ECOLOGY ACTION'S
GARDEN COMPANION

GROW BIOINTENSIVE® News from Around the World

SPRING 2020

IN THIS ISSUE:

The Jeavons Center Mini-Farm Report

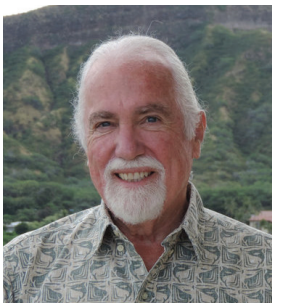
By John Jeavons, Ecology Action Executive Director

The following was written at the beginning of 2020. Since that time, much has changed across the world... but Biointensive is still growing strong! The biggest change at Ecology Action has been the transformation of the 2020 Internship into an online program. We will provide updates on our 2020 activities in the Summer Newsletter, and hope you enjoy reading about our 2019 season here. This is an excerpt from a longer article, available in full at growbiointensive.org/Enewsletter.

As the 2019 Internship program was wrapping up, The Jeavons Center (TJC) was abuzz with activity! Mini-Farm Manager Melvin Castrillo, Interns Ana Cantillano and Marcia Suarez (Nicaragua), and Fredrick Onyango (Kenya), and Apprentice Ike Enahoro (California) harvested crops from 14 growing beds each, and planted compost crops in all these as well as 40 additional growing that make up TJC's 11,000 square feet of GROW BIOINTENSIVE (GB) cultivation (equivalent to 110 standard GB growing beds in our hilly terrain). Earlier in the program, each person designed a *12-Month Growing Season Garden Plan* for their 14-bed "mini-farm". In November each gave a presentation on their project, to an audience including EA and Victory Gardens for Peace (VGFP) staff, interns, and apprentice, as well as Juan Manuel Martínez Valdez, Director of ECOPOL, Ecology Action's International Partner in Latin America, the Caribbean, and Europe. The presentations went well, and suggestions were given for strengthening each approach. Lunch was prepared by Ana and Marcia, and a multi-course celebration dinner prepared by Cynthia Raiser Jeavons was enjoyed by all. Each intern received an 8-Month Internship Participation Certificate from Ecology Action and from MESA (each intern was also a Multinational Education in Sustainable Agriculture (MESA) Steward); plus $500/month Scholarship Awards were given out to qualifying interns. See details below. In all, educationally a nourishing year was experienced at TJC in Willits, CA, and VGFP in Mendocino, CA!

Photo: Cynthia Raiser Jeavons

November 3-Day Workshop, 2019



An important scholarship program for our interns has been made possible by the Ceres Trust: *The Kent Whealy Scholarship Fund for Ecology Action*.

These scholarships are an appropriate legacy to honor the life-work of Kent Whealy, Founder of Seed Savers Exchange. Kent was a strong believer in the idea that any one person could make a meaningful change in the world, and he felt it his responsibility to do so. His dedication, vision, and exemplary leadership are an inspiration to countless people, and Ecology Action is honored to carry on Kent's work of catalyzing proactive people to create a more wonderful world future! Learn more about Kent's extraordinary life and work at cerestrust.org/kent-arthur-whealy.

Qualifying participants for the 2019 scholarships are:

- **Ana Cantillano:** creating a documentary to motivate GB practitioners and small farmers in Latin America. She intends to submit the film to the world-famous Sundance Film Festival in 2021—if accepted, the film could further GB global interest.
- **Marcia Suarez:** upgrading the teaching programs provided at her existing GB project sites in Nicaragua. This funding allows Marcia to focus on program administration and GB teaching without needing a second job.
- **Fredrick Onyango**: establishing a key GB Demonstration/Research site in western Kenya to help further G-BIACK's goal of spreading GB in the region.
- **Camila Guerro:** *"Demonstration of the GROW BIOINTENSIVE method of reducing the human carbon footprint in agriculture, to find a sustainable solution for climate change and social justice."* Her goal is to teach GB in four Chilean regions with the largest populations, as close to the cities possible.
- **Ariel Pinto:** developing an Agricultural Consciousness Project, creating a culture of GB agriculture inside Chilean educational centers—beginning at the private high school for low-income people of diverse ethnic backgrounds in his province, where he teaches. He plans to teach GB workshops outside the school as well.

A sixth intern, **Elena Vanasse Torres** of Puerto Rico, received a Fulbright Scholarship to pursue a degree in Environmental Science in Brazil during 2020. Elena chose to pursue this opportunity, leaving her internship two months early to secure full funding to support her studies. Her degree, and the GB expertise she gained with us, will help her achieve her goal of helping the many people in need in Puerto Rico.

In November 2019, Ecology Action was honored by special visits from our international partners G-BIACK and ECOPOL.

Spouses Samuel Nderitu and Peris Wanjiru co-direct the renowned non-profit GROW BIOINTENSIVE Agriculture Centre of Kenya (G-BIACK) (Ecology Action's International Partner for Africa). They visited Willits with son Keith (a videographer and musician) and daughter Annette (a specialist in organizational management). Samuel and Peris, who have trained over 9,000 farmers in 10 years, gave presentations about their work with GB and their inspirational Women and Girls Training Program, which teaches GB and other income-producing skills like sewing and beadwork to disadvantaged young women. The presentations were filmed and will be posted online later this year.

The family participated in Ecology Action's Fall 3-Day GROW BIOINTENSIVE Workshop with the kind support of the Willits Golden Rule Community. (EA 2017 interns James Christie-Fougere and Sharon Coombs travelled from Canada with their 2-year-old son, Lincoln, to help teach the workshop and provided good energy for us all!) Ecology Action presented the Nderitus with Certificates of Appreciation recognizing the work they do to help spread GROW BIOINTENSIVE in Kenya, Africa, Afghanistan and beyond.

Ecology Action awarded five grants to support G-BIACK's effective and award-winning work from our **LIFE Initiative**—enabling improved and sustainable ongoing **L**ove, **I**nspiration, and **F**riendship for the **E**arth (and its people). These funds supported the following:

- Peris taught farmers GB in Tanzania, a region depleted by years of conventional rice production. She planned to train 70 farmers, but the first day, 100 participants arrived with the Governor and a Ministry of Agriculture representative! The Governor asked the community to adopt GB and everyone to participate in the training. 700 people showed up on Peris' second day. The workshop was increased to two weeks to accommodate more and more participants and resulted in hundreds of people practicing GB, and 29 farmers serving as GB Community Resource People (CRPs) with additional training to help guide farmers in their communities in the future. Peris returned in January to do follow-up instruction with the CRPs.
- G-BIACK hired 6 new female staff drawn from the Women and Girl 18-Month Empowerment Program to meet growing GB educational opportunities in the region.
- Strengthening G-BIACK's Seed Bank.
- Strengthening G-BIACK's Satellite Demonstration and Education Centers throughout Kenya.
- Providing salary and benefits for Samuel and Peris for 2020 (they had no pay or vacations for 10 years).

Juan Manuel Martínez Valdez, Director of ECOPOL, visited for eight days at TJC in Willits and VGFP in Mendocino. Juan gave a presentation about his worldwide GB work, which was filmed and will be posted online later this year. Ecology Action presented him with a Certificate of Appreciation for his continuing Lifetime Major Contribution to GB in Latin America, the Caribbean, Europe and beyond. Juan plans to return to EA this year, so he and the six 2020 EA 8-Month Interns from Latin America can network to ensure the interns are fully prepared for their return to their home countries and their GB initiatives there, and understand how best to work with ECOPOL's network. This kind of communication was very effective with the 2019 Interns last November.

We send heartfelt gratitude and best wishes to recent retiree Leslie Roberts, for the years she spent as our Newsletter Editor, researching, writing, editing and doing layout for each issue. Leslie also compiled a database of Ecology Action Contacts, Interns and Apprentices, and helped keep the website updated. Thanks, Leslie!

New Projects: Sustainable Soil Fertility, 10-Bed Unit Project and Soil Science Spotlight

Soil testing and the application of the correct type and quantity of organic soil amendments at the correct time is a fundamental part of building and maintaining sustainable soil fertility. Inaccurate soil test analysis and amendment recommendations can damage soil, cost farmers time and money, and hinder the development of a sustainable closed-loop GB soil fertility system. As the GROW BIOINTENSIVE movement expands across the globe, soil testing and soil amendment recommendation standards must be established and unified across all GB sites, and all GB practitioners and teachers must understand the importance of carrying out the specified tests, the recommendations, and the maintenance of the soils according to those standards, to ensure quality control of soil fertility and the GB method across climates, cultures, and soil types ... *[continued online]*

2019: Year in Review at Victory Gardens for Peace

By Matt Drewno, VGFP Mini-Farm Manager

Looking back on 2019, I am full of gratitude for the hard work and contributions of everyone who participated in our programs, from our students who travelled from afar to be with us, to our staff, donors, and community members who continue to support this great work. It has been another year of inspiration and connection. The family of Biointensive farmers around the world continues to grow in all directions, from local to global, and there is so much happening it is hard to keep track of it all! So many individuals are taking the initiative to catalyze change in their communities.

Here are some of the highlights from Victory Gardens for Peace in 2019:

- **In January I traveled to Peru** with former intern Diego Hernandez (Mexico), film maker Matt Anderson, former EA Garden Managers Ryan Batjiaka, Lucas Howerter, and Eric Buteyn, to visit several key Biointensive projects including Eco-Huella, the Andean Alliance, and Arariwakuna. We visited ancient agricultural sites and seed banks and helped on the farms where we could. It was amazing to see how ancient, rural communities are incorporating Biointensive techniques to help maintain their cultures in challenging climates and socio-economic conditions.
- **We began developing the *Garden-Friendly Communities Resolution***—an open-source tool that communities can use to increase awareness, support and access to sustainable home and community gardens. Our work through 2019 resulted in the City of Fort Bragg, CA becoming the first to pass the resolution to become a Garden-Friendly Community; work on starting community gardens there has already begun. We look forward to publishing our process in later this year. To learn how to use this resolution in your community email Matt@Victorygardensforpeace.
- **In March and November we participated in the Ecology Action 3-Day Workshops** held each year in Willits, CA. We said goodbye to apprentices Brooke Eichenlaub of North Carolina and Gabriella Cobb of Vermont, who had completed their program at VGFP.
- **In March, the Victory Gardens for Peace Seed Bank** was invited to attend the Seed Library Summit in Santa Rosa, CA to represent our work and contribute to an ongoing dialogue on how seed banks and seed libraries can better serve their communities in the face of climate change. A highlight of this meeting was a discussion on what seed adaptability means in the face of climate change, and how this relates to our work as seed stewards in our communities. We met again at the Santa Rosa Heirloom Festival in September and continued our dialogue. We have been invited by Daniela Soleri of University of California Santa Barbara to participate in a study on how the genetics of a common bean variety change over space and time as it is distributed through seed libraries into communities around California.

Photo: VGFP Staff

- **In May and October, we held our two annual seed exchanges** at the first and last farmers markets of the year in Mendocino, CA. We also brought our seed bank to several other local events, including community meetings for the Garden-Friendly Community Resolution in Fort Bragg. As of January 2020, our seed bank was approaching 700 varieties of seed, all of which are made available to our community for free. We also continue to host our free seed cleaning workshops each December and January. Each year, the seed bank becomes more efficient and effective at fulfilling its mission to increase access to seeds and the network of seed savers in our community.
- **In April 2019 we welcomed 8-Month Interns** Camila Guerrera and Ariel Pinto Calvio of Chile and Elena Vanasse Torres of Puerto Rico to our 8-month GROW BIOINTENSIVE Internship Program. Their perspective and experience enriched our program, which ran through November 2019. Elena left us early in July to take on a Fulbright Scholarship in Brazil. Ariel and Camila stayed on and completed their GB Teacher Certification Course and, after presenting their final projects in November, were awarded scholarships to return home and begin working on their projects teaching GB in their communities. Congratulations, Ariel, Camila and Elena!

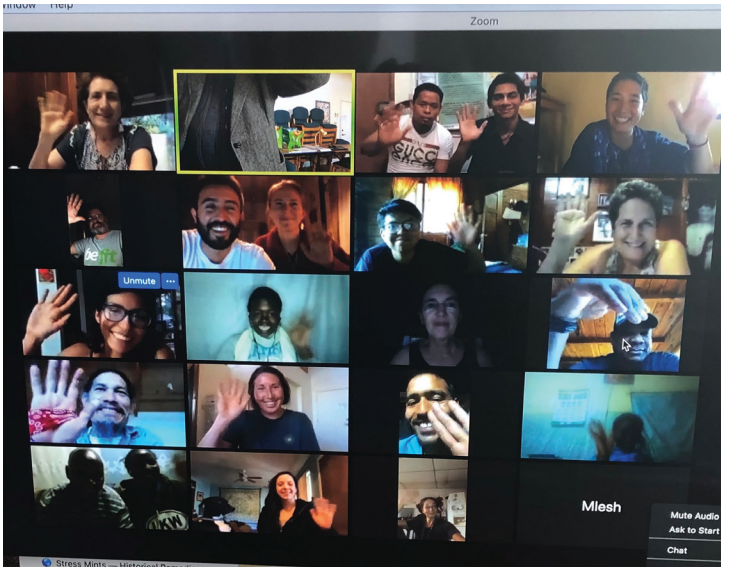
- **In addition to our 8-Month Interns, we were delighted to work with 2-Month Interns** Alexander Ederer (California), Philomena Jombo and Vivian Miel (both from University of Pacific, California). Participants of the Stanford Inn Sustainable Mindset Field School Hannah, Daniel, Morgan and Jesse also participated in our program. We were also grateful to have David Hill, a local participant, in our 9-Saturdays program; his great questions and deep perspective enriched our curriculum. The summer course was one of our best this year. A big thanks to Biointensive teachers Rachel Britten and Jes Pearce for their help!
- **In May, we hosted a garden tour at VGFP** and were honored to be joined by Biointensive for Russia (BfR) leader Carol Vesecky. We spent the day together and discussed present and future projects with the GB movement in Russia. She donated seeds to our seed bank and a copy of the Russian translation of *How to Grow More Vegetables* (8th ed., available online at growbiointensive.org/HTGMVRussian) to the VGFP library. We were so grateful for her visit!
- **In July we were sad to say goodbye to former Garden Manager Kimberley Fisher** of Bermuda, but we know she will continue to teach, inspire, and shine in her new role as a mother. Congratulations, Kimberley!

In 2020 we (like everyone!) are experiencing many changes—some good, some challenging—but still look forward to a productive and exciting year. My partner Jaime and I welcomed our daughter, Olivia Wren, to the world in April! We planned on hosting interns onsite as in previous years (we had already accepted excellent candidates from Kenya and Nicaragua) but in response to the coronavirus pandemic, Ecology Action transformed the program from onsite to online, running April 7 to November 20. While we miss living and working together with our interns, and hope to resume our regular schedule soon, we are confident that our online program will be a success! We are excited to welcome our newest staff member Elise de Cuba of Aruba, who arrived well before the virus made travel unsafe. As permitted by safety measures, we will be expanding the Garden-Friendly Community Resolution work in Mendocino County, strengthening our relationships within and beyond our community, developing the GardenCorps Project to help train leaders in communities to increase food security and food sovereignty, and increasing our capacity to train teachers in Biointensive food production. The integration of all our programs continues to inspire individuals from around the world and shows—now more than ever!—that we can, and should, create a better future together. I personally want to thank everyone who has contributed to Ecology Action over the years. I can tell you with heart, that the great work of this organization has and is spreading around the world—I have witnessed it in my travels to Nicaragua, Peru, Dominican Republic, Chile and Mexico. I have met people from every continent who have been inspired and are working hard to bring about a more peaceful and sustainable world. Thank you for a great 2019 and for being a part of the Ecology Action family. The world is a better place because of our shared focus on a better future. We will keep growing together, even while we are apart. ●

Meet the Interns!

By John Jeavons,
Ecology Action Executive Director

As a result of the COVID-19 pandemic, Ecology Action transformed our 8-month onsite internship program—which normally brings people from all over the world to Mendocino to study at The Jeavons Center and Victory Gardens for Peace GROW BIOINTENSIVE Mini-Farms—into an online course using Zoom. Although we miss working with the interns in person, and plan to continue the onsite program when it's possible again, a wonderful result of the distance-learning program (which we also intend to continue) is that more people are able to participate! We have 27 participants from around the globe: Mexico, Nicaragua, Argentina, the US , Nepal, Kenya, and Chile—too many to introduce here! Read more about them online at *growbiointensive.org/Enewsletter.* ●



A Girl's GB Education in Kenya

By Ann Nyambura, Form IV, 2019

This article was sent by Joshua Machinga, GB educator and Director of Manor House Agricultural Center (MHAC) in Kenya and written by one of their students, a girl who has been inspired to change her life, and our world, by learning GB at her school in Kenya.

Right now, humans are cutting off the branch they are sitting on. July 29, 2019 was Earth Overshoot Day: the day we no longer have resources to support us sustainably; what we consume or exploit for the rest of the year comes at the expense of our planet. Replacing those resources takes more time than we have, since the population is continuously growing, and resources are fewer each year. I have made it my mission to help reverse this trend: to move Overshoot Day forward. I know how, because I am living proof that it all starts with girls' education. Because I'm educated, I will have a small, healthy family in the future, and right now I am bringing the knowledge and skills my community needs to cope with resource limitations and climate change.

I was born and raised in Nairobi, the capital city of Kenya, the first born in a family of three. My father was an electrician and my mother a hairdresser. Both had only basic education, but wanted more for us. I was a very good student, an over-achiever, but my hopes and dreams were crushed when my father died. For a time, I thought I would never achieve anything, and all hope was lost. In Kenya, you must pay fees to go to secondary school, plus internal exam fees, plus the cost of a school uniform, exercise books, pens... My parents couldn't afford to keep me in school, so my siblings and I struggled. It is "normal" for a 15-year-old to get married, and many believe the highest achievement of a woman is marriage. I had no options, but I had a clear plan for my future. Yet when I was twelve, that future looked bleak.

A year after my father died, my mother heard of Lenana Girls High School, and she struggled to get me in. This was a chance for me to be educated, and I took it more seriously than ever. Lenana not only provides for my education; they also make sure I have a safety net through the mentoring. I have a bigger vision now, and am committed to my dream to help better the community. I share everything that I learn each day with people back home. I have made a formal plan of how I will contribute to the community though empowerment and sustainable practices training. When people are well informed, they make wise decisions in their lives, and subsequently reduce the strain of climate change on the environment. At school we are learning GROW BIO-INTENSIVE Mini-Farming, techniques good for our environment.

Each day we are faced with changing weather patterns, and we find ourselves with fewer and fewer harvests at the end of each farming season. The global phenomena of the *El Niño* and *La Niña* have been affecting the farmers in extremely disturbing ways. In 2016/2017 there were serious floods, and this year, a terrible drought affected our farmers, both resulting in lower harvests. That will change once the people are well informed and trained on the tactics to counter climate change, and how to practice agriculture that is climate-smart.

Ann Nyambura at the entrance of the GB garden at her school

I have also been very concerned about the issues of deforestation, and land contamination with plastics and all types of residues. This has led to the increase of greenhouse gas emissions, increasing the effects of climate change—but most of the polluting products can be reused and recycled as raw materials in other processes. What I am proposing will be a lifetime project that will invest in the reduction of deforestation and an increased use of alternative energy, starting from my backyard through every corner of the country; we can improve and reduce these effects faster and more effectively.

The core of the project will focus on the use of available resources in farming, and the closing of nutrient cycles. I will emphasize good use of animal and vegetable waste on the farms. I will encourage investment in solar water pumps and other equipment to help lessen the effects of drought during dry times. The water table in many areas is not very far from the surface, hence it will be easy to irrigate with manual pumps when the need arises. The climate-smart techniques such as GROW BIO-INTENSIVE I want to invest in involve increasing tree cover. While the trees hold the soil together and capture

the greenhouse gases, normal agricultural production takes place alongside them. I will be focusing on training more youths in these practices, since they are advocates of change who will engage their communities.

Although currently I am a student at Lenana Girls High School and I will be taking my final year of high school this year, I have not lost contact with my people back home. I still take time to send messages to my village to hopefully inspire other girls to work hard and help break the vicious cycle of poverty. I am determined to get back and give back to the community and country that is helping me get to where I am today. During my vacations I visit communities in my county and beyond to motivate and share my story with other girls, so that they know and learn that it is possible to be who we want to be, even from disadvantaged and marginalized backgrounds.

All it takes is unleashing the willpower and potential in each and every one of us. Change happens when you have the skills and capacity to make it happen. I have come to an understanding that educated girls are far more clever, plan their lives in a better way, and have better chances of being happy than uneducated girls.

I believe having access to education makes girls and women better decision makers, and reduces the number of children that they have, reducing the pressure on the limited resources available, and therefore reducing the effects of climate change. Having access to education also means girls will be more open-minded to change, and will accept change faster, hence the implementation of measures on climate change will be easier and more accepted.

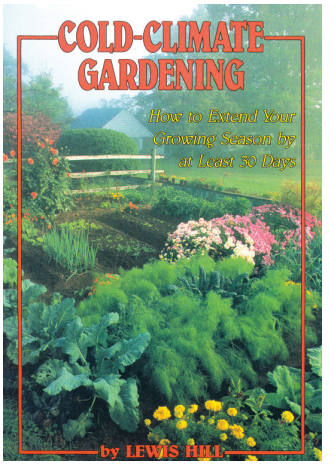
I do know, because I am living proof, that education is the center of all. Thank you for helping me! •

Book Review:

Cold-Climate Gardening: How to extend your Growing Season by at least 30 days

by Lewis Hill, Storey Communications, 1975 (1990 rev.)
Review by David Troxell

The Jeavons Center (Ecology Action Headquarters) is located at around two thousand feet of elevation in the hills outside Willits, CA, about 150 miles north of San Francisco. Due to our elevation and latitude, we have a pretty short growing season, with June frosts a common occurrence and the beginning of November often bringing nighttime lows in the 20s (-7 °C). Because of this, we employ many techniques to maximize production in the time we have, and are always looking for new ideas for extending our gardening season. We found *Cold-Climate Gardening* to be a very useful book in this regard.



The book does include some general gardening pointers and discussions, from composting to the use of manures and mulches. But most of the content focuses on using microclimates or creating artificially controlled environments, such as greenhouses, hot beds, and cold frames, as well as more specific tips for certain types of crops, from berries to fruit trees to greens. There are ways to jumpstart your garden in the springtime, as well as extending the season later into the fall, and all are discussed.

In addition to material on cultural measures (pruning and planting methodology, for example) which can be taken to maximize yield in colder climates, *Cold-Climate Gardening* also lists specific varieties of fruits and vegetables which do well in areas which may experience not only colder temperatures, but decreased daylight hours in the early spring and late fall as well. In addition, tips for cultural considerations specific to northern gardeners are covered, as well as a discussion on hardy hedge materials. Even ideas for growing better lawns in colder climates get their own nod.

Overall, this is a handy book that compiles a lot of ideas on cold-climate gardening in one easy-to access and concise place. Anyone who has ever gone through the heartbreak of a late frost within a week or two of picking that first ripe heirloom tomato of the season will appreciate the advice given within these pages. •

Bay Laurel and Poison Oak

By David Troxell,
Ecology Action Communications Director

If you live in a part of California which receives regular rainfall, poison oak (*Toxicodendron diversilobum*) is a part of life. Like poison ivy and poison sumac, poison oak releases an oil called urushiol when damaged. The allergen is absorbed into your skin when you touch the plant, and results in an itchy skin rash. Depending on how sensitive one is to this oil (15-20% of people experience no reaction whatsoever) this noxious plant is a reason to keep dogs in the house and off the couches. It can turn handling firewood and clearing fence lines into a weeks-long reminder of an afternoon's work, complete with sleepless, itchy nights. Oh, that feeling when you realize, three hours into weed-whacking a field, that half of the weed juice splattered all over your jeans and soaking into your underpants is poison oak oil!

Winter and early spring can be especially daunting for those sensitive to poison oak. On the one hand, cold, wet weather means we have more clothing (and gloves) on and therefore have less risk of direct skin contact. However, the urushiol can easily rub off on fabrics and lie in wait for days, transferring on to your bare forearm the next time you throw that jacket on, for example. You can also spread the oil to other people! What really increases the exposure risk in the winter is that the distinctive 3-lobed green (late spring/summer) or red (fall) leaves are gone, making the shrubs that much harder to notice. They pretty much look like dead sticks lying at the base of a tree or shrub with a bunch of other dead sticks. Sigh.

Photo:buytreesonline.com

Calamine and hydrocortisone creams are the standard treatment for poison oak. But for those of us who have gardens, especially larger edible gardens with herbs, a different antidote might be growing not far away.

The Bay Laurel Tree (*Laurus nobilis*) is native to the Mediterranean, and its dried leaves are used in cooking as pungent and savory flavoring for soups, stews, and sauces. The leaves are usually simmered in the dish and removed before serving. But bay leaves aren't only used in culinary applications, and in fact have medicinal properties as well.

The primary terpene responsible for both the aromatic and healing powers of this tree is eucalyptol. When the leaves are made into a poultice, breathing in the fumes of the poultice are said to greatly help with a variety of breathing issues, acting primarily as a vasodilator. A poultice of the leaves is also said to be useful when applied to the skin topically, acting as an astringent and helping with a variety of rashes. The rash which is caused by poison oak oils is no match for a batch of bay leaves, slowly boiled in water until the liquid in the pot is quite low. Soak a rag in this solution (cooled enough so it won't injure the skin, but still quite warm) and apply it gently to the affected area. The heat of the poultice provides immediate relief, and the eucalyptol acts as a numbing agent and helps combat the urushiol biochemically.

Laurus nobilis can be found in many nurseries, and grows well in any Mediterranean climate with warm, dry summers and cool, wet winters like those we have in much of California. The trees can be kept smaller in stature with regular topping and pruning, supplying a steady supply of leaves to make delicious soups or combat poison oak rashes for years to come. ●

IMPORTANT NOTE: There is a BIG difference between the Mediterranean Bay Laurel Tree (*Laurus nobilis*) which we are discussing, and the tree known as either the "California Bay Laurel" or the "Oregon Myrtle" (*Umbellularia californica*), which is a large hardwood tree native to oak woodlands and coastal forests of California, extending into Oregon. The California Bay Laurel also has extremely aromatic leaves, which possess their own medicinal properties, and is deserving of its own feature in a future column. Sometimes people substitute them for Bay Laurel in cooking, but you should **not** use them for treating poison oak as described above! **The vapors from boiling California Bay Laurel leaves can cause harmful respiratory reactions in people and animals, and should be avoided. Only use *Lauris nobilis* leaves for treating poison oak.** ●

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.

La Huerta Verde Esmeralda

By Ligia and Tania Espinoza Benavides
GB Farmers and Educators in Costa Rica

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

La Huerta Verde Esmeralda ("The Emerald Green Garden" (biointensivocentroamerica.com)) is a space for learning, experimentation and research for self-sufficiency and the dissemination of the GROW BIOINTENSIVE method! This Biointensive garden is in a mountainous area of the tropical humid forest climate transition to premontane at 1800 masl (5905 ft. elevation), near the small town of Copalchí in the province of Cartago, Costa Rica. It was created in 2016 and is managed by Ligia and Tania Espinoza Benavides, twin sisters of Nicaraguan origin now living in Costa Rica. In this article, they relate their experiences establishing Huerta Verde Esmeralda and what motivates them to have their own garden.

We are motivated by many things, but we will summarize them in three:

- the socio-ecological, economic, and political reality of the planet and our region of origin;
- the people we admire; and
- the need to create new models and productive systems to break paradigms that stagnate humanity and destroy nature.

We grew up in a country under reconstruction after a war, where the availability of and access to quality food were limited for the majority of the population, and the form or productive strategies to solve the problem—which were established for business reasons to regenerate the economy—did not seem appropriate. We studied environmental quality engineering and understood that the impacts of agricultural and agro-industrial activity for export and import of products and supplies were destructive and unsustainable, and also their contribution to climate change was significant.

So, searching for something we could do, on a personal level, to stop the destruction of the land and its natural resources—to help change the production and consumption paradigm, with a clear ecological focus—we changed our diet from omnivorous to vegetarian. In 2009, we eliminated meats from our diet. Since then, we try to be responsible consumers, conscientiously choosing our foods, checking labels, and trying as far as possible to buy local and free of pesticides. This has not been easy because there are very few options available; for that reason, out of necessity, we decided to become organic farmers, because we had to create the options that did not exist to diversify our diet and generate our new, personalized lifestyle.

In 2010, we met Juan Manuel Martínez, from the Mexican organization ECOPOL. Thanks to his noble energy and ability to inspire and teach, we trained at a basic level, learning the GROW BIOINTENSIVE method. We lived in the city, and we started our practice by installing and promoting small garden projects of 10 to 30 m² (100-300 sq. ft.) in friends' backyards and parks in our neighborhood and universities where we worked.

In 2014, we finished the second growing season at the 30 m² (300 sq. ft.) mini-farm we managed in Nicaragua, with the purpose of obtaining basic-level teacher certification in GROW BIOINTENSIVE (in the first official GB teaching, demonstration and research center headquarters, located in the *Universidad Nacional Agraria*'s farm *... [continued online]* ●

Photo: finca ecologica verd eesmeralda

The *Ollas* Project: Part II

By David Troxell,
Ecology Action Communications Director

Not all experiments end in success. Most great ideas have several iterations which fail: kinks, unforeseen challenges, and unintended consequences arise that need to be addressed before success can be achieved.

Over the summer of 2019, Ecology Action partnered with local potters to determine best practices for successful use of *ollas* in a garden (see The Garden Companion's Fall 2019 issue). *Ollas* are unfired clay pots with long necks and bulbous bases which are buried up to their necks in the garden soil and then filled with water. The soil around the *olla* is then irrigated by the water wicking through the semi-porous wall of the pot.

Rain and Maya's Ceramics here in Willits made us several beautiful ollas to use in this experiment. Each pot had a total volume of around three liters. Two of the *ollas* had walls 1/4" (6.4mm) thick, and one was thicker at 3/8" (9.5mm), and one was thinner at 1/8" (3.2mm). The thinnest *olla* was fired longer, almost glazing, and therefore the terra-cotta had a less porous, more porcelain-like consistency.

We wanted to find out if water would wick out of a thinner pot faster than a thicker one. We found that all thicknesses empty at approximately the same rate: water-wicking speed is determined more by the moisture content of the surrounding soil than vessel wall thickness. However the *olla* which was fired longer and had a more porcelain-like consistency (which happened to be the thinnest one) emptied at a slightly slower rate than the others, simply because it was less porus than the thicker vessels. This was expected.

We also wanted to determine whether the *ollas* should be placed singly, at the base of the plants, or in a regular grid throughout the bed. Since GROW BIOINTENSIVE beds are long and relatively narrow, and since we were using zucchini squash as a test crop, we decided to run the first tests with the *ollas* at the bases of the plants.

Our experience with zucchini in this garden in 2018 told us to plant on three-foot centers, staggered, and also what to expect yield-wise: that we would have more zucchini than we could feed everybody living on our road by September if we planted just five plants. 2018 was the first year for this section of double-dug beds, and there was quite a bit of organic fertilizer added throughout the growing season, as well as copious overhead watering.

At the beginning of the 2019 growing season we performed a soil test, which showed proper levels of all the nutrients were present. We planted the second-year beds with similar crops to those in the previous season: corn, potatoes, squash, zinnias, sunflowers, zucchini, and a new addition, tomatoes. Only the zucchini, in one half of one bed, were irrigated using the *olla* system. The rest of the garden continued receiving overhead hand-watering.

Photo: Ecology Action Staff

A beautiful locally made *olla*

Without exception, everything in the garden was stunted compared to the previous year. There was no noticeable deficiency, and soil tests showed no potential cause for the reduced yield and size of everything in the garden, from the sunflowers to the squash. There was almost no corn. The tomatoes were delicious, decent-sized and beautifully colored fruit hanging off of perfectly green, bonsai-sized plants.

This garden is at 3,000 feet elevation, atop a mountain above Laytonville, CA, about 25 miles north of Willits. We had a very late start to our growing season in 2019, with nighttime temps of 30°–40°F (-1°–4°C) through July. Still, this seems unlikely to have caused squash to not set fruit, for example. It is possible that watering was less frequent than the previous season, and there was definitely a reduction in organic fertilizers added. Soil compaction seems a likely culprit. Perhaps it was a combination of factors, but overall, something was amiss with this garden.

Photo: Ecology Action Staff

An *olla*, at work in the garden

Having said that, the half of the bed which was irrigated via the *ollas* system was a complete disaster! Out of the five zucchini plants, which in 2018 drowned us in zucchinis, this year we harvested zero zucchinis from our garden. The plants all looked magnesium-deficient.

The only two that set any fruit wound up with blossom end rot, typically caused by a calcium deficiency.

How do you add liquid nutrients to a plant that you're only watering via a clay pot? Good question. Do you pour a little bit of cal-mag into the *olla* at the next watering? We went with a foliar feed of a light calcium application.

A couple of strange things about the supposed calcium deficiency: 1) the soil test indicated Ca^{++} was in the desirable range, and 2) none of the other crops, including the tomatoes in the very next bed, displayed signs of calcium or magnesium deficiency. In our experience, if you have a calcium deficiency, all your tomatoes show it in their fruit. None of our tomatoes had blossom-end rot; only the zucchini, a few feet away, did.

Calcium and magnesium deficiencies are usually caused by over-watering. The excess water ionizes with the calcium molecules and drags them down out of the root zone where they become unavailable. We were actually hoping that these kinds of deficiencies could be prevented with this watering system, since it is impossible to overwater using the *ollas*.

However, it seems the opposite happened. We think the most likely explanation for our results is: the garden was fertilized for the 2019 season using only a topdressing of compost; lack of overhead watering caused the humic acid and nutrients in the compost—which would normally make their way with the water down to the root zone—to stay in the top few inches of the soil. *Ollas* don't really begin to water effectively until about six inches down, because the thin neck dries out first. This dry zone also causes a lot of the microbial life in the top layer of soil, which is critical for plant health and success, to dry out.

This year, we will be using the *ollas* in a different garden, one which did much better in 2019. As a control, we will plant two beds with the same crop from the same source. One bed will be watered using traditional hand-watering, and the other using *ollas* buried on three-foot centers. This time we will not bury them quite as deep, with the aim of keeping that critical top layer of soil moist.

We feel that mulch would be helpful in this application and in most gardens in arid zones. We understand that this is not always feasible for people coping with arid conditions, but suggest that some of the plants grown for compost could be used as a thin layer of mulch. We will attempt to add a thin layer of mulch to the surface of the soil in 2020 and see how our *olla* gardens fare! Stay tuned for the results! ●

Tool Tip: Agribon

Seedling Protection: Floating Row Covers

Spring is a time of sun and frost, when delicate seedlings need protection from the elements. While glass cloches and greenhouses are durable and plastic-free, most gardeners can't afford them. We don't love to use plastic in the garden, but floating row covers are a more affordable way for the average small-scale farmer to cope with temperature fluctuations. In contrast to plastic sheeting, floating row covers (made of non-woven polypropylene fabric) help keep plants warm and moist when the temperature drops, but they do not trap heat the way solid plastic does—so if the temperature rises and you're not there to vent your beds, your row covers will be less likely to cook your seedlings.

Agribon is our preferred row cover—it's more durable than others we've tried, lightweight, resistant to exposure, reusable (so less plastic than if you replace it every year), and affordable; it allows light and air to pass through (you cannot water through it, but it can easily be lifted), and depending on thickness, can provide protection from frost, excess heat, wind and insects as the season progresses.

- **Agribon AG-15 Insect Control:** Lightweight, potects crops from pests. Does not retain unnecessary heat. 90% light transmittance.
- **Agribon AG-19 Insect Control/Light Frost**: Light enough to be laid over plants without hoops or frames. Strong enough to withstand light to moderate wind/other stress. 85% light transmittance. Provides up to 4°F of frost protection, and can keep the soil up to 4° F warmer.
- **Agribon AG-30 Medium Frost**: Widely used for frost protection on citrus, strawberries, vegetables and nursery stock. Conserves water by reducing evaporation. 70% light transmittance. Up to 6°F of frost protection, and can keep the soil up to 6°F warmer.
- **Agribon AG-50 Heavy Frost**: Protects fruit trees from late spring frost damage, and shrubs and vegetable crops from unseasonably low temperatures. Provides 6-8°F frost protection, with 50% light transmittance, and can keep the soil up to 6-8°F warmer.
- **Agribon AG-70 Extra Heavy Weight**: Provides 8+°F of frost protection, with 30% light transmittance, and can keep the soil up to 8°F warmer.

We get ours from groworganic.com/collections/row-covers. ●

Seasonally Appropriate: Pricking Out Seedlings

From GROW THE EARTH (johnjeavons.org)

Spring has sprung, and it's time to get your seedlings in gear for a productive year! In keeping with the season, I thought that this would be a good time to discuss the benefits of pricking out your seedlings before you transplant them. Many people are in the habit of simply planting their seeds in flats, and then transplanting the resulting seedlings directly in garden beds. Most don't know that *you can greatly increase plant health and yields by including a step in between planting the seeds and transplanting the seedlings, called "pricking out",* in which you select the healthiest seedlings and transfer them to a slightly new (sometimes deeper) flat to continue to grow to the correct size and hardiness, before finally transplanting them into a growing bed.

FIG. 33.—Effects of transplanting on the root system of cauliflower. Left, not transplanted; center, once transplanted; right, twice transplanted. Photograph taken as "heads" were forming. (*After Loomis, Cornell Univ. Mem.* 87.)

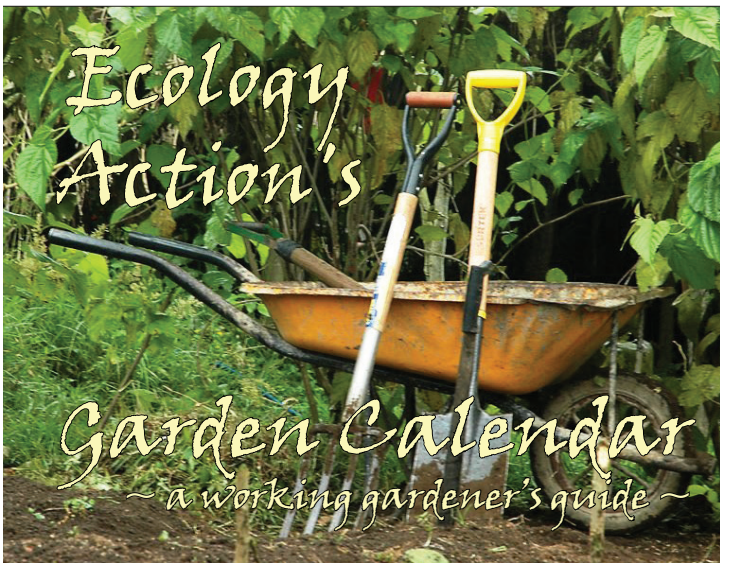
In the 1950's Dr. C.K Snyder of the University of California-Berkeley performed a study, with globally accepted results, showing that an increase in *root health* of just 2% to 4% enabled field crops to produce 200% to 400% the yield. The photograph above shows the difference pricking out makes to the root systems of the seedlings: on the left, you see the root system of seedlings which were not "pricked out" (transplanted) at all (i.e., direct sown); in the center, seedlings which were sown into a flat and transplanted into the bed; and on the right, seedlings that were pricked out before finally planted in beds. Which seedling would you like to have growing your crops?!

Some people are reluctant to take the extra time and effort to prick out seedlings—and I understand that an extra step at an already busy time of year isn't welcome, but believe me, the results are worth it! Years ago, a GROW BIOINTENSIVE Certified Teacher candidate did not believe that pricking out would make a difference. He had been starting lettuce seedlings in flats and then transplanting them directly into the double-dug growing bed, as most farmers do. After being encouraged for a long time to try pricking out the lettuce seedlings into a second flat, allowing them to grow to the right size and *then* transplanting them into the growing bed, he finally tried it. The result? He found that he reliably received *double the yield of lettuce* from the pricked-out seedlings, time and time again.

If you want to get the most out of your garden this year, it's easy to learn for yourself how and when to correctly *prick out* seedlings for different varieties. See pp. 85-86 in the 9th edition of *How to Grow More Vegetables (*2017). Also refer to Columns E through N in the Master Charts on pages 137-187 of the same book. You will be amazed!

Additional resources for making sure your seedlings get a good start and keep growing strong all season long:

- Watch the *GROW BIOINTENSIVE Beginner's Guide —Growing Seedlings in Flats* for free at johnjeavons.org/video-html.
- Ecology Action has created a Garden Calendar with recommendations and checklists to use each month for mini-farmers with a 5-Month Main Growing Season and a temperate climate. You can find and download it here: growbiointensive.org/PDF/EcologyActionBiointensiveGardenChecklist.pdf . ●



Soil Science Spotlight: Base Saturation

By John Beeby,
Ecology Action Soil Fertility Advisor

One of the primary functions of the GROW BIOINTENSIVE method is to allow small-scale farmers everywhere to build and maintain soil fertility levels that will allow the farmers to grow a large amount of food and compost materials in a very small area, with greatly reduced resource use, for an indefinite period of time, sustainably. Soil testing and the application of the correct type and quantity of organic soil amendments at the correct time is a fundamental part of building and maintaining sustainable soil fertility levels. To introduce the topic of soil testing and the reasoning and methodology involved in soil test analysis and making soil amendment recommendations to a wider audience, John Beeby and Ecology Action are creating a series of topics on the subject called "Soil Science Spotlight", which will be posted to growbiointensive.org in the "Protocol" section starting in 2020, with new posts added regularly. This is an excerpt from the first post in that series. Read the full article at growbiointensive.org/Enewsletter.

Q: *When you test your soil and the lab report lists "base saturation" results, what are they and how are they useful in understanding and improving your soil?*

A: Base saturations are the proportions of the available calcium, magnesium, and potassium (as well as hydrogen, sodium and aluminum) held in your soil. They are reported as percentages, so they tell you the proportion of each nutrient compared to the total amount of cations (positively charged nutrients) held in your soil. For example, if you have a soil that has a calcium base saturation of 70%, you know that 70% of the cations held by the soil are calcium; the rest is a mix of magnesium, potassium, sodium and other cations like hydrogen, zinc, copper, manganese, iron or aluminum. Base saturations do not tell you anything about the total amount of each cation; that is usually given elsewhere in the lab results.

Q: *Are there ideal base saturation percentages for the major cations (calcium, magnesium and potassium) that farmers should strive to achieve in order to maximize their yields*?

A: No, although some would disagree. In the 1930s and 40s, Dr. Firman E. Bear suggested that crops do best in soils that have base saturations of 65% calcium, 10% magnesium, 5% potassium and 20% hydrogen. This idea was further developed by Dr. William Albrecht, then by Dr. E. R. Graham, and later by Dr. E. O. McLean into an "ideal range" that varied depending on the author, but tended toward base saturations of approximately 60-85% calcium, 10-20% magnesium, and 2-5% potassium.

However, for more than 35 years, extensive and scientifically rigorous testing has shown that achieving these "ideal" base saturation percentages is not critical for optimizing yields, and that the expense and resources required for the additional fertilizers are generally not justified. This modern research makes it clear that having all necessary nutrients in sufficient quantities in the soil—rather than their ideal ratios—is what is critical for crops to thrive.

***Q:** So why do we still do the tests?*

A: Because knowing a soil's base saturation percentages can still be useful in some circumstances. Regarding calcium and magnesium, research shows that crops perform to their maximum potential with a variety of calcium to magnesium ratios, but that high calcium saturation levels can be one indicator of a calcareous soil, and can interfere with the availability of phosphorus, iron and zinc. Similarly, high magnesium saturation levels can interfere with a plant's uptake of potassium and vice versa, although this still is unlikely to significantly impact yields if all nutrients are available in sufficient amounts. Regarding sodium, the less sodium the better—crops don't need it, and it can be very detrimental to soil structure and health. However, determining whether a soil contains harmful amounts of sodium—and what amount (if any) needs to be leached from the soil to prevent crop damage—is generally based on the soil's sodium saturation *percentage* and not the *total amount* of sodium in the soil. This is because sodium, a positively charged ion, can be held by the soil's negatively charged clay and organic matter; this ability to hold onto cations is called the *cation exchange capacity* (CEC). If the soil has a very high CEC, it can hold onto more sodium before it becomes harmful to plants, whereas if it has a low CEC, even small amounts of sodium can be detrimental to your crops.

***Q:** What if your soil test results do not list base saturations?*

A: To calculate base saturations yourself, you divide the amount of each cation by the total CEC. Simple enough, right? The only tricky part is ... *[continued online]* •

Coronavirus Victory Gardens:
How to Feed the World in a Pandemic

By Peter Corning, Director of the Institute for the Study of Complex Systems (*complexsystems.org*)

The "Biointensive" growing system, a modernized version of an ancient method, could provide a vast opportunity to employ idled workers and produce food.

As tens of millions of idled workers worldwide face many months, perhaps even years, of unemployment and economic hardship, there is a low cost but highly productive system of growing food in small spaces that might be able to play an important role in providing work and feeding idled workers. The "Biointensive" mini-farming system, as it is commonly called, represents a much-improved version of an ancient (4,000 years old) Chinese method, and it was developed back in the 1970s in northern California by John Jeavons. The word "revolutionary" is not an exaggeration. One of his long-time fans is the famed Chez Panisse restaurant owner Alice Waters: "John's methods are nothing short of miraculous. He has shown... that astonishing quantities of high-quality produce can be grown on even the most devastated land."

Jeavons' unique method (which he has trademarked as "GROW BIOINTENSIVE") is really a complete growing system. It can yield 2-6 times more produce per acre (sometimes even more) than conventional row agriculture, while using only 30 percent (or less) of the irrigation water, little or no fossil fuels, and minimal soil amendments, or none. And it's done with simple hand tools and modest skills, so it requires very little capital investment in exchange for a lot of labor. Over time, you can even create new topsoil at a rate that is at least 60 times faster than in the natural world, if you do it right, because half or more of what you grow will be "carbon crops" that are turned into compost to "feed" the soil as well as the people. (It's also readily adaptable to varying climates and soils.)

Over the past 40 years Jeavons and his non-profit organization, Ecology Action, have trained hundreds of interns and teachers from about 30 different countries, and there are now an estimated 7 million Biointensive farmers around the world, as well as numerous indigenous training centers. Over the years there have also been hundreds of seminars and workshops at the Willits, California, Biointensive research farm and elsewhere, and Jeavons has made countless Power Point presentations across the U.S., and in several foreign countries. The headquarters farm, along with a satellite farm nearby, is still active.

The Biointensive system is based on using multiples of 100-square-foot growing beds (typically 5x20 feet or 4x25). Each one of these is carefully worked with a technique called "double-digging," using tools like a D-handled spade and digging fork to prepare the topsoil and loosen the subsoil down to 24 inches, so that the plant roots—as well as air, water, and beneficial microbes—can grow much deeper. The plants also benefit by creating their own micro-climate when they are growing close together. With an investment of about 30 hours of labor per week, it is possible to produce enough food with the Biointensive system to provide a complete, diversified diet on about 4,000 square feet of growing area (or 40 beds)—compared with the standard U.S. agricultural requirement of more than 100,000 square feet. And it's sustainable for the long term.

Over the years, Jeavons has also done meticulous research and experimentation, along with careful record-keeping, which is distilled in his legendary book *How to Grow More Vegetables*. Now in its ninth edition, it has sold more than 600,000 copies in eight languages. It has long since become an indispensable handbook and reference source for Biointensive farmers, and many others as well. I know, because our family developed and successfully operated a 16-acre Biointensive market farm on San Juan Island, Washington for a nearly a decade in the early 2000s as a post-retirement venture (with the help of a staff and many interns over the years, of course).

In theory, the Biointensive farming system could feed the entire world, including especially the estimated one billion people who are currently undernourished or malnourished. (According to the U.N., three-quarters of the world's existing farms are 2.5 acres or less.) More important, it could readily be utilized in urban back yards, and parks, and even some roof tops to grow food for unemployed city-dwellers.

However, poverty also represents a major obstacle to expanding Biointensive farming. The system is relatively inexpensive, but it still requires growing space, and water, and seeds, and starter compost, and soil amendments, and tools, and related equipment like water hoses, shade cloths, and plastic covers for cold weather, not to mention training. It's a very knowledge-intensive system. The cost of a "starter kit" for a new Biointensive mini-farm might range from $200-500 or more depending on where, and what, and how much you are growing. So, the total cost ... *see Victory Gardens, next page*

From Seed to Seed

By Nicholas Bell and Martina Widmer (*diyseeds.org*)

We received the following letter and thought it was worth sharing with you. Let's support this wonderful new online learning resource, and let's all save seeds!

Dear friends: Some time ago you discovered our DVD series *From Seed to Seed*. We continue to develop this project, aiming to make it available to as many people as possible. Thanks to sales of our 1st set and the participation and support of many people, Portuguese, Spanish and Arabic versions have been produced.

The big news is: our new website, ***diyseeds.org***. Please visit it, and share it far and wide!

From Seed to Seed is a series of 40 short films that gardeners of all levels can use to learn to produce their own vegetable seeds. Together, the films are a practical manual that can be used in schools, training programs or seed swaps. From cabbages to peppers, carrots to eggplants, 32 films describe the cycle of different vegetables from seed to seed, the biology of their flowers, the different varieties and how to extract, clean, sort, dry and store their seeds. The other 8 films explain theoretical and practical aspects of seed production, such as botanical classification, pollination, and selection or isolation techniques.

The films were produced by members of Longo Mai, a movement of self-managed collectives in five European countries that has existed since 1973 with around 200 people of over ten nationalities working in agriculture, animal breeding, forestry and crafts. For many years they have produced their own seeds, and they organize seed swaps.

By learning to produce your own seeds, you will contribute towards maintaining the vast heritage of heirloom varieties developed over countless generations that is fast disappearing. The only way to guarantee their survival is to cultivate them in our gardens and acquire the knowledge of how to multiply them.

The films can be viewed and downloaded free of charge at ***diyseeds.org*** in English, Arabic and Portuguese, under the Creative Commons License. Other versions will be added in the coming months. You will also find the complete explanatory texts which make up the soundtrack, as well as drawings of the botanical families. Two different versions of the DVDs are also available for purchase online: English/French/German and Portuguese/Spanish/English.

We are always interested to hear how you have used the films and any reactions you may have had. With our best wishes, Nicholas Bell and Martina Widmer •

Tool Tip: Auger

Our preferred tool for gathering soil samples is the **AMS One-Piece Open-Faced Soil Auger** (*gemplers.com*). The one-piece, open-faced auger extracts samples quickly and easily in mud, clay, or hardpan, and features 10-ga. high-carbon steel construction with an aggressive, 2-1/2"-dia. cutting head for better soil penetration. The 16-inch wide cross-handle with comfortable rubber grips and the 48-inch length make it comfortable for most to use.

Why have an auger? Our potato, alfalfa, comfrey, and other plants provide higher yields with good, even soil moisture levels at 36 inches deep. It does not take extra water to achieve this, just the regular daily watering (see pp. 92 in *How to Grow More Vegetables* (2017)) once deep-soil moisture levels have been reached. To determine if we have achieved the deep-soil moisture, we core down in 6-inch increments and place the result on a tarp in sequential order according to depth. It's easy to see how moisture levels change in each sample, and whether you have good moisture at 36 inches. •

Victory Gardens (continued from page 14)

to create new Biointensive farms for 10 million unemployed workers could be $2-5 billion. It would require major public and/or philanthropic subsidies.

Nevertheless, it's also a relatively low-cost way to employ and feed 10-20 million people. Not to mention coping with the threat that climate change poses to food security at the same time! Total global military spending amounted to about $1.8 trillion a year in 2018. To use that old cliché, turning some of our guns into butter (or swords into plowshares) would contribute significantly to international security, and it would be money well spent. In more than one sense, we could rightly call them "victory gardens." •

Ecology Action's Garden Companion

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Ecology Action Events: 2020

Dear GROW BIOINTENSIVE Family,

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

The Annual **Mini-Farm Tour** (May 3) is canceled.

The two **9-Saturdays Courses** are still scheduled (Part 1: July 11 - Sept 5 and Part 2: Sept 19-Nov 21). If either course series is canceled, full refunds or the option to transfer attendance to a future course will be given.

We are currently accepting applications for the **6-Month Internship at VGFP**, with the possibility that it may occur online, or onsite later in the season.

The **Fall 3-Day Workshop** is still scheduled for November 6-8, 2020. However, if it is necessary to cancel it, those registered to attend will receive a full refund or the option to transfer attendance to the Spring 2021 3-Day Workshop.

Wishing everyone good health and good gardening,
Ecology Action

Updates at: growbiointensive.org/events_main.html
or call 707-459-0150

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