

Excessive Captan Causes Injury

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A severe loss of newly planted chrysanthemum cuttings was sustained by one New York State flower grower this summer as a result of an excessive application of Captan 50W in dry form to the soil.

The damaged cuttings were sent to the Department of Plant Pathology and Floriculture for determination of the causal factor. The basal leaves of the cuttings exhibited a severe marginal burn, (fig. 1). On some plants this condition extended from the basal leaves to the new terminal growth. Information from the grower indicated that the appearance of the injury started within five days after planting.

Since no disease organisms were involved it appeared to be that some type of chemical injury had occurred. A soil test had shown that neither the total soluble salts nor the nutrient levels were abnormal.

Further investigation determined that the grower had applied Captan 50W in dry form at the rate of $3\frac{1}{2}$ pounds to 100 square feet of bench area in place of a steam sterilization treatment in December 1959. Rooted chrysanthemum cuttings that were planted at that time showed some slight leaf margin injury but they quickly outgrew this condition. No further evidence of injury was noticed at the time.

The first week of August 1960 the old crop was removed and the soil prepared for a new crop of chrysanthemums. Superphosphate was added as needed and the soil steam sterilized. It was immediately after planting that the injury occurred. The unusual chemical smell of the soil following steaming was the first indication that things were not right. The Captan was suspect because two benches in the greenhouse that had received the Captan treatment as previously described had the soil removed and these benches showed no damage of any kind.



Fig 1. Typical injury to chrysanthemum cuttings planted in Captan treated soil. Photographed August 20, 1960.

It seemed that the high temperatures achieved with the steam sterilization had resulted in a breakdown of the residual material in the soil and a release of some phytotoxic substance. The material was evidently not long lasting in effect since cuttings that were replanted following a heavy watering showed no evidence of damage and were growing normally.

To determine the possibility of a toxic material being released from Captan following a steam sterilization treatment a trial demonstration was prepared. On August 17, 1960 five inch clay pots that were filled with a regular potting soil mixture had Captan 50W incorporated into the top inch of soil at rates equivalent to 0, 1.3, 2.6, 5.2, 10.4 and 15.6 pounds to 100 square feet of area. The filled pots were steam sterilized at 180° F for one-half hour. The pots were removed from the sterilizer, allowed to cool and aerate for approximately 10 hours prior to planting.

Rooted cuttings of the chrysanthemum variety Indianapolis White were planted one cutting to a pot on August 18. The pots were placed in a 60° night and 70° F day temperature greenhouse and watered daily. On August 22 a marginal scorch was apparent on the plants in the pots of the three highest concentrations. Varying degrees of injury were seen on the plants in all of the Captan treated pots on August 26. There was no injury on the plant in the untreated soil.

The type of injury was somewhat similar in appearance to a very severe potassium deficiency with the margins of the leaves being scorched or burned. The scorched area was light tan in color and extended $\frac{1}{4}$ inch and more in from the margins on the affected leaves.

A photograph taken September 8, (fig. 2) shows the effect of the various concentrations of material on the subsequent growth of the plants. By this time the phytotoxic material had been leached from the soil by the daily watering. The new growth of the plants showed no further damage, but the treated plants had been severely stunted and delayed in growth.

Since this unfortunate occurrence the grower involved has changed all the soil in his greenhouse benches. This was done to ensure the avoidance of any future problems from subsequent steam sterilization of the soil.

From the foregoing it would certainly seem that the use of Captan as a dry application to the soil in place of a steam sterilization treatment is a practice that should not be employed. The rates used here were greatly in excess of those normally recommended. Where the material is used as recommended, one pound to 100 gallons of water on 400 square feet of bench area, there should be no injury.

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Captan Injury

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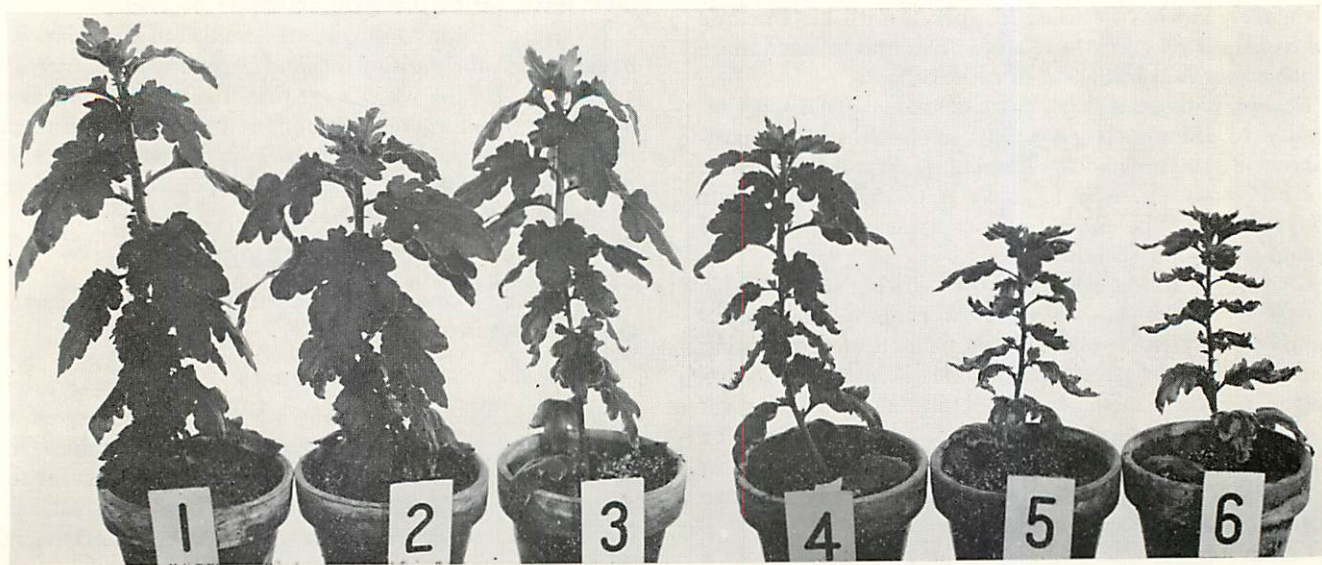


Fig. 2. Indianapolis White Chrysanthemums in Captan treated soil: 1, Check; 2, 1.3; 3, 2.6; 4, 5.2; 5, 10.4 and 6, 15.6 pounds per 100 square feet rate of application. Planted August 18, 1960, photograph September 8, 1960. Notice marginal leaf damage.