



Colorado Cactus & Succulent Society

**2022 GUEST EDITOR:
SCOTT BURKHOLDER**

Judith & Jackson Burkholder,
Assistant Editors

MONTHLY PLANT SHOW

Seriously, We will have
another one. Eventually.

[Club News!](#)

[November Meeting](#)

[CSSA Meeting](#)

[Start Sending in
Those Photos for
December's Potluck
meeting!](#)

November 2022, Vol 26 No. 6

The Colorado Cactus & Succulent Society promotes education, enjoyment, cultivation, and conservation of cacti and other succulents among our members and the larger community.



Kathy and Woody Minnich, with Rocks and Art
Woody Minnich Photo

UPCOMING MEETING

Date: Tuesday, November 15, 2022

Time: 7:00 PM

Location: Sturm Family Auditorium

Speaker: Woody Minnich

Presentation: The Cacti and Succulents of
New Mexico

Details:

This will be an in-person meeting, in the Sturm Family Auditorium, at the DBG's Freyer–Newman Center.

Denver Botanic Gardens:
1007 N York St
Denver, CO 80206

SUCCULENT BITS

Don't Forget!

CCSS November Meeting featuring Woody Minnich presenting "**The Cacti and Succulents of New Mexico**"

November 15th - 7 pm at the Denver Botanic Gardens

CSSA Biennial Meeting -

The Biennial Meeting is a thing! We are starting to staff committees and that takes volunteers. [Sign up here.](#) Scott Burkholder can provide volunteering details, and Rod Haenni at rhaenni@comcast.net has the latest meeting news.



New Mexican Agave
Woody Minnich Photo

SEE YOUR NAME AND PICTURES IN PRINT!

Submissions for the next newsletter are due at the end of the month.

We need your articles and pictures! Do you have an interesting plant? How about an interesting plant story? That you would like to see in print? Send it to me at seisnoir@comcast.net.

Please send photos as either JPG or PNG files. As for stories and news, send those as DOC or RTF, or TXT files, please!

December Potluck!

Our traditional December meeting will be a potluck! Our presentation will be member photos, so send you pictures to Randy at Randy

CCSS Show and Sale -

We are now closer to the 2023 Show and Sale than our 2022 extravaganza. We need to start planning and preparing. Stay turned for more information, and the first organization meeting!

NOTES FROM THE RE-POTTING BENCH

Fall is always an exciting time at the Re-potting Bench. Everything from draining the sprinklers, to leaf raking, to cleaning the beds and preparing for next year.

I suspect that you're doing the same!

And there's always one more plant to re-pot. At least, there is here.

At October's meeting we learned that CCSS has over \$63,000 in the bank. I'm pleased to report that our club will be solvent for yet another year.

Also at the October meeting we held elections for the Board of Directors. The slate of candidates contains all familiar names plus one, Alex MacMillan, joining the Board as the Member at Large. By voice acclamation we were all elected!

Finally, we enjoyed the presentation from John "Obie" Oberhausen. John is from Santa Fe, NM, and gave a talk on his efforts to save the endangered Santa Fe Cholla. While John's occupation is massage therapy, he has grown cactus for years and has started The Cactus Rescue Project. John shared stories and photos of his efforts to not only save the Santa Fe Cholla, but also expand it's numbers in and around Santa Fe!

Woody Minnich is one of our favorite speakers. I think I've heard all of his presentations EXCEPT the one for New Mexico. Which is odd because that's where he lives. This should be a special evening!

I know that November has barely started, but it is time to start thinking and planning for next year! Not only are we barely six months from our Show and Sale, but the CSSA convention is just a few months later. And we will need volunteers for both meetings.

The club gave Jackson Burkholder a grant a last year for histology lab equipment. He's been hard at work, and this month's newsletter features a short summary of "wide-band tracheids". Tracheids are the cells that move and store water and that's important in some succulents!

Thanks,

Scott Burkholder
2023 President
seisnoir@comcast.net



Scott >>

THE CACTI AND SUCCULENTS OF NEW MEXICO



New Mexico is an unusual state in comparison to its neighbors. To the west is the warm, often very hot, Arizona which is heavily influenced by the Sonoran, Coloradoan and Mojave deserts. To the east is the giant of our states. Texas can also be very hot and dry to its west, as well as extremely wet and humid in its south. Texas has probably the greatest number of cactus species of any state due to it being strongly influenced by the Chihuahuan and Tamaulipan deserts. To the north of New Mexico is the generally higher elevation and mostly cooler state of Colorado. With these three distinct adjacent states, New Mexico has a unique combination of all three. It has some Chihuahuan influence in its south and more Coloradoan relationships through its central and northern regions.

From the warmer and milder southern New Mexico, there are many wonderful genera. These range from: Agave, Coryphantha, Dasylirion, Echeveria, Echinocactus, Echinocereus, Echinomastus, Epithelantha, Escobaria, Ferocactus, Fouquieria, Mammillaria, Thelocactus, and Yucca. These genera are usually found growing in low elevations on rugged alluvial hills and smaller mountains. The moisture in these regions is from both western influenced winter rainfall and summer monsoonal flows from the south. Temperatures in these areas can be very cold to very hot, often ranging from 20F to 110F.

In the greater central and northern regions of New Mexico, there are fewer of the cacti and other succulents. These

genera range from: Agave, Echinocereus, Escobaria, Mammillaria, Neobesseya, Pediocactus, Sclerocactus and Yucca. These genera are mostly found in the Pinon, Juniper mountains or higher grasslands from elevations of 4,000 ft. to 10,000 ft. The rains in these areas can also come at any time of the year. Many of these plants are often under snow during the winter months. The temperatures are much cooler and vary from a -20F to a moderate high of 95F.

Some of the prize species found in New Mexico, mostly not endemic, include: Echinocereus rigidissimus, triglochidiatus, viridiflora, dasyacanthus and coccineus, Mammillaria denudata, heyderi, mieacantha and wrightii, Escobaria vivipara, sneedii, organensis, and missouriensis, Echinomastus intertextus, Pediocactus simpsonii and knowltonii, Sclerocactus wrightii, parvaflorus and papyracanthus, Agave neomexicana and parryi, Yucca elata, baileyi and baccata.

Most of the New Mexican cacti and succulents make great garden plants but can also be very handsome potted specimens. Allowing these genera to have a cool to cold winter is advised. They generally flower and grow better after a winter dormancy. We will not see all the New Mexican species of cacti or succulents in this presentation but we will visit the great majority and the most impressive. Come travel with me to the succulent territory of the beautiful, scenic and historic state of New Mexico.



WOODY MINNICH



Woody, as he is commonly known, grew up in the Mojave Desert and has had an attraction to desert plants and animals since the early 1950's. He has been involved with the cactus and succulent world for over 52 years, as a grower, field explorer, club and organization leader, writer, photographer, lecturer and presenter.

Having been a speaker all over the world, Woody is most often associated with giving presentations on his field work from the places he has traveled, such as: Argentina, Australia, Bolivia, Brazil, Chile, Madagascar, Mexico, Namibia, New Zealand, Peru, Socotra, South Africa, the United States and Yemen. To date, this makes 128 major trips. He is also recognized for having operated the nursery Cactus Data Plants since 1975. Woody's show quality plants were often considered one of the standards for staging and horticultural achievement. His favorite genera include: Adenium, Ariocarpus, Astrophytum, Copiapoa, Cyphostemma, Fouquieria, Gymnocalycium, Lithops, Mammillaria, Melocactus, Pachypodium, Turbinicarpus, Uebelmannia, and Pachycauls in general.

He has published numerous articles and reviews in various journals (CSSA) and his photography is featured in many books including; "The Copiapoa" by Schulz, "The Mammillaria Handbook" by Pilbeam, "The Cactus Lexicon" By Hunt and Charles, as well as many others. As of November 2017, he is featured as the primary photographer in the sold out book "The Xerophile." This book specializes in what the authors call, The Obsessed Field workers from around the world. He is also featured in electronic articles about conservation from "MNN Mother Nature Network" and "The Guardian Newspaper."

Woody and his wife, Kathy, live in Cedar Grove, New Mexico. He is a retired secondary school teacher of 32 years where he taught Graphics, Art and Architecture. In the cactus and succulent hobby, Woody is recognized for his high energy and creative spirit. As an educator, he has become an important part of the hobby and thus is an honorary life member of thirteen C&S societies across the country. He has been president, show and sale chair, newsletter editor, program chair, and plant of the month coordinator. Woody has also served on the CSSA board and numerous societies in many other leadership positions. He is a co-creator, and currently the president, of the Santa Fe Cactus and Succulent Club. With 52 years in the hobby and 64 years in the field (old fart), he has many experiences to share and thousands of photos to show.

WHAT'S UP WITH WBT'S?

By Jackson Burkholder - precisioncactus@gmail.com

When discussing the anatomy of cacti and some other succulent plants, the topic of wide-band tracheids (also called non-xylary tracheids or just WBT's for short) inevitably comes up. WBT's are a specialized type of tracheids, which are a type of plant cell found in the vascular tissue that move water upwards through the plant. As one of the major components of wood, tracheids are dead at maturity and have some sort of rigid, secondary cell wall. This secondary wall can either form as thickened areas encircling the cell like a stretched-out Slinky with gaps in-between, or almost completely envelope the cell. In prepared microscope slides, secondary cell walls react to a different stain than primary cell walls which cause them to appear pink instead of green.

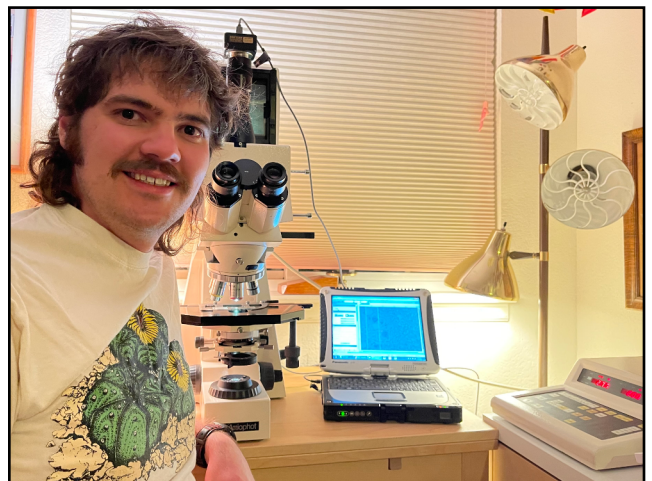
Like many tracheids, WBT's have the first type of secondary cell wall, with thickened areas either in an annular or helical pattern along the length of the cell. The distinguishing feature of WBT's is the width of these secondary thickenings. As their name implies these thickenings are much wider than they are on normal tracheids. They are easy to distinguish on micrographs, showing up as thick pink-stained rings protruding deeply into the inside of the cell.

WBT's are only found in three plant families. They are most common by far in the Cactaceae where they have been observed in almost all of the major groups (with the exception of *Pereskia*, *Leptocereus*, and some epiphytic cacti). In fact, some cacti have wood that is made up almost entirely of WBT's (Fig. 3). WBT's can also be found in a few species of the Purslane family, which is closely related to Cactaceae. The third family where WBT's have been seen is the ice plant family, Aizoaceae. Among the Mesembs, WBT's have been documented in the leaves of all but a few of its most basal members. Interestingly, WBT's are conspicuously absent in the least evolved genera of all three of the families where they are found. This includes *Pereskia* in the cactus family, *Portulaca* and *Talinum* in the Purslane family, and *Cleretum* in Aizoaceae. This creates an interesting problem from an evolutionary perspective because the abundance of WBT's suggests a single evolution, but the lack of these cells in the most basal genera suggests they evolved multiple times as each of these groups became more succulent.

A third option could be that WBT's only evolved once but were lost in the less succulent members of each family. This could make sense as WBT's certainly have the most benefit to succulent plants. It is theorized that WBT's are essential for allowing the wood of ball and barrel cacti to shrink and swell as the plants experience different levels of water. The wide secondary thickenings could also help keep these tracheids from collapsing completely when they shrink due to drought conditions.

Knowledge of WBT's is essential to understanding the anatomy of cacti and some other related succulent plants. These structures represent another fascinating way these plants have adapted to their desert environment. Unfortunately like many succulents adaptations the evolutionary origins of WBT's are difficult to resolve.

Jackson Burkholder



WHAT'S UP WITH WBT'S? (CON'T)

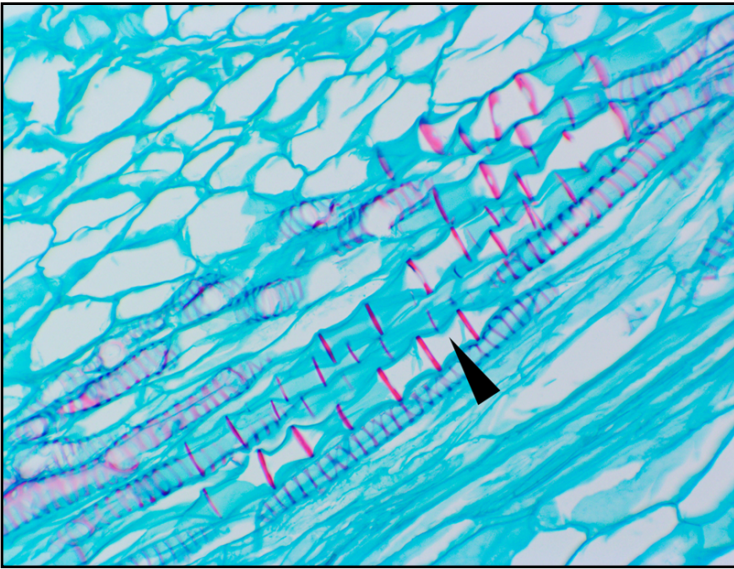


Fig. 1 - Longitudinal section of a *Turbinicarpus x mombergii* root showing the WBT's (One marked with arrow) compared to the regular tracheids. Note the pink-stained annular thickenings which protrude far into the cell. 200x.

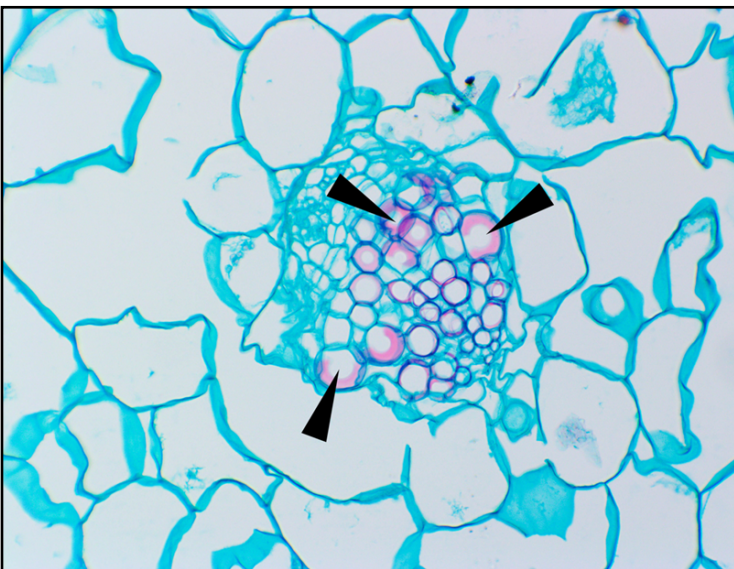


Fig. 2 - Cross section of a *Weingartia rauschii* vascular bundle showing the wide secondary thickenings of WBT's (three of which are marked with arrows). Regular tracheids with thinner secondary thickenings are also present. 200x.

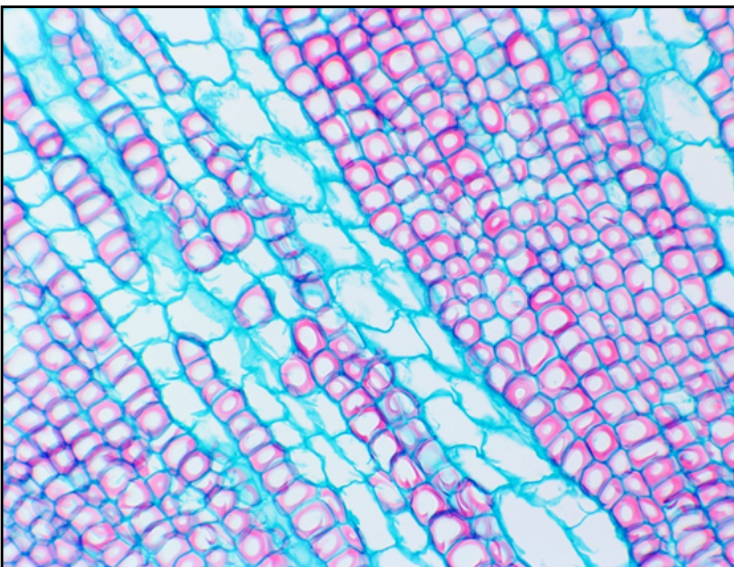


Fig 3. - Cross section of an *Astrophytum capricorn* stem showing wood composed of almost all WBT's. 200x.

WHAT'S UP WITH WBT'S? (CON'T)

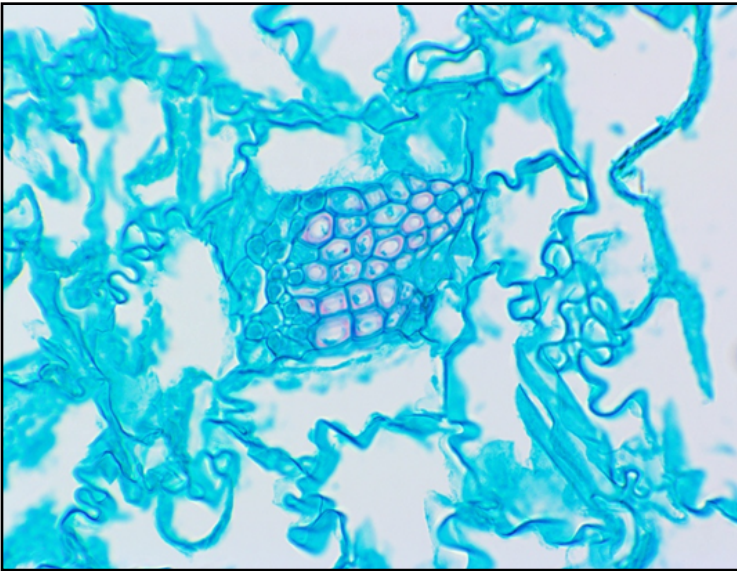


Fig. 4 – A cross section of a *Delosperma cooperi* (Aizoaceae) leaf showing a vascular bundle filled with WBT's. 400x.

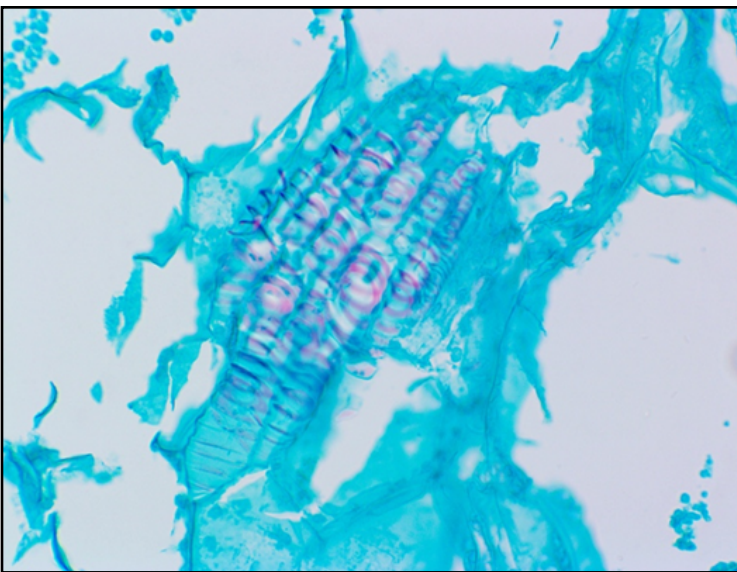


Fig. 5 – A vascular trace in a longitudinal section of a *Lithops sp.* leaf showing another example of WBT's in the Aizoaceae. 400x.

Further reading:

Crang, R., Lyons-Sobaski, S., and Wise, R. 2019. *Plant Anatomy*. Springer Nature, Cham, Switzerland.

Landrum, J. V. 2006. Wide-band tracheids in genera of Portulacaceae: novel, non-xylary tracheids possibly evolved as an adaptation to water stress. *J Plant Res.* 119: 497-504

Mauseth, J. D. 2004. Wide-band tracheids are present in almost all species of Cactaceae. *J Plant Res.* 117: 69-76

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UPCOMING PROGRAMS & EVENTS:

November 15 - CCSS Monthly Meeting

December X - CCSS Monthly Meeting and Potluck/Slideshow

April 28-30, 2023 - 2023 Show and Sale!

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