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

**GB/T 22101.3-2026**

Replacing GB/T 22101.3-2009

**Technical specification for the evaluation of resistance to  
diseases and insect pests in cotton - Part 3: Pink bollworm**

棉花抗病虫性评价技术规范 第3部分：红铃虫

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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 3 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 22101.3-2009 "Technical Specification for Evaluation of Cotton Resistance to Diseases and Pests Part

3. Pink Bollworm", and is consistent with GB/T 22101.3- Compared to.2009, 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.2009 edition);

---The "Terms and Definitions" section has been revised, removing the term and definition of "Qingling" and adding "Genetically Modified Insect-Resistant Cotton" and "Sensitive Red Bollworm Variety". Terms and definitions for "system", "intrusion hole", "emergence hole", and "standard susceptible cotton variety" (see Chapter 3, Chapter 3 of the.2009 edition);

---The requirements for selecting "Tested Bollworm" and "Tested Cotton Variety (Line)" have been revised, and requirements for "Data Recording" have been added (see...). Chapter 4 (sections

4.4 of the.2009 edition);

---Added a method for "indoor insect resistance assessment" (see Chapter 5);

---The method for "field insect resistance testing" has been changed, including the number of insects caught in the cage, the number of sampling surveys, and the sample size. Additional changes have been made. "Sowing and Field Management" (see Chapter 6, Chapter 4 of the.2009 edition);

---Added "Indoor Resistance Identification Form for Cotton to Pink Bollworm, Field Resistance Test Form, and Evaluation Result Recording Form" (see...) Appendix B);

---Added indoor resistance evaluation criteria for cotton varieties against bollworm (see Table C.1). Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents. This document was proposed and is under the jurisdiction of the Ministry of Agriculture and Rural Affairs of the People's Republic of China. This document was drafted by: Institute of Plant Protection, Chinese Academy of Agricultural Sciences; Institute of Plant Protection and Soil Fertilizer, Hubei Academy of Agricultural Sciences; and the National Agricultural... Technology Extension Service Center, Xinjiang Uygur Autonomous Region Academy of Agricultural Sciences. The main drafters of this document are. Zhang Yongjun, Xu Dong, Zhu Xiaoming, Wang Ling, Pan Hongsheng, Yang Xianming, and Zhuo Fuyan. The release history of this document and the document it replaces is as follows:

## 1 Scope

GB/T 22101.3-2026 is the Chinese national standard covering testing cotton against the pink bollworm - a pest that feeds inside the boll where nothing reaches it, and where resistance in the plant is therefore the only effective control. It replaces GB/T 22101.3-2009 and has been in force since 1 October 2026. It was issued on 31 March 2026 and takes effect on 1 October 2026, replacing GB/T 22101.3-2009. 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 resistance to bollworm 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.

## 3 Pink Bollworms Published on 2026-03-

31 Implemented on October 1, 2026 State Administration for Market Regulation The State

Administration for Standardization issued a statement.

## 4 Requirements

4.1 Test Bollworm Sensitive pink bollworm strains were selected. Larvae were reared with artificial feed, and adults were fed a 5%-10% honey solution. Indoor rearing conditions were as follows: Below. Temperature  $28^{\circ}\text{C}\pm 1^{\circ}\text{C}$ , photoperiod 14h.10h (light.dark), relative humidity  $50\%\pm 10\%$  for larvae and  $70\%\pm 10\%$  for adults. 10%. See Appendix A for the formulation and preparation method of artificial feed.

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 30m<sup>2</sup>, 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 period of bollworm infestation (early July to late September), 20 healthy cotton plants were selected from each plot, and samples were randomly collected. Collect one green bell from each 15-20 day old (2.0cm-2.5cm in diameter) plant that shows no signs of damage, keep it fresh, and bring it indoors. Place the larvae in a rearing container, with 5 newly hatched larvae per bollworm. After inoculation, seal the container to prevent escape and place it in the rearing room. Alternatively, in an incubator, the environmental conditions are the same as in 4.1.

**5.3 Survey Records** Three days after inoculation, check the number of entry holes to determine the actual number of inoculated insects. When emergence holes first appear on the bolls of the standard susceptible cotton variety, begin peeling. Open the green boll, check and record the number of emergence holes on the cotton boll and the number of live insects inside the green boll (according to Table B.1 in Appendix B).

#### **5.4 Result Calculation**

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

**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** Compare the differences in resistance to pink bollworm among tested cotton varieties (lines), standard susceptible cotton varieties, and resistant cotton varieties; based on the occurrence of pink bollworm... The corrected mortality rate of bollworm larvae on the green bollworm in the tested cotton varieties (lines) during the peak period was determined according to Table C.1 in Appendix C to assess the level of insect resistance.

**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 50m<sup>2</sup>. The tested cotton varieties (lines) were planted in single rows with 30 plants per row inside the cages, with no replicates, and the cultivation method was the same as in the field. Adults were released 10-15 days prior to the release. Use broad-spectrum chemical pesticides to control primary pests, prevent interference from other insects inside the cage, and carry out other routine field management according to local conditions.