Srdjan Acimovic, Virginia Tech, AHS Jr. AREC

2023 TREE FRUIT DISEASE STATUS REPORT – VIRGINIA

Summary. Green tip 50% was recorded on Fuji on 17 March in Winchester, other apple cultivars on 8 March in Timberville, on 1 March in Tyro, and 1 March in Rustburg (about 10 days later than in 2022). The 2023 growing season was overall dry and with low-amount of rain in Northern VA, however, there was more higher precipitation rain events central VA (Figs 1A, B). We had a warm early spring that switched to lower-than-average temperatures in May and June. Dry weather did not favor apple scab and Juniper rust infections all the way until 28 April when first major cedar apple rust infection occurred (no cedar galls were visible before 28 Aprils). Only four major apple scab infections occurred from 15 April to 8 May. Five fire blight infections were recorded in Winchester (6, 7, 15, 16 and 22 April). Apple bloom started on early cultivars on 5 April with full bloom on 14 April (Winchester, VA). Nine infection periods were recorded in Timberville between 5 April to 29 May. Three infections were recorded in Tyro from 27 March to 16 April. In Rustburg, eight infections were recorded between 4 to 24 April.

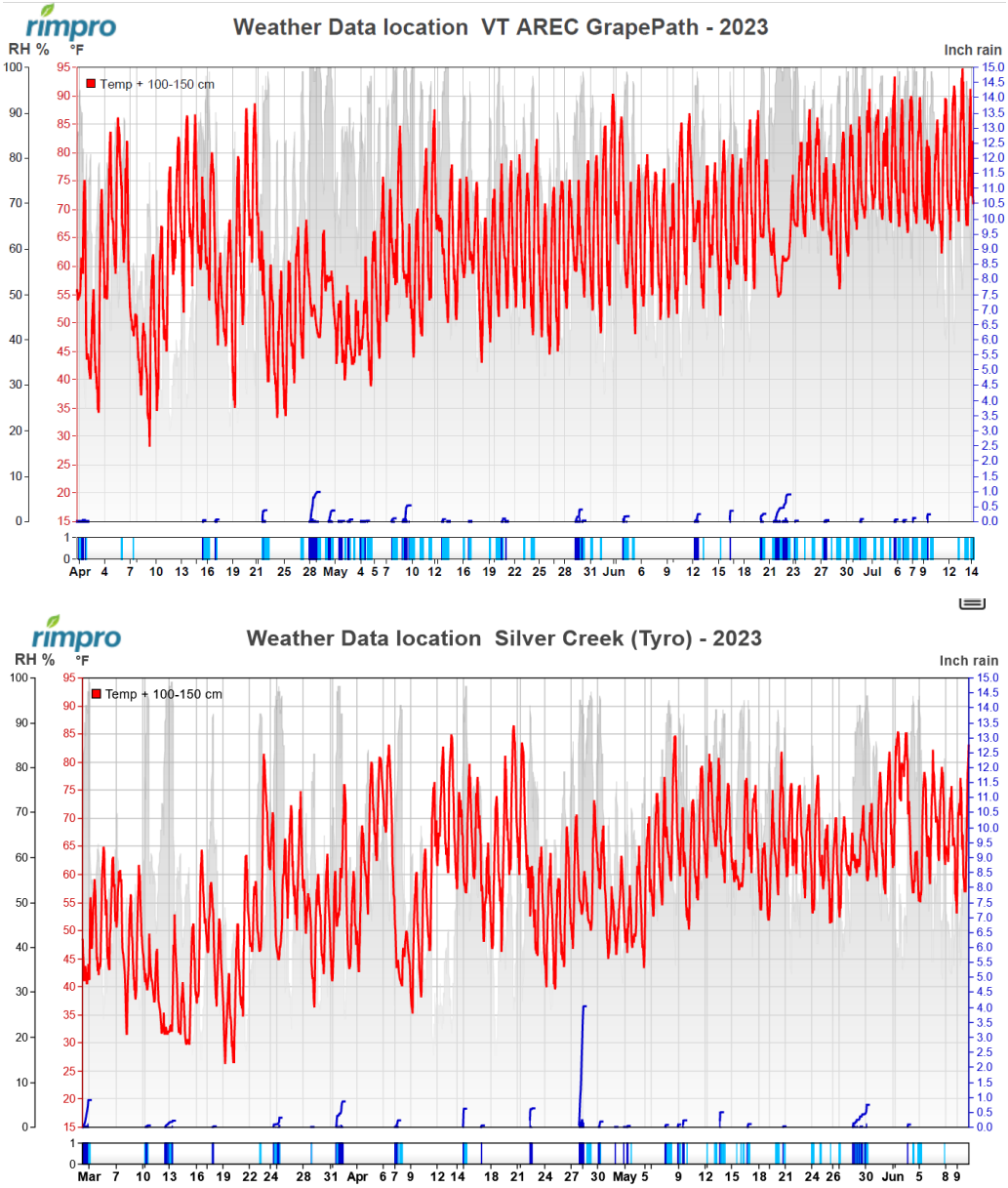

Figure 1. Weather conditions in Winchester and Tyro VA, recorded by weather stations. Top graph: red line shows temperatures (left y-axis in red), blue curved lines show rain lengths and amounts in inches (right y-axis in blue), grey background represent relative air humidity (RH) in % (far left y-axis in black). Bottom graph with dates shows the length of rain (dark blue) and of wetting periods after the rain stopped or from dew (light blue). Used by permission of RIMpro B.V., Netherlands: rimpro.eu

1. Apple scab. Based on historical (actual) weather data (Fig. 2), scab had four major infections based on the RIMpro apple scab prediction model (starting from Bloom). Before the first major infection on the 15 April at bloom stage (Winchester), two periods of ascospore release were recorded on 24 March and 1 April. We detected the first apple leaf scab lesions in Winchester on 16 May on 'Gala' trees. The prevailing cold but dry weather this spring, has not favored infections and slowed down disease symptom occurrence. This result was observed even with the large amount of last year's scab leaves I introduced in both 'Gala' and 'Fuji' block. In Winchester, primary scab season was over on 10 May (all ascospores were discharged from pseudothecia according to RIMpro's maturation model).

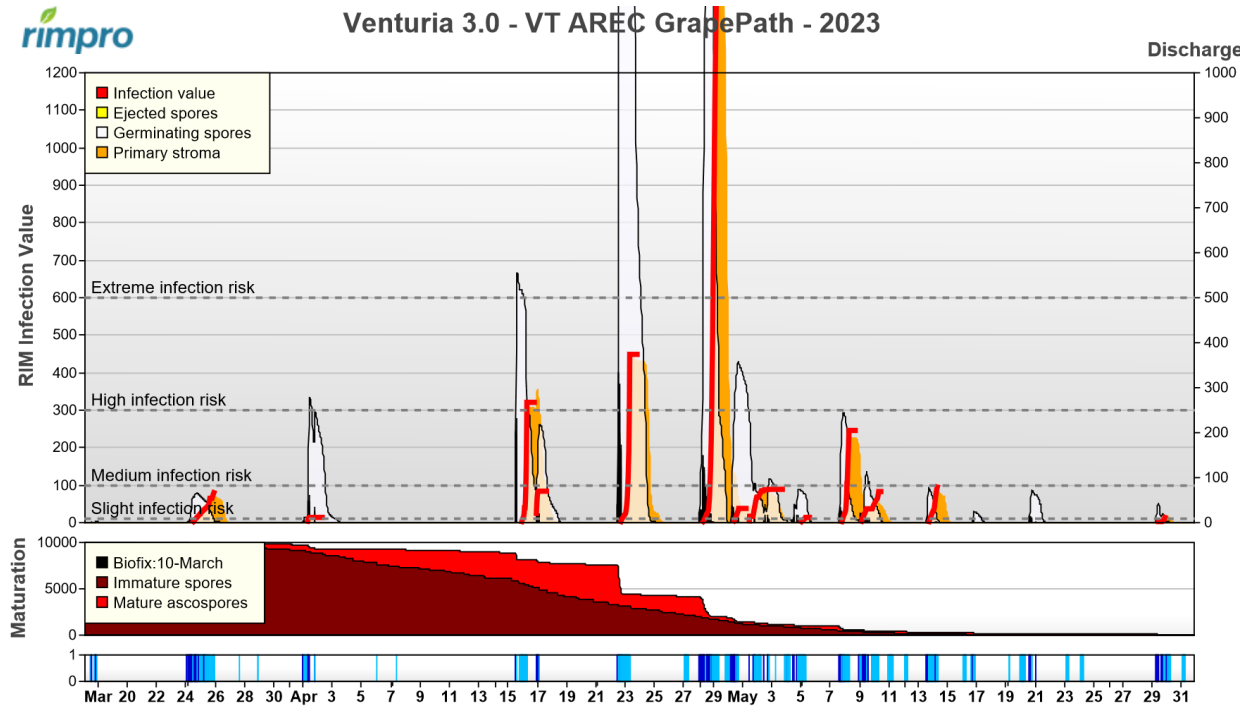

Figure 2. Apple scab infection periods in 2023 for Winchester VA in RIMpro model. White camel hump-like areas labelled "Germinating spores" show cumulative number of *Venturia inaequalis* ascospores that germinate over time and are read on the right-side vertical Y-axis scale that is labelled "Discharge". The red curved lines are the RIM infection values which, when divided by 100, are roughly the percentage of the total season's ascospores that are likely to cause infection in any given infection period. Read each curve's peak RIM infection value/s using the vertical Y-axis scale on the left side of the graph labelled "RIM Infection Value". Orange areas called "Primary stroma" just after each red curved RIM line represent scab lesions that were initiated by infection and are incubating in the leaf. Orange depicts the time during which kick-back fungicides can be applied. The light red areas in the middle "Maturation" graph is the proportion of mature ascospores that are ready for discharge with wetting events, whereas the dark red area is the proportion of immature ascospores remaining in leaf litter. Image used by permission of RIMpro B.V., Netherlands. https://www.rimpro.eu/

2. Fire blight conditions in Virginia were favorable at early to mid-bloom with the first infections predicted from 6 to 22 April, (Fig. 3). In the experimental apple orchard in Winchester, which we inoculated with *E. amylovora* on 14 April 2023, first fire blight symptoms were visible on 1 May: 1. FIRST FIRE BLIGHT SYMPTOMS ON FLOWERS VISIBLE IN WINCHESTER; 2. CEDAR APPLE RUST GALLS FULLY DEVELOPED AND BASIDIOSPORES INFECTING UNPROTECTED APPLE TREES, blog from May 1, 2023.

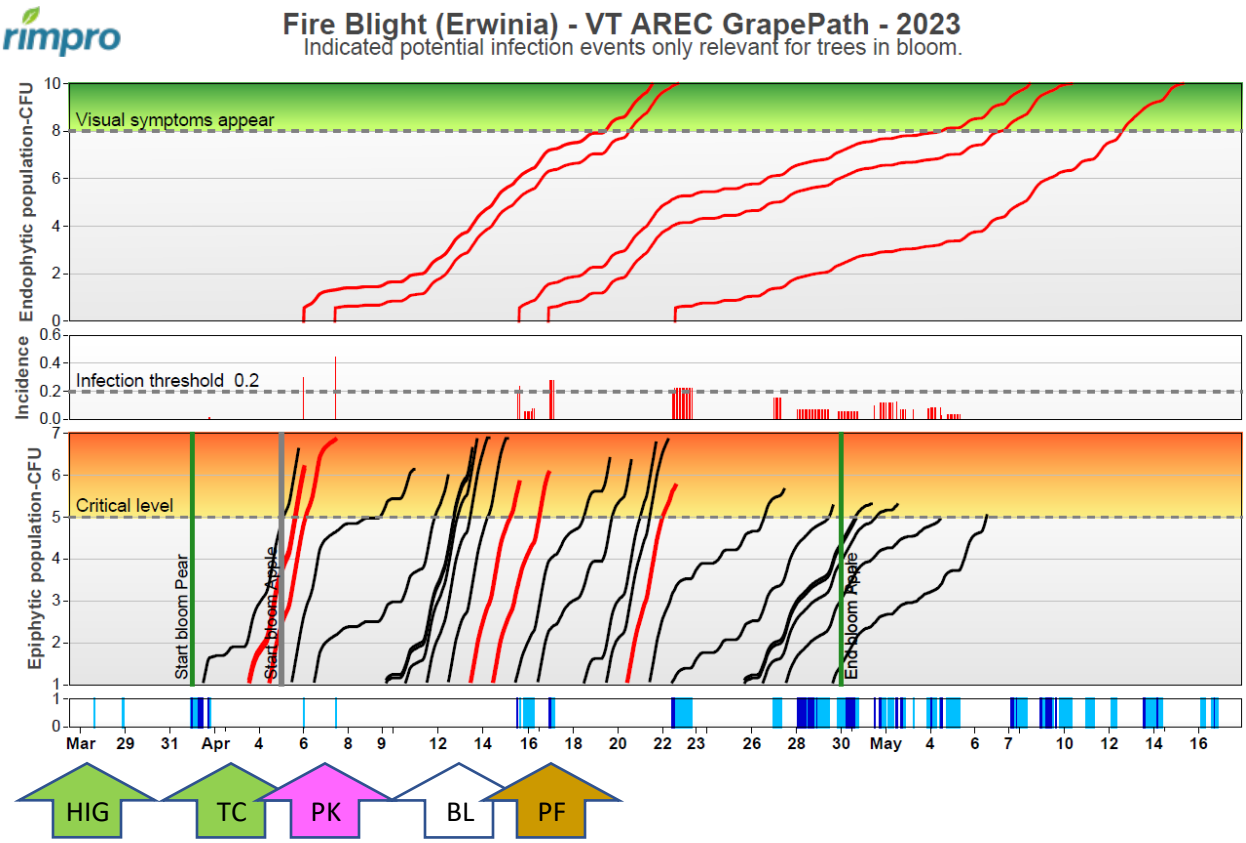

Figure 3. Fire blight infection periods in 2022 for Winchester VA in RIMpro model. Graph interpreter: Blossom blight infections are predicted to occur when the red bars in the center graph go through the dashed line indicating an infection threshold of 0.2. Upper graph red curved line indicates incubation of the infections and the time needed for visual symptoms to occur (blossom blight). Black/Red curved lines at the bottom graph show how bacterial populations grow on flowers: Any wetting that occurs after these line/s reach the orange area can trigger an infection. Lines start at 59°F when bees become active. Image used by permission of RIMpro B.V., Netherlands. https://www.rimpro.eu/

3. Cedar apple rust. The first orange, fully developed galls on cedars were visible on 28 April. Symptoms on 'Fuji' leaves in Winchester VA were first observed on 16 May on apple spur leaves.

4. Bitter rot was favored by few rain events in 2023 in Northern Virginia which still led to severe infections on fruit and leaves if fungicides were not applied. The first symptoms were visible 5 July in Winchester.