

MSU Extension Publication Archive

Archive copy of publication, do not use for current recommendations. Up-to-date information about many topics can be obtained from your local Extension office.

Chemical Weed Control for Vegetables and Small Fruits
Michigan State University Cooperative Extension Service
F Folder Series
S.K. Ries, R.F. Carlson, H. K. Bell, Horticulture; B.H. Grigsby, Botany and Plant Pathology
Issued March 1958
6 pages

The PDF file was provided courtesy of the Michigan State University Library

Scroll down to view the publication.



EXTENSION FOLDER F-241

CHEMICAL WEED CONTROL

**For
Vegetables
And Small
Fruits**

MICHIGAN STATE UNIVERSITY
Cooperative Extension Service • East Lansing

CHEMICAL WEED CONTROL

For Vegetables and Small Fruits

By S. K. RIES, R. F. CARLSON and H. K. BELL

Department of Horticulture

and B. H. GRIGSBY

Department of Botany and Plant Pathology

Weeds compete with your food crops for water, light, nutrients, and space. Weeds cut down yields and may cause a total loss of crop. Weeds harbor insects and diseases as well as damage the quality of the harvested product. Weeds reduce crop values for the United States an estimated 4 to 5 billion dollars each year; this loss is greater than that caused by diseases and insects combined.

Principles of Chemical Weed Control

Chemical weed control is not a gamble—it is a sound, economical practice. To get good control, follow these basic principles.

1. **Weeds are killed most easily when the weather favors weed-seed germination and rapid plant growth.** Crop plants are also most easily injured under these conditions. The chemicals recommended, though, are designed to kill weeds, but not crops, under conditions favorable for plant growth. Poor results from pre-emergence sprays often are due to the lack of enough soil moisture after spraying to activate the chemicals or to bring about weed-seed germination in the surface soil.

2. **Chemicals recommended for selective weed control kill best when weed seeds are germinating or when plants are young.** With the exception of 2,4-D, chemicals used at the recommended rates will not kill older plants.

3. **Use the recommended rate of application.** The selectivity of chemicals for crop plants (killing weeds and not the crop) occurs only when the amount of chemicals applied falls within certain ranges. The greater the range of tolerance of a crop plant, the better the chemical is for weed control, provided the chemical will kill weeds throughout this range. No crop plant is completely resistant to injury from herbicides.

4. **Do not disturb the soil in the crop row after applying chemicals.** Cultivate the crop, but be careful

not to throw soil into the row. If you disturb the area near the plants, you destroy the chemical layer. This may also bring weed seeds to the surface, where they germinate.

5. **Rates differ with soil type.** In general, use the lower recommended rates on light or sandy soils. Rates recommended for mineral soils may not be effective on muck soils. For instance, no practical concentration of NPA (Alanap-3) will effectively control weeds in cucumbers grown on muck soil.

6. **Know your weed species.** This is important because several chemicals are effective on certain species only. For instance, at the recommended rates, CIPC (Chloro IPC) will kill purslane, chickweed, and smartweed, but it will not kill lambs quarter or pigweed. If these last two are the only species present, CIPC will appear ineffective.

7. **Know the chemical's limitations.** These appear on the product label. Read it carefully. Below is the type of information given on labels. Known trade names are in parentheses after common names.

DNBP (Premerge or Sinox PE) should not be used in sprayers which have contained copper unless the sprayer is thoroughly cleaned, because the copper will react with the DNBP to form a substance which will clog screens.

Monuron (Karmex W) is sold as a wettable powder; the spray solution must be stirred constantly to be sure the chemical stays in suspension—evenly mixed in the water.

Sesone (Crag Herbicide 1) is effective only if it is applied before weed seedlings are more than one-fourth inch high.

8. **Be careful of wind drift and volatility.** Use only low-volatile forms of 2,4-D on vegetable and fruit farms. Be careful not to spray herbicides near sensitive crops such as grapes and tomatoes.

Weed Sprayers

You can use many types of sprayers to apply chemicals for weed control. You do not need to buy expensive, high-gallonage, high-pressure spray equipment. A complete weed-control sprayer should have the following features:

1. A pump which is inexpensive and easily replaced, which wettable powders will not damage, and with a minimum capacity of 4 gallons per minute.

2. Solution agitation (stirring), either mechanical or by using a bypass from the pump. If a power-takeoff sprayer does not provide agitation, add a bypass to a galvanized tee between the pump and pres-

sure gauge. In this case, a separate valve on the bypass line will regulate pressure. If the pump does not have enough capacity for agitation under specific spraying conditions, provide it by using both the next lower tractor gear and nozzle tips with a smaller orifice.

3. 50-mesh screens for suction line and nozzles. Wettable powders will not go through the 100-mesh screens which are sometimes provided.

4. A spray boom with nozzles which may be adjusted for distance between nozzles on the boom and for height above the ground. This is especially important for band spraying.

5. A gauge which measures pressure accurately up to 100 pounds per square inch.

6. Flat fan nozzles. The best nozzle size for general use is equivalent to an 8004 Teejet. For most work, a wide-angle nozzle—73 to 80 degrees—is best because the boom can be held close to the ground to reduce drift. This is most important when it is windy.

Sprayer Calibration

One of the most important factors in effective weed spraying is accurate calibration — determining the amount of spray material applied per acre. A range of 20 to 60 gallons per acre, at a pressure of 20 to 60 pounds per square inch, is satisfactory.

Adjust the boom height so that the spray overlaps about a third at ground level for pre-emergent spraying or at the top of the weeds for post-emergent spraying. For overall spraying, this places the nozzles about 18 to 20 inches apart on the boom and 18 to 20 inches from the sprayed surface. A good way to calibrate a sprayer is to:

1. Fill the spray tank with water only.
2. Spray a measured area, in a field if possible, at a fixed tractor speed and pressure gauge setting. **Be sure to allow for partial coverage if bands are used.**
3. Measure the amount of water needed to refill the tank.
4. Divide this amount by the fraction of an acre sprayed to get the gallons applied per acre. (An acre contains 43,560 square feet.)
5. Mix the amount of chemical desired per acre with water to give this much spray material.

For example, if 10 gallons were applied on one-fourth acre, the volume of spray material applied

would be 40 gallons per acre. If you change the tractor speed or gear, pressure setting, nozzle size, or number of nozzles, the amount of liquid applied per acre will be different and recalibration will be necessary.

Band Application

Since weeds in the crop row are usually the hardest to control, it may cost up to 80 percent less to spray herbicides in a band over the row rather than to cover the whole area.

If you use band applications, adjust for the area actually sprayed and not for the total acres in the field. For example, suppose the recommendation for a chemical is 4 pounds per acre, and 12-inch strips are sprayed over 36-inch rows. Only one-third of the ground area will be covered with spray material, so only $1\frac{1}{3}$ pounds of chemical (one-third of 4 pounds) will be required per acre. 4 pounds of chemical will then cover 3 acres of the crop.

To adjust the sprayer for band application, place the boom so that there is one nozzle over each row and plug the nozzles between rows. This is not always easy with standard booms, but you can buy adjustable booms or adapters.

Cleaning Weed Control Sprayers

It is important to keep weed control sprayers clean. This is especially true if you use them to spray more than one crop or to apply fungicides and insecticides. **Do not use a sprayer to apply insecticides and fungicides if the sprayer has contained 2,4-D.**

In cleaning a sprayer, it is important that you thoroughly rinse the whole sprayer with water, inside and out, including boom, hoses and nozzles, both **before and after** cleaning. Partially fill the sprayer with water before you add the cleaning agent. Keep the pump running so that the cleaning solution will circulate throughout the sprayer. Corrosive cleaning agents should not stand in tanks more than 2 hours.

When you are using only pre-emergence sprays, a good rinsing with water is enough. For other spraying purposes, remove weed-killers from sprayers by adding 1 gallon of household ammonia or 5 pounds of sal soda to 100 gallons of water. Allow this solution to stand in the sprayer for **at least 2 hours**. Drain it out through the boom and nozzles, and rinse the sprayer with water. Do not let spray solutions stand in the tank overnight.

Copper may interfere with the effectiveness of herbicides, especially DNBP. To remove copper residues from the tank, add 1 gallon of vinegar or commercial acetic acid to each 100 gallons of water; allow it to stand in the sprayer for **2 hours only**. Drain the sprayer immediately and rinse thoroughly with water.

WARNING

Suggestions in this folder are based on data obtained from 2 or more years of trials. Use of these chemicals and methods, however, depends on registration of the products by the U.S. Pure Food and Drug Administration. Growers are warned not to use a chemical on a food crop for which the compound is not registered; to do so will lead to confiscation of the crop if a residue is found on produce in either the fresh market or process crop.

Labels of registered compounds will show the amount of residue, if any, permitted by current regulations on specific crops. **Do not use any herbicide unless the label states that the chemical may be used on the specific crop to be sprayed.**

READ THE LABEL

Common Equivalents

- 1 acre = 43,560 square feet or 160 square rods
- 1 square rod = 272 square feet
- 1 cup = 16 tablespoons
- 1 tablespoon = 3 teaspoons

Common Names and Trade Names

amitrol	Amino Triazole, Amizol
CDAА	Radox
CIPC	Chloro IPC
dalapon	Dowpon
sesone	Crag Herbicide 1
diuron	Karmex DW
DNBP	Sinox, PE, Premerge
erbon	Baron
MCPA	MCP—Several companies
monuron	Karmex W
NPA	Alanap-3
CDT	Simazin
TCA	TCA—Several companies
EXD	Herbisan 5

SUGGESTED WEED CONTROL PRACTICES

Always Read the Label on the Container

Rates Given are for Pounds of Active Ingredients per Acre Actually Covered With Spray Material

Vegetables

Crop	Chemical*	Rate per Acre Actually Sprayed	Time of Application	Weeds Controlled	Remarks
Asparagus (seedlings)	Diuron	1 pound	Time of planting	Annuals	
	DNBP	3 pounds	Two days before seedlings emerge	Annuals	Adequate only if weeds are above ground.
	Stoddard Solvent	75-100 gals.	Before seedlings emerge	Annuals except ragweed	Adequate only if weeds are above ground.
Asparagus (established beds)	Monuron	1-3 pounds	1-1½ pounds after disking in spring and again after cutting season	Annuals	Do not apply in areas where the chemical may be washed into another area, such as orchards.
Beans (Snap and Lima)	DNBP	3-4 pounds	From emergence to crook stage before leaves emerge	Annuals	Spray when temperatures are between 65° and 85° F.
	Dalapon	10-20 pounds	At end of cutting season	Quackgrass	Quackgrass should be at least 6 inches high.
Beets	TCA	7-10 pounds	Just prior to come-up	Annual grasses	Should spray on a well-prepared seedbed.
	Common salt	200-400 pounds	Post-emergence	Annuals	Requires 200-400 gallons of water.
Cabbage, Broccoli, and Cauliflower	TCA	5-8 pounds	Just prior to come-up	Annual grasses	Use only on direct-seeded crops.
Carrots, Parsnips and Dill	Stoddard Solvent	75-100 gals.	After two true leaves have formed	Annuals except ragweed	Spray when weeds are not more than 2 inches high. Carrot roots should not be thicker than a lead pencil. Spray on cloudy days or in evening before dew formation.
Celery	Stoddard Solvent	75-100 gals.	In the seedling stage	Annuals except ragweed	Use only on seedbeds.
Lettuce	CIPC	1-2 pounds on mineral soil	Immediately after planting	Annual grasses, purslane, chickweed and smartweed	Use 1-2 pounds if temperature below 60° F., 2-3 pounds if temperature above 60° F.
Onions (seeds, sets and slips)	CIPC	6-8 pounds	From planting to crook stage	Annual grasses, purslane, chickweed and smartweed	Use 4-6 pounds when temperature is below 60° F.
	CIPC	8-10 pounds	After onions have 3-4 leaves	Annual grasses, purslane, chickweed and smartweed	Do not apply in flag stage. Direct spray at base of plant. May cause injury to fall-sown grains.
	EXD	5-10 pounds	Any time	Annuals	Direct spray so that it does not hit foliage.
	Sulphuric Acid	2½-3 gals.	2-3 leaf stage	Annuals	Apply in 100 gals. of water.
Peas	DNBP	1-2 pounds	2-4 leaf stage	Annuals	Apply until peas are 8 inches high. Temperature should be 65-85° F. Not effective on grasses.
	MCPA	⅓-¼ pounds	2-4 leaf stage	Annuals	Not effective on grasses.
Potatoes	DNBP	6 pounds	Just prior to come-up	Annuals	On muck or mineral soil.
	Monuron	2 pounds	Just prior	Annuals	Use only on muck soil.

Spinach	or Diuron		to come-up		
	CIPC	1-3 pounds on mineral soil	Immediately after planting	Annual grasses, purslane, chickweed, and smartweed	Use 1-2 pounds if temperature below 60° F., 2-3 pounds if temperature above 60° F.
Squash, Pumpkin	DNBP	2-4 pounds	Just prior to come-up	Annuals	May cause injury if heavy rain follows application.
Sweet Corn	DNBP	4 pounds	From emergence to spike stage (1 inch)	Annuals	Temperatures should be 65-85° F.
	2,4-D	1 pound	From emergence to spike stage (1 inch)	Annuals	May not control grasses. Do not use on early varieties such as North Star.
	CDA	4 pounds	Before emergence	Annuals	May not control all broadleaved weeds.
Vine Crops Cucumber Muskmelon Watermelon	NPA	4-6 pounds	Immediately after planting	Annuals	Apply within 1 day of planting.
		3-4 pounds	Just before vining	Annuals	No weeds should be visible.

Small Fruits

Brambles	Sesone	3-4 pounds	Before weeds appear	Annuals	Apply on moist soil in new or established plantings.
	DNBP	3-6 pounds	Early spring	Annuals	Do not apply in fall when tip-layering.
	CIPC	4-6 pounds	Spring or fall	Annual grasses	Do not use in fall when tip-layering.
Blueberries	DNBP	3-6 pounds	Spring or summer	Annual broad-leaved weeds	Apply as directed. Spray at base of plants. Do not apply within 4 weeks of picking.
Strawberries (new planting)	Sesone	3-4 pounds	2 weeks after planting and again after runner plants are established	Annuals	Apply on moist soil before weeds emerge.
Strawberries (producing bed)	2,4-D	½-1 pound	Immediately after picking season	Perennial broad-leaved weeds	Do not apply when flower buds are forming.

Quackgrass Control Before Growing Crop

	Dalapon	10-20 pounds	Sept. to Nov. 15	Quackgrass	Apply when grass is at least 6 inches high. If quackgrass is low in vigor, apply nitrogen to stimulate growth 2 weeks before spraying.
	Dalapon	10 pounds	Spring when grass is 4 inches high	Quackgrass	Wait for five weeks before planting.

Poison Ivy, Canada Thistle, and Horse Nettle Control on Non-Crop Areas

	Amitrol	4 pounds	Spring or summer		Apply when weeds are in full leaf but before flowers appear.
--	---------	----------	------------------	--	--

For Elimination of All Herbaceous Vegetation

	Monuron	20-40 pounds	Any time	All vegetation	Will last more than 2 years.
	Erbon	120-160 pounds	In spring	All vegetation	
	CDT	10-15 pounds	Any time	All vegetation	

* See table on common names and trade names.

Always Read the Label on the Container