



“10 Ways to Increase Garden Productivity”

Jason Matyas

*** FULL TRANSCRIPT ***

Hosted by Marjoryildraft
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Marjory: Hello and welcome to the Home Grown Food Summit. This is Marjoryildcraft. Our next presentation is on how to increase the productivity of your garden and in your garden. We have with us Jason Matyas and this is a really good presentation for those of you who are just starting out beginners and you want some very step by step methodical information about how to increase your yields and your time efficiency working in the garden. Here's Jason.

Jason Matyas: All right, thanks so much Marjory for having me be here for this awesome event. This is a session I'm calling increasing your garden productivity. I've got a lot of different things I want to cover because I think it was a lot of different areas people can work to improve their gardening productivity. Without further ado let me do a quick intro here and jump in.

I'm Jason Matyas. This is my family. I'm a husband and father of seven and we are gardening family. I was raised that way. I grew up in the garden in Southern California. Like I was raised basically from infancy eating fresh vegetables and learning how to grow my own food, I'm doing that same with my kids and my wife is part of that journey as well so we work together in the garden throughout the year and enjoy the seasons of the year and seasons of life together in that way. My background is ... I spend a decade active duty air force. I went all the way around the world.

Since I left active duty, I have enjoyed making this transition to being a father and enjoying family life particularly moving more and more into homesteading. That's one of the things that led me into getting involved with Beyond Off Grid project. I am the executive producer of the film and the producer of our training media. We're really all about educating and aspiring people about why you should reduce your dependence on modern systems and the modern economy and how you can seek true freedom by returning to the old past of productive households and local community interdependence.

I also have an heirloom seed business that I started several years ago with my children. We are very excited to bring heirloom seeds from our family to yours. The kids work in the business not just on the garden but also in packing seeds and fulfilling orders and we have a lot of fun together, working together as family. My kids are learning very

important lessons of hard work and return in investment for labor expanded. What are we going to cover? Let me talk about quick overview of what we're going to cover and then we'll dive in.

First, I want to talk real quick about a process that it's very important to understand. Gardening like many things in life, but particularly when you're working with biological systems in nature, it's very important that you start with this process. The first step is to observe. If you don't observe what's going on, you're not going to be able to determine problems you might be having, corrective measures and actions to take to correct those problem or even you may not even understand what's going right and so it's very important to observe. That's the very first step in being a successful gardener and increasing your garden productivity in particular.

The second step is to analyze. You observe and collect data. This may actually be and actually writing down data but it may just be taking mental notes of things although I do recommend if you haven't started the practice already of having a garden journal and journaling information following the footsteps of famous founding fathers like Thomas Jefferson who collected vast amounts of data on his gardens and his farm. This is very important to be able to analyze later and understand what's going so that the last step which is to modify or to take action upon the analysis that was conducted can be done and therefore corrective measures can be taken to fix problems or just to increase garden productivity to do better at which you're doing, okay.

There's some topics we're going to cover. First, we're going to talk about what to plant. It's very important actually first step and I put it first for a reason. Second, we're talking about time productivity because this is one of the things that a lot of people don't think about but is actually really important to think about how to make better use of time. The next is space productivity, how to make better use of the space you have. The last one is plant productivity, how to make your plants more productive.

Okay, so what to plant? The first and most important thing to recognize or to do when you're planting what to plant is plant what you like to eat or what your family likes to eat. It doesn't make a whole lot of sense to plant things that they're not going to enjoy or you're not going to use, okay. Secondly, plant what you when to can, freeze or dry. In other words, what do you want to preserve beyond the fresh growing season and be able to enjoy in the off season. Another thing to consider is to plant what is expensive to buy. Now, if you want to save money like most families do and look at ways that you can cut cost.

Certain types of fresh produce are very expensive to buy particularly they're expensive when they're in the off season so that may lead you to pursue certain methods of season extension in order to be able to grow off season to produce yourself when the price goes up because it

is in the off season. Very important to understand what really works where you're at, so you want to optimize for your location. Not just your zone or the general location that you're at but even just specifically your specific spot which has specific microclimate.

You don't want to be planting, most likely you don't want to be planting okra if you live in the far north because it doesn't get [hot enough 00:06:27] for okra to thrive. Likewise, you're not going to be doing very well with spinach if you're in the Deep South especially in the summer, and if you're in Florida, there's a lot of things that actually don't grow in the summer. They grow actually primarily in the spring and the fall which is more like a summer. Plant what thrives best in your locations in the appropriate season. Understand your microclimate. Like I said microclimates can vary widely even within a very small locality.

A good example is if you live on a south facing slope versus somebody on the other side of the hill, it was on a north facing slope can have extremely different microclimates because of the fact that one gets a lot more sun than the other one does. If you have wind, prevailing wind from a certain direction that can cause wind chill and other factors. Note your microclimate is the factors that go into that and which you might be able to do to affect it. Optimize your planting dates, okay. This is important to understand. You want to plant those things that are going to be ready when you're going to eat them and don't try to space out things if you can and try not to be planting everything all at once.

A lot of people plant a garden all at once. Everything comes in at once and particularly like summer squash. They'll plant half a dozen or a dozen plants and they've got a family of four. Therefore, when July rolls around, they've got baskets or carts full of zucchini and things that they have to get rid of and they can't consume them all or it may be too difficult to process all of them. Optimize your planting dates. Be smart about how you plant so that you stagger the production out in a way that you can use it and make the best use of it when the produce is in harvest.

Finally, always be testing different types and varieties. You can have significantly different results with different varieties of the same type of plant. Tomatoes were pictured here. Some tomatoes may do very well for you and other tomatoes may not do very well for you based upon lots of factors including nutrients in the soil, microclimate and other things. Always be testing different types of varieties so you can see what does best for you where you're at and also so you can understand what things your family enjoys the most. There may be certain tomatoes they don't really enjoy, maybe other tomatoes they do really enjoy. There may be certain squash they enjoy and other things they don't enjoy.

All of these things go into play. When you think you found something that you really like, that's great and you can keep planting it but I would still encourage you to always be trying new varieties because you won't

know that there are other great producing varieties that will work well in your location unless you test them first, unless you try them.

All right, let's talk about time productivity. There's basically two areas of time productivity. The first is making the most of your work time or getting better use out of the time you have to spend gardening. The second is making more of the calendar. When talking about how to make more of your work time, there's two basic measures, okay. One is effectiveness and this I like to describe as the output gain from a given input. There are certain things and different things you can do to increase your effectiveness. A lot of times, this relates the time but it doesn't always relate to time.

The end result maybe that it ends up using less time but the actual thing that was increasing the effectiveness wasn't necessarily related to time. That was just the result on the back end. Example is using good tools. If you have to weed a large area, using a little tiny hand weeder is not necessarily going to be the best tool for the job because you need to be able to make larger movements to weed. Doing something that's like a standing up weeder, like a collinear hoe weeder or something like that is going to be much more effective in the amount of force you're applying and the amount of result that you're getting, ultimately, it's going to take less time to weed the garden.

What you're doing is you're applying a more effective tool to the job. One example is good methods. This can be everything from planting to harvesting and everything in between, even watering. One example is more effective at watering maybe not watering by hand but actually watering with soaker hoses or drip tape or something like that. Even further taking it to the point where you're not doing it manually turning it on, manually turning it off. It's actually in a timer and so it's automated, obviously, with some observation and correction in your part but nonetheless, using certain methods or systems to be more effective in applying a given input to get the particular output you're looking for are one example of being more effective.

Then finally, good inputs particularly I'm thinking here like inputs in terms of soil or nutrients or supplements or things like that that you're using or going to be, if you use in particular one thing we'll talk a little bit about more later is if you have a particular problem, you're trying to address using the correct input to correct that, so might be that the plants are calcium deficient, maybe they're getting blossom and rot.

Applying the appropriate nutrient to that or the appropriate corrective soil amendment is going to be an effective correction to the problem that you have versus not understanding what the problem is and just trying different things and not necessarily being effective with what you're doing. That's effectiveness. That's one way to make more of your work time. The second is efficiency, which is the output per unit of time or unit cost. You could also do this in terms of cost. One example is

keeping your tools and your resources organized. If you're wasting your time trying to find your tools because you can't remember where you put them because you always put them in a different location, you're going to be wasting a lot of time.

You're not going to be efficient with the use of your time because you're wandering around looking for something that ideally would be in the same place all the time so you know exactly where to get it. Also, putting your tools in a good location near where you're going to use them most often is also one way to cut down the amount of time that it takes to get them and then put them to use in the garden. A very good example of efficiency is actually the kitchen garden. The entire concept of a kitchen garden is to have close at hand near the kitchen where food is prepared the most used herbs and veggies that a family would use.

This was standard in colonial times all the way through really, really World War II. It wasn't until the post-World War II economic boom and grocery stores came about that people kind of went away from having the kitchen garden. Even in urban areas, people would have a kitchen garden in the backyard or side yard or something. That's where they would go to harvest fresh herbs and vegetables that they would use on a regular basis for cooking. The reason that it was close by is because they didn't have to walk a long way so even if somebody was in an urban area where they may have limited space to put it any ways. If you're on a homestead or farm, I mean, you could put the garden wherever you want. Put it in the kitchen garden right outside the kitchen so they can walk there quickly and not waste time getting to and from is an example of being efficient in layout or in design of the space relative to the function that it needs to perform.

Let's talk about how to make more of the calendar, make better use of the calendar. There is a bunch of different techniques here. I'm going to go through these fairly quickly. The first is starting seeds indoors and transplanting. Another one is excessive plantings and another one is season extension.

I'm going to go into these a little bit more depth here but fairly quickly. When you're talking about starting seeds, you have to realize that the season length, the amount of time you have for growing is going to be determined by particular dates that are specific to your location. These dates are your last average frost date in the spring and your first average frost date in the fall. The keyword here is average because there can be variance from year to year. This year, where I live in Virginia, we had a very, very early last frost. We actually didn't have a frost since early March. Typically, it's middle of April so we had a very warm spring and basically, that average is way off for what we had this year.

Keyword here is average. The microclimate, not just this season as it varies from year to year but you can also have large variances due to

microclimate where you live if you're on a north-facing slope or a south-facing slope, if you have prevailing winds in the valley or something like that. All these things can affect when the frost dates for your particular location, not your region or even the city you live near but your particular location actually are. It's good to check with neighbors or maybe your ag extension. Generally, the most accurate local knowledge is going to be from neighbors or from your own observation if you've been able to be in the same location for a long period of time. You can actually go back and look at the frost dates for the history if you want to do that as well.

Your season length generally is going to be the different between those two frost dates. That is going to be the dates between which you can put plants into the ground and when they need to be harvested by if they're not frost tolerant. One way that you can get around the calendar constraint of your season length is to start your seeds early indoors. This is very common in most seeds when they're sold on the packet, will say start indoors, so in such and such weeks before last frost and so on and so forth.

This is fairly common. A lot of new gardeners don't do it because it's intimidating but overall, the idea here is that we're going to move or get around the frost date which it's not conducive to growing plants, especially certain plants, by planting them indoors and keeping them in an environment where they can grow before we put them out in the garden near or after the frost. With the last frost date of April 15th, here're some examples for some common crops like basil, broccoli, lettuce, peppers and tomatoes. You can see that basil and broccoli are both recommended to start six weeks before the last frost date. Your indoor planting date will be March 1st in this example. However, because of the frost sensitivity of these two different plants, basil being frost sensitive and it doesn't like cold temperatures and broccoli being somewhat frost sensitive, basil has to wait two weeks after the last frost date whereas broccoli can be planted two weeks before. There's a month difference in planting date. You can plant broccoli on March 28th whereas April 28th is when the soonest that you want to plant basil or planning to plant basil.

Lettuce is five weeks before the frost you can get it out basically at the last frost. Then you'll see that peppers and tomatoes are not frost tolerant, particularly tomatoes are very sensitive to temperatures anywhere near frost. You have to wait a full month generally after the frost date before you put those in. You also notice that the number of weeks for peppers and tomatoes are pretty long. You're talking about two to two-and-a-half months before the frost date is when you need to start them. They're actually going to go an extra couple of weeks to a month after that. You're looking at 12 weeks in both cases for peppers and tomatoes between when you plant the seeds and when you actually transplant those seedlings into the garden.

Starting indoors is one way to extend your season. Realize that this entire method depends upon transplanting. Transplanting does not necessarily always occur from your little seedling in your tray or your tray full of little seedling cells or something directly into the garden. In some cases, it requires that you actually repot those seedlings. Tomatoes is a very good example. If you want to get as much of a head start as possible and get your tomatoes going in the garden, you're going to want to plant them as seedlings in soil blocks like this or it's seed tray cells with soil in them but two months prior to the frost.

Because they can't go out in the garden until a month after frost, in that couple of months, they're going to get a lot bigger than or they're not going to be able to be kept in this small growing medium. You have to put in them in a larger growing medium. When you transplant them, you put them into like a three- or four-inch pot until they're ready to go in the garden. The problem here is space. I can put 50 soil blocks in one 10 x 20 tray so you're going to have 50 tomato plants in one of those trays but if I repot those into three- or four-inch pots, I'm looking to only getting like 10 of those per 10 x 20 tray. Basically, have like five trays of potted tomatoes for each 10-20 tray of tomato seedlings so it multiplies a lot. What happens is that you may run out of space indoors to keep these inside. I'll come back to this later but this is a very important point. If you want to do this, think about what your plants are going to need in the various stages before they get into the garden. It may require that you provide some kind of season extension for them not just indoors but you might want to do it outdoors. In a lot of cases with tomatoes, they don't need to be heated like a heated greenhouse. They just need to be in something like a cold frame or something similar to protect them from cooler temperatures or if you have a frost.

Another way that you can increase the amount of usage of the calendar is successive plantings and so whereas planting indoors is spacing moving your planting window to the left on the calendar, right? You're basically going to be starting earlier than you would, otherwise. Successive plantings is actually a kind of a way of compressing the calendar or maybe the opposite of stretching it out. You're able to plant more plants and get more growth out of your planting season than you would otherwise. There's two ways basically that this happens.

The first is don't plant just once. A lot of people do this. They plant the garden and they don't do anything else. Once you start harvesting things, particularly if it's something that you pull the plants out like root crops, once you pull a plant out, now you can plant there again. You want to optimize your use of space by planting after you harvest the first crop in a space. One thing that will particularly increase your use of time or the amount of production you can get out of a particular space in a given time is instead of just planting seeds, actually, you're putting transplants into the space where you just harvested a crop.

Basically, you're getting a jumpstart in the growing on that space because you're putting in a one-month-old plant or a six-week-old plant into that space instead of a seed which then is to germinate and grow from scratch. This is particularly good for solid greens if you are pulling the greens. A lot of people will actually cut greens which I think is actually a better method. Any kind of root crop in particular, you're going to pull the root crop out to harvest it, beets, carrots, those kinds of things. Instead of planting a seed in that spot to make use of the space, if you have transplants ready to go into that space, you can plop them in and essentially, it's like you just sped up or got a jumpstart of a number of weeks on the growth of that particular plant in that space.

One other good thing to consider is how you can use radishes which are one of the fastest growing crops, only take about three weeks. You can plant these with slow growing crops including ones that you just put in because a lot of times it takes a while to get established. Radishes only take three weeks to get to maturity, typically, three weeks to a month. You can plant them with a lot of things and then pull them out, get them out of the way. Then whatever else is next to them fills in that space.

Let's talk about season extension. I'm not going to go into a lot of depth here. I just want to give you some of the options that you can look at. One is a greenhouse. You don't have to buy a very expensive manufactured greenhouse with metal tubing and all that kind of stuff. You can make a very simple hoop house with PVC pipe and plastic sheathing. This is an example of one that I made awhile back that was 12 feet wide, 20 feet long. I used it to put my tomatoes in because I was able to basically grow them all the way into the fall. We actually had tomatoes at Thanksgiving, so fantastic way to do it.

Another really good frost protection method is cold frames and they're both anti-frost and heating depending on what kind you make and how you do them. This is actually a really good method for keeping your transplants that are not ready to go in the garden yet warm, particularly like those tomatoes I talked to you about that multiply when you take them from the little soil blocks or seedling cells and put them into a larger pot and you multiple the space that they take. If you build a cold frame in your yard like this, basically they can be outside on warm days.

You can also help with hardening them off as it's referred to getting them acclimated to the outdoor environment. Particularly, you can leave them outside at night and keep them protected from cool nights. If you're going to have a hard frost, you might want to look at bringing those plants in at night. If you design the cold frame correctly, a lot of times you can basically be able to give the plants what they need in terms of temperature at night without having damage.

Low tunnels are one of the easiest methods. Basically, you just get a plastic or a mesh and put them over hoops either wire or plastic hoops.

You can also have a metal EMT conduit that you can bend into hoops. These can be used both in your garden as well as on the right here. You actually see an example of double protection where inside of a greenhouse they also have low row covers. This is the method that Eliot Coleman uses to grow greens through the winter in Maine. He makes a very, very good revenue from selling those crops off season. Basically, he's selling it at times when the price is high. If you're interested in market gardening, that's one thing to consider using season extension to grow during times when the local supply is not as high. Therefore, the price goes up.

One other method is cloche. It's a French word. A traditional cloche is seen in the right here. You can use any manner of clear plastic or glass containers to basically provide insulative protection like in all mini greenhouse effects. One that's not as used as much but can be effective is basically using a structure with that access of heat mass. In this example here in this picture, you have a brick building and you notice the plants are basically planted in the flower bed up next to the building. The idea is, is that during the day, the sun shines onto the brick. Presumably, this is a south facing wall of the building, it absorbs that heat. Then in the evening and at night, it releases that heat and creates a microclimate in that bed near the wall so that heat-loving plants and plants that are more cold sensitive can have little extra protection just from the radiation of the heat near it.

You can also basically use the same principle inside of a greenhouse or even a cold frame. You put basic heat mass like bottles of water or similar inside of the season extension, the greenhouse or the cold frame. They soak up heat during the day and they release at night to help regulate the temperature.

All right, let's move on to space productivity. This is one that a lot of people have challenge with. They're limited on space and they're looking for any way they can to get more out of the given space that they have. Let's talk about some ways that you can do that. One that is really good is called interplanting. Let's talk about that in a minute. Stacking is basically a form of interplanting. It's the term that I came up with. I'll describe that method that I really like. This is a particularly effective method for getting more out of a given space, going vertical with your gardening and also using small spaces.

Let's talk about interplanting. Interplanting typically is based on timing. You can do non-timing-based interplanting but if you are doing that, it would most likely be basically doing the spacing of your plants to basically optimize the space so that there's this much foliage coverage and not wasted space. Because anything that's basically you don't have foliage over the ground is essentially a wasted space, so you're not collecting solar energy in that space. A lot of times, you can just do closer spacing or intensive spacing to do this. Interplanting based on timing, an example would be carrots and lettuce.

If you plant carrots and lettuce at the same time, carrots take a long time to grow particularly up to where they get of any size whereas lettuce often will grow quicker. If you space them correctly, you can basically harvest the lettuce when it gets big enough to harvest before the carrots get very large and they're not really competing with each other. By the time that you harvest the lettuce, now the carrots are larger and they fill in the space. That's the concept basically is you plant two things next to each other. One of which you will harvest at a certain point to reduce the amount of competition for that space with the other plant variety you have growing there.

I mentioned earlier, radishes. You can do this almost to anything. Anything that radishes will grow well next to, you can plant them there. Again, only three to four weeks and they're done so you can plant lots of radishes next to different things because they grow so quickly.

Stacking is my term, the most well-known of which is the three sister's method. Three sisters, of course being corn, pole beans and squash, winter squash typically. This was the method that the Native Americans presumably or as the legend goes showed to the pilgrims in New England. The idea here is that the pole beans use the corn as a trellis and the winter squash spread out amongst the corn at the base of the plants. You're basically three different plants growing in one space. You're getting more use of the space. The winter squash also provides some weed protection or weed suppression as well around the base of the plants.

Interplanting or stacking in particular based on height. I almost always plant basil at the base of my tomatoes and this goes to companion planting, which we'll get to in a minute. Basil and tomatoes go really well together. I always prune my tomatoes and I'll tell you why in a minute when we get to talking about preventing some common diseases. I prune the bottom foot-and-a-half to two feet of my tomato plants, all the foliage off of them. It provides a room down low for the basil to grow up. I basically have a segregation of the plant foliage so that basically, I can grow two things in one basic space.

One of my favorite combinations to use for height-based stacking is growing any shade tolerant plants underneath okra. Okra is a heat-loving plant. It gets really tall. It's a woody plant. It grows depending on the variety and the conditions in a year. Sometimes they'll get stunted and be a lot shorter but typically, it's going to be four to six feet and above. Sometimes I've had them grow seven or eight feet tall. However, okra is again a woody plant with stems that come out and the leaves are on the ends of the stems. It provides a dappled shade.

I particularly like growing summer squash under my okra because based on testing over a number of years, it seems to do pretty well. There's not a whole lot of decline in production in the summer squash from the okra. If you time it right, basically you can get the okra growing up

above the squash and they don't compete with each other. You're growing two in one space. Then the final, the trifecta on this is basic some of the three sisters method. You plant pole beans at the base of the okra.

Pole beans grow a lot better on okra than they do on corn because corn is not a very good trellis but okra as you can see because of its structure provides a really good structure for pole beans to grow on. This is combining a lot of different things. It's putting multiple plants in one area through interplanting and using this height-based synergism. These are also methods of vertical gardening. Essentially, any time you're using a plant as a trellis, that's a method of vertical gardening.

Let's talk real quick about vertical. I'm not going in a lot of detail here because this is covered in other sessions. I mean, not spend a whole session just on this. On the left here, you see pole beans growing on corn. That's the three sisters method. At the bottom, you see a traditional trellis. This is actually my favorite method of trellising which is a cattle panel or a hog panel sometimes they're called. It's a rigid wire structure. Work very well for providing a trellis. On the top right here, you see a very unique and interesting method of vertical growing which is not putting greens in the ground but growing them on a gutter mounted at the side of a house.

Now, this is really good if you have very limited growing space, a very creative use of space. You also have to realize that any containers are also method of vertical gardening in my perspective because basically, you're growing in a space that is not ground. You're providing the container as the growth and so you can grow them up. If you have any kind of hanging baskets or anything like that, window boxes, all these are examples of container gardening but I think they're actually vertical gardening because you're getting the plants up off the ground. You're getting the growth up off the ground. Typically, your lateral ground space is the space constraint that most people have that limits their productivity and so you can get around that by using containers or other methods of vertical gardening to get your growth going up instead of laterally, which is your primary constraint.

Last section here, let's talk real quick about using small spaces. There's lots of odd places that you can fit food into. One example is along paths or in any kind of landscaping area. You can do lots of things with edible landscaping along paths and roads. In this case, you actually see it's a flower bed along a walkway. The large green plants are actually nasturtium. They're not flowering in this picture but those are edible leaves and the flowers are edible. Also, you can put them in salads. There is also a chart here. I see okra in the background.

Basically, sweet potato vines. You can basically put into your landscaping, in your flower bed areas edible plants. It's one way to make better use the space you have by growing food there instead of

just things that are decorative. You can use fences that you have as trellises or as the support for trellises. In this case, you have pole beans growing up on netting which is being hung on a fence. As I mentioned, container gardening is a great way to create extra growing space when you have limited in-ground growing space.

Our last section we're going to talk about is plant productivity. There's lots of different things that affect plant productivity. This alone could be multiple sessions so I'm going to hit some highlights here, give you some tips that I've found from my lifetime in gardening and things that I've learned from a lot of other really good gardeners, experienced gardeners and farmers. Just going to go over a quick review of the section here and then we'll dive in the details. Light, temperature, nutrients, companion planting, weed control, common diseases, crop rotation and pest control. These are all things that affect plant productivity.

The first one being light, soil with more sun warms faster. A south to southwest facing slope are the warmest and they're going to have the longest season. If you are actually doing a property search or you have a larger property and you're looking at where am I going to put my garden space, take this into account. This can lengthen your season based upon the slope of the land that you're putting, you're growing space on. Realize that the sun is higher in the sky during the summer. The tree shield will be different in the summer. If you're looking at your property in the winter time or in the transition seasons, particularly in the winter or spring and you're looking ahead to the summer and you're trying to figure out where do I plant things, just be aware that if you have long shadows in the winter, those long shadows aren't going to be long in the summer. They're going to be shorter. You want to take that into account.

Also, when you're putting your plants in the garden, typically speaking, most plants like full sun. Based upon that reality, you generally want to plant your tall growing plants to the north side of your garden. You don't want to plant shorter plants on the north side unless they need shade. We'll talk about that in a minute. Leafy greens and summer vegetables can grow in a dappled sunlight or part shade. Those might be ones that you could put in some shade or partial shade in your garden, fill in some areas maybe.

Leafy greens are great and even root vegetables too. Beets and things like that in particular, you can put in different spots underneath other vegetables if they have a more vertical growing habit. If they can deal with part shade then you can basically fill in those areas with those other plants. Plants that are prone to bolt or go to flower, which is going to be things like spinach in particular and a lot of lettuces, a lot of leafy greens tend to want to bolt. If you have hot summers in particular, you should look at how you can shade them in the afternoon heat.

You want them to get morning sun and then in the afternoon when the sun is most and the heat is most intense, hot direct sunlight and high heat, the hottest part of the day typically is the early to middle afternoon, shortly afternoon, noontime. That's the time that you actually want to provide them some protection because it's the combination of heat and strong sunlight that makes these plants want to go flower. If you can provide some shade even though it's hot, you can help mitigate the conditions that are going to make them want to bolt.

Assuming that you don't want to eat bitter lettuce and you actually want to eat the leafy greens and have them taste good, typically you're going to want to try to prevent those plants from bolting as much as possible. There is a difference in variety. Some varieties are less prone to bolting, some are more prone to bolting, it just depends. When you're looking at what seeds to buy, look at the description of the variety. Typically, they'll say slow bolting or not as prone to bolt or that kind of thing or heat tolerant, things like that.

Temperature. Make sure you plant in the right season. A lot of people love like sweet peas or spinach. If you plant those when you plant the rest of your garden, you're probably not going to have a very good harvest because peas, spinach and lettuce typically, especially peas and spinach, like cool growing conditions. If you plant them when you plant all your other rest of your garden, typically by the time they get mature enough to produce, it's going to be too hot for them. The spinach is going want to bolt and the peas aren't really going to want to produce very well.

Some crops like these actually work better grown in the fall. Planting them in the late summer and letting them mature in the fall, when it's actually getting cooler, can give you much better results. If you're not already planting a fall garden or looking at fall gardening and how you can plant things at the right time, definitely look at doing that. The other thing you can do is looking at planting earlier and using some season extension methods to help those plants along. One of the challenges you have with really early crops in the spring a lot of times is that the ground is too cold and too wet for effective germination, sometimes you may actually look.

Even though most people typically are not going to transplant peas, you can actually transplant peas if you do them properly and not disturb the roots as much. Things like spinach and any leafy greens you can start indoors, grow in trays and then transplant them outside later. That gives you that jump that you need so that you can plant them in the garden in the early spring, get them to grow and get a good harvest from them before they start to bolt. Ensure that your heat-loving plants get full sun. Things like tomatoes, peppers, certainly okra, any kind of melon and most squash are going to like heat and are going to need full sun in order to do well.

Cooler weather plants, again, try to give them afternoon shade if you can because that will help reduce the temperature that they're experiencing and it will help them produce better and be less likely to bolt. All right, let's talk about some nutrients real quick. There're three primary macronutrients that plants need. You probably heard this before. It's NPK, nitrogen, phosphorus, potassium. There're three secondary macronutrients and those are calcium, magnesium and sulfur. Typically, when you have a problem with your growth in your plants, it's going to be due to one of these macronutrients. Sometimes it can be a micronutrient which I'm not really go into.

The purview of this discussion is really not into depth, into troubleshooting all these different things but just to hit some highlights here. Some sources of these different nutrients, bone meal is good for phosphorus. Blood meal is good for nitrogen. Potassium you can get from wood ash as well as banana peels. Bananas are really high in potassium. Also, you can get magnesium from Epsom salts or gypsum. Epsom is not a sodium chloride salt, it's magnesium sulfate and so it actually is high magnesium. It's actually got a lot of benefits including greening yellow plants and a bunch of other things as well. A lot of people love using Epsom salt.

For tomatoes, one of the primary things that cause blossom-end rot where your tomatoes start rotting on the bottom of them is a deficiency in calcium. The easiest way to correct this typically is going to be garden lime. You actually just sprinkle it around the base and water it in. That usually, in my experience, helps correct the problem pretty quickly unless you have a really severe calcium deficiency in which case you're going to have to use some other methods. All right, so another way you can increase productivity is through companion planting. This is just hitting the highlights here because I can't go into all the different combinations. There're entire books written on this topic.

The idea is planting types together that grow well together or have synergistic growth. There's a common phrase, carrots love tomatoes. It's actually the title of one of the more popular companion planting books. It's called Carrots Love Tomatoes. Look it up on Amazon or I got a link I can give to you later. Also, like I mentioned before, tomatoes and basil do really well as well as onions. I also plant onions near my tomatoes. Beans and strawberries do pretty well together. That's kind of a strange combination but it's just one example. There are not as many that as there are combinations that are synergistic, most of the different combinations of plants are either going to be synergistic or neutral.

However, there are some that are detrimental to each other. They are antagonistic to each other. You want to distance those out that are detrimental or antagonistic to each other. Some examples are onions with peas or beans which are legumes. Onions and legumes don't mix. Also, tomatoes and potatoes or corn, you don't want to have together

primarily because the blight that you get on one can affect the other. Tomato or potato blight is the same fungus as well as tomato hornworms and corn worms. Their worms will basically affect each other so you want to keep those apart as well.

One thing you can do as well, it's not just the effect on each other but you can also have secondary benefits to companion planting. That would be that like this example, radishes repel squash bugs. I always plant some radishes next to my squash and my cucumbers because those are the plants that are affected by squash bugs and radishes help to repel them. It's a preventative deterrent by planting radishes near those plants.

All right, another way to increase your productivity is by controlling weeds which are competing with the growth of your plants. Before you go and rip every weed at your garden, which is the natural inclination of most gardeners, and toss them aside or on the compost bin or whatever you're going to do, realize that many weeds are edible. Identify it before you remove it because you might actually be able to eat it or you might be able to feed it to your animals, particularly if you have rabbits. There're lots of great weeds that are great for rabbits. You can free feed for your rabbits. We have rabbits. My daughter raises rabbits. We feed a lot of weeds to our rabbits.

A couple examples here of edible weeds, lamb's quarter as shown on this picture here is basically a leafy green. You can eat it. You put it in salads and you could also cook it. It's way more nutritious than spinaches. That is a good leafy green that you can harvest. Another example is wood sorrel which has a lemony flavor and it's often use in dishes with fish and other things. These are just two examples. There're entire books on things that you can get either growing locally in your garden or even in the wild, wild crafting and those kind of things. Look them up and learn some of those things. Identify. Again, this is part of that overarching thing is with observe being the first step. Don't just observe and say, oh that's a weed but ask the question, what weed is that? Figure out what it is and then figure out if you can eat it, if you can use it for some purpose instead of just destroying it.

For those weeds that you do need to get rid of because they're competing with your plants, one method of weed control is manual weed control. This is the one that most people know about. It's using different types of weeders to dig or scrape or get the weeds out of the garden. Realize that different weeders are used for different purposes. Often, they are designed either for a certain kind of weed or the difference between a hand weeder and a weeder with a long handle is going to be one of size and scope of what you're doing. If you're working in a small space, you're probably going to want a hand weeder. If you're working on a larger space, you're going to want a weeder with a handle.

There's also things like people will use tillers for manual cultivation basically setting the depth on the tiller for just like half an inch or so of dirt and basically, just scheming the top off to cut all the weeds off. That's another method you could use if you're using a large area. Another method is killing the weeds. I highly recommend you stay away from roundup glyphosate at all cost because it is horrific in terms of its potential impact on your health. There are some natural methods of killing weeds. One of which is vinegar spray. You can get a high concentration vinegar and basically that will help kill the plants.

I didn't put in here as a separate point but you can actually use boiling water as well or a very hot water to kill. Then flame weeding is actually something that most people don't know about but if you're a pyromaniac like most men are, will probably love this. Typically, it's used by farmers and it's done at a particular time and the particular purpose that it's used for is to try to kill weeds that emerge more quickly than the crop that they've planted. Let's say, they've prepared a bed. There're some weed seeds in the bed that have basically been stirred up and so they're going to germinate and they planted whatever it is. Let's say carrots in particular. That's a good one because carrots take a while to germinate.

There's going to be some weeds that are going to pop up before the carrots, which is bad because now they're competing with the carrots. Once those weeds emerge and they pop up, they take a flame weeder which is basically just a propane burner torch on the end and they basically flame the surface and kill those weeds and kill them with heat. Because the carrot seeds are below the surface, they're not affected. That's the basic concept of flame weeding. Then you can also smother weeds.

Mulching is probably the best method of weed control. Not just because it helps to control weeds but also helps to control soil moisture and other things as well. You can use both natural things like hay or woodchips such as the Back to Eden method that has become quite popular in the last few years recommends using. You can also use artificial ones like plastic mulches. Plastic typically tends to be used more in larger scale farming and stuff because once you get to a certain size manually cultivating acres of space is just not very easy to do. A lot of times, plastic cover mulches will be used to help control weeds.

All right, we're getting close to the end here. Some common diseases to review. Everybody loves growing tomatoes or almost everybody loves growing tomatoes. The most common disease to affect tomatoes is blight. There's two different types, early and late. It affects both tomatoes and potatoes because they're in the same family, in the nightshade family. The best thing you can do to fight blight is a preventative measure which is to prune for air movement around the plants. As I mentioned this earlier, this is the reason that I prune my

tomatoes, the bottom couple of feet of my tomatoes, is to have good air movement near the surface.

You don't want to have a really heavy foliage down near the ground because when it rains, all the moistures on the ground and then as it heats up, it evaporates and evaporates right into all that foliage. What is blight? Blight is a fungus that spreads by spores and so it needs a moist environment to thrive. If you are basically capturing all of that moisture evaporating up from the ground into your foliage and the lower parts of the plants, the blight is going to have a field day. The best thing you can do is prune the lower branches off, have good air movement underneath the plants and you're going to be less likely to be affected by blight.

If you do see blight, you want to prune off the affected branches and stems as quickly as you can and get rid of them. Take them far away from the garden so that those spores can't be transferred onto other plants. A lot of times, early blight you can kind of stay on top of. If you get late blight, most likely your plants are probably going to be dead within a week or so, possibly even quicker. Late blight is pretty nasty. It's really, really hard to do anything with. There are some fungicides you can actually spray onto your plants when you do have this. Typically, the best thing is to basically prevent the conditions that allow for the blight to thrive.

Another common disease is powdery mildew which affects cucumbers and squash. Typically, you'll see it little white spots. It will actually sometimes look actually powdery but a lot of times it looks more like a kind of a faint whitish color on the leaves. Probably the best thing to do here is to basically prune off the affected leaves and branches or you can apply a bicarbonate spray which basically put in baking soda in a mixture of water and spray it on there. The idea is basically to kill the fungus that's there. Another one is fusarium wilt which affects numerous crops. You want to cut off the affected branches below the infection in order to deal with that.

One way that you can help to prevent common diseases is through crop rotation. Now, the idea behind that is basically that if you're moving the crops around different places anything that's soil born, anything that is in the soil by moving the plant that it affects to a different spot the next year, the disease will not follow the plant. That's one of the benefits of crop rotation. Crop rotation actually is primarily to plan out across different years to increase yield and fertility. Basically, it operates in the concept that some crops do best following others from the year before.

Some examples of these are potatoes are best after corn and legumes are a good preceding crop because they fix nitrogen. In general, anything that fixes nitrogen is going to be good before a plant that is a high user of nitrogen. However, some crops do poorly following others. One example of this is carrots, beets and cabbages generally are

detrimental to following crops for various reasons I can't go to in depth right here. These are some general principles of crop rotation. If you want to start implementing crop rotation, I recommend you do some more study on the topic and figure out the best way to do that for you. It will most likely be determined by the size your garden, how many plots you have, how often you can do the rotation.

The idea, the basic principle is important is that we want to not ... if we can try to stop diseases from carrying over to the next year because we're not putting the crop they affect in the same spot ever year, this one benefit as well as by having a synergistic effect between the crop planted one year and the crop that follows it the next year.

Getting close to wrapping up here. Pest control, now this is one of the most frustrating parts about gardening. You maybe weren't on the garden for a day or two and you go out there and all of a sudden, you're like, "Ah, holes in my leaves." What do you do? Well, how do we deal with pests? There's a lot of different ways you can deal with pests. The modern way of doing it is like, all right, kill it. Kill it with chemicals. We're probably going to try to avoid that as much as possible. There's a lot of different control measures you can use. I'll just review a couple of them.

One of the best that you can do is to have beneficial insects do the work for you. Lady bugs are great example. The aphids and lots of other things, praying mantis is also a very well-known one. There're also predatory wasps and other types of insects that eat harmful insects. If you can implement these measures, I recommend that you look at doing them because it's the most natural way of controlling them. Some common pests are squash vine borer. Now, if you've ever grown summer squash and everything looked like it was going fine and dandy then all of a sudden, your leaves started wilting and you're like, what's going on here? Then you look down at the stem and it looks like it's disintegrating. That's a squash vine borer.

This is a picture of what they look like, the bottom left, the middle picture right next to that is basically what it looks like when the result of the squash vine borer's damage to the stems. In particular, it's hard to see but there's actually a larva that's in the picture there, right here that's basically eating that the stem of the vine. There's two ways to deal with squash vine borer. The best way is to prevent them from laying their eggs on your plants, on your squash or other cucurbits. A floating row cover or timing your planting so that your plants are not in the garden when those bugs are there laying their eggs is the best way.

Floating row cover is the most certain way because you have control over it. The timing method can be difficult. Typically, they're only around for about a month in most places kind of like in early June but that's not always. The timing method can be imprecise and you might end up getting some eggs laid on your plants and you don't want that.

Now, what do you do if you have squash vine borer? The first thing again is observe. Check your squash at the stem near where the plant comes out of the ground and look for small holes. Definitely, look for any of the little tell tell signs of little pithy kind of stuff coming out of any of those holes. That means that you have a squash vine borer inside.

If you do, what do you do? Well, I've done a lot of research on this because we had problems within the past. The best method that I found is basically to cut open the stem. You need to cut a slit in the stem and you actually take, find that little larva and pull that thing out or smash it or whatever. Then what I also do is I take diatomaceous earth which is basically crushed up crustacean shells. You want to get food grade DE to use for this. I sprinkle it on the stem where I cut it open and on the base of the plant. Then for those plants, any stems that were damaged, you can actually cover them over with dirt and soil because squash like a lot of other plants will root with any part of the stem that is covered with soil. It will actually root. It will basically form new roots and help to grow the plant. Basically, what it does is it helps to potentially save that shoot or that stem that was affected.

Another one is worms or caterpillars. The most probably famous one is the tomato hornworm shown on the top right there. Probably a more devastating is the cabbage worm because it affects not just cabbages but also things like kale and color greens and basically any brassica it loves. How you deal with worms? Well again, first observe. Keep close eye on all your plants. If you see them, remove them manually by hand if you can before it becomes a large infestation.

If that doesn't control them, the best control measure is BT spray. BT stands for *Bacillus thuringiensis* which is basically a bacteria that kills the worms. You can also use and people report different amounts of efficacy, diatomaceous earth or DE, to use that as well. Another common pests are beetles. The two most common in my experience are Colorado bean beetles and squash beetles. We actually also have Mexican bean beetles but those aren't as common throughout the country. These two are probably the most common types of beetles.

Again, keep your eyes out. Look for them. Not just looking for the adult form but also look for the larva or for eggs. A lot of times, the eggs were laid on the underside of the leaf. If you see them, you want to smooch them. You just smash them with your fingers. It's easier to deal with if you catch it early than if it's only after they've eaten up your plants. You want to make sure that you try to catch it early. Observe, analyze and act as quickly as possible. Methods to control them, manual removal or basically killing them. Diatomaceous earth is another way you can deal with them.

Then I got this from a farmer friend of mine. You can make a spray with neem oil and DE. That is particularly effective and I'll tell you why.

Basically, it gets the benefits of diatomaceous earth in killing the bugs but the neem oil acts as a surfactant. Neem oil itself is also an insecticide and a repellent of insects. It acts as a surfactant to make the DE stick to the leaves including on the undersides. Then when it dries out, it's basically there and the bugs start to eat it and then it cuts up their insides and kills them.

Real quick, the recipe for making that neem oil and DE spray is a quarter cup of DE per gallon of water and two tablespoons of neem oil per gallon. You mix all that together in a garden sprayer, shake it up real well and then you spray it on the plant surfaces and it's a pretty effective insecticide in dealing with any kind of outbreaks of insects that you get.

One final common insect pest is aphids. A lot of times you find these in brassicas. I seem to always have them on my Brussels sprouts. Basically, you're going to use an insecticidal soap and basically, it suffocates them or smothers them and they can't breathe.

Another whole category of pests are mammals. If you live in a suburban area, you probably have deer because there's not enough hunting pressure and the deer problem. Typically, you're going to have to deal with that by putting in fences. There're some other control measures you could use as well but fencing is probably the most effective. Rabbits is a common one. If you can use the control method hinted at in this picture and you're diligent enough, go for that. Also, fencing is probably going to be the most effective method against rabbits.

Now moles and voles and in some cases, groundhogs are another pest. They are dangerous because they burrow underground and all that. There are traps. I recommend not using poison traps or this little thing on the right, this little spike is basically a solar-powered audio deterrent. Basically, it sends out a high-pitch sound that is supposed to drive them crazy and it scares them away. In a relatively small or medium sized garden, this will probably work pretty well. I use one of these and it seems work pretty effectively. When it's in use I put in the center of my garden. Typically, I only see mole or vole activity near the edges of my garden if I have it at all. They just don't like the little sound that it makes. It tends to drive them away.

Physical control is typically our best with mammals but there are some other controls that sometimes work. One of the good ones actually for deer and rabbits is actually dogs. If you have a dog that can be patrolling the area and keeping other animals out as a deterrent. That's a really good control method as well.

All right, well, we've covered a lot. Let's review what we've gone over. We talked about what to plant and some factors and considerations to take into consideration when you're looking at what to plant. We talked about time productivity, i.e. how to get the most effective use of your

time and efficient use of your time and also making good use of the calendar and how we can basically use season extension and planting seedlings indoors and successive planting and other methods like that to help make the most out of the time that we have and even extend our season length beyond what it normally is based on our frost dates.

We talked about space productivity and different methods we can use to increase the amount of production with the given space. A lot of these have to do with vertical gardening but also have to do with interplanting. Looking at creative places to put edible crops and edible landscaping, container gardening and other things like this are good ways to increase the use of the space that you have. Finally, plant productivity involves a whole bunch of different things but we're looking at how can we increase the productivity of our plants by reducing competition from weeds, from pests, making sure they have the right nutrients that they need to thrive and also making sure that we're giving them what they need in terms of water and other things, mulch for moisture control and all those kinds of things. All these different things affect the plant productivity. You want to look at different ways you can improve on all of these.

Before we go, I just want to let you know that I've got a special page for you that you can download the slides on this presentation which you may want to do for reference. Also, on this page, we'll have some recommended books and garden tools that I recommend that I've found been helpful as well as gardening supplies you can look at. I also have a special offer for you as a thank you for watching this presentation and considering implementing some of the things that I've recommended. The reason that I do this is because I'm a gardener at heart and I love to help other gardeners do better with what they have. I want all of us to make good use of the resources we've been given to grow more food for our families.

You can get the slides and these other resources listed on the page we've set up for you at seedsforgenerations.com/hgfs stands for Home Grown Food Summit, seedsforgenerations.com/hgfs or click the link on the page to go there. Thank you so much for your time and attention. I appreciate you watching the presentation. Hopefully, it's been helpful to you. If you have any questions, feel free to contact me via the website. I look forward to being in touch with you. This has been how to increase your garden productivity and I hope it's been helpful for you. All the best to you and to your family this year as you see to grow more food and do that most of what you've been given.

Thanks so much for this opportunity, Marjory, and I hope that the rest of the event is great for you and all the other presenters. Thanks for bringing us all together and helping us to work together to be a positive influence and help more people grow more food. Thanks.

Marjory:

Okay. There we go, Jason. That's pretty amazing. If you click on the button to the right there, you'll get in touch with Jason and he has some free gifts for you available there when you click at that button just for the Home Grown Food Summit attendees. Yes, Jason, thank you so much for that wonderful presentation.

We have so many other presentations coming up. This is Marjory Wildcraft and I will catch you on the next one.



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