

ICS 65.020.01
CCS B 15



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 22101.1-2026

Replacing GB/T 22101.1-2008

**Technical specification for the evaluation of resistance to
diseases and insect pests in cotton - Part 1: Cotton bollworm**

棉花抗病虫性评价技术规范 第1部分：棉铃虫

Issued on: March 31, 2026

Implemented on: October 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part

1. Structure and Drafting Rules of Standardization Documents". Drafting. This document is Part 1 of GB/T 22101, "Technical Specification for Evaluation of Cotton Disease and Pest Resistance". GB/T 22101 has already published the following... part.

1. The Cotton Bollworm;

3. Pink Bollworm;

5. Verticillium Wilt. This document supersedes GB/T 22101.1-2008 "Technical Specification for Evaluation of Cotton Disease and Pest Resistance Part

1. Cotton Bollworm", and is consistent with GB/T 22101.1- Compared to.2008, aside from structural adjustments and editorial changes, the main technical changes are as follows:

---The scope has been changed (see Chapter 1, Chapter 1 of the.2008 edition);

---The "Terms and Definitions" section has been revised, adding the terms "genetically modified insect-resistant cotton," "susceptible bollworm-infested cotton strains," and "bollworm infestation reduction rate." The terms and definitions have been revised, removing "larval mortality rate," "newly hatched larvae," and "double dish," and changing the term "standard susceptible insect." Definition of "cotton variety" (see Chapter 3, Chapter 2 of the.2008 edition);

---The requirements related to "Bollworm in Test Cotton" have been revised (see 4.1,

Chapter 3 of the.2008 edition);

---The selection settings for "Control Material" have been changed, and seed quality requirements have been added (see 4.2,

3.6 in the.2008 version);

---Added "Data Records" (see 4.3);

---The indoor insect resistance assessment method has been changed, removing the "double-plate collective insect feeding method" and the "separate single-head rearing method" as well as the "adjustment of assessment results". See Chapter 5,.2008 edition, sections 4.3, 4.4, and 4.5;

---The method for identifying field greenhouses has been changed. The revised method is divided into "Sowing and Field Management," "Insect Inoculation Methods," "Survey Records," and "Result Calculation." The results analysis and presentation consist of five parts (see Chapter 6, sections 5.2, 5.3, and

1 Scope

GB/T 22101.1-2026 is the Chinese national standard covering testing a cotton variety against the bollworm - the infestation method, the damage scoring and the classification of resistance, which for Chinese cotton mostly means confirming that the Bt trait is expressing as it should. It replaces GB/T 22101.1-2008 and has been in force since 1 October 2026, with Part 3 on pink bollworm. It was issued on 31 March 2026 and takes effect on 1 October 2026, replacing GB/T 22101.1-2008. The document is under the responsibility of the Ministry of Agriculture and Rural Affairs. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

This document defines the terminology and definitions for cotton bollworm resistance evaluation techniques, and specifies procedures for indoor resistance identification and field resistance testing. The content describes the verification method. This document applies to the indoor and field identification and evaluation of resistance to bollworm in genetically modified and non-genetically modified cotton.

4 Requirements

4.1 Test cotton bollworm Sensitive cotton bollworm strains were selected. Larvae were reared with artificial feed, and adults were fed a 5%-10% honey water solution. Indoor rearing conditions were as follows: Below. Temperature $26^{\circ}\text{C}\pm 2^{\circ}\text{C}$, photoperiod 14h.10h (light.dark), relative humidity $70\%\pm 10\%$. Artificial feed formulation and... The preparation method is shown in Appendix A.

4.2 Tested cotton varieties (lines) Tested cotton varieties (lines), standard insect-susceptible cotton varieties, and insect-resistant cotton varieties (locally cultivated transgenic insect-resistant cotton varieties). Seed quality. The quantity should meet the requirements of GB 4407.1.

4.3 Data Recording

4.3.1 Name and location of the test site Record the name, specific location, latitude and longitude of the test site, and draw a schematic diagram of the area.

4.3.2 Soil Data Record soil type, soil fertility, irrigation and drainage conditions, and soil cover. Describe the planting situation in the experimental site over the past three years.

4.3.3 Ecological types surrounding the experimental site

4.3.3.1 Agricultural Ecosystem Types Record the main cultivated crops and other vegetation around the experimental site, as well as the names and risks of common diseases, pests, and weeds in local cotton fields. Harmful situation.

4.3.3.2 Natural Ecological Types Record the distance to agricultural ecological types of areas and the surrounding vegetation.

4.3.4 Meteorological Data Record precipitation (precipitation type, daily precipitation) and temperature (daily average temperature, maximum and minimum temperature) data at the test site during the experiment. Record adverse weather factors that affected the experimental results throughout the entire experiment, such as severe drought and torrential rain.

5 Indoor Insect Resistance Identification

5.1 Sowing and Field Management Sow according to local conventional sowing time, method, and amount. The plot area should be no less than 30m², with 3 replicates, and arranged in a randomized block design. Cotton seeds should not be coated or treated with any insecticides. During the bollworm outbreak period, pesticides that affect lepidopteran pests should not be sprayed. Other practices should follow local field regulations. Management is carried out in the room.

5.2 Inoculation Method During the peak occurrence periods of the second, third, and fourth generations of bollworm larvae in the field, 20 healthy cotton plants were randomly selected from each plot. Collect one fully unfolded leaf from the top or lateral fruiting branch of each cotton plant. Preserve in an icebox and promptly bring back to the laboratory for resistance testing. Insect identification. Select a suitable insect rearing container, place one cotton leaf inside, keep it moist, and ensure the cotton leaf does not dry out. Inoculate each cotton leaf with one-day-old larvae. Five insects. After inoculating the insects, seal the insect rearing container to prevent the cotton bollworms from escaping, and place it in an insect rearing

room or incubator under the same environmental conditions as in 4.1.

5.3 Survey Records On the 5th day after inoculation, check the mortality of the larvae. Visually inspect and gently touch the larvae with the tip of a paintbrush; record those that react as live larvae, and those that do not react as dead larvae. Then record as death (according to Table B.1 in Appendix B). If the mortality rate of larvae in standard susceptible cotton varieties is $\leq 20\%$, the mortality rate of larvae in the tested cotton varieties (lines) is recorded as death. The insect mortality rate needs to be corrected; if the mortality rate of larvae in standard susceptible cotton varieties is $> 20\%$, the cause needs to be analyzed and the experiment repeated.

5.4 Result Calculation

5.4.1 The larval mortality rate is calculated according to formula (1).

5.4.2 The corrected mortality rate of larvae is calculated according to formula (2).

5.4.3 Statistical methods were used to calculate the mean ($\bar{y}$) and standard deviation (S) of the corrected larval mortality rate for each cotton variety in three plots. Larval Correction The mortality rate is expressed as $(\bar{y} \pm S)\%$. The calculation result is rounded to two decimal places.

5.5 Result Judgment and Expression

5.5.1 Result Determination Comparisons were made between tested cotton varieties (lines), standard susceptible cotton varieties, and insect-resistant cotton varieties during the peak occurrence periods of the second, third, and fourth generations of cotton bollworms. Differences in resistance of cotton varieties to bollworm; based on the peak occurrence periods of the second, third, and fourth generations of bollworms on the leaves of tested cotton varieties (lines) The average corrected mortality rate of cotton bollworm larvae was used to determine the level of insect resistance according to Table C.1 in Appendix C.

5.5.2 Results Presentation The results are presented as follows:

6 Field insect resistance test

6.1 Sowing and Field Management The tested cotton varieties (lines) were covered with 40-mesh (0.425mm) nylon netting. The netting height was 1.8m and the area was no more than 50m². The tested cotton varieties (lines) were planted in single rows within the cages, with 30 plants per row, without duplication. Protective rows were set up around the perimeter of the cages, and the cultivation method within the cages was the same as for the larger varieties. Field. 10-15 days before releasing the adults, apply a broad-spectrum chemical pesticide to control the pests once, preventing interference from other insects in the cage. Other treatments should be carried out as needed. Routine field management is carried out.