



# Colorado Flower Growers Association

IN COOPERATION WITH COLORADO STATE UNIVERSITY

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## 1960-1961 Tests for the Control of Lily Root Rot

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Previous work at Colorado State University has indicated that soil fungicides have not been consistently effective in the control of lily root rot (1, 2). Control has been achieved in 3 successive years by planting the bulbs in the bottom of the pot. The decrease in top symptoms as a result of this procedure has been attributed to the increased numbers of adventitious root originating from the below-ground portion of the stem. Since these roots are formed later than those originating from the bulb plate, they are still young and vigorous near the end of the forcing period when the buds are being developed.

In recent years new fungitoxins have been developed which are effective against the pathogens inciting root rot of lilies. For instance, Dexon has been found to be effective in the control of a number of diseases caused by *Pythium*. CP30249, not yet available commercially, holds promise for controlling diseases caused by a number of different pathogens. Thus tests were set up in 1960-61 to take a new look at soil fungitoxins as a means for the prevention of lily root rot.

Croft lily bulbs (7/8) from 2 sources<sup>1</sup> were planted at 2 different depths: the conventional depth and at the bottom of the pot. The medium used was a mixture of 1/3 peat, 1/3 sand, and 1/3 soil. The soil was not steamed.

Bulbs from the first source were planted at both depths and soil treatments were applied; each treatment at each depth consisted of 30 plants divided into 3 replications. Dexon was applied as a drench (30 ppm) at 10 day intervals from the day of planting (December 3, 1960) until Easter. In another treatment Terraclor was mixed thoroughly with the soil in a concrete mixer at the rate of 100 ppm (by weight of soil) and Dexon was applied also as a drench during the forcing period in the manner described previously. CP30249 was thoroughly mixed with the soil at 50 ppm. Non-treated plants were also included as controls.

In the second lot planted December 17, 1960, 50 plants were treated with Terraclor and Dexon (as described above). An equal number were not treated.

The results of tests involving the first lot of bulbs are recorded in Tables 1 and 2. These may be summarized and compared with previous work as follows:

1. Treatments with the soil fungicides significantly reduced the incidence of root rot whether bulbs were planted at the bottom of the pot or in a conventional manner.
2. The root systems of plants treated with soil fungicides were much more extensive than the controls. Roots of treated plants originating from deep planted bulbs were especially well developed and vigorous.

3. There was a lower incidence of above-ground symptoms in deep planted non-treated plants as compared with the conventionally planted controls. When symptoms developed in the former case, they were extremely severe and the roots from the below ground portion of the stem had not developed.
4. There was a high incidence of root rot in deep planted non-treated plants and the extent of the root systems were comparable to that of the conventionally planted control. This was not in agreement with the results of previous years and may have been due to the smaller bulbs used in this year's experiment.
5. There was no difference in the height of plants or bud count.
6. As in previous years, a significantly longer time was required for blooming in those plants derived from deep planted bulbs.

Control by the use of Dexon and Terraclor was particularly striking in the sec-

ond lot of plants. In the non-treated controls, 54% of the plants developed foliage symptoms. Symptoms were not evident on any of the treated plants.

Lily root rot appears to be incited by a complex of organisms including *Pythium*, *Rhizoctonia*, and *Fusarium* (3). Combinations of Dexon and Terraclor may be fungitoxic to the first 2 organisms while CP30249 is reported to be effective against all 3. The results of these tests would indicate that control of lily root rot by these treatments may be feasible. It must be emphasized, however, that this is based on only 1 year of research and thus this report is not to be interpreted as a formal recommendation for control.

**Note:** Those wishing to use Dexon and Terraclor may apply these according to the following directions:

1. Dexon -- Apply as drench at 7 to 10 day intervals at the rate of 0.6 to 1.0 ounce of the 70% active wettable powder in 100 gallons of water. This chemical

Table 1.--The general characteristics of Croft lilies from bulbs planted at 2 depths and treated with soil fungicides<sup>a</sup>.

Treatment	Avg. height of plant (inches)		Avg. extent of root system <sup>b</sup>		Avg. bud count		Avg. days to bloom	
	Conventional	Deep	Conventional	Deep	Conventional	Deep	Conventional	Deep
Dexon	9	9	2.2*	2.6**	3.1	3.5	108	117**
Dexon and Terraclor	9	8	2.3**	2.4**	3.0	3.4	109	117**
CP30249	8	8	2.6**	2.7**	3.1	3.2	107	117**
Control	8	9	1.8	2.0	3.2	3.3	107	120**

<sup>a</sup> Total number of plants in each treatment was 30 divided into three replications.

<sup>b</sup> Extent of root system estimated on a 0-3 scale with 0 = no roots, 3 = extensive roots.

\* \*\* Single and double asterisks indicate that differences between averages as compared with non-treated plants with bulbs at conventional depth are significant at 0.05 and 0.01 levels, respectively.

Table 2.--Symptoms of root rot on Croft lilies originating from bulbs planted at 2 depths and treated with soil fungicides<sup>a</sup>.

Treatment	Number of plants with foliar symptoms		Wet root rot <sup>b</sup>	
	Conventional	Deep	Conventional	Deep
Dexon	3**	0**	.4**	.6**
Dexon and Terraclor	1**	0**	.6**	.5**
CP30249	3**	0**	.6**	.2**
Control	7	1**	1.7	1.2

<sup>a</sup> Total number of plants in each treatment was 30 divided into three replications.

<sup>b</sup> Wet root rot estimated visually on 0-3 scale with 0 = no wet root rot, 3 = all roots with rot.

\* \*\* Single and double asterisks indicate that differences between averages as compared with non-treated plants with bulbs at conventional depth are significant at 0.05 and 0.01 levels, respectively.

is unstable in light when it is suspended in water, thus it should be used immediately after mixing.

2. Terraclor -- This compound does not "move" very well in the soil; therefore, mix thoroughly with the potting soil at approximately one pound of the 20% active dust with a cubic yard of greenhouse soil. This is approximately 5 tablespoons per bushel of soil.

<sup>1</sup>Appreciation is expressed to Vaughn's Seed Company and Geo. J. Ball, Inc. for the plant material used in these investigations.

#### LITERATURE CITED

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3. Bald, J. G. and P. A. Chandler. 1957. Reduction of the root rot complex on Croft lilies by fungicidal treatment and propagation from bulb scales. Phytopathology 47: 285-291.