

## 2022 Rule Proposal #10 Amended

**Purpose of Proposal:** To add 20-30°C as a temperature for *Helianthus annuus*, Sunflower. This would eliminate the current discrepancy between the AOSA methods for *Helianthus annuus* and *Helianthus* spp.

**Present Rule:**

**Table 6A. Methods of testing for laboratory germination.**

| Kind of seed  | Substrata               | Temperature (°C) | First count (days) | Final count (days) | Specific requirements and notes | Dormant seed |
|---|-------------------------|------------------|--------------------|--------------------|---------------------------------|--------------|
| <i>Helianthus annuus</i><br>Sunflower                       | T, B, S,                | 20               | 4                  | 7                  |                                 |              |
|   | Alternate method<br>TCS | 25               | 4                  | 7                  |                                 |              |
| <i>Helianthus</i> spp.<br>sunflower: large and small seeded | B, T                    | 20-30            | 3 <sup>b</sup>     | 7 <sup>c</sup>     |                                 |              |

**Proposed Rule:**

**Table 6A. Methods of testing for laboratory germination.**

| Kind of seed  | Substrata               | Temperature (°C)    | First count (days) | Final count (days) | Specific requirements and notes   | Dormant seed |
|---|-------------------------|---------------------|--------------------|--------------------|---|--------------|
| <i>Helianthus annuus</i><br>Sunflower                       | T, B, S,                | <b>20-30,</b><br>20 | 4                  | 7                  | <p>Note: Some samples may exhibit more fungal growth at 20-30; if this happens it is recommended to use 20°C</p> <p>For hybrid sunflower varieties 20°C should be used.</p> |              |
|   | Alternate method<br>TCS | 25                  | 4                  | 7                  |   |              |
| <i>Helianthus</i> spp.<br>sunflower: large and small seeded | B, T                    | 20-30               | 3 <sup>b</sup>     | 7 <sup>c</sup>     |   |              |

**Harmonization and Impact Statement:**

If this proposal is adopted, the germination testing methods for *Helianthus annuus* will more closely harmonize with both ISTA and the Canadian M & P.

Canadian M & P: for *Helianthus annuus* (all varieties included) 20-30, 20, and 25°C are acceptable germination temperatures; final count is 7 days. ISTA also lists 20-30, 25, and 20°C, with a 10 day final count for this species.

**Supporting Evidence:**

The AOSA Rules list 20°C but not 20-30°C for *Helianthus annuus* and 20-30°C but not 20°C for *Helianthus* spp. "Sunflower" falls under both of these, and a clear discrepancy exists.

In the past the AOSA Rules germination methods were presented in 4 different tables: Agricultural; Vegetable and Herb; Flower; and Tree and Shrub seeds. In 1997, these four tables were combined into one (now Table 6A). This discrepancy is likely a relic of the merging of the four tables. Additionally, it was discovered that in 1993 a rule proposal was submitted and passed to change the germination temperature for *Helianthus annuus* from 20-30°C to 20°C due to fungal issues (the primary fungus being *Rhizopus*). Thus the discrepancy in the AOSA Rules.

In 2020 a referee was conducted comparing the 20-30 and 20°C temperatures for *Helianthus annuus*. The referee design was analyzed and approved by the co-chairs of the AOSA/SCST Germination Subcommittee. A request for referee participants along with a survey on testing experience with sunflower was sent out to the AOSA/SCST membership. Of the respondents, the 8 labs with the most experience with this species were chosen for the study. Six lots of varying quality and type of sunflower seed (including confectionary, black oil and ornamental varieties) were procured for the referee.

Samples were sent out to eight labs in August of 2020. All labs completed the referee, in which 400 seeds of 6 lots were tested in 20-30°C and an additional 400 seeds were tested at 20°C.

The following are a summary of the results:

**Average germination results for sunflower from 8 laboratories:**

| Sample          | Tested at 20-30°C | Tested at 20°C |
|-----------------|-------------------|----------------|
| 1               | 93.7              | 92.7           |
| 2               | 84.0              | 75.3           |
| 3               | 85.6              | 86.2           |
| 4               | 95.9              | 95.8           |
| 5               | 97.5              | 97.3           |
| 6               | 77.6              | 83.2           |
| Overall Average | <b>89.05%</b>     | <b>88.42%</b>  |

The raw data was analyzed by Dr. Riad Baalbaki of the California Department of Agriculture and AOSA co-chair of the Germination subcommittee. Also, a PowerPoint presentation was made to the AOSA/SCST Referee Committee. The raw data, the statistical analysis, and the PowerPoint are included as supporting

evidence for this proposal, and support the case of including both temperature regimes for *Helianthus annuus* in the AOSA Rules.

One final piece of supporting evidence was provided during the germination methods survey conducted in the spring of 2021 by the SCST Germination Uniformity Working Group. In this survey, 52 laboratories reported testing sunflower, *Helianthus annuus*. The vast majority of the respondents reported using towels. 28 of the 52 labs used 20-30°C for this species, while 21 labs used 20°C and 5 labs used the alternate temperature of 25°C.

NOTE: After the referee presentation at the 2021 Annual Meeting, it was brought to our attention that the 20-30 °C temperature option had actually been removed from the AOSA Rules in 1993. The problem cited was decay due to fungal contamination which led to a slightly lower germination when 20-30°C was used as compared to 20°C. This problem has been addressed in the current proposal, where 20°C is the recommended temperature when fungal growth is a problem.

**Submitted by:**

Sue Alvarez, RST, Ransom Seed Lab, Carpinteria, CA [sue.alvarez@ransomseedlab.com](mailto:sue.alvarez@ransomseedlab.com)

Linda Barbosa, RST, Sakata Seed, Morgan Hill, CA [lbarbosa@sakata.com](mailto:lbarbosa@sakata.com)

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