



This is a section from the

2020/2021

Mid-Atlantic

Commercial Vegetable

Production Recommendations

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

The **full manual**, containing recommendations specific to New Jersey, can be found on the Rutgers NJAES website in the Publications section: <http://njaes.rutgers.edu/pubs/publication.asp?pid=E001>.

This manual will be revised biennially. In January 2021, a **critical update** with important updates to the 2020/2021 manual will be communicated through local Extension Agents and Vegetable Specialists.

The **label** is a legally-binding contract between the 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.

Cooperating Agencies: Rutgers, The State University of New Jersey, U.S. Department of Agriculture, and County Boards of Chosen Freeholders. Rutgers Cooperative Extension, a unit of the Rutgers New Jersey Agricultural Experiment Station, is an equal opportunity program provider and employer.

F. Commodity Recommendations

Pesticide Use Disclaimer

THE LABEL IS THE LAW

Before using a pesticide, check the label for up to date rates and restrictions.

Labels can be downloaded from: <http://www.cdms.net/>, <https://www.greenbook.net/>
or <http://www.agrian.com/labelcenter/results.cfm>

For more information on Pesticide Safety and the Pesticide Label see chapter D.

Guide to the Recommended Pesticide Tables in the Following Crop Sections:

1. Pesticides are listed by **group or code number based on chemical structure and mechanism of action**, as classified by the Weed Science Society of America (WSSA) for herbicides, the Insecticide Resistance Action Committee (IRAC) for insecticides, and the Fungicide Resistance Action Committee (FRAC) for fungicides.
If the number is in bold font, the product may have resistance concerns.
2. For **restricted use pesticides**, the restricted active ingredients are labeled with a *.
(See section D 3.2.1 “Restricted Use Classification Statement” for more information).
3. **In addition to the pesticides listed below, other formulations or brands with the same active ingredient(s) may be available. ALWAYS CHECK THE LABEL:**
 - a) to ensure a pesticide is labeled for the same use,
 - b) to ensure the pesticide is labeled for the desired crop, and
 - c) for additional restrictions.
4. All pesticide recommendations are made for spraying a **broadcast area of 1 acre** (43,560 square feet). **Adjust the rate for banded applications** (for more information, see section E 1.3 Calibrating Granular Applicators).
5. Check the label for the maximum amount of pesticide per application and the maximum number of applications per year.
6. **Bee Toxicity Rating (Bee TR):** N=nontoxic; L=minimum impact on bees; M=moderately toxic, can be used if dosage, timing and method of application are correct, but should NOT be applied directly to the crop if bees are present; H=highly toxic, severe losses expected, -- = data not available.

Leeks

Recommended Varieties¹

Belton* (summer/fall) ²
Comanche* (fall)
Lancelot (fall/overwinter)
Lexton* (overwinter)
Matejho RZ (summer/fall)
Megaton* (summer/fall)
Runner* (summer)
Tadorna (fall/overwinter)
Takrima* (fall)

¹Varieties listed in alphabetical order; * indicates F1 hybrid varieties.

²Harvest period in parentheses;

Recommended Nutrients Based on Soil Tests

In addition to using the table below, check the suggestions on rate, timing, and placement of nutrients in your soil test report and chapter B Soil and Nutrient Management. Your state's soil test report recommendations and/or your farm's nutrient management plan supersede recommendations found below.

Leeks ¹	N (lb/A)	Soil Phosphorus Level				Soil Potassium Level				Nutrient Timing and Method
		Low	Med	High (Opt)	Very High	Low	Med	High (Opt)	Very High	
		P ₂ O ₅ (lb/A)				K ₂ O (lb/A)				
	100-125	200	150	100	0	200	150	100	0	Total nutrient recommended
	50-75	200	150	100	0	200	150	100	0	Broadcast and disk-in
	25-50	0	0	0	0	0	0	0	0	Sidedress 3-4 weeks after planting if needed

¹Apply 3-4 lb/A of boron (B) with broadcast fertilizer; see also Table B-7 in chapter B Soil and Nutrient Management.

Seeding and Transplanting

For early spring plantings, southern transplants are used. For summer plantings, sow in seedbeds or transplant trays from early March to mid-May. About 2 lb of seed are required to provide enough plants to set an acre. Plant seed 1/3 to 1/2 inch deep 12-16 weeks before field setting. Transplants can be produced in 200-288 deep cell trays. Plants will be ready to set in early August. Spring leeks should be seeded approximately the third week of December and the fall crop approximately the first week of June.

Field Spacing

Rows 20-30 in. apart; plants 4-6 in. apart in the row. Set plants in trenches 3-4 in. deep using celery-type planter.

Culture

Leeks grow slowly for the first 2 or 3 months. To develop a long white stem, start to gradually fill in trenches and then hill soil around stems. Depending on the season it may require up to 20 hilling's to produce long white shank

Harvest and Post Harvest Considerations

Spring-transplanted leeks are ready for harvest in July. August-planted leeks are ready for harvest by November or can be overwintered. Half-mature leeks of the hardy varieties will stand winter freezing with some protection such as salt hay or straw if planted in very cold areas. In mild winter areas no protection is required and leeks will be ready for harvesting early in the spring. Undercut the leeks with a bar on a tractor or for smaller plantings dig with a spading fork.

After digging, leeks can be left in the field to dry for a short period. Leeks are bunched with 3-4 leeks per bunch. If soil sticks to the leeks, power wash the bunches before packing. If necessary, leeks can be cooled by icing in the box, hydrocooling or vacuum cooling with a water spray. Store leeks at 32°F and 95-100% relative humidity. Typical storage time is 7-21 days, but up to 2 months is possible.

Weed Control

THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of chapter F. Recommended Herbicides

1. Identify the weeds in each field and select recommended herbicides. More information is available in the "Herbicide Effectiveness on Common Weeds in Vegetables" (Table E-2) in chapter E Pest Management.
2. Minimize herbicide resistance development. Identify the herbicide site of action group number and follow recommended good management practices; **bolded group numbers in tables below are herbicides at higher risk for selecting resistant weed populations.** Include non-chemical weed control whenever possible.

1. Soil-Applied (Preemergence)

Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
3	Dacthal 6F Dacthal W-75	8.0 to 14.0 pt/A 6.0 to 14 lb/A	DCPA	6.0 to 10.5 lb/A	--	12
-Apply at time of seeding or immediately after planting sets. -Labeled for applications directly over transplants without crop damage. -A second application may be needed for longer season; but will not control emerged weeds. -Primarily controls annual grasses and a few broadleaf weeds, including common purslane. -Results have been most consistent when used in fields with coarse -textured soils low in organic matter, and when the application is followed by rainfall or irrigation. Maximum application not addressed on label.						
3	Prowl H2O 3.8CS	2 pt/A	pendimethalin	0.95 lb/A	30	24
-Apply at time of seeding or postemergence; do not mechanically incorporate. Do not apply preemergence to leeks planted on mineral soils with less than 3% organic matter or injury may occur. Seed must be fully covered by soil; injury may occur if seed is exposed. Prowl H2O can be applied directly over emerged plants with 2 to 3 true leaves without crop damage. -If sequential applications are made, allow 30 days between applications. Primarily controls annual grasses and certain broadleaf weeds. -Do not apply more than 2 pt/A per application; and do not apply more than 4 pt/A per season.						

2. Postemergence

Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
1	Fusilade DX 2EC	8 to 12 fl oz/A	fluazifop	0.125 to 0.19 lb/A	14	12
	Poast 1.5EC	1.0 to 1.5 pt/A	sethoxydim	0.2 to 0.3 lb/A	30	12
-Fusilade DX: use COC at 1.0% v/v (1 gal/100 gal of spray solution) or NIS at 0.25% v/v (1 qt/100 gal of spray solution). Poast: use COC at 1.0% v/v. The use of COC may increase the risk of crop injury when hot or humid conditions prevail. To reduce the risk of crop injury, omit additives or switch to NIS when grasses are small and soil moisture is adequate. -Use lower labeled rates for annual grass control and higher labeled rates for perennial grass control. -Yellow nutsedge, wild onion, wild garlic, and broadleaf weeds will not be controlled. -Controls many annual and certain perennial grasses, including annual bluegrass, but Poast is preferred for goosegrass control. For best results, treat annual grasses when they are actively growing and before tillers are present. Control may be reduced if grasses are large or under hot or dry weather conditions. -Repeated applications may be necessary to control certain perennial grasses. If repeated applications are necessary, allow 14 days between applications. Rainfastness is 1 h. -Do not tank-mix with or apply within 2 or 3 days of any other pesticide unless labeled. The risk of crop injury may be increased, or reduced control of grasses may result. Do not apply more than 24 fl oz/A of Fusilade DX in a single application and do not exceed 3 pt/A per season. Do not apply more than 1.5 pt/A Poast in single application and do not exceed 4.5 pt/A for the season.						
15	Dual Magnum	0.67 to 1.33 pt/A	s-metolachlor	0.64 to 1.27 lb/A	21	24
-A special Local Needs Label 24(c) has been approved for the use of Dual Magnum in leeks in NJ (expires 1/30/2022). The use of Dual Magnum is legal ONLY if a waiver of liability has been completed (see www.syngenta-us.com/labels/indemnified-label-login). -Apply after leeks have reached the 2 true leaf stage of growth; Dual Magnum will not control weeds that have emerged at time of application. Use lower rate on lighter coarse-textured sandy soils and the higher rate on heavier fine-textured soils. Do not use on coarse textured soils with less than 1% organic matter. -Follow with overhead irrigation if rainfall does not occur. -Primarily controls annual grass and certain broadleaf weeds, including galinsoga preemergence. -Do not apply more than once per crop season and do not exceed 1.33 pt/A per crop season.						

3. Other Labeled Herbicides These products are labeled but limited local data are available; and/or are labeled but not recommended in our region due to potential crop injury concerns.

Group	Product Name	Active Ingredient (* = Restricted Use)
15	Outlook	dimethenamid

Insect Control

THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of chapter F. Recommended Insecticides

Allium Leafminers

This new pest to the mid-Atlantic area is a long grey-black fly with a distinctive yellow or orange patch on the top of its head, yellow sides and “knees” (femur-tibia junction), and white halteres (knobs as second pair of wings). The larvae are a typical whitish maggot. Leek (*A. porrum*) and scallions (green onions) tends to be the most damaged Allium species or cultivars. Females repeatedly puncture leaves with their ovipositor, resulting in a line of small white dots. Leaves can be wavy, curled and distorted. Larvae mine leaves and move into bulbs and leaf sheathes where they pupate. Covering plants in April-May, or September-October, during the adult flights can exclude the pest. Avoid the adult oviposition period by delaying planting of spring allium crops. Systemic and contact insecticides can be effective.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Mustang Maxx	2.24 to 4.0 fl oz/A	zeta-cypermethrin*	7	12	H
4A	Scorpion 35SL	8.75 to 10.5 fl oz/A	dinotefuran - soil	21	12	H
4A	Scorpion 35SL	5.25 to 7.0 fl oz/A	dinotefuran - foliar	1	12	H
4A	Venom 70SG	5.0 to 6.0 oz/A	dinotefuran - soil	21	12	H
4A	Venom 70SG	3.0 to 4.0 oz/A	dinotefuran - foliar	1	12	H
5	Entrust SC (OMRI)	3.0 to 6.0 fl oz/A	spinosad	1	4	M
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	1	4	M
17	Trigard 75WSP	2.66 oz/A	cyromazine	0	12	H
28	Exirel	13.5 to 20.5 fl oz/A	cyantraniliprole	1	12	H
28 + 6	Minecto Pro	7.0 to 10.0 fl oz/A	cyantraniliprole + abamectin*	7	12	H

Aphids

Aphids found on leeks and other related vegetables are usually dark red or black. They are attracted to the compounds in Allium species that give them their distinctive smell. They walk short distances between plants and spread over long distances via air currents. They can survive on volunteer plants or on bulbs in storage. Aphids suck the sap of leek plants which can cause them to collapse. Look for aphids on leaves in the early to mid-season.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
1B	Malathion 57 EC	1.5 to 2.0 pt/A	malathion	3	24	H
3A	Mustang Maxx	2.24 to 4.00 fl oz/A	zeta-cypermethrin*	7	12	H
4A	Assail 30SG	5.0 to 8.0 oz/A	acetamiprid	7	12	M

Armyworms (AW), Cutworms (CW), Cabbage Loopers (CL)

These lepidopteran pests (caterpillars) come in various colors and shapes and can be found from the beginning till the end of the season. Cutworms are found very early in the season. They are immigrants from southern regions or have passed the winter in the area as pupae. Lepidopteran pest infestations are sporadic; no reliable methods have been found for predicting their occurrence. Plants should be scouted from planting until harvest for foliar feeding.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
3A	Mustang Maxx	2.24 to 4.00 fl oz/A	zeta-cypermethrin*	7	12	H
5	Entrust SC (OMRI)	3.0 to 6.0 fl oz/A (AW and CL)	spinosad	1	4	M
5	Radiant SC	5.0 to 10.0 fl oz/A (AW and CL)	spinetoram	1	4	M
11A	Dipel DF, others (OMRI)	0.5 to 2.0 lb/A (CW and CL); 1.0 to 2.0 lb/A (AW)	<i>Bacillus thuringiensis kurstaki</i>	0	4	N
18	Intrepid 2F	4.0 to 8.0 fl oz/A (AW)	methoxyfenozide	1	4	L

Onion Maggots

This pest is more important in onions, but it can also be a problem in leeks. Planting successive crops of any *Allium* species in the same field increases the likelihood of maggot damage. Adults resemble small, slender house flies. There are 3 generations each year, but the spring generation is generally most damaging. Flies live for 2-4 weeks and are capable of migrating about a mile in search of suitable hosts. Females oviposit on the soil near the plants or occasionally on the young leaves or plant necks. Maggot feeding causes wilting of foliage, after which it collapses. Larger leeks may survive but have distorted growth.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1B	Malathion 57 EC	1.5 to 2.0 pt/A (adults only)	malathion	3	24	H
3A	Mustang Maxx	2.24 to 4.00 fl oz/A (adults only)	zeta-cypermethrin*	7	12	H

Thrips

Thrips pierce plant tissue and remove liquids. Immature thrips often feed on young tissue between the leaf sheaths and the stem; adults feed on more mature tissue. Feeding injury results in whitish or chlorotic blotches. Extended feeding can reduce bulb size and increase leaf and bulb rots. Effective management relies on high pressure, high gallonage sprays for thorough coverage and penetration into the foliage.

Apply one of the following formulations:						
Group	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
1B	Malathion 57 EC	1.5 to 2.0 pt/A	malathion	3	24	H
3A	Mustang Maxx	2.88 to 4.00 fl oz/A	zeta-cypermethrin*	7	12	H
4A	Assail 30SG	5.0 to 8.0 oz/A	acetamiprid	7	12	M
4A	Scorpion 35SL	8.75 to 10.5 fl oz/A	dinotefuran - soil	21	12	H
4A	Scorpion 35SL	5.25 to 7.0 fl oz/A	dinotefuran - foliar	1	12	H
4A	Venom 70SG	5.0 to 6.0 oz/A	dinotefuran - soil	21	12	H
4A	Venom 70SG	3.0 to 4.0 oz/A	dinotefuran - foliar	1	12	H
5	Entrust SC (OMRI)	3.0 to 6.0 fl oz/A	spinosad	1	4	M
5	Radiant SC	6.0 to 10.0 fl oz/A	spinetoram	1	4	M
28 + 6	Minecto Pro	7.0 to 10.0 fl oz/A	cyantraniliprole + abamectin*	7	12	H

Disease Control

THE LABEL IS THE LAW-see the Pesticide Use Disclaimer on the first page of chapter F.
Recommended Fungicides

Damping-Off caused by *Phytophthora*, *Pythium*, and *Rhizoctonia*

Code	Product Name	Product Rate	Active Ingredient(s) (*= Restricted Use)	PHI (d)	REI (h)	Bee TR
FOR SEEDED BEDS: (Note: Apron XL LS and Maxim 4FS can be combined).						
For Pythium and Phytophthora control, use a seed treatment such as:						
4	Apron XL LS	0.085 to 0.64 fl oz/100 lb seed	mefenoxam	n/a	n/a	N
For control of other root rots apply:						
12	Maxim 4FS	0.08 to 0.16 fl oz/100 lb seed	fludioxonil	n/a	n/a	L
FOR TRANSPLANTED BEDS:						
For Pythium root rot control apply one of the following as a banded spray:						
4	Ridomil Gold 4SL	0.5 to 1.0 pt/A	mefenoxam	AP	48	N
4	MetaStar 2E AG	2.0 to 4.0 pt/A	metalaxyl	AP	48	N
For Rhizoctonia root rot control apply as in-furrow application:						
11	azoxystrobin 2.08F	0.40 to 0.80 fl oz/1000 ft row	azoxystrobin	0	4	N
For Pythium and Rhizoctonia root rot control apply as banded spray application:						
4 + 11	Uniform 3.66SE	0.34 fl oz/1000 ft row (see label)	mefenoxam + azoxystrobin	AP	0	N

Downy Mildew (*Peronospora destructor*)

Downy mildew on leeks is caused by the same pathogen on onion and garlic. Its development is promoted by cool, moist conditions. Management begins with planting pathogen-free seed or sets and crop rotations of at least 3 years without related crops. Be sure to eliminate culls and volunteers from the field.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following preventatively prior to the onset of disease.						
M05	chlorothalonil 6F	1.5 to 3.0 pt/A ¹	chlorothalonil	14	12	N
40	Forum 4.17SC	6.0 fl oz/A ²	dimethomorph	0	12	N
Rotate one of the following FRAC code 7 or 11 fungicides every 7 d when conditions favor disease development or when symptoms are present in the field:						
7	Fontelis 1.67SC	16.0 to 24.0 fl oz/A	penthiopyrad	0	12	L
7 + 11	Merivon 2.09SC	8.0 to 11.0 fl oz/A (for suppression)	fluxapyroxad + pyraclostrobin	7	12	N
7 + 11	Pristine 38WG	18.5 oz/A (for suppression)	boscalid + pyraclostrobin	7	12	--
11	azoxystrobin 2.08F	9.0 to 15.5 fl oz/A	azoxystrobin	0	4	N
11	Cabrio 20EG	12.0 oz/A	pyraclostrobin	7	12	N
Rotate one of the above with the following every 7 d as long as weather conditions favor disease development:						
3	Folicur 480SC	4.0 to 6.0 fl oz/A	tebuconazole	7	12	N

¹ Do not apply chlorothalonil more than 3 times per season. ² Forum 4.17SC must be tank mixed with another fungicide effective for downy mildew.

Fusarium Basil Rot

Leaf tips of infected plants will turn yellow and curl and eventually entire leaves will become chlorotic, turn brown and decay. Infected roots will turn dark brown. The outermost layers of infected bulbs will have a watery, brown discoloration. White mycelium may be present. The pathogen can survive in the soil for many years. Rotate away from leeks, garlic or onions for 4-5 years minimum. Avoid excess fertility. Insect feeding damage can increase basil rot; control onion maggot and other insects that may feed on bulbs.

Purple Blotch

Begin preventative applications in the fall as soon as transplants are set out especially in fields with a history of the disease. Rotate the following at 7-10 d intervals as long as night temperatures remain warm and there are extended periods of leaf wetness.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply the following preventatively prior to the onset of disease. Do not apply chlorothalonil more than 3 times per season.						
M05	chlorothalonil 6F	1.5 to 3.0 pt/A	chlorothalonil	14	12	N
Tank mix or rotate the above with one of the following FRAC code 3, 7, or 11 fungicides when conditions favor disease development or when symptoms are present in the field. Rotate fungicides with different modes of action.						
3	Folicur 480SC	4.0 to 6.0 fl oz/A	tebuconazole	7	12	N
3 + 9	Inspire Super 2.82EW	16.0 to 20.0 fl oz/A	difenoconazole + cyprodinil	7	12	--
3 + 11	Quadris Top 1.67SC	12.0 to 14.0 fl oz/A	difenoconazole + azoxystrobin	7	12	--
7	Endura 70W	6.8 oz/A	boscalid	7	12	--
7	Fontelis 1.67SC	16.0 to 24.0 fl oz/A	penthiopyrad	0	12	L
7 + 11	Pristine 38WG	10.5 to 18.5 oz/A	boscalid + pyraclostrobin	7	12	--
11	Cabrio 20EG	8.0 to 12.0 oz/A	pyraclostrobin	7	12	N
11	azoxystrobin 2.08F	6.0 to 12.0 fl oz/A	azoxystrobin	4	0	N

White Rot (*Sclerotium cepivorum*)

White Rot is severe only on overwintered leeks. Cool, moist soil conditions that are favorable for the growth of leek, garlic and onion are also ideal for white rot. Infection occurs at soil temperatures between 50-75°F (60-65°F optimum). The disease is greatly inhibited above 78°F. Sclerotia can survive for over 20 yr, even in the absence of a host plant. In treated fields, do not grow crops other than leek and leafy vegetables during the harvest year, and do not grow leeks, garlic, leafy vegetables, tomatoes, root crops, cereal grains or soybeans the following year.

Code	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply the following fungicide at 10-14 d intervals (for suppression only):						
3	Folicur 480SC	4.0 to 6.0 fl oz/A	tebuconazole	7	12	N

For Immediate Medical Attention

Call 911

**For a Pesticide Exposure Poisoning
Emergency Call**



For All States

This number will automatically connect you to the poison center nearest to you.

Anyone with a poisoning emergency can call the toll-free telephone number for help. Personnel at the Center will give you first-aid information and direct you to local treatment centers if necessary.

For Pesticide Spills

Small Spills: See the product label for cleanup advice.

Large spills: Call the National Response Center at 1-800-424-8802 or CHEMTREC at 800-424-9300 (24 hours) - Industry assistance with emergency response cleanup procedures for large, dangerous spills.

Be aware of your responsibility to report spills to the proper state agency.