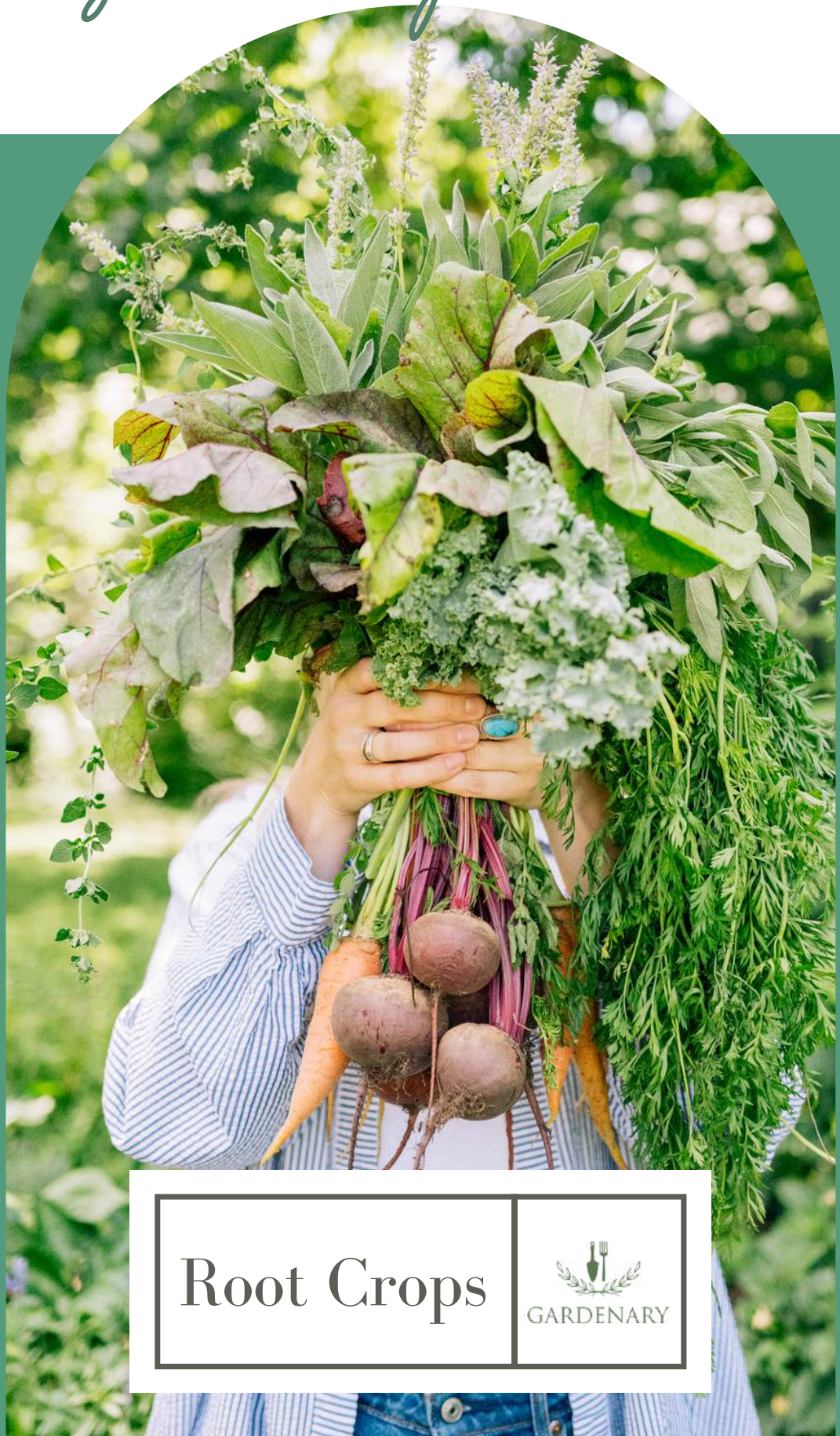
The Complete Guide to *Growing Roots*



Root Crops

GARDENARY

Gardenary

Nicole Johnsey Burke

Hello, I am

NICOLE BURKE

Nicole Johnsey Burke, the founder of Gardenary, Inc., and the author of Kitchen Garden Revival and Leaves, Roots & Fruit, is on a mission to bring back the kitchen garden and make it an ordinary part of life for everyone, no matter their level of gardening experience.

Since starting her own kitchen garden business in 2015, Burke and her company have built hundreds of kitchen gardens, taught thousands to garden through Kitchen Garden Academy, and trained over 1,000 garden consultants through Gardenary Consultant Certification.

Her work has been featured by Southern Living, This Old House, Modern Farmer, and the Garden Club of America. She believes kitchen gardens are a step that everyone can take to create positive change. To find more tips and tricks for building your own kitchen garden, visit her online at www.gardenary.com and follow online @gardenaryco.

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Introduction
GROWING ROOTS

"We pulled all the carrots, Mommy," my daughter yelled to me in passing. As if it was no big thing.

I immediately felt a sense of dread. "All the carrots?" I asked.

"All" meant an entire 4-by-10-foot garden bed planted with nothing but carrots. That's 40 square feet of garden space, if you're counting, and if you plant like I do, that's at least 400 carrots.

"Yep. Don't worry. We washed them off in our bathroom."

Four hundred carrots hauled through the living room and washed by two preschoolers in the bathroom sink? This was testing me.

But it wasn't the dirt-clogged sink or the sudden need to use up hundreds of carrots that was the issue. I was actually jealous. They'd pulled all those carrots while I was stuck in the kitchen. If you've never pulled a carrot, you don't know it yet, but a carrot harvest is not something you'd want to miss.

Growing root crops is great, but it's the moment you get to pull them from the soil that's the biggest thrill you can have in the garden. If you can beat your preschooler to the harvest.

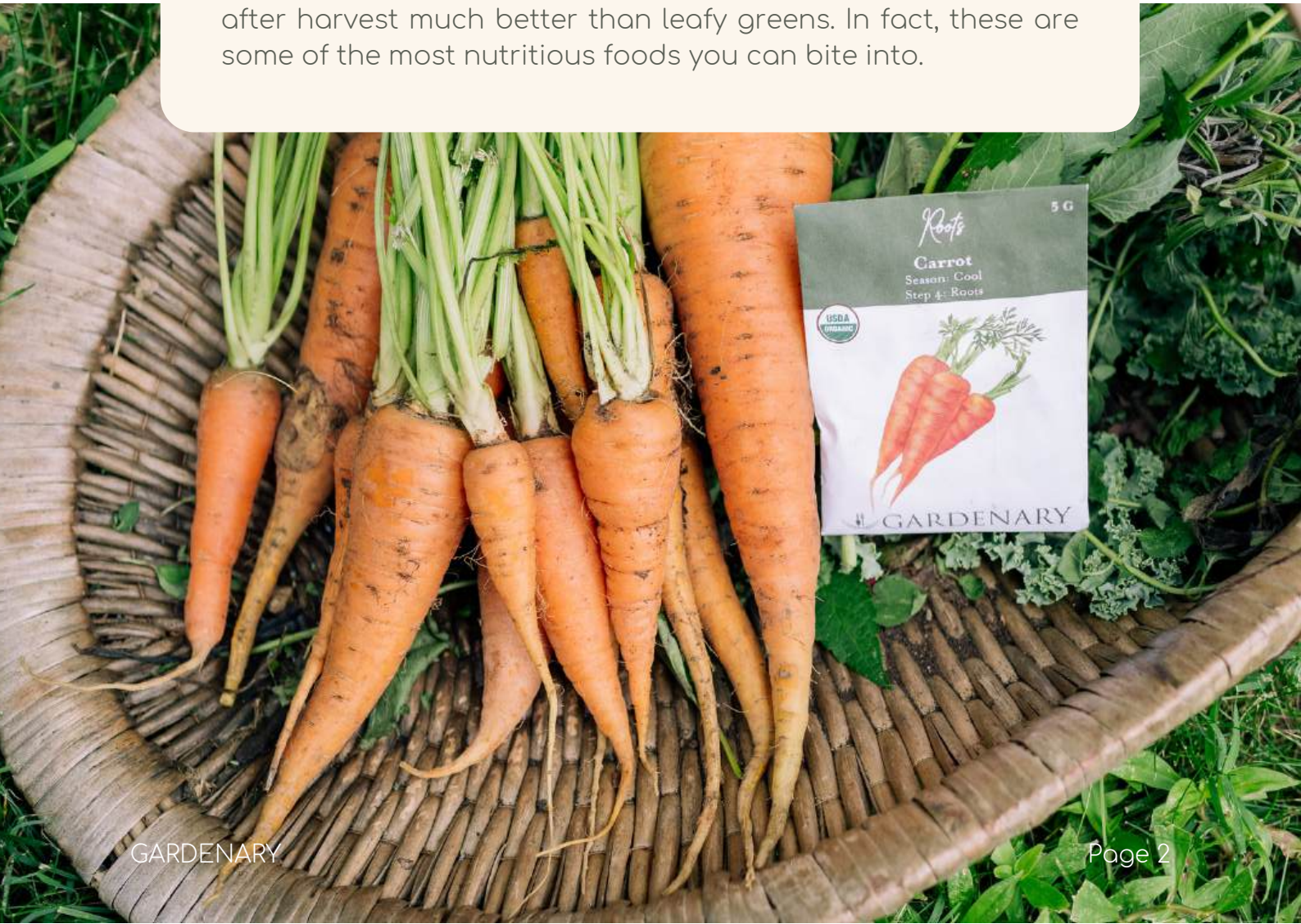
If you're new to growing hidden treasures underground, then consider this your complete guide to planting, growing, and—most importantly—harvesting your own root crops.

What Are Roots?

Roots are essentially the storage units for plants. In addition to anchoring the plants in the soil, they hold most of the nutrients needed to grow and mature. When a plant gets extra nutrients, water, or sunshine, it sends down deposits to the roots to save for the future, kind of like a plant piggy bank.

So when you grow roots, consider the fact that you're growing little stores of nutrition. The bottom parts of plants are built for endurance and longevity, which means your root harvests will last longer on the shelf or in the fridge than their leafy counterparts. This is why you often see radish and beet roots at the grocery store but not radish or beet leaves, though the leaves are just as edible.

These roots won't just last longer; they'll retain their nutrients for more days after harvest, too. Since roots are designed for long-term nutrition storage for the plant itself, carrots, beets, celeriac, parsnips, and radishes maintain their vitamin content after harvest much better than leafy greens. In fact, these are some of the most nutritious foods you can bite into.



Root Vegetable PLANT FAMILIES

Carrots

Apiaceae Family

AKA CARROT FAMILY

This family houses herbs like cilantro and dill. Its best-known root crop is the carrot, but it also includes fennel (which is technically a bulb), a carrot lookalike called parsnip, and the super nutritious root celeriac.

Radishes

Brassicaceae Family

AKA BRASSICAS

The brassica family is usually thought of in terms of leafy greens like kale and collards, but it also includes roots like radishes, turnips, and rutabaga. These plants grow bulbous roots underground as their leaves grow tall and wide above.

Beets

Amaranthaceae Family

AKA AMARANTH FAMILY

This family, best known for spinach and Swiss chard, includes beetroots, too. You'll notice the family resemblance when you see the shape of the beet leaves. Since beets can grow so wide, these plants need adequate space for the full root to form.

Garden SETUP

I prefer to grow most of my root vegetables in raised garden beds or containers, rather than in the ground. Some kind of raised box means better drainage and weed control, plus getting to start with nice, loose soil from the very beginning. Container options include grow bags and large containers with good drainage holes.

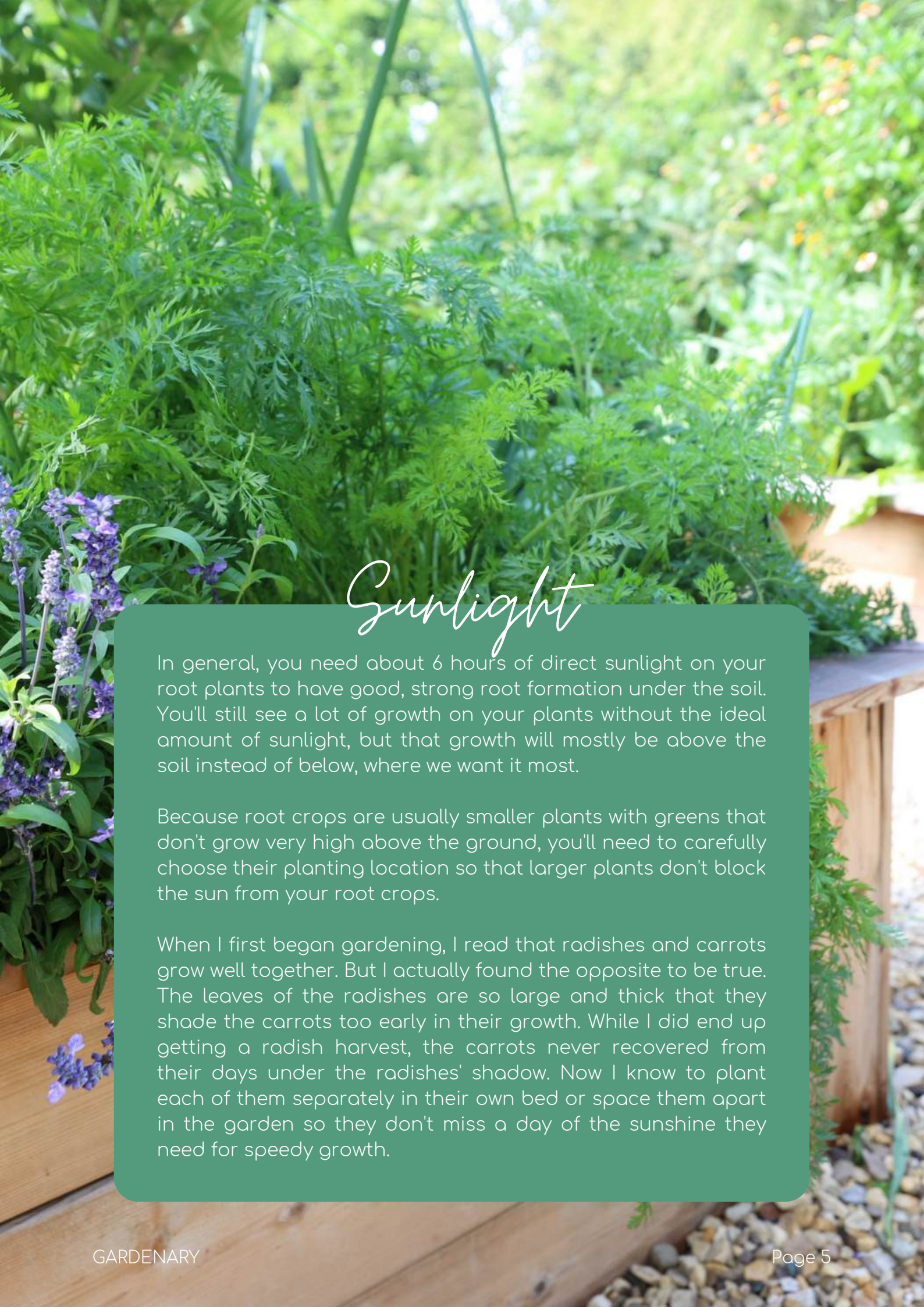
Many of these root crops, especially daikon radishes, carrots, and parsnips, need a good bit of vertical space to accommodate their long taproots, so your raised bed or container should be at least 12 inches deep.

I've found it's best to plant root crops in a bed all by themselves or along the outer edges of a bed. That way, there's no risk that other plants will block sunlight when they're just starting to grow.

Soil

A sandy loam soil blend works great. If you're filling a raised bed or container, mix some coarse sand and compost into topsoil or potting soil.

For best results, work some phosphorus and potassium into the top couple inches of soil before sowing seeds so that those essential nutrients will be right where your developing roots need them once they've sprouted.



Sunlight

In general, you need about 6 hours of direct sunlight on your root plants to have good, strong root formation under the soil. You'll still see a lot of growth on your plants without the ideal amount of sunlight, but that growth will mostly be above the soil instead of below, where we want it most.

Because root crops are usually smaller plants with greens that don't grow very high above the ground, you'll need to carefully choose their planting location so that larger plants don't block the sun from your root crops.

When I first began gardening, I read that radishes and carrots grow well together. But I actually found the opposite to be true. The leaves of the radishes are so large and thick that they shade the carrots too early in their growth. While I did end up getting a radish harvest, the carrots never recovered from their days under the radishes' shadow. Now I know to plant each of them separately in their own bed or space them apart in the garden so they don't miss a day of the sunshine they need for speedy growth.

Growing SEASON

Most of the plants we enjoy for their roots are planted in the cool season, when temperatures range from 45 to 75° F. Any colder, and root crops won't germinate. Any warmer, and most will stall their growth or never fully form a root.

Most roots love it when the days are warm, not hot, and the nights are cool, not cold. This means you'll get the best harvest from root crops during the "shoulder seasons" of spring and fall, or whatever time of year is equivalent to a cool season in your neck of the woods.

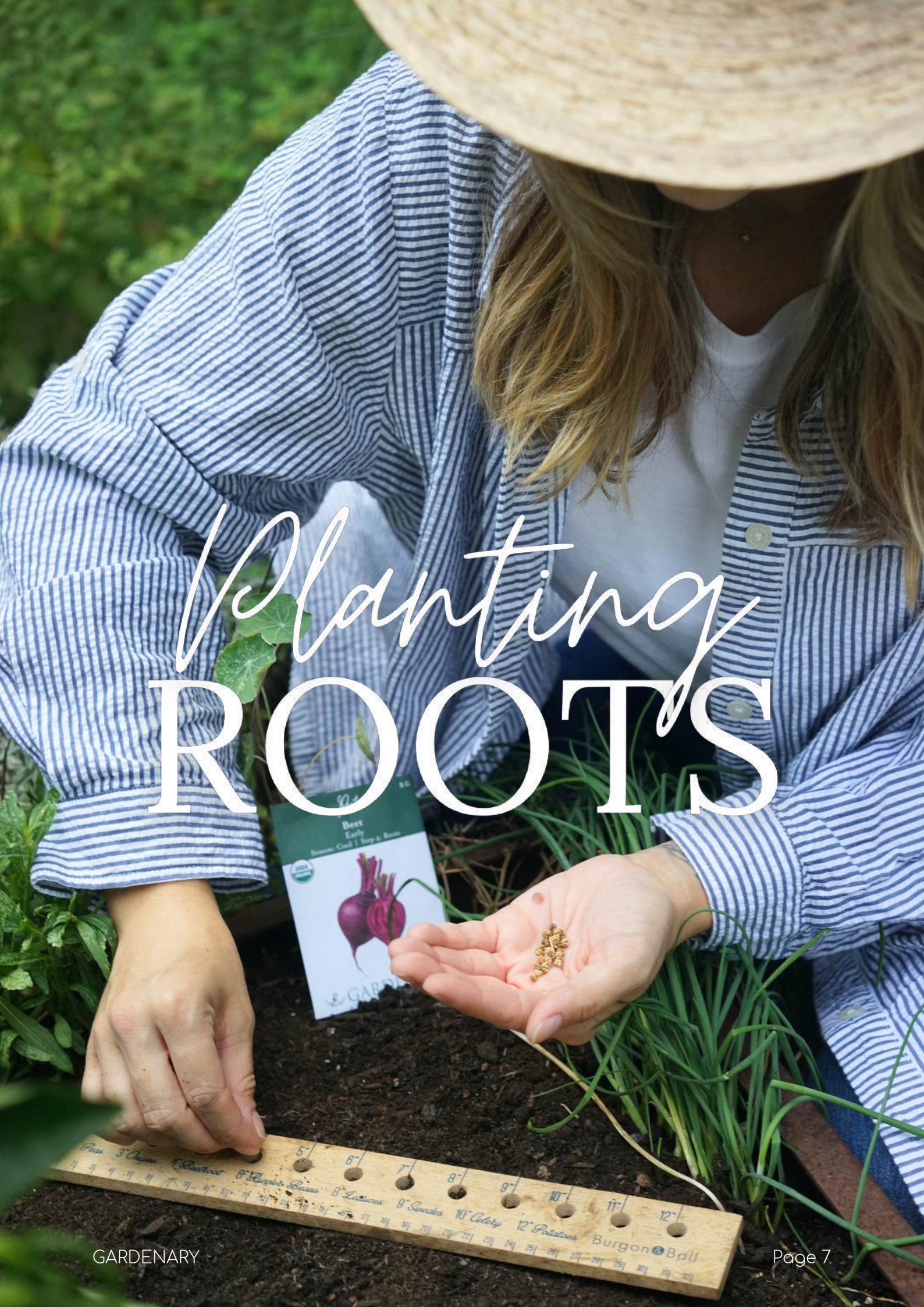
When I gardened in Houston, I planted root crops in the winter, but in the Chicago area, I grew them twice a year—in spring and in fall.

The timing can be tricky. You need the soil warm enough to be able to sow the seeds, but if you plant too late (once temperatures are already rising and your cool season is transitioning to warm), your crops will bolt and go to seed before they fully develop great roots.

And if you wait too late at the end of the warm season to plant, the soil and air temperatures will become too cold before the roots can fully form.

The trick is to look for weather that will be over 45°F but below 85°F for 2 to 3 months. If you can find this window as the weather either warms or cools, plant as soon as you can at the beginning of that timeframe.

The ideal soil temperature for the best root formation is between 55 and 75°F. Weather protection techniques can help you regulate your soil temperature and extend your growing time. During the transition from cold to cool season, for example, you could use a frost cloth or a cold frame when you first plant. And if your seeds need to germinate and begin to grow during the warm season, use a shade cloth to protect the roots and cool the soil. Then, as the seeds sprout and temperatures decrease a bit, you can remove the shave cloth and allow the plants to grow in the open air.


Planting
ROOTS
Beet
Early
Burgon & Ball

Plant SPACING

Have you ever heard of the "pot-size effect"?

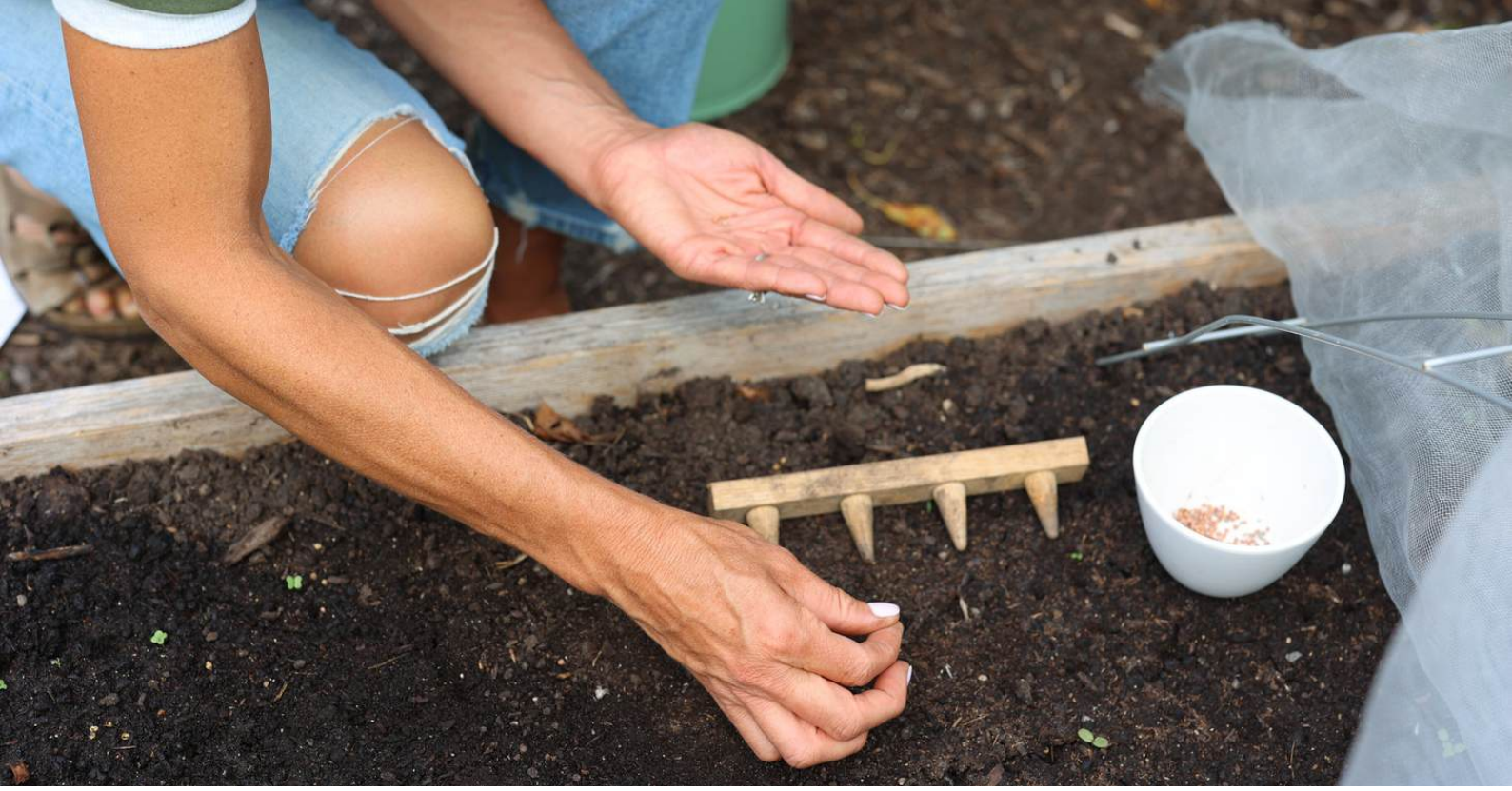
It's the idea that a plant will grow to the size of its pot and no further. It's based on scientific discoveries that, one, plants extend their roots to the edges of their container to get a sense of how big they can grow. And two, all those plant species reach larger sizes if they're simply grown in a bigger pot.

This is something to consider when you set up your root plants. Picture each tiny seed becoming a bulbous taproot, swelling and swelling... until detecting another plant nearby. Even though your root crops will likely be grown in a raised bed or at least a large container, imagine each plant as being in its own invisible pot. If you plant root seeds too close together, you've given each plant a small container that will prevent it from growing to its full potential.

So keep in mind the pot-size effect and the desired harvest size of the mature radish, carrot, beet, or even celeriac when determining how much space to give each root plant seed you put in the garden.

Below is my general recommendation for spacing your root vegetables in the garden. Keep in mind that exact spacing will vary depending on the variety of each root you're growing.

2	3	4
FINGERS APART	FINGERS APART	FINGERS APART
Radishes	*Carrots*	*Beets*



Step by Step TO PLANT ROOTS

Root crops typically don't like being transplanted. It's best to sow the seeds right where you want them to grow once the temperatures are right.

Step One
Gather your seeds, planting tools, and a watering can near the garden. Most root crop seeds, especially radishes and carrots, are tiny, so it's helpful to use either a dibber or a planting ruler to help you sow seeds.

Step Two
Before planting, use a little hand rake to clear any soil debris and rocks, break up soil clumps, and then level the surface.

Step Three
Space the seeds in rows at least 2 to 4 inches apart from one another, depending on the root you're growing. Place just 1 seed per planting hole. I recommend taking the time now to separate out your seeds as best you can so you don't have to worry about thinning as much later.

Step Four
Wait until all of your root seeds are planted to cover them. These seeds are small, so you barely need to cover them with soil or compost. Buried too deep, they'll struggle to reach the surface and might even die on their way to sunlight.

Step Five
Water in your root crops with care, as heavy watering (and heavy rain) can easily displace the seeds that you've so carefully sown.

Watering Tip

The best way to water root seeds and seedlings is from overhead with a gentle spray that allows the water to evenly disperse over the soil's surface instead of pooling in any one spot.

Step Six

Water every day or every other day. Don't allow the soil to dry out before seeds have fully germinated. This can be a bit of a commitment after planting carrots, which can take 10 to 25 days to sprout.

Step Seven

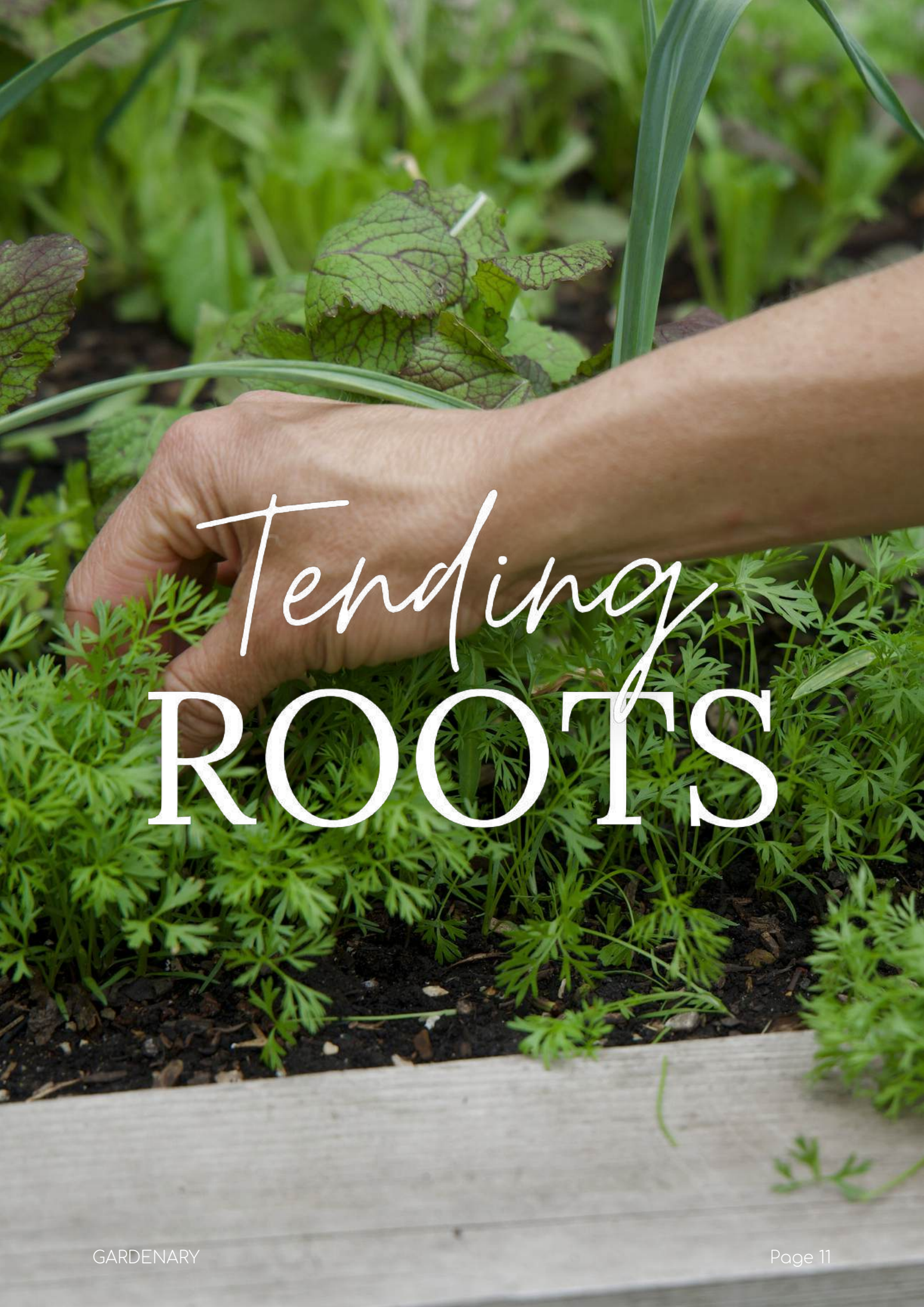
Repeat. As long as the temperatures remain in the optimal range, you can plant new root seeds every 1 to 2 weeks during the growing period.

Successive sowing won't necessarily result in more crops to harvest overall, but it does result in a steady supply of roots over a span of time, instead of 400 all at once in your bathroom sink.

Otherwise, it's difficult to know what to do with a large harvest of root crops if they're all ready at the same time.

Note

Each beet seed is actually a seed cluster containing 2 or more seeds. For every beet seed you plant, you should expect to thin several seedlings to allow each remaining beet enough room to grow to its fullest potential

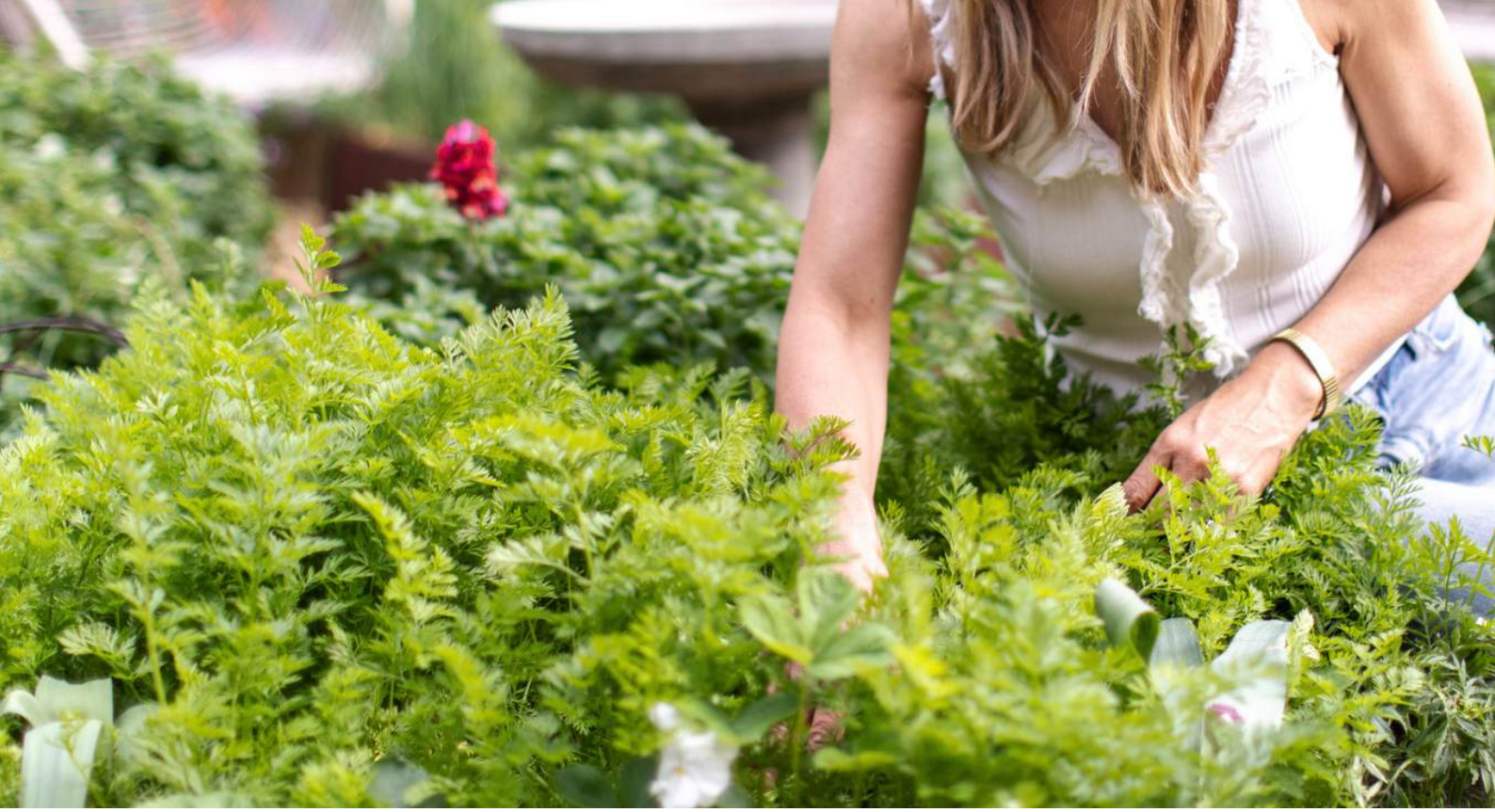

Tending
ROOTS

Watering ROOTS

Because root crops are planted by seed, consistent water at the outset is essential to be sure that the seeds make it to the seedling stage. During germination, seeds need to swell to the point of bursting, and to get to that point, they must stay wet for days. While the soil doesn't need to be soaking wet, it should be a little moist to the touch and never dry out completely.

Once the seeds are established and the greens start to show, root crops still need regular watering.

The easiest way to ensure consistent water long-term is to install a drip irrigation system that can put water at the root level, where plants need it most, rather than at leaf level. You can set a watering schedule for your root crops for every 2 to 3 days, making sure your plants are getting at least 1 inch of rain or supplemental water per week.



Fertilizing ROOTS

Root crops need extra nutrients designed to help them grow bigger roots.

Nitrogen, which is so essential to leafy greens, is not the thing to give root crops. Too much nitrogen means you'll end up with lots of greens on your plants and very small roots. On more than one occasion, I've watched lush, beautiful plants grow above the soil line, only to pull my radishes, carrots, or beets and be thoroughly disappointed by the tiny roots underneath.

Instead of nitrogen, the two main nutrients that support a plant's healthy root growth are phosphorus and potassium. Dosing your soil with these two nutrients when plants are just beginning to develop will encourage them to form thick roots.

But adding these nutrients later on in the plants' lives will encourage the formation of flowers—not the thing we're growing these plants for. That's why it's best to work these essential nutrients into the soil before planting.

When you're shopping for fertilizer for your root crops, look for an N-P-K ratio where the second and third numbers (for phosphorus and potassium, respectively) are higher than the first number (for nitrogen). And I always recommend natural and organic products like compost or animals waste products (like chicken and rabbit manures).

Thinning ROOTS

Once you've watered in your root crops and the seedlings begin to sprout, you'll see how well you did spacing each seed. Did you give every plant the proper amount of soil and sunlight it needs?

I use my fingers to measure if the seedlings are the right distance apart (two fingers for radishes, three fingers for carrots, and four fingers for beets).

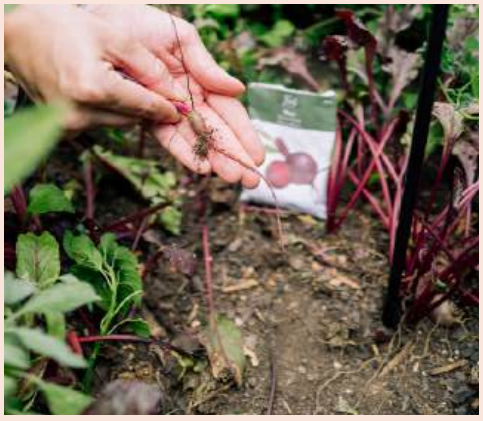
If seedlings are crowding each other, it's time to thin. Look for two seedlings too close together and pick one of those to remove, ideally whichever one seems a little more spindly or less hardy than its neighbor.

Thin root crops as soon as their first true leaves appear. Delaying might prevent your plants from putting on their best roots possible.

To thin, you can either pull the entire seedling out, root and all, or you can trim the extra seedling at the soil level with a pair of scissors. The second is less likely to damage the root of the remaining plant—plus it's less of a dirty job!

I've had some luck replanting my thinned radishes if I'm careful with the tender roots while digging them up and moving them. If you try this, keep any transplanted radishes well watered for the first three to five days in their new garden location.

Beets



Carrots

Supporting ROOTS

Clearing the soil area around your root crops is also an essential task. Once a week, take time to gently rake away debris like fallen leaves and airborne weeds that have begun to grow since you last took a look.

Root crops tend to be sensitive little things—they're constantly aware of their surroundings and will sometimes refuse to grow more if they sense there's another plant that needs space nearby.

When clearing the soil, if you see part of an underdeveloped root above ground, simply hill fresh soil around the exposed root. Hilling is the process of pushing compost or soil up along the main stem of the plant. By hilling soil, you're essentially burying your roots a bit deeper so they can more fully develop before harvest.

Harvesting ROOTS

Days to HARVEST

The challenge with waiting on root crops is not that they are necessarily slow in their growth.

It's more the uncertainty of when exactly they will be ready.

Looking at the greens on the plant can give you at least a hint as to what's happening underground. In general, the root's size imitates the growth aboveground. And fun fact: these leaves are harvestable and edible almost as soon as they start growing. Even while you're tapping your foot with impatience waiting for your beets to be ready, there are plenty of greens on those plants that you can harvest and enjoy long before the roots.

If you've given your plants adequate space, enough water, the right balance of nutrients in the soil, and all the sunshine available, many of your root crops should be ready for harvest in 2 months or under.

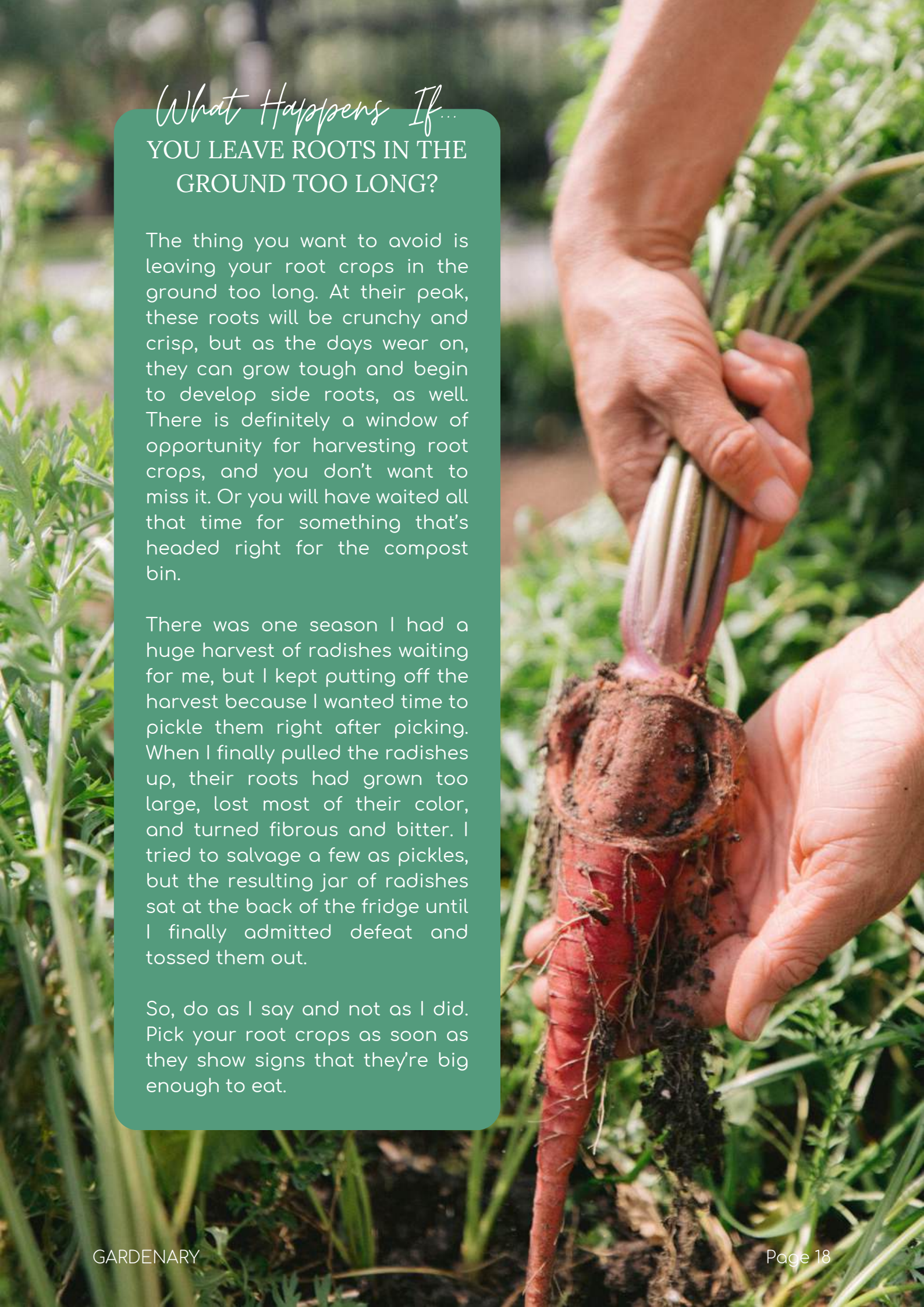
Radishes are typically ready in 35 to 45 days, though my favorite radish type, French breakfast radishes, grow in just 28 days.

Beets typically take between 50 to 70 days, while small carrots need 60 to 80 days. Celeriac and parsnips need as long as 90 to 100 days.

35 - 45
Radishes

50 - 70
Beets

60 - 80
Small Carrots



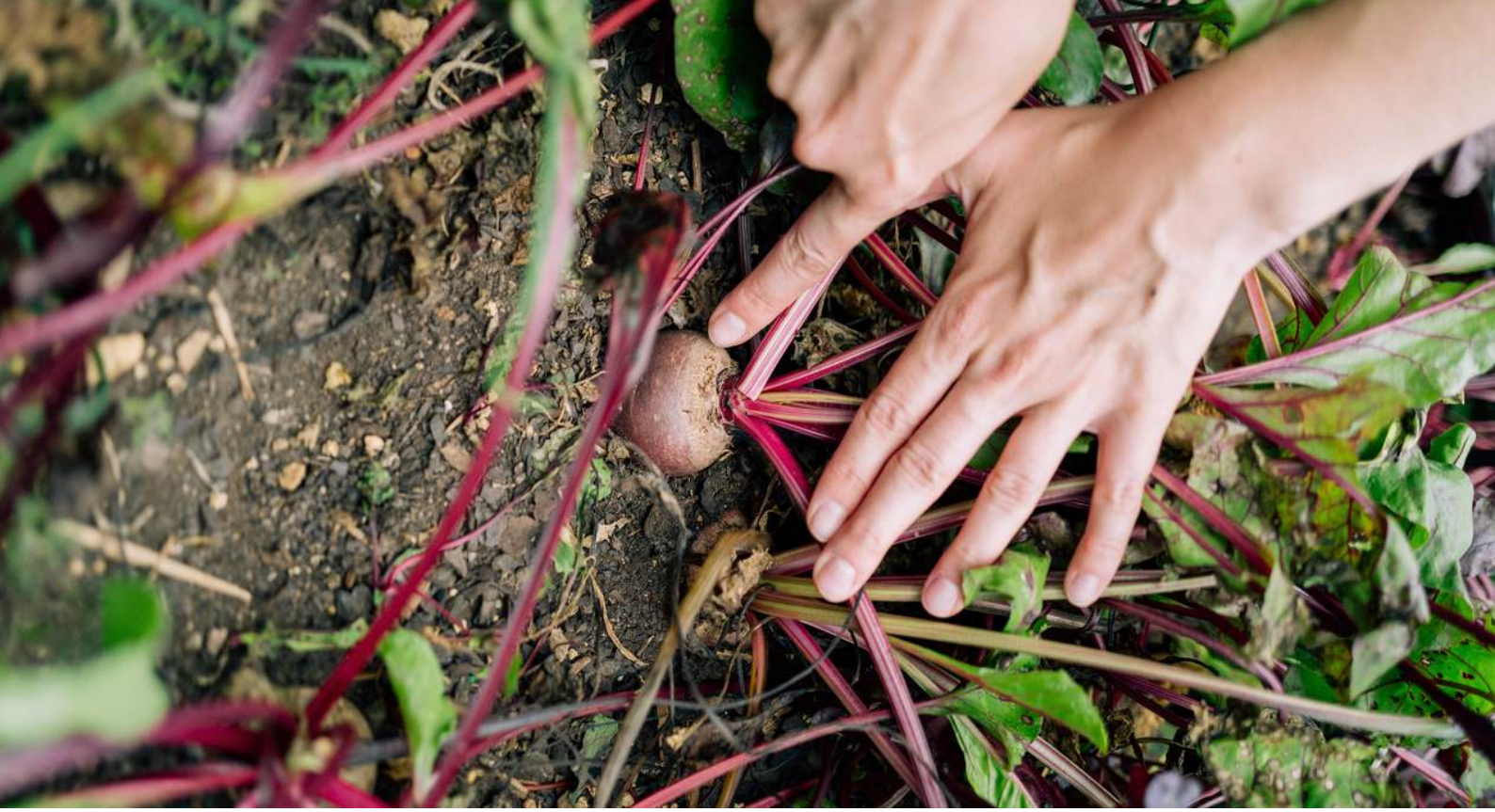
What Happens If...

YOU LEAVE ROOTS IN THE GROUND TOO LONG?

The thing you want to avoid is leaving your root crops in the ground too long. At their peak, these roots will be crunchy and crisp, but as the days wear on, they can grow tough and begin to develop side roots, as well. There is definitely a window of opportunity for harvesting root crops, and you don't want to miss it. Or you will have waited all that time for something that's headed right for the compost bin.

There was one season I had a huge harvest of radishes waiting for me, but I kept putting off the harvest because I wanted time to pickle them right after picking. When I finally pulled the radishes up, their roots had grown too large, lost most of their color, and turned fibrous and bitter. I tried to salvage a few as pickles, but the resulting jar of radishes sat at the back of the fridge until I finally admitted defeat and tossed them out.

So, do as I say and not as I did. Pick your root crops as soon as they show signs that they're big enough to eat.



Step by Step TO HARVEST ROOTS

To check if your root crop is ready, use your finger to sweep around the base of the greens to see if you can feel the shoulders, the part that pushes up against the surface. If you don't feel anything, the root probably needs more time to develop, so just push the soil back in place and check again in a week or two.

Sometimes, the roots show you they're ready to harvest by popping their shoulders above ground. They're not likely to continue growing much once they're bursting out of the ground, so that makes the decision to pull or not to pull an easy one.

Follow these steps to harvest root crops.

Step One

Water the garden well so the soil is moist. Let the water sit overnight.

Step Two

Early in the morning, use a straight tool like a hori hori to dig around the area of the root crops. Gently tug at the stems/base of each root plant to pull it up and then shake it free from dirt. Take a moment to admire your root and all its weird little stretch marks.

Step Three

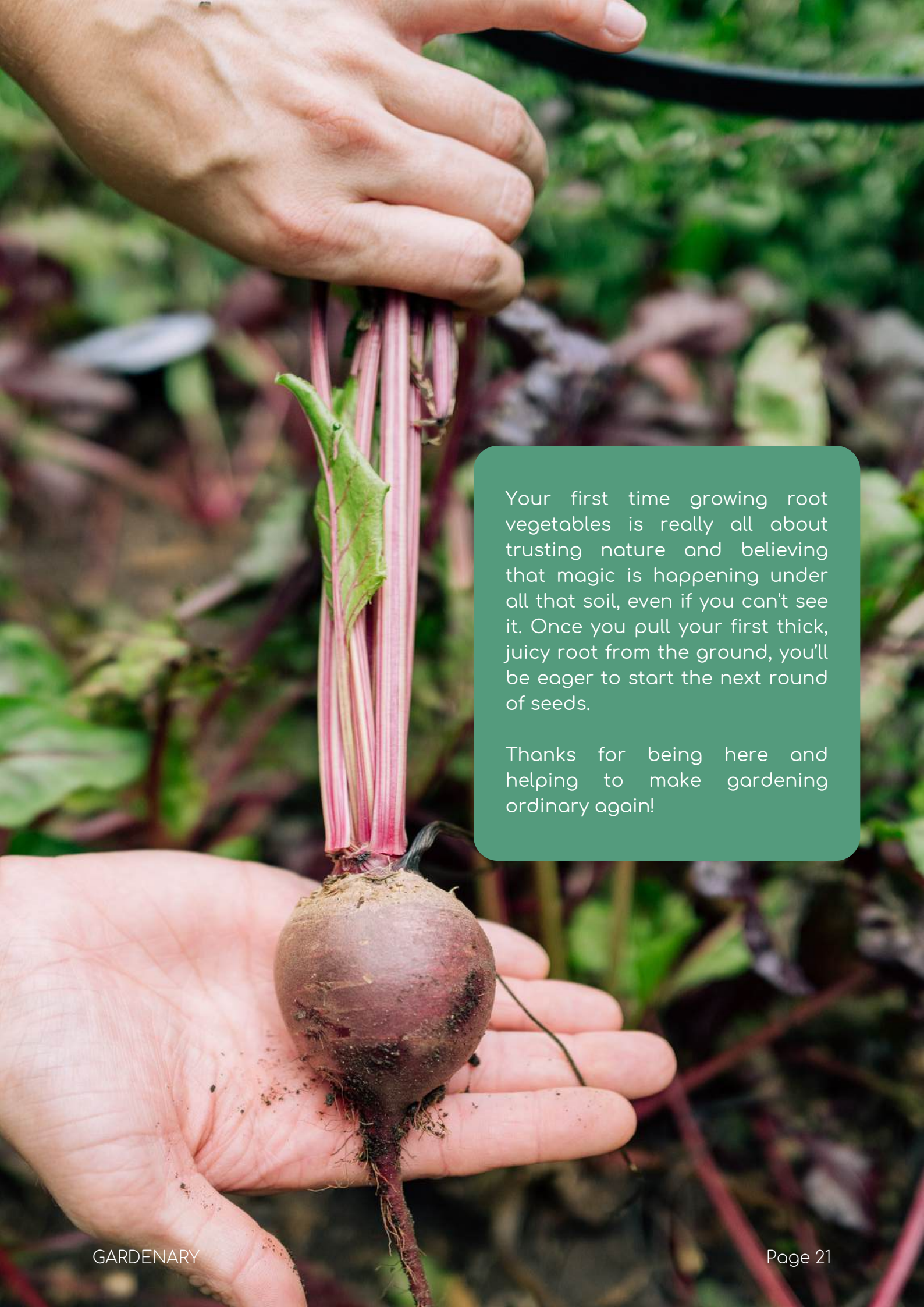
Rinse in cold water and store in a cool, dry place like a basement or your refrigerator's produce drawer. Come back the next day to search for more stems that look ready to pull so you can start the experience all over again.

Enjoying ROOTS

Fortunately for us all, most root crops store well. Their thick skin locks in moisture and nutrients during storage above ground. Larger roots can be stored in a root cellar by packing them with sawdust or sand in a container with a lid that's not fully closed. Or you can store these vegetables in the refrigerator for a few weeks before they lose some flavor and crispness.

Don't forget that the leaves of all your root crops are edible, but they'll wilt quickly. Those leaves aren't built for storage like the roots, which, again, is why you typically see roots without their leafy green tops at the grocery store. If you catch them fresh, those greens are every bit as healthy as kale and spinach leaves.

There are plenty of ways to enjoy your roots in the kitchen. Slice them up and toss them on a salad, roast them with some olive oil, or play around with pickling or fermenting them. Larger roots like daikon radishes, parsnips, and turnips do great in an air fryer for a healthier alternative to French fries. Carrots, of course, can be juiced for a tasty garden-fresh drink.



Your first time growing root vegetables is really all about trusting nature and believing that magic is happening under all that soil, even if you can't see it. Once you pull your first thick, juicy root from the ground, you'll be eager to start the next round of seeds.

Thanks for being here and helping to make gardening ordinary again!


Thank you
for being part
of the
Gardenary
community!