

# Corn Herbicide Rotation Restrictions

This is rotational restriction information for corn herbicides. The products are listed alphabetically by **Trade Names**, with the **Number of Months** you must wait to plant different vegetables after applying that herbicide.

AT=anytime herbicide labeled for the crop or no rotation restriction exists

FB= field bioassay required before planting the crop

NNY= not next year, the crop cannot be planted the following year

NY=the crop can be planted the year after application

V=variable, intervals vary by crop variety or other conditions specified on label

\*Transplanted tomatoes only

Trade Names	Number of Months						
	Tomato	Pea	Snap Bean	Sweet Corn	Cucurbits	Potato	Cole Crops
Aatrex and others	NNY	NNY	NNY	AT	NNY	NNY	NNY
Accent, soil pH < 6.5	10	10	10	10	10	10	10
Accent, soil pH > 6.5	18	18	18	18	18	18	18
Acuron	18	18	18	AT	18	18	18
Aim	AT	AT	AT	AT	V	V	12
Anthem, Anthem ATZ	18	11	11	AT	18	4	18
Balance Pro	18V	18V	18V	6	18V	6	18V
Basis	1	10	10	10	18	AT	18
Beacon	18	8	8-18	8	18	8-18	18
Bicep II Magnum	NNY	NNY	NNY	AT	NNY	NNY	NNY
Callisto	18	18	18	AT	18	18	18
Camix	18	18	18	AT	18	18	18
Celebrity Plus	10-18V	10	10	10-15V	10-18V	10-18V	10-18V
Corvus	17-24V	17-24V	17-24V	9-17V	17-24V	17-24V	17-24V
Define	12	12	12	AT	12	1	4-12V
Harness Xtra	NNY	NNY	NNY	AT	NNY	NNY	NNY
Hornet	26	10.5-18V	10.5-18V	10.5-18V	26	18	26
Impact	18	9-18V	9-18V	AT	18	9	18
Lariat, Bullet	NNY	NNY	NNY	AT	NNY	NNY	NNY
Laudis	10	10	10	AT	18	10	18
Leadoff	1	10	10	10	10-18	1	18
Lightning	40	9.5	9.5	18	40	26	40
Lumax, Lexar	18	18	18	AT	18	18	18
Marksman	NNY	NNY	NNY	NY	NNY	NNY	NNY
Northstar	18	8	8	8	18	8	18
Permit	2-8*	9	2-9	3	2-9	9	15-18
Prequel	18	18	10-18V	10	18	6	18
Princep	NNY	NNY	NNY	AT	NNY	NNY	NNY
Resolve DF, Resolve Q	1-1.5	10	10	10	18	18	18
Revulin Q	18	18	18	10-15V	18	18	18
Spirit	10-18V	10V	10V	8V	18	18	18
Steadfast	10-18V	10	10	10-15V	10-18V	10-18V	10-18V
Stinger	18	18	18	AT	18	18	AT
Surestart	26+FB	NY	26+FB	10.5-18V	26+FB	40+FB	26+FB
Surpass, TopNotch, FulTime	NNY	NNY	NNY	NY	NNY	NNY	NNY
Zidua	18	4-11	11	0	18	4	18

## Soybean Herbicide Rotation Restrictions

This is rotational restriction information for soybean herbicides. The products are listed alphabetically by **Trade Name**, with the **Number of Months** you must wait to plant different vegetables after applying that herbicide.

AT=anytime herbicide labeled for the crop or no rotation restriction exists

FB= field bioassay required before planting the crop

NNY= not next year, the crop cannot be planted the following year

NY=the crop can be planted the year after application

V=variable, intervals vary by crop variety or other conditions specified on label

\*Transplanted tomatoes only

\*\*In Indiana only, 18m for transplanted tomatoes and peppers, cabbage, melons, and cucumbers

Trade Names	Number of Months						
	Tomato	Pea	Snap Bean	Sweet Corn	Cucurbits	Potato	Cole Crops
Authority Assist	30+FB	10	10	18	30+FB	26	18-40V
Authority First, Sonic	30+FB	9-12-30+FB,V	30+FB	18	30+FB	18	30+FB
Boundary	12	8	12	4	12	0	12
Canopy, Canopy EX	9-10*	9-12	9-12	18	18-30V	18-30	18-30V
Classic	10*	12	12	18	18-30	30	30
Command	9	AT	9	9	AT	9	V
Envive	12*	12	12	18	18-30V	18-30V	18-30V
Extreme	18-40+FB,V	18-40+FB,V	18-40+FB,V	18-40+FB,V	18-40+FB,V	26	18-40+FB,V
FirstRate	18	9	9	18	18	18	18
Flexstar	10*	4	0	10	10-12	0	18
Optill	40+FB	4	4	18	40+FB	26	40+FB
Prefix	10	10	0	10	18	1	18
Pursuit**	40+FB	AT	2	18	40+FB	26	40+FB
Python	26	4	4	10.5-18V	26	12	26
Raptor	9	AT	AT	9	9	9	V
Reflex	10*	4	0	10	10-12	0	18
Scepter	18	18	11	18	18	18	18
Sencor	4	8	18	4	18	12	18
Spartan	AT*	12	12	18	12	12	12V
Synchrony XP	9*	9-12	9-12	18	18-30	18	18-30
Valor	12+FB	3-12+FB	3-12+FB	3-12+FB4	12+FB	12+FB	12+FB
Valor XLT	12	12	12	18	18	18	18
Xtendimax	30-180V	30-180V	30-180V	30-180V	30-180V	30-180V	30-180V

# Legumes – Horticulture

Major update by Ben Phillips, Liz Maynard – Oct 2020  
Reviewed by Liz Maynard – Aug 2021

## Crop Description

**Fresh or Snap Bean** (*Phaseolus vulgaris*): These are edible podded beans that are usually green (green beans) or yellow (wax beans), but they also come in red and purple podded varieties as well. They are harvested while pods and seeds are still tender. Older varieties (string beans) had a fibrous “string” the length of the pod that was removed during preparation for eating. Flat-podded Romano beans are also harvested while pods and seeds are tender. Within this category are “vining”, “pole”, or “runner” beans that need trellising, and “bush” beans that are short and sturdy.

**Dry Bean** (*Phaseolus vulgaris*): Dry bean refers to a wide variety of beans harvested after the seeds are mature and pods have dried down. Kidney, navy, black turtle, white, and pinto beans are examples. Within this category are “vining”, “pole”, or “runner” beans that need trellising, and “bush” beans that are short and sturdy.

**Lima Bean** (*Phaseolus lunatus*): Lima beans represent a different species than fresh beans and dry beans. They can be harvested when completely dry (like dry beans) or as “baby limas” before the seed has matured (similar to the southern pea described below). Some lima bean varieties will readily climb a trellis, but other varieties are more bush-like.

**Fresh Pea** (*Pisum sativum*): These peas are cool-season crops grown for their immature edible seeds or pods. Snow peas have flattened, tender, edible pods and seeds. Snap peas have edible pods and plump seeds. Shell peas have pods that are too tough to eat and the peas must be removed for eating. Some pea varieties will readily climb a trellis, but other varieties have a sprawling bush-like architecture.

**Dry Pea** (*Pisum sativum*): These peas are cool-season crops grown for their mature edible seeds, like dry beans. Dry pea varieties are bush-like to facilitate machine harvest.

**Southern Pea, Cowpea** (*Vigna unguiculata*): These peas are heat-loving crops more commonly grown in southern states, though they can be grown in the north. They include black-eyed peas, cream peas and crowder peas. They are grown for their immature and dried shelled seeds, and are well-accepted in markets where customers are familiar with them. Southern peas have a sprawling bush-like architecture.

## Planting and Spacing

### Fresh or Snap Bean, Dry Bean, Lima Bean, Southern Pea:

Rows 18 to 36 inches apart, 5 to 7 seeds per foot of row for bush types (70 to 100 pounds per acre), or 2 to 3 seeds per foot of row for vining types (35 to 50 pounds per acre). Larger inter-row spacing helps limit white mold development. These warm-season vegetables should be sown after soil temperatures average 60° F and frost danger is past. Sequential plantings of bush snap beans are possible. Vining types will readily climb a trellis of horticultural netting up to 8 feet tall without much training.

**Fresh Pea and Dry Pea:** Rows 32 to 36 inches apart, 6 to 8 seeds per foot of row for bush types (100 to 150 pounds per acre), or 3 to 4 seeds per foot of rows for vining types (50 to 75 pounds per acre). These cool-season vegetables should be sown in early spring for a spring crop or in mid to late summer for a fall crop. Plants deteriorate quickly in the heat of summer. Vining types will readily climb a trellis of horticultural netting up to 5 feet tall without much training.

## Fertilizing

**pH:** Maintain a soil pH of 6.0 to 6.5.

Before planting, apply 20 to 40 pounds N per acre for peas and 30 to 60 pounds N per acre for beans, 0 to 100 pounds P<sub>2</sub>O<sub>5</sub> per acre, and 0 to 100 pounds K<sub>2</sub>O per acre based on soil test results and recommendations from your state. Or apply some or all of that amount at planting in bands at least 2 inches below and 2 inches to the side of the row, except the rate of K<sub>2</sub>O should not exceed 40 pounds per acre when applied this way because peas and beans are sensitive to injury from fertilizer salts. Reduce the preplant fertilizer by the amount applied in bands at planting.

Beans are prone to zinc and manganese deficiency when pH is over 6.5. Include up to 1 pound of zinc per acre and 2 pounds of manganese per acre in the banded planting time fertilizer. If banding is not possible zinc may be broadcast up to 10 pounds of zinc per acre. Broadcasting manganese is not recommended. Foliar sprays of 0.5 pounds zinc per acre or 1 to 2 pounds manganese per acre can be used if needed.

Sidedressing is not needed for legume crops. Reduce the amount of fertilizer N applied by the value of N credits from green manures, legume crops grown in the previous year, compost and animal manures, and soils with more than 3 percent organic matter. The total amount of N from fertilizer (including starter) and other credits should be 40 to 60 pounds per acre.

## Harvesting

**Fresh or Snap Beans and Fresh Peas:** Harvests can take place every few days once plants start producing pods that are of the desirable size. More picking generates more flowers and more pods later. Bush-type beans are commonly machine harvested and sorted with a once-over pass. Time from seeding to harvest ranges from 50 to 60 days for beans, or 60-70 days for peas.

**Dry Peas and Dry Beans:** Harvests can take place as once-over harvests when pods are dry. Machine harvests should take place before noon when plants are slightly damp to avoid pod shatter. Time from seeding to harvest ranges from 70 to 120 days for beans, or 80 to 100 days for peas.

**Southern Peas and Lima Beans:** Target harvests for fresh products when the seeds are succulent, and the pods are juicy. When the first beans are ready plants can be hand harvested for fresh product about once per week. A once-over harvest is used for dry seeds. Time from seeding to fresh harvest ranges from 60 to 70 days for southern peas, or 60 to 90 days for lima beans. For dried seeds, time from seeding to harvest can be over 100 days.

## Legumes – Diseases

Reviewed by Dan Egel – Sept 2021

### Recommended Controls

#### Anthracnose of Legumes - Colletotrichum Fungus

##### Non-Pesticide

*Beans (Dry), Southern Peas/Cowpeas* | Use disease-free seed. Rotate to non-host crops for 3 years. Varieties with partial resistance are available, depending on the race of the pathogen. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

##### Pesticide

**Approach (2.08SC) (picoxystrobin)** *Beans (Dry), Peas (Dry)* | 6-12 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 11.

**Aprovia Top (difenoconazole, benzovindiflupyr)** *Beans (Dry), Peas (Dry)* | 10.5-11 fl. oz. per acre. A spreader sticker is recommended. REI: 12-hour. PHI: 14-day. FRAC 03, FRAC 07.

**azoxystrobin products (azoxystrobin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Rates depend on formulation and product. Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-9.7 fl. oz. per acre. REI: 4-hour. PHI: 0-day for fresh legumes, 14-day for dry legumes. FRAC 11.

**chlorothalonil products (chlorothalonil)** *Beans (Dry), Beans (Fresh), Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 7-day for fresh legumes, 14-day for dry legumes. FRAC M05.

**Fontelis (1.67SC) (penthiopyrad)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 14-30 fl. oz. per acre. Rates above 20 fl. oz. per acre are for fresh legumes only. REI: 12-hour. PHI: 0-day for fresh legumes, 21-day for dry legumes. FRAC 07.

**Headline (SC) (2.08) (pyraclostrobin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 6-9 fl. oz. per acre. REI: 12-hour. PHI: 7-day for fresh. 21-days for dry. FRAC 11.

**Priaxor (fluxapyroxad, pyraclostrobin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 4-8 fl. oz. per acre. REI: 12-hour. PHI: 7-day for fresh legumes, 21-day for dry legumes. FRAC 07, FRAC 11.

**propiconazole products (propiconazole)** *Beans (Dry), Beans (Fresh), Lima Beans, Southern Peas/Cowpeas* | 4 fl. oz. per acre. PropiMax EC and Tilt are labeled. REI: 12-hour. PHI: 7-day for fresh legumes. FRAC 03.

**Quadris Opti (SC) (azoxystrobin, chlorothalonil)** *Beans (Dry)* | 1.6-2.4 pts. per acre. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC M05.

**Quadris Top (SC) (azoxystrobin, difenoconazole)** *Beans (Dry), Peas (Dry)* | 12-14 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC 03.

**Quilt (SE) (azoxystrobin, propiconazole)** *Beans (Dry), Beans (Fresh), Southern Peas/Cowpeas* | 14 fl. oz. per acre. REI: 12-hour. PHI: 7-day for fresh legumes, 14-day for dry legumes. FRAC 11, FRAC 03.

**Topsin 4.5FL (thiophanate-methyl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Rates depend on formulation and product. Use 4FL formulation or Cercobin at 20-40 fl. oz. per acre, or 70WSB formulation at 1-2 lb. per acre. REI: 24-hour to 3-day. PHI: 14-day for fresh legumes, 28-day for dry legumes. FRAC 01.

**Vertisan (1.67EC) (penthiopyrad)** *Beans (Dry), Southern Peas/Cowpeas* | 14-20 fl. oz. per acre. REI: 12-hour. PHI: 21-day. FRAC 07.

## Common Bacterial Blight of Beans - Xanthomonas Bacteria

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Plant western-grown, certified disease-free seed. Rotate to non-host crops for 2 years. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

### Pesticide

**copper products (copper hydroxide, copper octanoate, copper oxychloride, copper sulfate, copper diammonium diacetate complex, cuprous oxide)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Several formulations of copper (Badge, Champ, Kocide) are labelled for use and may slow the spread of bacterial blights. See label for directions. REI: 4 to 48-hour. PHI: 0-day. FRAC M01. *OMRI-listed.*

## Damping-Off Seed and Seedling Rots of Multiple Crops - Multiple Pathogens

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Plant western-grown, certified disease-free seed. Avoid planting in prolonged wet conditions.

### Pesticide

**Ridomil Gold SL (4SC) (mefenoxam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.5-1.0 pt. per acre. Apply at planting if Pythium is a significant problem. Other formulations include MetaStar, Subdue Maxx, Ultra Flourish, and Xyler. Rates vary by formulation. REI: 48-hour. FRAC 04.

**Seed treatments for diseases (mefenoxam, fludioxonil, azoxystrobin, thiabendazole, difenoconazole, prothioconazole, sedaxane, penflufen)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Purchase seed commercially treated with a product such as Apron Maxx, Captan or Thiram. FRAC 04, FRAC 12, FRAC 11, FRAC 01, FRAC 03, FRAC 07.

## Gray Mold of Multiple Crops - Botrytis Fungus

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Southern Peas/Cowpeas* | Avoid fields with a history of the problem. Rotate to a non-broadleaf crop, such as grass grains or sweet corn for >6 years. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

### Pesticide

**Cannonball WG (50) (fludioxonil)** *Beans (Dry), Beans (Fresh), Southern Peas/Cowpeas* | 7 oz. per acre. Do not exceed 28 oz. per year. REI: 12-hour. PHI: 7-day. FRAC 12.

**chlorothalonil products (chlorothalonil)** *Beans (Dry), Beans (Fresh), Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 7-day for fresh legumes, 14-day for dry legumes. FRAC M05.

**Endura (WG) (boscalid)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 8-11 oz. per acre. REI: 12-hour. PHI: 7-day for fresh legumes, 21-day for dry legumes. FRAC 07.

**Fontelis (1.67SC) (penthiopyrad)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 14-30 fl. oz. per acre. Rates above 20 fl. oz. per acre are for fresh legumes only. REI: 12-hour. PHI: 0-day for fresh legumes, 21-day for dry legumes. FRAC 07.

**iprodione products (iprodione)** *Beans (Dry), Beans (Fresh), Lima Beans* | 1.5-2 pts. per acre. Formulations of iprodione include Nevado and Rovral. Make up to two applications starting at first flower, and ending no later than peak bloom. REI: 24-hour. FRAC 02.

**Omega 500F (4.17) (fluazinam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 8-13.6 fl. oz. per acre. Do not exceed 27.2 fl. oz. per crop cycle. REI: 12-hour. PHI: 14-day for fresh legumes, 30-day for dry legumes. FRAC 29.

**Switch 62.5WG (cyprodinil, fludioxonil)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 11-14 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 09, FRAC 12.

**Topsin 4.5FL (thiophanate-methyl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Rates depend on formulation and product. Use 4FL formulation or Cercobin at 20-40 fl. oz. per acre, or

70WSB formulation at 1-2 lb. per acre. REI: 24-hour to 3-day. PHI: 14-day for fresh legumes, 28-day for dry legumes. FRAC 01.

## Halo Blight of Beans - Pseudomonas Bacteria

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Plant western-grown, certified disease-free seed. Rotate to non-host crops for 2 years. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

### Pesticide

**copper products (copper hydroxide, copper octanoate, copper oxychloride, copper sulfate, copper diammonium diacetate complex, cuprous oxide)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Several formulations of copper (Badge, Champ, Kocide) are labeled for use and may slow the spread of bacterial blights. See label for directions. REI: 4 to 48-hour. PHI: 0-day. FRAC M01. *OMRI-listed.*

## Nematodes

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Lima Beans, Southern Peas/Cowpeas* | Collect soil samples for nematodes in the fall and avoid fields with high numbers. Rotate to a non-broadleaf crop, such as grass grains or sweet corn for >3 years. Rotation interval depends on the nematode count in soil samples. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue and displace nematodes is an important method to prevent nematode build-up.

## Rust of Legumes - Uromyces Fungus

### Non-Pesticide

*Beans (Dry), Southern Peas/Cowpeas* | Rotate to non-host crops for 3-4 years. Resistant varieties are available,

### Pesticide

**Approach (2.08SC) (picoxystrobin)** *Beans (Dry), Peas (Dry)* | 6-12 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 11.

**Aprovia Top (difenoconazole, benzovindiflupyr)** *Beans (Dry), Peas (Dry)* | 10.5-11 fl. oz. per acre. A spreader sticker

is recommended. REI: 12-hour. PHI: 14-day. FRAC 03, FRAC 07.

**azoxystrobin products (azoxystrobin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Rates depend on formulation and product. Use 2 lb. a.i. per gallon formulations (Quadris) at 6.0-15.5 fl. oz. per acre. Use 3.3 lb. per gallon formulations (Azteroid) at 3.9-9.7 fl. oz. per acre. REI: 4-hour. PHI: 0-day for fresh legumes, 14-day for dry legumes. FRAC 11.

**chlorothalonil products (chlorothalonil)** *Beans (Dry), Beans (Fresh), Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See label for directions. REI: 12-hour. PHI: 7-day for fresh legumes, 14-day for dry legumes. FRAC M05.

**Fontelis (1.67SC) (penthiopyrad)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 14-30 fl. oz. per acre. Rates above 20 fl. oz. per acre are for fresh legumes only. REI: 12-hour. PHI: 0-day for fresh legumes, 21-day for dry legumes. FRAC 07.

**Headline (SC) (2.08) (pyraclostrobin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 6-9 fl. oz. per acre. REI: 12-hour. PHI: 7-day for fresh. 21-days for dry. FRAC 11.

**Priaxor (fluxapyroxad, pyraclostrobin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 4-8 fl. oz. per acre. REI: 12-hour. PHI: 7-day for fresh legumes, 21-day for dry legumes. FRAC 07, FRAC 11.

**Proline 480SC (4) (prothioconazole)** *Beans (Dry), Southern Peas/Cowpeas* | 5.7 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 03.

**propiconazole products (propiconazole)** *Beans (Dry), Beans (Fresh), Lima Beans, Southern Peas/Cowpeas* | 4 fl. oz. per acre. PropiMax EC and Tilt are labeled. REI: 12-hour. PHI: 7-day for fresh legumes. FRAC 03.

**Quadris Opti (SC) (azoxystrobin, chlorothalonil)** *Beans (Dry)* | 1.6-2.4 pts. per acre. REI: 12-hour. PHI: 14-day. FRAC 11, FRAC M05.

**Quilt (SE) (azoxystrobin, propiconazole)** *Beans (Dry), Beans (Fresh), Southern Peas/Cowpeas* | 14 fl. oz. per acre. REI: 12-hour. PHI: 7-day for fresh legumes, 14-day for dry legumes. FRAC 11, FRAC 03.

**Rally 40WSP (myclobutanil)** *Beans (Fresh)* | 4-5 fl. oz. per acre. Snap beans only. REI: 24-hour. PHI: 0-day. FRAC 03.

**Vertisan (1.67EC) (penthioopyrad)** *Beans (Dry), Southern Peas/Cowpeas* | 14-20 fl. oz. per acre. REI: 12-hour. PHI: 21-day. FRAC 07.

## Viruses of Multiple Crops - Multiple Pathogens

Bean Yellow Mosaic Virus (BYMV) overwinters in wild legumes, like sweet clover, and is spread by aphids.

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Lima Beans* | For **BYMV**: Keep new plantings as far as possible with the previous production area. Eliminating overwintering host plants such as wild sweet clover may reduce infection. Monitor for aphids and avoid broad-spectrum insecticides that might kill natural enemies and flare aphid populations. Some tolerant varieties are available. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up and transfer back to overwintering wild legumes.

### Pesticide

**Insecticides** *Beans (Dry), Beans (Fresh), Lima Beans* | For **BYMV**: use aphid-specific insecticides to lower the population without also reducing the population of natural enemies. See insect section.

## White Mold (Timber Rot, Drop, Stem Rot) of Multiple Crops - Sclerotinia Fungus

This soil pathogen is long-lived in the soil, and has a wide host range on broadleaved crops and weeds, including beans, vine crops, lettuce, tomatoes, peppers, and cole crops. It goes by other names in other crops, such as Drop, White Mold, Stem Rot, and Timber Rot.

It is more commonly where humidity and temperatures are high. The fungus often infects flowers, which then drop off and infect the stems that they land on. The stems take on a woody appearance and can split open. Inspection of the stems will reveal small black pellets that are the overwintering body of the pathogen.

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Southern Peas/Cowpeas* | Avoid fields with a history of the problem. Rotate to a non-broadleaf crop, such as grass grains or sweet corn for >6 years. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

### Pesticide

**Approach (2.08SC) (picoxystrobin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 8-12 fl. oz. per acre. REI: 12-hour. PHI: 14-day. FRAC 11.

**Cannonball WG (50) (fludioxonil)** *Beans (Dry), Beans (Fresh), Southern Peas/Cowpeas* | 7 oz. per acre. Do not exceed 28 oz. per year. REI: 12-hour. PHI: 7-day. FRAC 12.

**Contans WG (5) (Coniothyrium minitans strain CON/M/91-08)** *Beans (Fresh)* | 1-6 lbs. per acre. Apply immediately after harvest or 3-4 months before planting. REI: 4-hour. PHI: 7-day. FRAC NC. *OMRI-listed*.

**Endura (WG) (boscalid)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 8-11 oz. per acre. REI: 12-hour. PHI: 7-day for fresh legumes, 21-day for dry legumes. FRAC 07.

**Fontelis (1.67SC) (penthioopyrad)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 16-30 fl. oz. per acre. Rates above 20 fl. oz. per acre for fresh legumes only. REI: 12-hour. PHI: 0-day for fresh legumes, 21-day for dry legumes. FRAC 07.

**iprodone products (iprodone)** *Beans (Dry), Beans (Fresh), Lima Beans* | 1.5-2 pts. per acre. Formulations of iprodione include Nevado and Rovral. Make up to two applications starting at first flower, and ending no later than peak bloom. REI: 24-hour. FRAC 02.

**Omega 500F (4.17) (fluazinam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 8-13.6 fl. oz. per acre. Do not exceed 27.2 fl. oz. per crop cycle. REI: 12-hour. PHI: 14-day for fresh legumes, 30-day for dry legumes. FRAC 29.

**Proline 480SC (4) (prothioconazole)** *Beans (Dry), Southern Peas/Cowpeas* | 5.7 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 03.

**Switch 62.5WG (cyprodinil, fludioxonil)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 11-14 fl. oz. per acre. REI: 12-hour. PHI: 7-day. FRAC 09, FRAC 12.

**Topsin 4.5FL (thiophanate-methyl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Rates depend on formulation and product. Use 4FL formulation or Cercobin at 20-40 fl. oz. per acre, or 70WSB formulation at 1-2 lb. per acre. REI: 24-hour to 3-day. PHI: 14-day for fresh legumes, 28-day for dry legumes. FRAC 01.

**Vertisan (1.67EC) (penthioopyrad)** *Beans (Dry), Southern Peas/Cowpeas* | 16-20 fl. oz. per acre. REI: 12-hour. PHI: 21-day. FRAC 07.

## Wilt of Multiple Crops - Fusarium Fungus

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Avoid fields with a history of the disease. Rotate to non-Legume crops for >6 years. Resistant varieties are available. Prompt destruction of the finished crop with tillage to rapidly breakdown tissue is an important method to prevent disease build-up.

## Legumes – Insects

Reviewed by Laura Ingwell, Kacie Athey – Sept 2021

### Recommended Controls

#### Aphids

#### Pesticide

**Admire Pro (4.6SC) (imidacloprid)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 7-10.5 fl. oz. per acre soil application, or 1.2 fl. oz. per acre foliar application. Do not exceed 1 soil application per season or 3 foliar applications per season. REI: 12-hour. PHI: 21-day for soil application, or 7-day for foliar application. IRAC 04A.

**Asana XL (0.66EC) (esfenvalerate)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 5.8-9.6 fl. oz. per acre. Do not exceed 38.4 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 03A. RUP.

**Assail 30SG (acetamiprid)** *Beans (Fresh), Lima Beans, Peas (Fresh), Southern Peas/Cowpeas* | Use 30SG formulations at 2.5-5.3 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 1.0-2.3 oz. per acre and do not exceed 6.9 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 04A.

**Brigade 2EC (bifenthrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 12.8 fl. oz. per acre per season for fresh beans and fresh or dried peas or 19.2 fl. oz. per acre per season on dried beans. Use 10DF, 10WP, or 10WSB formulations at 5.3-16 oz. per acre on fresh beans and peas only and do not exceed 32 oz. per acre per season. Allow 7 days between applications

on fresh beans and peas, and 7 days between applications on dry beans and peas. REI: 12-hour. PHI: 3-day for fresh legumes, or 14-day for dry legumes. IRAC 03A. RUP.

**Cruiser 5FS (thiamethoxam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28 fl. oz. per 100 lbs. of seed. Do not apply a neonicotinoid insecticide within 45-days of planting when using seeds treated with a neonicotinoid insecticide. REI: 12-hour. IRAC 04A.

**Dimethoate 4EC (dimethoate)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry)* | Use 2.67EC formulations at 0.5-1.0 pts. per acre on beans and do not exceed 2 pts. per acre per season on beans. Not for use on cowpeas/southern peas. Do not feed or graze livestock on treated plants. See pollinator precautions. Mechanical harvest only on day of application. REI: 48-hour. PHI: 0-day. IRAC 01B.

**Lannate LV (2.4L) (methomyl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.5-3 pts. per acre. Do not exceed 15 pts. per acre per season. Do not feed or graze livestock on treated plants within 7 days of application for succulent legumes, or 14 days of application for dry legumes. REI: 48-hour. PHI: 1-day at rates less than 1.5 pts. per acre, or 3-day for rates over 1.5 pts. per acre on fresh legumes, or 14-day for any rate on dry legumes. IRAC 01A. RUP.

**M-Pede (3.8) (potassium salts of fatty acids)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1-2% by volume. Must contact pest to be effective. To achieve enhanced and residual pest control mix with a labeled companion insecticide. REI: 12-hour. PHI: 0-day. IRAC UN, FRAC NC. OMRI-listed.

**Movento (2SC) (spirotetramat)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.0-5.0 fl. oz. per acre. Do not exceed 5 fl. oz. per acre per season. REI: 24-hour. PHI: 1-day for fresh legumes, or 7-day for dry legumes. IRAC 23.

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.2 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. RUP.

**Orthene 97 (S) (acephate)** *Beans (Dry), Lima Beans* | 8-16 oz. per acre. Do not exceed 34 oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 1-day for fresh Lima Beans, or 14-day for dry legumes. IRAC 01B.

**Sivanto 200 (1.67SL) (flupyradifurone)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 7-14 fl. oz. per acre. Do not exceed 28 fl. oz.



per acre per season. Allow 10 days between applications.  
REI: 4-hour. PHI: 7-day. IRAC 04D.

**Thimet 20G (phorate)** *Beans (Dry), Beans (Fresh), Lima Beans* | 4.5-7.0 oz. per 1,000 ft. of row. Drill granules to the side of the seed or in a band over the row and lightly incorporate with a drag chain. Granules must be incorporated into the soil. Do not place granules in direct contact with seed. Do not feed or graze livestock on treated plants. REI: 48-hour. PHI: 60-day. IRAC 01B. *RUP.*

**Transform WG (50) (sulfoxaflor)** *Beans (Dry), Beans (Fresh), Lima Beans* | 0.75-1.0 oz. per acre. Do not make applications less than 14 days apart or consecutively on the same crop. No more than four applications per crop. Maximum of 8.5 oz. per acre per year. REI: 24-hour. PHI: 7-day. IRAC 04C.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP.*

## Bean Leaf Beetle

Treatment for Bean Leaf Beetle is warranted at a threshold of 1 beetle per foot of row.

### Pesticide

**Baythroid XL (1EC) (beta-cyfluthrin)** *Beans (Dry), Peas (Dry)* | 2.4-3.2 fl. oz. per acre. Do not exceed 10.5 fl. oz. per acre per season. Allow 14 days between applications for dry legumes and 5 days for succulent cowpeas/southern peas. Do not feed or graze livestock on treated plants. REI: 12-hour. IRAC 03A. *RUP.*

**Brigade 2EC (bifenthrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 12.8 fl. oz. per acre per season for fresh beans and fresh or dried peas or 19.2 fl. oz. per acre per season on dried beans. Use 10DF, 10WP, or 10WSB formulations at 5.3.0-16 oz. per acre on fresh beans and peas only and do not exceed 32 oz. per acre per season. Allow 7 days between applications on fresh beans and peas, and 7 days between applications on dry beans and peas. REI: 12-hour. PHI: 3-day for fresh legumes, or 14-day for dry legumes. IRAC 03A. *RUP.*

**Cruiser 5FS (thiamethoxam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28 fl. oz. per 100 lbs. of seed. Do not apply a neonicotinoid insecticide within 45-days of planting when using seeds treated with a neonicotinoid insecticide. REI: 12-hour. IRAC 04A.

**Dimethoate 4EC (dimethoate)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry)* | Use 2.67EC formulations at 0.5-1.0 pts. per acre on beans and do not exceed 2 pts. per acre per season on beans. Not for use on cowpeas/southern peas. Do not feed or graze livestock on treated plants. See pollinator precautions. Mechanical harvest only on day of application. REI: 48-hour. PHI: 0-day. IRAC 01B.

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.2 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP.*

**Orthene 97 (S) (acephate)** *Beans (Dry), Lima Beans* | 8-16 oz. per acre. Do not exceed 34 oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 1-day for fresh Lima Beans, or 14-day for dry legumes. IRAC 01B.

**Sevin XLR Plus (4SC) (carbaryl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.5-1.0 qts. per acre. Do not exceed 6 qts. per acre per season. Do not use on shelled succulent peas and beans. Edible-pod succulent and dried shelled beans and peas only. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 01A.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP.*

## Caterpillars

There are many caterpillar pests of legumes, including European corn borer, corn earworm/tomato fruitworm, alfalfa caterpillars, cutworms, loopers, and armyworms. Always check the label for the specific list of caterpillars that the product can be used on.

### Pesticide

**Asana XL (0.66EC) (esfenvalerate)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 5.8-9.6 fl. oz. per acre. For armyworms, corn borers, cutworms, earworms, and loopers. Do not exceed 38.4 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 03A. *RUP.*

**Baythroid XL (1EC) (beta-cyfluthrin)** *Beans (Dry), Peas (Dry), Southern Peas/Cowpeas* | 0.8-3.2 fl. oz. per acre. For armyworms, corn borers, earworms, and loopers. Do not exceed 6.4 fl. oz. per acre per season for succulent Cowpeas/Southern Peas, or 10.5 fl. oz. per acre per season for

dry legumes. Allow 14 days between applications. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 3-day for for Cowpeas/Southern Peas, or 7-day for dry legumes. IRAC 03A. *RUP*.

**Brigade 2EC (bifenthrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | For armyworms, corn borers, cutworms, earworms, and loopers. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 12.8 fl. oz. per acre per season for fresh beans and fresh or dried peas or 19.2 fl. oz. per acre per season on dried beans. Use 10DF, 10WP, or 10WSB formulations at 5.3-16 oz. per acre on fresh beans and peas only and do not exceed 32 oz. per acre per season. Allow 7 days between applications on fresh beans and peas, and 7 days between applications on dry beans and peas. REI: 12-hour. PHI: 3-day for fresh legumes, or 14-day for dry legumes. IRAC 03A. *RUP*.

**Coragen (1.67SC) (chlorantraniliprole)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.5-7.5 fl. oz. per acre foliar application. For armyworms, corn borers, cutworms, earworms, and loopers. 5.0-7.5 fl. oz. per acre in furrow spray at planting for armyworms, corn borers, and earworms. Must be in the root zone to provide effective control. Do not exceed 15.4 fl. oz. per acre per season. Allow 3 days between applications. REI: 4-hour. PHI: 1-day. IRAC 28.

**Entrust SC (2) (spinosad)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3-6 oz. per acre. For armyworms, corn borers, earworms, and loopers. Use 2SC formulations at 3.0-6.0 fl. oz. per acre and do not exceed 29 fl. oz. per acre per season on succulent legumes or 12 fl. oz. on dried legumes. Use 80WP formulations at 1.0-2.0 oz. per acre and do not exceed 9 oz. per acre per season on succulent legumes or 3.75 oz. on dried legumes. Observe resistance management restrictions. Allow 5 days between applications. Do not feed or graze livestock on treated plants. REI: 4-hour. PHI: 3-day for fresh legumes, or 28-day for dry legumes. IRAC 05. *OMRI-listed*.

**Intrepid 2F (methoxyfenozide)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 4-16 fl. oz. per acre. For armyworms, corn borers, earworms, and loopers. Use 4-8 fl. oz. on young plants in early season. Use 8-16 fl. oz. for mid- to late-season applications or heavier infestations. Do not exceed 64 fl. oz. per acre per season. Allow 7 days between applications. REI: 4-hour. PHI: 7-day. IRAC 18.

**Lannate LV (2.4L) (methomyl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.5-3 pts. per acre. For armyworms, corn borers, earworms, and loopers. Do not exceed 15 pts. per acre per season. Do not feed or graze livestock on treated plants within 7 days of application for succulent legumes, or 14 days of application for dry legumes. REI: 48-hour. PHI: 1-

day at rates less than 1.5 pts. per acre, or 3-day for rates over 1.5 pts. per acre on fresh legumes, or 14-day for any rate on dry legumes. IRAC 01A. *RUP*.

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 2.72-4.0 fl. oz. for armyworms, corn borers, and earworms. 3.2-4.0 fl. oz. per acre for loopers. Do not exceed 24. fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP*.

**Orthene 97 (S) (acephate)** *Beans (Dry), Lima Beans* | 8-16 oz. per acre for cutworms and loopers. 12-16 oz. per acre for armyworms, corn borers and earworms. Do not exceed 34 oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 1-day for fresh Lima Beans, or 14-day for dry legumes. IRAC 01B.

**Radiant 1SC (spinetoram)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3-8 fl. oz. per acre for corn borers. 4-8 fl. oz. per acre for armyworms, earworms, and loopers. Do not exceed 28 fl. oz. per acre. per season for succulent legumes, or 12 fl. oz. per acre for dry legumes. REI: 4-hour. PHI: 3-day for fresh legumes, or 28-day for dry legumes. IRAC 05.

**Sevin XLR Plus (4SC) (carbaryl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1-1.5 qts. per acre for armyworms, corn borers, and cutworms. 0.5-1.5 qts. per acre for earworms. Do not exceed 6 qts. per acre per season. Do not use on shelled succulent peas and beans. Edible-pod succulent and dried shelled beans and peas only. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 01A.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28-1.92 fl. oz. per acre. For armyworms, corn borers, cutworms, earworms, and loopers. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP*.

## Cowpea Curculio Beetle

### Pesticide

**Asana XL (0.66EC) (esfenvalerate)** *Beans (Dry), Peas (Dry)* | 5.8-9.6 fl. oz. per acre. Do not exceed 38.4 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 21-day. IRAC 03A. *RUP*.

**Baythroid XL (1EC) (beta-cyfluthrin)** *Beans (Dry), Peas (Dry), Southern Peas/Cowpeas* | 1.6-2.4 fl. oz. per acre for dry legumes. 1.6-2.1 fl. oz. per acre for southern peas/cowpeas. Do not exceed 6.4 fl. oz. per acre per season

for dry legumes, or 10.5 fl. oz. per acre per season for succulent cowpeas/southern peas. Allow 14 days between applications for dry legumes and 5 days for succulent cowpeas/southern peas. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 3-day for cowpeas/southern peas, or 7-day for dry legumes. IRAC 03A. RUP.

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.2 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. RUP.

**Sevin XLR Plus (4SC) (carbaryl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.5-1.5 qts. per acre. Do not exceed 6 qts. per acre per season. Do not use on shelled succulent peas and beans. Edible-pod succulent and dried shelled beans and peas only. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 01A.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. RUP.

## Leafhoppers

Treatment for potato leafhopper is warranted at the following thresholds.

*Seedlings*: 0.5 per sweep, or 2 per row foot.

*3rd trifoliolate*: 1 per sweep, or 5 per row foot.

*Bud stage*: 5 per row foot.

## Pesticide

**Admire Pro (4.6SC) (imidacloprid)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 7-10.5 fl. oz. per acre soil application, or 1.2 fl. oz. per acre foliar application. Do not exceed 1 soil application per season or 3 foliar applications per season. REI: 12-hour. PHI: 21-day for soil application, or 7-day for foliar application. IRAC 04A.

**Asana XL (0.66EC) (esfenvalerate)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 5.8-9.6 fl. oz. per acre. Do not exceed 38.4 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 03A. RUP.

**Assail 30SG (acetamiprid)** *Beans (Fresh), Lima Beans, Peas (Fresh), Southern Peas/Cowpeas* | Use 30SG formulations at 2.5-5.3 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 1.0-2.3 oz. per acre and do not exceed 6.9 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 04A.

**Baythroid XL (1EC) (beta-cyfluthrin)** *Beans (Dry), Peas (Dry), Southern Peas/Cowpeas* | 0.8-1.6 fl. oz. per acre. Do not exceed 6.4 fl. oz. per acre per season for dry legumes, or 10.5 fl. oz. per acre per season for succulent cowpeas/southern peas. Allow 14 days between applications for dry legumes and 5 days for succulent cowpea/southern peas. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 3-day for succulent cowpeas/southern peas, or 7-day for dry legumes. IRAC 03A. RUP.

**Brigade 2EC (bifenthrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 2EC formulations at 1.6-6.4 fl. oz. per acre and do not exceed 12.8 fl. oz. per acre per season for fresh beans and fresh or dried peas or 19.2 fl. oz. per acre per season on dried beans. Use 10DF, 10WP, or 10WSB formulations at 4-16 oz. per acre on fresh beans and peas only and do not exceed 32 oz. per acre per season. Allow 7 days between applications on fresh beans and peas, and 7 days between applications on dry beans and peas. REI: 12-hour. PHI: 3-day for fresh legumes, or 14-day for dry legumes. IRAC 03A. RUP.

**Cruiser 5FS (thiamethoxam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28 fl. oz. per 100 lbs. of seed. Do not apply a neonicotinoid insecticide within 45-days of planting when using seeds treated with a neonicotinoid insecticide. REI: 12-hour. IRAC 04A.

**Dimethoate 4EC (dimethoate)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry)* | Use 2.67EC formulations at 0.5-1.0 pts. per acre on beans and do not exceed 2 pts. per acre per season on beans. Not for use on cowpeas/southern peas. Do not feed or graze livestock on treated plants. See pollinator precautions. Mechanical harvest only on day of application. REI: 48-hour. PHI: 0-day. IRAC 01B.

**Lannate LV (2.4L) (methomyl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Southern Peas/Cowpeas* | 0.75-3 pts. per acre. Do not exceed 15 pts. per acre per season. Do not feed or graze livestock on treated plants within 7 days of application for succulent legumes, or 14 days of application for dry legumes. REI: 48-hour. PHI: 1-day at rates less than 1.5 pts. per acre, or 3-day for rates over 1.5 pts. per acre on fresh legumes, or 14-day for any rate on dry legumes. IRAC 01A. RUP.

**M-Pede (3.8) (potassium salts of fatty acids)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1-2% by volume. Must contact pest to be effective. To achieve enhanced and residual pest control

mix with a labeled companion insecticide. REI: 12-hour. PHI: 0-day. IRAC UN, FRAC NC. *OMRI-listed*.

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.2 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP*.

**Orthene 97 (S) (acephate)** *Beans (Dry), Lima Beans* | 8-16 oz. per acre. Do not exceed 34 oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 1-day for fresh Lima Beans, or 14-day for dry legumes. IRAC 01B.

**Sivanto 200 (1.67SL) (flupyradifurone)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 7-14 fl. oz. per acre. Do not exceed 28 fl. oz. per acre per season. Allow 10 days between applications. REI: 4-hour. PHI: 7-day. IRAC 04D.

**Thimet 20G (phorate)** *Beans (Dry), Beans (Fresh), Lima Beans* | 4.5-7.0 oz. per 1,000 ft. of row. Drill granules to the side of the seed or in a band over the row and lightly incorporate with a drag chain. Granules must be incorporated into the soil. Do not place granules in direct contact with seed. Do not feed or graze livestock on treated plants. REI: 48-hour. PHI: 60-day. IRAC 01B. *RUP*.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP*.

## Mexican Bean Beetle

Treatment for Mexican Bean Beetle is warranted at a threshold of 0.5 beetle per plant.

### Pesticide

**Asana XL (0.66EC) (esfenvalerate)** *Beans (Fresh), Lima Beans, Peas (Fresh), Southern Peas/Cowpeas* | 2.9-5.8 fl. oz. per acre. Do not exceed 38.4 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 3-day for succulent legumes, 21-day for dry legumes. IRAC 03A. *RUP*.

**Baythroid XL (1EC) (beta-cyfluthrin)** *Beans (Dry), Peas (Dry)* | 2.4-3.2 fl. oz. per acre. Do not exceed 10.5 fl. oz. per acre per season. Allow 14 days between applications for dry legumes and 5 days for succulent cowpeas/southern peas. Do not feed or graze livestock on treated plants. REI: 12-hour. IRAC 03A. *RUP*.

**Brigade 2EC (bifenthrin)** *Beans (Dry), Lima Beans, Peas (Dry), Southern Peas/Cowpeas* | 2.1-6.4 fl. oz. per acre. *Treat Mexican Bean Leaf Beetle on dry peas and beans only*. Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 12.8 fl. oz. per acre per season for dried peas or 19.2 fl. oz. per acre per season on dried beans. Do not use 10DF, 10WP, or 10WSB formulations as they are labeled for fresh beans and peas only. Allow 7 days between applications on dry beans and peas. REI: 12-hour. PHI: 14-day. IRAC 03A. *RUP*.

**Cruiser 5FS (thiamethoxam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28 fl. oz. per 100 lbs. of seed. Do not apply a neonicotinoid insecticide within 45-days of planting when using seeds treated with a neonicotinoid insecticide. REI: 12-hour. IRAC 04A.

**Dimethoate 4EC (dimethoate)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry)* | Use 2.67EC formulations at 0.5-1.0 pts. per acre on beans and do not exceed 2 pts. per acre per season on beans. Not for use on cowpeas/southern peas. Do not feed or graze livestock on treated plants. See pollinator precautions. Mechanical harvest only on day of application. REI: 48-hour. PHI: 0-day. IRAC 01B.

**Lannate LV (2.4L) (methomyl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Southern Peas/Cowpeas* | 0.75-3 pts. per acre. Do not exceed 15 pts. per acre per season. Do not feed or graze livestock on treated plants within 7 days of application for succulent legumes, or 14 days of application for dry legumes. REI: 48-hour. PHI: 1-day at rates less than 1.5 pts. per acre, or 3-day for rates over 1.5 pts. per acre on fresh legumes, or 14-day for any rate on dry legumes. IRAC 01A. *RUP*.

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.2 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP*.

**Orthene 97 (S) (acephate)** *Beans (Dry), Lima Beans* | 8-16 oz. per acre. Do not exceed 34 oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 1-day for fresh Lima Beans, or 14-day for dry legumes. IRAC 01B.

**Sevin XLR Plus (4SC) (carbaryl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.5-1.0 qts. per acre. Do not exceed 6 qts. per acre per season. Do not use on shelled succulent peas and beans. Edible-pod succulent and dried shelled beans and peas only. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 01A.

**Thimet 20G (phorate)** *Beans (Dry), Beans (Fresh), Lima Beans* | 4.9-9.4 oz. per 1,000 ft. of row. Drill granules to the side of the seed or in a band over the row and lightly

incorporate with a drag chain. Granules must be incorporated into the soil. Do not place granules in direct contact with seed. Do not feed or graze livestock on treated plants. REI: 48-hour. PHI: 60-day. IRAC 01B. *RUP*.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.96-1.6 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP*.

## Mites

### Pesticide

**Acramite 50WS (bifenazate)** *Beans (Fresh), Lima Beans, Peas (Fresh), Southern Peas/Cowpeas* | 1-1.5 lbs. per acre. Do not exceed 2 applications per season. REI: 12-hour. PHI: 3-day. IRAC UN.

**Agri-Mek SC (0.7) (abamectin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.75-3.5 fl. oz. per acre. Not for cowpeas grown for fresh use. Do not exceed 10.25 fl. oz. per acre per season and do not make more than 2 sequential applications. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 7-day. IRAC 06. *RUP*.

**Portal (0.4EC) (fenpyroximate)** *Beans (Fresh)* | 2 pts. per acre. Do not exceed 4 pts. per acre per season. REI: 12-hour. PHI: 1-day. IRAC 21A.

## Pea Weevil Beetle

### Pesticide

**Baythroid XL (1EC) (beta-cyfluthrin)** *Beans (Dry), Peas (Dry)* | 2.4-3.2 fl. oz. per acre. Do not exceed 10.5 fl. oz. per acre per season. Allow 14 days between applications for dry legumes and 5 days for succulent cowpeas/southern peas. Do not feed or graze livestock on treated plants. REI: 12-hour. IRAC 03A. *RUP*.

**Brigade 2EC (bifenthrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 12.8 fl. oz. per acre per season for fresh beans and fresh or dried peas or 19.2 fl. oz. per acre per season on dried beans. Use 10DF, 10WP, or 10WSB formulations at 5.3-16 oz. per acre on fresh beans and peas only and do not exceed 32 oz. per acre per season. Allow 7 days between applications on fresh beans and peas, and 7 days between applications on dry beans and peas. REI: 12-hour. PHI: 3-day for fresh legumes, or 14-day for dry legumes. IRAC 03A. *RUP*.

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh),*

*Southern Peas/Cowpeas* | 3.2 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP*.

**Sevin XLR Plus (4SC) (carbaryl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.5-1.5 qts. per acre. Do not exceed 6 qts. per acre per season. Do not use on shelled succulent peas and beans. Edible-pod succulent and dried shelled beans and peas only. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 01A.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP*.

## Seed and Root Maggots

### Non-Pesticide

*Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Plant after the peak flight and egg-laying window of the first generation of flies looking to lay eggs around 360 GDD base 40. Handle seeds carefully to prevent cracking. Plow winter vegetation under early in the spring and thoroughly cover to limit attractiveness of rotting vegetation to the first generation of flies to lay eggs on.

### Pesticide

**Capture LFR (1.5) (bifenthrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.2-0.39 fl. oz. per 1,000 ft. of row. Apply as a 5-7 inch band over the row on the soil surface, open furrow, or in-furrow at planting. REI: 12-hour. IRAC 03A. *RUP*.

**Cruiser 5FS (thiamethoxam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28 fl. oz. per 100 lbs. of seed. Do not apply a neonicotinoid insecticide within 45-days of planting when using seeds treated with a neonicotinoid insecticide. REI: 12-hour. IRAC 04A.

**Thimet 20G (phorate)** *Beans (Dry), Beans (Fresh), Lima Beans* | 4.5-7.0 oz. per 1,000 ft. of row. Drill granules to the side of the seed or in a band over the row and lightly incorporate with a drag chain. Granules must be incorporated into the soil. Do not place granules in direct contact with seed. Do not feed or graze livestock on treated plants. REI: 48-hour. PHI: 60-day. IRAC 01B. *RUP*.

## Stink Bugs

### Pesticide

**Baythroid XL (1EC) (beta-cyfluthrin)** *Beans (Dry), Peas (Dry), Southern Peas/Cowpeas* | 1.6-2.4 fl. oz. per acre for dry legumes. 1.6-2.1 fl. oz. per acre for southern peas/cowpeas. Do not exceed 6.4 fl. oz. per acre per season for dry legumes, or 10.5 fl. oz. per acre per season for succulent cowpeas/southern peas. Allow 14 days between applications for dry legumes and 5 days for succulent cowpeas/southern peas. Do not feed or graze livestock on treated plants. REI: 12-hour. PHI: 3-day for cowpeas/southern peas, or 7-day for dry legumes. IRAC 03A. RUP.

**Brigade 2EC (bifenthrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 12.8 fl. oz. per acre per season for fresh beans and fresh or dried peas or 19.2 fl. oz. per acre per season on dried beans. Use 10DF, 10WP, or 10WSB formulations at 5.3.0-16 oz. per acre on fresh beans and peas only and do not exceed 32 oz. per acre per season. Allow 7 days between applications on fresh beans and peas, and 7 days between applications on dry beans and peas. REI: 12-hour. PHI: 3-day for fresh legumes, or 14-day for dry legumes. IRAC 03A. RUP.

**Lannate LV (2.4L) (methomyl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.5-3 pts. per acre. Do not exceed 15 pts. per acre per season. Do not feed or graze livestock on treated plants within 7 days of application for succulent legumes, or 14 days of application for dry legumes. REI: 48-hour. PHI: 1-day at rates less than 1.5 pts. per acre, or 3-day for rates over 1.5 pts. per acre on fresh legumes, or 14-day for any rate on dry legumes. IRAC 01A. RUP.

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.2 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. RUP.

**Sevin XLR Plus (4SC) (carbaryl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.5-1.5 qts. per acre. Do not exceed 6 qts. per acre per season. Do not use on shelled succulent peas and beans. Edible-pod succulent and dried shelled beans and peas only. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 01A.

**Transform WG (50) (sulfoxaflor)** *Beans (Dry), Beans (Fresh), Lima Beans* | 2.25 oz. per acre. *Suppression only.* Do not make applications less than 14 days apart or consecutively on the same crop. No more than four

application per crop. Maximum of 8.5 oz. per acre per year. REI: 24-hour. PHI: 7-day. IRAC 04C.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. RUP.

## Thrips

### Pesticide

**Admire Pro (4.6SC) (imidacloprid)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 7-10.5 fl. oz. per acre soil application. Do not exceed 1 soil application per season. REI: 12-hour. PHI: 21-day. IRAC 04A.

**Assail 30SG (acetamiprid)** *Beans (Fresh), Lima Beans, Peas (Fresh), Southern Peas/Cowpeas* | Use 30SG formulations at 4.5-5.3 oz. per acre and do not exceed 16 oz. per acre per season. Use 70WP formulations at 1.9-2.3 oz. per acre and do not exceed 6.9 oz. per acre per season. Allow 7 days between applications. REI: 12-hour. PHI: 7-day. IRAC 04A.

**Brigade 2EC (bifenthrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 2EC formulations at 2.1-6.4 fl. oz. per acre and do not exceed 12.8 fl. oz. per acre per season for fresh beans and fresh or dried peas or 19.2 fl. oz. per acre per season on dried beans. Use 10DF, 10WP, or 10WSB formulations at 5.3.0-16 oz. per acre on fresh beans and peas only and do not exceed 32 oz. per acre per season. Allow 7 days between applications on fresh beans and peas, and 7 days between applications on dry beans and peas. REI: 12-hour. PHI: 3-day for fresh legumes, or 14-day for dry legumes. IRAC 03A. RUP.

**Entrust SC (2) (spinosad)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 2SC formulations at 4.5-6.0 fl. oz. per acre and do not exceed 29 fl. oz. per acre per season on succulent legumes or 12 fl. oz. on dried legumes. Use 80WP formulations at 1.0-2.5 oz. per acre and do not exceed 9 oz. per acre per season on succulent legumes or 3.75 oz. on dried legumes. Observe resistance management restrictions. Allow 5 days between applications. Do not feed or graze livestock on treated plants. REI: 4-hour. PHI: 3-day for fresh legumes, or 28 day for dry legumes. IRAC 05. *OMRI-listed.*

**Mustang Maxx (0.8) (zeta-cypermethrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 3.2 fl. oz. per acre. Do not exceed 24 fl. oz. per acre per season. REI: 12-hour. PHI: 1-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. RUP.

**Radiant 1SC (spinetoram)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 5-8 fl. oz. per acre. Do not exceed 28 fl. oz. per acre. per season for succulent legumes, or 12 fl. oz. per acre for dry legumes. REI: 4-hour. PHI: 3-day for fresh legumes, or 28-day for dry legumes. IRAC 05.

**Sevin XLR Plus (4SC) (carbaryl)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.5-1.5 qts. per acre. Do not exceed 6 qts. per acre per season. Do not use on shelled succulent peas and beans. Edible-pod succulent and dried shelled beans and peas only. REI: 12-hour. PHI: 3-day for fresh legumes, 21-day for dry legumes. IRAC 01A.

**Transform WG (50) (sulfoxaflor)** *Beans (Dry), Beans (Fresh), Lima Beans* | 2.25 oz. per acre. *Suppression only.* Do not make applications less than 14 days apart or consecutively on the same crop. No more than four application per crop. Maximum of 8.5 oz. per acre per year. REI: 24-hour. PHI: 7-day. IRAC 04C.

**Warrior II (2.08CS) (lambda-cyhalothrin)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28-1.92 fl. oz. per acre. Do not exceed 7.68 fl. oz. per acre per season. Do not feed or graze livestock on treated plants. REI: 24-hour. PHI: 7-day for fresh legumes, or 21-day for dry legumes. IRAC 03A. *RUP.*

## Wireworms

### Pesticide

**Cruiser 5FS (thiamethoxam)** *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1.28 fl. oz. per 100 lbs. of seed. Do not apply a neonicotinoid insecticide within 45-days of planting when using seeds treated with a neonicotinoid insecticide. REI: 12-hour. IRAC 04A.

# Legumes – Weeds

Reviewed by Stephen Meyers, Ben Phillips – Sept 2021

## Recommended Controls

### All Weeds

Weed control methods in legumes vary by production system and crop.

For legumes that are no-till, direct-seeded into a killed crop (such as after a rye cover crop, or wheat) growers often use a burndown herbicide with a preemergence herbicide. For legumes direct-seeded into tilled soil, growers often combine one or more preemergence herbicides at planting with one or more cultivations. Sometimes, growers also apply a preemergence herbicide after the last cultivation to improve control of late-emerging weeds. Small, emerged weeds in both systems can be controlled with selective postemergence herbicides and/or shielded applications of nonselective herbicides


For specific weeds controlled by each herbicide, check the Relative Effectiveness of Herbicides for Vegetable Crops table.

Rates provided in the recommendations below are given for overall coverage. For a banded treatment, reduce amounts according to the portion of acre treated.


### Non-Pesticide


*Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | A stale seedbed can be prepared prior to transplanting with flame weeding or very shallow cultivation to control emerged weeds, instead of herbicides. Legumes lend themselves to this stale seedbed practice because they are often planted after common weeds have emerged in tilled soil. Uniform and close plant spacing in the row promotes rapid canopy cover, and fresh market growers can keep larger between row spacing clean with between row cultivation tools for hand-pickers or mechanical harvesters. A rolling cultivator on a wide tool-bars offer effective high-speed cultivation.


### Pesticide


**Aim EC (2) (carfentrazone)** POST  *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.5-2 fl. oz. per acre. Apply prior to or within 24 hours after seeding, or apply between crop rows with hooded sprayer. Do not allow spray to contact crop. Use


COC or NIS. Weeds must be actively growing and less than 4 inches tall. Do not exceed 6.1 fl. oz. per acre per season. REI: 12-hour. HRAC 14.

**Assure II (0.88EC) (quizalofop)** POST  *Beans (Dry), Beans (Fresh), Peas (Dry), Peas (Fresh)* | 5-12 fl. oz. per acre. Use 1 qt. of COC per acre. Apply to actively growing grass. Do not exceed 14 fl. oz. per acre. REI: 12-hour. PHI: 15-day for succulent beans; 30-day for dry beans and succulent peas; 60-day for dry peas. HRAC 01.


**Basagran (4) (bentazon)** POST  *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use Basagran 4L at 1.5 to 2.0 pts. per acre, or Basagran 5L at 1.2-1.6 pts. per acre. Apply when weeds are small and after peas have 3 pairs of leaves or first trifoliate leaf of beans is fully expanded. Do not add COC for peas. REI: 48-hour. PHI: 30-day. HRAC 06.


**clethodim products (clethodim)** POST  *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 2EC formulations at 6-16 fl. oz. per acre with 1 qt. of COC per 25 gals. of spray solution (1% v/v). Use Select Max at 9-32 fl. oz. per acre with 8 fl. oz. of NIS per 25 gals. of spray solution (0.25% v/v). Use low rates for annual grasses, the high rates for perennial grasses. Spray on actively growing grass. Wait at least 14 days between applications. Do not exceed 32 fl. oz. of 2EC formulations per acre per season. Do not exceed 64 fl. oz. of Select Max per acre per season. REI: 24-hour. PHI: 21-day for succulent legumes, 30-day for dry legumes. HRAC 01.


**Command 3ME (clomazone)** PRE  *Beans (Fresh), Peas (Fresh)* | 1.3 pts. per acre. For **fresh beans**: apply 0.4-0.67 pt. per acre. For **fresh peas**: apply 1.3 pts. per acre. Broadcast before planting, or after planting before crop emerges. Not effective on muck soil. REI: 12-hour. PHI: 45-day for succulent beans. HRAC 13.


**Dual Magnum (7.62EC) (s-metolachlor)** PRE  *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1-2 pts. per acre. For **fresh and dry peas**: apply after seeding before crop emerges. Do not incorporate. For **fresh and dry beans, and southern peas/cowpeas, and lima beans**: apply and incorporate before planting, or apply after seeding but before crop emerges. Can be tank-mixed preplant incorporated with Eptam or trifluralin. Do not use on muck soils. In all cases, use lower rates on coarse soils. Do not use on muck soils. Dual II Magnum contains a safener and may be used instead of Dual

Magnum to limit crop injury under cool soil conditions. REI: 24-hour. HRAC 15.


**Eptam 7E (EPTC)** PRE  *Beans (Dry), Beans (Fresh)* | 3.5 pts. per acre. Eptam 7E at 3.5 pts. per acre, or Eptam 20G at 15lbs. per acre. Apply before planting and incorporate immediately, or apply as a directed spray at last cultivation before pods start to form. Check label for sensitive types and varieties. *Green beans and small white beans on coarse soils*: do not exceed 3.5 pts. per acre (7E) or 15 lbs. per acre (20G). Suppresses nutsedge. REI: 12-hour. HRAC 15.

**Fusilade DX (2EC) (fluazifop-P)** POST  *Beans (Dry)* | 8-12 fl. oz. per acre. Include 1-2 pts. of COC or 0.5-1 pt. of NIS per 25 gals. of spray solution. Spray on actively growing grass. Wait at least 14 days between applications. Do not exceed 48 fl. oz. per acre per season. REI: 12-hour. PHI: 60-day. HRAC 01.

**glyphosate products (glyphosate)** POST  *Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 0.75-3.75 lbs. acid equivalent (ae) per acre. Use formulations of 3 lbs. ae per gal. (4 lbs. isopropylamine salt per gal.) at 1-5 qts. per acre, or formulations containing 4.5 lbs. ae per gal. (5 lbs. potassium salt per gal.) at 0.66-3.3 qts. per acre. Broadcast before or after planting but before crop emerges, or apply up to 0.75 lb. acid equivalent between crop rows with wipers, hooded or shielded sprayers. Use low rate for annuals and higher rates for perennials. See label for suggested application volume and adjuvants. REI: 4-hour to 12-hour. PHI: 14-day. HRAC 9.



**Lorox DF (50) (linuron)** POST PRE  *Peas (Dry)* | 1-2 lbs. per acre. For **dry peas and dry southern peas/cowpeas**: apply after seeding but before crop emerges. Do not apply to sand or loamy sand. Do not use on soils with less than 1% organic matter. REI: 24-hour to 8-day. HRAC 05.

**Optill (WG) (imazethapyr, saflufenacil)** POST PRE

 *Peas (Dry), Peas (Fresh)* | For **dry and fresh peas**: apply 1.0-1.5 oz per acre preplant, preplant incorporated or preemergence (up to 3 days after planting before cracking). *In Michigan*: do not apply more than 1 oz. per acre on sand or loamy sand soils preplant burndown or preemergence. *In Minnesota*: do not apply north of Highway 210. For **fresh peas in Illinois, Iowa, and Minnesota**: a sequential application of Sharpen may be made with a minimum of 30 days between applications. In all cases, some varieties may



be injured; check with seed supplier. Plant at least 1/2 inch deep to avoid injury. Do not use on any *Phaseolus* bean species. Do not apply group 14 herbicides within 30 days of planting. REI: 12-hour. HRAC 02, HRAC 14.

**Outlook (6) (dimethenamid-p)** PRE   *Beans (Dry)* |


10-21 fl. oz. per acre. Use lower rate on coarse soils low in organic matter. Apply before planting and incorporate, apply after planting before emergence, or apply after planting when beans have 1-3 trifoliolate leaves. Do not exceed 12 fl. oz. on coarse soils prior to emergence. REI: 12-hour. PHI: 70-day. HRAC 15.

**paraquat products (paraquat)** POST   *Beans*

*(Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | For **succulent legumes**: apply 2-4 pts. per acre before seeding or after seeding but before crop emergence. For **dry legumes**: apply 1.2-2.0 pts. per acre as a harvest-aid. Use 4-8 fl. oz. of NIS per 25 gals. of spray solution. REI: 12 to 24-hour. PHI: 7-day for dry legume harvest-aid applications. HRAC 22. *RUP.*

**pendimethalin products (pendimethalin)** PRE  

*Beans (Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | Use 3.3EC formulations at 1.2-3.6 pts. per acre. Use 3.8ME formulations at 1.5-3 pts. per acre. Use low rates on coarse soils. Broadcast and incorporate before planting. Not effective on soils with high organic matter. REI: 24-hour. HRAC 03.

**Poast (1.5EC) (sethoxydim)** POST  *Beans (Dry),*

*Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas* | 1-2.5 pts. per acre. Use 1 qt. of COC per acre. Spray on actively growing grass. Use high rate on quackgrass. Do not exceed 4 pts. per acre per season. REI: 12-hour. PHI: 15-day for succulent legumes, 30-day for dry legumes. HRAC 01.

**Pursuit (2) (imazethapyr)** POST PRE   *Beans*

*(Dry), Beans (Fresh), Lima Beans, Peas (Dry), Southern Peas/Cowpeas* | For **fresh beans in Illinois, Indiana, Iowa, Michigan, and Minnesota only**: apply and 1.5 fl. oz. per acre and incorporate within 1 week of planting, or apply within 1 day after planting. *In Missouri only*, a postemergence application can be mixed with Basagran after crop has at least one true leaf. Apply before July 31. For **dry beans and peas, Lima beans, and Southern peas/cowpeas**: apply 3 fl. oz. per acre and incorporate within 1 week of planting, or apply within 3 days after planting before crop emerges, or apply after crop has 1 fully expanded trifoliolate leaf or peas or cowpeas are at least three inches tall. *Early postemergence application not allowed on lima beans.* Use 8 oz. of NIS per

25 gals. of spray solution if emerged weeds are present. If using COC or N fertilizer on dry beans to improve weed control, add Basagran at 6-16 fl. oz. per acre or Rezult at 12-24 fl. oz. per acre to minimize crop injury. In all cases, do not apply to fields treated with trifluralin or injury may occur. In Minnesota north of Highway 210 and in Michigan on sandy or sandy loam soils do not apply more than 2 fl. oz. per acre. REI: 4-hour. PHI: 30-day for succulent legumes, 60-day for dry legumes. *i>ç* HRAC 02.

**Raptor (1) (imazamox)** POST   *Beans (Dry), Beans*

*(Fresh), Lima Beans, Peas (Dry), Peas (Fresh)* | 4 fl. oz. per acre. For **dry beans and peas**: apply 4 fl. oz. per acre after the first trifoliolate is fully expanded for beans, or first three pairs of leaves for peas. May add NIS, COC or N fertilizer. Must add Basagran or Rezult for dry peas. For **fresh peas**: apply 3 fl. oz. per acre when crop is at least 3 inches tall but prior to 5 nodes before flowering. Must add NIS. May add COC or N fertilizer. If using COC, you must add Basagran or Rezult. For **fresh beans in Illinois, Indiana, Iowa, Michigan, and Minnesota**: apply 4 fl. oz. per acre after the first trifoliolate is fully expanded and before bloom. Must add NIS. Do not add COC. May add N fertilizer. Must add Basagran or Rezult. For **succulent Lima beans**: apply 4 fl. oz. per acre when first or second trifoliolate is fully expanded and before bloom. Must add NIS. Must add Basagran or Rezult. **Notes:** Use NIS with at least 80% active ingredient at 1 qt. per 100 gals. of spray solution, or 1 gal. COC per 100 gals. of spray solution, or 2.5 gals. of nitrogen or 12-15 lbs. ammonium sulfate per 100 gals. of spray solution to improve weed control (but may increase crop injury). Use Basagran at 6-16 fl. oz. per acre or Rezult at 12-24 fl. oz. per acre to minimize crop injury. In all cases, Raptor is most effective on weeds less than 3 inches tall, and the 3 fl. oz. rate is weak on grasses. Using Raptor on fields treated with trifluralin may increase the risk of injury. Do not exceed 1 application per year. REI: 4-hour. PHI: 30-day when tank mixed with Basagran or Rezult. HRAC 02.


**Reflex (2L) (fomesafen)** PRE  *Beans (Dry), Beans*

*(Fresh), Peas (Fresh)* | For **fresh and dry beans**: Reflex is labeled in all states participating in this publication except in Kansas west of Highway 281 and in Minnesota north of Highway 2. It can be used in extreme southeast Missouri (Region 1) at 1.5 pts. per acre year; Indiana, Illinois, and Ohio south of I-70 (Region 2) at 1.5 pts. per acre in alternate years; Indiana, Illinois, and Ohio north of I-70 (Region 3), and the rest of Missouri at 1.25 pts. per acre in alternate years; Kansas east of Highway 281 and Michigan and Minnesota south of I-94 (Region 4) at 1 pt. per acre in alternate years; and in Minnesota south of Highway 2 and north of I-94 (Region 5) at 0.75 pt. per acre in alternate years. Preplant and preemergence applications are labeled for Regions 1, 2, 3, and 4. Postemergence applications are labeled for Regions 1, 2, 3, 4, and 5. Apply postemergence when dry beans or succulent beans have at least one fully expanded trifoliolate leaf, and use NIS, COC, or other additives

following label instructions. Do not use liquid nitrogen or ammonium sulfate as an additive. For **overhead irrigated dry beans in Kansas (KS 24c exp. 12/31/2022)**: 1 pt. per acre can be applied after the first fully expanded trifoliolate in any county. For **fresh peas in Michigan (MI 24c exp. 12/31/23) and Minnesota (MN 24c exp. 12/31/25) only**: apply 1 pt. per acre in a tank-mix with other herbicides after seeding peas and before emergence. Use only once in 2 years on same soil. 18-month waiting period before planting most other crops. REI: 24-hour. PHI: 30-day for succulent beans; 45-day for dry beans and succulent peas. HRAC 14.

**Rezult (5L) (bentazon, sethoxydim)** POST  Beans

(Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas | 3.2 pts. per acre. Apply when weeds are small and after peas have 3 pairs of leaves or first trifoliolate leaf of beans is fully expanded. An additional application of Basagran is allowed not to exceed 2 pts. per acre, and an additional application of Poast is allowed at 2.9 pts. per acre. REI: 48-hour. PHI: 30-day. HRAC 06, HRAC 01.

**Sandea (75) (halosulfuron)** POST PRE  Beans

(Dry), Beans (Fresh), Lima Beans, Southern Peas/Cowpeas | 0.5-1 oz. per acre. For **Southern peas/cowpeas**: apply 0.5 oz. per acre after planting but prior to soil cracking. Or use up to 1.0 oz. per acre as a directed postemergence application to the row middles when plants have 2-4 trifoliolate leaves but before flowering. For **Lima beans and fresh beans**: apply 0.5-1.0 oz. per acre after planting but prior to soil cracking. Or, use 0.5-0.67 oz. per acre for postemergence applications over crop and weeds when plants have 2-4 trifoliolate leaves but before flowering, or use up to 1 oz. per acre as a directed postemergence application to row middles with no crop contact. For **dry beans**: apply up to 0.67 oz. per acre after planting but prior to soil cracking. Or, use or as a postemergence application over crop and weeds when plants have 1-3 trifoliolate leaves but before flowering, or use up to 1 oz. per acre as a directed postemergence application to row middles with no crop contact. Use 0.5-1 pt. of NIS per 25 gals. of spray solution if emerged weeds are present at time of preemergence application. Use lower rates on coarse soils with low organic matter. Not recommended when temperatures are cool due to potential for crop injury. Do not exceed 1 oz. per acre per crop cycle or 2 oz. per acre per 12-month period. REI: 12-hour. PHI: 30-day. HRAC 02.


**Sharpen (2.85SC) (saflufenacil)** POST PRE  Peas

(Dry), Peas (Fresh) | For **fresh peas in Illinois, Iowa, Michigan, and Minnesota**: apply 0.75 fl. oz. per acre preplant incorporated or preemergence up to 3 days after planting before cracking. For **lentils in Minnesota**: use up to 2.0 fl. oz. per acre as described for fresh peas. For **dry pea and chickpeas**: apply 1-2 fl. oz. per acre to the surface as a

burndown early preplant through preemergence up to 3 days before cracking. Add MSO at 1 pt. per acre when used as a pre-plant burndown. Suppresses black nightshade, lambsquarters, pigweed, and velvetleaf. Higher rates in lentils and chickpeas will provide more, but still limited, residual weed control. Plant legumes at least 1/2-inch deep to avoid injury. Do not apply group 14 herbicides within 30 days of planting. REI: 12-hour. HRAC 14.


**Sonalan HFP (35.4) (ethalfluralin)** PRE  Beans

(Dry) | 1.5-4.5 pts. per acre. Apply and incorporate before planting. Use higher rates to suppress eastern black nightshade. *Not for muck soils*. REI: 24-hour. HRAC 03.

**Spartan 4F (sulfentrazone)** PRE  Peas (Dry) | 2.25-


8.0 fl. oz. per acre. Spring-apply early-preplant, preplant-incorporated, or preemergence up to 3 days after planting before cracking. Rate depends on soil texture, organic matter, and pH. Do not use on sand soils with less than 1% organic matter or apply after crop emerges. *Michigan, Minnesota, and Wisconsin only*: a fall application before soil freezes is allowed. REI: 12-hour. HRAC 14.

**Spartan Advance (glyphosate, sulfentrazone)** POST

PRE  Beans (Dry), Lima Beans, Peas (Dry),

Southern Peas/Cowpeas | 16-57 fl. oz. per acre. Spring-apply early-preplant, preplant-incorporated, or preemergence. Rate depends on soil texture, organic matter, and pH. Do not use on sand soils with less than 1% organic matter or apply after crop emerges. Provide simultaneous burndown of emerged weeds and residual preemergence weed control. *Michigan, Minnesota, and Wisconsin only*: a fall application is allowed for control of weeds ahead of winter. REI: 12-hour. PHI: 90-day. HRAC 9, HRAC 14.

**Spartan Charge (SE) (carfentrazone, sulfentrazone)**

POST PRE  Peas (Dry) | 3.0-10.2 fl. oz. per acre. For

**dry peas and chickpeas**: apply preplant-burndown, early-preplant, or preemergence. Do not use on coarse soils with less than 1% soil organic matter. Rate depends on soil texture, organic matter, and pH. Do not apply after crop emerges. REI: 12-hour. HRAC 14.

**Thistrol (2L) (MCPB)** POST  Peas (Dry), Peas

(Fresh) | 1-2 qts. per acre. Controls Canada thistle. Apply when peas have 6-12 nodes. Do not apply later than 3 nodes before pea flowering or after pea flower buds appear. Do not apply when peas are stressed or when temperature exceeds 90 F. REI: 24-hour. HRAC 04.

**trifluralin products (trifluralin)** PRE  Beans

(Dry), Beans (Fresh), Lima Beans, Peas (Dry), Peas (Fresh), Southern Peas/Cowpeas | 0.5-1 lb. a.i. per acre. Use 4E formulations at 1-1.5 pts. per acre for snap beans, lima beans, and peas, or up to 2 pts. per acre for dry beans. Use 10G formulations at 5-7.5 lbs. per acre for snap beans, lima beans, and peas, or up to 10 lbs. per acre for dry beans. Broadcast and incorporate 1-2 inches before seeding. Use low rate on coarse soils with less than 2% organic matter. Not effective on muck or high organic matter soils REI: 12-hour. HRAC 03.

## Mint – Horticulture

Major update by Ben Phillips, Liz Maynard – Oct 2020  
Reviewed by Liz Maynard – Aug 2021

### Crop Description

Mints are a group of perennial herbs that are commercially important as sources of essential oils obtained by distillation of their hay. The discussion in this section refers to production for essential oils. They are also commonly grown as a leaf herb; see the leafy vegetable section for common production practices for that product. The most common cultivated types are peppermint and spearmint.

**Peppermint** (*Mentha x piperita*): All peppermints are a hybrid of two other species, watermint (*M. aquatica*) and native spearmint (*M. spicata*). The varieties include Black Mitcham, Murray Mitcham, Robert's Mitcham, and Todd's Mitcham. The latter three varieties are more resistant to verticillium wilt.

**Spearmint**: Scotch Spearmint (*M. cardiaca*) and Native Spearmint (*M. spicata*). These two species of spearmints have distinctly different oils.

Because verticillium wilt disease is an important problem even with the more resistant varieties, growers should always use disease-free planting stock. Certified and disease-free stocks are available.

### Planting and Spacing

Mints are grown from 3- to 4-inch long dormant runners dug from existing fields in the late fall or spring. They spend their first year as a row crop before spreading through runners. The following years are spent as a solid stand or meadow crop. Careful fall plowing of established stands is important for both winter protection and for reducing the incidence of mint rust and other foliar diseases. "Squirelly" mint, which occurs primarily on peppermint, is caused by the mint bud mite, *Tarsonemus pipermenthae*. Although mints are perennials,

older stands may show serious build-ups of disease, insect, and weed problems and should be rotated out every 3 to 4 years.

### Fertilizing

**pH:** Maintain a soil pH of 5.5 to 6.5.

**New plantings:** Before planting new stolons, apply 40 pounds N per acre, 0 to 100 pounds P<sub>2</sub>O<sub>5</sub> per acre, and 0 to 400 pounds K<sub>2</sub>O per acre based on soil test results and recommendations from your state. Broadcast the fertilizer and plow it under when preparing the land for the planting furrows.

Topdress with 40 pounds N per acre on muck soils, or 80 pounds N per acre for mineral soils in early June.

**Established plantings:** Each year before emergence, broadcast or drill in 40 to 60 pounds N per acre, 0 to 50 pounds P<sub>2</sub>O<sub>5</sub> per acre and 0 to 150 pounds K<sub>2</sub>O per acre if a soil test recommends it.

Topdress with 60 to 90 pounds N per acre after canopy closure. The total amount of N from fertilizer should be 120 to 150 pounds N per acre.

Irrigation significantly increases oil yields on both muck and mineral soils, even in seasons with normal rainfall.

### Harvesting

For oil production, maximum yield and quality is reached when 10% of peppermint is in full bloom, or 100% of spearmint is in full bloom. Cut, windrow, and allow to partially dry for 24 to 36 hours before collecting for distillation. The machines for this are similar to hay machines, but the collection into distillation tubs requires a specialized procedure and equipment.

## Mint – Diseases

Reviewed by Dan Egel – Sept 2021

### Recommended Controls

#### Leaf Spot of Mint - Septoria Fungus

##### Pesticide

**chlorothalonil products (chlorothalonil)** | *Indiana only*. Several formulations of chlorothalonil (Bravo, Echo, Equus) are labeled at various rates. See product labels. REI: 12-hour. PHI: 80-day. FRAC M05.