

AgriVectors.org

A Systems Biology resource for *Vector Biologists*

Data to Disease Management

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Agricultural Vectors Consortium



Mueller Lab @ Boyce Thompson Institute

Open source toolkit

VAGRANT Xen Project docker
CHADO JBrowse
WebApollo MAKER Annotate this!
Pathway Tools



<https://solgenomics.net>



CASSAVABASE

<https://cassavabase.org>



SGN



CassavaBase



CitrusGreening

<https://citrusgreening.org>



YamBase

<https://yambase.org>



SweetPotatoBase

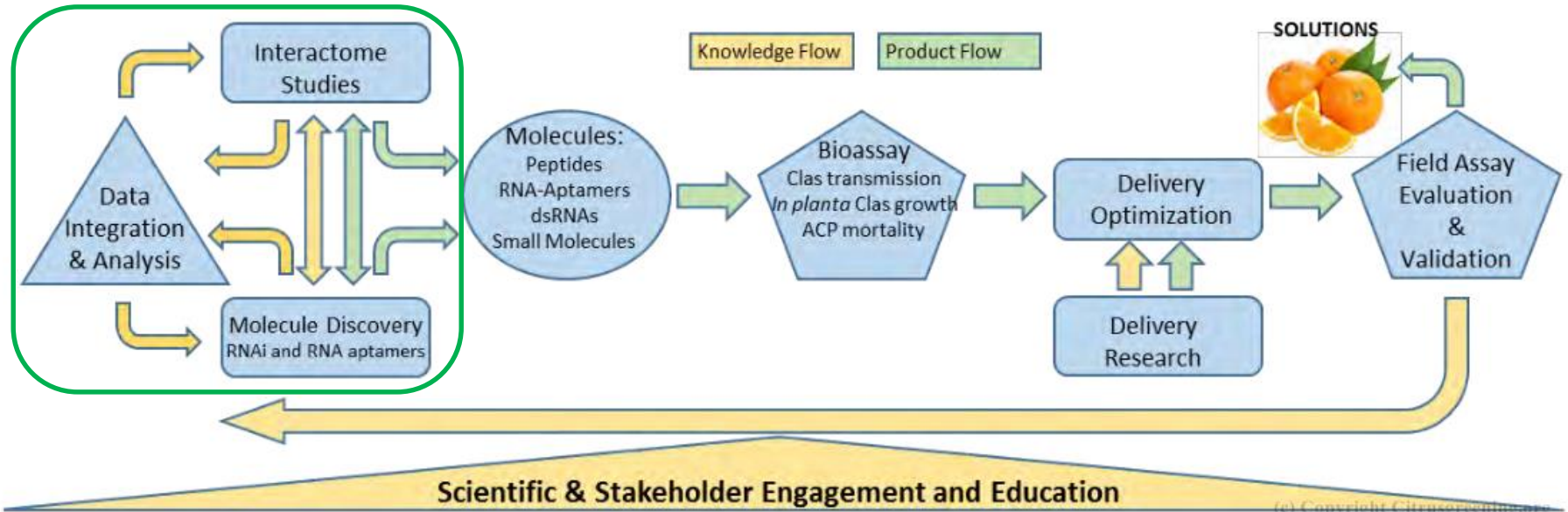
<https://sweetpotatobase.org>



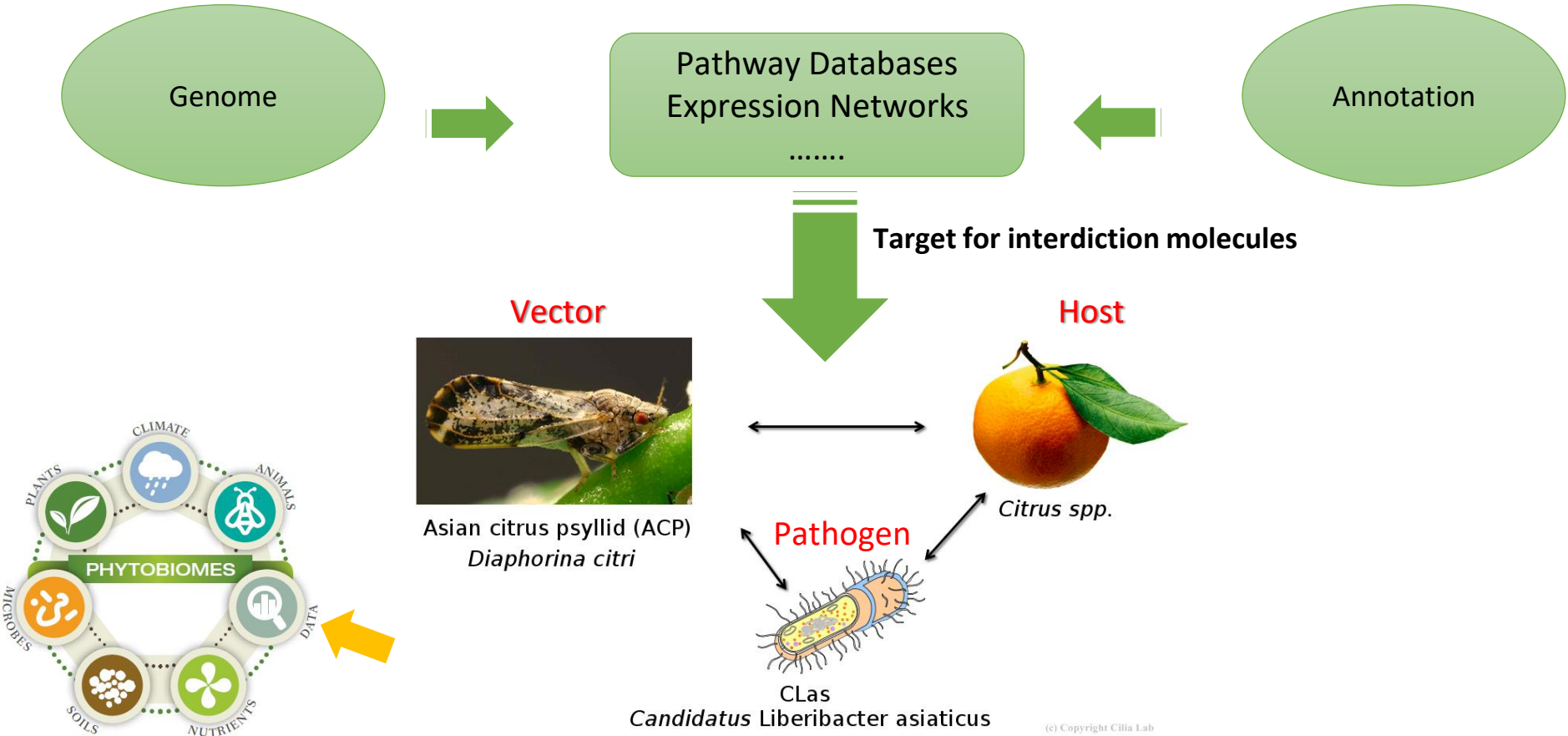
MusaBase

<https://musabase.org>

Citrusgreening.org: Portal for the HLB disease complex



Omics resources and databases are required for identification of targets for interdiction



(c) Copyright Cilla Lab

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

Disease Host Vector Pathogen About



Citrus

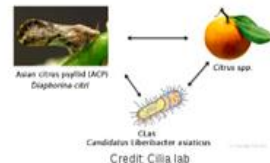
Asian citrus psyllid

Ca. *Liberibacter asiaticus*

Partners

The **citrus greening** disease (also called **huanglongbing**) has devastated the Florida citrus industry, and is now in CA and TX. Fruit from infected trees is safe to eat, but production is reduced so much that citrus may cease to be inexpensive and broadly available. If you are a citrus lover you should know that massive research efforts, including this project, are underway to keep citrus affordable and plentiful. [See impact on US production.](#)

Citrus Greening Solutions is a USDA NIFA project.



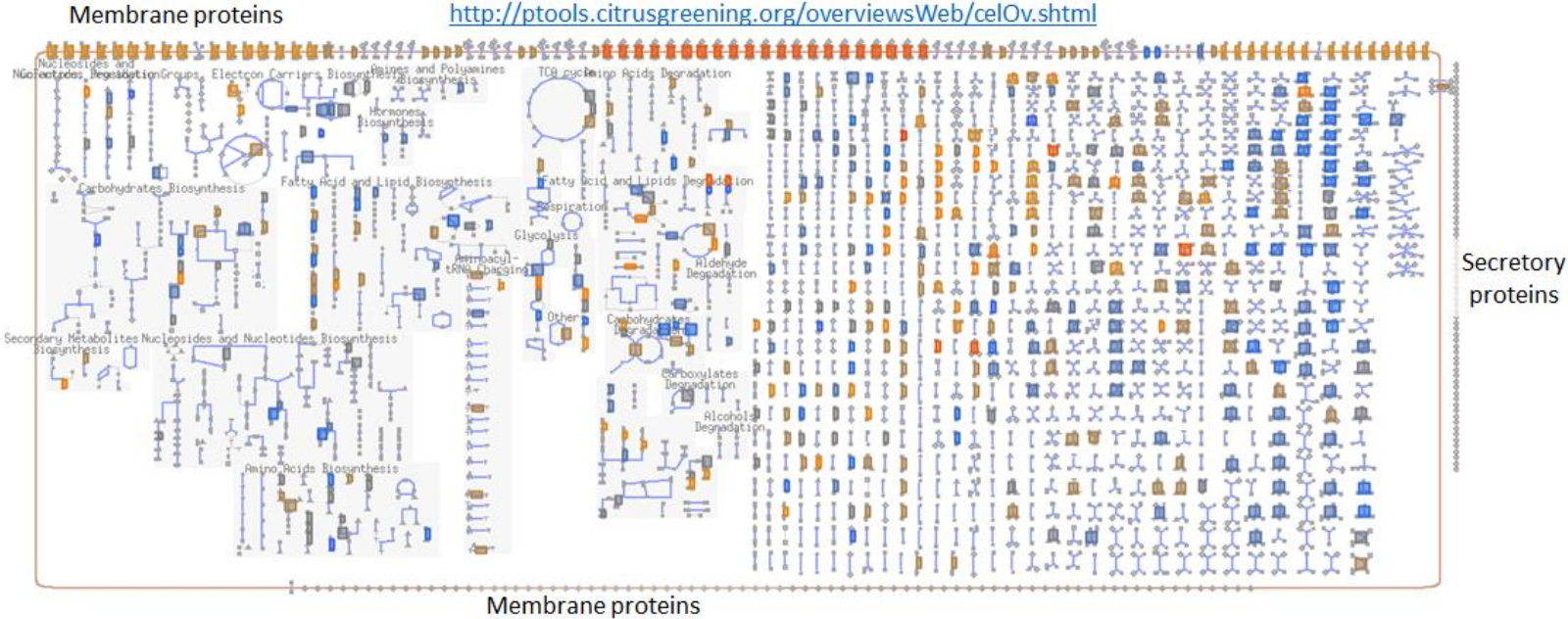
Citrus Greening
USDA NIFA Project

DiaphorinaCyc Pathways overlaid with Gut RNAseq results

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

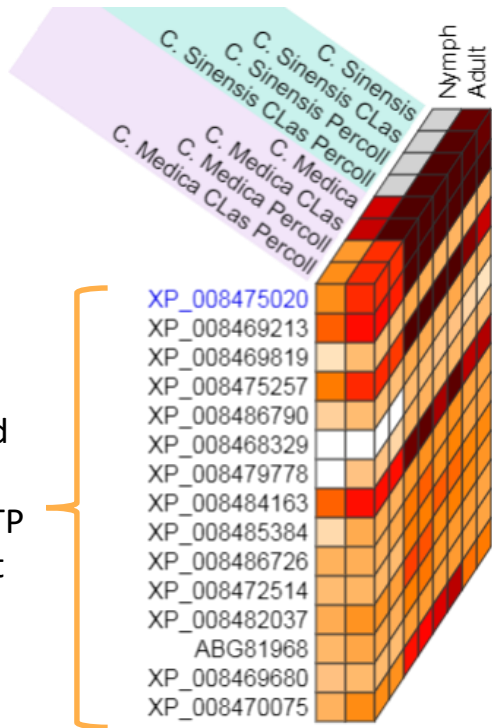
Transport Reactions: 17
 Proteins: 25,295 (was 12,548)

Transporters: 87
 Compounds: 1193



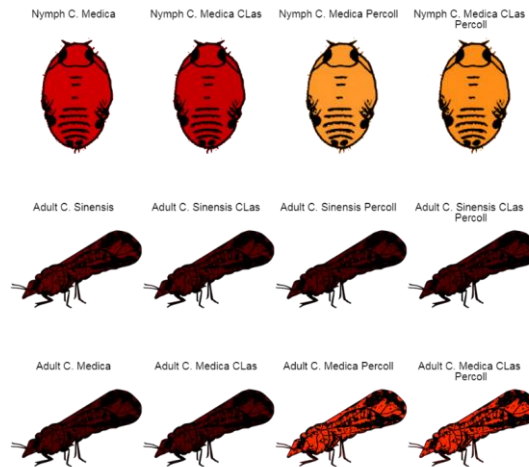
Proteomics results in Psyllid Expression Network

Genes correlated with XP_00847050 ATP synthase subunit beta



Tree Hosts: *C. medica* and *C. sinensis*
Treatment: Percoll gradient fractionation
Insect Stages: Nymph and adult
Conditions: Clas+ and healthy

Colored by level of expression



Outreach

- News
- Events
- Blog
- Publications



Citrus Greening
@CitrusGreening

A research, outreach and education portal for citrus greening disease or Huanglongbing (HLB). A @USDA_NIFA SCRI project.

Manhattan, KS
citrusgreening.org
Joined December 2012

[Tweet to Citrus Greening](#)

Tweets | **Tweets & replies** | **Media**

Citrus Greening @CitrusGreening · Oct 10
Updates from 2nd California ACP and #Huanglongbing Summit held @UCRiverside cist.ucr.edu.../Apr.../2016/09/ACPHLB-Summit-program.pdf

Citrus Greening Retweeted
Global Plant Council @GlobalPlantGPC · Oct 8
Citrus greening disease pathogen has gut-wrenching effect on insect vector. @BTScience
researchers reveal globalplantcouncil.org/news-events/la... #plantsci

Citrus Greening Solutions

About | Contact | Consumers | Growers | Research | Blog | News

USDA **NIFA**

United States Department of Agriculture
National Institute of Food and Agriculture

Welcome to citrusgreening.org. The citrus greening disease (also called huanglongbing) has devastated the Florida citrus industry, and is now in CA and TX. Fruit from infected trees is safe to eat, but production is reduced so much that citrus may cease to be inexpensive and broadly available. If you are a citrus lover you should know that massive research efforts, including this project, are underway to keep citrus affordable and plentiful.

Consumers
While Citrus Greening poses no threat to you or your family's health, it still affects your grocery budget and your access to citrus products such as orange juice, fresh oranges, grapefruit juice, limes, and lemons.

Growers
HLB/ Citrus Greening is a serious threat to citrus production. Management practices can be expensive and time consuming. While there is no end all cure to HLB, we are currently working on creating long term solutions, also known as therapies, to help citrus growers combat the disease.

Research
The Citrus Greening database hosts genome resources for the citrus host, the Asian citrus psyllid vector and the Ca. Liberibacter asiaticus pathogen. It also includes other bacteria related to the pathogen such as Ca. Liberibacter americanus and Ca. Liberibacter asiaticus gypsy.

News
USDA projects citrus output will continue slide

Blog
New Blog Post



Portal for all Agricultural Disease Vector Systems



AgriVectors Home Page



Citrusgreening



Zebra chip



Andrew Jensen



Pierce's disease



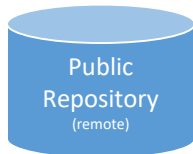
Alex Wild

Pathogens: Bacteria, virus and fungi

AgriVectors Data Schema

Improved Rapid Data Cluster Analyses
and Access

NCBI / EMBL / DDBJ
Ag Data Commons
i5k



Zebrachip
Citrusgreening
Pierce's disease



CRISPR / RNAi genes
Bacterial effectors
Microbiome
Geospatial disease data

Data Producers



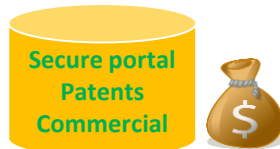
Researchers
Extension agents
Industry
INRA
USDA ARS / APHIS



Data Consumers



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



Data types



Omic 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 pathosystem-wide data

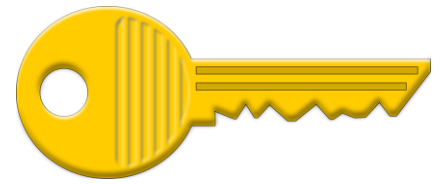
- Inclusive of Vector, pathogen, host, environment and beyond...
- Gene family based data sets (P450, RNAi pathway)
- E.g. Virus, Bacteria, or fungal infection assays
- Electrical Penetration Graph (EPG) feeding data
- Phenotyping data from disease trials
- Ecological and climactic data
- Behavioral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

Thank you!!

@Citrusgreening // @SahaSurya



#MakeDataGreatAgain

