

Delaware Cooperative Extension



This is a section from the

2024/2025

Mid-Atlantic Commercial Vegetable Production Recommendations

The recommendations are **NOT** for home gardener use.

The full recommendations are available online at:

<https://www.udel.edu/academics/colleges/canr/cooperative-extension/sustainable-production/commercial-crops/vegetable-crops/midatlantic-vegetable-recommendations/>

Printed copies of the recommendations are available for purchase at the New Castle, Kent and Sussex County Extension Offices in Delaware.

This publication will be revised biennially. In January 2025, a Critical Update with important updates for this publication will be communicated through the above website.

These recommendations were prepared and reviewed by individuals from Cornell University, University of Delaware, Delaware State University, University of Maryland, Penn State, Rutgers University, Virginia Tech, and West Virginia University with the purpose of providing up to date information for commercial vegetable growers in the Mid-Atlantic states of **Delaware, Maryland, New Jersey, Pennsylvania, Virginia, and West Virginia.**

Disclaimer

- The label is a legally-binding contract between the pesticide user and the manufacturer.
- The user **MUST** follow all rates and restrictions as per label directions.
- The use of any pesticide inconsistent with the label directions is a violation of Federal law.

G. Resources

1. Vegetable Seed Sizes

Table G-1. Vegetable Seed Sizes

Use this table to estimate your seed requirements. Varieties and seed lots can differ in seed size.

Check with your seed supplier and the label on the container for more precise information.

Crop	Seeds/Unit Weight	Crop	Seeds/Unit Weight
Asparagus	13,000-20,000/lb	Mustard	15,000-17,000/oz
Beans: baby lima	1,150-1,450/lb	Okra	450-550/oz
Beans: Fordhook	440-550/lb	Onions: bulb	105,000-144,000/lb
Beans: snap	1,600-2,200/lb	Onions: bunching	180,000-200,000/lb
Beets	24,000-26,000/lb	Parsnips	7,500-12,000/oz
Broccoli	8,500-9,000/oz	Parsley	240,000-288,000/lb
Brussels sprouts	8,500-9,000/oz	Peas	1,440-2,580/lb
Cabbage	8,500-9,000/oz	Peppers	4,000-4,700/oz
Carrots	300,000-400,000/lb	Pumpkins	1,900-3,200/lb
Cauliflower	8,900-10,000/oz	Radishes	40,000-50,000/lb
Celery	60,000-72,000/oz	Rutabaga	150,000-192,000/lb
Collards	7,500-8,500/oz	Spinach	25,000-50,000/lb
Cucumbers	15,000-16,000/lb	Squash: summer	3,500-4,800/lb
Eggplants	6,000-6,500/oz	Squash: winter	1,600-4,000/lb
Endive, Escarole	22,000-26,000/oz	Sweet corn: normal, sugary enhanced	1,800-2,500/lb
Kale	7,500-8,900/oz	Sweet corn: Super sweet (Sh)	3,000-5,000/lb
Leeks	170,000-180,000/lb	Tomatoes: fresh	10,000-11,400/oz
Lettuce: head	20,000-25,000/oz	Tomatoes: processing	160,000-190,000/lb
Lettuce: leaf	25,000-31,000/oz	Watermelons: small seed	8,000-10,400/lb
Muskmelons	16,000-19,000/lb	Watermelons: large seed	3,200-4,800/lb

2. Plant Spacing and Populations

Table G-2. Plant Spacing and Populations

This table lists plant population size (plants per acre) at different combinations of between- and in-row spacing.

Between-Row Spacing (inch) ↓	In-Row Spacing (inch) →												
	2	4	6	8	10	12	14	16	18	24	30	36	48
7	448,046	224,023	149,349	112,011	89,609	74,674	64,006						
12	261,360	130,680	87,120	65,340	52,272	43,560	37,337	32,670	29,040	21,780	17,424	14,520	10,890
18	174,240	87,120	58,080	43,560	34,848	29,040	24,891	21,780	19,360	14,520	11,616	9,680	7,260
21	149,349	74,674	49,783	37,337	29,870	24,891	21,336	18,669	16,594	12,446	9,957	8,297	6,223
24	130,680	65,340	43,560	32,670	26,136	21,780	18,669	16,335	14,520	10,890	8,712	7,260	5,445
30	104,544	52,272	34,848	26,136	20,909	17,424	14,935	13,068	11,616	8,712	6,970	5,808	4,356
36 (3 ft)	87,120	43,560	29,040	21,780	17,424	14,520	12,446	10,890	9,680	7,260	5,808	4,840	3,630
42 (3½ ft)	74,674	37,337	24,891	18,669	14,934	12,446	10,668	9,334	8,297	6,223	4,978	4,149	3,111
48 (4 ft)	65,340	32,670	21,780	16,335	13,068	10,890	9,334	8,167	7,260	5,445	4,356	3,630	2,722
60 (5 ft)			17,424	13,068	10,454	8,712	7,467	6,534	5,808	4,356	3,485	2,904	2,178
72 (6 ft)			14,520	10,890	8,712	7,260	6,223	5,445	4,840	3,630	2,904	2,420	1,815
84 (7 ft)			12,446	9,334	7,467	6,223	5,334	4,667	4,149	3,111	2,489	2,074	1,556
96 (8 ft)			10,890	8,167	6,534	5,445	4,667	4,084	3,630	2,722	2,178	1,815	1,361

3. Frequently Used Weights and Measures

Table G-3. Frequently Used Weights and Measures

Frequently Used Weights and Measures and Approximate Metric Equivalents

Liquid				Dry			
Pint	Liters	Gallons	Liters	Ounces	Grams	Pounds	Kilograms
0.5	0.24	1	3.8	0.25	7.1	1	0.45
1.0	0.47	2	7.6	0.50	14.2	2	0.91
1.5	0.71	3	11.4	0.75	21.3	3	1.36
2.0	0.95	4	15.1	1.0	28.4	4	1.81
2.5	1.18	5	18.9	2.0	56.7	5	2.27
3.0	1.42	6	22.7	3.0	85.0	6	2.72
3.5	1.65	7	26.5	4.0	113.4	7	3.18
4.0	1.90	8	30.3	5.0	141.7	8	3.63
4.5	2.13	9	34.1	10.0	283.5	9	4.08
5.0	2.37	10	37.9	16.0	453.6	10	4.54

Length	Area
1 inch = 2.54 centimeters	1 acre = 0.405 hectares
1 foot = 30.48 centimeters	1 square mile = 2.59 square kilometers
1 yard = 0.914 meters	1 square yard = 0.836 square meters
1 mile = 1.61 kilometers	1 square foot = 0.0929 square meters
	1 square inch = 6.45 square centimeters

4. Making a Plant-Growing Mix

Many pre-mixed growing media products suitable for conventional and organic production are available commercially. A good, lightweight, disease-free, plant-growing medium can also be made from a mixture of peat and vermiculite. A formula for a very simple mix for conventional production is given in Table R-4, but a preferred formulation is shown in Table R-5. If plants are to be grown in a medium longer than 8 weeks, use the formula in Table R-5. Organic growing media differ from conventional media because all components used must be allowable under organic production standards. When mixing your own, it is important to verify with your certifier that the materials you are using will not compromise your certification. More information on growing media, including several formulations, can be found in:

- Potting Media and Plant Propagation: <https://extension.psu.edu/potting-media-and-plant-propagation>
- Potting Mixes for Certified Organic Production: <https://attra-dev.ncat.org/wp-content/uploads/2022/06/pottingmixes.pdf>

Regardless of which formula is chosen, unless good mixing procedures are used, the results will be less than optimal. For best mixing, use a horizontal-type paddle mixer that folds or blends the components, such as lime and fertilizer, evenly throughout the mix. With tilted or other types of mixers, the components tend to segregate or separate out, resulting in erratic performance of the mix.

Good procedures to follow when preparing a mix are:

1. **Use a respirator to prevent inhalation of dust when mixing peat, vermiculite, and additives.**
2. For small quantities of mix preparation (1 cubic yard or less) place 4 to 5 inches of vermiculite in the bottom of a 5-gallon pail. Add all the additives (lime, fertilizer, etc.) to the vermiculite in the pail and mix thoroughly.
3. Fluff the recommended amount of peat. Start mixing and begin blending the peat.
4. While blending, add water according to the dampness of the peat. You will need approximately 1 gallon of water per bushel of peat in the mix.
5. While blending, slowly pour the additives, which you have already mixed thoroughly with a small amount of vermiculite, into the mixer and blend for 3 to 5 minutes.
6. Add the recommended amount of vermiculite after the other ingredients and blend for 1 minute or less, depending on the consistency of the vermiculite. It should be mixed thoroughly without breaking down.
7. **Use the mix for growing your plants soon after mixing.** It is not good practice to stockpile the mix in large piles for long periods of time.
8. **Read all labels of the ingredients used and heed all warnings that may be marked on the labels or bags.**

Table G-4. Simple Plant-Growing Mix

This mix will only get the seedlings up. Supplemental fertilizing will be needed to grow plants to transplant size. About 3 weeks after seeding, begin liquid fertilizing the plants with a soluble fertilizer, such as a 20-20-20, at the rate of 2-3 tsp/gal water. This rate should be applied at least weekly. More frequent applications may be desirable.

Note: Lettuce and cabbage transplants have been grown successfully on this mix diluted with an equal part of sand.

Materials	One Cubic Yard (=22 Bushels)	(2 Bushels)
Shredded sphagnum peat moss	11 bu	1 bu (10 gal)
No. 2, 3, or 4 domestic or African vermiculite ¹ or horticultural grade (dust-screened)	11 bu	1 bu (10 gal)
Pulverized limestone - use <i>dolomitic</i> lime for mixes made with <i>domestic</i> vermiculite <i>or</i> - use <i>calcitic</i> lime mixes made with <i>African</i> vermiculite	10 lb <i>or</i> 6 lb	1 lb (1¼ cups) <i>or</i> 9 oz (¾ cup)
- Superphosphate (20% P ₂ O ₅) <i>or</i> - Triple superphosphate (46% P ₂ O ₅)	2½ lb <i>or</i> 1¼ lb	4 oz (½ cup) <i>or</i> 2 oz (¼ cup)
Fertilizer (5-10-10)	5 lb	8 oz (1 cup)

¹Vermiculite should be approximately pea sized and relatively free of fines and dust. The final mix should have a pH of 6.0-6.5.

Table G-5. Preferred Plant-Growing Mix

Note: Osmocote is a slow-release fertilizer. Use a formula that will release nutrients over a period of 8-9 months.

Mixes should be made just prior to seeding. Plants grown in mixes containing Osmocote must be carefully watered, and the temperature must be carefully controlled prior to field planting. When using small cells, reduced Osmocote rates are suggested to control plant height.

Materials	One Cubic Yard (=22 Bushels)	(2 Bushels)
Shredded sphagnum peat moss	11 bu	1 bu (10 gal)
No. 2, 3, or 4 domestic or African vermiculite ¹ or horticultural grade (dust-screened)	11 bu	1 bu (10 gal)
Pulverized limestone - use <i>dolomitic</i> lime for mixes made with <i>domestic</i> vermiculite <i>or</i> - use <i>calcitic</i> lime mixes made with <i>African</i> vermiculite	10 lb <i>or</i> 6 lb	1 lb (1¼ cups) <i>or</i> 9 oz (¾ cup)
- Superphosphate (20% P ₂ O ₅) <i>or</i> - Triple superphosphate (46% P ₂ O ₅)	2½ lb <i>or</i> 1¼ lb	4 oz (½ cup) <i>or</i> 2 oz (¼ cup)
Sulfate or muriate of potash (50%-60% K ₂ O)	½ lb	1 oz (2 tbs)
Osmocote (18-6-12)	4 lb (tomatoes) 8 lb (eggplants) 8 lb (peppers)	6 oz (¾ cup) (tomatoes) 12 oz (1½ cups) (eggplants) 12 oz (1½ cups) (peppers)
Micronutrient mix	Use according to manufacturer recommendations	
Wetting agent (such as Aqua-Gro granular)	1½ pt	1 oz (4 tbs)

¹Vermiculite should be approximately pea-sized and relatively free of fines and dust. The final mix should have a pH of 6.0-6.5.