



Using Prediction Models to Manage Diseases in Fruit

Kim Leonberger
Extension Associate

Evan Tate
County Extension Agent

Nicole Gauthier
Extension Plant Pathologist

INTRODUCTION

Numerous plant diseases impact fruit crops throughout Kentucky. Factors such as plant growth stage, as well as rainfall, temperature, and other weather conditions, can be used to determine risk for plant disease. Prediction models are critical tools for growers, as they allow for protective management strategies to be deployed when disease risk is high. Use of these models can provide growers with cost savings, as unnecessary chemical applications are eliminated when risk of infection is low.

AG WEATHER PREDICTION MODELS

The plant disease fruit prediction models are a collaboration between the University of Kentucky Department of Plant Pathology and the UK Ag Weather Center. Seventy-nine Kentucky Mesonet weather stations are located throughout the Commonwealth and are used to calculate the disease risk for each area. Disease prediction models can be found at http://weather.uky.edu/plant_disease.html.

This publication details the steps for using and interpreting results from the plant disease prediction models. For the instructions included here, fire blight has been selected as the model.



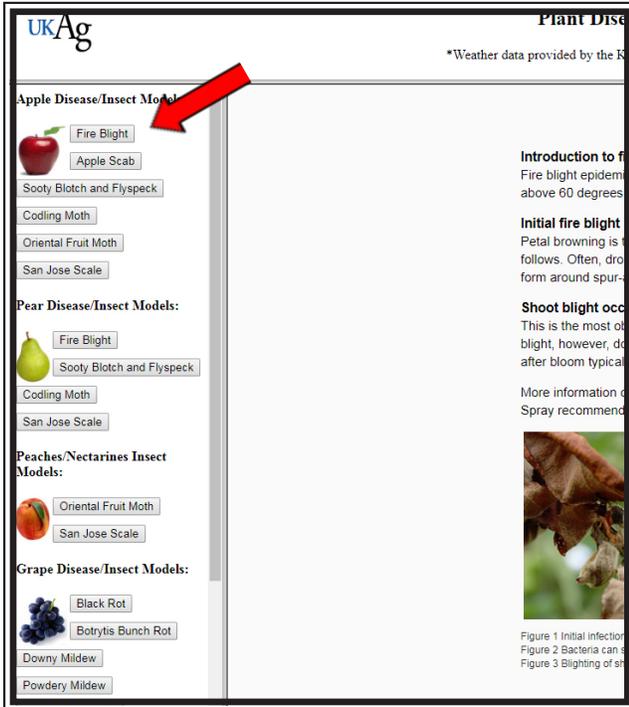
A KENTUCKY MESONET WEATHER STATION. THIS NETWORK OF AUTOMATED WEATHER AND CLIMATE MONITORING STATIONS WAS DEVELOPED BY WESTERN KENTUCKY UNIVERSITY.

While these models are meant to provide guidance on disease risk levels and appropriate management actions, ultimately, growers should make the final decision on management or chemical applications that are best suited to their orchard or vineyard.

USING COUNTY DISEASE PREDICTION MODELS

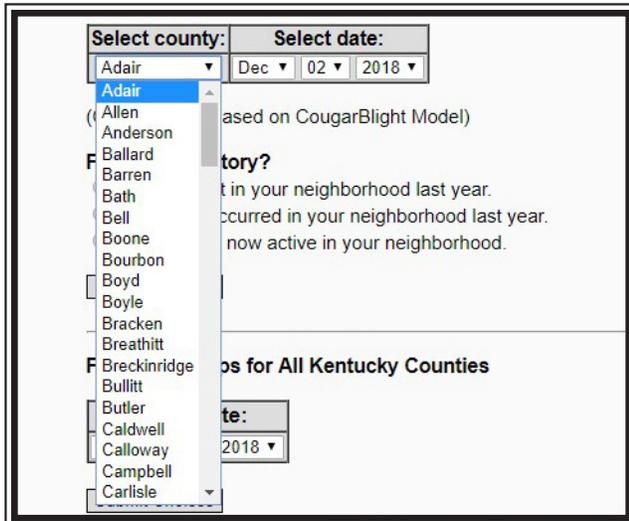
Step 1.

Select the disease model from the left-hand menu on the main page (in this case, Fire Blight).



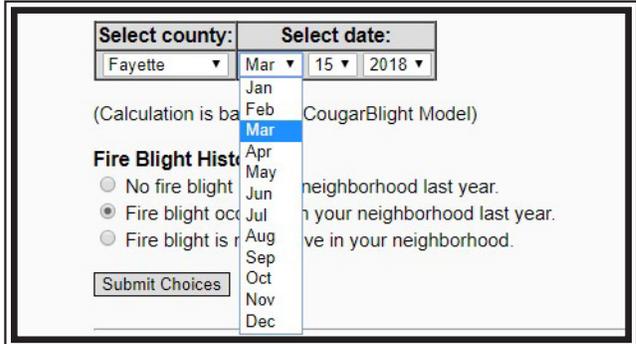
Step 2

Scroll down the page and select a county from the drop-down menu.



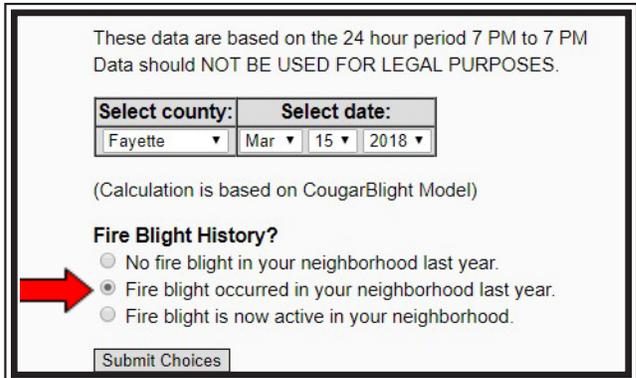
Step 3

Select today's date to determine current risk for fire blight. Other dates may be entered if assessment of past risk is warranted.



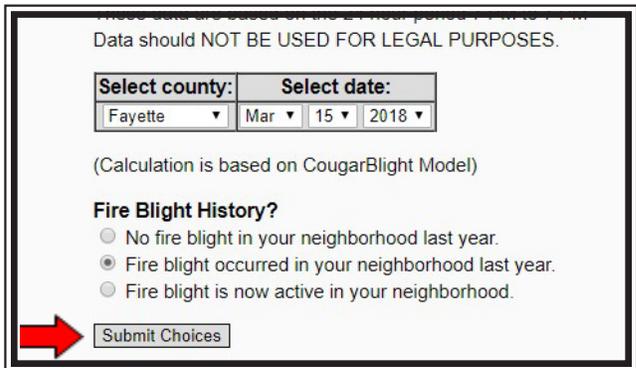
Step 4

Select disease history for the orchard.



Step 5

Click 'submit choices'.



(Note: The instructions demonstrated here use the Fire Blight Prediction Model. Other models may require additional information to determine risk.)

INTERPRETING COUNTY DISEASE PREDICTION MODELS

Data generated from the information entered (county, date, orchard history), as well as weather conditions, is presented in a table.

Evaluation of Fire Blight Infection for Fayette County				
Fire Blight History: Fire blight occurred in your neighborhood last year.				
Date	Max Temp	Precip	Max RH	Infection Risk
03/12/2018	39.7	0.38	100	NA
03/13/2018	38.8	0.02	100	NA
03/14/2018	38.1	0.02	96	NA
03/15/2018	59.4	0.00	62	Low

The table below presents the various possible levels of risk, as well as the associated action growers are advised to take. *Extreme* indicates the most elevated level of risk and *Low* represents the least amount of disease risk.

Growers are advised to take appropriate action based on risk level.

Risk Level	Advised Action
Extreme	Grower should spray with appropriate chemical
Exceptional	Grower should spray with appropriate chemical
High	Grower should spray with appropriate chemical
Moderate	Chemical application is warranted, especially if weather conducive to disease development is predicted
Caution	Chemical application is not advised, but weather forecasts and risk values should be closely monitored
Low	Chemical application is not required, but grower should consider orchard history and weather forecast

USING THE STATE SUMMARY DISEASE MODEL

Step 1

Under the heading *Maps for All Kentucky Counties*, select today's date to determine current risk for fire blight. Other dates may be entered if assessment of past risk is warranted.

Fire Blight History?

Jan Fire blight in your neighborhood last year.
 Feb Fire blight occurred in your neighborhood last year.
 Mar Fire blight is now active in your neighborhood.
 Apr
 May
 Jun Choices
 Jul
 Aug
 Sep
 Oct
 Nov
 Dec

Fire Blight Maps for All Kentucky Counties

Select date:
 Mar ▼ 15 ▼ 2018 ▼



Step 2

Click 'submit choices'.

Fire Blight Maps for All Kentucky Counties

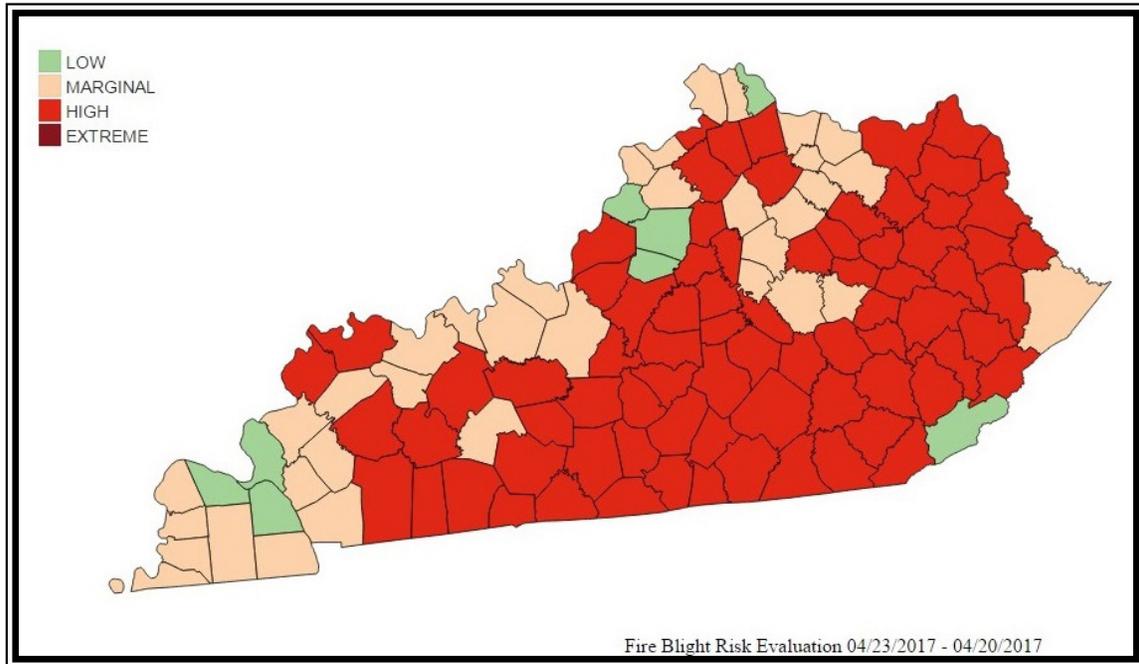
Select date:
 Mar ▼ 15 ▼ 2018 ▼



(Note: This example is from "Fire Blight Maps for All Kentucky Counties")

INTERPRETING THE STATE DISEASE PREDICTION MODEL

The risk for each county is indicated on a map via a color key that is located in the upper left-hand corner. In the example below, some counties are considered to be at a low risk level, while others are marginal, and a large number of counties are considered high risk. Note: State-wide disease prediction summaries, such as displayed below, are not available for all disease models.



All models are also available through a mobile friendly website compatible with phones and tablets (weather.uky.edu/dim.html). Follow steps as previously described when using the mobile friendly format.

ADDITIONAL RESOURCES

- Ag Weather Plant Disease Prediction Models
http://weather.uky.edu/plant_disease.html
- Plant Disease Prediction Models (Mobile Device Friendly Version)
<http://weather.uky.edu/dim.html>
- University of Kentucky Department of Plant Pathology Extension Publications
<https://plantpathology.ca.uky.edu/extension/publications>

January 2019

Photos: Paul R Bachi, UK (pg 1). All other images are website screenshots of the UK Ag Weather Plant Disease Prediction Model for Fire Blight, taken on December 3, 2018 by Kim Leonberger.

Editor: Cheryl Kaiser