

ECOLOGY ACTION'S GARDEN COMPANION

GROW BIOINTENSIVE® News from Around the World



SPRING 2021

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The Jeavons Center Mini-Farm Report

By John Jeavons, Ecology Action Executive Director

“Think of any subject in the same way you think about the structure of a tree. Think of the stout trunk and spectacular boughs branching off into hundreds, maybe thousands of individual lessons, each of those lessons containing a multitude of leaflets for you to thumb through on your pursuit of knowledge. Now think of the part that you don’t see, but without which, there would be no tree, I’m talking of course about the root of the subject. The inner workings of the physical world upon which every tree is grown, every subject is built and every leaflet is written. I want you to approach your pursuit of knowledge in a nonlinear sense, realizing that within every leaflet there is a map of the universe, within every leaf there is a map of the tree, and within you there is an answer to every question that you may come across on this pursuit of knowledge.”

– Sage Miller, TJC FTT, 19 years old

Clearly, the plants are rooting for us to succeed!

Reading the perceptive and beautiful thoughts on the holographic nature of knowledge and learning as a part of the the natural world written by TJC's newest Farmer-Teacher Trainer (FTT) Sage Miller (above), you can see why, in the midst of this tumultuous time, I continue to have hope for the future. Of course, it's not always easy: 2020 was an "interesting" year for Ecology Action, as it was for pretty much everyone around the world. Corona virus and wildfires presented their challenges and learning curves, but an 8-Month Zoom Internship with a bumper crop of global participants and a 3-Saturdays Zoom Workshop in November with participants from across the US and as far away as Sri Lanka provided progress and inspiration for the ever-growing Global GROW BIOINTENSIVE Family!

So far, 2021 appears to be continuation on a theme: the pandemic is still going strong, and climate change is driving disruptive weather systems here and across the globe, impacting farms, farmers, the food supply chain for billions of people. Now more than ever, it is vital for everyone to know how to grow food and soil, sustainably. So Ecology Action is forging ahead with our work as source of global GROW BIOINTENSIVE information and inspiration, and our goal is the same as it has been for almost 50 years: *to catalyze people everywhere to become proactive in growing their own soil, food, and thriving ecosystems.*

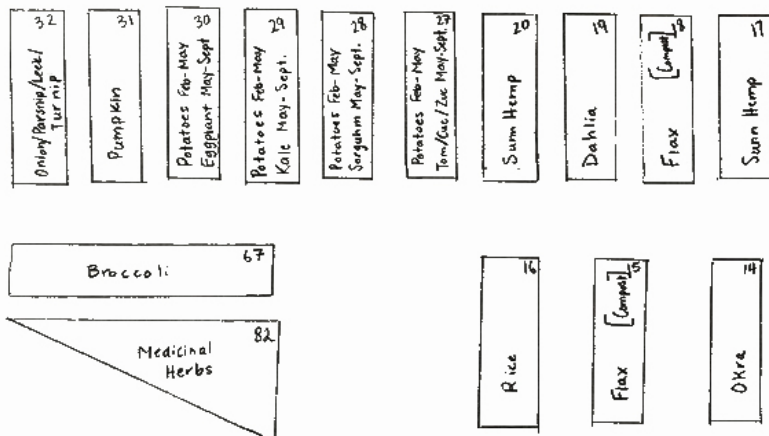
Our 2021 online training programs include an 8-Month Internship (bit.ly/EAInternships) and our spring 3-Day Introductory GROW BIOINTENSIVE Workshop (bit.ly/EA3Saturdays), transformed into a 3-Saturdays online extravaganza, both using Zoom to reach as many people as possible. So far we've got a lot of good people signed up for both, and it's not too late to join in!

The Jeavons Center Mini-Farm 2021 activities will include:

- **The establishment of four experimental 10-Bed Units (10BU), each providing a complete one-person diet and soil-growing combination in a 1,000 square-foot growing area.** This work complements the ongoing 10BU research at our Victory Gardens for Peace site (read the excerpt in this issue from Booklet 38 by Matt Drewno on this work) as well as other locations around the world. You might think such a small space would mean a diet design lacking in variety, but that's not the case! An example of one 10BU garden plan to be grown by FTT Sage Miller (diet design sketch, below) includes plenty of variety with onions, parsnips, leeks, turnips, pumpkins, potatoes, eggplant, kale, sorghum, tomatoes, cucumbers, zucchini, broccoli, flax, rice, dahlias, okra, medicinal herbs, and Sunn hemp. FTT Melvin Castrillo will be growing a another 10BU with a version of a typical Mexican diet.

(If you are not familiar with Sunn hemp (*Crotalaria juncea L.*), it is a tropical/sub-tropical legume from India, and is used as a green manure, a livestock feed, a fiber crop, and a nitrogen-fixer. While it can be invasive if not properly managed, when grown as a summer annual in a temperate region like TJC, Sunn hemp can produce over 5,000 pounds of biomass and 100 pounds of nitrogen per acre (11.47 lbs biomass/100 sq ft, .2295 lbs nitrogen/100 sq ft) in short 60 to 90

Low Uphill Diet Design 2021



days, giving it significant per day potential to sequester carbon and build soil organic matter levels. It is known to suppress plant-parasitic nematodes, making it helpful to future growing cycles, and the nitrogen it fixes in the soil can feed small grains in rotation, reducing the need for imported fertilizers. If used as a green manure, it must be dug under before reaching the full bloom or it becomes too fibrous and uses up its fixed nitrogen to bloom and seed. While some species of *Crotalaria*, including *C. juncea*, contain toxic alkaloids, in their seeds and pods, the variety "Tropic Sun" is non-toxic.)



Image: molokiseedcompany.com

- **Conducting legume interplanting experiments** to focus on growing crops and soil fertility in the smallest area at the same time, through well-chosen crop pairings. I have written about this process previously (johnjeavons.org/2018/10/02/cover-crops-interplanting-with-legumes) and am eager to see the results of these experiments in this year's garden data.
- **Conducting seed grow-outs** to ensure a reserve stock of seeds at TJC in the future. We will focus on grains, including five special varieties of barley that can mature and be harvested much faster than wheat. We'll also grow out rice, which you may find surprising, because it's a common misconception that rice can't be grown in cooler weather, or that it's a water-intensive crop. Actually, rice is successfully grown as far north as Hokkaido Japan, and we'll be growing out the M-101 variety, which is the coolest-weather rice available through the California Rice Experiment Station. Rice doesn't need to be grown in a flooded field or "paddy" to succeed: one grower near Sacramento grew rice in raised GB beds and informed us they got a very high yield compared with average wet-field growing conditions. We have grown rice at TJC before, but in these grow-outs we will focus on the special temperature and pH requirements for this variety.
- **Implementing a food storage system and diet design** for reserve food stock. If there's one thing 2020 made clear, it's that along with growing your own food, it's important to have 1) a backup stock (growing 20% more to provide a cushion for an emergency or a bad crop year is a good idea), and 2) a reliable way to store it. In this experiment, we aim to achieve a 2.5 to 6-month supply of food depending on the number of FTT Staff and Interns on site. The storage system will

use special 6-gallon easily resealable buckets, and the diet will be designed using foods that store well, provide good nutrition, and do not require a special environment other than sealed containers and a cool, dry space. For example, brown rice rapidly goes rancid at room temperature, while lentils are full of protein, easy to cook, come in many beautiful colors and store well. When designing and using a food storage system, it's important to keep track of how much you eat per month and rotate the stock to keep your stores fresh. Once we perfect our storage diet plan over the next year or so, we will incorporate the information into a booklet for wider use.

- **Growing a "living fence"** to keep the garden safe, provide biodiversity/pollinator support, and keep deer out (see article in this issue). FTT Kaitlin Dickman is our research coordinator for this and other projects.
- **Improving TJC seed storage system.** FTT Chloe Ellwanger is our seed system coordinator, and will ensure all seeds are filed by name, in packets sufficient to plant 100 or 50 square feet, rotated out to guarantee germination and vigor, with practical information from the HTGMV Master Charts on each packet to help staff and interns plant and grow crops easily and successfully.
- **Sponsoring the GROW BIOINTENSIVE® Soil Test Analysis and Amendment Recommendation (STAAR) Training Program** with EA Soil Fertility Advisor John Beeby as lead teacher. The STAAR program is the thin edge of the wedge needed to reverse the rapid depletion of the world's farming soils, and focuses on educating GB farmers and farmer-leaders to understand and use soil test analysis and scientific soil amendment recommendation to build lasting and sustainable soil fertility now and into the future. The initiative includes development of ten 10-Bed Unit Soil Test Stations in different soils, climates, and ecosystems around the world, costing only a fraction of a cent per person in the world which can ultimately be affected. The program and its participants are ready to begin work as soon as funding is secured.

As you read this issue, you will see the how Biointensive projects are growing around the world, healing the Earth its people, right where they are. We love our Global GROW BIOINTENSIVE Family and are proud of the work we and our partners do, and look forward to growing strong with you through 2021 and beyond! ●



Victory Gardens for Peace 2021 Internships

By Matt Drewno, VGFP Director

Having participated in several different agricultural programs, internships, courses, and jobs over the years, I can confidently say that EA internships are powerful. They provide a unique opportunity to experience GROW BIOINTENSIVE (GB) in action, supported by a diverse and engaging classroom experience, combining practical hands-on activities with the theory and science underpinning the method. Although COVID-19 has limited our ability to host on-site internships this year, we are strengthening our programs and look forward to continuing these important internships in the future.

When I first came to Ecology Action in 2010, I was fortunate to join the 6-month internship program and met my first group of interns as a fellow student. Two years ago, I met up with a graduate of that program in Peru and toured his amazing mini-farm tucked in the Andes Mountains, where he works with a small team to help *campesinos* use biointensive. Since that first experience in 2010, I have developed programs, taught, and learned with several teams of biointensive leaders. I feel privileged to work with the amazing people I have gotten to know at Ecology Action over the years. Some of the friendships we have forged have become the basis for a mutual support network of communication, project development, and celebration of hard work and dedication that we all share as we work towards a better future.

My experiences and friendships with these students inspired the development of EA's Victory Gardens for Peace Initiative. The VGFP Initiative is comprised of a series of community-based programs including a seed bank, educational materials, courses, community networks and projects. There are bits and pieces of GB projects from Peru, Oaxaca, Xochitla, New Zealand, Kenya, Malawi, Chile, Costa Rica, Russia, Nepal and other countries in our efforts. Communicating with past interns provides inspiration which keeps our combined efforts growing. The models we are developing in our community are integrated into our internship program, providing real-world examples for inspiration and engagement.

VGFP internships offer the opportunity for a wide variety of students to learn together, adding another dimension of interaction. We often have US college students on summer break working and learn-

ing alongside community leaders from Kenya and Mexico. We invite locals to participate, encouraging further connection and inspiration. Our approach is to increase the Biointensive movement by building relationships and sharing methods across groups.

VGFP internships start in April and run through December. Our interns experience the growing year and live onsite, working daily with the rhythms of our soils and climate. It's a cooperative effort of working together while also working on the self and on personal learning goals. Sometimes we drive each other crazy and sometimes we share ecstatic laughter around a bonfire. It is a family we create, and a microcosm of the world we cannot separate from. When challenges arise, I like to remind everyone: if we can't work here together what hope do we have in the future? These moments are ripe for tremendous growth and makes even the difficult times worth it.

Our 8-month curriculum is split into four 2-month stages. Our 2-month internships comprise the first part of our 8-month course and focus on a basic introduction to GB. Our 4-month interns extend their learning to include complete and sustainable diet design and garden planning. Our 6-month interns receive 2 additional months of project development and garden management training. Our 8-month teacher certification program is for students seeking to become GB teachers and community leaders. A major benefit of this arrangement is that introductory students are driven to greater understanding by learning and engaging with more advanced interns, and 8-month interns get to share their experience and practice teaching at an introductory level, creating a higher-quality learning experience for all.

We invite you to read more about these important programs—including our online internships at bit.ly/EAInternships. We also have 3-Saturdays Zoom workshops (online at bit.ly/EA3Saturdays) which are a great way to explore world of possibility that opens up as you work with biointensive soil, food and seed production.

Most interns I have worked with, especially international interns, rely on our scholarship program to achieve their learning goals. If you would like to donate to Ecology Action's scholarship fund, please contact us and let us know you want to support these programs. And keep an eye out for future newsletters to learn more about the exciting and inspiring accomplishments our students go out into the world and achieve. Thank you, and keep growing!

What We're Planting Now:

Biointensive Potato Protocol

By Ecology Action Staff



The following is an excerpt of a longer article, which we are unable to print due to space considerations. Read the full article at growbiointensive.org/Enewsletter.

Planting potatoes on St. Patrick's Day (March 17) is a tradition among US farmers. While planting on a specific holiday doesn't guarantee high yields, it's true for many in the Northern hemisphere that planting potatoes mid-March leads to an early summer harvest. That said, using local frost dates is the best way to determine your ideal planting date. For example, here at The Jeavons Center, we plant potatoes in mid-February, which is best for our 5-Month main growing season, using the GROW BIOINTENSIVE (GB) protocol below to achieve an excellent harvest of these high-calorie root crops (2019 TJC Intern Marcia is pictured above with a bumper crop grown this way). Try it with your own planting date and see what you harvest!

Goal: to plant 30lbs of seed potato and harvest 180lbs (~2 times the US average), a 6:1 ratio between yield and seed. GB beginning yields are 100 lbs/100 sq ft; intermediate yields are 200 lbs/100 sq ft; and high yields can be 400 lbs/100 sq ft, possibly more.

- *Use 65-day maturing potatoes.* Nutrient density and yield for 65-, 90- and 120-day-maturing potatoes is the same, so there is no reason to grow 120-day varieties. Yukon Gold is a 65-day variety we like: it stores well and tastes delicious.
- It can take up to a month for potatoes to initially sprout, so make a note on your calendar

to begin sprouting your seed potatoes to have them ready in time for planting. Long sprouts on potatoes will give 10% more yield than short sprouts because there are more nodes, but you can use shorter sprouts if that is all you've got. The Henry Doubleday Association in England carried out extensive research on growing potatoes, and found they got the best harvests with 20cm-long sprouts!

- *Three days before planting (already sprouted potatoes) cut the potatoes into pieces with two sprouting nodes and about 2 ounces of weight per piece—about the size of a large egg.* (See the front cover of this issue for an example.)
- *Use wood ash to prevent rot:* dip the cut edge of the sprouted potato in ash, and then let them dry out in a shaded, warmish area for 3 days before planting.
- *Double-dig the growing bed simultaneously while planting potatoes,* and organize the spacing according to whether the sprouts are long or short. Long sprouts can be spaced closer together than shorter sprouts: place the potato pieces with long sprouts horizontally along the top part of the already loosened lower trench in a bed that is being double-dug; shorter sprouts are placed in the trench with the sprouts oriented vertically. For Willits, and other areas with cool nights, plant them 9" deep with the normal 9" off set spacing. Also, read the potato planting part in HTGMV/2017, p. 26.
- Yields will be highest 1 foot in from the beds where the soil is warmer.

You can use a Mini Greenhouse (MG) or Agribon row covers to extend your growing season. Some hints for using a MG:

- *There are two types of mini greenhouses:* 12-inch or 18-inch high at shoulder (see p. 206, HTGMV/2017 for building plans). Soil heat level is higher with 12" shoulder MG, while heat rises more to the top with an 18" shoulder MG.
 - *Monitor the air and soil temperature* to make sure your potatoes aren't getting too hot. Use a soil thermometer to determine best time to water. Also, compare watering when soil temp is high with warm (not hot) water if possible.
 - *MG Seals:* place a looped-over piece of plastic along the edges of the MG ridgepole where the doors meet the ridge, and staple the touching edges of the loop to the ridge pole so that the outside air will be sealed off from the inside air of the MG. This will prevent heat from escaping.
- HOWEVER: ...[continued online] **5**

Global GB Partner: ECOPOL

By David Troxell, EA Communications Director
and Shannon Joyner, Garden Companion Editor



Ecology Action is blessed to work with some of the most enthusiastic and energetic people on the planet. Our international partners help us take the GROW BIOINTENSIVE method from garden to global, teaching people everywhere to feed themselves and grow the soil, now, and into a better, more sustainable future.

Of all our partners, *Ecología y Población* (ECOPOL) has been working with us the longest. ECOPOL was founded by Juan Manuel Martínez in 1992 after he trained with John Jeavons at Ecology Action and received the first Spanish translation of *How to Grow More Vegetables*. Juan implemented GB in a rural development project he was conducting for the Mexican Department of Social Security; he was so inspired by the results that he retired from government work and began a career spreading GB across Mexico. He and John Jeavons began corresponding and became lifelong friends and colleagues. Ecology Action has partnered with ECOPOL since its inception, and over the past 27 years ECOPOL representatives have come to act as GB ambassadors, with satellite programs and research and demonstration gardens established all over Latin America, the Caribbean, and most recently, Europe.

For many years Juan Manuel was ECOPOL, working essentially alone, with translation assistance from his daughter, Oneyda. We are continually astonished

by the sheer amount of work that this powerhouse of a human was (and is) able to accomplish, holding workshops for hundreds of people across the pueblos of rural Mexico, traveling solo throughout South America (reaching the tip of Chile in 2018) and becoming a fast-rising influencer in the Latin American food security movement, invited to speak at conferences and universities everywhere—most recently, he received an invitation to talk in Bosnia! Juan's work has reached an estimated 3.7 million farmers in 42 countries, across farming communities, universities, NGOs, and Federal and State governments. His dedication to and enthusiasm for GB and for helping rural populations is joyous and inspiring. To call Juan the Johnny Appleseed of Biointensive, spreading the method far and wide through a combination of steadfast will and powerful love, is not an exaggeration.

While obviously not ideal, one positive aspect of ECOPOL having such a small staff for such a long time was an exceedingly small budget: Juan's salary and travel expenses, along with a small stipend for Oneyda. In the early days, Juan would travel primarily overland, and focused mainly on spreading GB in his native Mexico, with excursions to wider Latin America over time. When we ran the math on the number of people reached for the money spent, the cost of training a person to use GB was lower for ECOPOL than any other program we had seen, through Juan's energy and his focus on building a magnificent team.

But Juan's efforts have yielded a vigorous and rapidly expanding GB network of farmers and certified teachers everywhere ECOPOL goes—outpacing even Juan's capacity for travel and teaching. To address



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this “problem,” in 2019 ECOPOL hired two Certified Master-Level GB Teachers to work with Juan full time. For the past few years, spouses Agustín Medina and Marisol Lopez have juggled government jobs while helping Juan Manuel part time, with results that showed how much could be accomplished if all three were able to attend to the project full-time. Both Agustín and Marisol have connections in Europe, and because of their recent work in Spain and Italy, GROW BIOINTENSIVE gardens are thriving and contributing data to our Soil Sustainability Research Project in both countries, as well as growing a community of enthusiastic GB practitioners who are looking forward to conferences and workshops resuming once COVID restrictions allow.

An important advance in 2020 was the creation of ECOPOL’s “online school,” as Juan is calling it. In development over the past few of years, the pandemic really provided the nudge (and the time!) needed to get the project rolling. In October 2020, a web developer started putting together the content: a 40-hour introduction to GROW BIOINTENSIVE designed to be taken at home by participants to prepare them for attending a three-day workshop, and a more advanced (120 hour) course to be taken after the workshop’s completion to help participants establish and maintain their gardens and to use GB sustainably. This training site, along with Ecology Action’s burgeoning online education resources (Zoom-based workshops and internships, electronic books and booklets in English and Spanish (New additions include Spanish ebooklets 0, 1, 10, 11, 13, 14, 15, 16, 17, 19, 22, 24, 30, 31, 33, 35, and *Rendimien-*

tos (“Yields”) all available for free at growbiointensive.org/ePubs, teaching videos, and the newly released bilingual English/Spanish film on the GROW BIOINTENSIVE global movement “In Our Hands/*En Nuestras Manos*”) combine to provide a formidable set of teaching tools that people all over the world can access right where they are. This is especially important for women who often cannot travel because they are the ones who provide for their families (and are therefore the ones we need to reach!) It really cannot be overstated how much this new website—in addition to a regular schedule of workshops, conferences, demonstrations, and teacher certification activities—will grow ECOPOL’s already extensive network when it comes online later this year.

With ECOPOL’s full-time staff tripled and the online training courses in development, the organization’s modest budget has (unsurprisingly) required a significant increase, which Ecology Action has eagerly committed to support (we provide about half of ECOPOL’s budget with the other half distributed among other funders).

ECOPOL’s goals are ambitious, and we need your help to make sure Juan, Agustin, Marisol, and Onyda’s important work keeps moving forward. Please make a tax-deductible donation to ECOPOL at <https://donatenow.networkforgood.org/ecologyaction> (select ECOPOL from the “special purpose” list) or you can send a check/money order made out to Ecology Action with “ECOPOL” in the memo area.

We are also asking that you, our global GROW BIOINTENSIVE Family, tell us about any organizations, foundations, or individuals who might be enlisted to support this very special project. ECOPOL is working hard to make our world better. Let’s get them the help they need, to help those who need it most! ●



You can watch a free 1-hour video presentation by Juan Manuel at vimeo.com/ondemand/ecologyaction/125942932

Recipe: Silky-Smooth Hummus

By Shannon Joyner

Garden Companion Editor/Art Director

Hummus is healthy, filling, and delicious—and nutritious: chickpeas and sesame seeds are some of the oldest crops consumed in the world, and are full of vitamins, minerals, and protein. I love hummus on toast for breakfast, but the plastic containers it comes in at the store? Not so much. Also, I prefer organic ingredients, but sometimes organic brands don't have the ultra-smooth texture I enjoy. So, after an extensive Internet search and some experimentation, I came up with hummus that is tangy and garlicky, and easy to make at home with a few basic ingredients. It might seem fussy to skin the chickpeas, but the resulting silky texture is heavenly (and it removes the nutrient binding phytates contained in the skins, so you can absorb more vitamin and mineral goodness from your hummus). You *can* leave the skins on, but your hummus won't be as velvety. This recipe uses dried chickpeas, but you can substitute two 15-oz cans of chickpeas if you like—just skip the soaking and boiling steps.

Ingredients

1 c dried chickpeas

1 tsp baking soda

3 cloves garlic, peeled, crushed, and coarsely chopped*

1 tsp salt (to taste)

Zest from 1 lemon

Juice from 1 lemon** (more to taste)

1/2 tsp ground cumin (optional, but delicious)

1/2 tsp smoked paprika (optional, but delicious)

1/3 cup sesame tahini (more to taste)

1 T olive oil

Ice water (make sure it's really cold – this is what helps the hummus to attain fluffy smoothness)**

1/4 tsp sea salt

Pick over the chickpeas, rinse, and soak overnight in 1 quart of water. The next day, drain and place chickpeas in a pan with 1 tsp baking soda. Cover with water by 2 inches, and bring to a boil over medium heat. Reduce heat and simmer until the chickpeas are very tender (you should be able to easily crush one between your fingers). Drain and cool until they can easily be handled.

Next, remove the skin from each chickpea – they should slip off easily when you pinch one between your thumb and forefinger. Discard the skins and place the chickpeas

in a food processor, blender, or even a mortar and pestle. Add the garlic, salt, lemon zest, cumin and smoked paprika, and blend until smooth. Add tahini and lemon juice and continue blending. Add ice water, 1 tablespoon at a time**, and continue blending until the mixture is ultra-creamy, fluffy, and silky-smooth. (You want it to be a good spreading consistency, not too thick or thin—if you refrigerate it, it will be a little thicker than it is at room temperature.) Taste and adjust seasoning to your liking.

Place in a bowl and swirl the top so there is a reservoir to hold any toppings you might want to add. The basic topping is a good splash of olive oil, but you can absolutely glam it up! Chopped fresh herbs, citrus zest, tapenade, muhumara, roasted garlic, basil or sun-dried tomato pesto, fresh salsa, chimichurri, dukkah, preserved lemons, or caramelized onions are just a few toppings you can try. Serve with bread, chips, or fresh veggies for dipping, and enjoy!

*If you're not a garlic fan, you can definitely reduce the number of cloves. If you want a VERY mild garlic flavor, you can boil the whole cloves with the chickpeas, and then add them to the mix when you blend it.

** I like mine really lemony, so I substitute chilled fresh lemon juice for some of the water. Taste as you go along and adjust the lemon and salt to your liking. ●



Image: Shannon Joyner

Herbal Spotlight: Rosemary

By David Troxell, EA Communications Director
and Shannon Joyner, Garden Companion Editor



This issue's featured herb is quite common in gardens in many parts of the world, and for good reason. A handsome woody perennial shrub, rosemary (*Rosmarinus officinalis*) belongs to the mint family, along with oregano, basil, and lavender. It has a strong and pleasant earthy/citrus/evergreen aroma, beautiful, pollinator-attracting purple-blue flowers, and many uses. The plant's needle-like leaves' ability to flavor meat is the stuff of legend, if you're into that sort of thing. The flavor it adds to soups, stews, and potato dishes is well known, but have you ever tried a dash of rosemary in lemonade, or a cold rosemary tea on a hot summer day? Delicious!

In addition to culinary delights, rosemary has a long history as a medicinal herb. Several cocktails use rosemary as an ingredient, which is telling, as many ingredients in older cocktails such as digestive bitters and herb-infused spirits often have medicinal qualities of their own. Around ~400 BCE, the Greek "father of medicine" Hippocrates prescribed rosemary for liver problems, and as it turns out, he was probably right to do so: modern research in India shows that rosemary enhances bile flow, which is necessary for detoxification and fat metabolism; other research shows it may also lower plasma liver enzymes.

Historically, rosemary has been linked to memory and cognitive improvement: students in ancient Greece would weave sprigs of rosemary in their hair during exams to improve their performance, and Shakespeare wrote "*There's rosemary, that's for remembrance.*" Modern people still use rosemary as an overall mental tonic; the smell is invigorating and has been shown to have a beneficial effect on the nervous system, most notably the circulatory nerves and the central nervous system. In a study published in 2007 in the journal *Psychiatry Research*, Japanese researchers found that five minutes of breathing a mixture of lavender and rosemary scents reduces salivary cortisol levels (a measure of stress) in 22 healthy volunteers; a study published in the *International Journal of Neuroscience* in 2003 found rosemary aroma can significantly improve memory and alertness in healthy adults. It's also got anti-inflammatory properties: the German scientific advisory board approved rosemary essential oil for treating arthritis and muscle pain.

Rosemary is our favorite herb to add to the steam-pot on the wood-burning stove in the winter; the aroma is savory and cheering and a bit reminiscent of Christmas, and the mental stimulation it provides helps alleviate the cognitive fog that can come with a long dark winter.

For a quick and delicious rosemary-kissed side dish, try cutting small red or yellow potatoes in half or in quarters, and tossing them with olive oil, lemon juice, whole unpeeled garlic cloves, salt, pepper, and lots of fresh rosemary. Roast at 400F, tossing occasionally, until the potatoes are golden and crisp and cooked through. Garnish with lemon zest and fresh parsley and serve. The crispy rosemary leaves are great to nibble. Yum.

Native to Southern Europe, rosemary is a simple shrub to grow in any Mediterranean climate. It prefers full sun and well-draining soil, and requires regular watering to establish, but should thrive off of winter rains and dry summers once they've been in the ground for a year or two. The more the young plants are pinched back the bushier they will become, and after a few years a woody trunk will begin forming. Rosemary plants can live for decades; make great pot plants, and wonderful bonsai. ●

Note: The content in this article is meant to inform, not to diagnose or treat any ailment. Always use common sense, and consult with your healthcare provider before attempting to treat yourself or others.

Uganda: Growing Climate Resiliency

North-South collaboration models bio-intensive agriculture and fosters women's leadership

By Godliver Businge and Suzanne York

Earth Island Journal bit.ly/EarthIslandBiointensiveUganda

The following article was published in Earth Island Journal in 2021. It is heartening to see Biointensive work receiving attention from so many organizations! Learn more about Earth Island's Women's Climate Centers International at: climatecenters.org

In Uganda, as in much of East Africa, climate change is leading to increasingly severe and erratic annual floods. In the past few months alone, the country has experienced such intense and unpredictable rainfall that it has at times brought life to a standstill, washing away roads, closing schools, and even destroying a public hospital near the shores of Lake Victoria.

Perhaps no one is impacted more by these changes than the rural women of Uganda. Women, who often take the lead on farming, face challenges growing crops in times of floods as well as drought. They must endure watching seeds washed away by rains and plants withering on the vines during dry spells. This past year, they also suffered through a plague of locusts that descended upon the region and decimated crops.

The voices of these rural women galvanized a global group of activists hailing from Uganda, Kenya, South Africa, and the United States, who came together in 2019 to found Women's Climate Centers International (WCCI). Guided by the slogan "Because the Earth needs powerful women," this North-South collaboration is working with communities in these African nations to create climate hubs to help them adapt to climate chaos. Community members lead the decision-making process. This approach supports locally appropriate solutions and knowledge-sharing for greater climate resilience, while also removing major obstacles to rural women's leadership.

In 2020, WCCI broke ground on its first climate center, in partnership with four women's groups in the district of Tororo, Uganda. The groups are made up of women subsistence farmers who sell their produce during harvest season.

The Tororo community, which has experienced the detrimental effects of climate change for many years now—including longer periods of drought, increasingly unpredictable rains, and extreme rainfall—was eager to work with WCCI. One woman offered up 300 trees to be planted at the inaugural center. Other women and men volunteered to clear the land for the center's farm and ready it for planting.

The initial work in Tororo is focused on bio-intensive farming—an organic agricultural system that focuses on achieving maximum yields from a minimum area of land, while increasing biodiversity and sustaining and restoring soil health—as a key solution to address issues of food and economic security. This farming method allows smallholder farmers to produce more food on their land, ensuring they can feed their families and have surplus products to sell. And since the method uses less water, fosters healthy soil, and relies on growing a diversity of plants, such farms are more likely to withstand increasingly unpredictable weather in the region.

At the Tororo center, we're using onsite composting from our eco san toilets, as well as from crop byproducts and animal manure, to fertilize crops. We're practicing deep soil preparation to ensure strong root systems. And we're modeling inter-planting, which allows plants to mutually benefit from each other. "Given the nurturing nature of women, by training them, we are indirectly training an entire country, as women will pass on their knowledge to their children," says Hajra Mukasa, one of WCCI's founding members.

As a result of this WCCI initiative, Tororo farmers are already increasing their crop yields without harmful chemicals, increasing profits, and improving their climate resiliency.

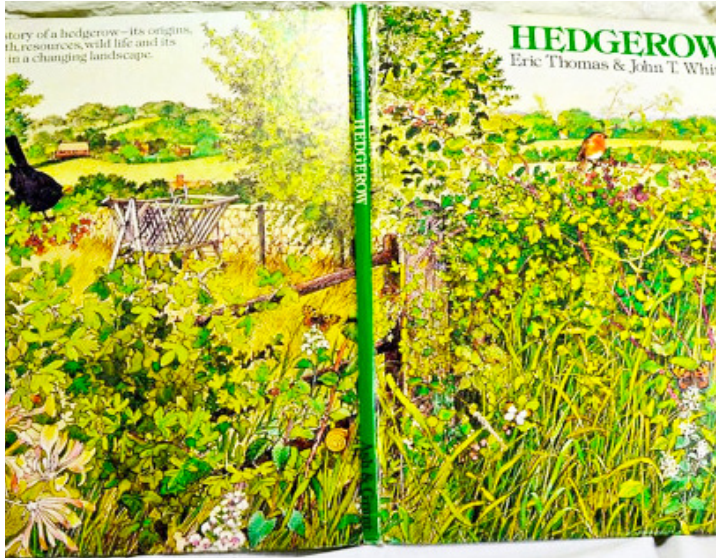
In the coming years, WCCI will build upon this work, using the Tororo climate hub as a model for others in Uganda and Kenya, and adding projects on environmental conservation and restoration, climate-smart water sanitation and hygiene, as well as advocacy and entrepreneurship training. ●



WCCI's first climate center, created in partnership with several women's groups in Tororo, Uganda, is focused on Biointensive farming. Photo: Edward Echwalu/EU ECHO.

TJC Hedgerow Project: A Living Fence

By Ecology Action Staff



Years ago, we received a copy of the book *Hedgerows* as a gift from a friend. It is a lovely book with beautiful illustrations that struck a chord deep within us and inspired us to think about creating hedgerows in our own gardens.

Currently, we have standard fencing around our growing beds to exclude deer and other herbivorous animals, which is effective but ugly. This year we are acting on our inspiration and embarking on a new project: planting a hedgerow along a segment of the existing fence, designed specifically for The Jeavons Center site, and intended to achieve several objectives:

- First, the hedgerow will act as a security fence, keeping out livestock, “passers-by,” and wildlife, specifically using deer-resistant plants.
- Second, it will provide “snacks” for humans and animals alike, by incorporating a variety of fruiting vines and shrubs, as well as nuts. Food intended for wildlife will be arranged to grow on the “outside” of the hedge, and snacks intended for the gardeners on the “inside.” It will also serve the purpose of reintroducing some native plants to the site.
- Third, after some years, it will provide coppicing material (harvested wood) for garden projects (tool handles, fence poles,) and possibly fuel.

- Fourth, it will provide a seasonal rotation of texture and color, in order to bring more aesthetic appeal to the area than the existing fence.

The hedge will be comprised of a few rows of large shrubs and small trees, planted on five-foot centers or less, which will act as vertical “living fence posts” in the design. Blackberry brambles will be planted in between these vertical elements and woven in-between and through them, acting almost like the barbed wire in a barbed wire fence. One of the advantages of the blackberry bramble is that thorny stems from previous years, while not living or providing fruit any longer, still act as a physical barrier, complete with sharp-hooked thorns.

Using *Hedgerows* as an inspiration, EA Communications Director David Troxell used his extensive experience in landscape and garden design to plan our hedge. Plant material is now being sourced, and work is set to begin this spring installing the first section, with work being performed by our TJC Farmer-Teacher-Trainer staff, and overseen by Kaitlin Dickman. To get them established, the new plantings will be irrigated by hand through this summer and fall; when the rains start around October or November, we can let off of the supplemental irrigation. Double digging begins soon. We are excited to keep you updated on the progress of this new project and can't wait to taste our first hazelnuts! ●

Ecology Action and John Jeavons Present: A “Three Saturdays” Zoom Workshop On Backyard Biointensive Gardening



Apr. 3, 10 and 17, 2021

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

Registration closes March 12, 2021

Small is Beautiful: Compact Farms

From GROW THE EARTH (johnjeavons.org)

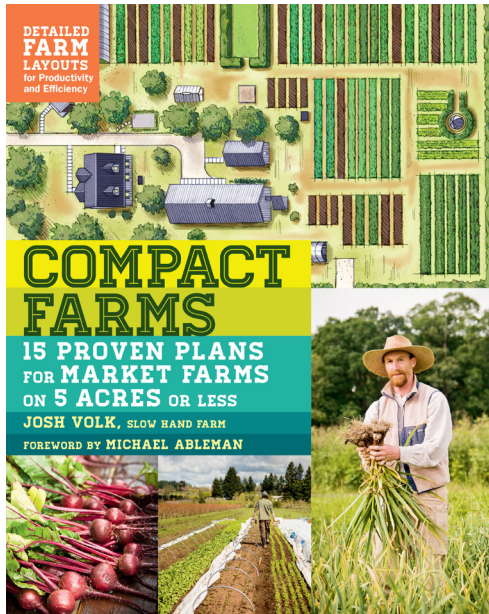
Have I mentioned that I think small farms are the best farms? Well, I'm not alone, and I have the perfect book to prove it. According to Josh Volk, author of *Compact Farms: 15 Proven Plans for Market Farms on 5 Acres or Less* (Storey Publishing 2017), "The point is that it doesn't take a large space to be productive or to make a decent, sustainable living."

From the publisher's website: "Small is beautiful, and these 15 real farm plans show that small-scale farmers can have big-time success. *Compact Farms* is an illustrated guide for anyone dreaming of starting, expanding, or perfecting a profitable farming enterprise on five acres or less. The farm plans explain how to harness an area's

water supply, orientation, and geography in order to maximize efficiency and productivity while minimizing effort. Profiles of well-known farmers such as Eliot Coleman and Jean-Martin Fortier show that farming on a small

scale in any region, in both urban and rural settings, can provide enough income to turn the endeavor from hobby to career. These real-life plans and down-and-dirty advice will equip you with everything you need to actually realize your farm dreams."

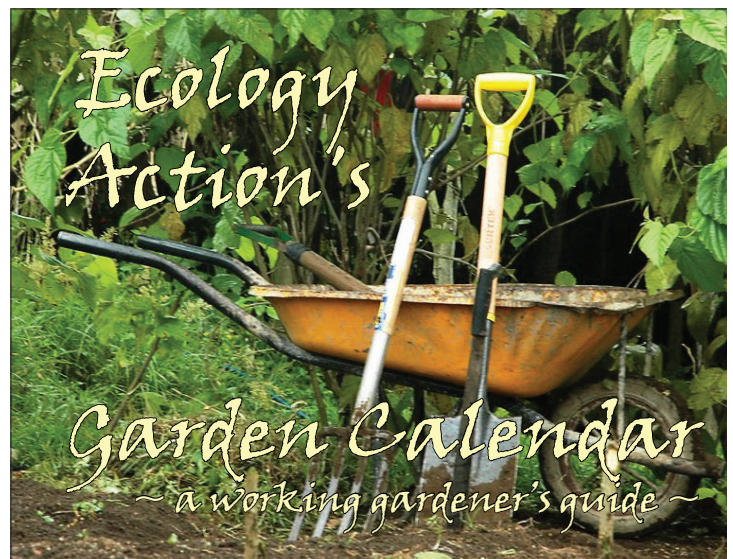
This is a beautiful and practical book that focuses on small-scale commercial farms effectively using less than 5 acres of production space, maximizing . From *Slow Hand Farm* (the author's own small space in Oregon); to a tropical oasis growing coffee and bananas in Hawaii; to a green sanctuary growing food on rooftops in New York City; to a less-than-an-acre mini-farm—Volk repeatedly makes his point that small-scale agriculture can be simple as well as successful.



Beginning with a brief impassioned plea on the joys and benefits of farming small scale, the crux of the book comes in Part Two: fifteen profiles of small-scale working market farms. Volk includes beautiful full-color or birds-eye layouts for every farm, as well as information about each farm's unique approach to labor, water, fertility, tools, infrastructure, crop care, harvesting, and the all-important question of what happens to the harvest. Dozens of beautiful photographs help to illustrate the farm profiles, and those who enjoy getting out the watercolors and pencils to design their gardens, or looking at landscape architecture books, will absolutely adore the farm layout illustrations.

But it's not all just pretty pictures. Volk clearly lays out the "nuts and bolts" of how to achieve small farm sustainability yourself—from carefully planning what you want to achieve, to considerations such as water, infrastructure, livestock, and harvest planning. Perhaps the most important consideration gets its own chapter: "Making It Work Financially" gets into the nitty-gritty details of numbers, budgets, and bottom lines. Volk's point throughout is that if planned properly, these small farms not only work, but work better than their larger counterparts, for the farmer, the consumer, and the planet. His passion for these small, productive pieces of land is evident on every page of this beautiful book.

If you are interested in small-scale farming and are considering making a go of it as a market farmer, *Compact Farms* is an absolute gold mine of information and a helping hand to get you on your way. And even if you're not going commercial, it's an enjoyable and edifying read for anyone interested in small-scale farming. I highly recommend it. ●



Download the free EA Garden Calendar at bit.ly/3kxXFdl

ECOLOGY ACTION'S GARDEN COMPANION

Soil Science Spotlight: Why Test Your Soil?

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

Understanding soil testing and the correct use of organic soil 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. You can find the whole series, online at growbio-intensive.org in the “Protocols” section.

When you look at the soil beneath your feet, you are seeing at a unique mini-universe. Your soil is probably supporting some type of plant life, either something growing because it is naturally suited and adapted to that soil and climate, or a species that developed elsewhere and may not be naturally suited to the local conditions. For the crops we plant, we cannot assume that the soil we have chosen to plant them in is optimally suited to support them. Instead, we must determine the soil’s strengths and weaknesses before we can improve it, to ensure our plants have the best opportunity to thrive. The questions we ask as we explore our soil: Does it have good structure that allows passage of air, water, and roots? Does it have enough organic matter to support diverse and healthy microbiological populations? Does it contain the nutrients needed by the plant, and are they available to the plant in sufficient quantities?

Before we can improve a soil, we must first understand it. How do we go about understanding our farm’s soil if it is really a mini-universe? Truthfully, we cannot hope to fully understand the complex interactions that take place in the soil. But modern soil analysis allows us to know much more about our agricultural soils and to be able to answer the questions that help us maintain fertility by testing for parameters such as organic matter, pH, calcium, magnesium, potassium, phosphorus, iron, boron, copper, zinc, manganese and electrical conductivity.

Most small farmers in the world are very aware of their soil, but do not actually test it. They observe it closely, they care for it, they monitor it after a storm and see whether it absorbed the rain or was eroded by it, they smell it, they walk it thousands of times and as they eat their crops, they are made of it. But without testing, they may be unaware that the soil’s productivity is being held back by a deficiency in one or more nutrient. The result: the farmer suffers reduced yields

that might be improved with a modest application of locally available organic fertilizer that contains the correct amount of the missing nutrient(s), and the soil becomes more depleted with each harvest. If farmers manage the soil with sustainable closed-loop methods such as GROW BIOINTENSIVE®, the soil can retain added nutrients over time without the need for constant applications of expensive fertilizers, and farms can maintain or even improve soil fertility and yields for many years to come, adding only the nutritionally balanced compost produced from the crops grown on the farm.

What is required to test your soil?

1. *Locate a suitable soil testing laboratory, hopefully one that is of high quality.* Select a local lab, to avoid having to export a soil sample which can require complex permits, and make sure it provides tests for a wide variety of soil parameters. Suggestions can be found at growyoursoil.org/steps, and please contact Grow Your Soil if you need additional help in locating a laboratory.
2. *Take a sample of the soil that is representative of your growing area and reflects the conditions that your plants will encounter as they grow.* To do this, dig a hole 1 foot (30cm) deep, scrape a small amount of soil from the sides of the entire depth of that hole (since the top 12 inches (30 cm) has the largest effect on the health of most plants), and put that small sample into a bucket.
3. *Repeat this digging and sampling process* with many holes around your growing area, combining all the small samples into the same bucket.
4. *Mix the bucket of combined samples thoroughly and take one sample from it* to send to the soil testing laboratory you selected. You may want to retain another sample as backup, and you may want to create and submit more than one composite sample if the soils vary greatly on your farm. For more complete instructions, see growyoursoil.org/sample.

What if sending your soil to a laboratory is not possible? Another approach to understanding your soil and determining what it needs to support your crops is to observe the crops that it grows for signs of nutrient deficiencies. *Test Your Soil With Plants* (Ecology Action, 2014 growbio-intensive.org/publications_main.html) is a unique resource for this approach that enables farmers to not only identify nutrient deficiencies but also to develop their own organic fertilizer recommendation to overcome these deficiencies. ●

Busy Bees

By Chloe Ellwanger, TJC Farmer-Teacher Trainer

Humans, being a naturally prideful species, often require the presence of grand mountains, ancient trees, or powerful men to feel humbled. It is another beast altogether—and, I'd like to offer, a much more potent affirmation of finiteness—to be humbled by a creature no larger than a thimble. Yet, if we simply sit still and pay attention, a single bee will serve humankind more humility than God himself on judgment day.

The human species is no stranger to hard work. Whether living paycheck to paycheck or in a penthouse on Broadway, few people get through life without knowing what it's like to work sunup to sundown and to do it all over again the next day. The term “busy bee” is often thrown around in these scenarios, and for good reason. Watch a bee for a day—she wakes with the dawn, vibrates the chill off her wings and gets to work. She commutes all day, to the garden, back home, back to the garden, and back home again, until the evening air becomes crisp and she's forced to rest. Sound familiar?

There is, however, a very defining difference between us and the bees. This difference is exactly where we may find our egos hanging their heads and admitting “humanity”. While we work to become revered doctors, spend endless hours writing great speeches, and stay up all night wracking our brains about how to end climate change, bees do it all simply to carry on the genetic line. They have no legacy, they won't be the “best” at what they do, their children will not tell stories of them—they won't even know their children. They simply carry out their six-week lifespans, laying eggs and visiting flowers to create food for the larvae that they will never know, and then they die with no acknowledgment. When—if—those larvae make it through the freezing winter; survive the threat of birds, wasps, and cuckoo bees; and have enough bee bread preserves to develop fully, then when they finally emerge from their cell the following season, they continue the cycle. Fly, eat enough to survive, provide for the next generation. They do not try to grow plants and diversity, they do not try to feed the starving, they do not try to save the world—but they do. They do it for nothing and for no one, but the simple instinctual pull to leave the darkness and fly.

By far the most well-known of the bee family is the western honeybee. From honeybees we receive wax and honey, both revered commodities. The rise of Colony Collapse Disorder in 2006 gave a new light to the im-

portance of bees in our agricultural system. Not only did it mean lower honey production, but it also gave rise to a larger question: if the bees disappear, who will pollinate our crops? Many crops rely on pollination by bees to provide good yields and genetic diversity. We've seen other countries' systems attempt to replace the skills of bees with human workers and cotton swabs, to the detriment of their crops and wallets. Here in the U.S., farmers can now rent honeybee hives, which disorients the bees and still results in low-yielding crops and sick bees. While the cause of the downfall of bee populations is still under speculation, it seems that one very obvious solution has been overlooked by both commercial and home gardeners: solitary bees.

Perhaps the most important difference between social bees and solitary bees is the fact that solitary bees do not produce honey—at least not in large enough quantities for humans to concern themselves with. Unlike honeybees who collect pollen in pouches on their hind legs, solitary species collect pollen on their abdomens. They only need to bring as much back to their nest as is needed to make bee bread (food, for their larvae to feed on when they hatch over winter) which means they don't have to be as particular as honeybees when it comes to leaving some behind as they flit from flower to flower. Rather than careful collection, solitary bees often simply rub their bellies on the flower's stamen and coat themselves in pollen—imagine a dog rolling around in the dirt on a warm day. This is great for farmers and gardeners, as it means that the ratio of flowers visited and flowers actually pollinated is much higher than that of honeybees. Honeybees can visit hundreds to thousands of flowers in a day but only pollinate about 15 due to their highly efficient pollen collecting method (which, I might add, is just as important of a quality as pollinating because it yields that liquid gold substance we all drool over), while solitary mason bees have the potential to pollinate about 2,000 flowers a day! It is easy to see how important it is to expand our knowledge and interest in native, solitary bees. Thor Hanson, author of *Buzz*, said it best—*“Bees today certainly need our help, but just as importantly, they need our curiosity.”*



And that is exactly what I would encourage you to do this garden season—get curious. Setting up solitary bee houses in your own garden and backyard is a much more feasible task than keeping a honey hive, and a much more beneficial one for your flowers, fruits and vegetables. While solitary bees, such as Mason and Leafcutter bees are not stinger-less, they are not as territorial as social bees can be, so it is a perfect opportunity for adults and children alike to observe the lives and behaviors of bees in more safely. There are so many resources to further your knowledge on solitary bees, and plenty of shops to help you establish a healthy population of Mason and Leafcutter bees in your area. Crown Bees (crownbees.com) and Knox Cellars Mason Bees (knox-cellarsmasonbees.com) are two companies who provide valuable information and the opportunity to purchase solitary bees and the tools you will need to set them up in your own backyard. It may cost you a bit up front, however, the keeping of solitary bees in much like that of seeds—if you do a little bit of research, and put forth a little bit of effort, you can “save seed” and sustain your population for years to come with no additional financial investment. Plus, they work for their money! And if you’re lucky enough to live in an area where Mason and Leafcutter populations already exist, you may be able to simply set up a “bee motel” in your yard and wait for them to come.

As a child, I vividly remember following my Papa, the beekeeper, around his yard, enamored with his relationship with his honeybees. His eyes lit up when he spoke about them, and each time he would go tend to the hive they would land on his arms and chest, seemingly embracing their caretaker. My cousins and I would eat tomatoes and raspberries right off the bushes surrounding the hive, brilliant colors and inexplicable flavors bursting on our tongues, creating a tingling sensation in the corners of our jaws. They were the best fruits I have ever tasted. I thanked my grandparents, and I thanked the bees. I cannot recall a time since those days that I have not, in some way, honored the dead bees I’ve come across—whether that was a full on funeral (conducted with the assistance of my wild childhood imagination and a few equally wild friends), or laying the deceased specimen at the base of a rose bush or apple tree, a simpler practice I’ve chosen in my adult years. It seems a bit silly, even to me as I write this, to put so much effort into something so seemingly irrelevant. But I hold a deep reverence for the bees, and always will, as I have inherently understood since early childhood that even though I am a member of the most powerful species on planet earth, I, as we all do, rely completely on the existence of one of the smallest. ●

SPRING 2021

Garden of Hope: Sorghum Comparison

By Ecology Action Staff

Mlesh Mlegwa, a 2016 EA intern, is the director of the grassroots non-profit CBO Garden of Hope (GOH, gardenofhopekenya.org) in Taita-Taveta County, Kenya. He recently wrote about his remarkably interesting work growing out and comparing two sorghum varieties (Gadam and EU 51) for resistance to predation and climate change. He indicates that the Gadam variety, while adapted to the local effects of climate change in his area, suffered greatly from predation by birds, while the EU 51 variety grows more slowly, but has well-formed heads, and did not attract birds. As you can see from his photos below (Gadam upper, EU 51 lower), the difference is distinct between the two. He provided a great video of this plot comparison (along with a nice tour of the other growing beds, which you can watch at bit.ly/GOHSorghum) and he also posted a useful video on winnowing seeds (bit.ly/GOHWinnowing). Both the research and the videos are great resources for all GB practitioners. Thanks Mlesh!



To support the excellent work Mlesh does at Garden of Hope, please donate at: <https://www.gofundme.com/mleshs-biointensive-training-farm> ●

ECOLOGY ACTION'S GARDEN COMPANION

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ECOLOGY ACTION EVENTS: 2021

Dear GROW BIOINTENSIVE Family,

In response to COVID-19, our schedule of public events is as follows, subject to change, as the situation progresses.

We are accepting applications for the 8-Month Online Zoom Internship (April 6 - November 23, 2021):

growbiointensive.org/Internship

The onsite Spring 3-Day Workshop is canceled, but an online Zoom-based version will take place over three consecutive Saturdays: April 3, 10, and 17, 2021. Register at: cccc

growbiointensive.org/workshop.html

Our 2021 schedule of events:

growbiointensive.org/events_main.html

or call 707-459-0150

Wishing everyone good health and good gardening,
Ecology Action

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