

Sp

Kill Those HOPPERS

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with **CHLORDANE or TOXAPHENE**

- Either of these poisons will give you quicker, longer lasting kills of grasshoppers than any other insecticide.
- You can buy either of them readily on the market.
- You can put them on the infested areas on your farm with a regular farm sprayer or duster.

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EXTENSION SERVICE

North Dakota Agricultural College and
U.S. Department of Agriculture Cooperating
E. J. Haslerud, Director, Fargo, North Dakota

CIRCULAR

NO. A-144

More about these two poisons---

Chlordane and toxaphene are made as:

1. Emulsion concentrates
2. Wettable powders
3. Dusts

With ground spraying equipment, use the emulsion or wettable powder form diluted with water to suit your sprayer.

Generally, substitute oil for water with the poisons when you spray by airplane. When airplanes can fly within 10 feet of the growing crops, water can be used, but for higher flying than that, oil is best.

APPLYING THE POISONS

Any farm sprayer or duster can be used to apply chlordane or toxaphene.

Power sprayers with long booms---up to 40 feet---are useful for field margin and field spraying. Clean your weed sprayer of all 2,4-D if you're going to spray susceptible field crops with hopper poison. On the other hand, if the young hoppers hatch out when the weeds need spraying, you may be able to do both jobs at once by mixing chlordane or toxaphene with 2,4-D in your sprayer.

Crop dusters can be used for field treating. Small hand dusters and sprayers can be used to poison small infested areas such as gardens, farmsteads and shelterbelts. Generally, sprays give a better kill than dusts.

WHEN TO POISON

The time to kill hoppers is when they are still small and have not moved far from the hatching beds. Most cropland hoppers lay their eggs in stubble fields, headlands, field margins, ditches, right of ways and fence rows. By treating these areas when the young hoppers are just hatching, you can keep them from moving into your fields later on.

Once the grasshopper develops wings, he's tough to bring under control.

Since either chlordane or toxaphene will continue to kill hoppers for one to three weeks after applying it, treating at hatching time will not only kill those hoppers that have hatched, but also those that hatch later and those that move into the poison areas.

HOW MUCH POISON DO YOU NEED

Chlordane sprays $\frac{1}{2}$ to 1 lb. actual chlordane per acre

Toxaphene sprays 1 to $1\frac{1}{2}$ lbs. actual toxaphene per acre

Chlordane dusts $\frac{3}{4}$ to $1\frac{1}{2}$ lbs. actual chlordane per acre

Toxaphene dusts $1\frac{1}{2}$ to $2\frac{1}{2}$ lbs. of actual toxaphene per acre

The lower rates listed in this table may do the job for you if you treat when the hoppers are just hatching, but later in the season you'll need to increase the amount of actual poison you use. If you put off spraying until the hoppers are full grown and widespread in tall, dense crop growth, you may have to use more poison than the highest figure listed in the table. It pays to treat early.

TREATING DIFFERENT PARTS OF YOUR FARM

Grain Fields

Grasshoppers seldom lay their eggs in cultivated fields, so you'll find the young hoppers hatching out in the field margins. Save your grain by treating these field margins with chlordane or toxaphene when the hoppers are hatching.

Remember, adult hoppers can cut your crop yields by as much as eight percent before you see the damage.

Legumes and Grass Fields

Here again, most of the eggs will be laid around the field margins, but there may be some over the entire field. Again, treat early and along field margins. Don't treat the rest of the field until the first hay crop has been cut.

You can trap hoppers by leaving some uncut strips in the field. Wait a few days until the hoppers have concentrated in these areas, and then spray or dust with one of the poisons.

If hoppers threaten your second hay crop, treat the entire field when the plants are about six inches high. This will kill the hoppers before they do much damage, and there will be little effective poison left on the hay at cutting time. Never apply chlordane nor toxaphene when plants are in blossom. These poisons are harmful to bees and other pollinating insects.

Pastures

Rangelands are a problem only when they border cultivated fields. Treat such heavily infested pastures with either of the poisons early in the season, before the grasshoppers move to lusher cropland.

- ➡ DON'T cut hay from grass and legume fields for at least 10 days after spraying.
- ➡ DON'T allow your livestock on pastures that have been treated for at least 10 days.

These insecticides build up in the fatty tissues of animals and are secreted in their milk.

If you can't keep your livestock off infested pastures for 10 days, use bran bait to kill the hopper.

USE BRAN BAIT WHERE LIVESTOCK IS GRAZING

Properly prepared bran baits, spread uniformly over a pasture, will not harm grazing livestock, but they will kill grasshoppers. Again, use chlordane or toxaphene as your hopper poison. Bait kills grasshoppers as well as sprays or dusts in sparse grass and stubble, and is effective just as long.

Wet Baits

Bran	25.0 lbs.
Sawdust (3 times volume of bran)	3.5 bu.
Chlordane or	0.5 lb.
Toxaphene or	1.0 lb.
Sodium fluosilicate	6.0 lbs.

This mixture with enough water added to make it thoroughly wet is spread at the rate of 20 lbs. to the acre. Remember, the amount of chlordane or toxaphene called for in this formula means actual weight of chlordane or toxaphene in the preparation you buy.

Dry Baits

You can use a dry bait made of flaky bran mixed with an oil solution. You can store dry bait longer than wet, and it takes less of the actual bait per acre. This is an advantage if you are putting your bait on by airplane.

Wet bait spreaders cannot be used with dry bait, but airplanes with single outlet dusters can handle the dry bait satisfactorily.

Make dry bait by adding 1/2 lb. of actual chlordane or 1 lb. of actual toxaphene to enough oil solution to make 1/2 gallon. Apply this mixture as a fine spray under pressure to 100 lbs. of bran. Dry bait may also be mixed by hand, if the oil-insecticide mixture can be evenly worked into the bran. Apply dry bran bait at the rate of 5-10 lbs. per acre depending upon the time of season, the number of hoppers present and the amount of plant growth.

Use wet or dry baits only on pasture, rangeland or marginal land such as roadsides, ditches and fencerows. Do not use them for cropland protection because the hoppers like the cultivated plants better than the bait.

OTHER CONTROL METHODS

Tillage

Cultivation discourages egg laying and prevents hopper development. Plowing, disking and duck-footing early in the fall causes the hoppers to move to the outer edges of the field where the eggs will be laid. Plowing after the eggs are laid, covers them too deeply for normal hatching in the spring. Disking destroys many of the egg pods and also exposes the eggs to weather, birds, rodents and other enemies.

Seeding

Seed only on fall or spring plowed land, or on clean summerfallow ground to protect your small grain crops during grasshopper outbreaks. Few hoppers will hatch in such fields and you can poison those hoppers concentrated along the outer edges of the field and attacking the margins of the crops.

Trap Strips

Hoppers often move from one field to another, especially when the crop is cut or has reached maturity. In such cases leave a barrier of a few rows of corn or cane, or uncut strips of alfalfa or sweet clover between the fields. Hoppers will gather in these areas and you can easily poison

CAUTION

With few exceptions all insecticides are poisonous to man and animals. Handle them with care. Observe the rules:

- ◆ Read the label and follow directions.
- ◆ Remove contaminated clothing and bathe thoroughly daily or after completing spraying or dusting operations.
- ◆ Do not swallow or inhale the insecticide.
- ◆ Apply the spray, dust or bait evenly over the entire area to be treated.
- ◆ Keep stored bran bait out of reach of livestock.

Chlordane and toxaphene are not dangerous if you follow these rules.

COMMUNITY ACTION

Each year state-wide grasshopper surveys are made. These surveys determine the degree of infestation and help us decide where control measures will be needed. We urge each of you to check your farm carefully for hopper pods and to report the presence of unusual numbers of hoppers or egg pods to your County Extension Agent or to your Extension Service entomologist. You can get information on the distribution and abundance of grasshoppers within your county from your County Extension Agent.

If grasshoppers are concentrated on a single farm and menace only the crops on that farm, individual action is enough to control them.

If, however, they are present in such numbers that they are likely to move from one farm to another, community and often county-wide action is needed. Such action calls for proper organization, education, effective leadership and the willingness of all of you to help

Good control this year will not only protect current crops but can greatly reduce the need for grasshopper control work next year.

Control started early before the grasshoppers become winged, will prevent crop losses.