How to know when PFD will strike again?

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Climate forecast for winter 2018-2019

- Consensus forecast of probability of El Niño weather pattern
  - over three month intervals

- Increased rainfall and moderate temperatures
  - PFD becomes more likely
Development of new PFD advisory system

- Project in collaboration with Natalia Peres and Clyde Fraisse
- To simplify PFD predictions from PFD-FAD
  - Less data collection required
  - Automatically pulls in weather data
- Based off of the FAWN system
  - Some stations with leaf wetness probes
  - Mostly calculated from available models
Homepage of new PFD advisory system

- Hosted on Agroclimate.org
  - Under tools/crop diseases
  - Similar to Strawberry Advisory System (SAS)
  - Each circle represents a FAWN weather station
Criteria to select

- Palmdale station selected
  - Map zooms in automatically
- Need to indicate bloom intensity
  - Will I recoup costs if application made?
- Flowering stage
- Last fungicide application
If there is an infection event

- Conditions could allow for infection event
- Still need sufficient bloom
- Fungicide applications minimum 7 days apart

Link to current FPG Fungicide recommendations
Disease simulation tab

- Graphical representation of infection risk
  - Can select time frame

- Forecasted risk (from NOAA weather data) for three days from actual date
  - Help plan if infection will be favored by weather in near term
Infection risk levels

- High risk (red area)
  - Index above 0.51; Spray as soon as possible
- Moderate risk (yellow area)
  - Index between 0.21 -0.5; Spray recommended
- Low risk (green area)
  - Index between 0-0.2; No spray recommended
Problem with station

- Problem with leaf wetness estimates
  - Should see an increase in infection index overnight from dew

- Please let us know ASAP if there is a problem
## Daily summary of data

- Gives leaf wetness, temperature, PFD index and risk level
  - Weather variables daily average
  - PFD index max. daily value

<table>
<thead>
<tr>
<th>Date</th>
<th>LWD</th>
<th>Temp (°F)</th>
<th>Temp (°C)</th>
<th>PFD Index</th>
<th>PFD description</th>
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<tbody>
<tr>
<td>2018-01-23</td>
<td>15.00</td>
<td>67.0</td>
<td>19.4</td>
<td>0.196</td>
<td>Low risk</td>
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<tr>
<td>2018-01-22</td>
<td>15.00</td>
<td>66.8</td>
<td>13.8</td>
<td>0.134</td>
<td>Low risk</td>
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<td>2018-01-21</td>
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<td>14.3</td>
<td>0.133</td>
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<td>2018-01-20</td>
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<td>2018-01-19</td>
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<td>2018-01-18</td>
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<td>52.0</td>
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<td>0.076</td>
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<tr>
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<td>2018-01-16</td>
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<td>49.4</td>
<td>9.6</td>
<td>0.050</td>
<td>Low risk</td>
</tr>
<tr>
<td>2018-01-15</td>
<td>13.00</td>
<td>49.4</td>
<td>9.6</td>
<td>0.214</td>
<td>Moderate risk</td>
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<tr>
<td>2018-01-14</td>
<td>17.25</td>
<td>64.8</td>
<td>18.2</td>
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</tr>
</tbody>
</table>
Weather data

- Can look at the weather data for every 15 min.
  - Temperature, relative humidity, rainfall, leaf wetness
- Find out when drying periods occur
  - After 4 hours of drying, PFD index resets to zero
With an account

- Can mark specific blocks of interest
  - Map and satellite views
  - Use map to find block and satellite to mark
- Specific risk assessment for location
Will send alerts

- SMS alerts for each location
- E-mail notification
- Can choose both
Conclusions

- New model was released in January for the 2018 PFD season
  - Fewer data inputs; easier to use
  - Login system should make block-by-block planning easier
- Working with programmer to detect and fix bugs
  - Expect occasional difficulties with program first year
    • Want your feedback on problems and ways to improve
How do application timings compare?

- Fort Meade grove in 2017
  - Valencia on Swingle with history of PFD
  - Headline at 15.5 fl. oz./acre

- Four timing treatments:
  - No applications
  - Weekly for three applications
    - March 8\textsuperscript{th}, 15\textsuperscript{th}, 22\textsuperscript{nd}
  - PFD-FAD (fungicide application decision)
    - Two applications recommended on March 15\textsuperscript{th}, 24\textsuperscript{th}
  - New PFD model
    - No applications recommended
Flower incidence 2017

- Data collected March 27th
Post-application buttons 2017

- Button data collected June 8-9<sup>th</sup>
Number of fruit 2017

Data collected July 20\textsuperscript{th}

![Bar chart showing number of fruit for different timing methods: New model, PFD-FAD, Weekly, UTC. The New model has the highest number of fruit, followed by PFD-FAD, Weekly, and UTC.]
Application timings 2018?

- Fort Meade same as 2017
- Polk City grove
  - Navel on Swingle with history of PFD
  - Headline at 15.5 fl. oz./acre
- Four timing treatments:
  - No applications
  - Weekly for three applications
    - Feb 26th, March 5th, 13th Fort Meade
    - Feb 25th, March 5th Polk City
  - PFD-FAD (fungicide application decision)
    - Two apps recommended on Feb 26th, March 7th Fort Meade
    - Two apps recommended on Feb 25th, March 7th Polk City
  - New PFD model
    - No applications recommended
Polk City location 2018

- Data collected buttons: June 6
- Fruit: July 6
Fort Meade location 2018

- Data collected buttons: June 6
- Fruit: July 18
Model performance conclusions

- 2017 season had low PFD incidence
- New model did not recommend a spray
  - There were no disease intensity differences among treatments
  - Means that the ‘no application’ recommendation was correct
  - Cost savings of three applications compared to weekly applications
  - Repeating experiment in 2 locations in 2018
    • Validation is an important part of model design
Performance conclusions

- 2018 season was again light PFD year in Peace River
  - No applications predicted again correct outcome
    - No differences among treatments despite different number of applications
- In Polk City CAS treatment had significantly more fruit despite no treatments
  - No treatments again correct outcome
- Need a year with disease prediction to see if the positive predictions work as well
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