WESTERN ASPEN ALLIANCE

TREMBLINGS

NEWSLETTER & BULLETIN BOARD

Vol. 11(4), November 2020

Partnering to preserve and restore healthy aspen ecosystems

MEMBER PARTICIPATION: The WAA is a virtual science-based community. Send us aspen items of interest and we'll help spread the word. Contact Paul Rogers, Director: p.rogers@usu.edu.

Share *Tremblings* with your friends and colleagues.

New members welcome!

WAA HAPPENINGS

The WAA as Community—The Western Aspen Alliance wishes to simply acknowledge that we are all under strain at this time due to national health concerns. Please stay safe by following CDC guidelines during this pandemic. We are in this together and very much wish to see you in-person when we can meet safely in our beautiful aspen forests again!

World's Fattest Aspen Winner—*I Spy Energy* sponsored that fat bole contest and the ballots are in! Jaycee Cappaert (pictured here), Logan, Utah sent us this whopper in a photo taken in the southern part of the state (exact location purposely withheld). Her winning entry measured 122 inches (310 cm) in circumference and she was awarded a custom "World's Fattest Aspen" sign to be placed (gently) on the tree. Congratulations Jaycee!

Bonus: check out Emily Beck's (I Spy Energy) DIY experiment on how/why leaf color changes in the fall.

Colorado News A Buzz in Aspen Stories—A recent surge of aspen-related media is occurring in Colorado. Wolves are back in the news and on the ballot in the Centennial State. But how will wolves help sustain aspen? Next up, what is really happening when forest visitors carve into aspen bark? Check out this article from *The Gazette* of Colorado Springs to find out! Finally, The Nature Conservancy is teaming up with Summit County to use aspen as fire breaks near developed areas. But the intensive management surrounding this real-life experiment isn't accepted by all. Read about it here.

Late morning light highlights autumn's advance on young aspen along the Snake River Valley in Grand Teton National Park, Wyoming. (Photo: Lance Oditt).

UPCOMING EVENTS

Prescribed Fires for Bird Habitat in Aspen: This webinar, hosted by the Ricketts Conservation Foundation, will take place Nov. 18, 2020. The presentation will address what effects forest treatments and fire are having on avian communities in western Wyoming. Register online.

North American Forest Ecology Workshop—NAFEW will conduct a virtual, abbreviated, conference on their normal odd-year schedule in 2021, following that up with

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a full-scale conference at Sault Ste. Marie, Ontario, Canada in 2022. The virtual mini-NAFEW will feature leading forest ecology speakers from Canada, Mexico, the U.S., as well as interactive sessions. Stay tuned for details on the 2021 half-day event at the conference website.

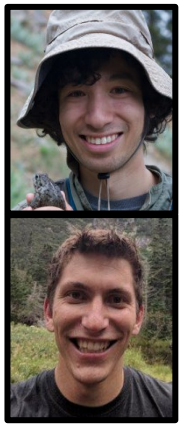
Natural Areas Association Webinar, Reprise —If you missed the summer webinar addressing aspen ecology and conservation by WAA Director Paul Rogers, you may now view the recording of the broadcast.

Aspen Workshops 2021—There are no definite dates set for next year at this time, but tentative proposals have been made for Wyoming (Aspen Days series), Colorado/New Mexico (Western Landowners Alliance), Alaska, and California (rescheduled). Please contact WAA Director Paul Rogers if you have ideas about where additional aspen workshops might be held.

COMMENTARY

Mapping aspen genetics and mortality risk: the view from above

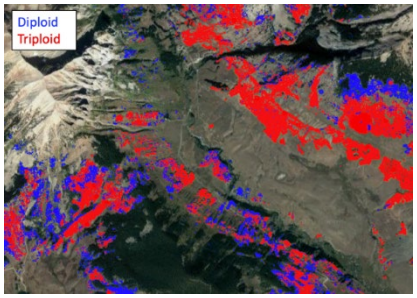
Benjamin Blonder, Assist. Prof., Dept. Env. Sci., Policy, and Mgt., Univ. California, Berkeley
Phil Brodrick, Res. Tech., Jet Propulsion Lab., Cal. Inst. of Tech., Pasadena, CA



Aspen genetics are a little more complex than human genetics. Humans are diploids, meaning we have two copies of each chromosome. Some aspen clones are diploid like us, but others are triploid, with three copies of each chromosome. Does ploidy level matter for the species' ecology and management? Well, we know from work by Karen Mock (Utah State Univ.) and colleagues that diploids and triploids can be intermixed within a landscape. And we know that triploid clones tend to be bigger than diploids (Pando, for example, is triploid) and tend to have stems that grow more rapidly and to larger diameters. A few small-scale studies have also now suggested that triploids are at higher risk of drought mortality.

But how would you know if a given clone is a diploid or a triploid? Until recently, determining ploidy level required intensive lab work involving karyotypes, flow cytometry, or DNA sequencing – all methods too slow and expensive to be carried out for the great variety of clones on a landscape. We've tried eyeballing clones in the field, and it is difficult to guess ploidy levels correctly. Because we lack a systematic way of distinguishing ploidy level at scale, our ability to determine whether drought mortality and ploidy level are linked has been limited.

We recently showed that ploidy level can be measured via remote sensing, from cameras mounted on drones. This dramatically increases the scales over which we can map aspen genetics. How does this work? Ploidy level variation influences leaf chemistry (shifts in water content, chlorophyll content, or defense compounds) as well as tree structure (different leaf shapes, canopy structure, and canopy height). This combination of chemical and structural changes, in turn, influences how the canopy reflects light in the visible and shortwave infrared bands. After obtaining multispectral imagery over a given forest as well as DNA-based ploidy level data for a network of field plots, we can train an algorithm to learn to predict ploidy level from only the multispectral imagery. This lets us then apply this algorithm to the imagery from the entire forest, mapping out the diploids and the triploids. This advance opens up the possibility of much broader-scale genetic mapping to support aspen ecology and management. Anyone with a drone and a commercially available multispectral camera can replicate this approach.



We have also been exploring scaling this approach up even further, using more advanced sensors mounted on aircraft. This work is ongoing, but our efforts so far show that the approach works well even at the scale of multiple watersheds. And more intriguingly still, when we integrate our ploidy level maps with stand damage

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maps, we are seeing more than twice the rate of stand damage in triploids than diploids. That's a big enough effect that large-scale ploidy level mapping might become widely useful. We're now working on developing detailed maps for the practitioner community.

WAA *Creates*

WE NEED YOUR CREATIONS FOR UPCOMING *TREMBLINGS*!

"WAA Creates" showcases artistic aspen-related contributions. We encourage fiction, folklore, poetry, drawings, paintings, photography, and other artistic expressions. Send your stuff to share with WAA readers.

This Aliveness You Feel

This aliveness you feel sense and love
As your bare feet learn to again kiss the soil
That you long to nourish the vitality of
This beauty you return to for joy and delight of soul and spirit too
Of creeks that flow free clear and clean in mountain meadows
As water sings ever anew its old story of renewal and return
While inspirations like Aspen leaves dance
Flutter and drift once more to the source ground of Earth
Golden iridescence pulled from limbs and twigs of the white barked trees
By brisk slight breezes with their seasonal songs of change
And we remember a respect for cycles of personal and collective transformation
As a call to honor and come home to ourselves
To remember our own wholeness and belonging
Are inseparable from the Quaking tree's one-root within this forest's humus
Beneath our soles and in our hearts
While gravities of Sun and Moon and Gaia herself
Are also suspended and held in the larger epic
Of a great cosmic blossoming
Occurring still in this remote galactic region of the Milky Way's Spiral of Life
Extending an invitation for opening
Into the heart of your own heart's naked hungers and desires
For the awakening and unspeakable grandeur of deep identity and being
We are each called and invited into

J. Larry Glover
Santa Fe, New Mexico

The artist: "I find Aspen to be an iconic image of wholeness we will do well to learn to see our face in." Larry Glover is a writer, speaker, and educator sharing the joys of discovering we are more like the forest than different. You may read more from Larry at his Wild Resiliency Blog.

RECENT ASPEN PUBLICATIONS

Aragon, D., C. Castillo, J. Moffroid, and G. Thomas. 2020. Patterns of Epiphytic Lichen Abundance on Aspen Stands in Proximity to Roads of Varying Vehicular Traffic. Teton Science School, Jackson, WY USA. [Project Report.]

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Curzon, M. T., B. J. Palik, A. W. D'Amato, and J. Schwager. 2020. Long-term soil productivity study: 25-year vegetation response to varying degrees of disturbance in aspen-dominated forest spanning the Upper Lake States. Pages 42-52 *in* L. S. D. Pile, et al. (eds). The 2019 National Silviculture Workshop: a focus on forest management-research partnerships. USDA, Forest Service, Northern Res. Sta., Madison, WI. NRS-P-193.

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Sloan, J. L., O. T. Burney, and J. R. Pinto. 2020. Drought-Conditioning of Quaking Aspen (Populus tremuloides Michx.) Seedlings During Nursery Production Modifies Seedling Anatomy and Physiology. Frontiers in Plant Science 11: 557894.

USDI, Bureau of Land Mangement. 2019. Pleasantview Hills Aspen Stand Diversity Project (Environmental Assessment). USDI, Bureau of Land Management, Pocatello, ID. DOI-BLM-ID-1020-2019-0011-EA.

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