

Progress Report

Conifer Translational Genomics Network

Y1Q1 – October 1, 2007 to December 31, 2007

General Progress: The CTGN (Conifer Translational Genomics Network) officially started October 1, 2007 as part of NRI's CAP program. Pre-start activities included a reverse site visit to CSREES headquarters in Washington DC, negotiated changes to the original proposal, and a kick-off team meeting in College Station, Texas, in early September. The next annual meeting of the team was scheduled for the first week of June, in Raleigh, NC. First year funds ultimately reached the lead institution (UC Davis) in late December, and efforts are currently underway to develop sub-contract awards to collaborating institutions. A project coordinator (Andrew Bower) was hired and started January 7, 2008.

Objective 1: Validate previously discovered SNP by trait associations in Cooperative operational tree improvement populations.

University of Florida – Open-pollinated progeny of the pseudo-backcross (slash pine X loblolly pine) X slash pine, and the slash and loblolly ancestrals (parents) were established on a test site at High Springs, FL, in December 2007 (see photo). This plantation will provide experimental material for tracking performance of loblolly SNP alleles in the backcross population.



Texas A&M University - A preliminary field trial was conducted to evaluate an indirect method for measuring wood stiffness: the acoustic sampler or Time of Flight method. Trees sampled with the acoustic method were also cored to provide wood stiffness measures using traditional methods. The success of this trial will determine if the acoustic approach will be satisfactory for large scale data collection. A part-time post-doctoral position has been offered to Daniel Chmura to work on the CTGN project.

Oregon State University - Recruitment for a post-doctoral research associate and a graduate research assistant was initiated, and negotiations are currently underway to hire a candidate for the former position.

North Carolina State University – Josh Steiger was hired to fill the CTGN technician position, and he is now working to streamline the sample collection and processing methods to be used for phenotypic analysis of wood samples. An announcement for a graduate student assistantship in Molecular Tree Breeding has been circulated to the international forest tree breeding, quantitative genetics, and population genetics research community. Applications are currently under review. Foliage samples have been collected from 225 individual trees for future DNA isolation and SNP genotyping. Planning is underway for additional sample collection for the remainder of the sample set during the 2008 growing season.

University of California at Davis – The first-ever trial of the Illumina Infinium platform with plants was completed in December with a 7,600 pine SNP array. SNPs were generated by the ADEPT2 SNP pipeline. Conversion was an outstanding 80%. We anticipate the operational Infinium run to include 21K SNPs. Planned genotyping activities over the next quarter include completion of two pre-existing loblolly pine mapping populations and two association populations.

Planning is well underway for the creation of a high-throughput DNA extraction and sample preparation lab to be housed in the UC Davis Genome Center. Anticipated start-up is early Spring.

Objective 2: Develop and economically evaluate new methods incorporating marker-assisted selection into conifer tree breeding programs.

Tom Byram and Nick Wheeler attended a 2.5 day workshop on the application of Simetar, a software add-on to Excel that facilitates “simulation and econometric models for probabilistic forecasting and risk analysis”. It is anticipated the software will be used to project most likely outcomes of MAS. Another 1.5 days have been spent scoping the likely models or scenarios for MAS/MAB application in tree improvement.

Objective 3: Develop databases (TreeGenes) and web-based tools to facilitate all aspects of the CTGN project.

Jill Wegrzne was hired as a full-time programmer (Level 5) and will be moving to Davis shortly. Recruitment is underway for a database manager and a lower-grade programmer. A CTGN website is up and running, and planning is underway to convert web and wiki sites currently being used to a Plone platform. Conversion schedule is uncertain.

Pipelines for handling the large databases that will be generated by this project continue to be developed, building off of the progress made by earlier projects (ADEPT2).

Objective 4: Develop an international genetic stock center for conifers.

Planning is underway for archiving live plant materials, as clones, in Mississippi and Oregon. Plans for establishing new freezer and frig farms at Davis to handle genetic reagents is also underway, with physical purchases anticipated in the second quarter of the project.

Objective 5: Develop an education plan for undergraduate and graduate curriculum in genomics-based breeding for forest trees.

A two-day planning meeting (Neale, Harry, Wheeler) was held at Placerville, CA in early October to outline the core curriculum of a 5-day workshop, anticipated to be held annually, starting the second year of the project. Key personnel have been working on workshop modules, developing back-ground materials and presentations. Oregon State University hired Dave Harry

and Nick Wheeler using funds advanced by the school in anticipation of sub-contract awards being made in the near future.

Objective 6: Develop an extension plan for continuing education in genomics-based breeding for practicing tree breeders and forest tree gene resource managers. Develop plans for extension evaluation of all activities.

Plans have been made and materials are being developed for a 1.5 day workshop to be held for all tree improvement cooperative personnel at the next annual team meeting (June, 2008).

Michael Coe was identified as a potential contractor to deliver our project extension and education evaluation services. Project personnel have met with Michael by phone and in person on several occasions to define our anticipated needs and timelines. For his part, Dr. Coe has provided us with an extensive working plan. He submitted a contract to UC Davis before Christmas and it is currently being processed. We are very excited to have Dr. Coe on the team.

The CTGN award was the focus of a number of news releases and web-postings. Complete URLs are listed at the end of this section. Click on the active links below to be taken directly to the relevant websites.

Capital Press: <[link to article at Capital Press](#)>¹

Oregon State University: <[link to OSU press release](#)>²

NRI CSREES: <[link to CSREES newsroom](#)>³

American Society of Plant Biologists <[public affairs news release](#)>⁴

US Forest Service Southern Research Station <[press release](#)>⁵

Pine Genome <[award announcement](#)>⁶

Project personnel have made a number of presentations to a wide range of audiences highlighting the proposed activities of the CTGN or essence of association genetics in plants/trees (Table 1).

Complete links

¹ Link is <http://www.capitalpress.info/main.asp?SectionID=67&SubSectionID=782&ArticleID=35778&TM=16126.53>

² Link is <http://oregonstate.edu/dept/ncs/newsarch/2007/Nov07/conifergenomics.html>

³ Link is <http://www.csrees.usda.gov/newsroom/news/2007news/coniferacap.html>

⁴ Link is <http://www.aspb.org/publicaffairs/research/conifer.cfm>

⁵ Link is <http://www.srs.fs.usda.gov/news/117>

⁶ Link is <http://www.pinegenome.org/ctgn/about.html>

Table 1. Extension, education and outreach presentations of the Conifer Translational Genomics Network (Q4, 2007).

Activity	Presenter/ Author	Title	Date & Location	Venue & Audience
Poster Presentation	Howe-Harry/ by Neale, D.B. et al	Conifer Translational Genomics Network	September 29, 2007. Seaside, OR	Annual Retreat, Center for Genomic Research & Biocomputing, OSU. About 50 OSU scientists and associates.
Oral Presentation	Harry, D.E.	Introducing the Conifer Translational Genomics Network: Goals and Extension Opportunities	October 17, 2007. Silver Falls Park, OR	Bi-Annual Planning Meeting, Oregon Forestry Extension. 21 extension foresters and administrative staff
Oral Presentation	Howe, G.T.	Introducing the Conifer Translational Genomics Network	October 22, 2007. Aurora, OR	Northwest Tree Improvement Cooperative Annual Meeting; 46 people, (Coop members)
Oral Presentation	Howe, G.T.	CTGN Field Activities	December 10, 2007. Vancouver, WA	Northwest Tree Improvement Cooperative Annual Meeting, December 10, 2007 (15 people): Coop members
Oral Presentation	Harry, D.E.	Understanding Biotechnology: Genomics and DNA markers	December 10, 2007. Salem, OR	67 th Ann. Meet. Oregon Seed Growers League. Approx. 120 attendees, comprising Growers, processors, distributors, breeders
Oral Presentation	Dudley Huber	The CTGN Project		Annual CFGRP (Cooperative Forest Genetics Research Program) Meeting. XXX attendees comprised of _____

Advisory committees have been populated for Science, Education and Extension (see Tables 2 - 5). All listed members have indicated a willingness to participate.

Table 2. Scientific Advisory Committee

<i>Scientific Advisory Committee</i>			
<i>Members</i>	<i>Email</i>	<i>Phone</i>	<i>Contact</i>
Jorge Dubcovsky	jdubcovsky@ucdavis.edu	530-752-5159	D. Neale
Ed Buckler	Ed.Buckler@ars.usda.gov	607-255-4520	D. Neale
Jack Dekkers	jdekkers@iastate.edu	515-294-7509	D. Harry
Hans van Buijtenen	Jpub@tamu.edu Jpseven2001@yahoo.com	979-846-7916	N. Wheeler

Table 3. Extension Advisory Committee

<i>Extension Advisory Committee</i>			
<i>Members</i>	<i>Email</i>	<i>Phone</i>	<i>Contact</i>
Jim Johnson	Jim.Johnson@oregonstate.edu	541-737-3700	
J.B. Jett	JB_Jett@ncsu.edu	919-515-2890	
Peggy Lemaux	Lemauxpg@nature.berkeley.edu	510-642-1589	

Table 4. Education Advisory Committee

<i>Education Advisory Committee</i>			
<i>Members</i>	<i>Email</i>	<i>Phone</i>	<i>Contact</i>
Bert Abbott	aalbert@clermson.edu	864-656-3060	
Toby Bradshaw	toby@u.washington.edu	206-616-1796	N. Wheeler
Bill Beavis	wdb@ncgr.org	505-995-4412	D. Neale
Steve Knapp	sjknapp@uga.edu	706-542-4021	D. Neale

Table 5. Stakeholders and Users Committee

<i>Stakeholders and Users Committee</i>			
<i>Members</i>	<i>Email</i>	<i>Phone</i>	<i>Contact</i>
Valerie Hipkins	vhipkins@fs.fed.us	530-622-2633	NW
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