Technique of Coloring Sugar Beet Seed for Treatment Identification

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In the treating of processed sugar beet seed, advantage was first taken of the usefulness of a water-soluble dye by adding a small amount of it to a suspension of the treating materials which were applied as a spray to the sugar beet seed. Thus used, the dye served as an infallible telltale of the quality of coverage, mechanically attained, by the spray treating equipment (1)[2]. Opportunity was afforded, also, to make some studies of the comparative effectiveness of fungicides which, when sprayed on the irregular surfaces of sugar beet seed, resulted in light, medium and heavy coverage with the treating material.

Early in 1948 some preliminary experimental work was done with dyes to determine the practicability of their use for the identification of specific seed treatments. In this search for satisfactory dyes, the range was purposely limited to the three primary colors—red, green, and blue, since it was contemplated that only three kinds of seed treatments would be made available for sugar beet growers—namely, insecticide, fungicide, and a combined insecticide-fungicide treatment. Pigments were not given serious consideration since they are not water soluble. It was felt that insoluble pigments would only add to the volume of the suspended materials used in the treating "mix," thereby increasing the chances of difficulty with the seed treater spray nozzle.

The natural color and the absorbent character of the tissue which composes the decorticated sugar beet seedball make it an ideal base for the application of red, green, blue and yellow dyes. Even seed from processed lots which contained a high percentage of dark colored seedballs responded to dyes, particularly the green.

In making the final selection of the dyes which were to be used commercially in conjunction with seed treatment, a group of each of the primary colors mentioned, and yellows, were tested. Since any coloring media selected had to be applied as a component part of the spray "mix," these dyes were screened on a basis of (1) complete compatibility with the fungicide Phygon and the insecticide Lindane, or, with combinations of both; (2) solubility in water; (3) brilliance without the use of excessive dosage; (4) freedom from phytotoxic effects upon germinating seed; (5) color-fastness for at least twelve months when seed was stored in paper bags; and (6) cost per pound.

In the process of elimination, three dyes were found which met all of the requirements stated and gave satisfactory results. The red selected was Safranine A, concentration 147 percent; the green was Victoria Green WB; and the blue was Methylene Blue 2B. It was found in commercial practice that the green and the blue dyes imparted colors to the beet seed which, because of lack of sufficient contrast, were confusing. The use of blue was discontinued and a yellow substituted therefore. The yellow selected was Auramine O, concentration 130 percent. The enthusiasm with which most of our growers have accepted our method of identifying sugar beet seed treatments by color has led to its permanent adoption as part of our process-

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[2] Numbers in parentheses refer to literature cited.

ing procedure. From the beginning, we have used a red dye to identify sugar beet seed which has been treated with Lindane insecticide only. There is little or no demand for this single treatment. Yellow dye is used to identify seed which has been treated with Phygon fungicide only. In all of our beet producing areas where' wireworms are not a factor this seed treatment is recommended and is generally accepted. The choice of a yellow color was a fortunate one for this treatment, since it intensifies the light yellow cast which treatment with this fungicide gives to the seedball. Moreover, when seed which has been single-treated with Phygon is returned from our early planting areas we find it a simple procedure to add the proper dosage of Lindane by retreatment for reissue to growers planting in wireworm-infested areas. The green dye, which is used to identify the double-treatment with Phygon and Lindane, when superimposed upon the yellow color, completely effaces that color.

Three grams of any one of the aforementioned concentrated dyes were found to give a satisfactory color to the processed sugar beet seed when applied in two quarts of treating material per hundredweight of seed (2) . When we first started using dyes, the procedure was to dissolve 132 grams of dye of the appropriate color in 2 gallons of hot water. When cooled, this dye solution was added to the treatment "mix" prior to its completion to a predetermined volume of 22 gallons. A total of 44 hundredweight of seed was treated with this volume of treating materials. Because of the time consumed in the dissolving and cooling of water solutions of dyes, the method was modified. We now make up concentrated stock solutions of the dyes to be used in alcohol. Generally, 5 gallons of solution are made at a time. Each pint of concentrated solution contains 132 grams of dye. The concentrated solution to be used for any desired quantity of treating materials is measured and diluted with cold water prior to being added to the treating materials. Thorough agitation is given the "mix" during the addition of dye solution.

Agriculturists, fieldmen and growers have accepted the value of seed treatment and have come to look upon color-coding the specific kind of treatment as a necessary adjunct thereto. The psychology of being able to see that seed has been treated is quite effective and cannot be ignored. At least three west coast processors now color their processed treated sugar beet seed for purposes of treatment identification. One of these is seriously considering the use of color identification of specific varieties. One producer-processor of flower seed uses dyes for the coloring of the seed to indicate the color of the flower which will be produced. It is evident that the possibilities have not been fully exploited.

Literature Cited

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