

**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control.**

- **R** after the insecticide name indicates that the compound has a restricted-use label.
- **O** indicates that the pesticide is labeled for organic use. However, check with your organic certifier to be sure that the material is allowed for your organic system.
- For Certified Organic insect control materials, refer to the Organic Materials Review Institute materials list at [www.omri.org](http://www.omri.org) or call 514-343-7600 or check with your local certifier and see [www.ams.usda.gov/nop](http://www.ams.usda.gov/nop).
- Pesticide use can many times be avoided by using a combination of pest management methods. See Part I, Section 11, “Organic Crop Production,” and Part II, Section 1, “Pest Management” to learn about IPM programs and methods for organic production.
- **Most of these products are highly toxic to bees and many other beneficial insect species. See labels for details. Try to minimize use when crop is blooming and bees are likely to be present.**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)	
Bean Leaf Beetle Threshold: 15% of leaf area removed and five or more beetles per foot of row	azadirachtin <b>O</b> (Neemix 4.5) <i>or</i>	See label for rates		12	12	Insect growth regulator derived from neem tree; effective for control of larvae only. Apply in sufficient water for adequate coverage.
	acephate (Orthene 97) <i>or</i>	0.5 to 1.0 lb	0.49 to 0.97 lb	14	24	Do not apply more than 2 lb ai per acre per season. Do not feed treated plants to livestock
	beta-cyfluthrin <b>R</b> (Baythroid XL) <i>or</i>	1.6 to 2.8 oz	0.013 to 0.022 lb	45	12	Green forage may be fed 15 days after last application. Maximum allowed per crop season is 11.2 oz of material (0.088 lb ai per acre per season)
	bifenthrin <b>R</b> (Brigade 2EC) <i>or</i>	2.1 to 6.4 oz	0.033 to 0.10 lb	18	12	Do not apply more than 0.3 lb ai per acre per season.
	carbaryl <b>R</b> (Sevin) <i>or</i>	Many formulations are available.		21	12	Relatively safe for humans and livestock. See label for specific uses, rates, and restrictions.
	chlorpyrifos <b>R</b> (Lorsban 4E) (Nufos 4E) (Yuma 4E) <i>or</i>	1.0 to 2.0 pt	0.5 to 1.0 lb	28	24	Do not allow livestock to graze treated soybean forage, hay, and treated areas or otherwise feed straw to meat or dairy animals. No more than three applications per year; maximum of 3 lbs ai per acre per season. Do not make second application of chlorpyrifos within 10 days of first.
	chlorpyrifos + gamma-cyhalothrin <b>R</b> (Cobalt) <i>or</i>	19 to 38 oz	0.37 to 0.74 lb chlorpyrifos 0.007 to 0.013 lb gamma-cyhalothrin	30	24	Do not allow meat or dairy animals to graze in treated areas or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. Do not apply more than 85 oz of Cobalt per season. See label for further limitations on applying Cobalt and other chlorpyrifos-containing products.
	cyfluthrin + imidacloprid <b>R</b> (Leverage 2.7) <i>or</i>	3.8 oz		45	12	Green forage may be fed 15 days after last application. Minimum interval between applications is 7 days. Maximum allowed per crop per season is 11.4 oz of material (0.10 lb cyfluthrin per acre per season; 0.14 lb imidacloprid per acre per season)
	deltamethrin <b>R</b> (Delta Gold) <i>or</i>	1.5 to 1.9 oz	0.018 to 0.022 lb	21	12	Do not apply more than 8.5 oz per season.
	dimethoate <b>R</b> <i>or</i>	Various formulations are available.		21	48	Do not feed or graze for 5 days after last application. See label for specific uses, rates, and formulations.
	esfenvalerate <b>R</b> (Asana XL) <i>or</i>	5.8 to 9.6 oz	0.03 to 0.05 lb	21	12	Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb ai per acre per season. Allow 3 to 5 days for control to occur. Read label for additional restrictions and limitations.
	gamma-cyhalothrin <b>R</b> (Proaxis) <i>or</i>	2.56 to 3.84 oz	0.01 to 0.015 lb	21	24	Do not apply more than 0.96 pt per season (0.06 lb per acre per season).
	lambda-cyhalothrin <b>R</b> (Warrior or Warrior II) (Taiga Z) (Mystic Z) <i>or</i>	0.96 to 3.2 oz	0.015 to 0.025 lb	30 or 45	24	Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.06 lb ai per acre per season. See label for specific uses, rates, and formulations. Warrior II uses half the rate of Warrior.

(continued)

**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)	
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)		
Bean Leaf Beetle (continued)	methomyl <b>R</b> (Lannate LV) (Lannate 90SP) <i>or</i> methyl parathion <b>R</b> (PennCap-M)	0.75 to 1.0 pt 0.25 to 0.38 lb  2.0 to 3.0 pt	0.23 to 0.34 lb  0.44 to 0.66 lb	14  20	48  4 days	Vary rate according to severity of infestation. Do not apply more than three applications per season. Lower rates help conserve beneficial arthropods  Do not make more than two applications per season.	
	permethrin <b>R</b> (Ambush 25W) (Arctic 3.2EC) (Pounce 25WP) <i>or</i> thiocarb <b>R</b> (Larvin 3.2) <i>or</i> zeta-cypermethrin <b>R</b> (Mustang Max) <i>or</i> zeta-cypermethrin + bifenthrin <b>R</b> (Hero)	2.0 to 6.4 oz   2.8 to 4.0 oz  2.6 to 6.1 oz	0.05 to 0.10 lb   0.0175 to 0.025 lb  0.025 to 0.06 lb	60   21  21	12   12  12	Do not apply more than 0.4 lb ai per acre per season. Do not graze treated areas or harvest for forage or hay. See label for specific uses, rates, and formulations.  Do not exceed 0.75 lb ai per acre per application or 3.0 lb ai per acre per season. Do not feed treated forage to livestock. Use lower rates for maximum protection of beneficial arthropods.  Do not apply more than 0.15 lb ai (24 oz) per season. Do not make applications less than seven days apart. Do not graze or harvest treat soybean forage for livestock.  Do not make applications less than 30 days apart. Do not apply more than 0.40 lb ai per season. Do not graze or harvest treated soybean forage, straw, or hay for livestock feed.	
	<b>Seed Treatments</b>						
	thiamethoxam (Cruiser 5FS) <i>or</i> imidacloprid (Gaucho)	1.28 oz per 100 lbs of seed  1.6 to 3.2 oz per 100 lbs of seed					Systemic insecticide. Early season protection from overwintered population only. Will not prevent later season problems.  Use as planter-box treatment. Early season protection from overwintered population only. Will not prevent later season problems.
	Grasshopper Threshold: 30% of leaf area removed before bloom or 15% between bloom and pod fill, or when 5 to 10% of pods are damaged	acephate (Orthene 97) <i>or</i> beta-cyfluthrin <b>R</b> (Baythroid XL) <i>or</i> bifenthrin <b>R</b> (Brigade 2EC) <i>or</i> carbaryl (Sevin) <i>or</i> chlorpyrifos <b>R</b> (Lorsban 4E) (Nufos 4E) (Yuma 4E) <i>or</i> chlorpyrifos + gamma- cyhalothrin <b>R</b> (Cobalt) <i>or</i>	0.25 to 0.5 lb  2.0 to 2.8 oz  2.1 to 6.4 oz  Many formulations are available.  0.5 to 1.0 pt  7 to 13 oz	0.24 to 0.49 lb  0.016 to 0.022 lb  0.033 to 0.10 lb  0.14 to 0.25 lb chlorpyrifos 0.003 to 0.005 lb gamma-cyhalothrin	14  45  18  21  28  30	24  12  12  12  24  24	Do not apply more than 2 lb ai per acre per season. Do not feed treated plants to livestock.  Green forage may be fed 15 days after last application. Maximum allowed per crop season is 11.2 oz of material.  Do not apply more than 0.3 lb ai per acre per season.  Relatively safe for humans and livestock. See label for specific uses, rates, and restrictions.  Do not allow livestock to graze treated soybean forage, hay, and treated areas or otherwise feed straw to meat or dairy animals. No more than three applications per year; maximum of 3 lb ai per acre per season. Do not make second application of chlorpyrifos within 10 days of first.  Do not allow meat or dairy animals to graze in treated areas or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. Do not apply more than 85 oz of Cobalt per season. See label for further limitations on applying Cobalt and other chlorpyrifos-containing products.

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**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)	
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)		
Grasshopper (continued)	cyfluthrin + imidacloprid <i>R</i> (Leverage 2.7) <i>or</i>	3.8 oz		45	12	Green forage may be fed 15 days after last application. Minimum interval between applications is 7 days. Maximum allowed per crop season is 11.4 oz of material (0.10 lb cyfluthrin per acre per season; 0.14 lb imidacloprid per acre per season).	
	deltamethrin <i>R</i> (Delta Gold) <i>or</i>	1.5 to 1.9 oz	0.018 to 0.022 lb	21	12		Do not apply more than 8.5 oz per season.
	diflubenzuron <i>R</i> (Dimilin 25W) <i>or</i>	2.0 to 4.0 oz	0.13 to 0.25 lb	21	12	Insect growth regulator; does not control adults. Apply before grasshoppers reach second to third instar. Do not apply more than two applications per season.	
	dimethoate <i>or</i>	Various formulations are available.		21	48	See label for specific uses, rates, and formulations. Do not feed or graze for 5 days after last application.	
	esfenvalerate <i>R</i> (Asana XL) <i>or</i>	5.8 to 9.6 oz	0.03 to 0.05 lb	21	12	For first and second instar nymphs use 3.9 to 5.8 oz. Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb ai per acre per season. Allow 3 to 5 days for control to occur. Read label for additional restrictions and limitations.	
	gamma-cyhalothrin <i>R</i> (Proaxis) <i>or</i>	2.56 to 3.84 oz	0.01 to 0.015 lb	21	24	Do not apply more than 0.96 pt per season (0.06 lb per acre per season).	
	lambda-cyhalothrin <i>R</i> (Warrior or Warrior II) (Taiga Z) (Mystic Z) <i>or</i>	1.6 to 3.8 oz	0.025 to 0.03 lb	30 or 45	24	Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.06 lb ai per acre per season. See label for specific uses, rates, and formulations. Warrior II uses half the rate of Warrior.	
	methyl parathion <i>R</i> (PennCap-M) <i>or</i>	2.0 to 3.0 pt	0.44 to 0.66 lb	20	4 days	Do not make more than two applications per season.	
	zeta-cypermethrin <i>R</i> (Mustang Max) <i>or</i>	3.2 to 4.0 oz	0.02 to 0.025 lb	21	12	Do not make applications less than seven days apart. Do not apply more than 0.15 lb ai (24 oz) per season. Do not graze or harvest treat soybean forage for livestock.	
	zeta-cypermethrin + bifenthrin <i>R</i> (Hero)	2.6 to 6.1 oz	0.025 to 0.06 lb	21	12	Do not make applications less than 30 days apart. Do not apply more than 0.40 lb ai per season. Do not graze or harvest treat soybean forage, straw of hay for livestock feed.	
	Green Cloverworm Threshold: 12 or more worms per linear ft of row and 15% of leaf area is removed	acephate (Orthene 97) <i>or</i>	0.5 to 1.0 lb	0.49 to 0.97 lb	14	24	Do not apply more than 2 lb ai per acre per season. Do not feed treated plants to livestock.
		<i>Bacillus thuringiensis</i> <i>O</i> <i>or</i>	Many formulations available and marketed under numerous names. Check label for rates.				An alternative to synthetic pesticides; provides reasonable control. Maintain continuous agitation to ensure uniform suspension.
		beta-cyfluthrin <i>R</i> (Baythroid XL) <i>or</i>	0.8 to 1.6 oz	0.007 to 0.013 lb	45	12	Green forage may be fed 15 days after last application. Maximum allowed per crop season is 11.2 oz of material.
bifenthrin <i>R</i> (Brigade 2EC) <i>or</i>		2.1 to 6.4 oz	0.033 to 0.10 lb	18	12	Do not apply more than 0.3 lb ai per acre per season.	
carbaryl <i>R</i> (Sevin) <i>or</i>		Many formulations available.		21	12	Relatively safe for humans and livestock. See label for specific uses, rates, and restrictions.	
chlorpyrifos <i>R</i> (Lorsban 4E) (Nufos 4E) (Yuma 4E) <i>or</i>		0.50 to 1.0 pt	0.25 to 0.50 lb	28	24	Do not allow livestock to graze treated soybean forage, hay, and treated areas or otherwise feed straw to meat or dairy animals. No more than three applications per year; maximum of 3 lbs ai per acre per season. Do not make second application of chlorpyrifos within 10 days of first.	

(continued)

**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)	
Green Cloverworm (continued)	chlorpyrifos + gamma-cyhalothrin <b>R</b> (Cobalt) <i>or</i>	7 to 13 oz	0.14 to 0.25 lb chlorpyrifos 0.003 to 0.005 lb gamma-cyhalothrin	30	24	Do not allow meat or dairy animals to graze in treated areas or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. Do not apply more than 85 oz of Cobalt per season. See label for further limitations on applying Cobalt and other chlorpyrifos-containing products.
	cyfluthrin + imidacloprid <b>R</b> (Leverage 2.7) <i>or</i>	3.8 oz		45	12	Green forage may be fed 15 days after last application. Minimum interval between applications is 7 days. Maximum allowed per crop season is 11.4 oz of material (0.10 lb cyfluthrin per acre per season; 0.14 lb imidacloprid per acre per season).
	deltamethrin <b>R</b> (Delta Gold) <i>or</i>	1.0 to 1.5 oz	0.012 to 0.018 lb	21	12	Do not apply more than 8.5 oz per season.
	difluorobenzamide (Dimilin 25W) <i>or</i>	2.0 to 4.0 oz	0.125 to 0.25 lb	21	12	Apply when larvae are small. Insect growth regulator; does not control adults. Do not apply more than two applications per season.
	esfenvalerate <b>R</b> (Asana XL) <i>or</i>	2.9 to 5.8 oz	0.015 to 0.03 lb	21	12	Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb ai per acre per season. Allow 3 to 5 days for control to occur. Read label for additional restrictions and limitations.
	gamma-cyhalothrin <b>R</b> (Proaxis) <i>or</i>	1.9 to 3.2 oz	0.008 to 0.013 lb	30	24	Do not apply more than 0.96 pt per season (0.06 lb per acre per season).
	indoxacarb (Steward) <i>or</i>	5.6 to 11.3 oz	0.055 to 0.11 lb	21	12	Do not apply more than 45 oz (0.44 lb ai) per season. Do not feed or graze livestock on treated fields.
	lambda-cyhalothrin <b>R</b> (Warrior or Warrior II) (Taiga Z) (Mystic Z) <i>or</i>	0.96 to 3.2 oz	0.015 to 0.025 lb	30 or 45	24	Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.06 lb ai per acre per season. See label for specific uses, rates, and formulations. Warrior II uses half the rate of Warrior.
	methomyl <b>R</b> (Lannate 90SP) (Lannate LV) <i>or</i>	0.13 to 0.25 lb 0.40 to 0.75 pt	0.12 to 0.23 lb	14	48	Vary rate according to severity of infestation. Do not apply more than three applications per season. Lower rates help conserve beneficial arthropods.
	methoxylenozide (Intrepid 2F) <i>or</i>	4.0 to 8.0 oz	0.06 to 0.12 lb	14	4	Use higher rate for heavier infestation. Do not apply more than 64 oz (1 lb ai) or four applications per season.
	methyl parathion <b>R</b> (PennCap-M) <i>or</i>	2.0 to 3.0 pt	0.44 to 0.66 lb	20	4 days	Do not make more than two applications per season.
	permethrin <b>R</b> (Arctic 3.2EC) (Ambush 25W) (Pounce 25W) <i>or</i>	2.0 to 6.4 oz	0.05 to 0.10 lb	60	12	Do not graze treated areas and do not harvest for forage or hay. Do not apply more than 0.4 lb ai per acre per season. See label for specific uses, rates, and formulations.
	spinosad (Entrust) <b>O</b> (Tracer) <i>or</i>	1.0 to 2.0 oz	0.03 to 0.1 lb	28	4	Does not harm beneficial insect complex in field. Do not feed treated forage or hay to meat or dairy animals. Do not apply more than 3.7 oz of Entrust or 6 oz of Tracer per acre per year.
	thiocarb <b>R</b> (Larvin 3.2) <i>or</i>	10 to 30 oz	0.25 to 0.75 lb	28	48	Do not exceed 0.75 lb ai per acre per application or 3.0 lb ai per acre per season. Do not feed treated forage to livestock. Use lower rates for maximum protection of beneficial arthropods.
	zeta-cypermethrin <b>R</b> (Mustang Max) <i>or</i>	2.8 to 4.0 oz	0.0175 to 0.025 lb	21	12	Do not make applications less than seven days apart. Do not apply more than 0.15 lb ai (24 oz) per season. Do not graze or harvest treat soybean forage for livestock.

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**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)	
<b>Green Cloverworm</b> (continued)	zeta-cypermethrin + bifenthrin <b>R</b> (Hero)	2.6 to 6.1 oz	0.025 to 0.06 lb	21	12	Do not make applications less than 30 days apart. Do not apply more than 0.40 lb ai per season. Do not graze or harvest treat soybean forage, straw of hay for livestock feed.
<b>Japanese Beetle</b> Threshold: 20% of leaf area removed during bloom and pod fill	carbaryl <b>R</b> (Sevin)	Many formulations are available.		21	12	Relatively safe for humans and livestock. See label for specific uses, rates, and restrictions.
	or					
	beta-cyfluthrin <b>R</b> (Baythroid XL)	1.6 to 2.8 oz	0.013 to 0.022 lb	45	12	Green forage may be fed 15 days after last application. Maximum allowed per crop season is 11.2 oz of material.
	or					
	bifenthrin <b>R</b> (Brigade 2EC)	2.1 to 6.4 oz	0.033 to 0.10 lb	18	12	Do not apply more than 0.3 lb ai per acre per season.
	or					
	chlorpyrifos + gamma-cyhalothrin <b>R</b> (Cobalt)	19 to 38 oz	0.37 to 0.74 lb chlorpyrifos 0.007 to 0.013 lb gamma-cyhalothrin	30	24	Do not allow meat or dairy animals to graze in treated areas or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. Do not apply more than 85 oz of Cobalt per season. See label for further limitations on applying Cobalt and other chlorpyrifos-containing products.
	or					
	cyfluthrin + imidacloprid <b>R</b> (Leverage 2.7)	3.8 oz		45	12	Green forage may be fed 15 days after last application. Minimum interval between applications is 7 days. Maximum allowed per crop season is 11.4 oz of material (0.10 lb cyfluthrin per acre per season; 0.14 lb imidacloprid per acre per season)
	or					
	deltamethrin <b>R</b> (Delta Gold)	1.5 to 1.9 oz	0.018 to 0.022 lb	21	12	Do not apply more than 8.5 oz per season.
or						
esfenvalerate <b>R</b> (Asana XL)	5.8 to 9.6 oz	0.03 to 0.05 lb	21	12	Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb ai per acre per season. Allow 3 to 5 days for control to occur. Read label for additional restrictions and limitations.	
or						
gamma-cyhalothrin <b>R</b> (Proaxis)	2.56 to 3.84 oz	0.01 to 0.015 lb	21	24	Do not apply more than 0.96 pt (0.06 lb per acre) per season.	
or						
lambda-cyhalothrin <b>R</b> (Warrior or Warrior II) (Taiga Z) (Mystic Z)	1.6 to 3.8 oz	0.025 to 0.03 lb	30 or 45	24	Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.06 lb ai per acre per season. See label for specific uses, rates, and formulations. Warrior II uses half the rate of Warrior.	
or						
methyl parathion <b>R</b> (PennCap-M)	2.0 to 3.0 pt	0.44 to 0.66 lb	20	4 days	Do not make more than two applications per season.	
or						
permethrin <b>R</b> (Ambush 25W) (Arctic 3.2EC) (Pounce 25WP)	2.0 to 12.8 oz	0.05 to 0.10 lb	60	12	Do not graze treated areas and do not harvest for forage or hay. Do not apply more than 0.4 lb ai per acre per season. See label for specific uses, rates, and formulations.	
or						
zeta-cypermethrin <b>R</b> (Mustang Max)	2.8 to 4.0 oz	0.0175 to 0.025 lb	21	12	Do not make applications less than seven days apart. Do not apply more than 0.15 lb ai (24 oz) per season. Do not graze or harvest treated soybean forage for livestock.	
or						
zeta-cypermethrin + bifenthrin <b>R</b> (Hero)	4.0 to 10.3 oz	0.04 to 0.10 lb	21	12	Do not make applications less than 30 days apart. Do not apply more than 0.40 lb ai per season. Do not graze or harvest treat soybean forage, straw of hay for livestock feed.	

(continued)

**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)	
Mexican Bean Beetle Threshold: 30% of leaf area removed before bloom and 15% of leaf area removed after bloom	acephate (Orthene 97) <i>or</i>	0.5 to 1.0 lb	0.49 to 0.97 lb	14	24	Do not apply more than 2 lb ai per acre per season. Do not feed treated plants to livestock
	azadirachtin <b>O</b> (Neemix 4.5) <i>or</i>	See label for rates		12	12	Insect growth regulator derived from neem tree. Apply in sufficient water for adequate coverage. Effective for control of larvae only.
	beta-cyfluthrin <b>R</b> (Baythroid XL) <i>or</i>	1.6 to 2.8 oz	0.013 to 0.022 lb	45	12	Green forage may be fed 15 days after last application. Maximum allowed per crop season is 11.2 oz of material.
	bifenthrin <b>R</b> (Brigade 2EC) <i>or</i>	2.1 to 6.4 oz	0.033 to 0.10 lb	18	12	Do not apply more than 0.3 lb ai per acre per season.
	carbaryl <b>R</b> (Sevin) <i>or</i>	Many formulations available.		21	12	Relatively nontoxic to humans and livestock. See label for specific uses, rates, and restrictions.
	chlorpyrifos <b>R</b> (Lorsban 4E) (Nufos 4E) (Yuma 4E) <i>or</i>	1.0 to 2.0 pint	0.5 to 1.0 lb	28	24	Do not allow livestock to graze treated soybean forage, hay, and treated areas or otherwise feed straw to meat or dairy animals. No more than three applications per year; maximum of 3 lb ai per acre per season. Do not make second application of chlorpyrifos within 10 days of first.
	chlorpyrifos + gamma-cyhalothrin <b>R</b> (Cobalt) <i>or</i>	19 to 38 oz	0.37 to 0.74 lb chlorpyrifos 0.007 to 0.013 lb gamma-cyhalothrin	30	24	Do not allow meat or dairy animals to graze in treated areas or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. Do not apply more than 85 oz of Cobalt per season. See label for further limitations on applying Cobalt and other chlorpyrifos-containing products.
	cyfluthrin + imidacloprid <b>R</b> (Leverage 2.7) <i>or</i>	3.8 oz		45	12	Green forage may be fed 15 days after last application. Minimum interval between applications is 7 days. Maximum allowed per crop season is 11.4 oz of material (0.10 lb cyfluthrin per acre per season; 0.14 lb imidacloprid per acre per season).
	deltamethrin <b>R</b> (Delta Gold) <i>or</i>	1.5 to 1.9 oz	0.018 to 0.022 lb	21	12	Do not apply more than 8.5 oz per season.
	difluorobenzamide <b>R</b> (Dimilin 25W) <i>or</i>	2.0 to 4.0 oz	0.13 to 0.25 lb	21	12	Apply when larvae are small. Insect growth regulator; does not control adults. Do not make more than two applications per season.
	dimethoate <i>or</i>	Various formulations are available.		21	48	Do not feed or graze for 5 days after last application. See label for specific uses, rates, and formulations.
	esfenvalerate <b>R</b> (Asana XL) <i>or</i>	5.8 to 9.6 oz	0.03 to 0.05 lb	21	12	Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb ai per acre per season. Allow 3 to 5 days for control to occur. Read label for additional restrictions and limitations.
	gamma-cyhalothrin <b>R</b> (Proaxis) <i>or</i>	1.9 to 3.2 oz	0.008 to 0.013 lb	30	24	Do not apply more than 0.96 pt (0.06 lb) per acre per season.
	lambda-cyhalothrin <b>R</b> (Warrior or Warrior II) (Taiga Z) (Mystic Z) <i>or</i>	0.96 to 3.2 oz	0.015 to 0.025 lb	30 or 45	24	Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.06 lb ai per acre per season. See label for specific uses, rates, and formulations. Warrior II uses half the rate of Warrior.
	methomyl <b>R</b> (Lannate 90SP) (Lannate LV) <i>or</i>	0.13 to 0.25 lb 0.40 to 0.75 pt	0.12 to 0.23 lb	14	48	Vary rate according to severity of infestation. Do not make more than three applications per season. Lower rates help conserve beneficial arthropods.

(continued)

**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)	
<b>Mexican Bean Beetle</b> (continued)	methyl parathion <b>R</b> (PennCap-M)	2.0 to 3.0 pt	0.44 to 0.66 lb	20	4 days	Do not make more than two applications per season.
	or					
	permethrin <b>R</b> (Arctic 3.2EC) (Ambush 25W) (Pounce 25W)	2.0 to 6.4 oz	0.05 to 0.10 lb	60	12	Do not apply more than 0.4 lb ai per acre per season. Do not graze treated areas and do not harvest for forage or hay. See label for specific uses, rates, and formulations.
	or					
	thiocarb <b>R</b> (Larvin 3.2)	10 to 30 oz	0.25 to 0.75 lb	28	48	Do not exceed 0.75 lb ai per acre per application or 3.0 lb ai per acre per season. Do not feed treated forage to livestock. Use lower rates for maximum protection of beneficial arthropods.
	or					
	zeta-cypermethrin <b>R</b> (Mustang Max)	2.8 to 4.0 oz	0.0175 to 0.025 lb	21	12	Do not apply more than 0.15 lb ai (24 oz) per season. Do not make applications less than seven days apart. Do not graze or harvest treat soybean forage for livestock.
	or					
	zeta-cypermethrin + bifenthrin <b>R</b> (Hero)	4.0 to 10.3 oz	0.04 to 0.10 lb	21	12	Do not make applications less than 30 days apart. Do not apply more than 0.40 lb ai per season. Do not graze or harvest treat soybean forage, straw, or hay for livestock feed.
	<b>Seed Treatment</b>					
	thiamethoxam (Cruiser 5FS)	1.28 oz per 100 lbs of seed				Systemic insecticide. Early season protection from overwintered population only. Will not prevent later season problems.
<b>Potato Leafhopper</b> Threshold: V1—1 per plant V2—3 V3—6 R4—9 or four per sweep if plants are moisture stressed; eight per sweep if plants not moisture stressed	acephate (Orthene 97)	0.5 to 1.0 lb	0.49 to 0.97 lb	14	24	Do not apply more than 2 lb ai per acre per season. Do not feed treated plants to livestock.
	or					
	azadirachtin <b>O</b> (Neemix 4.5)	See label for rates		12	12	Insect growth regulator derived from neem tree. Apply in sufficient water for adequate coverage. Effective for control of nymphs only.
	or					
	beta-cyfluthrin <b>R</b> (Baythroid XL)	0.8 to 1.6 oz	0.013 to 0.025 lb	45	12	Green forage may be fed 15 days after last application. Maximum allowed per crop season is 11.2 oz of material (0.088 lb ai per acre per season).
	or					
	bifenthrin <b>R</b> (Brigade 2EC)	2.1 to 6.4 oz	0.033 to 0.10 lb	18	12	Do not apply more than 0.3 lb ai per acre per season.
	or					
	carbaryl <b>R</b> (Sevin)	Many formulations available.		21	12	Relatively safe for humans and livestock. See label for specific uses, rates, and restrictions.
	or					
	chlorpyrifos + gamma-cyhalothrin <b>R</b> (Cobalt)	19 to 38 oz	0.37 to 0.74 lb chlorpyrifos 0.007 to 0.013 lb gamma-cyhalothrin	30	24	Do not allow meat or dairy animals to graze in treated areas or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. Do not apply more than 85 oz of Cobalt per season. See label for further limitations on applying Cobalt and other chlorpyrifos-containing products.
	or					
	cyfluthrin + imidacloprid <b>R</b> (Leverage 2.7)			45	12	Green forage may be fed 15 days after last application. Minimum interval between applications is 7 days. Maximum allowed per crop season is 11.4 oz of material (0.10 lb cyfluthrin per acre per season; 0.14 lb imidacloprid per acre per season).
	or	3.0 to 3.8 oz				
	deltamethrin <b>R</b> (Delta Gold)	1.0 to 1.5 oz	0.012 to 0.018 lb	21	12	Do not apply more than 8.5 oz per season.
	or					
	dimethoate	Various formulations are available.		21	48	See label for specific uses, rates, and formulations. Do not feed or graze within 5 days of application.
	or					
	esfenvalerate <b>R</b> (Asana XL)	2.9 to 5.8 oz	0.015 to 0.03 lb	21	12	Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb ai per acre per season. Allow 3 to 5 days for control to occur. Read label for additional restrictions and limitations.
	or					
	gamma-cyhalothrin <b>R</b> (Proaxis)	2.56 to 3.84 oz	0.01 to 0.015 lb	21	24	Do not apply more than 0.96 pt (0.06 lb) per acre per season.
	or					

(continued)

**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)	
Potato Leafhopper (continued)	lambda-cyhalothrin <b>R</b> (Warrior or Warrior II) (Taiga Z) (Mystic Z) <i>or</i>	0.96 to 3.2 oz	0.015 to 0.025 lb	30 or 45	24	Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.06 lb ai per acre per season. See label for specific uses, rates, and formulations. Warrior II uses half the rate of Warrior.
	methyl parathion <b>R</b> (Penncap-M) <i>or</i>	2.0 to 3.0 pt	0.44 to 0.66 lb	20	4 days	Do not make more than two applications per season.
	permethrin <b>R</b> (Arctic 3.2EC) (Ambush 25W) (Pounce 25W) <i>or</i>	2.0 to 6.4 oz	0.05 to 0.10 lb	60	12	Do not graze treated areas or harvest for forage or hay. Do not apply more than 0.4 lb ai per acre per season. See label for specific uses, rates, and formulations.
	zeta-cypermethrin <b>R</b> (Mustang Max) <i>or</i>	2.8 to 4.0 oz	0.0175 to 0.025 lb	21	12	Do not apply more than 0.15 lb ai (24 oz) per season. Do not make applications less than seven days apart. Do not graze or harvest treat soybean forage for livestock.
	zeta-cypermethrin + bifenthrin <b>R</b> (Hero)	4.0 to 10.3 oz	0.04 to 0.10 lb	21	12	Do not make applications less than 30 days apart. Do not apply more than 0.40 lb ai per season. Do not graze or harvest treat soybean forage, straw of hay for livestock feed.
	<b>Seed Treatment</b>					
	thiamethoxam (Cruiser 5FS)	1.28 oz per 100 lbs of seed				Early season protection only. Will not prevent later season problems.
Seedcorn Maggot Threshold: None. Good idea to use a seed treatment if soil typically is cold and wet after soybean is planted, especially if a green living cover crop has been tilled	<b>Seed Treatments</b>					
	thiamethoxam (Cruiser 5FS) <i>or</i>	1.28 oz per 100 lbs of seed				Not for hopper-box treatment.
	imidacloprid (Gaucho)	1.6 to 3.2 oz per 100 lbs of seed				Use as planter-box treatment. Do not graze or feed livestock on soybean hay or forage.
Seedcorn maggot note: • Seedcorn maggot can cause serious injury to both soybean and corn fields. Certain field conditions are more likely to lead to seedcorn maggot problems (see Table 2.1-6). If these conditions exist, a planter-box treatment is relatively inexpensive and a good investment.						
Slugs Threshold: Heavy feeding on cotyledons and unifoliate leaves	metaldehyde (Deadline MPs) (Metarex) <i>or</i>	10 lb	0.4 lb	0	12	See comments in corn section, Table 2.2-20.
	Soybean Aphid Threshold: 250 aphids per plant with an increasing population	acephate (Orthene 97) <i>or</i>	0.5 to 1.0 lb	0.49 to 0.97 lb	14	24
beta-cyfluthrin <b>R</b> (Baythroid XL) <i>or</i>		2.0 to 2.8 oz	0.016 to 0.022 lb	45	12	Green forage may be fed 15 days after last application. Maximum allowed per crop season is 11.2 oz of material.
bifenthrin <b>R</b> (Brigade 2EC) <i>or</i>		2.1 to 6.4 oz	0.033 to 0.10 lb	18	12	Do not apply more than 0.3 lb ai per acre per season.
chlorpyrifos <b>R</b> (Lorsban 4E) (Nufos 4E) (Yuma 4E) <i>or</i>		1.0 to 2.0 pt	0.5 to 1.0 lb	28	24	Do not allow livestock to graze treated soybean forage, hay, and treated areas or otherwise feed straw to meat or dairy animals. Do not make more than three applications per year; maximum of 3 lbs ai per acre per season. Do not make second application of chlorpyrifos within 10 days of first.

(continued)

**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)	
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)		
Soybean Aphid (continued)	chlorpyrifos + gamma-cyhalothrin <b>R</b> (Cobalt) <i>or</i>	13 to 26 oz	0.25 to 0.51 lb chlorpyrifos 0.005 to 0.009 lb gamma-cyhalothrin	30	24	Do not allow meat or dairy animals to graze in treated areas or otherwise feed treated soybean forage, hay, and straw to meat or dairy animals. Do not apply more than 85 oz of Cobalt per season. See label for further limitations on applying Cobalt and other chlorpyrifos-containing products.	
	cyfluthrin + imidacloprid <b>R</b> (Leverage 2.7) <i>or</i>	3.8 oz		45	12	Green forage may be fed 15 days after last application. Minimum interval between applications is 7 days. Maximum allowed per crop season is 11.4 oz of material (0.10 lb cyfluthrin per acre per season; 0.14 lb imidacloprid per acre per season).	
	deltamethrin <b>R</b> (Delta Gold) <i>or</i>	1.5 to 1.9 oz	0.018 to 0.022 lb	21	12	Do not apply more than 8.5 oz per season.	
	dimethoate <i>or</i>	Various formulations are available.		21	48	See label for specific uses, rates, and formulations. Do not feed or graze within 5 days of application.	
	esfenvalerate <b>R</b> (Asana XL) <i>or</i>	5.8 to 9.6 oz	0.03 to 0.05 lb	21	12	Do not feed or graze livestock on treated plants. Do not exceed 0.2 lb ai per acre per season. Allow 3 to 5 days for control to occur. Read label for additional restrictions and limitations.	
	gamma-cyhalothrin <b>R</b> (Proaxis) <i>or</i>	2.56 to 3.84 oz	0.01 to 0.015 lb	21	24	Do not apply more than 0.96 pt (0.06 lb) per acre per season.	
	lambda-cyhalothrin <b>R</b> (Warrior or Warrior II) (Taiga Z) (Mystic Z) <i>or</i>	0.96 to 3.2 oz	0.015 to 0.025 lb	30 or 45	24	Do not graze or harvest treated soybean forage, straw, or hay for livestock feed. Do not apply more than 0.06 lb ai per acre per season. See label for specific uses, rates, and formulations. Warrior II uses half the rate of Warrior.	
	methyl parathion <b>R</b> (PennCap-M) <i>or</i>	2.0 to 3.0 pt	0.44 to 0.66 lb	20	4 days	Do not make more than two applications per season.	
	zeta-cypermethrin <b>R</b> (Mustang Max) <i>or</i>	2.8 to 4.0 oz	0.0175 to 0.025 lb	21	12	Do not apply more than 0.15 lb ai (24 oz) per season. Do not make applications less than seven days apart. Do not graze or harvest treat soybean forage for livestock.	
	zeta-cypermethrin + bifenthrin <b>R</b> (Hero)	4.0 to 10.3 oz	0.04 to 0.10 lb	21	12	Do not make applications less than 30 days apart. Do not apply more than 0.40 lb ai per season. Do not graze or harvest treat soybean forage, straw, or hay for livestock feed.	
	<b>Seed Treatments</b>						
	thiamethoxam (Cruiser 5FS) <i>or</i>	1.28 oz per 100 lbs of seed					Not for hopper-box treatment. Might only be effective for late plantings and early aphid populations. Will not prevent later season problems. Good chance a later spray will be needed.
	imidacloprid (Gaucho)	1.6 to 3.2 oz per 100 lbs of seed					Use as planter-box treatment. Might only be effective for late plantings and early aphid populations. Will not prevent later season problems. Good chance a later spray will be needed. Do not graze or feed livestock on soybean hay or forage.

(continued)

**Table 2.4-18. Suggested insecticides, rates, and restrictions for soybean insect control (continued).**

Pest	Insecticides	Rate/A		Restrictions		Comments (Read the label for dosage method and limitations.)
		Formulated	Active ingredient	Harvest (days)	Reentry (hours)	
Two-Spotted Spider Mite Threshold: Treat when plants along field margin or within field show discoloration and mites are present	chlorpyrifos <i>R</i> (Lorsban 4E) (Nufos 4E) (Yuma 4E) or	1.0 to 2.0 pt	0.5 to 1.0 lb	28	24	When large numbers of eggs are present, scout the treated areas for 3 to 5 days. If newly hatched nymphs are present, make a follow-up application of a nonchlorpyrifos product that is effective against mites. Do not make second application of chlorpyrifos within 10 days of first. No more than three applications per year; maximum of 3 lbs ai per acre per season. Do not allow livestock to graze treated soybean forage, hay, and treated areas or otherwise feed straw to meat or dairy animals.
	bifenthrin <i>R</i> (Brigade 2EC) or	5.12 to 6.4 oz	0.08 to 0.10 lb	18	12	Do not apply more than 0.3 lb ai per acre per season.
	dimethoate	Various formulations are available.		21	48	See label for specific uses, rates, and formulations. Do not feed or graze within 5 days of last application.
Spider mite notes:						
<ul style="list-style-type: none"> <li>• Spider mite infestations can begin after extended hot, dry periods in the summer, usually in late July and August. Infestations usually begin along the edges of fields and progress into fields. Spraying the edges after early detection can prevent the need to treat entire fields.</li> <li>• However, beginning to see earlier infestations within the field in late June and early July if spring is hot and dry where whole field needs treatment.</li> <li>• The pyrethroids Proaxis, Mystic Z, Taiga Z, and Warrior are also labeled on soybean for two-spotted spider mites. However, all are for suppression only. Either a material containing chlorpyrifos or dimethoate would be a better choice.</li> </ul>						

## DISEASES

Fungicide seed treatment is especially important for beans planted early when soils are cold and wet. Under these conditions, seed decay and seedling diseases are major threats to plant populations as well as to ultimate plant vigor and yields. In early plantings, the fungicide treatment may have to take precedence over inoculation with nitrogen-fixing bacteria. In later plantings in warm moist soils, seedling diseases are less of a threat, so the successful use of nitrogen-fixing bacteria is the major concern.

If possible, do not add inoculant to seed freshly treated with fungicide. If a fungicide seed treatment is to be used, it should be applied to the seed several days before inoculant is added. Several specially prepared combinations of inoculant and fungicide are commercially available.

For growers who have problems with *Pythium* damping-off or early season *Phytophthora*, a fungicide treatment of metalaxyl (Apron or Apron XL LS) may improve plant stands and yields, even with *Phytophthora*-resistant varieties. This treatment is labeled for use by commercial seed treaters only.

Seed diseases have become a major problem in Pennsylvania. When purple seed stain or pod and stem blight (moldy beans) become a problem, crop rotation, clean seed, and use of a recommended variety are essential.

### Early Season Disease

**Brown spot.** Also known as *Septoria* leaf spot, brown spot is a foliar disease that under severe conditions can lead to rapid defoliation of the soybean plant. These outbreaks commonly occur after prolonged periods of rain and/or high relative humidity. The disease can be controlled easily with fungicides; however, under Pennsylvania growing conditions, disease levels warranting control are rarely observed. Soybean varieties resistant to the disease are not available. Control recommendations include plowing under crop residues soon after harvest, planting disease-free seed, and rotation to other crops.

**Brown stem rot.** The occurrence of this disease appears to be increasing in Pennsylvania. Losses have not been determined, but those in other areas reportedly have been as high as 25 percent. Losses occur because of reduced numbers and size of the seed and lodging of infected plants. External symptoms usually are not visible until late in the growing season. The lower portion of the diseased stems turns a dull brown color, followed by rapid dying of the leaves. The fungus responsible for this disease overwinters in the soil and in soybean debris. Severity appears to be greatest when cool weather

occurs during pod fill followed by hot, dry weather. Rotation to a nonsusceptible crop is a recommended control method. Genetic resistance has been identified, but the level of resistance available in varieties recommended for Pennsylvania is unclear.

### Mid-Season Disease

**Charcoal rot.** Charcoal rot, also known as summer wilt, can occur during periods of hot, dry weather, which causes plant stress. Plants affected with charcoal rot often appear wilted or drought stressed but do not regain growth after rain. These plants often seem to have accelerated maturity and are easily found when the field is near R6–R7 since these patches have already lost their leaves. The disease causes a reddish brown discoloration of the taproot and progresses up the stem producing small, black microsclerotia (reproductive structures) that resemble charcoal dust on the stem. The microsclerotia can survive in the soil for 2 years or longer and the fungus can survive in the seed coat for up to 3 years. The symptoms are similar to white mold without the white, cottony growth and large sclerotia. The best control measures include using certified, disease-free seed and crop rotation. In a field with a history of charcoal rot, rotate to a cereal crop for 2 years.