PlantPlan Genetics

SOUTHERN TREE BREEDING ASSOCIATION

PRESS RELEASE

Subject: **TREEPLAN success in Sweden**

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The following report by Dr Rosvall (as Research Director) summarised some experiences of Skogforsk (www.skogforsk.se) when introducing the TREEPLAN genetic evaluation system into their tree improvement programs in Sweden.

Extract of final report of the Association 'Skogsträdförädlings' grants for Forestry Research for introducing TREEPLAN in breeding work

Dr Ola Rosvall Skogforsk, Sweden 1 February 2012

During 2007 to 2012, with strong support of Föreningen Skogsträdsförädling, Skogforsk introduced the TREEPLAN® system to operational breeding in Sweden. TREEPLAN® is an advanced computer application comprising software and databases for analysis of genetic field-trial data. The TREEPLAN® system is provided by Australia-based PlantPlan Genetics Pty Ltd, which was also our collaborator in this major project.

Ultimately, the TREEPLAN®-system is designed to combine all information collected from the genetic field testing, past, present and future. In this way, estimates of breeding values will always be the best possible and accurate. A breeding value is a prediction of the genetic effect of a tree inherited by its progeny. It is used to select superior trees for breeding the next generation or to be used as parents in seed orchards. When estimating breeding values by TREEPLAN®, all information is used in an optimal way considering accuracy of the various data and considering the economic values of the different selection criteria.

In addition, the system allows estimating the performance of trees outside the actual area where they have been tested, provided that field experiments are linked together by relationships among trees or by common test sources. This will expand the base for selection and result in greater genetic gain.

With all data in the database and established routines for analysis, breeding values can be updated at any time, e.g., when new measurement data are added from existing or new field experiments, or when the economic value of a tree character is reassessed. It facilitates a "rolling-front strategy" that continuously updates which trees are the best for various purposes. This preparedness makes it easy to consider a specific request from any forest enterprise.

The operation to introduce the TREEPLAN®-system involved collating measurement data for all trees in all genetic field tests together with the kinship of the trees. The initial analysis of these data generated basic knowledge about the tree species, e.g., the general extent of genetic and environmental variation of various characteristics and how these co-vary. This information is then used when estimating breeding values.

Although the data-registration process was more extensive than anticipated and the objective of that part was not fully achieved, the project has been successful. An adequate number of trials have been assembled to support effective selection for planned breeding and seed orchard establishment. An example demonstrates that selection to a seed orchard resulted in almost 3 % greater production per ha, which is a 20 % increase in selection efficiency.

The result of the work is also a unique genetic survey of our tree species and how characteristics are expressed under different soil and climate conditions. This has a scientific value in its own right, aside from the improvement realized in breeding value estimates.

The introduction of TREEPLAN® has demanded and resulted in a comprehensive development of competence among Skogforsk personnel. The TREEPLAN®-system has been a driver for greater cooperation and co-ordination of operational breeding and of the supporting research and development. This has focused attention on key development issues. Research and development has also benefited from a broader international view. In this way, the TREEPLAN®-system both directly and indirectly has contributed to a more efficient breeding program. With TREEPLAN® as a key element of the breeding program, this development will continue.