

# TECHNICAL NOTES

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## A Quick Method to Estimate Germination Percentages for Seed Species

**This Technical Note by Dan Ogle, Plant Materials Specialist, and Brent Cornforth, Aberdeen PMC Farm Manager, describes a method to quickly determine approximate germination percentages of selected seed species. Brent Cornforth tested the technique described on the following pages with replicated studies.**

**File this Technical Note in the Plant Materials Section of the Field Office Technical Guide (FOTG), Section 6.**

## A Quick Method to Estimate Germination Percentages for Seed Species

The Plant Materials Center (PMC) at Aberdeen, Idaho, is part of the national plant materials program operated by the United States Department of Agriculture, Natural Resources Conservation Service (NRCS). The focus of the work at Aberdeen PMC includes: rangeland plant development and establishment techniques; riparian and wetland plant development and establishment techniques; promotion and demonstration of agroforestry practices including windbreaks and plantations; maintenance of Breeder seed for released varieties, production of Foundation seed for release to commercial growers; and technology transfer.

The PMC has 17 plant species (Cultivar or Selected Releases) which they are responsible for maintaining the Breeder and Foundation seed production. The Foundation seed is then sold through Crop Improvement Associations to commercial seed producers. The commercial seed producers ensure that a reliable supply of certified and non-certified seed is available to meet the public demand on both private and public lands.

Part of the seed production responsibility at the PMC involves the process of cleaning the seed once it has been harvested from production fields. Aberdeen PMC has a state-of-the-art seed cleaning plant considered the best cleaning plant within the PMC program that NRCS operates nationwide.

Following the seed cleaning processes, a seed sample must be sent to the state seed laboratory to test it for germination and other traits that you see on the tag when purchasing seed. If germination rates are too low, the seed lot will not qualify as Foundation Quality seed. If the lot does not qualify, the seed must be re-cleaned or used for other purposes. The PMC staff discovered a technique during their normal cleaning process that has enabled them to determine the approximate germination percentage during the cleaning process. If germination percentages are too low using this method, they immediately re-clean the lot until they are fairly sure it will meet the standards of Foundation Quality seed. This method has undergone replicated testing using older and newer seed lots to verify how reliable the method is.

The method involves the use of a **kerosene heater** and recently cleaned or older seed samples of approximately 100 seeds. The heater is allowed to burn for a long enough period to ensure the top surface is hot-320° to 340° F. (similar to a burner on a kitchen stove set at the high heat setting). Then 5 seeds are sprinkled on the top surface of the heater and observed. The live seeds that will germinate contain moisture and either pops similar to popcorn or sometimes roll over. The dead seeds with no germination are called duds and just lay on the burner and do nothing. Once 100 seeds have been tested, an estimate of germination percentage can be directly correlated. Although replicated tests of this method compared with state seed laboratory tests do not indicate 100 percent accuracy; the method does show promise as a quick method to indicate rough germination percentages.

The table on the following page compares germination percentages using a number of seed lots of varying ages and both state seed laboratory tests and kerosene heater tests.

## Germination Percentages from State Seed Laboratory and Kerosene Heater Tests

<u>Cultivar</u>	<u>Lot Number</u>	<u>State Test</u>			<u>Kerosene Heater</u>		
		<u>Rep1</u>	<u>Rep2</u>	<u>Avg</u>	<u>Pop</u>	<u>Roll</u>	<u>Combined</u>
Ephraim	SCO-87-10B22	80	72	<b>76</b>	<b>76</b>	18	94
Ephraim	SCO-95-Blend46	76	90	<b>83</b>	62	26	<b>88</b>
Regar	SCO-84-B7	42	34	38	74	24	98
Regar	SCO-93-23B61	80	78	<b>79</b>	<b>80</b>	18	98
Regar	SCO-95-Blend48	74	74	<b>74</b>	<b>66</b>	32	98
Paiute	SCO-89-23B1	26	34	30	68	22	90
Paiute	SCO-90-411B47	78	80	<b>79</b>	<b>74</b>	16	90
Bannock	SCO-95-Blend57	94	94	<b>94</b>	54	40	<b>90</b>
Topar	SCO-90-3B61	84	90	<b>87</b>	60	30	<b>90</b>
Magnar	SCO-95-1B47	82	98	<b>90</b>	34	48	<b>82</b>
Syn-A	SCO-94-21B21	88	88	<b>88</b>	44	42	<b>86</b>
Goldar	SCO-84-16B11	36	42	<b>39</b>	<b>30</b>	52	82
Goldar	SCO-96-6B40	76	68	<b>72</b>	58	24	<b>82</b>

### Bold indicates a reasonable correlation

Ephraim crested wheatgrass: Older seed lot - State test and poppers are equal. Newer seed lot - State test and poppers plus rollers have good correlation.

Regar meadow brome: Older seed lot - poor correlation. Newer seed lot - State test and poppers have good correlation.

Paiute orchardgrass: Older seed lot - poor correlation. Older seed lot - State test and poppers have good correlation.

Bannock thickspike wheatgrass: Newer seed lot - State test and poppers plus rollers have good correlation.

Topar pubescent wheatgrass: Older seed lot - State test and poppers plus rollers have good correlation.

Magnar basin wildrye: Newer seed lot - State test and poppers plus rollers have good correlation.

Syn A Russian wildrye: Newer seed lot - State test and poppers plus rollers have good correlation.

Goldar bluebunch wheatgrass: Older seed lot - State test and poppers have good correlation. Newer seed lot - State test and poppers plus rollers have good correlation.

### Discussion

This data indicates a very good correlation with newer lots of seed. Older seed lots more than 10 years old were not consistent using this method, but the test does give a general indication of seed viability. When testing fresh lots of seed this method is very reliable for the varieties grown and cleaned at Aberdeen PMC.

NRCS recommends the use of certified seed when available. In addition, it is very important to have a recent seed germination test for most purposes. However, there are situations where a bag of seed has been lying around for a long period and you wonder if it is still viable and could be used for a small project. This method will give you a rough indication of the seed viability. As an alternative to the kerosene heater, a kitchen stove and skillet may be used at the high heat setting.