

carbaryl (Sevin 80S or OLF)

Note. Some species of leafhopper are known to transmit brittle root disease of horseradish.

Thrips

methomyl (Lannate LV Or OLF)
 spinetoram (Radiant 2SC)
 spinosad (Entrust 80W, SpinTor 2SC or OLF)

Pesticide	Use Category ¹	Hours to Reentry	Days to Harvest
INSECTICIDE			
<i>Bacillus thuringiensis</i>	G	4	0
carbaryl/carbaryl bait	G	12	7
imidacloprid (soil/foliar)	G	12	21/7
malathion	G	12	7
methomyl (Lannate or OLF)	R	48	65
spinetoram	G	4	3
FUNGICIDE (FRAC code)			
Cabrio (Group 11)	G	12	0
chlorothalonil	G	12	14
Quadris (Group 11)	G	4	0
Ridomil Gold (Group 4)	G	12	0

See Table D-6.

¹ G = general, R = restricted

Disease Control

Damping-Off (caused by Pythium and Phytophthora)

Apply one of the following in a 7" wide band at planting:

mefenoxam (Ridomil Gold--1.0-2.0 pt 4SL/A or Ultra Flourish--2.0-4.0 pt 2E/A), or metalaxyl (MetaStar)--4.0-8.0 pt 2EAG/A

Bacterial Leaf Spot

Rotate to allow 2 years between horseradish plantings. Avoid cultivation or other activity when foliage is wet to minimize spread of the disease.

Cercospora Leafspot, Downy Mildew, Ramularia Leafspot, and White Rust

Practice good crop rotation with crops other than crucifers. When conditions favor disease development, apply the following and repeat every 7 to 14 days.

Quadris--6.2-15.5 fl oz 2.08SC/A, or Cabrio--8.0-16.0 oz 20EG/A, or chlorothalonil--3.0 pts 6F/A (Ramularia leafspot)

LEEKs

Varieties

Varieties¹

Arkansas	
Carina	
King Richard	
Lancelot	These varieties are recommended in areas of DE, MD, NJ, PA, VA, WV where climatic conditions are favorable for leek production.
Leafall	
Leekool	
Leekwik	
Upton	
Pandora	
Tadorna	

¹ Varieties listed alphabetically.

Recommended Nutrients Based on Soil Tests

Before using the table below, refer to important notes in Plant Nutrient Recommendations in Section B, Soil And Nutrient Information. These notes provide additional suggestions to adjust rate, timing and placement of nutrients depending on soil type cation exchange capacity and existing fertility levels.

Leeks	Soil Phosphorus			Soil Potassium		
	Pounds N per Acre	Level Low Pounds	Med Opt. P ₂ O ₅ per Acre	Level Low Pounds	Med Opt. K ₂ O per Acre	Level Opt. Pounds
	100-125 ¹	200 ¹	150 ¹ 100 ¹	200 ¹	150 ¹ 100 ¹	100 ¹
	50-75 ²	200 ²	150 ² 100 ²	200 ²	150 ² 100 ²	100 ²
	25-50 ³	0	0 0	0	0 0	0

¹Total amount nutrient recommended; growers producing vegetables on soils with high clay contents should reduce the recommended nitrogen and potassium rates by 20% and increase the phosphorus rate by 25%.

²Broadcast and disk-in

³Sidedress 3-4 weeks after planting if needed

Apply 3 - 4 pounds of boron (B) per acre with broadcast fertilizer. See Table B-10 for more specific boron recommendations.

Transplants

Southern transplants are used for early spring plantings. For summer planting, sow in seedbeds from early April to mid-May. About 2 pounds of seed are required to provide enough plants to set an acre. Seed should be planted 1/3 to 1/2 inch deep 12 to 16 weeks before field setting. Plants will be ready to set in early August.

Field Spacing

Rows: 20 to 30 inches apart; plants: 4 to 6 inches apart in the row. Set plants in trenches 3 to 4 inches 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 to 3 or 4 inches.

Harvesting and Storage

Spring-transplanted leeks are ready for harvest in July. August-planted leeks are ready for harvest by November or can be wintered over. Half-mature leeks of the hardy varieties will stand winter freezing with some protection such as salt hay or straw. They will be ready early in the spring.

Weed Control

Identify the weeds in each field and select recommended herbicides that control those weeds. See Tables E-2 and E-3.

Match preplant incorporated and preemergence herbicide rates to soil type and percent organic matter in each field.

Apply postemergence herbicides when crop and weeds are within recommended size and/or leaf stage.

Find the herbicides you plan to use in the Herbicide Resistance Action Committee's (HRAC) **Herbicide Site of Action Table E-7** and follow the recommended good management practices to minimize the risk of herbicide resistance development by weeds in your fields.

Postemergence

Sethoxydim--0.2-0.3 lb/A. Apply 1 to 1.5 pints per acre Poast 1.5EC with oil concentrate to be 1 percent of the spray solution (1 gallon per 100 gallons of spray solution) postemergence to control annual grasses and certain perennial grasses. **The use of oil concentrate 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 nonionic surfactant when grasses are small and soil moisture is adequate. Control may be reduced if grasses are large or if hot, dry weather or drought conditions occur. For best results, treat annual grasses when they are actively growing and before tillers are present. Repeated applications may be needed to control certain perennial grasses. Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. Do not tank-mix with or apply within 2 to 3 days of any other pesticide unless labeled, as the risk of crop injury may be increased, or reduced control of grasses may result. Observe a minimum preharvest interval of 30 days and apply no more than 3 pints per acre in one season.

Postharvest

Paraquat--0.6 lb/A. **A Special Local-Needs 24(c) label has been approved for the use of Gramoxone Inteon 2SC or OLF for postharvest desiccation of the crop in Delaware, New Jersey and Virginia.** Apply 2.4 pints per acre Gramoxone Inteon 2SC or OLF as a broadcast spray after the last harvest. Add nonionic surfactant according to the labeled instructions. See the label for additional information and warnings.

Insect Control

NOTE: Copies of specific insecticide product labels can be downloaded by visiting the websites www.CDMS.net or www.Greenbook.org. Also, specific labels can be obtained via web search engines.

Onion Maggot

malathion (**flies only**) (Malathion 57EC)
zeta-cypermethrin (**flies only**) (Mustang MAX, Respect or OLF)

Thrips, Aphids

acetamiprid (Assail 30WDG or OLF)
Chenopodium extract (**aphids only**) (Requiem)
malathion (Malathion 57EC or OLF)
spinetoram (Radiant 2SC)
zeta-cypermethrin (Mustang MAX, Respect, or OLF)

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

Bacillus thuringiensis (Biobit, Dipel, Dipel 2X, Javelin, XenTari or OLF)
spinosad (**AW and CL only**) (Entrust 80W, SpinTor 2SC or OLF)
spinetoram (**AW and CL only**) (Radiant 2SC)
zeta-cypermethrin (Mustang MAX, Respect, or OLF)

Pesticide	Use Category ¹	Hours to Reentry ²	Days to Harvest
INSECTICIDE			
acetamiprid	G	12	7
<i>Bacillus thuringiensis</i>	G	4	0
<i>Chenopodium</i> extract	G	4	0
malathion	G	12	3
spinetoram	G	4	1
spinosad	G	4	1
zeta-cypermethrin	R	12	7
FUNGICIDE (FRAC code)			
Cabrio (Group 11)	G	12	7
chlorothalonil (Group M5)	G	12	14
Endura (Group 7)	G	12	7
Folicur (Group 3)	G	12	7
Forum (Group 40)	G	12	0
Inspire Super (Groups 3 + 9)	G	12	7
Pristine (Groups 11 + 7)	G	12	7
Quadris (Group 11)	G	4	0

See Table D-6. ¹G = general, R = restricted

²Chemicals with multiple designations are based on product and/or formulation differences. CONSULT LABEL.

Disease Control

Purple Blotch and Downy Mildew

Begin preventative applications in fall as soon as transplants are set out especially in fields where purple blotch had been a problem in the past. Rotate the following at 10-day intervals as long as night temperatures remain warm and there are extended periods of leaf wetness.

Alternate:

Forum--6.0 fl oz 4.18SC/A (for downy mildew only; must be tank mixed with another fungicide effective for downy mildew), or

chlorothalonil--1.5-3.0 pt 6F/A or OLF; (do not apply chlorothalonil more than three times per season)

With one of the following FRAC code 11 fungicides:

Quadris--6.0-12.0 fl oz 2.08SC/A for purple blotch, or
Quadris--9.0-15.5 fl oz 2.08SC/A for downy mildew, or
Cabrio--8.0-12.0 oz 20EG/A (use 12 oz/A for downy mildew), or

Pristine--10.5-18.5 oz 38WP/A (for purple blotch) or 18.5 oz 38WP/A for downy mildew suppression, or

FRAC code 3 fungicides

Folicur--4.0-6.0 fl oz 3.6F/A, or

Inspire Super--16.0 to 20.0 fl oz. 2.82SC/A (Purple blotch only), or
Endura--6.8 oz 70WG/A (for purple blotch only)

Materials with different modes of action (FRAC code) should always be alternated.

White Rot (Sclerotium)

This disease is severe only on overwintered leeks. Disease development is favored by cool, moist soil conditions. The soil temperature range for infection to occur ranges from 50° to 75°F, with optimum being 60° to 65°F. At soil temperatures above 78°F, the disease is greatly inhibited. Sclerotia can survive for over 20 years, even in the absence of a host plant. Soil moisture conditions that are favorable for leek, garlic and onion growth are also ideal for white rot development.

Apply Folicur--4.0-6.0 fl oz 3.6F/A (10–14 day interval) (suppression only)

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 during the following year.

**LETTUCE, ENDIVE,
AND ESCAROLE**

Lettuce and endive are cool-season crops. Properly hardened lettuce transplants can tolerate temperatures as low as 20° to 25°F (-6.67° to -3.89°C). Temperatures above 85°F (29.4°C) for several days will cause seedstalk formation and bolting in lettuce. Temperatures below 70°F (21.1°C) during the seedling stage promote premature seedstalk formation in endive and escarole.

Varieties

Varieties ¹	DE	MD	NJ	PA	VA	WV
Lettuce: Bibb, Boston and Butterhead Types						
Ermosa (DMR,LMV,TBR)			N	P	V	WV
Buttercrunch	D		N	P	V	WV
Odyssey (TBR)				P		
Esmeralda	D	M	N	P		WV
Optima			N	P		
Bennett				P		
Harmony (DMR,TBR)				P		
Summer Bibb	D		N	P	V	WV
Lettuce: Iceberg Types						
Summer Time				P		
Ithaca (spring)	D	M	N			WV
Ithaca (fall)	D	M	N	P		WV
Maverick II (spring and fall)			N	P		
Mesa 659 (fall)	D	M	N	P		WV
Lettuce: Leaf Types						
Grand Rapids (TBR)	D	M	N	P	V	WV
Royal Green (TBR)	D	M	N	P	V	WV
Lettuce: Leaf Types						
New Redfire			N	P	V	WV
Red Sails (Direct Market)						WV
Salad Bowl (Direct Market)	D	M		P		WV
Royal Oakleaf				P		

(table continued next column)

Varieties (continued)

Varieties ¹	DE	MD	NJ	PA	VA	WV
Lettuce: Leaf Types						
Waldmann's Green	D		N	P		
Tropicana				P		
Lettuce: Leaf Types (continued)						
Two Star			N	P	V	WV
Red Express				P		
Lettuce: Romaine (COS) Types						
Ideal Cos (spring,fall)(TBR)			N	P	V	WV
Green Forest (CRR,TBR)	D		N	P	V	WV
Coastal Star (CRR)				P		
Rouge de Hiver (red)(fall)				P		
Capistrano (TBR, heat resistant)				P		
Pyramid Cos			N	P		
Lettuce: Batavia Types						
Magenta (red)				P		
Nevada				P		
Endive						
Green Curled	D		N	P	V	WV
Salad King	D		N	P		WV
Escarole						
Florida Deep Heart	D		N	P		WV
Full Heart Batavian	D		N	P	V	WV

¹Varieties listed by maturity, earliest first.#

Letters in parentheses indicate disease resistance possessed by varieties. See the "Abbreviations" section in front portion of this publication.

Recommended Nutrients Based on Soil Tests

Before using the table below, refer to important notes in Plant Nutrient Recommendations in Section B, Soil And Nutrient Information. These notes provide additional suggestions to adjust rate, timing and placement of nutrients depending on soil type cation exchange capacity and existing fertility levels.

Crop	Pounds N per Acre	Soil Phosphorus Level			Soil Potassium Level		
		Low	Med	Opt.	Low	Med	Opt.
		Pounds P ₂ O ₅ per Acre	Pounds P ₂ O ₅ per Acre	Pounds P ₂ O ₅ per Acre	Pounds K ₂ O per Acre	Pounds K ₂ O per Acre	Pounds K ₂ O per Acre
Leaf Lettuce	100-125 ¹	200 ¹	150 ¹	100 ¹	200 ¹	150 ¹	100 ¹
Endive,	50-75 ²	200 ²	150 ²	100 ²	200 ²	150 ²	100 ²
Escarole	25-50 ³	0	0	0	0	0	0
Iceberg Lettuce	60-80 ¹	200 ¹	150 ¹	100 ¹	200 ¹	150 ¹	100 ¹
	25-50 ²	200 ²	150 ²	100 ²	200 ²	150 ²	100 ²
	25-30 ³	0	0	0	0	0	0

¹Total amount nutrient recommended; growers producing vegetables on soils with high clay contents should reduce the recommended nitrogen and potassium rates by 20% and increase the phosphorus rate by 25%.

²Broadcast and disk-in

³Sidedress 3-5 weeks after planting

Seed Treatment

Treat seeds to prevent disease. See the Disease section for more information.