FIELD AND GREENHOUSE TESTS WITH SYNTHETIC GROWTH-REGULATING SUBSTANCES APPLIED TO SUGAR BEET SEEDS AND PLANTS

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CONSIDERABLE publicity has recently been given to the possibility of modifying growth through the application of certain synthetic growth-regulating substances to the seeds or to the foliage of plants. Claims have been made in advertising pamphlets, newspapers, trade journals, radio advertising, and some scientific publications that the application of these chemicals and commercial preparations greatly increased the yield and quality of plants. There have also been a number of reports showing that applications of a large number of these substances at different concentrations to a wide variety of plants have produced no beneficial response. Various methods of applying these substances to plants or seeds have been used. Seeds are usually dusted with flour or talc containing the substance or soaked in dilute aqueous solutions before planting. Growing plants are usually treated with a dust or spray containing the substance. Recent publications (5, 7) have given fairly complete reviews on the broader aspects of the subject. The purpose of the present report is limited to the possible application of some of these substances in sugar beet culture.

Ireland (3, 4) reported tests showing increases in the yields of stock beets and sugar beets amounting to about 200% and 62%, respectively. These yields, however, were estimated and apparently based on non-replicated tests. Amlong and Naundorf (1) reported increased yields up to 157% and slightly reduced sugar percentage when seed was soaked for 24 hours in 1/100 normal heteroauxin (indoleacetic acid). Nuckols (8) reported no significant beneficial results from any of the seed treatments applied at Scotts Bluff, Nebr. Stewart and Hamner (9) also reported no statistically significant response from any of the treatments used on sugar beets planted at Beltsville, Md., or at Lake Geneva, Wis. Replicated tests reported by Dexter (2) failed to show any increase in yield, sucrose percentage, or purity resulting from the use of several chemicals and commercial preparations.

MATERIALS AND METHODS

Improved U. S. 22 sugar beet seed was used in tests conducted in the greenhouse and in the field.

Dusts containing naphthaleneacetic acid, naphthaleneacetamide, indoleacetic acid, indolebutyric acid, and levulinic acid were prepared by dissolving the chemicals in a suitable solvent, then mixing this solution with talc to produce a thick paste. The mixture was stirred occasionally as drying progressed at room