AgriVectors.org

A Systems Biology resource for *Vector Biologists*

Data to Disease Management

Surya Saha
Boyce Thompson Institute, Ithaca, New York, USA
ss2489@cornell.edu | @SahaSurya

Agricultural Vectors Consortium

PLANT & ANIMAL GENOME XXVII

Mueller Lab @ Boyce Thompson Institute

Open source toolkit

VAGRANT

Xen Project

docker

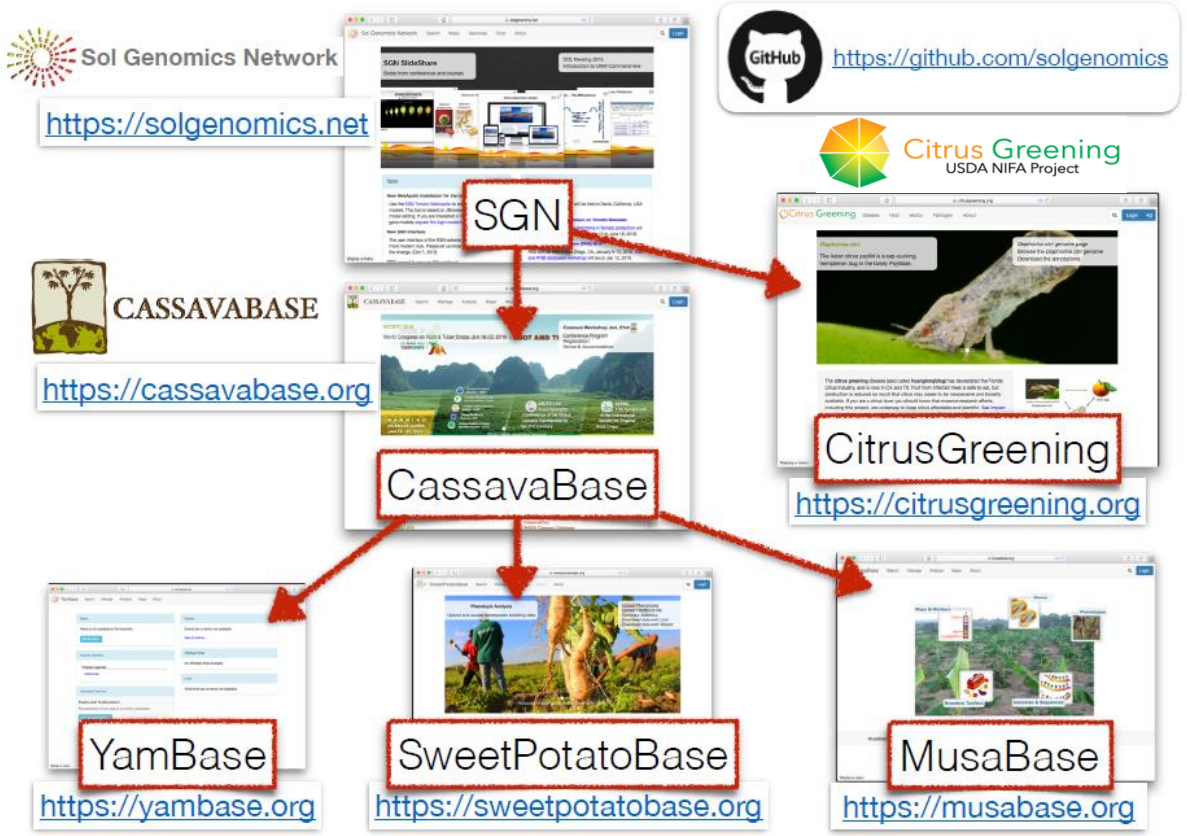
CHADO

JBrowse

Web Apollo

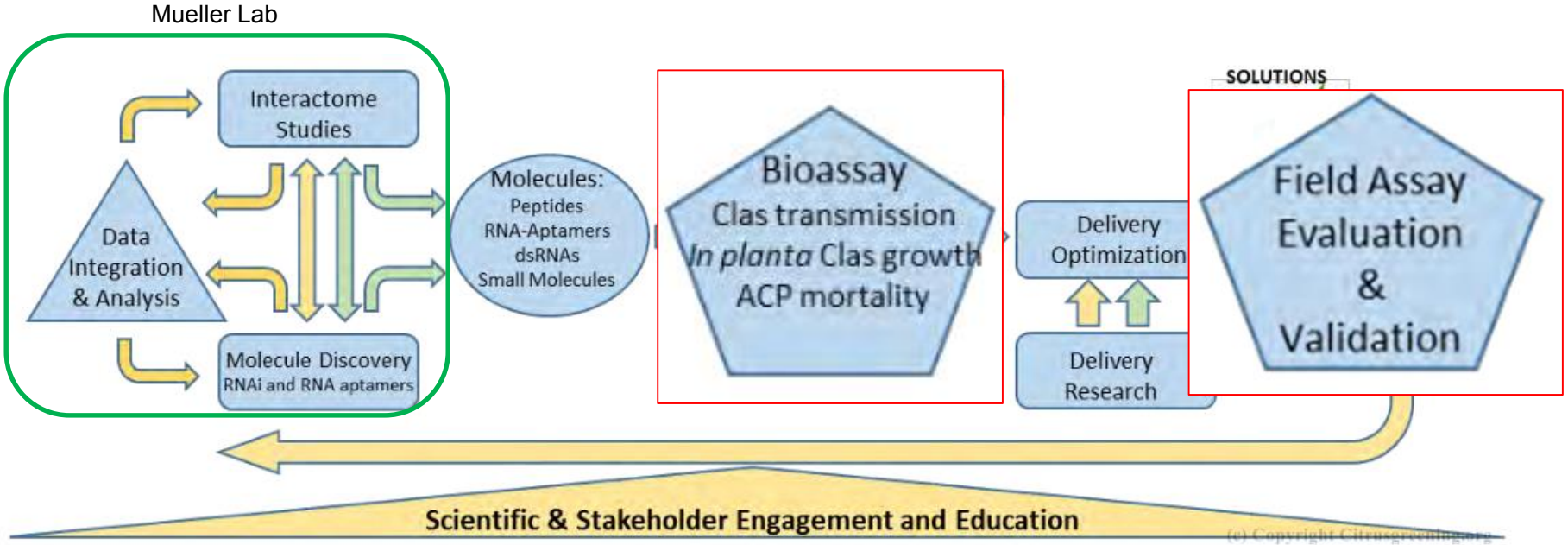
MAKER Annotate this!

Pathway Tools



BTI

Project Workflow



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USDA
United States Department of Agriculture
National Institute of Food and Agriculture

Omics resources and databases are <u>required</u> for identification of targets for interdiction

Genome

Pathway Databases
Expression Networks
.....

Annotation

Target for interdiction molecules

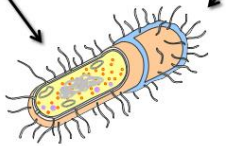
Vector

Asian citrus psyllid (ACP)
Diaphorina citri

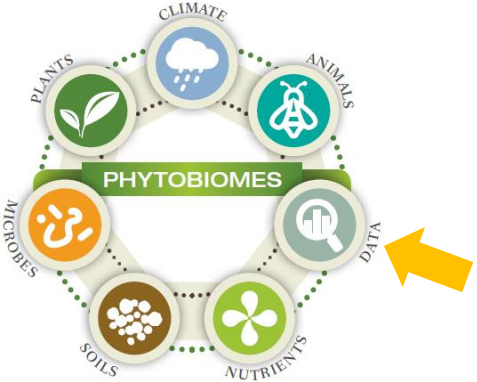
Host

Citrus spp.

Pathogen



CLas
Candidatus Liberibacter asiaticus



Citrusgreening.org

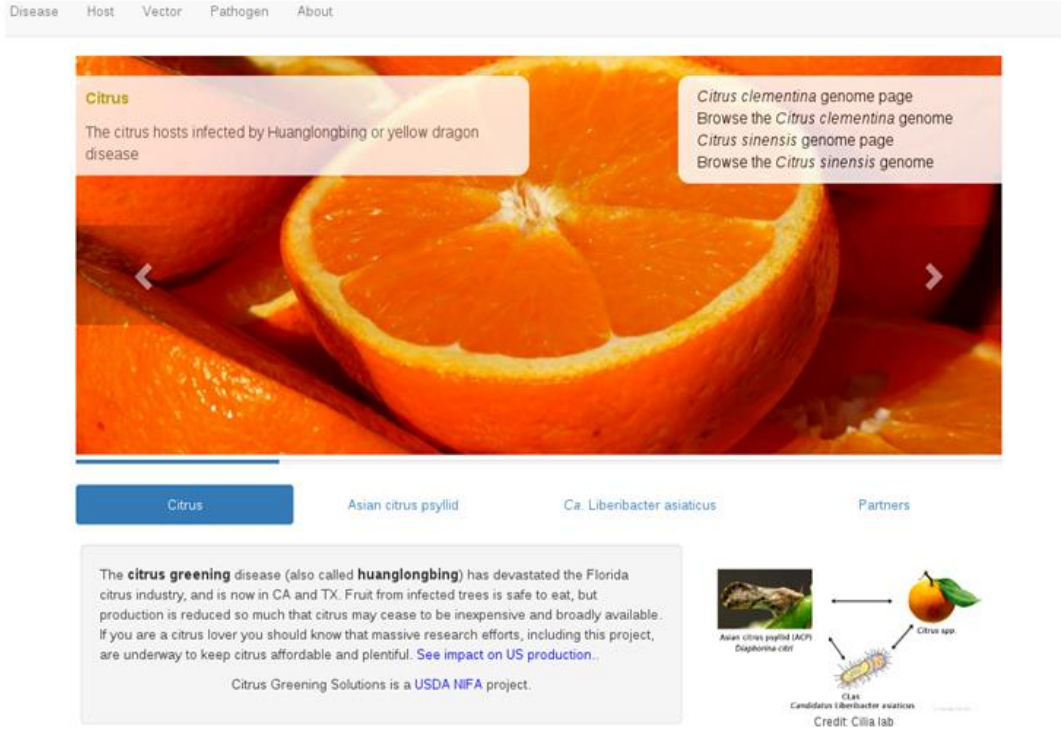
https://citrusgreening.org/

Host, Vector and Pathogen(s)
- Blast Databases
- Genome browser – Jbrowse
- Metabolic pathway database
- Annotation Editor – Apollo
- Psyllid Expression Network (PEN)
- FTP site for download

Disease background

News, Publications, Links

Social Media



Citrus Greening
USDA NIFA Project

DiaphorinaCyc Pathways overlaid with Gut RNAseq results

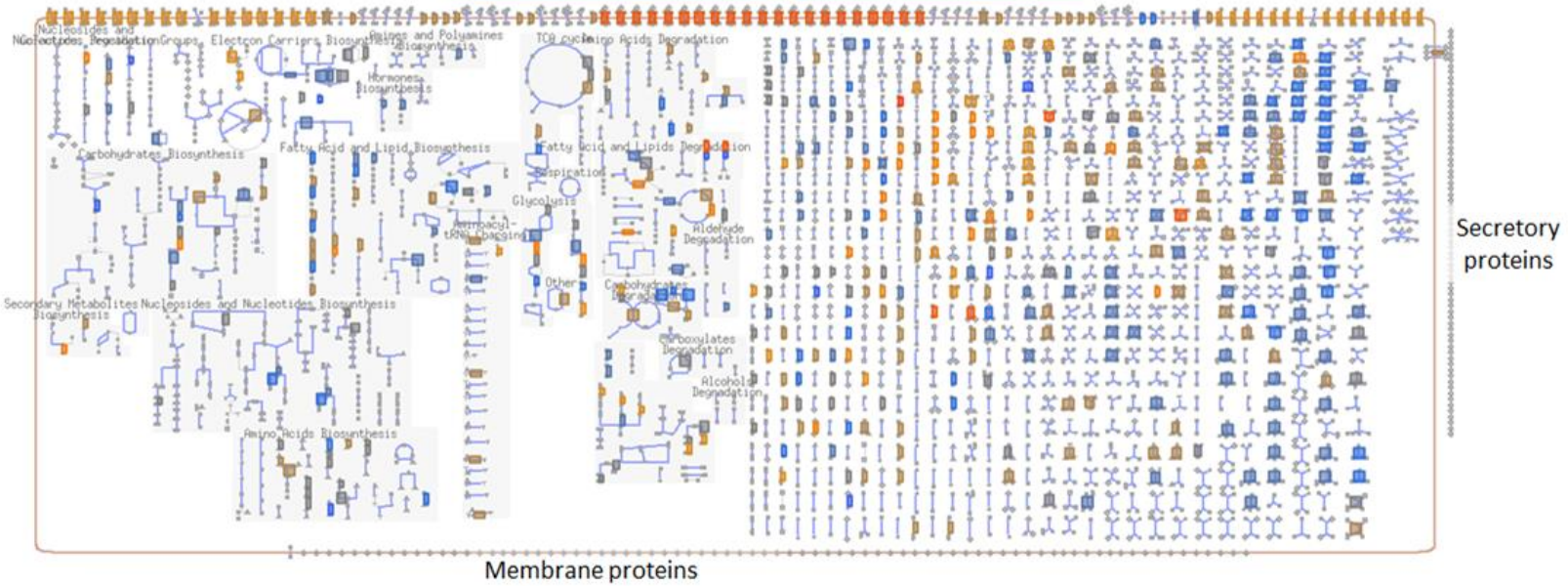
Pathways: 171
Enzymes: 3,507 (was 2,857)

Transport Reactions: 17
Proteins: 25,295 (was 12,548)

Transporters: 87
Compounds: 1193

Membrane proteins

http://ptools.citrusgreening.org/overviewsWeb/celOv.shtml



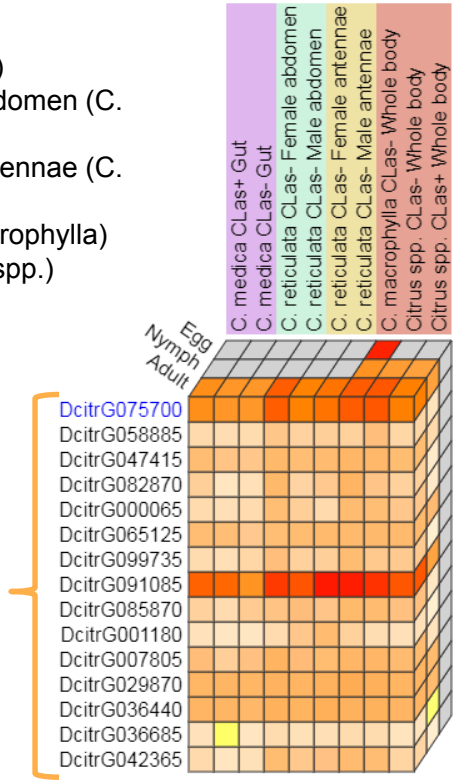
Cellular Overview of *Diaphorina citri* overlaid with RNAseq expression counts

Kruse et al. 2017

Citrus Greening
USDA NIFA Project

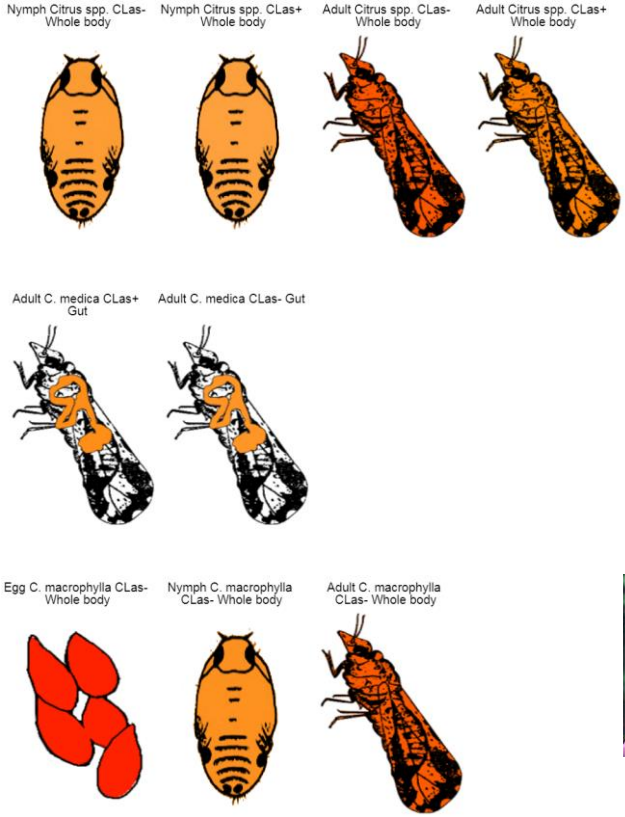
Psyllid Expression Network (PEN)

Gut RNAseq (Citron)
Male and female abdomen (C. reticulata)
Male and female antennae (C. reticulata)
Whole body (C. macrophylla)
Whole body (Citrus spp.)



Genes correlated with DcitrG075700 tyrosine protein kinase Fps85D-RA

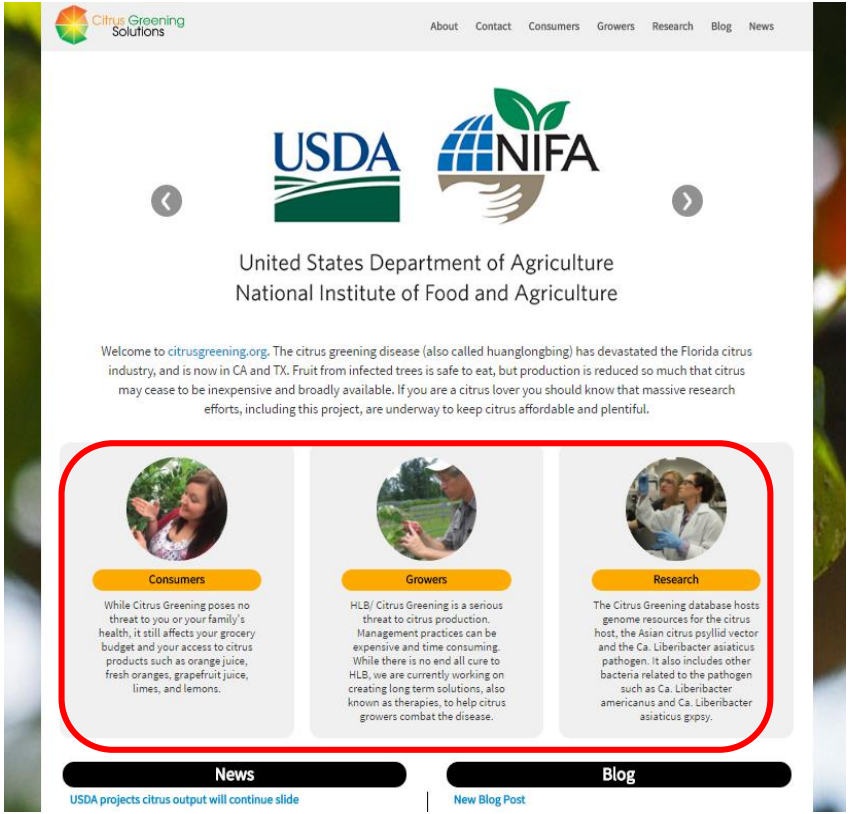
Colored by level of expression



Mirella Flores
Mueller Lab

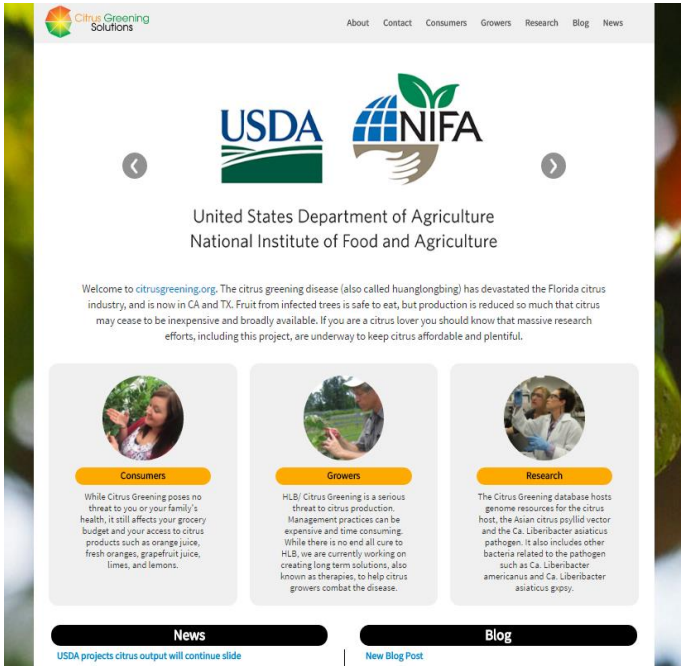
Outreach

- News
- Events
- Blog
- Publications



Citrus Greening
USDA NIFA Project

Portal for all Agricultural Disease Vector Systems



AgriVectors Home Page

Citrusgreening

Zebra chip

Andrew Jensen

Pierce's disease

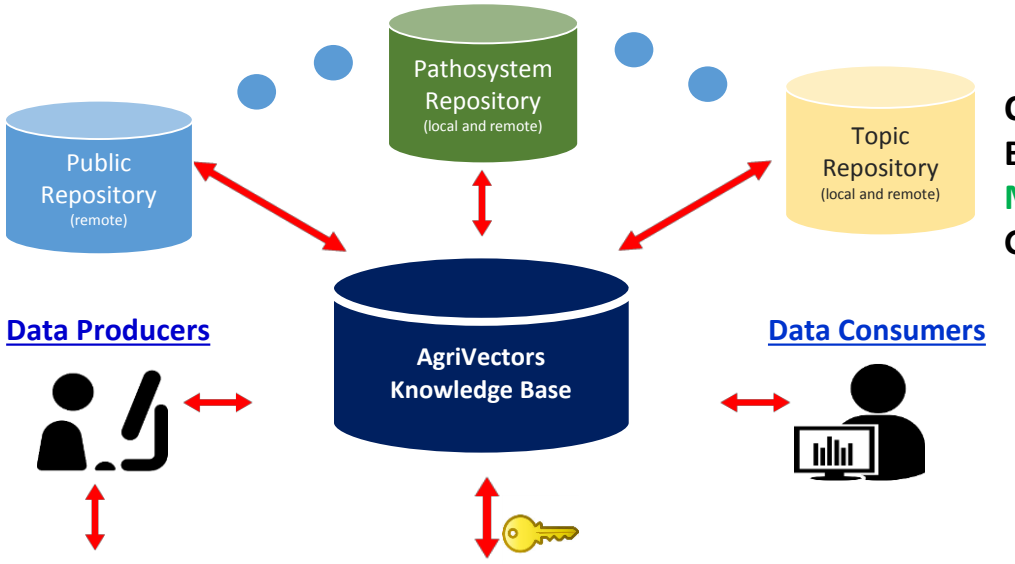
Alex Wild

Pathogens: Bacteria, virus and fungi

AgriVectors Data Schema

Your Pathosystem
Zebrachip
Citrusgreening
Pierce's disease

NCBI / EMBL / DDBJ
Ag Data Commons
i5k



CRISPR / RNAi genes
Bacterial effectors
Microbiome
Geospatial disease data

Researchers
Extension agents
Industry
INRA
USDA ARS / APHIS

Researchers
INRA / USDA ARS / APHIS
IPM product development
Outreach and extension
Educators

Data types

Omics data sets

- Genome assembly and official annotation
- Transcriptomes
- Mass spectrometry proteomics

Population biology

- Insecticide resistance
- SNPs and Indels
- Variants
- Simple Sequence Repeats
- Mitochondrial genes

Data types

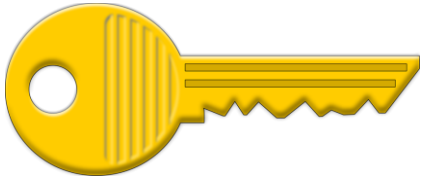
Integrated pest management <u>pathosystem-wide</u> data

- Inclusive of Vector, pathogen, host, environment and beyond...
- Gene family based data sets (P450, RNAi pathway)
- E.g. Virus, Bacteria, or fungal infection assays
- Electrical Penetration Graph (EPG) feeding data
- Phenotyping data from disease trials
- Ecological and climactic data
- Behavioral assays
- Toxicology, Insecticide resistance, etc.

Genes (structural and functional curation)

Publications, notes, posters, videos and abstracts……

Project ideas and Preliminary data



Salivary gland transcriptomics of hemipterans

- Host range based on orthologous enzymes and proteins
- Pathogen acquisition/transmission/…replication?
- Chemical and pathogen response

Host immunity based on pathogen exposure

Fecundity and development assays

Microbiome and virome characterization

AgriVectors Roadmap

2018

- Build research, government and industry partnerships
- Design Citrusgreening.org as a model system
- Generate preliminary data sets

2019

- Establish primary and secondary consortia members
- Present to community at scientific meetings
- Fundraising for sub-projects
- Integrate and mine novel data types at Citrusgreening.org

2020+

- Fundraising for AgriVectors umbrella project
- Apply for research coordination network (RCN) funding for AgriVectors community meetings

BTI

Agricultural Vectors Consortium

United States Department of Agriculture
Wayne Hunter (Ft. Pierce, FL)
Michelle Heck (Ithaca, NY)
Rodney Cooper (Wapato, WA)
Lucy R. Stewart (Wooster, OH)

University of Idaho
Shirley Luckhart
Edwin Lewis
Sanford Eigenbrode

Washington State University
Daisy Fu

Texas A & M University
Cecilia Tamborindeguy

Oklahoma State University
Astri Wayadande

University of Florida
Jawwad Qureshi

You??

Thank you!!

@Citrusgreening // @SahaSurya

Poster PO0237

AgriVectors Data Schema

Improved Rapid Data Cluster Analyses and Access