

Minnesota Nurserymen's newsletter



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CHEMICAL WEED CONTROL IN THE NURSERY

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The successful grower of nursery stock realizes the necessity of reducing operational costs to continue in business. One of the largest expenditures in the nursery is spent on weed control. Roughly over \$2 million is spent annually for cultivation for weed control in nursery crops. Savings up to \$450 per acre have been reported by using chemical herbicides.

Unfortunately, the use of plant growth regulators for weed control in nursery crops is still in its infancy. Relatively little work was done prior to 1950 and presently there are only a few scientists devoting much time to this important field of research.

There are many problems in using chemical herbicides in the nursery. The great diversity in plants in genera, species and cultivars complicates general recommendations. Whereas, one type of plant might tolerate high levels of a particular herbicide, a closely-related species could be injured at greatly reduced rates. Age of plant, its condition and growth habit are extremely important. Small, newly-established plants will not tolerate rates as high as older, well-established ones. Nurserymen are concerned in finding herbicides which can be used safely from a time preceding seed germination or planting rooted cuttings until the plants are ready for sale.

Safety margins to the crops with a long, residual control of weeds is sought by the grower. Shallow-rooted plants are less tolerant to herbicides than the deep-rooted types. Soil type is extremely important as sandy soils show toxic effects more quickly than clay soils or soils high in humus. Reduced rates are recommended for sandy soils especially for the very soluble herbicides. Moisture conditions must be good for satisfactory results.

Timing of an application is very important for a plant which shows tender new growth

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is often injured more easily than a dormant plant. Thus, early spring and fall applications are generally recommended. Pre-emergent herbicide applications are made before weeds have germinated. Very small weeds seedlings are killed more easily than big weeds and at a reduced rate of application. Once the crop has germinated or growth has started sprays should be directed between the rows and as little as possible of the spray should come in direct contact with the crop.

Granular materials should not be applied when the foliage of the crop is wet. These materials are more effective when irrigation precedes an application of a herbicide. Usually they are safer to use when foliage is present. Temperatures between 50° F. to 75° F. are considered to be ideal for best herbicidal action. Some chemicals are very volatile above 70° F. and greater crop damage can occur.

Residual effects, effective rates of application without crop damage, duration of an effect, number of applications needed per season and effects on succeeding crops must be learned for a particular herbicide before widespread recommendations can be made.

Many different herbicides have performed exceedingly well in preliminary tests; however, the nurseryman who uses them should be very cautious at first. Small trial applications are suggested to different crops on various soils in the nursery. After the nurseryman has determined effective rates for weed control on particular crops he can increase the area on which the herbicide can be used.

To have a starting point upon which to begin a nursery weed control program, we have reviewed available literature on the subject and drawn heavily upon preliminary experiments conducted at the J. V. Bailey Nurseries. Suggestions for use of herbicides are given below. All materials given below are given in total active ingredients per acre except where noted.

Preplanting Field Applications

Dalapon (Dowpon) 10-15 lb/A or TCA

(Sodium TCA) 22 lb/A applied to growing vegetation in fall followed by plowing one to two weeks later has been very effective in quack-grass control. Planting can be done the following spring.

Spring applications of dalapon, 5 lb/A when the foliage is about 6-8 inches long followed by plowing a week or two later has been very effective too. Planting should be delayed about 4 to 6 weeks after application.

To kill brush and broad-leaved weeds, applications of 2,4-D, 2,4,5-T, combinations of the two, or 2,4,5-TP (Silvex) at 3 lbs. acid equivalent per 100 gallons of water is effective. All foliage should be wetted thoroughly. Avoid drift to adjacent areas containing sensitive nursery stock.

Preplanting Seed and Transplant Beds

Application of calcium cyanamid at 50 to 75 lbs. per 1000 sq. ft. to moist, warm cultivated soil and mixed with the soil to a depth of 2 to 3 inches is recommended for general weed control. Plantings into these beds should be delayed 6 to 8 weeks depending on moisture and temperature conditions after application.

Soil fumigation has become quite popular in recent years. Moist, deeply cultivated soils can be treated for best results. Temperatures above 50° F. are suggested for better action of these chemicals. Chloropicrin (Picfume and Larvacide), methyl bromide (Dowfume MC-2, Brozone and Trizone), SMDC (Vapam), and DMTT (Mylone) have been used successfully. Manufacturer's directions should be followed in using these fumigants. A "gastight" covering is needed for fumigation with methyl bromide. It is safe to plant into the treated beds 3 to 6 days after treatment.

Vapam, mylone and chloropicrin require water seals, thus ample water should be available. In sand or very sandy soils, a covering is suggested to give much more effective control. With Vapam and chloropicrin, planting should be delayed for 1 to 3 weeks, whereas with Mylone a 2 to 6 weeks delay is suggested.

Hay and straw mulches should not be used on these beds if good weed control is desired. These fumigants do not have a residual effect and any weed seed introduced to the area will grow.

Prior to germination of crop seeds, DNBP (Premerge, Sinox P. E.) 8 to 10 lb/A, simazin (Simazine) 1/2 to 1 lb/A, neburon (Kloben) 4 lb/A or CIPC (Chloro-IPC) 8 to 10 lb/A placed between the rows has given good weed control. However, severe damage has occurred in some cases and only small trials are suggested. Granular materials are preferred in these beds.

Seed Beds - Post-emergence

Stoddard solvent or equivalent aromatic

oils have been recommended at 15 to 75 gallons per acre for many coniferous evergreens. Excellent weed control for 6 to 8 weeks has been observed. Small seedlings can be injured severely especially if temperatures at application time are high. Granular DNBP or CIPC at 8 to 10 lb/A has been reported to give good weed control in many different crops. Barberry will not tolerate a DNBP application.

On a heavy loamy soil, simazin at 1/2 to 1 lb/A applied soon after seedlings emerged to mostly coniferous seedlings gave excellent weed control extending for about 6 to 8 weeks. Better weed control with a greater residual effect was observed at the 1 lb/A rate. Injury was noted to broad-leaved plants.

Liner and Transplant Stock

For many evergreens either in early spring or late fall when there is no tender new growth, Stoddard's solvent at 10 to 20 gallons/A plus PCP (pentachlorophenol) 4 lb/A or DWBP 1 to 2 lb/A applied with a low-pressure sprayer with a hooded boom has given excellent results. The mixture was applied between the rows and directed away from crop foliage. Junipers were less tolerant than spruce and pine to the DNBP mixture.

SES (Sesone) at 4 to 6 lbs/A applied between nursery rows gave good weed control for 6 to 8 weeks in some experiments. Winged burning bush, evergreen Euonymus and privets were injured at these rates. Since unsatisfactory grass control was received with sesone alone; inclusion of dalapon, 5 lb/A or monuron (Telvar) or diuron (Karmex) 1/4 to 1 lb/A gave much better general weed control. Sesone, 2 lb/A gave excellent results in another experiment. Seasonal weed control was obtained by making 2 to 3 applications.

For October or early April applications, CIPC 8 to 10 lb/A has been reported to be very effective in weed control in deciduous stocks.

Two applications of Simazine at 1 to 2 lb/A in the second year after transplanting gave excellent weed control. Applications were made in May and mid-July to August. Certain plant materials were intolerant to simazin especially when the plants were small. The following genera have been reported to be injured: Betula, Fraxinus, Hypericum, Larix, Philadelphia, Pinus (Mugo), Rosa (rugosa), Spirea and Tilia. Injury has been more pronounced on sandy soils. Genera which tolerate rates up to 2 lbs. include: Abies, Acer, Alnus, Amelanchier, Berberis, Cornus, Cotoneaster, Crataegus, Elaeagnus, Ginkgo, Gleditsia, Hydrangea, Juniperus, Malus, Picea, Populus, Potentilla, Prunus, Pseudotsuga, Quercus, Rhus, Ribes, Rosa (except Rugosa), Sorbus, Symphoricarpos, Syringa, Tamarix, Taxus, Thuja, Tsuga, Ulmus and Viburnum. In general, weed control has been unsatisfactory with rates below 2 lb/A in our experiments. However, good weed control has been observed at 1 lb/A under certain conditions although the residual effect is much shorter.

Potted stock could be considered in this category. Rates of 1 1/2 lb/A of simazin have looked good with the UC soil mix for small evergreen transplants and rooted cuttings. For late fall applications with well-established larger plants, simazin 4 lb/A gave excellent weed control extending into July of the next year. Diuron 2 lb/A and noburon 3 lb/A gave excellent results. Injury was observed to golden mock-orange, golden prostrate junipers, and Mugho Pine (diuron) in this experiment.

Established Field Stock

Treatments which have proved to be safe to crop plants with good weed control with smaller plants might be used for the field in established stock. Often the rate can be increased safely by 1 or 2 lbs. per acre to give a longer residual effect for the larger field-grown plants.

Simazin at 1 to 3 lbs/A, DNBP or CIPC 4 to 10 lb/A have given excellent results in some experiments. A mixture of sesone 3 lb/A, monuron 1/2 lb/A and dalapon 5 lb/A has been reported to give satisfactory general weed control on a wide variety of different nursery plants.

Late fall or early spring applications are recommended, for greater plant tolerance allows for heavier herbicide application and consequently better weed control over a longer period of time. However, remember to reduce the amount of herbicide approximately by one-half if a porous sandy soil low in organic matter exists in the field.

Special Crops

Pre-emergent applications with no apparent injury to gladioli has been reported with CIPC 8 lb/A, diuron 1 1/2 lb/A, DNBP 4 lb/A, simazin 2 to 4 lb/A, sesone 6-8 lb/A, neburon 6 lb/A and 2,4-D 2 lb/A (broadleaved weeds only). For post-emergent control when the gladioli are up, the herbicides should be placed between the rows. Granular materials are well-adapted for applications at this time to

get closer to the crop with less danger of contact injury.

A combination of DNBP 7 1/2 lb/A plus CIPC 4 lb/A gave good seasonal weed control in German iris with no adverse effect on the crop.

Pre-emergent applications of herbicides to peonies included Stoddard solvent 80 gallons /A plus PCP 8 lb/A, diuron 4 lb/A, neburon 6 lb/A or simazin 2 to 4 lb/A. Seasonal weed control was realized. With the exception of the Stoddard solvent mixture, all other herbicides should be applied to a cleanly cultivated field.

Two days after planting garden chrysanthemums applications of herbicides were made. Sprays were directed away from the plants. CIPC 8 lbs/A, diuron 8 lb/A, diuron 4 lb/A plus sesone 3.6 lb/A and monuron .8 lb/A, gave excellent weed control for approximately two months with no apparent plant injury.

References:

1. The Latest on Gladiolus Weed Control, Bing, A. N.Y. Sta. Flo. Gro. Bul. 159: 1-2, March 1959.
2. Pre-emergence Weed Control in Nursery Crops, Chappell, W. E. The Plant Propagator Vol. 7 (1):6 Feb. 1961.
3. Nursery Weed Control Practices, Grigsby, B. H. Michigan State Nursery Notes 17. April 1958.
4. Weed Control in Nursery Stock, Havis, J. R. Plants and Plantings 1-8. March 1, 1960.
5. Weed Control in Nurseries, Havis, J. R. Plants and Plantings supplement to March 1, 1960.
6. Weed Control in Ornamental and Forest Nurseries, Holm, L. G. NCWCC Proc. 15:71-72. 1958.

SOURCES OF CHEMICALS

<u>Chemical</u>	<u>Trade Name</u>	<u>Manufacturer</u>
1. dalapon	Dowpon	Dow Chemical Company Midland, Michigan
2. TCA	Sodium TCA	Dow Chemical Company
3. chloropicrin	Picfume	Dow Chemical Company Morton Chemical Company Chicago, Illinois
	Larvacide	Larvacide Products, Inc. 117-119 Liberty Street New York 6, New York
4. methyl bromide	Dowfume MC-2	Dow Chemical Company
	Brozone	Dow Chemical Company
	Trizone	Dow Chemical Company

<u>Chemical</u>	<u>Trade Name</u>	<u>Manufacturer</u>
5. SMDC	Vapam	Stauffer Chemical Company P. O. Box 222 South Omaha Station Omaha, Nebraska
6. DMTT	Mylone	Union Carbide Chemical Company 180 S. Broadway White Plains, New York
7. DNBP	Premerge Sinox D. E.	Dow Chemical Company Dow Chemical Company
8. simazin	Simazine	Geigy Agricultural Chemicals Ardsley, New York
9. neburon	Kloben	E. I. du Pont de Nemours Company Wilmington 98, Delaware
10. CIPC	Chloro-IPC	Allied Chemical Corporation Niagara Chemical Division Middleport, New York Columbia Southern Chemical Corp. Pittsburgh, Pennsylvania Stauffer Chemicals
11. Stoddard solvent	Stoddard Solvent Stanisol Sorasol Stod-sol	Many oil companies
12. PCP	Pentachlorophenol	Allied Chemical Corporation 40 Rector Street New York, New York Pennsalt Chemical Corporation Tacoma, Washington Stauffer Chemical Company
13. SES	Sesone	Union Carbide Chemical Company 180 South Broadway White Plains, New York
14. monuron	Telvar	E. I. du Pont de Nemours Company
15. diuron	Karmex	E. I. du Pont de Nemours Company

ARBORETUM NOTES:

Promising New Trees and Shrubs

Blue Beech (*Carpinus caroliniana*). The Blue Beech is characterized by its smooth, light gray bark with muscular swellings along its angular stems. Although commonly grown with a single stem, it is most effective when grown with multiple stems to form a natural clump. This species grows to a height of about 20 feet and forms a well rounded and a bushy crown. The leaves are simple, ovate with toothed margins, turning orange to red in the fall. The fruits are produced in clusters at the tips of leafy stems. Each dry fruit is borne in the axil of a lobed foliar bract.

The multiple-stemmed habit of growth, the brilliant autumn coloration of the foliage, the interesting, hop-like fruits, and the gray, muscular stems are all interesting features that make this a worthwhile ornamental.

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FROM THE EDITOR

C. Gustav Hard, Extension Horticulturist

The current issue contains a summary of weed control work on nursery stock at the University of Minnesota and other research stations. The listing of sources of chemicals is designed to serve as a guide for these materials. This does not constitute an endorsement of the company. Any omissions is due to insufficient information on sources of the chemicals.

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