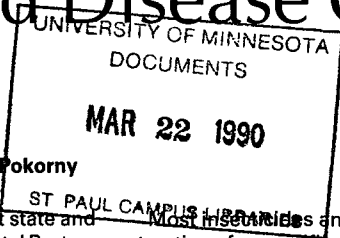


AG-FO-1881—Revised 1990

COMMERCIAL VEGETABLE Weed, Insect, and Disease Control Guide: Beans and Peas



W. D. Hutchison, F. L. Pflieger, Leonard B. Hertz, and J. D. Pokorny

Pesticide suggestions in this guide are based on current state and federal registrations and tolerances set by the Environmental Protection Agency (EPA). *Directions given in this guide and on current container labels should be read, understood, and followed carefully in order to control pests and diseases effectively without causing excessive residues to remain on the crops.* The following information is up to date at the time of this printing. Information regarding any changes during the 1990 season will be made available to all commercial growers.

Suggestions for sampling and action thresholds are sometimes based on local studies, but are often derived from those of other states in the North Central Region, especially Michigan, due to lack of local data.

This publication is for your information. The University of Minnesota and its officers or employees make no claims or representations that the chemicals discussed will or will not result in residues on agricultural commodities and assume no responsibility for results of their use.

State and Federal laws require that only certified applicators may use or supervise the application of certain pesticides with restricted uses. Information about certification is available from your county extension agent-agriculture.

RATES OF APPLICATION FOR INSECTICIDES AND FUNGICIDES

If you are preparing sprays that contain emulsifiable concentrates (E), read the label to determine how many pounds of active ingredient are in each gallon of concentrate. For example, 25-percent methoxychlor emulsifiable concentrate contains 2 pounds of active ingredient per gallon. If you wish to apply 1 pound of actual methoxychlor per acre, decide on the amount of liquid you want to apply per acre and add 1/2 gallon of 25-percent methoxychlor concentrate to the amount of water needed for 1 acre.

Most insecticides and fungicides can be mixed. Read the label instructions for specific combinations.

Sometimes small amounts of insecticides or fungicides are listed in terms of tablespoons and teaspoons. These always mean level measures—not rounded or heaping.

Recommendations may be given in terms of pounds or gallons of commercial preparation or as pounds of active ingredient per acre. "Pounds active ingredient" means the equivalent of 100-percent chemical. For example: 2 pounds of 50-percent methoxychlor wettable powder contains 1 pound of actual methoxychlor; 4 pounds of a 25-percent wettable powder contains 1 pound of active ingredient, and 20 pounds of a 5-percent dust contains 1 pound of active ingredient.

W. D. Hutchison is extension entomologist and assistant professor, Department of Entomology; F.L. Pflieger is extension plant pathologist and associate professor, Department of Plant Pathology; Leonard B. Hertz is extension horticulturist and professor, Department of Horticultural Science; and J. D. Pokorny is director, Plant Disease Clinic, Department of Plant Pathology. The authors acknowledge the assistance of other members of these departments.

The information given in this publication is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by the Minnesota Extension Service is implied.

Issued in furtherance of cooperative extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Patrick J. Borich, Dean and Director of Minnesota Extension Service, University of Minnesota, St. Paul, Minnesota 55108. The University of Minnesota, including the Minnesota Extension Service, is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, religion, color, sex, national origin, handicap, age, veteran status, or sexual orientation.

CHEMIGATION OF PESTICIDES

Minnesota Pesticide Control Law requires each chemigation system used for applying pesticides with the irrigation water to be registered with the Minnesota Department of Agriculture (MDA) and contain the necessary approved anti-pollution check valves. Only pesticides displaying product label approved for chemigation application can be applied by this method. Specific information on check valves, registration, and posting is available from MDA (612/297-2614).

1990 Herbicide, Insecticide, and Fungicide Suggestions

BEANS

Weeds	Herbicide†	Amount/acre commercial product	Remarks and limitations
SNAPBEANS			
Germinating grasses and some broadleaves	Eptam or Genep 7E (EPTC)	2 qt.	Apply before planting and immediately incorporate. Also may be applied via center pivot irrigation in 1/2 to 3/4 inches of water.
	Dual 8E (metolachlor)	3/4-1 1/2 qt.	Apply before planting and incorporate; or apply after planting before crop and weeds emerge. Use lower rate on sandy soils.
	Treflan 4E (trifluralin)	1/2-3/4 qt.	Apply before planting and incorporate. Use lower rate on sandy soils.
	Prowl 4E (pendimethalin)	1/2-1 1/2 qt.	Apply immediately before planting and incorporate into the soil surface. Don't use on muck or peat soils.

†Abbreviations used in tables: phi—preharvest interval, NTL—no time limitations, D—dust, DF—dry flowable, DG—dispersible granules, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, SL—soluble liquid, SP—soluble powder, and W—wetttable powder. Dosages of insecticides are actual chemical per acre, with some exceptions. *Restricted use pesticide. Post treated areas when required by labels.

BEANS (continued)

Weeds	Herbicide†	Amount/acre commercial product	Remarks and limitations
Tank mixes for annual weeds	Eptam 7E + Treflan 4E Dual 8E + Eptam 7E	2 qt. + 1/2 qt. 3/4-1 1/2 qt. + 2 qt.	Apply before planting and immediately incorporate. Apply as a tank mix before planting and immediately incorporate; or apply Eptam alone preplant incorporated and Dual preemergence after planting before crop and weeds emerge. Use lower rate of Dual on sandy soils. Apply before planting and incorporate.
	Dual 8E + Treflan 4E Dual 8E + Prowl 4E	2 pt. 1 pt. 2 pt. + 1 1/2 pt.	Apply before planting and incorporate.
Emerged annual and perennial weeds	Roundup 3E (glyphosate)	2 qt.	Apply before seeding to emerged weeds or after seeding but before crop emerges. Do not contact bean crop.
Emerged annuals	Gramoxone Extra* (paraquat)	3 pt.	Apply prior to crop emergence. Do not contact bean crop.
Emerged annual broadleaves, yellow nutsedge, Canada thistle	Basagran 4E (bentazon)	1 qt.	Early postemergence, after beans have more than 2 true leaves. A second application of 3/4 qt. may be required for nutsedge and thistle control.
LIMA BEANS			
Germinating grasses and some broadleaves	Lasso 4E (alachlor)	2-3 qt.	Apply before planting and incorporate or after planting but before weeds and crop emerge. Use lower rate for coarse textured soils. See SNAPBEANS.
	Dual 8E (metolachlor) Treflan 4E (trifluralin)	3/4-1 1/2 qt. 1/2-3/4 qt.	See SNAPBEANS.
Annual broadleaves	Basagran 4E (bentazon)	1 qt.	Apply early postemergence when the beans have one fully expanded trifoliolate leaf and the weeds are small, actively growing.
Tank mixes for annual weeds	Lasso 4E + Treflan 4E Dual 8E + Treflan 4E Dual 8E + Prowl 4E	2 qt. + 1/2 qt. 3/4 qt. + 1/2 qt. 2 qt. 1 pt.	Apply before planting and incorporate. Use higher rate of alachlor for nightshade control. See SNAPBEANS. Apply before planting and incorporate. See SNAPBEANS.
	Roundup 3E (glyphosate)	2 qt.	Apply before seeding to emerged weeds or after seeding but before crop emerges. Do not contact bean crop.
Emerged annual and perennial weeds	Roundup 3E (glyphosate)	2 qt.	Apply before seeding to emerged weeds or after seeding but before crop emerges. Do not contact bean crop.
Emerged annuals	Gramoxone Extra* (paraquat)	3 pt.	Apply prior to crop emergence. Do not contact bean crop.
Yellow nutsedge, Canada thistle	Basagran 4E (bentazon)	3/4 + 3/4 qt.	Use split application. Apply when the beans have one fully expanded trifoliolate leaf. The weeds should be 4 to 6 inches tall. Make second application 10 days later.

Insects	Chemical†	Formulation			Remarks and limitations
		Recommended	Product/acre	Dosage	
Aphids	acephate (Orthene)	75S	2/3-1 1/3 lb.	1/2-1 lb.	14 day phi dry, snap; NTL limas. Do not feed treated vines.
	diazinon	4E	1 pt.	1/2 lb.	7 day phi for beans; 4 days for hay; 1 day for forage.
	dimethoate (Cygon, De-Fend, Dimex, Rebelate)	4E 2.67E	1 pt. 1 1/2 pt.	1/2 lb.	NTL. Do not feed treated forage to livestock. Note: 4-day re-entry.
	endosulfan (Thiodan)	3E	2 pt.	3/4 lb.	3 day phi. Do not exceed three applications. Do not treat lima beans. Do not feed forage. May be combined with pyrenone. 24-hr. re-entry. 1 day phi.
Bean leaf beetle	malathion	5E	1 1/2 pt.	1 lb.	
	acephate (Orthene)	75S	2/3-1 1/3 lb.	1/2-1 lb.	14 day phi dry, snap; NTL limas. Do not feed treated vines.
	carbaryl (Sevin)	XLR plus	2 pt.	1 lb.	NTL.
	dimethoate (Cygon, De-Fend, Dimex, Rebelate)	4E 2.67E	1/2-1 pt. 3/4-1 1/2 pt.	1/4-1/2 lb.	NTL. Do not feed treated forage to livestock. 4-day re-entry.
	ethion (Nialate)	4E	1/2-1 pt.	1/4-1/2 lb.	2 day phi. Do not feed treated vines. 24-hr. re-entry.
Green cloverworm	malathion	5E	1 1/2 pt.	1 lb.	1 day phi.
	methoxychlor	2E	4 pt.	1 lb.	3 day phi.
	acephate (Orthene)	75S	2/3-1 1/3 lb.	1/2-1 lb.	14 day phi dry, snap; NTL limas. Do not feed treated vines.
	carbaryl (Sevin)	XLR plus	2 pt.	1 lb.	NTL.

† Abbreviations used in tables: phi—preharvest interval, NTL—no time limitations, D—dust, DF—dry flowable, DG—dispersible granules, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, SL—soluble liquid, SP—soluble powder, and W—wettable powder. Dosages of insecticides are actual chemical per acre, with some exceptions. *Restricted use pesticide. Post treated areas when required by labels.

BEANS (continued)

Insects	Chemical†	Formulation		Dosage	Remarks and limitations
		Recommended	Product/acre		
European corn borer	acephate (Orthene)	75S	1-1 ¹ / ₃ lb.	3 ¹ / ₄ -1 lb.	14 day phi. Do not feed vines. NTL.
	carbaryl (Sevin)	XLR plus	2-3 pt.	1-1 ¹ / ₂ lb.	
	*methomyl (Lannate)	2L	2-4 pt.	1 ¹ / ₂ -1 lb.	3 day phi.
Leafhoppers	carbaryl (Sevin)	XLR plus	2 pt.	1 lb.	NTL.
	diazinon	4E	1 pt.	1 ¹ / ₂ lb.	7 day phi.
	dimethoate (Cygon,	4E	1 ¹ / ₂ pt.	1 ¹ / ₄ lb.	NTL. Do not feed treated vines. 4-day re-entry. Do not treat if crop or weeds are in bloom.
	DeFend, Dimex, Rebelate)	2.67E	3 ¹ / ₄ pt.		See remarks and limitations under aphids. 24-hr. re-entry.
	endosulfan (Thiodan)	3E	2 pt.	3 ¹ / ₄ lb.	2 day phi. Do not feed forage. 24-hr. re-entry.
	ethion (Nialate)	4E	1 pt.	1 ¹ / ₂ lb.	3 day phi. Do not exceed .2 lb. Al/acre/season. Do not feed treated vines.
	*esfenvalerate (Asana XL)	0.66E	5.8-9.6 fl oz	.03-.05 lb.	1 day phi.
	malathion	5E	1 ¹ / ₂ pt.	1 lb.	1 day phi (succulent beans only).
	*methomyl (Lannate)	90SP	1 ¹ / ₃ -1.1 lb.	1 ¹ / ₄ -1 lb.	90SP not restricted; 1.8L restricted.
	methoxychlor	1.8L	1 ¹ / ₂ pt.		3 day phi.
Spider mites	*oxydemetonmethyl (Meta-Systox-R)	2E	4 pt.	1 lb.	21 day phi.
	dimethoate (Cygon, De-Fend)	4E	1 ¹ / ₂ -1 pt.	1 ¹ / ₄ -1 ¹ / ₂ lb.	NTL. Do not treat if the crop or weeds are in bloom. Do not feed treated vines. Note: 4-day re-entry.
		2.67E	3 ¹ / ₄ -1 ¹ / ₂ pt.		
	*oxydemetonmethyl (Meta-Systox-R)	2E	2 pt.	1 ¹ / ₂ lb.	21 day phi, forage or grazing. No more than three applications per season. 48-hr re-entry. Snap and lima beans only.
	malathion (Cythion)	5E	1 ¹ / ₂ pt.	1 lb.	1 day phi.
Seed corn maggot	chlorpyrifos (Lorsban)	50SL	2 oz./100 lb. seed		Limas and snapbeans only.
	diazinon	50W	1 ¹ / ₂ oz./bu.	1 ¹ / ₄ oz./bu.	Seed treatment only. Lima, snap, white, and kidney beans.

Treatment is strongly recommended for fields where manure or cover crops have been partially buried by recent tillage.

Wireworms, white grubs diazinon 14G 25 lb. 3¹/₂ lb. Broadcast soil treatment before planting. Disc in thoroughly. Lima, pole, and snap beans.

In fields with a history of wireworm damage, bait stations can be used to sample wireworms 2 to 3 weeks before planting. Treatment is recommended if captures average more than 1 per trap.

Cutworm carbaryl (Sevin) XLR plus 2-3 pt. 1-1¹/₂ lb. 3 day phi.

trichlorfon (Dylox) 80SP 1¹/₄ pt. 1 lb. 21 day phi. 24 hr. re-entry.

BEANS

Diseases	Chemical†	Remarks
Seed rot, damping off	Apron 12.5D, Apron-Terraclor D, Captan, Evershield, Thiram, Evershield C, Flo-Pro-D, Terra-Coat L-205N	There are several fungicide formulations for seed treatment made by several different companies. Read and follow label instructions.
Rhizoctonia root and stem rot	Terraclor 2E, Terraclor 75WP, Terraclor 10G	See labels for additional information.
Fungal foliar diseases Anthracnose, Rust	Bravo	Bravo is available in the following formulations: Bravo 500, Bravo 720, Bravo 90 DG, Bravo Flowable, and Bravo W 75.
Botrytis gray mold	Benlate 50 DF, Bravo (Snapbean only)	
White mold	Benlate 50 DF, Botran 75W, Rovral, Terraclor 2E, Terraclor 75 WP	
Bacterial blight	Citcop 4E, Copper-Count-N, Kocide 101, Kocide 606, K-Cop	Plant disease-free western-grown seed.

†Abbreviations used in tables: phi—preharvest interval, NTL—no time limitations, D—dust, DF—dry flowable, DG—dispersible granules, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, SL—soluble liquid, SP—soluble powder, and W—wettable powder. Dosages of insecticides are actual chemical per acre, with some exceptions.
*Restricted use pesticide. Post treated areas when required by labels.

Weeds	Herbicide†	Amount/acre commercial product	Remarks and limitations
Annual grasses and some broadleaves	Lasso 4E (alachlor)	2 qt.	Apply after planting before crop and weeds emerge. Cold, wet soils after treatment may delay maturity and reduce yield.
	Ramrod 4F (propachlor)	4 qt.	Apply after planting before crop and weeds emerge.
	Treflan 4E (trifluralin)	1/2 qt.	Apply before planting and incorporate. Use lower rate on lighter soils.
	Dual 8E (metolachlor)	3/4-1 1/2 qt.	Use lower rate on sandy soils. Apply preemergence only. <u>Do not incorporate.</u>
Emerged annual broadleaves and Canada thistle	Command 4E (clomazone)	1 pt.	Apply and incorporate before planting. May be used with other herbicides for increased broadleaf weed control.
	Basagran 4E (bentazon)	3/4-1 qt.	Apply after the peas have three pairs of leaves or four nodes and the weeds are small. Do not apply more than 2 qt./acre/year. Will give some control of yellow nutsedge.
Emerged annuals	Thistrol 2E (MCPB)	1-2 qt.	Apply when peas have developed 6 to 12 nodes and before thistles are 9-inches tall. Apply in at least 15 gallons of water. Do not feed treated vines to livestock. Don't apply after pea flower buds appear.
	Gramoxone Extra* (paraquat)	3 pt.	Apply before or after seeding but before crop emergence. Do not contact crop.
Emerged annual and perennial weeds	Roundup 3E (glyphosate)	2 qt.	Apply before or after seeding but before crop emergence. Do not contact crop.

PEAS (for processing and dry field peas)

Insects	Chemical†	Formulation		Remarks and limitations	
		Recommended Product/acre	Dosage		
Aphids	diazinon	4E	3/4-1 pt	3/8-1/2 lb	NTL (4 day phi, hay or forage). NTL. Do not feed vines within 21 days after last application. Not more than 1 application/season. 4-day re-entry.
	dimethoate (Cygon, Defend)	4E 2.67E	1/3 pt	0.17 lb	
	*esfenvalerate (Asana XL)	0.66E	2.9-5.8 fl oz	.015-.03 lb	3 day phi. Do not feed vines. Do not exceed 0.1 lb AI/acre/season.
	malathion (Cython)	5E	1 1/2 pt	1 lb	3 day phi, 7 days if vines to be fed.
	*mevinphos	4E 10.3S	1/4-1/2 pt 1 1/2-3 fl oz	1/8-1/4 lb	1 day phi.
	*methyl parathion (PennCap-M)	2FM	1 1/2-2 pt	3/8-1/2 lb	10 day phi, 15 days forage.
	*oxydemetonmethyl (MetaSystox-R)	2E	1 1/2 pt	3/8 lb	21 day phi. Not more than three applications per season. Do not graze or cut treated vines for feed or forage within 21 days. 48-hr. re-entry.
	*parathion	4E	1 pt	1/2 lb	10 day phi, 15 days forage. 48-hr. re-entry.
Loopers, armyworms, alfalfa caterpillar	carbaryl (Sevin)	XLR plus	2-3 pt	1-1 1/2 lb	3 day phi.
	*esfenvalerate (Asana XL)	0.66E	5.8-9.6 fl oz	0.03-0.05 lb	3 day phi. Do not feed vines. Do not exceed 0.1 lb active ingredient/acre/season.
	*parathion	4E	1 pt	1/2 lb	10 day phi, 15 days forage. 48-hr. re-entry.
Seed corn maggot	methomyl (Lannate)	90SP	1/2-1 lb	7-14 oz	1 day phi, 5 days forage, 14 days hay. Other formulations of methomyl are restricted use pesticides.
	diazinon	50W	1/2 oz./bu	1/4 oz./bu	Seed treatment.
	chlorpyrifos	50SL	2 oz./100 lb seed	1 oz./100 lb seed	Seed treatment.

Seed treatment is strongly recommended for fields where manure or cover crops have been partially buried by recent tillage.

Diseases	Chemical†	Remarks
Seed rot, damping-off	Apron 12.5 D, Apron-Terraclor D, Captan, Evershield C, Thiram, Terra-coat L-205N	There are several fungicide formulations for seed treatment made by several different companies. Read and follow label instructions.
Fungal foliar disease Powdery mildew	Kocide 101, Kocide 606F	
Root rot		Grow on clean land and use 5-year interval between crops of peas. A soil test for determining degree of infestation by root-rot causing fungi is useful for land selection.

†Abbreviations used in tables: phi—preharvest interval, NTL—no time limitations, D—dust, DF—dry flowable, DG—dispersible granules, DS—dry soluble, E—emulsifiable concentrate, F—flowable, G—granules, L—liquid, S—solution, SL—soluble liquid, SP—soluble powder, and W—wetttable powder. Dosages of insecticides are actual chemical per acre, with some exceptions.

*Restricted use pesticide. Post treated areas when required by labels.