

GLADIOLUS ISSUE

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Dr. Norman W. Butterfield
University of Massachusetts, Waltham Field Station

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1. Changes in the Census for Gladiolus Industry

There is a large commercial acreage of gladiolus grown in Massachusetts for cut flowers and for corms for re-sale and replanting. The census for 1959 shows that we have 114 acres in production. At a recent meeting for the Western Massachusetts Gladiolus Society we listed over 100 acres grown for corms and cut flowers in that area alone.

This does not mean that the census report is not right. It simply means that either all the growers were not contacted or that the growers did not report their total acreage. It is estimated that there are nearly 350 acres of gladiolus in production for cut flowers and for corms for re-sale in Massachusetts.

2. Chemical Weed Control for Gladiolus

- a. Much labor is required to hand-weed a crop of gladiolus, especially early in the season. Also, weeds reduce the quality of cut flowers, and reduce the size of the corm.
- b. Weeds also harbor such diseases as the white break virus. Therefore, it is essential to keep weeds to a minimum. The gladiolus appears to be a crop well adapted for chemical weed control. They are reasonably tolerant to many of the weed killers.
- c. The objective of our program for gladiolus is to find chemicals that will do a satisfactory job of control of weeds and will not injure the crop. We want a chemical that can be used early in the season as a pre-emergence herbicide, and as the gladiolus grower in this area needs to hill to keep the flowers from being blown over, we need a post-emergence herbicide also.

Because of shortages of good land to rotate the gladiolus crop, we need a chemical that has no residual effect that might eventually accumulate in the soil to inhibit growth.

3. Results of Research During the Past Few Years Indicate that:-

- a. Two chemicals do a good job for controlling weeds in gladiolus. These chemicals are Dinitro (premerge) and Diuron (Karmex DW). The latter is strictly a pre-emergence type. The former may be used as both a pre-emergence and a post-emergence control. (See definitions)
- b. The success of any weed control program depends to a large degree on proper temperature and the proper amount of moisture previous to applying the weed chemical. The purpose of the moisture is to get the weed seed in the germinating stage at the time of applying the chemical. For best results the soil, if recently stirred up as for hilling, should be irrigated with 1/2" of water to settle the soil or wait for a good rain if irrigation is not available.

4. Soil Conditions for Best Results - From several years' experience in testing chemicals for weed control in gladiolus, we have found that the soil must be settled after planting or hilling by either a good rain or 1/2" of irrigation. Brushing with a broom or brush is only second best.

5. Definition of Terms:-

Pre-emergence Treatment - any treatment made after the gladiolus is planted but before it emerges from the ground.

Post-emergence Treatment - any treatment made after the gladiolus emerges.

Directed Spray Application - a post-emergence application of a spray at the base of the gladiolus, to avoid direct contact with the leaves.

50% w.p. - wettable powder and percent of active ingredient available.

Rate of Application - refers to the amount of active ingredient applied to a unit area such as one acre or 1000 sq. ft.

Surfactants - a compound such as detergents and soaps to increase the effectiveness of the contact of the chemical (herbicide) with

the weeds.

6. Report of Preliminary Results on Chemical Weed Control for 1962 at Waltham Field Station

TABLE I - List of Chemicals Submitted for Testing for 1962

CHEMICAL	COMPANY	Recommended Rate In lbs. per Acre
Solan (Em)	Niagara Chemical	4.0
29952ECC (Em)	Niagara Chemical	4.0
Dicryl (Em)	Niagara Chemical	4.0
Alipur 101 (Em)	Naugatuck Chemical	3.0
Alipur 10G (Em)	Naugatuck Chemical	3.0
Falon 44E	Naugatuck Chemical	3.0
Alanap-3 (Em)	Naugatuck Chemical	3.0
SD7583 (Em)	Shell Development	2.0
Casoron w.p. 50%	Thompson-Hayward Chemical	4.0
Casoron granular 4%	Thompson-Hayward Chemical	4.0
Dacthol 75% w.p.	Diamond Alkali Chemical	8.0
Dacthol 2.5% granular	Diamond Alkali Chemical	8.0
Crag Herbicide #1 90%	Union Carbide	3.8
Diuron (Karmex DW) w.p.	Dupont Chemical	1.5
Dinitro (Em)	Dow Chemical Company	6.0

Rating Scale for Reporting Weed Populations

1. - No weeds until September 1st.
2. - 0-20% of area in weeds.
3. - 21-60% of area in weeds.
4. - 61-100% of area in weeds.

Of the chemicals tested for controlling weeds in gladiolus, Diuron applied alone or in combination with Dinitro proved most effective. Alipur 10G was the next most effective herbicide. Chemicals that show promise for further consideration are Solan, 29952ECC, Alipur #101 and Dicryl.

Chemicals receiving a merit of 3 and 4 should not be thrown out completely, for perhaps by raising the concentration good control of weeds might be obtained. The companies manufacturing them should be in the best position to tell whether increasing the rates would give satisfactory results - and without injury. It will take several years' experience before full evaluation can be made. No injury was noted from any of the chemicals at the rates used in these tests.

In regard to the results of weed control on cormels, the data indicate that Diuron at the rate of 3/4 lb/acre is safe to use for control of weeds as a pre-emergence treatment. Full strength of 1.5 lb/acre (actual) produced no injury under conditions of this experiment. Alipur 10G gave good control of weeds with no injury to the cormels.

CHEMICAL AND TREATMENT	Rate lbs/acre Actual	Merit Rating in Weed Control	
		Rep. 1	Rep. 2
Solan	4.0	2	2
29952ECC	4.0	2	2
Dicryl	4.0	2	4**
Dicryl*	4.0	2	2
Alipur* (101)	3.0	2	2
Alipur 10G	3.0	2	2
Falon-44-E	3.0	4	4
Falon* Plus	3.0	4	4
Dinitro	1.5		
Alanap-3	3.0	4	4
Alanap-3 plus Dinitro	3.0	3	3
	1.5		
3d7583	2.0	4	4
Casoran	4.0	4	4
Casoran raked into soil	4.0	3	3
Casoran granular	4.0	3	3
Casoran* granular raked into soil	4.0	2	2
Dacthol*	8.0	3	4
Dacthol* 2.5 granular	8.0	3	4
Crag Herbicide	3.8	4	4
Diuron pre-emergence	1.5	1	1+
Diuron (Dinitro & hilled) post-emergence	1.5	1	1+
Diuron (Dinitro & hilled) post-emergence	3/4	3	3+
Diuron-Dinitro (hilled) post- emergence - swept vs. irrigation)	1.5		1+ swept 1 irrig.

** Poor control of crabgrass.

* Chemicals indicated with an asterisk were re-applied as a directed spray when it was found that the chemical was not doing the job of weed control. They were re-applied on July 10. In no instance did the chemical show any improvement in merit as a result of re-application.

TABLE II - Results with Cormels (Friendship)

CHEMICAL	Rate lbs./acre Actual	Merit Rating in Weed Control	
		Rep. 1	Rep. 2
Diuron	3/4	1+	1+
Diuron	1.5	1	1
Alipur 10G	3.0	1	1

- 6c. The chemicals were in most instances applied as pre-emergence to the weeds and pre-emergence to the crop. Diuron was applied as both a pre-emergence and post-emergence to the crop and pre-emergence to the weeds.
7. Some Preliminary Trials using Diuron in Combination with a Surfactant, Triton.

Occasionally it would be desirable to kill off a crop of weeds that had become 2" or 3" tall. Diuron alone as directed spray is not always effective. To improve the kill of weeds a surfactant, Triton, was added to the regular strength Diuron (1.5 lbs. actual per acre). The results were very satisfactory in both replicates. When the weeds were 6 - 12" tall, the treatment was not effective.

3. Comments by a Gladiolus Grower as Reported in the N. E. Gladiolus Yearbook for 1963 on Weed Control, Fertilization, Insect Control, Reading Directions on the Label, and Comments Concerning the Controversial Subject by Rachel Carson.

"Fertilization is carried out with Superphosphate at plowing time, and with 5-10-10 under the bulbs and as a side dressing. For several years I have had Chlordane mixed with my fertilizer. This has been most effective in controlling cut-worms, wire-worms, and other subterranean pests. With the best intentions in the world, I hope, Rachel Carson has stirred up a storm with her crusade against insecticides. As with many other controversial subjects, there are valid arguments on both sides. We of the earth who labor in an ever small world, know full well that the cupboard would be bare without the use of chemicals. I have used Arasan, DDT, Chlordane, and various weed-killers for many years. My field is a Mecca for all kinds of birds, including

some well-nourished Pheasants. Kildeer raise their families in my rows. Rabbits gambol and eat my vegetables. Dogs and cats visit in numbers. I have yet to find a dead bird or animal, and I question whether they would all come here to eat, but go elsewhere to die. There has been no shortage of earthworms despite the Chlordane, and robins thrive on them. Perhaps this is the place to mention again the importance of reading directions on the label and following them. In the use of these useful and powerful agents, there is no truth in that if a little is good, a lot is better. The efficient and proper quantities have been established and should be adhered to strictly.

"The use of weed-killers has done more to reduce the grower's labor than anything else. A fine research project is underway at the Waltham Field Station under Dr. Norman Butterfield. The most effective agent is Diuron. I apply it after hilling-up. 'Till then the pre-emergence spray has taken care of things, but then the dormant weed seeds are exposed and ready to sprout. Diuron slays everything except witch-grass. At one time last summer, between the rain, the cold, and other obstacles, one section of the field was not sprayed until the weeds were 4 to 6 inches high. It looked like a toss-up between a lost cause and a challenge. However, the spray was applied, and in 48 hours the results were fantastic. Fortunately, this episode was preserved for posterity by before-and-after pictures, taken by one of my friends, Harold Farnsworth of Hopkinton.

"I see no reason to change chemicals until something better is proven with no ifs or buts. This wonder drug (Diuron) must be used strictly according to protocol. The amount of water used does not matter too much, but the amount of Diuron prescribed for the area treated must be exact. The method of application should be meticulous if damage to plants is to be avoided. I use a knapsack tank with a controllable fan-type nozzle. It is filled with just enough solution to treat one row. I determined this amount originally by spraying with plain water, a sort of trial run. The solution is applied on a calm day, close to the ground, so that there is a minimum of splashing. There has never been any damage to plants or bulbs when done in this way. There have been some questions as to possible damage to bulbs when planted in land where weed-killer was used previously. I rotate my flowers between two areas. Although the weeds did not appear the next year in the treated area until late in the season, the Buckwheat cover germinated and made a good crop. Bulbs, bulblets and seeds did the same, and I could find no evidence of build-up in the soil. This too has been the experience at Waltham."

9. Amount of Water and Chemical (Dinitro) to use for Pre-emergence Spraying (Basic amount 6 qts/acre)

TABLE I

<u>Amount of Liquid</u> (When rate ** is 6 qts/acre)	<u>Amount of Water</u>	<u>Area to be Covered</u>
1 tablespoon	1 quart	100 sq. ft.
2 tablespoons	2 quarts	200 sq. ft.
4 tablespoons	1 gallon	400 sq. ft.
10 tablespoons	2½ gallons	1000 sq. ft.
1 cup	4 gallons	1600 sq. ft.
1 pint	8 gallons	3200 sq. ft.
1 quart	16 gallons	6400 sq. ft.
3 quarts	50 gallons	20,000 sq. ft.
6 quarts	100 gallons	1 acre

** The two gallon rate of Dinitro was also used and no indication of injury to the gladiolus. Where weeds are very heavy the two gallon rate might be used to an advantage.

10. TABLE II Amount of Diuron (Karmex DW) to use for Small and Large Areas (Basic amounts 1½ lbs/acre). Use the same amount of water as given in Table I.

Amount of *Diuron when rate is 1½ lbs/acre actual

1/2 teaspoon	100 square feet
2 tablespoons	1000 square feet
1-1/2 pounds	1 acre

* In putting on Diuron, agitate the solution frequently because this material is not wholly soluble in water.

11. Control of Insects

Since the winter meetings of the New England Gladiolus Society there has been much interest in the use of insecticides as a preplanting treatment. The following chemicals will keep down an infestation of wireworms.

MATERIALS

Aldrin - 2 lbs/acre actual for light soils and 3 lbs/acre for heavy. This chemical is not readily available in Eastern Massachusetts.

Heptachlor - Same rate as for Aldrin but should not be used in soil in which food crops may be grown within 2 years.

Chlordane - Double the rate for Aldrin.

Application - We suggest that these materials be applied evenly either in the spring or fall -- and harrowed into the soil thoroughly. They are available as granules, dust, wettable powder or emulsifiable concentrates. One easy way to get these chemicals on evenly is to get your fertilizer company to mix the desired chemical into the fertilizer. Give him the rate per acre of fertilizer to be used and the kind and amount (actual) insecticide per acre. Since he has the mixing equipment, he could do a much better job than could be done by hand. At this meeting it was recommended that Aldrin be sprayed over the corms, as planted in the row, before they were covered to control thrips.

How Long will Treatment Last?

Indications are from research and practice that one application should be good for 3 to 4 years from chlordane and Aldrin and 2 years for heptachlor.

12. Control of Diseases

- a. General - Some varieties are more susceptible to disease than others; therefore, use resistant varieties. Disease can be reduced to a minimum by sanitation, such as dis-

carding diseased corms at harvest and at planting. Roguing plants showing off-color during the growing season is a practical method of preventing an increase of diseased corms. The crop should be rotated to new areas where practical, and not planted again in the same area for at least four or five years for best results.

b. Gladiolus Corm Treatments for Disease Control

1. Thiram plus dieldrin dust (Examples:- Delsan A-D Seed Protectant; Panoram D-31)

Dust corms so that they are thoroughly covered before planting.

Research shows that this treatment should control Fusarium yellows, Bacterial Scab, and Curvularia Rot.

OR

2. New Improved Ceresan

Soak corms 15 minutes in a 2 pounds per 100 gallon solution. Add 10 fluid oz. spreader-sticker.

Reports from Canada indicate that this treatment may be satisfactory where Curvularia Corm Rot has been a problem.

Partially dry corms; then plant immediately.

Where Stromatinia (Sclerotinia) has been a problem, try the new fungicide Botran applied as a 4% dust to the corms. This gave excellent results in Illinois.

13. Fertilizer for the Crop of Gladiolus

The soil test will help to determine whether lime and superphosphate is needed. If needed, it may be broadcasted over the plot before plowing. Twenty-five to fifty pounds to 1000 square feet of each material will usually take care of the pH, calcium and phosphate. For a general recommendation, we suggest that the gladiolus be fertilized by side-dressing the crop when the foliage is 8" to 12" high; 1/2 lb. of a 5-10-10 or fertilizer

of similar analysis on each side of a 100 foot row is usually adequate. For the exhibitor who is looking for the ultimate in size, he may want to feed his plants at slightly higher rates and more often. Experience should dictate how much and when to feed.

Contributors to this issue: Professor W. D. Whitcomb
Dr. J. J. McRitchie
Dr. N. W. Butterfield

NOTE

All pesticide food or feed additive chemicals mentioned in this publication are registered and cleared for the suggested uses in accordance with federal laws and regulations. Chapter 727, Acts of 1960, Commonwealth of Massachusetts requires that all pesticides sold in Massachusetts be registered with the Massachusetts Department of Public Health. Trade names, where used for clarity, do not indicate endorsement or imply that similar products are not satisfactory.

WARNING - Most pesticides are poisonous. Read and follow all directions and safety precautions on labels. Handle carefully and store out of reach of children, pets, and livestock.