INTERFERENCE OF AMMONIA, RELEASED FROM SUGAR BEET SEED BALLS, WITH LABORATORY GERMINATION TESTS

Myron Stout and Bion Tolman

Experimental work conducted by the U. S. Dept. of Agriculture during the past 4 years has shown that some lots of sugar beet seed contain substances which are toxic to the germinating seed. The toxic agent has been shown to be free ammonia hydrolyzed from the organic nitrogen compounds of the seed ball during the process of germination.

The rules for seed testing of the Association of Official Seed Analysts, and also the official rules under the Federal Seed Act, recommend soaking beet seed for 2 hours before testing, but do not make recommendations as to quantity of water to be used. In many commercial laboratories, this precautionary soaking procedure has been omitted. Recently, several inquiries have been made by commercial sugar beet seed producers concerning the cause of low laboratory germination tests on seed that was apparently well filled as shown by high cracking test and weight per bushel. In these instances improvement of germination by the usual gravity methods of recleaning was impossible. However, when these seed lots were thoroughly washed in running water prior to testing, the germination percentages approximated the germinability that was indicated by cracking tests.

The economic aspect of the problem is evidenced by the fact that several lots of sugar beet seed, later shown to be of high quality, were unacceptable to the commercial trade on the basis of laboratory germination tests made without soaking or washing of the seed balls.

The importance of washing the seed balls prior to making the germination test was strikingly shown in the following experiment with six different seed lots. These seed lots were selected from commercial seed sources because of the wide spread between the germination percentages obtained in the laboratory and the expected germinability indicated by cracking tests. A small quantity of seed from each one of the six lots was washed in running tap water for 24 hours and air dried. The germination of the washed seed from each lot was then compared with untreated seed. Germination tests were conducted by five different methods, as follows: (1) On a cotton substratum in petri dishes; (2) in sand in shallow pans; (3) between moist blotters; (4) in soil in the greenhouse, planting depth $\frac{1}{2}$ inch; and (5) in the...