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*1965 Condensed
Insecticide
Recommendations*

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Insect Control for
VEGETABLE CROPS

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Commercial vegetable gardeners find it impossible to produce vegetables profitably unless they control insects at maximum efficiency and minimum cost. The housewife of today will not accept unsightly wormy vegetables; not only are wormy fruits and vegetables unappetizing but the waste from trimming increases food costs. Thus the commercial vegetable gardener must produce a quality product that is acceptable and safe to the consumer. Careful and correct use of the right insecticides will enable him to do this.

These condensed insecticide recommendations have been prepared for use by Illinois commercial vegetable farmers; they are not for home gardeners, who should use only those insecticides that are extremely safe to handle, apply, and store. Furthermore, the commercial vegetable gardener must use a wider variety of insecticides than the home gardener in order to obtain maximum insect control at the least cost.

In using insecticides, read the label and carefully follow the instructions. Do not exceed maximum rates recommended; 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, the dilution, the rate of application per acre, and the date or dates of application.

Some of the insecticides recommended here can be poisonous to the applicator. In using them, the commercial gardener is expected to use precautions to protect himself, his workers, and his family from undue or needless exposure.

In using these recommendations, always refer to the table on the next page, which lists the limitations

and restrictions on use. These limitations apply to the vegetables as human food. If you use any portion of a vegetable for livestock food (tops, stalks, etc.) refer to the label for instructions as to the interval required between application and feeding.

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

Recommendations sometimes change during the growing season. These recommendations are printed only once each year, and are therefore subject to change without notification.

These recommendations were prepared by entomologists of the University of Illinois College of Agriculture and the Illinois Natural History Survey and replace mimeographs NHE 88 through 95.

Leaflets describing the life history, biology, and habits of some of the insects mentioned can be obtained from the offices of county farm advisers or by writing to 280 Natural Resources Building, Urbana. These are indicated by an NHE number in the tables.

Insecticide recommendations for livestock and livestock barns (Circular 898), for field crops (Circular 899), and for the homeowner (Circular 900) can also be obtained from the above offices or from the College of Agriculture, Urbana.

CIRCULAR 897 UNIVERSITY OF ILLINOIS COLLEGE OF AGRICULTURE COOPERATIVE EXTENSION SERVICE
In cooperation with ILLINOIS NATURAL HISTORY SURVEY Urbana, Illinois, January, 1965

Cooperative Extension Work in Agriculture and Home Economics: University of Illinois, College of Agriculture, and the United States Department of Agriculture cooperating. LOUIS B. HOWARD, Director. Acts approved by Congress May 8 and June 30, 1914.

LIMITATIONS IN DAYS BETWEEN APPLICATION AND HARVEST AND OTHER RESTRICTIONS ON USE OF INSECTICIDES RECOMMENDED IN ILLINOIS FOR CONTROL OF VEGETABLE CROP INSECTS

(Blank spaces indicate the material is not recommended for the specific use in Illinois)

| Insecticide | Aspara- | Beans | Brussels | | Cab- | Cauli- | Horse- | Radish ¹ | Turnip ¹ | Onions | Egg- | Toma- |
|--|---------|-------|----------|---------|------|--------|--------|---------------------|---------------------|--------|------|-------|
| | gus | | Broccoli | sprouts | | | | | | | | |
| carbaryl (Sevin)..... | 1 | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 3,14G | ... | 0 | 0 |
| carbophenothion (Trithion) ² | ... | 7A | ... | ... | ... | ... | ... | ... | ... | ... | 7 | 7 |
| diazinon..... | ... | ... | 5 | ... | 7 | 5 | ... | 10 | 10 | 10 | ... | 1 |
| endosulfan (Thiodan) | ... | B | ... | ... | ... | ... | ... | ... | ... | ... | 1 | 1 |
| Guthion ² | ... | ... | 15 | 7 | 21 | 15 | ... | ... | ... | ... | ... | ... |
| Kelthane..... | ... | 7 | ... | ... | ... | ... | ... | ... | ... | ... | 2 | 2 |
| malathion..... | ... | 1 | 3 | 7 | 7 | 7 | 7 | 7 | 3 | 3 | 3 | 1 |
| mevinphos (Phosdrin) ² | ... | ... | 1 | 3 | 1 | 3 | ... | ... | 3 | ... | ... | ... |
| naled (Dibrom)..... | ... | ... | 4 | 4 | 4 | 4 | ... | ... | 4 | ... | ... | ... |
| parathion ² | ... | ... | 7 | 7 | 10 | 7 | ... | 15 | 10 | 15 | 15 | 10 |
| Perthane..... | ... | ... | 3 | 3 | 3 | 3 | ... | ... | ... | ... | ... | ... |
| rotenone..... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 | 1 |
| toxaphene..... | ... | ... | ... | B | 7D | B | C | C | C | ... | 5 | 1 |
| trichlorfon (Dylox)... | ... | ... | ... | 21 | 21 | 21 | ... | ... | 28C | ... | ... | 21 |

| Insecticide | Pota- toes ¹ | Col- lards | Kale | Lettuce | Spinach | Swiss chard | Sweet corn | Cucum- bers ³ | Melons ³ | Pump- kins ³ | Squash ³ | |
|-----------------------------------|----------------------------|---------------|------|---------|---------|----------------|---------------|-----------------------------|---------------------|----------------------------|---------------------|--------|
| | | | | | | | | | | | Winter | Summer |
| carbaryl (Sevin)..... | 0 | 14 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 0 | 0 | 0 |
| diazinon..... | ... | 10 | 10 | 10 | 10 | 12 | 0 | 7 | 3 | ... | 3 | 7 |
| endosulfan (Thiodan) | 0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| malathion..... | 0 | 7 | 7 | 14 | 7 | 7 | 5 | 1 | 1 | 3 | 1 | 1 |
| Meta-systox-R ² | ... | ... | ... | ... | ... | ... | ... | ... | 14A | 14F | 14F | 14F |
| mevinphos (Phosdrin) ² | ... | 3 | 3 | 2 | 4 | ... | 1 | 1 | 1 | 14 | 14 | 1 |
| naled (Dibrom)..... | ... | 4 | 4 | 4 | 4 | 4 | ... | ... | ... | ... | ... | ... |
| parathion ² | 5 | 10 | 10 | 21 | 7 | 21 | 12 | 15 | 7 | 10 | 15 | 15 |
| Perthane..... | ... | ... | ... | 4 | 7 | ... | ... | ... | ... | ... | ... | ... |
| rotenone..... | ... | 1 | 1 | 1 | 1 | 1 | ... | ... | ... | ... | ... | ... |
| toxaphene..... | 0 | 28 | 28 | E | 21F | E | ... | ... | ... | ... | ... | ... |
| trichlorfon (Dylox)... | ... | 28B | 21 | 28B | ... | ... | ... | ... | ... | ... | ... | ... |

¹ Root crops such as radishes, turnips, carrots, potatoes, and sugar beets should not be grown in soil where aldrin, dieldrin, or heptachlor was applied as a soil insecticide the preceding year.

² To be used only by professional applicators or commercial gardeners.

³ Only apply insecticide late in the day after pollination is complete.

A. Not more than twice per season.

B. Not after edible portions or heads begin to form.

C. Do not use tops for feed or food.

D. If outer leaves are stripped; otherwise, B.

E. Do not apply after seedling stage.

F. Not more than once per season.

G. If tops are to be used as feed.

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CABBAGE AND RELATED COLE CROPS¹

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|---|----------------|---------------------------|---|-----------|--|
| Cabbage maggot ² (NHE-44) | All season | diazinon | 3 | Broadcast | Disk in just before planting. Use only for cabbage, cauliflower, and broccoli. |
| | | diazinon granules | 1 | Furrow | At time of planting, apply on soil surface behind shoe and ahead of press wheel. |
| | | diazinon | 4 oz. per 50 gal. transplant water | | |
| | | Guthion | 3 oz. W.P. or 2 oz. E.C. per 50 gal. transplant water | | 6 fluid oz. transplant water per plant. |
| Aphid (NHE-47) | All season | Guthion | $\frac{3}{4}$ | Foliage | When aphids appear, but before leaves begin to curl. |
| | | malathion | 1 | | |
| | | mevinphos | $\frac{1}{4}$ | | |
| | | parathion | 0.4 | | |
| Diamond-back moth larva; imported cabbage worm; cabbage looper (NHE-45) | All season | Guthion | $\frac{3}{4}$ | Foliage | When small worms first appear, and about every 5 to 7 days thereafter. |
| | | naled | 1 | | |
| | | parathion with toxaphene | $\frac{1}{2}$ 2 | | |
| | | Perthane with diazinon | $\frac{1}{2}$ | | |
| | | or parathion or mevinphos | 0.4 $\frac{1}{2}$ | | |
| Cutworm | At planting | trichlorfon | 1 | Soil | At planting, or at base of plant as needed when damage first occurs. |
| Flea beetle and leafhopper | All season | carbaryl | $1\frac{1}{2}$ | Foliage | As needed. |

¹ Root crops such as radishes, turnips, carrots, potatoes, and sugar beets should not be grown in soil where aldrin, dieldrin, or heptachlor was applied as a soil insecticide the preceding year.

² Maggots are resistant to aldrin and dieldrin in some areas of Illinois. Compound 4072 controls these resistant maggots, but does not as yet have label approval.

ASPARAGUS

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|---------------------------|--|-------------|-----------------------------------|------------------|---|
| Asparagus beetle (NHE-49) | Early and mid-season on spears and ferns | carbaryl | $1\frac{1}{2}$ | Spears and ferns | As needed, not oftener than every 3 days. |
| | | rotenone | 0.2-0.4 | Spears | As needed. |

COLLARDS, KALE, LETTUCE, SPINACH, SWISS CHARD

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|----------------------|--------------------|---------------------------|-----------------------------------|------------------------|--|
| Aphid (NHE-47) | All season | diazinon | ½ | Foliage | As needed. |
| | | malathion | 1 | | |
| | | mevinphos | ¼ | | |
| | | naled | 1 | | |
| | | parathion | 0.4 | | |
| Cutworm | On seedling plants | toxaphene | 1½ | Base of plant and soil | When first damage appears. |
| | | trichlorfon | 1 | | |
| Leafhopper | All season | malathion | 1 | Foliage | When first leafhoppers appear and as needed. |
| Caterpillar (NHE-45) | All season | naled | 1 | Foliage | As needed. |
| | | Perthane | 1 | | |
| | | with diazinon | ½ | | |
| | | or malathion | 1 | | |
| | | or mevinphos or parathion | ½ 0.4 | | |
| Leaf miner | All season | diazinon | ½ | Foliage | When first miners are observed. |
| | | parathion | 0.4 | | |
| Flea beetle | All season | carbaryl | 1 | Foliage | As needed. |
| | | rotenone | ¼ | | |

CUCUMBERS AND OTHER VINE CROPS

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|---|---------------------------|---------------|-----------------------------------|--|--|
| Striped and spotted cucumber beetles (NHE-46) | Seedling to mature plants | carbaryl | 1 | Foliage | When beetles first appear; as often as necessary thereafter. |
| Aphid (NHE-47) | All season | diazinon | ½ | Foliage | When aphids become noticeable. |
| | | malathion | 1 | | |
| | | Meta-systox-R | ½ | | |
| | | mevinphos | ¼ | | |
| | | parathion | ½ | | |
| Squash bug ¹ (NHE-51) | All season | parathion | ½ | Foliage | Do not apply until first eggs are found hatching (about June 15 to July 15). |
| Leafhopper | July-August | malathion | 1 | Foliage | As needed. |
| Squash vine borer | June-September | carbaryl | 1 | Base of stem and runners for 3 ft. from stem | Weekly applications when vines begin to run—usually 5 applications. |
| Pickle worm | August-September | carbaryl | 1 | Foliage | Weekly applications, beginning in late August. |
| Mites | July-September | malathion | 1 | Foliage | As needed. |
| | | mevinphos | ¼ | | |
| | | parathion | ½ | | |

¹ Trichlorfon, 1 lb. per acre, for squash bug will be recommended if label approval is granted.

TOMATOES AND EGGPLANT

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|-----------------------------|--------------------------------------|--|--|---------------------------|---|
| Cutworm (NHE-77) | Early and midseason | carbaryl trichlorfon | 2 1 | Base of plants or foliage | As needed. |
| Flea beetle | May-June | carbaryl rotenone | 2 0.2-0.4 | Foliage | Apply every week as long as needed. |
| Aphid (NHE-47) | May-July | diazinon endosulfan malathion parathion | $\frac{1}{4}$ $\frac{1}{2}$ 1 0.4 | Foliage | As needed, but before leaves curl. |
| Corn earworm | July-September; occasionally in June | carbaryl toxaphene | 2 2 | Foliage | Add to weekly applications of fungicide sprays beginning at first fruit set. If spraying is infrequent, use 6 lb. of toxaphene. |
| Hornworm | July-September | carbaryl trichlorfon | 2 1 | Foliage | When first small worms appear. |
| Mites | July-September | carbophenothion Kelthane malathion parathion | 1 $\frac{1}{2}$ 1 0.4 | Foliage | As needed. |
| Russet mite | July-September | parathion sulfur dust ¹ sulfur spray ¹ | 0.4 10 10 | Foliage | As needed. |
| Blister beetle (NHE-72) | June-September | carbaryl parathion toxaphene | $1\frac{1}{2}$ $\frac{1}{4}$ 2 | Foliage | As needed. |
| Fruit fly and picnic beetle | August-October | diazinon spray diazinon granules pyrethrin dust ¹ | $\frac{1}{2}$ 1 1 | Foliage Foliage | When flies or beetles first appear. Apply to hamper immediately after it is filled. |

¹ No limitations on use.

ONIONS

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|-----------------------|---------------------------|---|--|-----------|---|
| Onion maggot (NHE-50) | All season | diazinon W.P. | $\frac{1}{2}$ -1 for 40-50 lb. of seed | Seed | Seed treatment for set onions only. Use lighter dosage of diazinon on sandy, highly mineral soils. |
| | | ethion ¹ W.P. | 1 for 40-50 lb. of seed | | |
| | | diazinon granules ethion ¹ granules | $\frac{1}{2}$ -1 $\frac{1}{2}$ -2 | Furrow | Use 1 lb. active ingredient per acre for rows 12" apart; $\frac{3}{4}$ lb. for rows 18" apart; $\frac{1}{2}$ lb. for rows 24" apart. Up to twice these amounts are needed for ethion on muck soils. |
| | | diazinon | 2 | Broadcast | Preplanting; disk into upper 1 to 2 inches of soil. Supplement with foliage spray below. |
| | | diazinon malathion | $\frac{1}{3}$ 1 | Foliage | Supplemental to soil treatment. Make first application when first adult flies are seen; make another 1 week later. From then on only as necessary. |
| Thrips (NHE-48) | Midseason and late season | diazinon parathion | $\frac{1}{2}$ $\frac{1}{2}$ | Foliage | When injury first appears and every 10 days as necessary. |

¹ No restrictions when used as recommended.

SWEET CORN

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|--|----------------|--|-----------------------------------|----------------|--|
| Rootworm (NHE-26) Seed corn maggot (NHE-27) Seed corn beetle (NHE-27) Wireworm (NHE-43) | April-August | diazinon | 1 | Row | Apply on soil surface behind planter shoe and ahead of press wheel. |
| Cutworm (NHE-38) | April-June | carbaryl | 1½ | Base of plants | When first damage appears. Use large quantities of water per acre. |
| Flea beetle (NHE-36) | April-July | carbaryl | 1½ | Foliage | As necessary. |
| Japanese beetle (NHE-32) | July-September | carbaryl | 1 | Ear zone | As necessary. |
| Corn borer | June-September | carbaryl spray, dust, or granules diazinon granules | 2 1½ | Foliage | Make first application when tassel ratio is 30 to 40. Repeat every 4 to 5 days as long as field has 20 or more unhatched egg masses per 100 plants. |
| Corn earworm ¹ (NHE-33) | June-September | carbaryl | 2 | Ear zone | Market corn: At first silk and every 2 to 3 days for 5 to 8 applications. On very early or late planted corn, treatment may be necessary before silking when eggs are being laid on stalks and flag leaves. Canning corn: At 30 to 50% silk and every 3 days thereafter until corn is within 1 week of harvest. |
| Sap beetle (NHE-10) | July-September | carbaryl diazinon malathion parathion | 2 1 1 ½ | Foliage | When adults first appear in field; usually between pollen-shedding and silk-drying. |
| Corn leaf aphid (NHE-29) | July-September | malathion mevinphos parathion | 1 ¼ ¼ | Foliage | As needed to produce attractive ears for fresh market. |

¹ Azodrin will be recommended upon label approval.

POTATOES¹

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|----------------------------|----------------|-------------------------------|-----------------------------------|-----------|---|
| Flea beetle | May-July | carbaryl | 1 | Foliage | When first damage appears on leaves, and repeat as needed. |
| | | endosulfan spray | $\frac{1}{2}$ | | |
| | | endosulfan dust | 1 | | |
| Colorado potato beetle | May-July | carbaryl | 1 | Foliage | As needed. |
| | | endosulfan spray | $\frac{1}{2}$ | | |
| | | endosulfan dust | 1 | | |
| Potato leafhopper (NHE-22) | May-July | carbaryl | 1 | Foliage | Weekly applications when leafhoppers first appear. |
| | | endosulfan spray | $\frac{1}{2}$ | | |
| | | endosulfan dust | 1 | | |
| | | phorate ² granules | 2 to 3 | Soilband | Place on either or both sides of row at planting but not in contact with seed. Use lower rate on sandy soils and heavier rate on heavy soils. Do not use on muck soils. |
| Aphid (NHE-47) | All season | endosulfan spray | $\frac{1}{2}$ | Foliage | As needed. |
| | | endosulfan dust | 1 | | |
| | | malathion | 1 | | |
| | | parathion | $\frac{1}{4}$ | | |
| | | phorate ² granules | 2 to 3 | Soilband | As for leafhoppers. |
| Blister beetle (NHE-72) | All season | carbaryl | $1\frac{1}{2}$ | Foliage | As needed. |
| | | toxaphene | 2 | | |
| Wireworm (NHE-43) | All season | phorate ² granules | 2 to 3 | Soil | Preplanting, disk in; or use as soilband at planting. |
| White grub (NHE-23) | All season | phorate ² granules | 3 | Soil | Preplanting, disk in; or use as soilband at planting. |
| Grasshopper (NHE-74) | July-September | carbaryl | $\frac{3}{4}$ | Foliage | As needed, control in fence rows, roadsides, ditch banks, etc., before migration. |
| | | toxaphene | $1\frac{1}{2}$ | | |

¹ Potatoes should not be grown in soil where aldrin, dieldrin, or heptachlor was applied as a soil insecticide the preceding year.

² No restriction when used as recommended.

BEANS

| Insect | Time of attack | Insecticide | Lb. of active ingredient per acre | Placement | Timing of application |
|--|---------------------------|---|-----------------------------------|-----------|---|
| Seed maggot (NHE-27) | All season | dieldrin ¹ lindane ¹ | Manufacturer's directions | Seed | At seeding. |
| | | phorate ¹ granules | 1½ | Soilband | Place on either or both sides of row at planting but not in contact with seed. |
| Bean leaf beetle (NHE-67) | Early and late season | carbaryl | 1 | Foliage | When feeding first appears and weekly for 2 or 3 applications as needed. |
| | | malathion | 1 | | |
| Leafhopper (NHE-22) and plant bug (NHE-68) | All season | carbaryl | 1 | Foliage | Before plants become yellow and stunted. Repeat applications at weekly intervals as necessary. |
| | | malathion | 1 | | |
| Mexican bean beetle | Midseason and late season | phorate ¹ granules | 1½ | Soilband | As for seed maggot. |
| | | carbaryl | ½ | Foliage | When occasional leaves show lacework feeding. |
| Aphid (NHE-47) | All season | malathion | 1 | Foliage | Usually applied when a few aphids can be found on each plant, but before leaves begin to curl and deform. |
| | | endosulfan | ½ | Foliage | Usually applied when a few aphids can be found on each plant, but before leaves begin to curl and deform. |
| Blister beetle (NHE-72) | Midseason and late season | phorate ¹ granules | 1½ | Soilband | As for seed maggot. |
| | | carbaryl | 1½ | Foliage | As needed. |
| Corn earworm (NHE-33) | Late season | carbaryl | 1½ | Foliage | As needed, but usually after September 1. Worms may be present before bloom. |
| Mites | Midseason and late season | carbophenothion | ¾ | Foliage | As needed, but especially during drouthy periods particularly if carbaryl has been used on crops. |
| | | Kelthane | 0.4 | | |
| | | malathion | 1 | | |
| | | phorate ¹ granules | 1½ | Soilband | As for seed maggot. |

¹ No restrictions when used as recommended.

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 easy 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 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 cabinet.

6. Wash out and bury or burn 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 insecticide.

10. Do not leave puddles of spray on impervious surfaces.

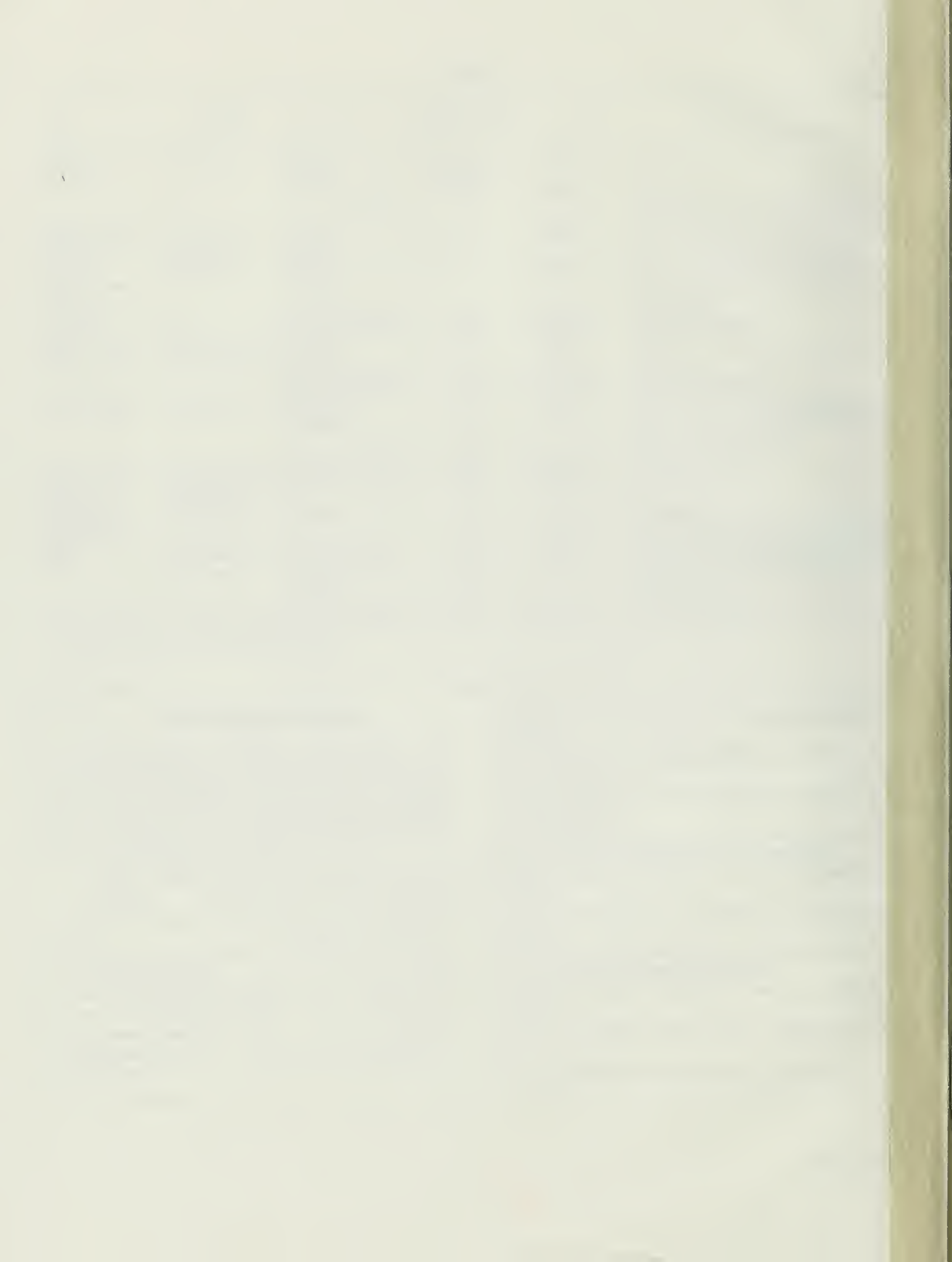
11. Do not apply to fish-bearing or other water supplies.

12. Do not apply insecticides, except in an emergency, to areas with abundant wildlife.

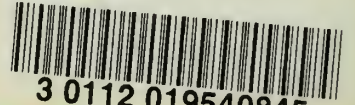
13. Do not apply insecticides near dug wells or cisterns.

14. Do not spray when weather conditions favor drift.

15. Observe all precautions listed on the label.



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