AFIF CHAIR IN AGROFORESTRY AND AFFORESTATION FINAL REPORT 2003-2013








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Overview Summary

This report summarizes the activities of the AFIF Chair position in Agroforestry and Afforestation during the past 10 years. The AFIF Chair was created in July 2003, and this July 2013 represents the end of the 10 year commitment to the development of the AFIF Chair position. My goal is to continue on as Director of the Centre for Northern Agroforestry and Afforestation once the AFIF Chair has ended.

Vision Statement

To advance the capabilities of farmers for competing in a global economy by diversifying farm income through the incorporation of innovative agroforestry and afforestation practices into farming systems.

Mission Statement

- To facilitate the coordination and collaboration of scientific research activities, both biological and socio-economic, among the stakeholders in Saskatchewan for using woody plants in agroforestry/afforestation systems on agricultural land for farm diversification, fibre production and other environmental purposes.

- To facilitate the incorporation of the biological and socio-economic knowledge related to agroforestry/afforestation systems into the College of Agriculture and Bioresources curriculum and into extension programs for stakeholders on the land base.

- To network with various agencies to develop Saskatchewan as a knowledge centre in Agroforestry/Afforestation.

Highlights and Accomplishments

Research

1. Obtained over $3.5 million in research funding for various agroforestry and afforestation projects.
2. Trained 8 M.Sc. and 3 Ph.D students and served on 4 M.Sc. and 5 Ph.D. committees related to agroforestry.
3. Published 2 book chapters, 21 journal articles, 10 technical reports and 92 presentations related to AFIF Chair position.
4. Developed a network of hybrid poplar, willow and conifer plantations across the province that continue to be used for demonstration purposes for growers, the general public and for researchers.

5. Have achieved a better understanding of the agronomy of growing trees on agricultural land with respect to herbicides, management practices, pest and diseases and yields.
6. Have developed tree growth models to predict biomass yields for various tree species in Saskatchewan.
7. Have produced maps of carbon sequestration estimates for long term growth of hybrid poplar and willow biomass energy plantations.
8. Hosted numerous field days at the University of Saskatchewan Campus and worked with ForestFirst to hold a Willow Biomass Energy Conference in Saskatoon.

Social

1. Raised awareness of the potential use of trees on agricultural landscapes and benefits to the producer
2. Worked closely with the Agroforestry Unit from ForestFirst (formerly known as the Saskatchewan Forest Centre) to transfer research findings to the grower. Unfortunately, ForestFirst was closed in July 2009 which has reduced our impact on promoting agroforestry in the province.
3. Developed a web page to disseminate agroforestry information

Economic

1. Determined the costs of establishment for hybrid poplar and willow plantations but further research is needed on delivered costs and value of fibre.

Academic

1. Two faculty were hired in the area of agroforestry – Nicolas Belanger (2004-2009) and Anthony Kimaro (2009-2012). These faculty developed an agroforestry course which was highly subscribed by the students in the College of Agriculture and Bioresources.
2. New initiatives are being developed with Anthony Kimaro (who is now with the World Agroforestry Centre (ICRAF) in Tanzania) on an international collaboration to look at enhancing the resilience of agro-ecosystems and livelihood strategies of smallholder farmers in adapting to climate change through Agroforestry in the drylands of Eastern Africa.

Synopsis of the development of Agroforestry in Saskatchewan for 2012

INDUSTRY ACTIVITY

PRT Growing Services (John Kitchen)

Short rotation woody crop activities at PRT Growing Services Ltd. include a variety of technical and business development projects, aimed at increasing the company's competence in this area. Since 1999, we have implemented small scale demonstration projects, and more recently completed a 75 acre project near Prince George, BC which includes biosolids disposal, short rotation willow and poplar for biomass feedstock, and a biomass boiler for greenhouse heating. We have now harvested small test areas of three-year old willow and poplar with the Ny Vraa JF woody biomass harvester and utilized the fuel in our boiler. We have also added demonstration plots at our locations in Prince Albert, Saskatchewan, Dryden, Ontario and Campbell River, BC. As part of these projects, we have improved planting productivity to commercially viable levels with both six-row and two-row equipment. Winter dieback and weed control remain as issues, however for certain applications we are comfortable with several varieties of willow and poplar and can recommend an integrated weed management plan for growers. Future plans include participation in projects aimed at testing more varieties for performance in cold climates.

Conservation Learning Centre (CLC) (Larry White)

The poplar clonal trials (Hybrid and Balsam) are on-going, as are the alley cropping, riparian planting and the biomass plantings. Scientists from AESB at Indian Head collected some of the Balsam clones for analysis of wood quality this year. The CLC did take out about a 10 acre field of hybrid poplar due to weed issues as it had not been properly tended for the past three years which was due to timing issues and some of it caused by the very wet conditions experienced in the past three years. It is uncertain whether this field will be re-planted. We did another successful Sinbar 80 trial in 2012 to gather more data to support a minor use registration for willow crops. The raspberry and Haskap plantings continue as well.

GOVERNMENT AGENCIES

Ministry of Economy (Larry Stanley)

The bioenergy industry seems to have been put on hold at the moment while companies concentrate on the re-start of the lumber, OSB and pulp industry. Prince Albert Pulp Mill is operating their biomass boiler using hog from the Meadow Lake Pulp Mill and the heritage pile at PA. Meadow Lake Tribal Council has prepared a feedstock availability report for their proposed biomass boiler project. The report made note of all available material within defined distances from the proposed generation site, including scrub brush on agriculture lands, agriculture crop residual and purpose grown plantations (hardwood and softwood).

Agroforestry Development Centre (Bill Schroeder)

Woody crop research at the AAFC Agroforestry Development Centre has continued along three streams, breeding and development of new poplar and willow clones, designing agroforestry systems for biomass production and end use applications for woody biomass. Significant progress has been made in breeding new willow and poplar genotypes. In 2012 12 new willow clones were selected and three new polar clones released. Controlled crossing of both poplar and willow continues. Development of willow biomass systems progressed significantly in the past year mainly quantifying biomass yield from naturally growing willows on the periphery of wetlands and use of domesticated willows for nutrient interception and biomass production in riparian buffers. A post-doctoral fellow, Dr. Jaconette Mirck has collected considerable data to support the concept of willow ring harvest. Also a University of Regina M.Sc. candidate is studying the impact of biomass harvest around wetlands on avian populations and diversity. Finally, beginning in March 2012 the ADC Laboratory/Greenhouse complex is being heated by a 300kw biomass burner. With this system we have offset 90 percent of the natural gas used in the previous heating system. The feedstock for the burner is willow harvested from willow rings using a Bio-Baler. We are collecting data on heating efficiency of feedstock as well as harvest, handling and processing costs.

Saskatchewan Research Council (Mark Johnston)
The Saskatchewan Research Council (SRC) continues to manage a number of agroforestry research and demonstration projects at the Conservation Learning Centre, located south of Prince Albert. Many of these projects are in partnership with the Agroforestry Development Centre in Indian Head. They include an ecobuffer, alley cropping demo, hybrid poplar clonal trial, balsam poplar common garden and willow biomass demos.

The SRC is collaborating with the U of S on the field work for the Agriculture Greenhouse Gas Program project; “Shelterbelts as an Agroforestry Management Practice for the Mitigation of Greenhouse Gases”. As well, SRC is providing monetary contributions to the Poplar Council of Canada (PCC) Environmental Services Working Group for a white paper on the environmental services of poplar and willow. SRC is also involved in the PCC “Pesticide Working Group”.

University of Saskatchewan

Chemical Engineering

Kurt Woytiuk and Bill Campbell (M.Sc.)

In 2012, the fluidization group made further progress on the torrefaction and gasification of willow and wheat straw. Preliminary work was presented at the 2012 Symposium on Energy from Biomass and Waste in Venice, Italy. Mr. Campbell is currently in the detailed design phase of a continuous torrefaction system that will be used in the

thermal treatment of agroforestry products and agricultural residues for energy production. The continuous device is scheduled to be completed in 2013. Mr. Woytiuk is currently refining a system for contaminant measurement from the gasification of biomass. The system will be used to evaluate means of contaminant reduction in syngas. Finally, Mr. Campbell has begun investigation into a new non-invasive, online analyser for biomass using spectral methods.

Other Noteworthy News Developments

"The USDA Farm Service Agency (FSA) has announced the tenth new Biomass Crop Assistance Program (BCAP) project area in Clinton, Essex, Franklin, Herkimer, Jefferson, Lewis, Oswego, Oneida and St. Lawrence counties in northern New York State for the production of shrub willow. Up to 3,500 total acres are approved for the shrub willow plantings in central and northern New York State. These producers are eligible to receive establishment and annual payments to grow shrub willow for biomass conversion to bioenergy. FSA has reserved up to $4.28 million for enrollments in this Project Area. Shrub willow is a short rotation woody crop and can produce large amounts of woody biomass through coppicing harvests that allow for repeated cuttings of wood from each shrub. The technology that will be employed reflects 25 years of research and development spearheaded by the State University of New York College of Environmental Science and Forestry's willow biomass program. The 3,500 acres will be planted in 2013 and 2014 to provide a steady supply of this biomass material to the biomass conversion facilities. Land preparation for the contracted acreage will take place in 2012 and 2013. To support shrub willow producers in the project area, FSA will enter into 11-year contracts with the eligible producers to grow the willow biomass crops on cropland enrolled in BCAP contracts. These participants will be required to maintain the willow during the 11-year contracts at their own expense, but will receive an annual rental payment. Producers must have a production agreement with a qualified biomass conversion facility, such as the project sponsor, ReEnergy Holdings LLC, which has three bioenergy generating facilities in the region committed to the project area - ReEnergy Lyonsdale (20 MW), ReEnergy Chateaugay(22 MW) and ReEnergy Black River (60 MW). The signup periods for producers in project area counties are scheduled to run from June 18 through Sept. 14, 2012."
(source: http://www.esf.edu/willow/bcap.htm)

RESEARCH PROGRAM

Details outlining the establishment and location of these studies can be found at www.saskagroforestry.ca under research and trials.

CONIFER TRIALS

The four conifer trials will be remeasured in 2014 for their 10 year measurements.

HYBRID POPLAR

Stock Trial (established 2002)

The hybrid poplar stock study at Meadow Lake as part of the NSERC Strategic Grant program has finished its 9th growing season. The trees were all measured again this past fall (2012) for height and diameter. Data from 2012 are presented for height (Fig. 1) and tree volume (Fig. 2) for the two sites.

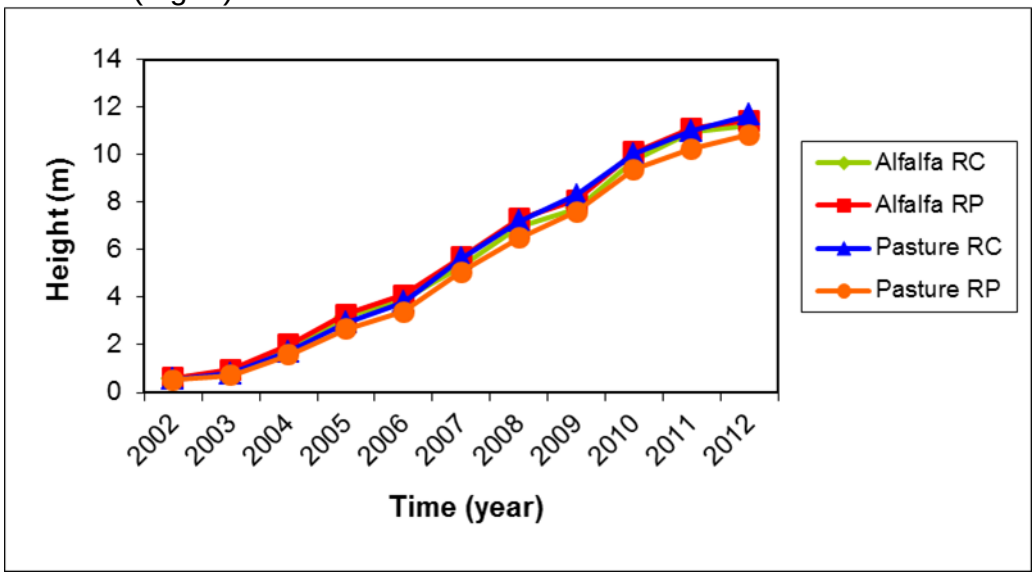

Figure 1. Walker poplar heights for rooted cuttings (RC) and rooted plugs (RP) at the Alfalfa and Pasture sites near Meadow Lake.

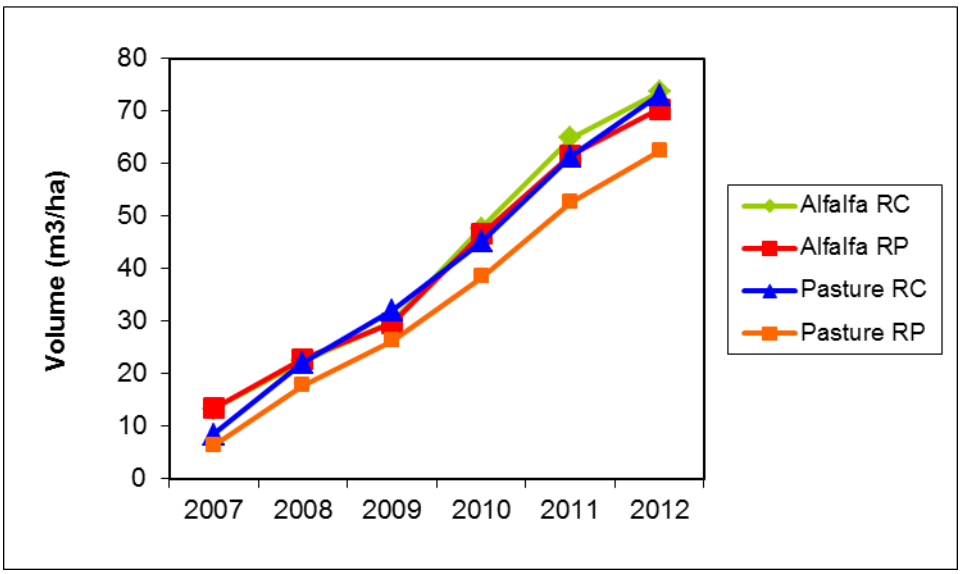

Figure 2. Walker poplar volumes for rooted cuttings (RC) and rooted plugs (RP) at the Alfalfa and Pasture sites near Meadow Lake.

Clone X Fertilizer Trial (established 2003)

No fertilizer was applied to this clone trial again this year as three years (2003-2005) of repeated fertilization did not yield any growth increases for this study. The site was not managed for weeds this year and 10th year tree measurements were collected in the fall 2012.

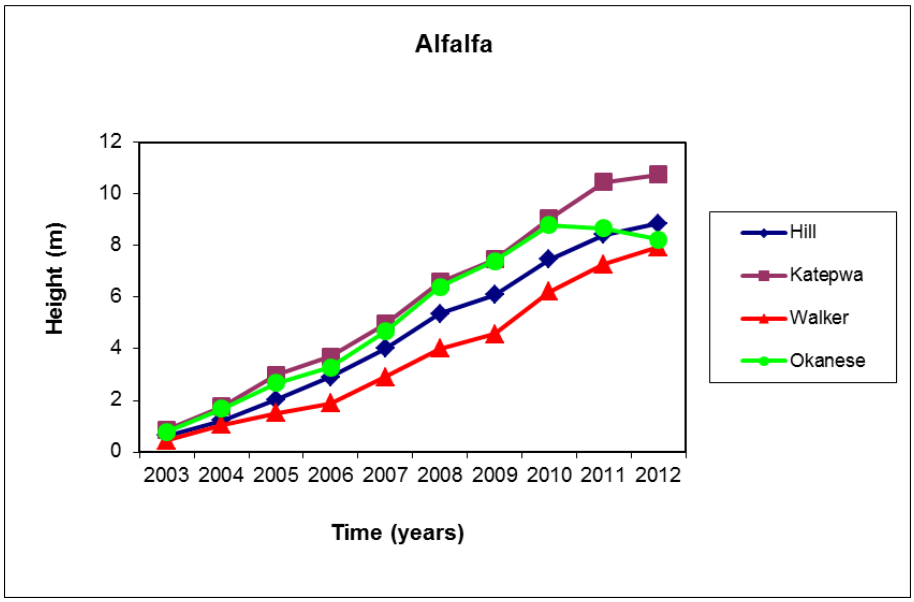

Figure 3. Mean poplar clone heights at the Alfalfa site near Meadow Lake averaged across fertilizer treatments.

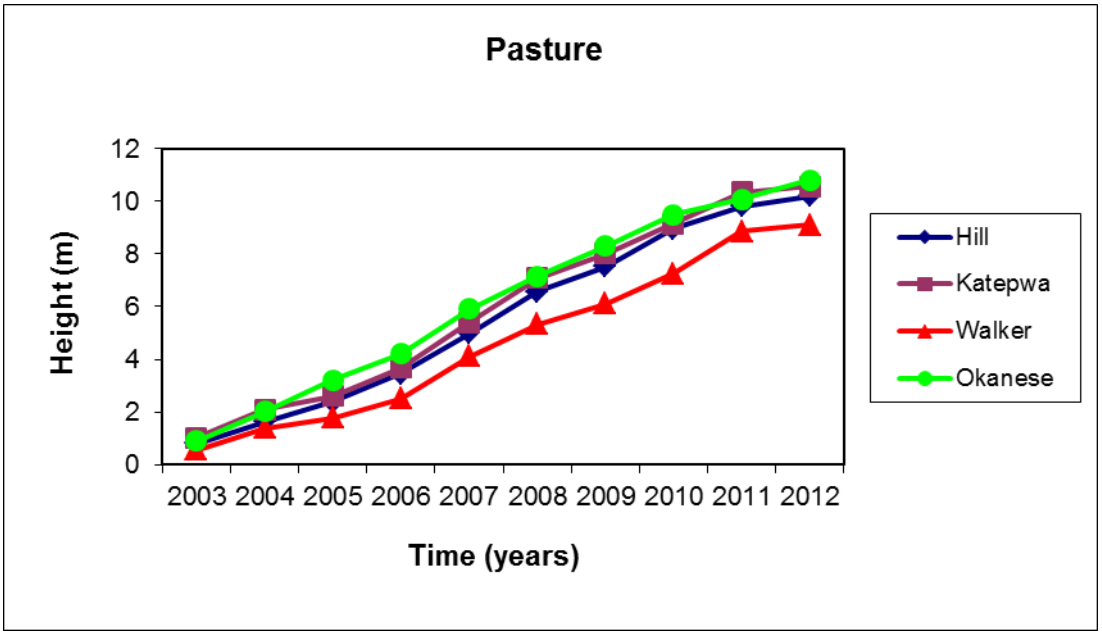

Figure 4. Mean poplar clone heights at the Pasture site near Meadow Lake averaged across fertilizer treatments.

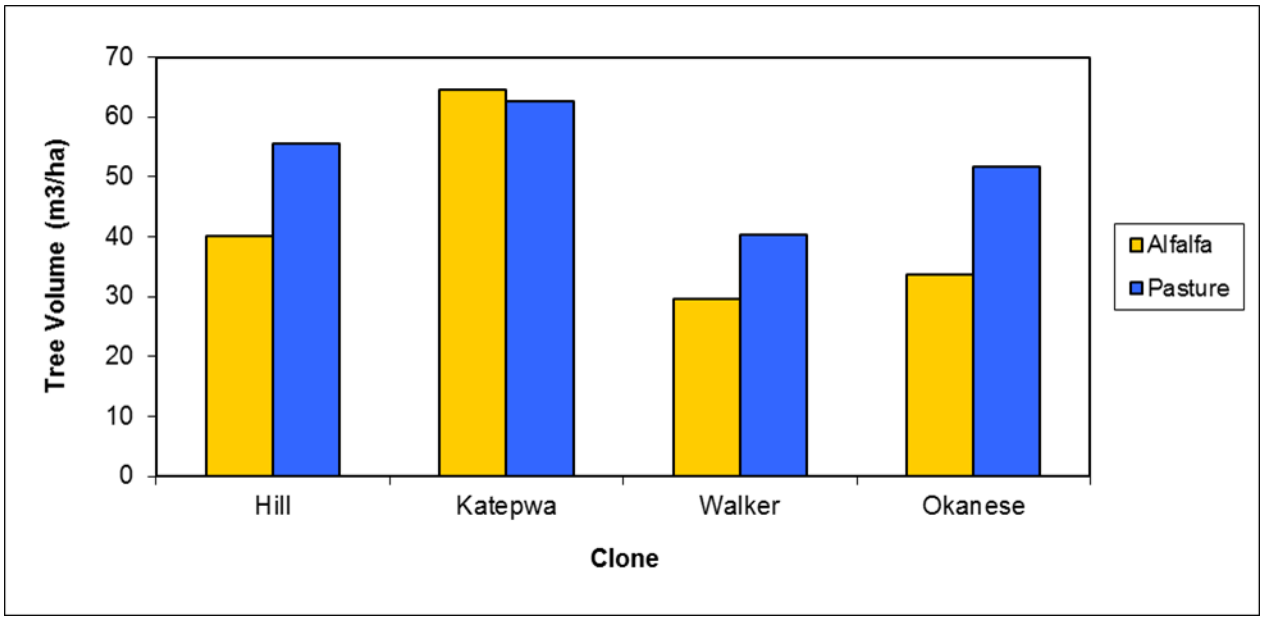

Figure 5. Average tree volume at age 10 by clone and site.

Spacing Trial (established 1997)

The three spacing trials at Meadow Lake, Henribourg and Birch Hills were remeasured the fall of 2012. Tree volumes range from 175 m^3/ha at Meadow Lake, 110 m^3/ha at Henribourg to 76 m^3/ha at Birch Hills for the 8X8' spacing (Figures 6-10). The tree heights (Fig. 6) and DBH (Fig. 7) for Meadow Lake and volumes (Figs. 8-10) for each spacing and location are presented below:

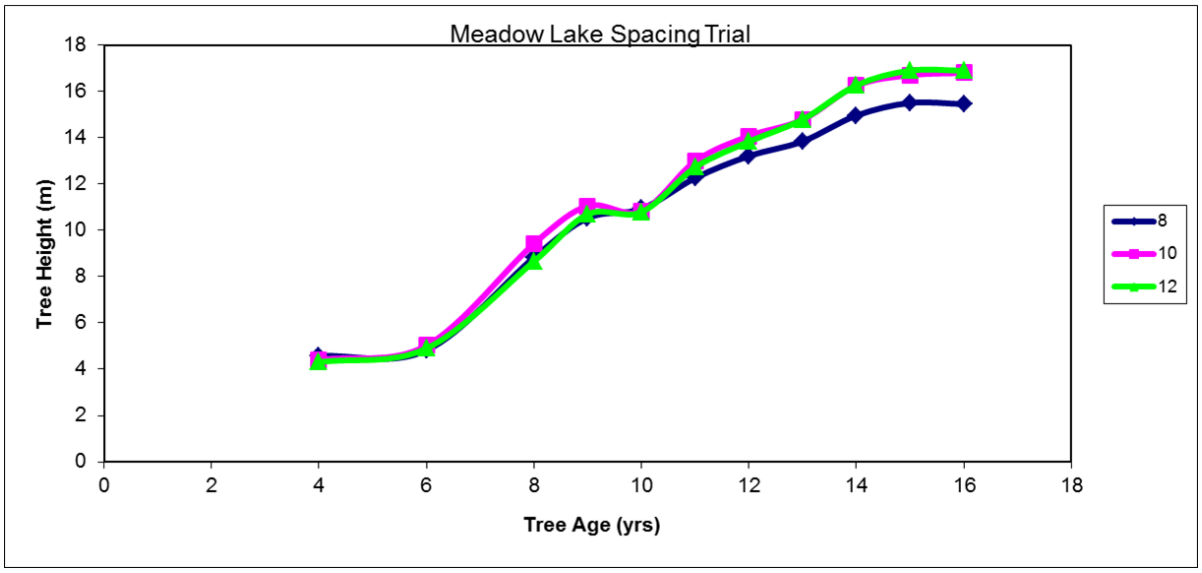

Figure 6. Mean Walker poplar tree height for the three tree spacings (8X8', 10X10' and 12X12') at the Alfalfa site near Meadow Lake.

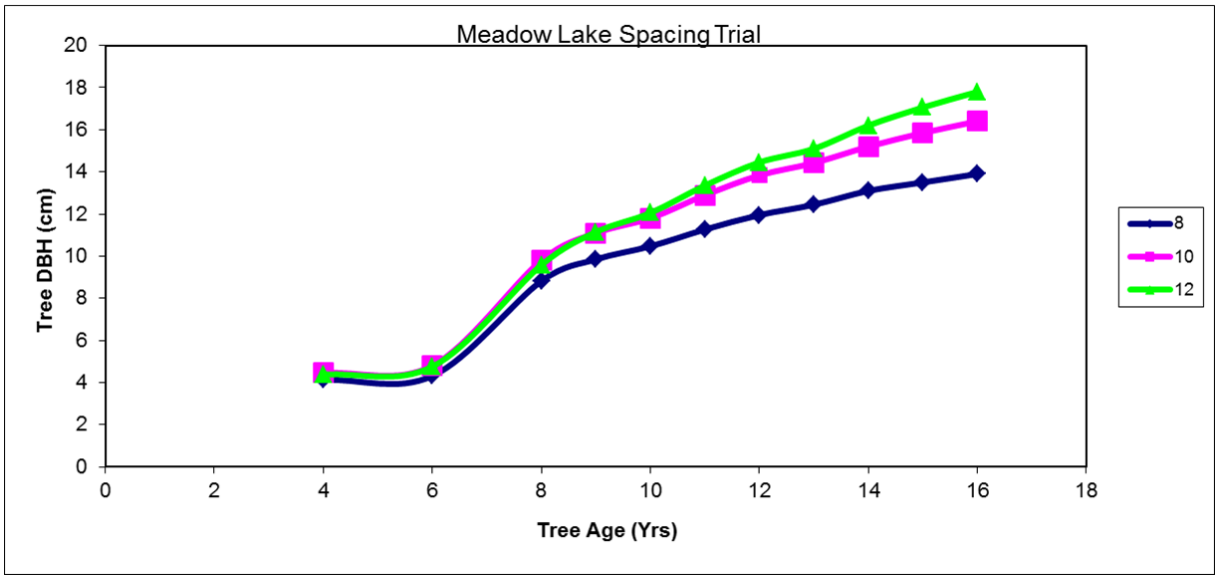

Figure 7. Mean Walker poplar tree DBH for the three tree spacings (8X8', 10X10' and 12X12') at the Alfalfa site near Meadow Lake.

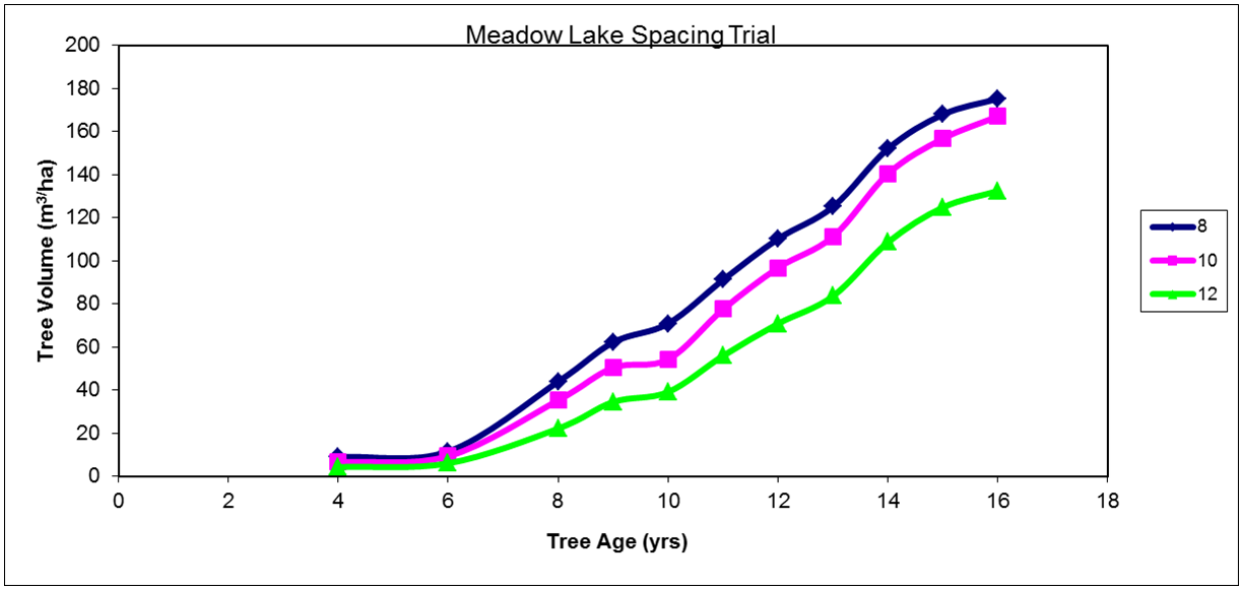

Figure 8. Mean Walker poplar tree volume for the three tree spacings (8X8', 10X10' and 12X12') at the Alfalfa site near Meadow Lake.

Figure 9. Mean Walker poplar tree volumes for the three tree spacings (8X8', 10X10' and 12X12') at Henribourg.

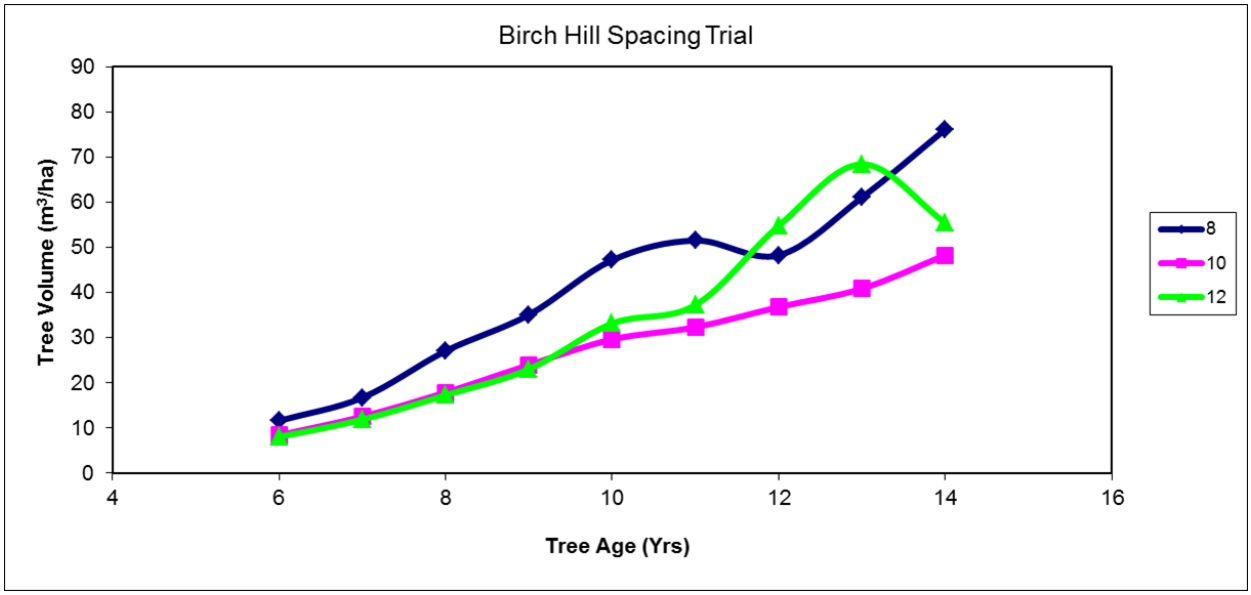

Figure 10. Mean Walker poplar tree volumes for the three tree spacings (8X8', 10X10' and 12X12') at Birch Hills.

WILLOW

Willow and Hybrid Poplar Short Rotation Species (established 2006)

The short rotation woody crop study with the Canadian Forest Service and Forest First has finished its fifth growing season. This study is investigating different willow clones to evaluate their performance for biomass energy. Students from the Chemical Engineering Department have been using biomass material from this plantation for their research in gasification and torrefaction.

Willow Clonal Trial (established 2007)

As part of the willow NSERC Strategic project and ADF grants, a 30 clone trial was planted in 2007at the University plot of land at Circle and 14th Street. The clones were obtained from our collaborating partners at SUNY in New York. Six of the best clones from this list of 30 clones were also planted at PRT Nurseries in Prince Albert, a farm in Birch Hills and at the SaskPower Shand greenhouse in Estevan. All four sites were instrumented with weather stations and soil temperature and moisture probes. The measurement plots were harvested in the spring of 2011 except for the Estevan site which was under water for several months due to flooding. After the measurement plots were harvested, the remaining willow was cut down so that the next rotation could start growing. 2013 represents the 3rd growing season and it is our goal if we can find funding to harvest the measurement plots in the spring of 2014 to obtain second rotation

biomass yields to validate our modelling work. The data from these plots is being used in a North America wide analysis of willow yields by the research group at SUNY.

Ryan Hangs is finishing his Ph.D thesis this year which will contain the most comprehensive research on willow in western Canada. Preliminary research from Ryan shows that a 4 year rotation of willow will result in small deficits of P, K and Mg and larger losses of Ca; however, the losses represent a small fraction of the extractable soil pools (Table 1).

Table 1. Preliminary nutrient budget (kg ha^{-1}) for willow in Saskatchewan for one 4-year rotation (Source: Hangs, 2013).

Budget Variable	N	P	K	S	Ca	Mg
Extractable Soil Nutrients	79.6	66.1	1332	579	18524	4574
INPUTS						
Mineral weathering	0	0.2	14.4	0	39.4	12.4
Soil Mineralization	181.2	0	0	110.6	0	0
Atmospheric Deposition	22.6	6.5	25.8	31.4	47.6	17.4
TOTAL	203.8	6.7	40.2	142.0	87.0	29.8
OUTPUTS						
Coppiced stems	5.4	0.8	3.0	0.6	10.9	1.7
Harvested Stems	60.2	8.9	44.7	10.1	125.4	16.4
Leaching	6.6	0.4	1.1	20.2	44.7	32.2
TOTAL	72.2	10.1	48.8	30.9	181	50.3
Input-Output	131.6	(3.4)†	(8.6)	111.1	(94)	(20.5)
TRANSFERS						
Leaf Litter	82.7	15.5	115.5	25.7	264.9	42.6
Stools and Roots	158.6	41.8	61.2	40.4	53.6	41.1
Litter Decomp	21.1		47.5	10.5	110.9	18.4
Fine Root Turnover	50.4	12.3	17.8	11.8	15.5	12.1

† loss of nutrient

Agricultural Greenhouse Gas Program (AGGP) Project

This project will provide science-based knowledge of shelterbelt systems as an agroforestry practice to develop strategies to help farmers decide on what are the best options (including BMPs) for mitigating GHGs when planting shelterbelts. Shelterbelts include farmyard and field shelterbelts, forest belts, eco-buffers and natural shelterbelts. The anticipated knowledge will include: 1) development of technology for identifying species/age in shelterbelts using remote sensing techniques, 2) an inventory of tree/soil C pools and GHG emissions for different species and soil zones across Saskatchewan, 3) development of tree growth models to predict C accumulation over time, 4) predictions of C cycling for shelterbelts with time, 5) understanding how past climate has impacted tree growth and predictions of how growth might be impacted by future climate change scenarios, 6) an assessment of the sustainability of shelterbelts as a C accumulator and an economic analysis at a farm level, and 7) protocol development for measuring, monitoring and verifying C in shelterbelts. Information will be disseminated on shelterbelts and technology transfer to aid farmers with their decisions in adoption of shelterbelts for GHG mitigation using BMPs. Carbon modeling and inventory of shelterbelts will collectively determine the magnitude of shelterbelt impacts on C sequestration in Saskatchewan and the potential impact as a GHG mitigation strategy today and with future climate scenarios. New strategies and designs of shelterbelts for GHG mitigation and environmental purposes will be examined to maximize benefits to farmers and the environment. This project involves researchers from U of Saskatchewan, SRC, U of Regina and Mount Allison University and is funded by AAFC.

Over 40 farmers have been visited to collect information from their shelterbelts for the project and another 80+ farms will be visited this year. Several mapping projects have been done based on the historical record of tree distribution for Saskatchewan (Fig. 12). Maps have been created to determine potential age and location of shelterbelts across the province (Fig. 13) as well as expected distribution of shelterbelts on the landscape since 1925 (Fig. 14).

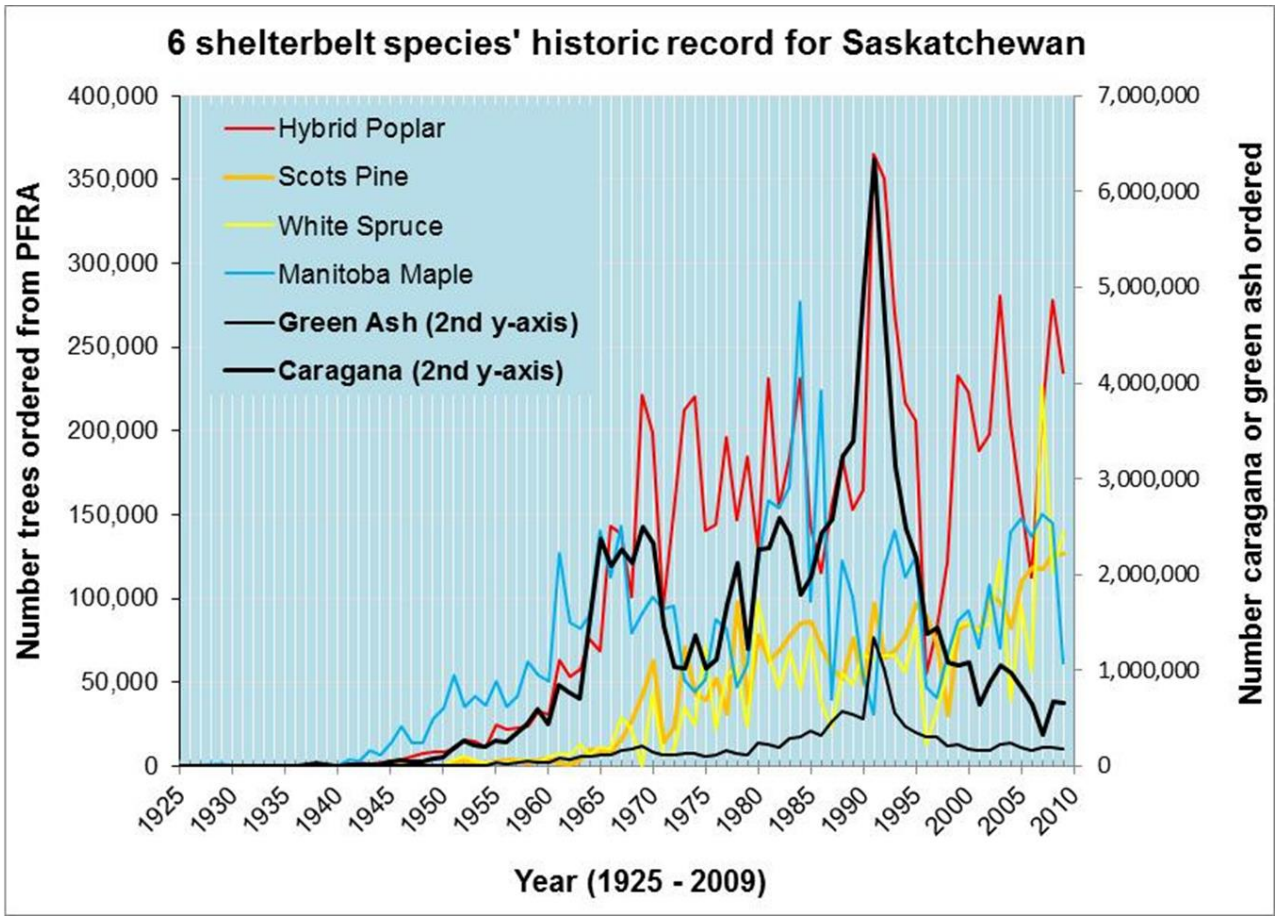

Figure 12. Historical distribution of trees shipped from the Agroforestry Development Centre in Indian Head.

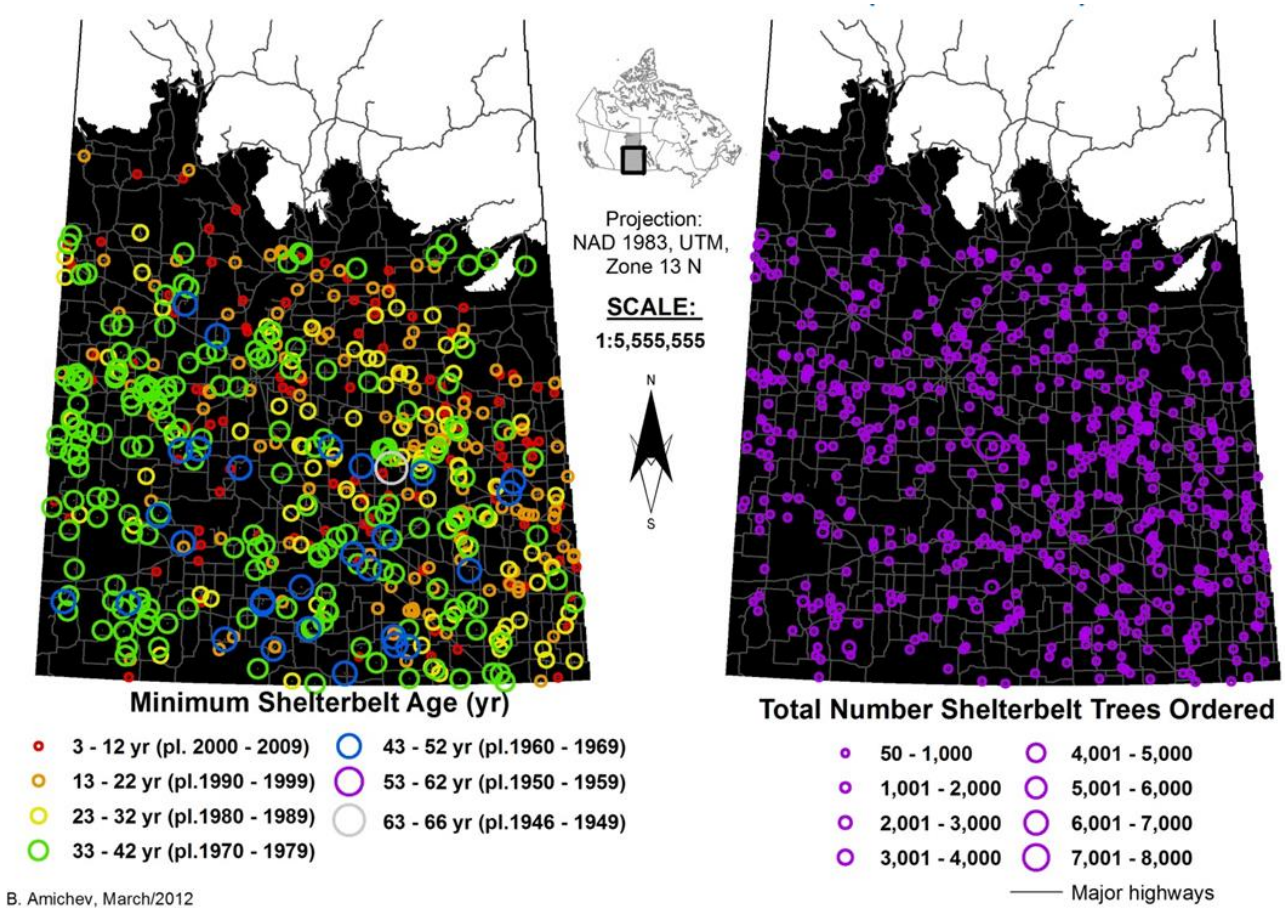

Figure 14. Potential age and location of hybrid poplar shelterbelts in the province as derived from the PFRA tree orders database (1946-2009).

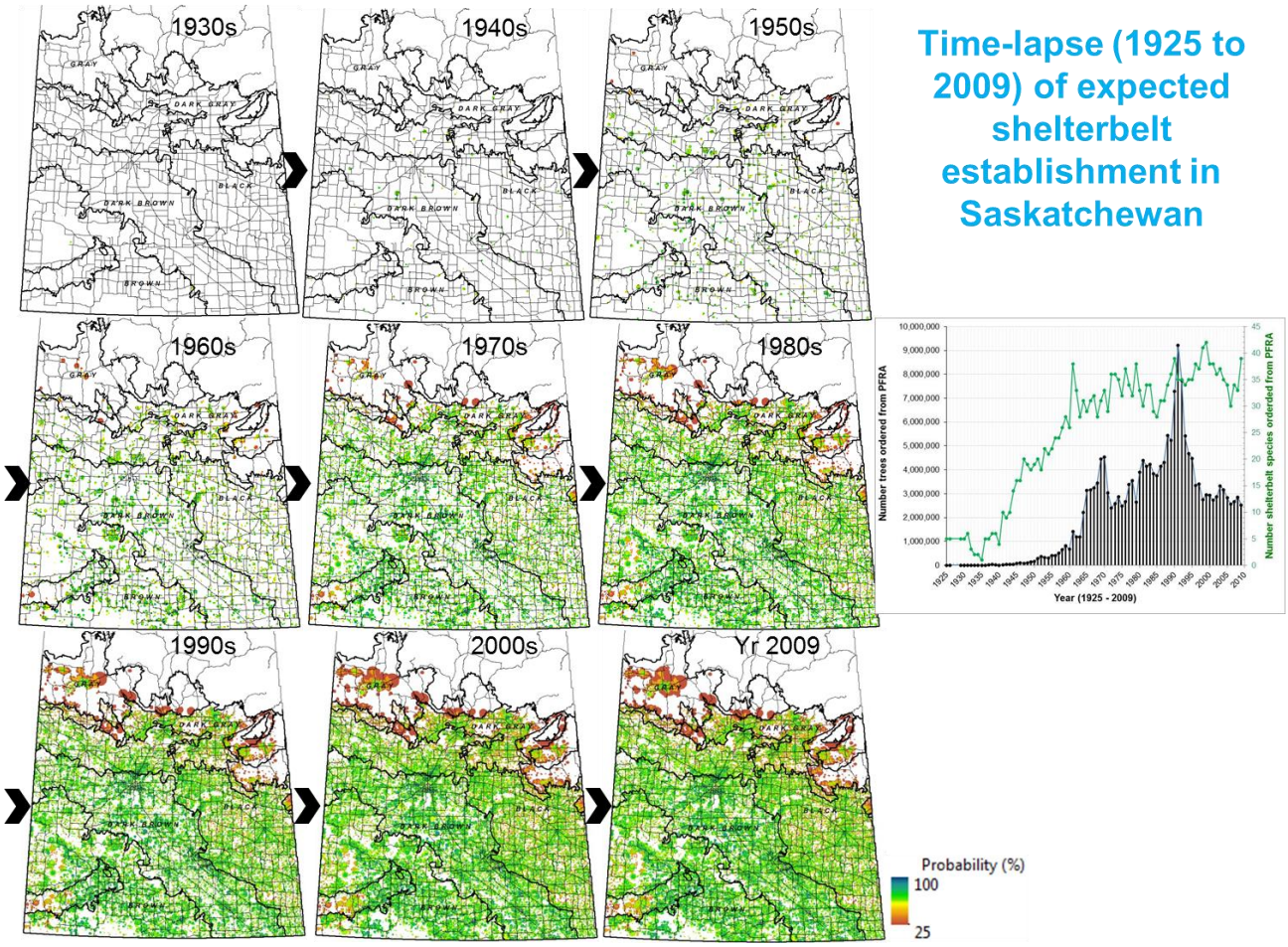

Figure 15. Maps showing the expected distribution of shelterbelt establishment (1925-2009) in the province.

Committees related to Agroforestry:

Member, Board of Directors for Poplar Council of Canada 2011

Other Activities

Met with Dr. Marian Marinescu of FP Innovations about the development of a technical and economic study of biomass co-firing with coal. I provided them with yield data from our plantations to help with their analysis.

Forestry/Agroforestry Summit

I will be participating in a forestry/agroforestry summit that is being planned for October to discuss the research needs of the forestry/agroforestry community and how they might be addressed by researchers in the province.

Summary of Theses (Supervised)

I have supervised or co-supervised 12 graduate students and participated on eight other student committees related to research in agroforestry the past 10 years.

Completed

C. Stadnyk. M.Sc. Root Dynamics and Carbon Accumulation of Six Willow Clones in Saskatchewan. 2010

S. Konecsni. M.Sc. Fertilization of Willow Bioenergy cropping systems in Saskatchewan. 2010

R.M. Nash. M.Sc. Drought Adaptations of Hybrid Poplar Clones Commonly Grown on the Canadian Prairies. 2009

N.W.H. Booth. M.Sc. Nitrogen Fertilization of Hybrid Poplar Plantations in Saskatchewan, Canada. 2008 (Co-supervised with J.D. Knight)

B. Sing., Ph.D. Nutrient Uptake by Hybrid Poplar in Competition with Weed Species Under Growth Chamber and Field Conditions Using the Soil Supply and Nutrient Demand (SSAND) Model. 2008

M.K. Steckler. M.Sc. Nutrient Cycling in Hybrid Poplar Stands in Saskatchewan: Implications for Long-Term Productivity. 2007

J.J. Gunderson., M.Sc. The Effect of Hydrocarbon Contamination and Mycorrhizal Inoculation on Poplar Fine Root Dynamics. 2006 (Co-supervised with J.D. Knight)

R.M.A. Bloc., M.Sc. Fine Root Dynamics and Carbon Sequestration in Juvenile Hybrid Poplar Plantations in Saskatchewan, Canada. 2005

In Progress

A. Oesi. M.Sc. Carbon cycling in agroforestry systems in Tanzania

C. Amadi. Ph.D. Role of shelterbelts in mitigating greenhouse gases

G. Dhillon. Ph.D. Soil carbon sequestration and dynamics in the shelterbelts of Saskatchewan

Summary of Theses (On Committee)

Completed

J. Ens. Ph.D. The effect of willow (Salix spp.) plantations on nutrient availability and greenhouse gas emissions in the Canadian prairies. 2012

L. Anderson. M.Sc. Assessing shifts in marginal agricultural land use for second generation biofuel production. 2012. (Bioresource Policy, Business and Economics)

Z. Hosseini-Nasabnia. M.Sc. Characterization of Fungal Communities Associated to Willow SRIC Plantations in the Canadian Prairies Ecozone Using PCR-Based Molecular Methods. 2012. (Food and Bioproducts Science)

A.H. Corredor. M.Sc. Molecular profiling of fungal functional groups associated with rhizosphere of Salix. 2011 (Food and Bioproducts Science)

B.D. Pinno. Ph.D. Site Productivity of Poplars in Canada: Relationships with soil properties and competition intensity. 2008.

In Progress

K. Woytiuk. Ph.D. Chemical characteristics of willow for biofuels (Chemical Engineering)

T. Olowokudejo. Ph.D. Remote sensing of shelterbelts in Saskatchewan (University of Regina)

R. Hangs. Ph.D. Environmental Constraints Influencing the Viability of Short-Rotation Willow Plantations in Saskatchewan

J. Rempel. M.Sc. Costs and benefits associated with on-farm shelterbelts in Saskatchewan. (SENS)

Summary of Research Funding

Funding specifically obtained for research dealing with agroforestry and afforestation where I was the principle investigator totaled $3,527,969 during the 10 years of the AFIF Chair. The breakdown of these research grants are as follow:

NSERC programs	$1,562,391
AAFC	$1,579,110
ADF	$ 195,580
SK Forest Centre	$ 190,888
Total	$3,527,969

Projects where I was a co-investigator totaled $466,784. These amounts do not include any in-kind contributions. Thus approximately $4 million were directed to research in the area of agroforestry and afforestation in the province of Saskatchewan.

Summary of Published Articles Related to AFIF Chair

Book Chapters (2)

Thevathasan, N.V., A.M. Gordon, R. Bradley, A. Cogliastro, P. Folkard, R. Grant, J. Kort, L. Liggins, F. Njenga, A. Olivier, C. Pharo, G. Powell, D. Rivest, T. Schiks, D. Trotter, K.C.J. Van Rees, J. Whalen, and L. Zabek. 2012. Agroforestry research and development in Canada. In: Agroforestry: The Future of Global Landuse. Nair PKR and Garrity DP (eds.), Springer, The Netherlands (in press)."

Kulshreshtha, S.N., K.C.J. Van Rees, H. Hesseln, M. Johnston, J. Kort, 2010. Issues in Agroforestry Development on the Canadian Prairies. P 91-127 In L.R. Kellimore (ed) Handbook on Agroforestry: Management Practices and Environmental Impact. Nova Science Publishers, Inc. New York.

Journal Articles (21 published, 2 submitted):

Steckler, M.K., B. Lafleur, K.C.J. Van Rees, N. Bélanger. Quantifying nutrient pools and fluxes in fast-growing hybrid poplar plantations. New Forests (Submitted)

Amichev, B.Y., K.C.J. Van Rees, R.D. Hangs, N. Bélanger, T.A. Volk, V. Vujanovic, and J.J. Schoenau. First-Rotation Yields of 30 Short-1 Rotation Willow Cultivars in Central Saskatchewan, Canada. Journal Biomass Bioenergy (Submitted)

Helena Corredor, A., K.C.J. Van Rees, V. Vujanovic. 2012. Changes in root-associated fungal assemblages within newly established clonal biomass plantations of Salix spp. Forest Ecology and Management 282:105–114

Davis, E.L., C.P. Laroque and K. Van Rees. 2012. Evaluating the suitability of nine shelterbelt species for dendrochronological purposes in the Canadian Prairies. Agroforestry Systems. DOI 10.1007/s10457-012-9591-8

Hangs, R. F.C. Stevenson, J. Schoenau and K.C.J. Van Rees. 2012. Measuring harvestable biomass in short-rotation willow bioenergy plantations using light attenuation. Bioenergy Research DOI 10.1007/s12155-012-9238-7

Hangs, R., J. Schoenau, K.C.J. Van Rees and J.D. Knight. 2012. The effect of irrigation on nitrogen uptake and use efficiency of two shrub willow (Salix spp.) biomass energy varieties. Can. J. Plant Science. 92:563-575

Moukoumi, J., R.E. Farrell, K.C.J. Van Rees, R.K. Hynes and N. Bélanger. 2012. Intercropping *Caragana arborescens* with *Salix miyabeana* in short rotation intensive cultures in the Canadian Prairies as a means to satisfy nitrogen demand and maximize growth. BioEnergy Research DOI 10.1007/s12155-012-9181-7)

Amichev, B.Y., W.A. Kurz, C. Smyth and K.C.J. Van Rees. 2012. The carbon implications of large-scale afforestation of agriculturally marginal land with short-rotation willow in Saskatchewan. Global Change Biology Bioenergy 4: 70–87,
This paper was one of the top 15 most downloaded articles in 2012 in this journal.

Kabba, B.S., J.D. Knight, K.C.J. Van Rees, 2011. Modeling nitrogen uptake for hybrid poplar under weed competing conditions. Forest Ecology and Management, 262:131-138.

Hangs, R.D., J. Schoenau, K.C.J. Van Rees, and H.H. Steppuhn, 2011. Examining the salt tolerance of willow (Salix spp.) bioenergy species for use on salt-affected agricultural lands. Canadian Journal of Plant Science, 91:1-9.

Hangs, R., X. Guo, J. Schoenau, K.C.J. Van Rees, 2011. A simple technique for estimating above-ground biomass in short-rotation willow plantations. Biomass and Bioenergy, 35:2156-2162.

Amichev, B.Y., R.D. Hangs and K.C.J. Van Rees, 2011. A novel approach to simulate growth of multi-stem willow in bioenergy production systems with a simple process-based model (3PG). Biomass Bioenergy, 35: 473-488.

Volk, T.A., L. P. Abrahamson, K.D. Cameron, P. Castellano, T. Corbin, E. Fabio, G. Johnson, Y. Kuzovkina-Eischen, M. Labrecque, R. Miller, D. Sidders, L.B. Smart, K. Staver, G.R. Stanosz and K. Van Rees. 2011. Yields of willow biomass crops across a range of sites in North America. Aspects of Applied Biology 112:67-74.

Pinno, B.D., Wilson, S.D., Steinaker, D.F., Van Rees, K.C.J., and McDonald, S.A, 2010. Fine root dynamics of trembling aspen in boreal forest and aspen parkland in central Canada. Annals of Forest Science, 67:710 DOI: 10.1051/forest/2010035.

B.Y. Amichev, M. Johnston and K.C.J. Van Rees, 2010. Hybrid Poplar Growth in Bioenergy Production Systems: Biomass Prediction with a Simple Process-Based Model (3PG). Biomass Bioenergy, 34:687-702.

Rick M.A. Block, J. Diane Knight, Neil W.H. Booth and Ken C.J. Van Rees, 2009. Nursery Stock Type, Nitrogen Fertilization and Shoot Pruning Effects on the Growth of Juvenile Hybrid Poplar in Saskatchewan. Canadian Journal of Plant Science, 89, 289-301.

B.S. Kabba, J.D. Knight and K.C.J. Van Rees, 2008. Nutrient Uptake of Hybrid Poplar in Competition with Weeds Using the Soil Supply and Nutrient Demand (SSAND) Model. Canadian Journal of Soil Science, 89:197-207.

J.J. Gunderson, J.D. Knight and K.C.J. Van Rees, 2008. Relating Hybrid Poplar Fine Root Production, Soil Nutrients and Hydrocarbon Contamination. Bioremediation Journal, 12:156-167.

Van Rees, K.C.J., 2008. Developing a National Agroforestry and Afforestation Network for Canada. Policy Options, 29(2), 54-57.

Kabba, B.S., J. Diane Knight and Ken C.J. Van Rees, 2007. Growth of Hybrid Poplar as Affected by Dandelion and Quackgrass Competition. Plant Soil, 298:203-217.

Gunderson, J.J., J.D. Knight and K.C.J. Van Rees, 2007. Impact of Ectomycorrhizal Colonization of Hybrid Poplar on the Remediation of Diesel-contaminated Soil. Journal of Environmental Quality, 36:927-934.

Welham, C., K.C.J. Van Rees, B. Seely and H. Kimmins, 2006. Projected Long-term Productivity in Saskatchewan Hybrid Poplar Plantations: Weed Competition and Fertilizer Effects. Canadian Journal Forest Research, 37:356-370.

Block, R.M.A., K.C.J. Van Rees and J.D. Knight, 2006. A Review of Fine Root Dynamics in *Populus* Plantations. Agroforestry Systems, 67:73-84.

Technical Reports (10)

R. Hangs, S. Konecsni and K. Van Rees, 2010. Development of willow clones for agroforestry and bioenergy. Final Report. SAF Agricultural Development Fund Project #20060145

Ken Van Rees, S. Konecsni and Ryan Hangs, 2009. Development of Willow Clones for Agroforestry and Bioenergy. SAF Agricultural Development Fund Project #20060145. 2008 Progress Report. 27 pp.

K.C.J. Van Rees, 2008. Growth of Hybrid Poplar Clones and Conifer Species on Agricultural Land. Saskatchewan Forest Centre Final Report 2008. 18 pp.

Ken Van Rees, Nicolas Bélanger and Ryan Hangs, 2008. Development of Willow Clones for Agroforestry and Biomass Energy. SAF Agricultural Development Fund Project 2007 Progress Report, February 15, 2008. 23 pp.

K.C.J. Van Rees, 2007. Growth Strategy for Agroforestry in Saskatchewan: Environment, Agriculture and Employment. Saskatchewan Agriculture, Food and Environment and Industry and Resources, Regina, Saskatchewan.

K. Van Rees, J.P. Kimmins and J.D. Knight. 2006. Role of Hybrid Poplar Plantations for Wood, Farm Diversification and Carbon Sequestration in Saskatchewan. Strategic Project No. STPGP 246005-01. NSERC Strategic Research Program final report, December 2006.

K.C.J. Van Rees and D. Jackson, 2006. Development of Conifer Plantations for Intensive Forest Management on Agricultural Land. Final Report, Saskatchewan Forest Centre, FDF Project.

K.C.J. Van Rees and D. Jackson, 2006. Siberian Larch Seed Source Study. Final Report, Saskatchewan Forest Centre, FDF Project.

K.C.J. Van Rees, H. Lazorko and S. Silim, 2006. Enhancing Hybrid Poplar Growth by Nitrogen Fertilization. Final Report, Saskatchewan Forest Centre, FDF Project

K.C.J. Van Rees, 2004. Agroforestry/afforestation in Saskatchewan: Past and Present. Agroforestry Workshop on Sustaining SK Agroforestry. Saskatchewan Forest Centre Annual General Meeting, Oct 6, Saskatoon, Saskatchewan.

Summary of Presentations (92 presentations)

K.C.J. Van Rees, B. Amichev, R. Hangs, N. Belanger, V. Vujanovic, T. Volk, R. Farrell and J. Schoenau. 2012. First Rotation Yields From Willow Plantations Across an Environmental Gradient in Saskatchewan. ASA-SSSA Annual Meeting, Cincinnati, OH, Oct 21-24, 2012.

Ken Van Rees, N. Belanger, V. Vujanovic, G. Scoles, R. Grant, T. Volk, B. Amichev, R. Hangs, R. Farrell, J. Schoenau. 2012. First Rotation Yields for 30 Willow Clones in Saskatchewan: Where do we go from here?" Clean Energy Fund Project 106CE Annual Workshop. 'Addressing Key barriers and Issues to the Extensive Deployment of Short Rotation Plantations/Agroforestry Energy Systems in Canada. Wendake, QC. March 13-14, 2012.

K. Van Rees, G. Salvas, M. Labrecque, P. Savoie, D. Sidders. 2012. Invited Round Table Panel. Short Rotation Woody Crops: from small to large scale. Clean Energy Fund Project 106CE Annual Workshop. 'Addressing Key barriers and Issues to the Extensive Deployment of Short Rotation Plantations/Agroforestry Energy Systems in Canada. Wendake, QC. March 13-14, 2012.

Hangs, R.D, Schoenau, J.J., and Van Rees, K.C.J. 2012. A Novel Technique for Rapidly Separating Willow Roots from Clay Soil. In Proc. Soils and Crops Workshop. University of Saskatchewan. Saskatoon, SK.

Hangs, R.D, Schoenau, J.J., Van Rees, K.C.J., and Jensen, T. 2012. Examining the Nutrient Dynamics of Willow Biomass Energy Plantations. In Proc. Soils and Crops Workshop. University of Saskatchewan. Saskatoon, SK.

Hangs, R.D, Schoenau, J.J., Van Rees, K.C.J., and Jensen, T. 2012. First rotation nutrient dynamics within willow bioenergy plantations. In Proc. Great Plains Soil Fertility Conference. Denver, CO.

Corredor A.H., K. van Rees, Vujanovic V., 2011. Beneficial fungi in willow biomass plantations for bioenergy. The Soils & Crops Conference, March 15-16, Prairieland Park, Saskatoon SK.

Van Rees K., Amichev, B., Knight D. Kort J. Nesdoly, R. and Schroeder B., 2010. Development of Hybrid Poplar Plantations in Saskatchewan: What have we learned in 15 years? Fifth International Poplar Symposium Poplars and willows: from research models to multipurpose trees for a bio-based society. 20 – 25 September 2010. Orvieto, Italy.

Corredor A.H., K. van Rees, Vujanovic V., 2010. Molecular profiling of arbuscular mycorrhizal fungi in willow biomass plantations. Canadian Phytopathological Society-Reg. Meeting, December 9, Saskatoon SK.

R.D. Hangs, J.J. Schoenau, and K.C.J. Van Rees, 2010. Screening willow clones for salt tolerance. Annual Meeting Can. Society Soil Science, June 20-24 Saskatoon SK.

R.D. Hangs, J.J. Schoenau, and K.C.J. Van Rees, 2010. Response of willow growth to irrigation and fertilization in Saskatchewan. Annual Meeting Can. Society Soil Science, June 20-24 Saskatoon SK.

B.Y. Amichev and K.C.J. Van Rees, 2010. Carbon Budget of Agricultural Land Following Afforestation with Willow for Bioenergy Production: a CBM-CFS3 Model Simulation. Annual Meeting Can. Society Soil Science, June 20-24 Saskatoon SK.

K.C.J. Van Rees, 2010. Short Rotation Woody Crops: Developing a Bioenergy Program in Saskatchewan. University of Toronto, Feb. 4, 2010.

K.C.J. Van Rees, B.Y. Amichev, R.D. Hangs and T.A. Volk, 2010. Productivity of Willow Clones Across an Environmental Gradient in Saskatchewan. IEA Bioenergy Task 43 Sustainability across the supply chain of land-based biomass. June 1-4, 2010, Kamloops, BC.

K.C.J. Van Rees, 2009. Short Rotation Woody Crop Production for Saskatchewan: Another Option for Bioenergy. Presentation to the Go Green Fund, Ministry of Environment, Dec. 13, 2009. Regina.

Beyhan Amichev and Ken Van Rees, 2009. Modelling Willow Production for Saskatchewan. IEA Linking Technology and Biomass, Dec 1-4, 2009. Taupo, New Zealand.

Amichev, B.Y., M. Johnston and K.C.J. Van Rees, 2009. Hybrid poplar growth in plantation systems: Biomass prediction with a simple processed-based model. Poplar Council of Canada Annual Meeting Sept. 28-30, 2009. Regina SK.

Hangs, R.D., K.C.J. Van Rees and J.J. Schoenau, 2009. Screening salt tolerance in willow. Poplar Council of Canada Annual Meeting Sept. 28-30, 2009. Regina SK.

Konecsni, S.M. and K.C.J. Van Rees, 2009. Nitrogen uptake by willow bioenergy cropping systems in Saskatchewan, SK. Poplar Council of Canada Annual Meeting Sept. 28-30, 2009. Regina SK.

R. Hangs, Schoenau, J.J., and K.C.J. Van Rees, 2009. Evaluating different techniques for estimating biomass in short-rotation willow plantations. IEA Bioenergy Conference Biofuels & Bioenergy: A Changing Climate, August 23-26, Vancouver, BC.

S. Konecsni and K.C.J. Van Rees, 2009. Nitrogen uptake by willow bioenergy cropping systems in Saskatchewan, Canada. IEA Bioenergy Conference Biofuels & Bioenergy: A Changing Climate, August 23-26, 2009. Vancouver, BC.

C. Stadnyk, and K. Van Rees, 2009. Examining root dynamics of willow in Saskatchewan. IEA Bioenergy Conference Biofuels & Bioenergy: A Changing Climate, August 23-26, 2009. Vancouver, BC.

K.C.J. Van Rees, 2009. Agroforestry and Afforestation. Planting the Seed Development & Sustainability of Natural Resources in Saskatchewan. The 6th Annual NRT Conference, SIAST Woodlands Campus, March 21, Prince Albert, Saskatchewan.

Beyhan Amichev, Werner Kurz and Ken Van Rees, 2009. Carbon Budget of Agricultural Land following Afforestation with Willow for Bioenergy Production: A CBM-CFS3 Model Simulation. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Vladimir Vujanovic and Ken Van Rees, 2009. Molecular Study of Fungal Functional Groups Associated to High Density Willow Plantations in Canada. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Robert Grant, Ken Van Rees and Kimlin Metivier, 2009. Using the Ecosys Mathematical Model to Simulate Sustainable Productivity and Greenhouse Gas Exchange of Short Rotation Willow for Biofuel. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Christine Stadnyk and Ken Van Rees, 2009. Examining Root Dynamics of Willow in Saskatchewan. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Sheala Konecsni and Ken Van Rees, 2009. Fertilization of Willow Bioenergy Cropping Systems in Saskatchewan, Canada. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Doug Jackson and Ken Van Rees, 2009. First Year Growth Results After Coppicing for Willow Plantations at Four Sites in Saskatchewan. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Beyhan Amichev, Ryan Hangs and Ken Van Rees, 2009. A Novel Approach to Simulate Growth of Multi-Stem Willow Species with a Simple Process-Based Model (3PG). Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Ryan Hangs, Jeff Schoenau and Ken Van Rees, 2009. Evaluating Different Techniques for Estimating Biomass in Short-Rotation Willow Plantations. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Aura Helena Corredor, Ken Van Rees and Vladimir Vujanovic, 2009. Taxonomical Composition of Fungal Communities in the Rhizosphere of Willow. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Zahra Hosseini-N, Ken Van Rees and Vladimir Vujanovic, 2009. Fungal Biodiversity on Leaves and Stems of Willow. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

Ken Van Rees, 2009. An Overview of the Willow Program in Saskatchewan. Willow Crops: Research and Opportunity Conference, March 17-18, Saskatoon, Saskatchewan.

B. Amichev and K. Van Rees, 2008. Predicting Hybrid Poplar Growth with a Simple Process-based Model (3PG). Biofuels, Bioenergy and Bioproducts from Sustainable Agricultural and Forest Crops. Short Rotation Crops International Conference, August 19-21, Bloomington, Minnesota.

K.C.J. Van Rees, 2008. Willow as a Biofuel Crop. Saskatchewan Soil Conservation Association Crop Advisors Workshop, December 4-5, Regina, Saskatchewan.

K.C.J. Van Rees, 2008. Wood Bioenergy Systems in Canada. Biofuels, Bioenergy and Bioproducts from Sustainable Agricultural and Forest Crops. Proceedings of the Short Rotation Crops International Conference, Bloomington, MN, August 19-21, 2008. USDAFS North. Res. Station, General Technical Report NRS-P-31.

N. Booth, K. Van Rees and D. Knight, 2008. Nitrogen Fertilization of Hybrid Poplar Plantations in Saskatchewan, Canada. Proceedings of the 2008 Soils and Crops Workshop, February 28 and 29, Saskatoon, Saskatchewan.

M. Steckler, J.D. Knight, N. Bélanger and K.C.J. Van Rees, 2007. Nutrient Cycling in Hybrid Poplar Stands in Saskatchewan. Abstracts of the ASA-CSSA-SSSA International Annual Meetings, November 4-8, New Orleans, Louisiana.

K.C.J. Van Rees, 2007. General Soils. Workshop on Tree Nutrition for Greenwood Resources, November 16-17, Boardman, Oregon.

K.C.J. Van Rees, 2007. Drip Irrigation and Root Systems. Workshop on Tree Nutrition for Greenwood Resources, November 16-17, Boardman, Oregon.

K.C.J. Van Rees, 2007. Nutrient Cycling in Hybrid Poplar Stands in Saskatchewan: Implications for Long-Term Productivity. Workshop on Tree Nutrition for Greenwood Resources, November 16-17, Boardman, Oregon.

K.C.J. Van Rees, 2007. Hybrid Poplar Research in Saskatchewan. Workshop on Tree Nutrition for Greenwood Resources, November 16-17, Boardman, Oregon.

K.C.J. Van Rees, 2007. Development of an Agroforestry Industry in Saskatchewan: Opportunities for the Future. Workshop on Intensive Silviculture Systems in Canada's Rural Landscape: Current Research and Future Directions, April 25-26, Auberge Le Baluchon, Montreal, Quebec.

K.C.J. Van Rees, 2007. Growing an Agroforestry Strategy in Saskatchewan. Making Money Through Agroforestry Conference, April 4-5, Saskatoon, Saskatchewan.

K.C.J. Van Rees, 2007. Agricultural Forestry in Saskatchewan: A New Era for Planting Trees on Farms. Soils and Crops 2007, University of Saskatchewan, March 1-2, Saskatoon, Saskatchewan.

K.C.J. Van Rees, 2007. Opportunities for Agroforestry in Saskatchewan. Saskatchewan Soil Conservation Association, February 15, Saskatoon, Saskatchewan.

K.C.J. Van Rees, 2007. Agroforestry Strategy for Saskatchewan. Saskatchewan Forest Centre Board of Directors Meeting, February 13, Prince Albert, Saskatchewan.

R.D. Hangs, K.C.J. Van Rees, N. Bélanger, R.E. Farrell, G. Scoles, V. Vujanovic and R. Grant, 2007. Willow Research Program at the University of Saskatchewan. Environmental Applications of Poplar and Willow International Poplar Commission Working Party Workshop, Montreal, Quebec.

R.D. Hangs, K.C.J. Van Rees, N. Bélanger and J. Kort, 2007. Environmental Benefits from Agroforestry. Saskatchewan Forest Centre Agroforestry Management Course, Prince Albert, Saskatchewan.

R.D. Hangs, K.C.J. Van Rees, N. Bélanger and J. Kort, 2007. Environmental Benefits from Agroforestry. Saskatchewan Forest Centre Agroforestry Management Course, Whitewood, Saskatchewan.

K.C.J. Van Rees, N. Bélanger, R. Hangs, R. Farrell, G. Scoles, V. Vujanovic, R. Grant, B. Schroeder and D. Sidders, 2007. Biomass Energy in Saskatchewan: Development

of Willow Plantations. IEA Task 30 Meeting, August, University of Guelph, Guelph, Ontario.

X.M. Zhang, K. Van Rees and V. Vujanovic, 2007. Fungal Community Structure Associated with High Density Willow Plantations. CPS – SK Regional Meeting 2007, December 3, Saskatoon, Saskatchewan.

R.D. Hangs, K.J. Greer, K.C.J. Van Rees and W.R. Schroeder, 2007. Determining Soil Nutrient Requirements for Growing Hybrid Poplar. Soils and Crops 2007, University of Saskatchewan, March 1-2, Saskatoon, Saskatchewan.

Clive Welham, Ken Van Rees, Brad Seely and Hamish Kimmins, 2006. Management Practices for Sustainable Returns of Wood and Carbon Sequestration from Hybrid Poplar Plantations in the Canadian Prairie Region. International Congress on Cultivated Forests, October 3-7, Bilbao, Spain.

R.M.A. Block, K.C.J. Van Rees and J.D. Knight, 2006. Fine Root Dynamics in Hybrid Poplar Plantations in Saskatchewan. Agroforestry Conference: Deriving Diversity on the Farm through Agroforestry, March 21-22, Saskatoon, Saskatchewan.

R.D. Hangs, K.J. Greer, K.C.J. Van Rees and W.R. Schroeder, 2006. Measuring Soil Nutrient Bioavailability in Hybrid Poplar Plantations. Agroforestry Conference: Deriving Diversity on the Farm through Agroforestry, March 21-22, Saskatoon, Saskatchewan.

D.H. Jackson and K.C.J. Van Rees, 2006. Development of Conifer Plantations for Intensive Forest Management. Agroforestry Conference: Deriving Diversity on the Farm through Agroforestry, March 21-22, Saskatoon, Saskatchewan.

B.S. Kabba, J.D. Knight and K.C.J. Van Rees, 2006. Growth of Hybrid Poplar Trees as affected by Understory Competition. Agroforestry Conference: Deriving Diversity on the Farm through Agroforestry, March 21-22, Saskatoon, Saskatchewan.

W.R. Schroeder, G. Inouye, S. Silim and K.C.J. Van Rees, 2006. Hybrid Poplar for Farm Diversification in Saskatchewan. Agroforestry Conference: Deriving Diversity on the Farm through Agroforestry, March 21-22, Saskatoon, Saskatchewan.

M. Steckler, J.D. Knight and K.C.J. Van Rees, 2006. Nutrient Cycling and Budgets for Hybrid Poplar at Meadow Lake. Agroforestry Conference: Deriving Diversity on the Farm through Agroforestry, March 21-22, Saskatoon, Saskatchewan.

K.C.J. Van Rees, 2006. Effect of Stock Type, Pruning, Fertilization and Spacing on Hybrid Poplar Growth. Agroforestry Conference: Deriving Diversity on the Farm through Agroforestry, March 21-22, Saskatoon, Saskatchewan.

A. Worley and K.C.J. Van Rees, 2006. Soil Properties of Afforested Land Compared to Arable Land. Agroforestry Conference: Deriving Diversity on the Farm through Agroforestry, March 21-22, Saskatoon, Saskatchewan.

R.D. Hangs, K.J. Greer, K.C.J. Van Rees and W.R. Schroeder, 2006. Measuring Soil Nutrient Bioavailability in Hybrid Poplar Plantations. Soil Science Society of America Annual Meeting, November 12-16, Indianapolis, Indiana.

B.S. Kabba, J.D. Knight and K.C.J. Van Rees, 2006. Soil Supply and Nutrient Demand (SSAND) Model – Tool for Predicting N Uptake for Hybrid Poplar in Competition with Weeds. Soil Science Society of America Annual Meeting, November 12-16, Indianapolis, Indiana.

K.C.J. Van Rees and S. Silim, 2006. Yearly Fertilization of Hybrid Poplar Clones in Central Saskatchewan: Third Year Results. Poplar Council of Canada Annual Meeting, September 25-28, Pasco, Washington.

J. Gunderson, J.D. Knight and K.C.J. Van Rees, 2006. The Effect of Mycorrhizal Inoculation on Hybrid Poplar Fine Root Dynamics in Hydrocarbon Contaminated Soils. Canadian Society of Soil Science Annual Meeting, May 14-17, Banff, Alberta.

B.S. Kabba, J.D. Knight and K.C.J. Van Rees, 2006. Nitrogen Uptake Modeling for Hybrid Poplar in Competition with Weeds using the SSAND Model. Canadian Society of Soil Science Annual Meeting, May 14-17, Banff, Alberta.

B.S. Kabba, J.D. Knight and K.C.J. Van Rees, 2005. Growth of Hybrid Poplar as Affected by Dandelion and Quackgrass Competition. 69th Annual Meeting of the Soil Science Society of America “Mapping our New Horizons”, November 6-10, Salt Lake City, Utah.

M.K. Steckler, J.D. Knight and K.C.J. Van Rees, 2005. Nutrient Cycling in an Intensively Managed Short Rotation Hybrid Poplar Plantation in Meadow Lake, Saskatchewan Canada. Canadian Society of Soil Science Annual Meeting, May 15-18, Halifax, Nova Scotia.

K.C.J. Van Rees, 2006. Saskatchewan Agroforestry Opportunities, Saskatchewan Institute of Agrologists Workshop, October 26, Saskatoon, Saskatchewan.

K.C.J. Van Rees, 2006. Agroforestry and Afforestation in Saskatchewan. Board of Directors, Saskatchewan Forest Centre, February 14, Prince Albert, Saskatchewan.

R.D. Hangs, K. Greer, B. Schroeder and K.C.J. Van Rees, 2005. Measuring Soil Nutrients in Hybrid Poplar Plantations. Canadian Institute of Forestry/Poplar Council of Canada National Conference and Annual Meeting, August 22-25, Prince Albert, Saskatchewan.

H. Kimmins, Welham Seeley and K.C.J. Van Rees, 2005. Modelling of Hybrid Poplar. Canadian Institute of Forestry/Poplar Council of Canada National Conference and Annual Meeting, August 22-25, Prince Albert, Saskatchewan.

K.C.J. Van Rees, 2005. Tree Farming in Saskatchewan: A Historical Perspective. Canadian Institute of Forestry/Poplar Council of Canada National Conference and Annual Meeting, August 22-25, Prince Albert, Saskatchewan.

M.K. Steckler, J.D. Knight, N. Bélanger and K.C.J. Van Rees, 2005. Nutrient Cycling in a Young Hybrid Poplar Stand in Saskatchewan. Canadian Institute of Forestry/Poplar Council of Canada Annual Meeting, August 22-25, Prince Albert, Saskatchewan.

K.C.J. Van Rees, 2005. Tree Farming in Saskatchewan: A Thing of the Past or an Option for the Future. Soil Science Seminar Series, October 24, Saskatoon, Saskatchewan.

R.M.A. Block, J.D. Knight and K.C.J. Van Rees, 2005. Belowground Carbon Sequestration by Roots in Hybrid Poplar Plantations. Capturing Canada's Green Advantage: Biosphere Solutions for Climate Change and the Economy, BIOCAP Canada Foundation – 1st National Conference, Feb 2-3, Ottawa, Ontartio.

Ryan Hangs, Ken Greer and Ken Van Rees, 2005. Soil Nutrient Supply Rates as an Indicator of Site Suitability and Early Growth Requirements of Hybrid Poplar Seedlings. Proceedings of the 2005 Soils and Crops Workshop, February 17-18, Saskatoon, Saskatchewan.

Michael Steckler, K. Van Rees and J.D. Knight, 2005. Nutrient Cycling in Intensively Managed Short Rotation Hybrid Poplar Plantations. Proceedings of the 2005 Soils and Crops Workshop, February 17-18, Saskatoon, Saskatchewan.

K.C.J. Van Rees and N. Belanger, 2005. Historical Perspectives of Afforestation in Saskatchewan. Capturing Canada's Green Advantage: Biosphere Solutions for Climate Change and the Economy, BIOCAP Canada Foundation – 1st National Conference, Feb 2-3, Ottawa, Ontario.

K.C.J. Van Rees and S. Silim, 2004. Intensive Management of Hybrid Poplar: 1st year Fertilizer Results. Poplar Council of Canada Annual Meeting, August 8-12, Vancouver, British Columbia.

R.M.A. Block, K.C.J. Van Rees and J.D. Knight, 2004. Fine Root Dynamics in Juvenile Hybrid Poplar Plantations in Saskatchewan, Canada. Annual Meetings of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, October 31-November 4, Seattle, Washington.

R.D. Hangs, K.J. Greer and K.C.J. Van Rees, 2004. Soil Nutrient Aupply Rates as an Indicator of Site Suitability and Early Growth Requirements of Hybrid Poplar Seedlings.

Annual Meetings of the American Society of Agronomy, Crop Science Society of America, and Soil Science Society of America, October 31-November 4, Seattle, Washington.

Rick Block, Diane Knight and Ken Van Rees, 2004. Fine-root Dynamics in Hybrid Poplar Plantations in Saskatchewan, Canada. 1st World Congress of Agroforestry, June 27-July 2, Orlando, Florida.

Ken Van Rees, Diane Knight, Rick Block, Neil Booth, Doug Jackson, Bill Schroeder, Roger Nesdoly and Grant Harrison, 2004. Cultural Practices for Establishing Hybrid Poplar Plantations in Saskatchewan, Canada. 1st World Congress of Agroforestry, June 27-July 2, Orlando, Florida.

K.C.J. Van Rees, 2004. Agroforestry/afforestation in Saskatchewan: Past and Present. Agroforestry Workshop on Sustaining SK Agroforestry. Saskatchewan Forest Centre Annual General Meeting, Oct 6, Saskatoon, Saskatchewan.

J.D. Knight, R.M.A. Block, K.C.J. Van Rees and R.G. Nesdoly, 2003. Establishment of Hybrid Poplar Plantations in Saskatchewan, Canada: An Agroforestry Initiative. 717 – p688. Canadian Society of Soil Science Meeting, August 10-13, Montreal, Quebec.

R.M.A. Block, J.D. Knight, R.G. Nesdoly, W.R. Schroeder, G. Harrison and K.C.J. Van Rees, 2003. Hybrid poplar plantation establishment in Saskatchewan: First year results. Soils and Crops 2003, University of Saskatchewan, February 17-18, Saskatoon, Saskatchewan.

K.C.J. Van Rees, R.M.A. Block, N. Booth, G. Harrison, G. Jackson, J.D. Knight, R.G. Nesdoly and W.R. Schroeder, 2003. Agroforestry/ Afforestation Initiatives in Saskatchewan: Establishment of Hybrid Poplar Plantations. Poplar Council of Canada Annual Meeting, September 15-19, Rouyn-Noranda, Quebec.

R.M.A. Block, K.C.J. Van Rees, J.D. Knight, R.G. Nesdoly, W.R. Schroeder, G. Harrison and H. Kimmins. 2003. Hybrid Poplar Plantations in Saskatchewan, Canada: An Agroforestry Initiative. XII World Forestry Congress, September 21-28, Quebec City, Quebec.

R. Nash, K.C.J. Van Rees, S. Salim and W.R. Schroeder, 2003. Responses of Three Related Poplar Clones to NH_4 and NO_3 Ratios. Poplar Council of Canada Annual Meeting, Rouyn-Noranda, September 15-19, Quebec.

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