Oregon State University
Extension Service
Master Gardener™

THE WINTER CARROT PROJECT

A community science project with the Union County Master Gardeners

Carrots are a popular and nutritious garden vegetable that are hardy to most winter temperatures in our region. In fact, carrots even are more delicious after they experience a few frosts.

When carrots get cold, they increase the amount of sugar in their cellular fluid. Because a sugar solution freezes at a lower temperature than water, this fluid acts like antifreeze and prevents cells from from expanding and bursting when exposed to freezing temperatures. The result: carrots that taste like candy - that you can harvest all winter long!

WHAT

This community science project aims to gather data on planting times, germination, and harvest dates + yields of carrots grown for winter harvest in Union County.

WHO

Any Union County gardener with an in-ground or raised bed garden plot (or large containers) that gets at least 6 hours of sun a day. Must be available for planting and tending carrots in your home garden late July through mid-August, harvesting in December and January, and submitting data in February. **Sign up to participate by filling out the form at this link: https://beav.es/ppJ**

WHEN

Gardeners will plant provided carrot seeds from late July - early August 2024, recording a small amount of data throughout the growing season. Gardeners will submit their finished data in February 2025. Gardeners get to keep all carrots they grow :) The provided seeds can grow up to 10 pounds of carrots.

AT A GLANCE

JULY - AUG 2024

- Prep soil for carrot patch
- Plant seeds & record data
- Water & weed carrot patch

SEPT - NOV 2024

- Follow suggestions for watering and maintaining carrot patch
- Provide protection if desired

DEC 2024 - JAN 2025

- Starting December 15 or later, harvest!
- Record harvest data
- Give carrots extra protection for temps below 20°F if no snow cover
- Enjoy frost-sweetened carrots from your garden!

FEB 2025

- Complete data collection
- Enter data online or return your data sheet to the Extension Office: 10507 McAlister Rd, Ste 9, La Grande, OR 97850

Winter Carrot Project Seed Specs

Variety: ‘Bolero’ (F1) carrot seed, pelleted

Description: Uniform, thick, slightly tapered roots that hold well in the ground and are great for storage. Mature carrots measure 7-8" long.

Optimum soil germination temp: 77-86° F

Days to germination: 7-21

Days to maturity: 75 (can be up to 95 when planted for fall maturation)

Provided packet contains 150 seeds

The Winter Carrot Project in Photos:

1. Using a garden tool to create a narrow, 2-inch-deep trough.

2. Gently pressing seeds to ensure good contact with the soil.

3. Top-dressing with potting soil to prevent soil crusting and increase moisture around seeds. July 2o initial planting date.

4. Finished carrot rows (shown with drip irrigation T-tape - not required!).

5. Freshly germinated carrots, one week after planting.

6. Nearly mature carrots in mid-October, 75 days after germination.

7. Dec 17 carrot harvest - about 8 lbs - 22 weeks after seeding.

8. Dec 17 carrot patch after harvest - leaves tucked around plants for added insulation.

9. January carrot patch with floating row cover. Snow will provide added protection.


1.


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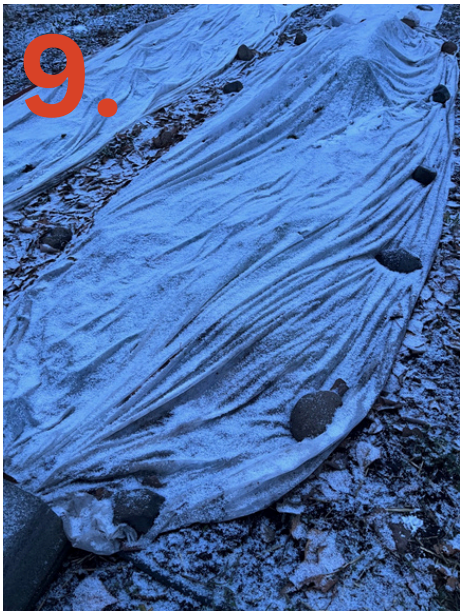
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Instructions -

Select and Prepare a Site

Carrots need a minimum of six hours of sunlight per day. Eight or more is ideal for the fastest growth. They also need regular moisture, so pick a spot that is close to a water source. For this study, the planting area should be unprotected by a structure such as a greenhouse or given supplemental heat. The provided seeds will grow a line of carrots up to 12 feet long if planted in a single row. Depending on how your garden is organized, you could prepare different size sites (see Table 1). We recommend planting all of the test carrot seeds together as a block, rather than planting several patches throughout your garden, as they will be easier to consistently water and protect from winter weather if they are all together.

Whatever the size of your planting area, organize the carrots in rows, spacing the carrot seeds about an inch apart from each other, with a minimum of 8 inches between rows. For example, if you did a 4' x 3' planting area, you would have three rows of carrots each 4' long, with nine inches of spacing on either side of each row.

Planting Area Size	Number of rows
12' x 1'	1
6' x 2'	2
4' x 3'	3

Table 1: Suggested Planting Areas

Carrots perform best in loose, fertile soil with good water holding capacity and a pH of 6-6.8. That kind of soil isn't always available! If your site needs it, add finished compost to improve the soil texture and water holding capacity, and fertilizer to supplement any missing nutrients.

Do not add manure unless it has been composted or aged for at least 120 days to significantly reduce the likelihood of harmful pathogens ending up on your carrots. Because carrots have direct contact with the soil and are often eaten raw, this is especially important. Pathogens like E.coli and salmonella can't be easily removed from the root surface once they're on it.

Heavy, compacted, or very rocky soils can be a challenge, possibly resulting in split, oddly shaped, or stunted carrots. If your garden has one or all of these conditions, consider growing the carrots in a container. It is possible to grow carrots in containers and raised bed gardens. Be aware that overwintering is more of a gamble in these situations, as the roots will experience colder temperatures and will be more likely to suffer cold damage. We welcome data from raised bed or container grown carrots in this study.

Extension Publications that can help you with site preparation and planning:

Growing Vegetables in Central Oregon - https://beav.es/pSH

Food Hero Carrot Growing Guide - https://beav.es/pSV

WSU Carrot Growing Fact Sheet - https://beav.es/pS9

Plant Seeds and Record Data

One of the biggest challenges to growing carrots for winter harvest is that they need to be planted when summer temps are high. Carrots won't germinate (sprout) well in hot, dry soil, so you will need to make an extra effort to keep the soil consistently moist until the seeds germinate. However, even regular watering isn't always enough, as carrot seeds need to be planted at a shallow depth. Even with daily watering, the top 1/4-inch of most soils will be bone dry by afternoon on a hot day.

Another barrier is soil crusting, a normal side-effect for many soil types that are overhead watered or left bare. If the soil crusts, carrots seeds will have a hard time breaking through. The following technique is aimed at overcoming both moisture loss and soil crusting to get good carrot germination even in a heat wave.

- Select a planting date within the study range: **July 20 - Aug 3 for Union County participants**.
- Mark out your rows and create a small trough where the seeds will be planted. Use a trowel, hori hori, triangular weeder, or just your hand to create a dip in the soil that is as long as the row and about 2 inches deep. See photo 1 for an example. Prepare each carrot row in this way.
- Sprinkle about a 1/4-inch depth of potting soil or fine-textured compost at the base of each trench. Granular fertilizer can also be applied at this time.
- Place the seeds along the bottom of each trench, spacing them 1 inch apart. **Plant the entire packet of seeds**, about 150 total. The provided seeds are pelleted, which means they have a clay coating. This makes them easier to handle and helps hold moisture near the seed. Spacing them 1 inch apart eliminates the need for thinning later.
- After all the seeds are placed, gently press them into the soil along the full length of each row. This gives them good contact with the soil, improving their exposure to moisture. See photo 2.
- Sprinkle another 1/2-inch of potting soil or fine-textured compost on top of the seeds and water them in with a gentle spray nozzle. The bottom of the trough should now be about an inch or two from the soil surface. See photos 3 and 4.
- Record your seeding info in the Planting Data section while it's fresh in your mind.
- Water once a day or as needed. Because the trough is lower than the ground level, the bottom of it (where the seeds are) will be in shade at the beginning and end of the day. This shade is minimal but crucial when it comes to soil moisture, protecting that band of soil from getting fully dried out, even on a hot day. Try this same method to help beet, lettuce, or other fall vegetable seeds sprout in mid-summer temps.
- Watch for germination, which could begin as soon as a week out and can take as long as 3 weeks to get going. When it does, record under Germination & Growth Data.

If you are growing in containers: For the seeds provided, you will need several large containers (at least 12" deep), spacing the seeds at least 1" apart in all directions. You will not need to apply the trench method in a container filled with potting mix as it has adequate moisture-holding capacity, just plant the seeds at a 1/4-inch depth. We recommend adding an all-purpose fertilizer blend (an N-P-K or 6-4-4 or similar) at the rate listed for containers on the product label.

Observation and Maintenance

Watering: Once the seeds have germinated, you can water less frequently. Every 2-5 days should be sufficient, depending on your soil type and the weather. Encourage carrot roots to grow straight down by watering deeply. You may water with a hose & spray nozzle, a soaker hose, drip irrigation tubing, or a sprinkler. A sprinkler will be the least efficient, distributing the water unevenly and putting it in places you don't need it. For this reason, it's not recommended but it works in a pinch.

If watering by hand with a hose & spray nozzle, water until the soil surface stays shiny and saturated-looking for about 15 seconds after spraying. For any of the watering methods, it's a good idea to take a look at how deeply the water is going down after a typical watering. A good way to measure that is by digging a narrow hole (in a place that won't bother the young carrots) about an hour after watering to check how far the water has infiltrated. The goal is 6-8-inches per watering. If your irrigation method is not getting water that deeply into the soil, water for longer or try a different method. If it is reaching down 6-8 inches, you can continue watering that way without checking the infiltration depth again.

Once the carrot greens are a few inches tall, use your hand to push soil around the seedlings, filling in the trenches so the soil surface is now level.

Continue watering your carrots until the first hard freeze. Fully hydrated carrots will survive better in winter conditions than dehydrated carrots.

Observation: Notice if the carrot greens look healthy and bright green. If they are yellowing, you may need to add some all-purpose fertilizer. If you notice pests or other problems, consult the resources linked to above or contact your local Master Gardeners for advice on how to manage.

The carrots should be nearly mature by mid to late October, when diminishing day length and cold temps will start slowing growth to nearly a halt. This carrot variety reaches mature size 75-95 days from germination (see picture 6). They are technically harvest-ready at this point, but this project is testing winter hardiness and yields, so we'll wait another couple of months!

Seasonal protection: As the weather gets colder, there are a few things you can do to add a little protection. Carrots are hardy down to at least 20° F (possibly lower) without protection. As winter progresses, the tops will start looking sad (some of the leaves will turn yellow or brown), but this isn't a concern. The part of the plant we want to protect at this point is the root. You can gather leaves or straw around the bases of the plants (see picture 8) to insulate the soil. You can also provide cover in the form of floating row cover. This is a spun cloth that allows light and water to pass through but adds up to 8° F of temperature buffer. You can place it directly over the plants (see picture 9) or drape it over supports (plastic or metal hoops). Be sure to weigh the sides with rocks or anything heavy (t-posts work great!). Snow will also provide significant insulation if it's covering the carrots when a cold snap hits. With these minimal protections, carrots can survive single-digit or even sub-zero temperatures.

For containers: In mid-fall, you may need to move your carrot containers to a sunny or more protected site (out of the wind, away from where snow will drift or pile up, etc.). You may even wrap them (as a cluster or individually) with bubble wrap, burlap, or a cloth tarp to create extra insulation for the sides of the containers. Two layers are better than one (i.e. bubble wrap, then a dark cloth). Keep in mind that darker colors will help absorb more warmth during the day. Floating row cover may also be used to protect the carrot tops.

Harvest

Now comes the best part! Harvesting winter carrots isn't all that different from harvesting summer carrots, but there are a few things to keep in mind.

We're studying how carrots grow in winter conditions in our county, so hold off on your first harvest until at least December 15 or later if the weather cooperates.

- You may begin harvesting as soon as December 15. If possible, leave at least half of the carrots in the ground for future harvests.

- The carrots will be sweeter and more flavorful if you let them go through several frosts & freezes before you harvest.

- For this study, plan to harvest some carrots in December and some in January, with an optional third harvest in February. Doing multiple harvests lets you experience how the carrots' flavor changes with more exposure to winter weather. It will also test how successful your garden site is at holding this variety of carrots deep into the winter.

Things to keep in mind:

- Never harvest carrots when air temps are below freezing or if the ground is frozen solid. Pick a harvest window that is later in the day, several hours after air temps have risen above freezing. This allows the plants to thaw and rehydrate before they are harvested.

- Avoid removing a covering of snow to harvest carrots if there are predicted temps below 20°F in the near-term forecast. That snow will provide crucial protection. It's best to leave it in place until the cold snap passes.

- If sub-zero temps are forecasted at any point during the harvest phase of the project, you may want to harvest most of your carrots to avoid potential significant loss. In this situation, harvest all but a small test patch (5-10 carrots), leaving that to sit until late January or February to see how it performs in the extreme temps.

- Harvest gently so as not to damage carrots that will stay in the ground. Roots that are nicked by harvesting tools will be more prone to splitting.

Submit Data

Please record all requested data throughout the carrot growing process on the provided form and turn it in no later than February 28, 2025. You may enter your data into the online form (link provided on data sheet) or turn in a paper copy.

Thank you for participating! Sharing the details of your winter carrot growing experience will help us learn more about growing winter vegetables in our area. Any extra tidbits you can provide will contribute to our understanding for how various sites may perform differently in similar weather. We will share the results with all active participants. If you enjoyed the experience, we invite you to participate again in a future year!

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