Tracking disease and insect pests using Smartphone technology: a new approach for regional pest management

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Outline

- Recap what we've learned about whitefly and virus management from the past 4 years of survey data
 - Hit the high points from last year's talk
- Decision Support System
 - Collect scouting data \rightarrow formulate management recs.
 - GPS/GIS, smartphone-based technology and the internet
 - In cooperation with ZedX Inc.



Introduction

- Project was established in summer of 2007
- Improve management of TYLCV and whiteflies
- Use survey data to gain an understanding of factors that contribute to "local" outbreaks of whiteflies and the viruses they transmit
 - Identify common features of problem locations (e.g., land usage, border fields, production practices)
- Develop a strategy to reduce epidemics
 - <u>Decision Support System</u>





2006/2007 Season

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USDA

2007/2008 Season







2008/2009 Season







2009/2010 Season

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2010/2011 Season

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Some Natural Questions

- Can we rely on geographical attributes or simply location to predict whitefly and/or TYCLV outbreaks?
- Can we rely on weather conditions to predict whitefly and/or virus outbreaks?
 - ...Yes and No
 - Daily weather variables have predictive value, but may not be all that useful
 - Cold weather events may be most telling



Mother Nature's Role

Minimum temperature and total daily rainfall recorded in Immokalee



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 - ...Yes and No
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 - Cold weather events may be most telling
- Can we rely on geographical attributes or simply location to predict whitefly and/or TYCLV outbreaks?



1st Order Nearest Neighbors (whiteflies)



115

Correlation Analysis



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Conclusions

- It is possible to predict the severity of TYLCV & whitefly density with select weather variables
 Cold events
- Geographical features are perhaps the best predictor of these pests
 - Natural scale of these pests is regional
- Developing or coordinating an area-wide pest management protocol is perhaps the best bet for maximizing control
 - The <u>Decision Support System</u> could facilitate such an effort



Decision Support System (DSS)

- We hired ZedX Inc., (www.zedxinc.com) to develop the <u>Decision Support System</u> (DSS)
- Users will use their mobile device (i.e., smartphone) to collect and upload GPS-labeled scouting data to a central server
- Data is processed and then delivered as real-time reports and management recommendations to growers and/or their scouts.
- To make it widely adaptable, we enabled the system to record both production and pest information for a wide variety of crops



Accessing the DSS

- Mobile Phone Access
 - Download the ARSWF "App"
 - Data collection
- Web-based Access (<u>arswf.zedxinc.com</u>)
 - Create field boundaries/name fields
 - Create data entry forms
 - View data
 - Modify data entries
 - View video tutorials
- System is secure (password protected)
 - But flexible enough to share disease and pest information among collaborating growers



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https://arswf.zedxinc.com/cgi-bin/index.cgi#





ARSWF Smart Phone First Time Setup Smart phone first time setup by zedxvid | 2 weeks ago | 11 views

ARSWF Smart Phone Draw and Save Boundaries

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DSS: Pros and Cons

• <u>Cons</u>

- Transitioning to new technology
 - Learning curve
- Open sharing of pest data

Pros

- Open sharing of pest data
- Pest information readily available for mapping and viewing
- Comprehensive database of pest data
- Potential for improved pest management



Acknowledgements

- Lisa Rouse
- Rachel Broadbent
- Mark Verbeck
- Glades Crop Care
- Agmart
- Gargiulo
- Immokalee Tomato Growers
- Pacific Tomato Growers
- Six L's
- West Coast Tomato

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