

## 2011 SRSFC Report

### Title: Identification of Viruses in Blackberry Yellow Vein Disease Complex

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### Obejctives:

1. Conduct field surveys with extension agents to collect plant material with virus symptoms.
2. Test plant material at NC State University by RT-PCR and ds RNA using primers and protocols developed at the University of Arkansas and USDA-ARS, Corvallis, OR, to determine virus combinations in Blackberry Yellow Vein Disease (BYVD) complex in blackberry plantings.
3. Communicate results to researchers, extension agents, growers and others through publications, workshops, presentations at meetings and field days.

### Justification and Description:

Virus and virus-like diseases have an enormous impact on blackberry production throughout the world and the U.S. Virus complexes have emerged in blackberry in the Southeastern U.S., in recent years and have contributed to lower yields, poor berry quality and reduced lifespan of commercial blackberry plantings. Virus complexes are responsible for development and implementation of special management methods used by nurseries to provide growers with planting stocks from virus-tested sources. Virus survey was conducted in the Fall of 2011 in commercial plantings in Western North Carolina to determine what viruses are present in Blackberry Yellow Vein Disease (BYVD) Complex.

### Methodologies:

Leaves with virus-like symptoms were collected in two to five year old blackberry plantings that were originally established with virus-tested tissue culture plants. The reverse-transcription polymerase chain reaction (RT-PCR) was used for virus detection and identification. Protocols for nucleic acid extraction and specific primers were developed by I. Tzanetakis at the University of Arkansas, Fayetteville, AR, and R. Martin at USDA-ARS, Corvallis, OR. Samples were tested for the following viruses: *Blackberry yellow vein associated virus* (BYVaV), *Blackberry chlorotic ringspot virus* (BCRV), *Beet pseudo-yellows virus* (BPYV), *Tobacco ringspot virus* (TRSV), *Raspberry bushy dwarf virus* (RBDV), *Blackberry virus Y* (BVY), *Blackberry virus Z* (BVZ), *Blackberry virus X* (BVX) and *Impatiens necrotic spot virus* (INSV).

**Results:**

The most prevalent virus in BYVD complex was BYVaV, followed by TRSV, BVY, BVX, and BCRV. In most instances BYVaV was found in mixed infections with TRSV, and to a lower extent in combinations with the other three viruses. The incidence of viruses in mixed infections was higher in older plantings when compared to two year old plantings.

**Conclusions:**

The results of the survey indicate that viruses in BYVD complex are spreading rapidly in the environment and infecting virus-tested plants as early as the first or the second year after establishment in the field. Further research should focus on epidemiology, biology and ecology of viruses in BYVD complex in order to develop efficient control strategies to prolong the lifespan of plantings and prevent economic loss to berry producers.

**Impact Statement:**

This project has identified viruses in BYVD complex in the major blackberry growing area in North Carolina. It has also shown that viruses can spread rapidly and that disease management should include other strategies (control of alternate hosts and virus vectors) in addition to use of virus-tested plant material.