

## Survey for the presence of 10 new viruses in blackberry

### Progress Report

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In the few last years more than a dozen new virus species have been discovered in *Rubus* species (blackberry and raspberry). Most of the new viruses found in blackberry are associated with blackberry yellow vein disease (BYVD) whereas the new viruses in raspberry are associated with several diseases including crumbly fruit and decline. The reasoning behind the work described below was to estimate the presence of 10 of the newly discovered viruses in blackberry in the Midsouth and Southeastern United States. Research was performed on blackberry material collected in 2008 and 2009 from Arkansas, Georgia, North and South Carolina and the viruses we tested for were *Beet pseudo-yellows virus* (BPYV), *Black raspberry necrosis virus* (BRNV), *Blackberry chlorotic ringspot virus* (BCRV), Blackberry virus E (BVE), Blackberry virus S (BVS), *Blackberry virus Y* (BVY), *Blackberry yellow vein associated virus* (BYVaV), *Raspberry leaf mottle virus* (RLMV), *Rubus chlorotic mottle virus* (RCMV) and *Strawberry necrotic shock virus* (SNSV). All viruses other than RCMV have been found in blackberry in the United States. RCMV, a presumably beetle transmitted virus, was reported for the first time in raspberry in 2008 and was added in our study to investigate the possibility that it also infects blackberry.

More than one hundred plants showing typical BYVD symptoms were tested for each of the viruses by molecular techniques (RT-PCR). The virus most commonly found in all states in both cultivated and wild blackberries was BYVaV with about 60% infection rate. BCRV, a pollen transmitted virus was found in 18% of the samples, followed by BYV with 10% and BPYV with 7% infection rates. We did not detect RLMV, RCMV or SNSV in any of the samples whereas all other viruses were found in less than 5% of the samples tested.

Our results indicate that BYVaV remains the prominent virus in BYVD plants. An interesting finding was that BCRV, a widespread virus in wild roses in Arkansas, is also a common virus in blackberry. We have also tested plants for several other *Rubus* viruses including Tobacco and Tomato ringspot viruses, *Impatiens necrotic spot virus*, *Raspberry bushy dwarf virus* and *Cherry leaf roll virus* and we determined that several samples were infected with only one of the tested viruses, elevating the possibility that there are more viruses infecting blackberry in the South given that BYVD is caused by a complex of viruses and single infections do not typically cause symptoms.



Left: Navaho from North Carolina infected with *Blackberry yellow vein associated virus*, *Blackberry chlorotic ringspot virus* and *Blackberry virus X*. Right: 'Kiowa' from South Carolina infected with *Blackberry chlorotic ringspot virus* and *Tobacco ringspot virus*.