



Forest Ecosystem Science Co-operative Inc.



Forest Genetics Ontario

Forest Co-op
“FGO – Field Guides”

Final Report

Living Legacy Trust
(LLT Project No. 04-014)

January 30, 2004



Forest Ecosystem Science Co-operative Inc.

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The Forest Ecosystem Science Co-operative Inc. (Forest Co-op) is an incorporated not-for-profit co-operative which, in this case, is representing Forest Genetics Ontario (FGO), also a not-for-profit corporation with a mission to promote the conservation of genetic diversity in trees while supporting economic development by enhancing the productivity of forests through tree breeding. There are three (3) incorporated regional associations under the FGO umbrella; Forest Gene Conservation Authority (FGCA), Superior-Woods Tree Improvement Association (SWTIA) and Northeast Seed Management Association (NESMA). Forest Genetics Ontario and the Ontario Ministry of Natural Resources have partnered in the Forest Co-op “FGO - Field Guides Project”.

The Forest Co-op “FGO - Field Guides Project” involves the development and production of two field guides to support the delivery of second generation tree improvement efforts. The two field guides are:

- 1) “Field Guide to Seed Orchard Establishment & Management” - (“Field Guide No. 1”)
Most of the first generation tree improvement programs in Ontario are nearing completion of the testing phase of the breeding cycle. With the completion of the testing phase, the focus of first generation tree improvement is shifting to seed production.

FGO is promoting the development of orchard-specific management plans that identify seed production goals (both in quantity and quality), and a schedule of management activities to reach those goals. Such plans could include identifying and focussing management activities on portions of the individual orchards that are least susceptible to pollen contamination, and identifying the elite trees (highest level of genetic improvement) within the orchard for separate cone collections.

Perhaps the biggest challenge to implementing these orchard management plans is the lack of full-time seed orchard managers. Seed orchard management activities in Ontario are generally done either under contract, or are assigned as one element of industrial staffs’ overall duties. Consequently, there is a need for field manuals to provide guidance to technical staff on how to implement each aspect of a seed orchard management plan.

The objectives of “Field Guide No. 1” were to develop a field manual for technical personnel that would:

- provide step-by-step procedures for each activity associated with management activities required to promote optimum seed production in first generation orchards and
- guide the development of a database regarding seed orchard management actions.

2) “Field Guide to Second Generation Progeny Test Establishment and Management” (“Field Guide No. 2”)

The goals of progeny testing within an advanced-generation tree breeding program include:

- a) improved estimates of the relative “breeding value” (ie. level of genetic superiority for specific traits) of parents,
- b) identification of progeny within estimated breeding values that are superior to parental breeding values, and
- c) estimation of various statistical parameters that are required to estimate the level genetic improvement in target traits at harvest age, and develop breeding strategies for the next generation breeding.

Once progeny tests are established, the key determinant of the quality of breeding value estimates (both parental and progeny) and parameter estimates is the attention paid to managing tests to promote the expression of the inherent variation in target traits. In Ontario, the primary focus is on improving the growth rate. Competing vegetation can delay the expression of inherent growth potential. Severe damage or stress can also prevent the expression of variation in growth potential. Various pests (eg. white pine weevil, spruce budworm) have caused considerable damage. Indeed, damage due to pests has been an important factor in depressing the estimated level of genetic improvement in the first generation tree improvement programs.

As with seed orchard management in Ontario, progeny test management activities in Ontario are generally done either under contract, or are assigned as one element of industrial staffs’ overall duties. Consequently, there can be significant turnover from year to year in the technical staff assigned to maintain progeny tests.

The objective of “Field Guide No. 2” was to develop a field manual for technical personnel that would:

- outline the timing of management activities required to promote high-quality information from second generation progeny tests
- provide step-by-step procedures for each activity associated with progeny test establishment and management and
- guide the development of a database regarding progeny test management.

The Forest Co-op FGO-LLT Field Guides Steering Committee was the review team for both “Field Guide No. 1” and “Field Guide No. 2”. The Steering Committee is comprised of:

- Paul Poschmann, Forest Co-op Chair and FGO Director
- Brian Nicks, Forest Co-op Director & FGO Vice-Chair
- Bill Thornton, FGO Chair
- Dianne Miller, Forest Co-op General Manager

with the assistance of Technical Review resources which included but were not limited to:

- Dennis Joyce, OMNR
- Paul Charrette, Superior-Woods Tree Improvement Association, Tree Improvement Specialist
- Randy Ford, Northeast Seed Management Association, General Manager
- Barb Boysen, Forest Gene Conservation Authority, Forest Resource Management Specialist.

OVERVIEW OF ACTIVITIES & ACHIEVEMENTS

“Field Guide to Seed Orchard Establishment & Management” - (“Field Guide No. 1”)

In November 2001, under a “Collaborative Research Agreement” with Canadian Forest Service, Dr. R. F. (Ron) Smith was contracted to produce “Field Guide No. 1”. Dr. Smith co-authored “A Manual for Forest Tree Seed Orchard Management in the Maritimes” in 1988. New information, with an emphasis on synthesizing Ontario information, was incorporated into the “Field Guide No. 1”.

The general process followed for development of “Field Guide No. 1” was for Dr. Smith to produce the first draft, have it reviewed technically and then, when appropriately re-drafted, send it to Ontario for review by the Forest Co-op FGO-LLT Steering Committee. (This was done on a chapter by chapter basis for all nine chapters and related appendices.) Because the principle audience for this publication is to be orchard managers in northern Ontario, this two-tiered approach was recommended. This was particularly important for several chapters that required specific inputs from Ontario (e.g. some computer programs recommended by OMNR, recommended areas for establishing orchards, as well as integrating recommendations from some research conducted in Ontario). Once the process of obtaining inputs from different individuals / groups was underway, and the content plan grew to include an addition of two new chapters, it became very apparent that the original target date for completion of this field guide (March 31, 2002) was overly optimistic and unrealistic and was revised to mid-year 2003 (which also became a challenge). By January 2004, “Field Guide No. 1” was ready for printing and publications were ready for distribution early February 2004.

“Field Guide to Second Generation Progeny Test Establishment and Management”
(“Field Guide No. 2”)

A “Request for Proposals” to develop “Field Guide No. 2” was issued by the Forest Ecosystem Science Co-operative Inc. in July 2002 and, in late September, KBM Forestry Consultants Inc. was chosen as the project contractor. The KBM consulting team was led by Rod Seabrook, senior consultant. Work commenced on this project early November 2002 and the text of the field guide was complete by April 2003. Through the summer months, photography work was undertaken and, document design and layout completed. By the end of the September 2003, “Field Guide No. 2” was ready for printing and the publication was available for distribution by the end of October 2003.

SUMMARY

“Field Guide to Seed Orchard Establishment & Management” (“Field Guide No. 1”) and distribution by mid-February. “Field Guide to Second Generation Progeny Test Establishment and Management” (“Field Guide No. 2”) are now available. We are very pleased with the calibre of work, due diligence expended and quality of product that has been afforded these two initiatives. It has been noted in past reports that the original timeframe was far too ambitious for both field guides but the additional time has been well invested in the excellence of the finished documents which have been delivered within the original cash budget. Once again, we would like to take this opportunity to thank the Ontario Living Legacy Trust for their support of these projects.

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