

California Seed Association
Cucurbit Seed Testing Program
Standard Operating Procedure (“SOP”) for the 2023 Seed Crop
Effective February 1, 2023

I. PURPOSE AND OBJECTIVE

The purpose of the CSA Cucurbit Seed Testing Program, (“the Program”), is to take pro-active voluntary steps to mitigate Cucumber Green Mottle Mosaic Virus (“CGMMV”) seed-borne disease risk, in order to protect and sustain Northern California’s cucurbit seed production as well as research and development areas.

The objective of the 2023 CSA Cucurbit Seed Testing Program is to reach 100% participation by the seed industry in pre-plant testing of seed lots destined for seed production and for research and development.

II. SCOPE

A. Seed lots of the species listed below shall be tested for the presence of Cucumber green mottle mosaic virus (CGMMV) if they will be used for seed production increases and research & development trials and product development trials (e.g. breeder seed production, trial seed, line development, and research trials).

B. The Program applies to transplants destined for and direct seedings in the California counties of Butte, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, Tehama, Yolo and Yuba.

III. KINDS AND SPECIES

The following crop kinds and species of the Family Cucurbitaceae are included in The Program:

Bitter gourd, Chinese bitter melon (*Momordica charantia*);

Calabash, bottle gourd, opo squash, long melon (*Lagenaria siceraria*);

Cucumber (*Cucumis sativus*);

Gherkin (*Cucumis anguria*);

Melon, cantaloupe, oriental melon (*Cucumis melo*);

Watermelon (*Citrullus lanatus*); and

Winter squash (*Cucurbita moschata*, *Cucurbita maxima* and varieties derived from interspecific hybrids).

Summer Squash, Pumpkin (*Cucurbita pepo*)

IV. RESTRICTIONS

A. Field Planting for 2023. Notwithstanding part D below, prior to field planting, a seed lot shall be sampled and tested per this SOP and found negative for CGMMV.

B. Greenhouse Planting. Prior to greenhouse planting for the commercial production of transplants, a seed lot shall be sampled and tested per this SOP and found negative for CGMMV. Participants shall also ensure and document that all seed lots being planted and/or grown in the same greenhouse structure have been sampled and tested per this SOP and found free of CGMMV.

C. Participants will adhere to their National Seed Health Accreditation Pilot Program agreements and any USDA approved amendments regarding sow-in-test exceptions for breeding lines planted at greenhouses owned and operated by the breeder/producer. All lines must be sampled, tested and found free of CGMMV prior to transplanting into fields in California. Prior to commercial and greenhouse seed planting seeds must be tested and found free of CGMMV.

D. *Cucurbita pepo* seed produced on breeder/producer facility in a county within the Northern California/Sacramento valley seed production area from breeding lines that have previously been tested and found free of CGMMV and sown back at the same breeder/producer facility for the purpose of breeding will be exempt from the testing requirement. All other *Cucurbita pepo* parent seed and seed samples can be tested individually or in a composite as long as the line or lot sample size meets the guidance given and testing is completed no later than 60 days after sowing.

In all cases, cucurbit seed to be used for any off-site increase, production or trialing in CA must be tested prior to sowing.

V. SAMPLING

A. Samplers. For any lots not tested prior to the creation of this agreement, sampling of candidate seed lots shall be carried out by qualified local, state or federal officials or by samplers accredited by the International Seed Testing Association (ISTA) or the Accredited Seed Sampling Program (ASSP; of the USDA Agriculture Marketing Service), certified by the Association of American Seed Control Officials (AASCO) or trained on seed sampling under a program based on the principles of the preceding programs, the Association of Official Seed Certifying Agencies (AOSCA) or the National Seed Health System (NSHS). Seed lots sampled and tested prior to the creation of this agreement are exempt from this requirement as long as they have been tested and found to be free of CGMMV by an approved testing lab. Samplers for R&D seed must be trained to the standards of a thorough quality management system and sampling principals and methodology of one of the programs cited above, and this must be

documented accordingly. This training can be done by certified company samplers as a part of an overall sampling program.

B. Procedures¹. Candidate seed lots shall be sampled following the latest guidelines of the Association of American Seed Control Officials' "AASCO Handbook on Seed Sampling" or the International Seed Testing Association's "International Rules for Seed Testing."

C. Treated Seed². Seed lots that have been treated with a pesticide (e.g., insecticide or fungicide) may be tested prior to treatment or post treatment. Seed lots that have been heat-treated to mitigate a CGMMV detection in the seed lot are not eligible for distribution and planting under this agreement until a validated method is approved.

D. Small Lot Sample Size³. For lots containing less than 20,000 seeds, a 5% sample size is adequate per existing NSHAPP guidance. The quantity of the lot should be based on the full quantity of the seed lot, not on the quantity possessed by the program participant.

VI. TESTING

A. Laboratories⁴. Laboratories authorized through the National Seed Health System (NSHS) or Naktuinbouw Accredited Laboratories system with accreditation for testing the presence of CGMMV.

B. Method^{3,5}. National Seed Health System, CB 3.1 – Cucumber green mottle mosaic virus, Version: Latest. General parameters: 2000 seeds per seed lot; 100 seed subsample size resulting in 20 subs evaluated via an ELISA.

C. Small Lot Sample³. Samples from small seed lots may be combined and analyzed in a composite sample as long as the subsample size does not exceed 100 seeds. Should the composite sample fail, none of the seed lots from which the composite was generated may be used. Additional individual lot testing or composite sampling may occur to resolve which lot(s) are contaminated and which are free of CGMMV.

VII. RECORDS

A. Data. Participants are required to maintain the following information regarding CGMMV tested negative seed lots:

1. Crop species;
2. Crop variety;
3. Unique seed lot identification number;
4. Seed origin;
5. Year produced;
6. Testing laboratory location, test number and date;

7. If testing is done at an external laboratory, a testing laboratory contact name, address, phone, and email

Records may be paper-based or paper-less (in an electronic database).

B. Confidentiality. Records shall remain with and under the control of each participant.

C. Records of test results should be retained for a minimum of three years post final seed lot use, after the date of test completion or two years after the consumption or disposal of the seed lot, whichever is later which is in alignment with NSHAPP retention.

D. Audit. Upon request by the California Seed Association (CSA) and/or the county agriculture office, at an arranged place, date and time, participants will make testing data available for confidential review by CSA staff and/or the county agriculture staff.

VIII. SOP MAINTENANCE, ANNUAL REVIEW AND AMENDMENT

A. SOP Maintenance. CSA's Vegetable / Flower Seed / Grower Shipper Liaison & Plant Health Committee will form a subcommittee called "Cucurbit Seed Production Testing Program." The subcommittee meetings will be led and conducted per CSA's By-Laws. Membership on the subcommittee is open to one representative of each program participant.

B. Annual Review. The subcommittee shall meet at least once a year, preferably prior to CSA's Mid-year Meetings and make a report to the full committee regarding the program and its recommendations for the next year's SOP.

C. Amendments. If necessary, a participant can make a request to CSA to call a meeting of the subcommittee to consider in-year amendments.

IX. REFERENCES

1. Association of American Seed Control Officials (AASCO) sampling guidance can be found at: <http://www.seedcontrol.org/accreditation.html>

The International Seed Testing Association sampling guidance can be ordered from ISTA: <https://www.seedtest.org/en/productrubric.html>

2. [NSHS Progress Report, Treated Seed Study: \(page 4\). Published December 10, 2019 via email to the NSHAPP member representatives. Tracy L. Bruns, Ed Podleckis, Gary Munkvold.](#)

3. National Seed Health System (<https://seedhealth.org/>). METHODS / SEED HEALTH TESTING METHODS /CUCURBIT / Cb 3.1 Cucumber Green Mottle Mosaic Virus. <https://seedhealth.org/cb3-1/>.

4. National Seed Health System (<https://seedhealth.org/>). ACCREDITATION / APHIS – ACCREDITED ENTITIES.
https://www.aphis.usda.gov/plant_health/acns/downloads/SeedHealthProgram/Entities/EntitiesAccredited.pdf.

Naktuinbouw Accredited Laboratories list: <https://www.naktuinbouw.com/nal-authorized-laboratories>

5. [ISTA Validated Seed Health Testing Method 7-026](https://www.seedhealth.org/wp-content/uploads/2019/04/ISTARules2019SHmethods7-026.pdf): Detection of *squash mosaic virus*, *cucumber green mottle mosaic virus* and *melon necrotic spot virus* in cucurbit seed.
<https://www.seedhealth.org/wp-content/uploads/2019/04/ISTARules2019SHmethods7-026.pdf>.