Beans (Snap and Lima)

Recommended Snap Bean Varieties

Snap Beans (Bush)	Variety[1]	Color[2]	Length (inch)	Sieve Size[3]	Use[4]	Days	Heat Tol.[5]	Reported Disease Resistance[6]						
								BCMV	BCTV	Cl	Ua	Psp	Xap	Pss
Bush Green Round Podded Types	Annihilator	DG	6.0	4	F,P	53	X	R	R					
	Barron	DG	5.5	3-4	F,P	54		R	R			R	I	R
	Bowie	MDG	5.5	3-4	F,P	56		R	R					
	Bridger	MDG	5.5	4-5	F,P	52	X	R	R			I		I
	Bronco	DG	5.3	3-4	F	53		R						
	Caprice	MDG	5.5	3-4	F,P	56		R		R		R	R	I
	Colter	MDG	5.5	4	F	53		R	R		R			
	Dominator	DG	6.0	4	F,P	53	X	R	R					
	Greenback	DG	6.0	4	F	56	X	R						
	Jade II	DG	6.5	4	F	60		R			I			
	Jaguar	DG	5.5	3-4	F,P	56	X	R		R	I			
	Lewis	MDG	5.5	3-4	F,P	53		R	R		R	R		I
	Maxibel	MG	7.0	2.3	F	60								
	Momentum	DG	5.8	3-4	F	56		R						
	Nyquist	DG	5.4	4	F,P	56		R						
	Pike	MDG	5.25	3	F	55		R	R			I	I	I
	Prevail	DG	5.5	3-4	F	54		R	I					
	Provider	MG	5.5	4-5	F	55								
	PV857	DG	5.5	4-5	F	54	X	R			I			
	Strike	MG	5.5	3-4	F	55		R						
	Sybaris	DG	5.8	3-4	F,P	56		R			I			
	Tema	DG	5.5	3	F	53		R						
	Valentino	DG	5.75	3	F	53		R			R			
	Wyatt	DG	5.75	3-4	P	54		R	R			R	R	R
Bush Green Flat Podded Types	Greencrop	MG	6.5		F	55								
	Navajo	MDG	5.5-6		P	55				R				
	Roma II	MG	5.5		F,P	58		R						
	Tapia	MG	6		F,P	54		R			I			
	Usambara	MG	5.5		P	54	X	R				I		
	Velero	MDG	6.25		P	56		R	R					
Bush Yellow Round Podded Types	Carson	Y	5.5	4-5	F,P	56		R		R				R
	Gold Rush	MY	6.0	4	F	55		R						
	Rocdor	Y	6.0	4	F	53		R		R		R		
	SV1003GF	MY	5.2	3-4	F	56		R						I
Pole Types	Cobra	MG	6.5	4-5	F	55	X							
	Early Riser	MG	9	flat	F	55	X							

[1]**Listed alphabetically within type**. [2]G=Green, Y=Yellow, M=Medium and D=Dark.

[3]Bean diameter category for majority of beans at harvest, 2=14.5/64 to 18.5/64 inch, 3=18.5/64 to 21.0/64 inch, 4=21.0/64 to 24.0/64 inch, 5=24.0/64 to 27.0/64 inch.

[4]F=fresh, P=processing Not all processing beans that perform well in the region are listed; consult with your processor for variety recommendations.

[5]Heat Tol.=Heat Tolerance. Heat tolerant varieties produce a high yield and a high percent of marketable pods when plants are exposed to high temperatures during flowering and pod set.

[6]Disease resistance reported from source seed companies. R=Resistant; I=Intermediate/partial resistance; BCMV=Bean Common Mosaic Virus; BCTV=Beet Curly Top Virus; Ua=rust caused by *Uromyces appendiculatus*; Cl=Anthracnose caused by *Colletotrichum lindemuthianum*; Psp=Halo Blight caused by *Pseudomonas savastanoi pv. phaseolicola*; Xap=Common Blight caused by *Xanthomonas axonopodis pv. phaseoli*; Pss=Bacterial Brown Spot caused by *Pseudomonas syringae pv. syringae*.

Recommended Lima Beans Varieties

Type	Variety[1]	Comments and Downy Mildew Resistance[2]
Lima Beans, Fordhook Type[3]	Fordhook 242	90 days, no resistance to current races of Downy Mildew
Lima Beans, Bush Baby Types[3]	Bridgeton	86 days, fresh market
	Cypress	77 days, cold soil tolerance, resistant to Downy Mildew race E
	Dixie Butter Pea	75 days, no resistance to current races of Downy Mildew
	Emperor	79 days, cold soil tolerance, resistant to Downy Mildew race F
	Jackson Wonder	85 days, no resistance to current races of Downy Mildew, speckled type
	Meadow	77 days, resistant to Downy Mildew race E
Lima Beans, Pole Types	Big 6	No resistance to Downy Mildew
	Big Mama	No resistance to Downy Mildew
	Dr. Martin	No resistance to Downy Mildew
	King of the Garden	No resistance to Downy Mildew
	Locally Selected Heirlooms	No resistance to Downy Mildew

[1]**Listed alphabetically within type**. [2]Based on results from University of DE tests. [3]Use varieties recommended by processors. Consult the University of DE Extension at *http://extension.udel.edu/ag/vegetable-fruit-resources/vegetable-small-fruits-program/variety-trial-results/* for variety trial results.

Variety Selection and Seed Treatment

Marketability, adaptability to the area, disease resistance and consistency in production should be considered when selecting snap bean types and varieties. Snap beans varieties can be bush types (can be harvested mechanically), or pole types (usually hand harvested). Pole types yield better in long season areas. Use seeds treated with fungicides to prevent diseases; see the Disease Control section below. Rough handling of seed greatly reduces germination.

Poor Pod Set, Deformed Pods, Split Set

High night temperatures during bloom (> 70°F, > 24°C) cause diminished pollen release and result in poor pod set, deformed pods with missing seeds, and "split set". Varieties differ in their heat susceptibility; choose only heat tolerant varieties for summer flowering plantings. Consult the variety recommendations table above or your seed supplier for information on heat tolerant varieties for your area.

Recommended Nutrients Based on Soil Tests

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

Beans[1,2]		**Soil Phosphorus Level**				**Soil Potassium Level**				
		Low	**Med**	**High (Opt)**	**Very High**	**Low**	**Med**	**High (Opt)**	**Very High**	
	N (lb/A)	**P_2O_5 (lb/A)**				**K_2O (lb/A)**				**Nutrient Timing and Method**
Snap Beans Single Crop	40-80	80	60	40	0[3]	80	60	40	0[3]	Total nutrient recommended
	20-40	80	60	40	0[3]	80	60	40	0[3]	Broadcast and disk-in
	20-40	0	0	0	0	0	0	0	0	Sidedress 4 weeks after planting
Snap Beans After Peas	20-40	80	60	40	0[3]	80	60	40	0[3]	Total nutrient recommended
	0-20	80	60	40	0[3]	80	60	40	0[3]	Broadcast and disk-in
	0-20	0	0	0	0	0	0	0	0	Sidedress 4 weeks after planting
Lima Beans Single Crop	60-90	100	60	20	0[3]	140	100	60	0[3]	Total nutrient recommended
	30-40	100	60	20	0[3]	140	100	60	0[3]	Broadcast and disk-in
	20	0	0	0	0	0	0	0	0	Band place with planter
	20	0	0	0	0	0	0	0	0	Sidedress 3-5 weeks after emergence
Lima Beans After Peas	30-40	0	0	0	0	0	0	0	0	Total nutrient recommended
	20	0	0	0	0	0	0	0	0	Band place with planter
	20	0	0	0	0	0	0	0	0	Sidedress 3-5 weeks after emergence

[1]Apply 1-2 lb/A of boron (B) every 3 yr on most soils; see also Table B-7. in Chapter B Soil and Nutrient Management. **Do not** place B in starter fertilizers due to sensitivity problems. [2]Apply 25-30 lb/A of sulfur (S) for most soils. [3]In VA, crop replacement values of 20 lb/A of P_2O_5 and 40 lb/A of K_2O are recommended on soils testing Very High.

Plant Tissue Testing

Plant tissue testing can be a valuable tool to assess crop nutrient status during the growing season to aid with in-season fertility programs or to evaluate potential deficiencies or toxicities. Critical snap bean tissue test values for most recently matured leaves up to first bloom: N 3-4%, P 0.3-0.5%, K 2.0-3.0%, Ca 0.8-1.5%, Mg 0.25-0.45% and S 0.2-0.4%. For additional nutrients and other growth stages consult with a tissue testing laboratory or check the following University of Florida website: *https://edis.ifas.ufl.edu/publication/ep081*.

Site selection, Soil, and Fertilization

Well-drained friable sandy loams to clay loams are well suited for legumes. Avoid compacted soils that can flood. Slightly acid soils (pH 6-6.5) are preferred. If lime is needed, apply it several months before planting. All P and K can be applied before planting. Beans respond to N applications, especially bush types.

Planting and Harvesting Dates

Note: In PA and normally cooler areas, delay the start of planting by 10 days and stop planting 14 days sooner than indicated below. In the southern part of the region, plantings that will result in pod set at temperatures above 90°F (commonly mid-July to early August) are at risk of blossom drop, split set, high cull percentage, and reduced yield.

Variety	Planting Dates	Harvesting Dates
Market Snap	April 10 - August 10	June 20 - October 20
Processing Snap	April 20 - August 10	July 1 - October 20
Fordhook Lima	May 15 - July 10 (June 20 - July 10 in the southern part of the region)	August 1 - October 20
Baby Lima	May 15 - July 20	August 1 - October 30
Pole Lima	May 15 - June 15	July 15 - October 30

Spacing

Snap Beans.

Rows 30-36 inches apart, 6-10 plants/ft. Plant 50-75 lb/A of seed depending on seed size (lower rate for lighter seeds). Narrow rows increase yields but render late-season tillage difficult. Plant in rows 18-24 inches apart with 5-7 plants/ft. Plant 75-120 lb/A of seed, depending on seed size. Calibrate planter according to seed size. Sow 1-1½ inches deep in light sandy soil; shallower in heavier soil.

Lima Beans, Fordhook Type.

Rows 30-36 inches apart, 2 plants/ft. Plant 85 lb/A of seed, 1½ inches deep.

Lima Beans, Baby Types.

Rows 30-36 inches apart, 3-4 plants/ft. Plant 50 lb/A of seed, 1½ inches deep (deeper if soil is dry). For irrigated fields: Rows 18-30 inches apart, 4-5 inches between plants; plant 96 lb/A of seed at close spacing and 78 lb/A at wider spacing.

Lima Beans, Pole Types.

Large-seeded pole lima beans are often started in a cold frame or greenhouse which results in higher germination percentages and earlier crops. Plant 1 seed per cell at a depth of 1 inch in containers or plug flats with cells that are at least 1.5 inches in diameter and 2 inches deep. Use a sterile commercial greenhouse medium. Bottom heat will stimulate growth and help produce transplants quicker. Transplant to the field once plants have the first true leaves. Do not allow transplants to become completely root bound. Do not disturb roots during the transplanting process or stunting may occur. Pole lima beans are very vigorous and should not be planted too close together or excessive vine growth may reduce yields. Space plants at a distance of 3-6 ft in the row (less vigorous types closer, more vigorous types further apart) with a minimum of 5 ft between rows.

Irrigation

Snap and lima beans are grown under irrigated and dryland conditions. Bean crops respond to irrigation and the highest yields are obtained when soil moisture is maintained at 50% of field capacity or higher, from the 2 trifoliate leaf stage through pod sizing. Water use during flowering and pod sizing can be over 0.25 inches/day and water deficit during this period will have the greatest negative impact on yield and pod quality. However, a balance must be struck between maintaining adequate moisture for pod growth and minimizing wetness in the canopy which promotes White mold in all beans and Downy mildew and Pod blight in lima beans.

Trellising Pole Lima Beans

Sturdy wooden or metal posts should be spaced every 15-20 ft in the row. Additional smaller spacer stakes may be needed in between posts. At least 5 ft, preferably 6 ft, of the posts or stakes should be above ground. Tightly stretch a 10-12 gauge wire and attach to wooden posts with fencing staples. Stretch a second wire between posts about 1 ft above the soil and weave twine in a V shaped pattern between the wires for vines to climb. Alternatively, 6 ft plastic netting can be stretched between the top and bottom wire. An individual stake or line should be placed at each plant for the initial climbing to the trellis. Bean supports should be put up before the bean plants begin producing "runners" and falling over. Trellises have to be sturdy enough to support the heavy lima bean vines.

No-Till / Conservation Tillage

Snap and lima beans have been successfully grown in no-till and conservation tillage systems, though lima bean yields are often lower, and residues can make harvest more difficult. In no-till systems, bean seeds are usually drilled into the stubble/plant residue of a small grain crop. Consider bean variety, date of planting, soil fertility practices, insect control, planting equipment, mulch, residue at harvest, and weed species in the field. For more information on this production method, see section A 6. Conservation Tillage Crop Production.

Harvest and Post-Harvest Considerations

Processing snap beans are usually harvested when 50% of the beans are sieve size 4 or smaller, but this percentage will depend on processor needs and variety. The yield of processing snap beans ranges from 4 to 6 ton/A. Processing should occur soon after harvest and transport times should be minimized. Washing and precooling shelled beans is recommended for distance transport.

Fresh market snap beans are either hand harvested multiple times at the desired size or machine harvested when the highest percentage of marketable beans can be obtained. The yield of fresh market snap beans ranges from 150 to 250 bushel/A. Beans for fresh market shipping should meat US No. 1 standards or higher.

Baby lima beans for mechanical picking are harvested when the highest percentage of full pods can be obtained and when plants have approximately 10% dry pods. Hand-picked lima beans are picked at the full green seed stage.

Fordhook lima beans are harvested when the highest percentage of full pods can be obtained but before any pods have dried.

Grading and Packing

A grading line will typically have offloading and conveying belts, a gravity separator to remove soil, rocks, and heavy field trash, an air blast trash remover for leaves, stems, and other light field trash, a rotating drum tumbler to remove pin beans and immature pods through slots, a broken bean eliminator, vibrating tables where good pods are further segregated from field trash, a sizer for processing beans, vibrating washers where pods are rinsed with water to remove soil particles and to remove some of the field heat, grading tables where pods are manually inspected to remove overmature, blemished, decayed, or other defective pods, and for fresh market beans, a box filler. Beans are moved by vibration into wire bound crates or waxed cartons, which are weighed and unloaded onto a box closing machine after which boxes go to a cold storage area. In smaller operations, many of these tasks will be done by hand at a sorting table. Field packing is practical mainly for direct market and local sales. Beans may also be harvested directly by consumers or local wholesalers as U-pick.

Cooling and Storage

Fresh market snap beans are highly perishable and should be cooled rapidly after harvest, preferably to 40-43°F (4-6°C). Vacuum or forced-air cooling can be effective, but the preferred method is hydrocooling as the cold water cools beans rapidly and the free moisture helps prevent wilting or shriveling. Use chlorinated water with a 55-70 ppm free chlorine concentration and pH of 6.5-7 (neutral) for washing and hydrocooling.

Beans should be stored at 39-45°F (4-7°C) and 95% relative humidity. Under these conditions, beans will maintain quality for 7-10 days. Temperatures of 38°F (3°C) and lower may cause significant chilling injury. Beans lose moisture rapidly if not properly protected by packaging or by a relative humidity of 95% or above. When the relative humidity approaches saturation, as in consumer packages, temperatures above 45°F (7°C) must be avoided to prevent serious decay within a few days. Beans should not be stored or shipped with ethylene generating fruits and vegetables.

Weed Control

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

Recommended Herbicides

1. Identify the weeds in each field and select recommended herbicides. More information is available in the "Herbicide Effectiveness on Common Weeds in Vegetables" (Table E-3) in Chapter E Pest Management.

2. Minimize herbicide resistance development. Identify the herbicide mode of action group number and follow recommended good management practices; **bolded group numbers in tables below are herbicides at higher risk for selecting resistant weed populations.** Include non-chemical weed control whenever possible.

1. Non-Selective or Burndown

Group	Product Name (*=Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
9	Roundup PowerMax3 4.8L "Generic" glyphosate 3L	19 to 29 fl oz/A 24 to 48 fl oz/A	**glyphosate**	0.75 to 1.13 lb acid equivalent/A	--	24
-Apply preplant or preemergence. -Some glyphosate formulations may require an adjuvant, refer to label. Tank mix with appropriate herbicides for residual weed control. -Glyphosate controls many perennial weeds as well as annuals if applied when the weed is actively growing and has reached the stage of growth listed on the label. -Repeat applications are allowed, with maximum application of 5.3 qt/A per year.						
22	Gramoxone SL 3.0*	1.7 to 2.7 pt/A	**paraquat**	0.6 to 1 lb/A	--	12
-Apply preplant or preemergence. Always include an adjuvant (nonionic surfactant or crop oil concentrate). Tank mix with appropriate herbicides for residual weed control. -Paraquat may not control established grasses. Spray coverage is essential for optimum control. -Rainfastness 30 min. A maximum of 3 applications per year are allowed. -***Restricted-use pesticide***. Only certified applicators, who successfully complete the paraquat-specific training, can mix, load, or apply paraquat. Application of paraquat "under the direct supervision" of a certified applicator is no longer allowed. Required training link (*https://campus.extension.org/enrol/index.php?id=2201*); certified applicators must repeat training every three years.						

2. Soil-Applied (Preplant Incorporated or Preemergence)

Group	Product Name (*=Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
2	Pursuit 2L	1.5 to 2.0 fl oz/A	**imazethapyr**	0.024 to 0.031 lb/A	30	4
-**Lima beans; labeled for snap bean in NJ only**. -Apply as preplant incorporated or to the soil surface, but shallow, thorough incorporation improves consistency of performance when dry weather follows application. Primarily controls broadleaf weeds. Combine with another herbicide to control annual grasses. -Pursuit residues persist in the soil after harvest and may affect following crops. Follow label instructions. -Pursuit is an ALS inhibitor, Group 2 herbicide, and there is widespread resistance in the region to this family of herbicides. -Maximum Pursuit application at planting: 2 fl oz/A for lima beans and 1.5 fl oz/A for snap beans. -Maximum number of applications per year: 1.						
2	Sandea 75DF	0.5 to 1.0 oz/A	**halosulfuron**	0.024 to 0.047 lb/A	30	12
-Apply after seeding but before cracking. Controls or suppresses yellow nutsedge and many annual broadleaf weeds. Results have been most consistent when the application was followed by rainfall or irrigation. -Use the lower rate on coarse-textured (sandy) soils low in organic matter, and the higher rate on fine -textured (silt and clay) soils. -Heavy rainfall before crop emergence can result in crop stunting. -**Do not** apply Sandea to crops treated with a soil-applied organophosphate insecticide or use a foliar applied organophosphate insecticide within 21 days before or 7 days after a Sandea application. -Sandea is an ALS inhibitor, Group 2 herbicide, and there is widespread resistance in the region to this family of herbicides. -Maximum Sandea application per season: 1 oz/A.						
3	Prowl H2O 3.8CS Prowl 3.3 EC	1.0 to 3.0 pt/A 1.2 to 3.6 pt	**pendimethalin**	0.48 to 1 lb/A 0.5 to 1.5 lb/A	--	24
-Labeled only for preplant incorporated application; apply before planting and incorporate thoroughly within the top 2-3 inches of soil. -The lower rates are recommended for early planted fields or coarse-textured soils. -Primarily controls annual grasses and certain broadleaf weeds. -**Do not** use when soils are cold and/or wet soil conditions are anticipated during emergence, or crop injury may result. -**Do not** apply more than once per cropping season. **Not recommended in NJ.**						
3	Treflan 4E	1 to 1.5 pt/A	**trifluralin**	0.5 to 0.75 lb/A	--	12
-Labeled for preplant incorporation only; incorporate into 2-3 inches of soil within 8 h after application. -Primarily controls annual grasses and a few broadleaf weeds (weak on ragweed). Poor incorporation can reduce overall weed control. -Treflan may be applied up to 4 weeks prior to planting. -**Do not** use or reduce the rate used when cold, wet soil conditions are expected, or crop injury may result. -Maximum application not addressed on label.						
13	Command 3ME	4 to 6 fl oz/A	**clomazone**	0.094 to 0.14 lb/A	45	12
-Lima beans only. Special Local Needs Label 24(c) for the use of Command in DE, MD, and VA (expires in DE 12/31/2030; labels for MD and VA have expired at the time of publication of these recommendations, check for updates).						

2. Soil-Applied (Preplant Incorporated or Preemergence) - Command 3ME- continued next page

***2. Soil-Applied (Preplant Incorporated or Preemergence) - Command 3ME** - continued*

-Lima bean crop can be planted 60 days after an application of Command to a previous crop, assuming the rate in the previous crop was not above 12 fl oz/A. -Apply to suppress annual grasses and certain broadleaf weeds including common lambsquarters, velvetleaf, spurred anoda, and jimsonweed. Use the lower rate on coarse-textured soils low in organic matter and higher rates on fine-textured soils and on soils with high organic matter. Some temporary crop injury (partial whitening of leaf or stem tissue) may be apparent after crop emergence; beans recover from minor early injury without affecting yield or earliness. -Observe all precautions. Maximum number of applications per season: 1						
13	Command 3ME	6.4 to 10.7 fl oz/A	**clomazone**	0.15 to 0.25 lb/A	45	12
-**Snap beans only.** Apply to control annual grasses and many broadleaf weeds including common lambsquarters, velvetleaf, spurred anoda, and jimsonweed. Command will not control yellow nutsedge, mustards, morningglory species, or pigweed species. -Use the lower rate on coarse-textured soils low in organic matter and higher rates on fine-textured soils and on soils with high organic matter. Some temporary crop injury (partial whitening of leaf or stem tissue) may be apparent after crop emergence; beans recover from minor early injury without affecting yield or earliness. -**WARNINGS**: Command spray *or* vapor drift may injure sensitive crops and other vegetation up to several hundred yards from the point of application. **Do not** apply adjacent to sensitive crops (see label) or vegetation, or under unfavorable wind or weather conditions. Command may limit subsequent cropping options, see the label. -Maximum number of applications per season: 1.						
14	Reflex 2SL	1 to 1.5 pt/A	**fomesafen**	0.25 to 0.375 lb/A	30	24
-**Snap beans only.** Controls several common broadleaf weeds. Tank mix for control of annual grasses. -Maximum of 1.25-1.5 pt/A may be applied either preemergence or postemergence in one year. Maximum rates vary by state (see Regional Use Map on herbicide label for details). -**Do not** apply more than once in a 2-year period (alternate year applications). Rotational restrictions for most vegetables is 18 months.						
14+14	Spartan Charge 3.5EC	3 to 3.75 fl oz/A	**sulfentrazone + carfentrazone**	0.082 to 0.103 lb/A	--	24
-**Lima beans only. Special Local Needs Label 24(c) for the use of Spartan Charge for lima beans in DE only (expires 12/31/2026).** Labeled for ALS-resistant pigweed (Group 2 herbicides). Do **not** use Spartan Charge if temporary crop injury is not acceptable. -Combine with another herbicide to control annual grasses. Apply no later than 3 days after seeding, but **do not** apply after cracking. Expect some temporary crop injury after emergence.						
15	Dual Magnum 7.62E	1 to 2 pt/A	**s-metolachlor**	0.95 to 1.91 lb/A	--	24
-Preplant incorporated or preemergence; incorporated applications should be worked into the soil 2-3 inches deep by disking twice with blades set 4-6 inches deep. Primarily controls annual grasses and nutsedge; nutsedge control is improved with preplant incorporation. Dual will not control emerged weeds. A postemergence herbicide may be required for adequate broadleaf weed control. -**Do not** apply more than 2 pt/A during any one crop year.						
15	Eptam 7E	3 to 3.5 pt/A	**EPTC**	2.5 to 3 lb/A	--	12
-**Snap beans only.** Preplant incorporated applications only; incorporate by disking twice into 3-4 inches of soil immediately after application. Useful for nutsedge control, annual grasses, and some broadleaf weeds. -Combining Eptam with Dual Magnum may improve weed control but may increase the risk of crop injury when weather conditions are adverse. **Do not** exceed 9 pt/A per year (3.5 pt/A on coarse-textured soils).						

3. Postemergence

Group	Product Name (*=Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
1	Shadow 3EC Select 2EC Select Max 0.97EC	4 to 5.33 fl oz/A 6 to 8 fl oz/A 9 to 16 fl oz/A	**clethodim**	0.07 to 0.125 lb/A	21	12
	Assure II/Targa 0.88EC	6 to 12 fl oz/A	**quizalofop**	0.04 to 0.08 lb/A	15	12
	Poast 1.5EC	1 to 2.5 pt/A	**sethoxydim**	0.2 to 0.5 lb/A	15	12

-**Select Max and Poast can be applied to snap beans and lima beans; Assure II/Targa labeled for snap beans only.**
-**Select 2EC**: use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal spray solution). **Select Max 0.97EC**: use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal spray solution). **Shadow 3EC**: use crop oil concentrate (COC) at 1% v/v (1 gal/100 gal of spray solution) for large or stressed grasses; use nonionic surfactant (NIS) at 0.25% v/v (1 qt/100 gal of spray solution) when crop safety is a concern. **Poast 1.5EC**: use COC at 1% v/v. **Assure II/Targa 0.88EC**: use COC at 1% v/v.
-**General comments:** -The use of COC may increase the risk of crop injury when hot or humid conditions prevail. To reduce the risk of crop injury, switch to NIS when grasses are small and soil moisture is adequate. -Use lower labeled rates for annual grass control and higher labeled rates for perennial grass control. For best results, treat annual grasses when they are actively growing and before tillers are present. -Yellow nutsedge, wild onion, wild garlic, and broadleaf weeds will **not** be controlled with these herbicides. -These herbicides control many annual and certain perennial grasses. Clethodim is best on annual bluegrass; while Poast is preferred for goosegrass control. -Repeated applications may be necessary to control certain perennial grasses. If repeat applications are necessary, allow 14 days between applications. -Rainfastness is 1 h.
-**Do not** apply more than 8 fl oz/A of Select 2EC in a single application and **do not** exceed 2 pt/A for the season; d**o not** apply more than 16 fl oz/A of Select Max in a single application and **do not** apply more than 1 application per season.
-**Do not** apply more than 5.33 fl oz/A of Shadow 3EC in a single application and **do not** exceed 5.33 fl oz/A for the season.

3. Postemergence -.Shadow, Select, Select Max, Assure, Targa, Poast - continued next page

***3. Postemergence.-.Shadow, Select, Select Max, Assure, Targa, Poast** - continued*

-**Do not** apply Assure II/Targa within 7 days of another Assure II/Targa application. **Do not** make more than 2 applications per season, and **do not** exceed 14 fl oz/A for the season. -**Do not** apply more than 2.5 pt/A Poast in a single application and **do not** exceed 4 pt/A for the season.						
2	Raptor 1L Beyond Xtra 1L	4 fl oz/A	**imazamox**	0.031 lb/A	--	4
-Apply to control annual broadleaf weeds when the crop has 1-2 fully expanded trifoliate leaves but before bloom stage of bean growth -Add nonionic surfactant to be 0.25% of the spray solution (1 qt/100 gal of spray). -Add 0.5 to 1 pt/A of bentazon (Basagran) to reduce the expression of injury symptoms or use **Varisto 4.18L** which is a prepackaged mixture of Raptor plus Basagran; 21 fl oz/A of Varisto = 4 fl oz/A of Raptor and 21 fl oz/A of Basagran 4L -Strictly observe all plant back restrictions. -Raptor/Beyond Xtra are ALS inhibitors, Group 2 herbicide, and there is widespread resistance in the region to this family of herbicides. -Rainfastness is 1 h. -**Do not** apply more than 4 fl oz/A per year and more than one application per growing season.						
2	Sandea 75DF	0.50 to 0.66 oz/A	**halosulfuron**	0.023 to 0.031 lb/A	30	12
-Apply with nonionic surfactant at 0.25% of the spray solution (1 qt/100 gal of spray solution) to control yellow nutsedge and certain annual broadleaf weeds. Use only the lower rate when treating snap beans. -Applications should be sprayed when the crop has 2-3 trifoliate leaves and annual weeds are less than 2 inches tall. (Treatments applied when beans are younger increases the risk of temporary stunting, and applications after the 3 trifoliate leaf stage increases the risk of a split set.) Occasionally, slight yellowing of the crop may be observed within a week of Sandea application. When observed, recovery is rapid with no effect on yield or maturity. -Sandea provides both residual and postemergence control of susceptible weed species. Provides control of yellow nutsedge and certain annual broadleaf weeds. Control of weeds taller than 3 inches may not be adequate. -Sandea is an ALS inhibiting herbicide and resistant weed populations are common in the region. **Do not** use Group 2 herbicides repeatedly in the same field. -**Do not** apply Sandea to crops treated with a soil-applied organophosphate insecticide or use a foliar applied organophosphate insecticide within 21 days before or 7 days after a Sandea application. -Rainfastness is 4 h. -Do not apply more than 2 applications, or more than 2 oz/A of product per year.						
6	Basagran 4L Basagran 5L	1 to 2 pt/A 0.8 to 1.6 pt/A	**bentazon**	0.5 to 1 lb/A	30	48
-Apply when beans have fully expanded first trifoliate leaves. Use lower rate to control common cocklebur, mustards, and jimsonweed and the higher rate to control yellow nutsedge, common lambsquarters, common ragweed, and Canada thistle (2 applications may be needed to control nutsedge and thistle). Basagran will not control pigweed species. -Do not cultivate within 5 days before applying Basagran or within 7 days after application. -Temporary, pronounced crop injury may be observed that can result in delayed maturity. -The use of oil concentrate may increase the risk and severity of crop injury. To reduce the risk of crop injury, omit additives or switch to a nonionic surfactant when weeds are small and soil moisture is adequate. -**Do not** spray when temperatures are over 90°F (32°C). -Rainfastness is 4 h.						
14	Reflex 2SL	Rates vary, refer to the specific label	**fomesafen**	0.125 to 0.375 lb/A	30	24
-**Snap beans only.** Apply when snap beans have 1-2 fully expanded trifoliate leaves. -The recommended rate is 0.5 to 0.75 pt/A based on local research. This is lower than the labeled rate to reduce the risk of crop injury. -Use the lower recommended rate when weeds are small or when there is good soil moisture, high humidity, and warm cloudy weather causing "soft" growing conditions. Add nonionic surfactant to be 0.25% of the spray solution (1 qt/100 gal of spray). -Tank mix with bentazon to improve the control of common lambsquarters, smartweed, velvetleaf, cocklebur, galinsoga, and yellow nutsedge. Use of crop oil can improve weed control but may slightly reduce crop tolerance. **Do not** use urea ammonium nitrate (UAN) or ammonium sulfate (AMS) on snap beans or severe injury may occur. -Lima beans and most other vegetables are sensitive to fomesafen. -Reflex provides both residual and postemergence control of susceptible weed species. -Be sure to consider rotational crops when deciding to apply fomesafen. Rainfastness is 1 h. -Maximum Reflex application: 1.25 to 1.5 pt/A IN ALTERNATE YEARS.						
15	Dual Magnum 7.62E	1 to 2 pt/A	**s-metolachlor**	0.95 to 1.91 lb/A	50	24
-**Lima beans only. Special Local Needs Label 24(c) for the use of Dual Magnum applied "over the top" of lima beans in DE only (expires 12/31/2026).** -Apply after the first trifoliate stage of lima bean to extend residual control for Palmer amaranth and grasses. Dual Magnum will not control weeds if they have emerged. -When Dual Magnum is applied over the top of lima bean, leaf spotting or speckling may be observed. -Maximum Dual Magnum amount: 2 pt/A for the season.						

3. Postharvest

Group	Product Name (*=Restricted Use)	Product Rate	Active Ingredient	Active Ingredient Rate	PHI (d)	REI (h)
22	Gramoxone SL 3.0*	1.5 to 2 pt/A	**paraquat**	0.56 to 0.75 lb/A	--	24
-**Supplemental Label in DE for the use of Gramoxone SL 3.0 for postharvest application to desiccate the crop.** -Apply after the last harvest for bareground or plasticulture. Always include an adjuvant. -Spray coverage is essential for optimum effectiveness. See the label for additional information and warnings. -Rainfastness 30 min. A maximum of 2 applications for crop desiccation are allowed.						

3. Postharvest - Gramoxone - continued next page

***3. Postharvest - Gramoxone** - continued*

-***Restricted-use pesticide***. Only certified applicators, who successfully complete the paraquat-specific training, can mix, load, or apply paraquat. Application of paraquat "under the direct supervision" of a certified applicator is no longer allowed. Required training link (*https://campus.extension.org/enrol/index.php?id=2201*); certified applicators must repeat training every three years.

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

Group	Product Name (*=Restricted Use)	Active Ingredient
14	Aim (hooded or directed application only)	**carfentrazone**

Insect Control

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

Recommended Insecticides

Note: For **premixes**, the group number (representing the mode of action) and active ingredient that contributes the most to control is generally listed first. In some cases, only one ingredient in a premix provides control.

Soil Pests

Seed Maggots Seed maggots are mostly a problem in soils high in organic matter or with recent organic matter incorporation, under moist conditions, and when cool springs delay seed germination. For the best control, plant seeds commercially treated with thiamethoxam (Cruiser 5FS) - **commercially applied seed treatment only.** Brigade eVo and Elevest are also labeled for use in-furrow.

Above-ground Pests

Aphids Treat only if aphids are well distributed throughout the field (50% or more of terminals with 5 or more aphids), when weather favors population increase, and if beneficial species are lacking.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Lannate LV*	1.5 to 3.0 pt/A	methomyl	see label	48	H
1B	Dimethoate 400EC	0.5 to 1.0 pt/A	dimethoate	0[1]	48	H
4A	Neonicotinoid insecticides registered for use on Beans: see table at the end of Insect Control.					
4C	Transform WG	0.75 to 1.0 oz/A	sulfoxaflor	7	24	H
4C + 3A	Ridgeback*	5.5 to 13.8 fl oz/A	sulfoxaflor + bifenthrin	3	24	H
4D	Sivanto Prime	7.0 to 14.0 fl oz/A	flupyradifurone	7	4	M
23	Boxadon 360	2.1 to 3.4 fl oz/A	spirotetramat	1	24	L
23	Movento 2SC	4.0 to 5.0 fl oz/A	spirotetramat	1	24	L
23 + 7C	Senstar	8.0 to 10.0 fl oz/A	spirotetramat + pyriproxyfen	7	24	L
29	Beleaf 50SG	2.8 oz/A	flonicamid	7	12	L

[1]Mechanical Harvest only.

Bean Leaf Beetles (BLB) and Mexican Bean Beetles (MBB)

Bean leaf beetle adults, which are similar in size to spotted cucumber beetles, and Mexican bean beetle adults (copper-colored ladybeetles with black spots), and larvae (yellow with spines) chew holes in leaves, but also may cause direct injury to pods. Early control measures are recommended to reduce yield loss from defoliation and reduce population levels later in the season. Begin spraying at 20% defoliation or 1 beetle per plant.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s) and Crop Restrictions**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Lannate LV* (MBB only)	0.75 to 3.0 pt/A	methomyl	see label	48	H
1A	Sevin XLR Plus	0.5 to 1.0 qt/A	carbaryl - **snap beans only**	3	12	H
1B	Orthene 97	0.5 to 1.0 lb/A	acephate - **lima beans only**	1	24	H
1B	Dimethoate 400EC	0.5 to 1.0 pt/A	dimethoate	0[1]	48	H
3A	Pyrethroid insecticides registered for use on Beans: see table at the end of Insect Control.					
4A	Neonicotinoid insecticides registered for use on Beans: see table at the end of Insect Control.					

[1]Mechanical Harvest only.

Cutworms

See also section E 3.1. Soil Pests - Detection and Control.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Lannate LV*	1.5 pt/A	methomyl	see label	48	H
1A	Sevin XLR Plus	1.0 to 1.5 qt/A	carbaryl	3	12	H
1B	Diazinon AG500*[1]	2.0 to 4.0 qt/A	diazinon	45	72	H
3A	Pyrethroid insecticides registered for use on Beans: see table at the end of Insect Control.					

[1]Broadcast just before planting and immediately incorporate into the soil.

Leafminers

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1B	Dimethoate 400EC	0.5 to 1.0 pt/A	dimethoate	0[1]	48	H
5	Blackhawk 36WG[2]	2.5 to 3.3 oz/A	spinosad	3	4	M
5	Radiant SC[2]	5.0 to 8.0 fl oz/A	spinetoram	3	4	H
6	Agri-Mek SC*[3]	1.75 to 3.5 fl oz/A	abamectin	7	12	H
17	Trigard 75WSP	2.66 oz/A	cyromazine	7	12	H
28	Exirel	10.0 to 20.5 fl oz/A	cyantraniliprole	1	12	H
28	Verimark	6.75 to 13.5 fl oz	cyantraniliprole **- soil**	n/a	4	H
28 + 6	Minecto Pro*[3]	7.5 to 10.0 fl oz/A	cyantraniliprole + abamectin	7	12	H

[1]Mechanical Harvest only.
[2] Control may be improved by addition of an adjuvant.
[3]Use of a non-sticker adjuvant is required.

Mites

Spot-treat areas along edges of fields when white stippling along veins on the underside of leaves is first noticed. Broadspectrum insecticides (Groups 1B, 3) provide initial knockdown, but continued use may result in outbreaks.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1B	Dimethoate 400EC	0.5 to 1.0 pt/A	dimethoate	0[1]	48	H
6	Agri-Mek SC*[2]	1.75 to 3.5 fl oz/A	abamectin	7	12	H
6 + 28	Minecto Pro*[2]	7.5 to 10.0 fl oz/A	cyantraniliprole + abamectin	7	12	H
20B	Kanemite 15SC	31.0 fl oz/A	acequinocyl	7	12	L
20D	Acramite 50WS	1.0 to 1.5 lb/A	bifenazate	3	12	M
21A	Magister SC	32.0 to 36.0 fl oz/A	fenazaquin	7	12	H
21A	Portal	2.0 pt/A	fenpyroximate	1	12	L
N/A	Sulfur 80WG (OMRI)	3 to 10 lb/A	sulfur	0	24	M

[1]Mechanical Harvest only.
[2]Use of a non-sticker adjuvant is required.

Potato Leafhoppers (PLH)

PLH can cause hopperburn on leaves, which can reduce photosynthesis and yield. Seeds treated commercially with thiamethoxam (Cruiser 5FS) are protected from PLH for about 3 weeks post-planting. Sweep netting can help determine if pest densities warrant control. Treat if the number of adults plus nymphs exceeds 100 per 20 sweeps.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s) and Crop Restrictions**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Lannate LV*	0.75 to 3.0 pt/A	methomyl	see label	48	H
1A	Sevin XLR Plus	1.0 qt/A	carbaryl - **snap beans only**	3	12	H
1B	Dimethoate 400EC	0.5 to 1.0 pt/A	dimethoate	0[1]	48	H
1B	Orthene 97	0.5 to 1.0 lb/A	acephate - **lima beans only**	1	24	H
3A	Pyrethroid insecticides registered for use on Beans: see table at the end of Insect Control.					
4A	Neonicotinoid insecticides registered for use on Beans: see table at the end of Insect Control.					
4D	Sivanto Prime	7.0 to 14.0 fl oz/A	flupyradifurone	7	4	M

[1]Mechanical Harvest only.

Stink Bugs

Sweep netting can be useful to detect stink bugs. Treatment is recommended if the number of adults and nymphs exceed 7 per 50 sweeps during pod development. **Note: Brown and brown marmorated stink bugs are less susceptible to pyrethroids than green and southern green stink bugs**.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1B	Orthene 97	0.5 to 1.0 lb/A	acephate - **lima beans only**	1	24	H
3A	Pyrethroid insecticides registered for use on Beans: see table at the end of Insect Control.					

Tarnished Plant Bugs (a.k.a. Lygus bugs)

Treat only if the number of adults and/or nymphs exceeds 15 per 50 sweeps from the pin pod stage until harvest.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Lannate LV*	1.5 to 3 pt/A	methomyl	see label	48	H
1A	Sevin XLR Plus	1.0 to 1.5 qt/A	carbaryl	3	12	H
1B	Dimethoate 400EC	0.5 to 1.0 pt/A	dimethoate	0[1]	48	H
1B	Orthene 97	0.5 to 1.0 lb/A	acephate - **lima beans only**	1	24	H
3A	Pyrethroid insecticides registered for use on Beans: see table at the end of Insect Control.					
4C	Transform WG	1.5 to 2.25 oz/A	sulfoxaflor	7	24	H
15	Rimon 0.83EC	12.0 fl oz/A	novaluron - **beginning of oviposition**	1	12	M
15 + 4A	Cormoran	12.0 fl oz/A	novaluron + acetamiprid	7	12	M
29	Beleaf 50SG	2.8 oz/A	flonicamid	7	12	L

[1]Mechanical Harvest only.

Thrips

Treatments should be applied if thrips are present from cotyledon stage to when the first true leaves are established and/or when first blossoms form.

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Lannate LV*	1.5 to 3 pt/A	methomyl	see label	48	H
1B	Orthene 97	0.5 to 1.0 lb/A	acephate - **lima beans only**	1	24	H
3A[1]	Pyrethroid insecticides registered for use on Beans: see table at the end of Insect Control.					
4A[2]	Neonicotinoid insecticides registered for use on Beans: see table at the end of Insect Control.					
5	Blackhawk[3]	2.5 to 3.3 oz/A	spinosad	3	4	M
5	Radiant SC[3]	5.0 to 8.0 fl oz/A	spinetoram	3	4	H
15	Rimon 0.83EC	12.0 fl oz	novaluron - **nymphs only**	1	12	M

[1]Resistance concerns with western flower thrips.

[2]Resistance concerns with tobacco thrips.

[3]Control may be improved by addition of an adjuvant.

Whiteflies

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
4A	Neonicotinoid insecticides registered for use on Beans: see table at the end of Insect Control.					
4D	Sivanto Prime	10.5 to 14.0 fl oz/A	flupyradifurone	7	4	M
7C	Knack	8.0 to 10.0 fl oz/A	pyriproxyfen	7	12	L
15	Rimon 0.83EC	12.0 fl oz	novaluron - **young nymphs only**	1	12	M
21A	Magister SC	32.0 to 36.0 fl oz/A	fenazaquin	7	12	H
23	Boxadon 360	2.1 to 3.4 fl oz/A	spirotetramat	1	24	L
23	Movento	4.0 to 5.0 fl oz/A	spirotetramat	1	24	L
23 + 7C	Senstar	8.0 to 10.0 fl oz/A	spirotetramat + pyriproxyfen	7	24	L
28	Exirel[1]	13.5 to 20.5 fl oz/A	cyantraniliprole	1	12	H
28	Verimark	6.75 to 13.5 fl oz	cyantraniliprole **- soil**	n/a	4	H
28 + 6	Minecto Pro*	10.0 fl oz/A	cyantraniliprole + abamectin	7	12	H

[1]Control may be improved by addition of an adjuvant.

"Worm" Pests, Including: Corn Earworms (CEW), Beet Armyworms (BAW), European Corn Borers (ECB), Yellow-Striped Armyworms, and Loopers

Several species of lepidopteran "worm" pests can attack beans. These pests feed on leaves and also attack pods. An action threshold of 30 larvae per 3 ft of row or about 20% defoliation is often used pre-pod. Once bean pods form, control measures are often needed weekly to protect the crop from direct damage or infestation of the pods. In processing snap beans, treat every 5-7 days if CEW catches in local blacklight traps average 20 or more per night and most corn in the area is mature. For lima beans, treat when CEW populations exceed 1 per 6 ft of row.

Note that CEW, BAW, and soybean looper populations have developed resistance to pyrethroids (Group 3A); use these insecticides with caution and rotate to other classes within a season. For BAW, there are resistance concerns for diamides (Group 28).

Apply one of the following formulations:						
Group	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s) and Crop Restrictions**	**PHI (d)**	**REI (h)**	**Bee TR**
1A	Lannate LV*	1.5 to 3 pt/A	methomyl	see label	48	H
1B	Orthene 97	0.5 to 1.0 lb/A	acephate **- lima beans only**	1	24	H
3A[1]	Pyrethroid insecticides registered for use on Beans: see table at the end of Insect Control.					
5	Blackhawk	2.2 to 3.3 oz/A	spinosad	3	4	M
5	Radiant SC	4.0 to 8.0 fl oz/A	spinetoram **- except yellow striped armyworm**	3	4	H
11A	DiPel DF, others (OMRI)	0.5 to 2.0 lb/A	*Bacillus thuringiensis kurstaki*	0	4	N
11A	XenTari (OMRI)	0.5 to 2.0 lb/A	*Bacillus thuringiensis aizawai*	0	4	N
15	Rimon 0.83EC	12.0 fl oz	novaluron **- young larvae only**	1	12	M
15 + 4A	Cormoran	12.0 fl oz/A	novaluron + acetamiprid	7	12	M
18	Intrepid 2F	10.0 to16.0 fl oz/A	methoxyfenozide	7	4	L
22	Avaunt eVo	3.5 to 6.0 oz/A	indoxacarb **- CEW, ECB only**	3	12	H
28[2]	Coragen 1.67SC Coragen eVo	3.0 to 7.5 fl oz/A 1.2 to 2.5 fl oz/A	chlorantraniliprole	1	4	L
28[2]	Exirel	10.0 to 20.5 fl oz/A	cyantraniliprole **- CEW, ECB only**	1	12	H
28[2]	Vantacor	1.7 to 2.5 fl oz/A	chlorantraniliprole - **soil**	1	4	L
28[2]	Vantacor	1.2 to 2.5 fl oz/A	chlorantraniliprole - **foliar**	1	4	L
28[2] + 6	Minecto Pro*	7.5 to 10.0 fl oz/A	cyantraniliprole + abamectin **- CEW, ECB only**	7	12	H

[1]Resistance concerns with CEW, BAW, and soybean looper. [2]Resistance concerns with BAW.

Group 3A Pyrethroid Insecticides Registered for Use on Beans

Apply one of the following formulations (check if the product label lists the insect you intend to spray; the label is the law):
Note: Group 3A insecticides <u>not</u> recommended for CEW, BAW or soybean looper due to resistance issues.

Product Name (*=Restricted Use)	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
Asana XL*	2.9 to 9.6 fl oz/A[1]	esfenvalerate - **snap beans only**	3	12	H
Brigade 2EC*, Brigade eVo*	1.6 to 6.4 fl oz/A	bifenthrin	3	12	H
Declare*	1.02 to 1.54 fl oz/A	gamma-cyhalothrin	7	24	H
Hero*	4.0 to 10.3 fl oz/A	zeta-cypermethrin + bifenthrin	3	12	H
Lambda-Cy 1EC*	1.92 to 3.84 fl oz/A[1]	lambda-cyhalothrin	7	24	H
Mustang Maxx*	4.0 fl oz/A[1]	zeta-cypermethrin	1	12	H
Warrior II*	0.96 to 1.92 fl oz/A[1]	lambda-cyhalothrin	7	24	H
Combo products containing a pyrethroid					
Besiege*	5.0 to 10.0 fl oz/A[1]	lambda-cyhalothrin + chlorantraniliprole (Group 28)	7	12	H
Brigadier*	3.8 to 5.6 fl oz/A	bifenthrin + imidacloprid (Group 4A) - **foliar only**	7	12	H
Elevest*	4.8 to 9.6 fl oz/A	bifenthrin + chlorantraniliprole (Group 28)	3	12	H
Ethos XB*	3.4 to 8.5 fl oz/A	bifenthrin + *Bacillus amyloliquefaciens* - **soil**	3	12	H
Ethos XB*	6.8 to 8.5 fl oz/A	bifenthrin + *Bacillus amyloliquefaciens* - **foliar**	3	12	H
Ridgeback*	3.4 to 13.8 fl oz/A	bifenthrin + sulfoxaflor (Group 4C)	7	24	H

Group 4A Neonicotinoid Insecticides Registered for Use on Beans					
Apply one of the following formulations (check if the product label lists the insect you intend to spray; the label is the law):					
Product Name (*=Restricted Use)	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
Admire Pro	7.0 to 10.5 fl oz/A	imidacloprid - **soil**	21	12	H
Admire Pro	1.2 fl oz/A	imidacloprid - **foliar**	7	12	H
Assail 30SG	2.5 to 5.3 oz/A	acetamiprid	7	12	M
Assail 30SC	2.1 to 4.5 fl oz/A	acetamiprid	7	12	M
Combo products containing a neonicotinoid					
Brigadier*	3.8 to 5.6 fl oz/A	imidacloprid + bifenthrin (Group 3A) **- foliar only**	7	12	H
Cormoran	9.0 to 12.0 fl oz/A	acetamiprid + novaluron (Group 15)	7	12	M

Disease Control

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

Nematodes

See also sections E 1.5. Soil Fumigation and E 1.6. Nematode Control. Use fumigants listed in the Pest Management chapter or Mocap 15G at 13 to 20 lb/A (0.9 to 1.4 lb/1000 linear feet of row) in a 12-in. band over the row. Do not use as an in-furrow treatment. A Special Local Needs Label 24(c) is available for use of Mocap EC (2.0 to 3.9 fl oz/1000 linear feet of row or 1.33 to 2.75 qt/A broadcast) on lima and snap beans in DE and MD. Velum can also be used at 3.0 to 6.0 fl oz in-furrow at-planting.

Taking soil samples in the fall for soybean cyst nematode (SCN) and root knot nematode determinations from fields to be planted the following season is highly recommended. Growers who rotate snap beans with soybeans should be alert for problems caused by SCN in infested fields. Snap beans are susceptible, where baby lima beans are resistant to SCN. Snap beans and lima beans are very susceptible to root knot nematode.

Seed Treatment

Use treated seed and avoid rough handling of seed as it greatly reduces germination.

IMPORTANT: Do not use treated seed for food or feed!						
Code	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI(d)**	**REI(h)**	**Bee TR**
For Rhizoctonia and Fusarium:						
12	Maxim 4FS	0.08 to 0.16 fl oz/100 lb seed	fludioxonil	AP	12	L
For Rhizoctonia:						
11	Dynasty	0.15 to 0.76 fl oz/100 lb seed	azoxystrobin	AP	4	N
For Pythium/Phytophthora:						
4	Apron XL	0.16 to 0.64 fl oz/100 lb seed	mefenoxam	AP	48	N
For Rhizoctonia, Fusarium, Pythium, and Phytophthora: (additional Apron XL may be needed under high pressure)						
4 + 12	Apron Maxx RFC	0.15 oz/100 lb seed	mefenoxam + fludioxonil	AP	48	N

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

Damping-off and root rots are caused by a complex of soilborne fungi including *Rhizoctonia*, *Pythium, Phytophthora,* and *Fusarium* spp. In the Mid-Atlantic region, the primary cause of root rot in beans are *Pythium* spp., which often cause extensive damage during periods of warm, wet, humid weather in July and August. On snap beans, *Pythium* spp. can also cause extensive pod rot.

Rotate beans with non-legume crops. Avoid fields with low lying areas, poorly drained soils, and minimize soil compaction. Plow under previous crop residue rather than disking. Select cultivars that set pods high in the plant, are more upright in architecture and use a close row spacing to help avoid pod contact with the soil surface.

Code	**Product Name (*=Restricted Use)**	**Product Rate**	**Active Ingredient(s)**	**PHI (d)**	**REI (h)**	**Bee TR**
Apply one of the following at-planting (see label for application methods and restrictions):						
Pythium root rot						
4	Ridomil Gold 4SL	0.5 to 1.0 pt/A	mefenoxam	AP	48	N

Damping-off caused by Phytophthora, Pythium, and Rhizoctonia - continued next page

Damping-off caused by Phytophthora, Pythium, and Rhizoctonia *- continued*

Pythium and Rhizoctonia root rot						
4 + 11	Uniform 3.72SC	0.34 fl oz/1000 ft row[1]	mefenoxam + azoxystrobin	AP	0	N
Rhizoctonia root rot						
7	Fontelis 1.67SC	1.2 to 1.6 fl oz/1000 ft row	penthiopyrad	AP	12	L
11	azoxystrobin 2.08F	0.4 to 0.8 fl oz/1000 ft row	azoxystrobin	AP	4	N

[1]Avoid direct seed contact, which may cause delayed emergence.

Bacterial and Fungal Diseases

Anthracnose (*Colletotrichum* sp.) and Web Blight (*Rhizoctonia* sp.)

Use western-grown, certified seed and rotate to allow 2 years between bean plantings.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations on a 7 to 14-day schedule and rotate between different fungicides:						
3 + 11	Quilt Xcel 2.2SE	10.5 to 14.0 fl oz/A	propiconazole + azoxystrobin	7	12	N
11	azoxystrobin 2.08F	6.2 to 15.5 fl oz/A	azoxystrobin	14	4	N
11	Headline 2.09EC	6.0 to 9.0 fl oz/A	pyraclostrobin	7/21	12	N
7 + 11	Priaxor 4.17SC	4.0 to 8.0 fl oz/A	fluxapyroxad + pyraclostrobin	7/21	12	N

Bacterial Blight

Use western-grown, certified seed. Apply copper as a preventative prior to the onset of disease and on a weekly basis under favorable conditions for disease development to help mitigate the spread of the pathogen. Avoid harvesting during wet conditions.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
When incidence is low, apply the following on a 7 to 10-day schedule:						
M01	copper (OMRI)[1]	at labeled rates	copper	0	48	N

[1]There are several OMRI listed copper-based products; see labels for specifics. Copper applications for bacterial disease management may also help suppress some fungal pathogens in organic production systems.

Bacterial Brown Spot

Use certified pathogen-free seed. Bacterial Brown Spot occurs primarily on lima beans and is more troublesome in irrigated fields and during wet seasons. Apply copper as a preventative prior to the onset of disease and on a weekly basis under favorable conditions for disease development to help mitigate the spread of the pathogen. Avoid harvesting during wet conditions.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
When incidence is low, apply the following on a 7to 10-day schedule:						
M01	copper (OMRI) [1]	at labeled rates	copper	0	48	N

[1] There are several OMRI listed copper-based products; see labels for specifics. Copper applications for bacterial disease control may help suppress some fungal pathogens in organic production systems.

Common Bean Rust (*Uromyces appendiculatus*) on Snap Bean

Rust is often a problem during late summer and early fall. Plant resistant cultivars whenever possible. For susceptible cultivars, start fungicide applications when the disease symptoms first appear.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations on a 7 to14-day schedule and rotate between fungicides with different modes of action:						
M05	chlorothalonil 6F	2.0 to 4.0 pt/A	chlorothalonil	14	12	M
3	Rally 40WSP	4.0 to 5.0 oz/A	myclobutanil	0	24	N
3	tebuconazole 3.6F	4.0 to 6.0 fl oz/A	tebuconazole	7	12	N
3 + 11	Quilt Xcel 2.2SE	10.5 to 14.0 fl oz/A	propiconazole + azoxystrobin	7	12	N
7	Fontelis 1.67SC	14.0 to 30.0 fl oz/A	penthiopyrad	0	12	L
11	Headline 2.09EC	6.0 to 9.0 fl oz/A	pyraclostrobin	7/21	12	N
11	azoxystrobin 2.08F	6.2 to 15.5 fl oz/A	azoxystrobin	0	4	N

Lima Bean Downy Mildew (*Phytophthora phaseoli*)

Races B, D, E, and F of the pathogen have been found in the Mid-Atlantic area over the past 15 years. **Race F has been the only race detected in Delaware since 2006.** Plant resistant varieties when possible (see varieties table above). Avoid excessive irrigation and poorly drained soils.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
When weather conditions are favorable for disease development, apply and rotate between the following fungicides with different modes of action:						
4 + M01	Ridomil Gold Copper 65WP	2.0 lb/A	mefenoxam + copper	3	48	N
11	Headline 2.09EC	6.0 to 9.0 fl oz/A	pyraclostrobin	7/21	12	N
21	Ranman 400SC	2.75 fl oz/A	cyazofamid	0	12	L
40	Forum 4.17SC (seed only)	6.0 fl oz/A	dimethomorph	0	12	N
If lima bean Downy mildew is observed in the field, apply one of the following:						
4 + M01	Ridomil Gold Copper 65WP	2.0 lb/A	mefenoxam + copper	3	48	N
P07	Phosphite	4.0 to 6.0 pt/A	phosphite	0	4	N

Lima Bean Pod Blight (*Phytophthora capsici*)

P. capsici has a very broad host range and can survive in the soil for several years. Avoid heavy irrigation and irrigating at night, especially after pod set. Avoid planting on poorly drained or compacted soils and in fields with rotations of cucurbits and peppers that are also hosts.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
When weather conditions are favorable for disease development, apply and rotate between the following fungicides with different modes of action:						
4 + M01	Ridomil Gold Copper 65WP	2.0 lb/A	mefenoxam + copper	3	48	N
28	Previcur Flex	1.2 to 2.0 pt/A	propamocarb hydrocloride	0.5	12	N
21	Ranman 400SC	2.75 fl oz/A	cyazofamid	0	12	L
29	Omega 500F[1,2]	8.0 fl oz/A	fluazinam	14/30	12	N
40	Forum 4.17SC	6.0 fl. oz/A	dimethomorph	0	12	N
43	Presidio 4SC	4 fl oz/A	fluopicolide	0	12	L
P07	Phosphite	4.0 to 6.0 pt/A	phosphite	0	4	N

[1]Applied for Downy mildew management may also control *P. capsici*. [2]Not labeled for aerial applications.

Pythium blight (Cottony leak)

Cottony leak can be a serious problem during prolonged periods of hot, humid, wet weather. Select cultivars with good plant architecture that keep the pods off the soil surface. Pods in contact with the soil surface are more prone to infection. Using a narrower row spacing may help keep plants more erect, and pods from contacting the soil. Select fields with good drainage and avoid planting in low-lying areas. Avoid overhead watering.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Apply one of the following formulations at disease onset and rotate between different modes of action:						
4 + M01	Ridomil Gold Copper 65WP	2.5 to 5.0 lb/A	mefenoxam + copper	3	48	N
21	Ranman 400SC	2.75 fl oz/A	cyazofamid	0	12	L
P07	Phosphite	4.0 to 6.0 pt/A	phosphite	0	4	N

Southern Blight *(Sclerotium rolfsii)*

Southern Blight can be a serious disease of snap and lima beans in the southern most areas of the region. The pathogen may survive in the soil for many years so avoid planting in fields with a known history of the pathogen. Disease development is favored by high temperatures and wet weather conditions. Rotations will not eliminate the pathogen, but rotations with corn, sorghum, small grains or grasses may help reduce disease severity. Avoid overhead irrigation. Apply the following in a preventative manner, especially in fields with a history of the disease.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
3	Tilt	4.0 fl oz/A	propiconazole	7	24	N
3 + 11	Quilt Xcel	10.5 to 14.0 fl/A	propiconazole + azoxystrobin	7	12	N
11	azoxystrobin 2.08F	15.5 fl oz/A	azoxystrobin	0	4	N

Tan Spot on Lima Bean (*Didymella americana*)

Tan Spot was recently confirmed on lima bean in DE and MD although its occurrence is sporadic. Lesions are tan and irregular in shape with reddish borders. The products listed below are labeled for use on the crop but do not specifically list Tan Spot as a target disease.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
3 + 11	Quilt Xcel 2.2SE	10.5 to 14.0 fl oz/A	propiconazole + azoxystrobin	7	12	N
7	Endura 70WG	6.0 oz/A	boscalid	7	12	--
7 + 3 + 11	Miravis Neo	13.7 fl oz/A	pydiflumetofen + propiconazole + azoxystrobin	14	12	N

White Mold (*Sclerotinia*) and Gray Mold (*Botrytis*)

White Mold is caused by *Sclerotinia* which has a broad host range and can persist in the soil for over 5 years. Avoid poorly drained soils and excessive overhead irrigation, especially preceding and during flowering. Rotation to non-hosts (such as corn or small grains) for at least 3 years may help reduce disease levels but will not completely eliminate the pathogen. Always harvest infested fields **after** non-infested fields to help minimize potential spread.

Code	Product Name (*=Restricted Use)	Product Rate	Active Ingredient(s)	PHI (d)	REI (h)	Bee TR
Pre-plant: For White Mold only. Apply 3-4 months prior to disease onset to allow the active agent to reduce levels of sclerotia in the soil. Incorporate 1-2 in. deep but **do not plow before seeding** to avoid spreading of untreated sclerotia from lower to upper soil layers.						
44	Contans 5.3WG (OMRI)	1.0 to 4.0 lb/A	*Coniothyrium minitans*	--	--	N
Post seeding: Close spacing of snap beans may increase the potential for White Mold. **Fungicide sprays are needed *only* when the soil has been wet for 6-10 days before or during bloom.** This causes sclerotia to germinate and eject spores. For snap beans, a fungicide should be applied at 10-20% bloom. A second spray should be made 7-10 days after the first spray if the soil remains wet and blossoms are still present. Check labels for details on fungicide timing. For lima beans, later fungicide applications have been beneficial if favorable environmental conditions persist. **Apply one of the following:**						
1	Topsin M WSB	1.5 to 2.0 lb/A	thiophanate-methyl	14	24	N
2	iprodione 4F	1.5 to 2.0 pt/A	iprodione	see label	24	N
7	Endura 70WG	8.0 to 11.0 oz/A	boscalid	7	12	--
7	Fontelis 1.67SC	16.0 to 30.0 fl oz/A	penthiopyrad	0	12	L
7 + 11	Priaxor 4.17SC	4.0 to 8.0 fl oz/A	fluxapyroxad + pyraclostrobin	7	12	N
7 + 11 + 3	Miravis Neo	13.7 fl oz/A	pydiflumetofen + azoxystrobin + prothioconazole	14	12	N
7 + 12	Miravis Prime	10.3 to 13.4 fl oz/A	pydiflumetofen + fludioxonil	14	12	--
9 + 12	Switch 62.5WG	11.0 to 14.0 oz/A	cyprodinil + fludioxonil	7	12	L
12	Cannonball WG	7 oz/A	fludioxonil	7	12	L
29	Omega 500F	8.0 fl oz /A	fluazinam	14/30	12	N