



TREMBLINGS

NEWSLETTER & BULLETIN BOARD

Vol. 2(2), May 2011

“...partnering to preserve and restore healthy aspen ecosystems.”

NOTICE: The WAA is a user-driven organization. *Tremblings* will attempt to capture the greater aspen user group's wants and needs. Please send suggestions, contributions, **recent publications**, photos, and commentary ideas to Paul Rogers (p.rogers@usu.edu).

WAA HAPPENINGS

Editor's Comment—This issue of *Tremblings* surpasses all previous issues in length, activities, and recent publications....by far. It appears aspen science is on a lot of people's minds and we are doing our best to stay abreast of this surge. Happy reading!

New WAA Steering Committee member—Steve Kilpatrick is retiring from Wyoming Game & Fish and starting a new position at Teton Science School (<http://www.tetonscience.org/>). Steve brings a wealth of field experience in wildlife habitat and monitoring in the northern Rockies. In addition to advising the WAA, he will be working with Teton Science School on wildlife habitat curriculum and research. Steve has long held a passion for aspen habitat and we welcome his insights.

Aspen Bibliography reaches wide audience—The online Aspen Bibliography yielded a surprising level of use during a single 3-month sample period (Nov.-Jan., 2010-11): 32,125 cover page downloads; 517 full text downloads. To our knowledge, this is the largest online aspen-specific database in the world. You may access this resource by clicking “Search Aspen Literature” at: <http://www.western-aspen-alliance.org/>.

Aspen Restoration Guidelines—The “Guidelines for Aspen Restoration on the National Forests in Utah” was re-released in April due to some minor editing errors and oversights in the earlier version. If you downloaded a copy before April, please see the

updated (4/8/11 version) at the same WAA link: <http://www.western-aspen-alliance.org/pdf/AspenRestoration.pdf>. Hardcopy versions of the document are available from the WAA on a limited basis until supplies run out.

Aspen Exclosure Design & Construction—Friends of Northern Arizona Forests has produced a step-by-step guide to erecting fencing for the purpose of excluding browsers of aspen and other understory plants. While building more than 6.5 miles of fencing FoNAF devised more efficient and durable fencing techniques. Copies of “Raising exclosure fences efficiently” can be obtained here: <http://www.friendsofnorthernarizonaforests.org/>.

Click on "Aspen Program," next click on "Exclosure Maintenance" in the sidebar, and then follow the second paragraph to the file download.



Richie Gardner (Utah State University, MS Candidate) uses a catapulting device for genetic sampling of out-of-reach aspen canopy leaves on Cedar Mountain, southern Utah, USA (Photo: Karen Mock).

Bark Beetle, Climate, Aspen—This episode of KPCW's (Park City, Utah, USA) *This Green Earth* was all about climate change, bark beetles and the changing face of western forests. Liz



TREMBLINGS

NEWSLETTER & BULLETIN BOARD

Vol. 2(2), May 2011

Hebertson (US Forest Service, Entomologist) discusses the status of several species of bark beetles that affect our trees and the reasons why these native species are now causing trouble. Paul Rogers (USU, Western Aspen Alliance) addressed Sudden Aspen Decline, what is causing this phenomenon, and what we can expect to see for this Western icon in future years. Follow the link: <http://www.western-aspen-alliance.org/?include/media.html>

Colorado Plateau landscape. Contact Paul Rogers for further details: p.rogers@usu.edu.

Root Development Symposium—6th International Symposium on Root Development: adventitious, later, and primary roots. August 7-11, Amos, Quebec, Canada. A mixture of basic and applied science will focus on root development research with model plant species as well as those with applications in horticulture, agronomy, forestry, and general ecology. See details at: <http://root2011.uqat.ca/travel.asp>.

UPCOMING EVENTS

Mountain Pine Beetle/Aspen Dynamics Workshop—This event has been **CANCELED**...but the WAA is looking into opportunities to revise the field trip and discussion later this year or early next. The interaction of disturbances in these two key western forest types, with ramifications for climate change, are simply too important to forget. Potential sponsors interested in reviving this excursion/discussion should contact Paul Rogers (p.rogers@usu.edu).

8th North American Forest Ecology Workshop—This biennial conference brings together forest ecologists from Canada, Mexico, and the United States to share recent research advances and participate in day-long field tours of local forests. Abstracts may be submitted for oral and poster presentations until March 22, 2011. The conference will be held at the Hotel Roanoke and Conference Center, in Roanoke, Virginia June 19-23. Further details may be found at: <http://www.cpe.vt.edu/nafew/>

Monroe Mountain Field Trip—The Utah Forest Restoration Working Group and Fishlake National Forest will be sponsoring a July 6-7 field trip to explore aspen conditions, past treatments, and related browsing issues across this high elevation plateau. The Monroe Mountain Project is a collaborative process involving a wide range of interest and user groups with a mission of agreement on sustainable aspen communities on this large

COMMENTARY

Landscape genetic studies raise new questions about old paradigms

Karen E. Mock, Associate Professor, Dept. of Wildland Resources, Utah State University, Logan, Utah.

James N. Long, Professor, Dept. of Wildland Resources, Utah State University, Logan, Utah.



Conventional wisdom on the management of aspen is based on a long history of solid research and a wealth of practical experience. However, recent discoveries using molecular tools are changing our understanding of aspen regeneration ecology in ways that could change management practices. Our traditional view of aspen dynamics is that aspen forests consist of small numbers of large clones, that reproduction from seed is negligible, and has been so since perhaps the Pleistocene, and that aspen is best regenerated by coppicing. According to this traditional view, aspen cannot effectively be re-established once it is lost from a landscape, and the decline of genetic diversity over time is inevitable. Consequently, the management of western aspen has been focused on vegetative regeneration (suckering), and genetic diversity has never been a major management concern.



TREMBLINGS

NEWSLETTER & BULLETIN BOARD

Vol. 2(2), May 2011

Research at Utah State University is beginning to challenge some of this conventional wisdom (Mock et al. 2008): the number of clones in western landscapes is much higher than predicted from coarse morphological differences (e.g. fall color or stem and leaf morphology), patterns of diversity are patchy, and most clones are in fact not very large at all. Even the contiguous stand containing the famed "Pando" clone in Utah contains at least 52 other clones, all clustered around the edges of Pando! Our continuing research in other parts of Utah and Colorado is showing that patches of remarkably high genetic diversity are quite common, often with individual clones represented by only one or a few stems. This pattern is consistent with the recurring observations of aspen seedlings emerging in post-fire environments, where such events would be most easily detected. These findings suggest that episodes of sexual reproduction are much more common than previously thought and that genetic diversity, both within landscapes and within stands, is unexpectedly high.

The genetic diversity that comes from a seeding event is disproportionately important to long-term aspen persistence; genetic recombination followed by natural selection will allow aspen as a species to adapt to changing climates and other environmental challenges. The more genotypic combinations natural selection has to work with, the better the chances of species survival and local/regional adaptation. Management strategies to conserve genetic diversity might include identifying, protecting, and regenerating clone-rich patches.

At USU, genetic research on aspen is continuing on a broad array of questions, including the description of continent-wide landscape genetic diversity, a range-wide analysis of variation in ploidy (chromosome number), assessment of clonal succession within stands, the ability of remote sensing techniques to identify clonal boundaries and clonal richness, and the use of emerging genetic tools to look at the variation in gene expression within and among regional aspen populations. It's an exciting time in the fields of aspen ecology and genetics, and we expect our research will contribute

to a better understanding of aspen dynamics, evolutionary history, and ultimately, improved management!

Mock, K.E.; Rowe C.A.; Hooten, M.B.; DeWoody, J.; Hipkins, V.D., 2008. Clonal dynamics in western North American aspen (*Populus tremuloides*). *Molecular Ecology* 17, 4827-4844.

RECENT ASPEN PUBLICATIONS

Baba, K.A.; Karlberg, A.; Schmidt, J.; Schrader, J.; Hvidsten, T.R.; Bako, L.; Bhalerao, R.P. 2011. Activity-dormancy transition in the cambial meristem involves stage-specific modulation of auxin response in hybrid aspen. *Proceedings of the National Academy of Sciences* 108(8): 3418-3423.

Bahram, M., Polme, S.; Koljalg, U.; Tedersoo, L. 2011. A single European aspen (*Populus tremula*) tree individual may potentially harbour dozens of *Cenococcum geophilum* ITS genotypes and hundreds of species of ectomycorrhizal fungi. *FEMS Microbiology Ecology* 75(2): 313-320.

Coyle, D.R.; Allred, A.M.; Kosola, K.R.; Raffa, K.F. 2011. Altered GAI activity of hybrid aspen has minimal effects on the performance of a polyphagous weevil, *Polydrusus sericeus*. *Entomologia Experimentalis Et Applicata* 138(2): 104-109.

Diouf, P. N.; Stevanovic, T.; Cloutier, A.; Fang, C. H.; Blanchet, P.; Koubaa, A.; Mariotti, N. 2011. Effects of thermo-hygro-mechanical densification on the surface characteristics of trembling aspen and hybrid poplar wood veneers. *Applied Surface Science* 257(8): 3558-3564.

Edenius, L.; Ericsson, G.; Kempe, G.; Bergström, R.; Danell, K. 2011. The effects of changing land use and browsing on aspen abundance and regeneration: a 50-year perspective from Sweden. *Journal of Applied Ecology* 48: 301-309.

Fladung, M.; Becker, D. 2011. Targeted integration and removal of transgenes in hybrid aspen (*Populus tremula* L. x *P. tremuloides* Michx.) using site-specific recombination systems (vol 12, pg 334, 2010). *Plant Biology* 13(1): 223-223.

Girardin, M.P.; Raulier, F.; Bernier, P.Y.; Tardif, J.C. 2008. Response of tree growth to a changing climate in boreal central Canada: a comparison of empirical,



TREMBLINGS

NEWSLETTER & BULLETIN BOARD

Vol. 2(2), May 2011

process-based, and hybrid modelling approaches. *Ecological Modelling* 213: 209-228.

Halbritter, H.; Bender, L. 2011. Quality of habitat occupied by elk (*Cervus elaphus*) in the southern Sacramento Mountains, New Mexico. *The Southwestern Naturalist* 56(1): 1-8.

Jung, K.; Chang, S.X.; Arshad, M.A. 2011. Effects of canopy-deposition interaction on H⁺ supply to soils in *Pinus banksiana* and *Populus tremuloides* ecosystems in the Athabasca oil sands region in Alberta, Canada. *Environmental Pollution* 159: 1327-1333.

Khattab, S. 2011. Effect of Different Media and Growth Regulators on the in vitro Shoot Proliferation of Aspen, Hybrid Aspen and White Poplar Male Tree and Molecular Analysis of Variants in Micropropagated Plants. *Life Science Journal-Acta Zhengzhou University Overseas Edition* 8(1):177-184.

Kross, A.; Fernandes, R.; Seaquist, J.; Beaubien, E. 2011. The effect of the temporal resolution of NDVI data on season onset dates and trends across Canadian broadleaf forests. *Remote Sensing of Environment* 115: 1564-1575.

Kuhn, T.J.; Safford, H.D.; Jones, B.E.; Tate, K.W. 2011. Aspen (*Populus tremuloides*) stands and their contribution to plant diversity in a semiarid coniferous landscape. *Plant Ecology* (In press) DOI 10.1007/s11258-011-9920-4.

Laquerre, S.; Harvey, B.D.; Leduc, A. 2011. Spatial analysis of response of trembling aspen patches to clearcutting in black spruce-dominated stands. *Forestry Chronicle* 87(1): 77-85.

Lu, Y.; Equiza, M.A.; Denga, X.; Tyree, M.T. 2010. Recovery of *Populus tremuloides* seedlings following severe drought causing total leaf mortality and extreme stem embolism. *Physiologia Plantarum* 140: 246-257.

Makhatkov, I.D. 2010. Relation of populations of forest-forming species in the fir-aspen-birch forests of West Salair. *Contemporary Problems of Ecology* 3(6): 687-692.

Messaoud, Y.; Chen, H.Y.H. 2011. The influence of recent climate change on tree height growth differs with species and spatial environment. *PLoS ONE* 6(2): e14691.

Myking, T.; Bohler, F.; Austrheim, G.; Solberg, E.J. 2011. Life history strategies of aspen (*Populus tremula*

L.) and browsing effects: a literature review. *Forestry* 84(1): 61-71.

Newlon, K.R.; Saab, V.A. 2011. Nest-site selection and nest survival of Lewis's Woodpecker in aspen riparian woodlands. *The Condor* 113(1): 183-193.

Nishikubo, N.; Takahashi, J.; Roos, A.A.; Derba-Maceluch, M.; Piens, K.; Brumer, H.; Teeri, T.T.; Stalbrand, H.; Mellerowicz, E.J. 2011. Xyloglucan endo-transglycosylase-mediated xyloglucan rearrangements in developing wood of hybrid aspen. *Plant Physiology* 155(1): 399-413.

Randall, J.A.; Walters, M.B. 2011. Deer density effects on vegetation in aspen forest understories over site productivity and stand age gradients. *Forest Ecology and Management* 261(3): 408-415.

Rumble, M.A.; Gamo, R.S. 2011. Habitat use by elk (*Cervus elaphus*) within structural stages of a managed forest of the northcentral United States. *Forest Ecology and Management* 261: 958-964.

Schreiber, S. G.; Hacke, U.G.; Hamann, A.; Thomas, B. 2011. Genetic variation of hydraulic and wood anatomical traits in hybrid poplar and trembling aspen. *New Phytologist* 190(1): 150-160.

Smith, E.A.; Collette, S.B.; Boynton, T.A.; Lillrose, T.; Stevens, M.R.; Bekker, M.F.; Eggett, D.; St. Clair, S.B. 2011. Developmental contributions to phenotypic variation in functional leaf traits within quaking aspen clones. *Tree Physiology* 31: 68-77.

Tozer, D.C.; Nol, E.; Burke, D.M. 2011. Quality of mature aspen and maple forests for breeding Yellow-bellied Sapsuckers (*Sphyrapicus varius*). *Canadian Journal of Zoology* 89(2): 148-160.

Wall, W. B.; Belisle, M.; Luke, L.A. 2011. British Columbia's interior: moose wildlife habitat decision aid. *BC Journal of Ecosystems and Management* 11(3): 45-49.

CONTACTS:

Paul Rogers, Director, Western Aspen Alliance, Utah State University: p.rogers@usu.edu

Dale Bartos, Aspen Ecologist, Rocky Mountain Research Station: dbartos@fs.fed.us