

ROSBREED

Enabling marker-assisted breeding in Rosaceae

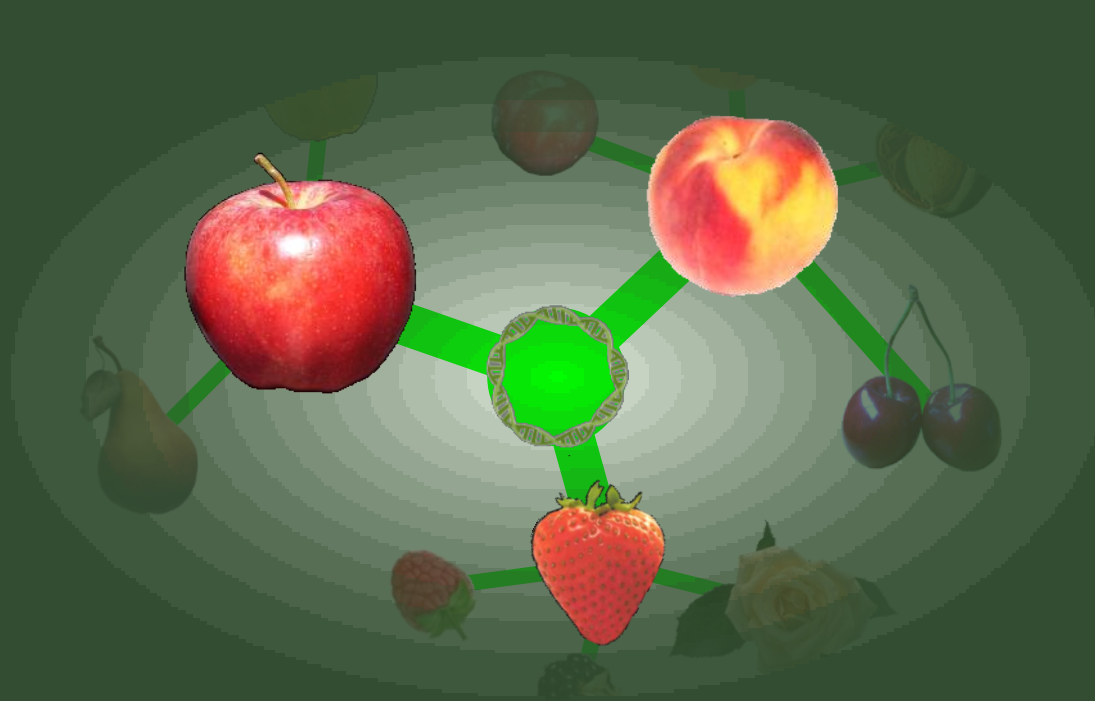
RosBREED: Transferring Marker Assisted Breeding Capabilities to the Public and Private Community of U.S. Rosaceae Breeders

Cholani Weebadde, Extension Team Leader, MSU



Outline of Presentation

- ❖ Currently available community resources through RosBREED
 - ❖ Standard phenotyping protocols
 - ❖ Pedimap
- ❖ Ways to connect with RosBREED

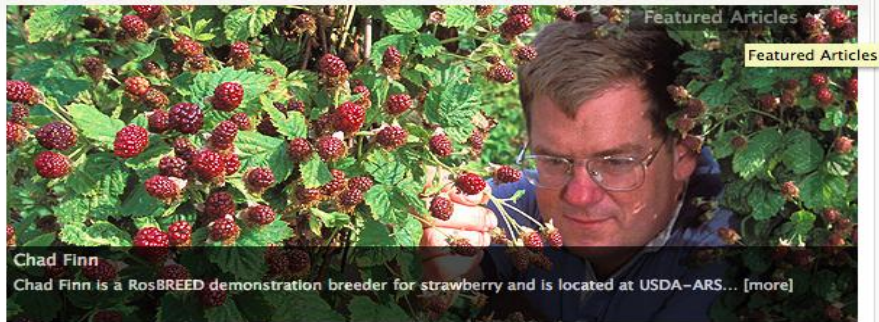


Standard Phenotyping protocols


Why we think Standardizing Phenotypic Protocols is important

- Phenotypic data is associated with Genotypic data for identifying Marker Trait Locations for MAB
- Associations can only be made if same protocol was used for phenotyping
- A lot of thought have been given to develop these protocols





Downloads

 RosBREED: Enabling marker-assisted breeding in Rosaceae
RosBREED will create a national, dynamic, sustained ... [Read More...]

 Slideshow
Enabling marker-assisted breeding in Rosaceae Click ... [Read More...]

News

RosBREED releases the May issue of their newsletter (05/26/10)
Enhancing the RosBREED network at professional meetings: International Fruit Tree Association (IFTA) Grand Rapids, MI RosBREED project will use every opportunity to link with its Advisory Panel (AP) ... [Read More...]

ASHS RosBREED Workshop has been scheduled for August 4th, 2010
RosBREED will be hosting a workshop at the 2010 ASHS Annual Conference in Palm Desert, CA. The workshop will be Wednesday, August 4th 8-10 am. For more information please visit the ASHS RosBREED ... [Read More...]

Peach genome sequence has been released!! (04/01/2010)
On 1 April 2010 at 9 pm PST, the peach genome sequence was released on GDR. Please visit this website for more information. ... [Read More...]

Resources

Project Description
Integration of modern genomics tools with traditional breeding approaches will transform crop improvement in Rosaceae, significantly improving ... [Read More...]

Marker-Locus-Trait Associations
A marker-locus-trait (M-L-T) association is a predictive genetic marker developed for specific locus that contribute to genetic variation for ... [Read More...]

Welcome to the RosBREED Project

Funded by the 2009 USDA NIFA Specialty Crops Research Initiative, RosBREED will create a national, dynamic, sustained effort in research, infrastructure establishment, training, and extension for applying marker-assisted breeding (MAB) to deliver improved plant materials more efficiently and rapidly. The Rosaceae family (including apple, peach, sweet and tart cherries, and strawberry) provides vital contributions to human health and well-being, and collectively constitutes the economic backbone of many U.S. rural communities. Rosaceae genetics and genomics are developing rapidly but have not been translated to routine practical application. [Read More...]

Highlights



Amy lezzoni presents at the ...

Upcoming Events

> August 4, 2010
ASHS RosBREED Workshop has been scheduled for August 4th, 2010
Palm Dessert
More Info
View All Events

You can access these standardized phenotyping protocols by logging into our website:



Resources



Phenotyping in Sweet Cherry

Videos Coming
Soon.... An example....

By Blessing Athanson

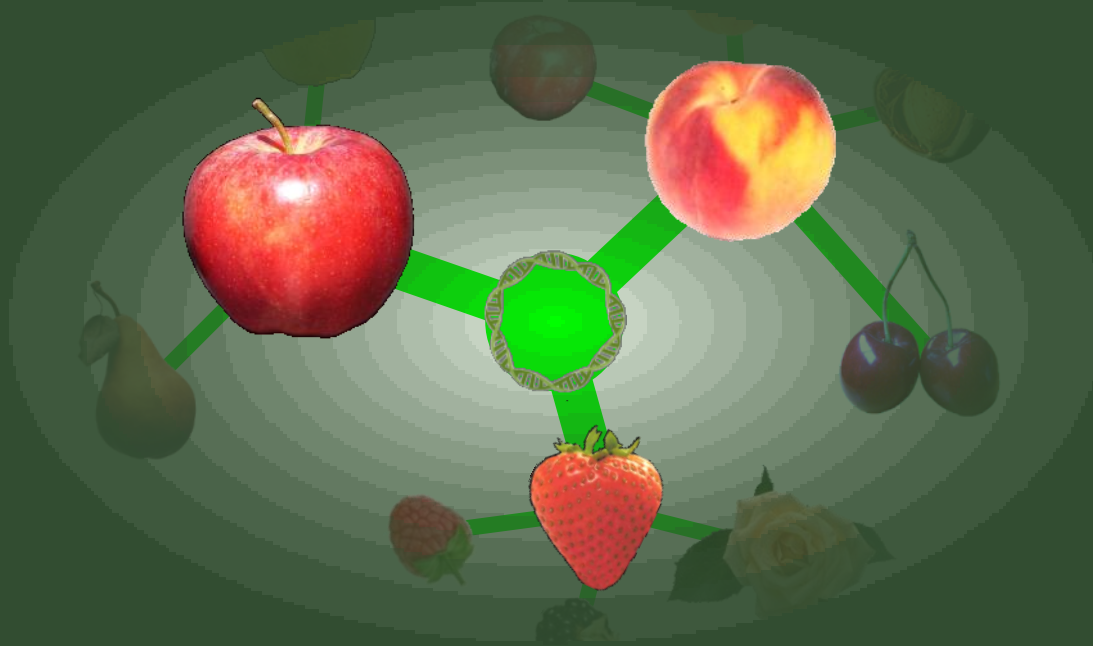
Associate in Research

&
Addie Dahl

Associate in Research

Nnadozie Oraguzie – PD

Amy Iezzoni and Cameron Peace-Collaborators



Pedimap



Pedimap – a program to organize and visualize Pedigrees

- ❖ What is Pedimap?
- ❖ What does Pedimap Do?
- ❖ How to access Pedimap?

Pedimap

Software for the visualization of genetic and phenotypic data in pedigrees

Roeland E. Voorrips, Wageningen UR – Plant Breeding

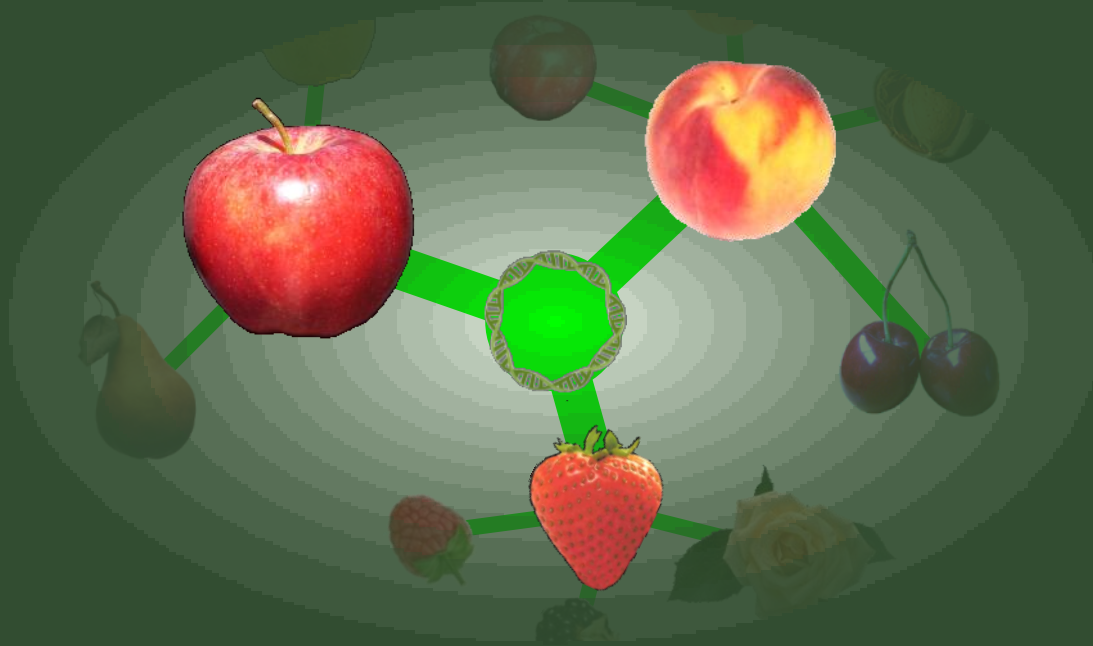
Pedimap is a tool for exploring and visualizing the flow of phenotypes and alleles (observed or based on Identity-by-Descent calculations) through pedigrees. It has tools for the manual and automatic selection of parts of the pedigree based on criteria such as ancestors and/or progeny to a specified number of generations, along the maternal, paternal or both lines, sibs etc. For each selection multiple views can be generated to display different linkage groups, phenotypic traits etc. Once a view is created for one selection, it can be automatically recreated for any other selection. Pedimap can deal with numeric as well as textual phenotypic scores, and with polyploids as well as diploids. The genetic information can be displayed according to genetic linkage maps, hence the name.

Pedimap is available for the Windows platform (all 32-bit or 64-bit versions, Windows98 up to Windows7). Pedimap can be downloaded [here](#).

What is Pedimap?

- Software for exploring and visualizing the “flow” of phenotypes and alleles through pedigrees
- Developed by Roeland E. Voorrips at Wageningen UR – Plant Breeding, The Netherlands
- Freely available!





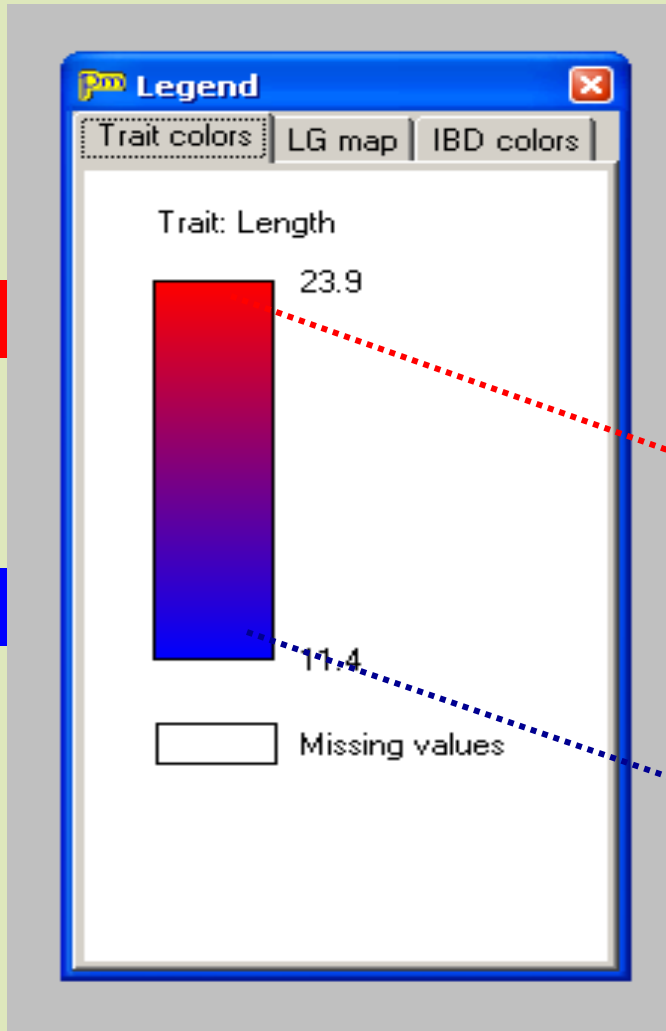
What does Pedimap Do?

What does Pedimap Do?

- Can be used to present genetic information such as:
 - phenotypic traits
 - scored marker alleles
 - Identity-By-Descent probabilities
 - QTL functional allele probabilities

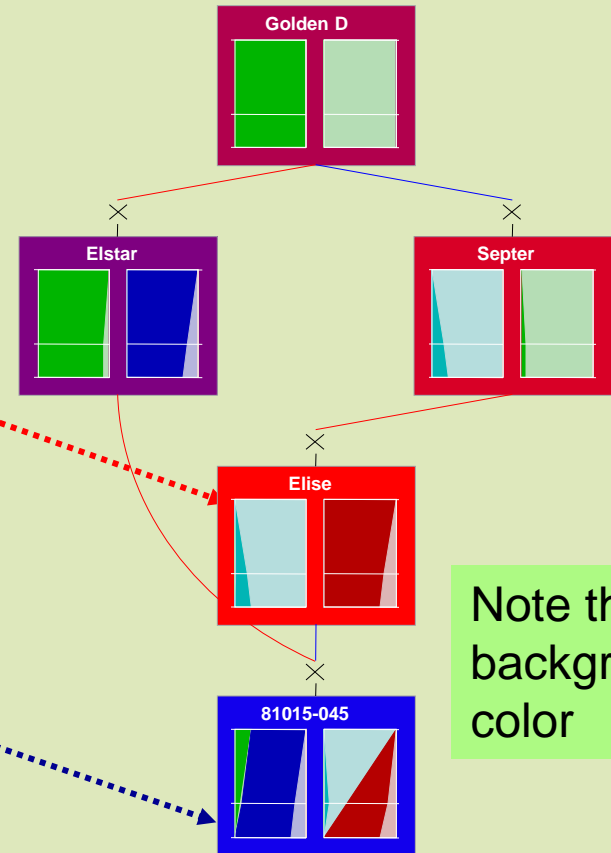


Visualizing Phenotypic Data



High value

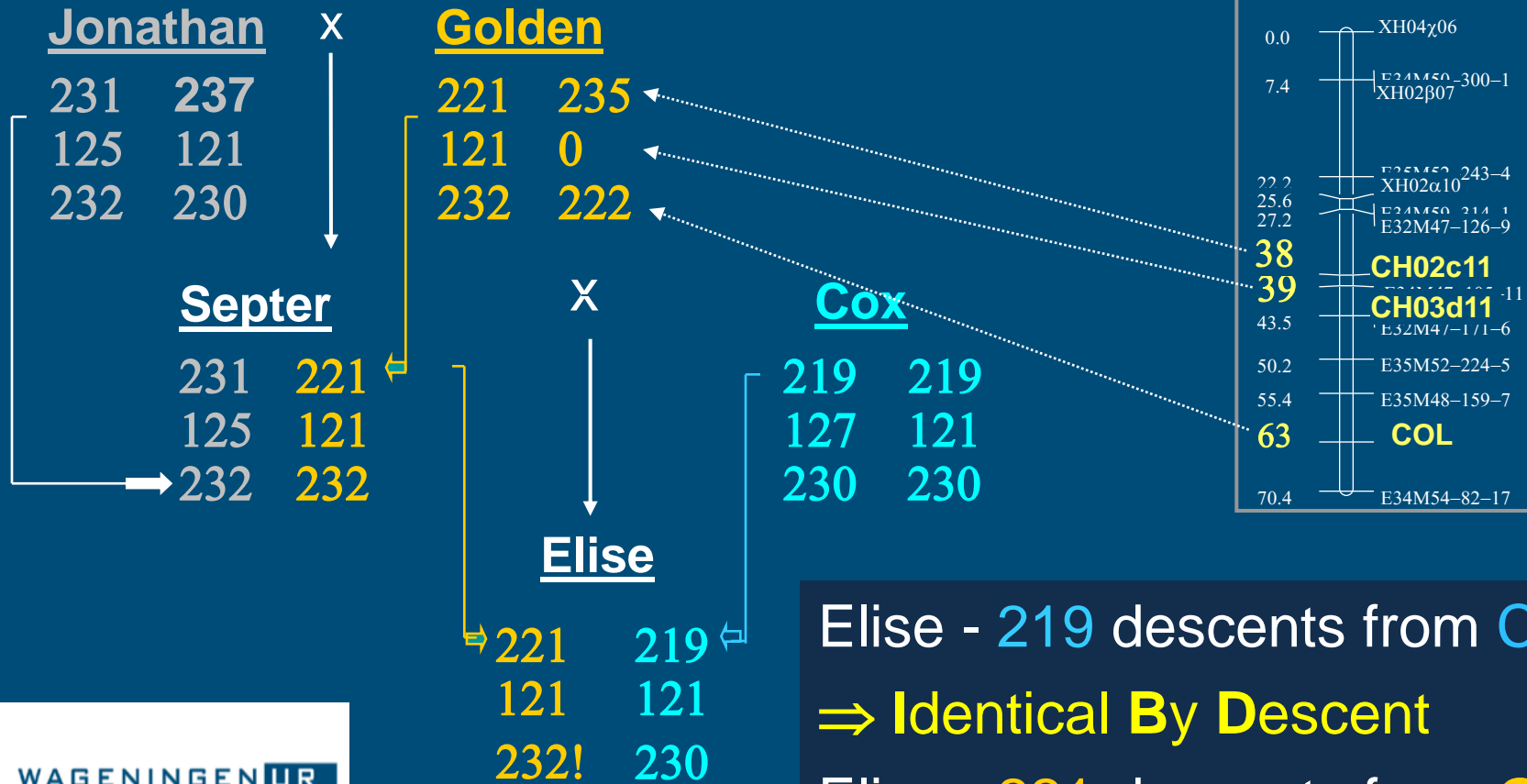
Low value



Note the background color



Identity-By-Descent (IBD)

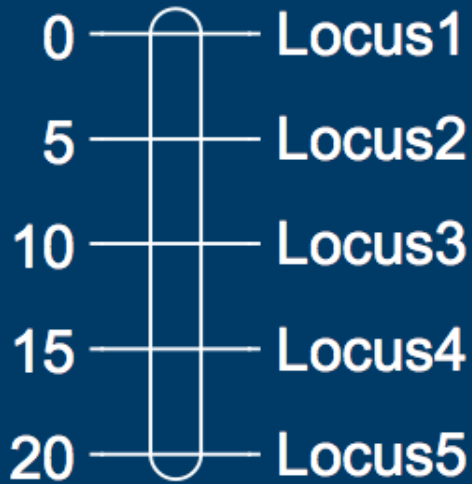


Elise - 219 descents from **Cox**
 ⇒ **Identical By Descent**
 Elise - 221 descents from **GD**



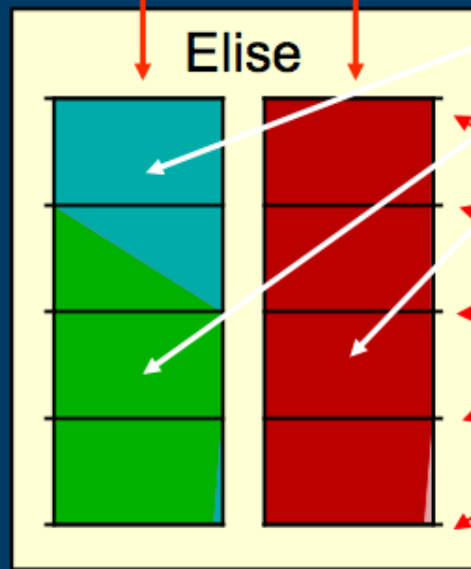
Visualizing Genotypic Data

Assume you are looking at 5 loci



Linkage group inherited from

mother father



Color indicates founder from which allele is inherited

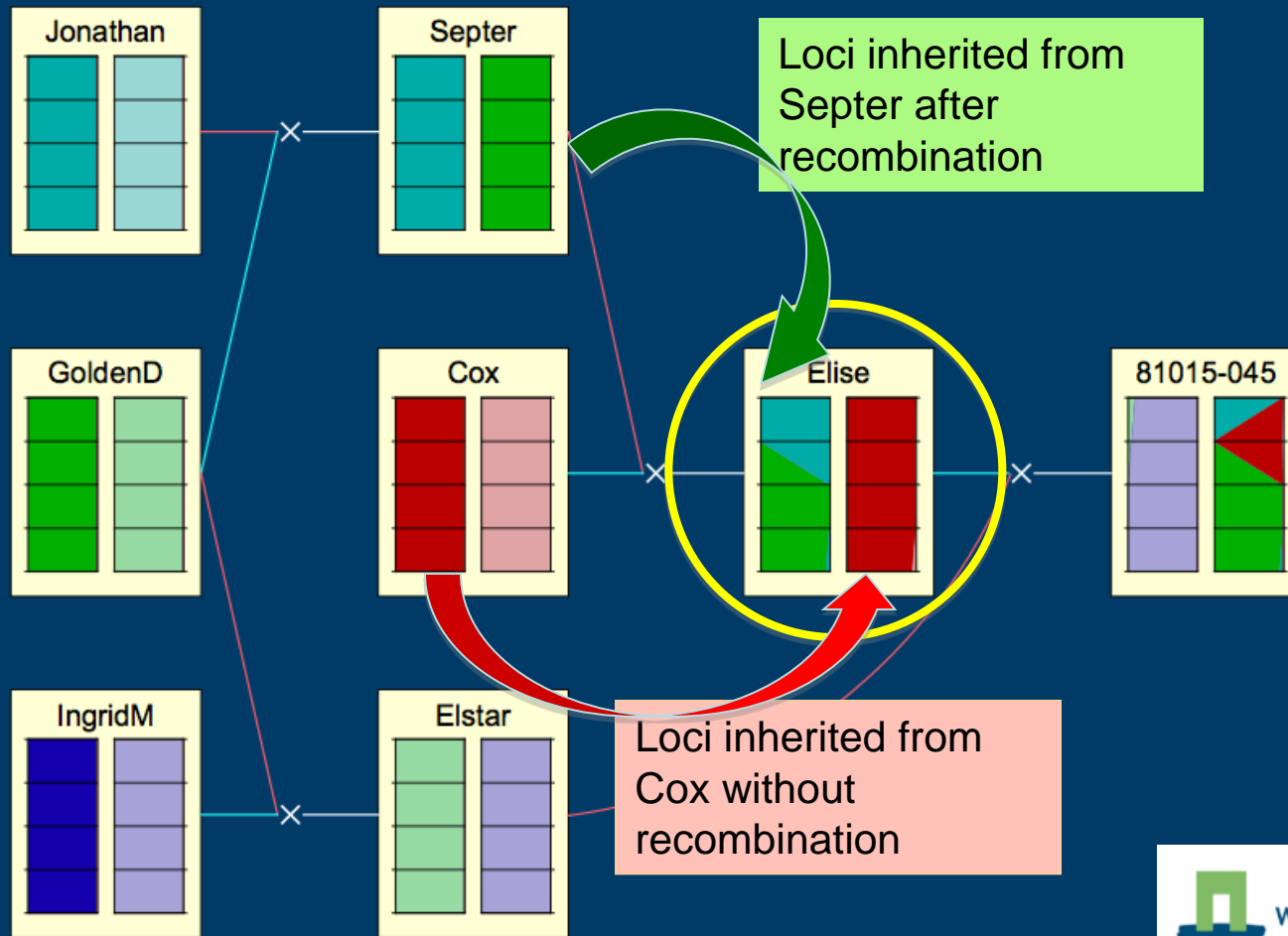
Locus positions



Width indicates probability of founder alleles



Visualizing Genotypic Data



- Pedimap allows breeders to visualize distribution of desirable alleles for important traits across their germplasm

→ To support decisions in parent selection and crossing



Thoughts from a RosBREED Peach breeder: Ksenija Gasic....

“I put in to pedimap pedigree information (for those that I could find) of all genotypes that we have in our germplasm collection. I also created the separate file with all of the crosses I performed in last 3 years with all of their pedigree information to track what genotypes I’m using and how are they connected through pedigree. Additionally, I’m working on genes involved in drought resistance/tolerance in peach and **I used pedimap to select most distant genotypes for discovery of allelic differences in promoter region**”



Thoughts from a RosBREED Peach breeder Ksenija Gasic cont'd....

“I am also planning on including many of ‘nuisance’ or as we call it usefull data into pedimap file so I can use coloring system to visualize published data on disease resistance and some other traits of interest in my germplasm to help me decide in creating next year breeding plan.”



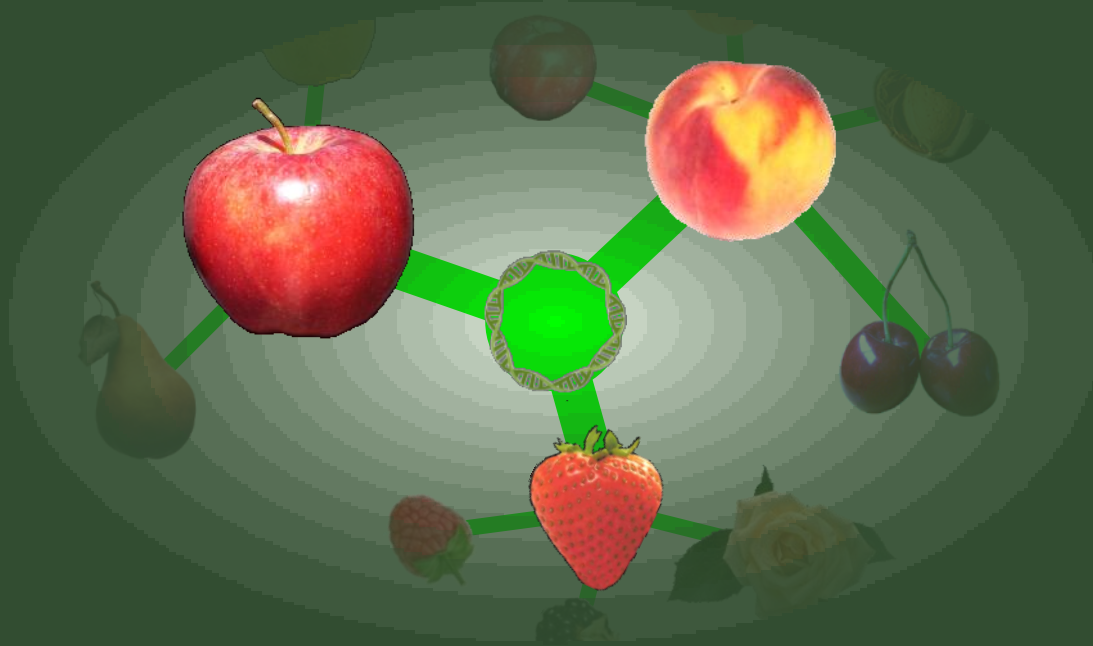
Thoughts from a strawberry breeder: Jim Hancock



“I will find Pedimap most useful in parent selection. Not only can I pick out the individuals with the most complementary traits but also the ones that are the most diverse. Currently, I stare at spread sheets for hours making these decisions.”

We hope you will also benefit from the use of Pedimap





How Can You Get Pedimap?

How Can I Get Pedimap?

- Step 1: Go to website

www.plantbreeding.wur.nl/UK/software_pedimap.html

- Step 2: Read webpage
– interesting stuff!

- Step 3: See below
first paragraph

Pedimap

Software for the visualization of genetic and phenotypic data in pedigrees

Roeland E. Voorrips, Wageningen UR – Plant Breeding

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“Pedimap can be downloaded **here**”



How Can I Get Pedimap? cont'd

Step 4

Step 5

Step 6

Pedimap

Software for visualization of genetic and phenotypic data in pedigrees

Download & Installation instructions

You can download Pedimap by clicking [this link](#). Installation is simple: just copy all files from the downloaded zip file to any directory on your PC.

How to obtain a licence

Pedimap can be used, with limitations, without a license. However, a free, personal license can be obtained [here](#). The license file will be send to you by email. To unlock all Pedimap features, simply copy the license file to the same directory where you installed Pedimap and restart the program.

www.plantbreeding.wur.nl/UK/software_pedimap.html



How Can I Get Pedimap? cont'd

Pedimap

Software for visualization of genetic and phenotypic data in pedigrees

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Step 7 (final)



www.plantbreeding.wur.nl/UK/software_pedimap.html





We do have a link for Community breeders under the “Breeding” menu item that will also take you to the Pedimap software.

Community Breeders

Welcome to Community Breeders: the community of Rosaceae breeders (publ

Software

An introduction to PediMap software, used to visualize breeding data across pedigrees, will be provided at the 2010 American Society for Horticultural Science annual conference. Currently, RosBREED's 12 demonstration breeders are using PediMap (click here for more information regarding this software and to request a free copy). Further details coming soon.

Marker-assisted breeding (MAB) information

RosBREED's Project Director, Dr. Amy Iezzoni, has started

- Her first feature piece describes a gene that influences
- Sweet cherry fruit size and firmness

Molecular short course announcements

Title: Molecular Plant Breeding – An International Short

Course Dates: August 29—September 3, 2010

Organized by: Michigan State University Plant Biotechnology and the Plant Breeding and Genetics Program and Dr. C. ... outreach team leader.



We also have Dr. Umesh Rosayro who will be able to answer your questions on any statistical issues and software

What other new features are coming up in RosBREED years 3 and 4?

- Participatory workshops (year 3 & 4)
- Regional workshops (year 4)

To learn what MAB applications and databases are working well for us, you are welcome to participate in these workshops that will happen near you....



RosBREED Extension Outreach Team



Cholani Weebadde
Michigan State University
Area of interest: Outreach
Role: Extension Team Leader



Michael Coe
Cedar Lake Research LLC
Role: External evaluator



Carlos Crisosto
UC Davis
Area of interest: Peach extension
Role: 2013 CA regional meeting host



Gennaro Fazio
USDA-ARS, Cornell University
Area of interest: Apple extension
Role: Coordination with other RosBREED Teams



Karina Gallardo
Washington State University
Area of interest: Agricultural economics
Role: 2013 WA regional meeting host



Amy Iezzoni
Michigan State University
Area of interest: Cherry breeding and genetics
Role: Project Director



Jim McFerson
Washington Tree Fruit Research Commission
Area of interest: Industry research
Role: Industry liaison



Dorrie Main
Washington State University
Area of interest: Bioinformatics
Role: RosBREED website development



Cameron Peace
Washington State Univ.
Area of interest: Apple & cherry fruit quality
Role: Coordination with other RosBREED Teams



Greg Reighard
Clemson University
Area of interest: Peach extension
Role: 2013 SC regional meeting host



Audrey Sebolt
Michigan State University
Area of interest: Cherry breeding and genetics
Role: Extension Team Leader's assistant



Alexandra Stone
Oregon State University
Area of interest: Vegetable extension
Role: PBG Works website administrator



Kenong Xu
Cornell University
Area of interest: Genomics of fruit trees
Role: 2013 NY regional meeting host

Who we are:

Cholani Weebadde, Michigan State Univ.

Michael Coe, Cedar Lake Research LLC

Carlos Crososto, UC Davis

Gennaro Fazio, USDA-ARS (Cornell Univ.)

Karina Gallardo, Washington State Univ.

Amy Iezzoni, Michigan State Univ.

Jim McFerson, Washington Tree Fruit Commission

Dorrie Main, Washington State Univ.

Cameron Peace, Washington State Univ.

Greg Reighard, Clemson Univ.

Audrey Sebolt, Michigan State Univ.

Alexandra Stone, Oregon State Univ.

Kenong Xu, Cornell Univ.

RosBREED

Enabling marker-assisted breeding in Rosaceae



www.rosbreed.org

Participatory workshops in 2012 and 2013

- We will have a total of **9 Participatory workshops** to share the successful MAB applications of our Demonstration Breeders

Locations: New York, Michigan, South Carolina, Arkansas, Texas, California, Washington, Minnesota, and New Hampshire



Regional Workshops in 2013

- We will also have **4 Regional workshops** organized by four of our regional extension specialists to provide training on MAB:
 - Carlos Crisosto - California (Univ. of Calif. - Davis)
 - Karina Gallardo - Washington (Wash. State Univ.)
 - Greg Reighard - South Carolina (Clemson Univ.)
 - Kenong Xu - New York (Cornell Univ.)





Enabling marker-assisted breeding in Rosaceae

Dedicated to the genetic improvement of U.S. rosaceous crops

May 28, 2010

Volume 1 Issue 2

Enhancing the RosBREED network at professional meetings, International Fruit Tree Association (IFTA) Grand Rapids, MI

RosBREED project will use every opportunity to link with its Advisory Panel (AP) members and Rosaceae community breeders to enhance the network. While we were fortunate to meet and interact with 21 of our AP members in San Diego in January at RosBREED I, some of our AP members were not able to attend this meeting. Considering the participation of our AP members and Co-PDs at the 2010 International Fruit Tree Association (IFTA) meeting in Grand Rapids, Michigan, we met over dinner on to interact with our AP members who were not in San Diego and visit again with those who were present at RosBREED I. We met over Dinner on March 1, 2010 and took this opportunity to discuss project activities and networking strategies.



Co-PD Jim McFerson and AP member Bill Dodd commenting on strategies to communicate science discoveries on fruit traits to industry representatives.



After carefully reviewing the IFTA schedule, we realized the only time available to meet was over dinner. Pictured from left to right: Cennaro Fazio, Brian Sparks, Lailing Cheng, Amy Iezzoni, Jim McFerson, Bill Dodd, Cholani Weebadde, and Audrey Sebolt.



We even talked as we were passing each other in the hall way between sessions at IFTA. Pictured from left to right: Greg Reighard, Brian Sparks, Amy Iezzoni, Audrey Sebolt, and Jim McFerson.

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RosBREED Quarterly Newsletter

The easiest way to find out the latest information on RosBREED and what is happening near you.

Acknowledge two of our AP members:

David Karp
Brian Sparks

For their interest and time in reviewing the Newsletters

Summary

We hope RosBREED's outcomes will benefit you

RosBREED Newsletter - Latest success stories and what applications are ready for testing

If you'd like to receive the RosBREED newsletter, please meet me after this talk and provide your email address



Acknowledgements



This project is supported by the Specialty Crops Research Initiative of USDA's National Institute of Food and Agriculture



Questions?



Project meetings and workshops

<i>Timeline</i>	<i>Meeting</i>	<i>Location</i>	<i>Target Audience</i>	<i>Theme</i>
YR 1	RosBREED I	San Diego, CA Jan 7 th – Jan 8 th , 2010	RosBREED Participants, Advisory Panel Members, & Collaborators	RosBREED Orientation & Planning
	SNP Summit	Seattle, WA May 2010	RosBREED Genomics team participants & Collaborators	Design genotyping platforms in coordination with international partners.
	ASHS	Palm Springs, CA August 2010	Non-core breeders & local AP Members	RosBREED Introduction to non-core Rosaceous crop breeders
YR 2	RosBREED II	East Lansing, MI Week of March 3 rd , 2011	RosBREED Participants, Advisory Panel Members, & Collaborators	<ul style="list-style-type: none"> Breeding teams perform data analysis. Overview of RosBREED goals, accomplishments, deliverables to date. Feedback from AP Members & Collaborators
YR 3	RosBREED III	East Lansing, MI Week of March 5 th , 2012	RosBREED Participants, Advisory Panel Members, & Collaborators	<ul style="list-style-type: none"> Breeding teams perform data analysis. Overview of RosBREED goals, accomplishments, deliverables to date. Feedback from AP Members & Collaborators
	Participatory Workshops	4 locations* 2012	Core and non-core breeders Local Advisory Panel Members	Assist in MAB adoption by breeders Stakeholder education
YR 4	RosBREED IV	TBD 2013	RosBREED Participants, Advisory Panel Members, & Collaborators	<ul style="list-style-type: none"> Breeding teams perform data analysis. Overview of RosBREED goals, accomplishments, deliverables to date. Feedback from AP Members & Collaborators Final recommendations and program evaluation
	Participatory Workshops	5 locations* 2013	Core and non-core breeders Local Advisory Panel Members	Assist in MAB adoption by breeders Stakeholder education
	Regional Workshops	NY, SC, WA, CA 2013	Regional extension specialists. Non-core breeders Industry representatives	MAB training Technology transfer Engage stakeholder community

* Participatory workshops will be located in NY, MI, SC, AR, TX, CA, WA, MN, and NH.