

Bean: green, lima, navy, red kidney

Planting

Green bean

The between-row and in-row spacings for green beans depends on whether the conventional or close-row spacing system is being used.

Conventional rows are spaced 30–36 inches apart. The in-row spacing should result in a final plant stand of 7–9 plants/ft of row for irrigated fields and 6–8 plants/ft of row for non-irrigated fields.

Close-row systems have rows spaced 18–24 inches apart. In-row spacing should result in a final stand of 3–4 plants/ft for irrigated and non-irrigated fields. Carefully manage close-row spacings because such systems can increase the potential for white mold disease.

Seed: 75–90 lb/a; depends upon seed size, germination, row spacing. Plant seed 0.5–2.0 inches deep depending on soil conditions. Plant shallow if soil is cool and moist, but deeper in dry, warm sandy soils.

Lima bean

Rows: 18–36 inches. Rows narrower than 30 inches can increase the incidence of white mold. Wider rows allow cultivation and better air circulation, making them less prone to the disease.

Seed: Target stand density of 100,000 plants/a: for 30-inch rows, 5–6 plants/ft; for 18-inch rows, 2–3 plants/ft. Depends upon seed size, germination, row spacing.

Navy and red kidney bean

Rows: 28–32 inches.

Seed: Plant 2 inches apart and 1.0–1.5 inches deep in heavy soil and 2 inches in sandy soil. Use 75–100 lb/a of red kidney; 35–45 lb/a navy bean; depends on seed size, germination, row spacing.

Planting considerations (date, field selection)

Plant green beans from May 10–July 15. They prefer growing season temperatures of 60–70°F and soil temperatures above 50°F. Temperatures above 85°F can result in poor pollination and “split set.”

Plant navy and red kidney beans June 1–June 9. Lima beans germinate best at soil temperatures of 65°F. All bean seeds are subject to planter damage. Select planter plates to fit seed and reduce planter speed to minimize cracking of seed coat.

Grow on well-drained soils. Beans should follow corn on farms that use a corn-oats-forage rotation. Don't use atrazine on the crop preceding the beans; it may leave a soil residue that will injure the beans. Select fields without major weed problems. On sandy soil, plow under rye cover crops before they deplete soil moisture. Allow at least 2 years between bean crops because disease organisms may live in the soil or on plant residue.

Irrigation

Green and lima beans require a constant supply of moisture, especially during the blossom/pod-set period. Moisture stress during blossom/pod-set period may cause blossom and pod drop. This causes split pod set and reduces yields. An effective irrigation program can ensure high yields and high pod quality, particularly on sandy soils. Proper irrigation management should promote uniform germination and emergence, plant development, and harvest maturity—all are important in mechanical harvesting. If the WISP program is used to schedule irrigations,

the AD value for green and lima beans on sands is 1.3 inches, and on silt loams the AD value is about 2.5 inches.

Lime and fertilizer

Lime: Use dolomitic limestone to maintain a pH of 6.0 for dry beans. Green beans should be limed to 6.8 on mineral soils and 5.6 on organic soils to help avoid certain diseases.

Fertilizer rates: Apply P_2O_5 and K_2O according to soil test recommendations. Use annual nitrogen, P_2O_5 , and K_2O recommendations in the following table. Take credits for previous legume crops and manure.

Application: Fertilizer may be applied broadcast or in a band 2 inches below seed and 2 inches to the side. Be sure seed does not contact fertilizer. Beans are salt-sensitive; contact with fertilizer can reduce germination.

Nitrogen (N): Apply broadcast or sidedress at trifoliolate. Split applications on sandy soils. Check with processor for optimum N timing for each variety. On irrigated sands, apply the N in two applications to reduce leaching. In years with leaching due to excess rain, an extra 30–40 lb N/a may be needed on sandy soils. Research has shown that applications to green beans greater than 100–120 lb N/a resulted in yield reductions.

Magnesium: Correct deficiencies on acid soils with dolomitic limestone. If pH is above 6.5, use magnesium sulfate or potassium-magnesium sulfate to apply 10–20 lb/a of magnesium in row fertilizer.

Zinc: Deficiency may occur on sands or eroded soils. To correct, add 2–4 lb/a of zinc (as sulfate, oxide, or frits) to row fertilizer or broadcast 4–8 lb/a of zinc. Add 0.5–1.0 lb/a if using zinc chelates. You can also apply zinc in a foliar spray (1 lb/a Zn as sulfate or 0.15 lb/a Zn as chelate).

Annual nitrogen, phosphate, and potash recommendations for bean crops

Crop	Nitrogen		Phosphate and potash		
	Organic matter (%)	Amount to apply (lb/a)	Yield goal	Amount P ₂ O ₅ to apply* (lb/a)	Amount K ₂ O to apply* (lb/a)
Lima bean	<2	60	2,000–3,000 lb/a	20	40
	2.0–9.9	40	3,001–4,000 lb/a	30	60
	10–20	20	4,001–5,000 lb/a	40	80
	>20	10			
Navy & red kidney bean	<2	40	10–20 cwt/a	20	20
	2.0–9.9	30	21–30 cwt/a	30	40
	10–20	20	31–40 cwt/a	40	60
	>20	10			
Green bean	<2	60	1.5–2.5 ton/a	10	40
	2.0–9.9	40	2.6–3.5 ton/a	15	60
	10–20	20	3.6–4.5 ton/a	20	80
	>20	0	4.6–5.5 ton/a	25	100
			5.6–6.5 ton/a	30	120

*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 bean—green, lima, navy, red kidney

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Angular leaf spot (Fungal pathogen: <i>Phaeoisariopsis griseola</i>)				<i>Practice a 2-year break between bean crops to permit decomposition of crop debris. Infested residue should be thoroughly incorporated into the soil to hasten decomposition.</i>
Bacterial blights (brown spot, common blight, fuscous blight, and halo blight)	copper oxychloride + basic copper sulfate	2.0–4.0 lb C-O-C-S WDG	0	Rotating crops, deep-plowing debris, and planting disease-free seed are very effective controls.
	copper oxychloride + copper hydroxide	1.0–2.0 pt Badge SC	0	Apply at 7- to 14-day intervals when conditions are favorable for disease development. Not effective when disease pressure is severe.
		0.5–1.25 lb Badge X ₂	0	
	copper hydroxide	0.66–2.0 pt Champ Formula 2 4.6F, Champ DP	0	
		1.0–3.0 lb Champion 77WP, Champ WG, Kentan DF	0	
		1.5–3.0 lb Kocide 101 77WP, Kocide DF	0	
		1.3–4.0 pt Kocide LF	0	
		0.67–2.0 pt Kocide 4.5 LF	0	
		0.75–2.25 lb Kocide 2000DF	0	
		0.5–1.25 lb Kocide 3000	0	
0.67–4.0 pt Nu-Cop 3L		0		
streptomycin sulfate	30,000 ppm (3%) solution streptomycin sulfate 62.5%	NA	Treat seed with streptomycin sulfate to help inactivate bacteria on the seed surface.	
Botrytis gray mold and Sclerotinia white mold				<i>Rotate bean fields with nonhost crops. Both fungi infect a broad range of crop and weed hosts. Plant on well-drained soil. In areas prone to disease, avoid excessive irrigation before and during the bloom period.</i>
	boscalid	8.0–11.0 oz Endura 70 WDG	7 (succulent) 21 (dry)	Do not exceed two sprays and 22.0 oz/a of Endura per season.

(continued)

Disease control in bean—green, lima, navy, red kidney (continued)

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Botrytis gray mold and Sclerotinia white mold (cont.)	cyprodinil + fludioxonil	11.0–14.0 oz Switch 62.5WG	7	Do not use more than 56.0 oz/a per year. Application may be made by ground only. Apply prior to or at disease onset.
	fluazinam	0.5–0.85 pt Omega 500F	14 (edible podded & succulent beans) 30 (dry & lima beans)	Do not use more than 1.75 pt/a per year. Make first application at 10% bloom and again 7–10 days later as needed. Use higher rate for most severe disease pressure.
	fludioxonil	7.0 oz Cannonball WP	7	For white mold control, make first application at 10–20% bloom. Ground application only.
	iprodione	1.5–2.0 pt Iprodione 4L AG, Meteor, Nevado 4F, Rovral 4F	14	Apply spray at 10% bloom and again 5–7 days later or at 100% bloom, if necessary. Do not graze or feed treated vines to livestock.
	penthiopyrad (edible podded & succulent shelled beans)	<i>Botrytis</i> : 14.0–30.0 fl oz Fontelis <i>Sclerotinia white mold</i> : 16.0–30.0 fl oz Fontelis	0	Do not exceed 72.0 fl oz/a per season. Make no more than 2 sequential applications of Fontelis before changing to an effective fungicide with a different mode of action. For Botrytis management, make first application before disease development. For Sclerotinia management, make first application at beginning bloom and 7–10 days later or at full bloom.
	prothioconazole (dried shelled peas, beans)	5.7 fl oz Proline 480SC	7	Follow label for appropriate resistance management strategy. Not labeled for green beans. Labeled for soybean but rates vary for specific diseases.
	thiophanate-methyl (green & dry beans)	1.0–1.5 lb Topsin M WSB 20–30 fl oz Topsin 4.5FL	14 14	Apply spray at 25–50% bloom and again 7 days later at 100% bloom. Do not graze or feed treated vines to livestock.
1.5–2.0 lb Topsin M WSB 30–40 fl oz Topsin 4.5FL		14 14	Apply once at 50–75% bloom. Do not graze or feed treated vines to livestock.	
thiophanate-methyl (lima beans)	1.0–2.0 lb Topsin M WSB	14	Begin application at 10–30% bloom. Do not exceed 4.0 lb/a product per season. Do not graze or feed treated vines to livestock.	
Common mosaic virus and bean yellow mosaic virus	<i>Common mosaic is seed-borne. Yellow mosaic overwinters in perennial legumes and other hosts. Both are transmitted in the field by aphids. These virus diseases are not controlled by fungicides or seed treatments.</i>			
Pod tip rot (<i>Rhizoctonia</i> spp.)	myclobutanil	4.0–5.0 oz Rally 40WSP	0	Treat when pods begin to develop. Do not exceed 1.25 lb/a product per season. Allow at least 30 days following last application before planting new crops.
Root rots (<i>Fusarium</i> , <i>Pythium</i> , <i>Rhizoctonia</i>)	<i>Rotate non-legume crops with beans, and use cover crops between plantings and over winter. When symptoms appear, timely irrigation can promote new feeder root development and produce an acceptable crop. Subsoiling 20–22 inches can promote deep rooting and improve yields. Wet soil conditions during emergence may increase root rot losses.</i>			
	PCNB	<i>Rhizoctonia</i> root and stem rot only: 2.0–3.0 pt Blocker 4F	at-plant only	Apply 2.0–3.0 pt/a based on 36-inch row spacing. Avoid direct seed application.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Disease control in bean—green, lima, navy, red kidney *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions	
Rust	<i>Bury all bean debris after harvest. If rust does not appear within 4 weeks of harvest, fungicides are unnecessary.</i>				
	chlorothalonil	1.3–3.0 pt Bravo Weather Stik, Echo 720, Equus 720	7	Do not apply more than 9.0 lb ai/a chlorothalonil per season. Do not graze treated areas or feed treated plant parts to livestock.	
		1.25–2.7 lb Bravo Ultrex 82.5WDG, Equus DF	7		
		1.125–2.5 lb Echo 90DF	7		
		2.0–4.25 pt Echo Zn	7		
	myclobutanil	4.0–5.0 oz Rally 40WSP	0	Do not exceed 1.25 lb/a product (0.5 lb ai/a) per year. Observe a 30-day plantback interval between last application and planting new crops. (Formerly Nova.)	
	prothioconazole	5.7 oz Proline 480SC	7	Follow label for appropriate resistance management strategy.	
	tebuconazole	4.0–6.0 fl oz Folicur 3.6 F, Monsoon, Onset 3.6L, Orius 3.6F, Tebusha 3.6FL, TebuStar 3.6L, Tebuzol 3.6F, Toledo, Willowood Teb 3.6SC	7	Do not apply more than 24.0 fl oz/a per season of tebuconazole.	
	Rust, anthracnose, Alternaria leaf spot, Alternaria blight	azoxystrobin	6.2–15.4 fl oz Aframe, Equation SC, Quadris Flowable, Satori	0 (succulent) 14 (dry)	Quadris, Satori, Headline, and one of the components of Quilt belong to the Group 11 (strobilurin) fungicide category. Do not exceed more than 1 application of any of these products before alternating with a fungicide having a different mode of action. Do not exceed 4 foliar applications of strobilurin fungicides per crop per year. Do not exceed 1.44 qt/a Quadris or Satori, or 18.0 fl oz/a Headline per season. Do not use pyraclostrobin on lima beans. Do not feed bean forage or hay treated with these products earlier than 14 days after the last application.
		azoxystrobin + propiconazole	14.0 fl oz AzoxyStar, Quilt 10.5–14.0 fl oz Willowood AzoxyProp Xtra	7 (succulent) 14 (dry)	
pyraclostrobin		6.0–9.0 fl oz Headline	7 (edible pod) 21 (dry)		
azoxystrobin + chlorothalonil <i>(dry beans only)</i>		1.6–2.4 pt Quadris Opti	14		
fluxapyroxad + pyraclostrobin		4.0–8.0 fl oz Priaxor	7		
penthiopyrad		14.0–20.0 fl oz Vertisan	21		
	picoxystrobin	6.0–12.0 fl oz Aproach	14 (seed) 0 (vines & hay)	Begin applications prior to disease development; continue at a 7- to 14-day interval. Use higher rates and shorter intervals when disease pressure is high.	

(continued)

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Disease control in bean—green, lima, navy, red kidney *(continued)*

Disease	Active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Rust, anthracnose, Alternaria leaf spot, Alternaria blight <i>(cont.)</i>	propiconazole	4.0 fl oz Tilt	7	Do not apply more than 12.0 fl oz/a per year for resistance management consideration. Apply when conditions are conducive for disease.
Sclerotinia white mold	<i>Coniothyrium minitans</i>	1.0–4.0 lb Contans WG	0	Apply postharvest to fields with white mold infection before incorporating crop debris or apply 3–4 months before disease onset. Immediately incorporate product into top 1–2 inches of soil. Do not plow before planting. This product is a biological material that should be kept cool before use. Intercept WG helps to reduce the soil-borne inoculum of Sclerotinia. The higher product rate is used when incorporation to a depth of greater than 2 inches occurs.
	PCNB	<i>at-plant:</i> 4.0 pt Blocker 4F		Do not apply after pod formation.
Seed decay, rot, preemergence damping-off	azoxystrobin captan chloroneb fludioxonil mefenoxam metalaxyl pyraclostrobin thiram trifloxystrobin	Dynasty Maxim 4FS Apron, Ultra Flourish Allegiance, Sebring Stamina Signet Trilex		Most seed is treated with fungicide/insecticide. Do not use treated seed for food or feed. Multiple generic products are available for active ingredients listed without commercial product names.
Virus complex (transmitted by aphids)	<i>A combination of cucumber mosaic virus and alfalfa mosaic virus can cause plant stunting, foliage mosaic, blossom abortion, misshapen and discolored pods, and significant yield reductions. The soybean aphid is the primary vector. Planting early to avoid high populations of the soybean aphid that appear in mid-July helps to reduce losses.</i>			

Scouting calendar for insect pests of beans

April			May			June			July			August			September			
early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late	early	mid	late	
			Seed maggot															
			European corn borer															
			Potato leafhopper															
			Tarnished plant bug															
										Soybean aphid								
										Corn earworm								

Pest management

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Insect control in bean—green, lima, navy, red kidney

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Bean aphid and soybean aphid	<i>Phorate and disulfoton treatments at planting will also control aphids (see leafhopper section for rates).</i>			
	0.24–0.97 lb acephate	0.25–1.0 lb Orthene 97S	0 (lima) 14 (dry)	Do not exceed 2.0 lb ai/a per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
	0.5–1.0 lb acephate	8.0–16.0 oz Acephate 97UP	1 (lima)	Do not apply more than 2.1 lb/a of formulated product per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
	0.044–0.10 lb acetamiprid	1.0–2.3 oz Assail 70WP	7	Do not exceed 3 applications or 6.9 oz/a of product per crop season.
	0.047–0.10 lb acetamiprid	2.5–5.3 oz Assail 30 SG	7	Do not exceed 3 applications or 16.0 oz/a of product per crop season.
	alpha-cypermethrin	3.2–3.8 fl oz *Fastac	1 21 (dry)	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	0.025–0.10 lb bifenthrin	1.6–6.4 fl oz *Brigade 2EC	3	Do not apply more than 0.2 lb ai/a or 12.8 fl oz/a of product per season.
	0.06–0.086 lb bifenthrin + imidacloprid	3.8–5.5 fl oz *Brigadier	7	Do not apply more than 16.6 fl oz/a (0.26 lb ai/a) per season. No more than 0.2 lb ai/a bifenthrin and 0.13 lb ai/a imidacloprid are allowed per season.
	0.25–0.5 lb dimethoate	0.5–1.0 pt Dimethoate EC	0	Do not use at bloom. Do not feed treated vines to livestock.
	0.025–0.05 lb esfenvalerate	5.8–9.6 oz Asana	3 (green) 21 (dry)	Do not exceed 0.2 lb ai/a per season.
	flupyradifurone	7.0–10.5 fl oz Sivanto	7 21 (dry)	Foliar application. Apply when pests reach or exceed established thresholds. Do not apply more than 28.0 fl oz of Sivanto per acre per crop season.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 oz *Proaxis	7–21	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. Do not graze treated area or feed vines to livestock. The 21-day PHI applies only to dried, shelled legumes.
	imidacloprid	1.6–3.2 fl oz Gaucho 600/100 lb seed	—	Green and lima beans only. Preplant commercial seed treatment. There is a 12-month rotational plantback restriction for crops not listed on label.
		7.0–10.5 fl oz Admire Pro	21	Apply in a narrow band centered on the plant row within 14 days of planting.
		3.5 fl oz Provado 1.6	7	Apply every 7 days as needed. Do not exceed 10.5 fl oz/a Provado per season and do not exceed a total of 0.5 lb ai/a imidacloprid per season (any formulation).
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Do not apply more than 0.12 lb ai/a per season. Do not feed treated foliage to animals.
	lambda-cyhalothrin + chlorantraniliprole	6.0–10.0 fl oz *Besiege	7 21 (dry)	Allow at least 5 days between applications. Do not apply more than 31.0 fl oz/a Besiege per season.
	1.0–1.25 lb malathion	1.5–2.0 pt Malathion EC	1	A short residual contact insecticide. Do not apply more than once every 7 days.
	1.0 lb naled	1.0 pt Dibrom 8E	1	Short-lasting residual contact insecticide.
	thiamethoxam	0.765–1.28 fl oz Cruiser 5FS/100 lb seed	—	Seed treatment only. There is a 120-day plantback restriction for crops not listed on the label.
	zeta-cypermethrin	3.2–4.0 oz *Mustang Maxx	1	Apply every 5 days as needed. Do not exceed 24.0 oz/a Mustang Maxx per season.

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

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Celery

Cole crops

Cucumber

Insect control in bean—green, lima, navy, red kidney *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Bean leaf beetle	0.24–0.97 lb acephate	0.25–1.0 lb Orthene 97S	0 (lima) 14 (dry)	Do not exceed 2.0 lb ai/a per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
	0.5–1.0 lb acephate	8.0–16.0 oz Acephate 97UP	1 (lima)	Do not apply more than 2.1 lb/a of formulated product per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
	alpha-cypermethrin	2.7–3.8 fl oz *Fastac	1 21 (dry)	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	0.0125–0.019 lb beta-cyfluthrin	1.6–2.4 fl oz *Baythroid XL	7	For dry beans only. Do not exceed 4 applications or 6.4 fl oz/a per year.
	0.033–0.10 lb bifenthrin	2.1–6.4 fl oz *Brigade 2EC	3	Do not apply more than 0.2 lb ai/a or 12.8 fl oz/a of product per season.
	0.08–0.086 lb bifenthrin + imidacloprid	5.1–5.5 fl oz *Brigadier	7	Do not apply more than 16.6 fl oz/a (0.26 lb ai/a) per season. No more than 0.2 lb ai/a bifenthrin and 0.13 lb ai/a imidacloprid are allowed per season.
	1.0 lb carbaryl	Sevin	3	
	0.25–0.5 lb dimethoate	0.5–1.0 pt Dimethoate EC	0	Do not use at bloom. Do not feed treated vines to livestock.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 oz *Proaxis	7–21	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. Do not graze treated area or feed vines to livestock. The 21-day PHI applies only to dried, shelled legumes.
	imidacloprid	1.6–3.2 fl oz Gaucho 600/100 lb seed	—	Green and lima beans only. Apply as a commercial seed treatment before planting. There is a 12-month rotational plantback restriction for crops not listed on the label.
		16.0–24.0 fl oz Admire Pro	21	Apply in a narrow band centered on the plant row, 1–2 inches below the seed depth. Apply within 14 days before planting.
		3.5 fl oz Provado 1.6	7	Apply every 7 days as needed. Do not exceed 10.5 fl oz/a Provado per year.
	lambda-cyhalothrin + chlorantraniliprole	6.0–10.0 fl oz *Besiege	7 21 (dry)	Allow at least 5 days between applications. Do not apply more than 31.0 fl oz/a Besiege per season.
	thiamethoxam	0.765–1.28 fl oz Cruiser 5FS/100 lb seed	—	Seed treatment only. There is a 120-day plantback restriction for crops not listed on the label.
	zeta-cypermethrin	2.72–4.0 oz *Mustang Maxx	1	Apply every 5 days as needed. Do not exceed 24.0 oz/a Mustang Maxx per season.
0.04–0.1 lb zeta-cypermethrin + bifenthrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.	
Corn earworm	acephate	1.0–1.33 lb Orthene 75WSP 0.75–1.0 lb Orthene 97PE	1 (lima) 14 (dry)	Do not exceed 2.0 lb ai/a per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
	0.5–1.0 lb acephate	12.0–16.0 oz Acephate 97UP	1 (lima)	Do not apply more than 2.1 lb/a of formulated product per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
	alpha-cypermethrin	2.7–3.8 fl oz *Fastac	1 21 (dry)	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.

*Restricted-use pesticide.

(continued)

Pest management

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Insect control in bean—green, lima, navy, red kidney *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions	
Corn earworm <i>(cont.)</i>	azadirachtin	10.0–21.0 oz Azatin XL Plus 0.5–2.0 gal Neemix 0.25 0.25–1.0 pt Neemix 4.5EC	0	Apply every 7 days as needed. May treat heavy infestations every 3–4 days.	
	<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	1.0–2.0 lb Lepinox WDG	0	Treat early instar larvae before noticeable feeding damage occurs. Repeat as needed.	
Asparagus	0.0125–0.019 lb beta-cyfluthrin	1.6–2.4 fl oz *Baythroid XL	7	For dry beans only. Do not exceed 4 applications or 6.4 fl oz/a per year.	
	0.025–0.10 lb bifenthrin	1.6–6.4 fl oz *Brigade 2EC	3	Do not apply more than 0.2 lb ai/a or 12.8 fl oz/a of product per season.	
	0.08–0.086 lb bifenthrin + imidacloprid	5.1–5.5 fl oz *Brigadier	7	Do not apply more than 16.6 fl oz/a (0.26 lb ai/a) per season. No more than 0.2 lb ai/a bifenthrin and 0.13 lb ai/a imidacloprid are allowed per season.	
	1.5 lb carbaryl	Sevin WP, L, XLR Plus	0	See label for rates. Apply at first sign of damage.	
	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.	
	0.015–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3 (green) 21 (dry)	Do not graze or feed treated vines to livestock. Do not exceed 0.2 lb ai/a per season.	
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 oz *Proaxis	7–21	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. Do not graze treated area or feed vines to livestock. The 21-day PHI applies only to dried, shelled legumes.	
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Do not apply more than 0.12 lb ai/a per season. Do not feed treated foliage to animals.	
	lambda-cyhalothrin + chlorantraniliprole	6.0–10.0 fl oz *Besiege	7 21 (dry)	Allow at least 5 days between applications. Do not apply more than 31.0 fl oz/a Besiege per season.	
	0.225–0.9 lb methomyl	0.75–3.0 pt *Lannate LV	3	Wait 3 days to feed vines, 7 days to feed hay.	
Bean	0.031–0.063 lb spinetoram	4.0–8.0 oz Radiant SC	3	Do not apply more than 28.0 oz/a (0.219 lb ai/a) or exceed 4 applications per crop.	
	spinosad	2.2–3.3 oz Blackhawk	3 28 (dry beans)	Apply when pests reach or exceed established thresholds. Do not apply more than 20.0 oz/a Blackhawk per crop season in succulent beans and 8.3 oz/a per crop season in dry beans. Do not exceed 6 applications in a year.	
		3.0–6.0 fl oz Entrust SC	3	Use higher rates for larger larvae. Apply in adequate spray to get good coverage for best control. Do not exceed 0.45 lb ai/a per season.	
	zeta-cypermethrin	2.72–4.0 oz *Mustang Maxx	1	Apply every 5 days as needed. Do not exceed 24.0 oz/a Mustang Maxx per season.	
	0.04–0.1 lb zeta-cypermethrin + bifenthrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.	
	Cutworms	<i>Spot treat when numbers exceed two larvae per foot of row.</i>			
		0.5–1.0 lb acephate	8.0–16.0 oz Acephate 97UP	1 (lima)	Do not apply more than 2.1 lb/a of formulated product per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
			0.67–1.33 lb Orthene 75WSP 0.49–0.97 lb Orthene 97PE	0 (lima) 14 (dry)	Do not exceed 2.0 lb ai/a per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.

*Restricted-use pesticide.

(continued)

Insect control in bean—green, lima, navy, red kidney *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Cutworms <i>(cont.)</i>	alpha-cypermethrin	1.3–3.8 fl oz *Fastac	1 21 (dry)	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	azadirachtin	1.0–3.5 pt Aza-Direct 10.0–21.0 oz Azatin XL Plus 0.5–2.0 gal Neemix 0.25 0.25–1.0 pt Neemix 4.5EC	0	Apply every 7 days as needed. May treat heavy infestations every 3–4 days.
	0.0065–0.0125 lb beta-cyfluthrin	0.8–1.6 fl oz *Baythroid XL	7	For dry beans only. Do not exceed 4 applications or 6.4 fl oz/a per year.
	0.04–0.08 lb bifenthrin	3.4–6.8 oz *Capture LFR	—	Apply as a 5- to 7-inch band over an open furrow or in-furrow with the seed. Do not apply more than 0.1 lb/a Capture LFR per season as an at-plant application.
	0.08–0.086 lb bifenthrin + imidacloprid	5.1–5.5 fl oz *Brigadier	7	Do not apply more than 16.6 fl oz/a (0.26 lb ai/a) per season. No more than 0.2 lb ai/a bifenthrin and 0.13 lb ai/a imidacloprid are allowed per season.
	carbaryl	1.0–1.5 lb Sevin 50WP 1.25–1.88 lb Sevin 80S 1.0 qt Sevin XLR Plus	0	See label for rates. Apply at first sign of pests. Repeat at 7- to 10-day intervals.
	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.
	0.015–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3 (green) 21 (dry)	Do not exceed 0.2 lb ai/a per season. Do not graze or feed treated vines to livestock.
	0.0075–0.0125 lb gamma-cyhalothrin	1.92–3.20 oz *Proaxis	7–21	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. Do not graze treated area or feed vines to livestock. The 21-day PHI applies only to dried, shelled legumes.
	0.015–0.025 lb lambda-cyhalothrin	0.96–1.6 fl oz *Warrior II	7	Do not apply more than 0.12 lb ai/a per season. Do not feed treated foliage to animals.
	lambda-cyhalothrin + chlorantraniliprole	6.0–10.0 fl oz *Besiege	7 21 (dry)	Allow at least 5 days between applications. Do not apply more than 31.0 fl oz/a Besiege per season.
	zeta-cypermethrin	1.28–4.0 oz *Mustang Maxx	1	Apply every 5 days as needed. Do not exceed 24.0 oz/a Mustang Maxx per season.
	0.04–0.1 lb zeta-cypermethrin + bifenthrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.
European corn borer	<i>Apply insecticide when beans are in the early bloom stage AND moth catches in nearby blacklight traps exceed 15 moths/night for first generation or 100 moths/night for second generation. Once moth catches drop, delay applications until beans are 1 inch long.</i>			
	0.24–0.97 lb acephate	0.25–1.0 lb Orthene 97S	0 (lima) 14 (dry)	Do not exceed 2.0 lb ai/a per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
	0.5–1.0 lb acephate	12.0–16.0 oz Acephate 97UP	1 (lima)	Do not apply more than 2.1 lb/a of formulated product per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.
	0.75–1.0 lb acephate	Orthene SP	0 (lima) 14 (dry, green)	Do not apply more than 2.1 lb ai/a of formulated product per season. Do not feed treated vines. Do not apply to green or succulent beans for use as a food crop.

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Insect control in bean—green, lima, navy, red kidney *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
European corn borer <i>(cont.)</i>	alpha-cypermethrin	2.7–3.8 fl oz *Fastac	1 21 (dry)	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	1.0–2.0 lb <i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	Lepinox WDG	0	Treat early instar larvae before noticeable feeding damage occurs. Repeat as needed.
Asparagus	0.019–0.025 lb beta-cyfluthrin	2.4–3.2 fl oz *Baythroid XL	7	For dry beans only. Do not exceed 4 applications or 6.4 fl oz/a per year.
	0.025–0.10 lb bifenthrin	1.6–6.4 fl oz *Brigade 2EC	3	Do not apply more than 0.2 lb ai/a or 12.8 fl oz/a of product per season.
	0.08–0.086 lb bifenthrin + imidacloprid	5.1–5.5 fl oz *Brigadier	7	Do not apply more than 16.6 fl oz/a (0.26 lb ai/a) per season. No more than 0.2 lb ai/a bifenthrin and 0.13 lb ai/a imidacloprid allowed per season.
	1.0 lb carbaryl	Sevin WP, S, L, XLR Plus	0	
	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.
Bean	0.015–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3 (green) 21 (dry)	Do not exceed 0.2 lb ai/a per season. Do not graze or feed treated vines to livestock.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 oz *Proaxis	7–21	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. Do not graze treated area or feed vines to livestock. The 21-day PHI applies only to dried, shelled legumes.
	imidacloprid + beta-cyfluthrin	2.4–2.8 fl oz *Leverage 360	7	For dry beans only. Minimum interval between applications is 14 days and maximum allowable crop use per season is 6.4 fl oz/a.
Carrot	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Do not apply more than 0.12 lb ai/a per season. Do not feed treated foliage to animals.
	lambda-cyhalothrin + chlorantraniliprole	6.0–10.0 fl oz *Besiege	7 21 (dry)	Allow at least 5 days between applications. Do not apply more than 31.0 fl oz/a Besiege per season.
	0.225–0.9 lb methomyl	0.75–3.0 pt *Lannate LV	3 (green) 21 (dry)	Wait 14 days before grazing or feeding hay.
Celery	0.023–0.063 lb spinetoram	3.0–8.0 oz Radiant SC	1	Do not apply more than 28.0 oz/a Radiant (0.219 lb ai/a) per crop and do not exceed 6 applications per year.
	spinosad	1.7–3.3 oz Blackhawk	3 28 (dry beans)	Apply when pests reach or exceed established thresholds. Do not apply more than 20.0 oz/a Blackhawk per crop season in succulent beans and 8.3 oz/a per crop season in dry beans. Do not exceed 6 applications in a year.
Cole crops		3.0–6.0 fl oz Entrust SC	3	Use higher rates for larger larvae. Apply in adequate spray to get good coverage for best control. Do not exceed 0.45 lb ai/a per season. Do not use a buffering agent.
	zeta-cypermethrin	2.72–4.0 oz *Mustang Maxx	1	Apply every 5 days as needed. Do not exceed 24.0 oz/a Mustang Maxx per season.
Cucumber	0.04–0.1 lb zeta-cypermethrin + bifenthrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.

*Restricted-use pesticide.

(continued)

Insect control in bean—green, lima, navy, red kidney (continued)

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Loopers and green clover-worm	<i>Treat when numbers exceed two to four larvae per foot of row.</i>			
	0.24–0.97 lb acephate	0.25–1.0 lb Orthene 97S	0 (lima) 14 (dry, green)	Do not exceed 2.0 lb ai/a per season. Do not feed treated vines.
	0.5–1.0 lb acephate	12.0–16.0 oz Acephate 97UP	1 (lima) 14 (green)	Do not apply more than 2.1 lb/a of formulated product per season. Do not feed treated vines.
	alpha-cypermethrin	2.7–3.8 fl oz *Fastac	1 21 (dry)	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	azadirachtin	1.0–3.5 pt Aza-Direct 10.0–21.0 oz Azatin XL Plus 0.5–2.0 gal Neemix 0.25 0.25–1.0 pt Neemix 4.5EC	0	Apply every 7 days as needed. May treat heavy infestations every 3–4 days.
	<i>Bacillus thuringiensis</i> subsp. <i>aizawai</i>	0.5–2.0 lb Ketch DF	0	Use lower rate for light infestations and small larvae; use higher rate for larger larvae and heavy pressure.
	<i>Bacillus thuringiensis</i> subsp. <i>kurstaki</i>	Biobit FC, WP 1.0–2.0 lb Lepinox WDG	0 0	See label for rate. Treat early instar larvae before noticeable feeding damage occurs. Repeat as needed.
	0.019–0.025 lb beta-cyfluthrin	2.4–3.2 fl oz *Baythroid XL	7	For dry beans only. Do not exceed 4 applications or 6.4 fl oz/a per year.
	0.025–0.10 lb bifenthrin	1.6–6.4 fl oz *Brigade 2EC	3	Do not apply more than 0.2 lb ai/a or 12.8 fl oz/a of product per season.
	0.08–0.086 lb bifenthrin + imidacloprid	5.1–5.5 fl oz *Brigadier	7	Do not apply more than 16.6 fl oz/a (0.26 lb ai/a) per season. No more than 0.2 lb/a bifenthrin and 0.13 lb/a imidacloprid are allowed per season.
	0.025–0.05 lb esfenvalerate	5.8–9.6 fl oz *Asana XL	3 (green) 21 (dry)	Do not exceed 0.2 lb ai/a per season. Do not feed treated vines.
	0.0075–0.0125 lb gamma-cyhalothrin	1.92–3.20 oz *Proaxis	7–21	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. Do not graze treated area or feed vines to livestock. The 21-day PHI applies only to dried, shelled legumes.
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Do not apply more than 0.12 lb ai/a per season. Do not feed treated foliage to animals.
	lambda-cyhalothrin + chlorantraniliprole	6.0–10.0 fl oz *Besiege	7 21 (dry)	Allow at least 5 days between applications. Do not apply more than 31.0 fl oz/a Besiege per season.
	0.225–0.9 lb methomyl	0.75–3.0 pt *Lannate LV	3 (green) 14 (dry)	Wait 3 days to feed vines, 14 days to feed hay.
	1.0–1.5 lb naled	1.0 pt Dibrom 8E	1	A short residual contact insecticide. Do not apply more than once every 7 days.
0.031–0.063 lb spinetoram	4.0–8.0 oz Radiant SC	1	Do not apply more than 28.0 oz/a Radiant (0.219 lb ai/a) per crop and do not exceed 6 applications per year.	

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Insect control in bean—green, lima, navy, red kidney *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Loopers and green clover-worm <i>(cont.)</i>	spinosad	2.2–3.3 oz Blackhawk	3 28 (dry beans)	Apply when pests reach or exceed established thresholds. Do not apply more than 20.0 oz/a Blackhawk per crop season in succulent beans and 8.3 oz/a per crop season in dry beans. Do not exceed 6 applications in a year.
		4.0–6.0 fl oz Entrust SC	3	Use higher rates for larger larvae. Apply in adequate spray to get good coverage for best control. Do not exceed 0.45 lb ai/a per season. Do not use a buffering agent.
	zeta-cypermethrin	<i>cloverworms:</i> 2.72–4.0 oz *Mustang Maxx <i>loopers:</i> 3.2–4.0 oz *Mustang Maxx	1 1	Apply every 5 days as needed. Do not exceed 24.0 oz/a Mustang Maxx per season.
	0.04–0.1 lb zeta-cypermethrin + bifenthrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.
Potato leafhopper and plant bug	<i>Treat potato leafhoppers when they exceed an average of one adult/sweep or one nymph/10 leaves. If plants are younger than the two-true-leaf stage, reduce thresholds to one adult/two sweeps (nymphs will not be present yet). Treat tarnished plant bugs when they exceed an average of one bug/sweep.</i>			
	0.5–1.0 lb acephate	8.0–16.0 oz Acephate 97UP	1 (lima) 14 (green)	Do not apply more than 2.1 lb/a of formulated product per season. Do not feed treated vines.
		0.67–1.33 lb Orthene 75WSP 0.49–0.97 lb Orthene 97PE	0 (lima) 14 (dry, green)	Do not exceed 2.0 lb ai/a per season. Do not feed treated vines.
	alpha-cypermethrin	2.7–3.8 fl oz *Fastac	1 21 (dry)	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.
	azadirachtin	1.0–3.5 pt Aza-Direct 10.0–21.0 oz Azatin XL Plus 0.5–2.0 gal Neemix 0.25 0.25–1.0 pt Neemix 4.5EC	0	Apply every 7 days as needed. May treat heavy infestations every 3–4 days.
	0.019–0.025 lb beta-cyfluthrin	2.4–3.2 fl oz *Baythroid XL	7	For dry beans only. Do not exceed 4 applications or 6.4 fl oz/a per year.
	0.025–0.10 lb bifenthrin	1.6–6.4 fl oz *Capture 2EC, *Discipline 2EC	3	Do not apply more than 12.8 fl oz/a (0.2 lb ai/a) per season.
	0.06–0.086 lb bifenthrin + imidacloprid	3.8–5.5 fl oz *Brigadier	7	Do not apply more than 16.6 fl oz/a (0.26 lb ai/a) per season. No more than 0.2 lb ai/a bifenthrin and 0.13 lb ai/a imidacloprid are allowed per season.
	1.0–2.0 lb carbaryl	4.0 lb Sevin 50WP 2.5 lb Sevin 80S 1.0 qt Sevin XLR Plus	0	See label for rate.
	0.25–0.5 lb dimethoate	0.5–1.0 pt Dimethoate EC	0	Do not use at bloom. Do not feed treated vines to livestock. Also controls mites.
	1.0–2.0 lb disulfoton	*Di-Syston 8–15%	60	Place granules in a 7-inch band directly behind planter shoe in front of the press wheel at planting time only. Apply liquid in a water emulsion or with liquid fertilizer as a soil injection on each side of the seed furrow at planting. Do not apply directly on seed. Do not apply more than once per season. Do not feed vines or hay to livestock. If adequate rainfall does not occur within 10–14 days of treatment, irrigate to activate the product.

*Restricted-use pesticide.

(continued)

Insect control in bean—green, lima, navy, red kidney *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Potato leafhopper and plant bug <i>(cont.)</i>	0.015–0.05 lb esfenvalerate	2.9–9.6 fl oz *Asana XL	3 (green) 21 (dry)	Do not exceed 0.2 lb ai/a per season. Do not graze or feed treated vines to livestock.
	flupyradifurone	7.0–10.5 fl oz Sivanto	7 21 (dry)	Foliar application. Apply when pests reach or exceed established thresholds. Do not apply more than 28.0 fl oz of Sivanto per acre per crop season.
	0.01–0.015 lb gamma-cyhalothrin	2.56–3.84 oz *Proaxis	7–21	Do not apply more than 0.96 pt/a (0.06 lb ai/a) per season. Do not graze treated area or feed vines to livestock. The 21-day PHI applies only to dried, shelled legumes.
	imidacloprid	1.6–3.2 fl oz Gaucho 600/100 lb seed	—	Green and lima beans only. Apply as a commercial seed treatment before planting. There is a 12-month rotational plantback restriction for crops not listed on the label.
			21	Apply in a narrow band centered on the plant row 1–2 inches below the seed depth. Apply within 14 days before planting.
			7	Apply every 7 days as needed. Do not exceed 10.5 fl oz/a Provado per year.
	0.02–0.03 lb lambda-cyhalothrin	1.28–1.92 fl oz *Warrior II	7	Do not apply more than 0.12 lb ai/a per season. Do not feed treated foliage to animals.
	lambda-cyhalothrin + chlorantraniliprole	6.0–10.0 fl oz *Besiege	7 21 (dry)	Allow at least 5 days between applications. Do not apply more than 31.0 fl oz/a Besiege per season.
	1.0–1.25 lb malathion	1.5–2.0 pt Malathion EC	1	
	0.45–0.9 lb methomyl	1.5–3.0 pt *Lannate LV 0.5 lb *Lannate SP	3	Do not graze within 3 days after application or use for hay within 7 days.
	1.0 lb naled	1.0 pt Dibrom EC	1	A short residual contact insecticide. Do not apply more than once every 7 days.
	0.06–0.09 lb/1,000 ft row phorate	4.5–7.0 oz/1,000 ft row *Thimet 20-G	60	Minimum 30-inch row spacing. Apply granules in a band over the row at planting but do not contact seed. Do not graze or feed treated forage to livestock.
	thiamethoxam	0.765–1.28 fl oz Cruiser 5FS/100 lb seed	—	Seed treatment only. There is a 120-day plantback restriction for crops not listed on the label.
0.017–0.25 lb zeta-cypermethrin	2.72–4.0 oz *Mustang Maxx	1	Apply every 5 days as needed. Do not exceed 24.0 oz/a Mustang Maxx per season.	
0.04–0.1 lb zeta-cypermethrin + bifenthrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.	
Seed corn maggot	<i>Plant during fly-free periods or use an insecticide at planting. First-generation adults emerge at 200 DD₃₉ while second-generation adults emerge at 600 DD₃₉. Fields with fresh green manure are more attractive for egg laying.</i>			
alpha-cypermethrin	2.7–3.8 fl oz *Fastac	1 21 (dry)	Apply when pests reach or exceed established thresholds. Do not apply more than 11.4 fl oz of Fastac per acre per crop season.	
0.04–0.08 lb bifenthrin	3.4–6.8 oz *Capture LFR	—	Apply as a 5- to 7-inch band over an open furrow or in-furrow with the seed. Do not apply more than 0.1 lb/a Capture LFR per season as an at-plant application.	
chlorpyrifos		—	Use seed pretreated with chlorpyrifos (Lorsban) and a fungicide. Seed can be purchased pretreated.	
imidacloprid	1.6–3.2 fl oz Gaucho 600/100 lb seed	—	Green and lima beans only. Preplant commercial seed treatment. There is a 12-month rotational plantback restriction for crops not listed on label.	

*Restricted-use pesticide.

(continued)

Pest
management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Insect control in bean—green, lima, navy, red kidney *(continued)*

Insect	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Seed corn maggot <i>(cont.)</i>	0.06–0.09 lb/1,000 ft row phorate	4.5–7.0 oz/1,000 ft row *Thimet 20-G	60	Same as for leafhoppers above.
	thiamethoxam	0.765–1.28 fl oz Cruiser 5FS/100 lb seed	—	Seed treatment only. There is a 120-day plantback restriction for crops not listed on the label.
	0.017–0.25 lb zeta-cypermethrin	2.72–4.0 oz *Mustang Maxx	1	Apply every 5 days as needed. Do not exceed 24.0 oz/a Mustang Maxx per season.
	0.04–0.1 lb zeta-cypermethrin + bifenthrin	4.0–10.3 fl oz *Hero	3	Do not apply more than 0.266 lb ai/a per season. Wait at least 5 days between applications.
Wire-worms	<i>Rotate with nonsusceptible crops to reduce wireworm populations.</i>			
	0.04–0.08 lb bifenthrin	3.4–6.8 oz *Capture LFR	—	Apply as a 5- to 7-inch band over an open furrow or in-furrow with the seed. Do not apply more than 0.1 lb/a Capture LFR per season as an at-plant application.
	3.0–4.0 lb diazinon	Diazinon G, WP, EC, D	—	Preplant broadcast incorporated, 4–8 inches.
	imidacloprid	1.6–3.2 fl oz Gaucho 600/100 lb seed	—	Green and lima beans only. Apply as a commercial seed treatment before planting. There is a 12-month rotational plantback restriction for crops not listed on the label.

*Restricted-use pesticide.

Weed control in bean—green, lima, navy, red kidney

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Weeds	<i>Till several times before planting to control early germinating weeds. After planting, but before beans emerge, kill emerging weeds with a rotary hoe or spike-toothed harrow. Cultivate beans at least twice before plants cover the middle of the row. Do not cultivate when plants are wet because this may spread disease. Several of the following herbicides can be tank mixed with each other or with liquid fertilizer for simultaneous application. Check specific herbicide labels for mixing directions and application details.</i>			
Annual weeds	2.0–3.0 lb alachlor	4.0–6.0 pt *Micro-Tech, *Intro, or registered equivalent		Lima and red kidney beans only. Preplant-incorporated alachlor controls most annual grasses and many broadleaf weeds, including black nightshade, but is weak on velvetleaf, mustards, smartweed, and common lambsquarters. Preplant treatment also provides reasonable yellow nutsedge control. Apply preplant treatment within 7 days before planting and shallowly incorporate. Do not make more than 1 application per cropping season. Can lower yields if wet, cold conditions prevail.
	0.15–0.25 lb clomazone	0.4–0.67 pt Command 3ME	45	Succulent snap beans only. For suppression and control of annual grasses and broadleaves, make a single preemergent soil application before seeding or after seeding but before crop emergence. Place seed or roots of transplants below the chemical barrier when planting. Strictly follow all precautions and restrictions on the label to minimize offsite movement and carryover. Read and understand the Vegetable Disclaimer section of the label; the end user of this product assumes all liability for failure to perform and any crop injury resulting from its use.
	dimethenamid-P	10.0–21.0 fl oz Outlook	70	Dry beans only. Consult label for variety-specific information and allowable rates depending on soil texture and organic matter. Outlook controls most annual grasses and pigweed and suppresses nightshade. It is weak on velvetleaf, lambsquarters, ragweed, and smartweed. Can cause stunting if wet, cold conditions occur during bean germination or emergence. Allowed application methods and timing vary by bean type. Preplant-incorporated: Apply to dry soil within 14 days before planting and blend into the top 1–2 inches of soil. Provides reasonable yellow nutsedge control at the highest rate recommended by soil type. Preemergence: Apply before or after planting but before weed emergence. Provides only limited control of yellow nutsedge. Postemergence: Although Outlook will not control emerged grasses, it can be applied to beans with 1–3 trifoliolate leaves. Postemergence applications can speckle bean leaves.
	3.0–4.0 lb EPTC	3.5–4.5 pt Eptam 7E		Dry beans (consult label for allowable types) and succulent green beans only. Preplant-incorporated treatment controls most annual grasses and broadleaf weeds. Weak on smartweed and black nightshade. Incorporate 2–3 inches deep immediately after application. Can stunt beans if cool weather follows application. Do not exceed 3.5 pt/a Eptam 7E when treating green beans on sandy soils or on small white navy bean varieties. Ineffective on peat and muck soils.
	0.56–1.68 lb ethalfluralin	1.5–4.5 pt Sonalan HFP (dry beans) 1.5–2.0 pt (dry peas)		Dry beans and dry peas only. Preplant-incorporated treatment controls annual grasses and broadleaf weeds but is weak on wild mustard, smartweed, common ragweed, and velvetleaf. Some black nightshade suppression. Incorporate 2–3 inches deep within 2 days of application and before planting beans. May carry over in soil. Ineffective on peat or muck soils. Rate varies by soil type.

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Weed control in bean—green, lima, navy, red kidney *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Annual weeds <i>(cont.)</i>	fomesafen	Reflex (rate varies by location; check label)	30 (green) 45 (dry beans)	Dry and green beans only. Reflex is rate-restricted by location and prohibited from use in many areas of Wisconsin. Check label to determine if it can be used in your area. Preemergence or preplant surface application controls several broadleaf weeds.
	0.03 lb imazamox	4.0 oz Raptor		Dry beans and dry peas: Apply to dry beans with at least one fully expanded trifoliolate leaf but before the bloom stage, and to dry peas with at least three pairs of leaves but before the bloom stage. Application may reduce crop growth, quality, and yield; cause temporary yellowing; and delay maturity. Raptor applications may be made with or without the addition of a fertilizer. A nitrogen-based fertilizer may improve weed control, but it will also increase the likelihood of crop damage. When nitrogen and/or crop oils are added to the mixture, include 6.0–16.0 oz/a Basagran or 12.0–24.0 oz/a Rezult to minimize injury. For application to dry peas, always include Basagran or Rezult in the Raptor spray mixture, regardless of additives. Only 1 application of Raptor may be made per crop season. Read the label for more specific directions, precautions, and restrictions. Lima (succulent) and green beans: Apply to lima beans between first- and second-trifoliolate leaf stages or to green beans with at least one fully-expanded trifoliolate but before bloom when weeds are less than 3 inches tall. Treatments made before the first-trifoliolate leaf stage may cause temporary yellowing, stunt growth, and hurt crop quality and yield. Do not apply to beans during flowering. Raptor must be applied as a tank mixture with Basagran to minimize crop response. Using more than 16.0 oz/a of Basagran may reduce grass control. A non-ionic surfactant containing at least 80% active ingredient must be added at a rate of 1.0 qt/100 gal spray solution. Do not tank mix Raptor with any pesticides other than Basagran. Do not apply Raptor more than once per year.
	<i>lima & dry beans:</i> up to 0.0475 lb imazethapyr	up to 3.0 fl oz Pursuit	30 (succulent lima) 60 (dry beans)	Certain dry beans, lima, and green beans only. May reduce crop growth, quality, yield and/or delay maturity. Since maturity may be delayed, timing of harvest may need to be adjusted. Do not apply Pursuit in the following situations: —if cold and/or wet conditions are present or predicted to occur within 1 week of application; —by air or irrigation; —after July 31 for green beans; or —postemergence to lima and green beans. See label for specific instructions for postemergence application information for certain dry beans. Sensitive crops may be injured by this product; spray equipment should be thoroughly cleaned with water before being used to apply other products. Follow rotational crop guidelines printed on the label or injury may result to subsequent crops.
	<i>green beans:</i> 0.0238 lb imazethapyr	1.5 fl oz Pursuit	30 (green)	
	pendimethalin	2.4–3.6 pt Prowl 3.3EC 2.0–3.0 pt Prowl H ₂ O		Controls most annual grasses and certain broadleaf weeds. Rate varies depending on soil texture and organic matter. Make one preplant-incorporated application. Incorporate 1 inch deep using equipment capable of giving uniform incorporation. Incorporating in two passes gives better results.

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Weed control in bean—green, lima, navy, red kidney *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Annual weeds <i>(cont.)</i>	s-metolachlor	1.0–2.0 pt Dual II Magnum or Dual Magnum		Apply as a preplant treatment and shallowly incorporate or apply as a preemergence treatment. Controls most annual grasses and annual broadleaf weeds. Weak on velvetleaf, wild mustard, smartweed, and common lambsquarters. Preplant treatment gives reasonable yellow nutsedge control. Can delay maturity and reduce yields if wet, cold conditions occur after planting. Ineffective on peat or muck soils. Choose product rate for specific soil texture, organic matter classification and weed species expected.
	trifluralin	several manufacturers		Controls annual grasses and some broadleaf weeds, but is weak on wild mustard, smartweed, common ragweed, velvetleaf, and black nightshade. Rate varies depending on soil texture, organic matter, and type of bean planted. Incorporate 2–3 inches deep within 24 hours of application. See label for plantback restrictions. Ineffective on peat or muck soils.
Nutsedge and some broadleaves	0.023–0.047 lb halosulfuron	0.5–1.0 oz Sandea (rate varies by crop use and application timing—see label)	30 (green, lima)	<p>Preemergence timing (dry beans, green beans, lima beans): Apply after planting but prior to soil cracking. Use the lower rate on lighter texture soils with low organic matter. Apply uniformly with ground equipment in a minimum of 15 gal water/a.</p> <p>Postemergence timing (dry beans, green beans, lima beans): Apply to dry bean between the first- and third-trifoliolate stage or to green and limas between the second- and fourth-trifoliolate stage. Apply prior to flowering for all bean types.</p> <p>Use the lower rate on lighter texture soils with low organic matter. Directed sprays will limit crop injury. May be applied between rows. Avoid herbicide contact with the planted crop. See restrictions on the label if plastic is used on the planted row. Do not apply more than 1.0 oz/a Sandea per crop cycle (restricted to lesser amounts for some bean types—see label), and 2.0 oz/a Sandea per 12-month period. Use of soil or foliar-applied organophosphate insecticides on Sandea-treated crops may increase potential for and severity of crop injury. Consult label for important usage information and precautions.</p>
Emerged weeds	glyphosate	several manufacturers and formulations available		See manufacturer’s label to assure that the formulation is labeled for this crop and for specific instructions. Glyphosate may be applied any time before crop emerges. Apply before seed germination in coarse sandy soils. 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. Do not tank mix with soil-residual herbicides unless otherwise specified.
	*paraquat	several manufacturers and formulations available, not all are registered for this use		Prepare seedbed early to allow for maximum weed emergence. Application can be made as a banded or broadcast treatment before, during, or after planting, but before crop emergence. In preplant and preemergence (to the crop) uses, do not apply to soils lacking clay minerals, i.e. muck, pure sand. Use the higher rate for heavy weed infestations. Seeding should be performed with minimal soil disturbance. Always add crop oil concentrate or non-ionic surfactant to spray mixture. Follow precautions on label.

*Restricted-use pesticide.

(continued)

Pest management

Asparagus

Bean

Carrot

Celery

Cole crops

Cucumber

Weed control in bean—green, lima, navy, red kidney *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Emerged grasses	0.094–0.25 lb clethodim	6.0–16.0 oz Select 2EC	30	See label for specific bean types. Apply to actively growing grasses. Do not cultivate grasses within 7 days before or after application. Include appropriate surfactant as required by the label. Do not apply if rain is expected within 1 hour. See label for tank mix instructions.
	clethodim	Select Max (see label for rate—varies by bean type)	30 (dry beans) 21 (succulent)	
	0.124–0.375 lb fluazifop-P-butyl	8.0–24.0 fl oz Fusilade DX	60	
	0.034–0.08 lb quizalofop	5.0–12.0 oz Assure II or Targa	15 (green) 30 (dry beans)	Apply to actively growing grasses. Check label for specific instruction regarding grasses controlled and application rates. Always add crop oil concentrate or a non-ionic surfactant. Rainfast 1 hour after application. Maximum annual use rate varies by formulation and bean type—see label.
	0.094–0.47 lb sethoxydim	0.5–2.5 pt Poast	15 (green) 30 (dry beans)	Make postemergence applications to actively growing grasses within the size ranges indicated on the label. Check the label for wild proso millet or rescue treatment rates and for information on quackgrass control. Do not exceed 4.0 pt/a Poast per crop season. Always add 2.0 pt/a of oil concentrate. Do not cultivate 5 days prior to or within 7 days following application.
Emerged annual broadleaves	0.75–1.0 lb bentazon	several manufacturers and formulations	varies by label	Suggested as a postemergence spray when annual broadleaf weeds escape an earlier treatment. Controls velvetleaf, mustard, and purslane. Partial control of black nightshade, common lambsquarters, and redroot pigweed when applied in the very small seedling stage. Does not control grasses. Green beans are more sensitive to foliar burn than dry beans. Include 1.0–2.0 pt/a of crop oil concentrate in the spray mixture. Some oil concentrates cause excessive leaf burn, particularly during warm, humid weather. Apply when beans have at least the first trifoliate leaves expanded and annual broadleaf weeds are small and actively growing. Do not cultivate within 5 days before or 7 days after Basagran application. Must thoroughly cover weeds. Do not apply to beans under stress or if rainfall is expected within 4 hours of treatment.
	fomesafen	Reflex (rate varies by location; check label)	30 (green beans) 45 (dry beans)	Dry and green beans only. Reflex is rate-restricted by location and prohibited from use in some areas of Wisconsin. Check label to determine if it can be used in your area. Apply postemergence broadcast to control broadleaves, including eastern black nightshade, pigweeds, common ragweed, and common purslane. See label for application timing based on crop and weed growth stage.
Preharvest and spot treatment of emerged weeds	glyphosate	several manufacturers and formulations available	varies by bean type	Certain dry beans only—see label. May be applied as an over-the-top broadcast spray to control labeled weeds before harvest. The crop should be in the hard dough stage (< 30% moisture). Only 1 application can be made per year. Do not combine spot treatment with a preharvest spray. Do not use if the crop is for seed or will be fed to livestock. Allow 30 days between treatment and replanting with any crop not listed on the herbicide label. Some formulations may also be used as a spot treatment for troublesome weeds such as Canada thistle or quackgrass. Any crop receiving spray in the treated area will be killed.

*Restricted-use pesticide.

(continued)

Weed control in bean—green, lima, navy, red kidney *(continued)*

Weed	Rate/a of active ingredient	Rate/a of commercial product	Days to harvest	Remarks and suggestions
Dry bean and dry pea harvest aid	*paraquat	several manufacturers and formulations available	7	Treat when at least 80% of the pods are yellowing and mostly ripe, and no more than 40% (bush peas and beans) or 30% (vine peas and beans) of the leaves should be green. For vining beans or bush beans with lush growth, use a single application at the higher rate. Gramoxone Inteon may be applied as a split application, but do not make more than two or exceed a total of 2.0 pt/a. Add non-ionic surfactant at 1.0 qt/100 gallons spray mix. See label for precautions. Not all paraquat formulations are registered for this use.
	0.015–0.03 lb carfentrazone	1.0–2.0 oz Aim EW	0	Applications should be made when the crop is mature and the grain has begun to dry down. Use sufficient spray volume to provide complete foliage coverage. See label for adjuvant recommendations and maximum allowable use rates.

*Restricted-use pesticide.

