

## Establishing Perigord Black Truffle Production in BC

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 part of the southern interior and southwestern BC should be suitable for truffle 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 PhD, PAg, Adjunct Professor in Agroecosystems at the **University of BC**, Wayne Hadow PAg, Sharmin Gamiet of **Mycology Resources**, and Quentin Wyne of **Oyama Gardens**.

In the Sarrion region of Spain it has been estimated truffières can 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 producers and consumers of Perigord black 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 in this research at two phases to ensure that the fungi are correctly identified and that Perigord black truffles dominate on the root systems at time of establishment and over time. 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 UBC-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 the 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 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 producers 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 mycorrhizal fungi can't grow from root to root. Moreover, to give the Perigord truffle species a competitive edge against native fungi in the truffle orchard, 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 and soil conditions.

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.

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