

SESSION 1

FALL APPLICATION OF TRIBENURON METHYL FOR BUNCHBERRY CONTROL IN WILD BLUEBERRIES.

D.E. Yarborough and J.L. D'Appollonio, University of Maine.

Tribenuron methyl (Express XP) was applied to a non-cropping wild blueberry (*Vaccinium angustifolium*) field containing bunchberry (*Cornus canadensis*) in the fall of 2006 and 2007 to evaluate the herbicide's effectiveness in controlling bunchberry and potential injury to wild blueberry. Tribenuron methyl was applied at a rate of 0.43 oz ai a⁻¹ with a nonionic surfactant at 0.25% v/v to ten 1-m² plots per treatment date on 29 August, 26 September and 17 October 2006, and to a 24 by 50 ft block for each treatment date on 4 September, 17 September, and 3 October 2007. Ten 1-m² plots per treatment timing were evaluated at four weeks or two weeks post-treatment, respectively, for blueberry and bunchberry percent cover using a Daubenmire cover scale converted to percent cover, and results were compared to untreated control plots. In 2006 only, in ten 0.9-m² plots per treatment the blueberry and bunchberry stems were counted prior to all treatments and then recounted on 16 July 2007. On 16 July 2007 and 7 August 2008, percent blueberry and bunchberry covers were evaluated for all plots. The 1-m² plots were hand-harvested on 2 August 2007 and 7 August 2008, respectively, and converted to pounds per acre. Percent cover data were analyzed using Duncan's Multiple Range test for the 2006 to 2007 data and paired t-tests for the 2007 to 2008 data; yields were analyzed using Duncan's Multiple Range test. In 2007 the 2006 August treatment had the highest blueberry cover and the lowest bunchberry cover. Blueberry cover was significantly higher in the August treatment than the other treatments, while bunchberry cover was significantly lower than the untreated control in the August and September treatments but not for the October treatment. The same trends held true for the stem counts, except that the blueberry stem count for the August treatment was significantly greater than the October treatment only. The October treatment had the highest yield, with the August treatment a close second, but the yields did not vary significantly among treatments in 2007. In 2008 the blueberry cover was significantly higher on the 4 September 2007 treatment than the previous year; the untreated and the September and October treatments were not significantly different. In 2008 the bunchberry cover was significantly lower on the check and all treatments. The untreated changed from 55% to 45% cover, but all of the treatments had significantly greater reductions in bunchberry cover with the 4 September treatment reduced from 75% to 5%, the 17 September treatment from 63% to 15% and the 3 October treatment from 20% to 5%. In all treatments blueberry yields were suppressed, but only the 17 September treatment was significantly lower than the untreated control. Tribenuron methyl is effective in reducing bunchberry cover without significantly reducing blueberry cover but still has the potential for reducing yields the year after application. Therefore, a State of Maine 24 C label for the Express TotalSol formulation was given in September 2008 for application in the crop year after harvest. Fall treatments were made in both cropping and non-cropping fields in 2008 to compare effectiveness of tribenuron methyl to control bunchberry and evaluate potential injury and yield of wild blueberry in 2009 and 2010.

MESOTRIONE EFFICACY ON GOLDENROD AND BLACK BULRUSH.

Nathan Boyd and Scott White, Dept. of Environmental Sciences, NSAC, PO Box 550, Truro, NS, B2N 5E3.

Callisto (Mesotrione) efficacy on perennial weeds varies with time of application. Experiments were conducted in 2007 and 2008 to determine the growth stage of goldenrods (*Solidago* spp.) and black bulrush (*Scirpus atrovirens*) most susceptible to post-emergent applications of Callisto and to determine if Callisto efficacy is greater following a pre-emergence herbicide. Preliminary results indicate that optimal control of goldenrod top-growth is obtained from post-emergent Callisto applications made before flower bud initiation when the plants are 10cm to 30cm tall. Applications at later growth stages were less effective. Control levels were improved when Callisto applications followed a Velpar (hexazinone) application. Callisto did not effectively control black bulrush at label rates but sixty to seventy percent control was achieved with two consecutive (early and late) applications at label rates.

AMÉNAGEMENT DE BLEUETIÈRES À L'AIDE DU GLYPHOSATE – RÉSULTATS FINAUX.

Sophie Gagnon, Agrinova.

Étant donné la problématique environnementale et sociale causée par l'utilisation de l'hexazinone dans les bleuétières du Québec au cours des dernières années, des essais expérimentaux ont été mis en place pour valider la possibilité de substituer ce produit par le glyphosate lors de l'aménagement d'une bleuétière.

La réduction de l'utilisation de l'hexazinone dans les bleuétières aurait des impacts positifs sur les trois sphères du développement durable. Au niveau économique, les producteurs réduiraient leurs coûts de production, car cet herbicide est très coûteux. De plus, de nouvelles superficies pourraient être aménagées en raison des contraintes qui sont plus élevées pour l'utilisation de l'hexazinone, comparativement à l'utilisation du glyphosate. Par ailleurs, du point de vue environnemental, le glyphosate est beaucoup moins soluble que l'hexazinone, ce qui réduit les risques de le retrouver dans les eaux souterraines. Finalement, sur le plan social, certaines municipalités freinent le développement de bleuétières sur leur territoire en raison de la problématique environnementale associée à l'hexazinone. Sa substitution favoriserait donc l'acceptation sociale du développement de la production de bleuets sur de nouveaux territoires.

Les essais d'aménagement de bleuétières à l'aide de glyphosate ont permis de constater qu'il est possible de substituer l'hexazinone par le glyphosate pour contrôler les mauvaises herbes lors de l'aménagement d'une bleuétière. Également, il a été démontré qu'il est économiquement avantageux de le faire. Les résultats ont toutefois mis en évidence certaines limitations reliées à cette méthode.

Lors des deux années d'expérimentation, le glyphosate a démontré un bon contrôle du *kalmia angustifolia*, la principale mauvaise herbe problématique dans les bleuétières en

aménagement. Le traitement optimal est le glyphosate appliqué une seule fois, à l'automne suivant le premier broyage, utilisé à 0,9 kg/ha avec un adjuvant et une fertilisation au printemps suivant. Le fauchage automnal suivant l'application s'est révélé indispensable afin d'éviter la phytotoxicité sur le bleuetier. Tant pour les parcelles de glyphosate que les parcelles d'hexazinone, l'utilisation du glyphosate humecté en période estivale demeure nécessaire pour certaines mauvaises herbes hautes non contrôlées par l'herbicide principal.

Les dommages au bleuetier survenus lors de la deuxième application de glyphosate laissent également supposer qu'il peut y avoir un effet résiduel suite à une première application. Tant que ce constat n'est pas validé dans des essais subséquents, une deuxième application de glyphosate d'automne, effectuée à une année d'intervalle avec la première, serait donc à déconseiller.

Suite à ce projet, il serait également pertinent de poursuivre l'expérimentation dans les mêmes parcelles, dans les premières années de production, afin d'étudier l'entretien d'une bleuetière suite à un aménagement à l'aide du glyphosate.

SHEEP SORREL BIOLOGY AND MANAGEMENT IN WILD BLUEBERRY FIELDS.

Nathan Boyd and Karen Kennedy, Dept. of Environmental Sciences, NSAC, PO Box 550, Truro, NS, B2N 5E3.

Sheep sorrel (*Rumex acetosella* L.) is a wide spread perennial weed in wild blueberry fields. A Factorial experiment was designed to examine the impact of Velpar (hexazinone) applications (none versus 2.56 kg Velpar/ha) over a range of fertility levels (0, 20, and 40 kg N/ha applied in a 14-18-10 mix) on sheep sorrel population dynamics. The experiment was initiated in the sprout year at three sites in 2007 and two sites in 2008. Sheep sorrel appears to rely predominately on vegetative reproduction for population growth within an established blueberry field with approximately 98% of all seedlings emerging within a clone dying even where Velpar was not applied. Fertilizer inputs had minimal impacts on sheep sorrel growth. Velpar applications tend to reduce population size but the extent of the reduction varies between sites. In most cases, Velpar applications significantly reduced seed production. Velpar and Kerb (Pronamide) remain the only registered products that are registered for use in wild blueberry that reduce sheep sorrel density. A post emergence product is needed to provide an alternative management option.

WEED CONTROL UPDATE FROM NEW BRUNSWICK

Gavin Graham, NB Department of Agriculture and Aquaculture.

New Brunswick Department of Agriculture and Aquaculture (NBDAA) has included a new pest identification tool, the Integrated Pest Management Images Database, on the NBDAA website (www.gnb.ca/agriculture). This fully searchable tool will assist growers in identification of diseases, insects, weeds and other crop disorders by providing high quality images for viewing, along with links to other supporting information such as factsheets.

Specific weed issues within the Province remain similar to previous seasons, although sheep sorrel, smooth bedstraw, hawkweed, burnweed and bristly arilia populations are increasing. NBDAA has conducted 18 research trials over the past two seasons in response to established weed issues in wild blueberries. Trial work has focused on fall herbicide application, grass control, tank mixes of mesotrione and grass herbicides, sheep sorrel control, general herbicide screening and fertility influence on weed populations. Future registration possibilities and trial plans will be discussed.

POSTER

OPTIMUM LEAF NUTRIENT CONCENTRATIONS OF WILD LOWBUSH BLUEBERRY.

Jean Lafond, Agriculture et Agroalimentaire Canada/Agriculture and Agri-Food Canada, 1468 Saint-Cyrille Normandin, Québec, G8M 4K3

Wild lowbush blueberry plants (*Vaccinium angustifolium* Ait.) have low nutrient requirements and can grow in nutrient-poor and acid soils. Studies have shown that lowbush blueberry productivity can be increased through additions of fertilizer or amendments. Fertilizer recommendations for N, P and K in Quebec were established on the basis of field trials. However, there are no fertilizer reference charts for blueberry that are based on soil analyses like those available for other crops. Research carried out in Maine and Maritime Provinces established minimum and maximum concentrations for the main nutrients in blueberry leaves collected at the tip-dieback stage in the sprout year. However, these standards may no longer be appropriate for the productivity levels achieved in recent years. The objective of the current study was therefore to determine minimum and maximum leaf nutrient concentrations for wild lowbush blueberry under the climatic and edaphic conditions of the Saguenay–Lac-Saint-Jean region of Quebec, Canada. These concentrations were derived using the boundary-line approach, which involves estimating the relationship between maximum relative fruit yield and leaf N, P, K, Ca and Mg concentrations. The data used to determine the minimum and maximum leaf nutrient concentrations were obtained from two different fertilization trials conducted from 2001 to 2006 on eight commercial blueberry fields in the Saguenay–Lac-Saint-Jean region of Quebec, Canada. These trials were selected to provide a wide range of fruit yields and leaf nutrient concentrations. A two-year pruning cycle was used in these experiments. The fields were mowed in the fall prior to the start of the trials.

Significant quadratic relationships were obtained between leaf N, P, K, Ca and Mg concentrations and relative fruit yields according to the boundary-line approach. Minimum leaf N and Mg concentrations were comparable to those obtained in earlier studies. Minimum leaf concentrations were revised downward for P and Ca. Only minimum K concentration was higher compared to published standards. Maximum leaf concentrations were revised downward for all nutrients. Minimum and maximum concentrations were 16.36-20.55, 1.19-1.66, 5.40-7.10, 2.93-3.88 and 1.34-1.81 mg g⁻¹ for N, P, K, Ca and Mg respectively. The differences between the values reported in earlier studies and those

obtained in the present study can be attributed to soil fertility, blueberry clones and new crop management practices. These concentrations were used to establish sufficiency ranges suited to wild lowbush blueberry growing conditions in the Saguenay–Lac-Saint-Jean region.

Le plant de bleuet nain sauvage (*Vaccinium angustifolium* Ait.) a de faibles besoins en éléments nutritifs et il peut croître sur des sols acides et faiblement pourvus en nutriments. Plusieurs études ont indiqué que la productivité du plant de bleuet pouvait être accrue avec l'apport de fertilisants ou d'amendements. Les recommandations actuelles en N, P et K au Québec ont été établies à partir d'essais réalisés au champ. Toutefois, il n'y a pas de grilles de référence en fertilisation pour le bleuet basées sur les analyses de sols comme pour les autres cultures. Des recherches effectuées dans les provinces Maritimes et au Maine ont établies les concentrations minimales et maximales des feuilles pour les principaux éléments nutritifs. Les feuilles ont été prélevées à l'aoûtement de l'année de végétation. Toutefois, ces valeurs ne sont plus nécessairement adaptées à la productivité atteinte depuis quelques années dans la région du Saguenay-Lac-Saint-Jean (Québec, Canada). L'objectif de l'étude a donc été de déterminer les concentrations minimales et maximales des éléments nutritifs dans les feuilles de bleuet sous les conditions climatiques et édaphiques du Saguenay-Lac-Saint-Jean en utilisant la relation entre les rendements relatifs et l'ensemble des concentrations optimales en N, en P, en K, en Ca et en Mg des feuilles. Les données utilisées pour déterminer les concentrations minimales et maximales des feuilles ont été obtenues de deux essais de fertilisation qui ont été réalisés entre 2001 et 2006 sur huit bleuetières du Saguenay-Lac-Saint-Jean, Québec, Canada. Ces essais ont été retenus car ils permettaient d'avoir un large éventail de concentration d'éléments nutritifs dans les feuilles et de rendements en fruit. Un cycle de production sur deux ans a été retenu pour ces essais. Les champs où se sont déroulés les essais avaient été préalablement fauchés.

Des essais de fertilisation azotée et phosphatée ont été réalisés sur huit sites situés au Saguenay-Lac-Saint-Jean entre 2001 et 2006. En moyenne, plus de 80 % des échantillons ont rencontré les concentrations minimales des éléments nutritifs dans les feuilles. Les concentrations minimales en N et Mg des feuilles ont été comparables aux valeurs proposées antérieurement. Les concentrations minimales ont été revues à la baisse pour le P et le Ca, tandis que la concentration en K a été supérieure. Les concentrations maximales ont été revues à la baisse pour tous les éléments. Les concentrations minimales et maximales ont été de 16,36-20,55, 1,19-1,66, 5,40-7,10, 2,93-3,88 et 1,34-1,81 mg g⁻¹ pour le N, P, K, Ca et Mg respectivement. La détermination des concentrations minimales et maximales des éléments nutritifs dans les feuilles a ainsi permis d'établir des intervalles de suffisance correspondant aux conditions de croissance du bleuet nain dans la région du Saguenay-Lac-Saint-Jean.

UPDATE ON THE DISTRIBUTION OF *RHAGOLETIS MENDAX* (DIPTERA:TEPHRITIDAE) IN LOWBUSH BLUEBERRY IN NORTH WESTERN NEW BRUNSWICK, CANADA.

Sonia O. Gaul¹, Evans Estabrooks², Charles Vincent³, Kenna MacKenzie¹.

¹Agriculture and Agri-Food Canada, Atlantic Food and Horticulture Research Centre, 32 Main St., Kentville, NS B4N 1J5; ²Evans and Associates Agricultural Consulting, 207 Allee Shaw Lane, New Maryland, NB E3C 1J2; ³Agriculture and Agri-Food Canada, Horticulture Research and Development Centre, 430 Gouin Blvd., Saint-Jean-sur-Richelieu, QC J3B 3E6.

The distribution of *Rhagoletis mendax*, the blueberry fruit fly, is expanding within eastern Canada. To investigate the current distribution within New Brunswick, standard yellow sticky traps were placed in selected fields of lowbush blueberries to the north and west of known areas of blueberry maggot infestation. Captures of adult flies and were recorded. In addition, fruit was harvested and larval counts were obtained. Adult flies were trapped in 4 fields, and larvae were found in fruit from 2 fields of the 11 sites monitored 1-3 years each. The *R. mendax* distribution and associated site characteristics has been updated to include 2008 data.

TOWARDS IDENTIFICATION OF *RHAGOLETIS MENDAX* (DIPTERA:TEPHRITIDAE,) IN LOWBUSH BLUEBERRY FRUIT USING REAL-TIME PCR.

Karen L. Burgher-MacLellan, Sonia Gaul, Kenna MacKenzie and C. Vincent. Agriculture and Agri-Food Canada, Atlantic Food and Horticulture Research Centre, 32 Main St., Kentville Nova Scotia, B4N 1J5, Canada

Blueberry maggot is a key insect pest of lowbush blueberry due to the potential presence of larvae in fruit, and the quarantine restrictions on both domestic and internationally exported fruit. We investigated the use of real-time polymerase chain reaction, PCR, a rapid and efficient method for identification of insect species, as a larval detection tool. Seven sets of PCR primers found in mitochondrial Cytochrome Oxidase I and II regions were tested with DNA from the four life stages of three *Rhagoletis* spp. PCR products were sequenced and the intra-specific and inter-specific similarities were 100% and 91% - 99.5 % respectively. Four species-specific primer sets were designed for real-time PCR using SYBR Green and melting curve analysis. This technique was found to be reliable, fast and able to detect and identify *Rhagoletis* spp. from the fruit of lowbush blueberry.

ORGANIC PRODUCTION OF WILD BLUEBERRIES I. INSECTS AND DISEASE.

F. Drummond, S. Annis, J. Smagula and D. Yarborough, the University of Maine.

Little is known about the responses of wild lowbush blueberry diseases, insect pests and their natural enemies to production practices in Maine, especially those common to organic production. In 2004 to 2007 a replicated field experiment was conducted to assess the main and interactive effects of pruning (mowing versus burning), sulfur application (0 or 1120 kg/ha), and fertilization (0, 22, or 45 kg N/ha) on a crop managed for two, 2-year production cycles in Amherst, Maine, USA. Plant growth response, yield, fruit quality, weed, disease,

and insect populations were assessed. Effects on diseases and insects are reported in this paper. In both 2005 and 2007, treatment plots pruned by burning had a greater number of red-striped fireworm (*Aroga trialbamaculella* Cham.), grasshoppers (*Melanopus* spp.) and blueberry thrips (*Frankliniella vaccinii* Morgan & *Catinathrips kainos* O'Neil) than mowed plots, possibly because of the significantly greater number of natural enemies (ants and spiders) that were found in mowed plots. Sulfur treatments interacted with pruning treatments for populations of red-striped fireworm in 2005, and thrips and tarnished plant bug in 2007. Higher grasshopper densities were associated with higher fertilizer rates. Host plant quality, expressed by leaf micronutrient levels affected insect pest community structure, suggesting that differential responses to organic management practices might play a role in determining organic pest complexes. Fifteen percent of the variation in the reduction in yield was associated with blueberry thrips and grasshopper populations over the two crop cycles. There was no significant effect of the type of pruning or for sulfur treatment on the incidence of Monilinia blight disease (caused by *Monilinia vaccinii-corymbosi* (Reade) Honey) in either 2005 or 2007. The low level of disease, <6% in 2005 and <1% in 2007, indicates that there were initially low levels of *Monilinia* inoculum in the field.

ORGANIC PRODUCTION OF WILD BLUEBERRIES III. FRUIT QUALITY

D. Yarborough, F. Drummond, S. Annis and J. Smagula, the University of Maine.

Organic wild blueberry growers indicated they were concerned that the use of sulfur for controlling weeds could impart a sulfur or off flavor to the fruit. Fruit were harvested in 2007 from organic production study plots that received a sulfur treatment of 1100 kg/ha in 2004. Two one liter fruit sub samples were taken from the mowed, unfertilized control plots with no sulfur and from similar plots that received the sulfur treatment in each of eight blocks. A portion of the sample was used to determine N, Ca, K, Mg, and P in percent and Al, B, Cu, Fe, Mn, and Zn in PPM using ICP/OES, percent S was determined with an Elemental Vario-Max. Other fresh fruit analyses were conducted to assess pH, percent soluble solids, titratable acidity and Hunter values. A sensory panel analysis (taste-test) was conducted with a second one-liter sample of fresh fruit. Thirty six people each received three samples of berries. No significant differences were found in fruit quality but the Mn and K levels were higher and the Ca and Mg levels lower in the analysis on the fruit from the sulfur treatments. Taste-test panelists indicated that the berries not treated with sulfur had a 'more tart/sharper taste' suggesting that treatment with sulfur may have a beneficial effect on fruit flavor. The much higher levels of Mn that were found in the fruit from plots treated with sulfur would also confer a beneficial health effect.

SESSION 2

FLIES IN THE TREES.

Dr. Francis A. Drummond and Judy Collins, University of Maine

My research lab has been studying the movement of blueberry flies between and within blueberry fields for several years now. As a result of this work a perimeter treatment strategy has been developed and widely adopted in Maine. However, we have found that flies tend to not only move horizontally, but also move vertically up into trees that comprise the edge of many blueberry fields. Is this movement due to leking behavior or numerical response to food and is it important? This presentation reports on the significance that this behavior appears to play in colonization of fields and the effect of tree species on tree colonization. Field experiments have shown that dispersal from trees probably don't result in flies jumping over treated perimeters. Field and laboratory experiments have shown that oak and maple trees are preferred tree hosts compared to birch, poplar, and spruce trees. The preference for tree species appears to be related to leaf volatiles given off during the summer.

INSECTICIDE EFFICACY TRIALS.

Judith A. Collins and Francis A. Drummond, University of Maine

Three new materials have shown promise for control of various blueberry pest insects. Delegate[®] WP (spinetoram) is registered by EPA as a reduced-risk material. A spin-off of spinosad, it is a broad-spectrum insecticide offering the advantage of low toxicity to beneficial insects and a longer residual than spinosad as well as short reentry and preharvest intervals. Our initial trials have shown it to be effective against both blueberry spanworm and blueberry flea beetle larvae. Metaflumizone, although not currently registered in the US, offers many of the same advantages. It is a broad-spectrum material that offered very good control of blueberry spanworm in a 2008 efficacy trial. Assail[®] 30 SG or acetamiprid is a new generation neonicotinoid insecticide that is systemic and moves into the plant through the roots and also through the leaf cuticular surface. Strawberry rootworm, blueberry spanworm, blueberry flea beetle, and blueberry thrips have all been successfully controlled with this material.

BIOLOGICAL CONTROL OF MONILINIA AND BOTRYTIS BLIGHTS OF LOWBUSH BLUEBERRY.

D. Langdon¹, P.D. Hildebrand², J.A. Traquair³ and G.J. Boland⁴. ¹Department of Environmental Biology, University of Guelph, (UoG) ON N1G 2W1, Canada; ²Atlantic Food and Horticulture Research Centre, Agriculture and Agri-Food Canada, (AAFC) 32 Main St. Kentville, NS B4N 1J5; ³Southern Crop Protection and Food Research Centre, AAFC 1391 Sandford St. London, ON N5V 4T3; ⁴Department of Environmental Biology, UoG ON N1G 2W1.

Mummy berry blight, caused by the fungus *Monilinia vaccinii-corymbosi*, is an important disease of lowbush blueberry. In early spring, ascospore infections can cause substantial loss of leaves and flowers. The purpose of this study was to evaluate the efficacy of the commercial biological control agents against ascospore infections. Exploratory field and controlled environment trials were conducted on the following agents: Actinovate (*Streptomyces lydicus*), Prestop (*Gliocladium catenulatum*), Sporodex (*Pseudomyzma flocculosa*), Mycostop (*Streptomyces griseoviridi*), Endofine (*Clonostachys rosae*), Blight Ban C91 (*Pantoea agglomerans*), Blight Ban A506 (*Pseudomonas fluorescens*) and Serenade Max QST 713 (*Bacillus subtilis*). Serenade Max was the only product that showed strong activity toward ascospore infections while Endofine showed some activity, but not enough to warrant further investigation. In controlled environment experiments, Serenade Max displayed excellent protectant activity and interestingly also showed some postinfection activity. When the bacteria of Serenade Max were filtered out, the filtrate suppressed disease on plants indicating that the antifungal activity of Serenade Max does not rely on the presence of the bacteria. However, no inhibition of germination by Serenade Max was observed in counts of ascospores on treated young blueberry leaf tissue indicating that the mechanism of action on *M. vaccinii-corymbosi* ascospores and infection is not clearly understood. A phenomenon known as “induced host resistance” may be the mode of action of Serenade Max. In field trials, rates of 2, 5 and 8 kg/ha were applied either once or twice. The first spray was applied before the first forecasted infection period of the year followed by a second application 7-10 days later. The level of disease control with two applications at 8 kg/ha approached that of the fungicide Topas, the industry standard, but yields were not increased as occurred with Topas. Unfortunately, none of the tested products was effective against Botrytis blight.

LEAF DISEASE RESEARCH UPDATE.

David Percival, Louise Cooke and Jason Grant. Department of Environmental Sciences, Nova Scotia Agricultural College, P.O. Box 550, Truro, Nova Scotia, Canada, B2N 5E3.

Leaf disease trials were conducted during the 2008 growing season at commercial field sites in Nova Scotia, New Brunswick and Prince Edward Island with emphasis on sprout phase of production trials focusing on the suppression of *Septoria* and rust, and crop phase of production trials focusing on the suppression of *Septoria*. Emphasis was placed on assessing fungicide efficacy (including reduced risk products), Bravo[®] application rate and frequency and strategies to minimize residue issues in processed berries. Results from trials in the sprout phase of production have indicated the continued effectiveness of Bravo[®] as a means

to suppress *Septoria* and rust, and the effectiveness of prothioconazole in reducing both *Septoria* and rust. In addition, results from 2008 have indicated the required necessity of monitoring for *Septoria* in the crop year, and the benefits to leaf retention, harvestable yield and berry quality when using Pristine™ in the crop phase of production. However, there is still a remaining need to determine the physiological impact of these leaf diseases on wild blueberry growth and development, and the also differentiate leaf disease versus other disease and plant growth regulator effects which may be present.

SESSION 3

TOWARDS AN AUTOMATED, WIRELESS IRRIGATION SYSTEM FOR EFFICIENT WATER USE IN LOWBUSH BLUEBERRY PRODUCTION.

Lindsay Russell¹, Jean-Pierre Privé¹, Paul Hildebrand², Nathan Boyd³ and Dave Percival³

¹Agriculture and Agri-Food Canada, Senator Hervé J. Michaud Research Farm, 1045 St. Joseph Rd., Bouctouche, NB E4S 2J2; ²Atlantic Food and Horticulture Research Centre, Agriculture and Agri-Food Canada, (AAFC) 32 Main St. Kentville, NS B4N 1J5; ³Department of Environmental Sciences, Nova Scotia Agricultural College, P.O. Box 550, Truro, Nova Scotia, Canada, B2N 5E3.

A four-year field study evaluating the performance of an automated irrigation system (“Intelligent Irrigation System,” IIS) for lowbush blueberry production is currently underway in Tracadie, New Brunswick and Debert, Nova Scotia. The aims of the project are: 1) to assess the performance and efficiency of the system for use in frost protection and crop production; 2) to develop a water management plan for lowbush blueberries based on plant physiological and environmental considerations; and 3) to evaluate the impact of irrigation on vegetation dynamics and foliar diseases. Unfortunately, with the abundant rainfall received during the previous three growing seasons as a major mitigating factor to irrigation treatments, results to date have been inconclusive. The discussion will center primarily on frost protection applications and technological aspects of the IIS.

THE CURRENT STATUS AND ISSUES ON BLUEBERRY PRODUCTION IN CHINA.

David Yarborough, the University of Maine

In the past seven years, the area of blueberries planted in China has increased from 24 to 1,323 ha, and is projected to increase to 14,900 ha by 2010. More than 10 provinces have begun commercial blueberry culture. Blueberries are grown from Northeastern to Southwestern China. Blueberry cultivars were chosen for different production areas based on the regional climate. Lowbush blueberry and half-high blueberry, about 20% and 15% of the total area respectively, are mainly cultured in the Northeast; Northern highbush blueberries, about 37% of all production areas, are mainly cultured along the coastal line area of Liaoning, Shandong, north part of Jiangsu, and part of Yunan Province. Rabbiteye and southern high bush are mainly cultured in Zhejiang, Jiangsu, Guizhou and part of Yunan

Provinces, have 28% of the total production area. Production of blueberries in China increased from 2 to 340 tons from 2001 to 2007, and it is estimated that it will increase to 12,300 metric tones. More than 2/3 of the fruit are used for the fresh market with more than 80% being exported to Japan or Hong Kong. Less than 1/3 of the fruit produced was processed for IQF and exported to other countries.

The major issues caused by the rapid development include 1. site selection for orchards have not been properly evaluated and many of the orchards being established in regions where the conditions are not suitable for blueberry growing, 2. cuttings used for planting are too small and most orchards have only a few easy propagated cultivars, 3. rapid development has lead to poor quality orchards and 4. the lack of experience on fruit harvest and processing. Five initiatives for blueberry growing include 1. to develop blueberry growing areas in suitable regions ecologically, 2. to master the cultivation techniques, 3. to select varieties scientifically and to prepare strong cuttings for planting, 4. to carry out soil management carefully, and 5. to establish plantations following the experimental trials.

EXTENSION REPORT FOR NOVA SCOTIA

Peter Burgess, IPM Coordinator AgraPoint

Overall, Nova Scotia had a good production year in 2008, with yields at our 10 year average of 40 million pounds, according to CFIA figures. Some areas of the province were very good while other areas had poor crops. For the most part, Cumberland County, Queens County and Yarmouth Counties had very good yields. However, as we move eastward through Colchester County (Truro Area) towards Cape Breton yields decreased. The later pollination season in these areas combined with poorer weather and contributed to poorer yields.

Diseases and weeds continue to be the major pest issues in Nova Scotia. There were above average Monilinia infection periods this season, but overall producers controlled the disease quite well. Leaf diseases are still a challenge for producers with *Valdensinia* becoming more prominent. Early leaf drop due to *Septoria* and Leaf Rust is hurting overall plant health and yield potential, with research ongoing to try and find optimal control techniques. Grasses, sheep sorrel, goldenrods are the major weed issues facing growers with emerging weeds like St. John's Wort and Spreading Dogbane becoming more prolific.

Weather has been a major factor affecting yields over the past 4 years. Wet weather has contributed to and enabled leaf diseases to become more prominent over this time. As well, weed control has been decreased, in part due to these wet weather patterns. This past year, excessive rain from mid July through the end of harvest challenged growers to get their fields harvested. The moisture resulted in good berry size, but the excessive rain led to several delays in harvesting. This pushed harvesting later into September than normal, where fruit shatter and berry drop became a real concern and reduced harvested yields.

WBPANS, NSAC, AgraPoint and AAFC have worked together over the past year to help extend information to Nova Scotia growers. Information sessions included: WBPANS AGM (November), WBPANS winter meeting (March), 3 twilight meetings (June), WBPANS field

day (July), Small Acreage Workshop (September). The blueberry blightline was continued under the direction of Rick Delbridge and expanded to include more grower co-operators. A grass ID poster and a Disease ID poster were designed and distributed to producers at the various sessions. This initiative is on-going as a broadleaf weed poster is near completion, and an insect poster is being developed. There are many other initiatives on-going led by the partners listed above as well as other consultants and researchers.

PEI WILD BLUEBERRY PRODUCTION REPORT.

Chris Jordan, PEI Department of Agriculture, PO Box 1600, 440 University Avenue, Charlottetown, PEI, C1A 7N3.

The 2008 blueberry crop in PEI had a good start with the application of Bravo (chlorothalonil) to sprout fields in 2007. An excellent bud count was well protected with lots of snow covering fields in late fall/early winter. This resulted in below average winter kill in most regions of PEI. Spring had lots of long wet periods which produced ideal conditions for *Monilinia* blight infections. Despite the weather, growers were able to apply their fungicide sprays in a timely manner. Although some blight did show up in some fields, there was surprisingly very little damage this year due to *Monilinia*. The amount of blossom on the fields was impressive. Unfortunately, cool wet weather in early May resulted in poor pollination in early fields. Some *Botrytis* was also present. Mid-to late-fields did have better pollination weather which resulted in good fruit set for those regions. Growers continue to struggle with a shortage of honey bee colonies. This shortage is supplemented by the use of leaf cutter bees and bumble bees. Above-average rainfall in August and September made the blueberry harvest extremely difficult. Reports of crop loss have been documented due to heavy rains beating the berries off the vines, or fields which were too wet to harvest prior to berry drop. These conditions resulted in PEI producing 9.8 million lbs of wild blueberries in 2008. This is a significant increase over the 2006 crop at 8.4 million lbs (same crop cycle) and 17% higher compared to the 2007 crop (8.3 million lbs). The five year running average for PEI is now 8.6 million lbs.

NEWFOUNDLAND BLUEBERRY PRODUCTION REPORT

Jane White, Fruit Crop Development Officer, Department of Natural Resources

2008's long winter made for a late spring for most parts of Newfoundland and Labrador. The bloom was excellent all over the province but weather conditions, pollination issues, diseases and a high population of blueberry leaf-tier all played a part in decreasing the yields on farm this season.

As well the yields from the wild pick areas have decreased over the past ten years due to the lack of harvesters required to hand rake the crop and the wild pick areas, especially the public blueberry management units, have grown up to different woody succession plants such as alders/pin cherry etc. Harvesters involved in the wild pick are finding they have to go farther and farther to get any amount of berries.

The total wild blueberry crop is 650,000 to 680,000 lbs. The blueberries are harvested equally from managed and wild picks.

NEW BRUNSWICK BLUEBERRY REPORT 2008

Michel Melanson, Crop Development Specialist, New Brunswick Department of Agriculture and Aquaculture, P.O. Box 6000, Fredericton, NB, E3B 5H1.

The 2007 vegetative fields looked very good in the fall of 2007. The fruit bud number was good and little to no winter injury was observed because of the thick snow cover. Deer have caused significant damage to some fields. The snow stayed late in the spring causing delays on the spring pruning operations. Monilinia and botrytis blight pressure was low this past year. Valdensinia leaf disease was noted in a number of fields. Tip midge, as previously reported was not as prevalent this past year. The chainspotted geometer was also identified a few fields. Major weed problems this year included witch grass, tickle grass, sheep sorrel, and a host of other common weeds. Burnweed was also identified in blueberry fields. The season began in dry conditions. The month of the June and July were dry in the southern region, but wet in the Northeast. Beginning in late July, the weather became wet and stayed wet through early harvest. The rainy weather conditions delayed the harvest and made harvesting difficult at the beginning. Many of the fruits were damage because of splitting or falling to the ground before being picked of the stems.

The final crop is estimated to be 33.6 M lbs of wild blueberries in 2008. This is a record crop, surpassing the previous record of 26.1 M in 2007 and 60.1% higher than the 2006 crop of 20.9 M lbs (same cycle). The Northeast region of NB harvested 64% of the total crop, 8% larger than in 2007.

The NB department of Agriculture and Aquaculture collaborated on a number of activities this past year. Regional meeting were organized in the spring, an Annual Field Day was organized in July, and research plots were established. A biweekly crop update was published by the department and available of the web site.