

ECOLOGY ACTION'S GARDEN COMPANION

GROW BIOINTENSIVE® News from Around the World



image: cynthia raiser-jeavons

FALL 2023

IN THIS ISSUE:

THE JEAUVONS CENTER MINI-FARM REPORT • VICTORY GARDENS FOR PEACE
MINI-FARM REPORT • SOIL SCIENCE SPOTLIGHT: DORAN/USDA SOIL TEST
PART III • GB EMPOWERING PEOPLE WITH DISABILITIES IN MOZAMBIQUE
• BOOK REVIEW: WHAT I STAND ON • NPR: STUDY SHOWS TOPSOIL GONE
FROM MIDWEST FARMS • RECIPE: FRIJOLES BORRACHOS • GOING A LITTLE
BIT VEGAN COULD HELP SAVE THE WORLD • MARTZ FAMILY FARM • DAHLIA
PROJECT UPDATE • WHEN SEEDS HIBERNATE: BREAKING DORMANCY
• DIY: RED CABBAGE pH INDICATOR • EVENTS, OPPORTUNITIES...AND MORE!

The Jeavons Center Mini-Farm Report

By John Jeavons, Ecology Action Executive Director

At The Jeavons Center (TJC, Ecology Action's GROW BIOINTENSIVE® Closed-Loop Sustainable Mini-Farming world headquarters), we continue to be busy as the mini-farm transitions from summer into fall. The optimal planting window for late autumn/winter annual crops at TJC is September 15 - October 15. These crops mature in the early spring and are harvested around May 15 in our climate, and usually include wheat, barley, cereal rye (with its fantastic rooting system: see HTGMV/2017, p.44), Cold-Weather Banner fava beans—fairly rare, which can withstand temperatures up to 110°F (!) and produce a large amount of seed and mature biomass—and garlic.

These crops are interplanted with Woolly Pod Vetch (WPV), selected for its potential to fix almost .63 lb (.29 kg) of nitrogen per 100 sq. ft. (10m²) while other temperate legumes have the potential to fix less than .25 lb. (.11 kg) of nitrogen in the same planted area. This accelerated nitrogen fixation means that much less WPV seed is needed to fix the .25 lb. of nitrogen/100 sq ft we need in the soil. The remaining .25 lb./100 sq ft of nitrogen (for a total of .5 lb./100 sq ft of growing space) is applied in the form of three 5-gallon (20-liter) buckets of cured compost per 100 sq ft (10m²) growing bed. To improve germination rates, soak the WPV seeds for three days, changing the water each day. At the beginning of the 4th day, gently roll the wet seeds on a dry towel to remove excess water, and then mix them with fine, dry soil

so they will not clump together when broadcast. This broadcasting should be done after the cured compost and any organic fertilizers (not manure, it's not sustainable) are added and sifted into the soil 4-8 inches (10-20cm) deep. After broadcasting, the WPV seeds should be gently "chopped" into the soil 5-10 inches (12-25cm) deep. Then you can transplant annual crop seedlings into the growing bed on offset centers, and they'll grow together with the WPV. When the WPV begins to flower, break the stems off at ground level, so the nitrogen fixed in the roots will stay in the soil, rather than being used to produce seeds. For amounts of nitrogen and carbon required per 100 sq ft (10m²) growing bed, see the compost section of Self-Teaching Mini-Series Booklet 14, *A 21-Bed Mini-Farm*, published by Ecology Action. For the dynamics of nitrogen-fixation in the soil, see *Managing Cover Crops Profitably*, published by SARE (sare.org/resources/managing-cover-crops-profitably-3rd-edition).

TJC's Farmer Teacher Trainer (FTT) Team includes Mini-Farm Manager Melvin Castillo, Assistant Mini-Farm Manager Suraya David Sadira, and FTT Jessi Mickow. In October, potential FTT Evandro Rachadel started his trial period with us. Welcome tEvandro! As part of our larger International *10-Bed Unit Project*, Suraya and Jessi have each designed and planted an experimental 10-Bed Unit (10BU) to investigate the potential of growing a complete balanced diet for one person annually, plus sufficient compost material to feed the soil the diet crops are growing in! They also each have four additional growing beds for doing crop tests of their choice and design.

Suraya writes: *"This year our planned fall-winter 10-BU design included 3 beds of barley, 3 of wheat, 3 of fava beans, and one of cereal rye. However, in the actual planting, each section always changes a little as we adjust for time and resources. So far in the Lower Uphill section of the TJC mini-farm, we have planted 2 beds of wheat, 3 beds of barley, 2 beds of fava beans, 1 bed of cereal rye, 1 bed of garlic, and 2 beds of a winter cover crop mix that will be harvested for immature biomass. In the Middle Knoll Garden section, we have 3 beds of barley planted, 2 beds of fava beans, and are working on getting the other crops in. We have just harvested 4 beds of summer sunflower heads and will be harvesting the stalks for biomass soon. Summer crops still growing in the garden include corn, sweet potatoes, and Jerusalem artichokes that are finishing*



Fall/winter fava beans alongside summer crops

Grains interplanted with WPV



up, as well as tomatoes and peppers that are still producing. We are looking forward to phasing fully into the coming fall/winter season but are still definitely appreciating where we are at now.”

The 2023 Online 8-Month GROW BIOINTENSIVE Internship taught by John Jeavons and Matt Drewno, began the year with 25 participants from four continents on April 4, and will be concluding on November 14 with participants’ Final Presentations during the last two Tuesdays. The five most accomplished participants will be selected to receive an annual award that includes monthly funds and support for two soil tests and amendment recommendations. We always look forward to the GB teaching and demonstration projects that result from these awards, as they are usually exciting and always interesting!

Our annual Fall 4-Saturdays Introductory GROW BIOINTENSIVE Workshop began on October 28, and continues through November 18, taught by John and Matt, with seven participants from California, Nevada, Vermont, Oregon, New Jersey, and Kenya. It’s always a pleasure to meet enthusiastic garden-



The Jeavons Center Team, 2023

ers from such a variety of places! Registration is now open for our Spring workshop (see below).

Looking ahead, John Jeavons has been working with Ecology Action Soil Advisor John Beeby on The Sustainability Fund's (growbiointensive.org/sustainabilityfund) Sustainable Soil Fertility International (SSFI) Proposal. This initiative is intended to address the fact that there is as little as 20 years of farmable soil remaining on the Earth. SSFI’s goal is to breathe life and health into agricultural soils on five continents using GROW BIOINTENSIVE, with the assistance of a team of managers trained in John Beeby’s 5-Year Soil Test Analysis and Recommendation (STAAR)/Soil Test Station (STS) Programs (funded by Ecology Action). SSFI’s planned \$35,700,000 budget is only ~\$0.0045/person given a population of 8 billion people. As human social stability and ecosystem health rely on our ability to grow food successfully and sustainably, fertile agricultural soil is important for a sustainable future. This proposed initiative provides an inexpensive way to help accomplish a globally important goal.

A reflection: *The best way to greatly reduce the incidence of disease and insects in your crops is to grow a healthy soil.* A healthy plant has an amino acid mix in its leaves that is not attractive to insects; plants that are grown in deficient soil can’t produce the right amino acids in the right amounts to repel insects or ward off disease. So if you spot disease or insects infesting your plants, the first thing to do is ask yourself: *How am I going to create a healthy soil?* ...and then accomplish it! ●

John Jeavons and Matt Drewno Present: A Four Saturdays” Zoom Workshop On Backyard Biointensive Gardening



Mar. 2, 9, 16, & 23, 2024

Learn to grow healthy food and fertile soil from
the author of “How to Grow More Vegetables”
growbiointensive.org/workshop.html

Victory Gardens for Peace Mini-Farm Report

By Matt Drewno, VGFP Mini-Farm Manager

As I write, there is a gentle rain falling on our yurt, moistening the land and bringing back the green growth we so welcome with the winter rains. Each year, spring and autumn bring a quickening focus on getting things ready for transition. In the spring, it's getting winter crops harvested, building compost, starting seedlings, prepping beds, and transplanting warm season crops. And in the autumn, it's harvesting our summer crops, building more compost, and cultivating beds in preparation for transplanting our winter cover crops. In the spring it's an acceleration towards a great rising and awakening of life, and in the autumn it's working with nature to put things to rest so that they can awaken renewed and refreshed.

All of this plays into our personal lives as well. Each autumn—and I'm feeling it as I sit and write this very moment—there is an acceleration and then a strong drag which slows us down and calls us to rest. We ignite the wood stove to carry the light as days get shorter, and bask in the warmth as the rain falls, and we dry, and rest. It's a blessing to work the Earth, to feel the sun, the changes that occur throughout the year, the rising and falling, in-breath and out-breathe, the ascending and descending—the rhythms of life and the universe.

Moving into winter we are given ample time to reflect on the past year. Some of us then choose

resolutions for the new year as the daylight begins to increase and ascend once again. At Victory Gardens for Peace (victorygardensforpeace.com), despite the challenges the world is facing and creating for itself, we feel the calm of knowing that there will be a time where a great shift will occur- I feel closer to it each day. At some point, we just have to walk away from all that we can no longer agree with and participate in and create the reality we want for ourselves, our families and our community. This is a difficult shift, because it involves not only deciding we can no longer participate, but it means we must also take on new responsibilities. To be responsible, able-to-respond can be a challenging choice. But its these challenges we set for ourselves which make us stronger, more sensitive and creative beings.

I would like to thank my coworkers Janét Moore and Matthew Gammatt for their hard work this past year in growing a good garden, with great care for the soil. And our 8-month interns from Kenya, Clarice Wawuda and Eliakim Kipngtech who left their homes and families to come and learn with us for the past 7-months. It's always a bittersweet moment as we approach the end of our internships as folks radiate the excitement of returning home to be with their beloved families, farms and communities, but also recognizing how much we will miss working with one another, the friendships formed and the journey of growing together. I am grateful for the many friendships formed over the years with Biointensive farmers around the world. There truly is a comfort in knowing that all over the world, we have allies and friends who know what is possible when we return to the Earth, in commune with Nature and in service of the vision of helping people realize their power in creating a better world.

I would also like to thank our recent high-school interns Adam Sholin, Papillon O'Feral, Francesca Mills, and Zayden Pfadt. Congratulations go out to both Adam and Francesca who graduated high-school this year, and have gone on to University to study Agriculture and Ecology. Their hard work and good energy will forever be in remembered in our hearts and our soil! Remember those who dug before you, they enrich our lives and our soils!

Special thanks also to our GardenCorps participants Suzabelle Spaulding, Ana Valencia, Marc Hoepfner, and Matilda Hernandez (and also Pa-

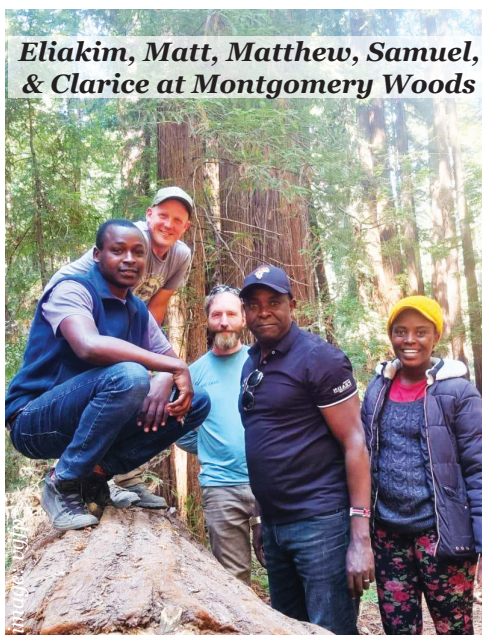
Victory Gardens for Peace in full bloom



image: bgfp

pillon, Francesca, and Adam mentioned above!). Our GardenCorps 4-month course requires commitment and focus to learn the techniques of Bio-intensive and design. This year we developed a design for a new community garden in Fort Bragg, CA, and are working to make it a reality. I'd like to thank the Bee Bold Alliance, the Katzeff Family, and Thanksgiving Coffee for their support for this project. We will keep you posted as this project grows and opens to give others in our community access to the resources to grow food for their friends and family and to build the relationships and confidence needed to transition to a local, sustainable community.

In September, we were graced with a visit from friend and colleague Samuel Nderitu of G-BIACK (GROW BIOINTENSIVE Agriculture Center of Kenya). Samuel toured the Victory Gardens for Peace



Eliakim, Matt, Matthew, Samuel, & Clarice at Montgomery Woods

Mini-Farm, we discussed seed saving and seed banking in our communities, surprised by the similarities and challenges we face in creating safe, accessible, and healthy seeds for gardeners and farmers in our regions. We took a trip to Montgomery Woods, a beautiful grove of

old growth redwoods just down the road from the garden. Samuel and I co-taught a class on seed saving at the local community college for folks enrolled in our sustainable vegetable and fruit growing class. It was a great trip, and we were so grateful for his visit. We send our best to all those in G-BIACK and across Kenya who are doing such amazing work to help farmers and soils thrive in challenging circumstances.

Many other wonderful opportunities to help the community have taken root this past year, including: helping design a community garden for Seniors at the Fort Bragg Redwood Coast Senior Center; the Flockworks organization of Fort

GardenCorps students survey community garden site



Bragg to assist in supporting their garden which serves TK-12th grade students in Fort Bragg; and the Sorrel Leaf Healing Center which serves children and adolescents experiencing mental health crisis to help with resources as they establish a mini-farm project to assist their residents in connecting with nature and eating healthy food. We feel blessed by the outreach and support which is reciprocated as we work together in serving our community.

Thank you all who made 2023 such a wonderful year. I feel honored to be a vehicle to translate your support into meaningful and responsible action to help inspire communities here and abroad. We all play an important role in making a better today and tomorrow. As 2024 approaches, I hope that you take time to rest and reflect and build the visions and dreams to make 2024 a special year. Each year we approach closer to tipping points—tipping points which don't always spell disaster, but can enable us to shed what does not serve our future and create the opportunities which will bring about a better world for all those living on Earth. Lets do it together!

Come Work With Us!
Victory Gardens for Peace
is looking for a
Full-Time GB Farmer
 Find out more at:
[***growbiointensive.org/Opportunities***](http://growbiointensive.org/Opportunities)

Soil Science Spotlight: The Dr. John Doran/ USDA Soil Quality Test Kit Guide, Part 3

By John Beeby (growyoursoil.org)
Ecology Action Soil Fertility Advisor

Soil testing and the correct use of organic amendments is an important part of GB. John Beeby and Ecology Action created the “Soil Science Spotlight” to introduce the topic to the GB community. Read the whole series at growbiointensive.org in the “Protocols” section.

In Part 1 of this series, I introduced the USDA Soil Quality Test Kit Guide, developed by Dr. John Doran (bit.ly/DoranSoilTest). The Guide describes tests for: **infiltration, bulk density, physical observations, aggregate stability, earthworms, soil respiration, slaking, water quality, electrical conductivity, pH, and nitrate levels.**

In addition to infiltration and soil bulk density tests which I discussed in the previous issue (growbiointensive.org/Enewsletter/Summer2023/soilscience.html), you can follow the instructions in the Guide on how to perform **Physical Observations** of the color and depth of your topsoil, as well as your soil’s rooting depth. This also points to the Soil Organic Matter (SOM) level, structure, and can help determine if the topsoil depth might be improved with additional organic matter as well as some tillage to allow roots to travel deeper into the soil and deposit root organic matter to create a deeper topsoil over time.

The **Aggregate Stability Test** is another great way to understand your soil’s structure, its ability to withstand heavy rainfalls, and indirectly, to assess the soil’s organic matter level. You can also run the very simple **Earthworm Count Test** to understand a soil’s structure, organic matter level, and overall biological health. All of these tests are going to give you slightly different perspectives on similar soil

properties, allowing you to make sound decisions on whether your soil’s organic matter level needs to be improved, if the soil needs to be tilled, etc.

Now let’s talk about **Soil Respiration**. Does a soil breathe? Yes! Soil microbes living in an aerobic soil (a soil with plenty of air) are like us in that they take in oxygen and release carbon dioxide: a process called “respiration”. This carbon dioxide eventually leaves the soil and can either be taken up by plants (especially effectively when plants are grown close together as in GROW BIOINTENSIVE), or if it’s not taken up by plants, it escapes into the atmosphere and adds to the ongoing climate change crisis. However, this is not to say that soil respiration is bad! Soil respiration is a good sign of healthy active soil macro- and microbiological populations, which is good for soil health so long as we replenish the organic matter that was consumed and converted into carbon dioxide.

A healthy soil macro- and microbial population is essential for good soil structure and tilth. So, by determining if a soil is respiring well, you can understand something about the health of the soil’s microbial ecosystem, as well as whether the soil has sufficient organic matter to support that ecosystem. Unfortunately, it can be challenging to acquire the equipment to measure soil respiration and to afford the Draeger tubes that can only be used once. The *Solvita* system (solvita.com) is another way to measure soil respiration, but it also can only be used once and can be challenging to acquire in some areas of the world. So, instead of measuring soil respiration directly, other tests in the Guide (such as the infiltration rate, aggregate stability, bulk density, earthworm count, and physical observations of the topsoil color and depth and the rooting depth) can allow for a similar understanding of the soil’s organic matter and macro- and microbial population health in a way that approximates a soil respiration test. ●



Soil Science Spotlight

*If we understand a soil,
we can improve it*

GB Empowering People with Disabilities in Mozambique

Simon Nyaga, Director of Bold Impact Africa (boldimpact.africa) promotes GB to small-scale farmers, as well as environmental conservation, childhood/youth development, advocacy, community/policy development, and entrepreneurship for women and youth groups. He holds degree (BSc. CRM) from Kenyatta University, and learned GB at the GROW BIOINTENSIVE Agriculture Centre of Kenya in 2016. He shared this article with us.

USAID states "In Mozambique people with disabilities (PWD) are routinely marginalized and discriminated against, particularly in rural areas. They often lack full access to education, health care, information and employment. In addition to practical barriers, prejudice and stigmatization make it even more difficult for Mozambicans with disabilities to maximize their contribution to society." (usaid.gov/mozambique/factsheets) Simon's project helps address this challenge.

In the heart of Maputo, Mozambique, a small but impactful initiative is making waves. Simon Nyaga, the founder of Bold Impact Africa, has spearheaded a project that is transforming the lives of individuals with disabilities in this vibrant African nation. Through a grant received by Bold Impact Africa, in collaboration with Mozambique citizen Xangamira Siteo and with the support of the Mandela Washington Fellowship for Young African Leaders (yali.state.gov/mwf), this project is empowering people with disabilities to use GROW BIOINTENSIVE farming skills.

Mozambique is home to 475,011 individuals living with various disabilities, including physical, hearing, mental, visual, and multiple disabilities. For these individuals, disseminating their rights and unlocking their full potential has been a persistent challenge. Simon Nyaga and his team recognized the need to address this issue and decided to empower them through sustainable GROW BIOINTENSIVE (GB) farming training. The project focused on equipping 30 individuals with disabilities, aged 18 to 40, with essential farming skills over a two-week training program in August 2023. The training program delved into the core principles of GB farming, covering topics such as double digging, composting, carbon farming, and calorie farming. One of the significant achievements of the project was the establishment of a GROW BIOINTENSIVE demonstration site. Here, individuals with disabilities actively participated in

transplanting seedlings using the GB diagonal offset method. This experience gave participants an opportunity to put newly acquired knowledge into practice and build confidence in their farming abilities.

To ensure the sustainability of the project and the success of its beneficiaries, a three-day monitoring and follow-up phase was implemented. This phase involved visits and site tours to the participants' homes. The primary objectives of these visits were to monitor the implementation of the farming techniques, provide seedlings, offer technical support, and address any identified capacity gaps.

The impact of this project goes beyond the training itself. As a result of the acquired skills, all the participants successfully established growing beds and began cultivating a wide range of crops, including maize, beans, kale, spring onions, and lettuce. These efforts have significantly contributed to household food security, demonstrating that empowerment through education can have a far-reaching impact for all people.

Simon Nyaga's vision, coupled with the collaboration with Xangamira Siteo and the support of the Mandela Washington Fellowship's LINC project (Leveraging Innovations in New Communities, www.mandelawashingtonfellowship.org/program-impact-stories/forty-alumni-selected-as-2023-linc-grant-recipients), has brought about positive change in the lives of persons with disabilities in Mozambique. Through GROW BIOINTENSIVE farming, these individuals have not only gained valuable skills but also newfound independence and a source of sustenance for their families. This project serves as a shining example of how a small grant, determination, and the power of collaboration can create lasting change in communities that need it most. It's a testament to the fact that when people come together with a shared goal, the possibilities for positive transformation are endless. ●



Follow up visit: deaf project participants tend thriving GB garden

Book Review: What I Stand On

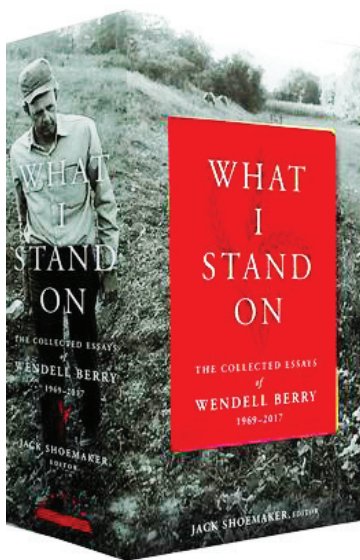
By John Jeavons, Ecology Action Executive Director
from johnjeavons.org/2019/09/26/what-i-stand-on/

According to Wikipedia, Wendell Erdman Berry (born August 5, 1934) is an American novelist, poet, essayist, environmental activist, cultural critic, and farmer. He is an elected member of the Fellowship of Southern Writers, a recipient of The National Humanities Medal, and the Jefferson Lecturer for 2012. He is also a 2013 Fellow of The American Academy of Arts and Sciences. Berry was named the recipient of the 2013 Richard C. Holbrooke Distinguished Achievement Award. On January 28, 2015, he became the first living writer to be inducted into the Kentucky Writers Hall of Fame.

What I find more profound than all these accomplishments is the breadth and scope of Berry's understanding of people, society, and farming, and how they can work together to form the ground and foundation upon which our civilization literally and figuratively stands. In his deeply moving collection of essays *What I Stand On The Collected Essays of Wendell Berry in Two Volumes, 1969-2017*,

Berry takes what he has lived and observed, and uses it to give sense to the heart of what we need to internalize and act upon, as we confront a world in which climate change and agricultural challenges are growing at an ever-increasing rate.

The back cover of Volume 1 summarizes this feeling: *“Wendell Berry is our essential voice on the cultural and ecological crisis brought on by industrialization, technology, and the market economy, urging us to live differently, better, more sustainably. This Library of America volume...presents the complete text of his landmark 1970 book, The Unsettling of America—a far-ranging meditation on the intrinsic connections between culture and agriculture—along with thirty-two essays from eight other books published from 1960 to 1990. It reveals the younger Berry as an already masterful stylist, whether chal-*



lenging corporate greed and innovation for its own sake or treating topics as varied as family, farming, the dignity of hard work, and racism. Anticipating such contemporary concerns as organic farming, buying local, renewable energy, even the do-it-yourself and slow food movements, Berry's incomparable essays peak with gathering urgency today.”

The back cover of Volume 2 notes, *“Iconoclastic, inspiring, powerfully moral, democratic in tone and attuned to the rhythms of nature, Wendell Berry's essays are quintessentially American. ... [This volume] finds him turning to issues of political and social debate—big government, science and religion, technology, and the meaning of citizenship following the tragedy of 9/11—and burnishing his reputation as one of the master prose stylists of the last century. Here is the complete text of his 2000 book Life is a Miracle in which E.O. Wilson becomes an unlikely adversary—and forty-two essays and speeches from nine other books published from 1993 to 2017, among them his 2012 Jefferson Lecture to the National Endowment for the Humanities, It All Turns on Affection, an eloquent plea for practiced love of the land.”*

I have worked for over 50 years developing the GROW BIOINTENSIVE method, seeking to heal the depletion of agriculture, and to help farmers live and work in harmony with the everyday miracle of the seasonal and biological cycles that nourish and sustain our civilization. I am drawn to Berry's writing because he expresses so well the thoughts and emotions that keep me inspired to continue this work. Two other individuals come to mind, whose writings have given us (me) such a rich sense of humanity and inspiration for the difference we can make in the world as individuals, particularly in the area of farming and tending the Earth.

Gandhi said, *“To forget how to dig the earth and to tend the soil is to forget ourselves.”*

Lincoln said, *“Ere long the most valuable of all arts will be the art of deriving a comfortable subsistence from the smallest area of soil. No community where every member possesses the art can ever be the victim of oppression in any of its forms.”*

And Berry says *“The soil is the great connector of lives, the source and destination of all. It is the healer and restorer and resurrector, by which disease passes into health, age into youth, death into life. Without proper care for it we can have no community, because without proper care for it we can have no life.”*

ECOLOGY ACTION'S GARDEN COMPANION

There has never been a better time to read and draw inspiration from Berry's writing than right now, as we work to save a world where mechanized, chemical, herbicidal farming is wreaking havoc on our ecosystems, and as little as 21 years of farmable soil remains to feed future generations.

(Did you know that nitrate fertilizer used to grow crops exist as a result of surplus TNT explosives left over from World War II? It's true. Also true is the fact that nitrate fertilizer use depletes soil organic matter (grist.org/article/2010-02-23-new-research-synthetic-nitrogen-destroys-soil-carbon-undermines/) and the ability of soil to hold on to organic nitrogen, in a vicious cycle: the more nitrate fertilizer a farmer uses, the faster the soil loses its organic matter (and its ability to produce food). In one loosely figurative sense, when we use synthetic nitrogen fertilizers, we are dynamiting our soils in order to grow food as we focus on products rather than dynamic, living biological processes! Without a good, closed system, fully sustainable farming paradigm, we are "at war" with nature, and it is not possible for individuals, families, communities, ecosystems and the world to live well, or live at all. In contrast, it can be seen though the data in a University of California-Berkeley Masters Thesis, that living closed-loop sustainable food- and soil-growing biologically intensive practices, have the potential of building up to 20 pounds of fertile, carbon-rich, biological nitrogen-friendly, farmable soil per pound of food eaten.)

As I noted in *The Soul of Soil* (johnjeavons.org/2016/12/31/soul-of-soil/), a heaping table-spoon of fertile living soil can contain approximately the same number of life forms as there are people on the Earth. May this living force be with us! It certainly is with Wendell Berry, a Master of Soul and Soil; we can all learn from his writings how to better live in and proactively transform our living, thriving mini ecosystems as we create a wonderfully livable Earth no longer besieged by climate change.

As you stand in your part of the Earth, your garden, and as you work in the living soil to grow a better and more sustainable and just tomorrow, read and be nourished by the wonderful opportunities Wendell Berry's words speak to the deepest good in each of us. It is the cultivation of healthy souls, the conscious and unconscious parts of our inside selves that determines what we create.

In fact, the way we cultivate the soil is how we cultivate our souls. ●

NPR: New Evidence Shows Fertile Soil Gone From Midwestern Farms

The following is excerpted from an article published in 2021 at npr.org/2021/02/24/967376880/new-evidence-shows-fertile-soil-gone-from-midwestern-farms. Extrapolating soil organic matter levels by comparing soil color is an interesting idea. GROW BIOINTENSIVE can build topsoil up to 60 times faster than in nature, and can be an important tool for small farmers to restore soil fertility.

Farming has destroyed a lot of the rich soil of America's Midwestern prairie. A team of scientists just came up with a staggering new estimate... [that] the most fertile topsoil is entirely gone from a third of all the land devoted to growing crops across the upper Midwest... Some of their colleagues, however, remain skeptical about the methods that produced this result. ... Even the study's critics, though, agree that topsoil is endangered.

The new study emerged from a simple observation[that the] color of bare soil varies, and that variation is related to soil quality. The soil that's darkest in color is widely known as topsoil. Soil scientists call this layer the "A-horizon." It's the "black, organic, rich soil that's really good for growing crops," says Evan Thaler, a Ph.D. student at the University of Massachusetts, Amherst. It's full of living microorganisms and decaying plant roots, also called organic carbon. When settlers first arrived in the Midwest, it was everywhere, created from centuries of accumulated prairie grass. Plowing, though, released much of the trapped carbon, and topsoil was also lost to wind and water erosion. The soil that remains is often much lighter in color.

Thaler and his colleagues compared that color, as seen from satellites, with direct measurements of soil quality that the USDA has carried out, and found that light brown soil contained so little organic carbon, it really wasn't A-horizon soil at all. The topsoil layer was gone. What's more, Thaler found that this was consistently the case on particular parts of the landscape. "The A-horizon was almost always gone on hilltops," he says.

Thaler believes that a century of plowing is to blame. The soil...fell down hillsides, a little bit each year, as farmers tilled. Thaler's team then expanded their study ...calculating that about a third of the crops were growing on erosion-prone hills. This produced their estimate that a third of all cropland in that region had lost its topsoil.

That estimate is far higher than those published by the U.S. Department of Agriculture. "I think the USDA is dramatically underestimating the amount of loss," Thaler says.

...{continued online}

Recipe: Frijoles Borrachos (Drunken Beans - Vegan)

By Shannon Joyner, Garden Companion Editor

Fall in Northern California means hot days and cool nights, interspersed with gentle rainstorms reminding us that winter is on its way. The signs of a changing season—the scent of those first rainstorms, when the air is still warm enough to allow plants to release their volatile oils, the flocks of geese calling to each other as they fly south to winter nesting grounds—bring a feeling of joy and expectation. And it's finally time for soup again! After a long day of outdoor projects before the rain blew in this evening, I'm exhausted. I don't want to cook, but I'm longing for a warm, nourishing bowl of something delicious. My version of the traditional Mexican dish *Frijoles Borrachos* (drunken beans, inspired by rachelcooks.com/frijoles-borrachos) is quick, brothy, gently spicy, and packed full of protein. Instead of bacon, this vegan version uses smoked paprika and vegetable bouillon to provide rich umami flavor. Served with *Pico de Gallo* (“beak of the rooster” aka *salsa fresca*), this is fast comfort food that is good for body and soul. You can make it without beer if you prefer: just add additional broth and adjust the seasoning, and maybe add a few drops of bitters to mimic the taste of hops. I used canned beans because I was in a hurry, but dried beans will work if you plan ahead, soaking them overnight; use 1 cup of dried beans, increase cooking liquid by 2.5 cups, adjust seasoning, and simmer, covered, until tender, about 2.5 hours.

Frijoles Borrachos (~4-5 servings)

2 15-oz cans of pinto beans, drained
2 T olive oil
1 cup finely diced onion
2 T chopped pickled jalapenos and 1 T of their juice (adjust spiciness to taste)
1 T minced garlic
1.5 cups dark beer
1/2 cup vegetable broth or water
1 15-oz can diced fire-roasted tomatoes
1 vegetable bouillon cube
1 T each brown sugar and molasses
1 tsp each dried Mexican oregano, ancho chili powder, salt, and ground cumin

1/2 tsp each onion powder, ground coriander, and smoked paprika

1/4 tsp ground black pepper

1 bay leaf

2 teaspoons fresh lime juice

In a large pot over medium heat, heat olive oil until it shimmers, and sauté the onion until softened, about 5 minutes, stirring frequently. Add garlic, pickled jalapenos, and spices and cook, stirring, for 1 minute or until fragrant. Add tomato, beer, broth, bouillon cube, brown sugar, molasses, and salt. Stir, scraping any brown bits off the bottom of the pot.

Add beans, stir to combine, and bring to a boil. Reduce heat to low, partially cover pan, and simmer gently for ~1/2 hour or until the liquid has reduced a bit, but the beans are still fairly soupy, stirring occasionally. Remove from heat, stir in the lime juice, and taste for seasoning. Serve in bowls, topped with *pico de gallo* and sour cream, with warm tortillas on the side (or over polenta!). Keeps in the refrigerator for up to 4 days, or in the freezer for up to 3 months. Reheat over low heat, stirring often.

Pico de Gallo

1 cup each chopped fresh cilantro, finely diced onion, and finely diced tomato

1 T chopped pickled jalapenos

1 T olive oil

1/4 tsp salt, to taste

Juice of 1 lime

Mix all ingredients in non-reactive bowl, and taste for seasoning. Best served the day it's made, but will keep for a day covered in the refrigerator. •



Going A Little Bit Vegan Could Help Save the World

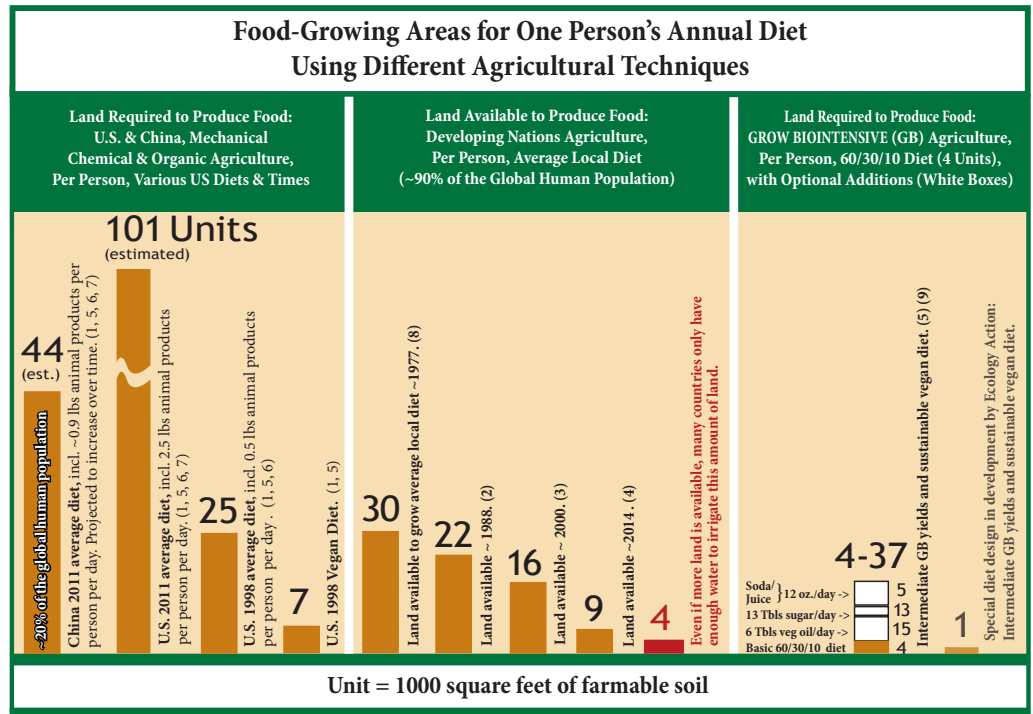
By Shannon Joyner, Garden Companion Editor

In 2015, Ecology Action created the chart below (updated in 2022, full-size image at growbiointensive.org/Enewsletter/Fall2023/food.html), showing the area needed to produce food using different agricultural techniques. It illustrates that the average conventionally grown American diet, which relies heavily on animal products, uses much more land than a vegan diet. Unfortunately, many people worry that a vegan diet will be too restrictive or unfamiliar, and think there's no point in trying if they're not going to be "perfect" vegans from the start. But changing habits takes time and persistence, and it's better to make a series of incremental changes over time to achieve a big goal, rather than never doing it at all!

And with going vegan, if we *all* start making those changes right now, we can make a big difference in terms of sustainability. An article in the journal *Nature* (*Feeding climate and biodiversity goals with novel plant-based meat and milk alternatives* nature.com/articles/s41467-023-40899-2) states that if we substitute 50% of animal-derived foods with plant-based foods (and restore the forests cleared to raise livestock) we could help reverse the terrible climate impacts animal-based diets have had on our planet: "...We find a substantial reduction in the global environmental impacts by 2050 if globally 50% of the main animal products (pork, chicken, beef and milk) are substituted [with plant-based alternatives]—net reduction of forest and natural land is almost fully halted and agriculture and land use GHG emissions decline by 31% in 2050 compared to 2020. If spared agricultural land within forest ecosystems is restored to forest, climate benefits could double, reaching 92% of the previously estimated land sector mitigation potential. Furthermore,

the restored area could contribute to 13-25% of the estimated global land restoration needs under target 2 from the Kunming Montreal Global Biodiversity Framework by 2030, and future declines in ecosystem integrity by 2050 would be more than halved. The distribution of these impacts varies across regions—the main impacts on agricultural input use are in China and on environmental outcomes in Sub-Saharan Africa and South America. While beef replacement provides the largest impacts, substituting multiple products is synergistic."

This study focused on using commercial plant-based foods that mimic the taste/texture of meat and milk—which may not be particularly healthy, given the highly processed nature of many of those products. However, the overall idea—that a global dietary shift replacing at least 50% of animal-based foods with plant-based foods can have a big positive impact on global ecosystems—is good news. So, if you're a meat eater struggling to make your diet more sustainable, don't give up, get to 50% and then keep going! With a few tweaks and the right seasonings, vegetarian and vegan versions of your favorite dishes can be as good or better than the original. And knowing you're helping to save the Earth every time you substitute an animal product with a plant-based food (especially plants you grow yourself!) just makes every bite that much more delicious. ●



GROW BIOINTENSIVE® Farming Can Be a Solution.

Footnote: 9. In 2016, the data was 2T sugar/day and 2T vegetable oil/day

© 2015-22 Ecology Action, Willits, CA 95490. All rights reserved.

Martz Family Farm: How a Dream and GROW BIOINTENSIVE Collided

By Pilar C. Martz, 2023 EA 8-Month Intern

This is an excerpt from a inspiring article we received from 2023 8-month Intern Pilar about her family's journey with sustainable living and GROW BIOINTENSIVE. You can read the entire article at growbiointensive.org/Enewsletter/Fall2023/martz.html.

My husband and I met back in 2001, soon after 9/11. How we met was not as conventional as it is today, but fate intervened via Yahoo, and we were married in April of 2003. I have a bachelor's in architecture and at the time I was working for my father and for an American firm. Troy was working on his own as a web designer, we were living in a small apartment in Tijuana, Mexico and life was great, we were happy being part of the "rat race".

In January of 2005 our first daughter Andrea was born, and becoming parents changed our lives. Never liking the idea of daycare, we decided I would focus on raising her. All of a sudden, living in an apartment didn't seem so appealing, but having a backyard did, and when my second daughter Sofia was born in May of 2006, we knew we wanted to make some changes. These didn't come until 2008 when my husband accepted a job in San Diego, CA and we decided to move the family north of the border.

This is the year our lives changed forever. A colleague of my husband recommended a book that opened our eyes to a reality we didn't know existed, but I believe our souls felt, because it rang so true to us that scared us straight. Fear became the best catalyst for us, it made us take a hard look at our lives and realize that we didn't know much about anything that truly mattered if hardships came our way, and we knew we wanted to thrive not just survive, if there was ever an event. We sat down, had a lengthy conversation about our new goals, and decided to divide tasks deemed the most important for us to know (food production and health for me and energy for him) and focused on them, learning as much as we could, always putting them to practice.

The first documentary we ever saw on farming was Paul Gautschi's *Back to Eden*. It was so inspiring that I befriended every single gardener in the area

where we lived and had them dispose of their wood chips on the small acreage property we were renting. The soil was so hard that even a pick was no match for it, so we decided to cover it, creating a mulch to which we added spent mushroom compost and rock dust, and this became our first garden. We grew everything: beets, broccoli, onions, kale, chard, radishes, potatoes, cantaloupe, zucchini, watermelon, lettuces, peas, and the like.

We planted fruit trees, berries, experimented growing in straw, straight wood chips, amended soil, non-amended, you name it, we tried it. We learned about vermicompost and compost tea and started raising worms. At one point we had over a million of them. This property became our school for a lot of the things we were learning and applying at the time. Gardening was the place where I found my spirituality and where I saw the connection we have with every single living being on this earth, and how important it was to protect and preserve it.

We also started raising chickens and soon after, made friends with the owner of an organic food market and for eight months straight, I drove every day at seven in the morning to her store and collected all the fruits and vegetables deemed not sellable, all the fruit and vegetable scraps from the kitchen, the eggshells and egg cartons from the bakery, the pulp from the juice station, and all the spent coffee (two 55 gallon buckets daily), after which I would go home and sort out. As a side note, grocery stores waste so much food. I was amazed how much good food ended up in the bin. I had to learn quickly to preserve and store food, and the rest became worm food, chicken feed, and piles and piles of compost.



When we discovered and certified in permaculture and regenerative agriculture, the fear we once had which took us on this life-altering journey made us

feel empowered. We knew no matter the context, the place, the circumstance, we now had the tools we needed to succeed if we were thrown a curveball. My husband focused on energy production and dove deep into charcoal gasification, designing and building a prototype that produced 15 KW/h of electricity, and became very active in the permaculture circles due to his niche and expertise in sustainable energy, and participated in various symposiums, lectures and workshops.

In the middle of all of this in December of 2009, we had our third daughter Natalia, and my older children were of school age. Schooling our girls became its own journey. We started with regular public school, later did traditional homeschool that transformed into them going to a charter school that focused on homeschooling with school activities a few days a week. But in 2013, when we made the decision to return to Mexico and move south of Puerto Vallarta, the concept of freedom laid heavy in our hearts, so when we pulled our girls out of school to move south, we made the decision to radically un-school them. This meant no school, no homework, no menial work, no schedules, no exams, no structured learning.

Learning would become passion filled and self-guided, led by our own girls' likes and interests, harnessing their natural abilities to learn through play. Instead of us becoming "the teachers", we were the facilitators of that knowledge, bringing the tools, people, or environment that allowed them to understand on their own, at their own pace, and always with enthusiasm, because they were experiencing and studying things they were excited about. The act of learning or acquiring knowledge was not a segregated ability, it was all-encompassing and not subject-oriented. It needs to be hands-on and lived, or is forgotten. Now my two oldest daughters are about to start college, the oldest going for a degree in Pedagogy, and attending trade school for clothes-making and sewing, and my second daughter is pursuing Culinary school.

Through all of this, we filled our lives with work, learning, and raising our family. Having a background in architecture, I got certified in natural building and finishes. Having had experience processing foods and growing our garden, I was awarded a scholarship and did a master's in Food Safety Management, I did a year of Naturopathic Homeopathic medicine, and took a certification course on Natural Medicine

...{continued online}

Dahlia Project Update

By Suraya David-Sadira

FTT and Assistant Mini-Farm Manager, TJC

In 2021, we established an experimental 10-Bed Unit at The Jeavons Center with a diet design including dahlias as a versatile carbon/calorie/income crop. This is part five a continuing series on this project.

The Dahlias have been doing very well. As the temperatures drop a bit, the flowers have been getting more prolific. I notice that they tend to have a harder time when daytime temperatures are consistently over 90 degrees Fahrenheit and that they tend to like the 60-85°F range a lot better. Since they are still going strong, it is difficult to draw conclusions about which varieties I will select for further research next year. But, so far *Thomas Edison*, *Orcas*, *Patches*, *Maki*, *Mikayla Miranda*, and *Hometown Hero* have been performing really well.

We will harvest tubers later this fall and store them until next year, when we will decide which ones to use based on this season's final results, and grow at least 25 square feet of each selected variety. Through this ongoing research, we will develop more detailed protocols around pruning, and be able to track yields on a larger scale. The goal is to identify the varieties that perform best in our climate and soil, and then develop a best growing practices protocol to maximize yields and sustainability. It is definitely going to be a lot of work this year to divide all the tubers, but the work is fun and the information we're gathering is exciting.



You can read about the tuber harvesting and dividing process in my article from 2022, at: growbiointensive.org/Enewsletter/Spring2022/dahlias.html •

When Seeds Hibernate: Breaking Dormancy From the Bountiful Gardens Archive

Not all seeds are created equal! Different varieties have evolved and adapted to survive in different climates and soils, and it's important for a gardener to understand which ones need a little extra help to sprout and grow. This article provides an overview of seed dormancy and what you can do to increase germination rates.



Most domesticated vegetables and grains sprout when and where they are planted. A requirement for going dormant (literally meaning "sleeping") has been bred out of them, because the gardener is going to take care of them, making sure they're planted at the right time, and in the right conditions to sprout safely and thrive.

However, perennials, berries, trees, and many herbs are closer to being wild, and still go into dormancy to help them survive. And just as perennial plants survive the winter by going dormant (literally meaning "sleeping"), some seeds need a winter nap, too.

Seeds don't want to sprout on a warm day in December—they want to make sure winter is really over. So, each seed is programmed to need a specific period (up to 4 months, depending on the variety) in cold, wet, soil before they can sprout when the soil warms. If you plant seeds in the spring that need a period of winter dormancy, they may never sprout, or they may sprout after you have given up and sown another crop on top of them.

To break their dormancy (wake them up), the gardener needs to create the conditions the seeds are waiting for. There are three tricks gardeners use to break dormancy and get seeds to sprout: Stratification, Scarification, and Soaking.

Cold Stratification:

Most trees, shrubs, and many perennials from tem-

perate climates like to go through the winter as seeds. In nature, they drop from the plant, spend the winter in cold wet soil, and sprout in spring. This cold dormancy is an adaptation to temperate winters—it keeps the plant from having to face freezing temperatures as a small seedling.

You need to give the seeds enough cold time to meet their chill requirement—a process called *cold-conditioning or stratification*. If you plant in pots in the fall and leave them outdoors, they will sprout when the weather warms. If you want to plant in summer, you can use the refrigerator to provide the cold. (Place the seeds in a bit of moist potting soil in a jar before refrigerating for as long as needed, then plant as normal at the end of the stratification period.)

Each plant has a specific length of time that it needs for this cold, moist period—this prevents them from sprouting during unseasonable thaws. Chill requirements are usually given on the packet for each variety. So, for example, Rowan, or Mountain Ash, which naturally grows around the world in northern regions, needs 90 to 120 days of cold before sprouting. Red Root, from Mediterranean climates in the western US, needs only 30 to 90 days of cold. And Moringa, from the tropics, needs none. It doesn't even like to be stored in a refrigerator, because it needs warmth to stay alive.

Warm stratification:

Some plants need a period of *warm stratification*. The warm always comes first, as it mimics the summer weather when the seed first matures and falls from the plant. If you get your seeds in the summer and sow them in pots, they will get that warm stratification naturally. If you start your seeds during the cold part of the year, you can give them their warm stratification in your home. They do not need to be under lights or a window, since they haven't sprouted yet. They just need to be moist and warm like spring soil. The top of a refrigerator is good, or anywhere that is warm and airy. (Good air circulation prevents mold.) The potting soil for the stratification period should be moist but not soggy—the seeds don't have roots to absorb water, so they will not need watering except to replenish what is lost by evaporation.

Scarification:

There is another process that you may see mentioned on seed packets and in books. It is called *scarification*, and it is another way of breaking dormancy.

Cold is not the only danger to young seedlings—in many places, water is the limiting factor. A plant that sprouts before there is a good supply of water is condemned to shrivel and die. So, plants from places with a pronounced dry season have very hard seed coats that prevent water from entering the seed and initiating germination. These seeds need to have their tough seed coat scratched so that water can enter before they can sprout. In nature, flash floods or raging rivers tumble the seeds along with rocks and sand, which scratch the coating and start germination. That way, a tiny bit of rain or dew won't fool the seed into sprouting before there is enough water for growth. Licorice and Astragalus are both riverbank-adapted herbs that need to be scarified.

You can scarify seeds easily at home with a piece of fine sandpaper. Just cut the sandpaper in half, put a few seeds on the paper, and put the other half on top. Rub them lightly together 3 or 4 times. Then try soaking the seeds. If they swell up within a couple of hours, they are adequately scarified. If not, try again. If the seeds are cracked or broken, use less

pressure or fewer scratches next time. Usually, one or two tries will find the happy medium.

Soaking:

Plants that don't encounter turbulent storm waters have another way of preventing premature germination. Instead of a tough seedcoat, they have a coating of natural chemicals that prevent germination. Many dryland wildflowers, such as lupines, have this strategy. Garden plants that also have germination inhibitors are carrots, parsley, fennel, beets, and especially parsnips. These seeds all need a good soaking to remove the germination inhibiting compounds. For example, carrots and parsnips often take two weeks to sprout in the garden, and need to remain moist the entire time. However, if they are soaked for 8 hours and rinsed well in a strainer, you can plant them and get little seedlings in a few days.

The soaking removes the inhibitors that otherwise would dissolve very gradually in the moist soil. Be aware: most vegetable seeds do not have these germination-inhibiting chemicals and should not be soaked for long periods. (They will rot.) Peas, beans, and spinach can be soaked, but only long enough to soften the seed coat—usually 1 or 2 hours is plenty. Most other vegetable seeds need no soaking at all. ●

DIY: Making a pH Indicator from Red Cabbage from thoughtco.com & compoundchem.com

Did you know that red cabbage juice contains a natural, water-soluble pigment called a flavin (a type of anthocyanin), which changes color when exposed to solutions with different acidity levels? Acids turn the pigment red, neutral solutions create a purple/blue color, and alkaline solutions turn the flavin green to yellow. To make your own pH paper strips using a red cabbage indicator, take filter paper (or coffee filter) and soak it in a concentrated red cabbage juice solution. After a few hours, remove the paper and hang it to dry. Cut the filter into strips and use them to test the pH of various solutions. To test a sample, place a drop of liquid on the test strip. Don't dip the strip in the liquid because you'll get cabbage juice in it. An example of a basic solution is laundry soap. Examples of common acids include lemon juice and vinegar. For complete instructions on how to make and use cabbage juice as a pH indicator, go to thoughtco.com/making-red-cabbage-ph-indicator-603650. For a higher resolution version of this image, go to compoundchem.com/2017/05/18/red-cabbage/

MAKING AN INDICATOR FROM RED CABBAGE

The compounds that give red cabbage its colour can be extracted and used as a pH indicator solution. Here we look at the method and the colours!

MAKING THE INDICATOR

1. ROUGHLY CHOP THE CABBAGE
2. BOIL FOR A FEW MINUTES
3. STRAIN AND LET COOL
4. USE AS AN INDICATOR!

RED (pH <3) VIOLET (pH 4-7) BLUE (pH 7-8) YELLOW GREEN (AT pH >8)

Hydrogens on carbon atoms implied; each carbon has 4 bonds.

The red cabbage extract can be used to determine whether substances are acidic or alkaline. The structures of the anthocyanin pigments which give the red cabbage its colour are subtly changed at varying pH. These different structures give a range of colours.

© Andy Brunning/Compound Interest 2017 - www.compoundchem.com | Twitter: @compoundchem | FB: www.facebook.com/compoundchem

This graphic is shared under a Creative Commons Attribution-NonCommercial-NoDerivatives licence.

ECOLOGY ACTION'S GARDEN COMPANION

WRITER/EDITOR AND ART DIRECTOR: Shannon Joyner

CONTRIBUTORS: John Jeavons, Matt Drewno, John Beeby, Simon Nyaga, Pilar C. Martz, Suraya David-Sadira, *NPR*, Bountiful Gardens Archive, thoughco.com, compoundchem.com, EA Staff, and GROW BIOINTENSIVE® friends from around the world.

Ecology Action
5798 Ridgewood Road Willits, CA 95490-9730
Phone: (707) 459-0150

Ecology Action newsletters and full-length articles are available online at growbiointensive.org/Enewsletter/Archive.html

Printed with soy ink on 40% post-consumer paper

© 2023 Ecology Action. All rights reserved.

ECOLOGY ACTION EVENTS: 2024

Dear GROW BIOINTENSIVE Family,

Our schedule (subject to change) of public events is as follows.

Online Spring 4-Saturdays Introductory Workshop:

March 2, 9, 16, & 23, 2024. Register at: growbiointensive.org/workshop.html

Onsite 6- and 8-Month Internship Application Deadline:
January 5, 2024: growbiointensive.org/Internship/#Onsite

Online 8-Month Internship Application Deadline:
February 2, 2024: growbiointensive.org/Internship/#online

Onsite Garden Tours:

VGFP on May 4 • TJC on Jun 8 • VGFP on Oct 12, 2024
<http://growbiointensive.org/tour>

Our full 2024 schedule of events:
growbiointensive.org/events_main.html
or call 707-459-0150

Watch our 2-Week Farmer Training Course:
vimeo.com/ondemand/ecologyaction

Ecology Action

5798 Ridgewood Road
Willits, CA 95490-9730



51 years.

152 countries.

Millions of people educated.
Millions of garden beds created.
Billions of pounds of
fertile soil grown...
And we're just getting started.

Grow Hope. Grow Abundance.
GROW BIOINTENSIVE®!

Your donations and memberships
keep *all of us* growing!
growbiointensive.org/giving

Non-Profit Org.
U.S. Postage
PAID
Willits, CA
Permit No. 2

Address Service Requested