A NEW METHOD FOR QUICK DETECTION OF SEED OF RED AND YELLOW FORAGE BEETS AMONG SUGAR BEET SEED

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This problem viewed in a general way, has, since very long, attracted our attention as may be seen from one of our notes (Munerati-Milan) of 1927.

However this may be, it should, at the very outset, be stated that regardless of the kind of method employed, such method will be worthless if the principle on which it is based does not guarantee absolute certainty; it would deprive the method of its raison d'etre and would preclude its application.

In a series of tests, conducted also by us, and intended to ascertain whether colchicine would be capable of creating polyploid races, we noticed, among other things, that the rootlets of young plants grown from seed that had for a few hours been in a solution of colchicine, remained perfectly white in the case of the ordinary varieties of sugar beets, forage beets or half sugar beets with white roots. But they assumed, however, their peculiar color in the case of seed of varieties of forage beets with a colored root. This raised the question whether the layer of pigment would, under certain conditions, manifest itself in a more pronounced manner and whether we would be justified in using this as the principle of a technique on which to base a method for detection of varieties, with the exception, of course, of such beets (forage or half sugar beets) as do not differ in their reaction from ordinary sugar beets.

For that purpose we have performed several orienting experiments:

a. By using colchicine solutions of various concentration.

b. By allowing the seed balls to remain in the above-mentioned solutions for different periods of time (for 6, 12 and 24 hours respectively) and at distinctly different temperatures.

c. By transferring the seed balls for germination to cotton soaked in a colchicine solution and to cotton soaked in water, or to wet blotting paper; they were also put in sand containing colchicine and in sand with water.

d. By putting normal seed balls directly in cotton soaked in colchicine or in sand containing that substance.

The following facts were ascertained:

The longer the seed is exposed to the effect of the colchicine solution (obviously to a certain limit beyond which the seed loses its viability) the more pronounced the layer of pigment.

Seed balls which first have been exposed to the effect of a colchicine solution (0.5%) and are subsequently transferred to sand, which is also saturated with colchicine, produce young plants whose rootlets manifest their characteristics to an unusually high degree.

It is necessary to first immerse the seed balls in running water, especially so when one conducts the germination test with cotton or blotting paper.

When the seed has been exposed to the effect of the colchicine solution for too short a period (about 6 hours) and then is, for germination, transferred to sand saturated with water, the rootlets become elongated and determination will be less reliable.

When, at a moment when germination is well advanced, the trays with the germinating seed are removed from the thermostat and are for a few days exposed to the light and kept at the normal temperature of the laboratory, the color of the rootlets becomes almost invariably more pronounced.

As a rule, we prefer to conduct germination tests in sand rather than in cotton, but each investigator should base the technique to be followed on data obtained from direct observation.

At any rate, the problem is such a delicate one that in order to obtain reliable data, it will be necessary to simultaneously carry out several tests: The seed balls should be exposed to the effect of the colchicine solution for different periods of time and germination tests should be performed in sand or cotton saturated with water and in sand saturated with colchicine.

At present we are engaged in finding out whether it will be possible to replace the colchicine by other compounds. And here, another question, although one of secondary importance, presents itself: Will it be possible to use the sand or cotton saturated with colchicine again, provided the material has first been dried?