

Agroforestry *Update*

June 2007

**British Columbia
Agroforestry
Industry
Development
Initiative**

Also In This Issue:

News and Events	4
Hawthorn Update	5
Birch Workshop	6
Publications Available	7

Research Underway to Establish a Truffle Industry in British Columbia

Truffles are the edible fruiting bodies of fungi that form ectomycorrhizal associations with tree roots (a symbiosis between the fungi and tree roots). Truffles are an extremely valuable gourmet food, garnering as much as \$1,700 per kg. The Perigord black truffle (*Tuber melanosporum*) was originally produced in France and Italy in oak forests. Techniques for successful truffle propagation have since been employed elsewhere in Europe, New Zealand, Australia, and parts of the United States. Truffle orchards have not previously been attempted or established in British Columbia (BC) within a research context, although anecdotal evidence indicates that some individuals have already planted inoculated host trees. The climate in areas where Perigord truffles are successfully grown suggests that parts of the southern interior and southwestern BC should be suitable for their production.

With support from the BC Agroforestry Industry Development Initiative, the Truffle Association of BC (TABC) is conducting a research and development program to determine whether a Perigord black truffle industry can be established in BC. TABC is a registered non-profit organization dedicated to education, research, and commercial development of culinary truffles and other edible fungi such as chanterelles, cèpes, and pine mushrooms. The Research and Development Committee of the TABC will manage and deliver the project. The Committee consists of Dr. Shannon Berch, Adjunct Professor in Agroecosystems at the University of BC, Wayne Haddow, Sharmin Gamiet of Mycology Resources, and Quentin Wyne of Oyama Gardens.

In the Sarrion region of Spain it has been estimated that truffières produce between 10 and 60 kg/ha annually, returning approximately

\$2,900 to 17,000/ha/year (Samils 2002). Production variability, and thus the wide range of returns in Spain, are possibly due to a lack of management plans or cultivation guidelines. This project will assist the growth of a truffle industry in BC through developing information and protocols to manage establishment risks and provide quality assurance to both producers and consumers of truffles.

Truffle orchard establishment costs are relatively high, and the initial production returns may take 8 to 10 years after planting. It is therefore essential that the truffle fungus remains dominant on the host trees during this development period to avoid costly replanting. Monitoring is being conducted at two phases to ensure that the fungi are correctly identified and that Perigord black truffles dominate the root systems at establishment and over time.

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Truffles *continued*

“Truffles are an extremely valuable gourmet food, garnering as much as \$1,700 per kg.”

The first phase occurs during the inoculation of new commercial tree stock with the truffle fungus and then monitoring their development on oak or hazelnut roots from initiation to time of planting. Identification will be conducted both morphologically, by comparing the structure and anatomy of ectomycorrhizas with published descriptions, and molecularly, by analyzing DNA sequence information. The identification work will be conducted in collaboration with Dr. Dan Durall, Associate Professor in Biology at the University of BC, Okanagan campus. The second phase of monitoring will assess fungal abundance once planted in the truffle orchards. The orchard soils will also be monitored in this phase for characteristics essential for truffle development: pH, organic matter, as well as major and minor nutrients (especially calcium, nitrogen and phosphorus). The information gathered in both phases will be used to develop best practices guidelines on inoculation and monitoring, as well as creating a framework for monitoring soil conditions

and abundance of the inoculated fungus in BC truffle orchards.

Another goal of the monitoring work is to develop a certification process for the verification and classification of truffle species for subsequent quality-assurance reporting to industry and consumers. For marketability of the truffles it is essential that the original spore inoculum can be confirmed as that of *Tuber melanosporum* not one of the less valuable truffles that can easily be confused with it if appropriate protocols are not followed.

The Perigord black truffle is not native to BC nor are its hosts (European hazels and oaks), although the host tree species have already been introduced and grown in BC for over a century. To minimize the risk of disease transfer, especially that of hazelnut blight, TABC is conferring with the Canadian Food Inspection Agency to ensure that inoculated tree stock imported for this program does not introduce any pests or diseases. Information from the monitoring will be used to develop and publish a plant health protocol in consultation with the hazelnut prod-

ucers of BC. Experience with truffle introductions into New Zealand and Australia has shown that *T. melanosporum* is not an aggressive competitor and therefore it is unlikely that it will migrate from the truffle orchards where they are introduced. In fact, BC has hundreds of native ectomycorrhizal fungi species and they pose a greater threat to invade the truffle orchards and displace the *Tuber* species. Steps are being taken however, to ensure there is little or no movement of the truffle fungi out of, or native ectomycorrhizal species into, the truffle orchards. For example, the demonstration truffières are being established far enough away from other ectomycorrhizal trees such that their root systems won't overlap and fungi can't move from root to root. Moreover, to give the Perigord truffle a competitive edge against native fungi in the truffle orchards, the soil pH is being raised to about 7.8. BC soils are not commonly alkaline and most native fungi of BC are adapted to acidic to neutral soil conditions.

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Truffles *concluded*

In addition to the work on the cultivation of truffles, this project will also investigate other tangible benefits from agroforestry production including gains in wood or nut production on the host trees supporting the symbiotic truffle fungi as well as agritourism opportunities related to integrating truffle and wine production.

Research and development will be carried out initially by collaboration with three producers on Southern Vancouver Island, the lower Mainland, and in the Okanagan (Dave

Lestock - Kay, Duncan, Quentin Wyne, Oyama, and Sharmin Gamiet Abbotsford). A demonstration and research truffière is also being established at the University of BC's South Farm in Vancouver with the assistance of Dr. Art Bomke and Mark Bomford, allowing for future workshops and tours with access to the University's other facilities. In addition, professors, researchers, undergraduate and graduate students who are participating in the project

as it develops will have easy access to this site.

It is hoped that in time this project will lead to the development of a new, sustainable agri-business opportunity in the province, with resultant economic development and job creation benefits.

Literature cited

Samils, N. 2002. The socioeconomic impact of truffle cultivation in rural Spain. Masters thesis, Department of Forest Mycology and Pathology, Sveriges Lantbruksuniversitet.

For more information on this project or to become involved in the truffle development research, please contact the Truffle Association of BC:

Sharmin Gamiet:

sgamiet@incentiveaccess.com



Research and development work is underway to test the viability of establishing a Perigord black truffle industry in BC.

Announcements and Upcoming Events

A reminder that next **deadline** for letters of intent and applications to the British Columbia Agroforestry Industry Development Initiative is **Wednesday, August 15, 2007**

Tour: Agroforestry Potential for the Peace

August 22 - 23, 2007.

Two days of field tours will highlight alley cropping and other agroforestry opportunities for the Peace Region. Several invited speakers will provide presentations at the stops on the tour. Topics covered will include: a general introduction of agroforestry systems; setting up and managing a poplar/aspen intercropping operations; how carbon sequestration and credits integrate into business planning; and, alternate crops for intercropping and other agroforestry production systems. Tour stops will include the Doig River First Nation alleycropping demonstration project, the BC Grain Producers variety trials near Fort St. John, hybrid aspen trials, and the Murdoch Lake Agroforestry Demonstration near Manning, Alberta.

For more information, please contact:

Kathi Zimmerman
kathi@mcgregor.bc.ca

or

Dan Lousier
whiskeyjackscience@telus.net

McGregor Model Forest Association, PO Box 2640, Prince George, BC V2N 4T5, Tel: (250) 612-5840

Registration form and full agenda are available at:

www.mcgregor.bc.ca

Workshop and Tour: Agroforestry with Native Shrubs

The **Federation of BC Woodlot Associations**, on behalf of the Agroforestry Management Committee, is pleased to host a workshop and tour focused on Agroforestry with Native Shrubs, **Wednesday August 1 and Thursday, August 2, 2007 in Vernon.** Come and learn about the exciting opportunities for diversification of your agricultural or woodlot enterprise, as well as the conservation and environmental benefits of adopting agroforestry practices. The workshop will highlight leading-edge information on emerging berry crops in North America, as well as harvesting / processing technology, natural health products from shrubs, good agricultural practices and food safety. The tour will visit demonstrations in

the North Okanagan and West Kootenay that are using native shrub species for conservation and production.

Agenda and registration forms are available on the BC Agroforestry Initiative website:

www.woodlot.bc.ca/agroforestry/news.htm

Space is limited; your registration by Friday July 27 is appreciated.

For more information, please contact:
agroforestry@uniserve.com

Kootenay Silvopasture Demonstration Tour

Kootenay Tree Farms invites you to a free Christmas tree agroforestry production area tour located in the beautiful East Kootenay. **DATE: Aug 20, 2007** **TIME: 8:30 AM, PLACE: Start of Prichard Road, 10 KM east of Cranbrook.** Bring your own lunch and transportation. For full details or to RSVP your attendance, please phone Charlie Willis at (250) 489-4887 or email kootenaytreefarms@shaw.ca

Hawthorn Agroforestry Trial Update

By **MARILYN TAYLOR**
and
JEANETTE LEE

The West Kootenay Herb Growers Cooperative (WKHGC) kicked off the Hawthorn Farm Trial project in 2005 (see *Agroforestry Update* June 2005). Since then, much has happened and the project has attracted attention from a variety of disciplines. Three demonstration sites have been fully planted. The native *Crataegus douglasii* was planted last year. This year, *C. columbiana*, and two medicinal species, *C. laevigata* & *monogyna*, went into the ground.

In developing best practices for growing hawthorn, test plots were established to monitor effects of irrigation, soil amendments, and pruning techniques. One soil treatment simulates pear orchard

conditions (hawthorn is used as rootstock for pear trees) and a second mimics conditions for raspberry cultivation (hawthorn is often found with raspberry in the wild).

Over 200 flower, leaf and berry samples were gathered in the Thompson-Okanagan and West Kootenays and are being evaluated to see if geographic influences affect hawthorn chemistry. The WKHGC are also test - propagating specific hawthorns that exhibit higher chemical bioactive levels.

The BC Institute of Technology's Herbal Evaluation and Analysis Laboratory (HEAL) has completed a qualitative chemical analyses focusing on key flavonoids and compared native and medicinal hawthorn species. Early results show BC's native plants compare

favourably to the medicinal species. HEAL is now performing full chemical fingerprinting and evaluation of the native hawthorns.

Species identification is crucial for natural health product manufacturers, but hawthorn is a challenging group, taxonomically. Dr. T. A. Dickinson, Curator of the Royal Ontario Museum, a recognized authority on the hawthorn group, is providing valuable expertise on identification for this project.

The first demonstration tour, held last year, was well received. This year the WKHGC is participating in the native shrub workshop, August 1 & 2 in Vernon, with tour stops at the hawthorn trial sites in Edgewood. And, on August 3rd, the WKHGC teams up with the Central Kootenay Invasive Plant Committee to host a tour to the hawthorn trial sites followed by an agroforestry presentation.

For more information, please contact:

Jeanette Lee

West Kootenay Herb Growers Cooperative

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Dr. T. A. Dickinson examining freshly dried hawthorn samples at the West Kootenay Herb Growers Coop processing facility.

Birch Syrup Production Workshop and Training A Success

By **HELOISE DIXON - WARREN**

On April 21st the Quesnel Community and Economic Development Corp hosted a 1 - day workshop introducing participants to birch syrup production. In attendance were 30 registrants who came from throughout the province. The workshop provided an overview of the birch syrup industry, opportunities for development and the basic equipment and requirements for both backyard and commercial ventures. The group was also introduced to the importance of food safety as Russell Seltenridge, with Northern Health provided information on the Food Safety Initiative.

A panel discussion on birch syrup production and sugar bush management included Mike Mitchell, a teacher and producer from Hay River, Northwest Territories, who spoke about the rewards of incorporating birch syrup production into a First Nation student curriculum. Other panel members were Karen Alphonse of Sweet Tree Ventures (Williams Lake), Ted Traer of Moose Meadows Farm (Quesnel) and George Powell with the BC Agroforestry Initiative.

Following lunch, the participants travelled to Moose Meadows Farm to visit an operating "sugar bush" and observe a commercial evaporator and birch tapping. The field portion also included sampling of birch sap wine from Newfoundland (Sap World Inc.) and birch syrup from Quesnel (Birch Place Farm, Moose Meadows Farm), Williams Lake (Sweet Tree Ventures), Hay River, NT and Alaska. Other tree sap products were also sampled including Big Leaf maple syrup and Big Leaf maple wine from Vancouver Island.

The production of birch syrup is rewarding but it can be challenging. There are no standards in Canada, a limited amount of technical support. Until the recent development of the Birch Syrup Production Manual, most technical literature was geared towards the sugar maple industry. Unlike sugar maple, which has a ratio of 40 litres of sap to 1 litre of syrup, the ratio for birch is 80 to 120 litres of sap for every litre of syrup. As such, there is a substantial amount of evaporation that must be done in order to produce birch syrup. The sugars in

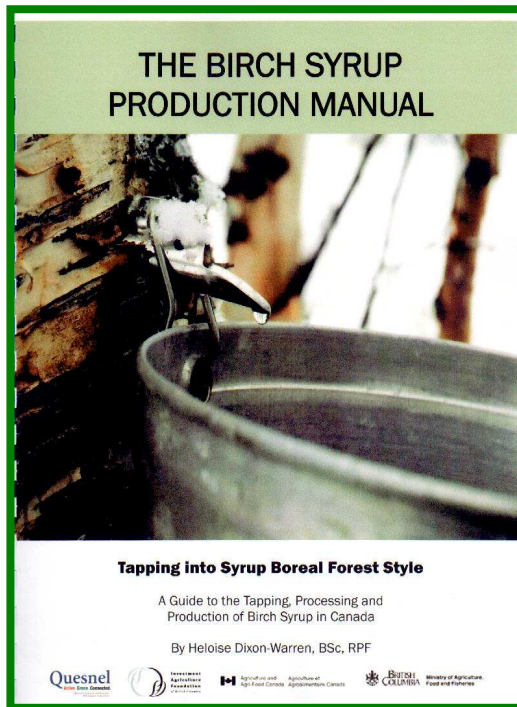
birch sap are primarily fructose and glucose which have a much lower scorching temperature than those in sugar maple. Because of this, as birch sap becomes increasingly concentrated, low temperature evaporation is needed to successfully produce syrup.

The opportunity for industry expansion is recognised. Birch syrup is a unique product and birch syrup makers are capitalizing on the premium price their product can command in the market. Among the 11 commercial producers in Canada (3 in BC), birch syrup retail prices range from \$13.50 to \$25.00 / 250 ml with one producer stating that they sold 1 litre of 100% pure birch syrup for \$100.00. All of the current producers state that demand exceeds supply and as such, they all sell out of their product annually.

Sponsors of this workshop included the BC Agroforestry Industry Development Initiative, Dominion & Grimm Inc., School District 28, Sap World Inc., Timber-Wine Company and Sweet Tree Ventures. For information on the 2008 training workshop, contact Heloise Dixon-Warren, RPF at: (250) 249-5329 or mmfarm@goldcity.net

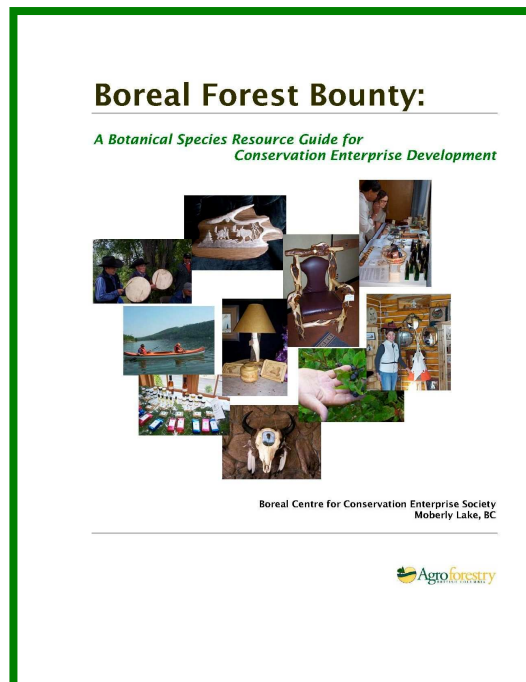
"All current producers (of birch syrup) state that demand exceeds supply and as such, they all sell out of their product annually."

Agroforestry Publications Available



The Birch Syrup Production Manual is the first of its kind in Canada. The manual is a comprehensive overview of the birch syrup industry and includes sections on tree identification, sugar bush management, tapping guidelines, syrup processing and packaging, marketing and food safety. Copies can be purchased from the Quesnel Community and Economic Development Corp.: www.quesnelinfo.com or contact April Cheng at (250) 992-3522.

Boreal Forest Bounty is a guide to 30 non-timber boreal plants with market potential through value-added processing. Each profile includes detailed information on species descriptions, commercial uses, First Nations' uses, environmental sensitivity, markets and prices, cultivation and harvesting, processing technology, and regulations. Copies can be ordered from the Boreal Centre for Conservation Enterprise, at (250) 788-9635, theborealcentre@hotmail.com, or mail Box 285, Moberly Lake, BC V0C 1X0



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If you have suggestions for future editions of the *Update* or know of an event that should be included, please let us know.



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