RosBREED

Combining Disease Resistance with Horticultural Quality in New Rosaceous Cultivars

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In This Issue

2 Meet the Socio-Economics Team

3 Featured Team Member

5 Rosaceae Nemesis

6 Cultivar Corner

8 Meet our AP Members

Sharing our Success: One Story at a Time

Jim McFerson, Extension Team Member and Mercy Olmstead, Extension Team Leader

Success stories are coming your way. Our stakeholders collaboration with scientists to develop the RosBREED project led to important considerations, changing how we communicate with them. The stakeholders challenged scientists to enable breeders to more effectively develop superior new cultivars that combine disease resistance with horticultural quality. Building on the first RosBREED project, applying new scientific knowledge and genetic tools, this project seeks to help deliver rosaceous cultivars offering producers and packers more options to sustainably protect their crops from disease and post-harvest disorders, while providing consumers with better taste, texture, nutrition, and appearance.

Every scientist involved in the RosBREED project appreciates the confidence stakeholders place in the research team to meet the challenge. We hope to maintain that confidence by doing good science, applying results, and communicating clearly and consistently with external supporters and breeding clientele as well as the research team.

Such communication is another challenge in a project as large, diverse, and ambitious as RosBREED. We are a huge project: 22 U.S. breeding programs, eight crops, 35 scientists, and 14 institutions. We have another four years to deliver on our objectives but are not satisfied to wait until then to share progress. Although much of our work is highly technical and so the results not easily described, our Extension Team intends to keep our stakeholders informed and our ears open to their ongoing input.

One way we intend to do that is via RosBREED Success Stories, highlighting tangible and intangible outcomes from our targeted activities. These Success Stories will be available in our quarterly newsletters, our newly designed website, and in a printable one-page format we call "RosBRIEFs."

The idea for RosBRIEFs came directly from our Industry and Extension Advisory Panel members at our kick-off annual meeting in 2015. They wanted to have communication materials they could use for their own clientele, free of technical jargon, acronyms, and excessive data. Such one-pagers will include success stories, new cultivar updates, Rosaceae disease features, and whatever else might fill this need. We also expect these short communications will be useful for the USDA, policy makers, and consumer-oriented media.

Drew Wilson

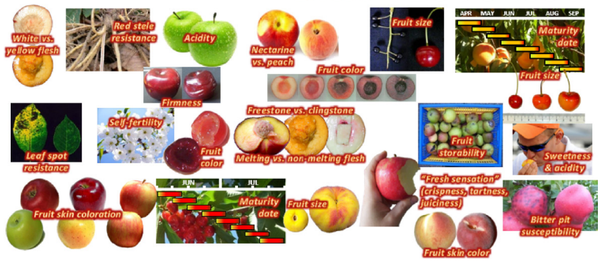
Another communication Success Story is the development and launch of a website redesign (www.rosbreed.org). Drew Wilson, our new webmaster and communications specialist, spearheaded this effort. Information is easier to find, text is streamlined, and lots of images are included. Along with pages for breeders, pathologists, and industry find our Success Stories at www.rosbreed.org/SuccessStories.

An increase in the quality and quantity of modern DNA tests developed (www.rosbreed.org/breeding/dna-tests), validated, and implemented in U.S. public and private rosaceous breeding programs is an important measurement for RosBREED.

(Continued on Page 2)

DNA TESTS THEN

DNA TESTS NOW



Already in Year 1, we are having significant successes in peach, strawberry, apple, and cherry (see above). For example, when RosBREED first started in 2009 there were three DNA tests being used by rosaceous crop breeders; now there are over 25.

As with many large projects, sometimes the successes are intangible. Although David Byrne (Texas A&M Univ.) and Stan Hokanson (Univ. of Minn.) have successful rose breeding programs, this is the first time both have worked together. The cooperation of the two largest public rose-breeding programs in the United States is one such success story. As a result of RosBREED, they are sharing germplasm and ideas that have led to additional funding. Networking and connecting resources in *Rosa* spp. is a success that will certainly lead to future projects and collaborations.

In the spirit of the Specialty Crop Research Initiative, our stakeholders challenged us to do more than conduct and report on our research. They challenged us to systematically communicate our progress towards objectives in a way that enhanced their ability to spread the word about RosBREED and continue providing input to make our project better. We expect our Success Stories and RosBRIEFs will successfully meet that challenge!

Featured Team: Socio-Economics Team

Chengyan Yue, Socio-Economics Team Leader and Mercy Olmstead, Extension Team Leader

A new cultivar's success is determined by many factors such as hitting appropriate market windows and having excellent horticultural quality, durable disease resistance, and excellent returns over current industry standards. However, there can be obstacles to grower adoption of a new cultivar, such as the need to implement different cultural practices compared to current, better-known cultivars. Measuring these factors that drive decisions to plant new cultivars is a key responsibility of our Socio-Economics (SE) Team.

The SE Team uses economic theories and methods to determine stakeholders' preferences for fruit or plant attributes, how they value tradeoffs between different attributes, and if breeding programs can benefit from the use of DNA information in the breeding process.

The SE Team will conduct cost-benefit analyses of using DNA information in various breeding programs – whether they are just beginning to use these tools or if they already have advanced capabilities. The goal is to quantify how implementing DNA tests increases breeding effectiveness, provides greater return on investment, and increases the number and market potential of new cultivars released to growers.

Often with increased disease resistance, fruit quality can suffer! This must be taken into consideration when deciding to adopt a new cultivar. The SE Team will conduct surveys and case studies with peach (K. Gasic, Clemson Univ. and M. Olmstead, Univ. of Florida) and strawberry (V. Whitaker, Univ. of Florida and L. DeVetter, Washington State Univ.) to determine how growers make decisions about tradeoffs between disease resistance and fruit quality.

While SE Team members reside in Minnesota and Washington, they serve the entire national RosBREED effort. The information the Team gains from this project will help breeders prioritize breeding targets, determine uses of DNA information that are economically feasible, and define the important factors that go into grower decisions of adopting a new cultivar. Results will be distributed to breeders via scientific presentations, industry meetings, and by working with the DNA-Informed Breeding and Extension teams. Factors affecting adoption decisions and grower-related results will be published in trade journals in cooperation with the Extension team.

RosBREED on Facebook OR @rosbreed

RosBREED By the Numbers

10K Number of peach hybrids waiting for marker-assisted seedling selection

288 Pear and blackberry individuals being paternity-tested for possible use in Crop Reference Sets

$250M Estimated economic impact of U.S. rose industry

3,053 Apple seedlings culled in the UMN breeding program (2015)

25,050 Number of genes in the strawberry genome

Featured Team Member: *Chengyan Yue*

Audrey Sebolt, Project Assistant, MSU

Our featured team member this quarter is Chengyan Yue, who has been our Socio-Economics Team Leader for both RosBREED projects.

Chengyan began her undergraduate studies in International Project Management at Tianjin University in China. While pursuing her bachelor's degree, she enrolled in an economics class and found it to be fascinating and therefore subsequently changed her major to economics. In 2007, after obtaining an MS and a PhD from Iowa State University, she accepted a position as an assistant professor at the University of Minnesota in the Department of Horticultural Science and the Department of Applied Economics, and currently holds the position of Bachman Endowed Chair in Horticultural Marketing. Just two years after starting her research at the University of Minnesota, the USDA-NIFA-SCRI funded RosBREED project (RosBREED 1) began – with Chengyan as the Socio-Economics (SE) Team Leader.

In addition to RosBREED 1 , Chengyan is also a participant in two USDA-NIFA-SCRI funded interdisciplinary collaborative projects: "Building Market Foundations for Sustainable Vegetable Production and Processing: A Consumer and Metrics-Based Approach" and "Germplasm Improvement of Low-Input Fine Fescues in Response to Consumer Attitudes and Behaviors". Communication within large collaborative research projects with multiple disciplines, Chengyan explained, can be difficult. For an interdisciplinary collaborative research project to be successful, her advice is to communicate frequently and for participants to strive to comprehend the objectives and impacts for all of the disciplines involved.

RosBREED 1 is considered to have been extremely successful and this was due, in part, to team leaders across multiple disciplines (breeders, extension, socio-economics, industry, and plant science researchers) communicating during monthly conference calls. Chengyan's organizational and communication skills, attention to details, and solid knowledge of economics methodologies contributed much to the SE Team's success. Chengyan and her team's results have provided tremendous insights towards how much certain attributes; such as crispness for apples, should influence breeders' decision making. These insights were revealed after surveying processors, producers, breeders, and consumers. The SE Team's methods and conclusions are presented in seven journal publications (www.rosbreed.org/publications). The most interesting aspect of this project for Chengyan was developing a framework to investigate stakeholders' (consumers, producers, and processors) preferences.

RosBREED's project director Amy Iezzoni had this to say of Chengyan: "Knowledge of relative trait values that were determined by Chengyan's SE Team have helped us make sure that RosBREED is on target, keeping our focus on the highest priority attributes and maximizing our project's impact across all levels of the supply chain."

Dr. Chengyan Yue. Photo: David Hanson

The SE Team has also benefited from transdisciplinary collaboration. Prior to RosBREED, Chengyan hadn't realized the vast number of apple cultivars and believed 'Bing' and 'Rainier' were the only sweet cherry cultivars grown. She now has a new perspective about fruit quality and comprehends how difficult it is to develop a commercially successful new cultivar. She also understands that breeders, for the most part, have the resources to develop a new cultivar with improved attributes, however, prior to RosBREED, they did not have the tools to more effectively achieve this goal.

(Continued on Page 4)

Chengyan is excited about her team's objectives for RosBREED 2. The SE Team's RosBREED 2 tasks include cost-benefit analyses of Washington State University sweet cherry and the University of Minnesota apple breeding programs. The SE Team's objective is to determine the extent to which, and in which situations, DNA testing increases breeding effectiveness, provides a greater return on investment, and increases the number and market potential of new cultivars released to growers. A graduate student under Chengyan's supervision (student name) is conducting cost-benefit analyses of the sweet cherry and apple breeding programs.

Why did you choose to be involved with RosBREED?

"First, I am interested in the research topic, which can have significant social, economic, and environmental contributions. Second, I am attracted by the transdisciplinary nature of the project, which is a challenging but rewarding experience. Third, this is a great opportunity to work with world-class top-notch researchers in various disciplines."

What successes do you hope to see from RosBREED?

"I hope we can successfully make use of the DNA information to hasten the release of new cultivars that are liked by consumers, distributors, and growers. I hope the work from the Socio-Economics Team can help with this process."

How have you already benefited from RosBREED?

"I learned a lot from RosBREED. The experience of working with researchers from different disciplines and with industry groups inspires me to tackle problems using innovative methods and to look at the same problem from many angles. I also now have extensive experience with successful communication among multiple disciplines and coordination among research teams, extension specialists, and industry groups, which I did find challenging at the beginning of this project. This unique experience and the high productivity of this research team also help me build my academic career."

What is one thing your colleagues don't know about you?

"My favorite fruit is sweet cherries – both 'Bing' and 'Rainier'. I like 'Rainier' better because of its juiciness and sweetness though!"

*Ph*inally *D*one!

Congratulations to Dr. Alejandra Salgado, Ph.D. from the University of Arkansas, a RosBREED student trainee (RosBREEDling).

Her major advisor was Dr. John Clark, and her dissertation topic was "Applying Molecular and Phenotypic Tools to Characterize Flesh Texture and Acidity Traits in the Arkansas Peach Breeding Program and Understanding the Crispy Texture in the Arkansas Blackberry Breeding Program".

Alejandra was also awarded the Outstanding Ph.D. Student in the Department of Horticulture, University of Arkansas, 2015. Her future plans include returning to Chile to find a position as a berry breeder.

Dr. Alejandra Salgado accepting an award for Outstanding Ph.D. Student with her advisor, Dr. John Clark, University of Arkansas.

Community Events

Annual Plant and Animal Genome (PAG) Conference

PAG is the largest Ag-genomics conference in the world, with more than 3,000 plant and animal science researchers and more than 130 exhibits, 150 workshops, 1,100 posters and 1,800 technical abstracts.

Town and Country Hotel and Conference Center, San Diego, CA
January 9-13, 2016
For more information: http://intlpag.org/

8th International Rosaceae Genomics Conference (RGC8)

INRA, Angers, France, June 27-30, 2016 (tentaive dates)

American Society for Horticultural Science Annual Conference

Sheraton Atlanta Hotel, Atlanta, GA
August 8 – 11, 2016
For more information: http://www.ashs.org/?page=GeneralConference

International Strawberry Symposium

Building on the success of past editions, the next ISHS International Strawberry Symposium will take place in Quebec city.

Quebec City Convention Centre, Quebec City, Quebec, Canada
August 13-16, 2016
For more information: http://www.iss2016-quebec.org/en

National Association of Plant Breeders Annual Meeting

Cotton Incorporated and North Carolina State University, Raleigh, NC
August 15-18, 2016
For more information: https://www.plantbreeding.org/annual-meeting-2016

Rosaceae Nemesis:
Apple Blue Mold

Mercy Olmstead, Extension Team Leader and Michael Wisniewski, USDA-ARS

RosBREED is helping breeders release cultivars that are durably disease resistant. Many of the diseases that have been profiled in this column thus far are associated with plants and preharvest fruit quality, but postharvest diseases like apple blue mold are also receiving attention in the project. Thus, our feature for this month's newsletter is apple blue mold, caused by the fungus *Penicillium expansum*.

Symptoms and Impact

Apple blue mold (Figure 1) is a significant postharvest disease that causes heavy economic losses due to decay in stored apples destined for the fresh market. Economic losses may be as high as $4.5 million to $5 million annually. The fungus primarily infects fruit through wounds from punctures or bruises, and thus minimizing activities in the postharvest chain that can damage fruit is very important. A good video resource for various postharvest diseases of pome fruits, including blue mold (in pear) is available at: *http://bit.ly/1NLIwgq*.

Figure 1. Apple blue mold is a serious postharvest disease exhibited as watery regions where areas of blue-green tufts of spores develop. Photo: W. Janisiewicz, USDA-ARS

Fighting the Pathogen

Growers combat potential sources of inoculum with good orchard sanitation – ensuring that decayed fruit and organic material on the orchard floor is removed. In the packinghouse, a drench or spray of a fungicide or a biocontrol agent (*Pseudomonas syringae*) can be used to prevent apple blue mold or other postharvest fungi from decreasing fruit quality after entering storage. Additionally, good sanitation of harvest and packing line equipment is essential to prevent harboring of *P. expansum* spores that may re-infect other fruit.

*Figure 2. A wild apple selection, PI 613981 (*M. sieversii*) showing resistance to blue mold compared to 'Royal Gala', which is susceptible. Photo: M. Wisniewski, USDA-ARS*

Resistant Germplasm & Breeding

With many diseases, identifying a genetic source of tolerance or resistance is a necessary first step. With such a source, DNA-based tools can be developed and breeders can effectively develop new cultivars that genetically combat apple blue mold. A source of resistance has been found in *Malus sieversii*, a wild apple native to the mountains in Central Asia, particularly southern Kazakhstan, eastern Uzbekistan, Kyrgyzstan, Tajikistan, northern Afghanistan and Xinjiang, China. This large-fruited apple species is the primary ancestor of domesticated apple (Cornille et al. 2012), easing its breeding use, with fewer generations expected to be needed to introgress the desirable resistance allele(s) into elite genomic backgrounds suitable for commercial release compared to use of *Malus* species sources with small and bitter fruit.

Since *Malus sieversii* is a genetically diverse species, numerous sources of resistance to blue mold may be present and the resistance genes may have diverse functions, ranging from the presence of specific phenolic compounds that may be fungitoxic, to the ability to quickly recognize the presence of the pathogen and respond with a variety of defense mechanisms. The specific mechanism responsible for the resistance identified in *M. sieversii* PI613981 is currently being investigated.

Bringing in *P. expansum* resistance from *M. sieversii* is possible through the collaboration of Michael Wisniewski and Jay Norelli, USDA-ARS, Kearneysville, WV, and Samir Droby, Volcani Institute, Israel (Figure 2). Their project will identify QTL(s) for blue mold resistance in a mapping population of 'Royal Gala' × *M. sieversii* PI613981. This information will then be used in the RosBREED project to develop a DNA test that will aid breeders in releasing cultivars resistant to apple blue mold.

On the Horizon: Solutions from RosBREED

Routine use of a DNA test for apple blue mold resistance will help breeders to develop new apple cultivars that are esistant to blue mold leading to less postharvest fruit decay. Economic losses would be lowered in both the fresh fruit and processed industries, leading to a success for apple growers and processers!

Reference

Cornille A, Gladieux P, Smulders MJ, Roldán-Ruiz I, Laurens F, et al. (2012). "New Insight into the History of Domesticated Apple: Secondary Contribution of the European Wild Apple to the Genome of Cultivated Varieties". PLoS Genetics 8 (5): e1002703. doi: 10.1371/journal.pgen.1002703.

Jewels in the Genome

Amy Iezzoni, Project Director,
Michigan State University

Peach acidity is a key component of peach fruit flavor. Too much acid makes a fruit taste sour; too little and it tastes bland. Absolute levels of acidity and sweetness are important to flavor, but so is their balance. Developing peach cultivars with the desired levels and ratio of sugars to acid has long been a priority for peach breeders. While complex genetic control make this a highly challenging breeding objective, the international Rosaceae research community has made amazing progress to better understand sugar:acid factors and their interaction. We already know that a region on peach chromosome 4 contributes directly to flavor because it is associated with both sugar and acid levels (see Peach Flavor *www.rosbreed.org/breeding/jewels_archive*).

Recent studies have also identified two other chromosomal regions that influence peach acidity. A specific chromosomal region with a large effect on acidity was identified on peach linkage group 5 and is called the *D* locus (Boudehri et al. 2009). *D* was consistently associated with high (dd) and low (DD, Dd) acidity levels and a diagnostic marker was developed to ascertain its genotypic effect for any peach individual (Eduardo et al. 2014). In the RosBREED project, a second locus, named *G7Flav*, has also been identified. *G7Flav* explains a smaller but significant amount of phenotypic and genotypic variance for acidity (Fresnedo-Ramirez et al., 2015). Combining this new information generated by the international Rosaceae research community, we can now better predict acidity levels in any peach individual and have developed a single DNA test that genotypes both the *D* and *G7Flav* loci (called "Ppe-Acid") for use by peach breeders worldwide. For details, see: *www.rosbreed.org/breeding/dna-tests*.

With this underlying genetic knowledge and the reliable Ppe-Acid DNA test, breeders can now plan crosses to maximize the probability of using parents with useful alleles and that are effective in combinations, identify superior seedlings with targeted levels of fruit acidity more efficiently, and deliver peach cultivars with wonderful fruit quality. Therefore, because knowledge of these genetic regions will lead to more effective breeding of peach cultivars, they are featured as two of RosBREED's "Jewels in the Genome."

References

Boudehri, K., Bendahmane, A., Cardinet, G., Troadec, C., Moing, A., Dirlewanger, E. 2009. Phenotypic and fine genetic characterization of the D locus controlling fruit acidity in peach. BMC Plant Biology 9:59.

Eduardo, I., López-Girona, E., Batlle, I., Reig, G., Iglesias, I., Howad W., Arús, P., Aranzana, M. 2014. Development of diagnostic markers for selection of the subacid trait in peach. Tree Genetics and Genomics 10:1695-1709.

Fresnedo-Ramirez, J., Bink, M.C.A.M., van de Weg, E., Famula, T.R., Crisosto, C.H., Frett, T.J., Gasic, K., Peace, C., Gradziel, T.M. 2015. QTL mapping of pomological traits in peach and related species breeding germplasm. Mol Breeding 35:166.

Cultivar Corner

For those who enjoy strawberries, we are featuring a high-yielding and great tasting cultivar out of Michigan State University, as well as a peach cultivar from David Byrne of Texas A&M University.

'WASATCH' STRAWBERRY

INVENTOR: Jim Hancock, Emeritus Professor and Small Fruit Breeder, Michigan State University

Photo: J. Hancock

What makes 'Wasatch' special?

It is a day-neutral cultivar that is well adapted to the Midwestern and Northeastern USA, Ontario and Quebec, and the Pacific Northwest. The particular cross from which 'Wasatch' is derived combined germplasm from California and the Eastern U.S. – a bicostal cross. The name was chosen to honor the germplasm source of day neutrality in strawberry, which was found in the Wasatch Mountains, Utah by Royce Bringhurst.

When was the cross made?

2008

What is the parentage of 'Wasatch'?

'Seascape' × MSU 38 ('Tribute' × 'Honeoye'). 'Tribute' is a tasty, old eastern day-neutral that just wasn't commercial anymore. 'Honeoye' is a well flavored, short-day cultivar that kicks out a lot of day-neutral progeny and is still widely grown in the east. 'Seascape' is a marginally flavored day-neutral and was developed in California. It is still widely grown in the east. So, the cross was a nice blend of divergent germplasm with varying fruit quality.

What is the size of the family from which it was chosen?

It was a medium-sized family – 93 individuals.

Are there other siblings that have commercial potential?

No, unfortunately.

Will this cultivar be used in RosBREED and how?

Photo: J. Hancock

'Wasatch' is being used in crosses to identify DNA diagnostic markers for disease resistance and fruit quality traits.

Other interesting notes...

In field trials over three seasons, 'Wasatch' has consistently performed as day-neutral, fruiting for an average of 12 weeks in Mt. Vernon, WA and eight weeks in Benton Harbor, MI – which is a desirably long period. 'Wasatch' is vigorous and high-yielding, with medium-sized fruit. Its internal color is paler than for 'Seascape' fruit but it is superior in flavor. 'Wasatch' fruits are smaller and softer than those of 'Albion' but have an excellent flavor.

'TEXFIRST' PEACH

INVENTOR: David Byrne, Stone Fruit Breeder, Texas A&M University

COLLABORATOR: Natalie Anderson, Texas A&M University, College Station, TX

Photo: D. Byrne

What makes 'TexFirst' special?

'TexFirst' is very early maturing, has good productivity, with a great round shape. It has a yellow ground color with high red blush, excellent firmness, and melting flesh. It has a chilling unit requirement of about 150 to 200 chilling units, making this a good fit for orchards in Texas and in California, where it was also tested.

When was the cross made?

There wasn't a deliberate cross! It was an open-pollinated seedling, meaning that pollen came from an unidentified pollinator.

What is the pedigree of 'TexFirst'?

The seed parent is 'Thai Tiger', a cultivar jointly released by Texas A&M University and Kasetsart University (Kampangsaen, Nakhonpathom, Thailand). The seed was planted in a high-density nursery in 1996, and 'TexFirst' was chosen for its outstanding fruit quality.

What is the size of the progeny population from which it was chosen?

113

Are there other siblings that have commercial potential?

No

Will this cultivar be used in RosBREED and how?

No, not directly, but it is related to germplasm used in the University of Florida (UF) breeding germplasm (i.e., 'TropicBeauty') that was jointly released by Texas A&M University and UF. This germplasm plus other parents are being used in the current project population.

Other interesting notes...

I work with a former student Unaroj Boonprakob who runs the peach breeding program with the Royal Project in Thailand. Initially I sent him a number of selections from my program for evaluation there. From these came the 4 Thai Tiger releases, one of these was the parent of 'TexFirst'.

We transfered material via pollen exchange and then I send budwood to Thailand.

'TexFirst' blooms before some of the standard cultivars like 'TropicPrince' and 'TropicBeauty', meaning that if growers can protect this peach, they will get a crop prior to their earliest cultivars. This can translate into great economic gains if they can avoid a frost from Mother Nature!

Photo: D. Byrne

Read about more cultivars at www.rosbreed.org

Community Breeders' Page

A Culture of Breeding Impact from Genomics Research

(An Upstream Research Approaches article)

Cameron Peace, DNA-Informed Breeding Team Leader

Achieving breeding impact has long been the guiding principle of Dr. Sue Gardiner and her team at Plant & Food Research (formerly HortResearch), New Zealand. Sue and colleagues have led fruit breeding innovations such as "fast breeding" and genomic selection. They were the first to implement routine marker-assisted seedling selection in Rosaceae (apple), including the invention and use of streamlined robotics that have spun off into the commercial company Slipstream Automation (with services soon becoming available to the wider Rosaceae community). They've also unraveled the genetics of valuable traits – numerous apple disease and pest resistances, red flesh color, fruit aroma, and rootstock-induced dwarfing – and converted the findings into DNA tests that are implemented in their breeding programs. All along the way, engaging in highly collaborative partnerships worldwide, this research group has established fundamental genomics resources and made numerous discoveries… and released new cultivars with substantial world market share.

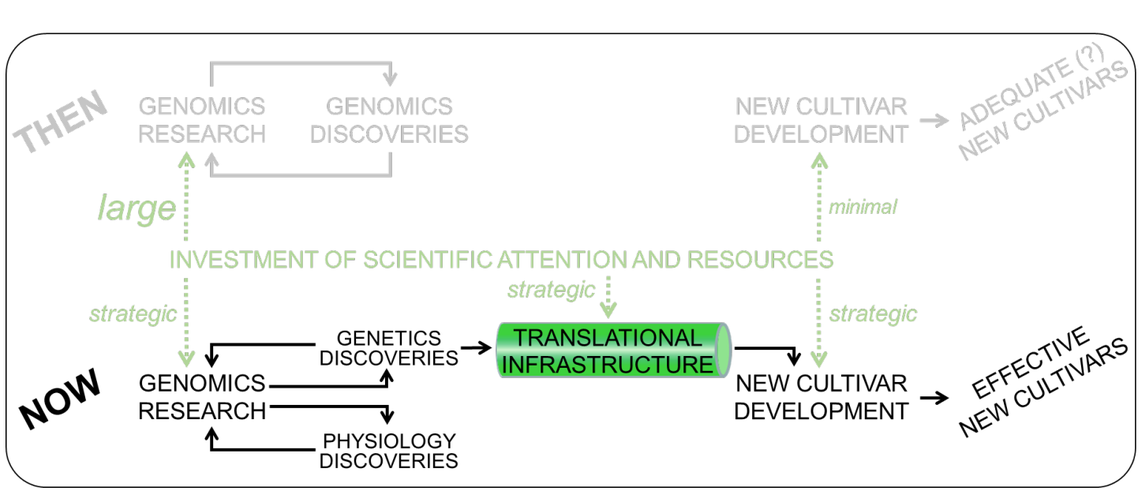
By delivering practical outcomes on research promises, Sue and colleagues have run counter to the historical culture of Rosaceae genomics.

For decades since the advent of modern tools for peering directly at the genetic blueprint of our crops, research funding worldwide was siphoned away from on-the-ground operational breeding, the kind of breeding that develops effective new cultivars that truly revolutionize the production and marketing landscape and consumer experience and health.

In the name of "genetic improvement", hot DNA-based techniques with their highly expensive equipment and consumables grabbed the attention of grad students, scientists, research institution directors, and grant-funding agencies. No wonder so many breeders and germplasm collection curators became highly skeptical of the so-called genomics revolution. But the culture is changing. The down-under pioneers of Plant and Food Research, our U.S.-based RosBREED endeavor, and the European-based FruitBreedomics consortium have demonstrated that genomics research can revolutionize cultivar development.

Breeding impact flows readily from genomics research in the new culture of Rosaceae genomics, genetics, and breeding. Breeding programs are already benefitting directly. By focusing on practical breeding decisions and operations, providing realistic promises, and collaborating worldwide, this ethos will be around for a long time.

For the full article, go to: *https://www.rosbreed.org/articles/community-breeders/culture-of-breeding.*



Read more at: www.rosbreed.org/breeding

Meet Our Advisory Panel Members

Our advisory panel members are a critical part of our success in RosBREED, as they verify from their experience the impact of our research and guide our priorities. They dedicate not only a day (plus two for travel) to our advisory panel meetings in January, but they also are called upon during the year to provide feedback to questions that our project members have.

David Karp

Extension Advisory Panel

What is your job description? How do you help the Rosaceae community?

First, I am Associate in the Agricultural Experiment Station, University of California, Riverside, primarily researching citrus, and particularly citron. Second, since 1992 I have written frequently about fruit for The New York Times, Los Angeles Times, and Gourmet magazine (when it existed, alas). Third, I grow 11 acres of stone fruit (peaches, nectarines, apricots, plums, gages, sweet cherries, and tart cherries) as co-owner (with the estimable Andy Mariani) of Xanadu Orchards LLC in Morgan Hill, Calif., selling locally, wholesale, and at the Santa Monica farmers market.

I help the Rosaceae community by writing intensively researched articles for general interest newspapers and magazines interpreting the world of fruit for consumers. My focus is on varieties, growing areas, horticultural practices, harvest maturity, and postharvest practices, specifically on how those factors combine to influence fruit quality as experienced by consumers.

Why are you interested in RosBREED?

As readers have undoubtedly surmised by now, I'm a fruit geek, and RosBREED brings together some of the best minds in pomology (i.e., other fruit geeks). I get to learn from these scientists each year via meetings, newsletters, and articles, to keep abreast of cutting-edge and potentially newsworthy developments.

How do you feel that you can contribute to RosBREED?

Since the inception of RosBREED I have served as a "contributing editor" for the newsletter – basically a glorified proofreader and copy editor. I attend the RosBREED Advisory Panel meetings each year in San Diego, and hopefully my blend of interest in and experience with germplasm, history, practical horticulture, marketing, and writing adds a different and useful perspective to the scientific community. I love serving as an intermediary between the knowers and the growers.

Kim Hummer

Scientific Advisory Panel

What is your job description? How do you help the Rosaceae community?

I am the Research Leader for the USDA-ARS National Clonal Germplasm Repository and the curator for the national small fruit collections. I help the rosaceous community by managing the collections of strawberry, raspberry, and blackberry species and making them available for their research. I then coordinate the data that is uploaded to the Germplasm Resources Information Network (GRIN).

Why are you interested in RosBREED?

We oversee the genetic and genomic analysis of *Fragaria* and *Rubus* for the U.S. National Plant Germplasm System. The RosBREED community with our scientists is performing cutting-edge research on these crops looking at molecular marker analysis and sequencing, as well as phenotyping and genotyping our collections. I am very interested in linking phenotype with genotype with our collections.

How do you feel that you can contribute to RosBREED?

I currently advise project scientists on the applicability of the basic research that is being done by RosBREED. I also coordinate and provide germplasm resources necessary for RosBREED research projects. Finally, I help to interpret RosBREED research for other scientists and the public.

Coming up in the next issue:

- Meet new members of the Advisory Panel
- Jewels in the Genome focus on more Rosaceae crops
- Summary of AP and Matching Partner meeting in San Diego, CA
- What will be the next Rosaceae Nemesis? Read next quarter's Newsletter to find out!

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