

## **USE OF MULTI-TRAIT LATERAL FLOW TEST STRIPS FOR THE DETECTION OF TRANSGENIC COTTON**

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### **Abstract**

Since its introduction in 1996, the production of transgenic cotton has been rapidly and broadly adopted. Transgenic traits currently in use or in trials in cotton include Roundup Ready<sup>®</sup>, BXN<sup>®</sup>, and Liberty Link<sup>®</sup> for herbicide tolerance and Bollgard<sup>®</sup>, Bollgard II<sup>®</sup>, Cry1F, and VIP3a<sup>®</sup> for insect resistance. Routine cottonseed testing quality control now typically includes tests for these traits, often in the form of lateral flow test strips because of their simplicity and speed. The benefits and widespread acceptance of these traits by growers has led to combining (“stacking”) these traits, for instance to add insect resistance to herbicide tolerance or to broaden the spectrum of insect resistance. This in turn has resulted in increased numbers of tests required to fulfill the requirements for cottonseed quality control. Lateral flow test strips with multiple test lines, each representing a distinct trait offer an economical solution. A single test may be run rather than conducting multiple tests. Multi-Trait tests are available from several manufacturers for Bollgard/Roundup Ready<sup>®</sup> (Cry1Ac and CP4 EPSPS), Bollgard II<sup>®</sup> (Cry1Ac, Cry2Ab, and CP4 EPSPS), and will be available soon for WideStrike<sup>®</sup> (Cry1Ac and Cry1F) cottonseed. Test time is typically 5 minutes, once samples have been prepared. As with single trait testing, sample preparation typically consists of crushing seeds in a 48 (6 rows, 8 columns) well plate, one seed per well, followed by addition of buffer. Strategies to facilitate testing large numbers of seeds include arranging strips in a comb format, with 8 strips to a comb. Validation protocols used by test strip manufacturers to determine and assure accuracy will be reviewed. With increasing numbers and combinations of stacked traits posing new challenges in test development, evolving strategies and methods for improving tests and testing regimens will be discussed.