

# Pea

Peas grow best in cool, moist early spring weather. To avoid all peas maturing at once, planting dates and varieties are chosen on the basis of degree days (DD). The base temperature used in computing degree days is 40°F. The number of degree days needed for a variety to reach the processing stage is fairly constant. Within a variety, temperature records are commonly used to predict the maturation or harvest date. Because of the large difference in spring and summer temperatures, several days separation at planting time may be required to separate harvests by only 1 or 2 days. Planting dates are determined using growing degree day requirements for maturation and on historical weather records.

Select fields with uniform fertility, soil type, slope, and drainage. Silt loams, sandy loams, or clay loams are best. High organic matter improves tilth and makes soil less droughty. Peas grown on sands and mucks require careful irrigation management.

Peas need adequate soil moisture but too much or too little reduces yield. Inadequate drainage starves the root zone of oxygen so that normal root respiration cannot occur, nitrogen-fixing bacteria cannot function efficiently, and root rot organisms become more destructive.

Peas typically follow corn in a rotation. Other crops such as small grains and hay also work well. The usual sequence is corn, peas, small grain, hay. Rotations with potatoes do not work well unless soil pH is above 6.6. Peas are sometimes grown in a double crop system. Green beans, soybeans, or silage corn may be planted after the peas are harvested. Double cropping can increase risks from diseases and insects.

Frequent pea culture increases disease and insect problems, especially common root rot. To avoid buildup of these

problems, peas should not be grown on the same field more than once every 4 or 5 years.

Peas do not compete well with weeds. The best time to control weeds is before planting. Canada thistles are particularly troublesome because their buds are hard to remove from shelled peas and greatly reduce the pea grade. Choose fields without major weed problems. Check that previous herbicides will not damage peas, since some chemicals persist in the soil.

## Planting

The best yields can be expected from the earliest planted peas. Till seedbed 4–5 inches deep, but do not work the soil too fine, or crusting will cause problems in emergence. Grain drills are generally used to plant peas. Seeding rates vary depending on cultivar. Plant seeds 2 inches deep in firm moist soil to promote fast, uniform germination and seedling emergence. Plant shallower if soil is heavy or very moist. Plant deeper (but no more than 3 inches) on light soils or if soil is dry or cloddy.

Good yields require adequate stands. Full stands of strong vigorous plants provide needed competition against weeds and make full use of soil moisture and nutrients. The problem is more apt to be one of too few plants rather than too many.

Early and light-vined varieties, such as Alsweet, should have at least 672,000 plants/a (nine plants/ft in 7-inch rows). Later varieties need a minimum population of 500,000 plants/a (six plants/ft in 7-inch rows). There are indications that populations higher than these minimums may be profitable. Base seeding rates on the final plant population desired. Large seeds require heavier rates than small

seeds. Poor germinating seeds or unfavorable conditions at planting require heavier rates.

## Seed treatment

Most pea seeds for commercial production are treated with a fungicide and dyed to make them stand out. The fungicide coating helps protect seed and seedling from soil fungi until emergence. Treated seeds are poisonous and must not be used for food or feed.

## Seed inoculation

Peas in association with the proper nitrogen-fixing bacteria can fix their own nitrogen from the air, therefore it may be beneficial to inoculate the seeds before planting. This is especially important if peas have not been grown in that field for more than 5 years.

## Lime and fertilizer

Determine fertilizer and lime needs with a soil test.

**Lime:** Adjust pH to 6.0 or higher on mineral soils and 5.6 on organic soils for maximum yields.

**Fertilizer rates:** Apply annual nitrogen,  $P_2O_5$ , and  $K_2O$  rates shown in the table below. Take credits for previous legume crops and manure.

**Application:** Broadcast and work in lime and fertilizer before planting. Small amounts of fertilizer (up to 200 lb/a) can be applied with the drill at planting time. Additional required fertilizer should be broadcast and incorporated before planting. Drill-applied fertilizer should be placed 2 inches to the side and slightly below the seed. Starter fertilizer is especially important for early peas on cool, wet soils because nitrogen-fixing bacteria are less active.

## Annual nitrogen, phosphate, and potash recommendations for peas

Nitrogen		Phosphate and potash		
Organic matter (%)	Amount to apply (lb/a)	Yield goal (lb/a)	Amount P <sub>2</sub> O <sub>5</sub> to apply* (lb/a)	Amount K <sub>2</sub> O to apply* (lb/a)
<2	40	1,000–2,500	10	15
2.0–9.9	30	2,501–4,000	15	30
10–20	20	4,001–6,000	25	45
>20	0			

\*Amounts shown are for optimum (O) soil test levels. Apply 50% of this rate if soil test is high (H) and omit if soil test is excessively high (EH). If soil test is low (L) or very low (VL), increase rates according to soil test recommendations.

## Disease control in pea

Disease	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Ascochyta blight</b>	<i>Use clean, disease-free seed and a 3-year rotation.</i>			
	azoxystrobin	6.0–15.5 fl oz Aframe, AzoxyStar, Quadris Flowable, Satori, Willowood Azoxy 2SC	0	Quadris, Satori, and Headline belong to the strobilurin group of fungicides. Do not exceed 1 application of any of these products before alternating with a fungicide having a different mode of action. Do not exceed 2 applications of strobilurin fungicides per crop per year. Do not exceed 2.88 qt/a Quadris or Satori, or 18.0 fl oz/a Headline per crop per season.
	pyraclostrobin	6.0–9.0 fl oz Headline SC	7	
	boscalid	8.0–11.0 oz Endura	21 (dried beans) 7 (succulent)	Use no more than 22.0 oz/a per season. Apply at beginning of flowering and again at full bloom for maximum efficacy. Do not make more than 2 applications/a per season.
	fluxapyroxad + pyraclostrobin	4.0–8.0 fl oz Priaxor	7	See label and follow instructions for limitations in tank mixing to avoid crop injury. Do not apply more than 16.0 fl oz/a per season.
	penthiopyrad	14.0–30.0 fl oz Fontelis	0	Do not exceed 72.0 fl oz/a per season. Do not make more than 2 sequential applications without alternating to a fungicide with a different mode of action.
<b>Bacterial blight</b> ("syringae" blight)	Use clean, disease-free seed. Avoid planting after green and lima beans. Don't over-irrigate. Copper-containing fungicides may aid in limiting bacterial disease spread.			
<b>Common root rot</b> ( <i>Aphanomyces</i> )	<i>There are no disease-resistant cultivars. Rotations with non-legumes slow the buildup of disease problems. A test from the UW-Madison Dept. of Plant Pathology predicts the potential for root rot. Trifluralin herbicide gives some protection against Aphanomyces root rot.</i>			
<b>Downy mildew</b> ( <i>Peronospora viciae</i> )	phosphoric acid salts, potassium phosphites	1.0–3.0 qt in 20 gal water/a Confine Extra, Fosphite, Fungi-Phite, K-Phite, Rampart	0	Apply at 2- to 3-week intervals. Also registered for control of Pythium and Phytophthora.
		3.0–4.0 pt ProPhyt	0	Start application at flowering and reapply at 7-day intervals or as conditions dictate.
		4.0 pt Phostrol	0	Apply at 7-day intervals starting prior to disease onset.
<b>Fusarium near wilt</b>	<i>Cultivars resistant to near wilt are the only effective control.</i>			
<b>Fusarium root rot</b>	<i>Avoid close cropping of peas. Plant peas in a 4-year rotation with other crops.</i>			
<b>Fusarium wilt</b>	<i>Use resistant varieties.</i>			

(continued)

**Disease control in pea** *(continued)*

Disease	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Powdery mildew</b>	8.0–10.0 lb wettable sulfur in 100 gal water or dust on 325 mesh dusting sulfur			Use mildew-resistant varieties. Begin applications at first sign of mildew. Do not apply when plants are wet or when temperatures are above 85°F.
<b>Rhizoctonia root rot</b>	azoxystrobin	0.40–0.80 fl oz Quadris Flowable/ 1,000 ft row	0	Use at planting. Follow manufacturer's directions.
<b>Seed rot, root rot, and damping-off</b>	captan thiram	varies by manufacturer		Seed treatment only. Follow manufacturer's instructions. Combination fungicides and insecticides are available. If using inoculum, apply just before planting. Plant disease-free seed.
	fludioxonil	0.08–0.16 fl oz/100 lb seed Dyna-Shield, Maxim 4FS, Spirato 480FS		
	fludioxonil + mefenoxam	1.5 fl oz/100 lb seed Apron MAXX RFC 0.016 fl oz/100 lb seed Apron XL 0.167–0.334 fl oz/100 lb seed Maxim XL		
	fluxapyroxad	0.24–0.47 fl oz Systiva		
	mefenoxam	0.5–1.0 pt Ridomil Gold SL 1.0–2.0 pt Ultra Flourish		
	metalaxyl	0.75 fl oz/100 lb seed Acquire, Metalaxyl 265 ST 2.0 oz/100 lb seed Allegiance 0.1–0.375 fl oz/100 lb seed MetaStar ST 0.75–1.5 fl oz/100 lb seed Sebring 318 FS 0.5–1.0 fl oz/100 lb seed Sebring 480 FS		
	pyraclostrobin	0.4–1.5 fl oz/100 lb seed Stamina		
	trifloxystrobin + metalaxyl	1.0 oz/100 lb seed Trilex 2000		
<b>Virus diseases</b>	<i>Virus diseases such as enation virus, mosaic seed-borne virus, mosaic pea streak virus, and pea stunt are spread by aphids. Good aphid control is the most effective control measure.</i>			

Pea

Pepper

Potato

Pumpkin & squash

Sweet corn

Table beet

Tomato

## Scouting calendar for insect pests of peas

	April			May			June			July			August			September		
	early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late
	Aphids																	
	Caterpillar contaminants																	

Insect control in pea<sup>a</sup>

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Alfalfa caterpillar</b>	<i>Treat if you find one caterpillar per 25 sweeps.</i>			
	0.017–0.025 lb alpha-cypermethrin	2.7–3.8 fl oz *Fastac CS, *Fastac EC	1 (succulent shelled or edible-podded peas) 21 (dried shelled peas)	Do not apply more than 11.4 fl oz (0.075 lb ai)/a per season.
	0.033–0.1 lb bifenthrin	2.1–6.4 fl oz *Brigade 2EC	3	Do not exceed 12.8 oz/a (0.2 lb ai/a) per season.
	0.0875 lb bifenthrin + imidacloprid	5.5 fl oz *Brigadier	7	Do not apply more than 16.64 fl oz/a per season. Do not apply more than 0.13 lb ai/a of imidacloprid or 0.20 lb ai/a of bifenthrin per season.
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Foliar treatment. Do not exceed 0.1 lb ai/a per season. Do not feed treated forage to livestock.
	flubendiamide	2.0–3.0 fl oz Belt SC	1 (succulent shelled peas) 14 (dry peas)	Do not apply more than 6.0 fl oz/a per crop season.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 fl oz *Proaxis (several manufacturers)	7	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season.
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Do not exceed 7.68 fl oz/a (0.12 lb ai/a) per season.
	lambda-cyhalothrin + chlorantraniliprole	6.0–9.0 fl oz *Besiege	7	Do not exceed a total of 31.0 fl oz of Besiege or 0.12 lb ai of lambda-cyhalothrin containing products or 0.2 lb ai of chlorantraniliprole-containing products per acre per year.
	methomyl	*Lannate LV, *Lannate SP (rates vary by formulation)	1 <sup>b</sup>	See label for remarks.
	zeta-cypermethrin	3.4–4.3 fl oz *Mustang	1	Do not apply more than 25.8 oz of product or 0.3 lbs ai/a per season including at-plant and foliar applications.
	0.017–0.025 lb zeta-cypermethrin	2.72–4.0 oz *Mustang Maxx	1	Wait at least 5 days between applications. Do not exceed 24.0 oz/a (0.15 lb ai/a) per season.

\*Restricted-use pesticide.

(continued)

<sup>a</sup> EPA-approved insecticides for pea insects. Usually honeybees do not work pea blossoms, but weed blossoms in the field or in the fencerow might attract bees. Avoid using Sevin sprays if bee yards are located within 2.0–2.5 miles of pea fields. Apply insecticides in the evening to avoid excessive kill of foraging bees.

<sup>b</sup> Harvest time is 5 days for forage and 14 days for hay.

**Insect control in pea<sup>a</sup>** *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Alfalfa caterpillar</b> <i>(cont.)</i>	0.04–0.10 lb zeta-cypermethrin + bifenthrin	*Hero, *Hero EW (rates vary by formulation)	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.
	0.079 lb zeta-cypermethrin + bifenthrin + imidacloprid	4.5 fl oz *Triple Crown	7	Do not apply more than 13.1 fl oz/a per season.
<b>Aphids</b>	<i>Treatment is recommended if you find one aphid per small pod or 10 per sweep.</i>			
	acetamiprid	2.5–5.3 oz Assail 30 SG 1.0–2.3 oz Assail 70WP	7	Do not make more than 3 applications per season. Do not exceed a total of 0.3 lb ai of acetamiprid-containing products/a per growing season.
	0.020–0.025 lb alpha-cypermethrin	3.2–3.8 fl oz *Fastac CS, *Fastac EC	1 (suc-culent shelled or edible-podded peas) 21 (dried shelled peas)	Do not apply more than 11.4 fl oz (0.075 lb ai)/a per season. Aphid control may be variable depending on species present and host-plant relationships.
	azadirachtin	Aza-Direct, Neemix 4.5	0	See label for rate. Suppression and adult feeding deterrence. Apply every 7–10 days.
	0.033–0.1 lb bifenthrin	2.1–6.4 fl oz *Brigade 2EC	3	Do not exceed 12.8 fl oz/a (0.2 lb ai/a) per season.
	0.06–0.0875 lb bifenthrin + imidacloprid	3.8–5.5 fl oz *Brigadier	7	Do not apply more than 16.64 fl oz/a per season. Do not apply more than 0.13 lb ai/a of imidacloprid or 0.20 lb ai/a of bifenthrin per season.
	dimethoate	several formulations	consult label	Consult label.
	0.015–0.03 lb esfenvalerate	2.9–5.8 fl oz *Asana XL	3	Foliar treatment. Do not exceed 0.1 lb ai/a per season. Do not feed treated forage to livestock.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 fl oz *Proaxis (several manufacturers)	7	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. See resistance statement under “General Use Precautions and Restrictions” on label.
	imidacloprid + beta-cyfluthrin	2.4–2.8 fl oz *Leverage 360	7	Maximum Leverage 360 insecticide allowed per crop season: 6.4 fl oz/a (0.05 lb ai/a beta-cyfluthrin, 0.10 lb ai/a imidacloprid). Do not feed treated vines or hay to livestock.
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Do not exceed 7.68 fl oz/a (0.12 lb ai/a) per season. See resistance statement under “General Directions for Use” on label.
	lambda-cyhalothrin + chlorantraniliprole	6.0–9.0 fl oz *Besiege	7	Refer to resistance management section of label. Do not exceed a total of 31.0 fl oz of Besiege or 0.12 lb ai of lambda-cyhalothrin containing products or 0.2 lb ai of chlorantraniliprole-containing products per acre per year.
	methomyl	*Lannate LV, *Lannate SP (rates vary by formulation)	1 <sup>b</sup>	See label for remarks.
	0.06–0.08 lb spirotetramat	4.0–5.0 fl oz Movento	1 (suc-culent) 7 (dried)	Do not apply more than 10.0 fl oz/a per season.

\*Restricted-use pesticide.

*(continued)*

<sup>a</sup> EPA-approved insecticides for pea insects. Usually honeybees do not work pea blossoms, but weed blossoms in the field or in the fencerow might attract bees. Avoid using Sevin sprays if bee yards are located within 2.0–2.5 miles of pea fields. Apply insecticides in the evening to avoid excessive kill of foraging bees.

<sup>b</sup> Harvest time is 5 days for forage and 14 days for hay.

Pea

Pepper

Potato

Pumpkin & squash

Sweet corn

Table beet

Tomato

## Insect control in pea<sup>a</sup> (continued)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Aphids</b> (cont.)	thiamethoxam	1.28 fl oz Cruiser 5FS/100 lb seed	—	Early season protection. Purchase treated seed from seed dealer or seed treatment representative.
	zeta-cypermethrin	3.4–4.3 fl oz *Mustang	1	Aids in control. Do not apply more than 25.8 oz of product or 0.3 lbs ai/a per season including at-plant and foliar applications.
		3.2–4.0 oz *Mustang Maxx	1	Wait at least 5 days between applications. Do not exceed 24.0 oz/a (0.15 lb ai/a) per season.
	0.04–0.10 lb zeta-cypermethrin + bifenthrin	*Hero, *Hero EW (rates vary by formulation)		Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.
<b>Army-worms</b>	0.017–0.025 lb alpha-cypermethrin	2.7–3.8 fl oz *Fastac CS, *Fastac EC	1 (suc- culent shelled or edible- podded peas) 21 (dried shelled peas)	Do not apply more than 11.4 fl oz (0.075 lb ai)/a per season.
	azadirachtin	Aza-Direct, Neemix 4.5	0	See label for rate. Suppression and adult feeding deterrence. Apply every 7–10 days.
	<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	Agree WG, DiPel DF, Javelin, Lepinox WDG (consult label for rate)	0	Consult label. Treat early instar larvae before noticeable feeding damage occurs. Repeat as needed.
	0.0875 lb bifenthrin + imidacloprid	5.5 fl oz *Brigadier	7	Do not apply more than 16.64 fl oz/a per season. Do not apply more than 0.13 lb ai/a of imidacloprid or 0.20 lb ai/a of bifenthrin per season.
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Foliar treatment. Do not exceed 0.1 lb ai/a per season. Do not feed treated forage to livestock.
	flubendiamide	2.0–3.0 fl oz Belt SC	1 (suc- culent shelled peas) 14 (dry peas)	Do not apply more than 6.0 fl oz/a per crop season.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 fl oz *Proaxis (several manufacturers)	7	For control of first and second instars only. Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. Use higher rates for large larvae.
	imidacloprid + beta-cyfluthrin	2.4–2.8 fl oz *Leverage 360	7	<b>Apply to small larvae, first and second instar armyworms.</b> Maximum Leverage 360 insecticide allowed per crop season: 6.4 fl oz/a (0.05 lb ai/a beta-cyfluthrin, 0.10 lb ai/a imidacloprid). Do not feed treated vines or hay to livestock.
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Use higher rates for large larvae. Do not exceed 7.68 fl oz/a (0.12 lb ai/a) per season.
	lambda-cyhalothrin + chlorantraniliprole	6.0–9.0 fl oz *Besiege	7	Use higher rates within the listed rate range for large larvae. Do not exceed a total of 31.0 fl oz of Besiege or 0.12 lb ai of lambda-cyhalothrin containing products or 0.2 lb ai of chlorantraniliprole-containing products per acre per year.

\*Restricted-use pesticide.

(continued)

<sup>a</sup> EPA-approved insecticides for pea insects. Usually honeybees do not work pea blossoms, but weed blossoms in the field or in the fencerow might attract bees. Avoid using Sevin sprays if bee yards are located within 2.0–2.5 miles of pea fields. Apply insecticides in the evening to avoid excessive kill of foraging bees.

<sup>b</sup> Harvest time is 5 days for forage and 14 days for hay.

**Insect control in pea<sup>a</sup>** *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions	
<b>Army-worms</b> <i>(cont.)</i>	methomyl	*Lannate LV, *Lannate SP (rates vary by formulation)	1 <sup>b</sup>	Foliar treatment. Do not apply more than 9.0 pt/a per crop. Do not make more than 6 applications per crop per year.	
	0.06–0.25 lb methoxyfenozide	4.0–16.0 fl oz Intrepid 2F	7	Do not apply more than 64.0 fl oz/a per year.	
	spinetoram	4.0–8.0 fl oz Radiant SC	3	Do not use for yellow-striped armyworm. Do not make more than 6 applications per crop. Do not exceed 0.219 lb ai/a per season. Wait at least 4 days between applications.	
	spinosad	2.2–3.3 fl oz Blackhawk 4.0–6.0 fl oz Entrust SC	3 (succulent peas) 28 (dried peas)	Scout with enough regularity to monitor the population size. Heavy infestations may require repeat applications, but follow resistance management guidelines. Do not make more than 2 applications of Group 5 insecticides (spinetoram and spinosad). For succulent peas, do not apply more than a total of 0.45 lb ai of spinosad (20.0 fl oz of Blackhawk or 29.0 fl oz of Entrust SC) per acre per season. For dried peas, do not apply more than a total of 0.188 lb ai of spinosad (8.3 fl oz of Blackhawk or 12.0 fl oz of Entrust SC) per acre per season. For dried peas, do not feed treated forage or hay to meat or dairy animals.	
	zeta-cypermethrin	3.4–4.3 fl oz *Mustang	1	Do not apply more than 25.8 oz of product or 0.3 lbs ai/a per season including at-plant and foliar applications.	
	0.017–0.025 lb zeta-cypermethrin	2.72–4.0 oz *Mustang Maxx	1	Wait at least 5 days between applications. Do not exceed 24.0 oz/a (0.15 lb ai/a) per season.	
	0.04–0.10 lb zeta-cypermethrin + bifenthrin	*Hero, *Hero EW (rates vary by formulation)	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.	
	0.079 lb zeta-cypermethrin + bifenthrin + imidacloprid	4.5 fl oz *Triple Crown	7	Do not apply more than 13.1 fl oz/a per season.	
	<b>Cutworms</b>	0.008–0.025 lb alpha-cypermethrin	1.3–3.8 fl oz *Fastac CS, *Fastac EC	1 (succulent shelled or edible-podded peas) 21 (dried shelled peas)	Do not apply more than 11.4 fl oz (0.075 lb ai)/a per season.
		azadirachtin	Aza-Direct, Neemix 4.5	0	See label for rate. Suppression and adult feeding deterrence. Apply every 7–10 days.
0.033–0.1 lb bifenthrin		2.1–6.4 fl oz *Brigade 2EC	3	Do not exceed 12.8 oz/a (0.2 lb ai/a) per season.	
0.0875 lb bifenthrin + imidacloprid		5.5 fl oz *Brigadier	7	Do not apply more than 16.64 fl oz/a per season. Do not apply more than 0.13 lb ai/a of imidacloprid or 0.20 lb ai/a of bifenthrin per season.	

\*Restricted-use pesticide.

*(continued)*

<sup>a</sup> EPA-approved insecticides for pea insects. Usually honeybees do not work pea blossoms, but weed blossoms in the field or in the fencerow might attract bees. Avoid using Sevin sprays if bee yards are located within 2.0–2.5 miles of pea fields. Apply insecticides in the evening to avoid excessive kill of foraging bees.

<sup>b</sup> Harvest time is 5 days for forage and 14 days for hay.

Pea

Pepper

Potato

Pumpkin & squash

Sweet corn

Table beet

Tomato

## Insect control in pea<sup>a</sup> (continued)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Cutworms</b> (cont.)	chlorantraniliprole	3.5–7.5 fl oz Coragen	1	Do not make more than 4 applications per crop season and allow at least 3 days between applications. Do not apply more than 15.4 fl oz/a Coragen per season.
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Foliar treatment. Do not exceed 0.1 lb ai/a per season. Do not feed treated forage to livestock.
	0.2 lb fenpropathrin	10.66 fl oz *Danitol	7	Do not exceed 42.66 fl oz/a per season.
	flubendiamide	2.0–3.0 fl oz Belt SC	1 (succulent shelled peas) 14 (dry peas)	Do not apply more than 6.0 fl oz/a per crop season.
	0.0075–0.0125 lb gamma-cyhalothrin	1.92–3.20 fl oz *Proaxis (several manufacturers)	7	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season.
	imidacloprid + beta-cyfluthrin	2.4–2.8 fl oz *Leverage 360	7	Maximum Leverage 360 insecticide allowed per crop season: 6.4 fl oz/a (0.05 lb ai/a beta-cyfluthrin, 0.10 lb ai/a imidacloprid). Do not feed treated vines or hay to livestock.
	0.015–0.025 lb lambda-cyhalothrin	0.96–1.6 fl oz *Warrior II	7	Do not exceed 7.68 fl oz/a (0.12 lb ai/a) per season.
	lambda-cyhalothrin + chlorantraniliprole	5.0–8.0 fl oz *Besiege	7	Do not exceed a total of 31.0 fl oz of Besiege or 0.12 lb ai of lambda-cyhalothrin containing products or 0.2 lb ai of chlorantraniliprole-containing products per acre per year.
	zeta-cypermethrin	1.4–4.3 fl oz *Mustang	1	Do not apply more than 25.8 oz of product or 0.3 lbs ai/a per season including at-plant and foliar applications.
	0.008–0.025 lb zeta-cypermethrin	1.28–4.0 oz *Mustang Maxx	1	Wait at least 5 days between applications. Do not exceed 24.0 oz/a (0.15 lb ai/a) per season.
zeta-cypermethrin + bifenthrin	*Hero, *Hero EW (rates vary by formulation)	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.	
0.079 lb zeta-cypermethrin + bifenthrin + imidacloprid	4.5 fl oz *Triple Crown	7	Do not apply more than 13.1 fl oz/a per season.	
<b>Loopers</b>	<i>Treat if you find one looper per 25 sweeps.</i>			
0.020–0.025 lb alpha-cypermethrin	3.2–3.8 fl oz *Fastac	1 (succulent shelled or edible-podded peas) 21 (dried shelled peas)	Do not apply more than 11.4 fl oz (0.075 lb ai)/a per season.	
azadirachtin	Aza-Direct, Neemix 4.5	0	See label for rate. Suppression and adult feeding deterrence. Apply every 7–10 days.	
<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	Agree WG, DiPel DF, Javelin, Lepinox WDG (consult label for rate)	0	Consult label. Treat early instar larvae before noticeable feeding damage occurs. Repeat as needed.	

\*Restricted-use pesticide.

(continued)

<sup>a</sup> EPA-approved insecticides for pea insects. Usually honeybees do not work pea blossoms, but weed blossoms in the field or in the fencerow might attract bees. Avoid using Sevin sprays if bee yards are located within 2.0–2.5 miles of pea fields. Apply insecticides in the evening to avoid excessive kill of foraging bees.

<sup>b</sup> Harvest time is 5 days for forage and 14 days for hay.

**Insect control in pea<sup>a</sup>** *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Loopers</b> <i>(cont.)</i>	0.033–0.10 lb bifenthrin	2.1–6.4 fl oz *Brigade 2EC	3	Do not exceed 12.8 fl oz/a (0.2 ai/a) per season.
	0.0875 lb bifenthrin + imidacloprid	5.5 fl oz *Brigadier	7	Do not apply more than 16.64 fl oz/a per season. Do not apply more than 0.13 lb ai/a of imidacloprid or 0.20 lb ai/a of bifenthrin per season.
	chlorantraniliprole	3.5–7.5 fl oz Coragen	1	Do not make more than 4 applications per crop season and allow at least 3 days between applications. Do not apply more than 15.4 fl oz/a Coragen per season.
	0.03–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3	Foliar treatment. Do not exceed 0.1 lb ai/a per season. Do not feed treated forage to livestock.
	0.2 lb fenprothrin	10.66 fl oz *Danitol 2.4 EC	7	Do not exceed 2.66 pts (42.66 fl oz)/a per season.
	flubendiamide	2.0–3.0 fl oz Belt SC	1 (succulent shelled peas) 14 (dry peas)	Do not apply more than 6.0 fl oz/a per crop season.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 fl oz *Proaxis (several manufacturers)	7	Do not exceed 0.96 pt/a (0.06 lb ai/a) per season.
	imidacloprid + beta-cyfluthrin	2.4–2.8 fl oz *Leverage 360	7	Maximum Leverage 360 insecticide allowed per crop season: 6.4 fl oz/a (0.05 lb ai/a beta-cyfluthrin, 0.10 lb ai/a imidacloprid). Do not feed treated vines or hay to livestock.
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Do not exceed 7.68 fl oz/a (0.12 lb ai/a) per season.
	lambda-cyhalothrin + chlorantraniliprole	6.0–10.0 fl oz *Besiege	1	Do not exceed a total of 31.0 fl oz of Besiege or 0.12 lb ai of lambda-cyhalothrin containing products or 0.2 lb ai of chlorantraniliprole-containing products per acre per year.
	methomyl	*Lannate LV, *Lannate SP (rates vary by formulation)	1 <sup>b</sup>	Foliar treatment. Do not apply more than 9.0 pt/a per crop. Do not make more than 6 applications per crop.
	0.031–0.063 lb spinetoram	4.0–8.0 fl oz Radiant SC	3	Do not make more than 6 applications per crop. Do not exceed 0.219 lb ai/a per season. Wait at least 4 days between applications.
	spinosad	2.2–3.3 fl oz Blackhawk 4.0–6.0 fl oz Entrust SC	3 (succulent peas) 28 (dried peas)	Follow resistance management guidelines. Do not make more than 2 consecutive applications of Group 5 insecticides (spinetoram and spinosad). For succulent peas, do not apply more than a total of 0.45 lb ai of spinosad (20.0 fl oz of Blackhawk or 29.0 fl oz of Entrust SC) per acre per season. For dried peas, do not apply more than a total of 0.188 lb ai of spinosad (8.3 fl oz of Blackhawk or 12.0 fl oz of Entrust SC) per acre per season. For dried peas, do not feed treated forage or hay to meat or dairy animals.
	0.020–0.025 lb zeta-cypermethrin	3.2–4.0 oz *Mustang Maxx	1	Wait at least 5 days between applications. Do not exceed 24.0 oz/a (0.15 lb ai/a) per season.

\*Restricted-use pesticide.

*(continued)*

<sup>a</sup> EPA-approved insecticides for pea insects. Usually honeybees do not work pea blossoms, but weed blossoms in the field or in the fencerow might attract bees. Avoid using Sevin sprays if bee yards are located within 2.0–2.5 miles of pea fields. Apply insecticides in the evening to avoid excessive kill of foraging bees.

<sup>b</sup> Harvest time is 5 days for forage and 14 days for hay.

Pea

Pepper

Potato

Pumpkin & squash

Sweet corn

Table beet

Tomato

## Insect control in pea<sup>a</sup> (continued)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Loopers</b> (cont.)	zeta-cypermethrin + bifenthrin	*Hero, *Hero EW (rates vary by formulation)	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.
	0.061–0.079 lb zeta-cypermethrin + bifenthrin + imidacloprid	3.5–4.5 fl oz *Triple Crown	7	Do not apply more than 13.1 fl oz/a per season.
	0.079 lb zeta-cypermethrin + bifenthrin + imidacloprid	4.5 fl oz *Triple Crown	7	Do not apply more than 13.1 fl oz/a per season.
<b>Seed maggot</b>	thiamethoxam	1.28 fl oz Cruiser 5FS/100 lb seed	seed treatment	Early season protection. Purchase treated seed from seed dealer or seed treatment representative.

\*Restricted-use pesticide.

<sup>a</sup> EPA-approved insecticides for pea insects. Usually honeybees do not work pea blossoms, but weed blossoms in the field or in the fencerow might attract bees. Avoid using Sevin sprays if bee yards are located within 2.0–2.5 miles of pea fields. Apply insecticides in the evening to avoid excessive kill of foraging bees.

<sup>b</sup> Harvest time is 5 days for forage and 14 days for hay.

## Weed control

Postemergence herbicides need to be applied at the correct stage of growth to avoid injury and prevent yield losses. Correctly counting leaves or nodes on pea plants is critical in timing herbicide applications.

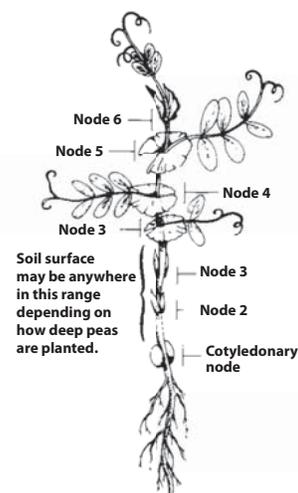
To count nodes, refer to the drawing of the pea plant. The point where the cotyledons (seed) are attached to the plant is the cotyledonary node. The root forms below this node and the stem above.

The two nodes above this point produce

incomplete or stipular leaves. These leaves can be above or below the soil surface and can be difficult to detect.

Count the first two nodes above the cotyledonary node as one and two. The third node has normal stipules and usually a leaf with two leaflets. The rest of the nodes produce normal stipules and a leaf with four leaflets. The uppermost node from which a leaf extends is the last developed node to be counted.

Within the folded stipules of this node are the growing point of the pea plant and stipules and leaves of still more nodes.



## Weed control in pea

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Annuals</b>	0.5 lb clomazone	1.3 pt Command 3ME		Command provides fair control of annual grasses and several broadleaf weeds but is weak on pigweed and black nightshade. Command is ineffective on peat and muck soils. The 3ME formulation is labeled for preemergence applications, but shallow incorporation is permitted, which should prevent volatility. Off-site movement through drift or vapors can cause bleaching of sensitive plants and must be avoided. Label includes significant buffer restrictions near sensitive sites, such as towns, housing, greenhouses, nurseries, and sensitive plants. Do not apply if wind exceeds 10 mph. Treated pea vines cannot be fed to livestock.
	0.047 lb imazethapyr	3.0 fl oz Pursuit	30	Apply as a preplant treatment within 7 days of planting and incorporate 1–2 inches deep or as a preemergence treatment within 3 days after planting. Ineffective on peat or muck soils.  Or apply postemergence when weeds are less than 2 inches tall and after peas are at least 3 inches tall but prior to five nodes before flowering. Include 2 pt/100 gal of non-ionic surfactant in the final spray mixture. Do not use crop oil as an adjuvant.  Pursuit controls several annual broadleaf weeds, including black nightshade, and some annual grasses. It can stunt peas if cool and/or wet weather follows treatment. The use of trifluralin prior to Pursuit application may increase the likelihood and severity of crop injury.  Treated pea vines cannot be fed to livestock.
	0.5–1.0 lb linuron	1.0–2.0 lb Lorox	60	Depending on rate, Lorox will provide fair to good control of most annual grasses; fair control of cocklebur and black nightshade; and good to excellent control of giant and common ragweed, lambsquarters, velvetleaf, pigweeds, and smartweeds. Apply Lorox after planting but before crop or weeds emerge, and do not disturb the soil after application as poor weed control and increased risk of crop injury will occur. Do not make more than one application per year. Do not apply to sand or loamy sand soil types. Do not apply on soils with less than 1% organic matter. Sufficient rainfall to move the herbicide into the root zone of germinating weeds is needed for best performance. Lorox can also be tank mixed with other herbicides labeled in Pea to improve weed control, but follow directions for the most restrictive herbicide.
	0.5–1.5 lb pendimethalin	1.5–3.0 pt Prowl H2O		Preplant-incorporated treatment controls annual grasses, lambsquarters, and pigweed but is weak on wild mustard, smartweed, common ragweed, velvetleaf, and black nightshade. Incorporate 1–2 inches deep. Can delay maturity of early-maturing pea cultivars. Pea injury is more severe on wet soils. Ineffective on peat or muck soils. Crops that allow preplant-incorporated pendimethalin use can be double cropped after peas. Treated pea vines cannot be fed to livestock.
	0.95–1.9 lb s-metolachlor	1.0–2.0 pt Dual II Magnum		Apply preemergence for good to excellent control of foxtails and other annual grasses, good control of black nightshade and pigweed, and partial control of nutsedge. Does not control most other broadleaf weeds. If soils are cold and wet during pea germination and emergence, Dual II Magnum may delay maturity and/or reduce yield. Pea vines can be cut for hay 120 days after application. Ineffective on peat or muck soils.

(continued)

Pea

Pepper

Potato

Pumpkin & squash

Sweet corn

Table beet

Tomato

## Weed control in pea *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Pea</b> <b>Annuals</b> <i>(cont.)</i>	0.017 lb saflufenacil	0.75 fl oz Sharpen		Sharpen may be applied preplant-incorporated or preemergence for residual suppression of select broadleaf weeds such as black nightshade, common lambsquarters, redroot pigweed, and velvetleaf. Check with your seed supplier for information regarding sensitive varieties. Sharpen may be preplant-incorporated up to 1 week prior to planting, but do not incorporate deeper than 3 inches. It can be applied preemergence up to 3 days after planting but prior to cracking stage (emergence) or severe crop injury may result. Also, make sure peas were planted at least ½-inch deep and soil conditions allowed furrows to close properly. Do not apply if cold and/or wet soil conditions are present or predicted within 1 week of application, and do not apply with any other products containing Group 14/Group E herbicides within 30 days. Do not feed or graze as forage for 65 days.
<b>Pepper</b>				
<b>Potato</b>	0.017 lb saflufenacil + 0.047 lb imazethapyr	1.5 oz OpTill		OpTill is a combination of Sharpen and Pursuit. It will control a broad spectrum of annual broadleaf and grassy weeds. Check the label for specifics. It may be applied preplant up to 30 days prior to planting but is more reliable if applied not more than 14 days prior to planting. OpTill may be preplant-incorporated up to 1 week prior to planting. Do not incorporate more than 3 inches deep. Preemergence applications may be made up to 3 days after planting but before emergence. Do not apply if crop is cracking. Some varieties may be sensitive to OpTill—check with your seed supplier prior to use. OpTill may be used in burndown applications as a tank mix with products containing glyphosate. Check labels for tank mix directions. Check product labels for additional cropping and plantback restrictions.
<b>Pumpkin &amp; squash</b>	0.5–0.75 lb trifluralin	1.0–1.5 pt Treflan HFP or comparable trifluralin formulation		Preplant-incorporated treatment controls annual grasses, lambsquarters, and pigweed but is weak on wild mustard, smartweed, common ragweed, velvetleaf, and black nightshade. Incorporate 2–3 inches deep within 24 hours of application. Can delay maturity of early-maturing pea cultivars. Pea injury is more severe on wet soils. Ineffective on peat or muck soils.
<b>Sweet corn</b>	<b>Emerged annual broad-leaves</b> 0.75–1.0 lb bentazon	several manufacturers and formulations	10	Excellent control of velvetleaf and wild mustard. Partial control of black nightshade, common lambsquarters, and redroot pigweed when applied to very small seedlings. Some burndown of yellow nutsedge and Canada thistle. Does not control grasses. Apply when broadleaf weeds are small and actively growing, but only after three pairs of pea leaves (usually four nodes) are present. Good coverage is essential for maximum control. Do not spray when peas are in bloom or when stressed by root rot. Rain or irrigation within 4 hours reduces effectiveness.
<b>Table beet</b>	0.023 lb imazamox	3.0 fl oz Raptor		Controls eastern black and hairy nightshade, wild mustard, field pennycress, shepherd's purse, and pigweed. Apply before weeds exceed 3 inches in height. Peas must be at least 3 inches tall, but five nodes before flowering. Add 0.25% non-ionic surfactant to the spray mixture. Weed control can be improved by adding 2.5% of liquid nitrogen fertilizer (28%) or 12–15 lb of ammonium sulfate per 100 gal of mix. Suppression of annual grasses will be increased if 1% crop oil concentrate is used instead of surfactant. When using crop oil concentrate or nitrogen fertilizer as an adjuvant, always add 6.0–16.0 oz/a of Basagran to reduce crop injury. Rain or irrigation within 1 hour will reduce control.
<b>Tomato</b>				

*(continued)*

**Weed control in pea** *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
<b>Emerged annual broad-leaves</b> <i>(cont.)</i>	0.5–1.0 lb acid equivalent MCPB	2.0–4.0 pt Thistrol		Controls many annual broadleaf weeds and inhibits Canada thistle flower bud formation. Weak on smartweed, mustards, and black nightshade. Lower rate controls only young weeds less than 3 inches tall. Apply 3.0–4.0 pt/a for thistle inhibition. Apply no later than three nodes before pea flowering. Usually delays pea maturity 1–4 days. Do not apply when soils are waterlogged or during drought. Do not apply if temperatures are over 90°F. Treated pea vines cannot be fed to livestock.
<b>Emerged annual grasses</b>	0.068–0.12 lb clethodim	9.0–16.0 oz Select Max	21	Apply to actively growing grasses before peas bloom but no later than 21 days before harvest. Include appropriate surfactant as directed by label. Do not apply more than once per season.
	0.094–0.125 lb clethodim	6.0–8.0 oz Select 2EC	21	
	0.034–0.083 lb quizalofop	5.0–12.0 oz Assure II or Targa	30	Controls most annual and perennial grasses but does not control broadleaves. Apply 5.0–8.0 oz/a for wild proso millet, 7.0–8.0 oz/a for foxtails, 8.0–10.0 oz/a for crabgrass, 9.0–10.0 oz/a for woolly cupgrass, and 10.0–12.0 oz/a for quackgrass. To avoid antagonizing activity, apply broadleaf herbicides either 7 days before or 24 hours after Assure II or Targa. Include non-ionic surfactant or crop oil concentrate according to label directions. Rainfall within 1 hour reduces effectiveness. Treated pea vines cannot be fed to livestock.
	0.094–0.48 lb sethoxydim	0.5–2.5 pt Poast	15	Controls most annual and perennial grasses but does not control broadleaf weeds or sedges. Thoroughly cover weeds. Adjuvants required for control; see label for rate and adjuvant instructions for specific weeds. Do not exceed 4.0 pt/a per season. Rainfall within 1 hour reduces effectiveness.
<b>Perennial weeds</b>	glyphosate	several manufacturers and formulations		See manufacturer’s label to assure that the formulation is labeled for this crop and for specific instructions. Some formulations require a wait of 3 days between application and planting. Crop contact will result in severe injury or death. If weeds have been mowed or tilled, do not treat until they have resumed active growth and reached the recommended stage on the label. Unless otherwise stated, allow 7 or more days before tilling treated fields.

Pea

Pepper

Potato

Pumpkin & squash

Sweet corn

Table beet

Tomato