Communications

Chemical Induction of Flowering in the Sweetpotato

An effective means of inducing flowering and seed production in sweetpotatoes would greatly facilitate the development of varieties with superior quality, higher yield, and disease resistance (*1*). However, many difficulties have been encountered by research workers in their attempts to discover methods for the initiation of flowering in sweetpotato plants, especially with those of the Jersey type. Hartman (*2*) used as many as eight different variables in an attempt to induce flowering in Jersey-type sweetpotatoes with no positive results. Similarly, Mikell (*3*) found that certain hormone applications were ineffective, either for induction, or for retardation of floral primordia formation in sweetpotatoes. It has recently been reported that flowering can be induced by grafting scions of sweetpotato plants onto root stocks of certain ornamental species that do not have storage roots (*1, 4*).

In an experiment initially designed to study the effects of foliar applications of 2,4-D (2,4-dichlorophenoxyacetic acid) on subsequent sprout production of the roots, sweetpotato plants (*Ipomoea batatas,* vars. Porto Rico and Gold Rush) were set 13 July, 1953 in a ground bed in the greenhouse. Twelve plants of each variety were randomized in four blocks of three plants each. Single blocks of three plants each were treated with 100, 500, or 2500 ppm of 2,4-D. A hand sprayer was used to make the applications at the time (4 Sept.) the roots had begun to enlarge, 53 days following setting of the plants. A group of three plants for each variety was left as a control. A second replicate was planted 31 July, and on 4 October, 64 days after setting the plants, 2,4-D at the concentrations listed here was applied to this replication.

By 7 November, 1953, it was observed that plants were flowering which had received certain 2,4-D treatments. The numbers of flowers that had developed by 5 Dec. and the dates on which the first flowers appeared are given in Table 1. No flowers occurred on nontreated plants or on those receiving 2,4-D treatments other than the ones listed.

Table 1. Effect of 2,4-D on flowering in sweetpotatoes.

Treatment		Porto Rico		Gold rush	
Chemical and concentration	Date of application	Date of first flower	No. of flowers to Dec. 5	Date of first flower	No. of flowers to Dec. 5
2,4-D 500 ppm	4 Sept.	7 Nov.	84	No flowering	
2,4-D 500 ppm	4 Oct.	7 Nov.	26	No flowering	
2,4-D 100 ppm	4 Oct.	No flowering		9 Nov.	11

Flowering in all cases was general, with many flowers occurring on each plant. Relatively small or nonenlarged roots were associated with the treatments that induced flowering (*1, 4*), and splitting of stems and petioles and tumefaction of stems near the bases of such plants were common.

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References

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Source of Error in Determination of Chromic Oxide Using Perchloric-Sulfuric Acid Digestion Method

Recently, in a series of determinations of the chromic oxide content of cow manure, by the method of Bolin, King, and Klosterman (*1*), it was concluded that temperature, time, and acidity were critical factors during the digestion period with the digest mixture of perchloric-sulfuric acid. A search of the literature showed that Smith (*2*) reported that hot, concentrated perchloric acid (70 to 85 percent $HClO_4$, by weight) has reducing, as well as oxidizing, properties and that the reducing reaction of hot, concentrated perchloric acid increases directly with the concentration of the acid and with the temperature. These reducing properties are assumed to result from the formation of hydrogen peroxide as a decomposition product.

Dilute perchloric acid, upon boiling, loses water until it reaches a concentration of 70 to 72 percent. This acid distills at about 203°C, accompanied by some decomposition (*2, 3*). Mixtures of perchloric and sulfuric acids will yield traces of hydrogen peroxide at temperatures of 180° to 185° C because of the dehydration effect of the sulfuric acid (*4*).

Low chromic oxide content in cow manure frequently resulted when the digestion was prolonged for any length of time beyond the minimum time required to oxidize the chromic oxide to chromic acid. In the absence of precise knowledge of the reactions involved, optimum conditions for this digestion were determined empirically. When a 400 to 500-mg sample of dry cow manure was digested at a temperature such that a clear orange-colored digestion mixture was obtained in approximately 10 or 12 min, results were obtained with a standard deviation of ± 0.02 percent in