into high yielding forage type oat cultivars; and b) incorporating finer stems into forage type oat cultivars.
- Improve the nutritive value of forage barley by selecting for smooth awns, lower ADF and higher TDN in advanced populations resulting from crosses with CDC Cowboy.

Contact: Bruce Coulman (306) 966-1387

Project number 2006-0140

Approved: 100,000.00

HASKAP BERRY BREEDING AND PRODUCTION

Objectives:

- Breed Haskap varieties suitable for the Japanese and North American markets that can be mechanically harvested with high yields.
- Develop Haskap production guidelines for growers.
- Understand the soil requirements of Haskap.
- Develop a strategy to “fast track” production of superior varieties.
- Screen Haskap seedlings for resistance to mildew and Angular Leaf spot.
- Collect and determine value of wild Saskatchewan Haskap berries.

Contact: Bob Bors (306) 966-8583

Project number 2006-0143

Approved: 41,000.00

AROMATIC OILS FROM SASKATCHEWAN GROWN CROPS AS NOVEL REDUCED RISK PEST CONTROL PRODUCTS

Objectives:

- Evaluate the essential oils extracted from locally grown specialty crops like dill, coriander, caraway and mint as potential biocontrol agents for a range of post harvest and seed-borne diseases utilizing a simplified assay system. The major components of each essential oil will also be purified and tested individually (i.e. dill oil = limonene and carvone).
- Take the most promising compounds from the screening trial and test them as potential biofumigants for control of diseases in enclosed environments (seed and product storages). Efficacy, optimum dosage and method of application, duration of efficacy and any issues with phytotoxicity will be evaluated.
- Design product development initiatives and/or additional studies based on the test results.

Contact: Doug Waterer (306) 966-5860

Project number 2006-0144

Approved: 37,500.00

IMPROVING YIELDS, QUALITY AND BY PRODUCT UTILIZATION OF SASKATCHEWAN-GROWN MILK THISTLE

Objectives:

- Previous ADF-supported research (Project No. 20020163) indicated that there is excellent potential for mechanized production of high quality milk thistle in Saskatchewan. High yielding locally adapted lines suited to mechanical harvest were selected in that project.
- The objectives of this project are to conduct:
 - 1) Agronomy trials to develop agronomic practices that will optimize the seed yield and seed quality obtained from the locally adapted lines of milk thistle that were developed as part of ADF Project No. 20020163. The specific objectives of the proposed trials will be to:
 - Determine optimum time of planting and harvest to achieve optimum seed yields and quality of the new lines.
 - Determine optimum plant populations of the new faster maturing, shorter-stature lines.
 - Determine the potential to selectively strip mature seed heads from plants and thereby minimizing shattering losses and eliminating the need for chemical desiccants.
 - Compare the effectiveness of organic desiccants in comparison to Reglone, a commercial non-organic desiccant.
 - 2) By product recovery trials to determine the amount and potential value of the by-products that could be recovered during milk thistle production and processing.
 - Determine the amount and composition of seed oil present in the milk thistle seed. This oil is presently discarded during the extraction of the medicinally active components from the milk thistle seed.

- Determine the amount and composition of the above ground biomass produced by the new lines of milk thistle. Previous trials of non-adapted lines indicated biomass yields and feed quality equivalent to irrigated alfalfa.
- Determine the amount and composition of the latex produced by the stems and leaves of milk thistle. Alternative sources of latex are in demand, both as a starting point for product synthesis and as an alternate biofuel.

Contact: Doug Waterer (306) 966-5860

Project number 2006-0163

Approved: 124,775.00

ASEXUAL PROPAGATION TECHNIQUES TO ENHANCE BREEDING STRATEGIES FOR LARGE SEEDED PULSE CROPS (DRYBEAN, FABA BEAN AND PEA)

Objectives:

- The proposed research focuses on the development of reliable clonal or asexual propagation techniques for dry bean, faba bean and pea.
- The specific objectives include:
 - identification of compatible root stocks for inter-varietal, intra-specific and inter-specific scions derived through either in vivo or in vitro breeding;
 - developing standard protocols of techniques for clonal/asexual propagation methods for mass multiplication of breeding materials; and
 - development of rooting techniques for mass propagation.

Contact: Albert Vandenberg (306) 966-8786

Crop Development Centre

51 Campus Drive, Saskatoon, SK S7N 5A8

Project number 206-0101

Approved: 267,504.00

DEVELOPMENT OF HULLED WHEAT VARIETIES WITH IMPROVED AGRONOMIC AND END-USE TRAITS

Objectives:

- To develop a spring spelt wheat variety which would be the next step up from 99SPELT9Z in terms of maturity, straw strength, quality and disease resistance.
- To develop einkorn wheat elite breeding lines that combine bread-making quality with agronomic performance of TM23 (check).
- To develop breeding lines from crosses between stronger-strawed emmer parents and baking quality emmer parents.

Contact: Pierre Hucl (306) 966-8867

Project number 2006-0102

Approved: 260,567.00

ENHANCING FUSARIUM HEAD BLIGHT RESISTANCE IN SPRING AND DURUM WHEAT USING NOVEL APPROACHES

Objectives:

- Backcross known FHB QTLs into CDC Go, CDC Osler and CDC Alsask spring wheat to the BC3 (*4) level and to phenotype the resulting populations in a FHB field nursery as well as using greenhouse protocols.
- Develop back-cross derived durum lines using a source of resistance identified by Pozniak (2005) in a tetraploid species of wheat. Three backcrosses (*4) will be conducted using a combination of greenhouse and field phenotyping. Molecular markers for the new durum source will be identified to aid in the backcrossing program.
- Characterize a potentially new source of FHB resistance from intergeneric lines first evaluated by Breker et al (2003). This material has not been fully tested in the field or greenhouse.

Contact: Pierre Hucl (306) 966-8667

Project number 2006-0160

Approved: 215,925.00

MOLECULAR APPROACHES FOR FAST TRACK GENETIC IMPROVEMENT OF KABULI CHICKPEA FOR WESTERN CANADA

Objectives:

- The proposed research brings together many aspects of molecular breeding for rapid improvement of early maturity and resistance to ascochyta blight for large-seeded kabuli chickpea.
- The specific objectives include:
 - development of molecular breeding strategy namely marker-assisted accelerated backcrossing for improvement of complex traits in chickpea;
 - assembling various QTL for resistance to ascochyta blight and double podding; and
 - accelerated restoration of the elite genetic background.

Contact: Bunyamin Taran (306) 966-2130

Project number 2006-0161

Approved: 78,480.00

OFF-SEASON EVALUATION OF CHICKPEA BREEDING LINES (PHASE II)

The primary objective of this project is to continue to utilize the off-season nurseries at ICARDA to evaluate the reaction to ascochyta blight, fusarium wilt and cold tolerance of CDC breeding lines in a systematic manner. The proposed project will enhance and intensify the long-term collaboration between CDC and ICARDA on improvement of agronomically and economically important traits of chickpea for Saskatchewan.

Contact: Bunyamin Taran (306) 966-2130

Department of Soil Science

51 Campus Drive, Saskatoon, SK S7N 5A8

Project number 2006-0127

Approved: 165,900.00

IMPACT OF REPEATED APPLICATIONS OF MANURE AND BIOGAS PRODUCTION BY-PRODUCTS ON SOILS AND CROPS

Objectives:

- To provide information on how repeated applications of raw manure at different rates, sequences and methods of application influence nutrients, organic matter, soil chemical and physical conditions, crop yield and quality at two long-term manure research sites, Dixon (Black Chernozem) and Melfort (Gray Luvisol). Recommendations to ensure the environmental and agronomic sustainability of repeated manure applications to the same land area will be developed.
- To determine how manure processing by-products from bio-gas production can serve as soil amendments to increase soil fertility and crop growth, thereby enhancing the value derived from manure processing. The value of these by-products in crop production will be established and compared to responses observed from application of raw manure.

Contact: Jeff Schoenau (306) 966-6844

Project number 2006-0130

Approved: 94,350.00

EVALUATION OF SOIL AMENDMENTS FOR INCREASING NUTRIENTS IN ORGANIC FARMING

Objectives:

- Characterize potential organic amendments with respect to nutrient compositions, and toxicity to germinating and emerged crops.
- Evaluate potential organic amendments for providing P (and other nutrients) to organically managed crops.

- Investigate the role of natural soil P pools for providing P for plant uptake in organically managed systems.

Contact: J. Knight (306) 966-2703

Project number 2006-0145

Approved: 195,580.00

DEVELOPMENT OF WILLOW CLONES FOR AGROFORESTRY AND BIOMASS ENERGY

Objectives:

- Develop willow clone trials in three locations – University of Saskatchewan campus, Prince Albert and the Melfort region.
- Determine which clones have the best survival and growth characteristics in Saskatchewan.
- Determine biomass yields for different clones and total carbon accumulation.
- Determine the best cultural practices for willow establishment, survival and growth and costs for establishment.
- Investigate nutrient and water use efficiency and tree nutrition for various willow clones.

Contact: Ken Van Rees (306) 966-6853

Department of Animal and Poultry Science

Room 6D10 - 51 Campus Drive, Saskatoon, SK S7N 5A8

Project number 2006-0113

Approved: 191,400.00

NUTRIENT UTILIZATION AND AVAILABILITY OF PROANTHOCYANIDIN-CONTAINING ALFALFA IN RUMINANTS

Objectives:

- **Long-Term:** To develop a super-genotype of alfalfa (i.e. "TANNIN ALFALFA") for the Saskatchewan forage, livestock, and feed industries. This new super-genotype will significantly improve alfalfa utilization efficiency and quality, reduce incidents of bloat and acidosis, reduce environmental impact, and maintain animal health. Information arising from the analysis of intermediate platform germplasm, as well as the final "TANNIN ALFALFA" germplasm, will be applied to the production of high quality beef and dairy feeding programs and also to support the alfalfa export industry.
- **Short-Term:** To assist in the development of "TANNIN ALFALFA" by comparing new platform genotypes of anthocyanidin- and proanthocyanidin-containing (Anth+PA+) alfalfa with their parental (control) germplasm through the following project objectives:
 - 1) Chemical characterization and assessment of protein and carbohydrate subfractions that are closely related to animal digestive behaviours;
 - 2) Determination of genotypic differences of anthocyanidin- and proanthocyanidin-containing (Anth+PA+) alfalfa in chemical functional group spectroscopic characteristics associated with nutritive value;
 - 3) Assessment of the impact on ruminal fermentation characteristics and rumen degradation kinetics;
 - 4) Determination of the ratio of available protein to available carbohydrates (particularly at the beginning of rumen degradation);
 - 5) Estimation of the energy value of the anthocyanidin- and proanthocyanidin-containing alfalfa (eg. GE, TDN, DE, ME, NE for dairy and beef);
 - 6) Assessment of the nutrient availability to ruminants (estimated microbial protein synthesis, metabolizable protein, rumen bypass protein, degraded protein balance);
 - 7) To provide crucial outcome information to the beef, dairy, and forage industries, so it may lead to more efficient feeding systems and assist nutritionists in designing low cost, efficient feed programs and a more competitive animal feeding industry; and

- 8) To train a graduate student (Ph.D) for Saskatchewan Agriculture and expose research environment to summer students.

Contact: Peiqiang Yu (306) 966-4132

Project number 2006-0124

Approved: 317,534.00

ETHANOL PRODUCTION FROM WHEAT - VALUE OF CO-PRODUCTS FOR ANIMAL PRODUCTION

Objectives:

- Characterization of DDGS feeding value through established chemical and in vivo/in vitro methods including near infrared spectroscopy, and creation of a DDGS data base that can be used to determine and improve predictability of feeding value.
- Complete a preliminary assessment of the functional properties of proteins immediately after the liquefaction, distillation and DDGS drum drying steps of ethanol production.
- Development of nutritional strategies that optimize the use of DDGS in low cost backgrounding programs for feeder cattle and for grazing and overwintering beef cows.
- Development of nutritional strategies that incorporate DDGS into finishing rations that have reduced potential for acidosis and other digestive problems.
- Determine the digestible energy and amino acid content of wheat DDGS and establish feeding recommendations for wheat DDGS in broiler diets.

Contact: Henry Classen (306) 966-6600

Department of Applied Microbiology and Food Science

Saskatoon, SK S7N 5A8

Project number 2006-0149

Approved: 132,000.00

INNOVATIONS INTO THE CONTROLLED DELIVERY OF MICRONUTRIENTS INTO FOODS AND FEED

Objectives:

- The overall goal of this project is to design microcapsules from plant proteins for the delivery of heart healthy essential fatty acids (EFAs) from flax to food, creating growth opportunities for the functional food market. The use of micro-encapsulation technology will improve the ease of delivery, while offering protection against oxidative rancidity and mechanical stress.
- Other objectives include:
 - formulating canola and/or pea protein-based microcapsules with entrapped flaxseed oil by both simple and complex coacervation; and
 - to coat formed capsules with additional layers for extra protection and surface modification. The latter is hypothesized to improve their delivery within a broader spectrum of foods. All capsules will be tested for improved stability, integrity and release within various model and real food environments, and, contrasted against gelatin-based counterparts.

Contact: Michael Nickerson (306) 966-5030

College of Engineering

Department of Agricultural and Bioresource Engineering

57 Campus Drive, Saskatoon, SK S7N 5A9

Project number 2006-0128

Approved: 54,756.00

SEEPAGE BENEATH CATTLE FEEDLOT PENS

Objectives:

- Determine the susceptibility of earthen floored feedlot pens to seepage of water and manure solutes. Seepage is defined as the amount of water and substances transported within water (e.g. dissolved ions, nutrients, organics) from the surface to the groundwater zone. Groundwater is the zone beyond the root zone (about 1 m in depth) and may be unsaturated or saturated.
- Specific objectives are related to field studies of feedlots to determine:
 - 1) seepage indicators (e.g. moisture content, different N and P forms, anions and cations, electrical conductivity, dissolved organic carbon, bacteria);
 - 2) how much seepage occurs (e.g. mm of water per year, mass of solutes per m² per year);
 - 3) the portion of seepage that occurs within the general soil matrix or as by-pass flow along large continuous pores (e.g. cracks, old root channels, or other biopores); and
 - 4) whether seepage is localized within pens (e.g. within low lying areas or under straw-manure mounds).
- With time and resources permitting, a fifth objective may be undertaken: to determine the effect of scraping and pen inactivity upon seepage potential.

Contact: Charles Maule (306) 966-5286

Project number 2006-0152

Approved: 99,800.00

DEVELOPMENT OF A SEMI-INDUSTRIAL DEHYDRATION SYSTEM FOR SMALL PRAIRIE FRUITS AND QUALITY ASSESSMENT

Objectives:

- Develop pilot and semi-industrial scale drying studies for small Prairie fruits.
- Improved quality characterization of fresh and frozen saskatoon berries and sour cherries.
- Compare existing methods and develop optimal, energy efficient drying technology for processing fruit and fruit products.
- Develop drying standards and recommendation for small Prairie fruits.
- Assess the overall market potential for processed fruit and fruit products in consultation with the industry.

Contact: Venkatesh Meda (306) 966-5309

Western College of Veterinary Medicine

Large Animal and Clinical Sciences

52 Campus Drive, Saskatoon, SK S7N 5B4

Project number 2006-0116

Approved: 64,870.00

THE ECOLOGY OF MYCOPLASMA BOVIS STRAINS DERIVED FROM CALVES IN WESTERN CANADIAN FEEDLOTS

Objectives:

- Determine the prevalence of Mycoplasma bovis in fall-placed feedlot calves.
- Describe the ecology of mycoplasma within pens of feedlot calves.
- Determine if specific strains of M. bovis are related to pathogenicity in the feedlot.

Contact: Murray Jelinski (306) 966-7166

Project number 2006-0117

Approved: 8,800.00

**IDENTIFICATION OF GENETIC CHARACTERISTICS OF E. COLI RESISTANT TO
ANTIMICROBIALS**

Objectives:

- Determine the genes contributing to antimicrobial resistance patterns observed in E. coli isolated from beef cattle presented to slaughter in Western Canadian abattoirs.
- Determine the association of genotypic patterns with phenotypic patterns for these isolates.
- Determine the associations between resistance genes within isolates.

Contact: Sarah Parker (306) 966-1994

University of Regina

Faculty of Engineering

Regina, SK S4S 0A2

Project number 2006-0154

Approved: 195,000.00

SASKATCHEWAN FIBRE, BIODEGRADABLE, MOULDABLE PRODUCT INDUSTRY

Objectives:

- The complete project seeks to develop a value-added industry utilizing Saskatchewan (SK) crop residue (straw). Specifically, the proposed research and development seeks to advance the utilization of Saskatchewan fibres for the commercial production of biodegradable, fibre-based, single-use containers. Initially, 9" diameter dinner plates using vacuum moulding techniques will be produced. The scope is to advance fundamental knowledge and its applications relating to collection of raw material, pre-processing of fibres; manufacturing product, sterilization and packaging methods; product testing and evaluation, production optimization, marketing and distribution strategies, and product expansion. Previously submitted in the Letter of Intent, the objectives for the complete project and those for this fund were indicated.
- The following list further summarizes the key objectives:
 - 1) To complete technical literature reviews on agricultural fibre processing initiatives and practices focusing on North American fibres for the past 10 years;
 - 2) To continue market assessment using a comparable, biodegradable, fibre-based product (from Seeker Green Products Ltd.) for creating distribution channels;
 - 3) To conduct research and development for raw source to finished product which will include aspects of fibre processing, pulping and processing, product test and evaluation and related packaging through either or both lab-scale or prototype pilot-scale production trial runs. Note the collaborations that have and are being established are essential in successful completion as specialized infrastructure is required and hence outsourcing of activities to local and supporting industry and research facilities will occur;
 - 4) To complete analysis for production and plant optimization related to full-scale or commercial industrial implementation along with incorporating product line diversification; and
 - 5) To continue efforts for transfer of technology for commercialization by pursuing opportunities and support of ventures and preparing appropriate documentation (business plans, reports and proposals). Although this proposal has identified the end product as a single use dinnerware item, the research to be completed into vacuum forming, fibre-based biodegradable single use items can be adapted for multiple end products. Furthermore, various aspects can be beneficial to other value-added bio-fibre projects (i.e. pre-processing of raw fibre can be used for applications in bio-composites manufacturing). As documentation of the challenges and successes in

this initiative will be recorded, the process of developing a viable commercial industry for future ventures can serve as a template or turnkey for similar Saskatchewan and foreign investment opportunities.

Contact: Denise Stilling (306) 337-2696

Other research organizations

Linnaeus Plant Sciences Inc.

4746 West 2nd Avenue, Vancouver, BC V6T 1B9

Project number 2006-0105

Approved: 281,448.00

DEVELOPMENT OF BRASSICA CARINATA AS A NEW INDUSTRIAL CROP FOR HYDROXY FATTY ACID PRODUCTION

Objectives:

- To develop transformed lines of *B. carinata* expressing an oleate 12-hydroxylase gene and accumulating hydroxy fatty acids in their seed oil.

Contact: Jack Grushcow (604) 224-5700

Prairie Swine Centre

2105 - 8th Street East, Saskatoon, SK S7H 5N9

Project number 2006-0119

Approved: 99,000.00

FOOD COURT DESIGN FOR LARGE GROUP AUTO-SORT FOR GROW/FINISH PIGS

Objectives:

- To compare the performance of finishing pigs in conventional small pens and LGAS with two different food court designs (centre vs. perimeter placed feeders).
- To quantify and compare the use of the food court area when feeders are placed in the centre vs. perimeter of the food court.
- To quantify the behaviour of individual pigs in centre vs. perimeter designed food courts and to relate this to productivity.

Contact: Harold Gonyou (306) 667-7443

Project number 2006-0133

Approved: 68,875.00

APPLICATION OF A BIOLOGICAL TREATMENT APPROACH TO CONTROL ODOUR AND GASEOUS EMISSIONS FROM SWINE OPERATIONS

Objectives:

- Control odour and gaseous emissions from swine operations through adaptation and modification of a biological approach developed for the control of hydrogen sulphide (H₂S) in oil reservoirs.
- Conduct laboratory and room-scale evaluation on the impact of the biological treatment process on the overall odour and gaseous emissions from swine rooms.
- Determine the impact of the treatment process on the nutrient properties of the treated swine manure.
- Conduct a feasibility study of the process for application of the treatment in an actual swine barn.

Contact: Bernardo Predicala (306) 667-7444

Project number 2006-0134

Approved: 58,100.00

NOVEL APPLICATION OF NANOPARTICLES FOR CONTROLLING ODOUR AND GASEOUS EMISSIONS FROM SWINE BARN

Objectives:

- The overall goal of this work is to control odour and gaseous emissions from swine operations by adapting new technologies from other fields of science.
- The specific objectives of this study are to:
 - 1) determine the most effective type of nano-particles and the appropriate deployment techniques for reducing swine barn gaseous contaminants (e.g. ammonia (NH₃), hydrogen sulphide (H₂S), odour) in laboratory-scale tests;
 - 2) evaluate the selected best nano-particles and deployment techniques in room-scale experiments;
 - 3) assess the impact of the treatment on manure nutrient properties, and
 - 4) conduct an economic analysis of applying the treatment in an actual swine barn.

Contact: Bernardo Predicala (306) 667-7444

Biolin Research Inc

161 Jessop Avenue, Saskatoon, SK S7N 1Y3

Project number 2006-0157

Approved: 24,300.00

ENHANCE THE FIELD RETTING OF FLAX STRAW WITH MODIFIED LOW COST FARM MACHINERY

Objectives:

Develop a lower cost, more effective, mechanical method to put long intact flax straw flat on the ground in a thin layer covering the whole field (i.e. no thick rows of straw) to ensure fast, consistent retting of the flax straw and hence higher profits for farmers and flax straw processors. Increase the profit flowing to flax farmers and flax straw processors from better, more consistently retted flax straw.

Contact: Alvin Ulrich (306) 668-0130

Prairie Agricultural Machinery Institute (PAMI)

Western Beef Development Centre

Box 1900, Humboldt, SK S0K 2A0

Project number 2006-0115

Approved: 99,000.00

REDUCING COST OF BACKGROUNDING CALVES WITH EXTENDED FALL GRAZING OF ANNUALS

Objectives:

The objective of this project is to evaluate different annual forages for their economics, production potential and use in low-cost backgrounding systems for calves. More specifically, to:

- study the effects of various grazing and feeding periods on the performance and carcass traits of steers;
- monitor the health of calves in each of the backgrounding systems;
- evaluate backgrounding cost of gain for cattle fed new and traditionally grown cereal forages in comparison to drylot backgrounding systems;
- to compare forage quality and availability from the different annual forages throughout the grazing season; and
- evaluate the performance and carcass characteristics of calves during the finishing phase.

Contact: Bart Lardner (306) 682-3139

Project number 2006-0118

Approved: 163,350.00

ECONOMIC AND PRODUCTION BENEFITS OF LATER CALVING ON PASTURE VERSUS EARLY CALVING IN WESTERN CANADA

Objectives:

- Evaluate the effects of early (March - April) versus late (May - June) calving on beef cow and calf performances (reproductive efficiency, growth and health performances) up to weaning.
- Evaluate the effects of early versus late calving on calf performances (growth and health performances, and feed efficiency) post-weaning under two different backgrounding/finishing regimes: 1) wean at 180 days, background for 3 months followed by a 200-day finishing period in the feedlot, or 2) wean at 180 days, background for 5-8 months followed by grazing on spring/summer pasture for 5 months, then 60-day finishing period in the feedlot.
- Determine if harvested and/or purchased feeds and labour could be reduced and sustainability and profitability improved by delaying calving (late May – June), thus matching the cow's nutrient requirements with nutrients provided by grazed forages.
- Evaluate the impacts of early versus late calving systems on costs and benefits to cow/calf producers (50 to 200 hd) and on strategies for marketing the weaned calf and retaining the weaned calf onto finishing.

Contact: Bart Lardner (306) 682-3139

Project number 2006-0147

Approved: 119,390.50

AGRONOMIC ASSESSMENT OF SOLID MANURE INJECTION AND OPTIMIZATION OF THE ASSOCIATED MECHANICAL SYSTEMS

Objectives:

- Phase I: Agronomic Assessment - Measure the agronomic performance of sub-surface applied (injected) beef cattle manure.
- Measure the agronomic performance of surface applied (uniformly broadcast) beef cattle manure.
- Measure the agronomic performance of sub-surface applied beef cattle manure with supplemental mineral nitrogen.
- Compare the agronomic performance of the various land application strategies.
- Phase II: Mechanical Optimization - Based on the year one results of the agronomic assessment and on the field operation of the solid manure injector, study the effects of different bends patterns on the power requirements of the flexible conveyors.
- Investigate different materials for the hoses that house the flexible conveyors.
- Investigate means of reducing the diameter of the hoses that house the flexible conveyors.
- Based on the year 2 results of the agronomic assessment and on the field operation of the solid manure injector, evaluate the impact of the modifications to the prototype implemented as a result of specific objectives.
- Design and fabricate a system capable of minimizing the impact of foreign objects on the injection device.
- Quantify the effect of the moisture content of the product on the conveying force and to investigate means of adding water to the injection system for lubrication when applying dry products.
- Develop a comprehensive strategy for future development of the prototype and technology transfer.

Contact: Hubert Landry (306) 682-2555 ext. 266

Alberta Invasive Plant Council

c/o Forest Health Section
8th Floor, 9920 108 Street, Edmonton, AB T5K 2M4

Project number 2006-0126

Approved: 75,000.00

DEVELOPMENT OF A BIOLOGICAL CONTROL PROGRAM FOR COMMON TANSY

Objectives:

- To form a consortium of Canadian and U.S. agencies and stakeholders that will generate ongoing support for European studies on potential biological control agents for common tansy.
- To generate the biological data needed to support petitions for regulatory approval to introduce one or more insects from Europe as biological control agents against common tansy in Canada.

U.S.A. Objectives:

- To prepare a test plant list for use in host-specificity studies with potential biological control agents for common tansy, and obtain approval of this list from the TAG and BCRC.
- To determine suitable areas for field surveys of insects on common tansy in Europe and western Asia, based on climatic similarity with areas where common tansy is a problem in North America.
- To select potential biological control agents for common tansy from among insect species found feeding on this plant in Europe.
- To characterize the chemical variability of European and North American populations of common tansy and other *Tanacetum* species, so that plant material of known chemotypes can be used in biological studies and host specificity tests.
- To conduct field and laboratory studies on the biology, behaviour, life history and environmental requirements of the selected potential biological control agents.
- To assess the host-specificity of potential biological control agents through field and experimental studies with a list of other potential host plants.

Contact: Mike Undershultz (780) 422-1508

Ecotech Research Ltd.

2054 Broad Street, Regina, SK S4P 1Y3

Project number 2006-0131

Approved: 27,918.00

FAST MAPPING OF SUBSURFACE SOILS, WATER AND CONTAMINANTS USING MULTIPLE ELECTROMAGNETIC SENSORS

Objectives:

- Develop fast, accurate and inexpensive field methods to map subsurface conductivity at the field level.
- Verify the accuracy of these methods by measuring the conductivity of soil core samples taken at test sites.
- Develop interpretation methods to estimate the depth and thickness of near-surface soil layers and create three-dimensional soil maps.
- Verify the accuracy of these methods by analyzing soil core samples at test sites.
- Develop interpretation methods to map subsurface soil moisture, map soil salinity levels, and map contaminant extent.
- Verify the accuracy of these methods by conducting lab tests on soil core samples from test sites.

Contact: Evan Morris (306) 352-2468

Canada-Saskatchewan Irrigation Diversification Centre

901 Mckenzie Street, Outlook, SK S0L 2N0

Project number 2006-0142

Approved: 80,000.00

DEVELOP AGRONOMIC PRACTICES FOR “SMALL” POTATO PRODUCTION IN SASKATCHEWAN

Objectives:

Potato production is the major horticultural industry in Saskatchewan. Highly competitive markets and increasing production costs have substantially reduced profit margins and forced the potato industry to seek other food and non-food alternatives. Recent health issues, (e.g. acrylamide associated with cancer in fried potatoes), with traditional processed potato products has compelled the potato industry to search for healthier options. “Small” potatoes are healthier, fresh and non-fry alternatives with economic potential. Small potato markets target tubers between 20 mm and 40 mm in diameter. Agronomic recommendations used for standard (larger) potato production cannot be effectively applied for producing small potatoes. Production practices including cultivar selection and agronomic practices should be suitably modified to optimize yields and maximize returns. Saskatchewan is ideally suited to growing small potatoes. Lower land cost, reduced disease pressure and availability of irrigated land makes Saskatchewan a low cost potato producer with minimal risk. Growing small potatoes is somewhat different than growing potatoes in the traditional manner. The differences and challenges in growing small potatoes compared to conventional potato production include cultivars that produce high yields of small size grades, earlier top-kill and harvest to maximize target size grades, and other production practices to optimize yields of small tubers.

- This study will develop cost-effective agronomic practices for producing “small” potatoes under Saskatchewan conditions. Specific projects include:
 - 1) Evaluate suitable potato cultivars for producing “small” potatoes.
 - 2) Develop optimum plant spacing and harvest timing to maximize tuber yields of target market grades.
 - 3) Examine the effect of tuber physiological condition to promote tuber set for small potato production.
 - 4) Identify suitable top-kill dates to maximize target tuber size grades for different cultivars.

Contact: Jazeem Wahab (306) 867-5406

Agriculture and Agri-Food Canada

Box 760, Indian Head, SK S0G 2K0

Project number 2006-0108

Approved: 30,000.00

THE EFFECTS OF POTASSIUM AND CHLORIDE NUTRITION ON SEED YIELD OF CANARYSEED

Objectives:

- To determine the responsiveness of canaryseed seed yield to K and Cl.
- To provide better recommendations to producers on the use of KCl in Canaryseed from soil test results.

Contact: William May (306) 695-5225

Agriculture and Agri-Food Canada

P.O. Box 3000, Lethbridge, AB T1J 4B1

Project number 2006-0138

Approved: 84,000.00

NEW METHODS FOR DIAGNOSIS AND PREVENTION OF BLACKLEG AND RING ROT IN SEED POTATOES

Objectives:

- Develop and verify sensitive diagnostic methods that reliably detect the pathogens causing blackleg and ring rot of potato. Utilize these methods to determine inoculum sources, vectors, and pathogen population levels in seed lots, on production and handling equipment and in fields.
- Characterize the pathogen populations causing blackleg and bacterial ring rot to ensure that the diagnostic and prevention strategies developed within this project are effective against all strains.
- Develop cost-effective biocontrol phagotherapy strategies to prevent blackleg and ring rot.
- Transfer information and products to industry.

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