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EC70-130 A 1970 Guide for ... Chemicals that Control Weeds

Laren Robison

Dave Nuland

John Furrer

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A 1970 GUIDE FOR - - -

CHEMICALS that CONTROL WEEDS . . .

By LAREN ROBISON
Agricultural Extension Agronomist (Weed Science)

DAVE NULAND
Instructor, Horticulture and Forestry

JOHN FURRER
Agricultural Extension Specialist (Pesticide Chemicals)

GAIL WICKS
Assistant Professor, Weed Science

CHARLES FENSTER
Agricultural Extension Agronomist (Crop Management)

This circular deals principally with herbicides as an aid for crop production. Good farming practices including crop rotations, clean seed, adapted varieties, proper seedbed preparation, proper planting date and depth, adequate row and plant spacings, timely cultivation, and adequate fertilization are, as always, of prime importance if weed problems are to be kept to a minimum. Also, of paramount importance is the prevention of weed seed production and dissemination.

The suggestions for chemical weed control contained in this circular are based on research results at the Nebraska Agricultural Experiment Station and elsewhere.

The information given herein 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 Cooperative Extension Service is implied.

To avoid dangers of drift, exercise judgment when spraying. Do not make field applications when wind velocity exceeds 8 mph. Wind will cause poor coverage and excessive drift. BE ESPECIALLY CAREFUL WITH 2,4-D AND SIMILAR COMPOUNDS AROUND VEGETABLES, ORNAMENTALS, TREES, SHRUBS, AND OTHER BROADLEAF CROPS.

BE SURE TO CALIBRATE APPLICATION EQUIPMENT.

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and U.S. Department of Agriculture

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E. F. Frolik, Dean; J. L. Adams, Director

"Use Crop Production Chemicals Wisely!"

- READ THE LABEL BEFORE EACH USE. Follow instructions; heed all cautions and warnings.
- APPLY ONLY AS DIRECTED, to the crops specified, in amounts specified and at times specified. *Federal law authorizes seizure of any raw agricultural commodity moving in interstate commerce which carries a pesticide residue in excess of the established tolerance.*
- STORE IN ORIGINAL, LABELED CONTAINERS. Keep out of reach of children, pets, livestock and irresponsible people.
- ELIMINATE EMPTY CONTAINER HAZARDS. Rinse empties that contained liquids. Two rinsings remove 95% of the chemical. BURN PAPER BAGS AND FIBER DRUMS. Stay out of the smoke.

FIELD CROPS—PREPLANT AND PREEMERGENCE

A 13-inch band application will reduce the total herbicide used in 40-inch rows by two thirds.

Preplant treatments are made before planting the crop. Preemergence treatments are applied from planting time to just before plant emergence. Postemergence treatments are applied after emergence of weeds or crop. Weed control with preemergence treatments may be poor if there is no rain to leach the herbicide into the surface soil. To overcome dependence on rainfall and to increase dependability, preemergence herbicides should be incorporated into the surface soil with a suitable implement. Excessive rainfall may leach some of the more soluble herbicides too deeply, especially on sandy soils. Soils high in organic matter or clay content generally require more herbicide than do sandy soils for equivalent weed control. Weed control with preemergence herbicides is more satisfactory on surface-planted crops and when applied to prepared seedbeds free of clods, trash, and weeds.

Some weed species are resistant to particular herbicides. Herbicides should be rotated to control a wider spectrum of weeds and to reduce the build-up of any particular herbicide in the soil. *If you use atrazine plant only corn or sorghum the following year—it may carry over and injure alfalfa, beans, potatoes, sugar beets, and small grains.* Herbicide residue problems in soils increase as one goes westward in Nebraska.

Sprayers should provide good agitation of spray solution and be equipped with 50-mesh or coarser screens to avoid clogging with wettable powders.

Crop	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product/A	Application time	Remarks
Corn	alachlor	2 to 3	2 to 3 qt Lasso	Preemergence	Primarily for annual grassy weed control. Shallow incorporation may be beneficial.
	atrazine	2 to 3	2.5 to 3.75 lb AAtrex 80W	Preplant or preemergence	AAtrex may not control fall panicum, crabgrass or field sandburs.
	atrazine + butylate	3 + 1	1.3 lb AAtrex 80W + 2 qt Sutan	Preplant	Incorporate immediately by double disking or equivalent soil mixing.
	atrazine + propachlor	1 + 2.4	1.3 lb AAtrex 80W + 3.75 lb Ramrod 65W	Preemergence	AAtrex may not control fall panicum, crabgrass or field sandburs. Ramrod controls primarily grassy weeds.
	linuron + propachlor	1 + 2	6.7 lb Londax WP or 20 lb Londax G	Preemergence	Eastern Nebraska only.
Field beans	EPTC	3	2 qt Eptam	Preplant	Immediately incorporate by double disking or equivalent soil mixing.
	EPTC + trifluralin	1.5 + 0.5	1 qt Eptam + 0.5 qt Treflan	Preplant	
Potatoes	EPTC	3	2 qt Eptam	Preplant	Incorporate immediately.
	diphenamid	4	5 lb Dymid 80W or 8 lb Enide 50W	Preplant or preemergence	Incorporation is beneficial.
Sorghum (These herbicides are for central and eastern Nebraska only)	atrazine	2 to 2.4	2.5 to 3 lb AAtrex 80W	Preplant or preemergence	Do not use on sandy soils or soils low in organic matter. Heavy rains may leach AAtrex and cause injury to sorghum. AAtrex may not control crabgrass, fall panicum or field sandburs. Do not use AAtrex at 2.4 lb/A for more than two consecutive years on continuous sorghum. Reduce AAtrex rate the third year.
	atrazine + norea	0.8 + 1.6	3 lb Herban 21A	Preemergence	
	atrazine + propachlor	1 + 2.4	1.3 lb AAtrex 80W + 3.7 lb Ramrod 65W	Preemergence	
Soybeans	alachlor	2 to 3	2 to 3 qt Lasso	Preemergence	Shallow incorporation may be beneficial.
	amiben	2 to 3	4 to 6 qt Amiben	Preemergence	
	trifluralin	0.75	0.75 qt Treflan	Preplant	Immediately incorporate by double disking or equivalent soil mixing.
	vernolate	2.5	1.6 qt Vernam	Preplant	
Sugar beets	cycloate	3 to 4	2 to 2.6 qt Ro-Neet	Preplant	Immediately mix into dry soil with power incorporator 1 to 2 inches. Do not use on sandy soils below 1% in organic matter. *Ro-Neet does not control kochia.* See Campaign Circular 204.

(continued on next page)

FIELD CROPS POSTEMERGENCE

Excellent growing conditions make weeds more susceptible to postemergence herbicides. Likewise, crops may be more subject to herbicide damage when growing rapidly. *Adjust herbicide dosages downward* when excellent conditions for growth are present the week before application and *upward* when ideal growth is limited by one or more factors. For wild buckwheat control, see page 6.

Crop	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product/A	Application time	Remarks
Barley and spring wheat	2,4-D amine	0.50 to 0.75	1 to 1.50 pt[3]	5-leaf to early boot	Do not treat winter barley in the fall. Spray field pennycress and mustards as soon as good growing conditions occur in the spring.
	2,4-D ester	0.25 to 0.50	0.50 to 1 pt[3]		
Corn	2,4-D amine	0.50 to 1	1 to 2 pt[3]	Before corn is 18″ high—over 18″ use drop nozzles	Later applications may cause brittleness and stalk breakage. Use lower rate when good growing conditions exist to reduce corn injury.
	2,4-D ester	0.25 to 0.50	0.50 to 1 pt[3]		
Oats and millet	2,4-D amine	0.50	1 pt[3]	6-leaf to flag leaf	Some injury may be expected at any stage with 2,4-D.
	MCPA	1	1 qt[3]		
Sorghum	2,4-D amine	0.50	1 pt[3]	During the period sorghum is 4″ to 12″ high. Over 12″ use drop nozzles.	Spraying before 4″ stage may inhibit root development. Spraying without drop nozzles after 12″ through early boot may inhibit head development.
	2,4-D ester	0.25	0.50 pt[3]		
Soybeans	chloroxuron	1.5	3 lb Tenoran 50W + 0.5% Adjuvan-T	Postemergence	Apply when weeds are less than 1″ tall. For broadleaf weed control. Will cause early soybean injury.
Sugar beets	dalapon	2 to 4	2.7 to 5.4 lb Dowpon	Grassy weeds less than 2″ tall	For annual grasses. Use higher rate (4 lb/A) on grass taller than 2″. For broadleaf weed control see Campaign Circular 204, Weed Control in Sugarbeets.
Winter wheat	2,4-D amine	0.50 to 0.75	1 to 1.5 pt[3]	Before early boot	Do not spray winter wheat in the fall. Spray field pennycress and mustards as soon as good growing conditions occur in the spring.
	2,4-D ester	0.25 to 0.50	0.5 to 1 pt[3]		

PASTURES, RANGES, AND FORAGE CROPS

Area or use	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product/A	Application time	Remarks
Alfalfa and birdsfoot trefoil seedlings	benefin	1.1 to 1.5	3 to 4 qt Balan	Preplant	Immediately incorporate by double disking or equivalent soil mixing. Early legume injury may occur.
	dalapon	2 to 3	2.7 to 4 lb Dowpon	2 to 4 weeks after alfalfa emerges when grass seedlings are less than 2″ tall	For annual grasses. Do not sell first year's crop or feed treated forage to dairy cows or animals being finished for slaughter. Can be mixed with 2,4-DB.
	2,4-DB	1	2 qt 2 lb/gal amine Butyrac or Butoxone	When weeds are small	For broadleaf weeds. Do not use treated forage for 30 days. DO NOT CONFUSE WITH 2,4-D.
	EPTC	3	2 qt Eptam	Preplant	Immediately incorporate by double disking or equivalent soil mixing. Early legume injury may occur.

[1] Refers to acid equivalent, phenol equivalent, or active material as applicable, calculated on a broadcast or total coverage basis.
[2] Retreatment may be necessary.
[3] Calculated on the basis of 4 lb/gal of active ingredient (the chemicals in a product that are responsible for the herbicidal effects). For other formulations see conversion table on page 7.

(continued on next page)

Area or use	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product/A	Application time	Remarks
Alfalfa (established 1 yr or more)	simazine	1 to 1.5	1.25 to 1.9 Princep 80W	Apply in late fall on dormant alfalfa	Primarily for winter annual weeds.
Cool-season grass seedlings	2,4-D	0.50 to 0.75	1 to 1.50 pt[3]	2- to 4-leaf stage	For broadleaf weeds.
Warm-season grass seedlings	2,4-D	0.25 to 0.50	0.50 to 1 pt[3]		
Warm-season grasses for seed	atrazine, diuron, or monuron	3	3.75 lb AAtrex 80W, Karmex, or Telvar	Spring or fall before weed emergence	Do not use until second year after seeding. Less effective in heavy plant residues.
Annual or biennial broadleaf weeds in pastures and ranges	2,4-D	1	1 qt[3]	Rosette stage in fall or when weeds are small in spring	Withhold milk cows from grazing treated areas for 7 days after application. With dicamba mixture do not harvest hay for dairy animals within 37 days of application.
	2,4-D amine + dicamba	1 + 0.5	1 qt + 1 pt		
Perennial broadleaf weeds in pastures and ranges	2,4-D	1 to 2	1 to 2 qt[3]	At bud stage of predominant weeds.[2] April for dandelions	Annual treatment for 2 to 3 years may be necessary. Withhold milk cows from grazing treated areas for 7 days after application. With dicamba mixture do not harvest hay for dairy animals within 37 days of application.
	2,4-D amine + dicamba	1 + 0.5	1 qt + 1 pt		

NON-CROP AREAS

Area or use	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product/A	Application time	Remarks
Chemical mowing	paraquat	1	2 qt Paraquat	Postemergence	Use enough water to insure good coverage. Add ½% X-77 wetting agent to spray solution.
Roadsides	2,4-D	1	1 qt[3]	Broadleaf weeds 2 to 6 inches	Repeat treatments may be necessary. For woody species replace 1 lb 2,4-D with 1 lb 2,4,5-T.
Irrigation ditchbanks, fence rows and around poles	diuron or monuron	8	10 lb Karmex or Telvar	Soon after ditches are open. Treat before weeds appear or soon thereafter	Use enough water to insure good coverage. Use 50 mesh or coarser screens.
	atrazine or simazine	6	7½ lb AAtrex 80W or Princep 80W		
	prometone	4	2 gal Pramitol		

LAWN AND TURF WEEDS

(Granular formulations and gravity flow applicators for liquids reduce herbicide drift)

Weed	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product	Application time	Remarks
Broadleaf weeds such as dandelion, ragweed, field bindweed, and plantain	2,4-D amine, dicamba, or silvex	1	1½ tbs[3]/1000 sq ft 2,4-D, Banvel, Silvex or mixtures (Use enough water to insure good coverage)	Fall or spring (Do not spray from May 1 to Sept. 15)	AVOID drift on desirable broadleafs. DO NOT use ester formulations of 2,4-D as damaging fumes drift unpredictable distances. Spray when calm. Check with neighbors before spraying. Avoid spraying Banvel around flowers, shrubs, and trees.

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Weed	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product	Application time	Remarks
Chickweed, henbit, violets, and knotweed	dicamba or silvex	1	1½ tbs[3]/1000 sq ft Banvel or Silvex	Fall or spring (Do not spray from May 1 to Sept. 15)	Use enough water to insure good coverage. Avoid spraying Banvel around flowers, shrubs, and trees.
Crabgrass, foxtail, and other annual grasses	Follow manufacturer's recommendations with Azak, Bandane, Betasan, Dacthal and Tupersan			Premergence to weeds in the spring	Use on established grass. Rake lawn prior to application and water in. Tupersan may be used at time of seeding.
Crabgrass	DSMA or MSMA	Follow manufacturer's recommendations with these organic arsonates		Postemergence	Repeat treatment every 7 days for 2 or 3 applications. Also effective on foxtail. May temporarily discolor bluegrass.
	kerosene		1 qt/100 sq ft	Postemergence, 2 to 4 leaves on crabgrass	Use white kerosene. Do not dilute. Apply when temperature is below 90° F.
White clover	dicamba, or silvex	1	1½ tbs[3]/1000 sq ft Banvel, Silvex or 2,4-D mixtures	Fall or spring (Do not spray from May 1 to Sept 15)	Avoid spraying Banvel around shrubs, flowers, and trees.

TROUBLESOME WEEDS AND WOODY PLANTS

Weed	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product/A	Application time	Remarks
Bursage, Skeletonleaf and woollyleaf	2,4-D	2	2 qt[3] emulsifiable formulations	Early June[2]	Same as for field bindweed except amine formulations less effective. If soil moisture conditions are poor, use oil-water emulsions as a carrier.
Canada thistle	2,4-D	2	2 qt[3]	Fall (rosette) and spring (early bud)[2]	Same as for field bindweed.
	dicamba	10	2.5 gal Banvel		
Cattails	2,4-D ester	6	1.5 gal[2,3] + 5% diesel oil + 0.5% emulsifier	Boot to early flowering. Retreat regrowth in late summer.	USE the equivalent of 150 gal of water per acre.
	amitrole	10	5 gal Amitrole or Cytrol	After flowering to fruiting	
	dalapon	20	27 lb Dowpon + 5% diesel oil + emulsifier		
Cottonwood, willows, and Chinese elm	2,4-D ester	2 to 3	2 to 3 qt[3]	Full foliage[2] (early June)	Aerial equipment: at least 5 gal carrier/A. Annual treatment for 2 to 3 years may be necessary. Basal treatment: 2 qt of herbicide/10 gal of diesel. Spray tree trunk to point of runoff.
Downy brome	atrazine	2	2.5 lb AAtrex 80W	Preemergence (fall or spring prior to April 1)	Use in waste areas such as fence rows and ditchbanks. Use sufficient water to insure good coverage.
	simazine	2	2.5 lb Princep 80W		
Field bindweed	2,4-D	1	1 qt[3]	Vigorous fall growth or bud stage in spring[2]	Avoid tillage 10 weeks before and 1 week after application. Plan to treat for several consecutive years.
	dicamba	10	2.5 gal Banvel		
Hemp	2,4-D	0.5 to 1	1 pt to 1 qt	2 to 12″ tall	At later growth stages use higher rate.
Hemp dogbane	2,4-D ester	1	1 qt[3]	Bud stage[2]	Use lower rates in crops.
		1 to 1.5	1 to 1.5 qt	Sept 1 to 30	Surfactant may help.
Hoary cress	2,4-D	2 to 4	0.5 to 1 gal[3] emulsifiable formulations	Rosette stage in the fall or early bud in spring[2]	Same as for field bindweed except amine formulations less effective.

[1] Refers to acid equivalent, phenol equivalent, or active material as applicable, calculated on a broadcast or total coverage basis.
[2] Retreatment may be necessary
[3] Calculated on the basis of 4 lb/gal of active ingredient (the chemicals in a product that are responsible for the herbicidal effects). For other formulations see conversion table on page 7.

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Weed	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial product/A	Application time	Remarks
Johnsongrass	dalapon	5	6¾ lb Dowpon	8 to 12″ new growth or regrowth[2]	Repeat treatment 3 times, 10 to 20 days apart. Treat when 70°F or above.
	TCA	80	100 lb Sodium TCA	Early spring[2]	Use enough water to insure good coverage. Retreat escaped plants.
	MSMA	3.5	3 qt Ansar 529 or 3 qt Daconate	Boot stage	Treat when 70°F or above. Do not use on cropland or grassland.
Leafy spurge	2,4-D	2	2 qt[3] emulsifiable formulations	Early bud stage in spring or late fall[2]	Same as for field bindweed except amine formulations less effective. Control seedlings.
	dicamba	10	2.5 gal Banvel	Fall or spring[2]	Same as for 2,3,6-TBA.
Milkweed, common	amitrole	4	8 lb Amino Triazole or Weedazol	Bud to bloom stage[2]	Use enough water to insure good coverage.
Musk thistle	2,4-D	1.5 to 2	1.5 to 2 qt[3]	Late fall treatment of rosettes or spring before flowering stalks lengthen	Chemicals other than 2,4-D not necessary for effective control. Annual treatments may be necessary for control of new seedlings.
Pricklypear	silvex	1 to 2	1 to 2 qt[3] Silvex	May 15 to June 15	Rotary hoe pads just prior to spraying. Add 1 gal/A diesel + 0.5% emulsifier in water carrier.
Poison ivy	amitrole	4	2 tbs Amino Triazole or Weedazol/gal water	Full foliage (June)[2]	Thoroughly wet all vegetation.
	2,4,5-T or 2,4-D+2,4,5-T	2 1 + 1	2 tbs[3] per gal of water		
Puncture vine	2,4-D ester	1	1 qt[3]	Pre-bud stage most effective	Mature burs not affected by 2,4-D.
Ragweed	2,4-D	1	1 qt[3]	Early summer[2]	Follow-up treatments may be necessary.
Russian knapweed	2,4-D	2	2 qt[3] emulsifiable formulations	Early bud stage[2]	Same as for field bindweed except amine formulations less effective.
Russian olive	2,4-D+2,4,5-T	1 + 1	2 qt[3]	Full foliage[2] (early June)	See remarks for cottonwood.
Sagebrush (sand or green)	2,4-D ester	1	1 qt[3]	4 to 8 inches new growth (June)[2]	Use sufficient water to insure good coverage.
Swamp smartweed	2,4-D ester	1	1 qt[3]	When growing vigorously[2]	Controls top growth principally. Repeat treatment necessary.
Western Snowberry	2,4-D ester	1 to 2	1 to 2 qt[3]	Full foliage[2] (May 10 to 25)	Use sufficient water to insure good coverage.
Wild buckwheat	bromoxynil	0.25	1 pt Brominil or Buctril	Early spring on winter wheat	Thoroughly wet all vegetation. Do not use on oats.
	dicamba + 2,4-D amine	2 oz + 0.50 lb	4 oz Banvel + 1 pt 2,4-D[3]		
	MCPA + dicamba	0.50 lb + 2 oz	1 pt MCP[3] + 4 oz Banvel		
Wild cane	butylate	4	2.7 qt Sutan	Preplant to corn	Incorporate immediately by double disking or equivalent soil mixing. Some crop injury may result from Eptam or Treflan. Plant corn on the land the year following Princep treatment.
	EPTC	3	2 qt Eptam	10 days prior to corn planting	
	simazine + EPTC	2 + 1.5	2.5 lb Princep 80W + 1 qt Eptam	Preplant to corn	
	trifluralin	1	1 qt Treflan	Preplant on soybeans	
Yucca	silvex	2	2 qt[3]	June[2]	Use diesel as a carrier.

TREES AND SHRUBS

Herbicides are an effective and efficient way of controlling weeds in tree and shrub plantations and in nursery line-out beds. Herbicides listed are capable of causing tree injury. However, they can be used safely. Rates of application should be strictly observed. Herbicides are used for control of weeds near the trees where machine cultivation is difficult or impossible. They may be applied as a circular band around the tree trunk or in bands along the tree row. A 40-inch band, 20 inches on either side of the tree row, has proved satisfactory in row plantations. Conventional machine cultivation or mowing should be used to control weeds between the rows.

Preemergence herbicides rely on moisture in the form of precipitation or sprinkler irrigation to incorporate the herbicide into the soil surface for effective weed control. Tree injury is sometimes experienced on sandy soils or those low in organic matter if heavy rainfall occurs shortly after herbicide application. The minimum herbicide rate listed is recommended for sandy soils.

Herbicides should be applied only after the trees are planted. For most of the preemergence herbicides listed here, only one application at the beginning of the growing season is recommended. Granular formulations of herbicides generally are not as satisfactory as spray formulations. In new plantations the soil should be firmly packed around the trees and free of clods and surface irregularities. A depression along the tree row caused by a mechanical tree planter may result in a dangerous concentration of chemical near the tree after a heavy rain. Granular formulations should be applied before April 1 for consistent satisfactory weed control.

ORCHARDS

Crop	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial praduct/A	Application time	Remarks
Apples, peaches, and pears	dalapon	1 lb Dowpon in 15 gal water used as a wetting spray		Postemergence, grass 1 to 10″ tall	Grass control only. Use only on trees over 4 years old. KEEP SPRAY OFF TREE FOLIAGE.
Apples, cherries, grapes, pears and raspberries	simazine	2 to 4	2.5 to 5 lb Princep 80W	Preemergence to weeds	Use lighter rate on sandy soils. Apply a 20″ band on each side of the row. Use on trees established 1 or more years. Use on grapes 3 years or older. *Use Princep and Casoron only on peaches, cherries and plums. Use Simazine and Karmex only on grapes.*
	diuron	2 to 4	2.5 to 5 lb Karmex 80W		

WINDBREAKS, CONIFERS, FOREST PLANTATIONS, ORNAMENTALS

Crop or use	Herbicide	Lb active ingredient[1] needed/A	Apply this amount commercial praduct/A	Application time	Remarks
Trees and shrubs	dalapon		1 lb Dowpon in 15 gal water used as a wetting spray	Postemergence grass 1 to 10″ tall	Grass control only. Use only on trees established 1 or more years. *Keep spray off foliage.*
	dichlobenile	4	100 lb Casoron 4G	Preemergence to weeds	Apply 20″ band on each side of tree row after trees are planted. Some injury to trees may result on low organic matter soils.
	paraquat	.5 to 1	1 to 2 qt Paraquat	Postemergence	Nonselective contact herbicide. Use sufficient water and wetting agent to cover weed foliage. *Keep spray off tree foliage.* Add ½% X77 wetting agent to spray solutions.
	simazine	2 to 4	2.5 to 5 lb Princep 80W	Preemergence to weeds	Use lighter rate on sandy soils. See remarks for Casoron.
	trifluralin	.5 to .75	1 to 1½ pints Treflan	Preplant	Incorporate 2 to 3″ deep prior to planting. After planting adjust machine to throw treated soil towards trees in the row.
Conifers, honey locust, and green ash	diuron	2 to 4	2.5 to 5 lb Karmex	Preemergence to weeds	See remarks for Casoron.

Conversion Table

Pounds of active ingredient per gal of commercial product	Pints of commercial product needed per acre to give the following pounds of herbicide per acre		
	¼ lb	½ lb	1 lb
2.00	1	2	4
2.64	¾	1½	3
3.00	⅔	1⅓	2⅔
3.34	⅗	1⅕	2⅖
4.00	½	1	2
6.00	⅓	⅔	1⅓

[1] Refers to acid equivalent, phenol equivalent, or active material as applicable, calculated on a broadcast or total coverage basis.

[2] Retreatment may be necessary.

[3] Calculated on the basis of 4 lb/gal of active ingredient (the chemicals in a product that are responsible for the herbicidal effects). For other formulations see conversion table above.

CALIBRATION OF EQUIPMENT

Calibrate equipment before using to make sure that it will apply the desired amount of herbicide solution per acre. Thoroughly clean and check equipment to see that all parts are working. Select the speed at which the equipment is to be operated and drive around in the field to be sure that everything is working properly. Calibrate on ground that has the same compaction as ground on which the equipment will be used. Final sprayer calibration should be made with spray solution.

Thoroughly clean all equipment immediately after use. See EC 65-169 Calibrating a Sprayer.

Sprayers

The number of gallons per acre a sprayer will discharge depends upon the ground speed, nozzle pressure, spacing of the nozzles, and size of nozzle opening (orifice). Herbicide formulations, spray carrier, and temperatures also affect spray discharge The use of 110° nozzle tips will allow spraying closer to the ground and thereby reduce spray drift. Wettable powders will settle out if allowed to remain in spray tank without continuous agitation.

Calibrating Broadcast Type Sprayers

1. Measure the effective width of the boom in feet. (Number of nozzles times the spacing between any two adjacent nozzles.)
2. Set fan type nozzle height so there is a 50 percent overlap of the spray pattern or follow the manufacturer's recommendation.
3. Divide the width of the boom into 43,560 (the number of square feet in an acre) to get the number of feet of travel necessary to cover one acre.
4. Measure and stake off the number of feet you need to travel to cover one acre. (A fraction of an acre such as ¼ or ½ can be used.)
5. Fill the supply tank and boom with clean water at the starting point to get an approximate calibration. Final calibration should be made with spray solution.
6. Spray the measured area exactly as you would in the field, using the same speed and pressure.
7. When you get to the end of the course immediately shut off the sprayer.
8. Measure carefully the number of gallons required to refill the spray tank. This is the volume of water the sprayer will deliver per acre—or fraction of acre as you determined in step 4. Final calibration should be made with spray solution.
9. Use this calibration information to determine the amount of herbicide to apply to a given volume of water in the spray tank. Assume that you determined your sprayer applies 18 gallons per acre. If you want to spray three pounds of EPTC (Eptam, 6 lb/gal) per acre, add one-half gallon of Eptam to each 17½ gallons of water in the spray tank.

Calibrating Band Sprayers

Most principles involved in broadcast sprayer calibration also apply to band applicators. For band spray applications use "E" type orifice tips. They deliver the same amount of spray material over the entire width of the spray pattern.

With 40″ row spacing on a planter, 13,080 feet of row are required for one acre. Traveling a distance of 327 feet with a 4-row planter is one-tenth of an acre (327 x 4 = 1308).

Begin band sprayer calibration by attaching plastic bags or other containers to each nozzle to catch its output. Assume your equipment is 4-row, you travel 327 feet and collect a total of one gallon of water from the four nozzles. The one gallon represents an application of one-tenth of an acre; therefore your sprayer is applying 10 gallons per acre. Now determine the fraction of the total land area you will spray with your band treatment. A 10″ band on 40″ spaced rows covers ¼ of the total land area; a 10″ band on 30″ rows covers ⅓ of the total land area; a 13″ band on 40″ rows covers approximately ⅓ of the total land area.

The amount of land area you are covering with your band spray determines the amount of chemical to use. Assume you are using amiben (2 pounds per gallon) at 3 pounds per acre on soybeans planted in 30″ rows. Your band width is 10″. You will be treating ⅓ of the total land area. Your rate of application will be ⅓ of three or 1 pound per acre. Since amiben is formulated 2 pounds of active ingredient per gallon, you will use ½ gallon of chemical to obtain the 1 pound of amiben. Therefore, your mixture ratio should be 9½ gallons of water to ½ gallon of amiben.

Granular Applicators

The calibration of band applicators for granular herbicides is similar to band spray calibration. There is one main difference--there is no adjustment of band width as this is set by the manufacturer.

Set the rate control adjustment as suggested by the manufacturer. Add granules to the hopper. Attach bags or other containers so they collect all granules discharged by the applicator. If your unit is 4-row with 40″ spacing travel 327 feet (this represents one-tenth acre). Remove the collecting containers (they should all contain approximately the same amount) and carefully weigh together all the granules collected.

Assume you collected 4 ounces of granules. Your applicator is applying 4 x 10 or 40 ounces (2½ pounds) of granules. In case the rate should be increased or decreased change the rate control adjustment and recalibrate.