

Cain Kids Plants and Produce Magazine

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Using Google Sheets For Basic Accounting

I personally use Google Sheets for accounting, tracking seeding, budgeting, organizing seed orders, and more. In this article I am going to create a basic accounting spreadsheet, and with the skills used to make this spreadsheet you should be able to make a good variety of others as well.

What Is Google Sheets

Google Sheets is the baby of Google Docs and an advanced calculator, assuming that calculator can do financial equations. You can put quantitative and qualitative information into Sheets, and link equations together. This makes editing super easy as you can change the whole sheet by editing one cell (I will show this). You can also use it simply as a schedule(er) with super convenient

dividers. It is also completely free! Excel is very similar to Sheets, but I just prefer sheets for most things.

Basic Accounting Spreadsheet

This basic accounting spreadsheet works great for me, and is much more convenient than trying to keep track of financial records on paper. I made this on my phone, but the process is the same on a computer!

- 1. Create a blank worksheet.** On a computer this is the big, blank, box near the upper left. For a phone however this is the small plus sign near the bottom right of the page.
- 2. Make a table.** For this you are going to first highlight the area you want the table in. It doesn't matter as much how many rows (the numbers) this table has, as once you know the basics it is pretty easy to extend the table as necessary. I would suggest making the column(the letters) to F, but if items you are entering have super long names you can extend it further right. From there click the little table in the

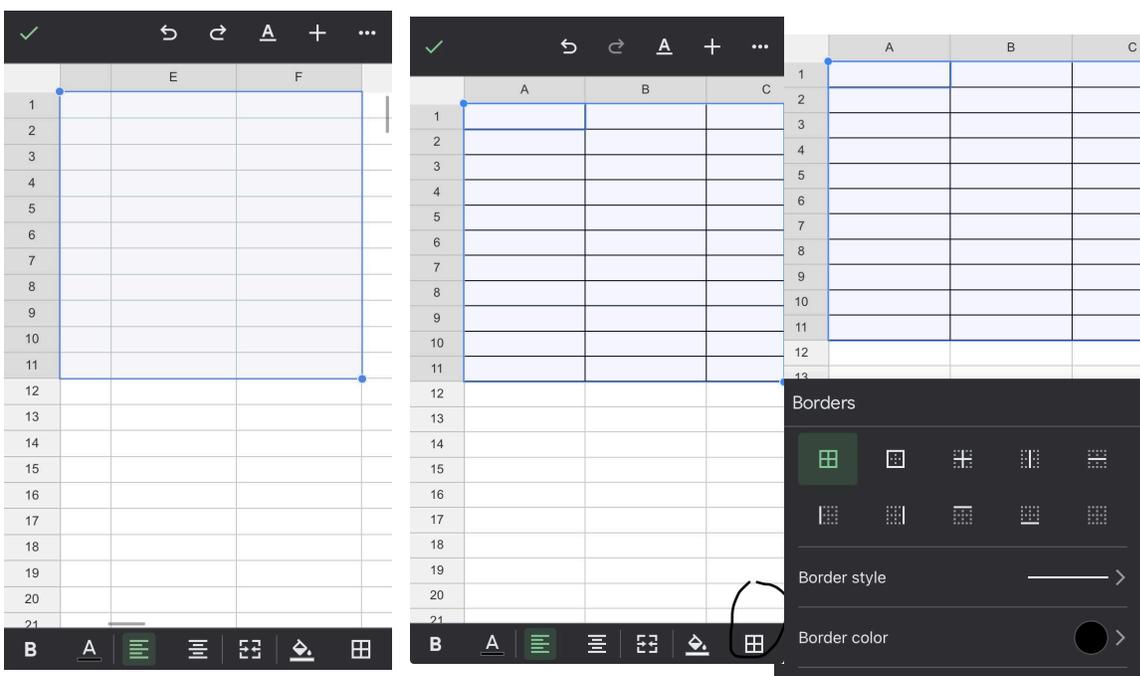
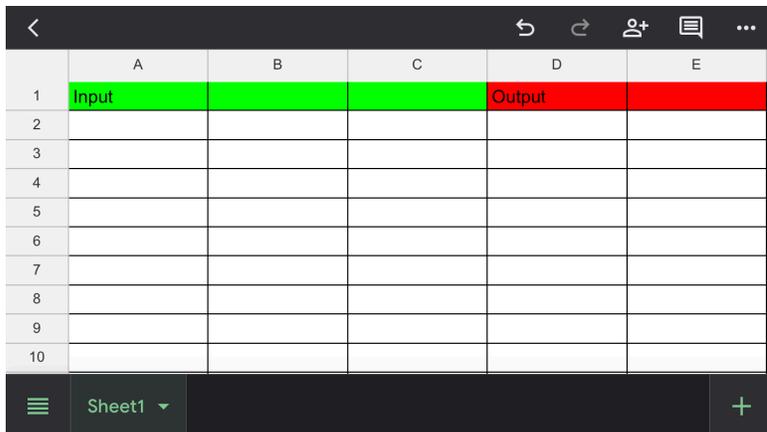
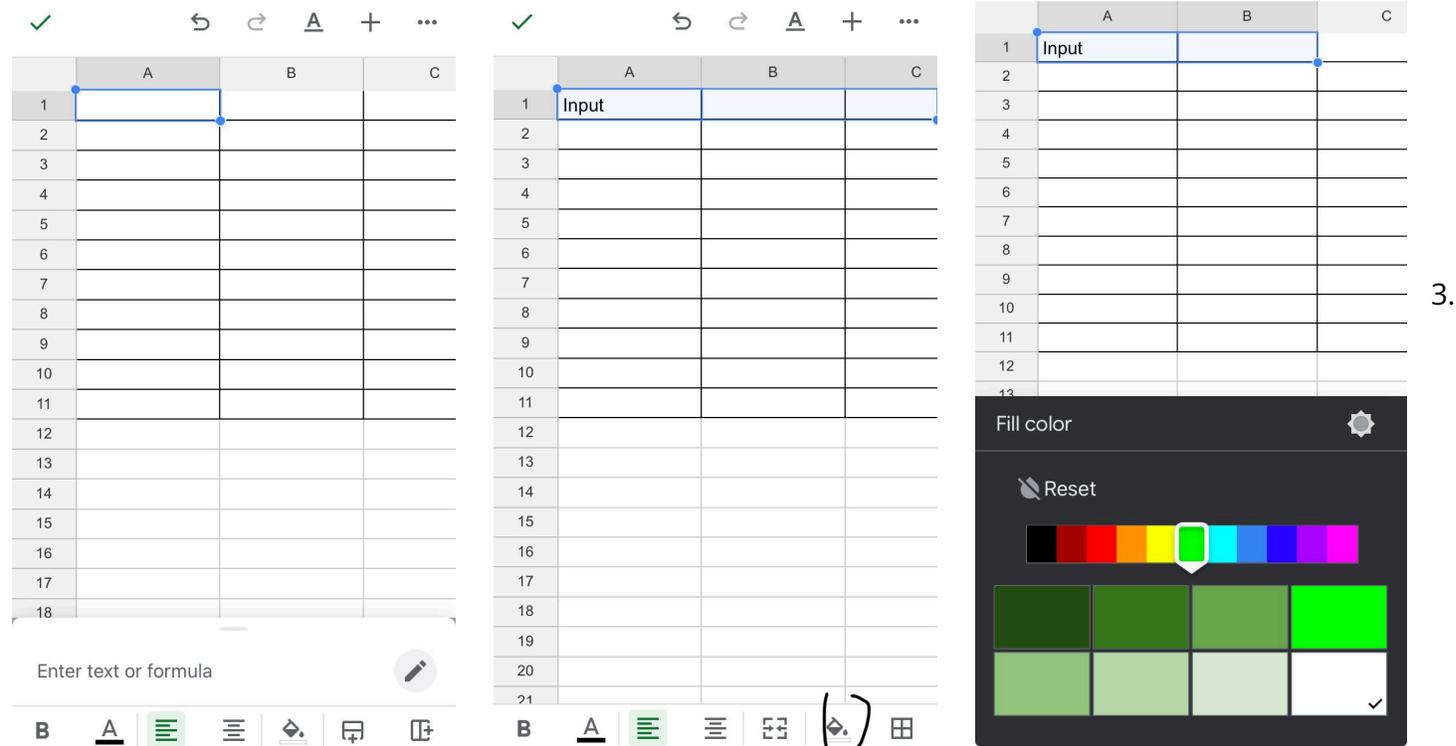


table in the bottom left corner, and choose your table/border type. This little table is in the top-right (but not all the way up or right) on the computer.

3. 3.Label and color your column(s). To type into any cell you just click on it, and type into the “enter text or formula” prompt that appears. After typing whatever you want, but in this case something to describe money coming in or out, you can click the little paint bucket to the left of the little table clicked in step 2 (this is the same on the phone and computer). You can choose whatever colors you like, but I normally use green to describe the sales and red to describe the cost.



4. Make a profit cell. This is super easy to make, as it is simply one cell. Just label and color one cell.

5. Make the input equation! First click on the first cell below the “Input” table (still in column A) After that type SUM, and click and highlight the whole

area of column A you put in the table. Your equation should read (assuming you made the table from step 2 10 deep) $SUM=(A2(\text{or } 1 \text{ it does not matter}):A10)$. **Repeat this step for the output column.**

The image shows a spreadsheet interface with three columns labeled A, B, and C. Rows are numbered 4 through 13. A blue selection box highlights the range A2:A11. A formula bar at the bottom shows the function `=SUM(A2:A11)`. A keyboard overlay is visible, showing the function key (fx) and the formula being typed.

6: Make the

profits equation! To make this equation you have to first put the equal sign directly below your profits cell, then click your inputs-value cell (where the sum of A2:A11 is displayed). After that click the little minus sign, and then the output-value box. It has to be done in this order or your equation will be backwards, meaning when you are making a profit it will show as a loss!

The image shows a spreadsheet interface with columns G, H, and I. Row 1 contains 'Profit/Loss' in column G. Row 2 contains '=A12-D12' in column D. A blue selection box highlights cell D12. A formula bar at the bottom shows the function `=A12-D12`. A keyboard overlay is visible, showing the function key (fx) and the formula being typed.

All Done! You can easily transfer the skills used to make this accounting sheet into schedules, garden plans, to-do list, and countless more. If you'd rather use the one I made, just contact me and I will send you a copy of it!

Remember to Contact me [here](#) if you have any questions!

Tyrannosaurus Rex facts you probably didn't know!

By: Aidan Cain

Aidan Cain is a fossil enthusiast who likes searching for coral in his backyard, and combing beaches and streams for fossils. He also likes to clean fossil's, and takes Paleontology classes in his free time. He will happily take any questions regarding fossils, and to see a portion of his collection click [here!](#) (The picture is not the authors).

You have most likely heard of the king of the dinosaurs, right? Whether you have or not, it is the world's largest, most feared, and most famous terrestrial carnivore to ever roam what we call home! So get ready for some mind blowing facts on this absolute unit!

Fact 1: How powerful was this beast?

Being known as one of the deadliest animals of all time, it would obviously need some gruesome body features to support this statement. One reason it's considered so deadly is because of the jaw. The jaw is arguably the scariest and

most powerful part of the body. It has a bite force of roughly 8,000 pounds! Not only that, but the teeth were adapted to crush bones without breaking. These teeth were serrated sharper than a knife and were very thick so the tooth wouldn't get chipped off. Adding on, some teeth could get up to 1 foot long.

Fact 2: How good were its senses?

In order for the T- Rex to catch its next unlucky victim, it would have to have some top notch senses. For example, the orbits (the eyes) on the skull were the size of an orange and were set higher on the head, which helped with seeing further. And it had overlapping vision which helped it see in 3-D(how humans see the world). Not only that but the rulers of the land had big nasal passages suggesting it had an amazing sense of smell. And the hearing from this behemoth was just as good too. But what about its taste? What did it like to eat? Those questions will help us dive into our next fact.

Fact 3: What did this beast eat?

This terrorizer of the dino world ate a lot of meat! And it makes sense why it needed all those calories to support and energize such a big body. We only know what it ate by its stomach contents, and we sometimes find bite marks on other dinosaurs from being ambushed by the T- Rex. Some of the dinosaurs that would be a delicious meal to a gigantic beast could include: *Hadrosaurus*, *Edmontosaurus*, *Triceratops*, and *Ankylosaurus*.

Fact 4: How big was the Tyrannosaurus Rex?

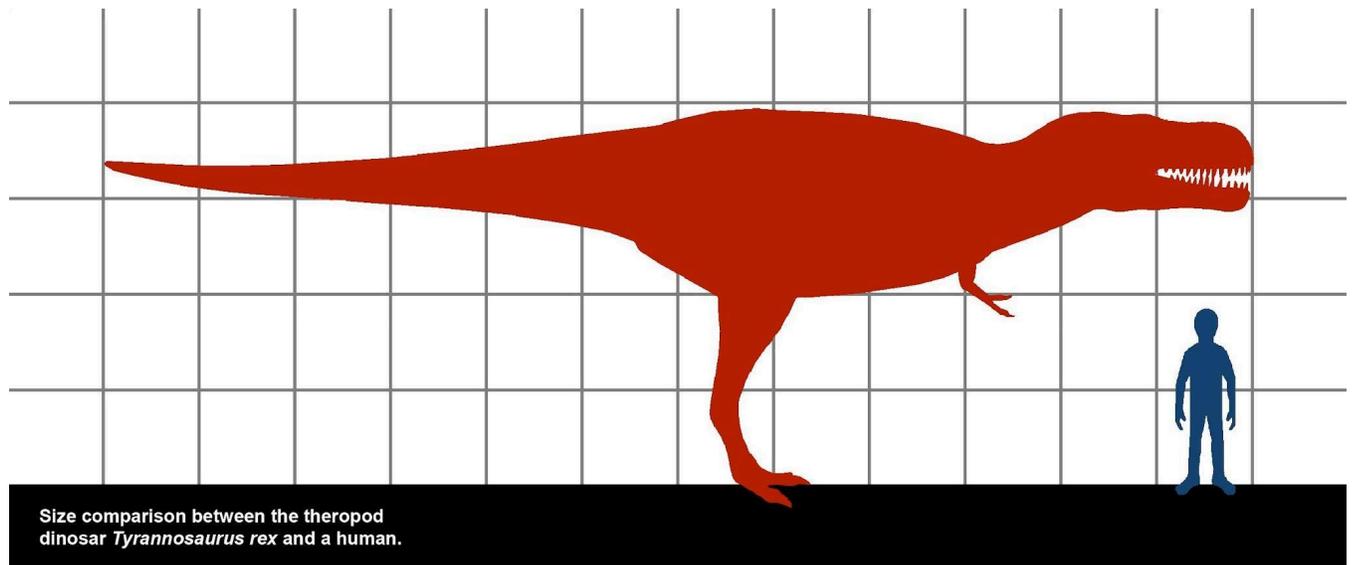
Any dinosaur that ate that much, must have been massive! But specifically, how massive could the T- Rex get? This titan could have weighed anywhere from 6-9 tons! And stood at a staggering 12-13 feet at the hips, and was 40 feet in length. And it's because of those stats, the Tyrannosaurus was the largest carnivore to live! But it wasn't always like that...

Fact 5: A T- Rex's evolution!

The famous king of dinos was never huge from the start. It was very small for a predator at first. It was about the size of a human. But over millions of years, the true Tyrannosaurus started to evolve. For example, the jaw was gaining a lot more muscle for a more powerful bite. To support all of that weight from those muscles, the skull would become even smaller, compact and dense. Now that it was finally growing, mother nature had to find a way to make sure this dinosaur was not too top heavy. So to prevent too much weight on one side of the body, the arms had to slowly shrink over generations and one of the fingers on each hand had to go. Which is why earlier forms of this unit had longer arms and 3 fingers. So now you don't wonder why the arms were so small compared to the body! But what did the last form of T-Rex evolve into? It most likely evolved into chickens and other birds. We can infer that birds came from dinosaurs like the one we're talking about right now. Some evidence to support that birds came from dinosaurs would be: similar body structure, same phalangeal formula, and some dinosaurs had what would be a modern day clavicle. Now it is important to remember that some dinosaurs didn't evolve into birds. And not all of that evidence was from only the T- Rex, but some evidence came from other closely related dinosaurs too.

Fact 5: Was it a pack hunter?

The answer is yes! These monsters hunted as a team, and we know that from the fact that there was a group of them found in Utah with 4-5 different Tyrannosaurs. It is believed that the younger ones of the pack chased the prey since they were fast and agile and the larger T- Rexs would finish them with brute force. These creatures were extremely smart, so don't get them mad!



Bonus: Tyrannosaurus Rex vs Spinosaurus!

If you have ever seen Jurassic World 3, you may recall the scene where a T-Rex got killed by a Spinosaurus in a fight. But what would realistically have happened? Well the answer is...nothing! The Spinosaurus lived 112-97 million years ago, whilst the T- Rex lived roughly 66 million years ago. Not only that, but the Spinosaurus lived in modern day Africa, and the king himself lived in modern day North America. But let's say they lived in the same place at the same time, who would win. The answer is pretty straightforward, the T- Rex would most likely win this duel. And that is because it was larger and had a more powerful body and bite. Not only that, but the Spinosaurus had teeth designed for catching small fish, turtles and other tiny aquatic creatures. The skull was also elongated which suggests that it wasn't for a brutal bite. To conclude this debate, the true winner is whatever you believe it to be. Due to the fact that this is VERY hypothetical and very fantasized.

Seasonal Recipe



February and March offer a shocking amount of opportunity for harvest from the unheated garden, including, but not limited to, carrots, kale, lettuce, spinach, and more. For this recipe I am going to focus on the carrots, as I pick a lot of my late-fall carrots in February before the days get too long (carrots are biennials and the longer days will cause them to go to seed). I also chose this recipe because it is absolutely possible to have parsley and green onions from the garden in February or March, but the green onions might have to be kept in an unheated greenhouse over the winter.

Marinated carrots

Makes 3 cups

You Need:

- 1 lb carrots
- 2 1/2 Tbsp lemon juice
- 1/2 tsp Dijon mustard or other grainy mustard
- 1/4 c olive oil
- 1 or 2 green onions, chopped
- 1 Tbsp chopped parsley
- 1 clove garlic, crushed
- Salt and black pepper

How To Make Marinated Carrots

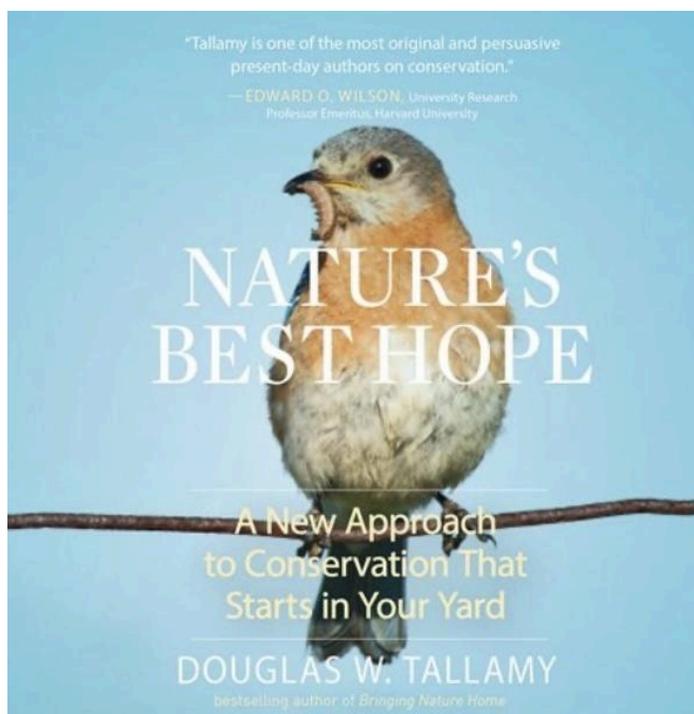
1. Scrub and peel carrots. Cut into uniform matchsticks or slices.

2. Blanch carrots in boiling water 3-4 minutes or until barely tender. Drain.
3. In a jar with a tight-fitting lid, combine lemon juice, mustard, olive oil, onions, parsley and garlic. Shake vigorously.
4. Pour over warm carrots. Season with salt and pepper to taste. Refrigerate 6-8 hours or overnight.

Dishes To Pair With:

- Mashed Potatoes
- Steak
- Mexican Street Tacos, make your coats spicy for this!
- Soups
- Great side or appetizer!

Book Review: *Nature's Best Hope* By: Doug Tallamy



Genre: Non-Fiction/Environmental Sustainability and Protection

Overall Rating: 4.2%

Where to Find It: Hoopla (a service offered through some libraries, it is available in both ebook and audiobook in this case), Amazon, Audible, and perhaps your local library. (This cover is from Hoopla)

I heard of this book last summer at a Wildlife Gardening Talk by Pat Sutton, and she highly recommended this author and his book(s). I will admit I did not read/listen to it until (I think) 6 months after I first heard its praise from her. I decided to listen to it while clearing thorn bushes from my woods (I am hoping to write about that once I start to see the results of my labor in the summer, stay tuned!), and I was pleasantly surprised. The book is written in a logical, serious, but also reasonable manner. *Nature's Best Hope* is based off of the predicament that humans are going to cause a sixth mass extinction, and drive ourselves to extinction, if we do not learn to live with nature and protect biodiversity. Tallamy provides a history of conservation, and also sets the stage by talking about former suggested solutions to the shocking loss of biodiversity on our planet. One interesting solution suggests we need to restore 50% of earth's land to natural habitats to restore biodiversity. This does not mean Antarctica either, because that would take up a good portion of the land. This solution suggests returning good, habitable, human land to nature. On the outside this seems completely impossible, but Tallamy then spends about over half of the book explaining his solution, native plants instead of lawns and what he calls Homegrown National Parks ([Click Here!](#)). He provides a shocking amount of statistics to explain his reasoning, and is not super adamant we must give up all we love for nature. Rather, it is acknowledged that a compromise is best and absolutely can be met if we change our mindset. He gave some interesting statistics about the absurd amount of lawn grown in America (I was already planning my *Why You Should Reduce Your Lawn Size* article when I listened to this), and even went into suggested theories on why humans are so obsessed with lawns. The book also dives into insects, and how 90% of plant insects are specialist species that require certain plants to live (when researching some more for my lawn article I saw most sources agree with this,

but the University of Oregon claims it is 70%) . Towards the end of the book he also talks about his own experiences, and interestingly to me, what he has seen when people planted small, diverse, native plant gardens in the city. At the end of the book he answers a lot of questions, both in chapters 10 and 11, and in the FAQ at the very end of the book. I do wish he would have talked more about compromise in agriculture. Other than that, an extremely convincing, logical, and statistical argument is made for native plants in this book. This book definitely inspires you to plant more native plants, compromise some lawn and non-native ornamentals, and rid your property of invasive species. He also has a kids version of the book, although I have not read it!

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Why You Should Reduce The Size of Your Lawn

Lawns are a cornerstone of American society, and social status. When you drive by a big, nice house, it always has a big, nice lawn. What is the cost of this

however? Better yet, what is the point? In this article I hope to answer both those questions as they pertain to agriculture, and natural ecology/biodiversity. First however, I want to cover the facts of lawns that affect both agriculture, and nature.

The Basic Facts..

- Over 40 million acres of American land is covered in turfgrass (this is counting sports fields, golf courses, and lawns¹. This is over 8 times the size of New Jersey! For reference, NJ produced 1.5 billion dollars worth of agricultural products on only 750,000 acres (or 1.9% of all the lawn in America). The largest National Park in America is *Wrangell-St. Elias National Park & Preserve*, and it only covers 13.2 million acres (not quite $\frac{1}{3}$ of the size of U.S lawns)!
- Americans spend \$30 billion collective dollars every year maintaining their lawns². What do we get from this? Hardly any food, poorer water and air quality, and the threat of extinction to over 1300 species in the U.S alone.
- According to the EPA, nearly one-third of the water we use is devoted to watering landscapes. In dryer regions such as Nevada, this figure can be as high as 60%³. Due to these staggering numbers, and the fact that there is a reason grass does not grow in the desert, counties such as Las Vegas have banned turf grass in many areas, and rather encouraged desert-friendly landscapes ([Here is an interesting video on it!](#)).
- According to an EPA study in 2004 (it is doubtful this number has gone down), Americans use 70 million pounds of fertilizer for their lawns every year. Of that 70 million pounds, much of it is wasted as run-off because turf-grass has much shorter roots than native grasses, and holds on to much less

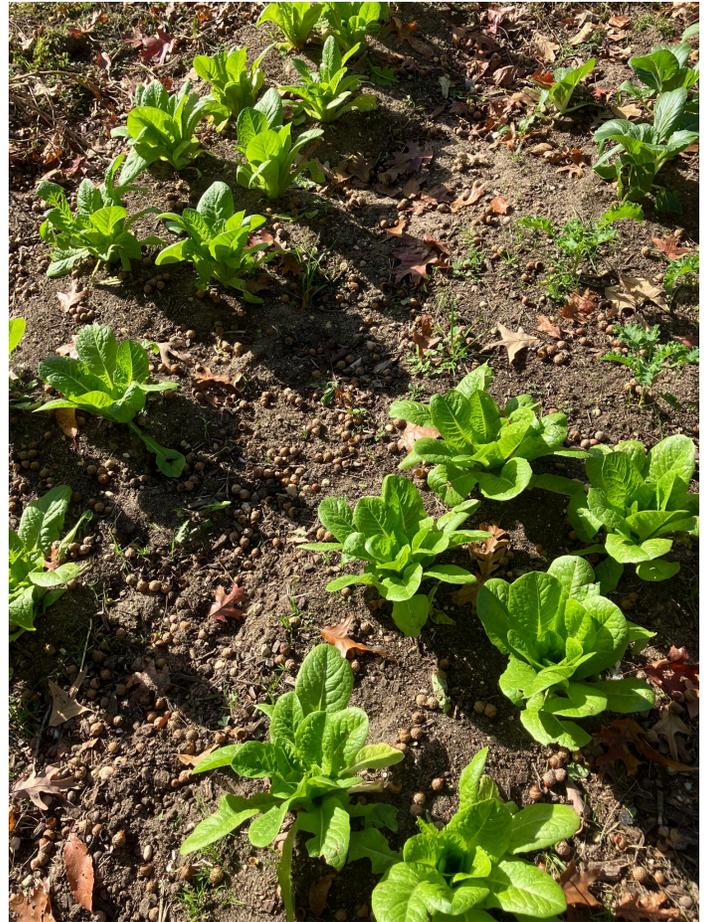
¹ Gashler, Krisy. "Limiting lawn management benefits soil ecosystems". *Cornell University*

² "Consider Lawn Alternatives to Support Wildlife". *Humaneworld.org*.

³ "Outdoor Water Use in the United States". *WaterSense/EPA*.

water. This is made worse by a lack of natural barriers, such as hedgerows, to collect and slow water flow. A perennial berry patch will hold on to much more water, allowing the water cycle to continue on healthier whilst giving you food. Everyone lives on a watershed, and you can probably figure out yours with a little bit of research.

- The high nitrogen fertilizers used on lawns cause extreme plant algae growth when introduced into waterways, and this is because it is just such an unnatural amount of nitrogen being introduced to the plants. Once this happens, the fastest growing plants outcompete everything else, and drown out anything else in the water way (algae blooms that stop us from swimming in lakes can be caused by fertilizer run-off).
- The warming effect of lawns. The ground is like a big solar bank, absorbing energy from the sun during the day and releasing it when it is cooler out (heat transfers from warm to cold). The American shadeless, short-cut, lawn is great at absorbing tons of energy throughout the day. Native Prairie's however shade the ground much better, and collect much less heat (there is lots of representation of this effect, but I like this short video [Here](#)). With that said, I am not saying you have to plant out your lawn in the prairie to enjoy this effect, many vegetable and flower plants will shade



the ground much better than lawns as well. Some greenhouses are heated with black-painted barrels filled with water, because the water heats up during the day and releases this energy when it is cooler outside than in the water. Curtis Stone also noted this effect in his book, *The Urban Farmer*, as cities and concrete collect heat all day, and release that heat when it is cooler out, prolonging his growing season as a mini farmer in the city. Here is an interesting article on this effect, [Here](#).

- Many plants can provide living fences to compliment an existing fence for extra privacy. These can also give you food, flowers, and wildlife habitat. Blackberries will get huge, opaque, and impenetrable in the summer by year 2 or 3 after planting. In the winter they are a bit more see through, but still impenetrable. Even the thornless varieties. Plus they provide berries and beautiful little flowers! I have also seen people grow grapes in NJ on a roofless-gazebo over a patio. In the summer the grape plant shades the patio with its leaves, and provides fresh fruit. Once the grapevine loses its leaves for winter however, extra sunlight is let into the patio making it more enjoyable for winter.

Agricultural Benefits of Reducing Your Lawn Size

The potential food-production of lawns is incredible. According to the 2022 Census of Agriculture, there were 4.3 million acres of vegetable production in the U.S. If we even put 10% of our lawns to use as mini-farms/home gardens, we could double domestic vegetable production easily. Now if those lawns used intensive growing methods available to tractor-less farms, domestic vegetable production would be even higher. If a quarter of that 10% of lawns (so at least 1 million acres) grew vegetables in small, heated greenhouses we could drastically reduce the amount of produce

we need to import in the winter. With the right growing practices most of the U.S could be harvesting food from their gardens in winter with minimal protection, and only minimal heating for certain crops once you get up north (I recommend reading *The Winter Market Gardener* for more information on that, it is available on Hoopla if your library offers that). Lawns in the deep south will have an easier time producing vegetables in the winter, and bringing peppers from Florida to NJ is a much shorter trip than bringing peppers from South America to NJ.

Most lawns will also be able to have **at least** a few fruit trees, especially if you choose dwarf varieties and prune carefully. Larger fruit trees can be used as shade for things like lettuce in summer, giving you two crops in the space it occupies. You could even plant fall lettuce in the shade of a mature peach tree, and once the tree's leaves fall off for winter the extra sunlight now let through will keep the lettuce plants alive in winter. You can either harvest the lettuce in winter, or get a super early harvest in spring before the peach tree grows all of its leaves back. Black berry's are prolific producers, and the hardest part of growing them is simply keeping them from invading the rest of your yard (which could pose a real risk for small yards in all fairness). Raised bed gardens look great, help prevent crazy plants such as blackberries and spearmint from taking over your yard, and can produce amazing amounts of food.

The additional food security brought about by even 10% of lawns being used for food production across the country is quite impressive as well. Imagine you get your lettuce from a single massive farm two counties over, and that farm has the responsibility of supplying lettuce to three different counties. If a worker forgets to open a greenhouse, turn on irrigation, weed, or even a disease outbreak occurs on the farm, the three counties that rely upon the farm for lettuce may not receive any. Now the grocery stores who sell this lettuce need to source the lettuce from farther away, and with less supply of lettuce and higher

transportation cost the price is bound to increase. Contrary to this, if every street had a few people farming lettuce on their lawns, or other people's lawn as well, then those people can provide the lettuce for that street. Now if someone loses irrigation for their lettuce and it all goes to seed, the only people who do not have lettuce are the people on that street, as opposed to the people of three counties. Now instead of having to find enough lettuce for three counties, suppliers only need to find enough lettuce for one street. It is not perfect, but can contain the problem better, and regional outbreaks of diseases like Covid will not affect the whole nation like it did in 2020. During the winter, if we increase domestic food production in warmer regions through the use of lawns, not only will our ecological footprint be lower (as we do not have to clear more natural habitat to grow more food), but trade wars and crop failures within warmer countries will not affect us as much. As I mentioned earlier, we could lower our ecological footprint, whilst increasing our food security, even more if northern lawn owners installed small heated greenhouses on their property. Losing all the greenhouses that feed a single town, as opposed to the one multi-acre greenhouse that feeds the whole county, is a much easier problem to solve. Maybe not easy, but easier.

I admit I might regret if everyone starts growing their own food in their front yards, as I wont have any customers. With that said, many people will not have time for vegetable gardens in their lawns, which admittedly take up more time than a lawn sometimes. However, you do not necessarily have to be the one growing the food in your yard. I realized this when reading Curtis Stone's book I mentioned earlier, as he did not own much of the land he farmed but rather farmed multiple peoples lawns (his book is also free through some libraries on Hoopla). In return for letting him farm their yards, the people who owned the lawns got free food, and were no longer obligated to mow and water their lawns

as there was no grass! Obviously if you decide to let people farm your lawn you can make your own “contract”, but the point is it is definitely possible to use lawns as productive vegetable/fruit gardens. This article [here](#) goes a little bit into how he made \$75,000 of 1/3 of an acre of production, but his book is no doubt the best resource if you are interested (The Urban Farmer By: Curtis Stone). It is not a system that works in every situation, and could definitely oversaturate the market if everyone followed it exactly, but it is a great example of how using lawns to farm is possible. I will list other resources for this type of intensive growing at the end of this article, as there are plenty of examples of people making it work. If you like the idea of having someone farm your lawn, reach out to a person who would be interested (this is not my way of advertising I need a lawn, I have plenty. Thank You to anyone who would have offered though!). Not only will you be feeding your community, but you will have less lawn maintenance, and money/free food depending on how you and the potential farmer work it out.

Here are 5 food-producing plants that I would grow on a lawn for the most production in the main growing season (not winter).

- Trellised tomatoes. They have to be trellised for maximum yield per square foot, as this allows you to interplant shade-loving plants such as arugula and lettuce amongst the tomatoes. I would also recommend indeterminate tomatoes, even though they are more work the trellis the yield per plant is much higher. Large farms will choose determinate tomatoes, which die after 2-3 weeks of production, because they often do not require trellising and produce all their fruit at once, making machine harvesting possible.
- Trellised Cucumbers. Once again, trellising them will allow you to interplant among the cucumber plants. I don't have any one cucumber I

prefer, but I recommend doing 2-3 different planting 1-2 months apart to extend your harvest as much as possible.

- Summer squash. Even the bush varieties can take up a good chunk of space, but they are super productive. I like the plain-old Yellow Straightneck squash. (Right: some Straightneck squash that did super well for me.)
- Baby greens. Baby greens are super easy to grow, and give you a ton of food, and variety, for the amount of labor and space they take up. These are good for interplanting under bigger plants such as pepper's.
- Peppers. Peppers can be finicky, but when happy they are super productive, and will produce well into the fall. It seems that when growing peppers, the most important thing is not to let them go into shock, ever. They simply don't recover as well as something like a tomato.



Ecological Benefits of reducing The Size of Your Lawn

The ecological benefits might be greater than the agricultural benefits of reducing the size of your lawn. Turfgrass (or any lawn, but I am using this term) is home to almost no life at all, maybe mosquitos and gnats if puddles form. There is hardly any food for any insects, and if there is no food for insects there are no pollination services, or food for wild birds. It is also worth noting most insects do not harm humans, or eat our crops. As far as the crops go, at least 70% (most

sources agree with Tallamy if you read my book review, but with that said Oregon University does not. I normally like to err on the side of caution with numerical information, so I used that smaller value) of plant eating insects are specialists that require certain species of plant to survive. That is exactly why only certain insects are agricultural pests, and also perfectly explains how they become pests.

This is a side note, but for example, the cabbage white butterfly can only eat brassicas (it will sometimes be found on other plants such as nasturtiums that contain similar chemicals, but sadly it mostly sticks to brassicas⁴). So if you plant a field of cabbage, this insect's population is going to skyrocket. This is due to the fact that predators of this species, such as the parasitic wasp, do not eat cabbage, and therefore do not come near the caterpillars on the cabbage... and do not control these horrible moth's population. To make matters worse, while not having enough predators, the cabbage white butterfly is able to feast on way more food than it would ever find in nature. The only hope at not using pesticides, or row covers, in this situation is attracting the predators of this species to your garden/field with plants they like. Even then it is not as simple as planting a flower in the corner of your yard, and now everything is perfect. Frankly, even when this intercropping with flowers and perennials is done at its best it is not perfect. I hope to experiment more with this however as I get older, so stay tuned.

Back on topic here, a lawn of grass does feed many insects, or birds for that matter. This is not a good thing at all, and by attracting a variety of insects to your yard you are not dooming your garden, or farms around you. This is easy to see just by walking around your garden, if you have one, and identifying all the bugs you see. Most of them are harmless, or even beneficial, to us and our plants (simply being nibbled on by a bug is not detrimental to plant health, and completely

⁴ Schoonhoven L., Loon Van J., Dicke M. "Insect-Plant Biology second edition". *Oxford University Press*, 2005.

natural. It is when the bug is not checked by other environmental factors such as predators or a lack of food problems arise). If you only grow one type of plant however, you are most likely not going to see nearly as much of a variety of insects then if you had a variety of vegetables, flowers, ornamentals, etc. Especially when that plant is a turfgrass lawn. Even in a small space this diversity is very, very possible to achieve. If you are interested in learning more I highly recommend checking out some of the free resources I list at the end.

You may have noticed I said 70% of plant eating insects are specialist, so what about the carnivorous ones? Most of these are good for your garden, as they eat the other bugs, not your plants. It is quite odd though, as planting a wide variety of plants attracts more of these non-plant eating insects. How does that work? They do not eat the leaves, petals, or stems of these plants. They do however, feed on the nectar, and sometimes pollen, of flowers. Nectar is not quite straight sugar, it can actually range from 10%-70% actually⁵. With that said however, it is the equivalent of a meal replacement shake for insects (except healthier). As most of you probably know however, sugar is necessary for life. Now the difference between bagged sugar and sugar produced through photosynthesis is worth another article, and it is one I don't know enough to write about, but am sure someone has.

As for mosquitos, which are considered carnivorous, there is no perfect answer. Mosquitos need flower nectar to survive, but also need standing water to breed in the first place. Simply eliminating stagnant water in your yard can eliminate a lot of mosquito issues. If you leave stagnant water outside in summer, about 24-48 hours after being laid, mosquito eggs will hatch and

⁵ Nicolson, Susan W. "Sweet solutions: nectar chemistry and quality." *Philosophical transactions of the Royal Society of London. Series B, Biological sciences* vol. 377,1853 (2022): 20210163. doi:10.1098/rstb.2021.0163

wiggle around the water for a week or two. It is interesting to see, and shows how often you need to refresh things like bird baths to prevent new mosquitos from reaching maturity in them (at least once a week). With that said, if you live in a crowded suburb your neighbors' stagnant water may let mosquitos breed either way, but realistically flower plants will not be what brings a mass of mosquitoes from your neighbors yard to your's. In fact, having a diverse planting of flowers can attract the mosquitoes' natural predators, which include DragonFly's (those need water to breed so that is a personal moral dilemma), Damselflies, and especially bats. According to the U.S Forest Service a single Brown Bat can consume 1,000 mosquitos an hour. Attracting bats requires more bat houses/places for bats to nest (dead trees, and generally just safe nooks and crannies), planting night flowering plants, water, and food (hopefully mosquitos cover that). You can buy, or build, bat houses to hang up as well. Personally, I love watching bats fly around after sunset in the summer, and I think that is because they always seemed so foreign and not something that could not be around my yard.

How does all this insect talk relate back to reducing your lawn size? Well like I said before, a turfgrass lawn harbors almost no life at all. We do not let them flower and feed pollinators and other insects, but even if we did they are wind pollinated and do not produce much nectar. On an evolutionary time scale, pollinator-plant relationships were built by the flowers providing nectar, and the pollinator transferring the pollen to another flower in search of more nectar. Wind pollinated plants did not develop these connections with pollinators, as they were able to reproduce with just the wind. The stereotypical clean lawn has no bald spots, no leaf litter, no shade, and especially not other plants. Patches of bare dirt are necessary for many native bees, including the Miner Bee. If you are interested in learning more about native bees, please let me know as that will

have to be a whole other article, but for now just know they are arguably more important than the European Honeybee's. Leaf litter, according to PennState⁶, is used by insects such as SwallowTail Butterfly pupa, walking sticks, nine-spotted Ladybugs, and even more as a place to overwinter. Shade is needed by all animals, and the extra cover a perennial shrub provides gives small mammals, snakes, small birds, and even turtles a safe haven from predators. The predators need to eat, but without protection their food source cannot reproduce, and in the end the predators will suffer from the lack of cover as well. The lack of variety in plants provides food for very little species, especially when what is present is not allowed to grow over 4 inches tall.

Why care about insects though? According to the National Park Service 75% of all flowering plants on earth are pollinated by insects. Some insects like Hummingbirds and bats do a little pollination, but the ecosystems that they live in rely on insects. These ecosystems rely on plants, and their amazing ability to turn sunlight into energy. Without insects we would lose the majority of all plant life on earth, and then the majority of all life on earth. The trophic cascade would then take out some more⁷. That equates to 1,200 food crops, and roughly 180,000 plants that keep us alive. 28% of our oxygen comes from terrestrial plants, without pollinators we would lose the majority of that. The rest comes from ocean plants, usually via phytoplankton. Terrestrial and marine life are directly connected however, and without healthy vegetation to help stabilize the climate, keep ocean acidification at reasonable levels, and prevent excessive runoff, we will also lose most of the oxygen produced by the ocean. Not only that, plants are phenomenal at storing carbon in the soil, and most of our garden perennials and natives have much deeper root systems that store much

⁶ Desorcie, Heather. "Insect Life Under the Leaves". *PennState College of Agricultural Sciences, Department of Entomology*, November 22, 2021.

⁷ Cool PDF! <https://www.fs.usda.gov/wildflowers/pollinators/documents/simpletruthbrochure.pdf>

more carbon in the soil than turfgrass. Insects also provide food for countless species, indirectly for herbivores who eat the plants reliant upon insects, and directly for the birds (who rely more on caterpillars than worms. Caterpillars cannot breed, feed, or survive in our lawns), reptiles, amphibians, and mammals that rely upon them (like Meerkats, which also hunt squirrels. They are the size of a squirrel, just very vicious apparently), and indirectly once again for the carnivores who eat the herbivores. The majority of life on earth would cease to exist without insects, and how humans would survive without the services provided by these ecosystems I do not know. The majority of the ecosystem services we rely on are not provided in adequate enough amounts by turfgrass lawns to sustain us. The short roots sequester very little carbon and allow too much water to run off, the lack of leaves as a result of cutting produce very little oxygen, it feeds almost no animals/insects, and gets extremely hot when in direct sunlight.

Even one small lawn in a suburban setting can do enormous amounts of good for migrating birds, and insects. Take the famous Monarch Butterfly for example, on its long trip down from the U.S to Mexico it needs to eat. When flying, if this Monarch only comes across grass, concrete, and highways it will not survive. When on the migration however, if the Monarch notices your lawn, with a variety of flowers (Milkweed is only necessary for Monarch reproduction), it will be able to stop and get some food to continue its journey. You can picture these small lawns as "islands" where birds, insects, and even bats can safely land, perhaps find shelter, and eat. Suburbia with perfectly pedicured lawns, and developments with just a few ornamentals at each house, are like an ocean to these species, as even when they do safely land they cannot find any food or shelter. If they are unlucky and choose an islandless path, then they run the very real risk of starving.

Even if not migrating, these lawns provide ecological corridors for local species. You might have a nature preserve a mile away, but to get there in the first place (we will say a butterfly for this example) the butterfly needs food, and shelter. Your small lawn in between the nature preserve and wherever that butterfly came from might be the difference between life and death. Even if you do not have a nature preserve nearby, your lawn might be the only place a butterfly can safely land, and eat, on your street. If everyone had a small pollinator garden, the butterfly could hop from yard to yard all day without ever going hungry.

Native or Non-Native?

I feel as though a quick detour is necessary before I write any further about how bad lawns are for the environment. Native plants are almost always better for the wildlife, and the general ecology of this planet. This makes sense, as these plants have co-evolved with these animals/insects for thousands of years, forming chemical and physical relationships non-natives cannot replicate. 20%-45% of native bees are pollen specialist, and without the plant (or genus of plant) that sustains them they cannot survive⁸. The specialist bee's especially need this specific type of pollen to feed their young. By planting the plants these bees rely on, we can save the specialist, and the generalist who can survive on any pollen/nectar. If you were like me you wondered;, What happens when the flower these specialist bee's rely on ends its blooming period? The specialist bee will time its reproduction and end-of-hibernation with the blooming period of its flower, collect the pollen necessary to rear its young, and then die or hibernate

⁸ "What is the role of native bees in the United States?". *USGS*.

again. Sometimes they can hibernate for another year if the flower they need does not bloom⁹. Your best chance at helping these specialists is planting a wide diversity of native plants, for these are the ones they have co-evolved with. As I mentioned earlier, at least 70% of plant eating insects are specialists as well. For the plant eaters, these plant-insect relationships are usually chemical relationships, and non-natives normally do not match the chemical profile native insects have become adapted to over thousands of years, making them inedible for the insect despite looking the same to us¹⁰. Some are physical relationships formed over thousands of years however. For Example, Monarch butterfly caterpillars can eat the sap of Milkweed, but will notch the base of leaves to limit the flow of this normally toxic sap. Milkweed sap can cause irritation in humans as well, so try to be careful when around it.

It is not that non-natives are necessarily bad for the environment, and should be completely eradicated (when an introduced species becomes invasive that's another story). It is also unfair to say every non-native cannot benefit the local ecology. Rather, a diversity of native plants is what's best for the local ecology, ecosystem, and us. Compromise between native and non-native can absolutely be made, and is what is most realistic. Extremism on the non-native side (which exists), or the native side will not solve anything.

Deep rooted plants are extremely beneficial to people, as they catch and prevent water from running off at a higher rate than plants with short roots,

⁹ Garland, Sandy. *WILD POLLINATOR PARTNERS*.

¹⁰ Prade, Patricia. Dr Minter, Carey. et al. "Exotic and invasive plants: Why are native insects such picky eaters?". *University of Florida*

require less fertilizer, and survive droughts much better than short rooted plants. The deeper the root, the more water it absorbs. Not only is this due to the higher root area collecting water (which further aids in preventing stagnant water and runoff) and nutrients for the plant, but also just being deeper and closer to the water table allows the plant to collect even more water, and access minerals deeper in the soil. The deeper roots also aid in physically loosening up soil, allowing water to flow deeper and drain into your aquifer more effectively as opposed to staying on the surface and collecting pollutants.

Although there is no definitive answer as each lawn is different, most of our lawn's grass only have roots extending 6"-1' in the soil. The EPA, and many others, claims Turfgrass lawns¹¹ only extend 1-2", some lawn companies claim 6" is ideal, other people say it is actually 4"-8", and others say a lawn's root system can be as deep as 2-3 feet (this is unrealistic but technically possible). Management, location, and variety can greatly impact root length, so I am sure each of those are right in some situations. Nonetheless, they all pale in comparison to a wide variety of native plants. There are still plenty of non-native plants with deep root systems, but as I explained, their ecological benefit is nearly never as significant as that of native plants. The goal of reducing your lawn size for nature is to help nature as best you can, so it makes sense to focus on natives. Some non-natives definitely deserve a spot in any garden, and so I am going to mention some of those in this list.....

- Coneflower. This perennial is native much of the continental U.S, and has roots that reach up to 5 feet underground. It supports numerous pollen

¹¹ https://cfpub.epa.gov/npstbx/files/KSMO_KnowYourRoots.pdf

specialist bee's¹², along with butterflies, small birds (directly through the seeds, and indirectly through the caterpillars it supports), and much more.

- Woodland Sunflower. These eastern North-America natives look very similar to “regular” sunflowers, but are rather perennial. Over 50 species of Caterpillar (Butterflies and Moths) use them as a host plant in their native range, and they support 50 species of pollen specialist Bees! Their roots go 3-5 feet deep, and spread through rhizomes, meaning they shoot up new plants through their roots!
- Goldenrod. This perennial is native to North America and beyond, and supports over 100 caterpillar species, along with over 30 pollen specialist

Bee's! It has an extremely deep root system, reaching up 8.5 feet, and I found out while doing some extra research on Goldenrod it normally is not what cause allergies¹³. Goldenrod requires pollinators to produce seeds, because most of the pollen it produces is too big to fly on the wind (admittedly some of the pollen will fly in the air, but not a substantial amount).¹⁴ Rather it is normally Ragweed causing these allergy issues. It has a plain green flower that does not require pollinators, as it instead lets go of its pollen to wind pollinate. Ragweed has had no reason to make pretty flowers, as it is not like a colorful flower will attract wind.

- Cold-Hardy Bananas. Absolutely not native, and probably will not give you bananas if you live in



¹² “Keystone Native Plants, Eastern Temperate Forests-Ecoregion 8”. *Garden for Wildlife* by National Wildlife Federation.

¹³ [This](#) and [This](#)

¹⁴ [This](#) along with [this](#)

New Jersey. My grandmother did harvest green bananas once though. Because they are not cold hardy (I know the name is Cold-Hardy Banana, but that is compared to the Banana plants down south) they are a bit more work to prepare for winter, and they do not contribute much else besides cover/shade to the local ecosystem. They do however always put people in awe when they see them. They are the coolest looking plants, and get so big without every being watered (at least I never watered mine). (Upper Left: Our Banana tree's a few years ago, we have since expanded that garden bed. The Phlox (which is native!) and the Iris (I cannot figure out if that species is native) are great flowers that compliment the banana's).

That small list only scratched the surface of deep-rooted plants you can plant in place of a lawn. Even in agriculture, the goal is always to get the plant's root system as deep and vigorous as possible to make the best possible use of the resources in the soil.

Reducing the size of your lawn does not necessarily mean more work. Especially if you choose native plants, as they are what would naturally be growing there either way. They often require little to no fertilizer, and require much less water than a lawn¹⁵. Many non-natives also have very deep root systems that require very little additional water and fertilizer. Getting flower gardens set up successfully in the first place relies on two things in my experience, water and mulch. If you keep the plants watered extremely well the first few months, assuming they are a perennial, they will be able to get a deep root system set up, and will pretty much take care of themselves in the future. We get free wood chips from an arborist, and put them on all our flower beds to not only make them look nicer, but also to suppress weeds and retain moisture. Unless an abnormally long drought hits like it did in the summer of

¹⁵ "Native Gardening". *U.S Forest Service*.

2024, we usually only mulch the newer flower gardens every spring, and weed those gardens once or twice in the summer. Once a flower bed is established however, there seems to be so many plants and leaves covering the ground we cannot mulch very much!

In the very beginning, setting up a flower garden might be a little bit more work/money than a lawn, but it will not be in the long run. If you choose native perennials, the cost and labor required to maintain these gardens will significantly drop after a year or two. If you have a local arborist you might even be able to get the mulch for free! As for the plants, just stay on the lookout. Considering perennials last many years, buying plant starts is not super expensive, but it can be a big upfront cost. By looking out for seed exchanges (I like the Port Norris Historical Society seed exchange), seed Libraries (Cumberland County Library has one now!), and even looking out for hundreds of free plants being given out in the driveway of a nursery (this actually happened to us!), you can significantly reduce the upfront cost to start these gardens.

The Solution?

As you can hopefully see, the agricultural benefits of reducing the size of your lawn are immense, but vegetable plants do not sustain local ecosystems very well. Although it is great that flower gardens feed so many species, especially when native, they do not feed us. What if instead of choosing which one is more important, we do both? The perimeter of a yard could be perennial native's, and the inner portion vegetable and fruit production. Native under-story plants could be planted around fruit trees. Containers of pollinator-favorites could be hung up around the property.

It is also worth noting we need to keep our sports fields, and lawns that are used for play. These are too socially invaluable to get rid of. Instead, we

should focus on converting the patches of lawn we do not use for anything into something useful. Have the play area, and the productive area (rather it be ecologically or agriculturally, or a mix of both, productive).

My point is, you don't have to pick one or the other. You can convert every square foot of your yard into a vegetable garden, but do not have to in order to make an impact. As per usual, a middle ground is what's best for everyone(everything?).

Resources For Vegetable and Fruit Growing:

- *The New Organic Grower*. By: Eliot Coleman. I really like the methods discussed in this book, and Coleman's common sense way of explaining his logic and techniques.
- *The Market Gardener*. By: J.M Fortier. This book is an amazing resource for intensive, small scale, direct-to-consumer growing.
- *The Urban Farmer*. By: Curtis Stone. The best book, and probably resource in general, I have found for farming on lawns.
- *The Lean Micro Farm*. By: Ben Hartman. This book talks alot about making your farm as efficient as possible, and I found it interesting as well as useful.
- The USDA and ATTRA are both phenomenal online resources. Rutgers also has a ton of online resources as well.
- The internet! All of these authors are on the internet, and Stone and Fortier have youtube channels! I also like the No-Till growers podcast/channel.
- Rodale Institute. Amazing free online classes, research articles, and webinars available online. You can also visit the farm in Kutztown PA.

Ecological and Wildlife Resources

- <https://patsuttonwildlifegarden.com/>
- Jenkins Arboretum. Free webinars, resources, and nature center in PA.
- Native Plant Society of NJ. Many free, and paid for, classes and resources regarding native plants.
- Merlin Bird ID. This is a free bird watching app by Cornell University I like.

- NJDEP. Lots of free resources, maps, and presentations!
- CU Maurice River. Lots of cool events, and a family membership for the cost \$30 (They have free events as well!).
- Youtube, Podcast, Research articles, and everything on the internet in between!
- <https://m.youtube.com/carbonnationfilm>. Including this cool channel, who mixed grazing cattle and ecology!

The Last Letter Home From Staff Sergeant James Stinsman

James Stinsman was a B-17 Flying Fortress Mechanic, and Waist Gunner in the European Theatre during WW2. He was part of the 535th Bomb Squadron, and flew in the *Ron Chee* (serial number: 42-3123. You can find the plane online). The *Ron-Chee* took off from Ridgewell, England on October 8th, 1943 to bomb a naval yard in Bremen Germany. The plane was shot down on the 8th, and crashed around Quakenbrueck, Germany. This letter was the last letter he sent home to his mother, on October 1st, 1943. He was 26 years old when he died.

Hello mom,

Just a few lines to let you know that everything is okay. Everything here is okay & the food is pretty good. We have only a couple of days left to send Christmas to home and I haven't [unintelligible] anything that I would like to send home, so I am sending you \$100 and you can do whatever you see fit with it.

From now on I'll be sending money home and you can keep half of it and save the other half for me so I'll have something when I come home.

We had a pass the other day & went to London and saw all the historical sights & also the places that have been bombed. We went to a nite club and saw an [unintelligible] floor show.

We have a movie nearly every nite at the base & a U.S.O show nearly every week. I've been on missions over enemy land and got a little touch of frostbite in the fingers, but outside of that everything is alright.

I'm sending a couple of [clippings(?)] from our newspaper The Star & Stripes. How is everyone doing at home? I hope they're alright. I will write again soon.

Jim

I acquired a collection of his letters, awards, and mechanics school notes from my grandmother, who is his niece. If you found that interesting please let me know, as I am thinking of converting the rest of the ones I have to PDF format.

Converted Online By: Mason Cain

Thanks for reading the Magazine! If you found this through the QR code on the stand, thanks for stopping by!

