



Purpose: This SOP describes the requirements and recommendations for referee projects conducted by AOSA/SCST members.

Scope: Regional, National, Subject Matter referee tests, referees designed as supporting evidence for rule proposals, referee projects designed for analyst training and education.

References: AOSA Rule proposal guidelines.

Definitions:

A referee test is a specially designed test which is sent out to a number of seed laboratories in order to obtain information intended to improve seed testing and to provide valuable feedback to the participating laboratories. Referee testing is coordinated by the joint AOSA/SCST Referee committee which has divided the membership into six joint regions. Referees may be conducted regionally or across the organizations. These regions are defined in Article XV of the AOSA Bylaws as:

Region 1: AK, ID, MT, OR, WA, WY

Region 2: IL, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI

Region 3: CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT, WV

Region 4: AZ, CA, CO, HI, NV, NM, OK, TX, UT

Region 5: AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA

Region 6: Canada

Some of the important reasons for referee testing are listed here:

1. Validation studies for Rule Proposals
 - a. Testing new methods which may prove to produce better, or more uniform results than the existing AOSA Rules.
 - b. To evaluate existing methods for continued appropriateness in seed testing.
 - c. To determine appropriate test methods for species not yet found in the AOSA Rules.
 - d. To test new substrates for appropriateness in seed testing.
 - e. To evaluate new methods for dormancy breaking, alternative temperatures, uniform blowing procedure, or pure seed unit definitions.
 - f. Comparison with other seed testing rules to promote harmonization.
2. Informational & Research studies
 - a. Preliminary studies as the foundation for further research and method development.
 - b. To promote precision, standardization, and uniformity among labs via educational studies.
 - c. To identify areas in seed testing in which research is needed to promote uniformity.
 - d. To test the interpretation and adequacy of existing AOSA Rules.
 - e. To serve as seed identification or seedling evaluation tools.
 - f. To educate analysts about the validation of new technologies.



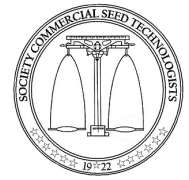
Types of Referees

Type of Study	Purpose	Pros	Cons
Virtual Evaluation	Seed identification, evaluation of specific abnormal types, seedling or tetrazolium evaluation.	All analysts view exactly the same content. Affordable to prepare. Survey tools come with some statistical and data collection tools built in.	Images can difficult to interpret compared to in-person analysis. Requires high quality images. Not suitable for germination method proposals.
Surveys	To gather information from analysts, especially regarding interpretation of the Rules, or to pinpoint methods needing further study or evaluation.	Quick way to gather information from many different labs. Useful as a guiding tool for future study.	May not be sufficient for rule proposal changes to the AOSA Rules.
Sub-samples: <i>A single large sample is divided into multiple smaller samples and sent to labs.</i>	Used for purity analysis, testing germination methods, hands-on tz testing, biochemical or other destructive testing, extending research beyond in-house studies.	If 6 lots and 6 labs participate, these are suitable for a rule proposal. Labs can conduct testing on their own time frame (within reason.)	Can be costly to source seed and ship samples. The waiting period to collect results and compiling information can be slower. Samples must be carefully divided before shipment.
Round-robin: <i>A single sample is passed between multiple labs.</i>	For non-destructive testing on difficult to find seed. Useful for seed ID on hard-to-find species. Testing blower uniformity or MSU procedures.	Only a single sample of each lot needs to be sourced. All analysts are looking at the same sample.	Labs must complete testing within the allotted time frame. Can be more difficult to track the progress of an individual sample.

Procedure: General Guidelines for Designing a Study

The following are the major steps of conducting scientific research.

1. Identify the problem you want to solve.
2. Identify the specific objectives and establish hypotheses.
3. Select the appropriate experimental design; identify treatments, variables, and experimental units.
4. Consult with the Statistics committee, and other committee relevant to the study (Germination, Purity, etc.)



5. Prepare the seed materials, the procedures/protocols to follow, and the equipment needed for the study. Always use a control check treatment. Include the following with each referee sample, or as part of a virtual referee or survey:
 - a. Clearly defined purpose.
 - b. Specific written instructions for the method(s) to be used.
 - c. Response sheet or link to survey response form with clear instructions for recording data/information.
 - d. Deadline/date for returning data, or time limit per lab for round-robin samples.
 - e. Contact information of the project coordinator.
6. Determine the observations to be collected, when to collect them, and conduct the study.
7. Consider a preliminary study before starting a bigger scale study, to reduce the number of treatments.
8. Analyze the data. Use ANOVA, mean separation tests, and/or tolerances whenever appropriate. See the Statistics Committee for available tools for statistical analysis.
9. Interpret the results, draw conclusions, and prepare a final report.

Special Considerations for Referees Supporting Rule Proposals

1. The relevant technical committee *must* be consulted prior to beginning the study.
2. The referee must include at least six (6) participating laboratories.
3. The referee must include a minimum of six (6) lots, preferably from different years and of varying characteristics to obtain a good representation of the crop kind. It may be appropriate to use additional lots, especially with non-uniform species.
 - a. If it is not possible to conduct a study using at least six lots the researcher must include documentation or evidence explaining why.
4. Authors should consider potential invasiveness of new species being added to the AOSA Rules.
5. For dormancy breaking methods, recently harvested seed must be used when dormancy is at its peak.
6. Germination substrata must be compared with the substrata in the current rule.
7. The new temperatures proposed must be compared with the temperatures currently stated in the AOSA rules.
8. Results should be reviewed by the Statistics committee and relevant technical committee.

Presenting Findings

1. After the results have been reviewed by the technical committee and statistics committee compile a report to be presented at the Annual Meeting.
2. Reports should include the following:
 - a. Title
 - b. Referee Region
 - c. Purpose
 - d. Materials & Methods
 - e. Results
 - f. Discussion



- g. Conclusions
 - h. Recommendations
 - i. Bibliography
 - j. Acknowledgements
 - k. Abstract
3. Project coordinators present a 7-10 minute oral report of the project at the Referee Presentations meeting.
 4. Presentations & Reports should be submitted to the Referee Chairs for review approximately 14 days before the annual meeting to allow time for review and revision before being presented.
 5. Digital copies must be submitted to the Referee Chairs for posting on the website.

Changelog

Changes Made	Date
Author: Person in charge of this process	Date: Click or tap to enter a date.
Approved:	
Signature:	Date: