

2016 AOSA Rules Change Proposal 11

Purpose of Proposal:

It is proposed to modify the text under 'Moisture and aeration', stressing the importance of adequate seed-to-media contact to allow for adequate and timely seed imbibition.

I. Present Rule

6.3 Moisture and aeration. — The substratum must be moist enough to supply the needed moisture to the seeds at all times. Avoid supplying excessive moisture that will restrict aeration of the seeds. Except as provided for those kinds of seeds requiring high moisture levels in the germination media, the substrata should never be so wet that a film of water is formed around the seeds. For most kinds of seeds, blotters or other paper substrata should not be so wet that by pressing, a film of water forms around the finger. See section 6.9b.

II. Proposed Rule

6.3 Moisture and aeration. — The substratum must be moist enough and provide adequate seed-to-media contact to supply the needed moisture to the seeds at all times. When appropriate, gently pressing seeds into the germination media helps ensure adequate seed-to-media contact to allow for adequate and timely imbibition.

Avoid supplying excessive moisture that will restrict aeration of the seeds. Except as provided for those kinds of seeds requiring high moisture levels in the germination media, the substrata should never be so wet that a film of water is formed around the seeds. For most kinds of seeds, blotters or other paper substrata should not be so wet that by pressing, a film of water forms around the finger. See section 6.9b.

III. Harmonization and Impact Statement

This change will not impact harmonization, either positively or negatively, and only provides further clarification when test conditions specify that seeds should be placed on top of a substrate.

IV. Supporting evidence

A study investigating the effects of two contact types on dichondra is attached (Appendix). Irrespective of seed quality, results indicated a large and significant difference in germination when seeds were placed on top of blotter paper (contact type 1) compared to gently pressing the seeds into the substrate (contact type 2), with contact type 2 consistently producing higher germination results. While differences may not be as dramatic for other species, the practice of maintaining adequate seed-media contact should ensure proper germination and eliminate one important source of variation in germination tests.

V. Submitted by

David M. Johnston, RST
SCST Co-Chair
Germination Subcommittee
Monsanto Seed Physiology Lab
2700 Camino del Sol
Oxnard, CA 93030
david.m.johnston@monsanto.com

Riad Baalbaki
AOSA Co-Chair
Germination Subcommittee
California Department of
Food and Agriculture
3294 Meadowview Road
Sacramento, CA 95832
rbaalbaki@cdfa.ca.gov

Sabry Elias
AOSA Chair
Research Committee
Oregon State University
The Seed Laboratory
Corvallis, OR 97331
Sabry.elias@oregonstate.edu

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APPENDIX

Assessing the Effect of Seed Contact on 5 Dichondra Samples of Varying Germination Quality

Introduction. This study was undertaken to investigate the effect of seed-media contact on germination behavior of dichondra. The study was conducted at the Seed Lab of the California Department of Food and Agriculture-Plant pest Diagnostics Branch. Previous trials indicated considerable variation in germination behavior of dichondra, and it was suspected that moisture level and effective contact of seed with substrate, both impacting adequate seed hydration, were the main factors contributing to such variation.

Materials and Methods. Five dichondra samples, with a wide range of labeled germination were selected for this study. Each sample was planted and evaluated according to AOSA rules, with contact treatment as the only difference. Contact type 1 consisted of manually planting seeds on top of two blotter sheets covered by a single sheet of filter paper, without exerting any pressure on the seeds during planting. Contact type 2 consisted of manually planting seeds on top of two blotter sheets covered by a single sheet of filter paper, with seeds gently pressed into the media during planting, to ensure a higher degree of seed-media contact. Care was taken not to injure the seeds during planting. Percentage germination was determined 28 days after planting following two preliminary counts and one final count. The experiment was laid out as a completely randomized design with two factors, sample and contact type, with 8 replicates of 50 seeds each, for a total of 400 seeds per treatment. Germination data was arc-sine transformed before analysis of variance and mean separation. The SNK test was used to compare means ($p \leq 0.05$), with Bonferroni adjustment for multiple comparisons. Untransformed germination data is presented.

Results and Discussion. Results indicated that both sample and contact type, but not their interaction, had a significant effect on germination (Table 1). Differences in germination with and without gently pressing dichondra seeds into the substrate were significant for all samples, and ranged from 8.5% to as high as 23.5% (Table 2). These results indicated that proper germination of dichondra requires constant contact of the seeds with the moist substrate, and the area of contact should be large enough to allow proper seed hydration throughout the test period. Previous observations indicated that failure to maintain good seed-media contact produced a high number of seeds that appeared fresh/dormant. Such seeds were hydrated, but did proceed to radicle emergence and seedling development. Transferring these seeds to Petri dishes lined with 3 layers of filter paper at higher than usual moisture levels, and gently pressing the seeds into the filter paper, resulted in seedling development within 2-4 days.

Table 1. Analysis of variance; contact type effects on germination of different dichondra samples.

Source of variation	df	Mean square	F	Sig.
Sample	4	1020.268	175.790	0.000
Contact type (CT)	1	1524.453	262.660	0.000
Sample x CT	4	14.582	2.512	0.062
Error	30	13.442		
Total	5837.969	39		

Table 2. Germination results and differences between the two contact types within each sample.

Sample	Contact type [†]	Germination (%)	Difference (contact 2-contact 1)
1	1	74.00	
	2	91.25	17.25*
2	1	52.00	
	2	75.50	23.50*
3	1	62.25	
	2	81.75	19.50*
4	1	84.00	
	2	92.50	8.50*
5	1	32.50	
	2	56.00	23.50*

[†]Contact type 1: seeds planted on top of two blotter sheets covered by a single sheet of filter paper, without exerting any pressure on the seeds; Contact type 2: seeds planted on top of two blotter sheets covered by a single sheet of filter paper, with seeds gently pressed into the media during planting.

*Significant difference according to the SNK test ($p \leq 0.05$).