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Title: Rapid lateral flow tests for Tulip Virus X in plant material by detection of a viral surface antigen or a specific RNA sequence

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Poster presentation

Abstract:

Tulip Virus X (TVX) is a pathogen for tulip. It is a filamentous, positive-stranded RNA virus, belonging to the family of flexiviridae and the genus of potex viruses. Its natural hosts are Tulipa species. Symptoms of infection comprise chlorotic or necrotic grey–brown streaking of leaves and streaks of intensified pigment (or of necrosis) in petals. Several mechanical transmission pathways for TVX have been identified during bulb production. During bulb storage, the dry bulb mite (*Aceria tulipae*) is the main vector for TVX.
Preventive actions focused on early recognition and removal of virus diseased plant are the best remedies to combat this virus. To support farmers and inspection services in early recognition of virus diseased plants, we developed two methods that can be applied in or near the field, both based on the well-known lateral flow immunoassay principle. In the first serological test a specific polyclonal antiserum directed against a virus coat protein was used both as capture ligand on the nitrocellulose membrane and as detection ligand immunobilised on the surface of carbon nanoparticles. In the second molecular test a double-labelled amplicon was sandwiched between an anti-digoxigenin antibody on the membrane and neutravidin on carbon nanoparticles. The double-labelled amplicon was obtained in a process in which viral RNA was converted into complementary DNA that was used as a template in a subsequent PCR procedure with a forward primer labelled with a digoxigenin and a reverse primer with a biotin molecule, both at the 5'-end.
Prototypes of the serological and molecular tests were developed and optimised for performance with extracts of tulip leave material. Both tests showed good results in initial experiments.
Further activities will concentrate on the validation of the tests and on the comparison of the performance characteristics with standard PCR- and ELISA diagnostics. The availability of rapid tests for TVX may initiate the development of rapid tests for other viruses in flower bulbs.