Progress Report 12/7/2019

Development of a Grape Disease Identification Guide and contributions to the MyIPM App.

Principal Investigator:

Mark Hoffmann,
Department of Horticultural Science
North Carolina State University
2721 Founders Drive, 258 Kilgore Hall
Raleigh, NC 27695
Phone: 919-352-8006
Email: mark.hoffmann@ncsu.edu

Co-Investigators:

Cain Hickey,
University of Georgia
Department of Horticulture
200 Hoke Smith Building
Athens, GA 30602
Phone: 706-542-1774
Email: vitis@uga.edu

David Lockwood,
University of Tennessee
Institute of Agriculture
252 Ellington Plant Sciences
Knoxville, TN 37996
Phone: 865-974-7421
Email: lockwood@tennessee.edu

Guido Schnabel
Clemson University
Plant and Environmental Sciences Department
105 Collings St./220 BRC
Clemson, SC 29634-0303
Phone: 864-656-6705
Email: schnabe@clemson.edu

Phillip Brannen
University of Georgia
Department of Plant Pathology
3307 Miller Plant Sciences Building
Athens, GA 30602-7274
Phone: 706-542-1250
Email: pbrannen@uga.edu

Mizuho Nita
Virginia Tech
AHS AREC, PPWS
595 Laurel Grove Rd
Winchester, VA 22602
Phone: 540-232-6047
Email: nita24@vt.edu

Sara Villani
North Carolina State University
Department of Entomology and Plant Pathology
MHCR&EC
455 Research Drive
Mills River, NC 28759
Phone: 828-687-0570
Email: sara_villani@ncsu.edu

Objectives:

(1) Develop an identification and management guide for common diseases in bunch grapes in the Southeast.
(2) Provide identification and management content to the MyIPM app

Justification and Description:

The grape and wine industry in the Southeast is rapidly growing. In 2015, grape and wine businesses in North Carolina alone had an impact of nearly $2 billion on the States' overall economy (Rimerman et al. 2017). That is an increase of ca. 30% compared to 2009 (Rimerman et al. 2011). Companies such as Duplin Winery, Biltmore Estates or Shelton Vineyards have a rich history in North Carolina and affect the economy of the whole Southeast. 13 American Viticulture Areas (AVAs) are established in Virginia (7), North Carolina (5, one shared with GA) and Georgia (2, one shared with NC). There are estimated to be ca. 800 vineyards and close to 200 wineries in North Carolina alone. Grape and wine businesses are often the local thriving force in the economic and educational development of rural areas in the Southeast (e.g. the establishment of the NC viticulture center at Surry Community College, Dobson NC). The Southeastern grape and wine industry contributes to an enhanced agro-tourism and to cultural diversity in both rural and urban environments.

However, growing grapes in the Southeast remains challenging. That is especially true for those who are not familiar with farming grapes or with farming in the Southeast in general. Weather-, pest- and disease-related issues affect the growth, survival, and sustainability of all grape cultivars, but especially of those cultivars with non-native genetics, such as *V. vinifera* and French-American and interspecific hybrids. For example in 2018, a late spring frost was responsible for some bud-loss on early breaking varieties in North Carolina, a greater-than-average rainfall had a negative impact on fruit-set in some regions, and Hurricane Florence set an early end to a long and humid summer. Due to the above average rain and the humidity, many vineyards showed severe incidences of Downey mildew (*Plasmopara viticola*) throughout the whole season, which often led to early defoliation and immature grapes of lower wine quality potential.

The timely and appropriate application of pesticides, frequent and educated scouting, and judicious vineyard sanitation are necessary for a successful, long-term establishment of a vineyard in the Southeast. Compared to most other major grape growing areas in the U.S., the biotic and abiotic pests in the Southeast clearly make farming *vinifera*/hybrid grapes a challenge. In the 2018 season, managers of major vineyards in North Carolina have applied chemical spray applications between 16 times/year (pers. comm. Randy Raymey, Shadow Springs Vineyards) and more than 25 times/year (pers. comm. Jason Krug, Raffaldini Vineyards). While there are regional and varietal differences in disease pressure and incidences, **the management of grape diseases and pests remains one of the most important tasks of a *vinifera*/hybrid vineyard manager in the Southeast**.

With a rapidly growing industry, especially in North Carolina and Georgia, outreach products are needed to educate industry members on disease and pest management in vineyards. Those products should be developed and delivered in a variety of different outlets, such as print, poster, pdf, homepage, blogs and mobile phone apps.

While spray and management guides exist and are available for no cost as pdf at the Homepage of the Southern Small Fruits Consortium (www.smallfruits.org), many questions remain regarding the delivery of identification and management information. Under the lead of Dr. Cain Hickey, a

phenology-based vineyard management poster is being developed (SSFC project 2018 E-01). This poster will aid vineyard managers and extension agents in disease control and management decisions.

Progress:

In a meeting in October 2019, PIs Schnabel, Hoffmann and Dr. Mengjun Hu (University of Maryland) have identified diseases for the myIPM app as well as for the disease identification guide. While the initial idea was to develop a paper-based book-like disease identification guide, we have decided to develop disease identification cards on hard plastic instead. Those cards can be used under all weather conditions. Each card will show pictures of a specific disease symptom on the front side, while the back-side will describe biology and management of the involved pathogens.

Hoffmann has agreed to contribute with following diseases to the myIPM app: *Trunk Diseases; Grapevine Red Blotch Disease; Grapevine Leafroll Disease; Pierces' Disease and Crown Gall*. Contributions will be made before January 2020. Dr. Hu contributed with bunch rots and foliar diseases. It was further agreed to use the myIPM data to develop disease identification cards for following diseases: *Trunk Disease, Virus Diseases, Pierces' Disease, Crown Gall, Downey Mildew, Powdery Mildew, Anthracnose, Phomopsis, Black Rot, Sour Rot, Bitter Rot, Grey-Mold.*

We aim to print and distribute disease identification cards in April 2020.

Literature:

Rimerman, F. and Co.LLP. 2011: The economic impact of wine and wine grapes on the state of North Carolina – 2009. 18pp.

Rimerman, F. and Co.LLP. 2017: The economic impact of wine and wine grapes on the state of North Carolina – 2015. 18pp.