

THE AMAZING UNDERGROUND SECRET TO A BETTER GARDEN



HOW TO  
STORE  
SEEDS  
— PAGE 78 —

# MOTHER EARTH NEWS

THE ORIGINAL GUIDE TO LIVING WISELY

AUGUST/SEPTEMBER 2014

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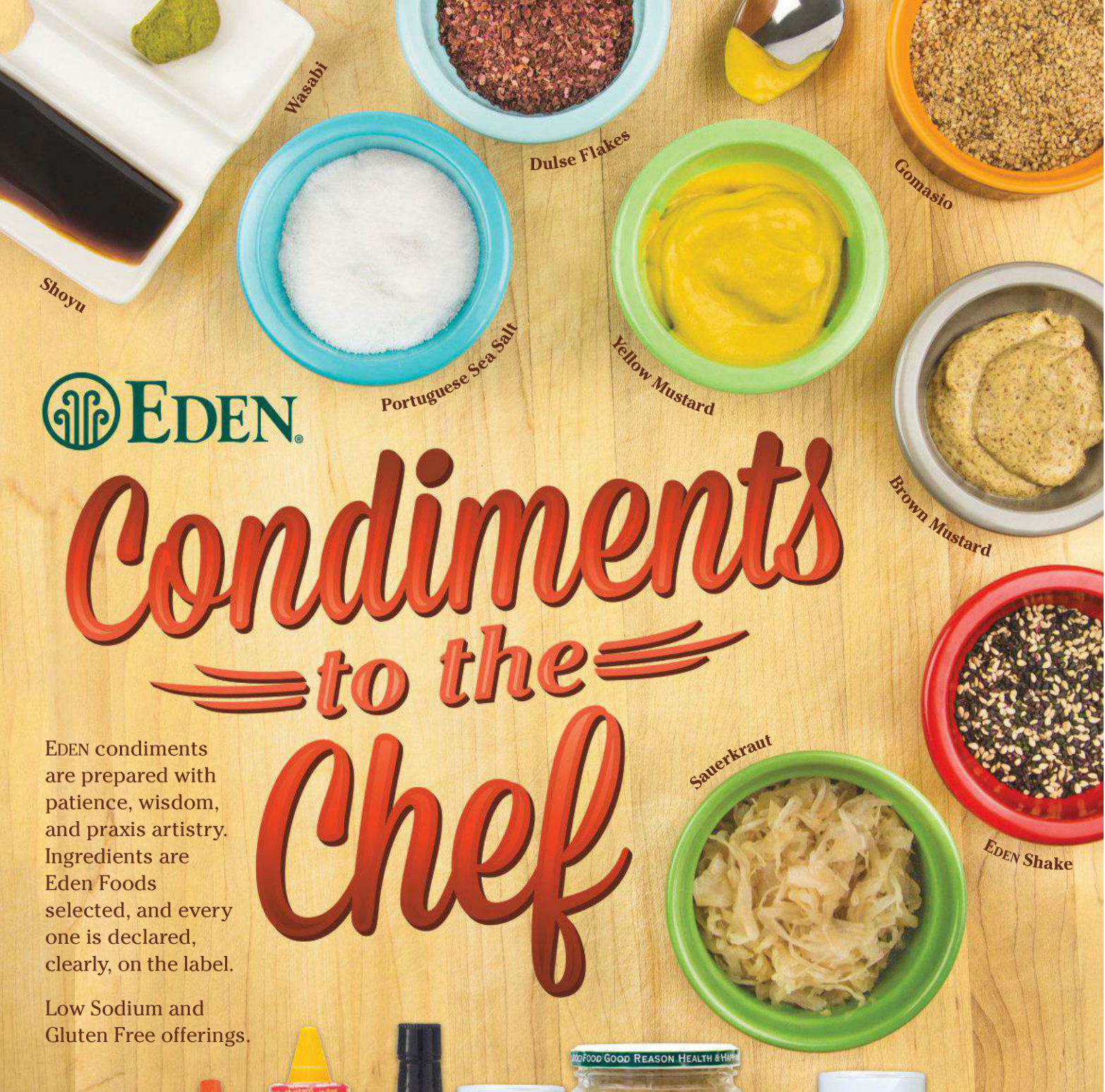
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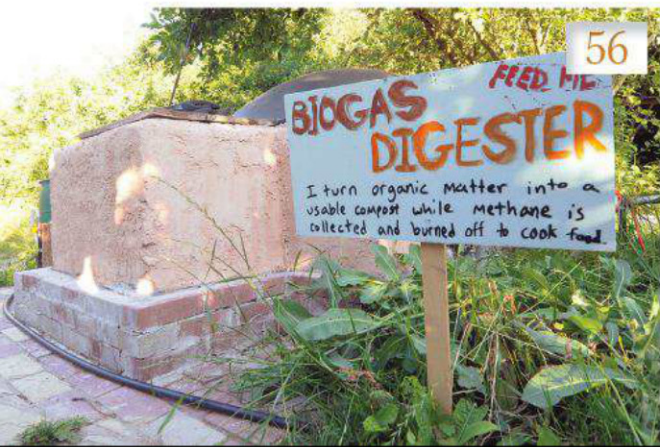
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MICHAEL ROTHMAN; BELOW: ISAAC MARQUEZ; RIGHT: KEITH WARD



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DEB HENDERSON



BARBARA DAMROSCH



JEFF SETARO; BELOW: FOTOLIA (3); BELOW, TOP LEFT: DREAMTIME



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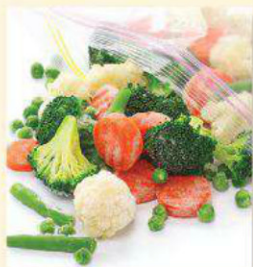
Walt Whitman

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### 6 Ways to Harvest Rainwater

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### Frozen Assets From the Garden

No need to invest in new, pricey food preservation equipment to put by summer's bounty—your trusty freezer in fact furnishes one of the best means of pressing “pause” to keep crops at peak flavor. Master two simplified methods that efficiently turn out freezer-ready stocks of vegetables for near-fresh future feasting. Go to <http://goo.gl/QFz56w>.

### Grow Healthful, Hardy Kale

Why plant kale in your fall garden? Think sweet winter salads, nourishing homemade soups, and infinitely snackable kale chips. Persuaded? Leaf through our plot-to-plate guide to cultivating this cole crop, complete with advice on variety selection and organic pest control, plus recipes. Go to <http://goo.gl/CeyHbe>.



### Stretch Watermelon Season

Ever thought to yourself—whilst chomping on a cool, crisp slab of watermelon—that it's a shame this fruit is with us for only a brief spell? We sure have. Enter these easy, can-be-enjoyed-on-a-frigid-January-evening recipes for dehydrated watermelon, watermelon wine, watermelon rind pickles and more. Go to <http://goo.gl/B5qNAz>.





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# Seeking Safer, Saner Agriculture

**W**e are especially proud of our story on Page 50, "The Amazing Underground Secret to a Better Garden," which explains one key way we can improve our gardens: by supporting the astonishing partnership soil fungi form with plants.

New scientific understanding of this relationship has emerged over the past few decades, and we now know that invisible networks of super-thin fungal threads (hyphae) are the principal structures for nutrient uptake for plants—not plant roots alone, as we had previously thought.

Scientists have discovered that this partnership is more than 400 million years old. So far, they have identified more than 6,000 species of these fungi—called "mycorrhizae"—that support crop and tree growth.

These extensive fungal networks interconnect with roots, making plants more drought-tolerant and extending plants' access to many nutrients by up to 2,500 times! Plus, the fungal threads help hold topsoil particles together, protecting the soil from erosion.

The fungi-plant relationship is symbiotic, meaning that both organisms benefit from it. The fungi deliver nutrients to the plant and, in return, the plant releases 10 to 20 percent of the carbohydrates it produces to the fungi. If there are no plants to feed them, these beneficial fungi die.

To promote this fungi-plant partnership, we should change several things about how we farm and garden. First, we should till the soil as little as possible. Second, we should avoid using chemical pesticides. And, third, we should never leave soil bare, even in winter. Instead, we should cultivate cover crops to keep live plants growing in our beds and fields year-round.

Many organic gardeners and farmers already know something about this

*myco-rrhizal* (meaning fungi-root) arrangement, so they try to reduce tilling, reject pesticides and plant cover crops to protect the mycorrhizae. But conventional industrial farming depends heavily on routine applications of pesticides that are toxic to the entire ecosystem. We hope farmers pay attention to this new knowledge and explore its potential to lead us to a more sustainable system.

Changing old habits is always hard. Can farmers find ways to modify their machinery so it disturbs the soil less? Many have already made the big switch to low-till methods, but in large-scale operations that practice currently depends on herbicides for weed control. Will

they investigate ways to eliminate herbicides and suppress weeds with cover crops that in turn support the mycorrhizae and generate essential nitrogen? Some farmers already pull seed drills or spinners behind combines to sow winter cover crops as they harvest, and some collect

a bonus by grazing their livestock on established winter cover crops.

But the chemical companies can profit more by defending the status quo. Vested interests, determined to sell more and more herbicide-tolerant, genetically modified crop varieties, will certainly not blaze the trail to explore the potential of plants' ancient partnership with mycorrhizal fungi. It is up to our wisest farmers to push for more research and lead the way to safer, saner, more sustainable ways to grow our food.

—MOTHER

(If you want to become a wiser farmer, we recommend these resources: [www.AcresUSA.com](http://www.AcresUSA.com), [www.StockmanGrassFarmer.com](http://www.StockmanGrassFarmer.com), and the Sustainable Agriculture Research & Education program at [www.SARE.org](http://www.SARE.org).)

It's up to  
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farmers to  
lead the way.

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“I was struck by an overwhelming sense of love, peace, inspiration and joy.”



Joel Salatin delivers his keynote speech at the FAIR in Puyallup, Wash., in June.



### Timesaving Garden Tractors

Wow, another great issue of MOTHER! We always expect that, and that's what we always get. In each issue, I look first for articles by Barbara Pleasant—what a talented gardener and writer.

Joel Dufour's piece about tools for large gardens was terrific (“Best Tools for Big Gardens,” June/July 2014). Two-wheel tractors are in short supply in this part of the country. My solution has been to use four-wheel garden tractors—not the riding mowers from big-box stores, but rather small, heavy-duty tractor models that accept ground-engaging tools.

I own two such tractors: a new Dixon and an older John Deere. Both are equipped with a “sleeve hitch,” which allows me to attach tools such as a plow and cultivator. I've invested less than \$5,000 in both machines. I don't use either for lawn mowing—only garden work. My plots are about 3,000 square feet, and using these tractors saves me time plowing, planting, cultivating and harvesting.

*Jack Graham  
Selah, Washington*

### Reconnecting the Disconnect

I just got home from the MOTHER EARTH NEWS FAIR in Asheville, N.C. (April 12 and 13). From the moment we arrived up until the very last event—where we witnessed hundreds united to hear Joel Salatin speak—I was (and still am) struck by an overwhelming sense of love, peace, inspiration and joy.

Many of us who are passionate about self-reliance and sustainability live in parts of the country where we are disconnected from like-minded people, and our daily reality can really drag us down sometimes. To be able to participate in your FAIR was truly inspiring.

Gatherings like the FAIR connect our divided nation. They also connect the knowledge and wisdom of older generations with the curiosity and tenacity of young people who are struggling to grow life where land has been paved over and chemicals have been scattered. At the MOTHER EARTH NEWS FAIR and other events like it, humanity can reconnect, rediscover its collective soul, and find ways to live up to its potential.

*Crystal Meserole  
Hendersonville, North Carolina*

### Be Mindful of Your Privilege

In response to “We Get What We Pay For” (News From MOTHER, June/July 2014): If by “we” consumers, you're referring to “we, the white, middle-class consumers,” then sure, go ahead and make that statement.

But please do us all a favor first: Take a step back and stop universalizing your bourgeois experiences. Oftentimes choice is limited by a racialized economic system that privileges one class of people over another. Nowhere in your editorial did you suggest a means for low-income people to actively engage in reshaping the food system.

*Asia Dorsey  
Denver, Colorado*

### Earth: Not a Political Issue

Don't back off of discussions about climate change or organic vs. industrial farming methods. They may represent “political” issues for some readers, but they are *real* issues, and if they can't be discussed among people who love the Earth, where can they be discussed?

I think MOTHER EARTH NEWS has done a tremendous job of not taking sides but still fostering a dialogue on these topics.

*Val Andriessen  
Kirkland, Washington*

### More Nostalgia, Less Fuel

Awesome grass-roots artistry in the story “Ready to Roll: A Handmade Market

## MOTHER's Wish List

**International Homesteading Education Month events.** Join in this September as we link up neighbors to teach and learn wiser-living know-how. Find the full list of skill-sharing events and get instructions for registering an event of your own at [www.MotherEarthNews.com/Homesteading-Month](http://www.MotherEarthNews.com/Homesteading-Month). All types of activities are welcome, and the online sign-up process is a breeze!

**Bloggers wanted.** If you enjoy do-it-yourself projects or have expertise in renewable energy systems or pastured meat production, we invite you to share your advice and anecdotes with our online audience. To learn more about joining MOTHER's Blog Squad, head to [www.MotherEarthNews.com/Blogging-FAQ](http://www.MotherEarthNews.com/Blogging-FAQ).



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Dear MOTHER

Wagon" (June/July 2014). The idea to bring goods to market using the original horse power is refreshingly different, and I bet others will follow the author's example. I hope so! Nostalgia is definitely in, and less gasoline usage is exactly what our Mother Earth needs.

*Todd Leonard  
Opelousas, Louisiana*

## Pig Photograph Correction

In the article "Become a Flexitarian" (June/July 2014), the caption for a photo of pigs on Page 45 read, "Gestation crates prevent sows from standing or turning around."

First of all, sows *can* stand in gestation crates. More importantly, though, the photo you printed is of

a farrowing crate—not a gestation crate. By definition, gestation refers to the mother's time between conception and birth, so the fact that there are piglets in the photo should have tipped you off that this was not a gestation crate. I recommend running a correction to your photo.

*Tim Andera  
DeFuniak Springs, Florida*

*The photo was indeed of a farrowing crate. We regret the error. —MOTHER*

## 30-Year-Old Tiller Still Truckin'

I enjoyed the article "Best Tools for Big Gardens" by Joel Dufour (June/July 2014). I have a BCS 735 tiller, and I purchase all the parts I need from Joel's

company, Earth Tools. Knowing Joel has been a great experience.

I bought my BCS tiller back in 1984. I still use it, and it's still the best tiller I've ever owned.

*Darrell Burdge  
Hazel Green, Kentucky*

## Debt-Free Living—And Lots of Sightseeing!

Regarding "Build Your Debt-Free Dream Home" (June/July 2014): Another option for debt-free living is to downsize from a typical home and buy an RV. You get a debt-free home, and you get the joy of traveling.

I have read several great posts by some recent retirees about their

(CONTINUED ON PAGE 82)

## The High Costs We Pay for Cheap Food

The article "Hidden Downsides of the Green Revolution" (June/July 2014) was excellent and right to the point—the best thing I've read in a long time concerning the Green Revolution. Like the article's author, Richard Manning, I've long thought we as a society are overfed and undernourished.

Modern agriculture fights nature instead of working with it. We have killed biodiversity. Our beef cattle are raised in feedlots and fed corn mash, protein supplements and drugs to keep them upright until they're ready for the slaughterhouse. The cows are sick, meaning U.S. consumers buy meat from sick cattle—which, regardless, still has the USDA stamp of approval on its packaging—at the supermarket.

Do we truly think we can nourish our bodies and stay healthy by consuming products from sick animals and empty

calories from highly processed foods? Oh, sure—because we mix vitamins and minerals into our processed foods, and because we ourselves then supplement our diets with pills.

As a consequence of the Green Revolution, we now grow our food in soil that's depleted of nutrients and chock-full of chemicals and artificial fertilizers. Our soil has become an artificial, inert medium that's devoid of any life. When are we going to have another Dust Bowl? We're asking for it.

Cheap food? You get what you pay for.

*Dana Fast  
Lake Clear, New York*



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# What's Really in Supermarket Meat

It's labeled "all natural," you say? You may still have paid good money for 12 to 15 percent added salt water.

Before you take a bite out of that plump roast, grilled chicken breast or juicy steak, you may want to make sure your meat isn't biting you back. That one serving of meat on your plate may contain enough added salt to equal that of a large serving of fast-food french fries. Processed food masquerading as fresh and, particularly, as "safe," is today's supermarket butcher-counter trend.

## Plumped and Enhanced

*Consumer Reports* sounded the alarm on "plumped" chicken back in 2008, when it revealed chickens from some big-name producers that are labeled "natural" are often pumped full of a salt-water solution, raising sodium content to unhealthy levels. Moreover, \$1.50 of the price tag per package is salt water. But the plumping practice doesn't end there, nor is it limited to chicken.

The demand for leaner meats has often translated to tougher and less flavorful cuts. Taking a page from the chicken processors' book, beef and pork processors began pumping liquids into their meat to offset poor texture and taste. Although often called "broth," the key ingredients in these fluids are water, salt and usually an antimicrobial. Meat processors inject the salt-water solution deep into the meat tissue to add "juiciness"—and weight—to the final product. This "enhanced" meat can still be labeled "natural."

## From Your Pocket to Their Wallets

Although Big Ag industry representatives would argue that consumer demand for lean but tender meat is the driving force behind enhanced meat, the financial result of customers paying for salt water instead of meat is clearly substantial. In a National Cattleman's

Beef Association fact sheet, Chance Brooks, associate professor of meat science at Texas Tech University, wrote, "The addition of water also increases yield, which is important to processors because of economic advantages that offset production costs."

## The Health Risks

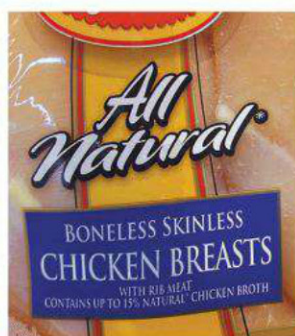
One serving of supermarket enhanced beef meets a good portion of your daily recommended sodium intake, which is between 1,500 and 2,300 milligrams. Just one 3-ounce serving of typical injected beef contains approximately 1,800 milligrams of sodium. Needle-injected meat has also been red-flagged by the Food Safety and Inspection Service (FSIS) as a high-risk carrier of *E. coli*. The needles that insert the salt solution can push bacteria on the surface (where bacteria is typically found) deep into the meat, where cooking may not kill them. To prevent this, FSIS recommends (not requires) that processors apply "an allowed antimicrobial agent to the surface of the product prior to processing."

These approved agents include a number of ingredients (and processes such as irradiation) that most consumers would likely find far from "natural."

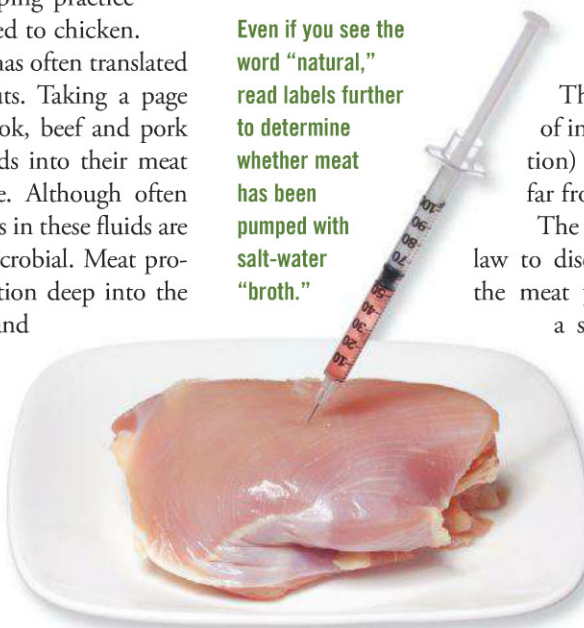
The good news: Processors are required by law to disclose somewhere on the label whether the meat you're buying has been pumped with a salt-water solution. Be aware that even designations such as "natural," "fresh" and "100% beef" do not automatically mean the meat hasn't been pumped. Look for small type, usually on the front of the package near the product name, which may read something like: "Contains up to 15% broth." To find truly natural meat,

consult websites such as [www.LocalHarvest.org](http://www.LocalHarvest.org), and check your farmers market or natural grocer to source meats from pastured and grass-fed animals that are naturally leaner to begin with.

—Amanda Kimble-Evans



Even if you see the word "natural," read labels further to determine whether meat has been pumped with salt-water "broth."



## Waterlogged Meat

What's for Dinner?	Price Per Pound, Retail	Amount You Are Paying for Salt Water
Pork shoulder (9.25 lbs)	\$2.08 per pound	\$2.31
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Circle #19; see card pg 81

All performance testing was performed by independent agency ATS, Marietta Georgia in December 2013. The Carryall 500 (which uses same powertrain as XRT800 and XRT850) was tested against the Toro® MDX, Cushman® 1200, and Deere® TX commercial-grade vehicles. They were tested with driver plus cargo — 650 lb (294.8 kg) total weight — on rolling hills. For the hill climb, vehicles were tested with driver plus cargo 1200 lb (544.3 kg) on a 15-17% grade. Your results may vary.





# Neighborhoods With Local Food at the Hub

What has the potential to bring a community together, increase its resilience, boost sustainability, make its residents healthier, and even add to property values? Some real estate developers see locally grown food as just such a catalyst and are embracing a new model known as “agrihoods.”

In the U.S., we often take food for granted, especially where it's grown and how it's sourced. But some

housing planners are learning that food can have a big impact on the success of a new residential development, particularly in challenging economic times. In years past, developers often built high-end housing around golf courses. Now some builders are instead designing around orchards, vineyards, cow pastures, vegetable gardens and even organic farms.

Kukuiula, a resort community on the island of Kauai in Hawaii, has, as do most luxury residential resorts, a golf course, clubhouse and spa. Kukuiula



Washington state's Grow Community cultivates vegetables and neighborly ties.

also has a less-common feature: a 10-acre farm where bananas, papayas, pineapples, arugula, chard, herbs and breadfruit are grown. The farm has a small staff, but many residents get their hands dirty by volunteering at the farm, while others simply sit back and enjoy the farm-to-table dinners. “It's humbling to see how an amenity as simple and relatively inexpensive as a small farm can have such a big impact on a new community,” says Brent Herrington, the developer of Kukuiula.

Sibella Kraus, president of the nonprofit group Sustainable Agriculture Education (SAGE) in Berkeley, Calif., says, “Urban agriculture is not just a way to grow vegetables, but also a way to strengthen community.” This is exactly what Marja Preston, senior director of development at Grow Community on Bainbridge Island, Wash., says she found when she clustered 24 new single-

family homes around four shared gardening spaces, which help members of the community accomplish one of their stated goals: getting to know their neighbors well. The success of these and other food-based developments has persuaded more developers to establish agrihoods. The trends we're seeing here at the Urban Land Institute (ULI) suggest that a mindset shift is underway, wherein having gardens and small farms in neighborhoods isn't a nuisance but an amenity.

—Edward T. McMahon, ULI

## The ‘Instant Pot’ Electric Pressure Cooker

If you've been looking for an electric pressure cooker, look no further than the Instant Pot.

Regular stovetop pressure cookers offer energy- and timesaving merits, including the ability to quickly tenderize budget cuts of meat and speedily prepare beans and other foods that normally require lengthy cooking. An electric pressure cooker saves even more energy than a stovetop pressure cooker does, however. The Instant Pot pulls 1,000 watts, compared with an average electric range's 2,500 watts for one large burner on high.

Electric pressure cooking can expand your kitchen repertoire. The Instant Pot has a timer for delayed starting plus a function to keep food warm for up to 10 hours after it has finished cooking. That means, on your way out the door in the morning, you can program the cooker to start at 4 or 5 p.m. so you'll come home to a just-cooked meal. The Instant Pot also doubles as a rice cooker and triples as

a slow cooker. Plus, it's perfect for making rich, flavorful stocks—in 40 minutes, you can have 8 quarts of perfectly seasoned vegetable, chicken or beef stock ready for making soup or storing in the freezer. You can even pressure can in the Instant Pot in small batches of four jars at a time (which you shouldn't do in a stovetop pressure cooker because it can't maintain an even enough pressure).

The Instant Pot features a stainless steel interior, which is not coated with nonstick materials—it's the only electric pressure cooker I've found without the stuff.

Nonstick coatings make many cooks nervous, as they're dangerous for birds and may be for humans as well. (Read more about that in “Teflon Dangers: Deadly to Chickens—And Us” at <http://goo.gl/mMPtFc>.)

At about \$150, the Instant Pot is a good value. To read specs on all available models and decide whether one is right for your kitchen, go to [www.InstantPot.com](http://www.InstantPot.com).

—Robin Mather





# Distributed Energy Generation

“Distributed energy” refers to electricity generation from many small-scale (often renewable) sources tied into the grid to meet the power demand of local communities—such as solar arrays or small wind turbines powering individual houses. This network is contrary to the conventional energy setup of large, centralized power plants that transmit electricity up to hundreds of miles to consumers. As the price of solar power continues to plummet and more homeowners install renewable energy systems on their homesteads, locally produced, distributed energy is becoming a larger component of the electricity grid.

Distributed small-scale power producers could make the nation’s electricity system stronger if their output were combined with storage systems and load-management software, according to the National Renewable Energy Laboratory. This is because these small systems relieve pressure on the grid during peak hours and continue to produce during outages. An increasing number of small renewable systems feeding into the electricity grid makes for a complex web of new connections, and, in this sense, the electricity grid must get a lot “messier” in order for its energy to be cleaner and less concentrated.



Now, some electric utilities are claiming the grid is becoming too messy—and they’re working to block home energy generation. The utilities say the grid is too fragile to handle the burden of distributed energy. But former U.S. Secretary of Energy Steven Chu calls the claims “another bullshit argument,” and says solar installations won’t threaten grid stability until they approach 20 percent of the customer base. No state has neared that

proportion, but that’s not stopping utilities from lobbying to repeal renewable-energy tax credits and abolish net-metering agreements between utilities and grid-tied homeowners seeking to sell their excess power back to the utility. For example, Hawaiian Electric Co., which operates in one of the most highly solar-powered states, has adopted policies that effectively halt solar installations. The company cites safety concerns even though less than 5 percent of its customers use photovoltaics.

The grid isn’t as burdened as these utilities claim, and renewable-energy proponents theorize the utilities may be attacking distributed energy to protect their profits rather than the integrity of the grid. It’s up to you to tell your state government that you support legislation allowing distributed energy. To get the facts, read the Department of Energy study “The Potential Benefits of Distributed Generation” at <http://goo.gl/wQYS2f>.

—Kale Roberts

## Grain Guide

At one time, every community in the country produced its own grain. The reasons why such communal grain self-sufficiency disappeared are many, ranging from cheap shipping rates to exhausted soils. But with renewed interest in local food systems, grain self-sufficiency has become a hot topic. Although written with a focus on growing grains in New

England, Jack Lazor’s new book *The Organic Grain Grower* is the best resource we’ve seen for small-scale grain growers everywhere. The book covers necessary equipment and cultivation techniques for many types of crops: corn, wheat, barley, oats, rye, spelt and triticale, buckwheat, soy, dry beans, and oilseeds. Lazor describes himself as “a grain-processing nut,” and his passion comes alive in this fine guidebook’s depth of detail.

—Robin Mather

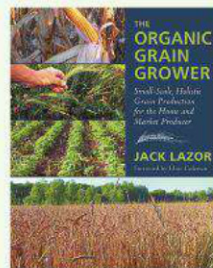
## Better Wedding Flowers

Couples preparing to tie the knot are often looking to make a statement with their wedding flowers, but not necessarily a huge environmental impact statement. Even the DIY bride abloom with ideas on how to create her own stunning arrangements will find that the flowers available from most florists have typically been shipped in from thousands of miles away and treated with toxic pesticides in order to grow and then preserve their blossoms—not exactly the makings of a romantic bouquet. To the betrothed’s rescue are flower

growers Lynn Byczynski and Erin Benzakein, who teamed up to pen *Fresh from the Field Wedding Flowers*, an illustrated guide to working with local flower growers and crafting sustainable bouquets, boutonnieres and

larger arrangements. The book showers couples with advice on how to incorporate the growing “slow flower” movement into any couple’s wedding budget.

—Jennifer Kongs

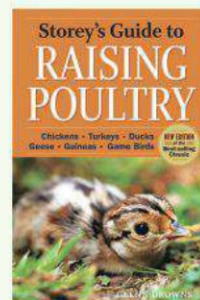


## Top Poultry Book

*Storey’s Guide to Raising Poultry*, updated for a fourth edition by renowned heritage-breeds conservationist Glenn Drowns, walks the reader through the ins and outs of raising chickens, turkeys, ducks and guineas. Drowns covers the full life span of the birds, from brooding to butchering. He even dives into less common fowl, including pigeons, emus, doves and ostriches. In addition to essential topics, such as shelters, feeders, medicine and predators, he also covers extrinsic matters, such as marketing, sales and growing your own poultry feed. Drawing on Drowns’ decades of experience with myriad common and rare breeds, this book delivers excellent advice for all levels of interest. Writes Drowns, “Nearly everyone can identify with some facet of the poultry world and

find valid reasons to raise these wonderful creatures.”

—Thaddeus Christian



Order any of these three excellent books on Page 64. —MOTHER



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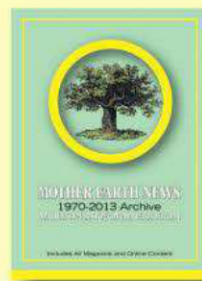
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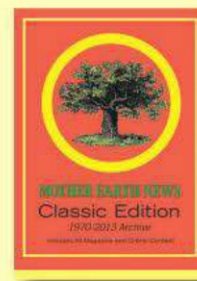


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The Gardener's Table

# SUMMER'S RICHES

*Green Beans,  
Tomatoes and Basil*





## These jewels of the peak-season garden pair nicely for simple yet unforgettable meals.

Story and photos  
by Barbara Damrosch

For the summer gardener-cook, every day brings an armload of beautiful vegetables, and the happy challenge is to make the most of them, especially those that thrive only in the warm season. Of these, tomatoes win the prize, and I could cheerfully put a platter of sliced, just-picked, ripe tomatoes on the table at every meal, but we must also make

room for tomato soups, pasta with fresh tomato sauces, and BLTs. High summer is a busy time. Even a basic ripe-tomato sandwich with mayo and a few basil leaves tucked in makes a satisfying summer meal, so the simplest fresh summer recipes work best.

Tomatoes may be the nation's most popular garden vegetable, but in some regions, they're a little tricky to grow (for an essential playbook, see "All About Growing Tomatoes" online at <http://goo.gl/LXNgc9> and check out

our collection of expert tomato-growing advice at <http://goo.gl/qACxzZ>). Beginners often plant more than they need—remember, a single cherry tomato plant will keep a couple well supplied for snacking and for scattering over salads. But you'll want a few of the indeterminate (vining) type with larger fruits for summer-long harvests. If you'd also like to dry, freeze or can tomatoes, grow a half-dozen determinate (bush-type) tomatoes as well. These ripen over a shorter stretch of time, which is just right for a few weeks of processing. Of these, dense, meaty, plum-shaped paste tomatoes make the quickest sauce with the deepest flavor.







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## Kitchen Tips for Top Tomato Treats

Ideally, you'll harvest tomatoes when they have fully colored up and softened. Sometimes picking them before that perfect day is necessary, to avoid some anticipated ill fate—an intractable pest, a disease, or the cracking that can happen with certain heirloom varieties. In fall, a frost might take you by surprise before you've had a chance to can or freeze your bounty. Fortunately, tomatoes ripen off the vine. If that hard green ball has even the slightest pink blush, it will eventually turn red on your kitchen counter.

After they're picked, ripe or not, tomatoes should not be refrigerated. Cold is the enemy of their flavor—another reason not to let tomatoes hang on the vine very far into fall, even if frost holds off.



**Plant wisely, and you'll have all the tomatoes you could desire for cooking, canning, freezing, dehydrating and eating fresh.**

In many cases, such as in sandwiches and salads, tomatoes can be used just as is. Other times, as in sauces, peeling is called for because the skin doesn't soften and shriveled bits of it can interfere with

a dish's texture. The best way to peel a tomato is to pour boiling water over it, count to 10, and then slip off the skin with your fingers. You can skin tomatoes that have been frozen whole by just holding them under running water for a few seconds.

Removing the pulp and seeds is sometimes necessary, too, either for texture or to decrease the water content. This can be done by cutting each fruit into quarters and scooping the pulp out of its cavities with your finger. For making a smooth sauce or purée, remove the skin and seeds by straining them out so you retain more of the nutrients in the pulp. If using a small food mill, cooking the tomatoes first makes the job easier. A more heavy-duty strainer can handle them raw.

## Panzanella

Tomatoes may be a New World fruit, but this summer salad was born in Italy. It's just the thing to make when ripe garden tomatoes are piling up on the countertops—and ripe they must be, so the juices will sink into the chunks of bread. Slightly stale bread is often recommended, but use fresh bread if you have it, and crisp it a bit, if you desire, in a hot oven. Most importantly, use great ripe tomatoes, organic and homegrown (or at least grown locally), and the best bread you can find—crusty, rustic and absorbent. This is a sensual dish, best made more so with your fingers than with tools. *Yield: 4 to 6 servings.*

*8 cups bread with the crusts left on, cubed or torn apart*

*1 clove of garlic, grated or pressed*

*1/3 cup extra-virgin olive oil*

*Dash of salt*

*Freshly ground black pepper*

*3 to 4 ripe tomatoes, or enough to make about 4 cups, coarsely chopped*

*2 ripe bell peppers (preferably orange or yellow), seeds removed, coarsely chopped*

*3 scallions, both green and white parts, chopped*

*1/2 cup fresh basil leaves, left whole if small, torn into pieces if large*

Place the bread in a large salad bowl. Add the garlic to the olive oil, and sprinkle over the bread, along with

the salt and pepper. Toss thoroughly to mix. Peel the tomatoes by pouring boiling water over them, so the skins slip right off. Chop coarsely, or pull them apart with your fingers, and then add them to the bowl of bread and toss again. Let the mixture sit for about 5 minutes, but do not refrigerate. Taste, and add more salt and pepper if needed. Add the peppers and scallions, then mix again. Stir in the fresh basil just before serving at room temperature.



**The juices from fresh, ripe tomatoes give new life to stale bread in this dish.**



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## Agave Fresh Fruit Salsa

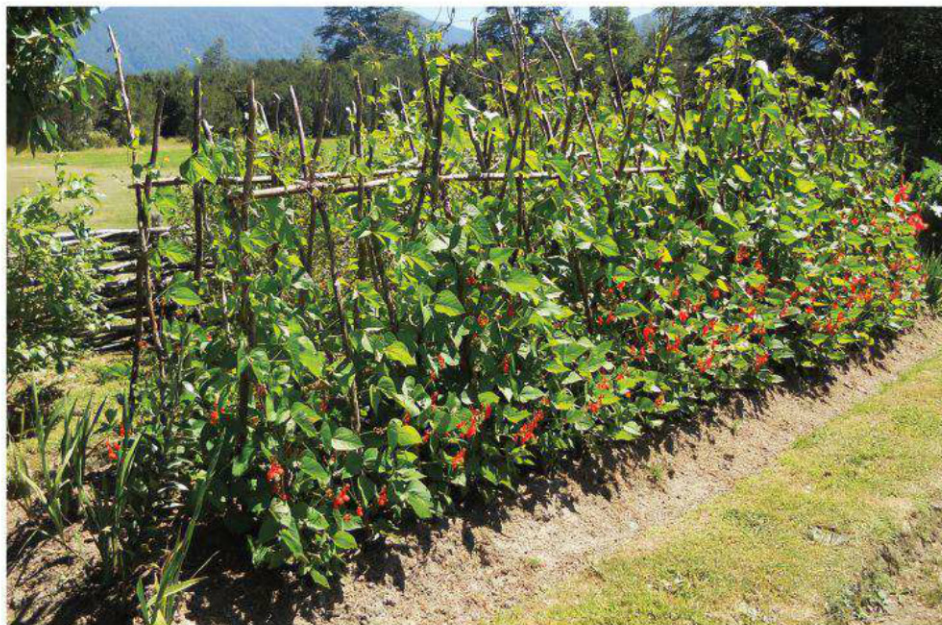
- 1 lb. fresh strawberries
- 4 fresh apricots OR 2 large peaches
- 1 ½ cups fresh, chopped pineapple
- 1 ½ cups fresh blueberries
- 1 ½ tbsp fresh lime juice
- ½ cup Domino® or C&H® Organic Blue Agave Syrup
- 1-3 tbsp chili powder
- 1 tsp finely chopped fresh cilantro
- ½ tsp finely chopped fresh mint

Dice strawberries, apricots and pineapple into 1/2-inch pieces. In a large bowl, combine all fruit and set aside. In a small bowl, combine lime juice and Agave Syrup. Add 1 tablespoon of chili powder (increase by teaspoonfuls to reach desired flavor); mix well. Add agave mixture, cilantro and mint to the fruit, tossing until combined. Serve immediately.

For our Sugar 'N Spice Chips recipe and more information, visit [dominoagave.com](http://dominoagave.com) or [chagave.com](http://chagave.com).

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Highly productive pole beans need tipis or trellises to give them plenty of room to climb.

## Bountiful Beans

Meanwhile, as my mother would say, you're "keeping up with the beans." As with tomatoes, beans come in both vining and bush types. Vining ones, usually called "pole beans" because they need support, bear for a long season, but must be picked regularly or they'll stop making pods. So pick you must, even if it means giving some away. Bush beans

mature over a shorter period, ideal for freezing, shelling or gorging.

With any bean, a series of harvests is possible. Start by picking some when the pods are small and skinny, as the French do, letting others get full-sized for the more typical snap bean harvest. If you wait too long and you can feel the seeds in the pod, wait a few days more until the shell bean stage, when the shells will

toughen but the seeds will swell to full-sized yet are still soft enough that you can dent them easily with your fingernail. This is a great way to take advantage of a surplus if you've fallen behind in your picking.

Lima beans are the most familiar shell bean type, but virtually any edible bean can be enjoyed this way. After shelling, the fresh bean seeds cook in about 20 minutes. To get dry beans for storing, just let the pods get fully dry, crisp and brown on the vine. Just note that, picked too soon, dry beans will get moldy when stored. Left too late, rain, frost or disease may ruin them.

## Cooking With Basil

And basil! What would high summer be without its lush, pungent leaves? The thing to remember about growing basil is to pinch off the flowering tips. This makes the plant branch and become bushy, giving you a better yield, and also keeps flowers from forming, which would eventually end the plant's leaf-producing stage. If flowers do form, pinch them off quickly.

## Herby Pickled Beans

Homemade dilly beans are easy to make. And if your dill has bolted before the beans are ready to pick, you can use any favorite herbs to season them. Fennel fronds or tarragon, for instance, would be nice. And don't worry if your beans aren't perfectly long and straight so that they stand up evenly in the jar. The curly types look and taste just fine even though you might not fit quite so many in. Just make sure they're plump and fresh, without blemishes. This recipe makes pickled beans for short-term storage. They'll keep for a month or two in the refrigerator. Fish them out of the jar as a snack, in a salad, or as a condiment with meals. *Yield: 2 pint jars.*

*2 whole cloves of garlic, peeled*

*2 tsp dried, crumbled hot pepper*

*About a half-pound garden beans, washed and trimmed at both ends*

*1 cup distilled white or cider vinegar (at least 5 percent acid)*

*2 tbsp sea salt or pickling salt*

*Several sprigs of fennel fronds, tarragon or dill, cut from the tips*

Divide the garlic and hot pepper between two clean, wide-mouth pint canning jars. Lay the jars on their sides and stuff as many beans as you can inside of them. In a pitcher, combine the

vinegar and salt with 1 cup of water, stir, and pour the mixture into the upright jars, covering the beans but leaving a quarter-inch headspace at the top. Carefully poke the herbs in, stem end down. Screw on clean canning jar lids and keep refrigerated.



Vary the herbs in this recipe to make pickled beans to your liking.





Basil does not hold its flavor well when dried, but it can be frozen. Purée or chop it finely and preserve it in oil. This is a bit like making pesto. Basil discolors easily, especially when moist, so don't wash it just before puréeing or chopping it to freeze.

I mix chopped basil with olive oil and freeze it in straight-sided jars — only the surface turns a little dark. It stays

soft enough that I can remove chunks of it as needed with a small knife. You can also freeze basil in oil by using ice cube trays with individual compartments. Be sure to leave the cubes in the tray until ready to use or they will darken on all sides.

If, despite your best efforts, your basil goes to seed too early in the season, just sow some more. 🌱

Barbara Damrosch farms and whips up creative, fresh summer recipes with her husband, Eliot Coleman, at their Four Season Farm in Harborside, Maine. She is the author of *The Garden Primer* and, with Coleman, of *The Four Season Farm Gardener's Cookbook*. Both are available on Page 64.

## Soupe au Pistou

When basil plants are bushy and lush, it's time to make this specialty of France. *Pistou* (like the Italian pesto) refers to the pestle with which basil is traditionally ground to make the necessary basil-based sauce. This is a quick soup, full of fresh flavors. Omit the shell beans if you have none, as well as the bacon for a vegetarian version. For an extra-meaty soup, add big chunks of browned sausage. Some will want to increase the garlic, or add scallions, young leeks, or a few peeled, chopped, fresh tomatoes.

The *pistou* recipe here omits the nuts I would toss into the blender if I were making the sauce to serve atop spaghetti. I like to pass the *pistou* separately, and have each person add a dollop and stir it in, watching the soup turn a striking shade of green.

*Yield: 4 to 6 servings.*

### **Pistou**

*1 cup fresh basil leaves, packed*  
*1 clove of garlic, peeled and coarsely chopped*  
*1/4 cup extra-virgin olive oil*  
*1/4 cup grated parmesan cheese, packed*

### **Soup**

*1 cup fresh shell beans, removed from their pods*  
*2 ounces slab bacon cut into 1/4-inch cubes, or 2 strips sliced bacon, chopped (or 2 tbsp olive oil for vegetarian version)*  
*2 medium onions, coarsely chopped*  
*1 large rib of celery, coarsely chopped*  
*1/2 pound small young potatoes, unpeeled, cut into chunks*  
*Two 6- to 7-inch-long zucchinis (about 1/2 pound), cut into rounds*  
*1/4 pound each green and yellow snap beans, trimmed and cut into 1-inch lengths*  
*1 bay leaf*  
*1/4 tsp salt, or to taste*  
*Freshly ground black pepper*

**Pistou:** Combine the basil leaves, garlic and olive oil in a blender or food processor. Blend just until smooth and well-mixed. Do not over-blend. Scrape into a bowl and add the grated parmesan. Stir until well-mixed. Cover and refrigerate if not using right away. You can also make large amounts, use what you need, and freeze the rest in small, straight-sided jars or ice cube trays.

**Soup:** Put the shell beans in a small saucepan with water to cover and simmer until just tender. Drain and set aside.

While the beans cook, heat a Dutch oven or large saucepan over medium heat and fry the bacon until browned, then remove with a slotted spoon and set aside. Fry the onions in the remaining bacon grease (or olive oil) over medium heat, stirring, until translucent. Add the celery, potatoes, zucchini, snap beans, bay leaf, salt and pepper. Add 3 cups of water, or enough to cover, bring to a boil, then cook over medium-low heat for about 15 minutes until vegetables are tender.

Add the shell beans and bacon to the soup. Reheat for a minute or two, taste for salt and pepper, and then serve hot, passing the *pistou* in a bowl for diners to stir in.



You can add ripe, chopped tomatoes to this summer soup recipe for added color and flavor.



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# Lifestyles of the SELF-SUFFICIENT

These three inspiring stories from our 2014 Homesteaders of the Year prove that you can reject the “rat race” and build a more sustainable, satisfying life.

By Jennifer Kongs

**B**reaking away from the confines of a full-time office job in order to build a self-sufficient homestead is something many of us dream about—but actually diving in can be a daunting decision. This year’s Homesteaders of the Year share how they have applied thrifty-living sense and DIY skills to work more from home doing jobs they love—jobs that connect directly to their health, creativity and life satisfaction. As the charts includ-

ed in this article show, all three families have saved big by constructing and renovating their homestead structures, often making use of salvaged wood and other repurposed materials. Two of the families even built their own homes.

If you, too, want to go “back to the land,” don’t be deterred by a lack of homesteading skills. At the outset, you may only have passion, determination, physical strength or an addiction to sun-ripened tomatoes. Whatever pulls you toward self-sufficient living will form the foundation

upon which you can build a framework of practical skills to carry you forward. Each how-to book you pore over and each conversation you have with practiced DIYers will expand your expertise. And each time you master a new skill, complete a challenging project or sit down to a delicious, 100 percent homegrown meal, you’ll feel more confident that you made the right choice. You can also learn and share new skills with your neighbors by participating in



**Norman grazes along the edge of Homesteaders of the Year Kelly and Glenn’s pond. The Florida couple’s hand-built house overlooks their native duck haven.**





our third annual International Homesteading Education Month this September. Go to [www.MotherEarthNews.com/Homesteading-Month](http://www.MotherEarthNews.com/Homesteading-Month) to join in.

Without further ado, we're proud to introduce the following hands-on and how-to families as our 2014 Homesteaders of the Year. For full interviews and even more stories of families practicing a DIY lifestyle, head to [www.MotherEarthNews.com/Star-Modern-Homesteaders](http://www.MotherEarthNews.com/Star-Modern-Homesteaders).

## Human-Powered Farm

**Who:** Kelly McCormick and Glenn Maresca, along with Kelly's parents, John and Linda

**Where:** Duette, Fla., since 2007

**What:** 5-acre farm with a 60-by-30-foot garden, tropical fruit trees, poultry, cows, a potbellied pig, bees and dogs



**Employment:** Kelly: freelance Web and graphic designer; Glenn: homestead maintenance man, car repairman and on-site vet

**Homestead Highlights:** Committing almost entirely to human and animal power; saving seeds to create heat- and pest-tolerant crop varieties; producing 80 percent of their food; crossing South Asian game hens with Turken chick-

**Clockwise from top left:** Kelly surveys the garden's tomatoes; Glenn hangs with Willie, the potbellied pig; the couple's cowshed made from recycled wood pallets.

ens to breed what they call "swampers"; adopting livestock from local animal organizations

**What does being a "modern homesteader" mean to you?**

To us, it means being self-sustaining without fearing new technology—enhancing time-honored activities with new concepts and ways of thinking. For example, we hope to eventually use solar power for all of our electricity.

**If you were starting over, what would you do differently? The same?**

We would have started much younger. We wasted so much time trying to con-

## Kelly and Glenn's Hand-Built Structures

Structure	Specs	Money and Time Spent	Notes/Materials
Home	1,500 square feet	\$45,000; 4 years	Built a wood frame with fiber cement siding; R-16 and R-30 insulation; shingle roof
Chicken coop	8 by 12 feet; 4-by-8-foot attached brooder/hospital space; 24-by-8-foot back run	\$2,000; 3 months	Brooder/hospital connected to main coop via wall of hardware cloth for easier flock introductions; floor made from shower wall covering for easy cleaning; shingle roof
Turkey coop	4 by 8 feet; 24-by-12-foot run	\$300; 1 month	Made of repurposed materials from chicken coop
Duck and goose pens	15 by 10 feet (for ducks); 12 by 6 feet (for geese)	\$0; 1 day	Used chain-link dog kennels courtesy of local animal organizations; shelters within made of wood pallets
Cowshed	16 by 12 feet	\$200; 1 week	Made of wood pallets and 2-by-4s; roof made of plywood and designed to be expanded as needed



form to social norms, when that time would have been better spent developing a sustainable life. We also would have gotten cows sooner. When we started, the thought of cows was daunting, mainly because of their size. We would never be without them now, though, because of the great manure and, after we breed Maybee, the fresh milk. We'd do everything else the same—even our failures have been fantastic learning opportunities.

#### What's unique about your garden?

The Florida gardening season is short, because the hot summer weather carries in bugs and disease, followed by flooding and a few frosts in winter. We start our seedlings inside the house and on a covered porch to jump-start the growing season. By saving seed each year, we've developed lines of landrace crops that are becoming more heat- and pest-tolerant.

We have a full loop between our animals, the garden and us—we use our animals for free fertilizer and pest control. We call our cultivation style “no-pesticide, non-mechanized” gardening, because we dig, weed and water by hand and have never used any pesticides. Annually, we spend about \$22 on the garden—just enough for some new seeds.

#### What thrifty-living tips do you have regarding homestead renewable energy?

Our renewable energy resource is, well, us! When we build a coop or a cattle shelter, instead of rolling out the extension cord for power tools, we build it with handsaws and hand drills. When the garden needs to be watered, instead of dragging hose around or installing water pipes, we carry buckets of water from our pond. When the garden needs to be tilled, we don't use a gas-powered tiller or tractor; we dig it by hand. We are trying to leave the smallest possible imprint on our land.

We wash our clothes with an antique, hand-cranked laundry wringer with a double-tub bench. We have two rain barrels by the laundry area that we use for wash water. We then use the greywater from the laundry to irrigate plants.

#### Where did you learn your DIY skills?

MOTHER EARTH NEWS! Kelly first tried—and succeeded—at baking a loaf of bread from the recipe available online at <http://goo.gl/RGZxhz>. Now we have



The Sailers in front of their Colorado home, from left: Jeremiah, Sarah, Emma, Bella, Ruby and Gia.

an established sourdough starter and bake bread regularly. We also rely on the Internet. Even those who aren't tech-savvy should embrace this vast resource, because it allows people from around the world to connect and discuss solutions to common challenges. We must mention our neighbors and family, too, as we have a community that's been in this area for generations. Their advice has been invaluable.

#### Tell us more about your animals.

We work with local organizations to adopt unwanted animals that then become our farm animals, and we rehabilitate and release native wildlife that just need a little help. The livestock we've adopted help reduce the strain on nearby animal organizations. You'd be amazed at how many chickens and ducks need a new home every year after Easter.

## Dreaming Big While Living Small

**Who:** Sarah and Jeremiah Sailer, with their daughters Emma, Bella, Ruby and Gia

**Where:** Loveland, Colo., since 2002

**What:** 1,100-square-foot home on one-fifth of an acre, with a vegetable garden, greenhouse, backyard chickens, meat rabbits, whole-foods kitchen and home-school lessons

**Employment:** Sarah: on-site home-school teacher, garden- and kitchen-experimenter, and freelance blogger at [www.ThriftyGoodLife.com](http://www.ThriftyGoodLife.com); Jeremiah: self-employed contract carpenter

**Homestead Highlights:** Maintaining a garden twice the square footage of their house; producing about half of their food; home-schooling their daughters;



The Sailer family converted their lawn—and driveway!—into an organic vegetable garden.





Jeremiah built a pantry over the house's staircase, then added a drop-down bridge so Sarah could store and access bulk goods without taking up valuable kitchen space (left). The hand-built backyard greenhouse and rabbit hutches help the family produce vegetables and meat from a small space (right).

heating primarily with wood; completing home renovations to accommodate their growing family; coordinating with Sarah's cousin to teach impoverished mothers in Haiti about gardening and raising animals

#### What made you start down the road to self-sufficient living?

Our family was dealing with health issues, and we decided to try treating them with natural and dietary measures. The combination of needing to change our diets and living on a tight budget created a perfect environment to learn resource-

fulness. We realized we would need to start buying a lot more organic produce, and wondered how much we could grow ourselves. Shortly after, we found answers in *The Self-Sufficient Gardener* by John Seymour.

#### Why home schooling?

We decided to educate our four girls from home in large part to commit the time to our homestead that we would have otherwise spent driving the girls to and from school and extracurricular activities. Home schooling threw the doors wide open for all of us to begin self-education. We learn together about

cooking, animals, farming and soil ecology, and we spend time with people who have specific skills, such as welding, painting, carpentry, horsemanship and pottery.

#### How does living in the city affect your ability to homestead?

We don't have access to pasture or open spaces, so we don't have the option to raise large livestock. This doesn't mean we can't take significant steps toward self-sufficiency, though. For instance, Sarah makes our own deodorant using coconut oil, baking soda, arrowroot powder and essential oils. She also

## The Sailer Family's Home Improvements

Structure/Renovation	Specs	Money and Time Spent	Notes/Materials
Chicken coop	6 by 15 feet	\$300; weekend project	Built from repurposed cedar siding; half is a fenced-in yard; metal roof
Rabbit cages	Large, 3-cage hutch; each cage is roomy enough for a doe with her kits	Less than \$100; 1 afternoon	Modeled off hutch seen on Craigslist ( <a href="http://www.Craigslist.org">www.Craigslist.org</a> ); made with repurposed wood and latches
Greenhouse	9 by 12 feet	\$600; 1 year	Used repurposed windows and recycled cedar fence pickets for sides; added discarded cabinets for storage
Upstairs kids' bedroom	5 feet high at center, tapers to 2½ feet at sides; total area 12 by 17 feet	\$500; 5 weekends	Renovated attic space; framed with repurposed materials and recycled, whitewashed fence wood
Pantry and drop-down "bridge"	Pantry: 5 feet tall by 33 inches deep by 35 inches wide; bridge: about 2½ feet wide by 8 feet long	About \$10; 1 weekend	Added a built-in pantry area accessible via a drop-down bridge that reaches over the staircase; used all repurposed materials except hinges and latch (see photo, above left)





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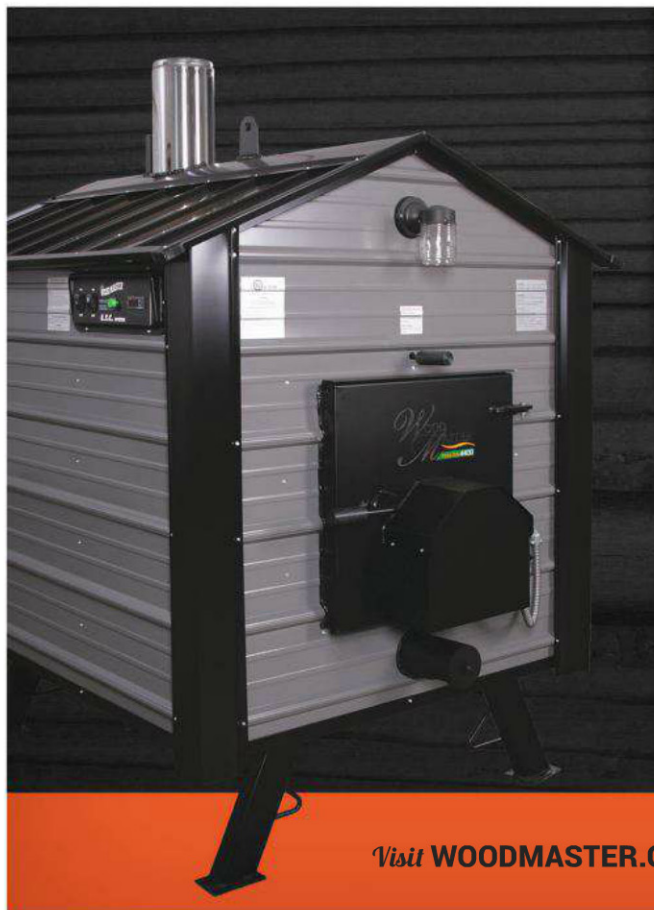
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Leslie and Andrew Gibbons built their home overlooking the Iowa countryside. Recently, the front room, painted green, was added as a seasonal sunroom.

creates simple household cleaners from white vinegar, castile soap, baking soda and essential oils. We strive to find creative ways to meet our family's food, energy and housing needs—such as adding a pantry and bridge in previously unused space over our stairwell (see photo, Page 29). We share our progress with neighbors who then think, "If they can do all of this, we could try something, too!"

**Where do you get any food that you can't produce?**

We buy our staples from a local co-op, and we get honey and meat from nearby farms associated with the co-op. Our beef and raw milk come from a local dairy. Loveland has a discount grocery outlet and a small, organic market that we frequent.

**What are your future goals?**

We love our small community and old house, so we've resolved to begin farming the neighborhood. With our expansion into three neighbors' yards this year, we have the potential to provide nearly all of our family's fresh produce, as well as sell to others. We are actively looking for restaurants and small businesses that will allow us to pick up food waste to begin composting on a larger scale. We continue to find ways to incorporate repurposed materials into our building projects. Longer range, we'd like to have

solar panels and a full greywater collection system, host community workshops to share thrifty-living tips and know-how, start selling bread baked in our new, handmade wood-fired bread oven—the list goes on!

## From Cornfield to Natural Haven

**Who:** Leslie and Andrew Gibbons, who share their land with Leslie's dad, Paul, and his wife, Yvonne

**Where:** Elkport, Iowa, since 1983

**What:** 100 acres of once-cornfield that is now native prairie and forest, to which the family has added several hand-built structures, a vegetable garden and apple trees

**Employment:** Leslie: makes and sells upcycled crafts; Andrew: do-it-yourself builder who maintains multiple part-time handyman jobs, including electrical, plumbing and small mechanical repair

**Homestead Highlights:** Living completely debt-free; heating solely with a woodstove fueled by wood cut from their property; hosting hunter friends in their hand-built, off-grid guest cabin in exchange for meat; producing about a quarter of their food from a 22-by-25-foot garden; bartering with the surrounding Amish community for goods they can't produce

**What made you pursue a more self-reliant life?**

As natives of Chicago, we got tired of city life. We both liked the country and wanted to raise our kids in a safer, less congested, more beautiful place. So, we got the *Back to Basics* and *Foxfire* books. We came out to look at some land—a cornfield—and decided to go for it.

**What does being a "modern homesteader" mean to you?**

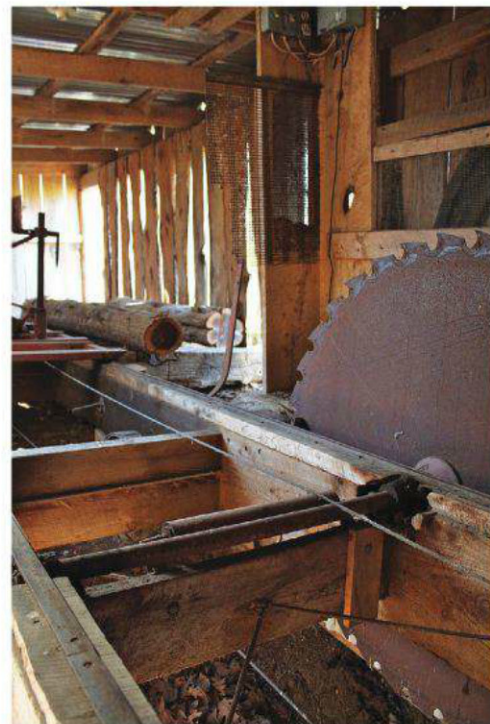
People thought we were nuts when we became homesteaders, but now we've proved them wrong! Well, some still think we're nuts. To us, it means freedom—freedom from debt, from the feeling that we have to work all the time to pay our bills, from having the expensive cars, from the consumer lifestyle.

**How did you get native grasses and wildflowers back onto your property?**

We have about 20 acres of tillable land, on which we've planted rye grass, red clover, Timothy grass and foxtail. We plowed, disked and seeded these acres when we first moved in. We have frost-seeded wildflowers and prairie grasses, too, including big bluestem. We pull the seeds off the grasses and spread them by hand. We sometimes dig up wildflowers, such as columbine, from nearby ditches and transplant them onto our property.

**What energy-efficient features does your homestead have?**





The Gibbons' off-grid, hand-built guest cabin and outhouse (above) are two of many DIY projects the couple has completed using their homestead's trusty old sawmill (right).

The guest cabin's minimal electric lighting runs on a 12-volt battery, but our guests mostly use kerosene lamps and candles. We also have solar-powered lights along our wooden walkway. We designed our house to take advantage of maximum sunlight, and we heat with wood that comes from our own forests. We do not have—and do not desire to have—air conditioning.

**Describe a general “day in the life” at your homestead.**

It depends on the season. For example, in fall, we're most often harvesting apples and making gallons of applesauce, hosting our turkey-hunting friends, cutting and stacking firewood, and readying the house and land for winter. Year-round, Leslie is in her art

studio creating items for her shop, and we're managing our firewood and doing maintenance on our structures.

**Where do you source the food you don't produce?**

Our hunting friends supply us with meat in exchange for stays in our guest cabin, and we often share meals, home-baked goods and excess produce with our Amish neighbors. We also frequent the local Amish-run “bent and dent” store for other staple items.

**How do you earn enough income to make ends meet?**

Leslie has a background in architectural design, interior decorating, painting and sewing and is an avid Dumpster diver. She puts these skills to use to earn income. She rents space in nearby

Turkey River Mall, where she sells her upcycled crafts. She also does many commissioned jobs, such as painting sets for community theaters. Andrew is a true handyman, able to design, build and fix almost anything. He has two part-time jobs, but he also does a lot of side jobs, such as making furniture and renovating old buildings. We live very frugally—just above the poverty line—and we live within our means. We save money, and we don't owe a penny to anyone! 🌲

## Leslie and Andrew's Handmade Buildings

Structure/Renovation	Specs	Money and Time Spent	Notes/Materials
House	2,200 square feet; 3 bedrooms; 2 bathrooms	\$20,200 (1986); 1½ years	Heated entirely with a Vermont Castings Vigilant woodstove; did carpentry, electrical and plumbing work themselves
Three-season room addition	12 by 16 feet	\$900; 8 months	Constructed the corners with four doors from 1875; floor is oak harvested from property and cut with their own sawmill
Garage/barn with later addition	15 by 30 feet; 15-by-30-foot addition	\$520 (in 1988); 2 months; addition: \$800; 2 months	Built with salvaged barn boards and rough-sawn lumber from local sawmill
Second garage	22 by 22 feet	\$1,500 (in 1989); 2 months	Made with leftover cedar siding from the house
Art studio	12 by 18 feet	\$1,200 (in 1993); 3 months	Repurposed the windows and door; long windows on north side were a neighbor's sliding glass doors
Guest cabin	20 by 24 feet	\$5,400; 2 years	Salvaged all the windows and doors; reclaimed porch posts purchased from an auction (25 for \$25)
Outhouse	5 by 8 feet	\$20; 3 weeks	Made mainly of materials left over from cabin construction





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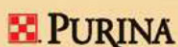
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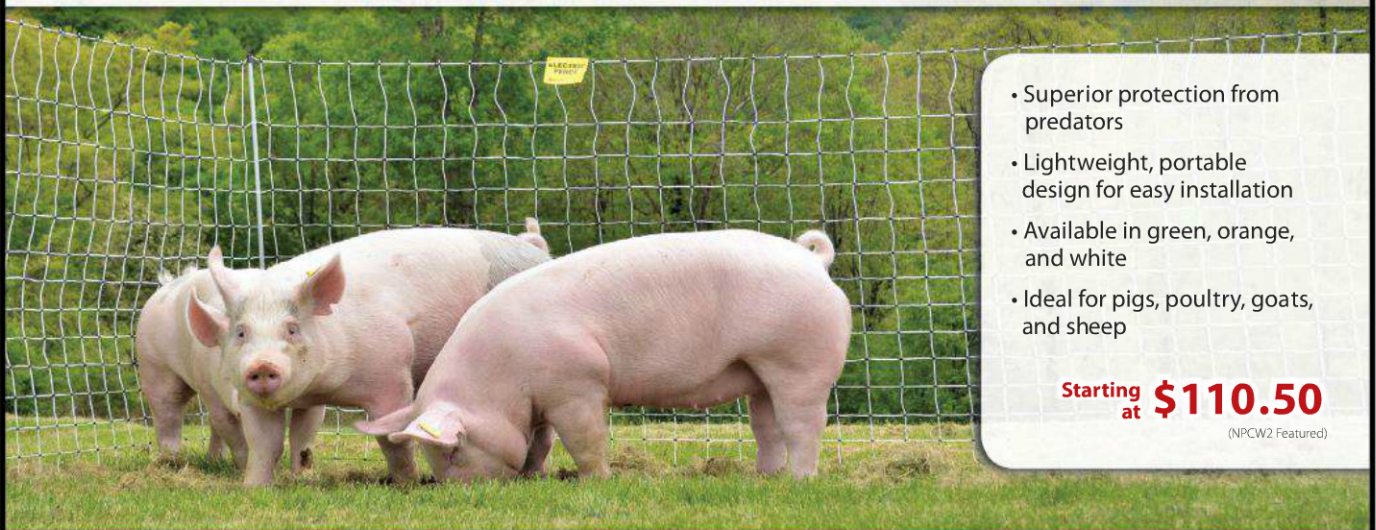
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# BEST SUMMER COVER CROPS

Sow these four fast-growing, weed-suppressing soil builders in any patch possible, even during your prime gardening season.

By Harvey Ussery

No gardening practice yields as many benefits as cover cropping, and growing cover crops *in every season* is as important as producing vegetables for your table. We too often think gardening reduces soil fertility, but in fact, the more you keep live plants growing, the richer your soil will become. Roots exude substances that feed beneficial soil organisms, including the amazing mycorrhizae (see Page 50). Deep-rooted plants draw minerals from subsoil, which makes the minerals available to shallow-rooted crops. Dead plants, including invisible roots, decompose and release nutrients for use by subsequent crops. Plants also prevent soil erosion, and decomposing roots open channels for oxygen and rain, and provide pathways through which earthworms and other important organisms can migrate. Repeated seasons of organic matter deposition will increase soil carbon, or “humus,” which is crucial to soil fertility, friable texture and water retention.

The ecological benefits of cover cropping go beyond soil improvement: Cover crops scavenge nutrient surges in soil that result from tilling in fresh plant matter or manure. They also prevent runoff pollution and “bank” excess nutrients for later crops. These beneficial covers boost biological diversity in and around gardens, a key to naturally preventing plant diseases and insect damage. Plus, many cover crops perform double-duty as forage for poultry and livestock, making a homestead less dependent on purchased inputs.

Too often, gardeners practice cover cropping only in the off-season—for instance, to protect soil in winter—and assume it’s not a summer option. But it is, and planting summer cover crops provides big payoffs.

## Unique Challenges

**Drought and heat.** Drought is more likely in summer, so gardeners must choose cover crop species that not only thrive in heat but are also drought-tolerant.







Sow a patch of cowpeas to set nitrogen between spring and fall plantings (left), and then cut the crop to form an excellent mulch (right).

Hot, dry soil is also inimical to seed germination, so no summer cover is likely to succeed without a little loving care.

If you broadcast seeds, first work them into the soil, then tamp the soil down with a rake. Even better, drill the seed by hand: Open closely spaced furrows with the corner of a hoe, dribble in seed, cover and tamp. Water immediately and as often as needed to keep the top quarter-inch of soil damp until germination. After plants become established, apply a light mulch to cool the soil and conserve moisture. You can also take advantage of shade offered by an existing crop, such as spring-planted broccoli, by seeding a cover crop into the same bed a couple of weeks before you remove the main crop. Most cover crops are adapted to close planting—the closer you plant, the sooner a tight, shading canopy will form.

**Limited space.** The greatest difficulty with summer cover cropping is revealed by the first question every gardener asks: “We’re already pushing the garden for maximum production—where do we find any unused space?” First, try hard to dedicate at least one bed in your rotation to growing a cover crop through an entire summer season, or maybe even a whole year. You’ll be amazed by how much an uninterrupted year under cover will do for your soil—and your future crops.

A couple of ways to sneak in more cover cropping: Gaps between early and late crops are opportunities to avoid the bane of any garden—bare soil—provided your chosen cover crop grows

quickly (keep reading for suggestions). You can also interplant low-growing covers at the base of tall crops—such as trellised tomatoes or pole beans—to achieve all the benefits of cover cropping and avoid any wasted bed space.

## Unique Benefits

**Abundant biomass.** In summer, large yields of biomass are typical, especially if you cut the cover crop during its vegetative stage to encourage rapid regrowth. You can work this surplus biomass into the soil or use it as livestock feed, compost fodder or mulch. Although overwintered covers provide those same benefits, summer cover crops yield a wider range of home-produced feeds for poultry and livestock, including cut-and-come-again greens, grains and seeds, and dried cover crops used as hay.

**Weed suppression.** Summertime is prime weed time, and fast-growing summer cover crops suppress weeds. They’re especially useful for filling that blank spot between early and later crops—space that would otherwise offer a field day for weeds.

**Biodiversity boost.** Summer covers make greater contributions to biodiversity because insects, birds and amphibians feed and reproduce during the growing season. Biodiversity creates ecological balance that can help mitigate plant diseases and damaging insects.

Let’s consider four summer cover crops that best rise to the challenge of warm summer conditions and offer a broad range



Fast-growing buckwheat forms a dense cover that shades out weeds (left), and the crop’s blooms bring in bees and other beneficials (right).



of benefits, especially in mixed plantings. Nature will do the work of killing these cover crops at the end of the season: All four are intolerant of frost and will die down into a protective mulch as freezing temperatures set in.

## Buckwheat

This broadleaf annual's greatest virtues are extremely rapid growth and profuse flowering. Its greatest limitation, extreme sensitivity to frost, can actually be turned into an advantage.

Buckwheat can form a tight canopy within two weeks, outstripping and shading out weeds. Its weed-suppressing prowess offers a responsible alternative to toxic herbicides. Tillage plus back-to-back successions of buckwheat have proved effective at suppressing even tough perennial weeds.

For preventing soil's exposure to baking sun, buckwheat may be the best of all covers to fill a gap between early and later crops. Plant buckwheat after all danger of frost has passed and make additional plantings anytime, up to 35 days before frost. Buckwheat flowers early (30 days from seed to bloom in my northern Virginia garden) and profusely, encouraging honeybees and other beneficial insects. Increase biomass yield by cutting the crop just before it reaches 25 percent bloom. Regrowth is rapid and a second such cutting may be possible. Plants make good fodder for poultry or rabbits, and chickens *love* buckwheat seeds: Just toss cut stems with seedheads to your flock.

Buckwheat's vulnerability to frost makes it a useful "nurse" for fall-planted, cold-tolerant crops, such as alfalfa and winter greens, which are often difficult to germinate in late-summer heat. The quick cover of some buckwheat sown with a winter crop will shade and cool the soil. The cold-hardy crop will grow in buckwheat's shade until a killing frost mows down the buckwheat, freeing the other plants for a surge of growth before winter dormancy.

## Sorghum-Sudangrass

Hybrid crosses of forage-type sorghum and sudangrass yield dramatic improvements to soil texture and increases in organic



In small plots, you can cut cover crops with a hand sickle.

On this farm, allelopathic sorghum-sudangrass is grown in alleyways to suppress weeds and produce fodder for compost, while cowpeas fix nitrogen in the space to be followed by food crops.

matter. Strains of sorghum-sudangrass grow 5 to 12 feet tall and produce an impressive amount of biomass. Cut back to 6 inches when the crop reaches 4 feet high to stimulate regrowth and encourage deeper, more aggressive root growth for opening compacted soil. The cut stalks make long-lasting mulches.

Plant sorghum-sudangrass about two weeks after the date for planting sweet corn in your area and anytime thereafter until six weeks before frost; it thrives in summer heat. After it's established, sorghum-sudangrass is highly drought-resistant.

If planted tightly—in rows spaced 8 inches apart and seeds at 1.5 inches apart, planted 1 inch deep—sorghum-sudangrass will beat out weed competition. Allelopathic compounds exuded from this crop's roots will suppress damaging nematodes and inhibit many sprouting weeds and crop seeds. However, this means gardeners should wait six to eight weeks after killing sorghum-sudangrass before sowing another crop in the same spot.

Sorghum-sudangrass makes good livestock forage, though you must not feed your animals young plants (those less than 24 inches high) or those stressed by drought or killed by frost, which may cause prussic acid poisoning. Ducks and geese love the leaves, and goats eat the stalks like candy.

## RESOURCES

### COVER CROP SEEDS

Peaceful Valley Farm Supply ([www.GrowOrganic.com](http://www.GrowOrganic.com)) offers all four summer cover crops, along with a cowpea inoculant to assure nitrogen fixation in the cowpea and hemp legumes. Use the Seed and Plant Finder to locate additional sources of cover crops ([www.MotherEarthNews.com/Custom-Seed-Search](http://www.MotherEarthNews.com/Custom-Seed-Search)).

The only source for nontoxic Certified Organic 'Tropic Sun' sunn hemp seed is Molokai Seed Company in Hawaii ([www.MolokaiSeedCompany.com](http://www.MolokaiSeedCompany.com)).

### MORE HOW-TO

"The Joys of Cover Cropping" provides an excellent introduction to cover crops (go to <http://goo.gl/W7jDFs>).

The 244-page compendium *Managing Cover Crops Profitably* (third edition) is indispensable for gardeners as well as farmers. Published by the Sustainable Agriculture Research & Education Program (SARE), you can order it as a book for \$19 or download it as a free PDF from SARE's website; go to <http://goo.gl/vXa2Eb>.





## Cowpeas

Cowpeas thrive in heat, grow fast and—with taproots reaching almost 8 feet deep—are highly drought-tolerant. They set about 130 to 200 pounds of nitrogen per acre and typically contribute a couple of tons of biomass to replenish soil organic matter. They do well in a wide range of soils, except highly alkaline soil.

Plant cowpeas in thoroughly warmed soil a week or two after your recommended date for planting sweet corn. Make successive plantings up to nine weeks before a killing frost. Treat the seeds with a rhizobial inoculant specific to cowpeas to ensure maximum nitrogen fixation. Tight plantings shade out weeds and conserve moisture, so plant seeds 1 inch deep in rows 6 inches apart (up to 15 inches apart for viny varieties) with seeds 2 inches apart in each row.

Beneficial insects feed on cowpeas' flowers and "extrafloral nectaries" (nectar-secreting glands near leaf nodes). The green plants make good fodder, which can also be dried for hay. Mature seeds provide feed for poultry and livestock and are a delicious table legume, too. Because a number of varieties set seeds at as early as two months, cowpeas are outstanding candidates to follow spring crops and set nitrogen for heavy-feeding, fall-planted alliums.

## Sunn Hemp

Sunn hemp is a tropical legume that quickly grows to 9 feet tall (see photo, Page 35). In dense plantings, it can set more than 120 pounds of nitrogen and 5,000 pounds of biomass per acre—or twice that if you cut the crop back, stimulating branching and additional root pen-



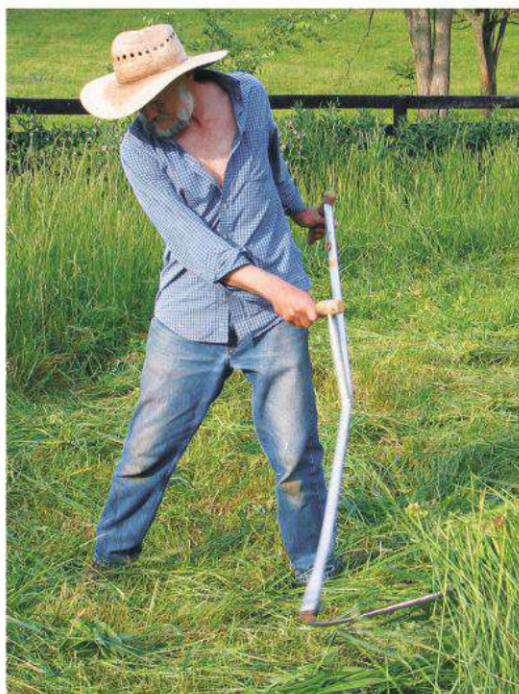
Sunn hemp undergoes an impressive growth spurt from two weeks after planting (top left) to four weeks (top right). The crop's yellow blooms boost insect diversity (left).

etration. It can fill midsummer niches between spring and fall crops, especially if the latter would benefit from a nitrogen boost. Sunn hemp is adapted to a wide range of soils (so long as they aren't waterlogged), but isn't frost-tolerant.

Plant sunn hemp a week or two after you'd plant sweet corn in your area, and succession sow up to nine weeks before a killing frost. Plant inoculated seed (use the same inoculant as for cowpeas) 1 inch deep, spacing 1.5 inches in the row and with rows 6 inches apart. Planting densely will crowd out weeds.

Younger sunn hemp plants contain more nitrogen, so cut them for composting or for a nutrient-rich garden mulch that will break down rapidly. After 60 days, the stems thicken and become fibrous and higher in cellulose; cuttings at this stage make long-lasting mulches that increase soil carbon.

Sunn hemp can be a valuable fodder, but *only* if you grow the variety known as 'Tropic Sun.' Other strains contain toxic alkaloids. 'Tropic Sun' is drought-tolerant and resistant to and suppressive of root-damaging nematodes. 🌱



Use a scythe to efficiently cut back cover crops in large plots. Make multiple cuttings to encourage regrowth.

Harvey Ussery, a veteran of raising homegrown produce and poultry, homesteads and grows cover crops year-round in northern Virginia. Find more tips on Ussery's website at [www.TheModernHomestead.us](http://www.TheModernHomestead.us).



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Circle #39; see card pg 81



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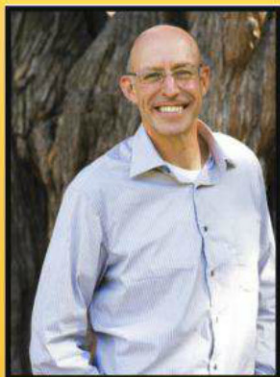
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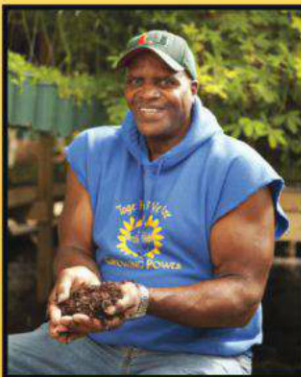
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**FRIDAY, NOVEMBER 7TH**



**MICHAEL POLLAN** is a 4-time *New York Times* Bestselling author, James Beard Award winner for best food writing, a 2009 *Newsweek* "New Thought Leader" and one of *Time* Magazine's 100 Most Influential People in 2010.



**WILL ALLEN** is the Farmer, Founder and CEO of Growing Power, a "Genius Grant" winner from the MacArthur Foundation, and was also named one of *Time* Magazine's 100 Most Influential People in 2010.

*Moderated by author and former Wisconsin Public Radio talk show host* **JEAN FERACA.**

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# DIY PRODUCE STORAGE BINS

Make a set of stackable vegetable crates out of cedar fence boards to create storage containers that move easily from garden to pantry or basement.

By Steve Maxwell

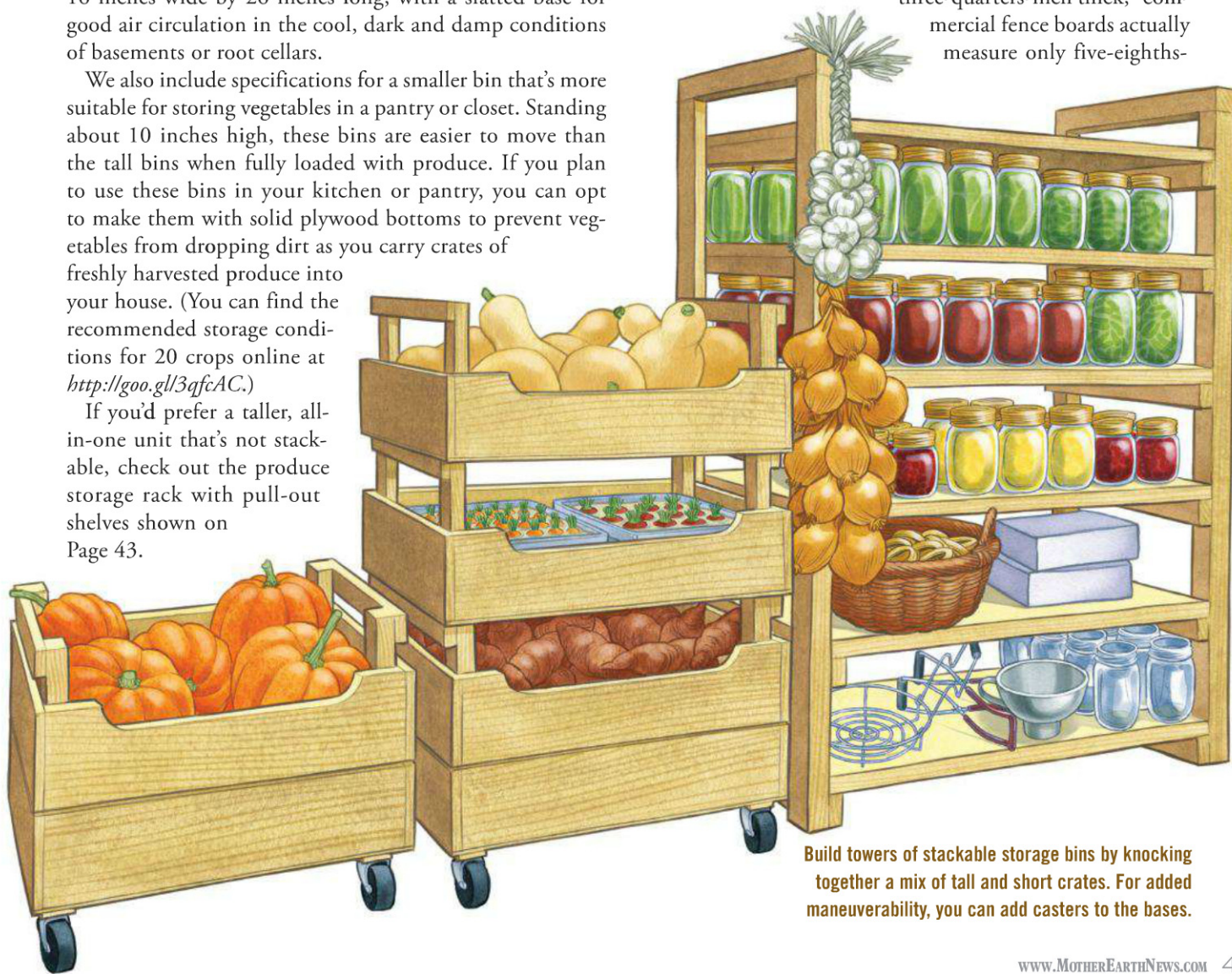
**T**hese sturdy produce bins are designed for bringing in the harvest from your garden or the farmers market. They stack together so you can store your crops neatly in your pantry, garage, basement or root cellar. The basic design produces a 14-inch-high bin measuring about 16 inches wide by 26 inches long, with a slatted base for good air circulation in the cool, dark and damp conditions of basements or root cellars.

We also include specifications for a smaller bin that's more suitable for storing vegetables in a pantry or closet. Standing about 10 inches high, these bins are easier to move than the tall bins when fully loaded with produce. If you plan to use these bins in your kitchen or pantry, you can opt to make them with solid plywood bottoms to prevent vegetables from dropping dirt as you carry crates of freshly harvested produce into your house. (You can find the recommended storage conditions for 20 crops online at <http://goo.gl/3qfcAC>.)

If you'd prefer a taller, all-in-one unit that's not stackable, check out the produce storage rack with pull-out shelves shown on Page 43.

## Crate Expectations

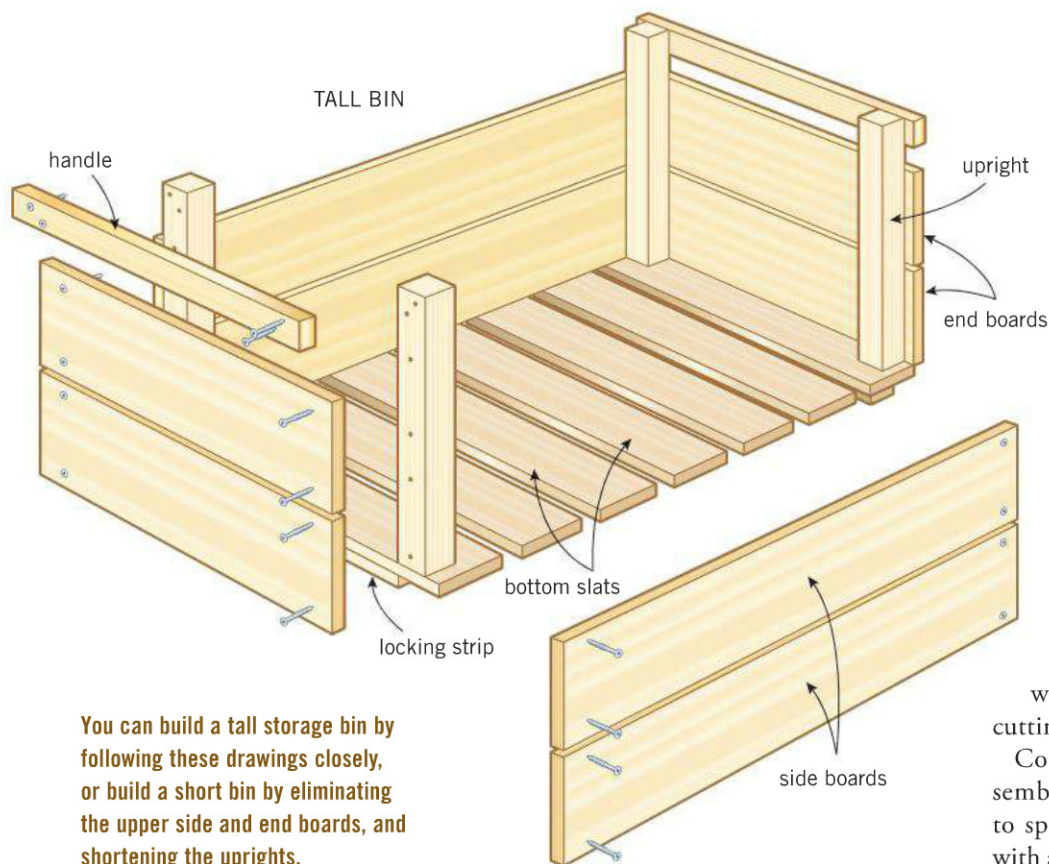
Simple tools, common materials and basic building skills are all you'll need to make these produce storage bins. Lightness and strength are their standout features because they're made mostly of standard cedar fence boards. Stocked at every building supply outlet, such boards are lightweight, long-lasting and easy to work with. Typically marketed as "three-quarters-inch thick," commercial fence boards actually measure only five-eighths-



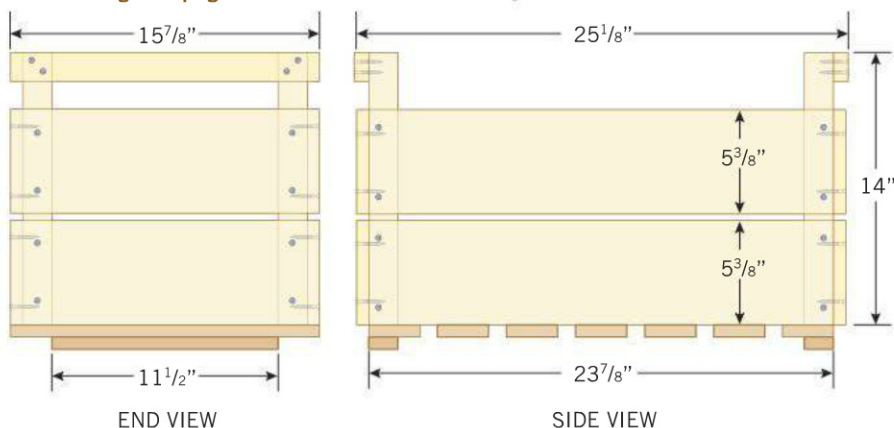
Build towers of stackable storage bins by knocking together a mix of tall and short crates. For added maneuverability, you can add casters to the bases.



TALL BIN



You can build a tall storage bin by following these drawings closely, or build a short bin by eliminating the upper side and end boards, and shortening the uprights.



inch—perfect for this project. You can construct the uprights from 1½-inch square stock and the handles from three-quarters-inch-thick hardwood.

**Make your first cuts.** To begin, you'll need to cut all the side boards, end boards, slats, uprights and handles for as many produce storage containers as you intend to build. The cutting lists below provide measurements for individual pieces as well as the total lumber needed for each size of crate. You can make the crates longer and wider if you prefer—just adjust the cutting list measurements.

Consider setting up a sawing assembly line in your home workshop to speed up your work. A stop block with a miter saw is one powerful way to cut all components to precise lengths. Prepare some kind of out-feed support or table, and clamp a block to the support so it will stop your wood at exactly the right point for crosscutting. Your setup time will be minimal, and you'll be happy with the results: fast, perfectly consistent cutting.

To create a pair of slats, simply cut standard 8-foot cedar fence boards into lengths of 15⅞ inches, and then rip them in half lengthwise. Each fence board will produce 12 slats. You'll need

## Materials List

Use these lists to calculate how much material and hardware you'll need to build a collection of DIY storage bins. Note the lumber required for each bin type, then follow the cutting list to trim all the pieces needed to assemble that bin.

Pay attention to the optional parts listed below. The solid bottom panel could be installed on either bin instead of slats. Omit the locking strips if you install casters to create a rolling bin.

### OPTIONAL PARTS, BOTH BINS

- 1 bottom plywood panel, ¼" x 15⅞" x 25⅛"
- 4 swiveling casters with plate mounts, 3"

### TALL BIN (14 INCHES HIGH), SLAT BOTTOM

#### Total lumber and hardware required

- 3 cedar fence boards, 8 ft. long
- 1½" square stock, 57"
- ¾" x 1½" hardwood, 32"
- 40 No. 8 screws, 1¾"
- 18 No. 6 screws, 1½"

#### Cutting list

- 4 side boards, ⅝" x 5⅜" x 23⅞"
- 4 end boards, ⅝" x 5⅜" x 15⅞"
- 4 uprights, 1½" x 1½" x 14"
- 2 handles, ¾" x 1½" x 15⅞"
- 7 bottom slats, ⅝" x 2⅝" x 15⅞"
- 2 locking strips, ⅝" x 1½" x 11½"

### SHORT BIN (10 INCHES HIGH), SLAT BOTTOM

#### Total lumber and hardware required

- 2 cedar fence boards, 8 ft. long
- 1½" square stock, 41"
- ¾" x 1½" hardwood, 32"
- 24 No. 8 screws, 1¾"
- 18 No. 6 screws, 1½"

#### Cutting list

- 2 side boards, ⅝" x 5⅜" x 23⅞"
- 2 end boards, ⅝" x 5⅜" x 15⅞"
- 4 uprights, 1½" x 1½" x 10"
- 2 handles, ¾" x 1½" x 15⅞"
- 7 bottom slats, ⅝" x 2⅝" x 15⅞"
- 2 locking strips, ⅝" x 1½" x 11½"



seven slats to build a base for one slat-bottomed bin.

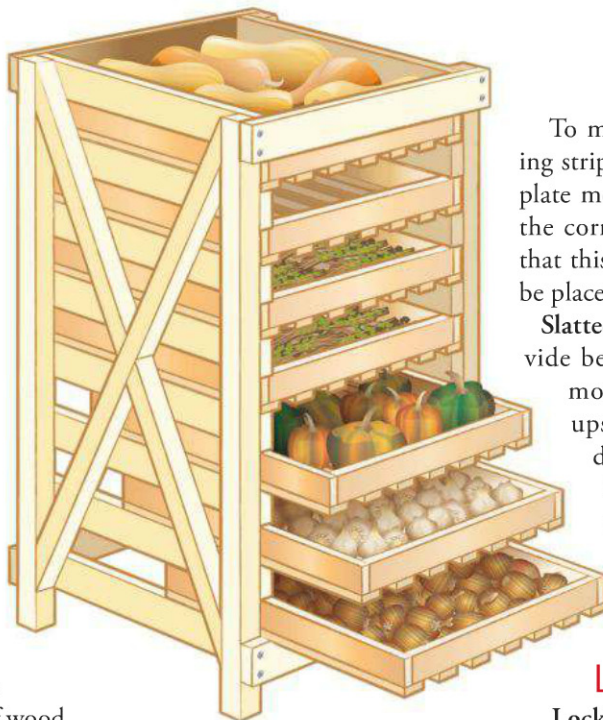
**Assemble the sides.** Although you could use a carpenter's square to ensure 90-degree corners when you assemble the sides, it's easier to use a sheet of plywood or waferboard with the original, uncut factory edges as a reference guide for creating a square assembly. Place two of the uprights you've cut onto the sheet, aligning their bottom ends with one edge of the sheet and positioning one of the uprights in a corner. Fasten a sidepiece cut from a cedar fence board across the top of the uprights with weatherproof wood glue and 1 $\frac{3}{4}$ -inch No. 8 deck screws driven into pre-drilled holes. (Pre-drill all holes to prevent splitting when you drive the screws.) If you're building the taller crate, fasten a second cedar side board on the uprights next to the first one, with a three-eighths-inch ventilation gap between them. Repeat the process to assemble the second side.

You don't need to wait for the glue to dry to complete the box. Stand both side assemblies upright on one end on a flat floor, and connect them with a single cedar end board secured with No. 8 screws and glue. Carefully flip this assembly, then add an end board to the opposite side of the crate. Add a second board to both ends if you're building the tall bin.

## Getting to the Bottom

Whichever height of container you're knocking together, the next step is to install the bottom. The plans allow you to choose between two different styles of base: solid or slatted.

**Solid bottom.** To install a continuous wooden bottom on your DIY storage bin, simply flip it upside down and secure a quarter-inch plywood base measuring 15 $\frac{7}{8}$  inches by 25 $\frac{1}{8}$  inches. Use glue and finishing nails to hold the base in place. If you'd like the bottom to be replaceable, use 1 $\frac{1}{2}$ -inch No. 6 screws driven into pre-drilled holes instead.



Find directions to build a food storage rack with pull-out shelves (above) at <http://goo.gl/Y2eLtw>. You can modify those plans to build a potato bin (below).

To make a rolling crate, skip the locking strips (described below) and screw the plate mounts of swiveling dolly casters to the corners of the base—but remember that this wheeled crate will always have to be placed at the bottom of a tower.

**Slatted bottom.** A slatted base will provide better air circulation—helpful for most stored crops. Turn your crate upside down and lay out seven cedar slats, evenly spaced across the base. Fasten each slat to the bottom edges of the side boards with glue and 1 $\frac{1}{2}$ -inch No. 6 screws driven into  $\frac{3}{32}$ -inch pre-drilled pilot holes.

## Lock It In

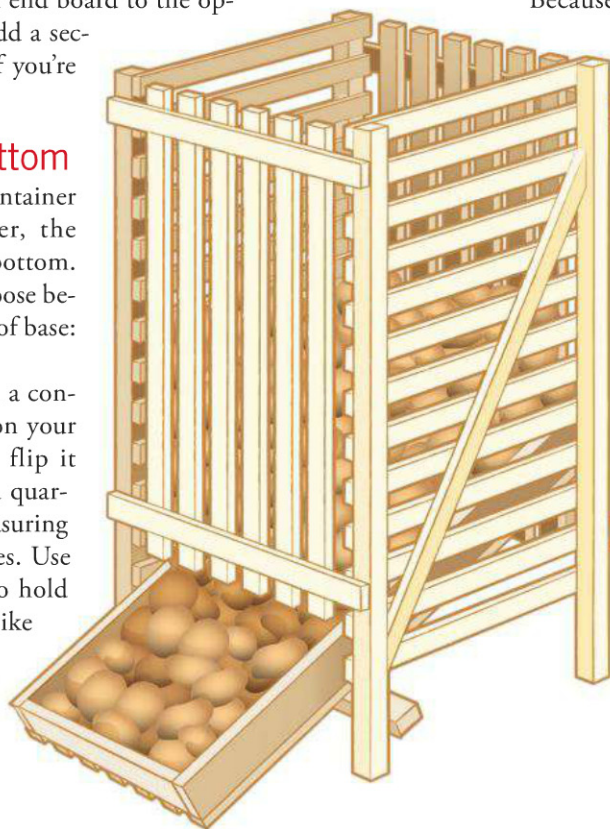
**Locking strips.** Complete the bottoms of both the tall and short bins by adding two 1 $\frac{1}{2}$ -inch-by-11 $\frac{1}{2}$ -inch locking strips onto the base at the ends (see drawing on Page 42). When you stack your pantry storage containers, the locking strips will

nest between the uprights of the crate below to create a secure tower. You can cut the locking strips from leftover cedar fence board. Use two No. 6 screws per locking strip.

**Handles.** Add the hardwood handles to the top of the crate's short ends by pre-drilling holes for two 1 $\frac{3}{4}$ -inch No. 8 screws in both the handle and upright pieces, then fastening the handles to the uprights with glue and screws.

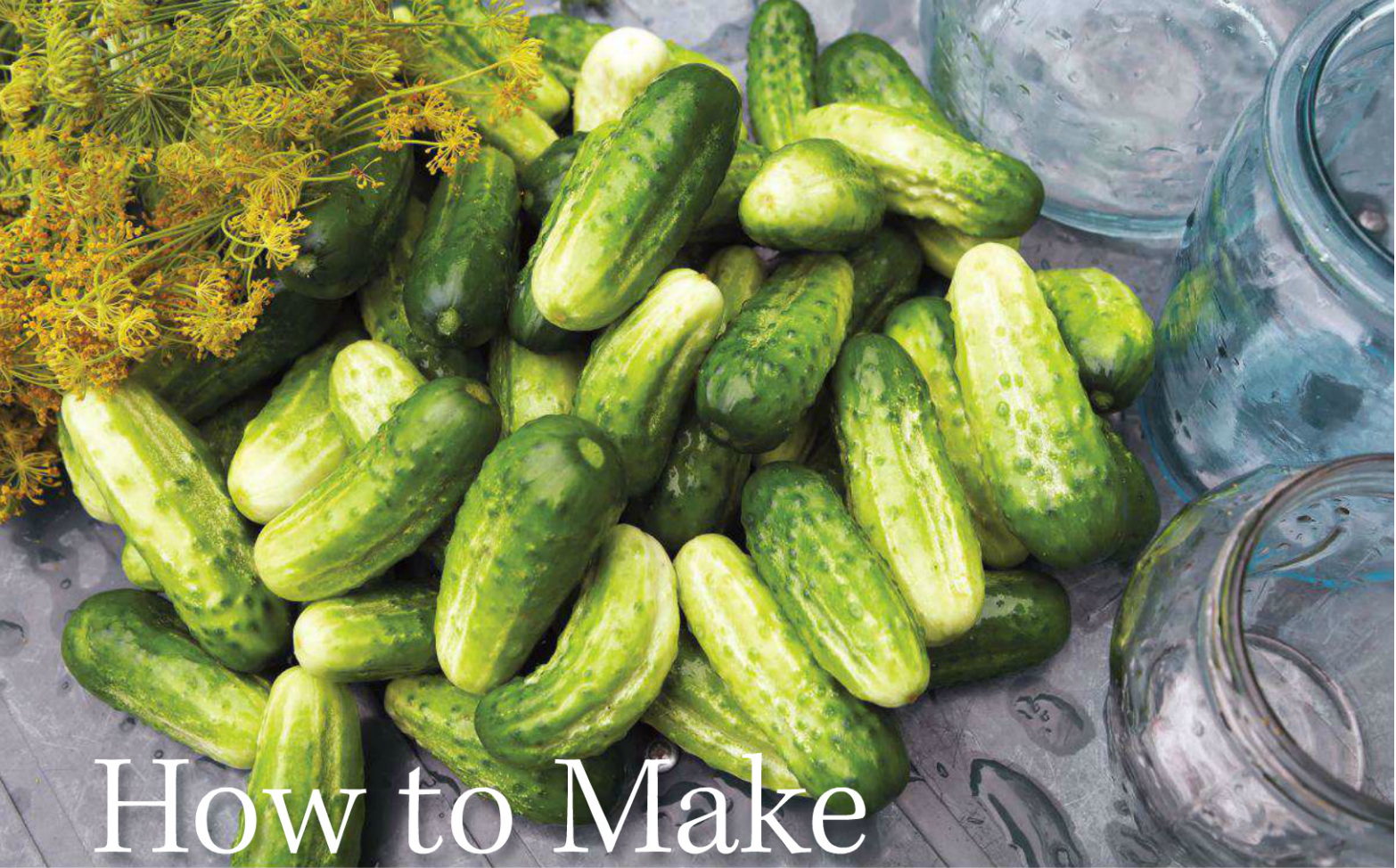
Because the short bin is shallower and lighter, you could use 2-inch-wide pieces of cedar fence board for the handles instead of the hardwood.

Don't bother applying wax, varnish or shellac to finish these produce storage bins. Finishes would be difficult to apply because of the rough surface of the cedar, and even non-toxic options, such as boiled linseed oil, could affect the smell and taste of your produce. You don't want anything to taint the great meals that will be made from homegrown food stowed in your handmade bins. 🌱



Contributing Editor Steve Maxwell has used his homemade produce storage bins in Ontario for more than 20 years. Follow his expert building and homesteading advice at [www.RealRuralLife.com](http://www.RealRuralLife.com).





# How to Make PICKLES

These three basic methods put perfect pickling within the grasp of every preserver. Just pick a pickle recipe and get started!

By Tabitha Alterman

**E**asy-to-prepare pickles pack a powerful punch of flavor and crunch. Even kitchen novices can learn in a flash how to make pickles and quickly concoct their own unique blends of preserved vegetables and fruits to add a tangy zing to everyday meals.

You can preserve vegetables using these three basic methods: lactic fermentation (cured with salt), canning (soaked in pickling lime) and refrigeration (immersed in a vinegar solution). Each type of homemade pickles described here includes a simple recipe for you to try.

## Fermented Pickles

Many pickle enthusiasts swear fermentation yields more complex flavors than you get from pickles made with vinegar. Also called “crock pickles” or “brine pickles,” they are acidified by lactobacilli bacteria and yeasts—microbes that thrive without oxygen while submerged in brine and that suppress the growth of other microbes that cause spoilage. The lactobacilli also produce B vitamins and flavor compounds. These probiotics may improve digestive, intestinal and immune function.

**The basics:** Mix food with flavorings and place inside crock. Make pickle brine and pour into crock. Cover with a weight to keep food submerged, and

drape with a towel to keep out dust. Ferment at room temperature for 2 or more weeks. Check container daily, and skim any scum from the top. Fermentation bubbles may be visible. Taste pickles regularly.

When your fermented pickles reach a flavor you like, you have three options for storing them:

1. Refrigerate to slow lactic fermentation. Pickles should last 4 to 6 months this way. Note that pickled vegetables last longer than pickled fruits, which generally keep well for only 2 to 3 months.

2. Store in a dark, cool spot, such as the basement, where your homemade pickles will continue to ferment but should stay tasty for several months.



3. Can fermented pickles for extended storage. The heat of canning compromises their crisp texture and kills the beneficial bacteria, but the flavor will remain. Canned fermented food could last a couple of years.

## FERMENTED KOSHER DILL PICKLE RECIPE

This recipe, adapted from Linda Ziedrich's *The Joy of Pickling*, uses grape, oak or sour cherry leaves, which contain tannins believed to help keep fermented homemade pickles crisp. Store-bought, canned grape leaves will also do the trick. *Yield: 1 gallon.*

### Equipment

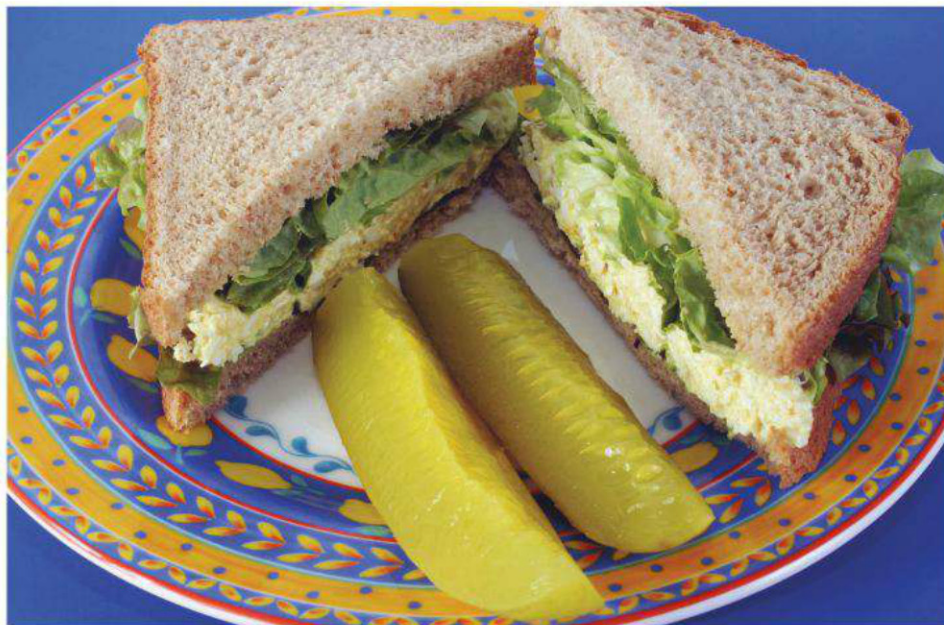
Clean, gallon-sized glass jar or ceramic crock  
Gallon-sized plastic bag or fitted  
crock weights

### Ingredients

1 handful clean grape, oak or sour cherry  
leaves (optional)  
Approximately 6 pounds of 4- to 5-inch  
unwaxed pickling cucumbers (preferably  
freshly picked), scrubbed and rinsed  
Peeled cloves from 2 to 3 heads of garlic  
2 quarts water  
1 cup cider vinegar  
6 tbsp unrefined sea salt or pickling salt  
1/4 cup dill seed or 2 handfuls dill fronds

Place leaves in the bottom of a clean crock. Slice blossom ends off the cucumbers and pack cucumbers into the crock, smallest ones first, adding garlic cloves throughout. Do not fill crock more than two-thirds full. In a separate container, stir together water, vinegar, salt and dill until salt dissolves. Pour this brine over cucumbers until liquid is an inch above cucumbers when you're pressing them down. If your crock has weights, set them on top of the cucumbers to submerge them. If you don't have special weights, fill a gallon-sized plastic bag with water and set it on top to keep cucumbers submerged. Cover crock with towel to keep out dust.

Ferment pickles for 1 to 4 weeks at room temperature, checking crock daily. Scum



Tangy, fermented dill pickles complement many sandwiches and contain healthy probiotics.

may develop on top; this is normal. Carefully lift off weight and rinse it to remove scum. Skim scum from top of container before replacing weight and towel. Don't worry about getting every last bit, but do this daily.

You may notice bubbles after the first few days, indicating lactic fermentation is underway. After a week, begin tasting the pickles daily. Keep fermenting until you enjoy the flavor. Pickles should be translucent throughout.

To store, place crock in a cool, dry, dark spot (the basement, for example), or remove pickles to smaller, lidded containers in the refrigerator. (If using metal lids, place a piece of plastic wrap between the container and the lid.) You may rinse fermented pickles and cover them with fresh pickle brine and seasonings, or strain and reuse your original brine. Pickles' flavor will improve after about a month in cooler conditions.

**Note:** The brine should develop a yeasty aroma that is pleasant, never putrid. If

pickles become slimy or moldy during fermentation, discard them and try again.

To can homemade pickles, process quart jars with half-inch headspace in a boiling water bath for 15 minutes. (*Bone up on canning how-to with our Home Canning Guide at [www.MotherEarthNews.com/Canning](http://www.MotherEarthNews.com/Canning). Plus, you can download our free How to Can app at [www.MotherEarthNews.com/Apps](http://www.MotherEarthNews.com/Apps).* —MOTHER)

## Canned Vinegar Pickles

Most modern pickling recipes rely on an acetic acid (vinegar) solution and heat treatment to preserve the vegetables. The resulting flavor is simple and sharp.

Vinegar pickles can be sweet, spicy or extremely sour. Popular examples include bread-and-butter pickles, sour gherkins and dilly beans. You must use vinegar with at least 5 percent acidity to produce pickles that are safe for long-term storage. Distilled white vinegar is the popular choice because it's cheap and won't darken pickles, and because its flavor is mild in comparison with those of cider, malt and wine vinegars. Avoid using rice vinegar and homemade vinegars, because their acidity usually is too weak. Always use canning recipes that have been tested for safety (see "Be Safe!" on Page 48).

**The basics:** Heat vinegar, water and seasonings to make brine. Pack whole



Cucumber slices soaked in pickling lime will keep their crunch when canned.



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Stacy Brewer  
Seattle, WA.

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Check out Stacy's [#madefromhere](#) story at [f/BallCanning](#)

Shine Through





For relish trays on demand, store fermented pickles in a cool, dark spot for up to several months.

or chopped food into sterilized canning jars. Cover with hot brine, leaving appropriate headspace. Apply lids and rings. Process jars in a boiling water bath.

## VINEGAR-PRESERVED

### OLD-FASHIONED LIME PICKLE RECIPE

This combination of ingredients and techniques makes the ultimate super-crisp, complexly flavored sweet-and-sour pickle. Pre-soaking cucumbers in pickling lime keeps them very crisp. *Yield: 4 quarts.*

#### Equipment

4 quart-sized canning jars with lids and rings  
Water bath canner with rack  
Candy thermometer

#### Ingredients

Approximately 6 pounds of 4- to 5-inch unwaxed pickling cucumbers (preferably freshly picked), scrubbed and rinsed

#### Soaking Solution

1 cup food-grade pickling lime (calcium hydroxide)  
1/2 cup pickling salt  
1 gallon cold water

#### Syrup Mixture

2 quarts cider or white wine vinegar (minimum 5 percent acidity; cider vinegar will darken pickles)  
6 cups granulated sugar or 5 1/4 cups honey (honey will darken brine)

2 1/2 tsp unrefined sea salt or pickling salt  
2 tsp mixed pickling spice, store-bought or homemade spice sachet (below)  
3 pounds white or yellow onions, diced

#### Spice Sachet

1-inch cinnamon stick  
1-inch piece of turmeric root, peeled, or 1/2 tsp of ground turmeric  
1 bay leaf  
1 small, whole, dried chile pepper or 1/2 tsp crushed, dried chile pepper  
1 tsp dill seed  
1/2 tsp white peppercorns  
1/2 tsp yellow mustard seeds  
1/2 tsp allspice berries  
1/2 tsp coriander seeds  
1/4 tsp fennel seeds  
1/4 tsp whole cloves

To prepare cucumbers for soaking, cut them into quarter-inch slices and discard the ends. In a 2-gallon or larger nonreactive (glass, plastic or ceramic) container, mix pickling lime with salt and water. Add cucumbers and soak for 12 to 24 hours, stirring occasionally. Scoop slices from

## A Peek at the Primary Pickle Types

Salt and vinegar are essential pickling ingredients. Which one is more important depends on the pickling method you choose—fermentation via salt or acidification via vinegar.

**Salt** amplifies flavors and draws moisture out of foods during fermentation, crisping them. Salt also keeps fermentation in check. A minimum salinity of 3.5 percent (2 tablespoons of salt per quart of water) is recommended for cucumber pickles.

Always use the type of salt called for in the recipe, because pickling, kosher and sea salts measure differently by volume. Harold McGee, author of *On Food and Cooking*, writes that un-

refined sea salt improves pickle crispness “thanks to its calcium and magnesium impurities, which help cross-link and reinforce cell-wall pectins.” Common table salt contains anti-caking agents and iodide, which will make pickle juice cloudy. Pickling salt is granulated salt without these additives.

**Vinegar** must have at least 5 percent acidity to preserve foods that will be canned. Never alter the vinegar or water quantity in a canning recipe, and never over-boil the brine. Such changes can reduce acidity, making pickles unsafe in long-term storage. If the brine is too sharp for your liking, add sugar.

Pickle Type	Vegetables or Fruit	Key Preservation Ingredient	Liquid	Typical Seasonings	How to Store
Fermented	5 to 6 pounds	Salt: about 2 tablespoons sea salt or pickling salt	About 1 quart water; may also use small amounts of vinegar for flavor	Dill, garlic, mustard, hot peppers	Refrigerator; ceramic, glass or stoneware crock in cool, dry, dark place; canning
Vinegar	5 to 6 pounds	Vinegar: 5 to 6 cups (1 cup per pound of food); minimum 5 percent acidity	About 3 quarts, at least 50 percent vinegar	Salt, sugar, pickling spice, garlic	Refrigerator; canning
Refrigerator	Any amount	Rice vinegar	Vinegar to cover	Hot peppers, shallots, onion	Refrigerator



lime solution, rinse in a colander and soak for 1 hour in fresh, cold water. Repeat rinsing and soaking steps at least two more times to completely remove the pickling lime. Drain well.

In a large pot, whisk together vinegar, sugar, salt and pickling spice or your homemade spice sachet. Add onions. Simmer over low heat for 10 minutes to make a syrup.

Sterilize 4 quart-sized canning jars and lids in boiling water. Pack cucumbers and onions into jars and pour hot syrup over them, leaving a half-inch headspace. Use a knife or chopstick to eliminate air bubbles. Wipe jar rims clean. Apply lids and rings.

The pickles can be canned via low-temperature pasteurization to avoid the higher heat that softens them. To pasteurize, fill canner halfway with water and heat to 180 degrees Fahrenheit. Set filled jars in canner, and continually monitor water temperature for 30 minutes. Make adjustments to maintain 180 degrees for the duration. The thermometer reading should never exceed 185 degrees. (Learn more about how to make pickles using the low-temperature pasteurization method at <http://goo.gl/eG7SHa>.)

Alternatively, process jars in a boiling water bath for 15 minutes. The flavor of vinegar pickles will improve after about a month in storage.

## Refrigerator Pickles

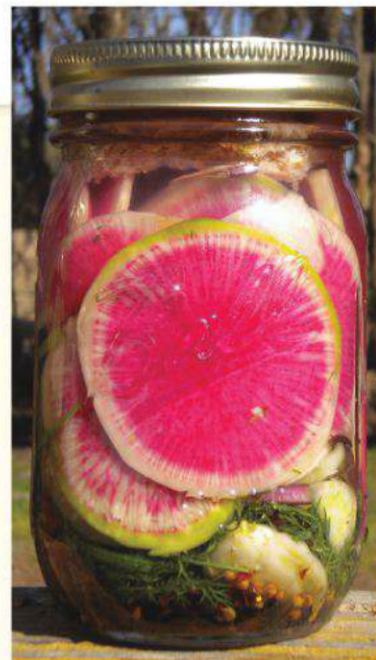
Sometimes called “quick pickles,” refrigerator pickles are technically vinegar pickles minus the canning. You can adjust a refrigerator pickle recipe—to use less salt or sugar or none at all—without food-safety fears. Refrigerator pickles stay crisp because the cucumbers are not subjected to heat. Making pickles using this method is as fast as the name implies. Refrigerator pickles are typically ready to eat within a day and should be consumed within a few months.

**The basics:** Prepare vinegar solution and pour over sliced vegetables. Cover and refrigerate.

## What Can I Pickle?

Most vegetables and fruits can be fermented, though some are better candidates for pickling because they're more apt to remain crisp. Popular fermented pickles include old-fashioned kosher dills (cucumbers with dill and garlic), half-sours (cucumbers pickled with less salt for a shorter amount of time), brined olives, sauerkraut (pickled cabbage), kimchi (Korean pickled cabbage, often spicy), beets, grapes, lemons, watermelon rinds, and Japanese plums. Fermentation expert Sandor Katz makes mixed vegetable ferments using whatever fruits and vegetables are available and seem appealing.

For a bounty of ideas on how to make pickles, we recommend *The Joy of Pickling* by Linda Ziedrich, *Pickles & Relishes* by Andrea Chesman, *The Beginner's Guide to Preserving Food at Home* by Janet Chadwick, and *The Art of Fermentation* by Sandor Katz. (You can order these pickling reference works on Page 64.)



Almost anything can be pickled, even these Chinese radishes.

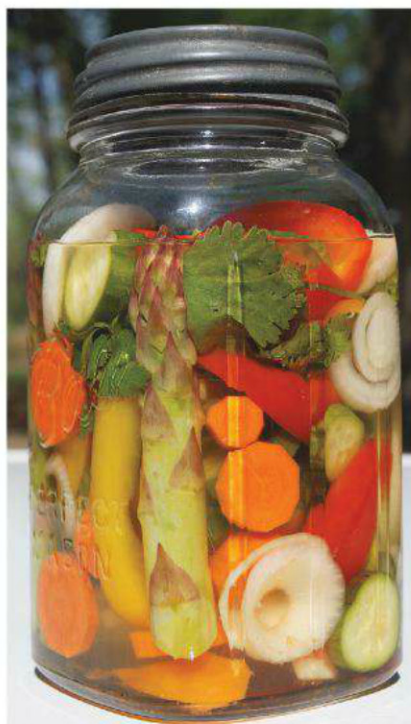
## SIMPLE THAI REFRIGERATOR PICKLE RECIPE

My refrigerator is nearly always stocked with vegetable slices covered in rice vinegar. I regularly add new vegetables to the jar along with more vinegar to keep them

covered. Sometimes I toss in garlic, turmeric or lemongrass. Because the refrigeration inhibits spoilage, low-acidity rice vinegar is OK to use in these homemade pickles. *Yield: 1 quart.*

Two 4- to 5-inch pickling cucumbers  
1 sweet salad turnip  
1 medium carrot  
2 shallots  
1 to 2 hot chile peppers, fresh or dried (optional)  
2 to 3 tbsp honey or granulated sugar  
1½ cups rice vinegar  
1 handful cilantro leaves

Peel (if desired) and slice vegetables into quarter-inch rings. Pack in a lidded storage container. Whisk honey into vinegar and pour over vegetables. Stir in cilantro. Refrigerate. Pickles will be ready to eat the next day and will stay good for roughly a month. 🌿



Just cover vegetables in sweetened rice vinegar, and you've made refrigerator pickles!

Tabitha Alterman is a big fan of fermentation. One of the coolest things she's ever done was taking fermentation guru Sandor Katz's course at the Natural Gourmet Institute in New York City.

## BE SAFE!

Find safe pickling recipes by consulting online resources offered by Ball Canning at <http://goo.gl/BjmQxh> and the National Center for Home Food Preservation at <http://goo.gl/r2KfWd>.



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# The Amazing Underground SECRET TO A BETTER GARDEN

Enjoy healthier soil and superior harvests by nurturing the symbiotic relationship between plant roots and mycorrhizal fungi.

By Douglas H. Chadwick  
Illustrations by Michael Rothman

**T**hroughout history, people's explanations of life involved all kinds of wonderful stories and complex philosophies. Facts just weren't really in the mix. That began to change with the rise of science. Scientific momentum picked

up sharply during the 16th and 17th centuries. As scholars scrambled to collect and categorize exotic beasts and botanical wonders, they dreamed of piecing together a full portrait of nature. Then, eyeglass lens-makers in the Netherlands assembled the first high-powered microscopes, and scientists looked closer at a few items that were right in front of them: soil, old bread

and drops of muddy water. The world they had been trying to make sense of for so long suddenly seemed ten, a hundred, a thousand times more intricate, strange and beautiful—alive in more ways than anybody could have ever imagined.

**A white fungal network called hyphae (shown below), not plant roots, is the principal structure for the uptake of many important nutrients in the plant kingdom.**





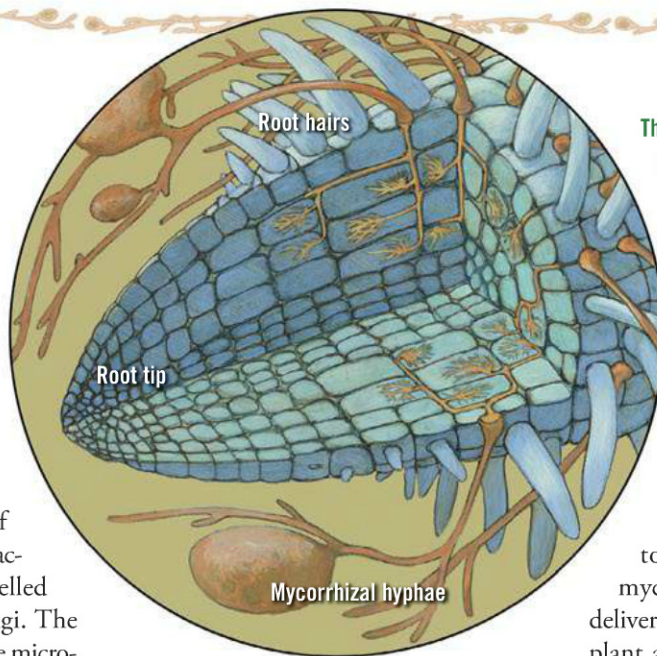
## Out of Sight, Out of Mind

We still define natural habitats primarily in terms of plants and animals, the two kingdoms of life we can see with unaided eyes. The greatest amount of biological activity and the largest diversity of species and genes, however, come from the other four kingdoms science now recognizes: bacteria, archaea (a less-studied division of life-forms formerly considered bacteria), protists (mostly single-celled algae and protozoans), and fungi. The vast majority of these members are microscopic in size. They cannot be seen with the naked eye, but we now know they permeate soils and suffuse waters. They drift en masse through air. They thrive not only on the surface of every plant and animal, but within them as well. From the upper reaches of the atmosphere to the bottom of the seas, down into the rock layers and outnumbering the stars in the known universe, microbes are literally the creatures that make Earth a living planet.

Microbes remain mostly in the “out of sight, out of mind” category of nature for a lot of folks. Others, chemical spray in hand, can hardly stop thinking about them, envisioning “germs,” mold spores and other unseen swarms poised to unleash disease and rot. Either way, a broader understanding of the life-forms that truly put the “bio” in “biosphere” has been slow to emerge. Interest is building, though, as the public learns more about the positive roles microorganisms play, including how some types can boost yields in gardens. These mycorrhizae—extraordinary fungi that interact with our garden crops—are what we’ll be zooming in on.

## From Miniscule Mycelium to Humongous Fungus

What is called a mushroom is merely the temporary structure some fungi grow to produce spores. The main body of a fungus typically consists of a network of fine-branching threads known as “hyphae.” While you’ll sometimes see them



The hyphae of mycorrhizal fungi are only a single cell wide, and they penetrate a root’s cell wall to facilitate nutrient exchanges between the fungi and the root tip (left). This illustration is magnified about 200 times.

massed together, spread like a web across a decomposing log, they’re usually hidden underground and essentially invisible to us; the individual filaments are only a *single cell* wide. The network of fungal hyphae is called a “mycelium.” As it turns out, the largest known creature on Earth is neither a blue whale nor a redwood tree; it’s the several-hundred-ton mycelium of one humongous fungus that’s between 2,000 and 8,000 years old. Spread across 4 square miles of Oregon’s Blue Mountains, the fungal network grows at an average depth of only a few feet. By contrast, the mycelia of most species

An extensive fungal network expands a plant’s access to soil nutrients by up to 2,500 times.

are small, but they’re as common as, well, dirt. If you pick up a pinch of soil almost anywhere, you’ll have miles of hyphae in your hand.

Estimates for the number of fungi species run in the millions. Mycologists have identified close to 100,000 so far. Of those, nearly 6,000 interact with plants’ roots. These are roughly divided into two types: those in which the fungus remains outside the root’s cells (ectomycorrhizal fungi) and those that penetrate the root’s cells (endomycorri-

zal fungi, illustrated above). The outcome in both cases is a continual exchange of goods. Ten to 20 percent of the sugars a plant produces through photosynthesis are absorbed by the mycorrhizae. In return, the fungus delivers many essential nutrients to the plant and increases drought resistance. Higher crop yields can be the result for gardeners. As the ends of the hyphae weave among soil particles via cracks and crannies too small for even the narrowest root hair, the mycelium becomes an auxiliary root system that’s in contact with a subterranean volume of soil from several hundred to 2,500 times greater than what the plant could reach alone.

Plants routinely face a challenge absorbing enough of certain key elements, such as phosphorus, nitrogen, potassium and iron. Fungi don’t face this obstacle; they produce specialized acids and enzymes that break the bonds that bind those nutrients to soil and organic compounds.

Although we call this process “decay” and attach a morbid aura to the word, it’s a lively enterprise. Gardeners recognize this decomposition from their compost piles. It’s no surprise that a plant with hundreds, if not thousands, of miles of hyphae working on the plant’s behalf to mine key nutrients and freight them back to the roots is able to grow faster, stay healthier, and ultimately yield more than it would without the fungi’s partnership.

## A Cooperative Companion

Polish scientist Franciszek Kamiński gets credit for discovering in the 1880s that the fungus and plant combination was in fact a symbiosis—a mutually beneficial partnership. A contemporary gave it the name “mycorrhiza,” which is Latin for fungus-root. Don’t get freaked out by



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Circle #3; see card pg 97

the Latin. Just say it with me: *my-core-rise-uh*. The plural is mycorrhizae: *rise-A*.

At least 90 percent of all plant families are known to partner with mycorrhizal fungi. These associations can be between a single fungus species and a single plant species, but most plants associate with many species of fungi, and vice versa. Mycorrhizae are by no means considered the exception any longer. They rule. *Mycorrhizae, not plant roots, are the principal structures for most nutrient uptake in the plant kingdom.*

Although we think of fungi being most at home in deep, dank forests, they're surprisingly abundant in open shrublands and prairies, too. The outer walls of hyphae contain gluey compounds that cause fine particles of earth to clump together on and around the threads. This process is a major factor in building soil structure and making the ground less vulnerable to erosion. Mycelial networks also play a valuable role in sequestering carbon within microclusters of filaments. They limit their partner plants' exposure to heavy metals, such as lead, zinc and cadmium, by keeping those elements bound to the hyphae's sticky sheath. At high latitudes and high altitudes, mycorrhizal fungi scrounge nutrients from cold, rocky soils. In boggy regions, the hyphae buffer plant partners from the high acid content of peaty soils. In saline ground, the hyphae help safeguard their partners from high salt concentrations. Mycorrhizae can also protect plants from pests and diseases.

## Mycorrhizal Fungi in the Garden

How can a gardener take advantage of this symbiotic relationship that plants and fungi have been developing for 400 million years? Microbiologist David Douds of the USDA's Agricultural

Research Service has been studying that question for 35 years. His studies show that fungal inoculants can increase the yields of many vegetable and field crops, including leeks, peppers, potatoes, strawberries, sweet potatoes and tomatoes (see photo, Page 53).

Inoculants can give transplants a strong start, but the main key to raising good crops lies in maintaining healthy communities of native mycorrhizal fungi in the

ground itself. Douds cautions against heavy or frequent tilling and the use of chemical fertilizers (especially phosphorus) and soil-applied fungicides. These activities break apart, weaken or otherwise suppress beneficial microbes, including fungal mycelia. You can keep your soil in prime condition by minimizing disturbances apart from occasional light tilling, weeding and mulching.

## Symbiotic Soul Mates

An equally important step is to ensure that mycorrhizal fungi survive through winter and early spring. The kinds of mycorrhizal fungi that support many garden crops aren't capable of living and reproducing independently of their plant partners. In a carefully weeded and fully harvested garden, mycorrhizal fungi

Mycorrhizae deliver many essential nutrients to plants, resulting in higher crop yields.

## How to Promote the Plant-Mycorrhizae Partnership

- Minimize soil tilling
- Always keep live plants in your beds, even in winter
- Rotate crops within your beds
- Avoid pesticides and chemical fertilizers
- Avoid applying too much phosphorus; a soil test every few years is a good idea



numbers can decline for lack of live roots to colonize. Douds advises avoiding empty beds by keeping plants, whether food crops or cover crops growing at all times. (See Page 35 for summer cover crop ideas.) In fall, plant rye, oats or, Douds' favorite, hairy vetch. All of these plants have extensive root systems and readily harbor mycorrhizae. Rows of perennial onions and strawberries can also serve as reservoirs for overwintering fungi. Orchards don't require the same attention, but buffer strips of a grass-and-legume blend will help retain a mix of fungi.

Douds sows hairy vetch in September while his garden is still producing, targeting areas where the soil is accessible, such as under and around tomato plants. The following year—usually late May when the hairy vetch is in full flower—he chops the shoots and lets them lie on the soil's surface. Wait until the hairy vetch is in full flower; cut it too soon and it will re-sprout as a “weed,” but cut it too late and it will produce seeds, which can be problematic. Douds



Leeks inoculated with mycorrhizal fungi (right) grow much better than those planted without an inoculant (left).

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Circle #36; see card pg 81



then transplants his tomatoes, peppers and other vegetables into the hairy vetch mulch.

Since learning about mycorrhizae's reliance on live plants for winter survival, MOTHER's Editor-in-Chief, Cheryl Long, has grown a thin strip of perennial alfalfa along the edges of her garden paths. "It doesn't take up growing space, and during summer I cut it for protein-rich poultry feed," Long says.

Many gardeners know that over-fertilization can be harmful, but they may not be aware that phosphorus builds up in soil more readily than the other two elements in common fertilizer mixes (nitrogen and potassium). Under a regimen of frequent, well-intended application, phosphorus can reach levels that actually discourage the formation of mycorrhizae. Phosphorus is the middle number of the N-P-K percentages shown on fertilizer products. Choose low "P" numbers unless a soil test has shown your soil is low in phosphorus.

To sustain populations of beneficial fungi, plant cover crops in otherwise empty garden beds.

### Learning a New Way

Now that scientists have taught us that invisible, magical mycorrhizae are in the soil, minimal tilling and constant cover crops should be considered a routine part of growing good crops. If you want to take extra steps in spring to help your crops establish these remarkable plant-fungi partnerships, Douds, in cooperation with the Rodale Institute, has developed a technique you can use to grow your own fungal inoculum to give your transplants a head start at the very beginning of their lives. For details, go to <http://goo.gl/xVpe3g>.

When gardening or farming with mycorrhizae in mind, there are a couple of things you don't need to worry about.

The first, Douds points out, is that you don't need to inoculate your established garden soil with beneficial fungi. If the soil has had plant cover and hasn't been abused, it will already have the fungi present. The second non-worry is

what would be best for beets, spinach and most members of the mustard family, which includes broccoli, Brussels sprouts, cauliflower, collard greens, kale and radishes. These are among the relatively few plants that get along fine without fungi for partners. 🌱

Wildlife biologist, author, and longtime contributor to *National Geographic*, Douglas H. Chadwick has spent much of his career among wild animals—very big wild animals. Yet ever since receiving his first microscope as a child, he has been equally fascinated by miniscule life-forms.

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# *Make a Biogas Generator to* PRODUCE YOUR OWN NATURAL GAS

Transform grass clippings, food waste or manure into renewable energy with a home-scale methane digester.



A 200-gallon generator in Oregon turns 15 pounds of food waste into cooking fuel daily.

By Paul Scheckel

**Y**ou can use many household organic “waste” materials to produce your own natural gas for cooking, lighting, and space and water heating. This gas, known as “biogas,” can also replace fossil-based natural gas to fuel an engine or an absorption cooling system, such as a gas refrigerator or chiller. Some gasoline engines are designed for or can be modified for use with natural gas, propane or biogas. Diesel engines can accept up to 80 percent biogas.

Biogas is a mixture of primarily flammable gases—mostly methane—along with carbon dioxide that forms anywhere organic material decomposes anaerobically (without oxygen),



such as in water, deep in a landfill, or in the guts of animals, including you.

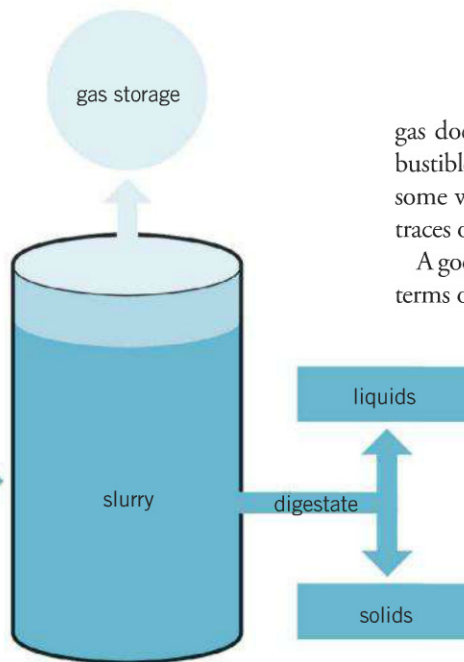
I prefer the term “generator” for the system, because it conveys the intention of producing something. By constructing a home biogas generator, you can make enough fuel to at least provide your cooking energy. A family with modest daily cooking needs will at a minimum require the output of a warm, well-fed, 200-gallon (27-cubic-foot) generator. This much biogas will allow for about one hour of daily stovetop cooking. Start small to develop an understanding of biogas by making a small generator from a single 55-gallon barrel. Find plans in *The Homeowner’s Energy Handbook* (see Page 64 to order at a 25 percent discount until Sept. 30, 2014).

## Energy Output

A well-managed methane digester can produce approximately its own volume of biogas each day. Anywhere from 10 to 60 percent of the solids will convert into biogas during digestion, so expect between 3 and 18 cubic feet of available biogas energy for each pound of dry material.

**Organic materials mixed into a slurry and put in an airtight container produce combustible gases, nitrogen-rich liquids and compostable solids.**

organic material (feedstock)

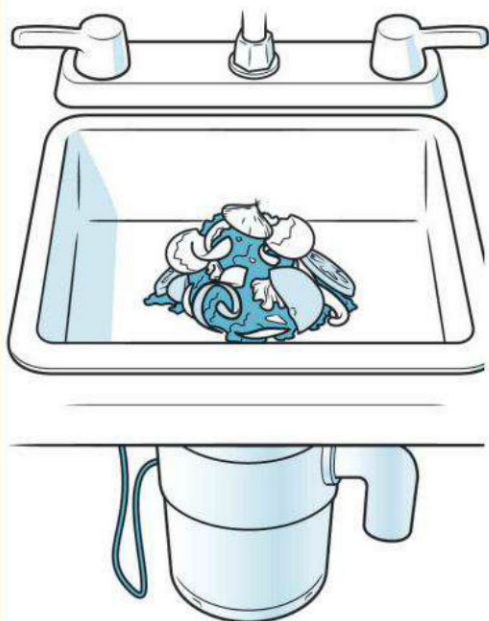


The exact makeup of biogas depends on what you feed to the digester. The main ingredient of biogas is methane. Methane (chemically known as  $\text{CH}_4$ ) is the primary component of conventional natural gas, commonly used for cooking and heating, although biogas is not as energy-dense. The methane content of biogas will probably range from 50 to 80 percent, compared with about 70 to 90 percent in utility-supplied natural gas. Natural gas contains up to 20 percent other combustible gases, such as propane, butane and ethane, while bio-

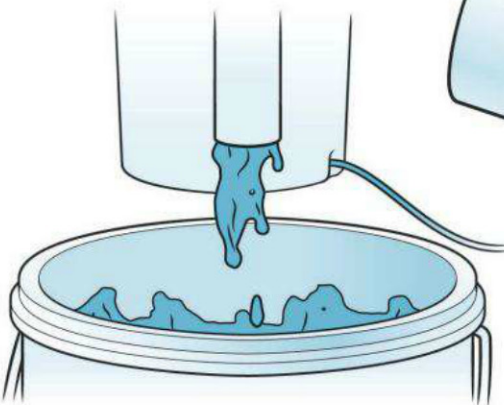
gas does not. Biogas’ primary noncombustible components are carbon dioxide, some water vapor, nitrogen and possibly traces of hydrogen sulphide.

A good material for producing biogas in terms of both production and availability is freshly cut grass clippings, which can produce about 1½ cubic feet of biogas per pound. At this rate, about 20 pounds of grass clippings will generate one hour of cooking fuel (grass silage is even better, requiring only about 10 pounds to produce this same amount of biogas). Food waste can yield slightly greater amounts of biogas per pound

than grass, but most people will have access to grass clippings in larger quantities (compare various materials using the chart on Page 58). If you own a cow, fresh manure is well-suited for on-farm methane production, despite its relatively low yield per dry pound. One cow will produce about 140 pounds (18 gallons) of manure each day, which could ultimately generate, on average, 85 cubic feet of biogas, or about three hours of daily cooking fuel. (Keep in mind that manure produced during hours your cow is on pasture will be difficult to collect.)



1. compostable raw material placed in sink



2. waste disposal under sink drains slurry into a bucket



3. slurry poured into digester

**For food waste, chop material into 1-inch or smaller bits. The author set up a chopping station in his garden using an old sink and garbage disposal attached to an extension cord. Other options include using a blender or chipper-shredder.**



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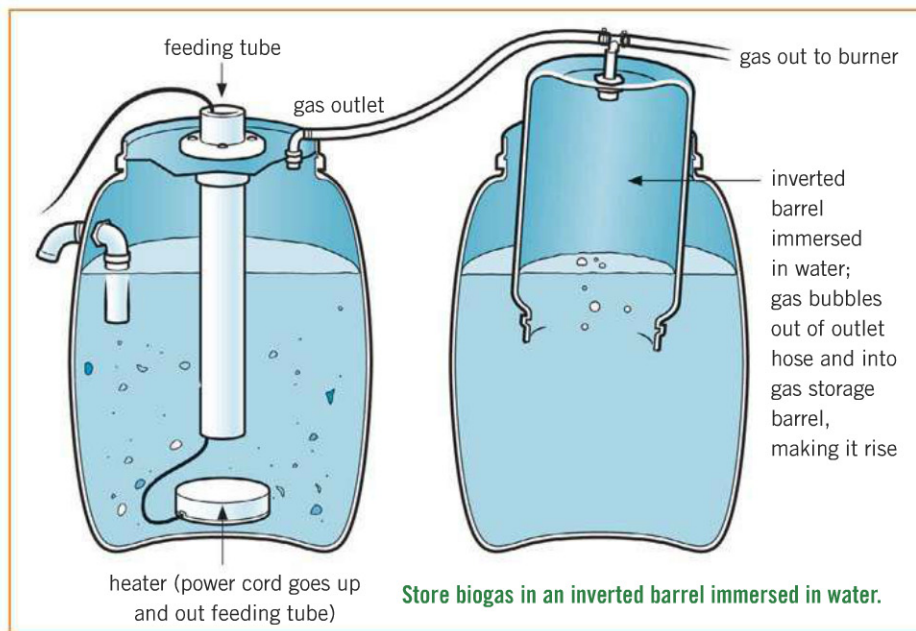
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## Producing Biogas

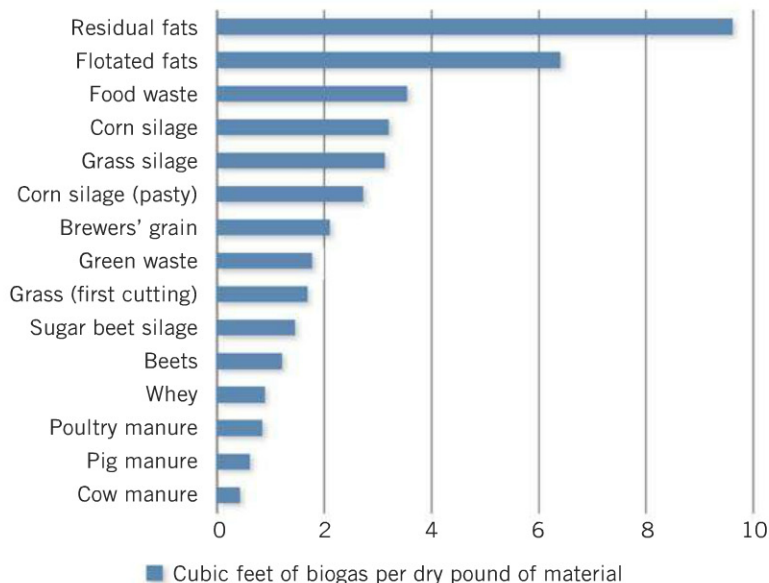
If you can compost it, you can digest it. Ideal biogas ingredients are those materials of which you have a plentiful, convenient and consistent supply, so you can make steady and useful quantities of biogas. Nearly any combination of vegetables, food scraps, grass clippings, animal manure, meat, slaughterhouse waste and fats will work as long as your recipe contains the correct ratio of carbon and nitrogen. Avoid using too many woody products, such as wood chips and straw, which contain large amounts of lignin (a

part of plant cell walls resistant to microbial breakdown), which tends to clog up the digestion process.

A methane generator usually contains a feeding tube for filling the digester vessel, an effluent outlet to remove digested solids and liquids (called the "digestate"), a gas outlet, and a collection tank for storing the biogas.

To produce biogas at home, first mix water with your organic material, or "feedstock." The range of total solids in the mix for optimal biogas generation is 2 to 10 percent, meaning that 90 to 98

## Biogas Yield From Various Materials



SOURCE: BAVARIAN ASSOCIATION FOR THE PROMOTION OF SOLAR ENERGY

PAGE 61, BOTTOM: FOTOLIA/MARKUS BORMANN






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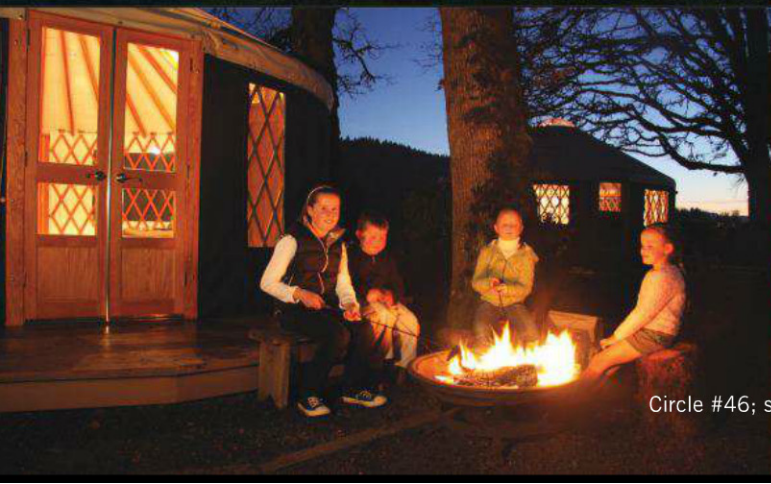
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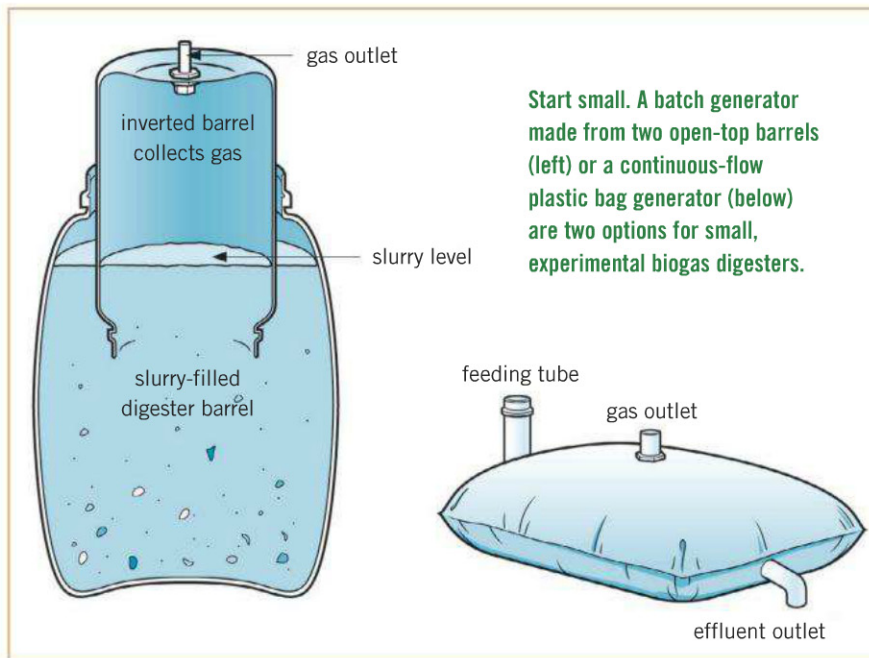




percent of the material inside your generator can be water, including the water that is part of your feedstock. Chop or shred solid material into 1-inch or smaller bits. Having more surface area available to microbes will promote better digestion of organic material. Fibrous material may digest more readily if it ages for a few days (allowing fungi and bacteria to begin breaking down the fiber) before going into the generator.

After you've added the feedstock, add enough water to make a slurry, and then add a starter culture of methane-producing organisms. These microbes, known as "methanogens," exist naturally in most animal dung, so if you use manure, you won't need to add them. But if you want to digest only food scraps or grass, you'll need to inoculate the mix to get the biological processes going (ideally, you'll need to do this only one time).

Maintain a temperature within the container that is close to body temperature, 90 to 100 degrees Fahrenheit, and you should be generating biogas in about a week. To reduce the amount of external heat required, place the generator in



**Start small. A batch generator made from two open-top barrels (left) or a continuous-flow plastic bag generator (below) are two options for small, experimental biogas digesters.**

the sun or inside a greenhouse. For extra insulation, wrap the generator with thin, flexible foam insulation or even Bubble Wrap, covered with UV-resistant, 6-mil black or clear polyethylene plastic.

As you produce biogas, pipe it into a simple holding container, such as a small barrel inverted into a larger barrel that is filled with water (see illustration, Page 58). Any storage container that is airtight

and expandable as gas flows in and out can be used. Apply external weight to the storage container to achieve the correct pressure required by your gas appliance.

You'll determine the retention time—the amount of time the generator takes to convert solids to biogas—through direct observation. After your generator is loaded and operating, keep track of the rate of gas production by observing the expansion of the gas collection barrel. When expansion slows, the production rate has dropped off, and it's time to feed. You may need to feed every day or once per week, depending on your material mix and the conditions inside the generator. It is best to feed according to a recipe. (Learn about recipe development in *The Homeowner's Energy Handbook*.)

Effluent is a low-odor blend of compostable solids and nutrient-rich liquid from your biogas generator. You can apply effluent directly to your garden as a soil amendment, but it's wise to first compost effluent to destroy any pathogens.

## Temperature: The Most Critical Detail

In most cases, material you put into a well-maintained methane generator operating in a temperature range of 70 to 105 degrees will be fairly well-digested in about a month (you'll continually add feedstock as material digests). The conditions you'll try to mimic within the generator are similar to those inside an animal's gut. Biological activity within

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**A biogas plant in Germany captures methane from a landfill to produce electricity.**



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[sunbeltexpo.com/men](http://sunbeltexpo.com/men)

More Information

(229)985-1968 or [sunbeltexpo.com](http://sunbeltexpo.com)



Circle #17; see card pg 81

the generator will produce some heat, but depending on your climate, you may need to supply additional heat.

To produce gas during winter in cold climates, you'll need to provide an additional source of warmth. A larger generator may produce enough gas for some of it to continuously heat water, which can circulate via closed piping to act as a heat exchanger. Or, you can wrap the outside of the barrel with flexible tubing covered with insulation and pump hot water through it (learn how to build a solar batch collector at <http://goo.gl/twbnmdH>). Another option is a submersible, thermostatically controlled electric water heater designed to keep livestock waterers from freezing.

Weigh the costs of providing heat against the benefits of gas production. If you live in a hot climate, provide some shade so the temperature inside the generator doesn't rise much above 105 degrees.

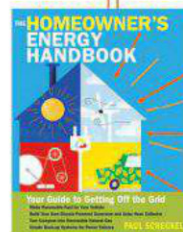
## Safety Considerations

Never make biogas indoors or in enclosed spaces. Methane is a flammable gas that will burn when mixed with air and exposed to a flame. A biogas generator could explode if the pressure drops and the flame is allowed to toll back through the piping. The risks are the same as with handling and storing conventional natural gas.

## Free Plans

You can find plans online to build generators up to 2,640 gallons in size at [www.CompleteBiogas.com/Build.html](http://www.CompleteBiogas.com/Build.html). Having a biogas generator is like having another mouth to feed, but with the right setup and a steady supply of feedstock, you'll produce fossil-free natural gas for a variety of energy needs on your homestead. 🌱

Paul Scheckel is a hands-on, off-grid homesteader, and he is an efficiency consultant for utilities, homeowners and businesses. See Page 64 to order his book *The Homeowner's Energy Handbook* (25 percent off the regular price until Sept. 30, 2014).





# Mother Nature's Insect Control

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FOR ORGANIC PRODUCTION



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- **Mosquito Bits®**—a versatile granular application with a spice shaker top—easily broadcasts over treatment area.



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Circle #53; see card pg 81

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The DR® VERSA-TRAILER™ is the FIRST trailer designed to take the hard work out of loading and unloading!

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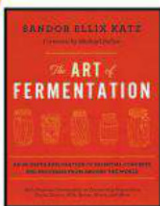
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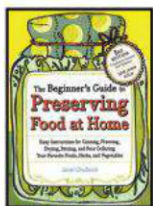




## real food



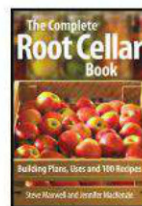
**The Art of Fermentation**  
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**The Beginner's Guide to Preserving Food at Home**  
By Janet Chadwick  
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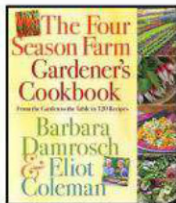
**Comfort Food Cookbook**  
Edited by Karen Will and Jennifer MacKenzie  
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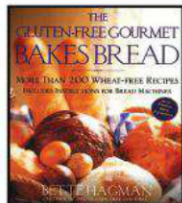
**The Complete Root Cellar Book**  
By Steve Maxwell and Jennifer MacKenzie  
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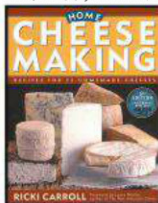
**Curing and Smoking: Made at Home**  
By Dick and James Strawbridge  
Price: \$19.95, Item #6215



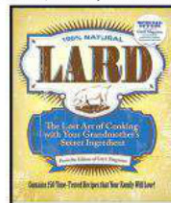
**The Four Season Farm Gardener's Cookbook**  
By Barbara Damrosch and Eliot Coleman  
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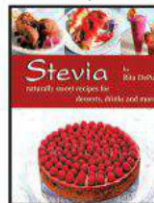
**The Gluten-Free Gourmet Bakes Bread**  
By Bette Hagman  
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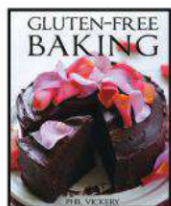
**Home Cheese Making**  
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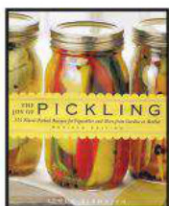
**Lard: Cooking with Your Grandmother's Secret Ingredient**  
Editors of Grit  
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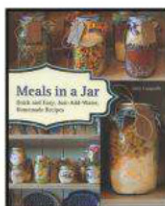
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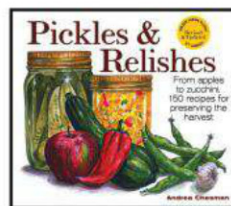
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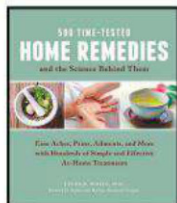
**Pickles & Relishes**  
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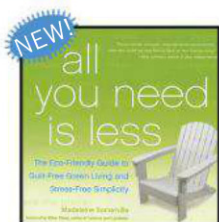
**Put 'Em Up!**  
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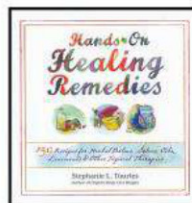
## natural health



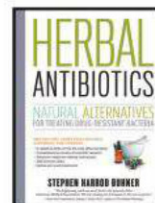
**500 Time-Tested Home Remedies and the Science Behind Them**  
By Linda White, Barbara Seeborg and Barbara Brownell Grogan  
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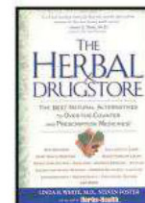
**All You Need Is Less**  
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**Hands-On Healing Remedies**  
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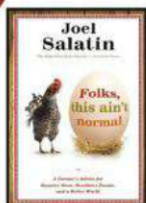
**Herbal Antibiotics**  
By Stephen Harrod Buhner  
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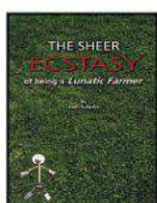
**The Herbal Drugstore**  
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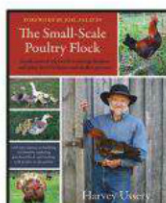
## homesteading and livestock



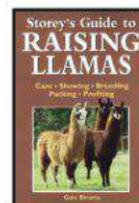
**Folks, This Ain't Normal**  
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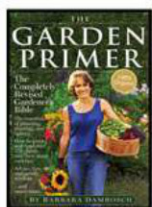


## organic gardening

NEW!

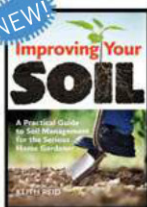


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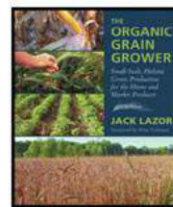


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2nd Edition**  
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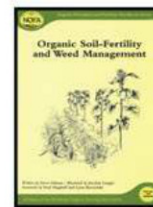
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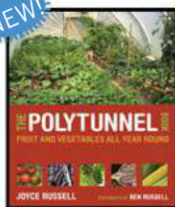
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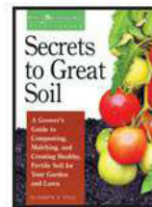
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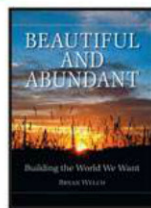
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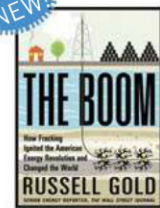


## nature and environment



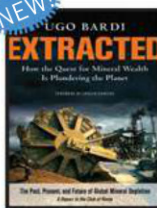
**Beautiful and Abundant**  
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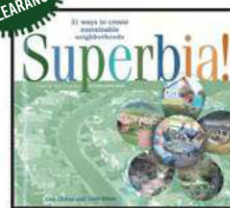
**The Boom**  
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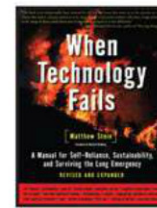


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CLEARANCE



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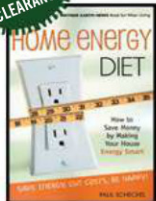


**When Technology Fails**  
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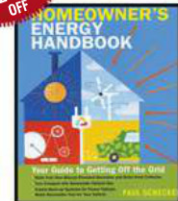
## renewable energy

CLEARANCE

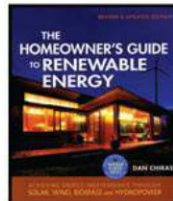


**The Home  
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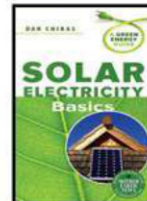
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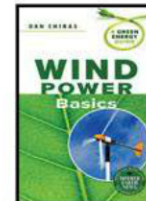
**The Homeowner's  
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(TDS isn't 0.00!) An Engineering Degree from Lafayette College and Steam Plant Design: SUPER VIRUSES have antiquated ordinary filters/distillers (not ENOUGH Destruction Time! Virus & Bacteria Chart). Click johnellis.com for a WW2 story that will SHOCK YOU!! Gilbert de Daunant (Prince Rainier's cousin) risked his life saving these people (exploits in a book by the President of MIT) while his brother was jailed for insulting a German officer! History buffs will be interested in his links to American history and European aristocracy that buy 100's of our machines. It's on PUBLIC RECORD at the Dept of Environmental Quality (DEQ) when ordinary filters/distillers couldn't even stop the smell of 10 million gallons of e-coli and noroviruses (municipal letters with a machine)! Only 1000 gallons of "light" tap water was sprayed on the 5 acre waste lagoon (they also make "light" distilled) and the smell was gone in 24 hours, saving \$10,000/day in fines! Also, a DOLE FOODS 7 page contract. Listen to a recording: 800 433-9553



Gilbert de Daunant (Prince Rainier's cousin): "I just walked 40 blocks and I am 94! Send another E5 to Monaco!"

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Circle #20; see card pg 81

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# *An Invisible Network* HOW YOUR IMMUNE SYSTEM PROTECTS YOU

Learn about your body's remarkable defenses against disease to better support your health.

By Linda B. White, M.D.

**W**e navigate a germ world. We handle money, borrow pens, share electronics, exchange kisses, shake hands, dig in gardens, clean litter boxes and change diapers. During our everyday business, we mingle with billions of microorganisms.

That we rarely succumb to infectious illness is downright miraculous, and our immune systems deserve most of the

credit for that. The main function of this diffuse, interacting network of cells and chemicals is to combat pathogenic (disease-causing) microbes. It patrols the body for anything abnormal and potentially dangerous, such as cancer cells.

This complex and fascinating system affects your every waking hour, so learning a bit about how it works will help you understand your body's response to infection and shed light on how to boost your immunity. Let's take a look inside.

## Divide and Conquer

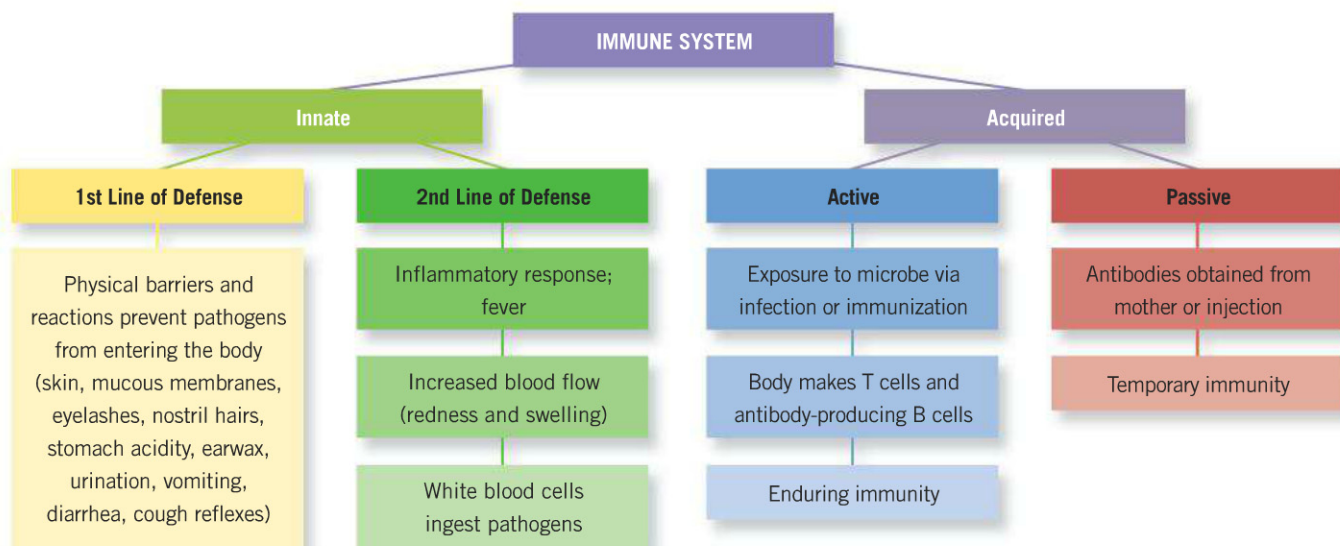
The immune system has two main divisions: the innate immune system, which needs no previous experience with intruders to dispatch them swiftly, and the acquired immune system, which requires contact and time in order to develop a specific response to a particular pathogen.

**Innate.** As its name suggests, the innate immune system is in place at birth. It reacts quickly and in a generalized fashion to any foreign invader. Physical barriers and reactions form a key component of this system: Skin and mucous membranes act like castle walls to keep out invaders. Eyelashes and nostril hairs trap dirt, microbes and pollen. Stomach acid-

Laughter really is medicine! Studies show that positivity plays a part in improving immunity.







ity kills many microbes. Earwax keeps the inner ears healthy. Urination flushes out bacteria. Vomiting and diarrhea propel bad microbes from the intestinal tract. The gag, swallow and cough reflexes protect the body's airways.

Fever is a second line of defense; it contributes by activating infection-fighting immune cells ("cytotoxic T cells"). White blood cells (called "leukocytes") form another component of innate immunity. These include natural killer cells (which attack virus-infected cells and cancer cells); cells involved in allergic reactions; and several types of cells ("phagocytic cells") capable of ingesting abnormal cells and bacteria, and other foreign material.

Some cells release "cytokines"—a large group of chemicals that facilitate communication among cells. Cytokines stimulate or inhibit activity of white blood cells, interfere with viral replication, and communicate with the brain. The brain, in turn, sends signals that influence the immune system and other bodily systems.

Here's an example: Some cytokines contribute to the "inflammatory response," the body's nonspecific response to any irritant, including infection. The body's characteristic redness, swelling, tenderness and warmth are evidence of increased blood flow and delivery of immunity goods to the site of the irritant. Meanwhile, cytokines also quickly reach the brain, prompting sleepiness to promote rest.

A steady but less dramatic rise in inflammatory chemicals over the course of the day leads to natural drowsiness at night. Chronic elevations of these chemicals—associated with chronic infections, autoimmune disorders, cardiovascular disease, diabetes, cancer, obesity, aging and T cell dysfunction—may disrupt learning and memory and lead to fatigue, anxiety and depression. Furthermore, chronic inflammation accelerates aging and contributes to a long list of chronic diseases.

**Acquired.** Compared with the prompt but nonspecific innate immune system, the acquired immune system develops reactions more slowly but creates a specific, enduring response to each type of intruder.

The acquired immune system contains white blood cells of its own called "lymphocytes." The two main types of lymphocytes are T cells and B cells. T cells, which mature in the thymus, can be further divided into helper T cells, cytotoxic T cells, and regulatory T cells. After being activated by helper T cells, B cells mature and secrete antibodies (also called "immunoglobulins"), which bind to microbes and toxins and recruit other elements of the immune system to help eliminate viruses and bacteria from the body.

## Connecting the Dots

It's December. While hobnobbing at a holiday party, a co-worker exhales an influenza virus into your breathing space. A couple of days later, you're coughing under the covers as your innate immune system struggles to contain the infection.

Meanwhile, B and T cells in your acquired system are learning to recognize



Our immune systems work to ensure that a simple handshake won't usually result in sickness.





Some studies show that animal companions can reduce kids' risk of developing allergies and asthma.

require booster shots to maintain effectiveness.

**Passive immunity.** This second immunity-acquiring process results from the receipt of antibodies from a person or animal previously exposed to the microbe. People exposed to rabies, hepatitis and other infectious diseases may be given injections of antibodies against the particular microbe. Additionally, a pregnant woman's antibodies cross from her placenta to her fetus. After birth, her infant receives these immunologic compounds in breast milk. Passive

immunity lasts for only a short period of time and does not result in immunologic memory—so, for example, a baby who gains immunity from her mother's milk will not retain that immunity forever.

## Our Microbial Companions

Some microorganisms threaten health while others support it. A host of beneficial microbes shapes an immune system and forms part of its nonspecific defense. About 90 percent of the cells in our bodies

this virus, mount an initial (albeit puny) response, and then create identical cells with immunologic memory against this particular viral strain. If you're ever re-exposed, your immune system will respond so quickly and precisely that you won't develop symptoms of that exact illness. That is why we usually get measles, mumps and similar diseases only one time. Flu viruses, on the other hand, are always evolving into new strains.

## How Our Bodies Acquire Immunity

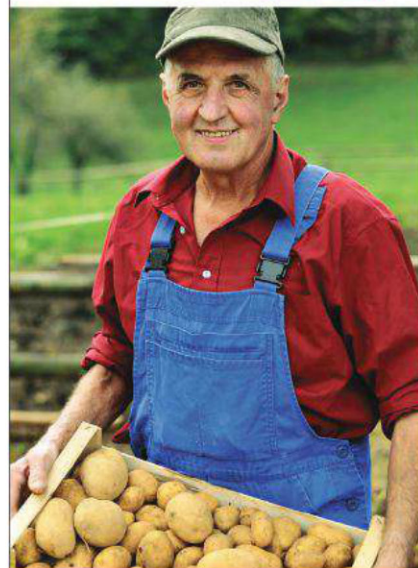
A body has two ways of developing immunity against a pathogenic microbe.

**Active immunity.** This immunity development entails exposure to the microbe. The microbe can be whole and alive, as usually happens when you're exposed to someone who's sick. Immunizations, on the other hand, involve exposure to only a small amount of a weakened or inactivated microbe, a fragment of the microbe, or an inactivated bacteria toxin (such as the tetanus toxin). Active immunity can last a lifetime when naturally acquired. Immunizations, however, often

Immunizations protect us from harmful microbes.



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Circle #41; see card pg 81

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are inhabited by bacteria, fungi or other nonhuman cells. These microbes colonize “lining cells,” such as in the outer eye, gut, upper respiratory tract, lower urinary tract and vagina, to keep harmful bacteria at bay. Our intestines alone house up to 500 different bacterial species whose members outnumber our own cells by a factor of 10.

Among other benefits, these “good” microbes contribute to immune system defenses. They out-compete pathogenic bacteria in the same way that a well-planted garden leaves little room for weeds. They also amplify the immune system response by supporting the health of immune cells, antibodies and other compounds. One of the reasons antibiotics shouldn't be dispensed without justification (such as to treat a serious bacterial infection) in humans and other animals is that they can also kill the resident good bacteria. That's why diarrhea and an overgrowth of yeast in the vagina, mouth, intestinal tract and, for infants, diaper area are typical antibiotic side effects.

To restore beneficial microbes after taking antibiotics, try taking probiotic supplements, which are live microorganisms capable of colonizing the intestinal tract, and eating live-culture fermented foods, such as yogurt and kefir. Probiotic supplements reduce the odds of antibiotic-associated diarrhea by 60 percent relative to placebo. Live-culture fermented foods contain strains of probiotics, so can also help keep your bacterial balance in check. Start ingesting probiotics and probiotic-rich foods when you must take antibiotics, and continue for seven to 14 days.

## Immune System Misfires

In order to attack pathogenic microbes and abnormal cells, the

immune system has to distinguish between self and nonself. Sometimes this intricate system breaks down.

In autoimmunity, the immune system attacks the body's own normal tissue. For instance, in Type 1 diabetes, the immune system attacks insulin-producing cells in the pancreas. In multiple sclerosis, the immune system attacks the myelin sheaths that insulate nerves in the brain and spinal cord.

In the case of hypersensitivity, the immune system is responding excessively or inappropriately. Everyday examples are hay fever and food or animal allergies. Food sensitivities (also called “food intolerances”), however, do not directly involve the immune system.

The immune system can also wear down. Immunodeficiency means the system is failing to fulfill its functions, increasing the body's vulnerability to infection and cancer.

Some immunodeficiency diseases are present at birth, while others are acquired from environmental exposures, chronic illness, malnutrition and certain medications. Viruses can impair immune function, a notorious example being the human immunodeficiency virus (HIV),

## Affecting Immunity

### Weakens your system:

- Chronic infections
- Stress overload
- Obesity
- Aging
- Insufficient sleep
- Depression
- Anxiety

### Strengthens your system:

- Probiotics
- Healing herbs
- Moderate exercise
- Ample sleep
- Meditation
- Laughter



Probiotic supplements and probiotic foods, such as live-culture yogurt, can restore beneficial gut bacteria.





Our systems learn to resist some diseases, such as chicken pox, after one exposure.

the cause of acquired immune deficiency syndrome (AIDS).

## Mood and Immunity

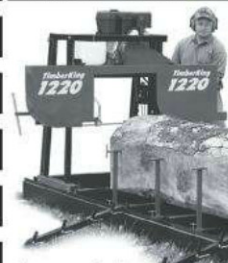
Several decades ago, scientists discovered that some of their allergic volunteers sneezed after viewing pictures of hay—without any exposure to its pollen. Then, in the mid-1970s, Robert Ader and Nicholas Cohen at the University of Rochester coined the term “psychoneuro-immunology” to describe the study of how nervous, hormone and immune systems interact. Their experiments showed that animals (human and nonhuman) could be conditioned to develop immune responses to innocuous agents, such as salt water.

We now know that depression and anxiety can aggravate allergies and asthma and dampen immune function. Infection and inflammation can also sour one's mood. In contrast, positive emotions and laughter buoy immunity. A 2013 Japanese study examined the effect of a type of laughter therapy on people with advanced gastrointestinal cancer, who were scheduled for surgery and chemotherapy—treatments known to undermine already fragile immune status. Compared with no additional therapy, laughter therapy improved immune levels.

Chronic physical or psychological stress impairs immune function, but meditation offers a means to manage stress. A 2012 study from the University of Brasilia Laboratory of Cellular Immunology

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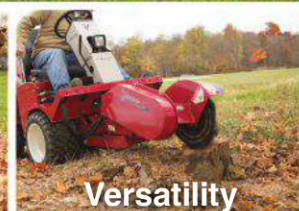
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found that pranic meditation, which employs breathing and visualization techniques, enhanced the function of phagocytic cells. In a 2008 Loyola University of Chicago study, women with early-stage breast cancer who received mindfulness-based stress-reduction training had reduced levels of the stress hormone cortisol, and improved natural killer cell activity and cytokine levels, compared with women who didn't receive the training.

## Plant Power

The plant kingdom offers many allies for our embattled systems. Traditional healers have long treasured Asian and American ginseng. Studies indicate that both species positively modify immune function and help prevent some respiratory infections. Ginseng is threatened by over-harvesting, however, and many ginseng products on the market are from cultivated plants. To join the United Plant Savers in protecting wild American ginseng, go to <http://goo.gl/AdECra>. You can also grow your own.

Other immune-tonic plants include Siberian ginseng, ginger, andrographis and medicinal mushrooms, such as shiitake, maitake and reishi. You can take your healing into your own hands by concocting your own teas and tinctures with these ingredients. (Read “19 Ways to Prevent and Treat Colds and Flu” at <http://goo.gl/JM888s> for more on immune-boosting herbal medicines.)

The days approaching fall and winter—cold and flu season—are a good time to think about nourishing your immune system. Eat whole foods, sleep amply, be social, stress less, exercise daily, and consider crafting some herbal immune boosters. Rest assured that your remarkable immune system is working day and night to protect you from infection. Now go out and enjoy this germy world. 🌿

Linda B. White, M.D., is the author of *Health Now: An Integrative Approach to Personal Health* and the co-author of *500 Time-Tested Home Remedies and the Science Behind Them* and *The Herbal Drugstore* (see Page 64 to order).

Circle #45; see card pg 81



# Don't Buy Survival Food... Until You Read This!

## Bad news...

There are some people out there who think folks like you and me are a bit "odd".

They think having a stockpile ready for a disaster is something they can put off for "someday" or "never".

But those people are just hiding their heads in the sand. They are dead wrong -- and **you are dead right.**

You've seen the evidence and you know the situation is way too serious not to do something about it. When a crisis hits, you'll be ready. You'll make darn sure your family won't go hungry.

The fact is, if you don't take action or if you stockpile the wrong foods, you could be setting your family up to starve. It sounds harsh, but the truth is too many people with good intentions are making critical mistakes with their food stockpiles.

## MISTAKES LIKE...

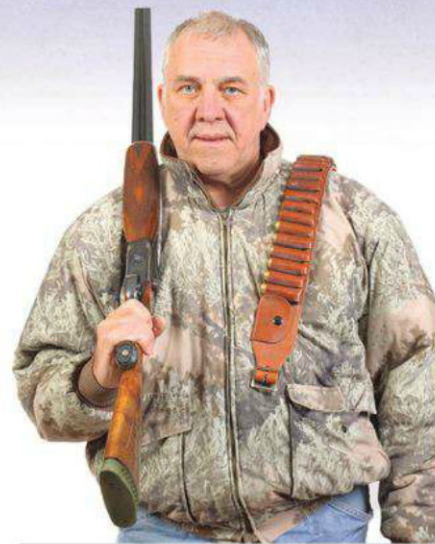
- Buying MREs (meals ready to eat) with a 5 year shelf life (depending on where you buy them, they could be nearly expired)...
- Getting gross survival foods that taste terrible and are so high in salt, MSG and preservatives you could clog your arteries and get yourself sick...
- Or simply buying the wrong foods and leaving a critical hole in your meal plan, which means your family can become malnourished...

Well, I decided to stop worrying. Obviously, waiting for the government to give me a handout in a disaster just wasn't an option for me. And I was completely turned off by the crazy prices of survival food sold by most stores.

So I got in touch with my buddy Frank Bates and put my order in for his Food4Patriots survival food kits.

This is Frank's new line of survival food and there are 4 reasons why it's literally flying off the shelves:

- **Food4Patriots is an incredible value.** This high quality survival food is without any fillers or poor-quality "franken-food" that the other guys use to pad their survival meals. They are made and packaged right here in the U.S.A. You won't believe the prices on these kits – a fraction of the price that other brands charge.
- There's no fancy packaging, it's military-grade sturdy stuff and can stand up to the crazy things that happen in a crisis. This food has a **shelf life of up to 25 years**, so you have complete peace of mind for the long term. And he's using the most compact kits so you can store them anywhere in your home without any extra hassle. They're sturdy, waterproof and stack easily. And extremely covert too.
- You can make these meals in less than 20 minutes; just add boiling water, simmer, and serve. I tried 'em and I think **they taste as good or better than any other survival food I've EVER had.** And you get a whole slew of choices for breakfast, lunch and dinner so you don't get stuck eating the same thing day-in and day-out.
- Frank has come up with some **impressive FREE bonuses** that are **ONLY** available to folks who purchase one of his kits on a first-come, first-served basis. For example, my 3-month kit came with 5,400+ heirloom survival seeds, 4 hard copy books, an 11-in-1 survival tool, and some other cool stuff.



*Protect your family in a crisis with 25-year shelf life survival food from [getfood48.com](http://getfood48.com)*

I want to make sure you don't miss out on this because **this is the #1 item to hoard today.**

Here's why... If you don't take action to get your food stockpile right now, you'll be in the same boat as the brainwashed masses who think "everything is fine." And if a crisis hits and your family asks, "What are we going to eat?" your mouth will go dry and you'll feel powerless.

But what if you decide right now to secure your food stockpile instead? Just **imagine how much better you'll feel right away.** And if a crisis hits and your family asks, "What are we going to eat?" you'll calmly reassure them that they're safe and they will have plenty to eat.

Listen, I can't predict the future. I don't know exactly when or how a crisis will hit. But from everything I see, it could be soon and it could be a big one. That's why I really want you to get the same peace of mind that I do.

*P.S. Got a call from Frank and you'll never believe who just tried to buy up his entire supply of food! You'll be shocked!*

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# Creative Golf Club Balusters

I went shopping for some deck balusters at a big-box store and came away with sticker shock. I knew there had to be a cheaper way to redo my deck! Later, I noticed some used golf clubs lying around and I thought, "Why not remove the heads and use the shafts with grips for deck balusters?"

I screwed 3-inch deck screws spaced 4 inches apart on a 2-by-4-inch top rail. I cut the heads off the clubs with a curved-nose wire cutter, then slipped the grip end of each club over the screws. Next, I slid the driver end of each club into holes I had drilled 4 inches apart on the bottom rail. I attached the top rail to the vertical deck posts, sealed the bottom rail to the clubs with silicone, and *presto!* I had beautiful deck balusters.

After my success with the first section, I bought a ton of inexpensive, used golf clubs to finish the job. Now I just have to find a use for all those cutoff golf club heads!

*Jeff Setaro*

*Horse Shoe, North Carolina*



**This creative deck design is on par with more expensive options.**

## Save Plumbing, Feed Birds

I love bacon, but I have old plumbing that can't handle grease. So, after I cook bacon, I deglaze the pan with a few drops of water and let it cool. Then I put about a quarter-cup of cornmeal in the pan and smash it until the cornmeal has soaked up all the grease. I take the greasy cornmeal mixture out to a dish on my fence where the wild birds are waiting. My pan is now nearly greaseless for washing. I was able to feed the birds, I

haven't used any paper towels to degrease the pan, and my plumbing is protected.

*Jean Cottel*  
*Eugene, Oregon*

## Mulching With Newspapers

We apply permaculture gardening techniques to our lawn, which means we need a lot of sheet mulch. Finding enough newsprint (especially in this era of electronic media) isn't easy, however.

Fortunately, we found a solution at our local public library. We've started carting away the library's old newspapers each week so the staff doesn't have to. This not only saves our librarians some work, but it also provides us with a steady, year-round supply of free sheet mulch. Our only "costs" are weekly library stops—which we would've made anyway—and homemade cheese ball trays that we give the library staff each Christmas. (It's not really a bribe; it's an investment.)

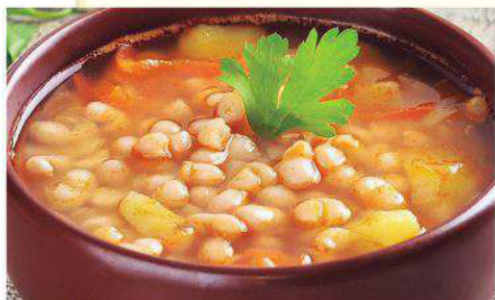
*John Ludy*  
*Fremont, Indiana*

## Beans, Beans, the Magical (Frozen) Fruit

Homemade burritos are a favorite in our home. But by the time I think about dinner, it's often too late for even the quick-soak method for cooking beans. Canned beans are a last-minute option, but the higher price compared with bulk dry beans deters me.

I learned how to freeze beans and it's been a great alternative. I make a big batch of beans once a month. After they're cooked and have cooled, I freeze the beans in storage bags. If I have extra time, I will pre-freeze the cooked beans on a cookie sheet for 20 minutes before bagging. This optional step prevents them from sticking together. When it's time for dinner, I break off a frozen chunk and heat it up. With a little planning, homemade beans are ready in minutes instead of hours!

*Gretchen Garcia*  
*Albuquerque, New Mexico*



**Precooked beans are easy to heat up for a quick, homemade side dish.**

## Free Farm Buckets (Frosting Not Included)

My husband and I have found 5-gallon buckets to be indispensable on our 4-acre homestead. We use these buckets for hauling compost, water and freshly harvested produce. We are conscientious of our water usage, so we position buckets under the eaves of our home to catch rainwater.

To avoid purchasing all of our 5-gallon buckets, we head to the bakery department of our local supermarket. We have found that they're more than willing to give away their used frosting buckets.

*Sarah Langlois*  
*Schuylerville, New York*



## Pucker Up! Cleaning With Lemons and Limes

After I use lemons or limes in a recipe, I recycle them by running the leftover portion around my kitchen sink drain to sanitize that area. Often a quarter or half of a leftover lemon or lime will work nicely. These natural cleaning products help my kitchen sink smell fresh, and cleaning with lemons and limes in this manner gives the fruits another job to do before I add them to the compost.

*Emily Kelly  
Spokane Valley, Washington*

## Recycle Prescription Bottles

I have a lot of old prescription bottles lying around, and I've come up with various uses for them. They're good for storing things, such as hairpins and tacks. I use the bottles for smaller food items, such as dried herbs. I store travel-sized shampoo and conditioner bottles in them while traveling so my luggage isn't affected if there's a leak. I also like to put earrings and other small jewelry items in them so the jewelry won't get lost. I'm sure old prescription bottles have many other uses that I just haven't thought of yet!

*Diana Laurenitis  
Peterborough, New Hampshire*

## The Sweetest Ant Poison

Pouring scalding hot water on an anthill usually gets rid of ants. The problem with this method, however, is that the hot water kills any plants that it touches, including grass. So you might get rid of the ants, but you will also have a bare spot in your yard for a long time.

I've learned how to kill fire ants successfully by using dry molasses, which is available online and in many garden centers. Heavily sprinkle dry molasses on the anthill, and the ants will be gone in a day or two. I haven't been able to get rid of other types of ants with dry molasses—only fire ants.

*Kirk Miller  
Richardson, Texas*

## Don't Pull the Plug on a Greywater System

If a complete greywater recycling system is not an option for your home or budget, you can still recycle some of your greywater. After bathing my children, I like to use buckets to transfer the soapy, used bath water to the washing machine. This way I use less water for our chores and everything (and everyone) still gets nice and clean!

*Caroline Beckett  
Oxford, Maine*

## Gardening on the Wild Side

Try unsplit log rounds as an inexpensive and eco-minded material for your next landscaping or gardening project. You can create borders and soil-retaining walls with log rounds. They last about as long as milled lumber, and they provide more flexibility in garden design. As an added bonus, the landscaping is easy to fix if a log rots out, plus the wood will match the natural earth tones of your outdoor space.

To begin landscaping with logs, select the best pieces you can find. If you don't have direct access to log rounds, check with a local firewood provider. Pace your garden off and set the logs on end in your desired shape. Setting the logs into a shallow trench will add stability on flat ground, and staking each one in place will help, too.

Create spectacular color displays by using the flat tops of the rounds as pedestals for potted plants. I like to allow my tomatoes to grow over the wall to create a feeling of an old wood structure being swallowed by new growth, and to help keep the leaves and fruit dry when watering the plants.

*Craig Braunschweig  
Redway, California*



Cherry tomatoes tumble over this log wall.

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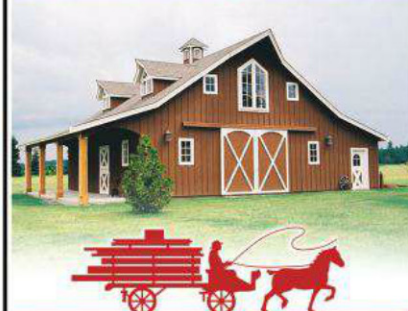


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Circle #38; see card pg 81

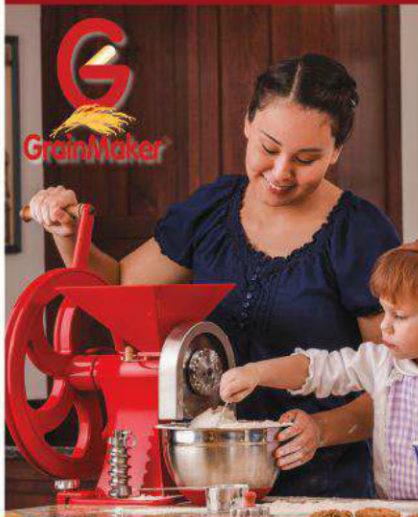
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## Stop to Smell the Wood Shavings

For my woodworking projects, I like to whittle butter knives and spoons from juniper wood. The wood shavings smell so wonderful that it would be a shame to just use them for kindling. I save the fragrant shavings and put them in little homemade bags of thin fabric to use as drawer fresheners. Juniper wood is supposedly good at keeping bugs away, too!

*Jenny Mörtzell  
Brooklyn, New York*



## Homemade Onion Powder

When canning season is over and I have stored enough onions to last through winter, I have just enough onions remaining to follow my favorite homemade onion powder recipe.

To make homemade onion powder, start with 2 pounds of organic onions from your garden or local farmers market. Peel the dried skins off the onions, and then cut each onion into approximately one-eighth-inch-thick, round slices. Separate the slices into

individual rings and put them in your solar or electric dehydrator (an oven set to a low temperature will also work). You will know the onions are sufficiently dried when you can pick up a ring and break it like a potato chip.

After the onion rings are totally dry, place them in an airtight bag or container until you're ready to use them. When you need some fresh onion powder, remove a few of the rings from the airtight container and grind them in your blender, food processor or

## Peddle Your Way to Fresh-Baked Bounty

Our love of good, whole-grain breads inspired my wife and me to buy a hand-powered, stone grain mill to grind fresh, nutritious flour. Reality set in shortly after we received the mill in the mail and proceeded to grind 6 cups of wheat berries for our maiden bread loaves. We pretty much wore out the four arms we have between us by taking turns at the crank for nearly an hour. We had to grind and regrind the grain four times to get it fine enough to bake with.

Fortunately, we had ordered the optional pulley to modify the manual grain mill and attach it to an electric motor, which I did in short order. That method proved to be a lot quicker and less physical, but in the conversion we lost the aesthetics and satisfaction of using a manually powered tool.

One day, while shopping in a thrift store, I found an elliptical trainer that works arms and legs at the same time, and I was able to buy it for a pittance. After I disassembled the machine, I realized that all I needed to adapt it to power our grain mill was a pulley and a V-belt from the local hardware store, and a small piece of scrap plywood from my woodpile. We now grind our grain manually in much less time than before, and we get in a reasonable workout. The best part is that we can comfortably grind our own flour without using an external power source.

*Monty Kaasch  
Truth or Consequences, New Mexico*





coffee grinder until they're powdery. A mortar and pestle will also work. If you wait to grind the powder until right before you use it, then it will be freshest.

You can use homemade onion powder in cooking the same way you use store-bought onion powder, only the taste is fresher and more pungent. Use onion powder in soups or stews, on popcorn in place of salt, or mixed into dips and salad dressings.

*Linda Deming  
Attica, Michigan*

## Hang in There!

If you've ever wondered how to store linens, here's a tip: Fold your linens over a strong clothes hanger and hang them in a spare closet. This keeps them from getting wrinkled, and you can find them easier than if you were digging through a trunk or drawer. This also works well for blankets, sheets, extra pieces of material, and generally any large piece of fabric that you would usually fold.

I also hang my gift bags on hangers arranged by holiday or season. I keep any leftover decorations or wrapping paper that I may use again in a bag that represents that item's holiday or theme. When I'm ready to hang up Halloween decorations, for example, I simply pull out the bag with a giant pumpkin on it.

*Dawn Hodges  
Bellville, Texas*

## Homemade Barbecue Chips

Over the past several years, we've planted six dwarf fruit trees of various species on our small, half-acre plot. In addition to the annual fruit they produce, we've found that the tree prunings are also useful.

First, after an overnight soak in water, they're great for adding a fruity, wood-smoke flavor to food on the grill (rather than using more costly, store-bought barbecue wood chips). Trimmed to about 6 inches and bundled together with natural fiber twine (or season-appropriate decorative ribbon), they make excellent gifts for other barbecue aficionados you may know.

Second, if you keep small animals that require chewing fodder—such as meat rabbits or pet gerbils—the pruning leftovers are a great substitute for, once again, the high-cost, store-bought version of a similar product.

*John Atwell  
Oakton, Virginia*

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Do you have handy home, farm or garden advice? We pay \$25 to \$100 for each tip we publish, plus \$25 for each photo or video we use. Send your tips to Letters@MotherEarthNews.com.

## Chicken Little Goes 'Glamping'



I built a henhouse 20 years ago, and eventually the only thing holding it together was the chicken poop on the floor. I went on a mission to find the perfect upgrade.

I found an old camper on Craigslist ([www.Craigslist.org](http://www.Craigslist.org)) that wasn't in good enough shape for a person to live in, but it turned out to be perfect for my hens. I purchased it for \$200, which is less than half the price I had paid for materials to build a coop from scratch 20 years earlier.

I used peeled poles to roll the camper-turned-henhouse into place. I used a Sawzall saw to take out the stove, water tank and heater, remove the cabinet doors, and cut holes in the closets to create perfect nesting boxes. Finally, I cut the back out of the battery box and added a ramp for the girls to come and go as they please. My hens love their custom "glamping" (glamorous camping) setup in this funky recycled henhouse.

*Karen Denman  
Rogue River, Oregon*

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Circle #54; see card pg 81

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Circle #44; see card pg 81





# How to Store Your Seeds

*What's the best way to store my garden seeds?*

Seeds are living organisms, so don't simply toss them into a shed or shoe box. To keep seeds you buy viable as long as possible, you should always keep them as cool and dry as you can. Usually, your best option is to keep them in the refrigerator, sealed in a glass jar.

If you live in a humid region, you can add silica gel to absorb additional moisture. Southern Exposure Seed Exchange ([www.SouthernExposure.com](http://www.SouthernExposure.com)) sells silica gel beads for drying seeds, or you can find them at craft supply stores, where they're sold for drying flowers. You can also use powdered milk as a desiccant: Measure 1 to 2 tablespoons from a freshly opened package onto a piece of fabric or a paper towel, fold it up, and then place it in the container with the seed packets. Powdered milk will



**Airtight jars placed in the refrigerator will safeguard the viability of the garden seeds stored within.**

absorb excess moisture for about six months.

If you're saving seeds from your garden, dry them well before you store them in the refrigerator. Spread the mature seeds in a shallow layer over a fine mesh screen or ceramic plate, and dry the seeds in a warm, dark and airy location for several weeks, until the seeds are hard and no longer pliable. A fan may help speed up the process. If possible, gently stir the seeds every now and then to expose them evenly to the air. Package the dry seeds in envelopes labeled with the variety and date, and then store them in glass jars in the refrigerator.

If treated well, most garden seeds will stay viable for one to five years, depending on the plant type. To learn how to test your seeds' viability, go to <http://goo.gl/chaexA>.

—Vicki Mattern

## Best Mosquito Traps for Your Yard

*Every summer, I find being outdoors after dusk impossible because of mosquitoes. Which trap should I use to control them?*

Several synthetic and organic pesticides will poison mosquitoes on contact, but they'll provide only minimal relief. The best way to reduce mosquito populations in your yard is to eradicate breeding sites and also install both passive and active mosquito traps.

Mosquitoes need water to breed—their larvae are the “wigglers” you can see in neglected buckets of water if you look closely—so you can naturally limit mosquito swarms by eliminat-

ing breeding sites in your neighborhood. To do this, always empty water from open containers, old tires and other potential breeding grounds within five days after a heavy rain. Add a product called Mosquito Dunks (made with *Bacillus thuringiensis*) to rain barrels and other standing-water supplies for a safe and easy way to prevent mosquito larvae from hatching. Or, let fish do the trick—prefer-

ably native minnows. You can purchase traps at a sporting goods store that have been designed to collect the minnows from a pond, and then release them to feed on larvae in your rain barrel or water garden.

You won't need many minnows—one fathead minnow can eat 74 mos-

quito larvae per day. A study from Rutgers University recommends 10 gambusia minnows for one standard rain barrel, and 35 to 100 for a water garden, depending on its size. Similar stocking rates would apply to arroyo chub minnows or fathead minnows.

Some effective active mosquito traps use multiple attractants—light, carbon dioxide and an attractant called “octenol”—to lure mosquitoes and then suck them in with a fan. A University of North Dakota professor of biology collected data in 2002 showing that the Mosquito Magnet ([www.MosquitoMagnet.com](http://www.MosquitoMagnet.com)) caught 8,000 female mosquitoes per night during peak-summer season. The Mosquito Magnet is pricey, starting at \$400. The cheapest Mega-Catch model ([www.MegaCatch.com](http://www.MegaCatch.com)) costs much less—\$150 with lures—and is a good fit for smaller yards. Shop carefully: Some anti-mosquito products actually spray chemical pesticides into the air—and those pesticides could be toxic to you, too.

—Barbara Pleasant



**Mega-Catch Pro 900 ALPHA mosquito trap**







Flail mowers, such as this Land Pride FM4188, can help keep your meadow free of invading foliage.

## Ideal Heavy-Duty Mowers for Your Meadow

*I don't want to mow my meadow every week with a riding mower, but I do need to mow it once or twice per year to keep weedy trees from moving in. What kind of heavy-duty mower do you recommend?*

Many people mow large areas too often. If you spend less time mowing, you'll not only save time and gas money, but you'll also preserve a vastly better habitat for birds, bees and other wildlife. To mow tall grass a couple of times per year, a brush mower or a flail mower is the most effective tool.

**Brush mowers** rotate on a vertical axis—either a heavy-duty, two-ended blade or, in the case of higher-quality mowers, a disk rotating on a vertical axis, usually with two hinged blades. The hinged blades better protect the drivetrain if you hit rocks or stumps. This style of mower is effective for cutting down material, but the way it chews up the matter isn't consistent. The mower will chop some of the material into small pieces while lopping some off at the base. The lopped-off grass will fall to the ground and the mower will pass over it, so you could have some pieces of mowed material that are 3 or 4 feet long, depending on the height of what you're cutting.

If you want a mower that will convert your meadow grass, weeds, brush or cover crops into smaller pieces that will break down more quickly into the soil or make good mulch, opt for a **flail mower**. These mowers have many blades hinged to a horizontal drum that rotates about 3,000 times per minute on a horizontal axis. The mower's multiple cutting surfaces at vari-

ous heights allow it to hack any substance into a small, uniform size. (It's essentially a chipper-shredder on wheels.) The horizontal drum axis will also evenly distribute the chewed-up matter across the width of the mower—unlike a brush mower, whose vertical-axis blade rotation tends to windrow the material to one side.

Both of these mower types are available as walk-behind units, or as power take-off (PTO) attachments for riding or walk-behind tractors. You can also buy towable, self-powered models (for riding tractors that do not have a PTO for driving implements). Even some riding brush mowers are starting to appear on the market.

—Joel Dufour

## Why Gas Guzzlers Are Still Going Strong

*U.S. fuel-efficiency standards were passed in the 1970s, so why am I still seeing so many inefficient vehicles on the road?*

Gas-guzzling vehicles do still dominate the road: In 2013, three out of five top-selling vehicles in the United States were pickup trucks with fuel efficiencies of less than 18 miles per gallon of gas. When Congress enacted the federal Gas Guzzler Tax in 1978, it exempted light trucks from that category. The "light truck" classification had been created earlier in the decade to acknowledge the difficulty that work vehicles would have in meeting the same standards as cars.

The auto industry has exploited the lower safety, fuel economy and emission standards required of light trucks by introducing light-duty luxury trucks, vans and four-wheel drive SUVs primarily used for the transport



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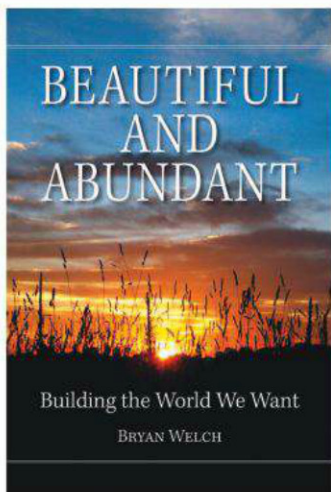
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of people (these luxury vehicles are rarely used for the off-road or utility purposes that allowed them to receive the exemptions).

A study by the nonprofit Friends of the Earth found that, since 1999, major automakers have avoided paying billions of dollars in Gas Guzzler Taxes by calling passenger vehicles "light trucks." Because they're cheaper to manufacture, the profit margin on these vehicles can be up to 10 times greater than that of more fuel-efficient cars.

Light truck sales grew from 30 percent of vehicle sales in 1990 to more than 50 percent of the nearly 20 million vehicles sold in the United States in 2013. As a result, the collective fuel economy of the U.S. vehicle fleet has been declining even though the law has forced increased fuel efficiency for "cars."

Along with pushing to close this sustainable-transportation loophole, you can walk, bike and rideshare more often. And if you're shopping for a new vehicle, consider one of the 25 plug-in hybrids now available. Find out how in my article "Let Sustainable Transportation Drive Your Buying Habits" at <http://goo.gl/YzHndA>.

—Steve Heckeroth

Do you want to know how to paint a picket fence or shoe a horse? Email your questions to AskOurExperts@MotherEarthNews.com, or write to Ask Our Experts; MOTHER EARTH NEWS; 1503 SW 42nd St.; Topeka, KS 66609. We'll answer as many as we can here.

## Clean Castoff Cast-Iron Cookware

*I found some old cast-iron cookware that's rusty and covered in black crud. Can I resurrect it?*

Old cast iron can be a bargain, says Mark Kelly, public relations manager for Lodge Manufacturing in South Pittsburg, Tenn., the last U.S. manufacturer to cast its own iron. Kelly says cast-iron cookware from China is usually lower-quality, with several telltale signatures: It will have odd marks at the "throat" of the handle and perhaps on the bottom, it may not look as finished, it will be thicker and clunkier, and the edges won't be as smooth. A better bet would be a piece of U.S.-made cookware, no matter how gunky it may appear.

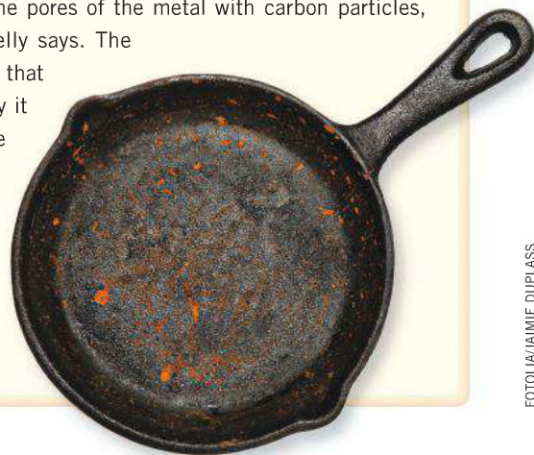
If you've found a well-made cast-iron piece, restoring it will be fairly easy. Kelly instructs: First remove rust using a soap-free steel wool pad (or have the rust sandblasted off at a metal shop), and then bake away any crust by heating the piece on a grill, over a wood fire, or in your self-cleaning oven. Cleaning it outside may be best, because the process could otherwise fill your house with smoke. You may need to repeat this process several times before the crust is gone.

When the cast iron is clean, re-season it by applying the cooking oil of your choice all over it. Preheat your oven to 350 degrees Fahrenheit, line the oven floor with aluminum foil, and bake the piece upside down for an hour. Turn off the oven and let the piece cool.

Seasoning cast-iron cookware fills the pores of the metal with carbon particles, which creates the nonstick effect, Kelly says. The more you cook with the piece, the more that effect will be enhanced, and that's why it gets better with time. Re-oil the piece after each use.

"There's no way to ruin cast iron," Kelly says. "Well, in Leviticus, it *does* say that it's a straight path to hell if you put cast iron in your dishwasher. But that's the only way."

—Robin Mather







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(CONTINUED FROM PAGE 10)

adventures RVing in the United States and New Zealand on the website [www.RetirementAndGoodLiving.com](http://www.RetirementAndGoodLiving.com).

*George Brock  
New York, New York*

## Polyculture Possibilities

The article "Hidden Downsides of the Green Revolution" (June/July 2014) made one of the best cases for biodiverse perennial polyculture farming that I've ever read.

Many people who are interested in permaculture and agroecology are looking to replace monocultures of corn, soy and wheat with diverse, woody polycultures. These mixes would include herbaceous understories, vining plants, fungi, and animals in rapid rotational schemes to produce more nutritious food per acre—with a fraction of the fossil fuel-based inputs—than any field of genetically modified corn or soy ever could.

*Scott Vlaun  
Norway, Maine*

## Challenge Accepted

You've received a lot of feedback on your article concerning childfree living as a consideration for green living ("Making a Green Choice: Childfree Living," February/March 2014). I have children myself, and I highly disagree with the article, but I would like to thank you for printing it.

Even though I hold a different opinion, I would rather subscribe to a magazine that has the fortitude to print something that challenges me than a magazine that simply panders to the greatest number of people.

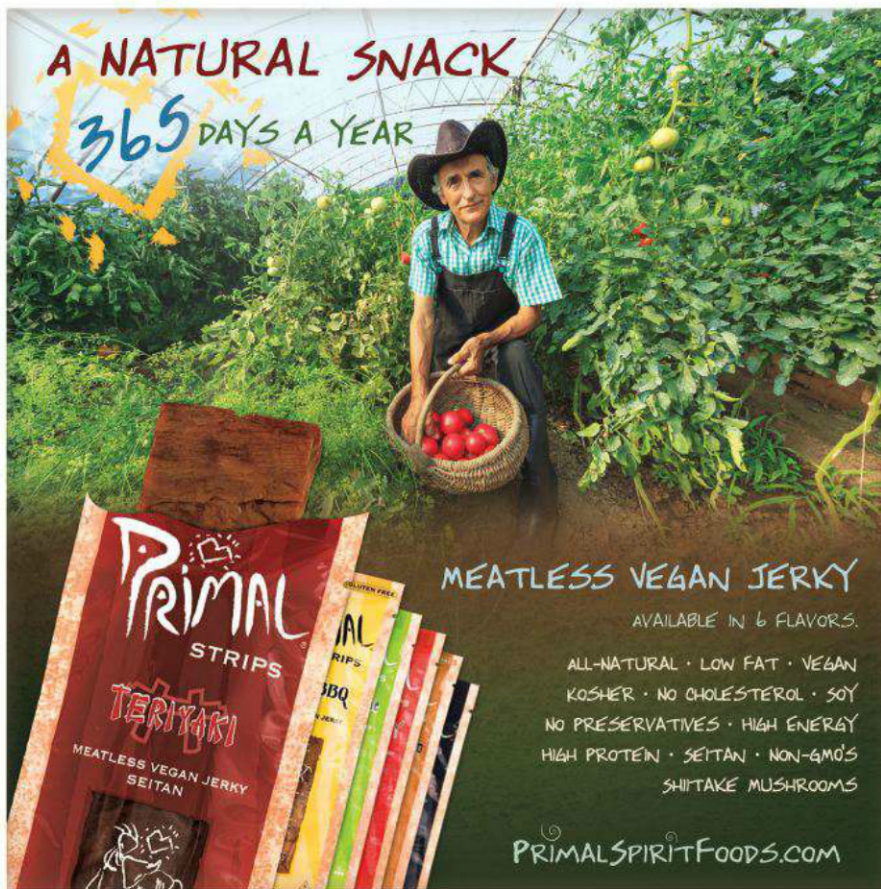
*Jacob Miller  
Champlin, Minnesota*

## Firsthand Effects of Fracking

I'm curious whether MOTHER EARTH NEWS has heard from readers who have had to leave their homes because of hydraulic fracturing.

My family saved all of our money for a long time and finally got our dream farm in 2012. Finding a home on land that hadn't been sprayed with toxic chemicals and didn't sit too close to other sprayed land wasn't easy.

I moved my children here to expand our holistic and organic lifestyle, to grow all of our own food, and to live in peace and quiet. Then, all of a sudden, there were cautionary



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flags everywhere and trucks doing testing that vibrated our home. That's when I first found out about the fracking.

A four-well pad is going in very close to my house. I can see it clearly, and I'm beyond upset. We quickly put the house on the market. We're selling our entire farm, including my beloved goats that I can't imagine living without. My heart is broken—for my family, for the Earth, and for all of the Earth's inhabitants. We aren't going to stick around to see the damage done here; our farm will become worthless and we would be poisoned by methane and chemicals.

Have other readers reached out to you about this? We don't know where to go or how people handle this kind of heartbreak and loss.

*Katie Skardoutos Tierney  
Brown City, Michigan*

## Nix the Neonics

After reading your article "Nursery Plants Contain Bee-Killing Chemicals" (Green Gazette, February/March 2014), I'm wondering where I can buy plants, trees and shrubs that haven't been contaminated with neonicotinoid pesticides. I live in central Pennsylvania, and while we have some good organic farms around, I have no idea whether local greenhouses stock organic offerings.

Do any reliable online resources provide this sort of information to help consumers steer clear of these dangerous pesticides?

*Mindy Harp  
Newport, Pennsylvania*

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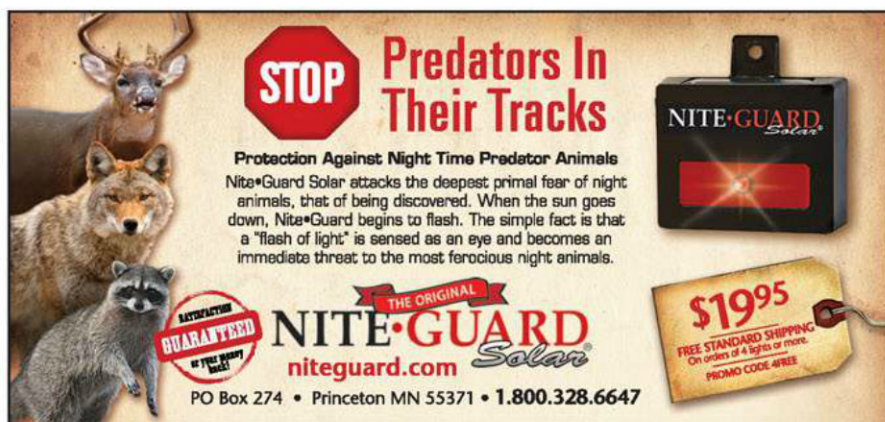
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The pollen and nectar of neonicotinoid-treated plants are poisonous to bees.

Mindy, we don't know of an online directory listing greenhouses that avoid neonicotinoids. Organic greenhouses do not use neonicotinoids. Unfortunately, unless a garden center or store grows its own plants, employees probably won't know what chemicals may have been applied to the plants. For information specific to your area, we recommend searching on [www.LocalHarvest.org](http://www.LocalHarvest.org), as well as connecting with others in your community via your state's MOTHER EARTH NEWS Facebook page, where you can share and discuss local resources. Learn more at [www.MotherEarthNews.com/Facebook](http://www.MotherEarthNews.com/Facebook). Friends of the Earth, a global network of environmental organizations, is working to get neonicotinoid-treated plants off store shelves via its BeeAction campaign. If you'd like to get involved, go to [www.FOE.org/BeeAction](http://www.FOE.org/BeeAction). —MOTHER

## Blue-Ribbon Request

Thank you for a lovely FAIR in Asheville, N.C.! The lectures and workshops were not only numerous and fascinating, but they also offered the unique opportunity to have questions answered by authors and experts I admire. I also valued being able to visit vendor booths for products I purchase regularly. Speaking directly with the business owners in such a cheerful setting was wonderful.

My friends and I left smiling, our arms laden with seed packets, seedlings, jams, juices and more. Best of all, as we slowly meandered home, our minds were abuzz with all the new knowledge and ideas presented at the FAIR. You must put on another FAIR next year; I (and all of my friends) implore you.

I do, however, have one request: At next year's FAIR, could we have some good-natured competitions and contests? I'm talking jams,



jellies, pickles, pies, sauces—delectables and crafts of every kind! I just happen to make some of the best homemade kombucha in the Southeast, and I would relish some healthy competition.

Marilyn Zumwalt  
Athens, Georgia

## The Power of Positivity

Oh, wow! Thank you so much for turning me on to the experience that is the MOTHER EARTH NEWS FAIR. It was a fantastic weekend! The live poultry-processing demonstration from Joel Salatin and David Schafer of Featherman Equipment was in itself worth the trip. I watched the demo, and although I've been processing my own chickens for a few years, I *know* I can do it better now.

I also enjoyed hearing MOTHER EARTH NEWS Publisher Bryan Welch's positive philosophy regarding a sustainable future. (Funny to call it "positive" when he talked about "voluntary death," but it was.) Even though I've been reading MOTHER forever, I didn't know who Mr. Welch was before attending the FAIR.

Next year, a caravan of us is planning to travel from Middle Tennessee to Asheville to attend! I've been telling everyone I know about the FAIR, and many are eager to have the experience, too.

Betty Taylor  
Williamsport, Tennessee

*Thank you all for the kind words about our FAIRS! We, too, love the invaluable face-to-face connections that the FAIRS make possible. We have FAIRS still to come this year in Pennsylvania and Kansas. You can find more information on these two events—including the speaker and workshop lineups—and stay up-to-date on announcements regarding the dates and locations of next years FAIRS at [www.MotherEarthNewsFair.com](http://www.MotherEarthNewsFair.com). —MOTHER*

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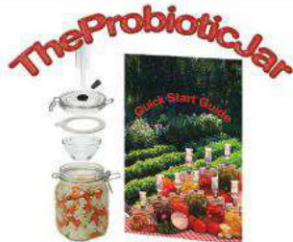
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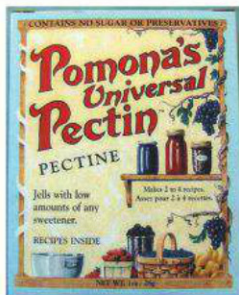


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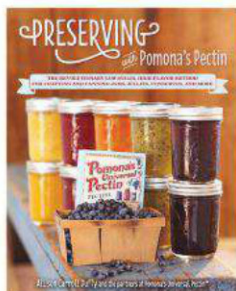


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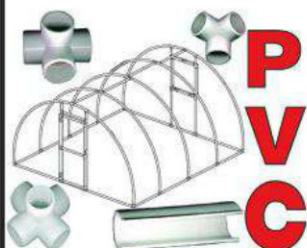
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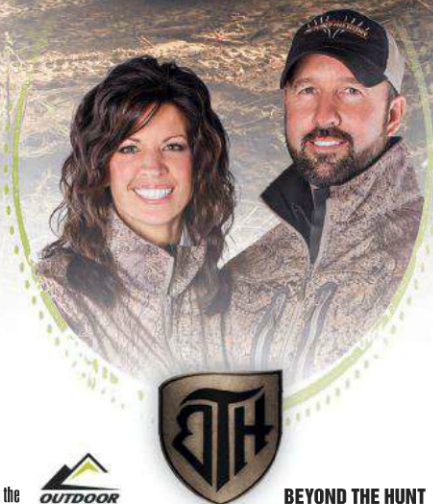
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