



NEWS AND INFORMATION

October 2016

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Director's Update



Celebrating the 50-Year Anniversary of the Mann Lab



Hugo Miller of Western Precooling demonstrates the first mobile block ice crusher and top-icing unit. Bob Kasmire of the Mann Lab was the key extension researcher in developing knowledge and application technology to support postharvest quality management of 'iceberg' lettuce during transportation and distribution. Digital image kindly provided by Craig Miller.

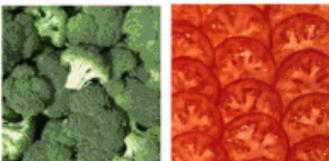
As we approach the 50-year mark since the establishment of Louis K. Mann Postharvest Laboratory (March 22nd 1967 to 2017), we will be commemorating and highlighting some of the early era publications and industry extension articles from the distinguished academic and extension faculty housed in this designated Special Facility on the University of CA Davis campus. The initial faculty in the Mann Lab included Shang Fa Yang, Robert F. Kasmire, Leonard L. Morris, Harlan K. Pratt, and Lawrence Rappaport. An article commemorating the 25th anniversary authored by Mikal E. Saltveit, at the time Director of the Mann Laboratory and Coordinator of the Postharvest Biology Program, may be viewed here ([link to PDF](#)). The article gives an excellent background to the origins of Mann Lab from the Department of Truck Crops (and changed to Vegetable Crops) alumni at the time. A research article entitled "Temperature and Lettuce Deterioration" from that time may be viewed here ([link to PDF](#)).

With two of our current faculty, Mikal and Marita Cantwell de Trejo, soon to join the ranks of distinguished Emeriti, we wanted to acknowledge our links to the past as we plan for the future and succession in the Postharvest Group. Profiles of our newest academic and extension faculty, with affiliations to Postharvest Quality and Safety programs from across the UCD campus and the UC system will appear in future newsletters.

In addition, Diane Beckles, faculty member of the Postharvest Biology Program and contributor to the [Postharvest Technology Center Summer Short Course](#), is coordinating a special seminar series focusing on key research contributions of Mann Lab over the years. Highlights from these seminars will be provided in upcoming newsletters.

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Postharvest Education at UC Davis



Successful Fresh-cut Workshop

With a more than full house and engaging speakers, the Fresh-cut Products Workshop, organized for the last time by Dr. Marita Cantwell promised and delivered. Topics included Marketing and consumer issues, product biology preparation and quality, temperature management, microbiology and sanitation and modified atmospheres and packaging.

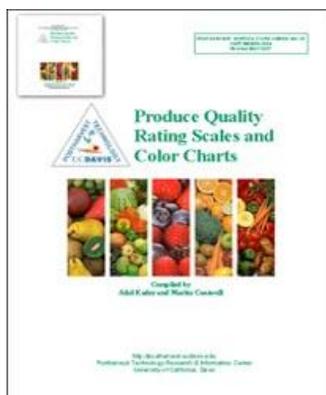
If you did not have a chance to attend this year's workshop, the binder of all the presentations along with a flash drive and supporting publications can be purchased [here](#).

Produce Safety Workshop Gets Commendation from Speaker James Gorny

November 1-3, 2016. UC Davis Campus. Produce safety expert Trevor Suslow developed this interactive two-and-a-half-day workshop to provide an expanded version of the FDA-recognized Produce Safety Alliance curriculum for grower certification with training sessions built from a science-based framework to create Microbial Produce Safety Systems from Preharvest to Postharvest.

We are pleased to share PMA Vice President, Food Safety & Technology James Gorny's, recent email: "... you've created an excellent program and an all-star lineup of speakers that uses the PSA curriculum as **the core** but also provides lots of extras that will be of interest and value to the industry."

In addition to the required components, leading academic and industry instructors will provide an expanded and interactive approach to building an improved understanding of the current scientific basis for produce microbial safety systems and introduction to preventive controls, validation, verification and environmental monitoring. Register [here](#), or visit the [website](#) for more information. If you need assistance, contact our Registration Coordinator, [Ms. Penny Stockdale](#), at 530-752-7672 for more information.



Sale! Receive 20% off our Produce Quality Rating Scales and Color Charts Binder or CD

The objective of this manual is to compile the rating scales (scoring systems) and color charts for maturity, ripeness, and quality of fruits, nuts, and vegetables for the benefit of those interested in produce quality evaluation. Available in printed format, or as a CD.

Use sale code PQRS20 to apply your discount. For a complete listing of all our publications see our bookstore.

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Postharvest Specialists' Updates & Other News



Please Welcome Barbara Blanco-Ulate

Barbara Blanco-Ulate has recently been appointed as an Assistant Professor in the Department of Plant Sciences at UC Davis with an emphasis in Postharvest Physiology. She obtained a Ph.D. in Plant Biology from UC Davis in Spring 2014. In her Ph.D. dissertation, she investigated the developmental control of tomato fruit susceptibility to *Botrytis cinerea*. The overarching aim of this project was to characterize fruit responses to fungal infection and to explore pathogen infection strategies. She did her postdoctoral research in the Department of Viticulture and Enology characterizing the impact of pathogen infections on the ripening and quality of grape berries. During her postdoctoral appointment, she established innovative approaches that integrate transcriptional profiling with metabolite and biochemical data to study the development and metabolism of ripening berries under field conditions. Her future research program will be focused on tomato and pepper fruit, which represent economically valuable postharvest commodities worldwide and particularly in California. Her research interests include the control of fruit ripening, fruit softening, improvement of fruit texture, flavor and aroma, and fruit-pathogen interactions.

Trevor Suslow September Activities

- Trevor participated as an Instructor in the Sprout Safety Alliance Pilot Train the Trainer held at the Illinois Institute of Technology's Institute for Food Safety and Health (IIT IFSH) facility in Chicago. If you are interested about the upcoming SSA grower certification training program hosted by the PTC see the Resource Spotlight section below, or contact Jenn Still at jrstill@ucdavis.edu.
- Trevor was invited to attend the United Fresh Produce Association Food Safety and Technology Council in Washington D.C. during the United Fresh Washington Policy Conference to present a research update, *WHOLE GENOME SEQUENCING AS A TOOL FOR SOURCE-TRACKING LISTERIA IN PRODUCE FACILITIES*, ([excerpted handout from the overall presentation is available here](#)) and to participate in the first meeting of the PMA / United Fresh Joint *Listeria* Working Group.
- A brief overview of the Postharvest Technology Center and Postharvest Biology Group was presented by Trevor during a joint UC Davis-University of Sydney workshop of institutional synergies in research, education, and training at the Tahoe Environmental Research Center in Incline Village.

Carlos Crisosto Busy with Summer Activities

In August, Carlos was an invited speaker at the five following events:

- The California Farm Academy (CFA) Training program meeting in Winters, CA and spoke on Postharvest Handling and Storage.





- Dayka Hackett Worldwide Produce Source, Kool Kountry Meeting in Dinuba, CA and spoke on Optimizing Overseas Transportation of Stone Fruits.
- Sun World Variety Display for table grape handlers in McFarland CA and presented Table Grape Consumer Preferences and Ideal Shipment Conditions.
- Sunview Cold Storage also in McFarland, CA, and spoke on Table Grape Fast Handling.
- Summeripe International in Reedley CA and presented Ideal Plum Storage Conditions.

In September, Carlos was invited to Guayaquil, Ecuador to present at the Mango Symposium International. He gave a talk on the Influence of physiological maturity in arrivals to the USA.

Additionally, Carlos was recently invited to be on the scientific committee for the IX International Peach Symposium. This Symposium, held under the auspices of the International Society for Horticultural Sciences (ISHS) and the Romanian Society of Horticulturists (SRH) at the University of Agronomic Sciences and Veterinary Medicine, Faculty of Horticulture, will take place between July 2 and July 6, 2017 in București, Romania. The Symposium will be comprised of plenary sessions, discipline focused sessions, workshops, and poster session and sponsors display where delegates can formally present, promote and discuss their work and products with other delegates. Please see their [website](#) for more information coming soon.

Bruhn Presents at Washington Association for Food Protection

Christine Bruhn addressed the Washington Association for Food Protection annual meeting in Chelan speaking on aspects of emerging opportunities in food irradiation. As part of her comments, Dr. Bruhn reported that as part of a USDA APHIS regulatory agreement to reduce the use of methyl bromide, countries shipping irradiated fruit into the US will accept irradiated US fruit in their country. As of 2016, 12 countries have signed Framework Equivalency agreements. This opens new opportunities for US growers. Further information can be obtained at the USDA APHIS website or from Dr. Bruhn.

Reid, Cantwell and Deltsidis Lead Postharvest Training in Tanzania

Michael Reid, Marita Cantwell and Angelos Deltsidis traveled to the Postharvest Training and Services Center at the World Vegetable Center in Arusha Tanzania in July for a 5-day workshop, focusing on postharvest handling of horticultural crops. The UC Davis Horticulture Innovation Lab funded the activity; you can read in more detail about the workshop on their [website](#).

Update on Farm Tank Event

The first day of this two-day event featured more than 35 different speakers from the food and agriculture field, interactive panels moderated by top food journalists and networking. On the second day, Friday September 23, Trevor Suslow and Erin DiCaprio, along with PTC Event Coordinator Penny Stockdale, participated in a morning of questions and answers as one of the only non-grower organizations at the table to table exhibit event, hosted by General Produce. Instead of a commodity, our product to showcase was research, extension and training. It was a refreshing opportunity for a mix of approximately 120 local chefs, locavores and food hub advocates, regional grower/shippers, media and bloggers to learn about the valuable resource and asset UC Davis is to the local community.



Resource Spotlight



DID YOU KNOW THAT A SPROUTED SEED PRODUCTION FACILITY IS CLASSIFIED AS A FARM UNDER THE FOOD SAFETY MODERNIZATION ACT (FSMA)?

...and therefore falls under the regulations and provisions of the "Produce Rule" (full title... **Standards for the Growing, Harvesting, Packing, and Holding of Produce for Human Consumption**). In addition to the requirement to be aware of the Produce Rule provisions, specific provisions under Subpart M set requirements to prevent or reduce the introduction of pathogens. Sprouted seeds and beans have been determined to present a unique public health risk because the warm, moist, and nutrient-rich environments for sprout production create the same conditions that are ideal for the growth of bacterial pathogens. There have been more than 28 outbreaks associated with sprout consumption since the release of the 1999 **FDA Guidance for Industry: Reducing Microbial Food Safety Hazards For Sprouted Seeds**

<http://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/ProducePlantProducts/ucm120244.htm>

No longer limited to guidance and voluntary programs, the first interval for compliance with these new regulations is January 2017, for the largest commercial sprout producers, and FDA has projected **facility inspections for larger sprout houses to begin in mid-2017**. To assist the sprout industry and its affiliated service industries and stakeholders, the Sprout Safety Alliance <https://www.ifsh.iit.edu/ssa> has recently launched its FDA-recognized curriculum and training course. These modules were created within a collaborative effort between the sprout industry, academia and federal, state and local government representatives of the Sprout Safety Alliance. In addition to satisfying the FSMA requirement that at least one responsible individual for each sprout operation (employee or consultant) receiving training within a recognized curriculum, the SSA sessions will enhance the sprout industry's understanding and implementation of best practices for improving sprout safety and understanding the specific requirements outlined in the FDA Standards for the growing, harvesting, packing, and holding of produce for human consumption specifically applicable to sprout operations. These mandatory provisions include validated antimicrobial seed treatment, pathogen testing of spent irrigation water or sprouts, environmental testing for Listeria, record-keeping, and more. An overview of the course agenda may be viewed here ([SSA Model Grower Training PDF](#))

The Postharvest Technology Center (PTC) and Lead Instructor, Trevor Suslow, are offering this SSA Sprout-Grower and Industry training and certification course on Dec 13-15, 2016 in Davis, CA. Registration will open on October 14th but interested individuals are encouraged to get on the Course Distribution List by sending an e-mail of intent (non-binding) to Jennifer Still jrstill@ucdavis.edu, PTC Program Support Associate. Your e-mail will be much appreciated assistance in gauging the extent of interest in registration and selection of an appropriate capacity venue.

Bridging the R&D Valley of Death

How research innovation navigates the often tortuous path from discovery to adoption and commercial or public benefit has been the topic of numerous scholarly and popular articles. As often happens in response to press releases surrounding publication of research in peer-review journals, summaries of authors conclusions are propagated widely in various trade media, listserv groups, and blogs. When this touches the areas of produce quality and safety, industry frequently reaches out to university extension to help assess the new information or technology. A key challenge for those intrigued by small info-blurbs to explore a potential practice modifier or solution is to determine the relative "goodness-of-fit" to their operation or that of their suppliers. Beyond the lay media sources, quick reads of the available abstract from the original article often suggest a technology or procedure much closer to a stage of readiness for adoption than the reality. The caveats and responsible phrasing of limitations, generally included in the publication narrative, are too often lost

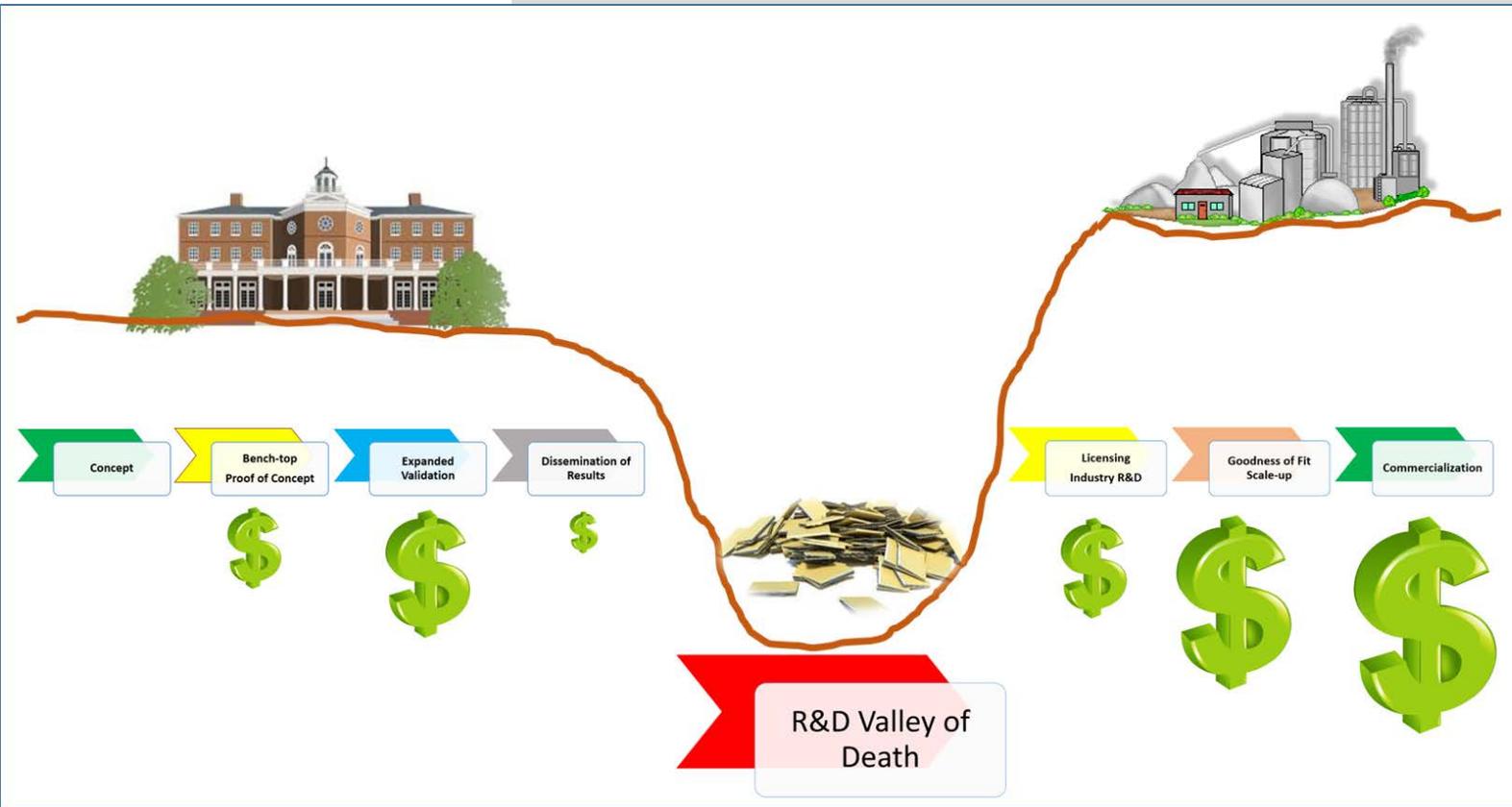


in translation or natural PR glossing over of details. The devil is in the details and the degree to which a specific innovation matches the goodness-of-fit analysis often determines how likely any given research development will bridge the R&D Valley of Death. (See figure below.)

A good recent example which came to our Center related to the interest and optimism generated by a report of studies evaluating the potential benefits of individual or combined components as coatings to improve quality and manage food safety risks on whole cantaloupe. An abstract of the article is available [here](#). The summarized conclusions from the study results highlighted the potential for the evaluated coatings to improve quality retention but the possibility of bacterial pathogens of concern to food safety was the leading source of industry interest and questions. My note here is not about the article but about how we frame research accomplishments and communicate where along the path to adoption of any singular research study may fit.

Digging into the specific details of methods, results, and result interpretation against the product, practices, processes, and economics of a targeted end-user often requires a critical iterative engagement between research, developer/marketer, and target end-user. In the absence of this process, many innovative and creative concepts fall into the Valley of Death prematurely. Lacking this translational R&D process, impractical expectations and unrealistic investments in adoption may result. Objective analysis of the potential cost:benefit to bridge the R&D Valley of Death requires a diversity of expertise and experience. The costs associated with moving from proof-of-concept to commercial adoption or development are highly variable but generally increase dramatically once the bridging function is completed.

So what is the point of all this? Early engagement and communication among the interested and affected stakeholders, before framing and initiating the primary proof-of-concept investment, typically positions research and technology advancements for success in finding their way to beneficial adoption. For our part, we have and plan to find the resources and capacity to be active partners in these assessments and fulfill the traditional bridging and translations functions in a bi-directional mode. Watch for future posting about new content and programs to widely engage diverse resources in this important function for the postharvest community.



Stay up-to-date with the Postharvest Technology Center by joining our [LinkedIn Group](#)



New Publications on our Website

Arpaia, Mary Lu, Collin, Sue, Sievert, James, Obenland, David (2015). Influence of cold storage prior to and after ripening on quality factors and sensory attributes of 'Hass' avocados. *Postharvest Biology and Technology* 110 (2015) 149–157

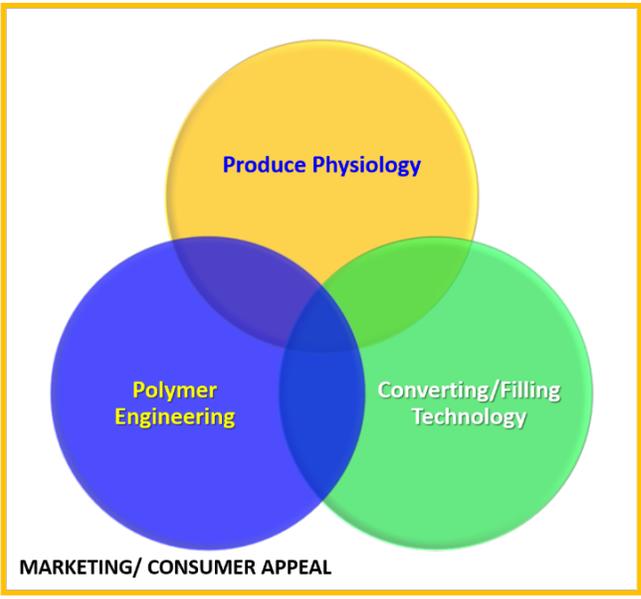
Carol Byrd-Bredbenner, Marjorie Nolan Cohn, Jeffrey M. Farber, Linda J. Harris, Tanya Roberts, Victoria Salin, Manpreet Singh, Azra Jaferi, and William H. Sperber. (2016). Food safety considerations for innovative nutrition solutions. *Ann. N.Y. Acad. Sci. ISSN 0077-8923*

Postharvest Calendar

- October 17-21, 2016. III Symposium on Horticulture in Europe (SHE 2016). Chania, Greece
- November 1-3, 2016. Produce Safety Workshop. UC Davis campus
- October 11-14, 2016. Postharvest Technology Course. Wageningen Campus, The Netherlands
- February 7, 2017. FRUTIC Symposium. Berlin Germany
- February 8-10, 2017. Fruit Logistica. Berlin, Germany
- July 2-6, 2017. IX International Peach Symposium. București, Romania.
- July 18-20, 2017. IX Congreso Iberoamericano de Tecnología Postcosecha y Agroexportaciones. UC Davis campus

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Ask the Produce Docs



Q. I was wondering if there is an equation you can use to solve for the optimal OTR that a plastic bag should have using the respiration rate of your product, mass of product that will be in the bag and the dimensions of the bag? I've tried to do this but I know I'm not doing it correctly because I keep coming up with a way lower OTR than what is conventionally used (based on the packing specifications that I've seen from some of our vendors for similar products).

A. The primary method for determining the required modified atmosphere package, oxygen transmission rate, is seen in the equation provided below. Parameters in addition to respiration rate (RR) include package surface area, product weight, structure thickness and target final modified atmosphere.

A thorough understanding of the equation and how each parameter can affect the package OTR is critical for optimal package design. It is the interplay, and often co-dependency, of these parameters that mandates we approach your question with the knowledge that there is no one package design that fits all uses.

Modified atmosphere packaging must be designed on an individual application basis. Once the produce respiration is characterized under key handling conditions, and the balance of parameters are determined, the target OTR can be calculated. Establishment of the target OTR allows the package design process to move from physiological science into the polymer and converting science and art.

OTR for a target atmosphere is:

$$*OTR = RR \cdot t \cdot W/A \cdot (O_2 \text{ air} - O_2 \text{ pkg})$$

- Where:
- OTR = Film O₂ Permeability (Oxygen Transmission Rate) per mil
 - RR = Respiration Rate (O₂ Consumption rate in ml/kg-hr)
 - t = Film Thickness (mils)
 - W = Product Weight (kg)

A = Film Surface Area (cm²)
O₂pkg = Desired O₂ Concentration in the Package (%O₂ Target Atmosphere)

NOTE: OTR in this example is calculated on a per mil basis. Therefore, when a 2 mil thickness film is used, the OTR on a per mil basis must double to achieve the equivalent package OTR.

*To convert OTR (CC/mil/cm²/Hr) to OTR (cc/100 in²/day) multiply by 15483.84

Jeffrey S Brandenburg
Affiliate PTC Workshop Instructor
The JSB Group LLC

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End Notes and Disclaimers

Postharvest Questions. If you have a perplexing postharvest question you'd like answered, please send it to postharvest@ucdavis.edu, and we'll see if one of our specialists can help.

Archived Items. Link to a data store of all our previous "[Ask the Produce Docs](#)" questions, or link to [archived copies](#) of our monthly e-newsletter as PDF documents.

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