



How to develop a planting plan for vegetables in Virginia: A sample spreadsheet

Authored by Shawn Jadrnicek, Extension agent, Agriculture and Natural Resources, Virginia Cooperative Extension, Virginia Tech, and Emmanuel Torres Quezada, Assistant Professor and Extension Specialist, Eastern Shore Agricultural Research and Extension Center, Virginia Tech

Always Have a Plan

One of the many challenges of crop production is the year-to-year fluctuations in plant response, which in some cases might seem random. However, the underlying principles of plant performance are very basic in nature. Year-to-year fluctuations for most crops will be driven by changes of a single or a combination of the following factors: air temperature, soil temperature, photoperiod, water availability, and nutrient availability.

While farmers cannot influence all these factors, unless their cropping system is under a controlled environment, they can try to match their planting dates with the time of the year that is considered historically most adequate for planting their crops. This approach is what gave birth to what we commonly refer to as growing seasons. In simple terms, a farmer could establish his or her crop within the recommended growing season and likely obtain good results. However, changes in topography, local weather, selling prices, and plant species create an array of potential alternative seasons for the farmer. In addition, it is unlikely that a farmer will grow only one crop species per year, in which case, it would be recommendable to create a planting plan that takes into consideration variations in weather, location, and the length of the growing season of each species. Extending the harvest timeframe is accomplished by planting multiple successions of the same crop according to climate conditions.

This publication proposes an excel spreadsheet to aid farmers, market gardeners, and home gardeners when creating a planting plan in different areas of the state of Virginia. In order to fully take advantage of the spreadsheet, it is useful to understand some key concepts first.

Julian Calendar Days

Refers to a continuous count of the days of the year beginning with January 01 (day 1) and finishing with December 31 (day 365). This spreadsheet does not take into consideration leap years. Julian calendars allow easy adjustment manually or with formulas embedded in the spreadsheet.

USDA Plant Hardiness Zones

It refers to a subdivision of geographic areas based on the average annual minimum winter temperatures, divided into 10°F zones. There are five plant hardiness zones in Virginia (Table 1). Please visit the USDA Plant Hardiness Zone Map for more information about different plant hardiness zones in the USA

[\(https://planthardiness.ars.usda.gov/\)](https://planthardiness.ars.usda.gov/).

Table 1. USDA plant hardiness zones of Virginia and average dates for first fall frost and last spring frost.

Plant Hardiness Zone	Average annual minimum winter temperature	Average first fall frost	Average last spring frost
6A	-10 to -5 °F	10/5 - 10/15	5/5 - 5/15
6B	-5 to 0 °F	10/5 - 10/15	4/25 - 5/5
7A	0 to 5 °F	10/15 - 10/25	4/15 - 4/25
7B	5 to 10 °F	10/25 - 11/5	4/5 - 4/15
8A	10 to 15 °F	11/5 - 11/25	4/5 - 4/15

Days to Maturity

Refers to the number of days that it will take the plant to produce a commercial product that is ready to harvest.

Spring Fall Factor

Refers to the additional days required for a plant to reach maturity based on shortened photoperiod and cooler temperatures.

Access the Planting Spreadsheet

To correctly take advantage of the spreadsheet please follow the following steps:

Choose a spreadsheet matching the climate zone of the farm or garden. For ease of use, descriptions and instructions for each column are located in the first row. Formulas link cells and make calculations easy. Be sure to only change cell numbers that are not generated by a formula. For example, if you need to change a date, change the Julian calendar date instead of the Gregorian calendar date since the Gregorian date is generated automatically using an excel formula. If a cell is generated by a formula, you will see a = followed by the formula in the formula bar above the spreadsheet.

When the spreadsheet is first opened, the columns are sorted alphabetically by crop type and variety. The maximum number of recommended successions of each crop for the specific climate is displayed in the spreadsheet and labeled as 01,02,03 to denote the successions. Delete successions that don't match the estimated harvest start and end dates for your marketing or family needs. Storage crops like potatoes have a single succession listed with the maximum date range listed in the notes. Choose varieties for your farm or garden that are resistant to disease and pest problems. Recommended varieties are found in *The Southeastern Vegetable Crop Handbook* and *The Mid-Atlantic Commercial Vegetable Production Recommendations* and are updated regularly. Each variety will have specific days to maturity. As you change the varieties you will need to update the days to maturity column to reflect the change.

The spreadsheet is easily sorted to make identifying and organizing information easier. Some useful sorts include sorting the Julian calendar seeding dates in column D from smallest to largest to produce a plan that lists planting dates of all the crops in chronological order to easily keep track of crop plantings as they progress through the year. A direct seed planting plan is generated by sorting the Direct Seed column C. A harvest calendar is created by sorting column R from smallest to largest for a chronological list of harvest dates.

The Units for 1 share column X denotes how many units you need for your family, market or CSA for each succession planted. A single unit on the sheet represents a single CSA share which typically feeds a family of 3-4. Add or decrease this number depending on how many units you need for you family, CSA or Farmers Market. You can also change the unit size (column W) which is the amount of produce in each unit measured by pounds, bunches or count. The unit of measurement is listed in column AQ. If you change the unit amount or the size of the unit, formulas in the spreadsheet automatically adjust the row feet, bed feet, plants needed, flats needed etc.

Adjust the rows per bed (column Z) to match your bed size and planting arrangement if different than listed.

Seed weight columns (AH, AI, AJ) are useful for direct-seeded crops. Seed weight may vary by variety and seed batch and is listed on the seed packet and should be adjusted as needed. Seed can be weighed before and after planting to determine if seeding targets were met.

Column AL, AM, AN, AO, and AP are used for quickly assessing how many flats or individual seeds are needed for each planting. Formulas for flat sizes 128 and 32 are depicted with different germination rates. Adjust the formula for additional flat sizes as needed if different than listed.

Please visit

https://www.pubs.ext.vt.edu/content/pubs_ext_vt_edu/en/SPES/spes-401/spes-401.html to access the latest version of the planting spreadsheets, according to your plant hardiness zone 6A, 6B, 7A, 7B, or 8A.

References

Hessler A. 2019. Virginia's Home Garden Vegetable Planting Guide: Recommended Planting Dates and Amounts to Plant. Virginia Cooperative Extension. Available at:

<https://piedmontmastergardeners.org/wp-content/uploads/2020/09/426-331.pdf>.

USDA. 2021. USDA Plant Hardiness Zone Map.

Available at: <https://planthardiness.ars.usda.gov/>.

Holmes, G. J., Kemble et. al. 2021. *Vegetable crop handbook: For the southeastern U.S.* Vegetable Growers News. Available at:

<https://content.ces.ncsu.edu/southeastern-us-vegetable-crop-handbook>

Wyenandt, C.A. et al. 2020 *Mid-Atlantic Commercial Vegetable Production Recommendations*. Virginia Cooperative Extension. Available at:

<https://njaes.rutgers.edu/pubs/publication.php?pid=e001>

Visit Virginia Cooperative Extension: ext.vt.edu

Virginia Cooperative Extension is a partnership of Virginia Tech, Virginia State University, the U.S. Department of Agriculture, and local governments. Its programs and employment are open to all, regardless of age, color, disability, gender, gender identity, gender expression, national origin, political affiliation, race, religion, sexual orientation, genetic information, military status, or any other basis protected by law.

2022

SPES-401NP