Clopyralid: Garden Demonstration Plots

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Procedure

In May 2002 we began a garden field demonstration to compare the effects of two sources and rates of clopyralid-containing compost on the growth of sensitive garden crops. We used two sources of compost; one was from eastern Washington and had a high level of clopyralid (lab analysis of 82 ppb), and one was from western Washington and had a lower level of clopyralid (lab analysis of 12 ppb). We applied compost to garden soil at two rates (1 and 3 inches), and incorporated the compost to a depth of six inches with a garden tiller. The demonstration includes five treatments (the two sources of compost at the two rates of addition, and an untreated control). Each treatment is replicated twice, for a total of ten plots. Each plot measures six feet by nine feet. All plots were fertilized with a complete organic fertilizer.

We transplanted three tomato plants (one each of Oregon Spring, Early Girl, and Sungold) and one tomatillo plant (Toma Verde) into each plot. We also sowed one row of peas (Knight) and one row of bush beans (Provider) into each plot.

Results

Observations on June 17, July 9, and July 18, 2002 are described below, followed by a summary.

June 18. Curling of leaves is apparent on tomatoes grown in the high (3-inch) application rate of the high-clopyralid compost. Curling is severe on new leaves of some plants (Figure 1 shows the most severe effects observed). All other tomatoes appear normal (Figure 2 shows the 3-inch rate of low-clopyralid compost and Figure 3 shows the unamended control). The tomato plants are growing more vigorously in the compost treatments compared with the control. The tomatillos show no negative effects from the compost.

Fig. 1. Most severe effects observed, high application rate of high rate clopyralid compost.

Fig. 2. High application rate of low rate clopyralid compost.

Fig. 3. Unamended control.

Fig. 4. Peas, high application rate of high rate clopyralid compost.

Fig. 6. Beans, high application rate of high rate clopyralid compost.

Fig. 5. Peas, high application rate of low rate clopyralid compost.

Fig. 7. Beans, high application rate of low rate clopyralid compost.

Peas and beans growing in the plots amended with the high-clopyralid compost are showing signs of clopyralid damage. Slight cupping of leaves has occurred at the 1-inch rate, while more severe cupping of pea leaves (Figure 4) and deformation of bean leaves (Figure 6) is evident at the 3-inch rate. Plants appear normal for all other treatments. Figures 5 and 7 show normal-looking pea and bean plants grown in the 3-inch rate of the compost containing lower amounts of clopyralid. Plants grown in the compost treatments are larger than plants in the untreated control.

July 9. Tomatoes, peas, and tomatillos have set fruit. The only plants showing serious clopyralid effects are those grown in the 3-inch application rate of high-clopyralid compost. Some pea and bean plants have slightly curled leaves in the 1-inch rate of high-clopyralid compost. No clopyralid effects are visible on plants grown in the low-clopyralid compost treatments. Plants grown in compost amended soils appear more robust than plants grown in the unamended soil. This is especially true for the peas and beans, where emergence and growth was much poorer in the unamended soil.

Leaf curling is apparent on all tomato plants grown in the 3-inch application rate of high-clopyralid compost. Curling ranges from slight to severe, with the most noticeable curling on the Sungold plants. Young fruit on the Sungold plants (a cherry tomato) are abnormally elongated with pointed ends. Some of the fruit on the Oregon Spring plants have dry scabs on the surface. The scabs form thin lines running from the blossom end to the stem end of the tomatoes. Early Girl fruit appear normal. Tomatillo plants do not show symptoms of clopyralid injury.

Pea and bean plants grown in the 3-inch application rate of high-clopyralid compost show leaf cupping and curling varying from mild to severe. Some pea pods are also curled. Beans have not yet set fruit.

July 18. Sungold cherry tomatoes are ripening and beans are setting fruit. Symptoms of clopyralid damage grown in the 3-inch rate of high-clopyralid compost are similar to those reported on July 9. Some pea pods are severely curled, some are near normal. Peas from pods that are ready for harvest appear normal and have good flavor. Severely curled pods do not have much fill yet, and have not been harvested. Beans are still developing and some are curled at the end of the pod.

With the exception of slight cupping of some pea leaves and slight curling of some pea pods grown in the 1-inch rate of high-clopyralid compost, all other treatments appear normal. Some of the tomatillo plants are becoming yellow and less robust, but this in not related to the treatments. Peas and beans grown in all compost treatments continue to be more robust than in the control plots.

December 20. No further changes were seen during the remainder of the growing season.

Summary

Only the 3-inch rate of the high clopyralid compost produced results that were unacceptable in a garden. All plants grew and set fruit, but deformation of leaves (and in some cases fruit) was quite noticeable in the 3-inch treatment of high-clopyralid compost. All other compost treatments produced plants that are equal or superior to the unamended control treatments.

For more information and printout source go to: **http://www.soils1.org**.
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