

2021-02-24- Clover Conservation Meeting Zoom chat notes:

Additional comments and follow up to select questions were added by Littlefield, Rodgers, Braunreiter, 2021-02-25 (*Added in red, italicized*)

08:38:32 From Tara Littlefield to Everyone : Welcome to the meeting! Please enter your name, affiliation, and why you are interested in this meeting;

08:38:32 For example, my name is Jonathan Kubesch, Virginia Tech, and I am here to grow and propagate the clovers

08:43:53 From Tara Littlefield to Everyone : Tara Littlefield, botanist, office of Kentucky Nature Preserves, Kentucky Native Plant Society, Kentucky Plant Conservation Alliance, plant conservation coordinator, I work on rare plant monitoring, management, restoration and recovery throughout the state and region. We can only prevent declines and extinctions of species if we work together, lots of stuff to do, so I work on a lot of collaborative projects.

08:46:58 From Bethany to Everyone : Bethany Mulhall-kdfwr stream and wetland mitigation program

08:47:37 From wcunningham to Everyone : Wes Cunningham here from Stantec Consulting. I do a fair amount of surveys for stoloniferum and have a couple of sites that I am currently monitoring. I also work in stream restoration in Kentucky.

08:49:06 From will.overbeck to Everyone : Will Overbeck, native to KY (not born so not a true Kentuckian), now KY-vacation-home goer, independent research for RBC, volunteer consultant to Friends of Wolf Run, friend of Julian Campbell, now plant ecologist in deep NW Suburbs Chicago.

08:51:34 From will.overbeck to Everyone : Wes - what city are you based in w Stantec? Nice to meet you!

08:52:27 From wcunningham to Everyone : Sorry, Will. Kentucky-centric here. I am in Louisville, KY. But as you may know, I have colleagues all over the place. Perhaps you know some.

08:52:53 From Daniel Boone to Everyone : Daniel Boone Field Botanist Ohio and clover enthusiast

08:55:45 From Joe Lacefield to Everyone : Joe Lacefield, Kentucky Fish and Wildlife private lands wildlife biologist. joe.lacefield@ky.gov

08:56:11 From Brent Harrel to Everyone : Brent Harrel-USFWS Private Lands Coordinator

08:57:24 From Heidi Braunreiter to Everyone : Heidi Braunreiter, Office of Kentucky Nature Preserves, Botanist, RBC Project Lead

08:57:45 From Valerie Pence to Everyone : Valerie Pence, Center for Conservation and Research of Endangered Wildlife (CREW), Cincinnati Zoo & Botanical Garden

08:58:48 From margiehunter to Everyone : Margie Hunter, Tennessee, Trifolium calcaricum conservation project TPCA

09:01:07 From Brad Ruhfel - UofM to Everyone : Brad Ruhfel, Collections Manager and Research Scientist at the University of Michigan Herbarium

09:01:12 From Julian Campbell to Everyone : Julian Campbell 859 229 7711bluegrasswoodland.com

09:01:22 From Hannah Devine to Everyone : Hannah Devine, USFWS, Frankfort KY, Private Lands Biologist

09:01:34 From Stacey Hayden to Everyone : Stacey Hayden, Clarks and Green River National Wildlife Refuges

09:01:39 From Cooper Breeden to Everyone : Cooper Breeden, Southeastern Grasslands Initiative, Tennessee Plant Conservation Alliance

09:01:50 From Michael Floyd to Everyone : Michael Floyd (USFWS) - always interested in rare plants, especially those that may require Federal protection. Looking forward to learning about clover today.

09:02:00 From Rachel Cook to Everyone : Rachel Cook, Office of Kentucky Nature Preserves, botany technician

09:02:29 From Ted Brancheau to Everyone : Ted Brancheau, Eastern Kentucky University - Graduate Assistant - Have experience with *Trifolium stoloniferum*, excited to hear about clover!

09:02:57 From will.overbeck to Everyone : Thanks Brent - looking forward to hearing more about your recent Partners for Fish and Wildlife projects sometime.

09:03:06 From jfinfera to Everyone : Jenny Finfera USFWS Columbus OH, Working on Recovery of running buffalo clover. I will also have to jump off sometime after 10 am for another meeting.

09:03:13 From Brad Ruhfel - UofM to Everyone : Forgot to add, working on *Trifolium* phylogeny

09:03:54 From Valerie Pence to Everyone : Valerie Pence, forgot to add: interest in tissue culture propagation of threatened clovers.

09:03:59 From Michael Vincent to Everyone : Michael Vincent, Curator Emeritus, Herbarium MU, Miami University, Oxford, OH 45056

09:04:04 From David Taylor to Everyone : David Taylor, Daniel Boone NF; have interest in rare native plants and manage two small populations of RBC on the forest.

09:04:25 From devin.rodgers to Everyone : Devin Rodgers, Office of KY Nature Preserves, work on rare plant monitoring and conservation across KY, including our clovers

09:04:25 From Jonathan Kubesch to Everyone : Jonathan Kubesch: jonathankubesch@vt.edu and PhD student

09:04:43 From Pat.Mahon to Everyone : Pat Mahon - Pure Air Natives, St. Louis, MO
Native plant ecological restoration, specifically prairie habitats.
Working with Jonathan Kubesch with *Tri. stoloniferum* propagation, and mass production of the species along with cultivation notes/research.

09:05:26 From wcunningham to Everyone : @Will Overbeck: If you want to catch up, my email is wes.cunningham@stantec.com

09:05:49 From will.overbeck to Everyone : Nice to meet everyone!

09:07:55 From Jen Koslow she/her to Everyone : I'm Jen Koslow. I am an Assoc. Professor at ECU and have worked with *T. stoloniferum* for ~10 years, primarily at the Blue Grass Army Depot and a restoration site called Taylor Fork Ecological Area, both in Madison County

09:20:53 From will.overbeck to Everyone : Does KNP use Carolina Vegetation Survey methods, to standardize methodology? Or...? I am currently using FQA with plot, transect, and inventory data.

09:35:29 From Joe Lacefield to Everyone : I did find a *stoloniferum* population while searching for *kentuckiense*

09:35:43 From Jonathan Kubesch to Everyone : The Buck Creek plants?

09:38:04 From Joe Lacefield to Everyone : @jonathan, no this was near glenns creek, a mile or so east of the Franklin site

09:39:25 From will.overbeck to Everyone : Good to see SGI in the mtg - @Cooper - will Dwayne be here? Looking forward to working with SGI!

09:39:27 From Pat.Mahon to Everyone : From that distribution of the *T. kentuckiense*, if I were searching for new populations, I would hit similar habitats on different branches from that river. Hard to see what they are, creeks or vernal streams. Instead of trying to look nearby to known populations (we know how all that can go). *Thanks Pat, I didn't go into to much detail with the areas we are searching for KY Clover since I was pressed for time, but we are focusing on -S facing woodlands along tributaries of the KY River in Franklin, Anderson, Mercer, Woodford and Jessamine, while these are around the known populations, our search areas did include a much broader area. However, the area is overwhelmingly private so gaining access to all sites has been a challenge, on aials, we narrowed our search to aspect and forested areas, similar to where we look for *physaria globosa* and the known KY clover sites, so modeling was involved. So much degraded habitat, bush honeysuckle is a major problem (Littlefield)*

09:41:10 From Cooper Breeden to Everyone : Will, Dwayne may join late. He had another commitment this morning.

09:41:26 From will.overbeck to Everyone : Nice presentation Brad, glad you will publish this.

09:43:31 From Jonathan Kubesch to Everyone : I have handled the Gattinger specimen from Nashville at TENN.

09:44:12 From Michael Vincent to Everyone : The Gattinger specimens do look like *T. kentuckiense* to me.

09:44:49 From Daniel Boone to Everyone : specimens look good to me also

09:45:34 From Mason Brock to Everyone : I love this slide!!

09:46:21 From Mason Brock to Everyone : *Physaria globosa* and *Perideridia Americana* are in the Outer Nashville Basin too. I've been looking...

09:51:30 From Michael Vincent to Everyone : Jonathan, I still have seeds and will forward them to you if you send me your address.

09:51:55 From will.overbeck to Everyone : Wow, Jon - that is good news if this seed bank data is correct.

09:52:33 From Jonathan Kubesch to Everyone : Yes Dr. Vincent!

Jonathan Kubesch

1252 Progress St Apt 5100F

09:52:42 From Jonathan Kubesch to Everyone : Blacksburg, VA 24060

09:53:09 From Michael Vincent to Everyone : Yes, it is. I have grown plants from very old specimens,

09:55:03 From Michael Vincent to Everyone : I have grown seed from herbarium specimens after cracking the seed coat with a razor blade.

09:55:10 From will.overbeck to Everyone : Do the samples have seed pods or earlier flowering stages? Sure it might make sense to look, but what are the chances of finding seed pods...

09:55:33 From Jonathan Kubesch to Everyone : I prefer to use a medium grit sandpaper

09:59:17 From will.overbeck to Everyone : Does Matthew Albrecht at MOBOT have interest or capacity to contribute in *T. kentuckiense* conservation?

Albrecht, Matthew

Department: CCSD

Office Phone: + 1 (314) 577-0262

e-mail: matthew.albrecht@mobot.org

10:01:20 From will.overbeck to Everyone : What about Sally Brown, Tom dorman, or other Palisades preserves for *T. kentuckiense* introductions? Seems like many appropriate habitats might be available at various sites with conservation easements. *(I agree and Yes, we are looking at several sites throughout our natural areas system with similar habitat at least CE protections, priorities are sites with globe bladderpod habitat (higher quality sites) since we know that is similar habitat and needs a lot of invasive management as well, this also ties back into propagation and so far we have not been able to propagate in mass so site is low initial due to lack of material-Littlefield)*

10:04:27 From Pat.Mahon to Everyone : You may have better results with Shaw Nature Preserve (MOBOT) via Dr. Quinn Long or Scott Woodbury. They can apply the propagation directly into good habitat. *Agree, I have worked with Quinn on several different projects and I have actually visited the KY clover site with him and Mathew while working on *Physaria globosa*, I will add him to our list!-Littlefield)*

10:05:28 From will.overbeck to Everyone : Quinn Long is an excellent contact - thanks you for mentioning him I have talked with him at SER meetings

10:05:43 From Michael Vincent to Everyone : I have seen the CM Gattinger specimen. I may have an image of it.

10:06:29 From Pat.Mahon to Everyone : Matt is in charge of taking in seed, but we've talked and they are overwhelmed and I believe he is hesitant to take seed in. Most of the stuff they get in was not stored correctly. I am unsure if his work load has been relieved from when he took on the position.

10:07:23 From will.overbeck to Everyone : Thanks Devin just asking generally to standardize methodology. A plant community delineated FQA would be the start and I would like to find out the currently used methods, *OKNP uses CVS level IV methodology on our long term monitoring and management plots and community characterizations. For select rare plant monitoring we use permanently marked belted transect, for forested plots in barrens restoration sites we use a modified methodology that is circular and collects additional dbh data-Littlefield)*

To follow up on what Tara said, we have used 10mX10m or 10mX20m plots for grasslands and small acid seeps, sometimes 20mX50m for certain white fringeless orchid sites. We still need to develop a concrete plot plan for any plots in Clover sites, since larger plots are more appropriate for woodlands and forests, but making them too big would be too time-intensive or dangerous depending on how shrubby or steep the site is-Rodgers.

10:08:34 From Mason Brock to Everyone : Michael Vincent, if you have an image of the CM specimen that would be fantastic!

10:16:15 From jfinfera to Everyone : I need to jump off I hope to get back on soon.

10:21:38 From Joe Lacefield to Everyone : I think the mid may hard freeze severely impacted RBC flowering in 2020 (*I noticed that as well from overall 2020 surveys, but it seems Mt. Folly Farm may have been protected from the late frost being in a lower ravine, as there were over 1,000 blooms. – Braunreiter*)

10:21:54 From will.overbeck to Everyone : Mason - what year did we monitor rbc at bgad? 2011? We took extensive species association data that year, too. *In what methodology? We have some floristic data from BGAD but nothing quantitative or exhaustive, I think Ron Jones has a full flora?-Littlefield)*

10:22:26 From Jen Koslow she/her to Everyone : Joe - I think you are right, but for sure we got out there late that year due to a variety of bureaucratic hang-ups on both the BGAD and ECU sides

10:22:44 From Mason Brock to Everyone : I think that's right. Summer 2011 I believe. Saw more stoloniferum that summer than I have every other year in my life combined

10:24:15 From Julian Campbell to Everyone : I have emailed Tara et al my current notes for this meeting; plus a drafted key to species adapted from Weakley, Isely, Fernald etc (*Thanks for the ideas Julian, I will add this info into the files, Littlefield also submitted a adapted weakley key with Ruhfel to pair with the genetic study and phylogeny of Trifolium kentuckiense-Littlefield)* (*Another note I think is worth mentioning, is bringing land managers into this conversation as they are the ones we really need on the ground making an effort to protect our clovers. –Braunreiter*)

10:25:00 From Jonathan Kubesch to Everyone : Julian, can I have your notes as well?
Are these PVAs corrected for population density?

10:25:32 From will.overbeck to Everyone : Julian, reading these now - hoping everyone takes a look - very nice document that will help us focus efforts. thank you!

10:27:53 From devin.rodgers to Everyone : Good key Julian

10:30:26 From will.overbeck to Everyone : There is a new treatment method out of Indiana for stilt grass - .5% glyphosate kills *Microstegium* but leaves many non-target unharmed. Is KY using this prescribed treatment yet? *OKNP has used this method on select areas-contact Josh Lillpop josh.lillpop@ky.gov*

10:30:53 From Ted Brancheau to Everyone : Density dependence usually isn't correct for small populations, so we did not

10:31:09 From David Taylor to Everyone : Julian, could I have a copy of your key?

10:31:45 From Ted Brancheau to Everyone : The restoration populations aren't close to any carrying capacity they may have, as far as we can tell

10:32:21 From devin.rodgers to Everyone : Does anyone know if there are pubescence differences between *reflexum* and *kentuckiense*?

10:32:42 From Jonathan Kubesch to Everyone : Devin, I am working on that now

10:35:38 From will.overbeck to Everyone : Thanks Jen and Ted, that was helpful and glad you are continuing research. I did notice from a quick visit to Taylor Fork many subpops are being suppressed/shaded out by *Lonicera maackii*. Could volunteer sometime to monitor/manage, just let me know. :)

10:37:16 From Julian Campbell to Everyone : Jonathan the WV Bartgis plant is the one I grew from his original discovery in ca 1984 along the New River; then I gave to Norman who grew at UK.

10:37:34 From Jonathan Kubesch to Everyone : Single plant selection!

10:37:42 From Michael Vincent to Everyone : Devin, *T. reflexum* is very variable with regard to pubescence; some populations have plants that are densely pubescent, while others have plants nearly glabrous. *T. kentuckiense* is only sparsely pubescent (the two KY sites) but my memory is that the Gattinger specimens from TN are more pubescent.

10:39:40 From Jonathan Kubesch to Everyone : Comparing *reflexum*, *kentuckiense*, and red at the seedling stage. *Reflexum* is inconsistent, but there may be some subtle field characters for red and *kentuckiense*

10:44:33 From Daniel Boone to Everyone : the Cincinnati population flowers every year since relocated in, 2012 except 2013 no disturbance or fire in fact if snow has melted will be looking at rosetts today

10:46:39 From Daniel Boone to Everyone : Indian Hill population at MM cave also flowers many years without fire or disturbance but Flint Ridge site MM cave responds after fire

10:52:26 From Mason Brock to Everyone : I was hoping someone would mention *Centuculus minimus*

10:53:15 From will.overbeck to Everyone : Animal trials, wildfire areas, streambank scour zones, etc. all have interesting habitat similarity!

10:54:50 From Michael Vincent to Everyone : I have seed from Mammoth Cave, I think, from Norm.

10:57:09 From Jonathan Kubesch to Everyone : Do you have the year on Mammoth Cave seed?
(Jonathan will track this down- he will be updating the clover seedbank database for KY, Littlefield)

11:00:22 From Stacey Hayden to Everyone : Please remember that on Clarks River NWR a Special Use Permit is required to collect anything, including plants or seeds. This includes research and propagation.

11:00:25 From will.overbeck to Everyone : Julian - could you copy your four questions here or would you like me to add these?

11:01:05 From Cooper Breeden to Everyone : Hey everyone--it sounds like everyone has seed but if SGI can help with seed banking, we're happy to help.

11:01:28 From will.overbeck to Everyone : From Julian: A. Can we form a real team to focus on recovery of native clover species, perhaps more or less limited to the Ohio Valley-*(Julian, this is what we are trying to do, Littlefield)*.

11:01:42 From will.overbeck to Everyone : B. Can we share all raw data from wild observations (including associated species), at least across the Ohio Valley?-*heritage databases contain this information, do you have a more specific project you want to work on that would necessitate detailed location information-Littlefield)*

11:01:50 From Mason Brock to Everyone : I want to hear from Cooper :(

11:01:56 From will.overbeck to Everyone : C. Can we join forces to write up a good scientific review of information about these species, especially the large amount of data on stoloniferum? *Julian, that's a great idea! Would love to work on an overarching paper of clovers, for RBC specifically the work that Jennifer Finferra has done to compile all the regional information from the various states is a good start, we do need an official species status assessment report which was not ever completed for RBC (it is required for recent listed species but not older ones). For KY we can use our recent status review report as a starter too. I do not know of a funding source currently so like many projects we work on we would have to carefully plan and coordinate to get it done-TL.*

11:02:16 From will.overbeck to Everyone : D. Can we together write useful cooperative proposals to government and funding organizations *(We are always looking into funding to accomplish priority goals, or more often than not we have to work with our existing resources, work more with partners and volunteers to accomplish priority goals? what specific proposals are you talking about? It is hard to answer open ended questions without actual details or goals-TL*

11:03:21 From will.overbeck to Everyone : I would be willing to co-author grants for funding for management/research - maybe larger scale projects with multiple partners/sites.

11:03:23 From Pat.Mahon to Everyone : We will be working with the St. Louis Zoo on their new Buffalo

11:03:46 From Jen Koslow she/her to Everyone : Thank you for organizing, Tara! So much to learn and share!

11:05:25 From Pat.Mahon to Everyone : I'll loop Dr. Quinn Long in on this clover stuff

11:05:28 From Cooper Breeden to Everyone : We're working on some research on T. calcaricum that we can share with the group in the next couple months once we finalize some results.

11:05:32 From will.overbeck to Everyone : thanks to everyone - looking forward hearing more for this topic.

11:07:04 From Wes Cunningham, Stantec Louisville to Everyone : This has been awesome.

11:07:08 From margiehunter to Everyone : Tara, please send key updates to everyone

11:07:08 From will.overbeck to Everyone : :)

11:07:12 From Joe Lacefield to Everyone : Thanks everyone!

11:08:32 From Mason Brock to Everyone : Good job everyone