

ECOLOGY ACTION'S GARDEN COMPANION

GROW BIOINTENSIVE® News from Around the World



9-Saturdays Course participants finish turning an enormous compost pile at VGFP Mini-Farm

FALL 2021

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The Jeavons Center Mini-Farm Report

By John Jeavons, Ecology Action Executive Director

“I enjoy GROW BIOINTENSIVE farming because it is inspirational and empowering. It focuses on a detailed knowledge of the whole ecosystem within a garden. Biointensive is extremely effective in using resources to grow a balanced diet while also regenerating the soil. Despite being a complex system, it becomes a simple process of caring for the garden and watching it grow, a process that in turn nurtures the mind, body and soul.”

– Suraya David-Sadira, TJC FTT, 2021

As The Jeavons Center mini-farm transitions into winter and we begin looking toward the start of the new growing season, it’s a pleasure to reflect on the different annual crops we’ll be growing into 2022. There are a few favorites I’m particularly focused on:

Barley

Because TJC has a fairly short (5-month) main growing-season, combined with an average of only 10 nights per year with a temperature of 60 degrees Fahrenheit, we need to get our warm/hot weather 60% Carbon-and-Calorie-Crops in as early as possible to achieve reasonable yields. For TJC, that means a planting date for the warm/hot weather crops of no later than May 16. To accomplish this, we need to get at least some of our cool/cold weather 60% Carbon-and-Calorie-Crops out of the growing beds as soon as possible to make room for the warm/hot weather crops. Most of the cool/cold weather 60% Crops we favor take about eight months to mature at TJC. However, barley (*Hordeum vulgare*) is unique in that it can take as little as three months. This means we can plant cool/cold weather barley as late as February 15 (and as early as October 7 if needed or desirable)

and still achieve a good harvest by May 16. Also, barley, according to *Cereal Crops* (by Warren H. Leonard and John H. Martin, The Macmillan Company, 1963), it is possible to harvest barley in 2 1/2 months (2 weeks ear-



ly) without impairing the nutritional value of the grain—although seed and dry biomass yields will be reduced a little. This year, TJC expects to be trialling the *Black Nile* and *Gopal* barley varieties in 15 growing beds—and possibly several more varieties as time and garden space allow. These seeds are being sourced for us by Lorenz Schaller, proprietor of the *KUSA Seed Society*. KUSA has a diverse array of crop seeds and varieties (see ancientcerealgrains.org/seedandliteraturecatalog.html for a catalog). Lorenz has also written a 3-volume series on barley, with the final fourth volume in preparation. You can read my review of the series in this issue (*The Book of Barley*, page 12).

Fava Beans

Banner Cold-Weather Fava Beans (*Vicia faba*) are one of our favorite 60% varieties because of its hardiness and productivity during our long, cold (hopefully wet), winters. This year, we’re also planting it because we are low on seed for this variety and need to replenish our stocks. Here is how it compares with the runners-up, which are also good. In Ecology Action’s experience, the two best varieties are the first two below, yet they are difficult to locate. The last is easily available and has some good aspects.



- *Banner*: Does not freeze until 10 degrees Fahrenheit, provides dense growth 4.5+feet high. At intermediate-level GROW BIOINTENSIVE yields, Banner can produce 9 pounds of seed and 36 pounds of mature dry biomass for compost material per 100 sq. ft. Grown for immature compost material, this variety can produce up to 160 pounds of wet biomass. See Table A, p. 40 in HTGMV (2017) to see how important this compost material yield can be!
- *Frederick*: Does not freeze until 15 degrees Fahrenheit, provides dense growth 4-feet high.
- *Vroma*: Does not freeze until 10 degrees Fahrenheit, provides less dense growth ~3.5-feet high.

Note: To destroy any weevil eggs in the dry fava beans at harvest time, store in a freezer for 3 full days immediately after harvest.

Early Stone-Age Wheat

Einkorn (*Triticum boeoticum* (wild wheat), or *Triticum monococcum* (domesticated species), was first cultivated in the fertile crescent of the Tigris/Euphrates conflu-



image: einkorn, slowfood.org.uk

ence by primitive humans 10,000 years ago, and is known as our “first wheat”. The name is derived from the German word for “single grain” because each spikelet contain only a single fertile flower and thus produces only one seed, in contrast with the multi-grain spikes of modern wheat. Einkorn contains 14 chromosomes, whereas modern wheat

contains 42. It is thought that because Einkorn does not have the D chromosome, which seems to be connected with wheat intolerance in many humans, that einkorn is easier to digest and may not cause as many problems for people with sensitivities to other forms of wheat. It also contains more 18.3% protein than modern wheat, and more antioxidants as well. When grown in northern Iran it produced all of one person’s calories annually with an average of just 3.7 minutes daily. (Actually 20 minutes a day for 60 days.)

Woolly Pod Vetch

This legume has the potential for fixing up to ~0.63 lb. of nitrogen in 100 sq. ft. of garden soil (if you pick off all its flowers, so the nitrogen does not go into producing seed). See also, Managing Cover Crops Profitably, SARE (Free online at sare.org/wp-content/uploads/Managing-Cover-Crops-Profitably.pdf).



image: vetch, ecology action

Woolly Pod Vetch (*Vicia villosa*) is one of the most effective legumes for nitrogen fixation, as only ~0.5 lb. of nitrogen is needed/100 sq. ft. growing bed per 6 month growing season (5 lb. carbon is needed/100 sq. ft. growing bed per 6 months – this is where your carbon crops come in handy). Since a 100 sq. ft. growing area needs 0.5 lb. of nitrogen to grow a crop, and because ~0.25 lb. of this can come from GB cured compost, the remaining ~0.25 lb. of nitrogen needed can come from growing out just 2.2 oz. of Woolly Pod Vetch seed!

Hard Red Spring Wheat

This traditional variety (*Triticum aestivum*) is also a favorite at TJC. At intermediate-level GROW BIO-

INTENSIVE yields per 100 square feet, it can produce 10 pounds of seed and 30 pounds of dry biomass. Plus, the freshly ground flour makes excellent bread and pasta! (See Table A, p. 40 in HTGMV (2017) to see how important the dry biomass compost material yield is.)

These and other varieties will go into the growing beds between now and the first hard frost, becoming part of the ongoing "smallest growing space" 10-Bed Unit Project underway here and at a dozen other GB test gardens globally, helping to determine the best complete, closed-loop. food, compost and soil-growing plan possible for the smallest growing area for a given climate. Growing edge Biointensive projects like this are flourishing around the world, helping to heal the Earth and its people, right where they are.

We love our Global GROW BIO-INTENSIVE Family and are proud of the work we and our partners do. We look forward to growing strong with you through 2022 and beyond!! ●



image: ecology action



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



April 2, 9 and 18, 2022

Learn to grow healthy food and fertile soil from
the author of “How to Grow More Vegetables”

growbiointensive.org/workshop.html



Victory Gardens for Peace GardenCorps® Program

Mission: Training leaders to serve their communities through establishing a stronger home and community gardening culture to promote food security and a healthier more peaceful future.

GardenCorps trains
community leaders to
grow a sustainable
gardening movement

GardenCorps leaders
create opportunities and
organize community to
increase access to organic
local food through
promoting home and
community gardening

A strong and resilient
community has its roots
in local food- *We can do
it! Si se puede!*

Victory Gardens for Peace GardenCorps program trains teams of individuals in sustainable food systems and community organizing to support the establishment of a local food and gardening culture.

GardenCorps is a 4-month, 2-part course including: 45 hours of hands-on training in sustainable food production and 45 hours of diet planning, garden design and agricultural leadership training. A description of the curriculum is on the reverse side.

Program participants are accepted on the grounds that they will apply what they learn and dedicate their efforts in 50 hours of community service within a 1-year period to develop community gardens and improve access to opportunities and resources in Fort Bragg, CA.

GardenCorps graduates develop the tools to demonstrate, teach and organize around sustainable home and community gardening. They are supported in this work by their teachers, classmates and community. The goal is an inclusive, sustainable and local food system for all which conserves resources and preserves ecologies.

2022 Program Dates:

Part 1: Saturdays June 4th- July 30th 9AM-3PM

Part 2: Saturdays August 20th- October 15th 9AM-3PM

Cost: \$450 (scholarships may be available)

Contact Matt@Victorygardensforpeace.com or call (847)404-2586 for more information.



VGFP is a project of Ecology Action, a 501c3 based out of Willits, California. Visit www.growbiointensive.org and www.victorygardensforpeace.com for more information.



Victory Gardens for Peace GardenCorps® Curriculum

GardenCorps is taught on site at the Victory Gardens For Peace Mini-Farm located in the town of Mendocino. All classes are led by certified Grow Biointensive® Teachers including Master-Level instructors. These instructors have experience working with farmers, gardeners and community organizers from around the world and bring a global perspective unified under the theme of growing soil, food, seed and community.



45 Hours Grow Biointensive Sustainable Gardening Techniques:

- Soil preparation, cultivation and fertilization
- Seed propagation and transplanting
- Composting
- Calorie and carbon farming
- Seed saving, adaptation and preservation

27 Hours of Agricultural Leadership Training:

- Garden and project management
- Community organizing and creating networks
- Working with businesses and local government
- Community seed banking
- Education and outreach methodologies
- Supporting home and community gardeners



27 Hours of Sustainable Garden and Diet Design:

- Applying permaculture principles
- Garden layout and infrastructure
- Planning for diet and nutrition in the garden
- Creating a sustainable garden plan for soil fertility
- Integrating theory and practice through real world application



For more information on how to become involved contact Matt@Victorygardensforpeace.com or call (847)404-2586
Donate to support a GardenCorps team in your community through our scholarship program!

Global GB Partner: GROW BIOINTENSIVE Agriculture Center of Kenya (G-BIACK)

By Shannon Joyner, Garden Companion Editor



The GROW BIOINTENSIVE Agriculture Centre of Kenya

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.

Husband-and-wife team Samuel Nderitu and Peris Wanjiru are graduates of the 2-Year Biointensive Training Program at Manor House Agricultural Centre, sponsored by the Kilili Self-Help Project (an Ecology Action partner organization based in California and Kenya). Samuel met EA Director John Jeavons at two African GB workshops with participants from eight countries sponsored by Ecology Action at Manor House in 2007, and eventually both Samuel and Peris completed the intensive onsite 8-month GROW BIOINTENSIVE Internships at Ecology Action's headquarters in California. Samuel and Peris are Co-Directors of their project, the **GROW BIOINTENSIVE Agriculture Centre of Kenya (G-BIACK)**, online at g-biack.org in Thika, Kenya, an area facing severe climate change impacts, with a high HIV/AIDS rate.

G-BIACK's focus is to demonstrate, train and promote GROW BIOINTENSIVE agriculture and community development techniques for sustainability among small-scale farmers across all provinces in Kenya. Their programs are very popular: farmers reach out to be trained at G-BIACK after seeing the results of GB in their neighbors' fields. G-BIACK broadens the impact of the training they provide by choosing to work with farmers who show leadership within their communities and can become Community Resource Persons (CRPs): teaching others to farm using sustainable GROW BIOINTENSIVE methods. In this way, they have been able to train thousands of farmers in just of a few years of operation, under extremely difficult conditions including ethnic violence, drought, floods, locust swarms and COVID-19. In last 10 years, the couple have:

- Trained over 15,000 smallholder farmers, with the goal of all of Kenya using (or aware of) GROW BIOINTENSIVE by 2030.
- Trained interns from all over Africa, as well as other countries, including 12 farmer-leaders from Afghanistan.
- Given many large-scale training sessions and symposia on GB, including one with 25 representatives from 12 countries.
- Trained farmers to establish GB Satellite Centers in 37 of Kenya's 47 counties (as of 2021) to support surrounding communities and create regional food security and sustainability networks.
- Established a Seed Bank and Seed Sovereignty Program to ensure local farmers have sufficient seed to maintain food security. Currently, the G-BIACK seed bank holds more than 1,000 species of seeds, including rare, indigenous, and endangered species collected from the communities they serve. G-BIACK propagates as many of these species as possible, with the goal of redistributing to the farming communities. The seeds are given out to farmers who need them, with a requirement that the farmer returns a quantity of the same seed to the seed bank at harvest to ensure future growth. G-BIACK has helped eight other communities establish seed banks of their own.
- Established a Women's and Girls Empowerment Program which has been especially effective at teaching marginalized and vulnerable young women to use and teach GB, and also to learn other economically viable skills such as sewing, accounting, and computer skills, so they can grow nutritious food as well as earn an income.



Kanjuku Primary School students learning GROW BIOINTENSIVE farming, 2021

Many of the students in the program participate in an NGO attachment program, spending three months working with an NGO, educating the staff to use and teach GB to others.

- Established a Biointensive Agriculture for Schools (BAS) Program which has created GB gardens in connection with over 70 schools and orphanages, projects that are of vital importance to the region. The AIDS epidemic has ravaged Kenya, and millions of children have been orphaned. Some are raised by grandparents, but often with the responsibility of raising younger siblings themselves; others are raised in orphanages. Malnutrition is endemic among these orphans, both from an outright lack of food, as well as consuming low-quality food that does not provide enough nutrition to maintain health. The gardens that G-BIACK catalyzes in schools and orphanages provide much-needed, high-quality food for the orphans, students, teachers, and caregivers, as well as teaching all of them the skills they need to grow food for a lifetime.
- Provide classes in nutrition for people impacted by the HIV/AIDS epidemic, including those marginalized by the disease, including many grandmothers taking care of grandchildren whose parents had died of AIDS.
- Completed an important 5-year “Limited Inputs Research Project” in cooperation with Ecology Action to discover if GB-maintained soil can remain fertile by using only a small amount of required nutrients in the first year (with very promising results, published in 2020, which you can read here:

<https://www.frontiersin.org/articles/10.3389/fsufs.2020.00067/full>).

- Trained four Community Resource Persons in each community where training has taken place, to act as GB resources after the original trainers leave. These CRPs provide training to others and are given updated training by G-BIACK on a regular basis to ensure quality control over the practice of GROW BIOINTENSIVE.

As a result of these efforts, an inspirational ripple effect is being created as farmers across the Kenya (and beyond!) learn to grow more food, build soil fertility, conserve resources, and create sustainable food security in their communities. G-BIACK has developed into a thriving education center and provides an excellent venue for the establishment of a larger training and demonstration facility.

G-BIACK’s goals are ambitious, and we need your help to make sure Samuel and Peris’ important work keeps moving forward. Please make a tax-deductible donation to G-BIACK at <https://donatenow.networkforgood.org/ecologyaction> (select G-BIACK from the “special purpose” list) or send a check/money order made out to Ecology Action with “G-BIACK” 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. G-BIACK is working hard to make our world better. Let’s get them the help they need, to help those who need it most! ●



Participants in G-BIACK’s 2020 Youth in Agroecology Program learning GB

Soil Science Spotlight: Saline and Sodic Soils

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. The whole series, with frequent additions, is online at growbiointensive.org in the “Protocols” section.

Whenever we irrigate crops to produce food, there is a risk of accumulating salts in the soil from the irrigation water used. Examples of human-induced salinity and sodicity in soils abound from irrigated agriculture in ancient Mesopotamia to the current San Joaquin Valley in California. The FAO estimates that 10% of our agricultural soils are affected by salinity and sodicity (1).

Excessive salts in a soil can significantly reduce its fertility and productivity, by making it difficult for plant roots to take up soil water in the presence of high levels of salts. Water moves from the soil into the crop roots due to the differences in osmotic potential between the soil and roots. If soil water has a lower concentration of salts than the roots, then water will naturally move from an area of lower salt (higher water concentration) like the soil to an area of higher salt concentration (lower water concentration) like the roots. If, however, the soil water has a similar or greater concentration of salts than the roots, then the water will not move into the roots as easily, and the plants could wilt and die. In addition, soils high in sodium lose their soil structure, making it more difficult for air and water to move into the soil, which is vital for beneficial soil microbial populations, the soil's resistance to wind and water erosion, the ability of roots to grow deeply into the soil, and the crops to thrive.

How does this occur, how do we prevent it, and how do we fix it?

All irrigation water contains salts like calcium, magnesium, potassium, and sodium to varying degrees. When irrigation water is applied, the salts it contains are added to the soil along with the water. If insufficient irrigation water is applied, some of the water from the application will evaporate and leave salts behind to accumulate on the soil surface. In addition, capillary action from the soil pores will cause soil water to slowly

rise to the surface, bringing with it soil salts. When the soil water evaporates, additional salts are added near the soil surface. Once significant levels of salts accumulate, they can be seen as a white layer on top of the soil, as shown below:

Since it can be difficult and costly to modify the salt concentration of irrigation water, prevention generally occurs by adding sufficient irrigation water to ensure that water moves the salts past the root zone of most crops. This prevents the majority of the salts from being left at the surface or rising to the surface through capillary action. In general, one would want to avoid frequent, light applications of irrigation water which tend to favor soil evaporation, little leaching and salt accumulation. Soils that are saline, defined as having an electrical conductivity greater than 4 dS/m and a sodium saturation content less than 15%, can be remedied by adding large amounts of irrigation water to the soil, which leaches the majority of the salts below the crops' root zone.

GROW BIOINTENSIVE® agriculture allows a farmer to use less water for a variety of reasons, while still adding enough water to leach salts and prevent saline or sodic soils to form. Close spacing and continually cropping prevents surface evaporation and the transport of soil salts to the surface, all the while increasing the yields per unit of area. In addition, by focusing on improving the organic matter content of a soil, GROW BIOINTENSIVE farmers increase the ability of a soil to take in water, create a resilient soil structure, and increase the cation (salt) exchange capacity, so higher levels of salts can be tolerated. If necessary, the farmer may also consider growing crops more tolerant of saline or sodic conditions.

Soils with high amounts of sodium (even sodium levels above 5% are detrimental) cannot be remedied simply by leaching due to their loss of soil structure which prevents good water infiltration. Gypsum (calcium sulfate) must be added, which allows the calcium to displace the sodium and reestablish cation bridges between organic matter and clay particles that facilitates good soil structure. The application of gypsum is then followed by the addition of large amounts of irrigation water to leach the sodium in the soil water below the root zone. To leach 50% of the salts from saline and sodic soils, generally 6 inches (15 centimeters) of irrigation water per foot (30 cm) of root zone must be added. Twelve inches (30 cm) of irrigation water per foot (30 cm) of root zone will leach approximately 80% of the salts, and 24 inches (60 cm) of water per foot (30 cm) of root zone will leach 90% of the salts.

During leaching, no crops should be growing in the soil, since they will not benefit from a flooded, saturated soil. If possible, minimize evaporation by covering the soil being leached with shade netting or mulch. If water infiltration of the soil is slow, it may be necessary to create a border around the soil that can hold 6 inches (15 cm) or more of water, so that the soil can be completely flooded and the water infiltrate at the pace the soil allows, rather than have to monitor for water running off the surface of the soil.

After flooding, it is helpful to retest the soil's electrical conductivity and/or sodium saturation level depending on whether the soil was saline or sodic. Knowing the salt concentration and overall irrigation water quality, monitoring the salt and sodium concentrations of the soil, using GROW BIOINTENSIVE® sustainable and organic farming, and avoiding frequent, light irrigation water applications are effective strategies for preventing human-induced soil salinity and sodicity. ●

1. Shahid S.A., Zaman M., Heng L. (2018) Soil Salinity: Historical Perspectives and a World Overview of the Problem. In: Guideline for Salinity Assessment, Mitigation and Adaptation Using Nuclear and Related Techniques. Springer, Cham. https://doi.org/10.1007/978-3-319-96190-3_2



Image: mrs. j. d. q. w. / iStockphoto.com / MEDIA/195143-010356

Salt-affected soils on Colorado range land. As the water evaporates, salts dissolved from the soil deposit and accumulate at the soil surface. Notice the crust of salt deposited on the ground and on the base of the fence post.

Interesting Heirloom: Takane Ruby Buckwheat

From Baker Creek Heirloom Seeds: Rare Seeds®



Image: Baker Creek Heirloom Seeds

A brilliant, ruby-red flowering superfood from Japan, this pink and red flowering buckwheat is a rare and wondrous pseudo-grain; blankets of pink can be seen blooming high in the Himalayas. In the late 1980s, Akio Ujihara, a professor emeritus from Shinshu University in Japan, collected seeds for a unique flowering buckwheat from Yunnan, China, at about 12,000 feet elevation. The professor selected and perfected this variety, and the signature red blanketed fields can now be found in Nara Prefecture, Japan. Japanese farmers quickly embraced this as a stunning cover crop, much more beautiful than white buckwheat. Tourism in the area to see the pink and red buckwheat fields has skyrocketed. The seeds are ground into a flour for soba noodles and can also be sprouted for a highly nutritious microgreen. In Japan, buckwheat is also brewed into tea and made into cookies. Honey from bees who fed on ruby buckwheat was analyzed by Shinshu University and shown to contain 100 times the antioxidant effect of regular honey. You can find the seeds at <https://www.rareseeds.com/store/vegetables/grains-and-cover-crops/takane-ruby-buckwheat> ●

Using GB and Plant Extracts to Protect Crops Naturally

By Fredrick Onyango, Director, SADA

We received the following innovative report on natural nutrient balance and pest control through the use of plant extracts from Sustainable Agroecological Development Action (SADA, sadacentrekenya.net), a GROW BIOINTENSIVE Demonstration/Education and Research organization located in Siaya County, Kenya. SADA Director Fredrick Onyango (2019 TJC intern, pictured below with wife Hellen) says: "Food security begins with sustainability of soil fertility. We established SADA Centre to restore the hope of farmers that despite the extent of soil degradation we can get our soil fertility back. The SADA staff trains farmers on compost making, management, and cured compost application. Some other major components are soil moisture conservation, crop diversity and rotation, cover cropping, minimal tillage (double digging), and use of open pollinated seeds."

Use GROW BIOINTENSIVE farming methods to feed and protect crops! In Kenya, after planting, the period between September and October is very critical since the crops are in their growth stage. They need weeding, enough nutrients, disease and pest control. During this time agro-veterinary shops make good sales from selling chemicals to farmers. Top dressing, and pest and disease control cost a lot of money. Chemical fertilizers commonly used by farmers are primarily made from non-renewable sources, including fossil fuels. Once these sources are depleted it is difficult to regenerate them

The problem with chemical fertilizers

It has been scientifically proven that excessive use of fertilizers damages the soil and causes other negative environmental effects [see the article from *The Guardian* in this issue on how pesticides damage vital soil organisms on page 11]. This soil damage is one of the reasons why farmers in the breadbasket areas of Kenya like Trans Nzoia County no longer enjoy the bountiful harvest of maize crop.

Use plant extracts instead

The yellow and purplish color of the maize, beans and other crops usually shows that the crops do not have enough Nitrogen (N), Phosphorus (P) and Potassium (K) and therefore require a supply of these nutrients. Well prepared plant extracts can address these deficiencies

if nutrient rich plants such as Tithonia (Mexican sunflower, *Tithonia rotundifolia*), stinging nettle (*Urtica dioica*) and comfrey (*Symphytum*), complemented with bio slurry, are applied to growing crops in the right way. These correct the deficiencies and even make the crop stronger to withstand pests and diseases. When prepared with plants that have insecticidal and anti-fungal properties such as the African marigold (*Tagetes erecta*), chilies, garlic, sodom's apple (*Solanum incanum*) and pyrethrum (*Chrysanthemum cinerariifolium*), the farmer can easily control harmful crop pests and diseases. Using these organic inputs, the farmers not only reduce the cost of buying chemicals, but also ensure they have food crops that are safe from chemical residues. Organics work differently: farmers should remember that plant extracts do not work in the same way as purchased chemicals. For instance, organic fertilizers like farmyard manure break down according to nature's rules. This means that they may not release nutrients as quickly as you expect. Organic plant extracts should be applied two to three times a week for them to protect your crops against harmful pests. There's little to no risk of toxic build up of chemicals and salts that can be deadly to plants and other organisms that consume them. Organic fertilizers are renewable, biodegradable, environmentally friendly and therefore sustainable. ●



Image: SADA

Vital soil organisms being harmed by pesticides, study shows

The tiny creatures are the 'unsung heroes' that keep soils healthy and underpin all life on land

By Damian Carrington, Environment Editor
The Guardian (<https://www.theguardian.com/>)

The following is an excerpt of an article published in The Guardian in May 2021, at <https://bit.ly/GuardianSoilHarmedbyPesticides>. GROW BIOINTENSIVE Sustainable Mini-Farming helps create and maintain a healthy and fertile ecosystem, including vital soil organisms, without the use of toxic, soil-damaging chemicals. Each GB garden is helping to protect an important natural resource: our soils!



Pesticides are causing widespread damage to the tiny creatures that keep soils healthy and underpin all life on land, according to the first comprehensive review of the issue.

The researchers found the measured impacts of farm chemicals on earthworms, beetles, springtails and other organisms were overwhelmingly negative. Other scientists said the findings were alarming, given the importance of these “unsung heroes”.

The analysis warned that soil organisms are rarely considered when assessing the environmental impact of pesticides. The US, for example, only tests chemicals on honey bees, which may never come into contact with soil, an approach described as “crazy”.

A UN report published in December found that the future looked “bleak” for soils without urgent action to halt degradation, given that it takes thousands of years for new soils to form. Soils are thought to contain nearly a quarter of all the planet’s biodiversity.

Layers of underground soil seen under grass. It is believed that a quarter of species on the planet live in the soil.

Nathan Donley, at the Center for Biological Diversity in the US and an author of the new review, said: “The level of harm we’re seeing is much greater than I thought it would be. Soils are incredibly important. But how pesticides can harm soil invertebrates gets a lot less coverage than pollinators, mammals and birds – it’s incredibly important that changes.”

“Beetles and springtails have enormous impacts on the porosity of soil and are really getting hammered, and earthworms are definitely getting hit as well,” he said. “A lot of people don’t know that most bees nest in the soil, so that’s a major pathway of exposure for them.”

Prof Dave Goulson, at the University of Sussex, UK, and not part of the study team, said: “The findings of harmful effects on soil organisms from the large majority of pesticides tested is alarming, given the vital importance of these ‘unsung heroes’ in keeping the soil healthy.”

The analysis, published in the journal *Frontiers in Environmental Science*, systematically reviewed nearly 400 studies of the effects of pesticides on non-target invertebrates that live at least part of their lives in the soil. It covered more than 275 species and 284 pesticides, but excluded any chemicals currently banned in the US.

The studies provided more than 2,800 “tested parameters”, where a specific pesticide had been tested on a specific organism for a particular feature, such as mortality, abundance, behaviour, reproduction, and biochemical and morphological changes.

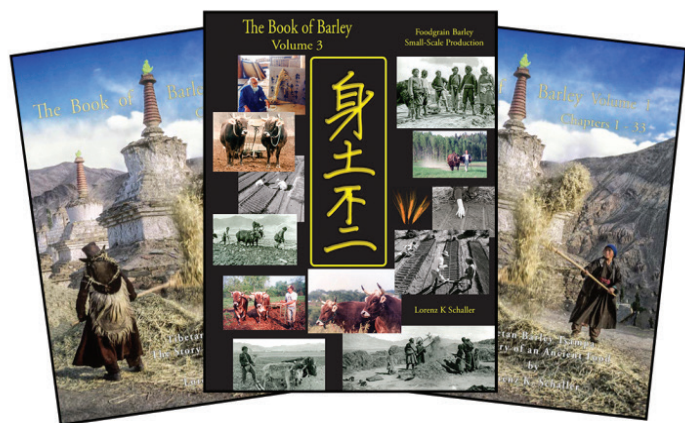
The scientists found 71% of the tested parameters showed negative effects from pesticide exposure, while 28% showed no significant effects and 1% showed positive effects. For example, 84% of the tested parameters in earthworms were negatively affected by the most-common classes of insecticides. Some herbicides and fungicides also harmed earthworms.

Donley said: “It’s not just one or two pesticides that are causing harm, the results are really very consistent across the whole class of chemical poisons.” A 2012 review showed that pesticides can also harm microbial life in soils.

Review studies may be affected by so-called publication bias, if researchers have tended to publish only those experiments that show a striking result. But Matt Shardlow, at the charity Buglife in the UK, said: “The answer is clear here – the distribution of outcomes in published studies is massively weighted on the negative side.” ... {continued at <https://bit.ly/GuardianSoilHarmedbyPesticides>} ●

The Book of Barley

From GROW THE EARTH (johnjeavons.org)



In 1981, while Ecology Action was preparing to relocate its GROW BIOINTENSIVE farming program to from Palo Alto to Willits, CA in 1982, I received a letter from Lorenz Schaller, an amazing grainsman, noting that the Kusa Seed Society—"a voice for the precious edible seeds of the earth"—was seeking a location where they could grow out their grain seed. If we had been staying in Palo Alto, it would have been wonderful to collaborate, but since we were moving, our paths diverged. Instead, Lorenz (or "Lenz" as I came to know him) began a periodic correspondence when Ecology Action needed information about a specific variety of grain. Lenz would respond, typically in four single-spaced pages, apologizing for the brevity of his answer. You can see by his Book of Barley (barleybook.com)—many years in the making, in three volumes totaling 1,613 pages—that he was accurate about the wide scope and comprehensive nature of his knowledge of grains. What is astounding is the fact that he is almost entirely self-taught!

Over the last almost four decades, Lenz and I have become good friends, and I can say without reservation that his knowledge and skill have increased proportionally with his age. His interests extend beyond grains, as well: of particular interest to me is his macrobiotic diet, which is based on 60:30:10 proportions, similar to the 60:30:10 GROW BIOINTENSIVE crop ratios which ensure the sustainable production of complete balanced diets, sufficient compost materials from these carefully-chosen diet crops, plus vegetables, soft fruits and seeds for to balance out vitamins, minerals, essential amino acids and income – food for one's wallet. (Incidentally, while traveling in Austria several years ago, I was told by a fellow traveler of a nearby valley on the way to Italy. It seems that this valley, which had been developed by the Romans many years previously, grew wheat, potatoes and vegetables using similar 60/30/10 proportions. Interesting!)

Anyway, back to Lenz' new book! **Volumes 1 and 2, Tibetan Barley Tsampa—The Story of An Ancient Food** are described as follows: "Here in this book, sparking and scintillating, the buried treasures of a precious human 'lost art' are unearthed and brought to light... Assembled and displayed in one place for the first time ever, here in *The Book of Barley* ... is the remarkable story of this 'founder crop' of agriculture, one of the world "pillars of civilization". From its early beginnings as a sacred grain on the first mini-farms at the dawn of agriculture to its deserved place on the supper table of the health-conscious modern home, the world history of this important foodgrain is herein explored from East to West...

Saints and mystics have used this cereal for a staple, surviving on it and little else, sinners too. The crop's boundaries are few, as world advances many. Despite the very positive modern nutritional value and culinary utility of foodgrain barley, its remarkable life story has never been gathered together, assembled and told in one place—until now.

Foodgrain barley is at the heart of the blending together of the East and the West—a marriage across time of the mystery cult of Eleusis in ancient Greece, the later cult of the goddess Ceres of Roman Italy, through to today's XVI Dalai Lama, the 3 scion of barley mini-farmers who lived in a remote high-altitude valley in The Land of Snows.

A nutrition-substance landmark, this comprehensive and monumental work is the result of the author's 50 years of modern-era research, study, experimentation and direct experience, involving this ancient human foodgrain."

Chapters include:

- What is a Tsampa
- Porridge
- Malting Barley
- More Ancient than History
- Egypt—"I am Barley"
- The Origins of Tibetans and Their Barley
- Ancient Barley Cultures in Turkey
- Ancient Barley Cultures in Ireland
- Food Barley and Ancient Greece
- Barley's Nutrition
- The Green Juice of Barley Leaves
- Barley— A Rich Source of Natural Antioxidants
- Barley's Medicinal Properties
- Barley Bread
- Seeds – Marvels of Microprocessing Genius

Volume 3, The Book of Barley—Foodgrain Barley: Small-Scale Production is "...a comprehensive technical manual for growing food-barley, a nutritious human foodgrain. Beginning with a detailed botanic and agronomic portrait of the food-barley crop plant,

the book proceeds with detailed presentations of 'how to' techniques for successfully growing and harvesting food grain barley in grain-gardens and on mini-farms.

Written in understandable language for laypeople, this book is a "grower's handbook" for successfully producing this nutritious cereal crop using organic ecological methods – completely avoiding the use of any synthetic, toxic, agricultural chemical fertilizers, seed treatments, or biocides.

Valuable tips and details covering techniques and tools for planting, weeding, irrigating, harvesting, and producing the crop for home food utilization are provided. This book emphasizes small-scale, "hands-on" appropriate technology throughout. Information in this book is based on practical methods researched and tested during the author's more than thirty-five years of experience in small-scale field production of the crop for home food use."

Topics include:

- Feed vs Food
- Food Barley as a Spiritual Teacher
- Food Barley — The World's Missing Grain
- Growth Stages of Barley
- Basic Barley Agronomy
- Threats Specific to Winter Growth-Habit Barley
- Protecting Stored Barley Grain
- Quick and Easy Guide to Growing Food-Barley
- Advanced Barley Growing
- Raising Excellent Seedlings for Transplant

Happily, a fourth volume is planned as a culinary and recipe guide.

For anyone interested in nutrition, farming, soil, and the history of one of the most important grain crops known to humans, I highly recommend checking out Lenz Schaller's tour-de-force exploration of barley. Don't wait! Begin this exciting ages-old and new as today nutrition-and soil-growing adventure, now!

To order, see amazon.com/Book-Barley-1-Lorenz-Schaller/dp/1717514162.

For the Kusa Seed Catalog, see ancientcerealgrains.org/seedandliteraturecatalog1.html •



Herbal Spotlight: Lemon Balm

By Shannon Joyner, Garden Companion Editor

Lemon balm (*Melissa officinalis*) is an easy-to-grow, bee-friendly perennial herb and a member of the mint family. Native to Europe and central Asia, it is now found across temperate and subtropical regions all over the world. Records concerning its use as a medicinal plant in the Mediterranean region and Europe date back over 2000 years, with beneficial effects said to include regulating sleep, appetite and digestion, reducing anxiety, and relieving pain. Modern research shows that various extracts of lemon balm may be effective at treating anxiety, insomnia, cold sores, gastrointestinal ailments, and Alzheimer's disease. Herbalists often recommend lemon balm as a "children's herb" because small amounts of lemon balm tea can be given to teething or colicky babies to help reduce discomfort. However, while lemon balm is generally considered safe for short-term use, it can have significant side-effects for certain individuals, so long-term use or overuse is not recommended.

You can buy many ready-made lemon-balm products in stores, but it's easy to make your own tincture at home:

Roughly chop enough fresh lemon balm to fill a pint jar, pressing it down a bit with a clean spoon. Pour in approximately 1 1/2 cups of vodka (at least 80 proof, 100 proof is better), pushing the leaves down to make sure they're submerged. Cover the jar with a lid, and place in a cool, dark place for at least 4 to 6 weeks (up to several months), giving it a gentle shake for the first few days to make sure the leaves stay covered. When you're ready to use the tincture, strain out the leaves and store the liquid in dropper bottles for easy use. Start with taking one dropper full at a time to see how that works for you, then adjust the dose to suit your needs. •

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 in any way.



Curried Socca (Chickpea Bread)

By Shannon Joyner
Garden Companion Editor

If you are looking for a delicious, vegan, gluten-and-grain-free, protein-rich snack that is quick and easy to prepare, then you should try *socca*. Originating in France (or in Italy as *farinata*, depending who you ask) and spreading from Gibraltar to Argentina, basic *socca* is a flatbread made with chickpea flour, oil, water, and salt. From there, you can add any flavoring you like: herbs, spices, nuts, seeds, sautéed vegetables—your imagination is the only limiting factor. It's traditionally eaten in southern France as an appetizer at bar-cafes, cooked in a cast-iron pan in a wood-fired oven, served smoking hot and crispy on the edges, drizzled with olive oil and sprinkled with flaked salt. In this version, adapted from minimalistbaker.com, *socca* gets an infusion of savory flavor with caramelized onions, garlic, curry powder, cumin, coriander and mustard seed. Delicious on its own, it would also make a good substitute for naan served with chutney.

Ingredients

BATTER

- 1 cup (120 g) chickpea flour
- 1/2 tsp heaped sea salt
- 1 tsp baking powder
- 1 scant cup (220 ml) warm water

SPICE BLEND

- 2 1/2 Tbsp olive or vegetable oil
- 1 small onion, sliced thin
- 1 clove garlic, minced
- 2 tsp curry powder
- 1 tsp whole cumin seed
- 1/2 tsp ground coriander seed
- 1/4 tsp whole mustard seed
- Extra olive oil and flaked sea salt for serving

Place chickpea flour, sea salt, and baking powder in a medium bowl, and whisk to combine. Slowly pour warm water into dry ingredients and whisk until smooth. Cover the batter and allow it to sit for at least 1 hour to hydrate the flour, stirring occasionally.

While the batter is resting, heat an oven-safe cast-iron skillet over medium-high heat. Add olive oil and onions and sauté, stirring occasionally for 5-8 minutes until onions begin to caramelize. Reduce heat to medium, and add garlic, cumin seed, and mustard seed and allow to toast until just fragrant (~1 minute), stirring occasion-

ally. Add curry and coriander powders, stir and allow to toast for an additional 1-2 minutes, until fragrant. Remove the mixture from the heat.

When the chickpea batter has rested add spice mixture and stir to combine. Preheat oven to 425 degrees F (218 C). Also heat the oven-safe cast-iron skillet from earlier over medium-high heat (it should still have a little oil from cooking the spices earlier – if necessary add a little more oil to keep the batter from sticking). Once the pan is nice and hot, add enough chickpea batter that, when you swirl it around the pan, the batter spreads into a large, thin pancake that reaches the edges of the pan.

Carefully transfer the hot skillet to the oven and bake for 10-15 minutes or until bubbles have formed, the edges have browned, and the top is slightly golden brown. Remove from oven after baking and let cool in the pan for a few minutes. Then gently loosen with a spatula, flip so that the crispy underside of the bread is on top, and slice into pieces. Repeat cooking process with the remaining batter (our cast-iron skillet is 10 inches in size and yields two large pieces of socca as the recipe is written – you could also use two pans and cook the whole recipe at the same time).

Sprinkle with flaky sea salt and serve hot with a good quality olive oil for dipping, or with anything you'd enjoy with naan. Leftovers will keep for 3 days or in the freezer for up to 1 month. Enjoy at room temperature or reheat on stovetop until warm. ●



Image: Shannon Joyner

Drought-Resistant Crops and Varieties

University of California Agriculture and Natural Resources (UCANR)

The following is an excerpt from a helpful handout published by the UCANR that can help you conserve water by planting varieties of popular crops that use less water and are hardier when faced with drought conditions than other varieties. You can download the entire document at <https://ucanr.edu/sites/scmg/files/183771.pdf>

Some crops and varieties require less water than others once they are established. The vegetables, grains and herbs on the following list were selected from seed catalogs and seed catalog websites that specifically mention the terms “drought-resistant” or “drought-tolerant” in the variety description. The list is not exhaustive, but represents an opportunity for the home food gardener to consider new (or new to you) and/or unusual crops or varieties that allow you to be water-wise. For additional possibilities, consult seed companies or nurseries that specialize in plants suitable for desert or dry climate areas. ●

<p>Bush Beans White Half Runner Snap</p> <p>Butter Beans Jackson Wonder Bush</p> <p>Garbanzo Beans Ceci</p> <p>Lima Beans Alabama Black-Eyed Butter Carolina Sieva Christmas Fordhook 242 Bush Henderson Bush Jackson Wonder Pima Orange Willow Le</p> <p>Pole Beans Blue Coco Garden of Eden Romano Louisiana Purple Pod McCaslan Snap Rattlesnake Selma Zesta Selma Zebra</p> <p>Tepary Beans (need warm nights) Big Fields White Black Blue Speckled Brown Speckled Cocopah Brown Colonia Morelos Speckled Mitla Black Pinacate Sacaton Brown Tohono O’odham White</p> <p>Broccoli Waltham 29 (when fall planted)</p> <p>Chard - Almost all varieties listed in desert or dry climate catalogs</p>	<p>Corn Anasazi Sweet Daymon Morgan’s Kentucky Butcher Hopi Blue Flour Hopi Pink Painted Mountain Flour Pinky Popcorn Silver Queen Hybrid Sweet Tennessee Red Cob</p> <p>Cowpeas (need warm nights) Pink-Eye Purple-Hull</p> <p>Cucumber Armenian Lemon</p> <p>Eggplant Listada de Gandia</p> <p>Amaranth Mayo Red Stripe Leaf Tampala</p> <p>Barley Ethiopian Hulless Jet Milan</p> <p>Quinoa all varieties</p> <p>Wheat Hard Red Spring Kamut Vaughan Turkey White Sonoran</p> <p>Herbs Basil - Mrs. Burns’ Lemon Borage Catnip Chamomile, German Chives Hyssop Lavender</p>	<p>Herbs, Continued Lemon Balm Mullein Oregano Rosemary Sage - once it’s established Sweet Marjoram Thyme</p> <p>Melon Iroquois Navajo Yellow</p> <p>Mustard (uses less water than many other cultivated vegetables) Southern Giant Curled</p> <p>Okra (needs warm nights) Gold Coast Hill Country Heirloom Red Jing Orange</p> <p>Pepper Jupiter Red Bell Ordoño</p> <p>Squash Cocozelle Zucchini Costata Romanesco Cushaw Green-Striped Dark Star Zucchini Iran Jumbo Pink Banana Lebanese Light Green</p> <p>Sunflower Skyscraper - edible seed</p> <p>Tomato Caro Rich Pearson Pineapple Stone Yellow Pear Cherry</p> <p>Watermelon Black Diamond</p>
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ECOLOGY ACTION'S GARDEN COMPANION

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ECOLOGY ACTION EVENTS: 2021-2022

Dear GROW BIOINTENSIVE Family,
Our schedule of public events is as follows, subject to change as required by COVID restrictions:

Online Zoom-based 3-Saturdays Introductory Workshops
November 6, 13, and 20, 2021;
April 2, 9 and 18, 2022; and November 5, 12, and 19, 2022:
growbiointensive.org/workshop.html

2-, 4-, 6-, and 8-month *onsite* internships at VGFP:
victorygardensforpeace.com/internships

8-month *online* internship:
growbiointensive.org/Internship/8Month.html

9-Saturdays *onsite* course series I and II at VGFP:
growbiointensive.org/9WeekCourse

GardenCorps Program at VGFP:
victorygardensforpeace.com/garden-corps

Our full 2021-2022 schedule of events:
growbiointensive.org/events_main.html
or call 707-459-0150

Wishing everyone good health and good gardening,
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