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1972 Suggested Insecticide Guides

Insect Control for FIELD CROPS

Insects and related pests play a major role in field crop production in Illinois. Although agronomic practices developed during the past century have reduced the importance of many insect pests, a large number of others, including several new invaders, have continued to threaten grain and forage production. Agronomic practices such as certain tillage operations, destruction of crop residues, selection of resistant hybrids, adjustment of planting dates, rotation of crops, etc., if used properly, still serve to suppress insect populations. Where possible, these practices continue to be used to provide more balanced insect control.

Practical applications of many insect-control techniques continue to be thoroughly investigated. Such control methods as insect sterilization, release of insect parasites, attractants for insect baits and traps, propagation and dissemination of insect disease organisms, as well as the use of insecticides, are being vigorously pursued. Despite the most optimistic reports, however, it is readily apparent that insecticides will be an important part of pest management for many years to come.

Certain precautionary steps should be taken when handling insecticides. Some of the insecticides suggested in the publication can be poisonous to the applicator. The farmer is expected to protect himself, his workers, and his family from undue or needless exposure.

When using insecticides, apply all the scientific knowledge available to insure that there will be no illegal residue on the marketed crop. Such knowledge is condensed on the label. Read it carefully and follow the instructions. But the label should be recent and not from a container several years old. Do not exceed maximum rates suggested; observe carefully the interval between application and harvest; and apply only to crops for which use has been approved. Make a record of the product used, the trade name, the percentage content of the insecticide, dilution, rate of application per acre, and the date or dates of application.

The chemical names used in these tables may be unfamiliar to you. These names are the common coined chemical names and as such are not capitalized. Trade names are capitalized. In the table of limitations the common names are listed first. Should the trade name

be more commonly used, it is in parentheses following the common name. Throughout the tables of suggestions, however, the common name is used if there is one. In case of question, refer to the table of limitations.

These suggestions for the use of insecticides are based on available data. Soil texture, soil pH, rainfall, slope of the field, wind velocity at planting, and other unpredictable factors affect the efficiency. Please report control failures and the circumstances associated with such failures to us.

Requested label clearances for a few uses of some insecticides, carriers, and solvents are uncertain for 1972, since many requests have not yet been officially cleared. Anticipating needed changes in labeling, we began modifying these suggested uses a few years ago. We have attempted to anticipate any further label changes in 1972, but an occasional use may still be canceled. Be sure to check with your county extension adviser if you are in doubt about the insecticide you plan to use. We will make announcements of label changes through the news media to keep you up to date.

This circular lists only suggested uses of insecticides for the control of many Illinois field crop pests, and is not designed to discuss other methods of control. Fact sheets discussing non-chemical control methods, descriptions of specific insects, and their life history and biology are designated as NHE numbers in this circular. This additional information can be obtained from the county extension adviser or by writing to the Office of Agricultural Publications, University of Illinois, Urbana, Illinois 61801.

Other Suggested Insecticide Guides are:

Circular 897 — Insect Control for Commercial Vegetable Crops and Greenhouse Vegetables;

Circular 898 — Insect Control for Livestock and Livestock Barns;

Circular 900 — Insect Control by the Homeowner;

Circular 1004 — Pest Control in Commercial Fruit Plantings.

These suggestions are revised annually by entomologists of the College of Agriculture and the Illinois Natural History Survey.

SPECIAL SUGGESTIONS AND MAJOR CHANGES FOR 1972

Federal Laws

Registration of pesticides is now the duty of the U.S. Environmental Protection Agency, not the USDA. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) is being revised. If passed, this Act requires that all pesticides be listed either for general use or for restricted use, and that all persons have a private or commercial license to apply the restricted-use ones. Farmers who apply restricted pesticides even on their own land would need to have a private applicator's license.

State Laws

Dairy farms. We recommended in 1965 that several chlorinated hydrocarbons (DDT, aldrin, heptachlor, etc.) not be used or stored on dairy farms. At that time, slight residues of the products could be found in milk produced where these products had been used for some years. The illegal amounts present in milk were not of public-health significance.

Most dairy farmers discontinued the use and storage of the several chlorinated-hydrocarbon products on their farms, but a few farmers did not. Occasional milk-residue problems continued to occur, and the milk was barred from the market. In 1971, the Interagency Committee on Pesticides disapproved the use or storage of certain insecticides on dairy farms.

The Illinois Department of Public Health has therefore announced that it is illegal for dairymen to apply or store the chlorinated-hydrocarbon insecticides — aldrin, chlordane, dieldrin, endrin, lindane, or heptachlor — on their farms, except for use in the farm residence. Previously the use of DDT was prohibited except by permit from the Illinois Departments of Agriculture or Public Health.

Methoxychlor and toxaphene can still be used on dairy farms for certain crops. They have a lower rate of storage in the fat of animals and are eliminated more rapidly from the animal's body than the other compounds. To avoid problems with residues in milk, however, dairymen must apply them carefully and exactly according to the directions on the label.

Applicator Licensing Revisions

Two types of licenses will be issued to those who apply pesticides commercially in Illinois. An applicator's license is required for those who determine the pesticide to be used, the rates, importance of wind velocity, crops to be sprayed, etc. The operator's license will be required for those who actually operate the machine but do not make decisions about rates and similar matters.

This revision broadens the law to include those who apply landscape and turf pesticides commercially. All governmental employees who apply pesticides must also be licensed.

For details, write to the Department of Agriculture, Division of Plant Industry, Springfield, Illinois 62700.

Changes in Suggestions for 1972

Corn insect complex in soil. Many farms in Illinois have no major corn-insect problem, and a seed treatment of diazinon at planting time is sufficient. This will protect against attack by seed-corn beetles and seed-corn maggots during germination. Fewest seeding-rate problems will occur when the correct amount of diazinon seed-treater is premixed with the seed just before it is put in the planter box.

If other insect problems are anticipated, the following insecticides — applied as a 7-inch band on the soil surface at planting — may be helpful:

Dasanit	1 pound actual per acre
Diazinon	1½ pounds actual per acre
Dyfonate	1 pound actual per acre
phorate (Thimet)	1 pound actual per acre
prophos (Mocap or Jolt)	1 pound actual per acre

We do not recommend any planting-time insecticide applications for the control of black cutworms. Apply baits or sprays at the first signs of a black-cutworm infestation. Early treatment is imperative.

Dyfonate controls garden symphlans. Other insecticides used for rootworm control may also give practical protection.

Rootworm complex. Three species of corn rootworms — northern, southern, and western — are present each year in Illinois. The southern corn rootworm adults migrate into Illinois each year. The northern and western corn rootworms overwinter as eggs in the soil of Illinois cornfields. The adults feed on corn silks during August and September when they lay eggs in the soil. Fields that had 5 or more of these rootworm beetles per cornstalk in August, 1971, may have a severe rootworm problem in 1972. Fields with fewer beetles may have a light to severe infestation in 1972.

If a very severe rootworm infestation is anticipated, 1 pound of carbofuran (Furadan) per acre will provide the best results. If light to moderately severe infestations are expected, any one of the following insecticides will provide practical control.

	<i>Pounds actual per acre (40-inch rows; check label for other row spaces)</i>	
	<i>Planting time</i>	<i>Cultivation</i>
Bux.....	1	1
carbofuran (Furadan)	¾	¾
Dasanit	1	1
Dyfonate	1	1
phorate (Thimet)	1	1
prophos (Mocap or Jolt)	1	...

If you plan to use insecticides for cultivation-time treatments, use a seed-treater at planting.

Piles of granules may accumulate when you stop your planter-applicator. To avoid loss of livestock and wildlife, these piles should be scattered and covered. If you see granules in the row, drag a chain or use a cover wheel behind the press wheel to completely cover granules.

European corn borer. Phorate has been labeled for the control of first-generation corn borers. We are not encouraging its use for corn-borer control, but leftover supplies of phorate from corn-rootworm control can be used for this purpose rather than to store them over the winter, when they are accident hazards. As we read the regulation, phorate can be used at planting, with one additional application — but not within 30 days of grazing or cutting for forage. Either a cultivation treatment for rootworms or a corn-borer application later would be acceptable, but not both.

In our experience, ¾ to 1 pound per acre of carbofuran at corn-planting time will not give enough control of first-generation corn borers to measure; much higher but illegal dosages will control first-generation corn borers to some extent.

Stored-Grain Insects

Resistance of the Indian meal moth to malathion has been confirmed in Illinois. The malathion wheat-dust protectant formulation has been dropped from the 1972 suggested recommendations. Unsatisfactory control is expected to occur in about 10 to 20 percent of the cases this year and will increase next year. However, malathion is effectively controlling the other stored-grain insects (about 12 important ones).

Substitute pyrethrin plus piperonyl butoxide spray for malathion in controlling Indian meal moth on stored grains. Repeated monthly treatments will probably be needed. Although not registered for use, dichlorvos (Vapona) resin strips in experiments have controlled infestations of Indian meal moths.

Clover and alfalfa pests. Beneficial insects often develop in clover and alfalfa fields. When the hay crop is cut, these beneficial insects move to other crops in search of insects as their food. Lady beetles, flower flies, aphid lions, big-eyed bugs, insidious flower bugs, and others that feed on other insects are commonly found in hay crop fields. If your hay supply is critical, follow the recommendations for insecticide use on these crops. If you can afford minor yield losses, manipulate cutting dates if possible to avoid insecticide application. It is better to use insecticides, however, than to allow the pest to kill the crop.

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LIMITATIONS IN DAYS BETWEEN APPLICATION OF THE INSECTICIDE AND HARVEST OF THE CROP AND OTHER RESTRICTIONS ON THE USE OF INSECTICIDES FOR FIELD CROP INSECT CONTROL

(Blanks in the table denote that the material is not suggested for that specific use in Illinois)

	Field corn				Sorghum	Forage crops			
	Seed and soil	Grain	Ensilage	Stover		Alfalfa	Clover	Pasture	Seed
azinphosmethyl (Guthion) ¹	...	...	...	...	...	16,E	16,E	...	16,E
Bux	A	...	...	...	...	...	...	...	...
carbaryl (Sevin)	...	0	0	0	21	0	0	0	...
carbofuran (Furadan) ¹	A	...	...	...	...	...	...	...	...
Dasanit	A	...	...	...	...	...	...	...	...
demeton (Systox) ¹	...	...	...	...	...	21,E	21,E	...	21,E
diazinon	A	...	10	10	7	7	7	...	7
Dyfonate ¹	A	...	...	...	...	...	...	...	...
Gardona	...	5	5	5	...	...	...	...	...
Imidan	...	...	...	...	...	7,E	...	...	...
malathion	...	5	5	5	7	0	0	0	0
methoxychlor	...	...	...	...	...	7	7	7	7
mevinphos (Phosdrin)	...	...	...	...	3	...	...	...	...
naled (Dibrom)	...	...	...	...	...	4	...	4	4
methyl-parathion ¹	...	...	...	...	...	15	15	15	15
parathion ¹	...	...	...	...	...	...	...	...	...
phorate (Thimet) ¹	A	B	B	B	...	...	...	...	...
prophos (Mocap or Jolt)	A	...	...	...	...	...	...	...	...
toxaphene	...	A	C	C	...	...	...	...	D
trichlorfon (Dylox)	...	28,H	28,H	28,H	...	...	...	...	...

	Barley		Oats		Rye		Wheat		Soybeans	
	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Straw	Grain	Forage
azinphosmethyl (Guthion) ¹	...	...	...	...	...	...	...	...	21	D
carbaryl (Sevin)	...	...	...	...	...	...	...	...	0	0
carbophenothion (Trithion) ¹	...	...	...	...	...	...	...	...	7	D
demeton (Systox) ¹	45,F	21,F	45,F	21,F	...	...	45,F	21,F	...	...
disulfoton (Di-Syston) ¹	...	...	...	...	...	...	...	G	...	...
malathion	7	7	7	7	7	7	7	7	0	0
parathion ¹	15	15	...	...	...	...	15	15	...	...
phorate (Thimet) ¹	...	...	...	...	...	...	...	G	...	...
toxaphene	A	D	A	D	A	D	A	D	21	D
trichlorfon (Dylox)	21	3	21	3	...	...	21	3	...	...

¹ Sprays to be applied only by experienced operators wearing proper protective clothing.

- A. No specific restriction when used as recommended.
- B. Do not apply after tasseling.
- C. Do not feed treated forage to dairy animals. Do not feed sprayed forage or granular-treated corn silage to livestock fattening for slaughter nor granular-treated stover within 28 days of slaughter.

D. Do not feed treated forage to dairy animals, livestock fattening for slaughter, or poultry.

- E. Once per cutting.
- F. Apply no more than twice per season with at least 14 days between applications.
- G. Do not graze treated wheat.
- H. Once only per season when plants are 3-12 inches tall.

TOXICITY AND PERSISTENCY RATINGS FOR INSECTICIDES¹

Insecticide	Toxicity to			Per-sistency as a residue	Insecticide	Toxicity to			Per-sistency as a residue
	Warm-blooded animals	Fish	Honey bees ²			Warm-blooded animals	Fish	Honey bees ²	
azinphosmethyl	1	...	1	3	methoxychlor	6	1	4	4
carbaryl	4	6	1	4	methyl parathion	1	6	1	6
carbophenothion	1	...	3	2	naled	3	2	5	6
demeton	1	3	3	3	parathion	1	2	1	6
diazinon	3	2	2	3	phorate	1	...	3	4
Gardona	6	1	2	1	toxaphene	3	1	5	1
Imidan	3	...	...	...	trichlorfon	4	6	4	5
malathion	5	3	1	3					

¹ A rating of 1 indicates high toxicity or persistence of residue; a rating of 6 indicates low toxicity (relatively safe) and little persistency.

² When applied at the optimum time to avoid bee-kill.

FIELD CORN

Insect	Time of attack	Insecticide ¹	Lb. active ingredient per acre	Placement	Timing of application (See table of limitations)
Corn rootworms ² (NHE-26)	June-August	Bux	1	Soil surface	As 7-inch band ahead of planter press wheel. For severe infestations, 1 pound of carbofuran is most effective. Basal treatments during cultivation with Bux, carbofuran, Dasanit, Dyfonate or phorate are effective.
		carbofuran	$\frac{3}{4}$		
		Dasanit	1		
		Dyfonate	1		
		phorate	1		
prophos	1				
Seed-corn maggot	At germination	diazinon	See page 3	On seed	For band treatment, see wireworm.
Seed-corn beetle					
Wireworm (NHE-43)	May-July	Wireworms may be partially controlled by Dasanit, diazinon, Dyfonate, phorate (Thimet), or prophos. Along with these five, carbofuran will give partial control of grape colaspis and white grubs. For rates, see page 2.			
White grub (NHE-23)	May-October				
Grape colaspis (NHE-25)	May-July				
Sod webworm (NHE-42)	May-June	carbaryl	1	At base of plant	At time of initial attack.
Cutworms (NHE-38)	May-June	carbaryl bait	1	Broadcast	When cutting starts. Repeat if needed.
		carbaryl plus molasses or Tractum	1 to 2	Direct at base of plant	Same as above.
		trichlorfon	1	At base of plant	Same as above. One application only permitted.
Billbugs (NHE-37)	May-June	carbaryl	1	At base of plant	As needed.
		diazinon	1		
Garden symphylan	May-July	Dyfonate	1 in row at planting 2 broadcast before planting		If suspected as a problem, use dyfonate for soil insect control.
Grasshopper (NHE-74)	June-September	carbaryl	$\frac{3}{4}$	Over row as spray	As needed. For ensilage corn use carbaryl, diazinon, or malathion.
		toxaphene	$1\frac{1}{2}$		
Flea beetle (NHE-36)	May-June	carbaryl	$\frac{3}{4}$	Over row as spray	When damage becomes apparent on small corn.
		toxaphene	$1\frac{1}{2}$		
Armyworm (NHE-21)	May-June	carbaryl	$1\frac{1}{2}$	Over row as spray	At first migration or when damage first becomes apparent.
		malathion	1		
		toxaphene	$1\frac{1}{2}$		
		trichlorfon	1		
	Late July-August	toxaphene	$1\frac{1}{2}$	Broadcast over infested area	When leaves below ear level are consumed and worms eating leaves above ear level.
Fall armyworm (NHE-34)	June; August-September	carbaryl	$1\frac{1}{2}$	In whorls	Granules preferred when worms deep in whorl. If worms are small and out on leaves, sprays will be satisfactory. When silking (see earworm).
		diazinon	1		
		Gardona	$1\frac{1}{2}$		
		toxaphene	$1\frac{1}{2}$		
Chinch bug (NHE-35)	June-August	carbaryl	1	Spray at base of plant	At beginning of migration. If applied in adjacent grain, do not harvest small grain.
Thrips (NHE-39)	June	carbaryl	1	On foliage as spray	When severe wilting and discoloration are noticed.
Corn leaf aphid (NHE-29)		diazinon granules	1	In whorl	Just before tasseling when aphids are appearing on individual plants. Preventive treatment. Not after tassel emerges.
		phorate granules	1		
		malathion	1	As a foliage spray	Apply during late whorl to early tassel when 50% of the plants have light to moderate infestations.
		diazinon	1		

FIELD CORN (continued)

Insect	Time of attack	Insecticide ¹	Lb. active ingredient per acre	Placement	Timing of application (See table of limitations)
Corn rootworm adults	Late July, early August	carbaryl malathion diazinon	1 1 1	Overall spray or directed towards silk	When silking is not over 50% and there are more than an average of 5 beetles per ear. Only to protect pollination.
Corn borer, first generation	June-July	carbaryl granules diazinon granules	1½ 1	On upper ⅓ of plant and into whorl	When tassel ratio is 30 to 50, and 75% or more plants show recent borer feeding in whorl.
Corn borer, second generation	Mid-August	carbaryl diazinon	As for first generation	From ear upward	At first hatch when there are 1 or more egg masses per plant.
Corn earworm (NHE-33)	July-August	carbaryl Gardona	1½ 1½	Spray ear zone	2 applications at 3- to 5-day intervals, starting at 30-50% silk. 25 gal. of finished spray per acre.

¹ See page 3 for insecticide restrictions. ² Rotations will control rootworms. To prevent damage from western corn rootworms, rotate corn with some other crop annually. To prevent damage from northern corn rootworms, do not grow corn more than 2 years consecutively in the same field.

SOYBEANS

Insect	Time of attack	Insecticide ¹	Lb. active ingredient per acre	Placement	Timing of application (See table of limitations)
Bean leaf beetle (NHE-67)	May-June, August	carbaryl ² toxaphene ³	1 1½	On foliage	When leaf feeding becomes severe, but before plants killed or pods eaten.
Clover root curculio adult (NHE-71)	May-June	carbaryl ² toxaphene ³	1 1½	On marginal rows	When clover is plowed, beetles migrate to adjacent beans.
Grasshopper (NHE-74)	June-September	carbaryl ² toxaphene ³	¾ 1½	On foliage	When migration from adjacent crops begins.
Flea beetle	May-June	carbaryl ² toxaphene ³	1 1½	On foliage	Seedlings usually attacked. Treat when needed.
Green clover worm (NHE-75) and webworm (NHE-42)	August	carbaryl ² malathion	1 1	On foliage	When damage appears and small worms are numerous between blossom and pod fill.
Mites	June-August	carbophenothion ⁴ azinphosmethy ⁴	¾ ½	On foliage	As needed on field margins and entire field.
Stink bugs	July and August	carbaryl ² malathion	1 1	To foliage	As needed but when stink bugs are numerous.
Thrips Leafhoppers	June-August	malathion	1	To foliage	As needed.

¹ See page 3 for insecticide restrictions on soybeans.

² Carbaryl should not be used at more than 1 lb. per acre. Higher rates may damage plants.

³ For use on dairy farms only when alternate material is not available and when insect emergency exists. Do not apply as foliage sprays or dusts to or adjacent to dairy pasture, hay, or forage crops.

⁴ To be applied only by experienced operators or those wearing protective clothing.

CLOVER AND ALFALFA

Insect	Time of attack	Insecticide ¹	Lb. active ingredient per acre	Placement	Timing of application ² (See table of limitations)
Alfalfa weevil (NHE-89)	March-June	Imidan	1	On foliage	When 25% of the tips are being skeletonized treat immediately; two treatments may be necessary on first cutting; regrowth following first cutting may need protection. By ground, use a minimum of 20 gal. of finished spray per acre (10 gal. on stubble) or 4 gal. by air. Do not apply during bloom. Instead cut and remove hay.
		azinphosmethyl ^{3, 4}	½		
		methyl parathion ³	½		
		malathion ⁵ with methoxychlor	¾ ¾		
		diazinon ⁵ with methoxychlor	½ 1		
		malathion ⁶	1¼		
		methyl parathion ³	½		
		azinphosmethyl ³	½		
		malathion ⁵ and methoxychlor	¾ ¾		
		diazinon ⁵ and methoxychlor	½ 1		
		Imidan	1		<i>This timing preferred over later spring treatments.</i>
Clover leaf weevil (NHE-12)	March-April	malathion	1	On foliage	When larvae are numerous and damage is noticeable, usually early to mid-April.
Spittlebug (NHE-13)	Late April, early May	methoxychlor	¾	On foliage	When bugs begin to hatch and tiny spittle masses are found in crowns of plants.
Aphid (NHE-14 and 19)	April-May	demeton ³ diazinon malathion	¼ ½ 1	On foliage	When aphids are becoming abundant and lady beetle larvae and adults, parasites, and disease are slight.
Leafhopper (NHE-22)	Early July	carbaryl methoxychlor	1 1	On foliage	When second-growth alfalfa is 1 to 6 inches high, or as needed.
Garden webworm (NHE-42)	July-August	carbaryl toxaphene ⁷	1 1½	On foliage	When first damage appears. Use toxaphene only on new fall seedlings.
Cutworm (NHE-77)	April-June	carbaryl	1½	On foliage	Cut, remove hay, and spray immediately.
Armyworm (NHE-21)	May-June, September	carbaryl malathion	1½ 1	On foliage	Only when grasses are abundant.
Seed crop insects	July-August	toxaphene ⁷	1½	On foliage	No later than 10% bloom.
Grasshopper (NHE-74)	June-September	carbaryl diazinon malathion naled	¾ ½ 1 ¾	On foliage	When grasshoppers are small and before damage is severe. When bees are frequenting bloom, do not apply carbaryl. Apply others only late in day.
Sweet clover weevil (NHE-15)	April-May	toxaphene ⁷	1½	On foliage	When 50% of foliage has been eaten. New seedlings only.

¹ See page 3 for insecticide restrictions.

² Before applying insecticides, be certain to clean all herbicides out of equipment. During pollination, apply very late in day.

³ To be applied only by experienced operators or those wearing protective clothing.

⁴ Water temperature should be above 55°F.

⁵ Use no less than these amounts.

⁶ Use only when air temperature is above 60°F.

⁷ Not for use on dairy farms. Do not apply as foliage sprays or dusts to fields adjacent to dairy pasture, hay, or forage crops.

GRAIN SORGHUM

Insect	Time of attack	Insecticide ¹	Lb. active ingredient per acre	Placement	Timing of application (See table of limitations)
Webworm	After heads form	carbaryl diazinon malathion	1½ ½ 0.9	On grain head	Before population reaches 5 larvae per head. Pest usually bad in wet seasons on late planted grain.
Corn leaf aphid	All season	malathion	0.9	Broadcast	Degree of infestation to warrant treatment not determined.
Corn earworm	After heads form	carbaryl	1½	Direct at head or broadcast	When 5 to 10 percent of heads are first infested by small worms.
Midge	August-September	diazinon	1	Direct at head	Late plantings only within 4 days of 90% head emergence.

¹ See page 3 for insecticide restrictions.

STORED GRAIN (Corn, Wheat, and Oats)^{1,2}

Insect	Time of attack	Insecticide and dilution ³	Dosage	Placement	Suggestions (See table of limitations)
Angoumois grain moth (earcorn) (NHE-62)	April-October (Southern ½ of Illinois only).	malathion 57% E.C., 3 oz. per gal. water	Apply to runoff	Spray surface and sides May 1 and August 1	Plant tight husk varieties. Store as shelled corn to avoid all but surface damage by angoumois moth.
Meal moths and surface infestations only (NHE-63)	April-October	malathion 57% E.C., 3 oz. per gal. water ⁴	2 gal. per 1,000 sq. ft.	Spray grain surface, bin walls, and ceiling	Clean and spray bin with 1.5% malathion to runoff before storage. Store only clean dry grain. Apply treatments June 1 or July 1 and August 15. Apply at storage and monthly thereafter during summer months.
		pyrethrin 6% + piperonyl butoxide 60% E.C., 4½ oz. per gal. water	2 gal. per 1,000 sq. ft.	Spray grain surface	
General Internal and external feeders (NHE-64, 65) Rice and granary weevils	April-October	malathion 57% E.C., 1 pt. per 3-5 gal. water ⁵	3-5 gal. per 1,000 bu.	Spray uniformly as grain is binned	Clean and spray bin with 1.5% malathion to runoff before storage. Store only clean dry grain. Spray surface grain at storage and again about August 15.
Flat grain beetle Saw-toothed grain beetle Rusty grain beetle		liquid fumigant ⁶	3-5 gal. per 1,000 bu.	On surface; repeat if necessary	Clean and spray bin with 1.5% malathion to runoff before storage. Store only clean dry grain. Apply in late July and September in the southern half of Illinois; apply in mid-August in the northern half of Illinois. Use surface treatment of malathion as recommended for meal moths.
Foreign grain beetle		73 mixture ⁶	As directed	On surface	
Cadelle beetle		phostoxin ⁶	180 tablets per 1,000 bu.	Tablets 2 feet apart	
Flour beetle					

¹ Corn need not be treated at harvest with a protectant unless it is to be carried over the following summer.

² Wheat and oats should be treated if they are to be held for one month or more in storage after harvest.

³ Use only the grade of malathion labeled for use on stored grain. Malathion vaporizes and is lost rapidly when grain is heat-dried.

⁴ On some farms, Indian meal moth resistance to malathion results in failure. Use pyrethrin instead.

⁵ Malathion dust no longer suggested because of greater likelihood of failure to control Indian meal moth.

⁶ Use with extreme caution. Apply only under calm conditions and when grain temperature is 70°F. or above. Grain should be 8 inches below the lip of the bin and should be leveled before fumigating.

SMALL GRAINS

Insect	Time of attack	Insecticide ¹	Lb. active ingredient per acre	Placement	Timing of application (See table of limitations)
Grasshopper (NHE-74)	June-August	toxaphene ²	1½	On entire plant	Control early while grasshoppers are small.
Chinch bug (NHE-35)	June-July	carbaryl	1	At base of stalk	After grain harvest, treat strip in stubble to protect corn from migrating bugs.
Armyworm (NHE-21)	May-June	malathion toxaphene ² trichlorfon	1½ 1½ ¾	On foliage	When worms are still small and before damage is done. Do not use malathion on barley or trichlorfon on rye.
Greenbug English grain aphid	May-June	demeton ³ parathion ³	¼ ¼	On foliage	When needed.
Hessian fly	Sept.-October; April-May	disulfoton phorate	½ ½	In drill row	Use granules in a grass-seeder for susceptible varieties planted early. Do not graze.

¹ See page 3 for insecticide restrictions.

² For use on dairy farms only when alternate material is not available and when insect emergency exists. Do not apply as foliage sprays or dusts to or adjacent to dairy pasture, hay, or forage crops.

³ To be applied only by experienced operators or those wearing protective clothing.

FOR YOUR PROTECTION: Always handle insecticides with respect. The persons most likely to suffer ill effects from insecticides are the applicator and his family. Accidents and careless, needless overexposure can be avoided. Here are a few rules that if followed will prevent most insecticide accidents:

1. Wear rubber gloves when handling insecticide concentrates.
2. Do not smoke while handling or using insecticides.
3. Keep your face turned to one side when opening, pouring from, or emptying insecticide containers.
4. Leave unused insecticides in their original containers with the labels on them.
5. Store insecticides out of reach of children, irresponsible persons, or animals; store preferably in a locked building. Do not store near livestock feeds. Better yet, buy no more pesticide than you will use. This eliminates a pesticide storage and disposal problem.
6. Wash out and bury, burn, or haul to the refuse dump all empty insecticide containers.
7. Do not put the water-supply hose directly into the spray tank.
8. Do not blow out clogged nozzles or spray lines with your mouth.
9. Wash with soap and water exposed parts of body and clothes contaminated with insecticides.
10. Do not leave puddles of spray on impervious surfaces.
11. Do not apply to fish-bearing or other water supplies.
12. Do not apply insecticides, except in an emergency, to areas with abundant wildlife.
13. Do not apply insecticides near dug wells or cisterns.
14. Do not spray or dust when weather conditions favor drift.
15. Observe all precautions listed on the label.
16. To avoid bee kill, apply insecticides after bee activity has been completed for the day; use the least toxic materials. *Warn beekeepers that you are applying insecticides.*

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