President’s Message

As my daughters and I talked about getting away for a few days next week before peach harvest gets fully underway, one of the first questions that they asked was, “I wonder what new Farm Markets we can find?” Maybe our family is a little different than most, or maybe fruitgrower families are special in general. That got me thinking about how we as a fruitgrowers are different from the general population, and led to the following...

You might be a fruit grower if:

- You plan your vacation route to go past a farm market you have yet to visit, and stop in on the way to your destination.
- You have four weather apps on your cellphone, and your non-farming friends ask you what the weather will be like tomorrow instead of watching the local news.
- You have a specific hat for spraying, another for the retail store, and a clean, non-smelly hat for those special, high-brow evening events.
- You never throw away a 5 gallon bucket, and have an unlimited number of uses for them.
- You have driven off the edge of the road while critiquing your neighbor’s fruit trees.
- You refer to farms by who owned them 50 years ago and fields by some long-gone building.
- Family weddings are planned around harvest season…and deer season.
- You carry a knife in your pocket and are momentarily baffled when the security guard at the hockey game says, “sir you can’t bring that into the stadium.” Then you realize that the rest of the world may consider a knife a weapon and not a tool.
- You can hear terms like Hydra-ladder, rootstock, Montmorency, cling, bitter pit, and acronyms like FREC, YGA, SHAP and EMLA and not be confused as to what the other person is talking about.
- When someone tells you not to touch your face while picking peaches, you know why.
- You know how many pecks are in a bushel, how many bushels are in a bin and how many bins fit on the truck...legally.
Adams County Nursery recognizes the importance of starting with quality nursery stock.
We know it is your goal to produce high quality fruit.
We strive to produce quality trees for the commercial industry.
Let us help you get started.

Begin with us. Begin well.
State Horticultural Association of Pennsylvania

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• You know how to properly strap on a picking bucket and how to move, set and climb a straight ladder and tri-pod ladder without crashing to the ground… well most of the time.

• You know what someone means when they say, “you can make that sharp turn at the end of the row if you use the brake.”

• You can answer any question with “Yupp”, and the other person is satisfied with the answer, and a head nod and a smile is a perfectly acceptable response. (An observation made by my daughter’s friend from Holland after his visit to farms in PA which included stops at a tractor dealer and a wholesale fruit purveyor.)

Yupp, we sure are different. But a good kind of different.

Best wishes for a great harvest season,

Tad

Tad Kuntz
SHAP President
Future Technology?

Having just celebrated a birthday, I realize that I have more years behind me than I have ahead of me. I remember back when I first started graduate school and the state of the fruit industry was in the 1970’s. Gasoline first rose above $1.00 per gallon. Pumps were not equipped to handle prices above $0.999 so they resorted to setting the price per gallon at half of the actual price then doubling the total on the pump. Of course that was easy since they did not have slides for credit cards and the amount totals had to be set by hand on the card slider.

When I was in graduate school everyone was planting mostly Malling 7 apple rootstock or maybe some daring souls were trying Malling 26. At Ohio State we had exactly one small block of Malling 9. Shoot, they were not even using Arabic numbers to designate the rootstock clones as it was still listed as Malling VII or Malling IX. Plantings at 10’ x 18’ for spur Delicious was considered high density. Today, M.7 is hardly planted anymore and they exist mostly in more than 25 year old blocks.

The peach industry has not seen as dramatic change in practices over the same span of years. Yes, we have new cultivars and new shaped cultivars such as flat peaches. We have white fleshed, sub-acid, and stony hard cultivars. There have been some changes in training systems with quad-V or perpendicular-V. The Darwin String Thinner is probably the most revolutionary technology that has been introduced, but not everyone has one, and many are still gun shy of blossom thinning. We still do not have a dwarfing rootstock for peaches despite all the work of the NC-140 project. Cherries have seen similar changes to apples. We now have dwarfing rootstocks and a plethora of new cultivars.

So what new technologies will be adapted by the industry in the not too distant future? As mentioned in another article in this issue, I would see the next big technological leap will be the adaptation of the use of drones or Unmanned Aerial Vehicles (UAVs). Over the last year, I have been working with Dr. Joe Sommer in Mechanical Engineering on developing uses of UAVs in orchards. We think we can develop the methodology to be able to estimate crop load, bloom density and detect tree stress in orchards by flying UAVs up and down the orchard rows. We can accurately map orchard blocks. The sophistication of camera lenses and the miniaturization of electronic components have dramatically reduced the cost of UAVs; while at the same time enhanced their usefulness. The image below was taken last year at Rock Springs from a height of approximately 35 feet above the orchard. High resolution scanning of the image could count the fruit to generate crop load estimation to allow for more efficient harvesting.

Of course, the first hurdle that needs to be overcome is getting ground rules established that would allow a grower to be able to fly the UAV.
Guest Editorial
by Erin Connolly

My name is Erin Connolly and I’ve been on the job as Department Head in Plant Sciences at Penn State for two months now and I would like to take this opportunity to tell you a little bit about myself. I’m originally from upstate NY (Queensbury, which is between Saratoga Springs and Lake George), went to Dartmouth College for my undergraduate degree (Biology) and UC Davis for my PhD (Genetics). I’d been working at the University of South Carolina since 2000; most recently, I served as Professor in the Department of Biological Sciences. I’m married and have two boys – Charlie (age 12) and Sam (age 10). My husband (Matt) is from Iowa (he went to Iowa State) and he’ll be teaching in the Department of Biology starting in August.

My research is focused on mineral nutrition in plants and I’m primarily interested in the molecular mechanisms that control iron uptake from the soil and delivery to the above-ground tissues. I have two ongoing projects: the first (funded by NSF IOS) focuses on Fe trafficking to mitochondria and chloroplasts. The second project is part of a large NSF Plant Genome Award (PI is Geoffrey Chang UCSD) entitled “Center for Research on Plant Transporters (CROPS) - A Plant Community Resource for the Structure and Function of Plant Membrane Transporters Underlying Important Crop Traits”.

The Department of Plant Science has an enduring, strong commitment to both basic and applied research on tree and small fruit and we’ve enjoyed a long relationship with SHAP. I’m very grateful both for SHAP’s support of our missions in research and extension and for SHAP’s advocacy on our behalf. In my first week on the job, I was fortunate to accompany the SHAP Research Committee on a tour of the research at Rock Springs and for lunch with Dean Roush. It’s clear to me that SHAP is a very well organized, engaged and vibrant group and I hope that we will continue our productive relationship for many years to come!
House Passes GMO Labeling Bill; President’s Signature is Final Step

On July 14, 2016, the House of Representatives passed legislation directing the Department of Agriculture to develop a program of mandatory labeling of GMO foods. The Senate passed the bill last week, and it now heads to the President to sign the bill into law, which the White House has stated he will do.

The federal law will preempt a state labeling law that took effect in Vermont July 1 and, in turn, prevent a patchwork of state regulations that would add undue costs and create confusion for industry members and consumers alike.

USApple applauds passage of this compromise legislation, as our position has been that we will only support a labeling law founded in science and that fosters national uniformity. This legislation accomplishes both.

The law will make disclosure mandatory for all food products derived from GMOs. This can be done in three ways: Text, symbol, or electronic link.

Last year, a House proposal called for a voluntary program in which “non-GMO” could be labeled, but there was no requirement in the affirmative for the presence of GMO. USApple leadership has favored an affirmative approach that requires foods be clearly labeled GMO.

To continue discovering new and valuable benefits from apples, USApple supports advancements from technology including genetics and genomics research. Benefits can include attributes such as improved quality, new varieties, new aromatic flavor profiles, improved pest resistance, and enhanced nutrition.

On July 8, the Senate had passed S.764, a bipartisan GMO labeling bill introduced by Senate Agriculture Committee Chairman Pat Roberts (R-KS) and Ranking Minority Member Debbie Stabenow (D-MI). (Dianne Kurrle, USApple Association, 7/14/2016)

Vermont’s GMO labeling law.

The Vermont law is scheduled to go into effect July 1, 2016. It does provide that the Vermont Attorney General will not enforce any labeling violations until: (1) the Vermont Attorney General first issues a corrective action notice to suspected violators; and (2) 30 days has passed from the issuance of the corrective action notice. Additionally, the Vermont law also states that consumers may not bring private actions under the law until July 1, 2017. (Ross Pifer, Director, The Penn State Center for Agricultural and Shale Law)

FDA Seeks Experts to Build Produce Safety Network

The FDA announced that the agency is seeking eight experts with backgrounds in science and policy to help build the Produce Safety Network that will support the implementation of the Produce Safety Rule. The experts will work in different regions of the country with state public health and agriculture agencies. As part of the regulatory oversight, the FDA anticipates that state officials will be working closely with the farmers who must comply with the new safety regulations. The new consumer safety officers will support those officials with education, outreach and technical assistance.

The eight experts will be the first segment of new hires planned this year by the network to support compliance with the rule mandated by the FDA Food Safety Modernization Act (FSMA). The FDA announcement added that an additional 40 new consumer safety officers will be hired later this year for domestic and international work that includes inspections, investigations and technical assistance. (Mark Seetin, USApple Association, 7/12/2016)

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General Assembly Adopts New State Budget

The Pennsylvania General Assembly—with bipartisan support—approved a $31.6 billion state budget that gives strong support to agriculture initiatives, including Penn State Cooperative Extension, the PA Preferred Program and veterinary services. Democratic Gov. Tom Wolf says he’ll let the spending bill become law without his signature, but hoped that the Legislature would revise the budget with a “sustainable revenue package”.

Under the budget, Penn State Extension will see a 2.5 percent increase in funding, while programs like agriculture promotion, PA Preferred and livestock and dairy shows will receive an additional 10 percent in funding. The budget does not address pension or property tax reform. PFB thanks Senators Jake Corman and Elder Vogel for their efforts in securing funding for agriculture priority issues.

While the General Assembly has not approved a tax code bill, discussions continue to evolve in an effort to find a bipartisan solution that balances the state budget. Senate Appropriations Committee Chairman Pat Browne, R-Lehigh County, said that he saw the proposed revenue package may develop from a menu of options being considered:

- A $1-per-pack increase in the cigarette taxes, raising the rate to $2.60 a pack;
- New taxes on loose leaf tobacco and e-cigarettes;
- An increase in the tax on banks and other financial businesses;
- Eliminating the vendor discount for certain businesses that make prompt transfer of sales taxes collections;
- A tax amnesty program;
- Applying the state’s 6 percent sales tax on digital downloads;
- Liquor sales reforms; and
- Legalized gambling expansion that will be enacted into law this fall.

Additionally, Browne indicated $53 million of the revenue needed to fund the budget would come from lapsed funds and one-time transfers from the separate accounts for the alternate fuels incentive grant program, the recycling fund, the volunteer companies loan fund, local law enforcement grant fund, and tobacco settlement dollars.

Without those new taxes and tax increases, Browne said the state was projected to face “an enormous, historically enormous hole” in 2017-18. (http://www.pennlive.com, July 13, 2016)

USDA Releases Final Estimate of the 2015 Apple Crop

USDA’s National Agricultural Statistics Service (NASS) has just published the agency’s final estimate for the 2015 apple crop in the July 6 edition of Noncitrus Fruits and Nuts. The final figure for the 2015 apple crop was pegged at 238.2 million bushels, down two percent from the original August 12, 2015, estimate of 242.2 million bushels.

While the change in the overall national production figure was modest, changes in two of the largest producing states - Washington State and New York State were more significant. For New York, the original estimate of 26.2 million bushels was increased by 6.2 million bushels, or 24 percent to 32.4 million bushels. For Washington State, the original estimate of 150 million bushels was cut by 8.3 million bushels, or 6 percent to a final figure of 141.7 million bushels. The third largest producing state, Michigan at 23.7 million bushels was essentially unchanged from the August 2015 estimate. (Mark Seetin, USApple Association, 7/12/2016)

New Rules Pave Way for Drone Use in Agriculture

Agriculture producers and businesses will be able to use drones for farm scouting with new rules from the Federal Aviation Administration. FAA officials unveiled a new set of rules for the commercial use of unmanned aircraft—commonly called drones—weighing less than 55 pounds. Here are some of the highlights from the FAA’s new rules for drones:

- Commercial operators must avoid all piloted aircraft and keep drones in sight at all times. Operators can use a visual observer to track the drone.
- Operators can fly at a maximum height of 400 feet above the ground, of higher if the drone is within 400 feet of a structure. Flight is restricted to between daylight and twilight.
- Operators cannot fly drones over anyone who is not participating in the operation, not under a covered structure or inside a vehicle. Operation from a moving vehicle can only occur in sparsely populated areas.
- Operators must be at least 16 years old and obtain a remote pilot airman certificate.

The FAA is working on establishing privacy education as part of the drone registration process, and is also providing guidance to state and local governments about insuring privacy.

DEP, Conservation Districts, Begin Farm Visits

Pennsylvania’s state and local agencies will begin a more concentrated program of farm inspections in the Chesapeake Bay Watershed this summer. Visits by the Department of Environmental Protection (DEP)
and conservation district staff will focus on verifying whether farms have developed and are following their plans for erosion and sedimentation control and manure management.

The visits are part of a revised strategy by DEP for improvement of water quality in the Bay. The state’s “reboot” strategy is being driven by the federal Environmental Protection Agency, which is claiming that Pennsylvania is behind in meeting nutrient reduction goals in the watershed. Conservation district visits will focus on conservation practices and documents that farmers are required to have under current state law. That includes a written soil conservation plan, along with a manure management plan for animal farm operations and farms that use animal manure. Compliance of farms with state planning requirements has been part of the state’s strategy for the bay cleanup since 2011.

Pennsylvania Farm Bureau has serious concerns with the EPA’s approach in cleaning the Chesapeake Bay Watershed. The EPA’s model used to determine the amount of nutrients reaching the bay failed to account for voluntary practices adopted by farmers. That’s why Pennsylvania Farm Bureau partnered with Penn State on a best management practices survey, conducted this spring. Once those results are compiled, they will be shared with the appropriate state and federal agencies. Pennsylvania Farm Bureau wants to make sure that the

men and women of agriculture are not unduly burdened during the Chesapeake Bay cleanup.

Farmers have made strides in reducing the nutrients reaching local tributaries that feed into the bay watershed. Farmers should get credit for those water quality improvements. Some of those conservation plans followed by farmers in their businesses may not have been recorded in formal plans. Help is available for farmers who need to update, or write, their conservation plans. Contact your local conservation district, or National Resource Conservation Service, for more information.

USGS Report Points To Water Quality Improvements in Bay Watershed

Monitoring of water quality in the Susquehanna River and its tributaries points to improvements in several key areas, according to a federal report. A report by the U.S. Geological Survey found that monitoring stations in Pennsylvania are recording reduced levels of nitrogen, phosphorus and sediment levels in the Chesapeake Bay Watershed.

While there are documented reductions in those nutrients, the levels are still above limits established by the federal Environmental Protection Agency in its Chesapeake Bay cleanup plan, Mike Langland, a USGS hydrologist told members of Pennsylvania Farm Bureau’s Natural & Environmental Resource Committee.

“We have some work to do, but we are heading in the right direction,” he said.

Reductions in nitrogen and phosphorus can be contributed to a number of factors, including best management practices used by farmers, improvements at wastewater treatment plants and a reduction in the number of coal-fired power plants used for electricity generation, Langland said.

The USGS survey collects data from 117 collection points in the watershed, including 34 in Pennsylvania. While improvements are being documented in several locations in Pennsylvania, there is still a concern in the southeastern portion of Pennsylvania’s Bay Watershed, with its concentration of agriculture and housing developments, Langland said.

Here’s what the USGS report shows in terms of water quality improvement in the Susquehanna River Watershed. The report looks at data collected between 2005 and 2014.

- Nitrogen
  - Out of 17 monitoring stations in Pennsylvania, 14 are showing improvement trends.
  - The highest concentration of nitrogen loads is found in the southeastern portion of the state. However, some of the largest reductions have been found in
monitoring stations in those areas. “In comparison to the rest of the watershed, the biggest reductions are in the Susquehanna River, but we have a ways to go to meet the goals,” Langland said.

- Phosphorus
  - Out of the 17 monitoring stations in Pennsylvania, 13 are showing improvement trends.
  - Throughout the Bay watershed, there’s been a 68 percent reduction in phosphorus per-acre loads. Marked improvements have been found in Pennsylvania’s southeastern corner and the Eastern Shore of Maryland.

- Sediment
  - Of the 17 monitoring stations in Pennsylvania, eight are showing improvement trends.
  - Throughout the Bay watershed, there’s been a 50 percent reduction in suspended sediment.

**USFRA Ag Progress Days Workshop: Communicating Sustainability**

Participants can learn new ways to talk to consumers about sustainable farming and ranching during Sustainability Communications Training at Ag Progress Days this summer.

The U.S. Farmers and Ranchers Alliance (USFRA), in conjunction with Pennsylvania Farm Bureau (PFB) and Penn State University’s College of Agricultural Sciences, will host the workshop on August 16 at 2:30 p.m. The training session, which is free and open to farmers and ranchers, will focus on new messaging that can be used when talking with and answering questions from consumers about sustainability. It will be held in the Special Events Building on the Ag Progress Days grounds in Centre County.

USFRA conducted research to determine the key areas of sustainability that consumers are most concerned about. They include, water, air, soil, and habitat. The training session will provide tools, including hard copy takeaways, for communicating your message of sustainability in those key areas. The event is one of several training sessions USFRA will host throughout the summer of 2016. USFRA, of which PFB is a member, was created to earn consumer trust in U.S. food and agriculture.

**Pennsylvania Makes Largest Change to Liquor Sales in Decades**

Pennsylvania lawmakers approved the first significant overhaul of the state’s liquor system in decades. A bill signed by Gov. Tom Wolf will allow grocery stores to sell wine, allow wineries to ship wine and provides for six-pack sales in gas stations.

“This historic legislation is a tremendous leap into bringing Pennsylvanian into the 21st century,” said House Speaker Mike Turzai, the prime sponsor of the legislation. “This privatization bill will bring consumers the added choice and convenience they have been asking for since Prohibition.”

The bill opens new options for wine sales, including allowing restaurants and hotels to sell up to four bottles of wine for take-out. The same option will be available for grocery stores that currently sell beer. Bed and breakfast establishments will also have the option of offering wine to guests.

Wineries will also have the chance to be licensed as “direct wine shippers,” which gives them the authority to send wine to in-state residents. It also creates an excise tax of $2.50 per gallon of wine sent to consumers, which will be used to support programs under the Pennsylvania Wine Marketing and Research Program Board. In addition, the bill removes Sunday sales restrictions at state-owned stores and allows gas stations to be licensed for six-pack sales.

**Spotted Lanternfly Quarantine Expanded, State Continues Progress in Combatting Invasive Species**

State Department of Agriculture officials announced that the Spotted Lanternfly quarantine has been expanded to Lower Macungie Township, Alburtis and Macungie Boroughs in Lehigh County and New Hanover Township in Montgomery County after small populations of the pest were found. The most recent detections are in municipalities adjacent to previously quarantined areas. The pest had not been found in the United States prior to its initial detection in Berks County in the fall of 2014.

“While no one wants to hear that there are additional findings, this affirms that our surveillance efforts are working,” said Agriculture Secretary Russell Redding. “It is extremely difficult to eradicate these pests but thanks to the ongoing survey efforts and commitment by local, state, and community members, who have been working together continuously to find the pest in the early stages, we are minimizing the impact of the species. New detections allow the control program to target its outreach and control efforts, working to end the spread of the insect.”

Areas where the pest has been found are now under quarantine. The general quarantine restricts movement of any material or object that can spread the pest. This includes firewood or wood products, brush or yard waste, remodeling or construction materials and waste, packing material like boxes, grapevines for decorative purposes or as nursery stock, and any outdoor household articles like lawnmowers, grills, tarps and other equipment, trucks or vehicles typically not stored indoors. The last detection of the pest was confirmed in November, 2015.

*Source: Pennsylvania Department of Agriculture*
PAMP board welcomes new members

Effective July 1, 2016 the PAMP board welcomed two newly appointed board members. David Peters of Peters Orchards, Gardners (Adams Co.) and Gary Faulkner of Godfrey Run Farm, Lake City (Erie Co.) have been appointed for 3-year terms. Reed Soergel, Soergel Orchards, Wexford (Allegheny Co.) has been reappointed to an additional 3-year term.

Inaugural PA Cider Fest a success

The inaugural PA Cider Fest held on June 25th, preceded by the Meet the Cider Makers dinner on June 24th was organized by CiderCulture.com and jointly sponsored by PA Apple Marketing and PA Preferred. PA Preferred and PAMP provided 700 tote bags to festival-goers, which included materials highlighting PA’s apple industry (produced by PA Preferred) as well as new brochure on PA ciders and cider apples (produced by PAMP).

The Fest, held on the grounds of Hauser Estate benefitted the PA Cider Guild. The PA Cider Fest, which featured only PA produced ciders, showcased more than 20 PA cideries and drew 1,200 cider enthusiasts from all over Pennsylvania and surrounding states.

U.S. States Begin Ban on Neonicotinoids

The first ban on sales of products containing the neonicotinoid class of pesticides will begin on January 1, 2018, in Maryland after Governor Larry Hogan announced he would allow the legislation (S.B. 198/H.B. 211) to become law without his signature. The Governor invoked a provision in the state constitution that allows legislation to become law within a 30-day time period if he does not sign or veto it. Exempt from the law are certified applicators, farmers, and veterinarians. Connecticut followed suit about a week later with a similar ban.

For the past decade, there has been a decline among bees. Many studies have been published over the past several years—some with conclusive results—that neonicotinoids are to blame for the decline in bee pollinators and some have found inconclusive results.

The Maryland bill was brought forward based on the same concerns that neonicotinoid pesticides are contributing to the mortality of bees and other pollinators. According to a 2015 USDA survey, Maryland lost about 60% of hives last year, which is much higher than the national average of approximately 42%. However, many researches remain uncertain if there is enough evidence to prove that neonicotinoid pesticides have a fatal impact on pollinators. One theory is that low-level exposure to neonicotinoids does not kill bees directly, but impacts their ability to forage for nectar and find their way back to the hive.

Other factors also influence the health of bees such as disease, parasites, and loss of habitat. How influential is the use of pesticides in the bee population along with the other factors?

The European Union banned some neonicotinoids in 2013 and is currently assessing data to be released in January 2017. The U.S. Environmental Protection Agency released the first of four studies on many of these pesticides in January. The preliminary study on imidacloprid finds that it is a potential threat to bees and will release a risk assessment on all ecological effects in December of this year.

Neonicotinoid insecticides (which include acetamiprid, clothianidin, imidacloprid, nitenpyram, thiacloprid and thiamethoxam) were introduced to the market in the 1980s and were targeted to specific pests and considered less harmful to humans. Neonicotinoids are absorbed when applied and remain in the tissue of the plant. The bans that have been passed have considered the fact that misapplication of the pesticide can be a hazard, thus allowing professionals to continue use of them.

If more research continues down the path of neonicotinoids being harmful and professional use is banned–what will happen? Crops, including self-pollinating crops, use these insecticides for crop management. Will it fall to the manufacturing companies to develop new insecticides or to the breeders to identify and incorporate multiple insect resistance genes.
Comparative Study of the Effects of Black and White Hail Nets on the Fruit Quality of Golden Delicious Apples
V. Ordonez et al.

The use of hail nets to protect apples during development and maturation on the tree is very common in Mexico. This practice can cause changes in fruit quality and aroma composition. The effects of the hail net color on the quality and aroma volatile production of apple cultivated in Chihuahua, Mexico, were evaluated. ‘Golden Delicious’ apple trees were covered with white or black hail nets. Apple samples were harvested weekly from August to early October, and analyzed for weight, axial and equatorial diameters, color (°Hue), firmness, total soluble solids (TSS), acidity, ethylene production (EC), and aroma volatile composition. The photosynthetically available radiation (PAR) was measured every ten days under each hail net and outside. Apple quality was affected by hail net color. Black hail nets delayed maturation and quality development of apples by one week when compared with white hail nets. The PAR values were 18% lower under black nets than under white nets. Quality parameters at commercial harvest (162 days after full bloom) showed that white-net apples presented 7% lower firmness, 11.1% less acidity, 8.3% higher TSS and a more developed yellow color, when compared with black-net apples. In addition, white-net apples presented higher contents of the main aroma compounds (in μg L⁻¹) 1-hexanol (8.09 vs. 4.38), 2-methyl-1-butanol (6.24 vs. 2.65), and 2-methylbutyl acetate (0.47 vs. 0.16). At the same maturity stage (beginning of the climacteric rise), no difference was found between white- and black-net apples in TSS, acidity, firmness and aromatic compounds. Hail net functionality goes beyond protecting orchards from hail damage; hail net color affects the apple maturation rate, quality and aroma volatile production.

(From Fruits 71:229)
Robots 'Could Replace' Migrant Workers
Post-Brexit

F. Seale

Brexit has the potential to fundamentally change firms’ business models if promises to end freedom of movement are delivered. Some sectors of the fresh produce industry might consider the use of robots and greater automation, while others will require a carefully considered immigration policy to prevent damaging staff shortages. This is according to a new Resolution Foundation report published on Monday ahead of a major conference on the future of robotics and its impact on the labour market. Adam Corlett, Economic Analyst at the Resolution Foundation said: “People have long warned about the rise of the job stealing robots, but they haven’t had much effect to date in a country that has record employment and a terrible record on productivity.”

Brexit could change this, he believes. Although changes will take time, Corlett said companies need to start preparing now for a potential loss of migrant labour. “For sectors like agriculture, further automation could provide part of the answer to coping with the changed labour market,” he said. “Although it will require a major shift in investment to become a reality.”

While it is still unclear what immigration controls will be introduced post-Brexit, further automation is most likely in sectors such as food manufacturing and agriculture – where at least one in eight workers are EU migrants – according to the report. The study notes that most of these sectors also have a high proportion of low paid staff and already face a significant challenge, with the introduction of the National Living Wage set to affect two in five workers by 2020.

Drawing on research by economists Carl Frey and Michael Osborne, the Foundation recognizes that while mechanization will bring challenges in fast changing sectors, it may be needed given flat-lining productivity and the potential for significant changes in migration policy.

Different strategies will be open to different sectors in the fresh produce supply chain. The need for further investment in technology is likely to prove most critical in food manufacturing, where almost a third of the workforce are EU migrants. The Foundation notes that this has traditionally been a low-investment sector that may require new approaches if a significant tightening of migration policy takes place.

However, some migrant labour reliant sectors, such as domestic personnel work and transport support, have much less scope for automation. Firms in these sectors will need to think more broadly about how they respond and push for an accommodating immigration policy, the report suggests. In any case, Brexit will force businesses “to make some pretty big calls on what investment and labour supply will look like in a post-Brexit economy,” said Corlett.

(From EuroFruit Magazine)
The climate has warmed dramatically over recent decades, especially since the 1980s. Global climate change impacts can already be tracked in many biological systems. Plant phenology is often used as a good indicator for climate changes. Previous analyses have stated an advance of spring events, a delay of autumn events, and a lengthening of the growing season over recent decades. Here, we continuously observed the bloom date and defoliation date of seven peach varieties from 1983 to 2012. We demonstrate that the bloom date of peach has advanced by 11.1 days, whereas the defoliation date has been delayed by 8.7 days. These observations suggest that the growing season has lengthened by 19.8 days over 30 years. The climate data indicates that the annual mean temperature has warmed by 0.67 °C per decade at NPGRC since the 1980s. The bloom date was negatively correlated with the average air temperature from February to April (r = −0.83, p < 0.01), indicating that higher temperatures from February to April may accelerate developmental processes and finally lead to an advance of spring events. To verify how winter warming influenced the spring event, we designed different winter chill units treatments to simulate different degrees of warming conditions. Simulative experiments indicated that the decrease in winter chill delayed the bloom date, which also suggests that the warming from February to April was the major reason for the advancing bloom date. Our results show a more dramatic trend of phenological change than other previous studies. This difference may be because our observations were focused on local climate changes and a relatively temperature-sensitive species. Our studies found a different pattern of phenological changes and could provide insights into local climate change research. (From Scientia Horticulturae 209:192)
The Economic Feasibility of Adopting Mechanical Harvesters by the Highbush Blueberry Industry
R. Gallardo & D. Zilberman

Mechanical harvesters engineered for fresh-market highbush blueberries (Vaccinium corymbosum) have the potential to relieve the burden associated with relying on human labor for harvesting a crop. However, such devices must be effective and maintain fruit quality to be economically viable. Results from an empirical economic model and a series of sensitivity analyses signal that shortening the gap between prices for the fresh and processing market would increase the likelihood of adoption, especially if prices for the fresh market drop by 26% and prices for the processing market increase by 63%. If changes in prices would occur at the same time, then prices for fresh-market blueberries would have to drop by 23% and for processing blueberries would have to increase by 9%. Increases in labor wages of 61% would make mechanical harvesters more profitable than hand harvesting. A 63% reduction in yield losses due to mechanical harvest in the field must occur for mechanical harvesters to become a profitable alternative. If only quality losses (e.g., presence of bruises on the external surface of the fruit) are reduced and yield losses are kept constant, then a 43% reduction in quality losses must occur for mechanical harvesters to become a profitable alternative. If both yield and quality losses are reduced, then a 20% reduction in yield losses and 29% reduction in quality losses would be required for mechanical harvesters to become profitable. We found that a mechanical harvester in its current incarnation is not yet a proven profitable alternative for fresh-market blueberries, given all initial assumptions considered in this study. The industry urges technical improvements to decrease harvest-induced loss from mechanical harvesting in the field and loss due to presence of bruises on the fruit external surface to ensure the massive adoption of mechanical harvesters, especially for fresh-market blueberries.

(From HortTechnology 26:299.)

How Hail Netting Reduces Apple Fruit Surface Temperature: A Microclimate and Modeling Study
M. McCaskill et al.

High fruit temperatures compromise fruit quality and cause production losses in the apple industry. In southeastern Australia, orchardists have begun investing in netting because of empirical evidence that it reduces these losses, but the magnitude of its effect and mechanisms responsible have not yet been quantified. Models of fruit temperature based on meteorological conditions could inform the design of netting structures, and improve tactical management to reduce sun damage through treatments such as protective sprays and the use of overhead irrigation to cool fruit. The objectives of this study were firstly to measure the effect of netting on fruit surface temperature, and secondly to test the thermodynamic Smart-Sinclair model. The study was conducted near Shepparton, Victoria, in an orchard where there were adjacent netted and non-netted sections. During late afternoon when sun damage normally occurs, netting was able to reduce the median fruit surface temperature by 1.5–2.0 °C, but there was a greater reduction in maximum fruit surface temperature of 4.0 °C. The model required calibration to account for turbulence in the transfer of heat from fruit to the surrounding air. The optimized model was able to predict fruit surface temperature with a root mean square error of 2–4 °C. The mechanism for the reduction in fruit surface temperature was by reducing the intensity of the solar beam in the late afternoon by interception and scattering, which more than offset the potential fruit heating effect of netting that occurs through a reduction in internal orchard wind speed.

(From Agriculture & Forest Meteorology 226:148)
Impact Spotlight: NIFA-funded Ag Robotics

June 9 marked the fifth anniversary of the National Robotics Initiative (NRI), a multi-agency effort among the National Science Foundation, NASA, the National Institutes for Health, USDA’s National Institute of Food and Agriculture (NIFA), the Department of Defense, and the Department of Energy. NRI accelerates the development and use of robots that work beside or cooperatively with people and solve problems in areas of national priority.

Through this initiative, NIFA is investing in research that enhances food production, processing, and distribution that benefits both consumers and rural communities. Water conservation is a critical, global issue for both human use and agricultural production. Agriculture plays a dominant role in this challenge, accounting for approximately 80 percent of the nation’s water use. A team of Cornell University researchers has improved the efficiency of irrigation by measuring how much water stress can be tolerated without detrimental effects on crop yield or quality. They did this by developing a water sensor that is inserted into plants to continuously measure water levels within the plant. These low-cost chips efficiently provide real-time, sensitive water measurements that inform growers on irrigation management.

A University of California-Davis team developed a high-speed machine that can not only distinguish weeds from the value crop, but can eliminate those weeds as carefully as a backyard gardener working by hand. The robotic cultivator uses a sensor to detect a faint fluorescent glow that seedlings emit when their seeds are coated with a special material prior to planting. Mounting these sensors on a tractor equipped with mini hoe-blades allows the weeder to move faster than traditional cultivators, with the potential to save up to 25 percent per acre off the cost of weeding by hand. The project will not only save farmers money, but will also prevent herbicide overload in the environment and reduce farm workers’ exposure to chemicals.

Growers of high-value tree-fruit, berries, and vegetables frequently need to predict yield well ahead of harvest so that they can prepare labor, shipping, storage, marketing, and sales ahead of time. A team from Carnegie Mellon University created a camera-equipped vehicle with the ability to detect fruit and conduct an automated image analysis. The image data is converted into measurements of yield components, such as fruit count, size, and quality. Watch the yield estimation vehicle in action on YouTube.

In 2015, NIFA awarded more than $3 million in grants for robotics research through the joint-agency initiative. For more NIFA impacts, visit nifa.usda.gov/impacts or the Land-Grant University Impacts website. Send us your NIFA-funded impacts at impactstories@nifa.usda.gov or share them with USDA_NIFA on Twitter #NIFAimpacts.

NIFA invests in and advances agricultural research, education and extension and seeks to make transformative discoveries that solve societal challenges.

The Use of Brassica Extracts & Thermotherapy for the Postharvest Control of Brown Rot in Peach

K. Pazolini et al.

Brown rot (Monilinia fructicola), one of the most important diseases of stone fruits, can lead to significant fruit losses in the field and postharvest. Canola and Indian mustard extracts acquired through different extraction methods, alone and in combination with thermotherapy, were tested against postharvest brown rot in peaches. Initially, canola and Indian mustard extracts collected through the methods of simple extraction (Sp), infusion (In) and maceration (Mc) were assessed for their capacity to control M. fructicola in vitro and in vivo. The Sp extracts of each species were selected to be tested under different treatment sequences, alone and in combination with thermotherapy (50 °C for 30 s) on peaches inoculated with M. fructicola. The most effective canola and Indian mustard treatment sequences were selected and compared with the chemical treatment (azoxystrobin®, 2 g L⁻¹) and a control (sterile distilled water). The Sp extractions of canola and Indian mustard were effective at postharvest control of brown rot in peaches. When these extracts were combined with thermotherapy in the sequence Sp extract + thermotherapy + Sp extract, the efficacy of postharvest brown rot control in peaches was improved. The canola Sp extract was more effective than the Sp of Indian mustard when combined with thermotherapy and it achieved a M. fructicola sporulation reduction level equal to that given by the fungicide solution when applied to “Eldorado” peaches.

(From Scientia Horticulturae 209:41)
Injury to Apples & Peaches at Harvest from Feeding by “Brown Marmorated Stink Bug” Nymphs Early & Late in the Season
A. Acebes-Donna, T. C. Lesky & J. C. Bergh

Halyomorpha halys (Stål) (Hemiptera: Pentatomidae) is an invasive species that has become an important orchard pest in the Mid-Atlantic region of the US. Adults and nymphs feed on tree fruit. Feeding injury from adults has been characterized but the injury from nymphs has not been examined systematically. Since the four plant-feeding instars of H. halys (second through fifth) differ substantially in size, it is plausible that the effects of their feeding on fruit injury and injury expression may differ among them. We compared feeding injury at harvest from young nymphs (second plus third instars), older nymphs (fourth plus fifth instars), and adults that were caged on ‘Smoothee Golden’ apples and ‘Redhaven’ peaches in early June (peach and apple), late July (peach), and late August (apple). Individual apples and peaches were caged at fruit set and assigned to the following treatments (n = 28/treatment): 1) control (no H. halys), 2) young nymphs or 3) adults early in the season, and 4) young nymphs, 5) older nymphs or 6) adults later in the season. Fruit in each treatment were exposed to 3–4 young nymphs, two older nymphs or 1–2 adults placed in the cages for 96 h and evaluated for external and internal feeding injury within 36 h after harvest. No injury was recorded from unexposed peaches or apples. The percentage of injured fruit and number of injuries per fruit varied significantly among the exposed treatments. Early season feeding by young nymphs yielded the least injury to peaches and apples. In apples, the highest percentage of injured fruit and number of injuries per fruit were caused by late season feeding by adults. In peaches, early season adult feeding produced the highest percentage of injured fruit and injuries per fruit. More internal than external injury was recorded on peach and no such difference was observed on apple. The implications of these findings on H. halys management in fruit orchards are discussed.

(From Crop Protection 89:58)
A downloadable pdf is available at http://www.sciencedirect.com/science/article/pii/S0261219416301545

Republic of South Africa Update on the Deciduous Fruit Supply & Demand

Post estimates that the South African apple production will increase by about one percent to 930,000 MT in the 2015/16 MY based on the increase in area planted and new plantings coming into full production. Post estimates that the South African apple exports will increase by about two percent to 473,021 MT in the 2015/16 MY, based on the available production and the weak rand exchange rate.

Post estimates that the South African pear production will increase by one percent to 410,000 MT in the 2015/16 MY based on the increase in area planted. Post estimates that the South African pear exports will increase by two percent to 210,100 MT in the 2015/16 MY based on the available production and weak rand.

Post estimates that the South African table grape production will decrease by about 2.7% to 283,700 MT in the 2015/16 MY, based on the dry weather conditions that resulted in smaller grape sizes. Post estimates that the 2015/16 MY exports will decrease by three percent to 255,800 MT based on the decrease in production. The domestic consumption of apples, pears and table grapes are forecasted to remain flat in the 2015/16 MY based on the available production and the slow economic growth prospects in South Africa.

South Africa is a net exporter of deciduous fruits, and only imports small quantities to fulfill a niche market or to satisfy domestic demand when supply is limited.
In late 2015, the Environmental Protection Agency issued the long awaited revision to the Worker Protection Standard (WPS). Although it is now technically active it will not be enforced until 2017 but the original WPS will still be enforced until the end of 2016.

Please keep in mind that the WPS covers both restricted use AND general use pesticides.

This article will deal with the highlights to the revision but also some areas of the current WPS that need emphasized. Let’s get started.

**Resources for the WPS:**
Although articles such as this and the winter meeting season can go a long way in explaining the WPS the best way to get a good understanding of the WPS is to get an individualized farm visit from a WPS specialist at Penn State University. If you want a specialist to meet with you at your farm to go over your compliance efforts you can call Jim Harvey at 814-863-8214 at the Pennsylvania Office of Rural Health or Email Jim at jdh18@psu.edu to schedule a visit. The visits are free and typically take an hour but can go longer.

**Organic Growers:**
Don’t ignore this regulation! Although organic growers use different products there is a very good chance that you are using pest control products that make you subject to the WPS. To know if your products are subject to the WPS look at the product label and if you see an EPA registration number on the label that product is probably under the WPS. To be absolutely sure look for the “Agriculture Use Statement” on the label and if you find that and are using that product in production Ag you are under the WPS and can be inspected.

**Just Family?**
There is an “immediate family” exemption to the WPS that exempts family members from MOST of the WPS protections. However family members must still use label required PPE (personal protection equipment) and still must obey the REIs (Restricted Entry Intervals) and the other label requirements.

So who falls under the family exemption? The regulation revision has expanded the family exemption to now include first cousins, nephews, nieces, aunts, uncles, grandchildren, grandparents and in-laws. The original exemptions are still valid and they include children, step children, foster children, parents, step parents, foster parents, siblings and spouses and of course the owner. In spite of this exemption why not give your family the benefit of these WPS protections?

**Training Changes:**
This is the area with the most changes. Under the revision growers subject to the WPS must now train their employees every year and they must be trained on Day 1 before they do any work in the crop areas if it has been less than 30 days since the last restricted entry interval expired. Make sure the employees sign off on their training and keep those on file. If the employee requests a copy of the sign off employers are now responsible to give them one copy.

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continued on page 19
Training materials will be changing but any EPA approved WPS training materials (including the Penn State University WPS training DVDs) will be good until January of 2018. New training materials should start showing up in 2017. Penn State will be redoing their DVDs to comply with the changes but it will take time.

Trainers in Pennsylvania still must have a current Pennsylvania Pesticide Applicator certification to train employees and must be present at the training. Trainers cannot just give employees a copy of the Handbook or DVD and tell them to take it home tonight and look at it. If you are using general use pesticides and don’t have a pesticide certification, find a grower friend to do your training for you.

Central Location – The big change here is the need to keep SDS sheets (Safety Data Sheets). Many of you are unfamiliar with SDS sheets but they are the old MSDS sheets in a standardized format. You will need to “display” them at the central location for 30 days following their use. Keeping them in a loose leaf notebook at the central location is acceptable. You need to keep these SDS sheets for two years after they were last used. You can get the SDS sheets from your pesticide supplier or download them off the Internet.

Of course you will still need to keep pesticide application information for 30 days at the central location and the pesticide safety information (poster). The central location must be easily accessible to your employees.

Decontamination Supplies: Pesticide Handlers still need three gallons of water, soap and paper towels at the mix and load site, within a quarter mile of the application area and where PPE is taken off. If they are working with a product requiring eye protection they must have “immediate “access to at least a pint of eye wash or fresh water. Handlers need an eye wash system at the mix and load site capable of delivering .4 gallons of water for 15 minutes or 6 gallons of water able to flow gently for 15 minutes. This does NOT have to be a fancy system, it can be a hose attached to a faucet. A change of clothes for Handlers is also required.

Although Handlers and Workers need to have access to the required decontamination supplies they can in emergency situations make use of natural waters that are close by in addition to the required decontamination supplies.

Workers need to have access to at least a gallon of wash water, soap and paper towels within a quarter of a mile of the crop area that they are working in.

Application Exclusion Zone (AEZ): This is new to the WPS and will be implemented over two years. Starting in 2017 the AEZ takes effect on the grower’s property. Then in 2018 the AEZ will cover areas outside of the grower’s property that fall within the “bubble”. This may include roads and your neighbor’s property. Keep in mind that the “bubble” moves with the application equipment as the application equipment moves.

The AEZ is an exclusion zone that surrounds the application equipment in a 360 degree radius. High drift applications such as air blast sprayers, aerial applications, fumigants, mist and fogging will need a 100 foot “bubble” where everyone is excluded except for Handlers that have the proper PPE and training to work inside that bubble. Low drift applications will need a 25 foot bubble. If someone is in that AEZ the Handler must suspend application in that area until they leave that area.

Respirator Fit Tests: The other big change is the Respirator Fit tests for Handlers that work with products requiring a respirator. Starting in 2017 Handlers MUST get an annual Fit test which involves first a medical evaluation. There are medical contractors that offer this but your local hospital probably can do it in their occupational health department. Once the medical evaluation is passed then the actual Fit tests can be done. The employee can conduct the Fit Test using kits from safety retailers. You can go to a commercial contractor that offers this or you might be able to get someone at your local fire company to do it for a small donation.

This article has just hit the highlights and hot spots of the WPS. Please feel free to contact Jim Harvey at Penn State for a further clarification on these various areas or a compliance assistance visit to your farm. Once again that contact information is jdh18@psu.edu or call at 814-863-8214.

WANTED

Used Allied Girette Model GH-16 pruning tower in fair to good operating condition OR with a salvageable drive axle in operating condition. Please call 304-676-1971.
In 2014, a group of “next generation” growers began collaborating with Penn State Extension on a project called Supporting Pennsylvania New Farmers in the Start-up, Re-strategizing, and Establishing Years. The project aims to increase the success of young farmers, specifically growers in year two to ten of establishing their businesses. A key component of the project is the “Models for the Future” on-farm demonstration plots. The model plots incorporate cutting-edge practices beneficial to beginning farmers, and have been established at seven farms within five counties across the state. The project has created educational opportunities for growers of diverse backgrounds, including the creation of study circle networks for beginning growers, a new commercial fruit grower school, and bilingual educational materials and videos. Three of the study circles are specifically designed to support women in agriculture, and three of the model plots engage Latino growers. The project is funded by the USDA NIFA and is specific to apple, berry, and vegetable production.

In this first in a series of articles, we will share some preliminary findings from the use of cover crops in the vegetable model plots. Cover crops are also being used in the small fruit and tree fruit plots, and sustainable practices in these model plots will be discussed in future articles. Vegetable crops require nutrient-rich soil so they can grow productive, healthy plants that produce a high-quality crop. While it may be tempting to grow the same crop in the same field every year to simplify land management, this practice reduces soil fertility and promotes the buildup of host-specific pests that, over time, would lead to disease, insect, and weed problems. Rotating fields between different crops reduces the buildup of crop-specific pests, as many pests need a specific host plant to reach damaging levels within a field. In addition to reducing crop-specific pests, vegetable rotations are an important component of the overall soil fertility management system on the farm.

To go one step further, growers and researchers in this study are adding cover crops to the vegetable rotations in multiple stages of crop succession. These crops are usually not grown with the intent of selling them at market, but instead are grown to improve the health of the field. They are often grown outside of the main summer production months (late fall to early spring), but can also be grown during the summer if they are paired with early or late season cool weather crops.

The vegetable model plots were planted in 2015. The crops in the rotation include tomatoes, squash, onions, and brassicas. These plantings are being broken up with cover crops of a winter (grain) rye, sorghum-sudangrass, a mixture of oats and peas, and a winter rye and clover mixture. Each plot is split in half, and half of the plot is grown under a staggered rotation schedule to allow multiple stages of the rotation to be present at the same time.

Each cover crop provides unique benefits to the field. In the winter rye and clover rotation, the clover takes atmospheric nitrogen and converts it to a form that can be taken up by the plant. When the clover decomposes and is incorporated into the soil, the N supplied can be used by later crops. Winter rye produces a large amount of biomass that can improve soil tilth and fertility. The cover crops remain in the field over the winter, and their roots hold the soil in place to prevent erosion. In addition to these benefits, the rye and clover reduce the growth of fall and spring germinating weeds by providing competition when the soil might otherwise be bare. The decomposing rye releases natural plant compounds that may reduce the growth of weed seeds.

Sorghum-sudangrass reduces populations of disease causing fungi, bacteria, and plant-parasitic nematodes when it is flail mowed and incorporated into the soil.

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The sorghum-sudangrass used in the project produces cyanogenic compounds that can suppress plant-pathogenic fungi. The sorghum-sudangrass releases the cyanogenic compounds to the soil when the cover crop is flail mowed, incorporated, and packed into the soil within thirty minutes after mowing. Packing the cover crop into the soil is essential because otherwise the cyanogenic compounds would volatilize into the atmosphere instead of being released into the soil where they will have an effect on plant-pathogenic fungi.

A broader environmental benefit of the cover crops are their ability to scavenge any nutrients within the soil that may have otherwise leached out during the winter, keeping the nutrients out of waterways that would eventually lead into the rivers of Pennsylvania. These cover crops may ultimately protect the Delaware Bay, the Chesapeake, and even the Gulf of Mexico.

To further demonstrate the impacts and real world applications of cover cropping to other beginning growers, the team is scouting for major pests and conducting leaf tissue analysis and soil health tests. Like other soil tests, the soil health test includes data on the chemical components of the soil. These variables include soil nutrient testing, soil acidity, and salinity. In addition to reporting on the chemical properties of the soil, the soil health tests include physical and biological soil properties. Physical properties include soil texture, density, and soil hardness. Biological properties include the presence of soil pathogens, soil active carbon content, soil organic matter, and soil protein content. Once the results of the scouting surveys, tissue tests, and soil health tests are evaluated, the team develops recommendations for soil inputs and pest management strategies to further demonstrate best management practices.

The model demonstration plots also allow growers to assess potential economic benefits from growing cover crops. For example, one grower calculated the savings from nitrogen credits due to a higher organic matter level, and it was $46/acre.

The cover crop project is scheduled to be completed in 2017. The demonstration plots are being utilized in study circles, workshops, and educational materials for other beginning farmers at the Penn State Extension Start Farming page. To find out more information on this Penn State Extension project, visit us at http://extension.psu.edu/business/start-farming.

SAVE THE DATE
Mid-Atlantic Fruit & Vegetable Convention
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When grown as a cover crop, winter rye forms a thick canopy that suppresses weeds by competing for sunlight and nutrients.

Model plot grower cooperators are in the re-strategizing and establishing years of developing their farm enterprises and incorporate many sustainable practices into their operations.

References


Nair, A. 2015. Cover crops in vegetable production systems. Iowa State University Extension.

Cleared For Takeoff: University Use of Unmanned Air Vehicles Resumes

Mike Basedow, Penn State Extension

(Editor’s Note: This announcement came out after I had written my Editorial)

“Alright, are you ready, Mike? Motor’s hot! Launch! Launch! Launch!”

With those final commands from aerospace engineering doctoral candidate John Bird, the AutoSOAR unmanned air vehicle was launched into the sky above the Russell E. Larson Agricultural Research Center at Rock Springs, releasing with it nearly a year of bottled-up anticipation among faculty, staff and graduate students across the Penn State community.

Unmanned air vehicles are flying again at Penn State for research, teaching and public service under the auspices of the Office for Research Protections. A new UAV program will ensure compliance with Federal Aviation Administration rules and puts in place an insurance, registration and procedural infrastructure to govern the outdoor operation of unmanned air systems at the University.

“With the emergence in popularity of unmanned air vehicles and essentially the ubiquity of these aircraft, it was becoming a combination of a privacy hazard and a safety hazard,” said Mike Yukish, the University’s newly appointed unmanned air systems operations manager, who is also head of the Manufacturing Product and Process Design Department in the Applied Research Lab and assistant professor of aerospace engineering. “All of a sudden the FAA said, ‘Structure. We need structure.’ And so Penn State was put in a position of immediately needing to put a process in place for UAVs that is centralized and controlled.”

Dr. Carl S. Bittner Travel Fellowship Award

Sponsored by the State Horticultural Association of Pennsylvania

PURPOSE:
The purpose of the Bittner Travel Fellowship Award is to expose young people working in the Pennsylvania fruit industry to new ideas on fruit production being used in other areas of the world. In order to do this, the State Horticultural Association of Pennsylvania has established a Fellowship of up to $500 that can be awarded annually to someone working in the fruit industry, and promoting leadership within the society.

RECIPIENT:
Must be a fruit grower, or someone else 18 yrs. or older, associated with fruit production in Pennsylvania who would like to travel outside the state of Pennsylvania.

The recipient would be expected to make a short presentation to the SHAP membership at the annual meeting concerning the information learned in this travel.

APPLICATION PROCEDURE:
To apply, a brief explanation of the proposed trip should be submitted in writing. The application letter should include the name, address, age, and potential trip being considered by the applicant.

Applications should be submitted by November 1st to be considered for use during the subsequent year. Applications for the award should be submitted to:

Maureen Irvin, Executive Secretary
State Horticultural Association of Pennsylvania
480 Mountain Road
Orrtanna, PA 17353

The SHAP Board of Directors will review the nominations prior to their November Board meeting, at which time they will make the final decision.

The award will be presented at the Annual Fruit and Vegetable Growers Dinner in January.
**Australia Responds to BREXIT**

Britain’s move to depart the European Union could have repercussions for fruit producers on the other side of the world. The UK is currently the second largest importer of Australian apples, with shipments totaling 699 tonnes over the 2015 calendar year, accounting for 18 per cent of Australian exports.

With Australia’s 2016 sales programmes to the UK scheduled to ramp-up over the coming months, experts suggest the economic uncertainty created by Brexit could see a reduction in the volume shipped. “The key issue for current apple exports to the UK is the value of the British Pound,” said Garry Langford of Apple & Pear Australia (APAL). “If the British Pound falls too much it will make our apples, and all other imports for that matter, more expensive in the UK and potentially reduce imports.”

In an article published in its weekly newsletter, Industry Juice, APAL said exporters had always responded to changes in the value of the Australian Dollar against their trading partners’ currencies, and were confident this instance would be no different. “In that sense, the British Pound changing value is all part of business-as-usual when it comes to trading internationally,” the article noted, adding that the UK will remain a valued trading partner.

APAL also revealed that at the end of April 2016, Australian apple exports were tracking 114 per cent higher than the same period last year.

*(From AsiaFruit)*

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**Estimation of Fruit Locations in Orchard Tree Canopies Using Radio Signal Ranging and Trilateration**

R. Arikapudi et al.

The development of novel robotic harvesters could benefit significantly from a model-based design approach, in which harvesting performance metrics—such as fruit reachability and average pick-and-place cycle—are calculated via simulation, and are used to guide mechanical design. The actual spatial distributions of fruits on orchard trees are necessary for such an approach.

Reported methods for measuring the locations of all fruits require several minutes per fruit, and, consequently, have been used only for very small numbers of trees. The novel method presented utilizes high-frequency radio signals and trilateration to measure the locations of all fruits in canopies, at speeds that are significantly higher than those of existing methods. More specifically, a fruit picker wears gloves on which an antenna has been attached. A mobile trailer carries four radio beacons that measure and log their distances from the antenna on each glove, every time a fruit is grasped to be picked. The coordinates of each glove are computed with respect to a coordinate frame attached to the trailer, and the fruit position is approximated by these coordinates. Data from an RTK-GPS and an inclinometer on the trailer are used to compute georeferenced fruit coordinates. Data were collected for 32,193 fruits in eight California pear and cling peach orchards. The measurement rate varied from approximately 8–12 fruits per minute, with an average of 10.8, which is a magnitude faster than existing reported methods. In open space, the root mean square error between the estimated and true distance (DRMS) in the system’s measurement volume was measured to be 10.3 cm. The error’s 90th percentile (R90) was 13.1 cm. In the periphery of and inside canopies, these errors were calculated via Monte Carlo simulation to be equal to 15.7 cm and 24.9 cm respectively. The horizontal accuracies (across and along the row), and the vertical accuracy were 9.6 cm, 4.3 cm and 5.7 cm respectively. The corresponding worst-case relative accuracies were 2.7%, 1.6%, and 3.4%, and were calculated by dividing each accuracy component by the distance between the fruits that were as far away as possible from each other along the corresponding axis. Finally, fruit position statistics, such as fruit elevation and horizontal distance from the row centers were computed and reported for a set of pear trees. Such data can be very useful for growers and for model-based design of harvesting machinery.

*(From Computers & Electronics in Agriculture 125:160)*
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