

POSTER ABSTRACTS

An Integrated Badnavirus Infects Blackberry

Shahid, M. S. (1), Aboughanem-Sabanadzovic, N. (2), Sabanadzovic, S. (3) and Tzanetakis I. E. (1)

1. Department of Plant Pathology, Division of Agriculture, University of Arkansas System, Fayetteville, AR 72701, USA (itzaneta@uark.edu)

2. Institute for Genomics, Biocomputing and Biotechnology, Mississippi State University, Mississippi State, MS, USA

3. Department of Biochemistry, Molecular Biology, Entomology and Plant Pathology, Mississippi State University, Mississippi State, MS, USA

A new badnavirus, tentatively named as blackberry virus F (BVF), was discovered in plants displaying blackberry yellow vein disease (BYVD) symptoms. BVF was characterized at the molecular level and several epidemiological attributes including genome integration, distribution, host range, population structure and association with disease symptoms were assessed. This discovery changes the standards in the production of virus-free propagation material as there are not methods developed to eliminate the integrated genomes of badnavirus. A sensitive detection protocol was developed that could assist in the elimination of BVF-infected material from the propagation pipeline.

Black Raspberry Genomic & Genetic Resource Development

J.M. Bushakra, M. Dossett, K.A. Carter, B.S. Gilmore, T.C. Mockler, D.W. Bryant, R. VanBuren, S. Filichkin, K.J. Vining, J. Weiland, M. Peterson, J.C. Lee, C.M. Bradish, G. Fernandez, P. Perkins-Veazie, J.C. Scheerens, L. Robbins, R. Agunga, E.B. Buck, C.A. Weber, K.E. Hummer, K.S. Lewers, F. Fernández-Fernández, J. Graham, S.J. Yun, J. Lee, Chad E. Finn, and N.V. Bassil

Over the last 75 years, the black raspberry industry in the United States has steadily declined due to lack of adapted and disease resistant cultivars. The high anthocyanin content of black raspberry and associated health benefits have revived interest in production and breeding new cultivars. The United States Department of Agriculture (USDA) Agricultural Research Service, National Clonal Germplasm Repository manages black raspberry germplasm and maintains a collection of over 175 accessions. Wild black raspberries collected in their native range from more than 130 locations across 27 US states and two Canadian provinces were recently added to this collection. Evaluation of this wild germplasm led to the identification of four sources of aphid resistance, three of which were introgressed into the elite breeding pool in three mapping populations. Funding was obtained from the USDA's Specialty Crops Research Initiative (SCRI) to develop the genomic infrastructure for breeding improved black raspberries. A major focus of this project is to develop, and make available, breeding and genomic tools to inform decisions regarding germplasm value and usage, crossing, and selection through marker-assisted breeding. This poster describes the genomic and genetic resources we have developed and future work to accomplish this project's objectives.

The Effect of High Tunnel on Raspberry Yield and Berry Quality

Pauliina Palonen, Anni Pinomaa, Tero Tommila

Department of Agricultural Sciences, PO Box 27, FI-00014 University of Helsinki, Finland

e-mail: Pauliina.palonen@helsinki.fi

Growing raspberries in high tunnels is gaining popularity. However, little is known about how tunnel growing environment affects berry quality including berry bioactive properties. The aim of our study was to examine the effect of high tunnel on the yield and berry quality in three floricane raspberry cultivars under Northern high-latitude conditions. The experiment included two Scottish cultivars 'Glen Ample' and 'Glen Dee', and the Finnish 'Maurin Makea' planted in an identical RCBD in a polyethylene high tunnel and an adjacent open field at 60°13' Northern latitude. Harvest season was 47 days in the open field and 62 days in the high tunnel. Total yield per cane was, on average, 99% higher in the tunnel compared to the open field. Berry size was not affected by growing environment, but was affected by cultivar: 'Glen Dee' had larger berries (6.3 g) than 'Glen Ample' (5.1 g) or 'Maurin Makea' (4.1 g). High tunnel decreased the contents of sugars (°Brix) and titratable acids. Sugar content was lowest in 'Glen Dee'. Berry bioactive properties were not affected by the growing environment, but were affected by cultivar. 'Glen Dee' berries were lowest in total phenolics. In the open field, antioxidant activity was higher for 'Glen Ample' berries than 'Glen Dee'. In conclusion, high tunnels may provide major benefits in raspberry production, as berry yield per cane was doubled in the tunnel, while berry bioactive properties, including phenolic compounds and antioxidant activity, were not affected by the tunnel. However, tunnel-grown berries contained less sugars and acids than the ones in the open field. 'Glen Ample' and 'Maurin Makea' berries were higher in phenolics and sweeter than 'Glen Dee' berries.

Observations of White Drupelets on Three Blackberry Cultivars in South Mississippi

Eric T. Stafne¹, Melinda Miller-Butler², and Barbara Smith³

¹Associate Extension and Research Professor, Mississippi State University, Poplarville, MS

²Biological Science Lab Technician, USDA-ARS Thad Cochran Southern Horticultural Laboratory, Poplarville, MS

³Research Plant Pathologist, USDA-ARS Thad Cochran Southern Horticultural Laboratory, Poplarville, MS

White drupelet disorder has long been known as a problem in blackberry production. Several possible causes have been discussed, such as low humidity, wind, rainfall, high light intensities, UV light, stinkbugs, red berry mites, and some interaction of some or all of these. In 2016, we observed three cultivars: Chickasaw, Kiowa, and Sweetie Pie. The early harvests had the most berries with white drupelets. We found that the sugar content of extracted white drupelets was substantially lower than normal drupelets. Sugar concentrations for whole berries with white drupelets were lower than normal whole berries by about 1 °Brix, not a significant difference overall. 'Sweetie Pie' had a mean percentage of berries that had at least one white drupelet of 21.9%, whereas 'Chickasaw' and 'Kiowa' were both less than 10%.

Towards a National Certification Scheme for Rubus in the United States

Gergerich R.C. (1), Martin R.R. (2) and Tzanetakis I.E. (1)

1. Department of Plant Pathology, Division of Agriculture, University of Arkansas System, Fayetteville, AR, USA 2. USDA ARS HCRL, Corvallis, Oregon

The National Clean Plant Network (NCPN) was established in the 2008 Farm Bill and supports seven specialty crops: grapes, fruit trees, berries, citrus, hops, rose and sweet potatoes. The three main objectives of NCPN are to: (1) develop and maintain G1 (Foundation) blocks to serve as sources of clean plant material for certification programs; (2) carry out pathogen elimination in asexually propagated crops; and (3) develop state-of-the-art diagnostics for systemic pathogens. A governing board consisting of researchers, industry representatives, and state regulatory personnel was established for each of the NCPN crops to develop lists of pathogens (viruses, phytoplasmas, viroids, and systemic bacteria) that need to be diagnosed for each crop, review proposals for funding, and coordinate activities between the centers

Yield improvement methods for primocane-fruiting blackberry in North Dakota

Abigail Debner and Harlene Hatterman-Valenti, North Dakota State University

The recent introduction of primocane-fruiting blackberry cultivars may enable blackberry (*Rubus* subgenus *Rubus*) production in northern climates such as North Dakota, however, methods to increase yield need to be evaluated. Four primocane-fruiting cultivars, Prime-Jim[®], Prime-Jan[®], Prime-Ark 45[®], and Prime-Ark Freedom[®] were evaluated in bare soil, silver plastic reflective mulch, and a high tunnel in 2015. Primocanes were subjected to no tipping, single soft-tipping and double soft-tipping treatments to determine the impact on growth and yield. A cultivar difference for berry number was only found in the silver mulch. Tipping increased the number of branches and inflorescences per plant but did not increase yield in the high tunnel or bare soil. Double-tipping decreased the number of berries compared to single-tipping and no tipping in the silver mulch. Further research is needed to evaluate additional growing seasons as the plants continue to mature.