棉花品种资源黄萎病田间抗性鉴定和评价

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摘要：通过田间抗病性鉴定和分析，掌握种质抗病性，筛选抗黄萎病核心资源，经遗传改良，定向选育与新疆棉花产业需求相吻合的抗病品种，并探讨病害治理策略。以收集的 396 份陆地棉品种资源为鉴定对象，2018—2019 年，通过自然病田小区试验，在 6 月底(蕾期)和 8 月底(铃期)，采用 5 级分级法，对品种资源进行黄萎病抗病性鉴定和评价。供试陆地棉种质具备丰富的抗病遗传多样性，种质间黄萎病变异系数高，可选择抗病种质利用。年度间各材料发病程度差异大，2018 年发病明显重于 2019 年，但材料间发病趋势基本相同；蕾期发病较轻，铃期发生重。2 年自然病田鉴定平均：73.3%的材料蕾期未发病；铃期相对病情指数(病指)超过 20 的材料占比 46.0%，相对病指在 0.1～20.0 的占比 50.4%，未发病的占 3.6%。铃期发病最重材料的发病率达 100%，病指高达 75.0；2018 年铃期参与鉴定材料的平均发病率和病指分别达 38.8%、19.2，比 2019 年分别高 19.0 百分点和 8.7。发病率与病指间存在极显著正相关关系，相关系数＞0.93；发病率和病指：蕾期比铃期变异系数大，蕾期与铃期存在极显著正相关关系，平均相关系数分别为 0.28、0.32。鉴定出 36 份抗黄萎病优异资源(自然病田铃期黄萎病病指≤10、纤维上半部平均长度≥29 mm、断裂比强度≥29.0 cN·tex^{-1}、马克隆值 3.5～4.9、皮棉产量≥2 250 kg·hm^{-2})，这些资源地域来源较广，抗黄萎病能力较强，与产量、品质匹配较好，可在抗病育种遗传改良中利用。

关键词：棉花；资源；黄萎病；田间鉴定

Identification and evaluation of resistance of cotton variety resources to Verticillium wilt in field

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Abstract: The disease resistance of germplasm was clarified and the core resources for resistance to Verticillium wilt were screened by identifying and analyzing the disease resistance in the field. By means of genetic improvement, the disease-resistant varieties that meet the needs of Xinjiang cotton industry were directionally selected and bred. At the same time, the disease management strategies were also discussed in this study. The 396 upland cotton varieties resources were collected as the identification objects to conduct

the natural disease field plot experiment from 2018 to 2019. The five level classification method was adopted to evaluate the resistance to Verticillium wilt at the end of June (bud stage) and the end of August (boll stage). The tested upland cotton germplasms were rich in genetic diversity of disease resistance, and the coefficient of variation of resistance to Verticillium wilt among germplasms was high, which could be used to cultivate disease-resistant germplasm. The incidence of each material varied greatly from year to year. The incidence in 2018 was more serious than that in 2019, but the general incidence trend between materials was the same. The incidence at the bud stage was lower than that at the boll stage. The average of natural disease field indentification in 2 years: 73.3% of the materials had no disease at the bud stage; at the boll stage, materials with the relative disease index of more than 20 accounted for 46.0%, the relative disease index between 0.1-20.0 accounted for 50.4%, and materials without disease accounted for 3.6%. The incidence of materials with serious incidence at the boll stage reached to 100%, and the disease index was as high as 75.0; the average incidence and disease index at the boll stage in 2018 reached 38.8% and 19.2, respectively, which were 19.0 percentage points and 8.7 higher than that in 2019. There was a very significant positive correlation between the incidence and disease index, with a correlation coefficient>0.93. In the incidence and disease index, the coefficient of variation at the bud stage was higher than that at the boll stage, and there was a very significantly positive correlation between the bud stage and the boll stage, and the average correlation coefficient was 0.28 and 0.32, respectively. A total of 36 excellent resources were identified to be resistant to Verticillium wilt   (disease index resistance to Verticillium wilt in field at the boll stage≤10, fiber length≥29 mm, breaking strength≥29.0 cN·tex^{-1}, micronaire value 3.5-4.9, lint yield≥2 250 kg·hm^{-2}) in this study. These resources had wide geographical sources, strong resistance to Verticillium wilt, good match with yield and quality, which could be used in genetic improvement of disease resistance breeding.

Keywords: cotton; resources; Verticillium wilt; field identification