Abstracts

from oral and poster presentations
given at the 103rd
Association of Official Seed Analysts
and the 90th
Society of Commercial Seed Technologists
(AOSA/SCST)
annual meeting
held in Boise, Idaho on
May 19–23, 2013

Seed Germination Conditions for *Miscanthus sinensis*

Erik J. Christian and A. Susana Goggi*

Miscanthus sinensis Andersson seed germination requirements are unknown, and a germination protocol is not available for this biomass-producing species. The objective of this study was to determine the effect of temperature combinations, light, and dormancy breaking techniques on seed germination, and to determine a base for establishing a standard germination protocol for *M. sinensis*. Seeds from four cultivars and two years of production (freshly harvested or one-year-old seed) were obtained from Mendel BioEnergy Seeds, Hayward, CA. Alternating temperatures commonly used by seed laboratories (15/25, 15/30, 20/30 °C for 16/8 h) were compared to the best germination temperature combination from a preliminary thermogradient table experiment (22/16 °C for 16/8 h). In addition, seeds were either treated with 500 mg L^{-1} GA_3, 2000 mg L^{-1} KNO_3, prechilled at 5 °C for 7 d or remained untreated as a control. Seeds from all treatments were subjected daily to either 8 h of light or 24 h of dark. The highest germination of freshly harvested seeds was recorded when seeds were germinated using 20/30 °C for 16/8 h. There was no significant difference in the germination of one-year-old seed regardless of the germination temperature treatment. Light did not promote germination regardless of treatment and seed age. Germination of GA_3-treated and prechilled seeds was significantly higher than germination of seeds treated with KNO_3 and the control.

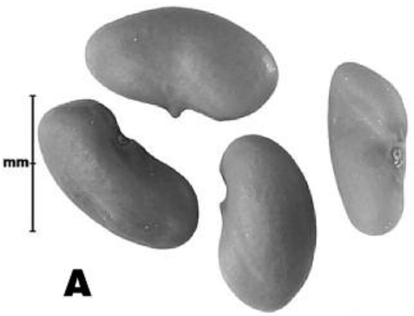
Iowa State University, Department of Agronomy and Seed Science Center, 195C Seed Science Center, Ames, IA 50011. *Corresponding author (Susana@iastate.edu). Received 5 June 2013.

Distinguishing Alfalfa, Sweet Clover and Black Medick Seeds

Jennifer Neudorf* and Ruojing Wang

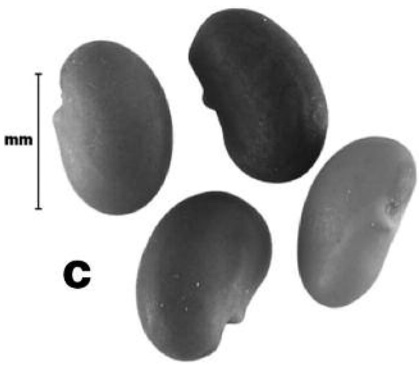
Alfalfa (*Medicago sativa* L.), sweet clover (*Melilotus* spp.) and black medick (*Medicago lupulina* L.) are common forage crops in North America. Under Canadian *Seeds Regulations*, grading standards require that these crops be distinguished. Specifically, the separation of sweet clover is one of three grading factors of other crops for the purposes of Grade determination (in Grade Tables VIII–XI and XIII) for labelling seed for sale in Canada. Alfalfa, sweet clover and black medick are all in the same family, Fabaceae, and exhibit similar seed features that pose challenges to both beginners and seasoned seed analysts. Staff at the Canadian National Seed Herbarium have examined these species and identified characteristics that may aid in distinguishing them. The key separation features are size, seed axis and radicle line.

Alfalfa (**A**) is the largest of the three species, with a twisted seed axis and a thin radicle line that curves to the middle of the seed. This species also tends



to be kidney-shaped with a long base and a pointed radicle lobe; the shape is variable due to the twisted pod.

Sweet clover (**B**) is slightly smaller, with a straight seed axis and a broad radicle line that curves to the edge of the seed. This species is oval shaped with a velvety, slightly wrinkled seed surface and a blunt radicle lobe.



Black medick (**C**) is the smallest of the three species, with a straight seed axis and a thin radicle line. The seeds are oval shaped; they tend to have a rounded base and a pointed radicle lobe. Black medick also typically has a greenish base, independent of the seed color.

Seeds of these species may not present all of the features described, due to immaturity, mechanical, chemical or insect damage, or disease. Cultivating expertise in taxonomy and obtaining good reference specimens will increase the chances of an accurate identification.

Canadian Food Inspection Agency – National Seed Herbarium, Seed Science and Technology Section, Saskatoon Laboratory, Saskatoon, Saskatchewan, Canada. *Corresponding author (jennifer.neudorf@inspection.gc.ca). Received 20 August 2013.

Proposed Change to AOSA/SCST Criteria Evaluating Corn Leaf Extension inside the Coleoptile

Harold Armstrong

Testing agricultural and vegetable seeds, Handbook No. 30, page 141, describes one corn abnormality as "(4) a shortened plumule, extending no more than one-half the way up through the coleoptile." This type of abnormal seedling has been viewed by some as a testing artifact, since this is not seen in seedlings planted on creped cellulose paper in light. Seed was solicited from a number of companies, shipped with a simple single digit identifying information to the Iowa State University Seed Testing Laboratory. Samples were then divided and shipped to members of the AOSA/SCST Mid West Referee Committee and other interested laboratories. Commercial Seed Analysts Association of Canada conducted a similar referee in 2009 due to the same concerns associated with media and light. This laboratory referee was conducted over two years and tested samples were planted to correlate current and proposed germination test scores to seedling emergence in both years. Referee participants were instructed to plant their samples in their usual method as well as on rolled towels in the dark. Participants counted normal seedlings, seedlings with leaves extending less than half the length of the coleoptile, abnormal seedlings and dead seeds. A multi-year field study compared field emergence to referee germination results according to the AOSA *Rules for testing seeds* and the proposed rule change. The field study found that the field emergence was much greater than normal germination according to the AOSA rules for these seed lots. The study also found that if percentage germination and percentage seedlings with leaves less than half the length of the coleoptile were added (the proposed rule change), field emergence was actually predicted by the adjusted germination score. The germination test is supposed to predict potential field emergence under ideal conditions. This rules change proposal provided a much better estimate of field emergence for seed batches with this tendency.

MSTC, 460 E. Adams St., Waterman, IL 60556 (harold.r.armstrong@monsanto.com). Received 1 July 2014.

Determining Seed Fill at the Chicago Botanic Gardens – Dixon Seed Bank Using X-ray Technology

H. Armstrong* and D. Sollenberger

The Dixon Seed Bank is a participant in the Seeds of Success campaign to preserve natural variation of species. Volunteers clean seed collections made by licensed seed collectors. Seed counts are made once the samples are cleaned, to determine how many seeds are in the collection. In the past, seeds were cut to determine percent fill. The Dixon Seed Bank is now exploring the use of X-ray technology to determine percent fill in a non-destructive manner. Attributes noted include filled seeds, non-filled seeds (empty or aborted) and insect predation. This provides the seed bank with more detailed knowledge as to the number of potentially viable seeds in the collection. Annually, more than 2000 collections are cleaned, counted and their viability estimated. Portions of the collections have been sent back for local ecotype regeneration, or forwarded to Kew Botanic Garden, while the remainder sealed and stored. Ultimately, these collections are meant to replenish natural diversity in the future.

Harold Armstrong, MSTC, 460 E. Adams St., Waterman, IL 60556; D. Sollenberger, Dixon Seed Bank, Chicago Botanic Garden, 1000 Lake Cook Rd. Glencoes, IL 60022. *Corresponding author (harold.r.armstrong@monsanto.com). Received 1 July 2014.