



TECHNIQUES TO DETERMINE TOTAL VIABILITY IN NATIVE SEED

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Abstract

The deep dormancy exhibited by seeds of many native plants can lead to the under estimation of total viability in laboratory tests. Pre-treatment of dormant seeds with gibberellic acid to break dormancy prior to testing for germination or total viability can give a more accurate assessment of seed quality.

Keywords

native seed, dormancy, viability, Tetrazolim chloride, laboratory test methods

1. Problems with Deep Dormancy in Native Seed

Native seed often exhibits a deep dormancy. This dormancy can make interpretation of total viability difficult using standard methods (prechill, light, KNO₃, alternating temperatures, scarification).

2. Use of Gibberellic Acid (GA₃) to Break Dormancy

The addition of gibberellic acid (GA₃) in combination with the more common methods of treatment for dormancy is effective in breaking dormancy for many native species (clip and chill with GA₃ added).

3. Deep Dormancy Can Interfere with TZ Test

The deeper dormancy of many native seeds can also interfere with the assessment of viability using tetrazolium chloride (TZ). Deeply dormant seed may not stain in a normal TZ test, due to the lowered metabolic rate of the dormant seed. The standard methods for testing viability with TZ can significantly underestimate the total viability of native seed lots when the seed is very dormant.

4. Breaking Dormancy Prior to the TZ Test

To determine total viability of dormant native seed, the seed is pretreated to break dormancy by cutting through the cotyledons and placing the cut seed in a 400 ppm solution of GA3 at 5°C overnight. The GA3 solution is then drained off and replaced with a 0.1% TZ solution and placed at 35°C. Breaking dormancy prior to the TZ test provides a more rapid and complete stain. This method allows a more accurate estimate of total viability in deeply dormant seed.

5. Reporting Percent Germination

It is important to distinguish total viability of a seed lot from percent of seed that will germinate readily under ideal conditions. This distinction is important when reporting laboratory results, since viability test results may not predict percent germination unless steps are taken to break dormancy at planting.

6. Reporting Percent Dormant Live Seed

Additional percent of seeds which germinate during the test with the aid of any dormancy breaking procedure is reported in the dormant column on the report. A note is added describing the method used to break dormancy.

7. Calculating Live Seed per Pound

The percent germination and percent dormant are added together to provide the total viability. It is this total viability which is used in calculating 'live seed per pound' (seed per pound x percent total viability).

Conclusions

We have found that combining traditional dormancy breaking methods with GA3 treatment produces rapid and reliable test results and improves the assessment of potential seed viability in seeds showing deeper dormancy.