



This is a section from the

2018

Mid-Atlantic

Commercial Vegetable

Production Recommendations

The manual, which is published annually, is **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>.

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/>, <http://www.greenbook.net/> or <http://www.agrian.com/labelcenter/results.cfm>

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

1. Pesticides are listed by **group or code number based on chemical structure and mode 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 the Pesticide Safety chapter 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 the Pest Management chapter, Calibrating Granular Applicators section).
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 crop if bees are present; H=highly toxic, severe losses expected, -- = data not available.

Okra

Okra is a tropical annual with a wide range of adaptation. However, okra is very sensitive to frost and cold temperatures and should not be planted until soil has warmed in the spring.

Recommended Varieties¹

Annie Oakley II*	Cajun Delight*	Clemson Spineless 80	Jambolaya*	Zarah*
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¹Listed alphabetically, *Hybrid.

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 the Soil and Nutrient Management chapter. Your state’s soil test report recommendations and/or your farm’s nutrient management plan supersede recommendations found below.

Okra	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	
	125-150 ¹	P ₂ O ₅ (lb/A)				K ₂ O (lb/A)				Total nutrient recommended
	50-100	250	150	100	0	250	150	100	0	Broadcast and disk-in
	25-50	0	0	0	0	0	0	0	0	Sidedress 3-4 weeks after planting
	25-50	0	0	0	0	0	0	0	0	Sidedress 6-8 weeks after planting

Apply 1-2 lb/A of boron (B) with broadcast fertilizer; see also Table B-7 in the Soil and Nutrient Management chapter. ¹If crop is to be mulched with plastic but not drip/trickle fertilized, broadcast 225 lb/A of N with recommended P and K and disk-in prior to laying mulch. For drip/trickle fertilization, see the Fertigation section in the Irrigation Management chapter.

Seed Treatment See Disease Control for seed treatment to prevent disease.

Seeding and Spacing

Field seeding is usually done between May 20 and June 1. Generally, only one planting is made. In northern areas of the region, sow seed in the greenhouse in cells in early May and transplant to the field through black plastic mulch on raised beds with drip irrigation in early to mid June. Okra also responds to row covers or high tunnels.

For dwarf varieties, space the rows 3-3½ ft apart. For medium and tall varieties, space the rows 4-4½ ft apart. Drill seeds ¼-½ inch deep, 3 or 4 per ft of row (5-7 lb/A). Thin the plants when they are 5 inches tall. Plants of dwarf varieties should be about 12-15 inches apart in the row; plants of tall varieties should be 18-24 inches apart.

Harvest and Post Harvest Considerations

Okra pods usually reach harvesting maturity 4-6 days after the flowers open. At this stage, the pods are 3-3½ inches long, free of excessive fiber and tender. Pick pods at 2-day intervals by snapping off or clipping the pedicel. Gloves should be worn to avoid skin reactions to the fine spines on the fruit. Large and undesirable pods should be removed to keep the plant productive over a longer period. Harvested okra should be kept at 50-55°F (10-13°C) and 85-90% relative humidity. Below 50°F, okra pods are subject to chilling injury.

Weed Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on page F 1.

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 the Pest Management chapter.
2. Minimize herbicide resistance development. Identify the herbicide site mode of action group and follow recommended good management practices. Include non-chemical weed control whenever possible.

1. Soil-Applied (Preplant Incorporated or Preemergence)						
Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
3	Treflan 4EC	1.0 to 2.0 pt/A	trifluralin	0.5 to 0.75 lb/A	--	12
-Incorporate into 2-3 inches of soil within 8 hr after application. -Primarily controls annual grasses and a few broadleaf weeds. - Do not use (or reduce the rate) used when cold, wet soil conditions are expected, or crop injury may result. -Poor incorporation can reduce overall weed control. -Maximum application not addressed on label.						
27	Callisto 4SC	6.0 fl oz/A	mesotrione	0.188 lb/A	28	12
-Use as row-middle or hooded post-directed treatment, but not both. -Apply as a band, leaving 1 foot of untreated soil over the seeded row (6" of untreated soil on each side of the row); do not apply over the row or severe injury will occur. If replanting, do not plant into treated soil. -Callisto controls common lambsquarters, pigweeds, as well and many other small-seeded annual broadleaf weeds, but Callisto is weak on ragweed and morninglory species. Apply Treflan 4EC between the rows of mulch to control annual grasses. -Crop injury may occur if an organophosphate or carbamate insecticide is applied within 7 days of Callisto. - Do not apply more than 1 application of Callisto per crop; do not apply more than 6 fl oz per year as a banded application.						

2. Postemergence						
Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
1	Poast 1.5EC	1.0 to 1.5 pt/A	sethoxydim	0.2 to 0.3 lb/A	14	12
-Apply with crop oil concentrate at 1.0% v/v (1.0 gal/100 gal of spray solution). 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. -Yellow nutsedge, wild onion, or broadleaf weeds will not be controlled. -Repeated applications may be needed to control certain perennial grasses. - Do not tank-mix with or apply within 1 week before or 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 1.5 pt/A in single application and maximum Poast application per season is 5.5 pt/A.						
22	Gramoxone SL 2.0	1.95 pt/A	paraquat *	0.49 lb/A	21	24
-Row middles as a shielded application. Include a nonionic surfactant at 0.25% v/v. -Use shields or hoods to prevent spray contact with the crop and low spray pressure (maximum of 30 psi) to reduce small droplets that are prone to drift. See the label for additional information and warnings. -Rainfastness is 30 minutes. A maximum of 3 applications per year are allowed.						
27	Callisto 4SC	3.0 fl oz/A	mesotrione	0.094 lb/A	28	12
-Use as row-middle or hooded post-directed treatment, but not both. -Apply as a direct spray using a hooded sprayer. Okra must be at least 3 inches tall at time of application. -Use a nonionic surfactant (0.25% v/v). -Set spray equipment to minimize amount of Callisto that comes in contact with okra foliate or crop injury will occur. -Callisto controls common lambsquarters, pigweeds, as well and many other small-seeded annual broadleaf weeds, but Callisto is weak on ragweed and morninglory species. Apply Treflan 4EC between the rows of mulch to control annual grasses. -Crop injury may occur if an organophosphate or carbamate insecticide is applied within 7 days of Callisto. -Rainfastness is 1 hr. - Do not apply more than 1 application of Callisto per crop; do not apply more than 3 fl oz/A per year as a post-directed application.						

3. Postharvest						
Group	Product Name	Product Rate	Active Ingredient (* = Restricted Use)	Active Ingredient Rate	PHI (d)	REI (h)
22	Gramoxone SL 2.0	2.25 to 3 pt/A	paraquat*	0.56 to 0.75 lb/A	--	24
-A Special Local-Needs 24© label has been approved for the use of Gramoxone SL 2.0 for postharvest crop desiccation in DE, NJ and VA. Apply after the last harvest. Always include an adjuvant. -Spray coverage is essential for optimum effectiveness. See the label for additional information and warnings. -Rainfastness 30 minutes. A maximum of 2 applications for crop desiccation are allowed.						

Insect Control

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Recommended Insecticides

Aphids

Cotton/melon aphids and green peach aphid (GPA) are most common on okra. In the summer, GPA winged females can produce numerous pale yellow or pink colored live young (nymphs). GPA are larger than cotton/melon aphids. Cotton/melon aphids are yellow. Tremendous numbers of aphids can build up on the undersides of leaves often following pyrethroid insecticide applications. Aphids are sucking insects that excrete a sugary, sticky substance (“honeydew”) that can coat fruit and cause growth of black sooty mold fungus. Both honeydew and mold can hurt marketability. Predators and parasitoids (braconid wasps) often can keep aphid populations below damaging levels. Broad spectrum insecticides, like pyrethroids, destroy these natural enemies. Preserve natural enemies by using selective insecticides whenever possible. Sample plants for aphids as well as the presence of natural enemy species. Spray only when aphid densities appear to be increasing in the absence of predators.

Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations (note: spray coverage to the underside of the leaf is important):						
1B	Malathion 57EC	1.5 pt/A	malathion	1	12	H
3A + 4A	Brigadier	3.8 to 9.85 fl oz/A	bifenthrin* + imidacloprid	7	12	H
3A + 4A	Swagger	7.6 to 19.6 fl oz/A	bifenthrin* + imidacloprid	7	12	H
4A	Admire Pro	7.0 to 14.0 fl oz/A	imidacloprid - soil	21	12	H
4A	Admire Pro	1.3 to 2.2 fl oz/A	imidacloprid - foliar	0	12	H
4A	Assail 30SG	2.0 to 4.0 oz/A	acetamiprid	7	12	M
4C	Closer SC	1.5 to 2.0 fl oz/A	sulfoxaflor	1	12	H
4D	Sivanto 200SL,Sivanto Prime	21.0 to 28.0 fl oz/A	flupyradifurone - soil	45	4	L
4D	Sivanto 200SL	7.0 to 12.0 fl oz/A	flupyradifurone - foliar	1	4	L
4D	Sivanto Prime	7.0 to 14.0 fl oz/A	flupyradifurone - foliar	1	4	L
4D	Sivanto Prime (GPA)	10.5 to 14.0 fl oz/A	flupyradifurone - foliar	1	4	L
9C	Beleaf 50SG	2.8 to 4.28 fl oz/A	flonicamid	0	12	L
23	Movento	4.0 to 5.0 fl oz/A	spirotetramat	1	24	L
28	Verimark (melon aphid)	6.75 to 10.0 fl. oz/A	cyantranilprole - soil/drip	1	4	H
28	Verimark (GPA)	10.0 to 13.5 fl oz/A	cyantranilprole - soil/drip	1	4	H
28	Exirel	13.5 to 20.5 fl oz/A	cyantranilprole - foliar	1	12	H
28 + 6	Minecto Pro	10.0 fl oz/A	cyantranilprole + abamectin*	7	12	H

Corn Earworms (CEW)

CEW is a lepidopteran pest of okra that appears when moths emerge from drying field corn. Moths lay a single egg on a leaf. Larvae vary in color (yellow, brown, green or red) but display longitudinal light-colored stripes and black dots from which hair grow. CEW larvae can be distinguished from other larvae due to the presence of hair on their body. Larvae will attack fruit almost immediately following their emergence. Scouting for signs of their presence is necessary. Pheromone traps can also be used to determine periods of moth activity.

Group	Product Name	Product Rate	Active Ingredient(s) (*=Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations:						
3A + 4A	Brigadier	5.1 to 9.85 fl oz/A	bifenthrin* + imidacloprid	7	12	H
3A + 4A	Swagger	10.2 to 19.6 fl oz/A	bifenthrin* + imidacloprid	7	12	H
3A	Bifenture 2EC	2.1 to 6.4 fl oz/A	bifenthrin*	7	12	H
3A	Sniper, Sniper Helios	2.1 to 6.4 fl oz/A	bifenthrin*	7	12	H
3A	Hero EC	4.0 to 13.0 fl oz/A	zeta-cypermethrin* + bifenthrin*	7	12	H
3A	Mustang Maxx	2.24 to 4.0 fl oz/A	zeta-cypermethrin*	1	12	H
5	Entrust SC (OMRI)	3.0 to 6.0 fl oz/A	spinosad	1	4	M
5	Radiant SC	5.0 to 10.0 fl oz/A	spinetoram	1	4	H
11A	Dipel (OMRI)	0.5 to 1.0 lb/A	<i>Bacillus thuringiensis kurstaki</i>	0	4	N
16B	Rimon 0.83EC	9.0 to 12.0 fl oz/A	novaluron	1	12	L

Corn Earworms continued on next page

Corn Earworms - continued

22	Avaunt 30WDG	3.5 oz/A	indoxacarb	3	12	H
28	Coragen 1.67SC	3.5 to 5.0 fl oz/A	chlorantraniliprole - soil/drip, foliar	1	4	L
28	Verimark	5.0 to 10.0 fl oz/A	cyantraniliprole - soil/drip	1	4	H
28	Exirel	7.0 to 13.5 fl oz/A	cyantraniliprole - foliar	1	12	H
28 + 6	Minecto Pro	5.5 to 10.0 fl oz/A	cyantraniliprole + abamectin*	7	12	H

Japanese beetles

Adult Japanese beetles emerge in June and can cause substantial feeding damage on okra leaves. They skeletonize leaves leaving a lace-like appearance.

Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations:						
1B	Malathion 57EC	1.5 pt/A	malathion	1	12	H
3A + 4A	Brigadier	5.1 to 9.85 fl oz/A	bifenthrin* + imidacloprid	7	12	H
3A + 4A	Swagger	10.2 to 19.6 fl oz/A	bifenthrin* + imidacloprid	7	12	H
3A	Bifenture 2EC, Sniper, Sniper Helios	2.1 to 6.4 fl oz/A	bifenthrin*	7	12	H

Stink Bugs

Multiple species may damage fruit including brown and green stink bugs, and the invasive brown marmorated stink bug (BMSB). Stink bugs have a characteristic shield shape, a triangle on their thorax, are approximately 0.5 inch long and can emit a foul odor when disturbed. BMSB can be distinguished from the native brown stink bug by the white stripes on the antennae. BMSB nymphs have characteristic black and white striped legs and a dark colored or dark and white body, depending on the instar or stage of development. Stink bug eggs are in masses, barrel shaped and cream to greenish colored. Both nymphs and adults remove fluid from the fruit tissue, leaving a conspicuous white “halo” or discoloration on the surface. BMSB feeding injury can be significantly more severe than that of other species. Growers should scout for their presence on plants, and initiate weekly sprays if observed.

Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations:						
1A	Sevin XLR Plus, Sevin 4F	1.0 to 1.5 qt/A	carbaryl	3	12	H
3A + 4A	Brigadier	5.1 to 9.85 fl oz/A	bifenthrin* + imidacloprid	7	12	H
3A + 4A	Swagger	7.6 to 19.6 fl oz/A	bifenthrin* + imidacloprid	7	12	H
3A	Bifenture 2EC, Sniper, Sniper Helios	6.4 fl oz/A	bifenthrin*	7	12	H
3A	Hero EC	10.3 fl oz/A	zeta-cypermethrin* + bifenthrin*	7	12	H
3A	Mustang Maxx	4.0 fl oz/A	zeta-cypermethrin*	1	12	H

Whiteflies

Whiteflies can be found on the underside of leaves where they aggregate in numbers. When disturbed, the white, tiny moth-like adults will fly off but quickly return to the plant. Nymphs and adults feed by removing fluids from plant material, creating stippling, yellowing and distortion of the leaves. Whiteflies also secrete honeydew, leaving a conspicuous sticky, shiny appearance to the plant during times of heavy infestation.

Group	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations:						
3A + 4A	Brigadier	5.1 to 9.85 fl oz/A	bifenthrin* + imidacloprid	7	12	H
3A + 4A	Swagger	10.2 to 19.6 fl oz/A	bifenthrin* + imidacloprid	7	12	H
4A	Admire Pro	7.0 to 14.0 fl oz/A	imidacloprid - soil	21	12	H
4A	Admire Pro	1.3 to 2.2 fl oz/A	imidacloprid - foliar	0	12	H
4C	Closer SC	4.25 to 4.5 fl oz/A	sulfoxaflor	1	12	H
4D	Sivanto 200SL, Sivanto Prime	21.0 to 28.0 fl oz/A	flupyradifurone - soil	45	4	L
4D	Sivanto 200SL, Sivanto Prime	10.5 to 14.0 fl oz/A	flupyradifurone - foliar	1	4	L
7C	Knack	8.0 to 10.0 fl oz/A	pyriproxyfen	1	12	L
16	Courier SC	9.0 to 13.6 fl oz/A	buprofezin	1	12	L
21A	Portal or Portal XLO	2.0 pt/A	fenpyroximate	1	12	L
23	Movento	4.0 to 5.0 fl oz/A	spirotetramat	1	24	L
28 + 6	Minecto Pro	10.0 fl oz/A	cyantraniliprole + abamectin*	7	12	H

Disease Control

THE LABEL IS THE LAW - See the Pesticide Use Disclaimer on page F 1.

Recommended Fungicides

Nematode Control

Okra roots are very susceptible to the damage caused by root knot and sting nematodes. See also the Soil Fumigation and Nematodes sections in the Pest Management chapter. Use the fumigants listed in the Pest Management chapter or the nematocide in the table below. Consult the label.

Code	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
Incorporate or drip-apply 7 days before planting:						
--	Nimitz 4EC	3.5 to 5.0 pt/A	fluensulfone	n/a	12	N

Seed Treatment

Use thiram 480DP at 3.0 to 4.0 oz/100 lb of seed (2/3 tsp/lb) *plus* Apron XL LS (0.32 to 0.64 fl oz/100 lb of seed) for improved germination and stand.

Damping-Off caused by *Rhizoctonia*

For control of seedling root rot and basal stem rot apply the following fungicide:

Code	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
11	azoxystrobin 2.08F	0.40 to 0.80 fl oz/1000 row ft	azoxystrobin	0	4	N

Fungal Diseases

Fruit Rot (*Choanephora*)

Choanephora is a soil-borne fungal disease which attacks senescent blossoms and fruit. There are no fungicides labeled for Choanephora control. Improving air circulation is the only effective means of reducing the chances for Choanephora development. In extreme cases, growers may remove the lower juvenile leaves to improve air circulation.

Fusarium and Verticillium Wilts

Rotate with non-solanaceous crops and avoid planting in fields with a history of either disease. If rotation is not option, soil fumigation will help reduce soil population of causal agents.

Cercospora leaf spot and Powdery mildew

Code	Product Name	Product Rate	Active Ingredient(s) (* = Restricted Use)	PHI (d)	REI (h)	Bee TR
Rotate the following every 7 d as long as weather conditions favor disease development:						
M1	Copper (OMRI) ¹	at labeled rates	copper	0	48	N
M5	chlorothalonil 6F ²	1.5 pt/A	chlorothalonil	7	12	N
3	Folicur 3.6F ³	4.0 to 6.0 fl oz/A	tebuconazole	4	12	N
11	azoxystrobin 2.08F ⁴	6.0 to 15.5 fl oz/A	azoxystrobin	0	4	N

¹There are a number of copper based products with OMRI labels. See labels for specifics. Copper applications for bacterial disease control may help suppress some fungal pathogens in organic production systems.² Cercospora and Powdery mildew;³ Cercospora only; ⁴ Powdery mildew only

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 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.